CYCLOPÆDIA:
OR, AN
UNIVERSAL DICTIONARY
OF
ARTS AND SCIENCES.

CONTAINING
An EXPLANATION of the TERMS, and an ACCOUNT
OF THE SEVERAL SUBJECTS,
IN THE
LIBERAL AND MECHANICAL ARTS,
AND THE
SCIENCES HUMAN and DIVINE.

Intended as a COURSE of ANCIENT and MODERN LEARNING.

By E. CHAMBERS, F.R.S.

Floriferis ut apes in ſaltibus omnia libant,
Omnia nos— LUCRET.

WITH THE
SUPPLEMENT
AND
MODERN IMPROVEMENTS,
Incorporated in one ALPHABET.

By ABRAHAM REES, D.D. F.R.S.

IN FOUR VOLUMES.

VOLUME THE THIRD.

LONDON,
Printed for J. F. and C. Rivington, A. Hamilton, T. Payne and Son, W. Owen, B. White and Son, T. Longman, B. Law,
C. Rivington, C. Dilly, H. Baldwin, H. S. Woodfall, J. Robſon, J. Knox, W. Domville, G. G. J. and J. Robinſon,
T. Cadell, A. Hamilton, jun. R. Baldwin, W. Otridge, N. Conant, J. Murray, A. Strahan, W. Fox, S. Hayes,
E. Johnſon, W. Bent, D. Ogilvy, G. and T. Wilkie, and W. Collins.
MDCCLXXXVIII.

MVSEVM
BRITAN
NICVM

CYCLOPÆDIA:

OR, AN

UNIVERSAL DICTIONARY

OF

ARTS and SCIENCES.

BRITISH MUSEUM

K.

K, A double conſonant, and the tenth letter of the alphabet.

This conſonant has the ſound of hard *c*, and is uſed before *e* and *i*, where, according to the Engliſh analogy, *c* would be ſoft; as in the words *kept*, KING: at the end of words it is not much uſed, except after *c*, and chiefly in monoſyllables, as *clock*, *back*, &c. It is now properly omitted in many other words, as *muſic*, *public*, &c. It is alſo uſed between a vowel and the ſilent *e* final, as *cloke*, *broke*, &c. It likewiſe ends a word after a diphthong, as *look*, *break*, &c. In the preſent pronunciation, *k* is ſilent before *n*.

K is borrowed from the Greek *kappa*; and was but little uſed among the Latins: Priſcian looked on it as a ſuperfluous letter, and ſays, it was never to be uſed except in words borrowed from the Greek. Dauſquius, after Sallus, obſerves, that it was unknown to the ancient Romans.—Indeed we ſeldom find it in any Latin authors, excepting in the word *kalendæ*, where it ſometimes ſtands in lieu of a *c*.—Carthage, however, is frequently ſpelt on medals with a *K*: SALVIS AVG. ET CAES. FEL. KART. and ſometimes the letter *K* alone ſtood for *Carthage*.—M. Berger has obſerved, that a capital *K*, on the reverſe of the medals of the emperors of Conſtantinople, ſignified KONSTANTINUS; and on the Greek medals he will have it to ſignify ΚΟΙΛΗ ΣΥΡΙΑ, Cœleſyria.

Quintilian tells us, that in his time ſome people had a miſtaken notion, that wherever the letter *c* and *a* occurred at the beginning of a word, *k* ought to be uſed inſtead of the *c*. See C.

Lipſius obſerves, that *K* was a ſtigma, anciently marked on the foreheads of criminals with a red-hot iron.

The letter *K* has various ſignifications in old charters and diplomas; for inſtance, KR. ſtood for *chorus*, K.R.C. for *cara civitas*, KRM. for *carmen*. KR. AM. N. *carus amicus noſter*, KS. *chaos*, KT. *capite tonſus*, &c.

The French never uſe the letter *k*, excepting in a few terms of art, and proper names borrowed from other countries. Ablancourt, in his dialogue of the letters, brings in *k* complaining, that he has been often in a fair way to be baniſhed out of the French alphabet, and confined to the countries of the North.

K is alſo a numeral letter, ſignifying 250, according to the verſe;

K *quoque ducentos & quinquaginta tenebit.*

When it had a ſtroke at top, $\overline{\text{K}}$, it ſtood for 250000.

K on the French coinage denotes money coined at Bourdeaux.

KAABA. See CAABA.

KAALING, in *Natural Hiſtory*, the name of a ſpecies of ſtarling, common in China, and not unfrequent in the Philippine iſlands. It is black, but its eyes, legs, and beak are yellow. It is eaſily kept tame, and may be taught both to ſing and talk. It eats rice and inſects in its wild ſtate; but when kept in a cage will feed very heartily on bread, and all kinds of fruit.

KAB, in *Jewiſh Antiquity*. See CAB.

KABANI, in the *oriental offices*, a perſon who ſupplies the place of what we call the notary public. All obligations that are valid are drawn by him; and he is likewiſe the public weigh-maſter, and every thing of conſequence ought to be weighed before him.

KABBADE or CABADE, the name of a military habit of the modern Greeks, which they wear under another garment.

KABBALA. See CABBALA.

KABIN, KHABIN, KEBIN, or KUBIN, a temporary kind of marriage, in uſe among the Mahometans.

The *kabin* is contracted before the cadi, in whoſe preſence the man eſpouſes the woman for a certain time, upon condition that if he quits her at the end of that term, ſhe ſhall be allowed a certain ſum of money.

Some authors ſay, that the *kabin* is only permitted among the Perſians, and in the ſect of Ali; but others maintain, that it is practiſed among the Turks.

KABBOS, in *Ichthyology*, the name of an Eaſt Indian fiſh of the muſtela kind. It grows to about two feet long, has no ſcales, but feels ſmooth and ſoft like the eel, and is of a brown colour; the noſe or ſnout much paler than the reſt, and ſpotted with black. The head is obtuſe, and the eyes placed very near the extremity of it.

KABESQUI, or CABESQUI, is the name of a piece of money, equal in value to five deniers and a *maille* of French, coined and current only in Perſia. See *Perſian* COINS.

KADARI, or KADARITES. See CADARI.

KÆADAS, *καιαδας*, among the Lacedæmonians, a dungeon for throwing their criminals into. It was of the ſame nature with the Athenian barathron, or orygma.

KÆKURIAGHAKA, in *Botany*, a name uſed by ſome authors for the tree which affords the gum elemi of the ſhops.

KÆMPFERIA, in *Botany*. See GALANGAL.

KAFER *alibeud*, in the *Materia Medica*, the name given by Avicenna to the drug we call *bitumen Judaicum*, or Jews pitch.

KAGHU, in *Botany*, a name by which ſome authors have called the cajou, or caſhew-tree, the fruit of which affords us the caſhew-nuts. See ACAJOU and ANACARDIUM.

KAHIASSCE, in the Turkiſh court, an officer of ſtate, anſwering to our maſter of the ceremonies.

KAIEBACA *debari*, in *Botany*, the name uſed by ſome authors for the ARNOTTO or ROCOU, called orleana or orellana by other authors.

KAIMACHAN, among the Turks. See CAIMACAN.

KAKILE, a ſpecies of eruca. See ROCKET.

The original ſenſe of this word was not the plant now named by it, but the *ſoldanella* or ſea bind-weed. This was one of the plants uſed in the making the pot-aſhes, or alkali ſalt for glaſs and ſoap-making, when thoſe manufactures were firſt brought into uſe; and it had both the names from that ſalt. The *kakile* from *kali*, and the *ſoldanella* from *ſoder* or *ſolda*, another name of that ſalt. Dioſcorides calls this *crambe thalaſſia*, and we find the ſame name turned into Latin and ſtill preſerved, and the plant called *braſſica maritima*, and in Engliſh the ſea-cabbage.

KAKOUSA, in *Botany*, a name by which ſome authors have called the tree which affords the gum elemi uſed in medicine.

KALD, a word uſed by Rulandus to expreſs vinegar.

KALE, in *Botany*. See CALE.

KALE, *Sea*. See CRAMBE.

KALED, a word uſed by ſome of the chemical writers to expreſs volatile.

KALENDAR. See CALENDAR.

KALENDS. See CALENDS.

KALI, or GLASS-WORT, *ſalſola*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: the empalement of the flower is permanent, compoſed of five oval obtuſe leaves; the flower has no petals, but has five ſhort ſtamina, which are inſerted in the diviſions of the empalement; it has a globular germen, with a ſhort two-pointed ſtyle, crowned by recurved ſtigmas; the germen becomes a globular capſule, with one cell wrapped up in the empalement, incloſing one large ſeed. There are ſeveral ſpecies.

The name *kali*, or *alkali*, was given it by the Arabians: among naturaliſts it has been alſo called *ſalicornia*, *ſoda*, &c. and in Engliſh, *glaſs-wort*, and *ſalt-wort*: though the *ſalicornia* or SALT-*wort* is now made a diſtinct genus.

Kali grows in great abundance in Egypt, and Syria; as alſo in Languedoc and Provence, where it is cultivated by the farmers, who ſow whole fields of it to good effect, and in many other places.

Being burnt, its aſhes made into a ley, and boiled with oil, make the beſt ſoap.

Out of the ſame aſhes, called alſo *pulverine*, is extracted a ſalt, called *alkali ſalt*; which mixed with a fine ſort of ſand, makes the fine glaſs called *cryſtal*.

All the ſorts of glaſs wort are ſometimes promiſcuouſly uſed for the making *ſal alkali*; but the greater glaſs-wort with a cochleated ſeed is moſt eſteemed for this purpoſe. The manner of making it is as follows: having dug a trench near the ſea, they lay laths acroſs it, on which they lay the herbs in heaps; and having made a fire below, the liquor which runs out of the herbs drops to the bottom, and at length thickening becomes *ſal alkali*; which is partly of a black, and partly of an aſh colour, very ſharp and corroſive, and of a ſaltiſh taſte; this when thoroughly hardened, becomes like a ſtone, and is then called ſoude or ſoda. Miller.

An impure ſoda is prepared from it at Montpelier, where the plant is ſaid to be cultivated for this uſe in the ſalt-marſhes; and a purer kind at Alicant in Spain, from a ſomewhat different ſpecies of *kali*. See KELP.

They make ſuch quantities of it in Languedoc, that they export it into ſeveral other countries, but principally into Italy, where the Venetians manufacture it into thoſe beautiful glaſſes which they afterwards return into moſt countries in Europe. However, the ſoda made here is inferior to that brought from Alicant; the beſt is in little dry ſonorous lumps, of a bluiſh grey colour, and full of little eyes, or holes.

The juice of this plant is cathartic and diuretic, accounted good to purge phlegmatic watery humours; and ſerviceable againſt the dropſy, jaundice, and obſtructions of the liver and ſpleen; half a dram of the juice is reckoned a ſufficient doſe; but it is ſeldom or never uſed in England.

This plant abounds greatly with ſea-ſalt, its juices being properly a ſaline, not an inſipid aqueous fluid; but the difference between the produce of this plant when green and when dry, is wonderful in chemical experiments. If diſtilled while freſh and green, it yields an inſipid water; if a pound of it be gathered freſh and hung up to dry, it will yield only three ounces of the dried plant; this being burnt, is more difficult than any other ſubſtance of a ſeeming like texture to be reduced to aſhes; and the aſhes finally produced from this quantity burnt in a potter's kiln, will yield only a dram and a half of a whitiſh ſalt, and this will but ſlightly ferment with aqua fortis. Four ounces of the freſh herb being boiled in water, and that water carefully evaporated, there will be formed near three quarters of an ounce of pure ſea-ſalt, in its own natural cubic form, faſtened to the bottom and ſides of the veſſel; and when no more ſalt will ſhoot, the remaining liquor being carefully diſtilled, increaſing the fire to a proper degree, the water will firſt paſs over, and then a dry volatile ſalt will be raiſed and ſtick to the top and ſides of the veſſel. The ſalts being purified, there will be found, as the reſult of the experiments, that this herb, while growing, contains about one fifth part of its weight of common ſalt. The herb which had been thus boiled being dried, and afterwards again boiled in four or five pints of water, and that decoction evaporated to half the quantity, the liquor will yield ſeveral different ſmells, as that of a honey-comb, that of cabbage, and other pot-herbs. And after all this, the boiled herb being left to putrefy, yields the ſmell of animal excrements, and in the ſame manner becomes the reſort of flies, and yields a proper place of habitation, and food for numbers of worms hatched out of the eggs of thoſe winged inſects. Henkel, de Affinit. Veget. et Miner.

All the experiments that can be made with the cubic cryſtals of ſalt, formed in the evaporated decoction of this herb, prove them to be common ſalt; and the volatile ſalt raiſed afterwards by fire from that liquor, in which no more of this cubic ſalt would cryſtallize, is found to be high alkali by its fermenting with the acid ſpirits. The juice of this plant, when it has been ſet by, in order to ſhoot, and all its ſea-ſalt has been ſeparated from if by that means, being dried away by evaporation, and the remainder calcined; there is found at laſt a dry and earthy ſubſtance, which has ſomewhat of a lixivial taſte, but does not run to a liquor by being expoſed to the air. This calcined ſubſtance, being mixed with any of the acid ſpirit, but particularly with that of the vitriol, becomes of a beautiful blue colour, not inferior to the fineſt ultramarine.

If the recent herb *kali* be ſet to ferment with common water, it yields, in the different ſtages of fermentation, ſeveral very different ſmells; firſt that of pickled cabbage, afterwards that of earth-worms killed in ſpirit of wine, and afterwards that of fiſh and dried herrings. If this matter be after all this diſtilled, it yields a ſpirit very much reſembling the finer ſpirit of tartar, and afterwards an empyreumatic oil, exactly reſembling thoſe of animal ſubſtances; but what is remarkable is, that there can be no volatile ſalt extracted from this putrefied maſs by any art. The reſiduum yields a pot-aſh, which effervеſces violently with acids, and with the vitriolic acid becomes a ſal enixum; with aqua fortis it makes nitre; with ſpirit of ſalt, it affords common ſalt, ſuch as that ſpirit was diſtilled from; and with all the acids of whatever kind under proper management, it yields the blue colour before mentioned, approaching more or leſs to the fine colour of the ultramarine, according to the nature of the acid and the proceſs. The ſalt extracted from purified pot-aſh, made in this manner, is of a greeniſh caſt like native borax, and the remainder, after the extracting of this ſalt, on mixing and digeſting with aqua fortis, will become a ſoft gelatinous matter of a truly metallic taſte. The *ſoda* promiſes to be an uſeful article of the materia medica, and has for ſome time paſt been adopted into practice in this country, as it has long been among the French, both by itſelf, and combined with tartar into the neutral ſalt called *ſal* RUPELLENSE.

KALI, *ſal*. See SALT-WORT.

KALIPH. See CALIPH.

KALMIA, in *Botany*, a genus of the *decandria monogynia* claſs. Its characters are theſe: the flower has a ſmall permanent empalement, and one petal cut into five ſegments, which ſpread open; it has ten ſtamina, which are the length of the petal, and decline in the middle; in the centre is ſituated a roundiſh germen, which becomes an oval or globular capſule with five cells, filled with very ſmall ſeeds. There are two ſpecies.

KALKABRE, a name given by ſome of the barbarous writers to *gagates*, or *jet*.

KAMAN, in *Natural Hiſtory*, a name given by many authors to a ſtone found about the burning mountains, and at ſome times uſed to engrave ſeals on. It is deſcribed as a white ſtone, variegated with ſeveral colours.

KAMAR, a word uſed by ſome writers in chemiſtry, to expreſs ſilver.

KAMINE, a name given by ſome to the BUTTER-*ſtone*.

KAN, or KHAN, the name of an officer in Perſia, anſwering to that of *governor* in Europe.

There are *kans* of provinces, countries, and cities, who have different additions to diſtinguiſh them.

KANASTER, is a name given in America to baſkets of ruſhes or cane, in which they put the tobacco which they ſend into Europe: hence ariſes the name of *kanaſter* tobacco, the beſt of which comes from Makaribou.

KANTREFF, or KANTREV. See CANTRED.

KANG, or *Chineſe ſtove*, is a kind of ſtove that is heated by means of a furnace, which caſts all its heat into it. The furnace is adapted to the fire of the ſtove which it is intended to heat; and may be placed either in a room that is uſed, or an adjoining room, or on the outſide of the houſe. The heat of this furnace, impelled by the outward air, ruſhes through a ſlit into a tube or conductor; and paſſing through this into another pipe or channel at right angles to it, lying under the middle of the floor of the ſtove, ſpreads through the ſtove by vent-holes in this laſt pipe, and is communicated to the bricks which form the pavement of the ſtove, and from them through the whole room. The ſmoke is carried off by funnels at both ends of the ſtoves. See a drawing and deſcription of this kind of ſtove in Phil. Tranſ. vol. lxi. p. i. art. 7.

Any kind of fuel is uſed in the heating furnaces, but ſea-coal is generally uſed: it is obſerved, that in order to draw off the noiſome vapours of the air, conſtantly heated by the coal fire, the Chineſe always keep bowls of water in the rooms, and occaſionally renew them: and the emperor's apartments in the palace are decorated with flower-pots, and little orange-trees, &c. which, as the Chineſe philoſophers alledge, is the beſt way of ſweetening the air, and abſorbing the fiery particles diſperſed in it. The reader will recollect, that this practice illuſtrates and confirms the doctrine lately advanced by the ingenious Dr. Prieſtley. See Air, *Phlogiſticated*.

KANGUROO, in *Zoology*, an animal on the coaſt of New Holland, which, when full grown, is as big as a ſheep, and in form reſembling the Jerboa. The head, neck, and ſhoulder, are very ſmall in proportion to the other parts of the body; the tail is nearly as long as the body, thick near the rump, and tapering towards the end: the fore-legs of one of them meaſured only eight inches in length, and the hind legs twenty-two: the progreſs is by ſucceſſive leaps or hops of a great length, in an erect poſture: the fore-legs are kept bent cloſe to the breaſt, and ſeemed to be of uſe only for digging: the ſkin is covered with a ſhort fur, of a dark mouſe or grey colour, excepting the head and ears, which bear a ſlight reſemblance to thoſe of a hare. See *Tab.* III. *Quadrupeds*, N° 26. Hawkeſworth's Voyayes, &c. vol. iii. p. 174.

KANDEL of the *Indians*, in *Botany*. See Rhizophora.

KAOLIN, the name of one of the two ſubſtances which are the ingredients of China-ware. The other, which is called petuntse, is eaſily vitrifiable, and this *kaolin* is ſcarce at all ſo: whence the fire compoſes from a mixture of them both a ſemivitrification, which is China-ware. See Porcelain.

Mr. Reaumur had an opportunity of examining this ſubſtance, not in its native ſtate, but only in form of ſmall bricks, made out of the paſte of the powder of the native *kaolin* and water. He found it of a white colour, and ſprinkled all over with fine glittering particles; but theſe he did not judge to be fragments of a different ſubſtance mixt among the maſs, as are the ſmall flakes of talc, in our clays and ſands; but that the whole maſs was compoſed of ſome ſtone reduced to powder and made into a paſte with water, and that theſe larger ſpangles were only coarſer particles of the powder; the examination of which he promiſed himſelf would diſcover what the ſtone was of which they were formed. And this was the more worthy a diligent enquiry, ſince the *petuntſe* might eaſily be ſupplied by many of our own earths and ſands; nothing being required of that but a ſubſtance eaſily running into a white glaſs. But the difficulty of vitrifying this other ingredient, renders it a thing much more difficult to be ſupplied by one of the ſame nature among ourſelves. The compariſon of theſe, with other mineral ſubſtances, ſoon proved that they were of the nature of talc; or, in other words, that *kaolin* was talc powdered, and made up into a paſte with water. And to be aſſured whether the whole maſs was talc powdered, or any thing elſe with a mixture of talc, he ſeparated the particles of the *kaolin* by water, and found the ſmall ones wholly the ſame with the larger; and that the larger, when reduced to powder alone, made with water a paſte wholly the ſame with the *kaolin*. It is well known, that the fragments of talc have a great reſemblance to the pearly part of ſome ſhell fiſhes; and hence unqueſtionably has ariſen the opinion of poreclain being made of ſea ſhells; ignorant perſons having ſeen the talc of *kaolin*, and taken it for a ſhelly matter. Talc has not yet been ſucceſsfully uſed in any of our European manufactures of porcelain; but it is eaſy to ſee, from many unanſwerable reaſons, that ſince China-porcelain is made of a mixture of vitrifiable and unvitrifiable matter, nothing is ſo likely to ſucceed with us in the place of the laſt of theſe as talc.

1. We know no ſubſtance in the foſſile world ſo difficult to reduce to glaſs as talc, which if put into the ſtrongeſt of our fires, in a crucible, is not to be vitrified, nor even calcined. 2. We know no ſubſtance which keeps ſo much brightneſs after having paſſed the fire as talc, or that is of ſo pure a white; whence we may alſo learn that it is not to the *petuntſe* alone, that the China-ware owes its whiteneſs, but that the *kaolin* is inſtrumental to the giving it that colour. 3. Talc is tranſparent, nay, and in ſome degree keeps its tranſparence after the action of the moſt violent fire. If we are to make porcelain of a vitrifiable, and an unvitrifiable matter mixed together, yet it is neceſſary that the unvitrifiable one ſhould retain its tranſparence; otherwiſe it would obſcure the maſs: and talc is therefore the only known ſubſtance qualified for this purpoſe. Perſons who have been at the China works, ſay, that the porcelain is made of equal quantities of *petuntſe* and *kaolin*, and is therefore a juſt and exact ſemivitrification. 4. Talc is well known to have a great flexibility or toughneſs, and as it is found to preſerve this even after it has paſſed the fire; it is very probable, that it is owing to this property of the *kaolin*, that the China-ware is ſo much leſs brittle than glaſs. Mem. Acad. Par. 1727.

It has been before obſerved, that we may eaſily in Europe be provided with different ſubſtances, which will, in our porcelain manufactures, ſupply the place of the *petuntſe* of China, and talc appears equally qualified to ſerve inſtead of the *kaolin*. For this purpoſe we may uſe the common Muſcovy talc, or iſinglaſs, uſed by our miniature painters, to cover their pictures inſtead of glaſs, and, by the curious, to preſerve objects for the microſcope; or perhaps the Venetian talc of the druggiſts, would ſucceed even better; at leaſt the proceſs is ſo rational, as to be extremely well worth trying.

But this *kaolin* is more probably an argillaceous earth, from its forming with water a maſs tenacious enough to be made into the loaves into which it is brought over. M. Bomare ſays, that by analyſing ſome Chineſe *kaolin*, he found it with a compound earth conſiſting of clay, to which it owed its tenacity; of calcareous earth, which gave it a mealy appearance; of ſparkling particles of mica, and of ſmall gravel or particles of quartz cryſtals. He ſays, that he has found a ſimilar earth upon a ſtratum of granite, and conjectured that it may be decompoſed granite. This conjecture is the more probable, as *kaolin* are frequently found in the neighbourhood of granites.

KAPI, a term in the eaſtern countries for *gate*.

Thus the chief gate of the palace of the emperor of Perſia is called *alla kapi*, the Gate of God. Hence alſo, the officer who has the command of the grand ſignior's palace-gates, is called *capighi bachi*.

KARABE. See Carabe.

KARADRE, a name given by the writers of the middle ages to a ſtone, of which they record many imaginary virtues, ſuch as the rendering people amiable, ſprightly, and the like. They deſcribe it to have reſembled cryſtal, but with a mixture of a duſky white. It ſeems to have been a foul kind of pebble cryſtal.

KARAITES. See Caraites.

Karat. See Carat.

KARATA, by ſome called *caraguata maca*, a kind of aloe growing in America; whoſe leaves, when boiled, are made into a thread, of good uſe for making cloth, fiſhing nets, &c. Its root or leaves thrown into the water, ſtupefy the fiſhes to that degree, that they are eaſily taken with the hand: its ſtalk, when dried and burnt, ſerves for tinder; and when briſkly rubbed on a harder wood, it takes fire, and conſumes itſelf.

KARATAS, in *Botany*. See Pine Apple.

KARFE, a kind of cinnamon.

KARKRONY, a building where the royal manufactures of Perſia are carried on.

Here are made their tapeſtries, cloth of gold, ſilk, wool, and brocades, velvets, taffeties, coats of mail, ſabres, bows, arrows, and other arms. There are alſo in it painters in miniature, goldſmiths, lapidaries, &c.

KARLE, a Saxon word, uſed in our laws, ſometimes ſimply for a *man*, and ſometimes for a *ſervant*, or *clown*.

Hence the Saxons call a *ſeaman* a *buſcarle*, and a domeſtic ſervant a *huſcarle*.

Karle *Hemp*, a term uſed by our country people for the latter green hemp.

KASI, a term in the Eaſt, applied to the fourth pontiff of Perſia, who is alſo the ſecond lieutenant civil, and judges of temporal as well as well as ſpiritual affairs.

He has two deputies, who determine matters of leſs conſequence; particularly quarrels ariſing in coffee-houſes, which make a great part of their buſineſs.

KASTRIL, in *Zoology*. See Kestril.

KATKIN. See Catkin.

KATOU-*carvo*, in *Botany*, a name by which ſome authors have called the tree, whoſe leaves are the tamalapatra, or Indian leaf of the ſhops. See Malabathrum.

KATOVINDEL, in *Botany*, the name given by the authors of the Hortus Malabaricus, to a genus of plants, called by ſome *elate*, and by Linnæus phœnix.

KAURYSAOUL, a body of ſoldiers who form the laſt of the five corps of the king of Perſia's guards.

They are in number two thouſand, and are all horſe, commanded by the conſtable, and in his abſence by the captain of the watch. They keep watch in the night around the palace, ſerve to keep off the croud when the ſophi goes on horſeback, keep ſilence at the audience of ambaſſadors, ſeize the khans and other officers when diſgraced, and cut of their heads when the ſophi commands it.

KAY, Key, or Quay, a wharf or place by the water ſide, in a ſea-port, for the loading and unloading of merchandize.

The verb *cajare*, in old writers, according to Scaliger, ſignifies *to keep in* or *reſtrain*; and hence came our term *kay*; the ground where keys are made being bound in with planks and poſts.

The lawful *keys* and wharfs for the lading or landing of goods, belonging to the port of London are the following: viz. Cheſter's *Key*, Brewer's *Key*, Galley *Key*, Wool Dock, Cuſtom-houſe *Key*, Bear *Key*, Porter's *Key*, Sab's *Key*, Wiggan's *Key*, Young's *Key*, Ralph's *Key*, Dice *Key*, Smart's *Key*, Somer's *Key*, Hammond's *Key*, Lyon's *Key*, Botolph Wharf, Graunt's *Key*, Cock's *Key*, and Freſh Wharf; beſides Billingſgate, for landing fiſh and fruit; and Bridgehouſe in Southwark, for corn and other proviſions; but for no other goods or merchandize. Deal-boards, maſts and timber, may be landed at any place between Limehouſe and Weſtminſter; the owner firſt paying or compounding for the cuſtoms, and declaring at what place he will land them.

KAYAGE, the money or toll, paid for loading or unloading wares at kays.

KEAJA, or Kiahia, is the name of the lieutenant of the chief officers of the Porte, or the ſuperintendant of their particular court.

KEALE, ſmall fragments reſembling chips or broken pieces of ſtone of various kinds; ſome of lime-ſtone, others of free-ſtone, and others of rag-ſtone, found mixed among the earth, of the upper ſtratum in many parts of this kingdom, and giving that ſoil the name of *kealy*; hence, ſome of theſe pieces of *keale* are thin and flat like bits of ſlate.

KEALY *ſoil*, in *Agriculture*, is uſed by the huſbandmen for a ſort of land, plentifully ſtrewed with *keale* or *kale*.

KEBER, the name of a ſect among the Perſians, who, in general are rich merchants. See Gabres.

KEBLA, or Keblah, called alſo Kebleh, Kibleh, and Alkebla, among the Mussulmen, denotes that point, or quarter, to which they turn themſelves when they ſay their prayers.

Mahomet, at firſt, durſt not propoſe any other *kebla* to his followers but the temple of Jeruſalem, which was the *kebla* of the Jews and Chriſtians. In the courſe of time, however, being willing to bring them off from any communication in matters of religion, with the Jews and Chriſtians, he appointed them, in the Koran, to turn themſelves, at prayer, towards the temple of Mecca: from which time they called theſe two temples the *keblatan*, or two *keblas*.

Ricaut adds, that it is not the temple of Mecca, properly ſpeaking, that the Turks call *kebla*, but rather the large ſquare tower in the middle of the amphitheatre of that temple.

The *kebla* of the Jews was the temple at Jeruſalem; that of the Sabians, the meridian; and that of the Magians, the riſing ſun. To this the prophet Ezekiel refers chap. viii. 16.

Kebla is alſo uſed for an altar; or rather a *niche*, as Ricaut calls it, which the Mahometans have in all their moſques, and which is place very exactly on that ſide towards the temple of Mecca.

Hence alſo *kebla* comes to be uſed, metaphorically, for the object, or end propoſed, in doing any thing.

Thus, the *kebla* of kings, is their crown and authority; that of men of buſineſs, is money; that of gluttons, good cheer, &c.

Kebla-noma, or Kebleh-noma, a name which the Turks and Perſians give to a little pocket-compaſs, which they always carry with them, in order to place themſelves the more exactly when they go to prayers.

KECKLE, on *board a ſhip*. When the cables gall in the hawſe, or the bolt-ropes do ſo againſt the ſhip's quarter, the ſeamen wind ſome ſmall ropes about them; and this is called *keckling*.

KEDGER, or Kedge-*anchor*, in a ſhip. See Anchor.

KEDGING, a ſea-term uſed when a ſhip is brought up or down a narrow river by the wind, though the tide be contrary to it. To do this, the ſeamen ſet their fore-ſail, foretop-ſail, and mizen-ſail, and let her drive with the tide, that they may flat her about. If ſhe come too near the ſhore, they have a little anchor ready, called the *kedger*, or *kedge-anchor*, with a hawſer faſtened to it from the ſhip; and this they drop in the midſt of the current, by which means they wind her head about; and this done, take up the anchor again.

KEDRELÆON, *cedrelaion*, in the *Materia Medica of the Ancients*, an oil taken from the *pix cedri*, or pitch of the cedar-tree.

KEEL, the loweſt piece of timber in a ſhip, placed in the bottom of her hull; one end thereof being let into the ſtern-poſt, and the other into the ſtem.

If we compare the carcaſe of a ſhip to the ſkeleton of the human body, the *keel* may be conſidered as the back-bone, and the timbers as the ribs. It, therefore, ſupports and unites the whole fabric, ſince the ſtem and ſternpoſt which are elevated on its ends, are in ſome meaſure, a continuation of the *keel*, and ſerve to connect and incloſe the extremities of the ſides by tranſoms; as the *keel* forms and unites the bottom by timbers. The *keel* is generally compoſed of ſeveral thick pieces, placed lengthways, which after being ſcarfed together, are bolted and clinched upon the upper ſide. When theſe pieces cannot be procured long enough to afford a ſufficient depth to the *keel*, there is a ſtrong thick piece of timber bolted to the bottom thereof, called the false *keel*.

When a ſhip has a deep *keel*, ſhe is ſaid to have a *rank keel*; and this ſerves to keep her from rolling. See *Tab. Ship. fig.* 2. *n.* 57.

Keel is alſo a name given to a low flat-bottomed veſſel, uſed in the river Tyne, to bring the coals down from Newcaſtle, and the adjacent parts, in order to load the colliers for tranſportation.

Keel *upon an even*, in *Sea Language*, denotes the poſition of a ſhip when her *keel* is parallel to the plane of the horizon, ſo that ſhe is generally deep in the water at both ends.

Keel-*haling*, or Keel-*raking*, in the *Sea Language*, is a puniſhment inflicted at ſea, in the Dutch navy, on very great offenders, who are drawn underneath the very *keel* of the ſhip. See Ducking.

Keel-*rope*, a hair rope running between the *keelſon* and the *keel* of a ſhip, to clear the limber-holes when they are choaked up with ballaſt, &c.

KEELAGE, *killagium*, a privilege to demand money for the the bottoms of ſhips reſting in a port or harbour.

KEELERS, in the *Sea Language*, ſmall tubs to hold ſtuff to grave a ſhip's bottom.

KEELING, a name uſed in ſome Engliſh writers for the common cod-fish. See Asellus.

KEELSON, in a *ſhip*, the next piece of timber to the *keel*, lying right over it next above the floor-timber.

KEEP, *to*, in *Sea Language*, is a term uſed on various occaſions: as

To keep *the land abroad*, is, to *keep* within ſight of land as much as poſſible. See Hold.

To keep *the luff*, is to continue cloſe to the wind, or to ſail with a courſe inclined to the direction of the wind as much as poſſible, without deviating to leeward. This is alſo called *keeping the wind*. See Close-*hauled* and Loof.

To keep *off*, is to ſail off, or *keep* at a diſtance from the ſhore. See Offing.

KEEPER *of the foreſt*, otherwiſe called *chief warden of the foreſt*, is an officer who has the principal government of all things belonging to the royal foreſt, and the check of all the other officers.

The lord chief juſtice in eyre of the foreſt, when he thinks fit to hold his juſtice-ſeat, ſends out his general ſummons to the *keeper* forty days before, to warn all under-officers to appear before him, at a day aſſigned in the ſummons. See Justice *of the foreſt*.

Keeper *of the great-ſeal*, is a lord by his office, and is ſtyled *lord keeper of the great-ſeal*. He is one of the king's privy-council, through whoſe hands paſs all charters, commiſſions and grants of the king under the great-ſeal; without which ſeal, all ſuch inſtruments, by law, are of no force: for the king is, in the interpretation of the law, a corporation, and paſſes nothing firmly but under the ſaid ſeal; which is, as the public faith of the kingdom, in the higheſt eſteem and reputation.

The lord *keeper* has the ſame place, authority, pre-eminence, juriſdiction, execution of laws, and all other cuſtoms, commodities, and advantages, as the lord chancellor of England has for the time being. Both theſe officers cannot properly ſubſiſt at the ſame time, ſince the ſtatute of 5 Eliz. The lord chancellor, or lord *keeper*, is ſuperior in point of precedency to every temporal lord.

Keeper *of the privy-ſeal*, is a lord by his office; through whoſe hands paſs all charters ſigned by the king, before they come to the great-ſeal, and ſome things which do not paſs the great-ſeal at all. He is of the king's privy-council, and was anciently called *clerk of the privy ſeal*; yet reckoned in the number of the great officers of the realm. 12 Ric. II. c. 11. 27 Hen. VIII. c. 11.

Keeper, *boat*, in *Sea Language*, one of the rowers, who remains as a centinel in his turn, to take care of any boat and her contents, either when ſhe lies by the ſhore, or along-ſide the ſhip; or when ſhe is towed a-ſtern of her.

KEEPING, in *Painting*, denotes the repreſentation of objects in the ſame manner that they appear to the eye, at different diſtances from it, for which the painter ſhould have recourſe to the rules of perſpective. There are two inſtances in which the famous Raphael Urbin has tranſgreſſed theſe rules: in one of his cartons, reſepreſenting the miraculous draught of fiſhes, the men in each of the two boats appear of full ſize, the features of their faces being ſtrongly marked; and the boats are repreſented ſo ſmall, and the men ſo big, that any one of them appear ſufficient to ſink either of the boats by his own bare weight: and the fowls on the ſhore are alſo drawn ſo big, as to ſeem very near the eye of the obſerver; who could not poſſibly, in that caſe, diſtinguiſh the features of the men in the diſtant boats. Or, ſuppoſing the obſerver to be in either of the boats, he could not ſee the eyes or beaks of the fowls on ſhore. The other inſtance occurs, in his hiſtorical picture of our Saviour's transfiguration on the Mount; where he is repreſented with thoſe who were then with him, almoſt as large as the reſt of his diſciples at the foot of the Mount, with the father and mother of the boy whom they brought to be cured; and the mother, though on her knees, is more than half as tall as the mount is high. So that the mount appears only the ſize of a little hay-rick, with a few people on its top, and a greater number at its bottom on the ground; in which caſe, a ſpectator at a little diſtance, could as well diſtinguiſh the features of thoſe at the top as of thoſe on the ground. But upon any large eminence, deſerving the name of a mount, that would be quite impoſſible.

KEEPITHEJA, in *Botany*, the name by which ſome authors call the tree, on the branches of which the gum lacca of the ſhops is uſually found.

KEEVE, or **Keevez**, a large tub, or brewing veſſel, in which ale or beer ferments, before it is tunned.

KEIKEM, in the *Materia Medica*, a name given by the Arabian writers, to a gum uſed in their time for making of varniſh.

Gum lacca is generally ſaid to be the ſubſtance meant by it, but Avicenna ſeems to expreſs by it every thing that was uſed as varniſh. Thus he ſometimes means by it the gum ſcandarach, and ſometimes amber. The *gum cancamum* of the Greeks is alſo certainly often meant by it: but this is ſcarce to be mentioned as an explication of the word, it being almoſt as general a term as itſelf, and ſtanding with many of the old authors for ſandarach, gum lac, and amber, as well as for the gum properly expreſſed by it. In ſhort, all the gums uſed in making varniſh, are in general called by the names of any one of them, and thus vernix, ſandarach, cancamum, and lacca, are made ſynonymous words, and either ſtands for each of the things ſignified by all the words.

KEIRAN, in the *Oriental Learning*, the Perſian and Arabic name for the planet Saturn, according to Salmaſius. See Chiun.

KEKIO. See Fern-*oil*.

KELMESAN, in *Botany*, a name given by ſome authors to the acacalis, or wild carob-tree.

KELP, in the *Glaſs-Trade*, a term uſed for a ſort of pot-aſhes uſed in many of their works, particularly for the cryſtalline metal. It is the calcined aſhes of a plant, called by the ſame name, and in ſome places ſea-thongs, or laces, a ſort of thick-leaved fucus or ſea-wrack: the *alga anguſtifolia vitrariorum* of John Bauhine. This plant, if kept moiſt a little after gathering, will ſhew afterwards, though long kept, its white ſalt upon the ſurface of its leaves. This plant is thrown on the rocks and ſhores in great abundance, and in the ſummer months is raked together, and dried as hay in the ſun and wind, and afterwards burnt to the aſhes called *kelp*, which are uſed not only in the glaſs, but in the alum works. This contains an alkali of the ſame kind with the plant kali, but more impure.

KEMA, in *Natural Hiſtory* a name given by Leo Africanus, and other writers of the African hiſtory, to a ſort of ſubterranean production of the vegetable kind, greatly eſteemed as a delicious food. The Arabian writers on medicine have often mentioned it, and that under names ſufficiently reſembling the modern African appellation, ſuch as *camahe*, *camah*, *kemah*, and *camha*. They are not the roots of any plant, but a find kind of ſubterraneous muſhroom, or truffle, white on the outſide, and which lie generally pretty deep in the earth.

KENKS, in the *Sea-Phraſe*, are doublings in a cable or rope, when it is handed in or out, ſo that it does not run ſmooth, or when any rope makes turns, and does not run ſmooth and clever in the block, they ſay it makes *kenks*.

KENNEL, a term uſed indifferently for a puddle, a water-courſe in the ſtreet, a houſe for a pack of hounds, and the pack or cry of hounds themſelves.

Among ſportſmen, a fox is ſaid to *kennel*, when he lies cloſe in his hole.

KENNETS, in our *Old Writers*, a ſort of coarſe Welſh cloth, mentioned in the ſtat. 33 Hen. VIII. c. 3.

Kennets, in a *Ship*, are ſmall pieces of timber, nailed to the inſide of the ſhip, unto which the tacks and ſheets are belayed (as they call it), i. e. faſtened.

KEPLER's *Law*, is that law of the planetary motions, diſcovered by Kepler: in reality, Kepler diſcovered two of the fundamental laws of the mundane ſyſtem, viz. 1. That the planets deſcribe about the ſun are as proportional of the times; and 2. That the ſquares of the times of revolution are as the cubes of the mean diſtances of the planets from the ſun. Sir I. Newton has ſhewn, that the firſt of theſe laws reſults from a centripetal force which urges the planets towards the ſun, and the ſecond, from the centripetal force being in an inverſe ratio of the ſquare of the diſtance.

Kepler's *Problem*. See Problem.

KERAMIANS, a ſect, among the Muſſulmen, ſo called from Mohammed Ben Keram, its author.

The *Keramians* maintain, that whatever the Alcoran ſays of the arms, eyes, and ears of God, is to be underſtood literally: ſo that they admit the tagiaſſum, that is, a kind of corporeity in God; which, however, they explain very variouſly.

KERANA, a long ſort of trumpet; ſomewhat in form of a ſpeaking trumpet, uſed by the Perſians.

To the ſound of this, they add a confuſed noiſe of hautboys, timbrels, drums, and other inſtruments, every evening at ſun-ſet, and two hours after midnight.

KERATOPHYTUM, a name by which Boerhaave expreſſes the black coral, called alſo antipathes, *lithophyton* and *pſeudocorallium*.

The *keratophyta*, in the Linnæan ſyſtem, are a ſpecies of the gorgonia: they are called the *frutices coralloides* or ſea-ſhrubs, and generally known among naturaliſts by the different appellations of *lithophyta lithoxyla*, and *keratophyta*; epithets intended to convey an idea of their compoſition, which, at firſt view, ſeems to conſiſt partly of a woody or horny, partly of a ſtony or calcareous ſubſtance, variouſly diſpoſed with reſpect to each other. Their general form approaches to that of ſhrubs, having a root-like baſe, by which they adhere to ſome ſolid ſupport in the ocean; and a ſtem, or trunk, and branches differently diſpoſed; ſome riſing up in one or more different twigs, ſubdivided into ſmaller and ſeparate ramifications; while others have their ſmaller branches connected in ſuch a manner, as to form a curious net-like ſtructure: from this diverſity of figure, they borrow the names of ſea-fans, ſea-feathers, &c. The ſeeming fibres of the baſe are, in reality, ſmall tubes, of which the whole ſhrub conſiſts: theſe tubes run up longitudinally into the trunk, and are alſo circularly diſpoſed about the centre of the trunk; the woody part, as naturaliſts have called it, thus formed, affords, when burnt, a ſtrong ſmell like burning horn; whence ſome have called it the horny part. Upon this part is ſuperinduced, a kind of ſtony or calcareous coat, which covers both trunk and branches to their extremities. In this coat may be diſcovered, regular orders or pores of cells; and viewed by the microſcope, it always appears to be an organical body, conſiſting of a regular congeries, like the cells in which animals have been formed or exiſted. Some of this kind of bodies have loſt their calcareous coverings by the violence of the waves, and other accidents. In ſome ſpecimens of an advanced growth, the calcareous tubes, juſt mentioned, find out little cells of animals of the polype kind, with proper openings to them all: theſe cells are diffuſed along the branches in ſome regular order, much in the ſame manner as they are in the corallines. From the cells the animals have been diſcovered extending themſelves as well to procure food as materials for the increaſe of this ſurpriſing ſtructure: and, therefore, there is no reaſon to doubt, that they are are animal productions: a ſmall ſprig of the *keratophyton flabelliforme cortice verrucoſa obducum*, or warted ſea-fan, is repreſented in *fig*. 7. *Tab*. II. *Corallines*. The outſide is covered with a cruſt, full of little lumps like warts; which when diſſolved in vinegar, diſcover the contracted bodies of polypes, like claws. C and C 1 are two views of one of the warts magnified: C 2 is the appearance of the polype, when the cretaceous matter was diſſolved: C 3, repreſents the particles that compoſe the incruſtation magnified. D, *fig*. 8. repreſents a ſea-willow, or *keratophyton dichotomum, caule & ramulis leviter compreſſis.* On both edges of the flat branches, are regular rows of little riſing cells in the calcareous part, with ſmall holes for an entrance to each. Ellis's Hiſt. of Corallines, chap. 5. See CORALLINES.

KERF is the notch or ſlit that is made by the ſaw between two pieces of wood, when they are ſawing aſunder.

KERFE-KARUMFEL, in the *Materia Medica*, a name given by Avicenna, and others, to the wood of the clove-tree, as the wood of the cinnamon-tree was called *kerſe darſini*; and many others in the ſame manner.

KERI *Cetib*, are various readings in the Hebrew Bible: *keri* ſignifies that which is read; and *cetib*, that which is written. For where any ſuch various readings occur, the wrong reading is written in the text, and that is called the *cetib*; and the true reading is written in the margin, with ק under it, and called the *keri*. It is generally ſaid by the Jewiſh writers, that theſe corrections were introduced by Ezra; but it is moſt probable that they had their original from the miſtakes of the tranſcribers after the time of Ezra, and the obſervations and corrections of the Maſorites. Thoſe *Keri-cetibs*, which are in the ſacred books written by Ezra himſelf, or which were taken into the canon after his time, could not have been noticed by Ezra himſelf, and this affords a preſumption, that the others are of late date. Theſe words amount to about a thouſand; and Dr. Kennicott, in his Diſſertatio Generalis, remarks, that all of them, excepting fourteen, have been found in the text of manuſcripts.

KERMES, a kind of little animal, found in great plenty on an evergreen of the oak kind, and forming excreſcences or *niduſes* of conſiderable uſe, both in phyſic and dying. See COCCUS.

The *kermes*, called alſo *ſcarlet grain*, and by the Greeks *coccos baphica*, by the Latins *vermiculus*, by the French ſometimes *vermillion*, or *grain de gale*, or *vermeil*, is about the ſize of a juniper-berry, round, ſmooth, and gloſſy; of a beautiful red colour, and full of a mucilaginous juice, of the ſame dye; it is fouud adhering to the bark on the ſtem and branches of a peculiar ſort of ſcarlet oak.

The *kermes* is the moſt famous, and moſt valuable creature of its kind, and is properly an inſect of the gall-inſect claſs, and of that genus whoſe figure reſembles a ſphere, from which a ſmall part had been cut off. This ſpecies is found on a particular kind of the ilex, known by the name of the *ilex aculeata cocciglandifera*. This never ariſes beyond the height of a ſmall ſhrub, and is very plentiful in the uncultivated parts of Provence and Languedoc, and in ſome other places; as in Spain, in the iſlands of the Archipelago, and particularly in Crete. The peaſants make their harveſt of theſe animals, from off theſe ſhrubs, at the proper ſeaſon; and though the hiſtory of this drug is a ſubject well worthy the attention of every naturaliſt, yet it is but of very late years that it has been enquired into with any degree of accuracy. Meſſrs. de la Hire and Sedileau opened a way to the knowledge of it, by their hiſtory of the gall-inſect of the orange-tree; but all the advantages that might have been expected thence, were not ſoon obtained, nor was the reſemblance and ſtrict analogy between the flat and ſpherical gall-inſects ſo ſoon obſerved, as might have been expected.

The *kermes*, when at his full growth, appears a ſmall ſhell fixed to the branches of this ſhrub, or ſeems a purſe or bag, the covering of which is ſufficiently ſtrong, bright, and ſhining, and of the colour of a ripe plum, and covered with the ſame ſort of whitiſh powder, as that fruit is when ripe. This powder, the people of the place call the flower of the *kermes*. Thoſe who have never ſeen *kermes* otherwiſe than in the ſhops of the druggiſts, may naturally think it of a reddiſh brown; but this is not its natural colour, but it is the effect of the vinegar, they uſe for its preſervation; that remaining on the branches, and which has not been affected by vinegar, having nothing of this colour, but exactly that of ripe ſloes in the hedges.

There are two kinds of *kermes*; the one, that which has been already deſcribed, which is of the colour of a plum, and which lays red eggs. The other is whitiſh, or ſomewhat reddiſh, and is covered in the ſame manner as the other, with a white powder, and lays its eggs in the ſame manner. Its growth is the ſame with the other, and at the ſame ſeaſons, and its eggs are white.

The young inſects produced from both theſe ſpecies, are very like, and have a conſiderable reſemblance to wood-lice, or millepedes, as indeed have the young of all the gall-inſect claſs. They differ however in colour: thoſe which are produced from the red eggs, are themſelves red; they are flat in ſhape, and ſomewhat more pointed behind than at the head: their back is convex, with a round arched prominence. This kind has ſeveral ſhining gold-coloured ſpangles, and is ſtriated on the back, and has ſeveral tranſverſe lines acroſs the belly. It has ſix legs, and two horns nearly as long as its body, and a tail ſplit into two, or forked, the divided parts being nearly as long as its horns, and its eyes are black and ſhining.

The young ones produced from the white eggs, are of a dirty white; their back is ſomewhat flatter than that of the others, and the ſpangles on them, viewed by the microſcope, appear of a ſilver colour, not of a gold. There are a much ſmaller number of theſe white than of the red *kermes*, and the people of the country call them the mother of the *kermes*. There are alſo among the *kermes*, ſeveral found, containing, inſtead of theſe eggs, the nymphs of two kinds of ſmall flies, which regularly are produced from them, and have both a power of hopping or jumping. The one ſpecies of fly is of a fine jet black, and the other is of a dirty white. One of theſe is a white winged fly, alike in all reſpects, to the gall-inſect fly, and is, without all doubt, the male *kermes*; through this very obſervation of a fly being produced from ſome of the *kermes*, has been one great occaſion of believing the *kermes* to be a true gall.

According as the winter has been more or leſs mild, the harveſt of *kermes* is the more or leſs plentiful; and the people always preſage themſelves a fine ſeaſon, when the ſpring has been free from froſts and fogs. It is obſerved, that the loweſt and oldeſt ſhrubs are always the fulleſt of this inſect; and the *kermes* produced on thoſe trees, which are in the neighbourhood of the ſea, is always larger and finer than from the inland places.

It is no uncommon thing to have two harveſts of *kermes* in a year. Thoſe of the latter ſeaſon are ſmaller and leſs valuable than thoſe of the firſt, and are found not on the branches, but on the leaves of the ſhrub; which is juſt analogous to the cuſtom of the gall-inſects of all other kinds; all which, about this age, leave the branches to feed on the leaves, where their yet tender trunks can find an eaſier entrance. See *Tab. of Inſects*, Nº 30.

From this analogy between the *kermes*, and other inſects of the ſame claſs, it ſhould ſeem worth while to try, whether ſome of thoſe may not poſſeſs the ſame virtues in medicine, at leaſt, if not in the arts. It is certain that the common oak produces a red gall-inſect of the very ſhape of the *kermes*, and of the colour of the paler ones. Reaumur, Hiſt. Inſect. p. 45.

The *kermes* is of a vinous ſmell, a bitter rough, agreeable taſte; and its pulp, or juice, is pregnant with numerous minute ova.

The animal retains theſe ova under her belly, till they hatch into a very numerous offspring.

Hence, when the *kermes* is dried, there comes out of it an infinite number of little inſects, and flies, ſo ſmall, that they are ſcarce viſible; inſomuch, that the whole inward ſubſtance ſeems converted into them. To prevent this inconvenience, they uſually ſteep the *kermes* in vinegar before it be dry; and thus prevent the excluſion of the ova, and kill ſuch animals as are already hatched.

They draw the juice, or pulp, from the *kermes*, by pounding it in a mortar, and then ſtraining it through a ſieve: of this they make a ſyrup, by adding a ſufficient quantity of ſugar. Sometimes they dry the pulp ſeparate from the huſk; which pulp, thus dried, they call *paſtel of kermes*.

The *kermes* again is of great uſe in phyſic: it is cardiac, deſiccative, and aſtringent; it fortifies the ſtomach, and prevents abortion. Of this is made that celebrated confection called ALKERMES.

The reſtringent and coroborant confection ſold in the ſhops, is prepared by diſſolving, in the heat of a water-bath, ſix ounces of fine ſugar, in ſix ounces, by meaſure, of damaſk roſe-water; then adding three ounces of the juice of *kermes*, warmed and ſtrained; and after the whole has grown cold, mixing half a ſcruple of oil of cinnamon. This confection is taken, from a ſcruple to a dram, or more, either by itſelf, or in juleps, with which it mingles uniformly, without injuring their tranſparency.

The dried grains of *kermes*, if they have not been too long kept, give out, both to water and to rectified ſpirit, the ſame deep red colour, and nearly the ſame kind of ſmell and taſte with thoſe of the expreſſed juice. The inſpiſſated extracts are conſiderably bitter, aſtringent, and of a kind of mild balſamic pungency.

It is, however, of greater uſe in dying ſcarlet; for which uſe the manner of preparing it is as follows: the *kermes* being taken when ripe, they ſpread it on linen; and at firſt, while it abounds moſt in moiſture turn it twice or thrice a day, to prevent its heating, till ſuch time as there appears a red powder among it: this they ſeparate, by paſſing it through a ſieve, and then again ſpread abroad the grain on the linen, till they perceive the ſame redneſs of powder, when they repeat the ſifting: thus they proceed, while they diſcover any red powder on the ſurface of the grain, which is ſtill paſſing through the ſcarce, till it yield no more.

In the beginning, when the ſmall red grains are found to move, as they will always do, they are ſprinkled over with ſtrong vinegar, and rubbed between the hands.—Were not this precaution taken, out of every grain would be formed little inſects, which would be of no uſe in dying.

The grain being quite emptied of its pulp, or red powder, by the proceſs above mentioned, is waſhed in wine, and then expoſed to the ſun; after this, it is put up into the huſks, formed into balls, and along with it the proportion of red duſt that it had afforded.

According to M. Marſigli's experiments, made at Montpellier, the *kermes* has the effect of galls, when mixed with vitriol; and makes a good ink: mixed with oil of tartar, or lime-water, its colour turns from a vermillon to a crimſon colour. In a decoction of turnſol flowers, it retains its proper colour. They have not been able to get any fixed eſſential ſalt from it; but a volatile ſalt it yields in abundance; which, in M. Marſigli's opinion, would have a better effect in medicine, if taken in a liquid, than when encloſed in conſerves and confections, which hinder its action.

Woollen cloth, prepared with alum and tartar, acquires on being boiled with dry *kermes* berries, a durable deep red colour, called *ſcarlet in grain*, from the *kermes* having been formerly ſuppoſed to be the grain or ſeed of the tree; and *Venice ſcarlet*, from the greateſt quantities having been dyed there. This colour wants the luſtre and fire of the cochineal ſcarlet now in vogue, but in return is far more permanent, nor ſubject to be ſtained by dirt, or acrid liquors; and when ſpotted with greaſe, may be cleaned again without injury to the colour.

Mr. Hellot obſerves, that the figured cloths to be ſeen in the old tapeſtries of Bruſſels, and the other manufactures of Flanders, which have ſcarcely loſt any thing of their livelineſs in ſtanding for two hundred years, were all dyed with this ingredient: that nevertheleſs *kermes* is at preſent entirely in diſuſe among the European dyers, though ſaid to be commonly employed in the Levant, and exported thither from Marſeilles in conſiderable quantities: that when the *kermes* ſcarlet (now called an ox-blood colour) is wanted for tapeſtries, &c. our dyers endeavour to imitate it with cochineal; that as the colour is difficultly hit with cochineal alone, they generally had a portion of Brazil wood; and that the dyes thus produced, though at firſt more vivid than they ought to be, often loſe their luſtre before a year is at an end, and turn white and grey in an extraordinary manner: that *kermes* might again be introduced to very good advantage, as its colour is of the moſt durable kind, and as ſundry ſhades are obtainable from it with leſs trouble and expence than from other drugs.

The ſame author has given a great number of experiments upon *kermes*, with different ſalts and metallic ſolutions. The principal of theſe are as follow:

On adding to the decoction of *kermes*, a ſmall quantity of ſolution of tin, the dark colour of the liquor is immediately brightened, and prepared woollen dyed therein, inclines more to the orange than with the *kermes* alone. With this improvement of the colour, it receives the imperfections, though not all the beauty of the cochineal ſcarlet; all alcaleſcent ſubſtances ſtaining the cloth, that is, deſtroying the effect of the acid ſolution.

Kermes, with cream of tartar, and as much of the ſolution of tin as is employed for the cochineal ſcarlet (without any alum) dyed unprepared cloth of an extremely vivid cinnamon colour. On dipping the cloth in a ſolution of alum, a part of the red re-appeared, but was not beautiful.

With cream of tartar, ſolution of tin and alum in larger quantity than the tartar, this drug gives purpliſh colours, which vary according to the proportions of the ingredients.

If vitriolated tartar be ſubſtituted to the alum and tartar; and if after the *kermes* has been boiled in a ſolution of a ſmall quantity of this ſalt, the ſtuff be boiled in this mixture for about an hour, the dye proves a beautiful kind of grey, in which the red is little perceived.

Glauber's ſalt, employed along with *kermes*, entirely deſtroys its redneſs, and gives an earthy grey colour. This dye is very periſhable, on account of the particular nature of the ſaline ſubſtance, by means of which the tinging particles are applied; for Glauber's ſalt diſſolves eaſily in cold water, and falls into a powder in the ſun's heat. This obtains equally in all dyes; thoſe drugs which afford moſt durable colours with tartar and vitriolated tartar, give very periſhable ones with the more diſſoluble and calcinable ſalts.

Green and blue vitriol, ſubſtituted ſeparately to alum, but taken in conjunction with cream of tartar, deſtroy likewiſe, or conceal the red colour of *kermes*, which in theſe two experiments has the ſame effect with galls, for it precipitates the iron of the green vitriol which tinges the cloth of a bright grey, and the copper of the blue, which gives a kind of olive dye. It likewiſe gave an olive dye with ſolution of copper made in aqua fortis; a certain mark that it poſſeſſes, like galls, an aſtringent precipitating quality. It is probably the aſtringency of *kermes* that renders its dye ſo durable; for all the barks woods, roots, and other ſubſtances that are aſtringent, yield permanent colours.

White vitriol, employed with cryſtals of tartar, changes the red colour of *kermes* into a violet. A tincture of biſmuth ore, in ſpirit of nitre, and a ſolution of biſmuth itſelf made leiſurely in four times its weight of ſpirit of nitre, diluted with an equal quantity of water, gave alſo a violet dye upon white cloth. See Neumann's Chemiſtry, by Lewis, p. 508, &c.

Kermes *mineral*. The *kermes mineral* was a preparation of Glauber, which the king of France bought of M. de la Ligerie, and made public in 1720. That receipt was in the following form: take a pound of Hungarian antimony, broken into thin pieces, according to the direction of its ſpecula; four ounces of nitre, fixed by charcoal; and a pint of rain-water: boil them two hours; then filtre the warm liquor, and when it cools, the *kermes* precipitates. The ſame antimony undergoes the ſame operations with the remaining liquor, to which three ounces of fixed nitre, and a pint of water is added. In a third boiling two ounces of nitre, and a pint of water are to be added to the former lixivium. The *kermes* thus obtained is about a dram, and is well edulcorated by waſhing it with water, and burning ſpirit of wine on it; then it is dried for uſe.

Mr. Geoffroy ſhews, by many experiments, that the *kermes* is the reguline part of the antimony, joined to a ſort of *hepar ſulphuris*. He teaches us a much eaſier way of preparing this medicine, thus: mix intimately the fine powder of two parts of antimony, and one of any fixed alkaline ſalt; melt thoſe metals in a crucible; then having powdered them while hot, boil them two hours in a large quantity of water; after this, paſs the hot liquor through paper, receiving it into a veſſel, in which there is hot water, the *kermes* ſeparates when it cools. The groſſer parts, which do not paſs through the paper, are to be boiled again, and filtrated as before; and the operation is to be repeated a third time, by which ſix or ſeven drams of *kermes* may be got out of every ounce of antimony. He ſays, he has ſeen effects like to thoſe of mild *kermes* from antimony, reduced to ſuch a fine powder, that none of the ſhining ſpicula are to be ſeen; and that the magiſtery of antimony, made by pouring ſpirit of nitre, or aqua regia, on the powder of antimony, and then edulcorating the maſs with water, has the ſame effects as *kermes*. Mem. de l'Acad. des Sciences, 1734, 1735.

Half a grain, or a grain of this powder, given every three or four hours, produces no violent effects; but by increaſing the doſe, it may be made to vomit, purge and ſweat.

When ſeven or eight grains are taken at once, it chiefly acts upon the primæ viæ, generally as an emetic and purgative. A doſe of three or four grains is ſeldom emetic, and more frequently purgative. When taken in theſe quantities as an evacuant, a little of it paſſes alſo into the viæ ſecundæ & tertiæ. When it is adminiſtered in ſmaller doſes, it paſſes almoſt entirely into the lacteal, blood, and lymphatic veſſels. In theſe it occaſions ſuch ſpaſms and oſcillations as it does in the primæ viæ; ſo that it increaſes all ſecretions and excretions, but particularly thoſe of urine, ſweat, and expectoration according to the doſe, the nature of the diſeaſe, and the diſpoſition of the patient. It produces ſingularly good effects in thoſe diſeaſes of the breaſt which proceed from fulneſs and obſtruction. It may be adminiſtered in any vehicle, or incorporated in a bolus, with other ſuitable remedies. But it ſhould never be joined with acids, when it is deſigned to act as *kermes*.

Some commend this medicine as the moſt univerſal reſolvent, and deobſtruent; aſſuring us, that it almoſt infallibly cures pleuriſies, peripneumonies, aſthmas, cattarrhs, anginæ, ſmall-pox, and many other diſeaſes. Others are as poſitive, that it heats and thickens the blood, thereby increaſing obſtructions, and is particularly hurtful in all inflammatory diſeaſes.

This preparation was famous in France, and known by the name of *poudre des Chartreux*, becauſe a Carthuſian monk, who got it from Mr. de la Ligerie, firſt brought it into vogue. See Hiſt. de l'Acad. des Science 1720, and the Memoirs for the ſame year, where it is ſaid that Glauber was looked upon as the firſt inventor of this remedy.

Its effects, like thoſe of many other antimonial preparations, are very various, which is frequently owing, as Mr. Geoffroy obſerves, to the different manner and care in making it. He adds, that the more the *kermes* contains of a regulus eaſily revivified, the more it proves emetic. He alſo ſhews how to make a cinnabar with the *kermes* and mercury, and ſo diſengage the vitriolic acid from the *kermes*. See Mem. de l'Acad. des Sciences, 1734.

KERN, or Kerne, a term in the ancient Iriſh militia, ſignifying a *foot-ſoldier*.

Camden tells us, the armies of Ireland conſiſted of cavalry, called *galloglaſſes*; and infantry, lightly armed, called *kernes*. The *kernes* bore ſwords, and darts; to the laſt were fitted cords, by which they could recover them after they had been launched out.

Kern, in the *Engliſh ſalt-works*, a word uſed to ſignify the cryſtallizing, or ſhooting of ſalt in the brine, when ſufficiently evaporated in the boiling pan.

This word is alſo uſed by the ſeamen for the firſt forming of the bay-ſalt, made by the ſun's heat in the iſles of May, &c. See Salt.

Kern-*ſtone*, in *Natural Hiſtory*, a name given by the common people of many parts of England, to a peculiar ſort of ſtone, which is found on the ſides of hills in ſandy countries, where the hills are rocky. Pyran ſands afford a great many ſtones of this kind; and the manner of their formation is thus: the rocks in the ſides of the hills are continually covered over with the loſe ſand, which the winds toſs up, and the ſparry matter continually ouſing out of the pores of theſe ſtones, with the wet, cements the grains of ſand together. When one cruſt is thus formed, another is ſoon added, and ſo on, till the whole maſs is of a conſiderable thickneſs; and the ſpar ſtill ſerving as a general cement, the whole is held together, though but in a loſe way, yet ſo as to reſemble a ſort of ſtone. The little grains of ſand are ſtill viſible in all parts of this ſtone, and are what induced the people to call it *kern-ſtone*, as they call theſe *kerns*, or *kernels*. This account of the origin of the ſtone is eaſily proved, by putting a ſmall piece of it into aqua fortis, for this diſſolves the ſpar, or cement, and the ſand is left looſe.

KERNES, in our *Laws*, ſignify idle perſons, or vagabonds.

KERNING, in *Letter-Foundery*. See *Letter* Foundery.

KERSEY, a kind of coarſe woollen cloth, made chiefly in Kent and Devonſhire.

KESITAH. This word is to be met with in Geneſis, and in Job; and is tranſlated in the Septuagint and Vulgate ſheep or lambs. But the Rabbins and modern interpreters are generally of opinion, that *Keſitah* ſignifies rather a piece of money. Bochart and Eugubinus are of opinion the Septuagint meant *minæ*, and not *lambs*; in Greek *hecatonmnon*, εκατονμνων, inſtead of εκατον αμνων. Now a mina was worth ſixty Hebrew ſhekels, and conſequently ſix pounds ſixteen ſhillings and ten pence halfpenny ſterling. M. de Pelletier of Rouen, is of opinion, that *Keſitah* was a Perſian coin, ſtamped on one ſide with an archer (*Keſitah*, or *Keſeth*, in Hebrew, ſignifying *a bow*) and on the other with a lamb; that this was a gold coin known in the Eaſt by the name of a Daric, and was in value about twelve livres and ten pence French money. Several learned men, without mentioning the value of the *Keſitah*, ſay it was a ſilver coin, the impreſſion whereof was a ſheep; for which reaſon the Septuagint and Vulgate tranſlate it by this name. Calmet is of opinion, that *Keſitah* was a purſe of gold or ſilver. In the Eaſt they reckon at preſent by purſes. The word *Kiſta* in Chaldee ſignifies a meaſure, or veſſel. And Euſtathius ſays, that *Kiſta* is a Perſian meaſure. Jonathan and the Targum of Jeruſalem tranſlate *Keſitah* a pearl. Gen. xxxiii. 19. Job xlii. 11. Or nine pounds Engliſh, ſuppoſing, as Dr. Prideaux does, that a ſhekel is worth three ſhillings. A Daric is a piece of gold, worth, as Dr. Prideaux ſays, five and twenty ſhillings Engliſh. See his Connect. P. I. p. 101. See Calmet Comment. upon Gen. xxxiii. 19. Gen. xxv. 12. Job, xlii. 2, &c. and Dict. Bibl.

KESTREL, the Engliſh name of a hawk, called alſo the *ſtannel* and the *windhover*, and by authors the tinnunculus and *cencris*. It builds with us in hollow oaks, and feeds on partridges and other birds.

KETCH, a kind of veſſel, equipped with two maſts, viz. the main-maſt, and mizen-maſt, and uſually from one hundred to two hundred and fifty tons burthen: they are uſed either as yachts, for conveying princes of the blood, ambaſſadors, or other great perſonages, from one place to another, or as bomb-*veſſels*: theſe are built remarkably ſtrong, and fitted with a greater number of riders than any other veſſels.

KETMIA, in *Botany*, ſee *Syrian* Mallow.

KETRAN, Kitran, or Alketran, a name given by ſome of the Arabian authors to the oil of cedar, called by the Greeks cedria. We have of later times formed the word *cedranum* upon this, and it has ſince been applied to the zopiſſa of the ancients, a compound made of pitch and wax melted together, and uſed for covering the bottoms of ſhips.

KETTLE, in the *Art of War*, a term the Dutch give to a battery of mortars, becauſe it is ſunk under ground.

Kettle-*drums* are formed of two large baſons of copper or braſs, rounded at the bottom, and covered over with vellum or goat-ſkin, which is kept faſt by a circle of iron and ſeveral holes faſtened to the body of the drum, and a like number of ſcrews to ſcrew up and down, with a key for the purpoſe. The two *drums* are kept faſt together by two ſtraps of leather, which go through two rings, and are faſtened, the one before and the other behind the pommel of the *kettle* drummer's ſaddle. They have each a banner of ſilk or damaſk, richly embroidered with the ſovereign's arms, or of the colonel, and are fringed with ſilver or gold; and to preſerve them in bad weather, they have each a cover of leather. The drum-ſticks are of crab-tree, or other hard wood, eight or nine inches long, with two knobs on the ends, which beat the drum head, and cauſe the ſound. The *kettle-drum*, with trumpets, is the moſt martial ſound of any; each regiment of horſe has a pair.

The *kettle*-drummer rides always at the head of the ſquadron, and his poſt is on the right when the ſquadron is drawn up.

The *kettle*-drum belonging to the royal regiment of artillery is mounted on a ſuperb waggon, richly gilt and ornamented, and drawn by four white horſes, elegantly capariſoned, with a ſeat for the drum-major general.

KEVELS, or Chevils, *in a Ship*, are two pieces of timber nailed to the inſide of a ſhip, from whence the upper ends branch outward into arms or horns, ſerving to belay the great ropes, by which the bottoms of the mainſail and foreſail are extended.

KEY, a little iron inſtrument, for the opening of locks.

L. Molinus has a treatiſe of *keys*, De Clavibus Veterum, printed at Upſal. He derives the Latin name *clavis* from the Greek κλειω, *claudo*, *I ſhut*; or from the adverb *clam*, *privately*; and adds, that the uſe of *keys* is yet unknown in ſome parts of Sweden.

The invention of *keys* is owing to one Theodore of Samos according to Pliny, and Polydore Virgil; but this muſt be a miſtake, the uſe of *keys* having been known before the ſiege of Troy: mention even ſeems to be made of them in the nineteenth chapter of Geneſis.

Molinus is of opinion, that *keys*, at firſt, only ſerved for the untying certain knots, wherewith they anciently ſecured their doors: but the Laconic *keys*, he maintains, were nearly a kin in uſe to our own: they conſiſted of three ſingle teeth, and made the figure of an E; of which form there are ſtill ſome to be ſeen in the cabinets of the curious.

There was alſo another *key*, called βαλαναγρα, made in the manner of a male ſcrew, which had its correſponding female in a bolt affixed to the door.

Key is, hence, become a general name for ſeveral things ſerving to ſhut up or cloſe others.

Key, or Key-stone, *of an arch, or vault*, is the laſt ſtone placed atop thereof; which, being wider and fuller at the top than bottom, wedges as it were, and binds in all the reſt.

The *key* is different in the different orders; in the Tuſcan and Doric, it is a plain ſtone; only projecting; in the Ionic, it is cut, and waved ſomewhat after the manner of conſoles; in the Corinthian and Compoſite, it is a conſole enriched with ſculpture, foliages, &c. See *Tab. Archit. fig.* 36. *lit. c. fig.* 50. *lit. f.*

M. Belidor makes the thickneſs of the *arch-ſtones* of a bridge, one twenty-fourth part of the width of the arch; but M. Gautier, another experienced engineer, makes their length, in an arch twenty-four feet wide, two feet; in arches, forty-five, ſixty, ſeventy-five, ninety wide, three, four, five, ſix feet, reſpectively: and it is obſerved by Mr. Muller, that the thickneſs allowed by Belidor is not ſufficient to prevent the weight of the arches from cruſhing the *key-ſtones* to pieces by their preſſure againſt one another. Muller's Pract. Fortif. p. 253.

The name key-*ſtones* or *arch-ſtones* is ſometimes alſo given to all the ſtones which form the ſweep of an arch, or vault-anſwering to what the French more diſtinctly call *vouſſoirs*.

Key is alſo uſed for the eccleſiaſtical juriſdiction; particularly for the power of excommunicating, and abſolving. The Romaniſts ſay, the pope has the power of the *keys*, and can open and ſhut paradiſe as he pleaſes; grounding their opinion on that expreſſion of Jeſus Chriſt, *I will give thee the* keys *of the kindgom of heaven*.

In St. Gregory we read, that it was the cuſtom heretofore, for the popes to ſend a golden *key* to princes, wherein they always encloſed a little of the filings of St. Peter's chains, kept with great devotion at Rome; and that theſe *keys* were worn in the boſom, as being ſuppoſed to contain ſome wonderful virtues.

Key, in *Polygraphy*, and *Steganography*, denotes the alphabet of a CIPHER; which is a ſecret known only to the perſon who writes the letter, and him who deciphers it. See ALPHABET.

Some ciphers have a ſingle *key*, where the ſame characters are uſed throughout; in other cyphers, the characters are varied, and the *key* is double.

Key, in *Muſic*, is a certain fundamental note, or tone, to which the whole piece, be it concerto, ſonata, cantata, &c. is accommodated; and with which it uſually begins, but always ends.

To get an idea of the uſe of the *key*, it may be obſerved, that as in an oration there is a ſubject, viz. ſome principal perſon or thing to which the diſcourſe is referred, and which is always to be kept in view, that nothing unnatural, and foreign to the ſubject may be brought in; ſo in every regular piece of muſic, there is one note, viz. the *key*, which regulates all the reſt. The piece begins and ends in this; and this is, as it were, the muſical ſubject, to which a regard muſt be had in all the other notes of the piece. Again, as in an oration there are ſeveral diſtinct articles, which refer to different ſubjects, yet ſo as they have all a viſible connection with the principal ſubject, which regulates and influences the whole, ſo in muſic there may be various ſubaltern ſubjects, that is, various *keys*, to which the different parts of the piece may belong: but then, they muſt be all under the influence of the firſt and principal *key*, and have a ſenſible connection with it.

To give a more diſtinct notion of the *key*, we muſt obſerve, that the octave contains in it the whole principles of muſic, both with reſpect to conſonance or harmony, and ſucceſſion or melody; and if either ſcale be continued to a double octave, there will, in that caſe, be ſeven different orders of the degrees of an octave, proceeding from the ſeven different letters, with which the terms of the ſcale are marked. Any given ſound, therefore, i. e. a ſound of any determinate pitch or tune, may be made the *key* of the piece, by applying it to the ſeven natural notes ariſing from the diviſion of an octave, and repeating the octave above or below, at pleaſure. The given note is applied as the principal note or *key* of the piece, by making frequent cloſes, or cadences upon it; and, in the progreſs of the melody, no other but thoſe ſeven natural notes can be admitted, while the piece continues in that *key*, every other note being foreign to the fundamental, or *key*.

For inſtance, ſuppoſe a ſong begun in any note, and carried on upwards, or downwards, by degrees and harmonical diſtances, ſo as never to touch any notes, but what are referable to that firſt note as a fundamental, i. e. are the true notes of the natural ſcale proceeding from the fundamental; and let the melody be ſo conducted through thoſe natural notes, as to cloſe and terminate in the fundamental, or any of its octaves above or below; that note is called the *key* of the melody, becauſe it governs all the reſt, limiting them ſo far, as that they muſt be to it, in the relation to the ſeven eſſential notes of an octave; and when any other note is brought in, it is called *going out of the key*.

From which way of ſpeaking, viz. a ſong's continuing in, or going out of the *key*, it may be obſerved, that the whole octave, with its natural notes, come under the idea of a *key*; though the fundamental or principal note is, in a peculiar ſenſe, called the *key*.

In which laſt ſenſe of the word *key* (viz. where it is applied to one fundamental note), another note is ſaid to be out of the *key*, when it has not the relation to that fundamental of any of the natural notes belonging to the concinnous diviſion of the octave.

Here too it muſt be added, with reſpect to the two different diviſions of the octave, that a note may belong to the ſame *key*, i. e. it may have a juſt muſical relation to the ſame fundamental in one kind of diviſion; and be out of the *key* with reſpect to another.

Now a piece of muſic may be carried through ſeveral *keys*; i. e. it may be given in one *key*, and be led out of that into another, by introducing ſome note foreign to the firſt, and ſo on to another: but a regular piece muſt not only return to the firſt *key*, but thoſe other *keys*, too, muſt have a particular connexion with the firſt. It may be added, that thoſe other *keys* muſt be ſome of the natural notes of the principal *key*, though not any of them at pleaſure.

As to the diſtinctions of *keys*, we have already obſerved, that to conſtitute any given note or ſound, a *key*, or fundamental note, it muſt have the ſeven eſſential or natural notes added to it; out of which, or their octaves, all the notes of the piece muſt be taken, while it keeps within the *key*, i. e. within the government of that fundamental.

It is evident, therefore, there are but two different ſpecies of *keys*, which ariſe according as we join the greater or leſs third, theſe being always accompanied with the ſixth or ſeventh of the ſame ſpecies; the third *g*, for inſtance, with the ſixth and ſeventh *g*; and the third *l*, with the ſixth and ſeventh *l*.

This diſtinction is expreſſed under the names of *ſharp key*, which is that with the third *g*, &c. and the *flat key*, which is that with the third *l*, &c. whence it is plain, that how many different cloſes ſoever there be in a piece, there can be but two *keys*, if we conſider the eſſential difference of *keys*; every *key* being either flat or ſharp, and every ſharp *key* being the ſame, as to melody, as well as every flat one.

It muſt be obſerved, however, that in common practice the *keys* are ſaid to be different, when nothing is conſidered but the different tune, or pitch of the note, in which the different cloſes are made. In this ſenſe, the ſame piece is ſaid to be in different *keys*, according as it is begun in different notes, or degrees of tune.

To prevent any confuſion which might ariſe from uſing the ſame word in different ſenſes, Mr. Malcolm propoſes the word *mode* to be ſubſtituted inſtead of the word *key*, in the former ſenſe; that is, where it expreſſes the melodious conſtitution of the octave, as it conſiſts of ſeven eſſential and natural notes, beſides the fundamental; and in regard there are two ſpecies of it, he propoſes, that that with a third *g* be called the *greater mode*; and that with a third *l*, the *leſſer mode*; appropriating the word *key* to thoſe notes of the piece in which the cadence is made; all of which may be called *different keys*, in reſpect of their different degrees of tune.

To diſtinguiſh then accurately between a *mode* and a *key*, he gives us this definition; viz. an octave, with all its natural and eſſential degrees, is a *mode*, with reſpect to the conſtitution, or manner of dividing it; but with reſpect to its place in the ſcale of muſic, i. e. the degree or pitch of tune, it is a *key*; though that name is peculiarly applied to the fundamental.

Whence it follows, that the ſame mode may be with different keys; i. e. an octave of ſounds may be raiſed in the ſame order, and kind of degrees, which makes the ſame mode, and yet be begun higher or lower; i. e. be taken at different degrees of tune, with reſpect to the whole, which makes different *keys*; and *vice verſâ*, that the ſame *key* may be with different modes, i. e. the extremes of two octaves may be in the ſame degree of tune, yet the diviſion of them be different.

Keys alſo denote thoſe little pieces in the fore-part of an organ, ſpinett, or harpſichord; by means whereof the jacks are played, ſo as to ſtrike the ſtrings of the inſtrument; and wind is given to the pipes, by raiſing and ſinking the ſucker of the ſound-board.

In large organs there are ſeveral ſets of theſe *keys*; ſome to play the ſmall ſecond organ, ſome for the main organ, ſome for the trumpet, and ſome for the echoing trumpet. In ſome there are but a part that play, the reſt being for ornament. There are twenty ſlits in large *keys*, which make the half notes.

M. Buliouſki, of Douliez, pretends to have invented a new kind of *keys*, much preferable to the common ones. With theſe, he ſays, he can expreſs ſounds which follow each other in a continual geometrical proportion; and ſo can furniſh all the ſounds in muſic, and by conſequence all the imaginary intervals and concords; whereas the common *keys* do but yield ſome of them.

Key, in a *Naval Senſe*. See KAY.

Keys, in *Sea Language*, a name given to certain rocks lying near the ſurface of the water, particularly in the Weſt Indies.

Keys, a denomination given to the ſeeds of the aſh.

KHAZINE, the grand ſeignior's treaſury. See TREASURY, and EXCHEQUER.

Here are kept regiſters of receipts, accounts of provinces, in drawers, marked with the years, and the places names: here is alſo kept part of the emperor's wardrobe.

Every day of the divan this treaſury is opened, either to take out, or put ſomething in; and the principal officers, who have the charge of it, are all to aſſiſt at this opening. The tchaouch-bachi, in their preſence, firſt breaks the wax wherewith the key-hole had been ſealed up, and, carrying it to the grand vizir, that miniſter firſt kiſſes it, and then draws out of his boſon the grand ſeignior's gold ſeal. In the mean time he looks narrowly after the officer, who when he has done his buſineſs in the treaſury, locks and ſeals up the place, and returns the ſeal to the vizir with the ſame ceremony as before.

Beſide this, there are other apartments for the money, where the officers are never allowed to enter with any cloaths that have pockets in them.

KIBES. See CHILBLAIN.

KICKER *againſt the ſpurs*, in the *Manege*. See RAMINGUE.

KID, in *Zoology*, the name by which young goats are called. See GOAT.

KIDDERS, thoſe that badge, or carry corn, dead victuals, or other merchandiſe, up and down to ſell: every perſon being a common badger, *kidder*, lader, or carrier, &c. ſays the ſtat. 5 Eliz. cap. 12. And they are called *kiddiers*, 13 Eliz. cap. 25.

KIDDLE, or KIDEL, *Kidellus*, a dam or wear in a river, with a narrow cut in it, for the laying of pots, or other engines to catch fiſh.

The word is ancient; for in Magna Charta, cap. 24. we read, *omnes* kidelli *deponantur per Thameſiam & Medweyam & per totam Angliam, niſi per coſteram maris.* And by king John's charter, power was granted to the city of London, *de* kidellis, *amovendis per Themaſiam & Medweyam.* A ſurvey was ordered to be made of the wears, mills, ſtanks, and *kidells*, in the great rivers of England, 1 Hen. IV. Fiſhermen of late corruptly call theſe dams *kettles*; and they are much uſed in Wales, and on the ſea-coaſts of Kent.

KIDDOW, in *Ornithology*, the moſt common Engliſh name of the LOMWIA, a web-footed bird, common on our ſhores, and called in different places the guillemot or guillem, and and the ſea-hen, and ſkout.

KIDNAPPING, in *Law*, is the offence of ſtealing and conveying away a man, woman, or child, and at common law is puniſhable by fine, pillory, &c. Alſo if a maſter of a ſhip ſhall, during his being abroad, force any man aſhore, and wilfully leave him behind, he ſhall ſuffer three months impriſonment. 11 & 12 W. III. c. 7.

KIDNEY, *rein*, in *Anatomy*, a part of an animal, whoſe uſe is to ſeparate the urine.

The *kidneys* are two, ſituate one on each ſide; one between the liver and muſculus lumbaris, on the right ſide; the other between the ſpleen and the ſame muſcle, on the left ſide. In man, the right is lower than the left; but in quadrupeds it is uſually the contrary; they are faſtened to the loins and the diaphragm, by their exterior membrane, and to the bladder by the ureters; the right is alſo faſtened to the inteſtinum cœcum, and the left to the colon; their figure reſembles a bean, or rather a creſcent, being curve on the ſide of the vena cava, and on the outſide gibbous.

There are ordinarily but two *kidneys*, though ſometimes three have been found, and ſometimes four, and ſometimes on the other hand only one. In men they are commonly about five inches long, and three broad, and one and a half thick; their ſubſtance is compoſed of glands, and very ſmall urinary pipes, or canals; the glands form the circumference, and ſerve to ſeparate the urine; the papillæ, or urinary tubes, form the inner part; they come out of the glands, and carry the urine into a cavity in the concave part of the *kidney*, called the PELVIS: whence it paſſes through the ureters into the bladder.

The *kidneys* are covered with two membranes; they have each of them arteries and veins; the arteries come from the aorta, and the veins terminate in the cava; theſe are all called *emulgents*. They have nerves alſo, which take their origin from the plexus renalis, formed by the ramifications of the intercoſtal veins, and the nerves of the loins.

The lymphatic veſſels of the *kidneys* appear upon blowing by the ureter into the pelvis of the *kidney*.

The *kidneys* ſecrete the urine from the blood, which, by the motion of the heart, is driven through the arteries into the emulgent arteries, and theſe carry it into the little glands; where its ſeroſity being ſeparated, it is received in at the orifices of the urinary pipes, which go from the glands to the pelvis, and thence runs by the ureters into the bladder; the blood, which could not enter the glands, is brought back by the emulgent veins. See *Tab. Anat. (Splanch.) fig.* 1. *lit. H. fig.* 4. *lit. b b, c c.*

KIDNEYS, *inflammation of the.* See NEPHRITIS.

KIDNEYS *of fiſh.* Fiſh of all kinds have *kidneys*, but they differ extremely in the ſeveral genera. All the cetaceous fiſhes, and many of the cartilaginous kinds, have two *kidneys*, as quadrupeds have. In moſt of the ſpinoſe kinds, they are found concreted into one. In the ſpinoſe fiſhes they are oblong, and extended throughout the whole length of the abdomen. In the cetaceous fiſhes they are of a roundiſh oblong figure, as in quadrupeds; and as to their ſituation, the ſpinoſe fiſh in general have them extended all along the back-bone, and the cetaceous kinds are on the contrary in the lower part of the belly; they are very long and large in the ſpinoſe kinds, and very ſmall and ſhort in the cetaceous. The urinary bladder is generally ſituated in the lower part of the abdomen in theſe creatures, and often lies upon the rectum. There are generally two ureters, by which the urine is ſecreted from the *kidneys* into it; but the urethra, through which the urine is to be diſcharged from the bladder, is leſs obvious in the ſpinoſe fiſhes. In the cetaceous kinds, it is plainly to be followed either into the vulva, or *foramen ſeminis.*

KIDNEY *beans*, in *Botany*. See *Kidney* BEANS.

KIDNEY *bean tree.* See *Liquorice* VETCH.

KIDNEY *wort.* See HERB *bennet*, and NAVEL *wort.*

KIGGELARIA, in *Botany*, a genus of the *dioecia decandria* claſs. Its characters are theſe: the male and female flowers are ſituated on different trees; the male flowers have an empalement of one leaf cut into five concave ſegments, and five concave petals, which are ſhaped like a pitcher, each having a honey gland faſtened to the baſe, with three obtuſe coloured lobes; and have ten ſmall ſtamina; the female flowers have petals like the male, but no ſtamina; in the centre is ſituated a roundiſh germen, which becomes a rough globular fruit, with a thick cover, having one cell, filled with angular ſeeds. We have but one ſpecies of this genus, which grows naturally at the Cape of Good Hope. Miller.

KILCH, in *Ichthyology*, a name uſed by ſome for a ſpecies of fiſh of the albula kind, caught in the lakes of Germany, of a fine firm fleſh and delicate flavour, and ſeems very little, if at all, different from the FERRA.

KILDERKIN, a kind of liquid meaſure, which contains two firkins, or eighteen gallons, beer-meaſure, and ſixteen ale-meaſure.

Two *kilderkins* make a barrel, and four a hogſhead.

KILLAS, in *Natural Hiſtory*, a name given by the people who dig in the mines of Cornwall, to a kind of greyiſh white earth, which is of great hardneſs, and ſeems to approach very much to the nature of the *ludus Helmontii* of ſome kinds, only that it is ſomewhat leſs hard than that, and has nothing of the ſepta or partitions that make the character of that foſſil. This earth contains ſo great a quantity of ſpar, that it ferments with acids very ſtrongly, though that ſpar being once diſſolved, and the earthy part of the ſubſtance only left, it will no longer ferment with theſe menſtruums; whence it is evident, that its terreſtrial matter is not alkaline, though the ſpar it contains is ſo.

This is the certain character of what is called *killas* in many parts of Cornwall, where it lies in ſtrata of two, three, or more feet thick, and often beſide this is laid on each ſide of the vein of tin or other ore. But in ſome other parts of England, the miners uſe the ſame word to expreſs a kind of white, brittle, and ſhattery ſtone, ſomewhat like the flag-ſtone with which they cover houſes in Northamptonſhire, and many other counties.

KILLAS is alſo uſed as the name of a ſlaty ſtone of various colours, ſpangled all over with talc, in ſmall flakes in the place where they uſe it. In this ſenſe they generally expreſs themſelves, when talking of the earth deſcribed above, by the phraſe *white killas*. They alſo ſometimes call this flaky ſtone by the name DELVIN.

KILLKENNY-*marble*, a fine black marble full of ſhells, and coralloide bodies, and much uſed in chimney-pieces, &c. See *Coralloide* MARBLE.

KILLOS, a name given by the miners of Cornwall to a ſtone of the ſlate kind, found in the mines there. See GROWAN.

KILLOW, or CULLOW, an Engliſh name for a black earth of a very remarkable ſtructure, ſeeming of a mixed nature between the marbles, ochres, and clay; and uſually containing a large quantity of the matter of the common vitriolic pyrites or ink-ſtone, which gives it a very ſharp unpleaſant taſte, and makes it, when thrown on the fire, emit a ſlight blue flame of a ſulphureous ſmell, and calcine to a deep red. It is common in many parts of England, Wales, and Ireland. It is lighter than any of the other clays, though that is the genus to which it moſt properly belongs; and it is of an uneven ſurface, and ſhattery ſtructure.

KILLYTH-STALLION, in our *Old Writers*, is where lords of manors were bound by cuſtom to provide a ſtallion for the uſe of their tenants mares.

KILN, a ſtove uſed in the manufacture of various articles. A fabric formed for admitting heat, in order to dry or burn materials placed in it to undergo ſuch operations.

KILN, *brick.* See BRICK.

KILN *for drying hops.* See HOPS and OAST.

KILN, *lime.* The *kilns* uſed for chalk or ſtone, they commonly make in a large pit, which is dug either round or ſquare, according as they have convenience; and is of ſuch a ſize as will be proper for the quantities they intend to burn. They are wideſt at the top, and narrower, by degrees, as they come nearer the bottom. The inſide of this pit is lined with a wall built of lime-ſtone; at the outſide near the bottom, they have a hole, or door, by which they take out the aſhes, and above that ſome have an iron grate, which comes cloſe to the wall all about it; but others arch it over with ſtone, or large pieces of chalk; and upon this they lay a layer of ſtone, or of whatever elſe they burn in the pit; upon this they place a layer of wood, or coals, and ſo on, layer over layer, to the top of the pit; only they obſerve, that the outermoſt layer be always of the fuel, not of the ſtone. When the *kiln* is thus filled, they give fire at the hole underneath, and the lime is finiſhed in a different time, according to the nature of the ſubſtance. That made of chalk is commonly burnt into lime in twenty-four hours; but lime-ſtone generally takes ſixty hours in burning. Ten buſhels of ſea-coal, or one hundred of faggots, three feet long, will burn forty buſhels of chalk, and this will yield thirty buſhels of unſlaked lime. Where chalk is ſcarce, they work up the chalk rubbiſh into a ſort of ſtiff paſte with water, and make it into a ſort of bricks, which they dry in the air, and then burn them into lime in the common way, but this is not quite ſo good as the other. Hot lime taken out of the *kiln*, and mixed into a very ſoft paſte with water, and then mixed with ſand, makes a kind of mortar, very much ſuperior to the common ſort. See LIME.

KILN, *malt*. See MALT.

KILNS *for drying madder, ſaffron*, &c. ſee the reſpective articles.

KILN *for tin-ore*. The place where the tin-ore is roaſted in order to burn away the mundic, and other ſulphureous matters that are mixed with it, is called the *tin-kiln*. This is a very plain ſtructure; its hearth or floor is made of one large ſtone, and this is covered with another, ſupported at ſix inches height above it. The uppermoſt has a hole in the middle, through which the ore is poured on the under one; and when it is diſtributed over it in a bed of three or four inches thick, it is burnt by means of a fire of furze-buſhes kept underneath, and communicating with the ſpace between the two ſtones by an aperture behind; the lower ſtone not reaching the wall by ſix inches.

When the ſulphur is all burnt away by the fire, and the flame is no longer blue, the whole bed of roaſted ore is thruſt off the ſtone by the rake into the aperture behind, through which it falls into the open fire. The fire is kept up with new buſhes, and there is a new bed of ore thrown in at the hole above. Thus the fire is kept up day and night, and ſupplies of freſh ore made through the hole by the black tin brought from the buddles of waſhing troughs. When the lower part of the furnace is filled up with the ore thrown into it, there is a hole behind this *kiln*, through which this ore, and the coals and aſhes are all raked out together, and left in the open air to cool; and the whole maſs thus raked out, will ſometimes be ſeveral days in cooling, the mixture of coals among it keeping it red-hot for a conſiderable time. When it is taken away from behind the furnace, it is waſhed again before it is put into the melting furnace. It is obſerved, that the different ores require for this laſt operation a different proportion, and different ſort of fuel. The moor-tin, that is, ſuch ore as is dug up in the moory countries, melts beſt with moor-coal charred; but that dug on the hills is found to run beſt with a mixture of charcoal and peat in equal quantities. The ſtones uſed for the *kilns* are always moor-ſtone. Phil. Tranſ. Nº 69.

KIMBULA, in *Zoology*, the name of a ſpecies of crocodile found in the iſland of Ceylon, and of a very beautiful variegation of colours, being mottled all over with extremely elegant black ſpots, ſhining with the gloſs of black velvet.

KIN-*bote*, compenſation for the ſlaughter of a kinſman. See BOTE.

KINAKINA *aromatica*, in the *Materia Medica*, a name by which ſome authors have called the *cortex eleutherii*.

KINDRED, in *Law*, are a certain body of perſons of kin, or related to each other. See ADMINISTRATION, AGNATI, COGNATI, CONSANGUINITY, and DEGREES.

KINE, in *Zoology*. See BULL and COW.

KING, a monarch, or potentate, who rules ſingly and ſovereignly over a people.

Camden derives the word from the Saxon *cyning*, which ſignifies the ſame; and that from *can*, *power*, or *ken*, *knowledge*, wherewith every monarch is ſuppoſed to be inveſted. The Latin *rex*, the Scythian *reix*, the Punic *reſch*, the Spaniſh *rey*, the French *roy*, come all, according to Poſtel, from the Hebrew ראש, *roſch*, *chief*, *head*. *Kings*, both among the ancient Greeks and Romans, were prieſts as well as princes. Virgil, ſpeaking of Anius, king of Delos, ſays,

> *Rex Anius, rex idem hominum, Phœbique ſacerdos.*

As to the Romans, Livy and Dionyſius are expreſs; they ſay, that though Numa inſtituted a great number of orders of prieſthood, yet ſome he diſcharged himſelf, and in perſon. After the expulſion of the *kings*, they were obliged to create a *rex ſacrorum*, a *king* of the ſacrifices, for the adminiſtration of the prieſtly part of the royalty.

Lawyers ſay, the *king* of England is a mixed perſon, a prieſt as well as a prince: at his coronation he is anointed with oil, as the prieſts and *kings* of Iſrael were, to intimate that his perſon is ſacred.

Among the Greeks the *king* of Perſia had anciently the appellation of the *great king*; the *king* of France now has that of the *moſt Chriſtian king*; and the *king* of Spain has that of *catholic king*. See CATHOLIC.

The *king* of the Romans is a prince choſen by the emperor, as a coadjutor in the government of the empire.

The *kings* of England, by the Lateran council, under pope Julius II. had the title of *Chriſtianiſſimus* conferred on them; and that of DEFENDER *of the faith* was added by pope Leo X. though it had been uſed by them ſome time before.

The title of *grace* was firſt given to our *kings* about the time of Henry IV. and that of *majeſty* firſt to Henry VIII. before which time our *kings* were called grace, highneſs, &c.

In all public inſtruments and letters, the *king* ſtyles himſelf *nos*, *we*; though all the time of *king* John, he ſpoke in the ſingular number.

The Hungarians formerly gave the name *king* to their queen Mary, to avoid the infamy which the laws of that country caſt upon thoſe that are governed by women: accordingly ſhe bore the title of *king* Mary, till her marriage with Sigiſmund, at which time ſhe took the title of queen.

The laws make it *high* TREASON barely to imagine or intend the death of the *king*; and, becauſe the deſtruction of the *king* may enſue that of his great counſellors or officers, it is felony in any of the *king's* ſervants to conſpire even that; though in other capital caſes, it is a rule, that *voluntas non reputabitur pro facto*; and an Engliſhman ſhall not, in any other caſe, be put to death, unleſs the deed follow the intent. The *king's* office (as he promiſes at his coronation) is to preſerve the rights and privileges of the church, the prerogative of the crown, the laws and cuſtoms of the realm, &c. or, as Forteſcue has it, he is *pugnare bella populi ſui, & eos rectiſſime judicare*. See *Coronation* OATH. He acknowledges no precedence in any other prince but the emperor.

The *king* is conſidered by the laws of England as the head and ſupreme governor of the national church. 26 Hen. VIII. cap. 1. 1 Eliz. cap. 1. In virtue of this authority, he convenes, prorogues, reſtrains, regulates, and diſſolves, all eccleſiaſtical ſynods or convocations.

He has the ſupreme right of patronage, called *patronage paramount*, over all the eccleſiaſtical benefices in England.

He has power, by his prerogative, without any act of parliament, to make war or peace, conclude leagues and treaties, grant ſafe conducts, give commiſſions for raiſing and regulating fleets and armies, as well as for erecting, manning, and governing forts and other places of ſtrength, to appoint ports and havens, to erect beacons, light-houſes, and ſea-marks, to prohibit the exportation of arms or ammunition out of the kingdom, diſpoſe of magazines, caſtles, ſhips, public moneys, &c. He has the ſole power of ſending ambaſſadors to foreign ſtates, and of receiving ambaſſadors at home. He convokes, adjourns, prorogues, and diſſolves parliaments; and may refuſe his aſſent to any bill paſſed by both houſes, without giving his reaſons for it. See DOCTRINE.

He may increaſe the number of members of either houſe at pleaſure, by creating new peers, and beſtowing privileges on other towns for ſending burgeſſes to parliament. But this part of the prerogative of increaſing the number of parliament men in the lower houſe ſeems to be given up by the late *kings*. The *king* is entruſted with the ſole power of conferring dignities and honours, ſo that all degrees of nobility, knighthood, and other titles are received by immediate grant from the crown; either expreſſed in writing, by writs or letters patent, as in the creation of peers and baronets; or by corporeal inveſtiture, as in the creation of a ſimple knight. And as the *king* may create new titles, ſo he may create new offices, but with this reſtriction, that he cannot create new offices with new fees annexed to them, nor annex new fees to old offices; for this would be a tax upon the ſubject, which cannot be impoſed but by act of parliament. The *king* has alſo the prerogative of conferring privileges upon private perſons; ſuch as granting place or precedence to any of his ſubjects; ſuch is alſo the power to enfranchiſe an alien, and make him a denizen. Such is likewiſe the prerogative of erecting CORPORATIONS.

The *king* is alſo the arbiter of commerce. Under this branch of the prerogative he has power to eſtabliſh public marts, or places of buying and ſelling; ſuch as markets and fairs, with the tolls belonging to them; and likewiſe to regulate weights and meaſures; to give money, which is the medium of commerce, authority, or to make it current; and the coining of money is the act of the ſovereign power, and the ſettling of the denomination or value for which the coin is to paſs current. The *king* may alſo at any time decry or cry down any coin of the kingdom, and make it no longer current.

Debts due to him are always to be ſatisfied in the firſt place, in caſe of executorſhip, &c. and till his debt is diſcharged, he may protect the creditor from the arreſts of others. He may diſtrain for the whole debt on a tenant that holds but part of the land; is not obliged to demand his rent as others are; may ſue in what court he pleaſes, and diſtrain where he liſts. In all doubtful caſes, *ſemper præſumetur pro rege:* no ſtatute reſtrains him, unleſs he be particularly named. In all caſes where the *king* is plaintiff, his officers may enter with an arreſt; and, if entrance be denied, break open a houſe, and ſeize the party; though in other caſes a man's houſe is his caſtle, and has a privilege to protect him againſt all arreſts.

He has cuſtody of the perſons and eſtates of ideots and lunatics; he is *ultimus hæres regni*, and to him revert all eſtates, when no heir appears. All treaſure-trove (i. e. money, plate, or bullion, found, and the owners not known) belongs to him; ſo all waifs, eſtrays, wrecks, lands recovered from the ſea, gold and ſilver mines, royal fiſhes, &c. belong to him. See REVENUE. He can unite, ſeperate, enlarge, or contract the limits of biſhopricks, or eccleſiaſtical benefices, and by his letters erect new biſhopricks, colleges, &c. See REGALIA.

He can diſpenſe with the rigour of the eccleſiaſtical laws, except thoſe which have been confirmed by act of parliament, or declared by the bill of rights; as, for a baſtard to be a prieſt, for a biſhop to hold a benefice in commendam, &c. He has alſo power to diſpenſe with ſeveral acts of parliament and penal ſtatutes, by a non-obſtante, where himſelf alone is concerned; to moderate the rigour of the law, according to equity; to pardon a man condemned by law, except in appeals of murder, and in caſe of impeachments by the houſe of commons; and to interpret by his judges, in ſtatutes and caſes not defined by law.

But though he be entruſted with the whole executive power of the law, yet he cannot ſit in judgment in any court; for juſtice muſt be adminiſtered according to the powers committed and diſtributed to the ſeveral courts.

The law eſteems him God's vicegerent on earth, and aſcribes various perfections to him, not belonging to any other man. *Rex eſt vicarius*, ſays Bracton, *et miniſter Dei in terra. Omnis quidem ſub eo eſt, et ipſe ſub nullo niſi tantum ſub Deo.* He is ſaid to have imperial dignity; and in charters before the Conqueſt, is frequently ſtyled *baſileus* and *imperator*, the titles reſpectively aſſumed by the emperors of the Eaſt and Weſt. His realm is declared to be an empire, and his crown imperial, by many acts of parliaments, particularly the ſtatutes 24 Hen. VIII. cap. 12. and 25 Hen. VIII. cap. 28. which at the ſame time declare the *king* to be the ſupreme head of the realm in matters both civil and eccleſiaſtical, and conſequently inferior to no man upon earth, dependant on no man, and accountable to no man. See alſo 24 Geo. II. cap. 24. 5 Geo. III. cap. 27. Hence it is that no ſuit or action can be brought againſt the *king*, even in civil matters; becauſe no court can have juriſdiction over him.

The law alſo aſcribes to the *king*, in his political capacity, abſolute perfection. The *king* can do no wrong; by which ancient and fundamental maxim we are not to underſtand, that every tranſaction of government is of courſe juſt and lawful, but that whatever is exceptionable in the conduct of public affairs is not to be imputed to the *king*, nor is he anſwerable for it perſonally to his people; and farther, that the prerogative of the crown extends not to do any injury; it is created for the benefit of the people, and, therefore, cannot be exerted to their prejudice. In the *king* there is no folly or weakneſs; no injuſtice or error; and, therefore, if the crown ſhould be induced to make an improper grant of any franchiſe or privilege, the law declares that the *king* was deceived in his grant, and thereupon ſuch grant is rendered void, merely upon the foundation of fraud and deception, either by or upon thoſe agents whom the crown had employed. Yet, notwithſtanding this perſonal perfection which the law aſcribes to the ſovereign, the conſtitution has allowed a latitude of ſuppoſing the contrary, in reſpect of both houſes of parliament; each of which, in its turn, hath exerted the right of remonſtrating and complaining to the *king* even of thoſe acts of royalty, which are moſt properly his own; ſuch as meſſages ſigned by himſelf, and ſpeeches delivered from the throne; nevertheleſs, for the ſake of freedom of debate, theſe acts of ſtate are uſually ſuppoſed to proceed from the advice of the adminiſtration. In the *king* likewiſe there can be no negligence or *laches*, and, therefore, no delay will bar his right: *nullum tempus occurrit regi.* In the *king* alſo there can be no infamy, ſtain, or corruption of blood. By his crown he is, *ipſo facto*, cleared of all attainder; no non-age or minority are allowed in him; and his very grants of lands, though held in his natural capacity, cannot be avoided by non-age. Nay more, the law aſcribes a kind of perpetuity, or immortality to him: *rex Angliæ non moritur.* His death is termed his *demiſe*, becauſe the crown is thereby demiſed to another.

He is ſaid not to be liable to death, being a corporation of himſelf, that lives for ever. There is no interregnum, but the moment one *king* dies, his heir is *king*, fully and abſolutely without any coronation, ceremony, &c. To theſe, it may be added, that the law attributes a kind of ubiquity to the *king*; he is in a manner every where, in all courts of judicature, which he alone has the right of erecting, and therefore cannot be nonſuited. The power of iſſuing proclamations is veſted in the *king* alone, conſidered as the fountain of juſtice.

Some things, however, there are which the *king* cannot do; viz. he cannot diveſt himſelf, or ſucceſſors of any part of his regal PREROGATIVE, authority, &c. There are ſeveral things alſo which he cannot do *ſalvo jure, ſalvo juramento, & ſalvo conſcientia ſua*: in particular, there are two things which he cannot do without the conſent of parliament; viz. make new laws, or raiſe new taxes.

KING, *champion of the.* See CHAMPION.

KING, *charters of the.* See CHARTER.

KING, *committee of the.* See COMMITTEE.

KING, *peace of the.* See PEACE.

KING, *quarantain of the.* See QUARANTAIN.

KING, *revenue of the.* See REVENUE.

KING, *ſucceſſion of the.* See CROWN, *right of.*

KING, *tenant of the.* See TENANT.

KING, *widow of the.* See WIDOW.

KING *of the Romans.* See ROMANS.

KING, among the *Hebrew Grammarians*, is an appellation given to a ſpecies of accents anſwering to our colon. See ACCENT.

KING *of the mullets.* See MULLUS *imberbis.*

KING *of the quails.* See DAKER *hen.*

KING *of the ſacrifices, rex ſacrificulus*, or *ſacrorum*, was a title of an ancient prieſt, or miniſter of religion, at Rome; who was ſuperior to the flamen dialis, but inferior to the pontifex maximus.

He was created at the comitia centuriata, or aſſembly of the centuries, and was at firſt choſen out of the number of the patricians. He could not, during his office, hold any magiſtracy, nor harangue the people. He preſided at all the ſacrifices, proclaimed the feaſts, &c.

His wife bore the title of *queen of the ſacrifices, regina ſacrorum*; and had herſelf a part in the ſacred ceremonies.

KING *at arms* or *of arms*, is an officer of great antiquity, and anciently he was of great authority; his buſineſs is to direct the heralds, preſide at their chapters, and have the juriſdiction of armory.

The origin of this title is doubtful. Some of the French writers imagine that it was given to heralds, becauſe they attended upon and regulated military ceremonies. Others attribute to them the ſtyle of *kings*, becauſe they governed and preſided in ceremonies of tournaments, in like manner as the maſter of the ceremonies at Athens was ſtyled *βασιλεα*. Others again aſcribe the title to them, becauſe in aſſigning arms, as expreſſions of honour to any perſon, they reſembled the kingly prerogative. But this ſuppoſes that the cuſtom of granting arms by the *kings* of heralds is as ancient as their titles; whereas Mr. Edmondſon obſerves, in his Complete Body of Heraldry, that it doth not any where appear that theſe *kings* had anciently the addition *armorum* given to them, they being then called, as they truly were, *reges heraldorum*; which for the moſt part continued till about the reign of Henry IV. when they began to be entitled *reges armorum*, although their primitive appellation was alſo uſed for ſome ages. The latter title of *reges armorum* was attributed to them before ſuch time as thoſe officers made any grant of arms.

In England we have three *kings* of arms; viz. Garter, Clarencieux, and Norroy.

Garter, principal KING *at arms.* See GARTER.

The two laſt are alſo called *provincial heralds*, becauſe they divide the kingdom between them into two provinces.

Theſe, by charter, have power to viſit noblemen's families, to ſet down their pedigrees, diſtinguiſh their arms, appoint perſons their arms, and, with *Garter*, to direct the other heralds.

Anciently the *kings at arms* were created, and ſolemnly crowned, by the *kings* of England themſelves; but of later days the earl marſhal has a ſpecial commiſſion, at every creation, to perſonate the *king*.

To theſe may be added *Lyon* KING *at arms*, for Scotland, who is the ſecond *king at arms* for Great Britain; he he is inveſted and crowned with great ſolemnity. To him belong the publiſhing the *king's* proclamations, marſhalling funerals, reverſing arms, &c. And alſo Ulſter *king* of *arms* in Ireland. See College *of Heralds*.

King's-*bench*. See Court *of king's bench*.

King's *evil*. See Evil.

King's *exchange*. See Exchange.

King's *houſhold*. See Houshold, Greencloth, Cofferer, and Revenue.

King's *library*. See Library.

King's *palace*. The limits of the *king's* palace at Weſtminſter extend from Charing-croſs to Weſtminſter-hall, and ſhall have ſuch privileges as the ancient palaces. 28 Hen. VIII. If any perſon ſhall ſtrike another in the *king's* palace, he ſhall have his right-hand cut off, be impriſoned during life, and alſo be fined. 32 Hen. VIII. cap. 12.

King's *prerogative*. See Prerogative, and King.

King's *privy council*. See Privy-*council*.

King's *ſilver*, the money due to the king in the court of common pleas, *pro licentia concordandi*, in reſpect of a licence there granted to any man for levying a fine of lands, or tenements, to another perſon. See Clerk.

King's *ſpear*, *aſphodelus*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flower has no empalement; it is of one leaf, cut into ſix parts, which ſpread open; at the bottom is inſerted a globular nectarium, having ſix valves, and it has ſix ſtamina, which are inſerted in the valves of the nectarium; between the nectarium is placed a globular germen, which becomes a fleſhy ſeed-veſſel, having three cells filled with triangular ſeeds. There are ſix ſpecies. Linnæus mentions only three ſpecies.

The ſeveral ſorts of this plant all flouriſh very well in any ſoil that is not too wet, which is ſubject to rot the roots in winter; and the way to increaſe them, is by parting their roots in Auguſt, before they ſhoot up their freſh green leaves. They may alſo be raiſed from ſeeds ſown in Auguſt, and the Auguſt following the plants produced from theſe may be tranſplanted into beds, and will produce flowers the ſecond year. They muſt not be planted in ſmall borders, among tender flowers, for they will draw away all the nouriſhment, and ſtarve every thing elſe. Miller.

The roots of aſphodel are of an acrimonious taſte, and heating quality; being drank, they promote urine, and the menſes; and the weight of a dram taken in wine, is uſed with ſucceſs in pains in the ſide, coughs, convulſions, and ruptures. They are good againſt bites of ſerpents, and make a good cataplaſm for foul ſpreading ulcers, inflammations, &c. The aſhes of the burnt root, rubbed on an alopecia, cauſe new hair to ſpring.

King's *thanes*. See Thanes.

King's *war*. See War.

King's *wardrobe*. See Wardrobe.

King-*fiſh*. See Opah.

King-*fiſher*, *iſpida*, the *alcedo iſpida* of Linnæus, in *Ornithology*, a very beautiful bird frequenting waters, and feeding on fiſh; it builds in deep holes in the banks of rivers, and lays five, or, according to ſome, nine eggs; it much approaches to the picus or wood-pecker, in many things, but wants its great character, which is the having two toes behind; the legs of this bird are very ſhort, and are black before, and red behind; its colours, particularly its green and blue, which are its general ones, are extremely bright and beautiful; it takes its prey after the manner of the oſprey, balancing itſelf at a certain diſtance over the water for a conſiderable ſpace, then darting below the ſurface, brings up the prey in its feet. While it remains ſuſpended in the air, in a bright day, the plumage exhibits a moſt beautiful variety of very dazzling and brilliant colours. This bird was called *halcyon* by the ancients. Ariſtotle has deſcribed the bird and its neſt, which, according to him, reſembled thoſe concretions that are formed by the ſea-water, and faſhioned in the ſhape of a long necked gourd, hollow within, but ſo narrow at the entrance, that if it overſet, the water could not enter. This neſt was called *halcyoneum*, and had medical virtues aſcribed to it. This neſt was a floating one, and therefore it was neceſſary for the poets who have deſcribed it to place it in a tranquil ſea, and to ſupply the bird which charms to allay the fury of a turbulent element during its incubation; for it had, at that ſeaſon, power over the ſeas and winds. During the days of this bird's incubation, in the depth of winter, the mariner might ſail in full ſecurity; and, therefore, they are called Halcyon *days*. See *Tab.* III. *of Birds*, N° 27.

King-*piece*, in any buildings, is a piece of timber ſtanding upright in the middle, between two principal rafters, and having ſtrutts or braces going from it to the middle of each rafter.

KINGDOM, among *Chemiſts*, is a term which they apply to each of the three orders or claſſes of natural bodies; *animal*, *vegetable*, and *mineral*.

KINGS, *books of*, two canonical books of the Old Teſtament, ſo called, becauſe they contain the hiſtory of the *kings* of Iſrael and Judah, from the beginning of the reign of Solomon, down to the Babyloniſh captivity, for the ſpace of near ſix hundred years. The firſt book of *Kings* contain the latter part of the life of David, and his death; the flouriſhing ſtate of the Iſraelites under Solomon, his building and dedicating the temple of Jeruſalem, his ſhameful defection from the true religion, and the ſudden decay of the Jewiſh nation after his death, when it was divided into two kingdoms: the reſt of the book was taken up in relating the acts of four *kings* of Judah and eight of Iſrael. The ſecond book, which is a continuation of the ſame hiſtory, is a relation of the memorable acts of ſixteen *kings* of Judah, and twelve of Iſrael, and the end of both kingdoms, by the carrying off the ten tribes captive into Aſſyria by Salmanaſſar, and the other two into Babylon by Nebuchadnezzar.

It is probable that theſe books were compoſed by Ezra, who extracted them out of the public records, which were kept of what paſſed in that nation.

KINK-*cough*. See Chin-*cough*.

KINKS, in the *Sea Language*. When ropes are new, or too hard laid, they are apt in foldings to make turns, which are called *kinks*.

KINNOR, in the *Jewiſh Antiquities*. See Cinyra, and Chinnor.

KINTAL, or Quintal, a weight of one hundred pounds, more or leſs, according the different uſage of divers nations.

The *kintal* of Smyrna is 123 pounds 3 ounces 9 drachms, or 120 pounds 7 ounces 12 drachms; but that of Aleppo is 465 pounds 11 ounces 15 drachms.

KIPE, a kind of ozier baſket, wide in the middle, and narrow at both ends; uſed for taking fiſh.

Kipe is alſo a game, which conſiſts in throwing ſomething into a hole, called the *kipe* hole.

KIPPER. See *Salmon* Fishery.

Kipper-time, a ſpace of time between the feſtival of the the finding of the Holy Croſs, May the third, and Twelfth-day; during which, ſalmon-fiſhing in the river Thames, from Graveſend to Henley, is forbidden by Rot. Parl. 50 Edw. III.

KIRK-MOTE, a ſynod. See Synod.

Sometimes the word is alſo taken for a meeting in the church, or veſtry. See Mote.

KIRK-SESSIONS, the name of a petty eccleſiaſtical judicatory in Scotland. Each pariſh, according to its extentent, is divided into ſeveral particular diſtricts, every one of which has its own elder and deacon to overſee it. A conſiſtory of the miniſters, elders, and deacons of a pariſh, form a *kirk-ſeſſions*.

Theſe meet once a week, the miniſter being their moderator, but without a negative voice. It regulates matters relating to public worſhip, elections, catechizing, viſitations, &c. It judges in matters of leſs ſcandal; but greater, as adultery, are left to the preſbytery; and in all caſes an appeal lies from it to the preſbytery.

KIRTLE, a term uſed for a ſhort jacket; alſo for a quantity of flax about a hundred weight.

KIS, in *Natural Hiſtory*, a name given by ſome people to the common pyrites; and by others to a peculiar kind of it, containing copper, and a ſmall quantity of ſilver.

KISSINA, in *Botany*, a name by which ſome authors called the tree, whoſe wood is the *agallochum*, or lignum-aloes of the ſhops.

KIST, a word uſed by Paracelſus as the name of a weight, equal to fourteen grains.

KIT, in *Muſic*, the name of a ſmall violin of ſuch form and dimenſion as to be capable of being carried in a caſe or ſheath in the pocket. Its length, meaſuring from the extremities, is about ſixteen inches, and that of the bow about ſeventeen. Small as this inſtrument is, its powers are coextenſive with thoſe of the violin.

KITCHEN, a room appropriated to the dreſſing of meat, and furniſhed with ſuitable accommodations and utenſils for that purpoſe. See Building.

The *kitchen* in the king's houſhold is under the direction and management of a clerk-comptroller, who has a ſalary of 500 l. a year, ſubordinate clerk at 250 l. a year, firſt clerk at 150 l. a year, junior clerks, two maſter-cooks, the ſalary of the firſt being 237 l. 10 s. a year, and of the ſecond 217 l. 10 s. a year, yeomen, grooms, &c.

KITCHEN-*Garden*. See Garden.

KITE, *falco milvus* of Linnæus, in *Ornithology*, the Engliſh name of a bird of the hawk-kind, with a brown body, and a white head, ſometimes marked with oblong ſtreaks of black; its tail is forked, and of a tawny red, and the wings are immoderately long and large, meaſuring near three times the length of the body; the coverts of the wings are varied with tawny black and white; the thighs are covered with very long feathers; and the legs are yellow and ſtrong. The *kite* generally breeds in large foreſts, or woody mountainous countries: it lays two or at moſt three eggs. Its motion in the air diſtinguiſhes it from all other birds; being ſo ſmooth and even as to be ſcarce perceptible; ſometimes it will remain quite motionleſs for a long while: at other times, glide through the ſky, without the leaſt apparent action of its wings, from whence it derived the old name *glead*, of the Saxon *glida*. Lord Bacon obſerves, that when *kites* fly high, it portends fair and dry weather. Pliny thinks that the invention of the rudder aroſe from the obſervation made of the various motions of the tail, when the *kite* was ſteering through the air. Lib. x. cap. 10.

It remains with us the whole year; but in many other countries is a bird of paſſage.

The whole bird is of uſe in medicine. The aſhes of the bird burnt, are ſaid to be effectual in the gout and epilepſy, being taken inwardly: the ſame is ſaid of the head and liver when burnt; and the latter alſo is an ingredient in ophthalmic medicines: the blood mixed with nettles and applied, is ſaid to give relief under the gout: the gall enters the compoſition of collyria for the eyes; and the fat is uſed to anoint parts pained with the gout.

KITE, in *Electricity*. See CONDUCTOR.

KITTIWAKE, in *Ornithology*, a ſpecies of the GULL kind, being the *larus riſſa* of Linnæus: the head, neck, belly and tail are of a ſnowy whiteneſs; behind each ear is ſometimes a duſky ſpot; the back and wings are grey; the bill is yellow, tinged with green; the legs are duſky, and have a ſmall knob inſtead of the back toe. This bird inhabits the romantic cliffs of Flamborough-head, the Baſs iſle, the rocks near the caſtle of Slains, in the county of Aberdeen, and Prieſtholm-iſle. The young of theſe birds are a favourite diſh before dinner, for whetting the appetite, in North Britain, but they have a rank taſte and ſmell. Pennant.

KIZILBASCH, or **KEZELBASCH**, a Turkiſh term ſignifying *red-head*: applied by way of obloquy to the Perſians, ever ſince Iſhmael Sophi, founder of the family laſt reigning in Perſia, who ordered his ſoldiers to wear a red cap, round which is a ſcarf or turban with a dozen plaits in it, in memory of twelve imams, ſucceſſors of Ali, from whom he pretended to deſcend.

Viginere writes the word *kezeilbaſs*, and adds, that according to the vulgar interpretation among the Perſians, the twelve plaits ſignify the twelve ſacraments of their law. But not contented with this, he looks out for another original, and tells us there is a myſtery in it, derived from the ancient paganiſm, when the Perſians adored fire, whoſe heat is denoted by the red colour, which in ſome meaſure ſymbolizes with the ſun, held by them in the higheſt veneration. He adds, that the twelve plaits ſhew the twelve months of the year, and twelve ſigns in which that luminary performs his courſe.

KLEINIA, in *Botany*. See *Foreign* COLTSFOOT.

KLEINHOVIA, in *Botany*, a genus of the *gynandria decandria* claſs: the characters of which are, that it is monogynous; the calyx is five-leaved; the petals are five; the nectarium is campanulated, pedunculated and ſtaminiferous; the fruit is an inflated capſule, containing five grains. There is only one ſpecies.

KLIMIA, or **CLIMIA**, in the *Materia Medica*, the name given by the Arabian writers to the *lapis calaminaris*. Avicenna and Serapion never call it by any other name. Some pronounce the word *calimia*. Hence the modern Greeks have formed their *celimia*, which is the name of the ſame ſubſtance; and our *calminaris* is evidently deduced from the ſame original.

KLINKETS, in *Fortification*, a ſort of ſmall gates made through paliſadoes, for ſallies.

KLIP *fiſh*, in *Ichthyology*, a name by ſome authors ſuppoſed to mean the *lupus piſcis* or wolf-fiſh; and by others, the common cod-fiſh.

Of the former opinion is Fabricius, who ſuppoſes the lupus ſo called, becauſe it is able to climb up rocks, or generally lies hid among rocks: the word *klip*, in the German ſignifying a *rock*. Of the other is Schonefeldt, who ſuppoſes the cod has its name of *klip-fiſh*, or rock-fiſh, from its being uſually dried upon the rocks.

KLIP-*fiſh*, is alſo a name by which the Dutch in the Eaſt Indies call a flat fiſh, caught frequently on thoſe ſhores, and ſometimes called alſo *ſoldaten viſch*, or the ſoldier's fiſh. It ſomewhat reſembles the bream in ſhape. Its general ſize is about ſix or ſeven inches in length, and it is of a very white and ſilvery hue. It differs very greatly, however, from the bream in many particulars. The nerves of its back-fin are prickly as in the pearch; its tail is pointed, not forked; and the iriſes of its eyes are yellow. It is one of the fineſt fiſh of the Eaſt-Indies. Its fleſh is very firm, and falls into large pieces, when dreſſed, like that of the cod, and is very well taſted.

KNAG, a term uſed by country people for a knot in wood; alſo for the branches which grow out in the hart's horn, near the forehead.

KNAPSACK, in *Military Language*, is a rough leather bag, which a ſoldier carries on his back, containing all his neceſſaries. Square *knapſacks* are moſt convenient, and ſhould be made with a diviſion to hold the ſhoes, black-balls, and bruſhes, ſeparate from the linen. White goat ſkins are the beſt.

KNAPWEED, *jacea*, in *Botany*, ſee CENTAURY.

KNAVE, an old appellation for a man ſervant, and ſo uſed in 14 E. III. ſtat. 1. cap. 3.

The word is formed from the Saxon *cnapa*, or Flemiſh *knape*, which ſignify the ſame.

KNAVE alſo ſignifies a male-child or boy: in which ſenſe *knave-child* has been frequently uſed, in contradiſtinction to a *girl*; and in this ſenſe Wickliff uſes the word in his tranſlation of Exod. i. 16. and other places of the Bible. In the old Saxon tranſlation of Mat. viii. 6. *Puer meus jacet in domo paralyticus*, was termed *Myn knapa*.

KNAVE has ſometimes alſo been uſed as an addition; as Willielmus Cowper de Denbigh, *knave*, &c.

It is a common opinion, that Rom. i. 1. was tranſlated, *Paul a knave of Jeſus Chriſt*. This miſtake was occaſioned by a Bible in the duke of Lauderdale's library, where the word *kneawe* is inſerted in leſs characters than the others, and a raſure might eaſily be diſcerned.

KNAVE-*line*, in a *Ship*, a rope faſtened to the croſs-trees, under the main or fore-top, whence it comes down by the ties to the ram-head, and there it is reeved through a piece of wood of about two feet long, and ſo is brought to the ſhip's ſide, and there haled up taught to the rails.

KNAUTIA, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe: it has ſeveral floſcular flowers, incloſed in one common cylindrical empalement, which have their petals ranged ſo as to appear like a regular flower, but each ſeparate floſcule is irregular; in the bottom of each floret is ſituated the germen, attended by four ſtamina; which germen changes to a ſingle, oblong, naked, ſeed. Miller mentions one ſpecies, which is nearly of a kin to the ſcabious; but Linnæus two.

KNAWEL, in *Botany*. See SCLERANTHUS.

KNECK, in the *Sea Language*, the twiſting of a rope or cable, as it is veering out.

KNEE, *genu*, in *Anatomy*, the articulation of the thigh and leg-bones. See FEMUR and TIBIA.

The mucilaginous glands of the *knee*, which lie near the edges of the patella, are very remarkable; they are diſpoſed in fringes, and ſupported by a great quantity of fatty matter, which in ſome meaſure makes one maſs with them. This common maſs is contained within the capſular ligament, and on the ſide of the joint is covered by a very fine membrane, which likewiſe lines the inner ſurface of the ligament. The glandulous ſubſtance is eaſily diſtinguiſhed from the fat by the reddiſh colour of the capillary veſſels, which ſurround the glands. The ſuperior portion of this maſs is, as it were, ſupported by a ſmall ligament, fixed in the anterior part of the great common notch of the condyles of the os femoris, and which from thence runs to the upper part of the patella.

There are alſo other mucilaginous glands, both above and below the edges of the ſemilunar cartilages, and likewiſe in the ham: ſome of theſe ſerve for the joint, and the others for the crucial ligaments. Theſe laſt lie in folds formed by the internal membrane of the capſular ligament, which give particular coverings to the crucial ligaments, and to the other bundles of ligamentary fibres near them. Winſlow.

KNEE, *dropſy of the*. See DROPSY.

KNEE, *luxated*. A luxation of the *knee* is a receding of the tibia from under the femur. The leg is ſometimes thus luxated from the baſis of the thigh-bone on the outſide, ſometimes on the inſide, and ſometimes backward, but very rarely or never forward, unleſs it be forcibly driven with great violence that way; for the patella is bound againſt the articulation forwards, by the ſtrong tendons of the muſcles which extend the leg; nor is it indeed eaſy for the bones of the leg to be wholly diſplaced from that of the thigh, ſo as to make a perfect luxation of the *knee*, by reaſon of the great ſtrength of the ligaments, and the two deep ſinuſes, which receive the head of the thigh bone, unleſs thoſe ſtrong ligaments ſhould happen to be broken aſunder at the ſame time. This is the reaſon alſo why people, who ſuffer a perfect luxation of the *knee*, are generally tortured with the moſt violent and excruciating pains, and convulſions; and if they eſcape the miſchiefs uſually attending ſuch ſymptoms, they are generally troubled afterward with a lameneſs and ſtiffneſs of the joint; but ſlight or imperfect luxations of this joint are uſually very ſpeedily and eaſily cured. The patient in this caſe is to be ſeated on a bed, bench, or table, and one aſſiſtant is to hold the thigh firmly above the knee, and another ſtrongly to extend the leg, while the ſurgeon replaces the bones by his hands and *knee*, in their natural ſituation. If the hands and ſlings are not ſufficient, in this caſe, to make a proper extenſion, recourſe muſt be had to the pullies, generally uſed on ſuch occaſions: but in children and young perſons, great care muſt be taken not to make the extenſion ſo violent, as to ſeparate the epiphyſes from the bones, to which they are, in ſuch ſubjects, not yet firmly united. After the luxation is properly reduced, the *knee* is to be bound up with a proper bandage, and placed in a frame or caſe, ſo as to be kept at reſt for a proper time. Heiſter, p. 172.

KNEE-*Pan*. See PATELLA.

KNEE, in the *Manege*, is the joint of the fore quarters, that joins the fore thigh to the ſhank.

KNEES, in a *Ship*, thoſe crooked pieces of timber, bowed like a *knee*, that bind the beams and futtocks together, being bolted faſt into them both. Some of theſe ſtand right up and down, ſome along-ſhip. They are uſed about all the decks; ſome hewed to that form, and others naturally ſo, which are certainly the beſt for ſervice. See CARLINE.

KNEE *of the head*, in a *Ship*, a large flat piece of timber, fixed edgeways upon the fore-part of a ſhip's ſtem, and ſupporting the ornamental-figure or image, placed under the bowſprit; it is the ſame with the *cut-water*.

KNEE-*timber*, in a *Ship*, the ſame with the *cut-water*, which is called the *knee of the head*.

KNEE-*holm*, or **KNEE** *holly*. See BUTCHER'S *Broom*.

KNEELING. See GENUFLEXION.

KNEVELS, in a *Ship*. See KEVELS.

KNIFE is a well known inſtrument made for cutting, and adapted in form to the uſes for which it is deſigned.

Knives are ſaid to have been firſt made in England in 1563, by one Matthews, on Fleet-bridge, London. Anderſ. Hiſt Com. vol. i. p. 402.

Surgeons have various ſorts of *knives*. See BISTOURY and *Tab. Surgery*, *Fig.* 4—8.

KNIGHT, *Eques*, among the *Romans*, was the ſecond degree of the nobility; following immediately that of the ſenators.

At the time of building the city of Rome, the whole army of Romulus conſiſted of three thouſand foot, and three hundred horſe, which three hundred horſe were the original of the Roman *equites*, or *knights*. Theſe made the ſecond order that had places in the ſenate.

Manutius and Sigonius are of opinion, that beſide the equeſtrian order, and thoſe *knights* immediately below the ſenators, Romulus inſtituted a military order, whereof the Roman cavalry was compoſed. But no ancient author takes notice of any order of knighthood inſtituted on purpoſe for the war, nor any other *knights* but thoſe three hundred, which, as we have obſerved, were the firſt foundation of the equeſtrian order.

The *knights* had horſes kept for them at the public charge; but when they were admitted among the ſenators, they reſigned that privilege: to be a *knight*, it was neceſſary they ſhould have a certain revenue, that their poverty might not diſgrace the order; and when they failed of the preſcribed revenue, they were expunged out of the liſt of *knights*, and thruſt down among the plebeians. Ten thouſand crowns are computed to have been the revenue required.

The *knights* grew ſo very powerful, that they became a balance between the power of the ſenate and the people. They neglected the exerciſes of war, and betook themſelves principally to civil employments in Rome; inſomuch that Pliny obſerves, in his time, they had no longer a horſe kept at the public expence.

Some ſay, that the order of *knights*, as diſtinct from the people, did not begin before the time of the Gracchi: others ſay the privilege was then firſt granted them, that no judge ſhould be choſen but out of their order: ſome time after which they admitted them into the ſenate. This, however, is certain, it was only from that time that a certain revenue was neceſſary, and that this intitled them to the knighthood, without being deſcended from ancient *knights*.

KNIGHT, in a more modern ſenſe, properly ſignifies a perſon, who for his virtue and martial proweſs, is, by the king, raiſed above the rank of gentlemen, into a higher claſs of dignity and honour.

The word *knight*, in its original German, *knecht*, ſignifies *a ſervant*; and has ſince been uſed for a ſoldier, or man of war. We have but one inſtance among us where *knight* is uſed in the firſt ſenſe, and that is in *knight of the ſhire*, who properly *ſerves* in parliament for ſuch a county. In the Latin, French, Spaniſh, Italian, and Dutch languages, *knight* is expreſſed by a word which properly ſignifies a *horſeman*, as being uſually employed on horſeback. Indeed our common law calls them *milites*, *ſoldiers*, becauſe they uſually held lands in *knight* ſervice, to ſerve the king as ſoldiers in his wars; in which ſenſe the word *miles* was uſed *pro vaſſallo*.

Knighthood was the firſt degree of honour in the ancient armies, and was uſually conferred with a great deal of ceremony on thoſe who had diſtinguiſhed themſelves by ſome notable exploit in arms. They were originally ſaid to be adopted, *adoptabantur in militem*, which we now called *dubbed*; as being ſuppoſed, in ſome meaſure, the ſons of him who knighted them.

The ceremonies at the creation of a *knight* have been various. The principal were a box on the ear, and a ſtroke with a ſword on the ſhoulder. Then they put on him a ſhoulder-belt, gilt ſword, ſpurs, and the other military accoutrements; after which, being armed as a *knight*, he was led in great pomp to the church.

The manner of making a *knight* with us, is deſcribed by Camden in a few words: *Qui equeſtrem dignitatem ſuſcipit, flexis genibus leviter in humero percutitur: princeps his verbis Gallice affatur:* Sus vel ſois chevalier au nom de Dieu, *ſurge vel ſis eques in nomine Dei.* This is meant of *knights-bachelors*, which are the loweſt, though the moſt ancient order of knighthood among us; for we have an inſtance of king Alfred's conferring this order on his ſon Athelſtan. Will. Malmſb. lib. ii.

Knights grew ſo very numerous, that the dignity became of much leſs repute. Charles V. is ſaid to have made five hundred in a ſingle day: on which account, therefore, new orders of knighthood were inſtituted, in order to diſtinguiſh the more deſerving from the croud. For the ſeveral kinds of *knights* among us, ſee BACHELOR, BANNERET, BARONET, BATH, GARTER, &c.

KNIGHT is alſo underſtood of a perſon admitted into any order, either purely military, or military and religious, inſtituted by ſome king or prince, with certain marks and tokens of honour and diſtinction.

Such are the *knights of the Garter*, *of the Elephant*, *of the Holy Ghoſt*, *of Malta*, &c. All which ſee under GARTER, ELEPHANT, &c.

KNIGHTHOOD, a military order, or honour; or a mark or degree of ancient nobility, or reward of perſonal virtue and merit.

There are four kinds of *knighthood*; *military*, *regular*, *honorary* and *ſocial*.

KNIGHTHOOD, *Military*, is that of the ancient knights, who acquired it by high feats of arms.

Theſe are called *milites*, in ancient charters and titles, by which they were diſtinguiſhed from mere *bachelors*, &c. Theſe knights were girt with a ſword, and a pair of gilt ſpurs; whence they were called *equites aurati*.

Knighthood is not hereditary, but acquired. It does not come into the world with a man like nobility; nor can it be revoked. The ſons of kings, and kings themſelves, with all other ſovereigns, heretofore had *knighthood* conferred on them as a mark of honour. They were uſually knighted at their baptiſm or marriage, at their coronation, before or after a battle, &c.

KNIGHTHOOD, *Regular*, is applied to all military orders, which profeſs to wear ſome particular habit, to bear arms againſt the infidels, to ſuccour and aſſiſt pilgrims in their paſſage to the Holy Land, and to ſerve in hoſpitals where they ſhould be received; ſuch were the knights Templars, and ſuch ſtill are the knights of Malta, &c.

KNIGHTHOOD, *Honorary*, is that which princes confer on other princes, and even on their own great miniſters and favourites; ſuch are knights of the Garter, St. Michael, &c.

KNIGHTHOOD, *Social*, is that which is not fixed, nor confirmed by any formal inſtitution, nor regulated by any laſting ſtatutes; of which kinds there have many orders been erected on occaſion of factions, of tilts and tournaments, maſquerades, and the like.

The abbot Bernardo Juſtiniani, at the beginning of his hiſtory of *knighthood*, gives us a complete catalogue of the ſeveral orders: according to this computation, they are in number ninety-two. Favin has given us two volumes of them under the title of Theatre d'Honneur & de Chevalrie. Menenius has publiſhed Deliciæ Equeſtrium Ordinum, and Andr. Mendo has written de Ordinibus Militaribus. Beloi has traced the original, and Geliot, in his Armorial Index, has given us their inſtitutions.

To theſe may be added, Father Meneſtrier de la Chevalerie Ancienne & Moderne, Michieli's Treſor Militaire, Caramuel's Theologia Regolare, Miræus's Origines Equeſtrium ſive Militarium Ordinum: but above all, Juſtiniani's Hiſtorie Chronologiche dell' Origine degl' Ordine Militari, e di tutte le Religione Cavalereſche: the edition which is fulleſt, is that of Venice in 1692, in two vols. fol.

KNIGHT *Marſhall.* See MARSHALL.

KNIGHTS *of St. Ampulla.* See AMPULLA.

KNIGHTS *of Annunciata.* See ANNUNCIATA.

KNIGHTS *of St. Anthony.* See ANTHONY.

KNIGHTS *of St. Bridget.* See BRICIANI.

KNIGHTS *of St. Catharine of Mount Sinai.* See CATHARINE.

KNIGHTS *of the Chapel.* See CHAPEL.

KNIGHTS *of Chriſt.* See CHRIST.

KNIGHTS *of the Collar.* See COLLAR.

KNIGHTS *of the Dragon.* See DRAGON.

KNIGHTS *of the Ermine.* See ERMINE.

KNIGHTS-*Errant*, a pretended order of chivalry, whereof ample mention is made in the old romances.

They were a kind of heroes, who travelled the world in ſearch of adventures, redreſſing wrongs, reſcuing damſels, and taking all occaſions of ſignalizing their prowefs. This romantic bravery of the old *knights* was heretofore the chimera of the Spaniards; among whom there was no cavalier but had his miſtreſs, whoſe eſteem he was to gain by ſome heroic action. The duke of Alva, notwithſtanding his age and gravity, is ſaid to have vowed the conqueſt of Portugal to a young lady.

KNIGHTS *of St. George.* See GEORGE.

KNIGHTS *Hoſpitalers.* See HOSPITALERS and MALTA.

KNIGHTS *of St. Louis.* See LOUIS.

KNIGHTS *of Malta.* See MALTA.

KNIGHTS *of St. Mark.* See ST. MARK.

KNIGHTS *of Mary.* See MARY.

KNIGHTS *of the Mine.* See MINE.

KNIGHTS *of Mount Carmel.* See CARMEL.

KNIGHTS *Rad.* See RAD.

KNIGHTS *of the Round Table.* See TABLE.

KNIGHTS *of the Temple.* See TEMPLARS.

KNIGHTS *Teutonic.* See TEUTONIC.

KNIGHTS *of the Thiſtle.* See THISTLE.

KNIGHTS *of the Shire*, or KNIGHTS *of Parliament*, are two gentlemen of worth, choſen on the king's writ in pleno comitatu, by ſuch of the freeholders of every county as have the value of 40s. per ann. within the county, clear of all taxes and deductions except parliamentary and parochial taxes, to repreſent ſuch county in parliament.

This qualification of electors for *knights* of the ſhire or county members, is ſettled by ſtat. 8 Hen VI. c. 7. and 10 Hen. VI. c. 2. According to the eſtimate of biſhop Fleetwood, in his Chronicon Precioſum, 40s. in the reign of Henry VI was equal to 12*l. per annum* in the reign of Queen Anne; and as the value of money has been lowered ſince, Judge Blackſtone concludes that 12*l.* in the biſhop's days muſt have been equivalent to 20*l.* at preſent. The other qualifications of the electors for counties in England and Wales, collected from ſtatutes are; that no perſon under twenty-one years of age ſhall be capable of voting; nor any perſon convicted of perjury or ſubornation of perjury: that no perſon ſhall vote in right of any freehold granted to him fradulently to qualify him to vote: that every voter ſhall have been in the actual poſſeſſion or receipt of the profits of his freehold to his own uſe for twelve calendar months before, except it came to him by deſcent, marriage, marriage ſettlement, will, or promotion to a benefice or office: that no perſon ſhall vote in reſpect of an annuity or rent-charge, unleſs regiſtered with the clerk of the peace twelve calendar months before: that in mortgaged or truſt eſtates, the perſon in poſſeſſion ſhall have the vote: that only one perſon ſhall be admitted to vote for any one houſe or tenement, to prevent the ſplitting of freeholds: that no eſtate ſhall qualify a voter, unleſs the eſtate has been aſſeſſed to ſome land-tax aid, at leaſt twelve months before the election: and that no tenant by copy of court-roll ſhall be permitted to vote as freeholder. 7 and 8 W. III. c. 25. 10 Ann c. 23. 2 Geo. II. c. 21. 10 Geo. II. c. 18. 31 Geo. II. c. 14. 3 Geo. III. c. 24.

Theſe *knights*, when every man who had a knight's-fee was cuſtomarily conſtrained to be a *knight*, were of neceſſity to be *milites gladio cincti*, for ſo the writ runs to this day; but now cuſtom admits eſquires to be choſen to this office.

It is required by 23 Hen. VI. c. 15. that all *knights* of the ſhire ſhall be actual *knights*, or ſuch notable eſquires and gentlemen as have eſtates ſufficient to be *knights*; and by no means of the degree of yeomen: and more preciſely by 9 Ann. c. 5. that every *knight* of the ſhire ſhall have a clear eſtate of freehold or copyhold to the value of 600*l. per annum*, except the eldeſt ſons of peers and of perſons qualified to be *knights* of ſhires. For other qualifications, ſee PARLIAMENT.

The expences of *knights* of the ſhire are to be defrayed by the country, during their ſitting in parliament, at the rate of four ſhillings a day. This rate of wages was eſtabliſhed in the reign of Edw. III. See alſo 35 Hen. VIII. c. 11. It is hardly neceſſary to add, that theſe are never now required.

KNIGHTS *Croſs*, in *Botany.* See CAMPION.

KNIGHTS, in a *Ship*, two thick, ſhort pieces of timber, uſually carved in the figure of ſome head, having in each four ſhivers, three for the halliards, and one for the top-ropes to run in. One of them ſtands abaft the main-maſt, and for that reaſon is called the *main-knight.* The other ſtands abaft the fore-maſt, on the ſecond deck, and is called the *fore-knight.*

KNIGHTS *fee*, an ancient law-term, ſignifying ſo much land of inheritance as was eſteemed ſufficient to maintain a knight with ſuitable retinue; which, in Henry the Third's days, was reckoned at 15*l. per ann.* And by a ſtat. 1 Edw. II. ſuch as had 20*l. per ann.* in fee, or for life, might be compelled to be knights. But this ſtatute is repealed 17 Car. I. Sir T. Smith rates a *knight's fee* at 40l. yearly. According to Coke, a *knight's fee* contained twelve carucates, or plough-lands. Stow ſays, that there were found in England, at the time of the Conqueror, 60,211 *knight's fees*; according to others there were 60,215; whereof the religious houſes, before their ſuppreſſion, were poſſeſſed of 28,015. See FEE.

KNIGHTS *ſervice, ſervitium militare*, a tenure whereby ſeveral lands in this nation were anciently held of the king; which drew after it homage, ſervice in war, eſcuage, wardſhip, marriage, &c. but taken away by the ſtatute 12 Car. II. c. 24.

KNIGHTEN-*gild*, in our *Old Writers*, a *gild* or company in London, conſiſting of nineteen knights, which king Edgar founded, giving them a portion of void ground lying within the walls of the city, now called Portſoken-ward.

KNITTLE, in *Sea Language*, a ſmall line, which is either plaited or twiſted, and uſed for various purpoſes at ſea, as to faſten the ſervice in the cable, to reef the ſails by the bottom, and to hang the hammocs between decks, &c.

KNOCKING *Mill.* See STAMPING.

KNOLL, a term uſed in many parts of the kingdom, for the top of a ſmall hill, or for the hill itſelf.

KNOTS, in *Gardening*, a term uſed to expreſs the rudiments of the firſt branches of plants, as they grow up from the ſeed. Thus in the melon the two firſt leaves or ſeed-leaves, are called the ears, and the branches that grow from them are called according to the order of their growth, the firſt, ſecond and third *knots.* Mr. Quintiny's famous method of raiſing the beſt melons, depended principally on the cutting off every third *knot* of the plant as they grew up. Philoſ. Tranſ. N° 45.

In trees, the *knot* denotes that part from whence it ſhoots out branches, roots, or even fruit.

The wood is harder and cloſer in the *knots* than in any other part, but is alſo more ſubject to ſplit there.

The uſe of the *knots* of plants is to ſtrengthen the ſtem: they ſerve alſo as ſearces to filtrate, purify, and refine, the juice raiſed up for the nouriſhment of the plant.

KNOT, on *board a ſhip*, is a large knob formed on the extremity of a rope by untwiſting the ends thereof and interweaving them regularly amongſt each other. Of this there are ſeveral ſorts; the chief of which are, the *wale-knot*, which is ſo made with the lays of a rope, that it cannot ſlip, and ſerves for ſheats, tacks, and ſtoppers. The *bow-line-knot* is ſo firmly made, and faſtened to the crengles of ſails, that they muſt break, or the ſails ſplit, before it will ſlip; the *ſheep-ſhank-knot*, which ſerves to ſhorten a rope without cutting it, which may be preſently looſened; the diamond *knot*, the roſe *knot*, &c. The *knots* are generally uſed to faſten one rope to another, by means of a ſmall chord attached to the neck of the *knot*, called the laniard, which is firmly tied about both ropes. They are alſo deſigned to prevent the end of a rope from ſliding through an eye, which the *knot* is intended to confine in a particular ſituation.

KNOT-*berries.* See RASPBERRIES.

KNOT-*graſs, polygonum*, in *Botany*, the name of a genus of plants, of the *octandria trigynia* claſs, the characters of which are theſe: the flower is of the apetalous kind, being compoſed only of a number of ſtamina ariſing from a funnel-ſhaped cup, divided into many ſegments at the edge; the piſtil finally becomes an angular ſeed, which is covered by a capſule that was originally the cup of the flower; to this may be added, that the flowers grow in the alæ of the leaves, and that the roots are fibrous. The ſpecies of *knot-graſs* enumerated by Linnæus are twenty-ſeven.

The ancients as well as moderns have deſcribed the common kinds of *knot-graſs* under the name of *polygonum*; but as they have alſo given the ſame appellation to another plant, much error has ariſen by miſtaking theſe ſynonyms;

Pliny began the miſtake, and others have ſince in great numbers ſallen into it, thinking Pliny's example to be a ſufficient excuſe.

The common great *knot-graſs* is eſteemed a very powerful aſtringent It is generally uſed in infuſion, and is ſaid to have great virtue in ſtopping hæmorrhages of all kinds.

Knot-grass, *mountain.* See Whitlow-*Graſs*.

Knots of the log-line, at ſea, are the diviſions of it. See Log.

Knot, in *Medicine*, a protuberance in the joints of old gouty people conſiſting of a thick, viſcous, crude, indigeſted pituita, accompanied with a bilious humour, hot and acrimonious; the groſſeſt and moſt terreſtrial part whereof clogs and is converted into a ſtony ſubſtance like chalk.

Knots appear to be generated like ſtones in the bladder.

Phyſicians ſometimes alſo call them nodes and tophi. See Tophus and Node.

Knot is alſo uſed for the intrigue of a romance, or dramatic piece; being that part where the perſons are the moſt embarraſſed, by a conjuncture of affairs, whoſe end it is not eaſy to foreſee.

Ariſtotle, under this term, includes all the incidents of a tragedy, from its beginning to the place where it begins to unravel. The *knot* holds as long as the mind is kept ſuſpended about the event. The *knot* ought always to laſt to the middle of the fifth act, otherwiſe the reſt of the piece languiſhes.

Knot, *Order of the*, was the name of a military order in the kingdom of Naples, inſtituted in 1352, by queen Jane I. on occaſion of the peace eſtabliſhed between her and the king of Hungary, by means of her marriage with Louis prince of Tarentum.

The order conſiſted of ſixty knights: Clement VI. approved this order, and gave it the rule of St. Baſil: it choſe St. Nicholas for its protector; but it dwindled away after the death of its foundreſs.

Knot, in *Ornithology*, the name of an Engliſh bird of the ſnipe-kind, not known among authors by any particular Latin name, unleſs it be the *calidrys nigra*, or black calidrys of Bellonius, which is doubtful from his deſcription; and ſaid to have obtained its Engliſh name from Canute, one of the Daniſh kings of this iſland, who was particularly fond of it; it is the *tringa Canutus* of Linnæus. It is ſeldom of more than two ounces and a half in weight; its head and back are of a greyiſh brown; its rump is variegated with black and grey; its breaſt and belly are white, and its ſides browniſh, in ſome, but not in all the birds of this ſpecies, there is on each ſide of the head a white ſtreak, running from the angles of the beak to the eyes; the long feathers of the wings are black and white; and the tail, which is two fingers breadth and a half in length, has its feathers tipped with white at the ends; its beak is a finger's breadth and a half long, and is black, but it is ſtronger than any other of the ſnipe kind; its eyes are large, and its legs are green. They appear in Lincolnſhire and Yorkſhire in the beginning of winter, always keeping about the ſea-ſhores. Their ſeaſon is from the beginning of Auguſt to that of November; and they diſappear with the firſt froſts.

KNOUT is the name of a puniſhment inflicted in Ruſſia, with a kind of whip called *knout*, and made of a long ſtrap of leather prepared for this purpoſe. With this whip the executioners dextrouſly carry off a ſlip of ſkin from the neck to the bottom of the back laid bare to the waiſt, and repeating their blows, in a little while rend away all the ſkin off the back in parallel ſtrips. In the common *knout*, the criminal receives the laſhes ſuſpended on the back of one of the executioners: but in the great *knout*, which is generally uſed on the ſame occaſions as racking on the wheel in France, the criminal is raiſed into the air by means of a pulley fixed to the gallows, and a cord faſtened to the two wriſts tied together; a piece of wood is placed between his two legs alſo tied together; and another of a crucial form under his breaſt. Sometimes his hands are tied behind over his back, and when he is pulled up in this poſition, his ſhoulders are diſlocated. The executioner can make this puniſhment more or leſs cruel; and, it is ſaid, are ſo dextrous, that when a criminal is condemned to die, they can make him expire at pleaſure, either by one or ſeveral laſhes.

KNOWING, *principles and rules of.* See Principle, and Rule.

KNOWLEDGE, according to Mr. Locke, conſiſts in the perception of the connexion and agreement, or diſagreement and repugnancy, of our ideas. See Idea.

In which ſenſe *knowledge* ſtands oppoſed to ignorance.

To *know that white is not black*, is only to perceive that theſe two ideas do not agree. So, in *knowing* that the three angles of a triangle are equal to two right ones; what do we more than perceive, that equality to two right ones neceſſarily agrees to, and is inſeparable from, the three angles of a triangle?

Knowledge, *kinds of.* For what relates to the agreement or diſagreement of ideas, we may reduce the whole doctrine, and conſequently the whole ſtock of out *knowledge*, to four heads, viz. *identity* or *diverſity*, *relation*, *coexiſtence*, and *real exiſtence*.

As to the identity or diverſity of our ideas, we may obſerve, that it is the firſt act of the mind to perceive its own ideas; and, ſo far as it perceives them, to *know* what each is, and thereby to perceive their difference; that is, the one not to be the other: by this the mind clearly perceives each idea to agree with itſelf, and to be what it is: and all diſtinct ideas to diſagree. This it does without any pains, or deduction, by its natural power of preception, and diſtinction: and, for doing this, men of art have eſtabliſhed certian general rules or principles; as that, what is, is; and that it is impoſſible for the ſame thing to be, and not to be. But no maxim can make a man *know* clearer, that round is not ſquare, than the bare preception of the two ideas, which the mind, at firſt ſight, perceives to diſagree.

The next kind of agreement, or diſagreement, the mind perceives, in any of its ideas, may be called *relative*, and is nothing but the perception of the relation between any two ideas, of what kind ſoever; that is, their agreement or diſagreement, one with another, in the ſeveral ways, or reſpects, the mind takes of comparing them.

The third ſort of agreement, or diſagreement, to be found in our ideas, is coexiſtence, or non-coexiſtence, in the ſame ſubject; and this belongs particularly to ſubſtances. Thus when we pronounce concerning gold, that it is fixed, it amounts to no more but this, that fixedneſs, or a power to remain in the fire unconſumed, is an idea which always accompanies that particular ſort of yellowneſs, weight, fuſibility, &c. which make our complex idea ſignified by the word *gold*.

The fourth ſort is that of actual and real exiſtence, agreeing to any idea.

Within theſe four ſorts of agreement, or diſagreement, ſeems contained all the *knowledge* we have, indeed all we are capable of; for all that we *know*, or can affirm, concerning any idea, is, that it is, or is not, the ſame with ſome other; as, that blue is not yellow: that it does, or does not, coexiſt with another in the ſame ſubject; as, that iron is ſuſceptible of magnetical impreſſions: that it hath that or this relation to ſome other ideas; as, that two triangles upon equal baſes, between the ſame parallels, are equal: or that it has a real exiſtence without the mind; as, that God is.

The mind becomes poſſeſſed of truth in ſeveral manners, which conſtitute ſo many different ſpecies of *knowledge*. Thus, when the mind has a preſent view of the agreement or diſagreement of any of its ideas, or of the relation they have one with another, it is called *actual knowledge*.

Secondly, a man is ſaid to *know* any propoſition, when, having once evidently perceived the agreement or diſagreement of the ideas whereof it conſiſts, and ſo lodged it in his memory, that whenever it comes to be reflected on again, the mind aſſents to it without doubt or heſitation, and is certin of the truth of it: this may be called *habitual knowledge*. And thus a man may be ſaid to *know* all thoſe truths which are lodged in his memory, by a foregoing, clear, and full preception.

Of habitual *knowledge*, there are two ſorts: the one conſiſts of ſuch truth, laid up in the memory, as, whenever they occur to the mind, it actually perceives the relation that is between their ideas; and this is in all thoſe truths where the ideas themſelves, by an immediate view, diſcover their agreement or diſagreement one with another. The other is of ſuch truths, whereof the mind having been convinced, it retains the memory of the conviction, without the proofs. Thus a man that remembers certainly, that he once perceived the demonſtration, that the three angles of a triangle are equal to two right ones, *knows* it to be true, when that demonſtration is gone out of his mind, and cannot poſſibly be recollected: but he *knows* it in a different way from what he did before; namely, not by the intervention of thoſe intermediate ideas; whereby the agreement, or diſagreement, of thoſe in the propoſition was at firſt perceived; but by remembering, that is *knowing*, that he was once certain of the truth of this propoſition, that the three angles of a triangle are equal to two right ones,—the immutability of the ſame relation between the ſame immutable things, is now the idea that ſhews him, that if the three angles of a triangle were once equal to two right ones, they will always be ſo. And hence he comes to be certain, that what was once true, is always true; what ideas once agreed, will always agree; and conſequently, what he once *knew* to be true, he will always *know* to be true, as long as he can remember that he once knew it.

KNOWLEDGE alſo may be uſefully diſtinguiſhed into three kinds; hiſtorical, philoſophical, and mathematical.

KNOWLEDGE, *hiſtorical*, is merely the knowledge of facts, or of what is or happens in the material world, or within our own minds. Thus, that the ſun riſes and ſets, that trees bud in the ſpring, that we remember, will, &c. are inſtances of *hiſtorical knowledge*.

KNOWLEDGE, *philoſophical*, is the *knowledge* of the reaſons of things, or of what is or happens. Thus he has a *philoſophical knowledge* of the motion of rivers, who can explain how it ariſes from the declivity of the bottom, and from the preſſure which the lower part of the water ſuſtains from the upper. So likewiſe the ſhewing how, and by what reaſon, deſire or appetite ariſes from the preception or imagination of its object, would be *philoſophical knowledge*.

KNOWLEDGE, *mathematical*, is the *knowledge* of the quantity of things, that is, of their proportions or ratios to ſome given meaſure. Thus he who knows the proportion of the meridian heat of the ſun at the ſummer ſolſtice to its meridian heat at the winter ſolſtice, might ſo far be ſaid to have a *mathematical knowledge* of the ſun's heat. So likewiſe he has a *mathematical knowledge* of the motion of a planet in its orbit, who can diſtinctly ſhew how, from the quantity of the impreſſed and centripetal force, the velocity of the planet is produced; and how, from the action of this double force, the elliptical figure of the orbit ariſes.

Theſe three kinds of *knowledge*, differ evidently, it being one thing to know that a thing is; another, the reaſon why it is; and a third, to know its quantity or meaſure.

It is alſo evident, that hiſtorical *knowledge*, though extenſively uſeful, and the foundation of the reſt, is the loweſt degree of human *knowledge*. Thoſe who aim at the greateſt certainty ought to join *mathematical* with *philoſophical knowledge*. Nothing can more evidently ſhew that an effect ariſes from a certain cauſe, than the *knowledge* that the quantity of the effect is proportional to the force of the cauſe. Beſides, there are many things in nature, the reaſons of which depending on certain figures or quantities, are not aſſignable but from mathematical principles.

KNOWLEDGE, *degrees of*. As to the different degrees, or clearneſs of our *knowledge*, it ſeems to lie in the different way which the mind has of perceiving the agreement or diſagreement of any of its ideas. When the mind perceives this agreement or diſagreement of two ideas immediately by themſelves, without the intervention of any other, we may call it *intuitive knowledge*; in which caſe the mind perceives the truth, as the eye doth light, only by being directed towards it. Thus the mind perceives that white is not black; that three are more than two, and equal to one and two. This part of *knowledge* is irreſiſtible; and, like the bright ſun-ſhine, forces itſelf immediately to be perceived, as ſoon as ever the mind turns its view that way. It is on this intuition that all the certainty and evidence of our other *knowledge* depends, which certainly every one finds to be ſo great, that he cannot imagine, and therefore cannot require a greater.

The next degree of *knowledge* is, where the mind perceives not this agreement, or diſagreement, immediately or by the juxtapoſition, as it were, of the ideas; becauſe thoſe ideas, concerning whoſe agreement, or diſagreement, the enquiry is made, cannot by the mind, be ſo put together, as to ſhew it. In this caſe the mind is obliged to diſcover the agreement, or diſagreement, which it ſearches for, by the intervention of other ideas: and this is that which we call *reaſoning*.

Thus, if we would *know* the agreement, or diſagreement, in bigneſs, between the three angles of a triangle and two right angles, we cannot do it by an immediate view and compariſon of them, becauſe the three angles of a triangle cannot be brought together at once, and compared with any other one or two angles; and ſo of this the mind has no immediate or intuitive *knowledge*. But we muſt find out ſome other angles, to which the three angles of a triangle have equality; and finding thoſe equal to two right ones, we come to *know* the equality of theſe three angles to two right ones.

Thoſe intervening ideas, which ſerve to ſhew the agreement of any two others, are called *proofs*; and where the agreement, or diſagreement, is by this means plainly and clearly perceived, it is called *demonſtration*: and a quickneſs in the mind to find thoſe proofs, and to apply them right, is that which is called *ſagacity*.

This *knowledge*, though it be certain, is not ſo clear and evident as intuitive *knowledge*; it requires pains and attention, and ſteady application of mind, to diſcover the agreement, or diſagreement, of the ideas it conſiders; and there muſt be a progreſſion by ſteps and degrees, before the mind can, in this way, arrive at any certainty. Before demonſtration, there was a doubt, which, in intuitive *knowledge*, cannot happen to the mind, that has its faculty of perception left in a degree capable of diſtinct ideas, no more than it can be a doubt to the eye (that can diſtinctly ſee white and black), whether this ink and paper be all of a colour. Now, in every ſtep that reaſon makes in demonſtrative *knowledge*, there is an intuitive *knowledge* of that agreement, or diſagreement, it ſeeks, with the next intermediate idea, which it uſes as a proof; for, if it were not ſo, that yet would need a proof, ſince, without the perception of ſuch agreement, or diſagreement, there is no *knowledge* produced.

By which it is evident, that every ſtep in reaſoning, that produces *knowledge*, has intuitive certainty; which, when the mind perceives, there is no more required, but to remember it, to make the agreement, or diſagreement, of the ideas, concerning which we inquire, viſible and certain. This intuitive perception of the agreement, or diſagreement, of the intermediate ideas in each ſtep and progreſſion of the demonſtration, muſt alſo be exactly carried in the mind; and a man muſt be ſure, that no part is left out, which, becauſe in long deductions the memory cannot eaſily retain, this *knowledge* becomes more imperfect than intuitive, and men often embrace falſhoods for demonſtrations.

It has been generally taken for granted, that mathematics alone are capable of demonſtrative certainty: but to have ſuch an agreement, or diſagreement, as may be intuitively perceived, being, as we imagine, not the privilege of the ideas of number, extenſion, and figure alone, it may, poſſibly, be the want of due method and application in us, and not of ſufficient evidence in things, that demonſtration has been thought to have ſo little to do in other parts of *knowledge*. For, in whatever ideas the mind can perceive the agreement, or diſagreement, immediately, there it is capable of intuitive *knowledge*; and, where it can perceive the agreement, or diſagreement, of any two ideas, by the intuitive perception of the agreement, or diſagreement, they have with any intermediate ideas, there the mind is capable of demonſtration, which is not limited to the ideas of figure, number, extenſion, or their modes.

The reaſon why it has been generally ſuppoſed to belong to theſe only, is, becauſe, in comparing their equality or exceſs, the modes of numbers have every the leaſt difference very clear and perceivable: and, in extenſion, though every the leaſt exceſs is not ſo perceptible, yet the mind has found out ways to diſcover the juſt equality of two angles, extenſions, or figures; and both numbers and figures can be ſet down by viſible and laſting marks. But, in other ſimple ideas, whoſe modes and differences are made and counted by degrees, and not quantity, we have not ſo nice and accurate a diſtinction of their differences, as to perceive or find ways to meaſure their juſt equality, or their leaſt differences. For, thoſe other ſimple ideas being appearances, or ſenſations produced in us, by the ſize, figure, motion, &c. of minute corpuſcles, ſingly inſenſible, their different degrees alſo depend on the variation of ſome or all of thoſe cauſes; which, ſince it cannot be obſerved by us in particles of matter, whereof each is too ſubtile to be perceived, it is impoſſible for us to have any exact meaſures of the different degrees of theſe ſimple ideas.

Thus, not knowing what number of particles, nor what motion of them, is fit to produce any preciſe degree of whiteneſs, becauſe we have no certain ſtandard to meaſure them by, nor means to diſtinguiſh every the leaſt difference; the only help we have, is from our ſenſes, which, in this point, fail us. But where the difference is ſo great as to produce in the mind ideas clearly diſtinct, theſe ideas, as we ſee in colours of different kinds, blue and red for inſtance, are as capable of demonſtration, as ideas of number and extenſion. And what is here ſaid of colours, holds true in all ſecondary qualities.

Theſe two then, *intuition* and *demonſtration*, are the degrees of our *knowledge*; and whatever comes ſhort of one of theſe, is only *faith* or *opinion*, not *knowledge*, at leaſt, in all general truths.

There is, indeed, another perception of the mind, employed about the particular exiſtence of finite beings without us, which going beyond probability, but not reaching to either of the foregoing degrees of certainty, paſſes under the name of *knowledge*.

Nothing can be more certain than that the idea we receive from an external object is in our minds: this is intuitive *knowledge*; but whether we can thence certainly infer the exiſtence of any thing without us, correſponding to that idea, is that, whereof ſome men think there may be a queſtion made; becauſe men may have ſuch an idea in their minds, when no ſuch thing exiſts, nor any ſuch object affects their ſenſes.

But it is evident, that we are invincibly conſcious to ourſelves of a different perception, when we look on the ſun in the day, and when we think on it by night; when we actually taſte wormwood, or ſmell a roſe, or only think on that ſavour or odour; ſo that we may add, to the two former ſorts of *knowledge*, this alſo of the exiſtence of particular external objects, by that perception and conſciouſneſs we have of the actual entrance of ideas from them; and allow theſe three degrees of *knowledge*, viz. *intuitive*, *demonſtrative*, and *ſenſitive*.

But, ſince our *knowledge* is founded on, and employed about, our ideas only, will it follow thence, that it muſt be conformable to our ideas, and that where our ideas are clear and diſtinct, obſcure and confuſed, there our *knowledge* will be ſo too? We anſwer, No; for our *knowledge* conſiſting in the perception of the agreement, or diſagreement, of any two ideas; its clearneſs or obſcurity conſiſts in the clearneſs and obſcurity of that perception, and not in the clearneſs or obſcurity of the ideas themſelves. A man (for inſtance), who has a clear idea of the angles of a triangle, and of equality to two right ones, may yet have but an obſcure perception of their agreement, and ſo have but a very obſcure *knowledge* of it: but obſcure and confuſed ideas can never produce any clear or diſtinct *knowledge*; becauſe, as far as any ideas are obſcure or confuſed, ſo far the mind can never perceive clearly, whether they agree or diſagree; or, to expreſs the ſame thing in other words, he that has not determined ideas to the words he uſes, cannot make propoſitions of them, of whoſe truth he can be certain.

From all this it follows; 1. That we can have no *knowledge* farther than we have ideas.

2. That we have no *knowledge* farther than we can have perception of the agreement, or diſagreement, of our ideas, either by intuition, demonſtration, or ſenſation.

3. We cannot have an intuitive *knowledge*, that ſhall extend itſelf to all our ideas, and all that we would *know* about them; becauſe we cannot examine and perceive all the relation they have one to another by juxtapoſition, or immediate compariſon one with another. Thus, we cannot intuitively perceive the equality of two extenſions, the difference of whoſe figures makes their parts incapable of an exact immediate application.

4. Our rational *knowledge* cannot reach to the whole extent of our ideas; becauſe, between two different ideas which we would examine, we cannot always find ſuch proofs, whereby we can connect one to another with an intuitive *knowledge* in all the parts of the deduction.

5. Senſitive *knowledge*, reaching no farther than the exiſtence of things actually preſent to our ſenſes, is yet much narrower than either of the former.

6. From all which it is evident, that the extent of our *knowledge* comes not only ſhort of the reality of things, but even of the extent of our own ideas. We have the ideas of a ſquare, a circle, and equality; and yet perhaps, ſhall never be able to find a circle equal to a ſquare. See CIRCLE.

KNOWLEDGE, *extent and limits of*. The affirmations or negations we make concerning the ideas we have, being reduced to the four ſorts above mentioned, viz. indentity, coexiſtence, relation, and real exiſtence, let us inquire how far our *knowledge* extends in each of theſe. 1. As to indentity and diverſity, our intuitive *knowledge* is as far extended, as our ideas themſelves; and there can be no idea in the mind, which it does not preſently, by an intuitive *knowledge*, perceive to be what it is, and to be different from any other.

2. As to the agreement, or diſagreement, of our ideas of co-exiſtence, our *knowledge* herein is very defective, though it is in this that the greateſt and moſt material part of our *knowledge*, concerning ſubſtances, conſiſts: for our ideas of ſubſtances being nothing but certain collections of ſimple ideas co-exiſting in one ſubject (our idea of flame, for inſtance, is a body hot, luminous, and moving upwards); when we would know any thing farther, concerning this, or any other ſort of ſubſtance, what do we but enquire what other qualities, or powers, theſe ſubſtances have, or have not? which is nothing elſe but to *know* what other ſimple ideas do, or do not exiſt with thoſe which make up ſuch complex ideas. The reaſon of this is, that the ſimple ideas, which make up our complex ideas of ſubſtances, have no viſible neceſſary connection, or inconſiſtence, with other ſimple ideas, whoſe co-exiſtence with them we would inform ourſelves about. Theſe ideas being likewiſe, for the moſt part, ſecondary qualities, which depend upon the primary qualities of their minute or inſenſible parts, or on ſomething yet more remote than theſe from our comprehenſion, it is impoſſible we ſhould *know* which have a neceſſary union, or inconſiſtence, one with another; ſince we *know* not the root from whence they ſpring, or the ſize, figure, and texture of parts on which they depend, and from which they reſult. Beſides this there is no diſcoverable connection between any ſecondary quality, and thoſe primary qualities that it depends on. We are ſo far from *knowing* what figure, ſize, or motion, produces (for inſtance) a yellow colour, or ſweet taſte, or ſharp ſound, that we can by no means conceive how any ſize, figure, or motion, can poſſibly produce in us the idea of any colour, taſte, or ſound, whatſoever, there being no conceivable connection between the one and the other.

Our *knowledge*, therefore, of co-exiſtence reaches little farther than experience. Some few, indeed, of the primary qualities have a neceſſary dependence, and viſible connection, one with another: as figure neceſſarily ſuppoſes extenſion; receiving or communicating motion by impulſe ſuppoſes ſolidity; but qualities co-exiſtent in any ſubject, without this dependence and connection, cannot certainly be *known* to co-exiſt, any farther than experience, by our ſenſes, informs us. Thus, though, upon trial, we find gold yellow, weighty, malleable, fuſible, and fixed; yet, becauſe none of theſe have any evident dependence, or neceſſary connection, with the other, we cannot certainly *know*, that, where any four of theſe are, the fifth will be there alſo, how highly probable ſoever it may be. But the higheſt degree of probability amounts not to certainty, without which there can be no true *knowledge*; for this co-exiſtence can be no farther *known* than it is perceived; and it cannot be perceived, but either, in particular ſubjects, by the obſervation of our ſenſes, or, in general, by the neceſſary connection of the ideas themſelves.

As to incompatibility, or repugnancy to co-exiſtence, we *know*, that no ſubject can have of each ſort of primary qualities, more than one particular at once, as one extenſion, or one figure; and ſo of inſenſible ideas peculiar to each ſenſe: for whatever, of each kind, is preſent in any ſubject, excludes all other of that ſort: for inſtance, one ſubject cannot have two ſmells, or two colours, at the ſame time.

As to powers of ſubſtances, which make a great part of our inquiries about them, our *knowledge* reaches little farther than experience; becauſe they conſiſt in a texture and motion of parts, which we cannot by any means come to diſcover; and I doubt, whether, with thoſe faculties we have, we ſhall ever be able to carry our general *knowledge* much farther in this part. Experience is that which, in this part, we muſt depend on: and it were to be wiſhed, that it were more improved. We find the advantages ſome men's generous pains have this way brought to the ſtock of natural *knowledge*; and if others, eſpecially the philoſophers by fire, had been ſo wary in their obſervations, and ſincere in their reports, as thoſe who call themſelves *philoſophers* ought to have been, our acquaintance with the bodies here about us, and our inſight into their powers and operations, might have been yet much greater.

As to the third ſort, the agreement, or diſagreement, of our ideas in any other relation; this is the largeſt field of *knowledge*, and it is hard to determine how far it may extend; this part depending on our ſagacity in finding intermediate ideas, that may ſhew the habitudes and relations of ideas, it is a hard matter to tell when we are at an end of ſuch diſcoveries. They, who are ignorant of algebra, cannot imagine the wonders of this kind that are to be done by it: and what farther improvements and helps, advantageous to other parts of *knowledge*, the ſagacious mind of man may yet find out, it is not eaſy to determine.

This, at leaſt, we may believe, that the ideas of quantity are not the only ones capable of demonſtration and *knowledge*; and that other, and, perhaps, more uſeful parts of contemplation, would afford us certainty, if vices, paſſions, and domineering intereſt, did not oppoſe or menace endeavours of this kind.

As to the fourth ſort of *knowledge*, viz. *of the real, actual exiſtence of things*, we have an intuitive *knowledge* of our own exiſtence, a demonſtrative *knowledge* of the exiſtence of God, and a ſenſative *knowledge* of the objects that preſent themſelves to our ſenſes.

Hitherto we have examined the extent of our *knowledge*, in reſpect of the ſeveral ſorts of beings that are: there is another extent of it, in reſpect of univerſality, which will alſo deſerve to be conſidered; and this in regard our *knowledge* follows the nature of our ideas. If the ideas, whoſe agreement, or diſagreement, we perceive, are abſtract, our *knowledge* is univerſal; for what is *known* of ſuch general ideas, will be true of every particular thing, in which that eſſence, that is, that abſtract idea, is found: and what is once *known* of ſuch ideas, will be perpetually and for ever true; ſo that, as to all general *knowledge*, we muſt ſearch and find it only in our own minds; and it is only the examining our own ideas that furniſhes us with it. Truth belonging to eſſences of things (that is, to abſtract ideas) are eternal, and are to be found out by the contemplation only of thoſe eſſences; as the exiſtence of things is to be known only from experience.

KNOWLEDGE, *reality of*. It is evident, that the mind *knows* not things immediately, but by the intervention of the ideas it has of them. Our *knowledge*, therefore, is real only ſo far as there is a conformity between our ideas, and the reality of things. But how ſhall we *know* when our ideas agree with things themſelves? It is anſwered, There are two ſorts of ideas, that we may have aſſured agree with things: theſe are,

1. *Simple ideas*, which, ſince the mind can by no means make to itſelf, muſt be the effect of things operating upon the mind in a natural way, and producing therein thoſe perceptions, which, by the will of our Maker, they are ordained and adapted to. Hence it follows, that ſimple ideas are not fictions of our fancies, but the natural and regular production of things without us, really operating upon us, which carry with them all the conformity our ſtate requires, which is to repreſent things under thoſe appearances they are fitteſt to produce in us. Thus the idea of whiteneſs, as it is in the mind, exactly anſwers that power which is in any body to produce it there; and this conformity between our ſimple ideas, and the exiſtence of things, is ſufficient for real *knowledge*.

2. All our *complex ideas*, except only thoſe of ſubſtances, being archetypes of the mind's own making, and not referred to the exiſtence of things, as to their originals, cannot want any conformity neceſſary to real *knowledge*; for that which is not deſigned to repreſent any thing but itſelf, can never be capable of a wrong repreſentation. Here the ideas themſelves are conſidered as archetypes, and things are no otherwiſe regarded than as conformable to them. Thus the mathematician conſiders the truth and properties belonging to a rectangle, or circle, only as they are ideas in his own mind, which poſſibly he never found exiſting mathematically, that is, preciſely, true; yet his *knowledge* is not only certain, but real, becauſe real things are no farther concerned, nor intended to be meant by any ſuch propoſitions, than as things really agree to thoſe archetypes in the mind.

3. But the *complex ideas*, which we refer to archetypes without us, may differ from them; and ſo our *knowledge* about them may come ſhort of being real: and ſuch are our ideas of ſubſtances. Theſe muſt be taken from ſomething, that does or has exiſted, and not be made up of ideas arbitrarily put together, without any real pattern. Herein, therefore, is founded the reality of our *knowledge* concerning ſubſtances, that all our complex ideas of them muſt be ſuch, and ſuch only as are made up of ſuch ſimple ones as have been diſcovered to co-exiſt in nature: and our ideas, being thus true, though not, perhaps, very exact copies, are the ſubject of real *knowledge* of them. Whatever ideas we have, the agreement we find they have with others will be *knowledge*. If thoſe ideas be abſtract, it will be general *knowledge*; but, to make it real concerning ſubſtances, the ideas muſt be taken from the real exiſtence of things. Wherever, therefore, we perceive the agreement, or diſagreement, of our ideas, there is certain *knowledge*; and wherever we are ſure thoſe ideas agree with the reality of things, there is certain, real *knowledge*.

KNOWLEDGE, *method of improving or enlarging*. It being the received opinion amongſt men of letters, that maxims are the foundation of all *knowledge*, and that ſciences are each of them built upon certain præcognita, from whence the underſtanding is to take its riſe, and by which it is to conduct itſelf in its enquiries in the matters belonging to that ſcience: the beaten road of the ſchools has been to lay down, in the beginning, one or more general propoſitions, called *principles*, as foundations whereon to build the *knowledge* that was to be had of that ſubject.

That which gave occaſion to this way of proceeding was, the good ſucceſs it ſeemed to have in mathematics, which of all the ſciences, have the greateſt certainty, clearneſs, and evidence in them. But, if we conſider it, we ſhall find, that the great advancement and certainty of real *knowledge* men arrive to in theſe ſciences, was not owing to the influence of thoſe principles, but to the clear, diſtinct and complete ideas, their thoughts were employed about, and to the relation of equality and exceſs, ſo clear between ſome of them, that they had an intuitive *knowledge*, and by that a way to diſcover it in others, and this is without the help of thoſe maxims. For is it not poſſible for a lad to *know*, that his whole body is bigger than his little finger, but by virtue of this axiom, the whole is bigger than a part; nor be aſſured of it till he has learned that maxim? Let any one conſider which is *known* firſt and cleareſt by moſt people, the particular inſtance, or the general rule; and which it is that gives life and birth to the other: theſe general rules are but the comparing our more general and abſtract ideas, which ideas are made by the mind, and have names given them, for the eaſier diſpatch in its reaſonings: but *knowledge* began in the mind, and was founded on particulars, though afterwards, perhaps, no notice be taken thereof, it being natural for the mind to lay up thoſe general notions, and make the proper uſe of them, which is to diſburden the memory of the cumberſome load of particulars. The way to improve in *knowledge* is, not to ſwallow principles with an implicit faith, and without examination, which would be apt to miſlead men, inſtead of guiding them into truth; but to get and fix in our minds clear and complete ideas, as far as they are to be had, and to annex to them proper and conſtant names: and thus, barely by conſidering our ideas, and comparing them together, obſerving their agreement or diſagreement, their habitudes and relations, we ſhall get more true and clear *knowledge* by the conduct of this one rule, than by taking up principles, and thereby putting our minds into the diſpoſal of others.

We muſt therefore, if we will proceed as reaſon adviſes us, adapt our methods of enquiry to the nature of the ideas we examine, and the truth we ſearch after. General and certain truths are only founded on the habitudes and relations of abſtract ideas; therefore a ſagacious, methodical application of our thoughts for the finding out theſe relations, is the only way to diſcover all, that can with truth and certainty be put into general propoſitions. By what ſteps we are to proceed in theſe, is to be learned in the ſchools of the mathematicians, who, from very plain and eaſy beginnings, by gentle degrees, and a continued chain of reaſonings, proceed to the diſcovery and demonſtration of truths, that, at firſt ſight, appeared beyond human capacity. This may reaſonably be ſaid, that, if other ideas that are real, as well as nominal eſſences of their ſpecies, were purſued in the way familiar to mathematicians, they would carry our thoughts farther, and with greater evidence and clearneſs, than poſſibly we are apt to imagine. This is reaſon ſufficient to advance that conjecture above mentioned; viz. "That "morality is capable of demonſtration, as well as mathe"matics;" for moral ideas being real eſſences, which have a diſcoverable connection and agreement one with another, ſo far as we can find their habitudes and relations, ſo far we ſhall be poſſeſſed of real and general truths.

In our *knowledge* of ſubſtances, we are to proceed after a quite different method; the bare contemplation of their abſtract ideas (which are but nominal eſſences) will carry us but a very little way in the ſearch of truth and certainty. Here experience muſt teach us what reaſon cannot; and it is by trying alone, that we can certainly *know* what qualities co-exiſt with thoſe of our complex idea; for inſtance, whether that yellow, heavy, fuſible body, I call *gold*, be malleable, or no; which experience (however it prove in that particular body we examine) makes us not certain that it is ſo in all, or any other yellow, heavy, fuſible bodies, but that which we have tried; becauſe it is no conſequence, one way or other, from our complex idea. The neceſſity or inconſiſtence of malleability has no viſible connection with the combination of that colour, weight, and fuſibility, in any body. What is here ſaid of the nominal eſſence of gold, ſuppoſed to conſiſt of a body of ſuch a determinate colour, weight, and fuſibility, will hold true if other qualities be added to it. Our reaſonings from thoſe ideas will carry us but a little way in the certain diſcovery of the other properties in thoſe maſſes of matter wherein all thoſe are to be found. As far as our experience reaches, we may have certain *knowledge*, and no farther. It is not denied, but that a man, accuſtomed to rational and regular experiments, ſhall be able to ſee farther into the nature of bodies, and their unknown properties, than one that is a ſtranger to them; but this is but judgment and opinion, not *knowledge* and certainty.

This would make it ſuſpected, that natural philoſophy is not capable of being made a ſcience. From experiments, and hiſtorical obſervations, we may draw advantages of eaſe and health, and thereby increaſe our ſtock of conveniences for this life; but, beyond this, it is to be feared, our talents reach not, nor are our faculties able to advance farther. See PHYSICS.

The ways to enlarge our *knowledge*, as far as we are capable, ſeem to be theſe two: the firſt is, to get and ſettle in our minds, as far as we can, clear, diſtinct, and conſtant ideas of thoſe things we would conſider and *know*; for it being evident that our *knowledge* cannot exceed our ideas, where they are either imperfect, confuſed, or obſcure, we cannot expect to have certain, perfect, or clear *knowledge*. The other art is, of finding out the intermediate ideas, which may ſhew us the agreement or repugnancy of other ideas, which cannot be immediately compared.

That theſe two (and not relying on maxims, and drawing conſequences from ſome general propoſitions) are the right method of improving our *knowledge* in the ideas of other modes, beſides thoſe of quantity, the conſideration of mathematical *knowledge* will eaſily inform us; where, firſt, we ſhall find, that he, who has not clear and perfect ideas of thoſe angles or figures, of which he deſires to *know* any thing, is utterly thereby incapable of any *knowledge* about them. Suppoſe a man not to have an exact idea of a right angle, ſcalenum, or trapezium, and it is clear that he will in vain ſeek any demonſtration about them.

And farther, it is evident, that it was not the influence of maxims or principles that led the maſters of this ſcience into thoſe wonderful diſcoveries they have made: let a man of good parts *know* all the maxims of mathematics ever ſo well, and contemplate their extent and conſequences as much as he pleaſes, he will, by their aſſiſtance, ſcarce ever come to *know*, that the ſquare of the hypothenuſe in a right-angled triangle, is equal to the ſquares of the two other ſides. This, and other mathematical truths, have been diſcovered by the thoughts otherwiſe applied. The mind had other objects, other views before it, far different from thoſe maxims, which men, well enough acquainted with thoſe received maxims, but ignorant of their method who firſt made thoſe demonſtrations, can never ſufficiently admire.

Our *knowledge*, as in other things, ſo in this alſo, has ſo great a conformity with our ſight, that it is neither wholly neceſſary, nor wholly voluntary. Men, who have ſenſes, cannot chooſe but receive ſome ideas by them; and, if they have memory, they cannot but retain ſome of them; and if they have any diſtinguiſhing faculty, cannot but perceive the agreement or diſagreement, of ſome of them one with another. As he that has eyes, if he will open them by day, cannot but ſee ſome objects, and perceive a difference in them; yet he may chooſe whether he will turn his eyes towards an object, curiouſly ſurvey it, and obſerve accurately all that is viſible in it. But what he doth ſee he cannot ſee otherwiſe than he doth; it depends not on his will to ſee that black, which appears yellow. Juſt thus it is with our underſtanding: all that is voluntary in our *knowledge*, is the employing or with-holding any of our faculties from this or that ſort of objects, and a more or leſs accurate ſurvey of them; but, they being employed, our will hath no power to determine the knowledge of the mind one way or other; that is done only by the objects themſelves, as far as they are clearly diſcovered. Thus, he that has got the ideas of numbers, and has taken the pains to compare one, two, or three, to ſix, cannot chooſe but *know* they are equal. He alſo, that hath the idea of an intelligent, but weak and frail being, made by, and depending on, another, who is eternal, omnipotent, and perfectly wiſe and good, will as certainly know, that man is to honour, fear, and obey God, as that the ſun ſhines when he ſees it. But yet, be theſe truths ever ſo certain, ever ſo clear, he may be ignorant of either or both of them, who will not take the pains to employ his faculties as he ſhould, to inform himſelf about them.

KNOXIA, in *Botany*, a genus of the *tetrandria monogynia* claſs; the characters of which are, that the flower conſiſts of a ſingle petal, and is funnel-ſhaped; and its ſeeds are two, and ſulcated.

KODDA-*pail*, in *Botany*, a name given by Plumier, and in the Hortus Malabaricus, to a genus of plants, called by Linnæus PISTIA.

KOEMPFERIA, in *Botany*. See GALANGAL.

KOENIGIA, in *Botany*, a genus of the *triandria trigynia* claſs; the characters of which are, that the calyx is formed of three leaves; that it has no corolla; and the ſeed is ſingle, ovated, and naked.

KOHLMULEN, in *Ichthyography*, a name given by ſome to the *aſellus flaveſcens*, or yellow cod, called by others *blank* and *gelbe*.

KOKOB, in *Zoology*, the name of a ſpecies of ſerpent, found in the Weſt Indies, and very fatal by its bite. It is ſmaller than our viper, and of a brown colour, variegated with green and red ſpots.

KOLERUS, a name gived by Paracelſus to an old dry ulcer.

KOLLOW. See KILLOW.

KOLTO, a name given by ſome writers to the PLICA *Polonica*.

KOMMANICK, in *Ornithology*, the German name for the large-creſted lark, common in many parts of Germany, but not known in England. It is larger than our common lark, and has a much larger and longer beak; its back is of a greyer colour, and leſs ſpotted than in the common lark; and its rump is ſcarce ſpotted at all; its creſt is very beautiful, and is compoſed of eight, ten, or twelve, feathers, much darker coloured than the reſt, and the bird can not only raiſe and depreſs, but can ſpread and contract them at pleaſure; it very ſeldom is ſeen high in the air, and never makes any long ſtay there, but is moſt frequently ſeen about the banks of rivers.

KONNARUS, a name given by Agathocles in Athenæus to a plant of Arabia, which the deſcription ſhews to be the ſame with the *ſaduc* of the later Arabians, the fruit of which is called *nabuc* or *nabech*.

This tree is the *lotus* of Dioſcorides, and the *acanthus* of Virgil, whoſe berries he mentions. The fruit of this tree is like a cherry, but ſmaller, and is ground to powder by the Africans when dried. It is very well known to all who are acquainted with the writings of the old phyſicians, that the berries of the *lotus* or *nabac* were ground down, by the Egyptians and other nations where they grew, to a fine powder, for medicinal uſes. They were aſtringent, and uſed both externally in poultices and fomentations, and internally in decoctions and other forms where aſtringents were required.

KORACHORYNCHUS *Indicus*, in *Ichthyology*, the name of a ſea-fiſh of the Eaſt Indies, called by the Dutch the *raevenbeck*. It has its name from its noſe reſembling the beak of a raven or crow, and is about ſeven inches long; its back and tail are red, and its belly yellow; it has alſo on each ſide two pale yellow longitudinal lines, running from the gills to the tail. It is a wholeſome and well-taſted fiſh. Ray.

KORAN. See ALCORAN.

KOS, in the *Jewiſh Antiquities*, a meaſure which held the quantity of four cubic inches, and ſomething over. This was the cup of bleſſing, out of which they drank when they gave thanks after ſolemn meals, as on the day of the paſſover.

KOUANIN, in the *Chineſe Languoge*, the name of a tutelary deity of women. The Chineſe make great numbers of the figures of this deity in white porcelain, and ſend them to all parts of the world, as well as keep them in their own houſes. The figure repreſents a woman with a child in her arms. The women, who have no chidren, pay a ſort of adoration to theſe images, and ſuppoſe the deity they repreſent to be of power to make them fruitful. It has been ſuppoſed, by many Europeans, that theſe images were meant to repreſent the Virgin Mary, with our Saviour in her arms; but this is an idle opinion; the Chineſe have been fond of this figure in all times that we have an account of. The ſtatue always repreſents an handſome woman, very modeſtly attired.

KRAKEN, in *Zoology*, a moſt amazing large ſea animal, ſeemingly of a crab-like form; the credit of whoſe exiſtence reſts upon the evidence produced by biſhop Pontoppidan, in his Natural Hiſtory of Norway, publiſhed ſome few years ſince; and though the reality of it cannot be denied, the relation will be thought to require good authentication.

As a full grown *kraken* has never been ſeen in all its parts and dimenſions, an accurate ſurvey of which muſt employ ſome time, and not a little motion, it is impoſſible to give a complete deſcription of one. Nevertheleſs, we ſhall ſubmit the probability of its exiſtence on the beſt information our author could collect, which ſeems to have fixed his own belief of it; though, at the ſame time, he acknowledges the account is very defective, and ſuppoſes a farther information concerning the creature may be reſerved for poſterity.

Our fiſhermen, ſays the author, unanimouſly and invariably affirm, that when they are ſeveral miles from the land, particularly in the hot ſummer days, and by their diſtance, and the bearings of ſome points of land, expect from eighty to a hundred fathoms depth, and do not find but from twenty to thirty; and more eſpecially if they find a more than uſual plenty of cod and ling, they judge that the *kraken* is at the bottom; but if they find by their lines, that the water in the ſame place ſtill ſhallows on them, they know he is riſing to the ſurface, and row off with the greateſt expedition, till they come into the uſual ſoundings of the place; when, lying on their oars, in a few minutes the monſter emerges, and ſhews himſelf ſufficiently, though his whole body does not appear. Its back, or upper part, which ſeems an Engliſh mile and a half in circumference (ſome have affirmed more), looks at firſt like a number of ſmall iſlands, ſurrounded with ſomething that floats like ſea-weeds; at laſt, ſeveral bright points or horns appear, which grow thicker the higher they emerge, and ſometimes ſtand up as high and large as the maſts of middle-ſized veſſels. In a ſhort time it ſlowly ſinks, which is thought as dangerous as its riſing; as it cauſes ſuch a ſwell and whirlpool, as draws every thing down with it, like that of Maleſtrom. The biſhop juſtly regrets the omiſſion of, probably, the only opportunity that ever has, or may be preſented, of ſurveying it alive, or ſeeing it entire when dead. This, he informs us, once did occur, on the credit of the reverend Mr. Friis, miniſter at Nordland, and vicar of the college for promoting Chriſtian knowledge; who informed him, that in 1680, a *kraken* (perhaps a young and careleſs one, as they generally keep ſeveral leagues from land) came into the waters that run between the rocks and cliffs near Alſtahoug; where, in turning about, ſome of its long horns caught hold of ſome adjoining trees, which it might eaſily have torn up, but that it was alſo entangled in ſome clifts of the rock, whence it could not extricate itſelf, but putrefied on the ſpot. Our author has heard of no perſon deſtroyed by this monſter, but relates a report of the danger of two fiſhermen, who came upon part of the water full of the creature's thick ſlimy excrements (which he voids for ſome months, as he feeds for ſome other); they immediately ſtrove to row off, but were not quick enough in turning to ſave the boat from one of the *kraken's* horns, which ſo cruſhed the head of it, that it was with difficulty they ſaved their lives on the wreck, though the weather was perfectly calm; the monſter never appearing at other times. His excrement is ſaid to be attractive of other fiſh, on which he feeds; which expedient was probably neceſſary, on account of his ſlow unwieldly motion, to his ſubſiſtence; as this ſlow motion again may be neceſſary to the ſecurity of ſhips of the greateſt force and burthen, who muſt be overwhelmed on encountering ſuch an immenſe animal, if his velocity was equal to his weight: the Norwegians ſuppoſing, that if his arms on which he moves, and with which he takes his food, were to lay hold of the largeſt man of war, they would pull it down to the bottom.

In confirmation of the reality of this animal, our learned author cites Debes's deſcription of Faroe, for the exiſtence of certain iſlands, which ſuddenly appear, and as ſuddenly vaniſh. Many ſea-faring people, he adds, give accounts of ſuch, particularly in the north ſea; which their ſuperſtition has either attributed to the deluſion of the devil, or conſidered as inhabited by evil ſpirits. But our honeſt hiſtorian, who is not for wronging the devil himſelf, ſuppoſes ſuch miſtaken iſlands to be nothing but the *kraken*, called by ſome the *ſoe troldcm*, or *ſea miſchief*; in which opinion he was greatly confirmed by the following quotation of Dr. Heirne, a learned Swede, from baron Grippenhielm; and which is certainly a very remarkable paſſage, viz. "Among the rocks "about Stockholm, there is ſometimes ſeen a tract of "land, which at other times diſappears, and is ſeen "again in another place. Buræus has placed it as an "iſland in his map. The peaſants, who call it *gummars* "*ore*, ſay, that it is not always ſeen, and that it lies out "in the open ſea, but I could never find it. One Sun-"day, when I was out among the rocks, ſounding the "coaſts, it happened that, in one place, I ſaw ſome-"thing like three points of land in the ſea, which ſur-"priſed me a little, and I thought I had inadvertently "paſſed them over before. Upon this I called to a pea-"ſant, to enquire for *gummar's ore*; but when he came, "we could ſee nothing of it: upon which the peaſant "ſaid, all was well, and that this prognoſticated a ſtorm, "or a great quantity of fiſh." To which our author ſubjoins, "who cannot diſcover that this *gummars ore*, "with its points, and prognoſticatious of fiſh, was the "*kraken*, miſtaken by Buræus for an iſland, who may "keep himſelf about that ſpot where he riſes." He takes the *kraken*, doubtleſs, from his numerous *tentaculi*, which ſerve him as feet, to be of the polype kind; and the contemplation of its enormous bulk lead him to adapt a paſſage from Eccleſ. xliii. 31, 32, to it. Whether by it may be intended the dragon that is in the ſea, mentioned Iſaiah xxvii. 1. we refer to the conjecture of the reader. After paying but a juſt reſpect to the moral character, the reverend function, and diligent inveſtigations of our author, we muſt admit the poſſibility of its exiſtence, as it implies no contradiction; though it ſeems to encounter a general prepoſſeſſion of the whale's being the largeſt animal on, or in, our globe; and the eradication of any long prepoſſeſſion is attended with ſomething irkſome to us. But were we to ſuppoſe a ſalmon or ſturgeon, the largeſt fiſh any number of perſons had ſeen or heard of, and the whale had diſcovered himſelf as ſeldom, and but in part, as the *kraken*, it is eaſy to conceive, that the exiſtence of the whale had been as indigeſtible to ſuch perſons then, as that of the *kraken* may be to others now. Some may incline to think, ſuch an extenſive monſter would encroach on the ſymmetry of nature, and be over proportionate to the ſize of the globe itſelf: as a little retroſpection will inform us, that the breadth of what is ſeen of him, ſuppoſing him nearly round, muſt be full two thouſand ſix hundred feet (if more oval, or crab-like, full two thouſand), and his thickneſs, which may rather be called altitude, at leaſt three hundred; our author declaring he has choſen the leaſt circumference mentioned of this animal, for the greater certainty. Theſe immenſe dimenſions, nevertheleſs, we apprehend, will not argue concluſively againſt the exiſtence of the animal, though conſiderably againſt a numerous increaſe or propagation of it. In fact, the great ſcarcity of the *kraken*, his confinement to the north ſea, and perhaps to equal latitudes in the ſouth; the ſmall number propagated by the whale, who is vipiparous; and by the largeſt land animals, of whom the elephant is ſaid to go near two years with young; all induce us to conclude, from analogy, that this creature is not numerous; which coincides with a paſſage in a manuſcript aſcribed to Svere king of Norway, as it is cited by Ol. Wormius, in his Muſeum, p. 280, in Latin, which we ſhall exactly tranſlate. "There remains one kind, which they call "hafguſe, whoſe magnitude is unknown, as it is ſeldom "ſeen. Thoſe who affirm they have ſeen its body, de-"clare, it is more like an iſland than a beaſt, and that "its carcaſe was never found; whence ſome imagine, "there are but two of the kind in nature." Whether the vaniſhing iſland, Lemair, of which capt. Rodney went in ſearch, was a *kraken*, we ſubmit to the fancy of our readers. In fine, if the exiſtence of the creature is admitted, it will ſeem a fair reference, that he is the ſcarceſt as well as largeſt in our world; and that if there are larger in the univerſe, they probably inhabit ſome ſphere or planet more extended than our own. Such we have no pretence to limit; and that fiction can deviſe a much greater than this, is evident, from the cock of Mahomet, and the whale in the Bava Bathra of the Talmud, which were intended to be credited; and to either of which our *kraken* is a very ſhrimp in dimenſions.

KRAMERIA, in *Botany*, a genus of the *tetrandria monogynia* claſs; the characters of which are, that it has no calyx; the corolla has four petals; the upper nectarium is divided into three ſegments, and the lower conſiſts of two leaves; the fruit is a dry, echinated, ſingle-ſeeded berry.

KUL, or **Kool**, a Turkiſh term, properly ſignifying a *ſlave*, or *ſervant*.

Mininſky tells us, the name is given to all the ſoldiers in the Ottoman empire, particularly to thoſe of the grand ſeignor's guard, and the infantry. The captains of the infantry, and thoſe who command the guards are called *kûl zabytlers*, and the ſoldiers of the guard *kapu kû leri*, i. e. *ſlaves of the court*. Others inform us, that all who hold any places depending on the crown, or receive wages from it, in a word, all who are, in any meaſure, the grand ſeignor's ſervants, take the title of *kûl*, or *kool*, i. e. *ſlave*, as more creditable than that of ſubject; even the grand vizir and the baſhaws value themſelves upon it. A *kûl* or ſlave, of the grand ſeignior, has authority to abuſe any who are only his ſervants; but a ſubject, who ſhould affront a *kûl*, or ſlave, would be ſeverely puniſhed. The *kûls* are entirely devoted to the will of the grand ſeignor, and look on it as a kind of martyrdom, that merits heaven, when they die either by his order, or in the execution of his commands.

KUPPER-*Nickel*, in *Natural Hiſtory*, is a reddiſh yellow mineral, containing the ſemi-metal called NICKEL, together with iron and cobalt, mineraliſed by arſenic and ſulphur. It is ſometimes of a vitreous texture, ſometimes fine-grained, and ſometimes conſiſting of ſcaly particles.

KURTCHI, an order of ſoldiery among the Perſians.

The word, in its original, ſignifies *army*; and is applied to a body of cavalry, conſiſting of the nobility of the kingdom of Perſia, and the poſterity of thoſe conquerors, who placed Iſmael Sophi on the throne. They are in number about eighteen thouſand men.

Their commander is called *kutchi baſchi*, which was formerly the firſt poſt in the kingdom; equivalent to a conſtable of France.

KYPHONISM, KYPHONISMUS, or CYPHONISMUS, an ancient puniſhment, which was frequently undergone by the martyrs in the primitive times; wherein the body of the perſon to ſuffer was anointed with honey, and ſo expoſed to the ſun, that the flies and waſps might be tempted to torment him. This was performed in three manners; ſometimes they only tied the patient to a ſtake; ſometimes they hoiſted him up into the air, and ſuſpended him in a baſket; and ſometimes they ſtretched him out on the ground, with his hands tied behind him. The word is originally Greek, and comes from κυφων, which ſignifies either the *ſtake* to which the patient was tied, the *collar* fitted to his neck, or an *inſtrument* wherewith they tormented him; the ſcholiaſt on Ariſtophanes ſays, it was a wooden lock, or cage; and that it was called ſo from κυπτειν, *to crook* or *bend*, becauſe it kept the tortured in a crooked, bowing poſture; others take the κυφων for a log of wood laid over the criminal's head, to prevent his ſtanding upright: Heſychius deſcribes the κυφων as a piece of wood, whereon criminals were ſtretched and tormented. In effect, it is probable the word might ſignify all theſe ſeveral things. It was a generical name, whereof theſe were the ſpecies.

Suidas gives us the fragment of an old law, which puniſhed thoſe who treated the laws with contempt, with *kyphoniſm* for the ſpace of twenty days; after which they were to be precipitated from a rock, dreſſed in women's habit.

KYSTIS, Κυϛις, in *Anatomy*. See CYSTIS.

L.

L, *EL*, a ſemi-vowel, or liquid conſonant, making the eleventh letter of the Engliſh alphabet, and always preſerving the ſame ſound.

The *l* is pronounced by applying the tongue to the palate.

Paſſerat obſerves, that *l* was frequently uſed among the ancients for *b*, as in *cillibæ* for *cibillæ*; for *d*, as *alipe* for *adipe*; for *c*, as *mutila* for *mutica*; for *n*, as *arvilla* for *arvina*, *belle* for *bene*, *colligo* for *conligo*; for *r*, as *fratellus* of *frater*, *balatrones* for *baratrones*: for *ſ*, as *ancille* of *am* and *cæſum*, *equilio* for *equiſio*; for *t*, as *equiſelis*, for *equiſetis*, *Thelis* for *Thetis*. See B, T, &c.

The *ll* is a modern contrivance, and was never uſed among ancient Roman authors: they wrote *alium*, not *allium*; *macelum*, not *macellum*; *polucere*, not *pollucere*.

The *ll* of the Greeks was ſometimes changed by the Romans into *li*, as in αλλομαι, *ſalio*; αλλος, *alius*; φυλλον, *folium*; *r* has alſo been turned into *ll*; as *hira*, *illa*; *ſarare*, *ſatullare*, &c. and *l* into *x* or *xill*; as *ala*, *axilla*; *mala*, *maxilla*; *velum*, *vexillum*; *d* was alſo uſed for *l*, *n* for *ll*, and *r* for *l*. See R, &c.

L is alſo frequently uſed inſtead of *d*, as in *Ulyſſes*, from the Greek Οδυσσευς, in the Æolic dialect Υδυσσης. Thus alſo for *dautia*, we ſay *lautia*; for *dacrumæ*, *lacrymæ*, &c. See D.

There are ſeveral people, for inſtance the Chineſe in Aſia, the Illinois in America, &c. who cannot pronounce the *r*, but always change it into *l*. Thus, when any of them have been baptized by the name of *Petrus Franciſcus*, &c. they always pronounce it *Petlus Flanciſcus*, &c. See R.

Among the Saxons the *l* was aſpirated, and the Spaniards and Welſh uſually double it at the beginning of a word, which ſounds nearly the ſame with our *hl* or *ſl*. At the end of a monoſyllable it is always doubled, except after a diphthong. In a word of more ſyllables it is written ſingle. It is ſometimes inſerted before *e*, and ſounded feebly after it.

The figure of our *L* we borrowed from the Latins, they from the Greeks, and they again from the Hebrews, whoſe *lamed* is much like our *L*, excepting that the angle is ſomewhat more acute.

L was alſo a numeral letter among the ancients, and is ſtill ſo in the Roman cyphering, ſignifying *fifty*; according to the verſe,

> *Quinquies* L *denos numero deſignat habendos.*

When a daſh was added at the top, thus, L̄, it ſtood for *fifty thouſand*.

L was uſed for fifty, being half a C, which ſignified a hundred, and was formerly written thus Ŀ, which, according to Paſquier, makes two LL, the one upright, and the other inverted.

The French Louis *d'ors* have a croſs on them, conſiſting of eight *L's* interwoven, and diſpoſed in form of a croſs.

The letter *L* is marked on the money coined at Bayonne.

The epochas on Greek medals are uſually written with the ancient *lambda*, *L*; which, according to the tradition of the antiquaries, ſtands for Λυκοϐαντος, a poetical word, unknown in common ſpeech, ſignifying *anno*, and which, it is probable, was more uſed in Egypt than Greece.

L, as an abbreviature, ſtands for Lucius; and *LLS.* for a SESTERCE. In Engliſh, it denotes a pound ſterling.

LA, in the *Italian Muſic*, a ſyllable by which Guido denominated the laſt ſound in each hexachord; if it begins in C, it anſwers to our A, if in G to E, if in F to D.

LABADISTS, or **LABBADISTS**, in *Eccleſiaſtical Hiſtory*, a ſect of religioniſts, followers of the opinion of Jean de Labbadie, who lived in the laſt century, and was contemporary with mademoiſelle Bourignon. Labbadie was a native of France, who, after having been honourably diſmiſſed, in 1639, from the order of the Jeſuits, to which he belonged, became a member and miniſter of the reformed church, and erected a new community, which, after his death, in 1674, ſettled at Wievert, in North Holland; where it ſoon ſunk into oblivion.

Some of his tenets were, that, 1. God could and did deceive men. 2. That in reading the Scriptures greater attention ſhould be given to the internal inſpiration of the Holy Spirit than to the words of the text; that the Scripture was not ſufficient to lead men to ſalvation, without certain illuminations and revelations from the Holy Ghoſt; and that the efficacy of the word depended upon him that preached it. 3. That baptiſm ought to be deferred till mature age. 4. That the good and the wicked entered equally into the old alliance, providing they deſcended from Abraham, but that the new admitted only ſpiritual men. 5. That the obſervation of Sunday was a matter of indifference. 6. That Chriſt would come and reign a thouſand years on earth. 7. That the eucharist was only a commemoration of the death of Chriſt; and that though the ſymbols were nothing in themſelves, yet that Chriſt was ſpiritually received by thoſe who partook of them in a due manner. 8. That a contemplative life was a ſtate of grace, and of divine union during this life, the ſummit of perfection, &c. 9. That the man whoſe heart was perfectly content and calm, half enjoys God, has familiar entertainments with him, and ſees all things in him. 10. That this ſtate was to be come at by an entire ſelf-abnegation, by the mortification of the ſenſes and their objects, and by the exerciſe of mental prayer. He alſo maintained that the faithful ought to have all things in common, and that there is no ſubordination or diſtinction of rank in the church of Chriſt. It is ſaid that the Browniſts, and afterwards the Quakers, offered to connect themſelves with this ſectary, but were rejected. See Journ. des Sçavans for October, 1727, where we have ſome account of Labbadie and his followers, which were moſtly women; and with ſome of whom, it has been ſaid, he took criminal liberties.

LABARIFERI, among the *Romans*, ſtandard-bearers, who carried the LABARUM.

LABARUM, in *Antiquity*, the banner or ſtandard borne before the Roman emperors in the wars.

The *Labarum* conſiſted of a long lance, with a ſtaff at the top, croſſing it at right angles; from which hung a rich ſtreamer, of a purple colour, adorned with precious ſtones.

Till the time of Conſtantine it had an eagle painted on it; but that emperor, in lieu thereof, added a croſs, with a cypher expreſſing the name of Jeſus, and choſe fifty of the braveſt men of his guards to bear it on their ſhoulders, each in his turn.

This ſtandard the Romans took from the Germans, Dacæ, Sarmatæ, Pannonians, &c. whom they had overcome.

The name *labarum* was not known before the time of Conſtantine; but the ſtandard itſelf, in the form we have deſcribed it, abating the ſymbols of Chriſtianity, was uſed by all the preceding emperors.

Some derive the word from *labor*, as if this finiſhed their labours; ſome from ευλαβεια, *reverence*, *piety*; others from λαμϐανειν, *to take*: and others from λαφυρα, *ſpoils*.

The *labarum* has afforded very ample matter for criticiſm, and has been diſcourſed of by Fuller, Alciatus, Cujas, Gyraldus, Lipſius, Meurſius, Voſſius, Hoffman, Valois, Du-Cange, &c.

LABDACISM, Λαϐδακισμος, in *Rhetoric*, the too frequent repetition of the letter L, as *ſol et luna luce lucebant*, and *alba levi lactea*.

LABDANUM, in the *Materia Medica*. See LADANUM.

LABEL, a long thin braſs ruler, with a ſmall ſight at one end, and a centre-hole at the other; commonly uſed with a tangent line at the edge of a circumferentor, to take altitudes, &c,

Label, in *Law*, is a narrow ſlip of paper, or parchment, affixed to a deed or writing, in order to hold the appending ſeal. Any paper annexed by way of addition, or explication to any will or teſtament, is alſo called a *label*, or CODICIL.

Among apothecaries likewiſe, the ſlip of paper round their phials, containing directions how to uſe the medicine, is called a *label*.

Label, in *Heraldry*, a kind of addition to the arms of the heir or firſt ſon, to diſtinguiſh him from the others. See FILE, and *Tab. Heraldry fig.* 23.

The *label* is eſteemed the moſt honourable of all differences; and is formed by a fillet uſually placed in the middle and along the chief of the coat, without touching its extremities. Its breadth ought to be a ninth part of the chief.

It is adorned with pendants ſomewhat like the drops under the triglyphs in the Doric frieze. When there are above three pendants, the number muſt be ſpecified in blazoning. There are ſometimes ſix.

The *label* is the only difference fixed on the coats of arms belonging to any of the royal family.

LABELLED-*line*, in *Heraldry*, a term uſe by ſome to expreſs the line in certain old arms, called more uſually *urdee* or *champagne*. Others apply the ſame word to expreſs the patee or dove-tail line, called alſo the *inclave-line* by Morgan. It ſomewhat reſembles the joint called a *dovetail* by our joiners, and its points, as they proceed from the ordinary, whether chief or leſs, reſemble the ends of *labels*. See URDEE and PATEE.

LABEO, in *Ichthology*, a name given by the old Latin writers to the fiſh uſually called *cheilon* and CHELON.

LABER, a word found in Serapion, and uſed there as the name of an aromatic drug. The commentators have been much perplexed to find the reaſon or etymology of the word, as it appears no where elſe in the writings of the ancients. It ſeems to be no other than a wrong ſpelling of the word *ſaber* or *ſebar*, ſometimes alſo written by the Arabians *cebar*, which is a name of the lignum aloes.

LABIA, in *Anatomy*. See LIPS.

Depreſſor LABIORUM. See DEPRESSOR.

Elevator LABIORUM. See ELEVATOR.

LABIAL, a term in the French law, uſed in the ſame ſenſe with ORAL.

Labial *letters*, among *Grammarians*, are thoſe whoſe pronunciation is chiefly effected by the motion of the lips. By which they ſtand contradiſtinguiſhed from PALATAL, DENTAL, GUTTURAL, &c. letters.

Labial *offers* are ſuch as are only made by word of mouth, or even by writing, where there is no valuable conſideration. In courts of equity theſe are not regarded.

LABIATE *flowers*, from the word *labium*, a *lip*, is a term uſed for a very large ſeries of flowers; the diſtinctions of which are, that they are monopetalous, and are in their lower part formed into a pipe or narrow tube, and in their upper become widened into one or two lips. The cup of theſe flowers conſiſts of one leaf, and is uſually tubular, and reſembles a paper cone; and their piſtil is ſurrounded with four embrios, which ripen into a fruit, compoſed of four ſeeds, and kept incloſed in the cup. By this they are diſtinguiſhed from the perſonated flowers, whoſe fruit is an oblong capſule; and they differ from the rotated flowers of borrage, and the like, that they have ſome ſort of reſemblance to the opening of the mouth of ſome animals. See *Tab.* VIII. *of Botany*, *Claſs* 4. See FLOWER.

Labiated *leaf*. See LEAF.

LABINÆ, in *Natural Hiſtory*, a term uſed by the authors who have written of Swiſſerland, and other mountainous countries, to expreſs thoſe vaſt maſſes of ſnow, which ſometimes fall from the hills and bury houſes, or even whole towns; and when hardened by the froſts, as is often the caſe, into ſolid ſubſtances, they overthrow woods, villages, and whatever ſtands in the way of their courſe, as they roll down the ſteep ſides of the precipices in their way. Some authors have alſo extended the word to a larger ſenſe, and made it expreſs the falling of vaſt rocks, or parts of mountains, and their rolling down in the ſame manner into the flat country; this is a miſchief very frequent in the ſame places, after froſts, and often very fatal.

LABIUM *ſuperius attollens*, in *Anatomy*, a name given by Spigelius to the muſcle, called by Albinus, Winſlow, and others, *zygomaticus major*.

LABORANT, in *Chemiſtry*, the perſon that attends on, and works under a chemiſt, while he is about any proceſs or experiment.

LABORATORY, or ELABORATORY, the chemiſts workhouſe, or the place where they perform their operations; where their furnaces are built, their veſſels kept, &c.

In general, the term *laboratory* is applied to any place where phyſical experiments, and operations in pharmacy, chemiſtry, pyrotechnia, &c. are performed.

Dr. Shaw, who has taken great pains to bring the ſtudy of chemiſtry more into uſe in England than it has hitherto been, has explained the eaſineſs of its operation in general, and attempted a means of making its practice leſs expenſive, by introducing in the place of that vaſt number of furnaces, and other contrivances, figured and deſcribed by the generality of writers on the ſubject, a *portable laboratory*, by means of which alone all the chemical operations may be commodiouſly performed. This *laboratory*, fitted for its ſeveral purpoſes, is figured in the plate of chemical furnaces and veſſels, to which we refer the reader. See *Tab.* IV. *of Chemiſt.* N° 52—58. ſeq. Its contrivance is ſuch, that not only complete courſes of chemical experiments and operations may be commodiouſly performed by its means, but all the medicines may be prepared in ſuch quantities, as to ſupply not only the demands of a family, but of an apothecary's ſhop, in moderate buſineſs. The firſt perſon who planned out this ſort of furnace was Beccher; and the ſcheme executed by Dr. Shaw is an improvement on that attempt. This *laboratory* conſiſts of two parts beſide the furnace; theſe are the apparatus and the materia medica. The apparatus may be divided into the remote and immediate, or, in other words, ſuch as are preparatory to the operations, and ſuch as are actually employed in them. The remote apparatus conſiſts of ſcales, weights, and meaſures; alſo mortar, ſieves, raſps, files, hammers, ſheers, and forceps. Next to theſe are the inſtruments uſed in the management of the fire, as ſhovels, hooks, tongs, and blow-pipes; likewiſe for charging the veſſels with the ſubject matters of the operations, as ſhells, horns, tin-plates, bruſhes, hares feet, ſpoons, and ſpatulas; alſo rounds for ſetting glaſſes upon, and for emptying their contents, &c. hooked tongs, cones, ingots, baſons, funnels, and ſtore-glaſſes, furniſhed, according to the nature of the things to be kept in them, with common cocks, wax ſtopples, and glaſs ſtopples; and for tying down theſe, bladders, leathers, and the like. In the laſt place come the inſtruments for making certain utenſils, as moulds for muffles, teſts, crucibles, and melting-pots, and iron rings for cutting glaſſes, and the necks of retorts. The more immediate apparatus, or that employed in the operations themſelves, conſiſts of veſſels containing the ſubjects to be wrought upon, particularly glaſs eggs, and bodies for digeſtion; retorts and receivers for diſtillation, blind heads for bodies in ſublimation; ſtone-pans, and cut-glaſes for evaporation; peculiar ſtout receivers and glaſſes for ſeparation; ſtrainers for percolation; paper for filtration; muffles and teſts for cupellation; crucibles for melting; pots for cementing; and lutings to cloſe the junctures of the veſſels, whenever neceſſary. For the materia chemica, ſee MATERIA *chemica*.

The furnace has four principal parts: 1. The cover. 2. The ring. 3. The body. And, 4. The foot. The general office and uſe of the cover is to check, ſuppreſs, and throw back the heat and flame, that the fuel may not waſte itſelf too faſt, as it otherwiſe would do to very little purpoſe in many of the operations; for the action of the fire being not momentary but ſucceſſive, the more it is kept in, and directed upon the ſubject, the more it is able to perform its effect, and that with the leſs expence or deſtruction of it. In order to increaſe the draught to the fire, and urge the air more forcibly through the body of the fuel, there is a moveable funnel or chimney, which may occaſionally be affixed to the orifice, in the top of the cover left for that and many other uſes. See the figure, ubi ſupra. The ring is the place or ſeat of many operations. The body to be worked upon by the fire is frequently lodged in it; and, in other caſes, it helps to enlarge the furnace, and renders it capable of operations it could not otherwiſe perform. The body of the furnace ſerves to contain the fuel, and is the common ſeat of the operations by the fire, in the running metals from the ores; and in theſe, and many other the like caſes, it performs the office of a crucible as well as fire place, and contains the ſubject mixed along with the fuel, as is practiſed at the ſmelting houſes. To this body there belong three ſeveral grates, which may be placed at different heights therein, according to the nature of the operation, and the diſtance required between the ſubject and the fire. Laſtly, the foot is of two kinds, and is not only of uſe in ſupporting the reſt of the parts, but it receives the aſhes of the fuel, and the melted matter that may, in any of the operations, run down from the ores of metals; or, on other the like occaſions, when the fire liquidates any thing above. The more immediate appurtenances of this furnace, are fuel and bellows. The general fuel is to be charcoal; or, as there is a contrivance for a vent or flue in the body of the furnace, common ſea-coal may be employed, and the ſmoke directed up the chimney of the room, in which the furnace is to ſtand. The ſtructure of this furnace is alſo very well fitted for a lamp, which is a ſort of heat, highly convenient for ſome curious digeſtions and calcinations; and by this means thoſe operations, which would otherwiſe require an athanor, may be conveniently performed, and that in the moſt accurate manner. The number of chemical proceſſes that may be formed by this furnace is not eaſily reckoned up; but it may not be improper to add an account of the ſeveral ſtates into which it is to be put for the performing them.

The moſt ſimple ſtate of the furnace is a combination of its two lower parts, the body and the foot. When theſe are put together, it is fit for fuſion by the naked fire, where the matter to be melted is to be mixed among the fuel: as for inſtance, in the running of the ores of lead, tin, or iron, which may thus, in the quantity of many pounds at a time, be ſeparated from their droſs, and purged for uſe, as exactly as at the mine-works, or ſmelting-houſes, either with the aſſiſtance of the bellows, or without, as the nature of the ore requires. By barely placing a grate in the middle of the body, the inſtrument becomes a melting-furnace for a crucible, wherein all the operations that require a fire of fuſion, animated either by the air, or bellows, are performable with ſuch advantages as cannot be had in the common wind or blaſt-furnaces made for this purpoſe. When only the body of the furnace with its middle grate is ſet upon the foot, it anſwers all the purpoſes of a ſhop-furnace, uſed by the apothecaries for decoction, inſpiſſation, extraction, and the like purpoſes, where a naked fire only is required; and certain diſtillations and ſublimations may alſo be performed conveniently by it.

It may in this ſtate alſo be conveniently made to ſerve the purpoſes of a *balneum Mariæ*, an aſh-heat, a ſand-heat, or a ſtill ſtronger one for digeſtion and ſublimation, by only ſetting on it in this ſtate a veſſel of water, or one filled with aſhes, ſand, or iron filings; and thus ſeveral operations, requiring the ſame kind of heat, may be carried on at the ſame time. If inſtead of a common pan, or veſſel to hold water, ſand, &c. the ring or third part of the furnace, be ſet on, furniſhed with its ſet of pots, the whole is then a furnace fitted for that ſort of diſtillation called *diſtillation in capella vacua*, where the retorts are contained in the cavity of the pots, and locked down therein without any viſible medium between. By this means many operations may be performed in the diſtillation and ſeparation of bodies, that could not be worked upon to ſo much advantage by any other method; particularly, the rectification of the ſtrongeſt acid ſpirits is very eaſily and conveniently performed this way at very little expence.

If an iron pan be placed in the room of the ring juſt mentioned, the inſtrument is then a calcining furnace, where ores or metals may be roaſted; and lead, antimony, and the like bodies, may be conveniently reduced to aſhes.

If the loweſt grate be uſed inſtead of the middle one, then either a cold ſtill, or, as it is generally called, a hot one, may be put into the body, and worked in the common manner with its head and refrigeratory. Thus all the cordial waters may be made, ſpirits may be rectified, and the eſſential oils diſtilled by the ſame means, as well as by the common fixed ſtills.

The laſt part, or cover of the furnace, may ſometimes be applied to the ring, ſometimes only to the body of the furnace without the ring. The inſtrument in this caſe becomes a proper reverberatory furnace, and is uſeful for cementation, cupellation, and the aſſaying of ores; and for diſtilling with a fire of ſuppreſſion, that is, where the fire is placed above as well as below the ſubject, and the veſſel that contains it.

A furnace of this nature has numerous advantages, not only over all the chemical furnaces in common uſe, but even over thoſe of the moſt celebrated ſtructure and contrivance, deſcribed by authors on particular occaſions, not excepting thoſe of Glauber and Vigani. Thoſe nicely contrived furnaces are generally adapted to ſome few particular purpoſes, and yet this eaſy kind anſwers in experiment thoſe very purpoſes better; and at the ſame time is of general uſe on all the other occaſions of chemiſtry. Experience has ſhewn, that it is better for the various uſes of Glauber's philoſophical furnaces than thoſe very furnaces themſelves, though made for theſe very purpoſes, and for the higher operations, as they are called, of metallurgical chemiſtry. For example, to obtain a pure ſpirit of ſalt in plenty, Glauber orders the ſalt to be thrown upon the fire, and has contrivances to catch the riſing vapour; but this is a tedious way, and turns to very little account in practice, nor is the matter much improved by quenching the coals in a brine of ſea-ſalt, and afterwards burning them for their fume. But all that can be expected from theſe aukward contrivances may be had commodiouſly from the furnace here deſcribed, where the fire being animated by bellows, cauſes the fire to burn more free, and the fuel to yield the ſpirit it was impregnated with much more quickly and eaſily, than in the furnace contrived by that author for the purpoſe, while the fuel is ſupplied by the door, without any diſturbance to the operation. Shaw's Eſſay on a Portable *Laboratory*.

There are many other curious philoſophical experiments, which can be no way ſo well done as with this kind of furnace, and many ſcarce at all without it. It is excellently fitted alſo for enamelling, making of paſtes, ſtaining of glaſs, and making the artificial gems; and beſide theſe, and a number of other curious uſes, it is extremely well fitted for all the common purpoſes of fires. Any artiſt who requires fire, in whatever manner, in his buſineſs, may contrive to apply it in this manner as he will. The offices of a common ſtove in the kitchen may alſo be very well ſupplied by it, and the warming a room or vault is as well done by it, as by any of the common contrivances of ſtoves, ovens, and other things, made purpoſely for that uſe.

The outer caſe of this furnace is to be made of good plate-iron of a conſiderable thickneſs, formed in ſeparate pieces of the figures expreſſed in the plate, and its ſize may be ſuch as the operator chooſes; obſerving only a due proportion to its ſeveral parts. The inner ſides of all the parts muſt be lined, at leaſt an inch thick, with a proper LUTE, which muſt be carefully laid on, and gently dried, the cracks which happen in the drying being filled up with more of the ſame luting. See *Portable* FURNACES.

LABORATORY *of an hoſpital*, is a place where the chemical, &c. remedies are made up.

LABORATORY, in a *Camp*, is a tent where the fire-workers and bombardeers prepare their works, drive their fuſees, fix their ſhells and carcaſes, make quick match, &c.

LABOUR, in a general ſenſe, imports the exertion of human ſtrength in the performance of any kind of work. See LAND.

Labourers conſpiring together, concerning their work or wages, ſhall forfeit 10*l.* for the firſt offence, 20*l.* for the ſecond, &c. and if not paid, to be ſet on the pillory. Stat. 2 & 3 Edw. VI. cap. 15. Juſtices of peace, and ſtewards of leets, &c. have power to hear and determine complaints relating to non-payment of labourers wages. 4 Edw. IV. cap. 1. And labourers taking work by the great, and leaving the ſame unfiniſhed, unleſs for non-payment of wages, or when they are employed in the king's ſervice, &c. are to ſuffer one month's impriſonment, and forfeit 5*l.* The wages of labourers are to be yearly aſſeſſed for every county, by the ſheriff and juſtices of peace, in the Eaſter ſeſſions; and in corporations by the head officers, under penalties. 5 Eliz. cap. 4. And the ſheriff is to cauſe the ſaid rates and aſſeſſments of wages to be proclaimed. 1 Jac. I. cap. 6. All perſons fit for *labour* ſhall be compelled to ſerve by the day, in the time of hay or corn harveſt; and labourers in harveſt time may go to other counties, having teſtimonials. From the middle of March to the middle of September, labourers are to work from five o'clock in the morning till ſeven or eight at night, being allowed two hours for breakfaſt and dinner, and half an hour for ſleeping in the three hot months; and all the reſt of the year from twilight to twilight, excepting an hour and a half for breakfaſt and dinner, on pain of forfeiting one penny for every hour's abſence. 4 Eliz. If any labourer ſhall make an aſſault upon his maſter, he ſhall ſuffer as a ſervant making ſuch aſſault.

LABOUR, likewiſe, is uſed to denote the pain which women endure in giving birth to their offspring; and is uſually divided into natural, difficult, and preternatural. For the progreſs of a natural *labour*. See DELIVERY.

A labour is ſaid to be difficult, when the infant is not brought into the world in the uſual time, that is, in an hour or two; but for certain cauſes is retained longer than ordinary, and cannot be brought away without difficulty, and the greateſt care and diligence. The moſt direct and immediate cauſes of accidents of this kind are, firſt, a bad conformation of the body, as in deformed women; and eſpecially when the bones of the pelvis, the os coccygis, and the os ſacrum, in particular, are preternaturally formed, by which means the pelvis is frequently rendered ſo narrow as not to admit the hands. Secondly, the age of the patient; when, for inſtance, women are either too young and tender, are too old, eſpecially in their firſt labour. Thirdly, when they are too timorous, delicate, or abound too much in blood. Fourthly, when their labour is too much haſtened, before nature concurs, and offers her aſſiſtance; or when the waters are either too ſoon diſcharged, or too long retained. Fifthly, when the patients, not before accuſtomed to ſuch circumſtances, refuſe to aſſiſt their genuine and legitimate pains by their own efforts. The more of theſe or ſuch cauſes concur, ſo much the more difficult is the *labour*, and the danger is alſo proportionable. When the head of the child is long confined in the pelvis, it is equally dangerous to the mother and the child; for by its preſſure againſt the ſoft parts, it may ſtop the circulation, and bring on inflammation and gangrene, which would prove certain death to the mother, and likewiſe to the child, by its affecting the brain. When this kind of danger is apprehended, the forceps muſt be uſed.

Preternatural *labour* is that in which the legs or breech are delivered firſt, and the body and head laſt. *Labours* of this kind are more or leſs difficult, according to the poſition of the child, and the contraction of the uterus. They are uſually divided into three claſſes: 1. When the lower parts of the child, as the feet, knees, or breech, preſent. 2. When it is known that the preſentation is wrong, and the midwife has the advantage of turning the child immediately, or breaking the membranes, by means of the waters. 3. When the child preſents wrong, and the uterus is cloſely contracted, the advantage of the water being loſt. When it is known that the breaſt, belly, ſhoulders, or any part but the head, feet, knees, or buttocks, preſent, and the membranes have ſomewhat protruded, let them be broke; and by immediately introducing the hand, let the feet be brought into the paſſage, and thus let the child be delivered, as when the feet preſent. In other caſes of preternatural *labour*, the method of delivery depends upon the part of the child which firſt preſents itſelf.

Labour, in *Sea-Language*, it uſed when a ſhip rolls or toſſes much in a turbulent ſea.

LABRISULCIUM, in the *Art of Healing*, is a chap in the lip, or the ſame with CHEILOCACE; and is a ſcrophulous ſymptom.

The chapt upper lip, as it is an attendant on the ſtrumæ, is beſt cured by the ſame internal remedies uſually preſcribed to alter and rectify this particular dyſcraſy of the blood, and its ſecreted juices; which, together with mercurial purgation, oftentimes takes down the ſwelling at leaſt for a time, till by getting a freſh cold, or ſome other treſpaſs in the non-naturals, a new fluxion ariſes, and the part ſwells up again.

The chap, or cleft, may be anointed with oil of almonds, ſpermaceti, ointment of tutty, or Turner's cerate of lapis calaminaris.

LABRUS, in *Ichthyology*, the name of a genus of fiſh, the characters of which are theſe: they are of the acanthopterygious tribe; the branchioſtege membrane on each ſide contains ſix ſlender and flat bones, when the fiſh is full grown; but in the young ones five only can be counted; the teeth are large, and are placed in the jaws, and on three bones on the fauces; the upper ones hard, and two in number, the lower one ſingle: the palate and tongue are ſmooth; there are thick and fleſhy lips covering the teeth; the membrane of the back-fin contains in its forepart double rays, ariſing from each baſe of theſe two; the one is prickly, the other ſoft and inoffenſive; the colour is generally beautiful, and in moſt of the ſpecies elegantly variegated; the tail is generally undivided; the ſcales are large, ſoft, and ſmooth; and there are no appendices to the pylorus. The ſpecies of this genus, enumerated by Artedi, are ten.

In the Linnæan ſyſtem this is a genus of the thoracic order, comprehending forty-one ſpecies. See WRASSE.

The word *labrus* is truly Roman, and is uſed in the ſame ſenſe by Ovid and others, being probably derived from the word *labra, lips*; this fiſh having remarkably thick and prominent lips.

LABRUSCA, in *Botany*, a name uſed by the old authors for black bryony.

LABURNUM, in *Botany*. See *Baſe-tree* TREFOIL.

LABUYO, in *Natural Hiſtory*, a name given by the inhabitants of the Philippine iſlands to a bird very common among them, and called by us the UROGALLUS.

LABYRINTH, Λαϐυρινθος, among the *Ancients*, was a large and intricate edifice cut out into various iſles and meanders, running into each other, ſo as to render it difficult to get out of it.

There is mention made of four celebrated *labyrinths* among the ancients, ranked by Pliny in the number of the wonders of the world; viz. the Cretan, Egyptian, Lemnian, and Italian.

That of Crete is the moſt famed; it was built by Dædalus, for king Minos, on the model of that of Egypt; and it was hence that Theſeus made his eſcape by means of Ariadne's clue.

That of Egypt, according to Pliny, was the oldeſt of all, and was ſubſiſting in his time, after having ſtood 3600 years. He ſays it was built by king Peteſucus, or Tithoës; but Herodotus makes it the work of ſeveral kings; it ſtood on the banks of the lake Mœris, and conſiſted of twelve palaces, in which the twelve kings of Egypt aſſembled to tranſact affairs of ſtate and religion, containing three thouſand apartments. See a plan and deſcription of this *labyrinth*, in the preſent ſtate of it, in Pocock's Hiſt. of the Eaſt, vol. i. p. 61, &c. See alſo Perry's View of the Levant, p. 381, &c.

That of Lemnos was ſupported by columns of wonderful beauty; there were ſome remains of it at the time when Pliny wrote. That of Italy was built by Porſenna, king of Hetruria, for his tomb.

Labyrinth, in *Anatomy*, denotes the ſecond cavity of the internal EAR, which is formed or excavated out of the os petroſum; and is thus called, as having ſeveral windings in it.

Dr. Vieuſſens obſerves, that the bone, out of which the *labyrinth* is dug, is white, hard, and very compact, that the ethereal matter of ſounds, laden with impreſſions ſtriking againſt its ſide, may loſe little or nothing of its motion, but communicate it entire to the nerves of the ear. See HEARING, SOUND, &c.

Labyrinth, in *Gardening*, is a part of the ground ſo planted and diſpoſed, as to render it difficult, when any one is in it, to find the way out; and in the attempting to get out, there are to be as many ſtops and diſappointments laid in the way as poſſible: the centre alſo is to be made difficult to be found. There are two general ways of making them; the firſt is with ſingle hedges, and this is what has been moſt practiſed in England; and this may be beſt where there is but a ſmall ſpot of ground allowed for the making of them; but where there is room enough, the double hedges are much the moſt eligible; and theſe are beſt of all, when there is a wood-work between them. The walks in *labyrinths* ſhould be gravelled, and ſhould by no means be made too narrow. Theſe are to be ſet with iron beams, and the paliſadoes ought to be ten, twelve, or fourteen feet high. *Labyrinths* are only proper for large gardens; and the fineſt in the world is ſaid to be that of Verſailles. That at Hampton-court, is well known.

LAC, *milk*. See MILK.

Lac *ammoniaci* is formed by triturating gum ammoniac in ſimple penny-royal water, in ſuch proportion that four ſpoonfuls, or two ounces of the emulſion, contain thirty grains of the AMMONIAC. Some have diſſolved it in vinegar of ſquills.

Lac *lunæ*. Dr. Plott gives this foſſil as a mark of good lime-ſtone; but it has been obſerved, that two quarries in Ireland, where *lac bunæ* was found, were of building ſtone; but would not burn into lime. Phil. Tranſ. N°. 477. § 9.

There are many varieties of this mineral, differing in their texture and colour. It is found in many parts of Europe, and alſo in Aſia and America. Many of the Engliſh quarries in Oxfordſhire, Glouceſterſhire, Northamptonſhire, and Derbyſhire, afford conſiderable quantities of it. It adheres to the roofs and walls of grottoes and caverns, and is lodged in the fiſſures of ſtrata of ſtone, ſometimes in form of a farinaceous powder, and ſometimes concreted into maſſes. Its ſurface is rough and duſky; it colours the hands, adheres to the tongue, melts readily in the mouth, without grittineſs, yields an inſipid taſte, and raiſes an ebullition in water, which ſoon diſſolves it into a fine white powder. See AGARIC.

Lac *ſulphuris*. See SULPHUR.

Lac *virginale*. See *Virgin's* MILK.

Lac *Virginis*. See VIRGIN'S *milk* and BENZOIN.

LACCA, *ſtick-lac*, improperly called *gum* LAC, is a ſort of hard, red, brittle, clear, and tranſparent ſubſtance brought from Malabar, Bengal, and Pegu, and uſed in dying ſcarlet, and in painting, making ſealing-wax, ſpirit varniſhes, &c.

Authors differ as to the production of this curious drug. F. Tachard, who was on the ſpot, tells us, that a kind of little ants, fixing themſelves on the branches of ſeveral trees, leave behind them a reddiſh moiſture, which being expoſed to the air and ſun, hardens in five or ſix days time, and becomes *lacca*. Some imagine that it is not the production of the ants, but a juice which they draw out of the tree, by making little inciſions in it; and others ſay, that the trees where the *lacca* is found do yield a gum; but that it is of a very different nature from the *lacca*.

The ants, they tell us, act here in quality of bees, and the lacca is their wax. They work at it eight months in the year, and the reſt of the time lie by, becauſe of the rains.

Lemery, having examined the gum *lacca* chemically, judges it to be a mean mixture between a gum and a reſin, and more abundant in ſalt than oil.

Mr. Geoffroy, examining the gum *lacca*, found it to be a kind of comb, ſuch as the bees, and ſome other inſects, are accuſtomed to make. Upon breaking it into pieces, it appeared divided into a great number of alveoli, or little cells, of an uniform figure, and which he thinks plainly ſhew that it never ouſed from trees. Theſe cells are not mere excrements, as ſome imagine; but are intended for ſomething to be depoſited in them, and accordingly are found to contain little bodies, which the firſt obſervers took for the wings, or other parts of the inſects that produced the *lacca*. Theſe little bodies are of a beautiful red colour; and, when broken, make a powder as fine as cochineal. It is moſt probable theſe cells are deſtined to lodge the young brood, as thoſe of the bees; and that theſe little carcaſes are the embryos of inſects, or perhaps their ſkins.

There are ſeveral ſorts of *lacca*; that mentioned in the laſt paragraph is the natural, being a kind of wax depoſited either on the branches of the trees, or on ſticks faſtened in the earth for that purpoſe, and thence called *ſtick-lac*. When it is prepared, thoſe kinds of dry cells are not ſeen. If the *lac* be ſeparated from the ſticks to which it adheres, groſly powdered, and deprived of its colour by digeſtion with menſtruums, it is called *ſeed-lac*; and when the *ſtick-lac* is freed from its impurities, by melting it over a gentle fire, and formed into cakes, it is called *ſhell-lac*. The grains, or plates, thus formed by liquefaction, and robbed of great part of the animal tincture, ſeem to be of an intermediate nature between that of wax and reſins, or to partake of the nature of both; they crumble on chewing, and do not ſoften or ſtick together again; laid on a red-hot iron, they inſtantly catch fire, and quickly burn off, with a ſtrong and not diſagreeable ſmell; diſtilled, they yield, like wax, an acid ſpirit, and a butyraceous oil; alkaline lixivia, and volatile alkaline ſpirits, diſſolve them into a purpliſh liquor; they diſſolve alſo, by the aſſiſtance of heat, in rectified ſpirit of wine, communicate to it a yellowiſh or browniſh red colour, an agreeable ſmell, and a bitteriſh, ſubaſtringent, not unpleaſant, taſte. The *lac* in ſubſtance, whether entire, or freed from ſo much of its colouring matter as boiling water is capable of extracting, has no manifeſt taſte or ſmell. Mr. Geoffroy reckons ſix or ſeven different kinds; beſides which, there are ſeveral paſtes uſed by the painters, that go by this name, or by that of *laque*. This gum, boiled in water with acids, makes a beautiful red dye.

To prepare the *lacca* for uſe in dying, they firſt ſeparate it from the branches to which it adheres, pound it in a mortar, and throw it into boiling water; and when the water is well dyed, they pour on freſh, till ſuch time as it will tinge no more. Part of the water thus tinged is evaporated in the ſun; after which the thickened tincture is ſtrained through a linen cloth.

The colour given by *lac* is leſs beautiful, but more durable, than that given by cochineal. To render the colouring matters of the *lac* diffuſible in water, ſo as to be applied to the ſtuffs to be dyed, Mr. Hellot directs the following proceſs. Let ſome powdered *gum-lac* be digeſted for two hours in a decoction of comfrey-root, by which a fine crimſon colour is given to the water, and the gum is rendered pale or ſtraw-coloured. To this tincture, poured off clear, let a ſolution of alum be added; and when the colouring matter has ſubſided, let it be ſeparated from the clear liquor, and dried. It will weigh about one fifth of the quantity of *lac* employed. This dried fecula is to be diſſolved or diffuſed in warm water, and ſome ſolution of tin is to be added to it, by which it acquires a vivid ſcarlet colour. This liquor is to be added to a ſolution of tartar in boiling water; and thus the dye is prepared.

The method of obtaining the fine red *lac* uſed by painters from this ſubſtance, is by the following ſimple proceſs. Boil the *ſtick-lac* in water, filtrate the decoction, and evaporate the clear liquor to a drineſs over a gentle fire. The occaſion of this eaſy ſeparation is, that the beautiful red colour, here ſeparated, adheres only ſlightly to the outſides of the ſticks, broke off the trees along with the *gum-lac*, and readily communicates itſelf to boiling water. Some of this ſticking matter alſo adhering to the gum itſelf, it is proper to boil the whole together; for the gum does not at all prejudice the colour, not diſſolve in boiling water: ſo that after this operation the gum is as fit for making ſealing-wax as before, and for all other uſes which do not require its colour.

A tincture of *gum-lac* may be thus prepared. Take two ounces of *gum-lac*, reduce it to a fine powder, and make it into a ſtiff paſte with oil of tartar *per deliquium*; ſet this in an open glaſs to dry by a gentle heat, then remove it to the open air, that it may relent and grow ſoft, then dry it again, and repeat this two or three times, at the end of which the hard body of this reſin will be found reſolved into a purple liquor. This may yet again be dried, and when dried, muſt be reduced to powder, which powder will afford a fine ſtrong tincture to ſpirit of wine, being boiled in it in a tall glaſs in a ſand-heat for two or three hours. And by this proceſs, ſtrong tinctures may be made from myrrh, amber, gum, juniper, &c. which will yield no tincture of ſtrength to ſpirit of wine alone, if treated in the uſual way.

A ſpirituous tincture of *ſtick-lac* has been ſometimes given as a mild reſtringent and corroborant in female weakneſſes, and in rheumatic and ſcorbutic diſorders. But the principal medicinal uſe of this concrete is as a topical corroborant and antiſeptic, in laxities and ſcorbutic bleedings, and exulcerations of the gums. Some employ for this purpoſe a tincture of the *lac* in alum-water; others, a tincture made in vinous ſpirits, impregnated with the pungent antiſcorbutics. The college of Edinburgh directs an ounce of the powdered *lac*, with half an ounce of powdered myrrh, to be digeſted in a ſand-heat, for ſix days, in a pint and a half of ſpirit of ſcurvy-graſs.

The *gum-lac* has been lately uſed as an electric, inſtead of glaſs, for ELECTRICAL *machines*. See LACQUER, LAKE, and VARNISH.

Lacca, *artificial*, or **Laque**, is alſo a name given to a coloured ſubſtance, drawn from ſeveral flowers; as the yellow from the flower of the juniper, the red from the poppy, and the blue from the iris or violet.

The tinctures of theſe flowers are extracted by digeſting them ſeveral times in aqua vitæ, or by boiling them over a ſtove fire in a lixivium of pot-aſhes and alum.

An *artificial lacca* is alſo made of Braſil-wood, boiled in a lixivium of the branches of vine, adding a little cochineal, turmeric, calcined alum, and arſenic, incorporated with the bones of the cuttle-fiſh pulverized, and made up into little cakes, and dried.

If it be to be very red, they add the juice of lemon to it; to make it brown, they add oil of tartar.

Dove-coloured, or columbine *lacca*, is made with Brazil of Fernambuck, ſteeped in diſtilled vinegar for the ſpace of a month, and mixed with alum incorporated in cuttle-fiſh bone. For other proceſſes, see LAKE and MADDER.

LACCIA, in *Ichthyology*, a name given by Paulus Jovius to the SHAD, or, as we ſometimes call it, the mother of the pilchards.

LACCOPADON, a word uſed by the old medical writers to expreſs the lax part of the ſcrotum.

LACCOS, Λακκος, among the Greeks, a ditch or trench uſed inſtead of an ALTAR, when ſacrifices were to be offered to the ſubterranean or infernal gods.

LACE, in *Commerce*, a work compoſed of many threads of gold, ſilver, ſilk, or linen, interwoven the one with the other, and worked upon a pillow with ſpindles, according to the pattern deſigned; the open work being formed with pins, which are placed and diſplaced as the ſpindles are moved. See GOLD *thread*.

The importation of gold and ſilver *lace* is prohibited.

Lace, *bone*, a *lace* made of fine linen thread or ſilk, much in the ſame manner as that of gold and ſilver. The pattern of the *lace* is fixed upon a large round pillow, and pins being ſtuck into the holes or opening in the pattern, the threads are interwoven by means of a number of bobbins made of bone or ivory, each of which contains a ſmall quantity of fine thread, in ſuch a manner as to make the *lace* exactly reſemble the pattern. There are ſeveral towns in England, and particularly in Buckinghamſhire, that carry on this manufacture; but vaſt quantities of the fineſt *laces* have been imported from Flanders.

The duties on foreign *bone lace* are as follow. *Bone lace* of thread, the dozen yards, pays on importation 15*s.* 4$\frac{80}{100}$*d.* and draws back on exportation 13*s.* 6*d.* Purl, or antlet *lace* of thread, the groſs, pays 3*s.* 10$\frac{20}{100}$*d.* Silk *bone lace* the pound, containing ſixteen ounces, pays 11*l.* 10*s.* 10$\frac{1}{2}$*d.*

Lace is alſo uſed for a kind of chord made of ſilk or cotton, chiefly uſed in lacing women's ſtays.

LACEDÆMONIUM *marmor*, in the *Natural Hiſtory of the Ancients*, the name of a ſpecies of marble, very hard, and of a beautiful green colour; it is a very cloſe, even, and compact marble; of a fine ſtrong and bright green, and when poliſhed, is the brighteſt of all the green marbles, and is remarkable for this, that the colour is not regularly and equally diffuſed through the whole maſs, but leaves in it many ſpots and lines very bright and pale, and ſome much deeper than the general colour, though there is no colour but green in the whole, only in different ſhades and degrees, ſome parts approaching to black, and others to whiteneſs.

It was originally found only in Egypt, and there not in entire ſtrata, but in large pieces waſhed off from the ſtrata, and ſometimes left on the ſurface, ſometimes buried in the earth, and was greatly valued. It has been ſince found in Italy and Germany, and in England. About five miles from the Hot-Wells at Briſtol there is a ſtratum of it, whence it might be had in conſiderable quantities. Its beauty would ſoon recommend it, if it were once known; and though hard to cut, it would make amends for that by the high poliſh it would take.

LACERNA, a thick coarſe ſort of military garment worn by the ancients.

The *lacerna* was a kind of cloke of woollen, only uſed by the men; who wore it over the toga, and, when that was not on, over the tunica. It was at firſt very ſhort, but growing popular in the Roman army, it was ſoon lengthened.

The *lacerna* was ſcarce known in Rome till the time of the civil wars, and the triumvirate; then indeed it came into faſhion; for the ſoldiers being then frequently in the city, or at the city gates, the ſight became familiar to the citizens, and they fell into the uſe of it; inſomuch that it became the common dreſs of the knights and ſenators, till the time of Valentinian and Theodoſius, when the ſenators were prohibited the wearing of it in the city.

The *lacerna* appears to have been much the ſame with the *chlamys* and *birrus*.

Martial mentions *lacernæ* of ten thouſand ſeſterces price.

LACERTA, *Lizard*, in *Aſtronomy*, a conſtellation of the northern hemiſphere, including, according to Hevelius, ten ſtars, and in the Britiſh Catalogue ſixteen, which are as follow:

Names and ſituations of the ſtars.	Signs.	Longitud.			Latitude. N.			Magnitude.
		°	′	″	°	′	″	
In the extremity of the tail	♓	19	42	7	44	24	30	5
In the right foot		27	58	36	51	18	22	5
	♈	4	23	56	55	34	10	4.5
In the head		1	37	33	53	19	9	5
		0	57	54	51	24	20	4.5
15.								
In the belly	♓	27	8	24	47	32	41	5
	♈	3	52	12	53	17	26	4
Firſt in the root of the tail	♓	25	43	28	44	2	31	6
	♈	6	27	28	53	41	44	6
3d in the root of the tail	♓	26	4	36	43	12	34	6
10.								
In the back	♈	0	19	52	47	30	59	5
2d in the root of the tail	♓	27	25	27	43	59	35	6
		29	11	36	45	5	6	6
	♈	0	41	5	44	34	34	6
		2	5	9	45	33	38	5
15.								
		1	45	28	43	41	10	6

LACERTA, the *lizard* or *eft*, in *Zoology*, the name of a large genus of animals, comprehending all thoſe quadrupeds which are oviparous, and have long tails continued from their bodies. The *lizard*, or *lacerta*, in the Linnæan ſyſtem, is a genus of reptiles in the claſs of *amphibia*, diſtinguiſhed by a four-footed naked body, with a tail, comprehending forty-eight ſpecies. The term oviparous is to be underſtood however in a larger ſenſe, expreſſing ſome among theſe, which, though they have true and proper eggs within them, yet never depoſit them as ſuch, but keep them in their bodies till they are hatched, and bring forth living young ones. Some of the ſerpents, as well as ſome of the *lizards*, are of this kind, and the obſervation is as old as Ariſtotle, who calls the creatures, whoſe generation is of this kind, *internally oviparous, externally viviparous*. See *Tab. of Serpents*, N° 30, ſeq.

The *lizard* claſs is very numerous; and the ſeveral ſpecies are diſtinguiſhed chiefly by the number of their toes, and the form and length of their tail.

The *lizard* lives in caverns, ruins, and deſolate places. The large green *lizard* is eſteemed above the reſt for medicinal purpoſes; but this being rarely to be found in theſe countries, what we ſay is to be underſtood of the common *lizard*.

Being cut in pieces, or bruiſed, eſpecially the head, and applied with ſalt, it extracts ſplinters, pieces of glaſs, or the like, out of the body. The fleſh, or the aſhes of it, burnt, made into a litus, with fat, cures an alopecia. It is alſo good againſt the ſting of a ſcorpion, and the bites of other venomous creatures.

LACERTA *aquatica*, or *vulgaris*. See EFT.

This ſpecies is found, in the ſpring and ſummer, in moſt ditches and ſhallow ſtanding waters throughout England, but are ſeldom or ever ſeen in winter. Theſe ſmall *lizards* ſhed their ſkins every two or three weeks, and theſe changes may be obſerved by keeping them in a jar of water. The animal begins this work of putting off the old ſkin, by looſening it with its fore feet about the jaws; it then puſhes it backward gently and gradually both above and below the head, till it is able to ſlip out firſt one leg, and then the other; which being done, it proceeds to thruſt the ſkin backwards as far as theſe legs can reach; it is then obliged to rub its body againſt pebbles, gravel, &c. till more than half its body is freed from the ſkin, which appears doubled back, and covering the hinder part of the body and tail. The animal afterwards turning its head round to meet its tail, takes hold of the ſkin with its mouth, and ſetting its feet upon it, by degrees pulls it quite off. The ſkin will be found with its inſide outwards, but not having the leaſt hole or breach. The animal will ſwallow the ſkin whole, as it does its other food, unleſs it be ſpeedily removed. Phil. Tranſ. vol. xliv. p. 532, &c.

LACERTA *chalcidica*, in *Zoology*, the name of a ſpecies of *lizard*, more uſually known by the name SEPS.

LACERTA *orbicularis*, in *Zoology*, the name of a very ſingular ſpecies of *lizard*, which is not long and ſlender like the reſt, but broad and rounded. It is an inhabitant of Mexico.

LACERTA *ſquamoſa*, in *Zoology*, a name given by authors to a ſpecies of *lizard*, more eminently ſcaly than any other kind. The general length of this creature is about a yard and half; his head from the noſe end to the fore-feet, is not above three inches; he has no neck; his trunk from the fore-legs to the hinder, is not above ten inches and a half, but his tail is exceeding long, not meaſuring leſs than a yard and a half quarter; the back part of his head is near two inches over; his noſe about an inch, his body nearly four inches, and his tail very taper; he is all over, except his throat and belly, and the lower part of his fore-legs, and the inward part of the hinder ones, covered with ſcales very thick; and in ſolidity equal to the hardeſt bone; the baſes of the ſcales are of a blackiſh yellow, the reſt of a pale yellow, like that of old ivory; they are ſtriated from the baſe to the cone, and are diſpoſed alternately in the manner of the ſcales of fiſh. It is ſaid to be a very tame and inoffenſive animal.

The throat and belly of this animal are beſet with hairs, and Mr. Ray ſuppoſes it from that, to belong to the viviparous quadrupeds, notwithſtanding that its ſhape has always made it be ranked among the *lizard* kind. It is preſerved in the muſeums of the curious, but we are not acquainted with the part of the world it lives in. Ray's Syn. Quad. p. 275.

LACERTA *ſubterranea*, the *under-ground lizard*, a very diſagreeable and dangerous ſpecies of lizard, found in the Antilles iſlands, and ſome other places. They are often met with by the people who dig in marſhy places, and are of a very formidable aſpect; they are about ſeven inches long. Their back is covered with black gloſſy ſcales, with a few grey ones, mixed here and there among them, and they look ſleek and gloſſy as if rubbed over with oil; the belly is no leſs ſcaly than the back, and their ſkin is of a yellowiſh colour. The head is ſmall and ſharp, and the mouth opens very wide, and is armed with very numerous and ſharp teeth; their eyes are very ſmall. As ſoon as they are dug up, and thrown on the ground, they immediately dig their way in again with their feet, which are prepared for that purpoſe, and armed with ſharp claws; and when they are once in, they burrow their way like moles wherever they pleaſe. They do great miſchiefs to the inhabitants in their gardens and plantations, burrowing horizontally at ſmall depths, and deſtroying the roots of every thing they meet with. Their bite is eſteemed as dangerous as that of the moſt poiſonous ſerpent.

LACETA *viridis*, the *green-lizard*, a very beautiful creature, which is common in many parts of Italy, and is ſometimes found in Ireland. It is conſiderably larger than our land-eft, and of a very beautiful green. See *Tab. of Serpents*, N° 31.

LACERTA *volans*, is a ſpecies of *lizard*, according to ſome writers, but Linnæus has referred this and another ſpecies to a diſtinct genus, under the name of *draco*; it lives on trees, feeding on ants, flies, and other inſects, and doing no injury to man or any other large animal. It has membranes on its ſides, which ſerve the office of wings, in carrying it from one tree to another, and has been called by Geſner the *dragon*, or *winged-ſerpent*.

LACERTUS, in *Ichthyography*, the *lizard-fiſh*, a name given by ſome writers to a fiſh of the cuculus-kind, much reſembling the common mackrel in ſhape and in taſte, and more uſually called trachurus.

LACERTUS is alſo uſed for a fiſh of the garfiſh-kind, or *acus Oppiani*,

Oppiani, but larger than the common ſpecies, and called by the Italian fiſhermen *aguglia imperiale*, or the imperial garfiſh, and by the fiſhermen of England, particularly in Cornwall, the *girrock*, in diſtinction from the common kind which they call *ſkipper*. It is thicker in proportion to its length than the common garfiſh, and has a ſhorter and ſharper ſnout, and inſtead of teeth, has only its jaws ſerrated like a file. It is a ſcarce fiſh, but is more firm in its fleſh than the common garfiſh.

LACERTUS *alter ſphincteris*, in *Anatomy*, a name given by Santorini, and ſome others, to one of the muſcles of the anus, now generally known by the name of the *levator ani*: the *muſculus ſedem attollens* of Veſalius, and *latus* of others. The thin termination of this muſcle, not the whole, is underſtood by this name.

LACERUM *folium*, among *Botaniſts*. See LEAF.

LACHES, (from the French *laſcher*, i. e. *laxare*, or *laſche*, *ignavus*) in our laws, ſignifies ſlackneſs or negligence; as it appears in Littelton, where *laches* of entry is a neglect in the heir to enter, and probably it may be an old Engliſh word; for when we ſay there is *laches* of entry, it is the ſame as if it were ſaid, there is lack of entry; and in this ſignification it is uſed. Litt. 136. No *laches* ſhall be adjudged in the heir within the age; and regularly *laches* ſhall not bar either infants or femes covert for not entry or claim to avoid deſcents: but *laches* ſhall be accounted in them, for non-performance of a condition annexed to the ſtate of the land. Co. Litt. 146.

LACHNÆA, in *Botany*, a genus of the *octandria monogynia* claſs: it has no calyx; the corolla is divided into four ſegments, with an uneven margin; the ſeed is ſingle and obliquely acute.

LACHNIS, in *Natural Hiſtory*, the name of a genus of foſſils, of the claſs of the *fibrariæ*; the characters of which are, that they are fibroſe bodies, not elaſtic, and compoſed of ſhort and abrupt fibres, or filaments.

The word is derived from the Greek λαχνη, a hair or ſhort capillament or fibre. See *Tab. of Foſſils, Claſs* 1.

The bodies of this genus are divided into thoſe which are compoſed of larger and broader, and thoſe which are compoſed of ſmaller and narrower filaments. Of the firſt of theſe, there are ſix ſpecies known among us; and of the other four.

It is very certain, that moſt of the reſt, from the quantities they are found in, might be made a very profitable thing to the owners of the pits where they lie, though they are in moſt places neglected.

LACHRYMA *Jobi*, in *Botany*, ſee JOB's *tears*.

LACHRYMÆ *Batavicæ*. See RUPERT's *drops*.

LACHRYMAL, or LACHRYMAL *gland*, in *Anatomy*, a ſmall oblong gland, ſituate above the eye, near the little canthus, whence proceed two or three ſmall ducts, which, opening on the inward ſurface of the eye-lid, filtrate a ſeroſity ſerving to moiſten the ball of the eye, and facilitate its motion.

Near the larger angle is alſo a little eminence, in form of a caruncle, which ſome have taken for another *glandula lachrymalis*, but by miſtake; this being no more than the duplicature of the inner membrane of the eye-lids. See CARUNCULÆ *Lachrymales*.

On the ſame ſide near the leſſer angle, are two little perforations, called *puncta lachrymalia*.

On the ſame ſide is alſo a ſmall bone, one of thoſe of the upper jaw, ſometimes called *os lachrymale*, but more uſually os unguis.

LACHRYMALIS, *fiſtula*, is a fiſtula in the larger angle of the eye.

It uſually happens after an abſceſs formed in the ſacculous lachrymalis, by means of the ſeroſity lodged there; which, being retained too long, becomes acrimonious, and occaſions an ulcer, which frequently degenerates into a fiſtula. See FISTULA *Lachrymalis*.

LACHRYMALIS, *ſacculus*. See SACCULUS and LACHRYMALIA.

LACHRYMALIA, or LACRYMALIA *puncta*, in *Anatomy*, two little apertures in the great angle of each eye, into which an aqueo-ſaline pellucid humour, ſecreted from the blood by the glandula lachrymalia, is conveyed, and thence carried off by the lachrymal canals, termed *cornua*, into a little bag called *ſacculus lachrymalis*, in the canal of the noſe; whence, by a pipe always open, it is carried into the cavity of the noſe; immediately under the lower os ſpongioſum.

Hence appears the reaſon why people, in crying, run at the noſe.

This humour, ſeparated by the glandula lachrymalis, ſerves to moiſten and lubricate the ball of the eye, and prevent any hurtful attrition: when it is ſecreted in any great quantity, ſo as to overflow the eye-lids, it is called tears.

LACHRYMATORIES, or LACRYMATORIES, in *Antiquity*, were ſmall glaſs or earthen veſſels, wherein the tears of the weeping friends that ſurvived were repoſited, and buried with the aſhes and urns of the dead. Some of theſe are ſtill ſeen in the cabinets of the curious.

LACINIATED *leaf*, in *Botany*. See LEAF.

LACK *of Rupees*. See RUPEE.

LACKER. See LACQUER.

LACMUS. See LITMUS.

LACONIC *ſtyle*. See STYLE.

LACONICA *ſcytala*. See SCYTALA.

LACONISM, Λακωνισμος, a ſhort, pithy, ſententious ſpeech, in the manner of the Lacedæmonians, who were remarkable for the cloſeneſs and conciſeneſs of their way of delivering themſelves.

LACQUER, or LACKER, is a varniſh applied upon tin, braſs, and other metals, to preſerve them from tarniſhing, and to improve their colour. The baſis of *lacquers* is a ſolution of the reſinous ſubſtance called ſeed-lac, in ſpirit of wine. The ſpirit ought to be very much dephlegmated in order to diſſolve much of the lac. For this purpoſe, ſome authors direct dry pot-aſh to be thrown into the ſpirit. This alkali attracts the water, with which it forms a liquid that ſubſides diſtinctly from the ſpirit, at the bottom of the veſſel. From this liquid the ſpirit may be ſeparated by decantation. By this method the ſpirit is much dephlegmated: but at the ſame time it becomes impregnated with part of the alkali, which depraves its colour, and communicates a property to the *lacquer* of imbibing moiſture from the air. Theſe inconveniences may be prevented by diſtilling the ſpirit; or, if the artiſt has not an opportunity of performing that proceſs, he may cleanſe the ſpirit in a great meaſure from the alkali, by adding to it ſome calcined alum, the acid of which uniting with the alkali remaining in the ſpirit, forms with it a vitriolated tartar, which, not being ſoluble in ſpirit of wine, falls to the bottom together with the earth of the decompoſed alum. To a pint of the dephlegmated and purified ſpirit about three ounces of powdered ſhell-lac are to be added; and the mixture to be digeſted during ſome days with a moderate heat. The liquor ought then to be poured off, ſtrained, and cleared by ſettling. This clear liquor is now fit to receive the required colour, from certain reſinous colouring ſubſtances, the principal of which are gamboge, and anotto, the former of which gives a yellow, and the latter an orange colour. In order to give a golden colour, two parts of gamboge are added to one of anotto; but theſe colouring ſubſtances may be ſeparately diſſolved in the tincture of lac, and the colour required may be adjuſted by mixing the two ſolutions in different proportions. When ſilver-leaf, or tin, are to be lacquered, a larger quantity of the colouring materials is requiſite than when the *lacquer* is intended to be laid on braſs.

There are ſundry other materials, from a due mixture of which a like colour may be produced, as turmeric, ſaffron, dragon's blood, &c. See *Gold Coloured* VARNISH, and *Japanner's* GILDING.

Inſtead of ſeed-lac, uſed in the compoſition of varniſhes for *lacquering*, reſin, or turpentine is ſubſtituted for the coarſer uſes; the following compoſition for braſs-work, deſigned to reſemble gilding, has been much recommended: take of turmeric ground, as it may be had at the dry-ſalters, one ounce, and of ſaffron and Spaniſh anotto each two drams: put them into a bottle with a pint of highly rectified ſpirit of wine, and place the bottle in a moderate heat, occaſionally ſhaking it, for ſeveral days; then ſtrain off the yellow tincture thus obtained, through a coarſe linen cloth, and putting it back into the bottle, add three ounces of good ſeed-lac groſsly powdered; place the bottle again in a moderate heat and ſhake it, till the ſeed-lac be diſſolved. The *lacquer* ſtrained as before will be fit for uſe, and muſt be kept in a bottle carefully ſtopped. By increaſing or diminiſhing the proportion of anotto, the *lacquer* will be rendered warmer and redder, or cooler and nearer a true yellow. A cheaper compoſition, little inferior to the former, may be formed of one ounce of turmeric-root ground, half a dram of the beſt dragon's blood, and a pint of ſpirit of wine, managed as the former.

The varniſh for tin may be made of one ounce of turmeric-root, two drams of dragon's blood, and one pint of ſpirit of wine, prepared in the ſame manner with the other. The dragon's blood may be increaſed or diminiſhed, as the red or yellow is to be the moſt prevalent; and for a coarſer *lacquer* the quantity of ſeed-lac may be leſſened, and the deficiency ſupplied by the ſame proportion of reſin. The *lacquer* for locks, nails, &c. where little or no colour is deſired, may be either ſeed-lac varniſh alone, or with a little dragon's blood; or a compound varniſh of equal parts of ſeed-lac and reſin, with or without the dragon's blood. The manner of laying on the *lacquer* is as follows: the pieces to be lacquered muſt firſt be made thoroughly clean; and if they be new founded, aqua fortis muſt be uſed for this purpoſe. When they are afterwards heated by a ſmall charcoal fire, the *lacquer* is laid on with a proper bruſh, like other varniſhes, and the pieces reſtored to the heat. After the *lacquer* is thoroughly dry and firm, the ſame operation muſt be renewed for four or five times, or till the work appears of the required colour and brightneſs.

The *lacquering* of leather, improperly called gilding, is performed by means of leaf-ſilver, coloured by a yellow varniſh. See *Japanner's* GILDING. For this purpoſe calf or goat ſkins are procured in a dry ſtate, after the common dreſſing and tanning. They are ſoftened by being immerſed and ſtirred about for ſome hours in a tub of water; and afterwards beaten againſt a flat ſtone and ſmoothed, by ſpreading them on the ſtone and rubbing them over with an iron inſtrument; the ſkins, thus prepared, and joined together in pieces of the dimenſions required; and then ſized on the grain of the leather with a kind of ſoft glue, or ſtiff ſize, that anſwers to the *gold*-SIZE uſed in other kinds of GILDING or SILVERING, prepared from parchment or glover's cuttings. The workman next proceeds to cover the whole ſurface of the ſized ſkin, before it be quite dry, with leaf ſilver, and with a fox's tail, made into the form of a ball at the end, ſettles the leaves, by preſſing and ſtriking them; and cloſes this operation with gently rubbing the whole ſurface with the tail. When the ſkins are ſilvered, they are hung to dry firſt on cords, and the drying is completed by putting them over a board joined together, with the ſilvered ſide next the boards, where they muſt be kept ſtretched out by means of ſome nails. They are then burniſhed with a flint burniſher, which operation is performed by ſpreading the ſkin even on a ſmooth ſtone and ſliding the burniſher backwards and forwards over every part of the ſkin, with a conſiderable degree of preſſure. In ſome manufactures the burniſhing is performed, by paſſing the ſilvered ſkins betwixt two cylindrical rollers of ſteel, with poliſhed faces. The ſkins are now prepared for receiving the yellow *lacquer* or varniſh, which gives the appearance of gilding. Different artiſts have different recipes for compounding this *lacquer*. The following is ſaid to be equal to any hitherto uſed: take of fine white reſin, 4½ pounds; the ſame quantity of common reſin; of gum ſandarac, 2½ pounds; and of aloes two pounds: bruiſe and mix them; and put them into an earthen pot over a good fire of charcoal, or over any other fire which has no flame: when all the ingredients are perfectly melted and mixed, add gradually to them ſeven pints of inſeed oil, and ſtir the whole well together with a ſpatula: let the whole boil, ſtirring all the time, to prevent a kind of ſediment, that will form, from ſticking to the bottom of the veſſel. When the varniſh is almoſt ſufficiently boiled, which will generally require ſeven or eight hours, add gradually half an ounce of litharge, or half an ounce of red lead; and when this is diſſolved, paſs the varniſh through a linen cloth, or flannel bag. A pint of oil, and a correſponding proportion of fine reſin and aloes have produced a very good varniſh in an hour and a half. This *lacquer* or varniſh is laid on the ſilvered leather in the open air: and is beſt done in ſummer, when it is hot and dry. For this purpoſe, the ſkins are ſtretched and faſtened with nails to the boards, on which the drying was finiſhed, with the ſilvered ſide outwards. And when theſe boards are properly diſpoſed on treſſels, the workman generally ſpreads ſome white of eggs over each ſkin; and when this is dry, the varniſh, which is nearly of the conſiſtence of a thick ſyrup, is repeatedly ſpread with the four fingers of one hand, moved ſo that each finger paints a kind of S with the varniſh, from one end of the ſkin to the other: and it is then diffuſed evenly over every part with the flat of the hand: after this, it is to be immediately beaten by ſtrokes of the palms of the hands, and principally where the varniſh is obſerved to lie thickeſt. When this coat of varniſh is ſufficiently dry, which may be known by the finger's making no impreſſion upon it, another coat is laid on in the ſame manner. When this coat is dry, the varniſhing for producing the appearance of gilding is completed; and if it has been well performed, the leather will have a very fine gold colour, with a conſiderable degree of poliſh or brightneſs. When there is an intention to have one part of the leather ſilver, and the other gold, a pattern is formed on the ſurface, by printing, calking, or ſtamping a deſign on the ſurface after the ſilvering. The ſkin is then to be varniſhed, as if the whole were intended to be gold; but after the laſt coat, inſtead of drying the varniſh, it is to be immediately taken off that part, which is intended to be ſilver, according to the deſign printed or calked upon it, by a knife, with which the workman ſcrapes off all that he can without injuring the ſilver, and afterwards with a linen cloth, with which all that remains is to be wiped or rubbed off. The ſkins, thus ſilvered and varniſhed, are made the ground of various deſigns for emboſſed work and painting. The emboſſed worked or relief is raiſed by means of printing with a rolling preſs, ſuch as is uſed for copper-plates; but the deſign is here to be engraved on wood. The painting may be of any kind: but oil is principally uſed, as being durable and more eaſily performed. Doſſie's Handmaid to the Arts, vol. i. p. 454, &c.

LACRYMA *cervina*, in *Natural Hiſtory*, a little round and hard bone, ſaid to grow in the great corner of a ſtag's eye after a certain age. Some alſo preſerve under this name a thickened excretion from the inner angle of that creature's eye, in colour and conſiſtence reſembling myrrh, or ear wax, long hardened in the ear. This is of a ſtrong and very diſagreeable ſmell, like the ſweat of the ſame animal, and is affirmed to be ſudorific and alexipharmic.

LACRYMÆ *Chriſti*, the name of a ſort of wine produced by grapes on the lower part of Mount Veſuvius; ſo called from the drops of juice oozing from the grapes, when fully ripe.

LACRYMAL. See LACHRYMAL.

LACTARIA, in *Botany*. See MILK-*wort*.

LACTARY *Column*. See COLUMN.

LACTATION, the act of giving ſuck.

The word is alſo applied to the time during which the mother doth that office to her young.

LACTEA *via*, the milky way. See GALAXY.

LACTEALS, or LACTEAL *veins* or *veſſels*, a kind of long ſlender tubes, for the conveyance of the chyle from the inteſtines to the common reſervatory.

They are called veins, becauſe their valves are diſpoſed as thoſe of the ordinary blood-veins, and becauſe the fluid which they contain runs from ſmaller into larger tubes.

They appear to have been known to Hippocrates, Eraſiſtratus, and Galen; but were firſt duly deſcribed and publiſhed by Aſellius, an Italian phyſician, in 1622, and called *lacteal*, from the liquor they contain, which reſembles milk. Vide Doug. Bibl. Anat. p. 236. ed. 1734. Their coats are ſo thin as to be inviſible, except when diſtended with chyle, or lympha. They ariſe from all the parts of the ſmall guts, and as they run from the ſides of the guts to the glands in the meſentery, unite, and form larger branches, called *venæ lacteæ primi generis*. The mouths from whence they receive the chyle, of the *lacteals*, which are open into the cavity of the guts, are ſo ſmall, as not to be ſeen by the beſt microſcope. It was neceſſary they ſhould be ſmaller than the fineſt arteries in the body, that nothing might enter to ſtop the circulation of the blood.

The ſame extremity of the *lacteals* has likewiſe a communication with the capillary arteries of the guts, by which they receive a lympha that dilutes, and propels the chyle forwards, and waſhes the *lacteals* and glands, that they might not fur, and be obſtructed by the chyle's ſtaying in them upon faſting.

The other extremity of the *lacteals* diſcharges the chyle into the veſicular cells of the glands diſperſed up and down the meſentery: and from theſe ariſe other *lacteals*, of a larger ſize, which carry the chyle immediately into the receptaculum chyli, and theſe are called *lacteæ ſecundi generis*.

The *lacteal veins* have valves at proper diſtances, which hinder the chyle from returning back into the inteſtines. Winſlow has divided the *lacteal* veſſels in the human body into three claſſes: they derive, he ſays, their firſt origin from the tunica villoſa of the inteſtines, and chiefly from that of the ſmall inteſtines, by a great number of ſmall capillary roots. From theſe roots there ariſes, between the coats of the inteſtines, a kind of rete mirabile, which ſurrounds almoſt the whole circumference of the inteſtinal canal, between the muſcular and external coat: this reticular texture of lacteal veſſels keeps cloſe to the external coat, and leaves the canal along with it, on the ſide of the meſentery, where it forms two planes of ramifications, plainly diſtinguiſhed from each other by the cellular ſubſtance, and adhering cloſely to the inſide of the two membranes of the meſentery. In this ſeparate ſtate they run up the laminæ of the meſentery as far as the firſt meſenteric glands, where they unite again into one plane. Theſe Winſlow reckons to belong to the firſt claſs of lacteals. The ſecond claſs comprehends thoſe veſſels, which, after this union, are diſtributed almoſt uniformly through the whole extent of the meſentery, from its circumference to its origin or adheſion to the vertebræ of the back, between the meſenteric glands, forming frequent anaſtomoſes or communications. The third claſs includes thoſe ramifications, which, after having paſſed through the meſentery, begin to unite as they approach the ſpina dorſi, ſo that their number is leſſened and their ſize increaſed; and having paſſed the laſt meſenteric glands, terminate about the middle of the adheſion of the meſocolon in ſmall common trunks, which receive a great number of lymphatic veſſels from the glandulæ lumbares, and others below theſe. The *lacteals* of this laſt claſs run down on the body of the inferior aorta, between the extremities of the ſmall muſcle of the diaphragm, and terminate in a kind of ciſtern, called RECEPTACULUM *chyli*.

It has been doubted, whether or no the inteſtina craſſa have any *lacteals* or not. The impoſſibility of human diſſection proper for ſuch an enquiry, gives no room either to affirm or deny. But the contents of the thick inteſtines ſeem not likely to afford much chyle; and therefore if there be any *lacteals*, it is probable they are very few.

However, Winſlow informs us, that he has exhibited ſeveral of theſe, very full of chyle, to the Royal Academy, in a human colon. And of theſe he makes a fourth claſs. The *lacteal* veſſels, in general, may be ſeen in thoſe who die of a violent or ſudden death, ſoon after a meal; and they remain viſible even in the inteſtines, for a long time after death, when a great number of the meſenteric glands have become ſcirrhous, eſpecially in children. Anat. vol. ii. § 8. Nº 215, &c.

In brutes, if diſſected at a reaſonable time after feeding, as two or three hours, the *lacteals* appear very tumid and white; and, if wounded, the chyle flows plentifully from them. But if inſpected when the ſtomach of the animal has lain ſome time empty, they appear like lymphatics, viſible indeed, but filled with a tranſparent liquor.

That the *lacteals* have a communication with the cavities of the inteſtines, is evidently demonſtrated by their contents, the chyle; but how their pores are diſpoſed to receive it, has not yet been diſcovered; nor is there any way known whereby to fill the *lacteals* from the cavities of the guts after death. It is probable then, their entrance into the gut is oblique, ſince neither wind nor liquors can paſs from thence. As it is found theſe pores can only receive any thing in their living ſtate, we may be allowed to imagine, that it is the periſtaltic motion of the guts which diſpoſes them in that ſtate to receive the chyle. And this may be done by means of the circular and longitudinal fibres of the inteſtines ſtill applying the internal coats of the guts to their contents, by which means its pores abſorb the chyle from the excrementitious part.

The *lacteals* are the abſorbents of the bowels, beginning in their inner ſurface: the ſame kind of veſſels are called abſorbents in other parts of the body, and take their riſe from the ſurfaces of the reſpective parts; ſo that the *lacteals*, LYMPHATICS, and ABSORBENTS, are the ſame kind of veſſels. Some anatomiſts have conſidered the *lacteals* and lymphatics, as the ſame veſſels, differing only in their ſituation, and both terminating in the ſame duct.

The ingenious Mr. Hewſon diſcovered the lymphatic ſyſtem in birds, fiſh, and turtle, and an account of his diſcovery was publiſhed in the Phil. Tranſ. vol. lviii. art. 34. p. 217 and vol. lix. art. 28. p. 198. and art. 29. p. 204. However, theſe diſcoveries were claimed by profeſſor Monro, in a letter read before the Royal Society in 1769, and the claim was afterwards ſupported in a pamphlet, called, A ſtate of Facts, &c. printed at Edinburgh in 1770. The profeſſor alledges, that he injected the *lacteals* of a ſea-tortoiſe or turtle with quickſilver, after injecting every artery and vein with wax in the year 1765; and that as early as the year 1761, he had mentioned the *lacteal* veſſels in fowls and fiſhes, though he had not injected them. Mr. Hewſon replies, that the profeſſor's not having injected the *lacteals* in fowls and fiſhes afforded a ſtrong preſumption that he had not diſcovered them; more eſpecially as in a work printed in 1758 he had declared, that, after a conſiderable number of experiments, he was convinced that neither birds, fiſh, not amphibious animals in general, had either *lacteals* or lymphatics: becauſe, after having ſeen theſe veſſels, he would naturally have haſtened to inject them. He alſo alledges, that the profeſſor publickly declared in his lectures ſince the year 1761, that he had ſought for the *lacteals* in fowls and fiſhes in vain by a variety of experiments; and ſo late as the year 1767, he alſo declared that the lymphatic ſyſtem was ſuppoſed to take place in men and viviparous animals, and by analogy, in thoſe fiſhes which Linnæus has claſſed among the mammalia. Adding, that he had found the *lacteals* in ſome amphibious animals, as the turtles. Upon the whole, the diſpute between Mr. Hewſon and the profeſſor ſeems to be reduced to this ſingle point, which of them firſt diſcovered the *lacteals* of birds; both agreeing that the lymphatics in their necks had been diſcovered by Mr. Hunter many years before: and Mr. Hewſon acknowledges, that the *lacteals* of the turtle were diſcovered by the profeſſor in 1765, ſome years before the publication of his own paper in the Philoſophical Tranſactions; though he ſays, that the deſcription of thoſe veſſels, publiſhed in that paper, was taken in 1763. It ſeems alſo to be agreed, that the profeſſor had ſeen what he ſuſpected to be *lacteals*; but Mr. Hewſon inſiſts that he had not diſcovered them before him. For a farther account of the ſtate of this controverſy, the reader may conſult Monro's pamphlet above mentioned, and Mr. Hewſon's Appendix to his Experimental Inquiry into the Properties of the Blood, &c.

LACTEAL *fevers*, a term uſed by *Medical Writers*, to expreſs what the women call *milk fevers*, that is, ſuch fevers as attend the difficult ingreſs of milk to the breaſts of lying-in women.

LACTEUS *lapis*, in *Natural Hiſtory*, a name given by ſome authors to the *galactites*.

LACTIFERI *tubuli*. See TUBULI.

LACTIFEROUS, an epithet applied to ſuch plants as abound with a milk-like juice, ſuch as the tithymal, ſow-thiſtle, and many others.

LACTUCA, in *Botany*. See LETTUCE.

LACTUCA *marina*, *ſea-lettuce*, in *Botany*, a name uſed by ſome authors for the *lichen marinus*, commonly called *oiſter-green*.

LACUNÆ, among *Anatomiſts*, certain excretory canals in the *genital* parts of women. See *Tab. Anat. (Splanch.) Fig.* 11. *lit.* I I.

Between the fleſhy fibres of the ureters, and the membrane of the vagina, is found a whitiſh glandulous body, about a finger thick, running round the neck of the bladder, having a great number of excretory ducts, which de Graef calls *lacunæ*, and which terminate in the lower part of the orifice of the womb; conveying thither a ſlimy matter, that mixes with the ſeed of the male.

LACUNAR, in *Architecture*, an arched roof or cieling; more eſpecially the planking or flooring over porticoes or piazzas.

LADA, in *Botany*, a name given by ſome authors to the plant which produces the common black pepper.

LADANUM, or LABDANUM, in *Pharmacy*, a gummous or a reſinous matter, ouſing out of the leaves of a ſhrub called *ciſtus ladanifera*, which is very common in the hot countries of the Levant, and whereof there are various kinds. The ſhrub is alſo plentiful in Spain, though no *ladanum* is brought from thence.

Dioſcorides ſays, they gather the *ladanum* by means of goats, which, brouſing on the leaves of this ſhrub, return to the ſtable with their beards loaded with a fat ſubſtance, which the peaſants rake off, with a kind of combs made for that purpoſe. This matter they thus collect into lumps, and, as it is mixed with the goats hair, and other impurities, call it *ladanum in the beard*, or *natural ladanum*. Others are ſaid to draw cords over the leaves and other parts of the ſhrub; and, ſcraping off what had ſtuck to the cords, they make up the *ladanum* into little balls.

Tournefort aſſures us, that the common way of gathering the *ladanum* at this time is, by bruſhing it off the leaves with a ſort of whip, compoſed of many laſhes, or ſtraps: after it is ſcraped off the ſtraps, they make it into cakes of different ſizes.

Pietro delle Valle tells us, he was informed by the Indians, that *ladanum* is formed like dew, and falls from heaven like manna; that it is gathered on the leaves of a plant a palm and a half high; that, after gathering, they boil it, by which means it becomes ſoft, like wax.

Bellonius ſays that this juice is collected by lightly bruſhing the ſhrub, in the ſummer heats, with a kind of rake, having ſeveral ſtraps or thongs of leather fixed to it, inſtead of teeth; the unctuous juice adheres to the thongs, and is afterwards ſcraped off with knives.

There are two ſorts of *ladanum* in the ſhops: the beſt, which is very rare, is in dark-coloured maſſes, of the conſiſtence of a ſoft plaſter, which becomes ſtill ſofter on being handled. The other is in long rolls coiled up, and much harder than the preceding and not ſo dark. The firſt has commonly a ſmall, and the laſt a very large admixture of fine ſand, blown upon the juice from the ſandy ſoil where it is found.

Ladanum has been ſometimes exhibited as a reſinous corroborant and reſtringent, but it is principally employed in external applications and perfumes. The ſoft kind, which has an agreeable ſmell and a lightly pungent bitteriſh taſte, makes an uſeful ingredient in the cephalic and ſtomachic plaſters of the ſhops. Rectified ſpirit of wine diſſolves nearly the whole of the pure *ladanum* into a gold-coloured liquor. Water acquires by infuſion much of its ſmell and taſte: and, by diſtillation in water an eſſential oil ariſes, leaving a brittle almoſt inſipid reſin and a pale-coloured liquor, which, inſpiſſated, yields a weakly bitteriſh extract. Heat ſoon deſtroys the ſpecific flavour of this juice. Lewis.

LADANUM, *Liquid*, more properly called *clear*, or *purified ladanum*, is a preparation of the natural *ladanum*, by melting and purifying it from the hairs, &c.

This hardened is ſometimes ſold for a ſort of black ambergris.

LADDER *to heaven*, in *Botany*. See LILY *of the Valley*.

LADDERS, *ſcaling*, in the *Military Art*, are uſed in the ESCALADE. They are of various ſorts: ſome are of ropes and ſome of wood; ſome are made of ſeveral joints, ſo as to be capable of being put together, and to form *ladders* of different length, according to the ſervice required. There is a ſort uſed in England, much of the ſame make as the common *ladders*, except that the ſteps turn about wooden pegs, ſo that the poles may be brought near each other, or to ſhut like a parallel ruler. Theſe are very convenient for carriage.

LADDERS, in a *Ship*, derive their names from the ſeveral hatchways or other parts where they are ſituated. Beſides theſe, there are ſome of a particular conſtruction, as the accommodation-*ladder*, and the quarter-*ladder*. The *accommodation-ladder* is a ſort of light ſtair-caſe, occaſionally fixed on the gang-way of the admiral, or commander in chief of a fleet. It is furniſhed with rails and entering ropes, covered with red bays, and the lower end of it is kept at a proper diſtance from the ſhip's ſide by iron-bars or braces, to render the paſſage more convenient to thoſe who enter or leave the ſhip. *Quarter-ladders*, are two ladders of rope, depending from the right and left ſide of the ſhip's ſtern, whereby to deſcend into the boats which are moored aſtern, in order to bring them up along-ſide of the ſhip, or to uſe them for any other occaſion.

LADEN, in *Sea Language*, denotes the ſtate of a ſhip when ſhe is charged with a weight or quantity of any ſort of merchandize or other materials, equal to her tonnage or burthen. If the cargo, with which ſhe is *laden*, be extremely heavy, her burthen is denominated by the weight of the goods; if it be light, ſhe carries as much as ſhe can ſtow, ſo as to be fit for the purpoſes of navigation. A ton in meaſure is generally eſtimated at 2000 lb. in weight, and therefore a veſſel of 200 tons ought to carry a weight of 400,000 lb. when the matter of which the cargo is compoſed is ſpecifically heavier than the water in which ſhe floats.

LADEN, *in Bulk*, denotes the ſtate of being freighted with a cargo, which is not in caſks, boxes, bales, or caſes: but lies looſe in the hold, being defended from the moiſture or wet of the hold, by a number of mats and a quantity of dunnage. Such are uſually the cargoes of corn, ſalt, or ſuch materials.

LADING. See BILL *of Lading*.

LADLE *of a gun*, the inſtrument wherewith the powder is put into the piece.

It is made of a plate of copper blowed in form of a half-cylinder, rounded at one end, the other being fixed upon a long ſtaff; this filled with powder, the gunner carries, with his left hand under the end of it, to keep the powder from falling out, till he enters it in the muzzle of the piece; when he has carried the powder home to the charge cylinder, he turns the *ladle*, that the powder may fall out, and withdraws it.

Ladles are fitted to the bore of each gun, and hold powder ſufficient for the charge.

Small *ladles*, with ſhort handles of wood, are alſo uſed in filling the fuzes of ſhells, or any other compoſition for filling the caſes of rockets, &c.

LADLE-*boards*, thoſe boards diſpoſed on the circumference of the water-wheels of over-ſhot mills; forming hollows, or receptacles, not unlike *ladles*, to receive the water that falls upon the wheel. See *Water*-WHEEL.

LADONIS, in the *Materia Medica of the Ancients*, a name given by ſome to the laurus or bay tree. We find the word in a compoſition preſcribed in Galen, from the works of ſome of the empirics of his time, but it never was uſed by the more regular authors.

LADRE, in the *Manege*, denotes *Dull*. See HORSE.

LADY's *bed-ſtraw*, or *cheeſe-rennet*, *galium*, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe; the flower which hath an empalement, indented in four parts, has alſo one petal, divided into four parts, and alſo four awl-ſhaped ſtamina: it has a twin germen ſituated under the flower, which afterwards become two dry berries, joined together, each incloſing a large kidney-ſhaped ſeed. There are ſeveral ſpecies of which the ſort commonly uſed in medicine is very common in moiſt meadows and paſture grounds, and flowers in June and July.

This plant is drying and incraſſating, good in ſtopping all kinds of fluxes and hæmorrhages, and for the cure of wounds: ſome commend a decoction of it for the gout; and a bath made of it is refreſhing to waſh the feet of perſons over-tired with walking. In the northern countries they uſe this herb for the making cheeſe, inſtead of rennet, whence it is called *cheeſe-rennet*; the flowers containing an acidity, which may be extracted by diſtillation. This plant is but ſeldom uſed in the ſhops.

LADY's *bower*, in *Botany*. See VIRGIN's *Bower*.

LADY-*bird*, in *Zoology*. See HEMISPHÆRIA and SCARABÆUS.

LADY's *comb*, in *Botany*. See SHEPHERD's *needle*.

LADY's *cuſhion*, in *Botany*. See SAXIFRAGE.

LADY-*day*, in *Law*, the twenty-fifth of March, being the ANNUNCIATION of the holy Virgin.

LADY's *finger*, *anthyllis*, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are theſe: the flower is of the butterfly kind, having a long ſtandard reflexed on both ſides beyond the empalement; the two wings are ſhort; the heel of the ſame length and compreſſed; in the centre is ſituated an oblong germen, which becomes a ſmall roundiſh pod incloſed by the empalement, having one or two ſeeds. There are ſeveral ſpecies.

LADY's *Mantle*, *alchemilla*, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe: the flower has a permanent empalement of one leaf, which is cut into eight ſegments; it has no petals, and each flower is ſucceeded by one ſeed wrapped up in the empalement. Miller reckons four, and Linnæus three ſpecies. The common ſort, uſed in medicine, grows naturally in dry fields and meadows in ſeveral parts of England; but is not very plentiful near London; and flowers from May to Auguſt.

The leaves are uſed, and are eſteemed to be vulnerary, drying, and binding, and of great force to ſtop inward bleedings.

Their ſtyptic matter is extracted both by water and ſpirit; the roots are more aſtringent than the leaves; and the extracts made from them proportionably ſtronger.

LADY's *ſeal*, in *Botany*. See TAMUS.

LADY's *ſlipper*, *cypripedium*, in *Botany*, a genus of the *gynandria diandria* claſs. Its characters are theſe: it has a ſimple ſpadix; the germen ſits under the flower, which is covered with a ſheath; the flower has four or five narrow ſpear-ſhaped petals which expand; the nectarium, which is ſituated between the petals, is ſwollen and hollow, in ſhape of a ſhoe or ſlipper; and it has two ſhort ſtamina; below the flower is fixed a ſlender contorted germen; which becomes an oval blunt capſule with three corners, having three valves and one cell, filled with ſmall ſeeds. There are two ſpecies.

LADY's *ſmock*, in *Botany*. See CARDAMINE.

LADY's *traces*, in *Botany*. See TWYBLADE.

LADY *of the Thiſtle*. See THISTLE.

LADY, *Preſentation of our*. See PRESENTATION.

LÆNA, among the *Ancients*, a thick ſhaggy upper garment. See CHLÆNA.

LAERTA, in *Natural Hiſtory*, a name given by authors to a ſpecies of veſpa or waſp, whoſe ſting is ſaid to be fatal; but this is an erroneous opinion. This waſp is larger and longer bodied than the common kind, but ſmaller than the hornet. It ſeems of a very irritable diſpoſition, attacking animals of any kind that come in its way.

LAETIA, in *Botany*, a genus of the *polyandria monogynia* claſs: the corolla has five petals; the calyx is compoſed of five leaves; the fruit is three-ſided, and contains a ſingle cell; the ſeeds are incloſed in a pulpy coat.

LAFORDSWICK, (Saxon, *hlaford*, i. e. *dominus*, and *ſwic*, *proditio, infidelitas erga dominum)* the betraying of a lord or maſter. This word is found in king Canute's laws, c. 61. and in the laws of king Henry I.

LAGA, in *Antiquity*, denotes *lex* or *law*: whence are deduced *Saxon-lage*, *Dane-lage*, &c.

LAGAN, or **LAGON**, in our *ancient Sea Laws*, ſhipwrecked goods, left by the ſea, lying on the ſand, either aſhore, or out at ſea.

The word ſeems formed from the Saxon *legan*, or *lugan*, *jacere, to lie*. Though others deduce it from the Latin *ligare, to bind*; and ſuppoſe it to denote goods tied together with a buoy, or the like, to hinder their ſinking to the bottom, that they may be found again.

Logan is uſually joined with jetſon and flotſon.

LAGANUM, in *Natural Hiſtory*, the name of a genus of the *echini marini*, of the general claſs of the placentæ. The characters of the *lagana* are, that they have their mouth in the centre of the baſe, and their aperture for the anus in its third region; that their ſuperficies is whole, and their edges waved. Of this genus there are five known ſpecies.

LAGEMAN, *(lagammannus) homo habens legem*, or *homo legalis ſeu legitimus*: ſuch as we call now good men of the jury. The word is frequently uſed in Domeſday, and the laws of Edward the Confeſſor, cap. 38.

LAGEN, *lagena*, in ancient time, was a meaſure of wine, containing ſix ſextarii: whence probably is derived our *flagon*. The lieutenant of the Tower has the privilege to take ***unam*** lagenam *vini ante malum & retro*, of all wine ſhips that come up the Thames; and ſir Peter Leiceſter, in his Antiquities of Cheſhire, interprets *lagena vini*, a bottle of wine.

LAGERSTROEMIA, in *Botany*, a genus of the *polyandria monogynia* claſs: the corolla is curled, and has ſix petals; the calyx is campanulated and divided into ſix ſegments;

the ſtamina are numerous, the outer ſix being thicker and longer than the petals.

LAGINE, in *Natural Hiſtory*, a name given by Pliny to a climbing plant, of the nature of that from which ſcammony was obtained, but ſmaller, and thence called by ſome *ſcammonea parva*, the ſmaller ſcammony. The ancient Greeks have called this plant *jaſine*; and it appears very probable, that the word *lagine* here mentioned by Pliny is but a corruption of that name.

LAGOCEPHALUS, in *Ichthyology*, the name of a ſpecies of orbis or globe-fiſh. It is about a foot long, and half a foot high.

LAGOECIA, in *Botany*. See *Baſtard* CUMIN.

LAGOPHTHALMIA, derived from λαγος, *hare*, and οφθαλμος, *eye*, this being the property of the eyes of hares: λαγοφθαλμια, a diſeaſe of the eye-lids, when the upper lid is ſo contracted, that the eye cannot be quite ſhut, but remains open even in the time of ſleep.

LAGOPUS, in *Ornithology*. See PTARMIGAN.

LAGOPUS is alſo the name of a ſpecies of the CANIS with a ſtrait tail throughout of the ſame colour. It is ſometimes called the white-fox, the iſatis, and the ſky-coloured fox. It is found in Lapland and Siberia.

LAGOUDI, a name given by the Indians to a tree, which produces the leſſer GALANGAL-root of the ſhops.

LAGRIMOSO, in the *Italian Muſic*, is uſed to ſignify a plaintive manner of ſinging or playing.

LAGURUS, *hair's tail graſs*, in *Botany*. See GRASS.

LAICA *vi removenda*. See VI.

LAID *up* is applied to a ſhip, when ſhe is either moored in a harbour during the winter ſeaſon, or laid by for want of employment; or when ſhe is become incapable of farther ſervice.

LAID *under metal*. See METAL.

LAIR, or LAYER, in *Gardening*. See LAYER.

LAIR, LAYR, or LAYER, among *Sportſmen*, denotes a place where deer harbour by day.

LAIR or LAYR *of a deer*, is the impreſſion which the beaſt has made on the graſs and ground, where he has lain down or repoſed.

LAIR, among *Huſbandmen*, alſo denotes a place where cattle uſually reſt, under ſome ſhelter; the ground being enriched by their dung.

LAITY comprehends ſuch of the people as are not included under the denomination of CLERGY; and may be divided into three diſtinct ſtates, viz. the CIVIL, the MILITARY, and the MARITIME.

LAKE, a collection of water, incloſed in the cavity of ſome inland place, of a conſiderable extent and depth.

According to ſome authors, thoſe only are properly called *lakes*, which receive and emit rivers.

Lakes, however, may be divided into four kinds: 1. Such as neither receive nor admit rivers. 2. Such as emit rivers, without receiving any. 3. Such as receive, without emitting any. 4. Such as both receive and emit rivers.

Of the firſt kind, ſome are perennial, others temporary: the temporary owe their origin, moſt of them, to rain, and to the cavity or depreſſion of the place where they are lodged.

In the Indies they make artificial *lakes*, of a mile or two in compaſs, which they wall about to catch the rain in wet ſeaſons, and preſerve it for their uſe in the dry ones. There are ſeveral of this kind of *lakes*, formed alſo by the inundations of the ſea and rivers, particularly the Nile and Niger; which, when they retire within their banks, leave floods of water, which the inhabitants take care to incloſe, to ſerve as a magazine for the enſuing months. There are ſeveral of theſe *lakes* alſo in Muſcovy, Finland, and Lapland, generated partly by the rain, and partly by the melting of the ice and ſnow.

The generation of perennial *lakes* may be alſo referred to rain, where the cavity is ſo deep as to receive a quantity in winter, more than the heat of the ſun will be able to exhale in ſummer; though it is probable many of theſe *lakes* have their ſprings at bottom, by which they are alſo continually ſupplied.

The only large *lake* of this ſort is the *lake* of Parime in America, lying directly under the equator, which is, in length, about three hundred and five German miles, and at the greateſt breadth about one hundred miles. To this claſs may be referred the turloughs, i. e. *terreus lacus*, or land-*lakes*, in Ireland, which are *lakes* one part of the year, and the reſt ſmooth fields; at the bottom of theſe turloughs are found holes, through which the water ſprings in winter, and ſinks towards ſummer.

The ſecond ſpecies of *lakes*, which emit, without receiving rivers, is very numerous; they owe their origin to ſprings, the cavities where the ſpring is found not being able to contain all the waters it yields. See SPRING. Of this kind is the Wolga, at the head of the river Wolga; the *lake* Odium, at the head of the Tanais; the Adac, whence flows one of the branches of the Tigris, the Ozero or White *lake*, in Muſcovy, that gives ſource to the river Shackſna; the *lake* Chaamay, to the eaſtward of the river Ganges, whence flow four very large rivers; the *lake* Nicaragua, in America; the lakes Frontena in Canada, out of which iſſues the river St. Lawrence, &c.

The third kind, viz. thoſe which receive rivers without emitting any, apparently owe their origin to thoſe rivers, which, in their progreſs from their ſource, falling into ſome ample cavity, are collected together, and form a *lake* of ſuch dimenſions, as may loſe as much by exhalation as it continually receives from its ſprings; or to a river's flowing on a ſoft ſpongy ſoil, which imbibes the water, and tranſmits it to the neighbouring grounds. The number of theſe are but ſmall.

The lake Aſphaltites, called the Dead Sea, is of this kind, receiving the river Jordan, but emitting none; the *lake* of Geneva, the lake Soran in Muſcovy, &c.

Of the fourth ſpecies, which both receive and emit rivers, we reckon three kinds; as the quantity of water they emit is greater, equal, or leſs than that they receive. If the quantity they emit be greater, it is plain they muſt have a ſpring at the bottom; if leſs, there muſt be ſome ſubterraneous ducts, or canals, or elſe the earth muſt be ſpongy; if it be equal, we gather, that they have neither any hidden ſprings nor canals. Of theſe *lakes* we have a great number, and thoſe very conſiderable ones.

The generality of *lakes* conſiſt of freſh waters, as moſt of thoſe which are ſupplied either from ſome ſpring, far from the ſea, or a river, or from the rain: ſome few of ſalt water, as thoſe produced from the inundation of the ſea, or by its immiſſion through ſome duct of the earth, or that have ſalt ſprings at bottom.

Dr. Halley is of opinion, that all great perennial *lakes* are ſaline, either in a great or leſs degree; and that this ſaltneſs increaſes with time; and on this foundation, he propoſes a method for determining the age of the world.

The large *lakes*, wherewith the northern regions abound, ſerve for very good purpoſes, inaſmuch as the warm vapours ariſing from them ſerve for a defenſative againſt the pinching cold of thoſe climates. To this it is owing, that Ireland, Scotland, &c. are leſs affected with froſts than much warmer countries.

They alſo furniſh exhalations and vapours, which diſtil on the countries bordering upon them in refreſhing ſhowers, and prevent their being barren deſerts.

The *lake* Neſs in Scotland has been commemorated by many writers, but never with any degree of judgment, till Mr. Fraſer gave a perfect account of it to our Royal Society. It never freezes though the winters be ever ſo ſevere, and is full of ſprings in almoſt every part; and its waters, in the time of the ſevereſt froſts, run fluid, and ſmoaking, for ſix miles down the river into which they are diſcharged, while every thing is frozen about them. The river runs very ſlowly notwithſtanding, and from this ſmoke of the water there is raiſed a ſort of fog which overſpreads the whole country for ſeveral miles. There is a mountain near its ſide, of two miles perpendicular height from the ſurface of the *lake*; and on the ſummit of this mountain there is another *lake*, which has no ſpring viſibly running into it, nor any outlet, and yet always keeps of the ſame degree of fullneſs, ſummer and winter. Due weſt from the river into which the lower *lake* diſcharges itſelf, there is an opening of ſea, or frith, of two miles long and ſix miles wide; the middle of this is ſometimes dry, and it is then eaſily ſeen that this was once dry land, and an inhabited country. There are found there large bodies of trees felled, and lying ſtraight along: the wood of theſe is black but it is very ſound, and there are many tumuli, or heaps of ſtones, to be ſeen under water in different parts of the frith, one of which is acceſſible at low water, and there have been found in it urns, which prove that they have been all burying-places. Phil. Tranſ. Nº 253. p. 231.

As the ſea waſhes away the banks of this frith, there is found in many places a large quantity of wrought timber; beams of fourteen or more feet long, with the marks of the axe and other inſtruments upon them; and at the depth of ſixteen feet, in the ſteep banks of the neighbouring river Beuly, there are found oak trees and pieces of burnt timber. We find by this, that the face of the whole country hereabout, is very different from what it was ſome ages ago, and there ſeems ſome reſemblance between the preſent face of things here, and that in the bogs of many parts of England. The trees found buried in theſe were felled by the conquering Romans, and perhaps theſe were of ſome ſuch origin.

We have many ſingularities offering to our view in the *lakes* of our own country; that of their freezing in peculiar ſeaſons is not one of the leaſt. Philoſophical Tranſ. Nº 114.

The ſtrange effect of ſome *lakes*, on their water being diſturbed, are recorded by many writers with an air of truth; but are to be examined with great precaution, before they are credited. Wagner, in his Hiſtory of Swiſſerland, quotes no leſs than thirty-five authors, who ſay, that a water there, called the *Lake of Pilate*, is of this kind, and that it cauſes tempeſts, rain, thunder, &c. if any thing be caſt into it; but the truth is, that it is a very tame puddle, ſcarce deſerving the name of a *lake*; and it is proved, by experience, that no conſequence at all attends the throwing it into confuſion by any means whatever.

LAKES, *ſubterranean*. That there are in many places immenſe *ſubterranean lakes*, can ſcarce be doubted, becauſe we ſee them in ſome places; but their effects are often perceived where they are not ſeen, and puzzle the people who attempt to account for thoſe effects upon other principles. The famous Zirchnitzer *lake* in Carniola, which fills and empties itſelf, at times, in an impetuous manner, bringing up with its waters fiſh, and even wild fowl, communicates with another immenſe *ſubterranean lake* in the mountain Savornick; and according to its filling or emptying, the upper one is alſo filled and emptied. See DUCK.

The grotto Podſpetſchio, in the ſame country, gives another inſtance of ſuch a *ſubterranean lake*. The people of the neighbouring country enter the ſide of the mountain where this *lake* is, by a ſmall opening, through which they go to a cavern of a great width and height; and at the end of this is a ſmall opening again, through which they go on to the edge of a vaſt ſubterranean piece of water. They go with torches, and find the water very clear and fine. It is ten cubits deep at the edge, and doubtleſs is much more in the middle. The water runs into this lake by a large channel, and runs out of it again by another, falling down a precipice into another *lake*, and that with ſuch a noiſe, that the report of a piſtol cannot be heard near it. Stones thrown in every way are heard to fall into water, and there is great reaſon to ſuppoſe the *lake* a German mile long; for at that diſtance there is another water diſcovered through ſuch another cleft of the rock, which ſtands at the ſame horizontal height as this, and is ſubject to the ſame accidents at the ſame time. This vaſt body of water ſometimes all runs off in a few minutes, and leaves the baſon dry, and after ſome weeks it fills again with a frightful noiſe. As theſe accidents always happen to both the waters above mentioned at the ſame time, they appear very plainly to be only the two ſides of the ſame *lake*. Phil. Tranſ. N° 191.

We have in England many of theſe reſervoirs, the water of which is always remarkably clear and cold, and is ſo loaded with ſpar, that it generally incruſts things very quickly that are put into it; and when raiſed into vapours, as a part of it ſometimes is, by the ſubterranean heat, or carried up with other vapours, ſtops at the cieling of the vaults, and there forms ſtalactitæ, and other ſuch concretions. In many of theſe *lakes* alſo are found the round balls of ſpar, called *ſtalagmitæ*. They are compoſed of ſeveral cruſts gathering round ſome central nucleus, and often exceed the ſize of a ſchool-boy's marble. Phil. Tranſ. N° 144.

In Pen-Park hole, in Glouceſterſhire, there is a remarkable inſtance of this, that ſtrange cavern containing one of the largeſt of the *lakes* in our kingdom.

It was accidentally diſcovered by ſome miners: it is twenty-nine fathoms deep from the ſurface, being a vaſt cavern of the ſhape of a horſe-ſhoe, ſurrounded with rugged rocks and rough walls of earth, containing in the midſt of it a river or ſubterranean *lake*, twenty fathom broad and eight fathom deep, of the ſame cold and petrifying water with the other reſervoirs of this kind.

LAKE, or LAQUE, a preparation of different ſubſtances into a kind of magiſtery for the uſe of painters. One of the fineſt and firſt invented of which, was that of *gum lacca* or *laque*; from which all the reſt, as made by the ſame proceſs, are called by the common name *laques*. See LACCA.

The method of preparing theſe, in general, may be known by the example of that of the curcuma-root of the ſhops, called *turmeric-root*; the proceſs for the making of which is this: take a pound of turmeric-root in fine powder, three pints of water, and an ounce of ſalt of tartar; put all into an earthen glazed veſſel, and let them boil together over a clear gentle fire, till the water appears highly impregnated with the root, and will ſtain a paper to a beautiful yellow. Filtre this liquor, and gradually add to it a ſtrong ſolution of roch-alum in water, till the yellow matter is all curdled together, and precipitated; after this pour the whole into a filtre of paper, and the water will run off and leave the yellow matter behind. It is to be waſhed many times with freſh water, till the water comes off inſipid, and then is obtained the beautiful yelow, called *laque of turmeric*, and uſed in painting.

In this manner may a *laque* be made of any of the tinging ſubſtances that are of a ſomewhat ſtrong texture, as madder, logwood, &c. but it will not ſucceed in the more tender ſpecies, as the flowers of roſes, violets, &c as it deſtroys the nice arrangement of parts in thoſe ſubjects, on which the colour depends.

A yellow *lake* for painting is to be made from broom-flowers in the following manner: make a ley of pot-aſhes and lime reaſonably ſtrong; in this boil, at a gentle fire, freſh broom-flowers till they are white, the ley having extracted all their colour; then take out the flowers, and put the ley to boil in earthen veſſels over the fire; add as much alum as the liquor will diſſolve; then empty this ley into a veſſel of clean water, and it will give a yellow colour at the bottom. Let all ſettle, and decant off the clear liquor. Waſh this powder, which is found at the bottom, with more water, till all the ſalts of the ley are waſhed off; then ſeparate the yellow matter and dry it in the ſhade. It proves a very valuable yellow.

Lake is at preſent ſeldom prepared from any other ſubſtance than ſcarlet rags, cochineal and Braſil wood. The beſt of what is commonly ſold is made from the colour extracted from ſcarlet rags, and depoſited on the cuttle-bone; and this may be prepared in the following manner: diſſolve a pound of the beſt pearl aſhes in two quarts of water, and filter the liquor through paper; add to this ſolution two more quarts of water and a pound of clean ſcarlet ſhreds, and boil them in a pewter boiler, till the ſhreds have loſt their ſcarlet colour; take out the ſhreds and preſs them, and put the coloured water yielded by them to the other: in the ſame ſolution boil another pound of the ſhreds, proceeding in the ſame manner; and likewiſe a third and fourth pound. Whilſt this is doing, diſſolve a pound and a half of cuttle-fiſh bone, in a pound of ſtrong aqua fortis, in a glaſs receiver, adding more of the bone, if it appear to produce any ebullition in the aqua fortis; and pour this ſtrained ſolution gradually into the other; but if any ebullition be occaſioned, more of the cuttle-fiſh bone muſt be diſſolved as before, and added, till no ebullition appears in the mixture. The crimſon ſediment depoſited by the liquor thus prepared is the *lake*: pour off the water; and ſtir the *lake* in two gallons of hard ſpring water, and mix the ſediment in two gallons of freſh water; let this method be repeated four or five times. If no hard water can be procured, or the *lake* appears too purple, half an ounce of alum ſhould be added to each quantity of water before it be uſed. Having thus ſufficiently freed the *lake* from the ſalts, drain off the water through a filter, covered with a worn linen cloth. When it has been drained to a proper dryneſs, let it be dropped through a proper funnel on clean boards, and the drops will become ſmall cones of pyramids, in which form the lake muſt be ſuffered to dry, and the preparation is completed.

Lake may be prepared from cochineal, by gently boiling two ounces of cochineal in a quart of water; filtering the ſolution through paper, and adding two ounces of pearl-aſhes diſſolved in half a pint of warm water and filtered through paper. Make a ſolution of cuttle-bone, as in the former proceſs; and to a pint of it add two ounces of alum diſſolved in half a pint of water. Put this mixture gradually to that of the cochineal and pearl-aſhes, as long as any ebullition appears to ariſe, and proceed as above. A beautiful *lake* may be prepared from Brazil wood, by boiling three pounds of it, for an hour in a ſolution of three pounds of common ſalt, in three gallons of water; and filtering the hot fluid through paper, add to this a ſolution of five pounds of alum in three gallons of water. Diſſolve three pounds of the beſt pearl aſhes in a gallon and a half of water, and purify it by filtering; put this gradually to the other, till the whole of the colour appear to be precipitated, and the fluid be left clear and colourleſs. But if any appearance of purple be ſeen, add a freſh quantity of the ſolution of alum by degrees, till a ſcarlet hue be produced. Then purſue the directions given in the firſt proceſs with regard to the ſediment. If half a pound of ſeed-lac be added to the ſolution of pearl-aſhes, and diſſolved in it before its purification by the filtre, and two pounds of the wood, and a proportional quantity of the common ſalt and water be uſed in the coloured ſolution, a *lake* will be produced that will ſtand well in oil or water, but it is not ſo tranſparent in oil as without the ſeed-lac. The *lake* with Brazil wood may be alſo made by adding half an ounce of anotto to each pound of the wood; but the anotto muſt be diſſolved in the ſolution of pearl-aſhes. There is a kind of beautiful *lake* brought from China; but as it does not mix well with either water or oil, though it diſſolves entirely in ſpirit of wine, it is not of any uſe in our kind of painting. This has been erroneouſly called ſafflower. Handmaid to the Arts, vol. i. p. 61, &c.

LAKE, *Orange*, is the tinging part of anotto precipitated together with the earth of alum. This pigment, which is of a bright orange colour, and fit for varniſh painting, where there is no fear of flying, and alſo for putting under cryſtal to imitate the vinegar garnet, may be prepared by boiling four ounces of the beſt anotto and one pound of pearl-aſhes half an hour in a gallon of water; and ſtraining the ſolution through paper. Mix gradually with this a ſolution of a pound and a half of alum in another gallon of water; deſiſting, when no ebullition attends the commixture. Treat the ſediment in the manner already directed for other kinds of *lake*, and dry it in ſquare bits or round lozenges. Handmaid to the Arts, vol. i. p. 119.

LAKE, *roſe*. See *Roſe* PINK.

LAKE of *madder*. See MADDER.

LAKE-*weed*, in *Botany*. See ARSMART.

LAMA, or **LAMAS**, the title of an order of prieſts among the weſtern Tartars, on the frontiers of China, who are held in great veneration.

They have a grand *lama*, who is their high-prieſt, and who is the ſecond perſon in the kingdom, being the next in authority to the king. He receives homage and adoration not only from the people, but from the neighbouring kings; none of whom are ever inthroned, without ſending ambaſſadors to him to obtain his benediction.

The more remote Tartars abſolutely regard him as the deity himſelf. They believe him immortal, and endowed with all knowledge and virtue. They come up every year from different parts to worſhip and make rich offerings at his ſhrine. The orthodox opinion is, that when the grand *lama* ſeems to die, either of old age or infirmity, his ſoul in fact only quits a crazy habitation to look for another, younger or better; and it is diſcovered again in the body of ſome child, by certain tokens known only to the *lamas* or prieſts, in which order he always appears.

The *lamas* are extremely ſuperſtitious, and are remarkably addicted to magic. See Phil. Tranſ. vol. lxvii. p. ii. art. 25.

LAMAC, a word uſed by ſome authors to expreſs gum arabic.

LAMARE, a word uſed by ſome of the chemical writers as a name for ſulphur.

LAMB, in *Zoology*, the young of the ſheep kind. See SHEEP.

A male lamb of the firſt year is called a wedder hog, and the female, a ewe hog; the ſecond year it is called a wedder, and the female a ſheave. If a lamb be ſick, mare's milk with water may be given it, and by blowing into the mouth many have been recovered after appearing dead. The beſt ſeaſon for weaning them is when they are ſixteen or eighteen weeks old; and about Michaelmas the males ſhould be ſeparated from the females; and ſuch males as are not deſigned for rams, gelded. See PASCHAL *Lamb*.

LAMB-*earth*, in *Huſbandry*, is a whitiſh ſtony loam. The name ſeems only a corruption of the word *loam-earth*. It is a clay, with an admixture of that ſort of ſtony matter which uſually conſtitutes lime-ſtone, of fragments of lime-ſtone, and of many ſmaller pieces of a ſtony matter, of a leſs firm concretion. Theſe ſtones are all of much the ſame colour with the earth, and the whole eaſily breaks and moulders upon putting water to it. It has uſually an admixture of ſea-ſhells alſo in it, and, while in the ſtratum, is ſo hard, as ſcarce to be cut by a ſpade. It is in great eſteem in many counties of England for making the earthen floor of barns, and other ſuch uſes.

LAMB'S *lettuce*. See VALERIAN.

LAMBATIVES, or rather **LAMBITIVES**, a form of medicine to be licked off the end of a liquorice-ſtick.

Lambatives amount to the ſame with *linctuſes*, *lohocs*, and *eclegmas*.

LAMBDOIDES, Λαμϐδοειδὴς, in *Anatomy*, an epithet applied to the third proper SUTURE of the cranium, in regard it reſembles the form of a Greek λ, *lambda*.

For the ſame reaſon it is ſometimes called ypſiloides, as bearing ſome reſemblance to the Greek Υ, *ypſilon*.

LAMBENT *fire*. See FIRE.

LAMBERT'S *blue*. See AZURE and BLUE *ultramarine*.

LAME, in the *Manege*, is uſed in ſeveral phraſes of that art; as *lame of an ear*, called in French *boiteux de l'oreille*, is ſaid of a horſe, when he halts upon a walk or trot, and keeps time to his halting with the motions of his head; for all *lame* horſes do not keep time in that manner. See HALTING.

LAME *of the bridle*, is uſed by way of raillery, to ſignify the ſame thing.

LAMELLÆ, derived of *lamina*, and ſignifying as much as *little laminæ*; little, thin plates, or laminæ, whereof the ſcales and ſhells of fiſhes, &c. are compoſed.

LAMENESS, *claudicatio*, in *Surgery*. We want a chirurgical treatiſe on *lameneſs*: no perſon has as yet enquired into the various cauſes, and the proper remedies adapted to them, in caſes of *lameneſs*; and in ſome inſtances remedies may be efficaciouſly applied.

Lameneſs ariſes from a variety of cauſes. From native deformity, or from the thigh being put out of joint in the birth; from the bad conformation of the cotyloid cavity of the oſſa innominata; from the weakneſs of the hips; from external accidents; and from diſeaſes. See LUXATION.

Natural *lameneſs* is incurable, but the *lameneſs* of the mother does not generally deſcend to the children; nevertheleſs it may ſometimes be communicated by cauſes difficult to diſcover. Zwinger tells us of a *lame* woman who brought three children into the world, afflicted with the ſame infirmity.

In all ſpecies of the accidental luxation of the thigh, as well as in fractures, the action of limping is unavoidable; and is only to be cured by a ſkilful reduction: ſometimes a ſimple blow or a ſlight fall, will occaſion a ſpecies of luxation of the thigh bone, in which an effuſion of the mucilage, and a relaxation of the ligaments enſuing, the bone is driven out of its place, and occaſions abſolute *lameneſs*: and ſometimes the unſkilful treatment of a ſurgeon is the only cauſe.

A leg or a thigh too long or too ſhort, occaſioned by violence in bringing an infant into the world, will make it halt all the days of its life, if an attempt be not made in proper time toward a cure, by endeavouring to reſtore the joint to its natural ſocket.

The leg or thigh, when grown too ſhort by the contraction of thoſe parts, for want of radical moiſture, in conſequence of ſome diſorder, produces an incurable *lameneſs*. It is the ſame in a relaxation of the ligaments, which is ſometimes cauſed by a ſciatic humour. If a ſcirrhus is formed in one of the reins, the thigh of the ſame ſide will become paralytic, or incurably *lame*. Sometimes it happens, without what is called a luxation, that the leg, merely by a contraction or rigidity of the muſcles which ſerve to put in motion, ſhrinks to that degree, that it cannot be moved without halting. The remedy for ſuch a complaint, is to employ emollient fomentations, together with reſolutive ſpirits, mollifying baths, pumping with mineral waters, and to wear a ſhoe with a leaden ſoal, of a weight proportioned to the contraction of the limb.

A weakneſs of the hips will occaſion a *lameneſs* of both ſides. This misfortune is frequently owing to nurſes, who put children to walk without aſſiſtance, before their parts have acquired ſufficient ſtrength and firmneſs to ſuſtain the weight of the body.

As ſoon as this weakneſs diſcovers itſelf, it may be corrected by having recourſe to a girdle round the waiſt, which taking in the whole ſwell of the belly, is well braced at the hips; this girdle will give ſtrength in walking, by fortifying the loins. They ought alſo to be bathed ſeveral times a day for ſome months with aſtringent decoctions.

LAMENTATIONS, a canonical book of the Old Teſtament, written by the prophet Jeremiah, according to archbiſhop Uſher and ſome other learned men who follow the opinion of Joſephus and St. Jerom, on occaſion of Joſiah's death. But this opinion does not ſeem to agree with the ſubject of the book, the lamentation compoſed by Jeremiah on that occaſion being probably loſt. The fifty-ſecond chapter of the book of Jeremiah was probably added by Ezra, as a preface or introduction to the *Lamentations*: the two firſt chapters are employed in deſcribing the calamities of the ſiege of Jeruſalem: in the third the author deplores the perſecutions he himſelf had ſuffered: the fourth treats of the deſolation of the city and temple, and the misfortune of Zedekiah: the fifth chapter is a prayer for the Jews in their diſperſion and captivity: and at the cloſe of all he ſpeaks of the cruelty of the Edomites, who had inſulted Jeruſalem in her miſery. All the chapters of this book, except the laſt, are in metre, and digeſted in the order of the alphabet, with this difference, that in the firſt, ſecond, and fourth chapter, the firſt letter of every verſe follows the order of the alphabet; but in the third the ſame initial letter is continued for three verſes together. This order was probably adopted, that the book might be more eaſily learnt and retained. The ſubject of this book is of the moſt moving kind; and the ſtyle throughout lively, pathetic, and affecting. In this kind of writing the prophet Jeremiah was a great maſter, according to the character which Grotius gives him: *Mirus in affectibus concitandis*.

LAMIA. See SHARK.

LAMIÆ, Λαμιαι, among the *Ancients*, a kind of dæmons, or evil ſpirits, who, under the form of beautiful women, are ſaid to have devoured children.

Horace makes mention of them in his Art of Poetry.—Some authors call them *Laniæ*, *à laniando*. Philoſtratus ſays, they are alſo called *Larvæ*, or *Lemures*, as if they were all the ſame. Bochart will have the word to be Phœnician, and derives it from לחם *to devour*; alledging, that the fable of the *Lamiæ* came from Lybia.

LAMINÆ, in *Phyſiology*, thin plates, or tables, whereof any thing conſiſts; particularly the human ſkull, which are two, the one laid over the other.

LAMIODONTES, is the name given by Dr. Hill to the GLOSSOPETRÆ.

LAMIOLA, in *Ichthyology*, a name by which ſome authors have called the MALTHA or ſorrat, a kind of ſhark.

Lamiola is alſo the name given by the modern Italians to a fiſh called in Cornwall the *tope*. It is a ſpecies of the ſqualus, called by the generality of authors *galeus* canis, and by Artedi the *ſqualus*, with the noſtrils placed near the mouth, and with the ſmall foramina near the eyes.

LAMIUM, *dead nettle*, in *Botany*. See ARCHANGEL.

Lamium *exoticum*, in *Botany*, a name given to a ſpecies of caſſida. See SKULL-*cap*.

LAMMAS-DAY, the firſt of Auguſt; ſo called, as ſome will have it, becauſe lambs then grow out of ſeaſon, as being too big. Others derive it from a Saxon word, ſignifying *loaf-maſs*, becauſe on that day our forefathers made an offering of bread prepared with new wheat.

On this day, the tenants who formerly held lands of the cathedral church in York, were bound by their tenure to bring a lamb alive into the church at high maſs.

It is celebrated by the Romiſh church in memory of St. Peter's impriſonment.

LAMNE, in *Ichthyology*, a name given by Appian, and ſome other of the old Greek authors, to the common SHARK, or as we uſually call it, the *white ſhark*, the *lamia* and *canis carcharias* of authors. This is properly a ſpecies of SQUALUS, and is accurately diſtinguiſhed by Artedi under the name of the *ſqualus*, with a flat back, and with numerous teeth ſerrated at the edges.

LAMP, Λαμπας, a ſort of luminary, conſiſting of oil diſpoſed with a wick in a proper veſſel for burning. See LENS.

The uſe of lighted *lamps* in churches, and places of devotion, is very ancient. In the city of Fez is a moſque, wherein are nine hundred brazen *lamps* burning every night. In Turky, all the illuminations are made only with *lamps*. Polydore Virgil aſcribes the firſt invention of *lamps* to the Egyptians; and Herodotus deſcribes a feaſt of *lamps* held annually in Egypt.

Kircher ſhews the manner of preparing *lamps*, which ſhall diffuſe a light ſo diſpoſed, as to make the faces of thoſe preſent appear black, blue, red, or of any other colour.

There has been a great diſpute among the learned about the ſepulchral *lamps* of the ancients: ſome maintain, they had the ſecret of making *lamps* that were inextinguiſhable, alledging ſeveral that had been found burning, at the opening of tombs fifteen or ſixteen hundred years old. But others treat theſe relations as fables; and others think, that the *lamps*, which were before extinguiſhed, took light afreſh upon the admiſſion of freſh air.

Dr. Plott, however, is of opinion ſuch perpetual *lamps* are things practicable, and has himſelf made ſome propoſals of this kind. The linum aſbeſtinum, he thinks, may do pretty well for the wick, and that the naphta, or liquid bitumen, conſtantly ſpringing into ſome of the coal-mines would anſwer for the oil.

If the aſbeſtos will not make a perpetual wick, he thinks there is no matter in the world that will; and argues, that the tradition of ſuch *lamps* muſt be fabulous, or elſe that they made them without wicks.

Such a *lamp* he thinks it poſſible to make of the bitumen ſpringing into the coal-mines at Pitchford, in Shropſhire; which, he ſays, like other liquid bitumen, will burn without a wick.

Thoſe *lamps* that kindle on the immiſſion of freſh air, the ſame author thinks, might be imitated by incloſing ſome of the liquid phoſphorus in the recipient of an air-pump; which, under thoſe circumſtances, will not ſhine at all; but on letting the air into the recipient, there will poſſibly, ſays he, appear as good a perpetual *lamp*, as ſome that have been found in the ſepulchres of the ancients.

Lamp, *Cardan's*, is a contrivance of an author of that name, which furniſhes itſelf with its own oil.

It conſiſts of a little column of braſs, tin, or the like, well cloſed every where, excepting a ſmall aperture at bottom, in the middle of a little gullet or canal, where the wick is placed.

Here the oil cannot get out, but in proportion as it waſtes, and ſo opens the paſſage of that little aperture.

This kind of *lamp* was much in uſe ſome years ago; but it has ſeveral inconveniences: ſuch as that the air gets into it by ſtarts and gluts; and that when the air in the cavity comes to be much rarefied by heat, it drives out too much oil, ſo as ſometimes to extinguiſh the *lamp*.

Dr. Hook, and Mr. Boyle, have invented other *lamps*, that have all the conveniences of Cardan's without the inconveniences.

The flame in a *lamp* never conſumes the wick, till the wick be expoſed to the air by the flame's falling downward; and from hence it may be inferred, that a way found out to keep the fuel, and conſequently the flame, at the ſame height upon the wick, would make it laſt a long time. Many ways have been deviſed to arrive at this, but it ſeems only poſſible to be done, in any degree of perfection, by hydroſtatics. Thus, let a *lamp* be made two or three inches deep, with a pipe coming from the bottom almoſt as high as the top of the veſſel; let it be filled ſo high with water, as to cover the hole of the pipe at the bottom, to the end that the oil may not get in at the pipe, and ſo be loſt. Then let the oil be poured in, ſo as to fill the veſſel almoſt brim-full, which muſt have a cover, pierced with as many holes as there are wicks deſigned. When the veſſel is thus filled, and the wicks are lighted, if water falls in by drops at the pipes, it will always keep the oil at the ſame height, or very near; the weight of the water being to that of the oil as 20 $\frac{8}{11}$ to 19, which in two or three inches makes no great difference. If the water runs faſter than the oil waſtes, it will only run over at the top of the pipe, and what does not run over will come under the oil, and keep it at the ſame height. Phil. Tranſ. N° 245, p. 388.

By 17 Geo. II. cap. 29. a convenient number of glaſs *lamps* ſhall be put in ſuch places of the city of London, as the mayor, aldermen, and commonalty, ſhall think fit; to be kept lighted and burning from ſun-ſet to ſun-riſing throughout the year; and rates ſhall be made not exceeding 6*d*. in the pound, nor above 50*s*. a year on any one perſon, for defraying the charges of them. Every alderman, with conſent of his deputy and common council, may contract yearly for the ſetting up *lamps*, and their lighting, trimming, &c. and perſons maliciouſly breaking down, or extinguiſhing any *lamp*, ſhall forfeit 40*s*. for the firſt offence, 50*s*. for the ſecond, and 3*l*. for the third, leviable by juſtices, or to be ſent to the houſe of correction. None but Britiſh oil is to be uſed for *lamps* in private houſes, under penalty of 40*s*. 8 Ann. cap. 9.

Lamp, *rolling*, in *Mechanics*, is a *lamp* A B (*Tab* IV. *Mechanics*, *fig*. 48.) that has within it the two moveable circles D E and F G, whoſe common centre of motion is at K, where their axes of motion croſs one another, in which point alſo is their common centre of gravity. If to the inward circle you join withinſide to the lamp K C, made pretty heavy, and moveable about its axis H I, whoſe centre of gravity is at C, the common centre of gravity of the whole machine will fall between K and C, and by reaſon of the pivots A, B, D, E, H, I, will be always at liberty to deſcend; and therefore let the whole *lamp* be rolled along the ground, or moved in any manner, the flame will always be uppermoſt, and the oil cannot be ſpilt. In this manner the compaſs is hung at ſea; and thus ſhould all the moon-lanthorns be made that are carried upon a pole before coaches or carriages which travel in the night. Deſag. Exp. Phil. vol. i. p. 57.

Lamp *black*. See BLACK.

Lamp, *cul de*. See CUL.

Lamp, *enamelling by*. See ENAMELLING.

Lamp, *fire of a*. See FIRE.

Lamp *furnace*. See *Lamp* FURNACE.

LAMPADARY, *lampadarius*, an officer in the ancient church of Conſtantinople, whoſe buſineſs was to ſee the church well lighted, and to bear a taper before the emperor, the empreſs, and the patriarch, when they went to church or in proceſſion.

The taper borne by the *lampadary* before the emperor was encompaſſed with divers circles of gold, in manner of crowns; thoſe held before the empreſs and patriarch had but one. It ſeems they were of emblematical uſe, and were intended to keep thoſe great perſons in mind, that their light was to illumine thoſe in inferior ſtations. There were alſo *lampadaries* in the emperor's palaces; and others in the houſes of the grandees: at firſt, the privilege of having a *lampadary*, or torch-beerer, was only granted to the principal officers of the crown, and the chief magiſtrates; but afterwards the emperor allowed it to other inferior officers, as queſtors, treaſurers, &c.

Together with the taper, they bore before the magiſtrates the emperor's image, &c. And it is very probable, it was on account of this image, that they were firſt permitted to have a *lampadary*.

LAMPADIAS is uſed by ſome authors for a kind of bearded comet, which, as they pretend, reſembles a burning lamp, being of ſeveral ſhapes: its flame or blaze tapering upward ſometimes like unto a ſword, and being at other times double or triple pointed.

LAMPAS, or LAMPERS, a kind of ſwelling in the palate of a horſe; ſo called, becauſe it is cured by burning with a lamp, or a hot iron.

The *lampas* is an inflammation or tumor in the roof of a horſe's mouth, behind the nippers of the upper jaw. It ariſes from abundance of blood reſorting to the firſt furrow of the mouth, near the fore-teeth, which cauſes that furrow to ſwell as high as his gatherers; it hinders the beaſt's feeding, and makes him let his meat fall, half chewed, out of his mouth.

The *lampas* is a natural infirmity which every horſe has firſt or laſt, and which every farrier can cure.

LAMPERN, in *Ichthyology*, a river fiſh, being the *petromyzon branchialis* of Linnæus, found in many parts of England, particularly in Oxfordſhire, and the neighbouring counties, and there called the *pride of the Iſis*. The Latin authors call it the *lampetra parva*, and *muſtela fluviatilis*. It is a ſmall fiſh, of a browniſh or bluiſh black upon the back, and a fine ſilver white on the belly, divided from the mouth to the anus with a ſtraight line; its mouth is circular or elliptic, and furniſhed with ſix or ſeven teeth, and over theſe a ſmall ſemicircular bone; in the middle of the head it has a hollow or ſmall tube, like the whale; the uſe of this is to admit the water and air, while the mouth is applied cloſe to the rocks; its gills are ſeven holes on each ſide, and it has two fins on the back.

The word *lampern* is uſed by the common people in England for one ſpecies of the *lampetra*, and is not to be confounded with the other called the *lamprey*, or the *lamprey-eel*. The near alliance in ſound between the two words *lampern* and *lamprey*, has deceived ſeveral to ſuppoſe they meant the ſame fiſh; and even ſome authors have not diſtinguiſhed them; but the determinate ſenſe of the word is this: they are the names of two fiſh, both of the genus of the *lampetra*, according to the generality of writers, and of the *petromyzon*, according to the new ſyſtem of Artedi.

No *lamperns* are to be taken in the rivers Thames and Medway, except from Auguſt 24 to March 30. 30 Geo. II. cap. 21.

LAMPETIANS, LAMPETIANI, a ſect of ancient heretics, in the ſeventh century, who fell in with ſome of the opinions of the Aerians.

Their founder, Lampetius, is ſaid to have been one of the chief of the Marcionites. They condemned all kind of vows, particularly that of obedience, as inconſiſtent with the liberty of the ſons of God.

LAMPETRA *Indica*, in *Ichthyology*, the name of an Eaſt Indian fiſh of the lamprey kind, caught in ſtanding waters, and called by the Dutch there *bont ael*, and *neegen oog*, or *nine eyes*.

LAMPREY, *lampetra, à lambendo petras*, becauſe this ſpecies is ſuppoſed to lick the rocks, in *Ichthyology*, belongs, in the Artedian and Linnæan ſyſtems, to the genus of PETROMYZON. The diſtinguiſhing characters of the common *lamprey*, or *petromyzon marinus* of Linnæus, are theſe: its back is of a blackiſh hue, with ſome angular whitiſh ſpots; the ſkin is tough, but much thinner than that of the eel; its mouth is rounded, and it lays ſo faſt hold of rocks, or wood, with this, that it ſeems to ſuck them, and ſticks ſo firmly as not to be eaſily removed; it can, however, contract this mouth lengthwiſe, and ſhut it at pleaſure; it has a white ſpot in the middle of its forehead, between the eyes, and before that a hole, ſurrounded with a thin membrane, by which it admits the water and air, while its mouth lies cloſely on the rock; the gills are placed within ſeven round holes on each ſide, and the edge of its mouth is ſurrounded with a range of ſhort fibrillæ, which have by ſome been miſtaken for teeth; but are really of no other uſe than to affix its mouth the more firmly; its teeth are placed within its mouth, and there are twenty rows of them, the inner ones being the larger: they are diſpoſed in rows from the centre toward the circumference, and are five, ſix, or ſeven in a row. See *Tab.* II. *Fiſh*, N° 17.

It is a fiſh that equally lives in ſalt and freſh water. In the month of March it commonly runs up into the rivers, and is then moſt valuable for the table, as being fat and full of eggs; ſo that the beſt ſeaſon for *lampreys* is in the months of March, April, and May, becauſe they are moſt firm when they firſt leave the ſalt water, and become waſted and flabby at the approach of hot weather; they are found in ſeveral of our rivers, but the Severn is the moſt noted for them. They are taken in nets along with ſalmon and ſhad, and ſometimes in weels laid in the bottom of the river. It has been an old cuſtom for the city of Glouceſter, annually, to preſent his majeſty with a *lamprey* pye, covered with a large raiſed cruſt; and as the gift is made at Chriſtmas, the corporation procure freſh *lampreys* at that time with great difficulty. They are reckoned a great delicacy, either potted or ſtewed; but are a ſurfeiting food, as one of our monarchs fatally experienced, Henry the Firſt's death being occaſioned by a too full meal of this fiſh. They are ſometimes found ſo large as to weigh four or five pounds. The leſſer *lamprey*, or *petromyzon fluviatilis* of Linnæus, ſometimes grows to the length of ten inches. Its mouth is formed like that of the preceding; on the upper part is a large bifurcated tooth; on each ſide are three rows of very ſmall ones; on the lower part are ſeven teeth, the exterior of which on each ſide is the largeſt; the irides are yellow; it has the ſame orifice between the eyes with the other ſpecies; on the lower part of the back is a narrow fin, beneath which riſes another, which at the beginning is high and angular, then grows narrow, ſurrounds the tail, and ends near the anus; the colour of the back is brown or duſky, ſometimes mixed with blue; the whole under-ſide is ſilvery. Theſe are found in the Thames, Severn, and Dee, and are potted with the large ſpecies, and are reckoned of a milder taſte. They are ſold to the Dutch as bait for their cod-fiſhery. Above 450,000 have been ſold in a ſeaſon at 40*s.* per thouſand. Of late, about 100,000 have been ſent to Harwich for the ſame purpoſe. It is ſaid the Dutch have the ſecret of preſerving them till the turbot fiſhery. The other ſpecies is the LAMPERN, already deſcribed.

LAMPREY, *Blind*. See EINBLINDER.

LAMPRILLON, or LAMPREYON, a name by which ſome authors have called the particular ſpecies of *lamprey*, which we by way of diſtinction call LAMPERN.

LAMPROPHORUS, an appellation anciently given to the neophytes, during the ſeven days that ſucceeded their baptiſm.

In the ceremony of baptiſm, the new Chriſtian was clothed with a white robe, which he wore for the week following; and was thence called *lamprophorus*, which ſignifies a perſon *wearing a ſhining garment*; from λαμπρος, *ſhining*, and φερω, *I bear*.

The Greeks alſo gave this name to the day of the reſurrection, becauſe their houſes were adorned and illuminated on that day with a great number of torches, as a ſymbol of the light which that myſtery diffuſed in the world.

LAMPSANA, in *Botany*. See NIPPLE-*wort*.

LAMPUGA, in *Ichthyology*, a name given by ſome authors to the fiſh more uſually known by the name of STROMATEUS.

LAMPUGO, in *Ichthyography*, a name given by many to the HIPPURUS, a ſea-fiſh, caught on the coaſt of Spain, and ſuppoſed by ſome to be the ſame with the DORADO.

LAMPYRIS, in *Natural Hiſtory*, a genus of the *coleoptera* claſs of inſects; the antennæ of which are filiform, the elytra flexile, the thorax plane and ſemiorbiculated, covering and ſurrounding the head, and the ſides of the abdomen are covered with folds of down. Linnæus enumerates eighteen ſpecies. See GLOW-*worm*.

LANÆ *petra*. See PETRA.

LANARIA, or *Herba* LANARIA, in *Botany*, a name given by the ancient Romans to a plant called *ſtruthium* by the Greeks, and uſed in the cleanſing of wool. The plant was of the thiſtle kind, and had large roots, and very prickly leaves. Some have ſuppoſed that the *chaſcuſa* of the ancients was the ſame with the *lanaria herba*, or *ſtruthium*; but this appears to be a great error; for the *chaſcuſa* of the Greeks is the *antirrhinum* of the Latins, which Pliny deſcribes to have leaves like flax.

LANATA, in *Botany*, a name given by Cordus, and ſome other authors, to the *aria Theophraſti*, or *white beam-tree*.

LANCARIM *ſpring*, the name of a medicated water of Glamorganſhire. It has its name from a town near which it riſes, and has been very long famous in the place for the cure of the king's evil. The body of water is about an ell broad, and runs between two hills covered with wood. About twelve yards from this ſpring the rill falls from a rock of about eight or nine feet high, with a conſiderable noiſe. The ſpring is very clear and riſes out of a pure white marle. The cures that have been performed there are proofs of a real power in the water; but there is ſome queſtion, whether the water or its motion and coldneſs, does the good; for the people, who come for relief, always drink of the ſpring, and bathe the part afterwards in the fall below. It is generally ſuppoſed that the lime-ſtone rocks communicate a virtue to it, by which it cures internally; but it has been often found, that the holding a limb diſordered with the evil, in the ſtrong current of a mill-tail, has cured it; and there is the ſame advantage in the fall of this water. Phil. Tranſ. N° 233, or abr. vol. ii. p. 333.

LANCASTER, *county palatine of*. See COUNTY.

LANCASTER, *duchy court of*. See COURT.

LANCE, *Lancea*, a ſpear; an offenſive weapon, borne by the ancient cavaliers, in form of a half pike.

The *lance* conſiſted of three parts, the ſhaft or handle, the wings, and the dart. Pliny attributes the invention of *lances* to the Ætolians. But Varro, and Aulus Gellius ſay, the word *lance* is Spaniſh; whence others conclude the uſe of this weapon was borrowed by the people of Italy from the Spaniards. Diodorus Siculus derives it from the Gauliſh, and Feſtus from the Greek λογχη, which ſignifies the ſame.

LANCEA *Chriſti*, in *Botany*, a name given by ſome authors to the *ophiogloſſum*, or adder's tongue. a ſmall herb found in moiſt places, with a ſingle ſtem of ſeeds.

LANCEARII, in *Middle Age Writers*, ſoldiers whoſe chief weapon was the lance. They were in great eſteem formerly.

LANCEOLA, in *Botany*, a name given by ſome authors to that ſpecies of plantain called *rib-wort*, or *plantago quinquenervia*, by moſt authors.

LANCEOLATED *leaf*, among *Botaniſts*. See LEAF.

LANCETI, a name given by the ancient laws of England to a kind of vaſſal, who were obliged to work for the lord one day in a week, from Michaelmas to autumn, either with fork, ſpade, or flail, at the option of the lord.

LANCETTE, or **LANCET**, a fine, ſmall ſurgeon's knife; ſtrait-pointed, and two-edged; uſed in opening veins, &c. See PHLEBOTOMY.

LANCH, in *Sea Language*, a peculiar kind of *long*-BOAT, employed by ſhips in the Mediterranean ſea. It is longer, lower, and more flat-bottomed than the long boat, and, though leſs fit for ſailing, better adapted for approaching a flat ſhore. It is alſo, by its conſtruction, fitter to under-run the cable than the long-boat, which adapts it to the harbours of the Levant ſea, where the cables of different ſhips are faſtened acroſs each other.

LANCH *of a ſhip*. See LAUNCH.

LAND, in a general ſenſe. See EARTH, SOIL, &c.

Dr. Davenant, from a ſcheme of Mr. King, ſtates the quantity of *land* in England and Wales to be thirty nine millions of acres; which, reckoning the number of inhabitants, as he does, to be 5,500,000, will at an average be 7¼ acres per head. Davenant's Works, vol. vi. § 3. See ACRE, and EXPECTATION *of life*.

LAND, in a *Legal ſenſe*, includes not only the face of the earth, but every thing under or over it; ſo that if a man grants all his *lands*, he grants thereby all his mines of metal and other foſſils, his woods, his waters, and his houſes, as well as his fields and meadows.

LAND, *incloſing of*. Incloſing of *lands*, and dividing the ſame into ſeveral fields for paſture and tillage, is one of the principal ways of improvement; firſt, by aſcertaining to every man his juſt property, and thereby preventing an infinity of treſpaſſes and injuries that *lands* in common are ſubject unto, beſide the diſadvantage of being obliged to keep the ſame ſeaſons with the other people who have *land* in the ſame field; ſo that the ſowing, fallowing, and tilling the ground, muſt be equally performed by all the landholders; and when there happens a ſlothful negligent perſon, who has *land* intermixed with others, it is one of the greateſt nuiſances imaginable. Secondly, where *land* is properly incloſed, and the hedge-rows planted with timber-trees, &c. it preſerves the land warm, and defends and ſhelters it from the violent cold nipping winds, which, in ſevere winters, deſtroy much of the corn, pulſe, or whatever grows on the champaign grounds; and where it is laid down for paſture, it yields much more graſs than the open fields, and the graſs will begin to grow much ſooner in the ſpring. The hedges and trees alſo afford ſhelter for the cattle from the cold winds in winter, and ſhade for them in the great heats of ſummer. Theſe hedges alſo afford the diligent huſbandman plenty of fuel, as alſo plough boot, cart boot, &c. And where they are carefully planted and preſerved, furniſh him with maſt for his ſwine; or where the hedge-rows are planted with fruit trees, there will be a ſupply of fruit for cyder, perry, &c. which in moſt parts of England are of no ſmall advantage to the huſbandman.

By this method of incloſing, there is alſo much more employment for the poor, and it is therefore a good remedy againſt beggary; for in thoſe open countries, where there are great downs, commons, heath and waſtes, there is nothing but poverty and idleneſs to be ſeen amongſt the generality of their inhabitants. Miller.

It muſt be acknowledged, that incloſures of waſte *lands* and commons would be uſeful, if they were divided into ſmall parcels, and given up to be occupied at moderate rents by the poor. But if beſides leſſening the produce of fine wool, they bear hard on the poor, by depriving them of a part of their ſubſiſtence, and only ſerve to increaſe farms already too large, which is commonly the caſe, the advantages attending them may not much exceed the diſadvantages. With reſpect to incloſures of open fields and *lands*, the advocates for incloſing are ready to own, that theſe diminiſh tillage, increaſe the monopolies of farms, raiſe the prices of proviſions, and produce depopulation. Such incloſures, therefore, however gainful they may be at preſent to a few individuals, are undoubtedly pernicious. It is a known fact, that in Northamptonſhire and Leiceſterſhire, where incloſing has greatly prevailed, moſt of the incloſed lordſhips are converted into paſturage; in conſequence of which many lordſhips have not now fifty acres ploughed yearly, in which fifteen hundred, or at leaſt a thouſand, were ploughed formerly; and ſcarce an ear of corn is to be ſeen in ſome that bore hundreds of quarters; the effect of which has been, that the price of wheat and malt is nearly doubled, and that the inhabitants in almoſt all the incloſed villages, where they have no conſiderable manufacture, are very ſenſibly diminiſhed; inſomuch that a hundred houſes and families have in ſome places dwindled into eight or ten; and the landholders, in moſt pariſhes that have been incloſed only fifteen or twenty years, are very few in compariſon of the numbers who occupied them in their open-field ſtate. It is no uncommon thing to ſee four or five wealthy graziers engroſſing a large incloſed lordſhip, which was before in the hands of twenty or thirty farmers, and as many ſmaller tenants or proprietors. All theſe are hereby thrown out of their livings, with their families, and many other families which were employed and ſupported by them. The ſtate of Norfolk is in ſome reſpects ſimilar to this. Incloſures, ſays the celebrated lord Bacon, in his hiſtory of the Reign of Henry VII. (ſee his Works, vol. iii. p. 431.) began in 1489 to be more frequent, whereby arable land was turned into paſture, which was eaſily managed by a few herdſmen. This bred a decay of people. In remedying this inconvenience, the king's wiſdom and the parliament's was admirable. Incloſures they would not forbid, and tillage they would not compel; but they took a courſe to take away depopulating incloſures, and depopulating paſturage by conſequence. The ordinance was, that all houſes of huſbandry, with twenty acres of ground to them, ſhould be kept up for ever, together with a competent proportion of land to be occupied with them, and in no wiſe to be ſevered from them. By theſe means, the houſes being kept up, did, of neceſſity, enforce a dweller; and the proportion of land for occupation being alſo kept up, did, of neceſſity, enforce that dweller not to be a beggar. This ſtatute was renewed in king Henry the Eighth's time; and every perſon who converted tillage into paſture ſubjected to a forfeiture of half the land, till the offence was removed. In a law of the twenty-fifth of the ſame reign, it is ſet forth, that many farms, and great plenty of cattle, particularly ſheep, had been gathered into few hands, whereby the rents of lands had been increaſed, and tillage very much decayed; churches and towns pulled down; the price of proviſions greatly enhanced, and a marvellous number of people rendered incapable of maintaining themſelves and families; and, therefore, it was enacted, that no perſon ſhould keep above two thouſand ſheep, nor hold more than two farms. In the third of Edw. VI. a bill was brought in for the benefit of the poor, for rebuilding decayed farm-houſes, and maintaining tillage againſt too much incloſing. In the year 1638 there was a ſpecial commiſſion from Charles I. for enforcing the ſtatute of the 30th of Elizabeth, by which no cottage was allowed in any country place, without at leaſt four acres of land to it, to prevent the increaſe of the poor, by ſecuring to them a maintenance; nor were any inmates allowed in any cottage, to ſecure the full cultivation of the *land*, by diffuſing the people more over it. And by an act in Cromwell's time, no new houſe was to be built within ten miles of London, unleſs there were four acres of *land* occupied by the tenant. Thus did the policy of our anceſtors diſcourage incloſing and engroſſing, upon the ſame general view of their depopulating tendency; and though the increaſe of trade and manufactures in more modern times has produced a conſiderable alteration in the ſtate of our country, and may require ſome change in our internal policy, yet it is eaſy to foreſee, becauſe facts juſtify the apprehenſion, that incloſing and engroſſing to the degree in which they have lately prevailed, will annihilate the ſmall occupiers of land, and reduce the inhabitants of the kingdom to two claſſes, viz. gentry and beggars, or grandees and ſlaves.

As in former times the number of the occupiers of *land* was greater, and all had more opportunities of working for themſelves, it is reaſonable to conclude, that the number of people willing to work for others muſt have been ſmaller, and the price of day-labour higher. The nominal price of day-labour is at preſent no more than about four times, or at moſt five times higher than it was in the year 1514. But the price of corn is ſeven times, and of fleſh-meat and raiment about fifteen times higher; therefore the price of labour has been ſo far from advancing in proportion to the increaſe in the expences of living, that it does not appear to bear now half the proportion to theſe expences that it did formerly. See on this ſubject Price's Obſervations on Reverſionary Payments, Supplement, p. 388, &c. Appeal to the Public on the Subject of the National Debt, p. 93, &c.

In incloſing of *land*, regard ſhould be had to the nature of the ſoil, and what it is intended for; becauſe corn-land ſhould not be divided into ſmall fields; for beſides the loſs of ground in hedges, &c. the corn doth ſeldom thrive ſo well in ſmall incloſures as in more open *land*, eſpecially where the trees are large in the hedge-rows. The graſs alſo in paſtures is not ſo ſweet near hedges, or under the drip of trees, as in an open expoſure; ſo that where the incloſures are made too ſmall, or the land over planted with trees, the herbage will not be near ſo good, nor in ſo great plenty, as in larger fields; therefore, before a perſon begins to incloſe, he ſhould well conſider how he may do it to the greateſt advantage: as, for inſtance, it is always neceſſary to have ſome ſmaller incloſures near the habitation, for the ſhelter of cattle, and the conveniency of ſhifting them from one field to another, as the ſeaſon of the year may require; and hereby the habitation, barns, ſtables, and out-houſes will be better defended from ſtrong winds, which often do great damage to thoſe that are expoſed to their fury. Theſe ſmall incloſures may be of ſeveral dimenſions, ſome of them three, four, ſix or eight acres in extent; but the larger diviſions for corn ſhould not conain leſs than twenty or thirty acres, or more, according to the ſize of the farm.

The moſt common incloſure is by a ditch and bank raiſed by its ſide with quick: this takes place in almoſt any ground; but as it is expenſive, and ſtone or water are more plentiful, they are uſed in its ſtead. In marſhy lands they only cut ditches, by way of fence between ground and ground; and theſe, when wide and deep enough, are a very good fence in all places where there is water to keep them full. In Cornwall and Devonſhire, and ſome other of the weſtern counties, they uſe a ſtone fence, which is the beſt kind both for the lands and for the cattle. Flat ſtones are very plentiful in theſe counties, and may be had at a trifling expence. With theſe ſtones they build round the land that is to be incloſed two walls near one another, laying the ſtones upon one another, firſt two and two, then one, all the way up; and as they riſe, they fill up the ſpace with earth; and ſo they continue the ſtone-work, filling it to what height and breadth they pleaſe, and beating the ſtones in flat to the ſides, which makes the whole firm. On the top of theſe walls they plant quick, and even timber-trees, which thrive extremely well. In the northern counties of England, and ſome others, where there is plenty of ſtone of a large and rough kind, they make their fences with the rough and unhewn ſtones, piling them up into a wall with no ſort of cement or mortar, only laying on large ones at the top in a bed of clay, which keep all the reſt together. They make theſe walls about five feet high, See EARTH-*banks*, FENCE, HEDGE, and WALL.

LAND, *draining of*. The draining of *land* is alſo another great improvement to it; for though meadows and paſtures, which are capable of being overflowed, produce a greater qantity of herbage than dry land, yet where the wet lies too long upon the ground, the graſs will be ſour and extremely coarſe; and when there is not care taken in time to drain this *land*, it will produce little graſs, and ſoon be over-run with ruſhes and flags, ſo as to be of ſmall value.

The beſt method for draining of theſe lands is, to cut ſeveral drains acroſs the land, in thoſe places where the water is ſubject to lodge; and from theſe croſs drains to make a convenient number of other drains, to carry off the water to either ponds or rivers in the lower parts of the lands. Theſe drains need not be made very large, unleſs the ground be very low, and ſo ſituated as not to be near any river to which the water may be conveyed; in which caſe there ſhould be large ditches dug at proper diſtances in the loweſt part of the ground, to contain the water, and the earth which comes out of the ditches ſhould be equally ſpread on the land, to raiſe the ſurface. But where the water can be conveniently carried off, the beſt method is to make under-ground drains at proper diſtances, which may empty themſelves into large ditches, which are deſigned to carry off the water. This ſort of drains is the moſt convenient, and as they are hid from the ſight, do not incommode the land; nor is there any ground loſt where theſe are made.

The uſual method of making theſe drains is to dig trenches, and fill the bottoms with ſtones, bricks, ruſhes, or buſhes, which are covered over with the earth which was dug out of the trenches; but this is not the beſt method, becauſe the water has not a free paſſage through theſe drains; ſo that whenever there is a flood, they are often ſtopped by the ſoil which the water frequently brings down with it. The beſt method yet found to make theſe drains is to dig trenches to a proper depth for carrying off the water, which for the principal drains ſhould be three feet wide at their top, and ſloped down for two feet in depth, where there ſhould be a ſmall bank left on each ſide, upon which the croſs ſtakes or bearers ſhould be laid, and below theſe banks there ſhould be an open drain left, at leaſt one foot deep, and nine or ten inches wide, that there may be room for the water to paſs through: the larger drains ſhould be at convenient diſtances, and ſmaller drains of about ſix or ſeven inches wide, and the hollow under the buſhes eight or nine inches deep, ſhould be cut acroſs the ground, which ſhould diſcharge the water into theſe larger drains. The number and ſituation of them muſt be in proportion to the wetneſs of the land; and the depth of earth above the buſhes muſt alſo be proportioned to the intended uſe of the *land*; for if it is arable land to be ploughed, it muſt not be ſhallower than a foot or fourteen inches, that there may be ſufficient depth for the plough, without diſturbing the buſhes, but for paſture land nine inches will be full enough; for when the buſhes lie too deep in ſtrong *land*, they will have little effect, the ground above will bind ſo hard, as to detain the wet on the ſurface.

When the drains are dug, there ſhould be prepared a quantity of good bruſh-wood, the larger ſticks ſhould be cut out to lengths of about ſixteen or eighteen inches, which ſhould be laid acroſs upon the two ſide-banks of the drain, at about four inches diſtance; then cover theſe ſticks with the ſmaller bruſh-wood, furze, broom, heath, or any other kind of bruſh, laying it lengthwiſe pretty cloſe; on the top of theſe may be laid ruſhes, flags, &c. and then the earth laid on to cover the whole. This ſort of drains will continue good for a great number of years, and are never liable to the inconveniences of the other; for the water will find an eaſy paſſage through them under the buſhes; and where there is plenty of bruſh-wood, they are made at an eaſy expence; but in places where wood is ſcarce, it would be chargeable to make them: however, in this caſe, it would be a great advantage to theſe *lands* to plant a ſufficient number of cuttings of willow, or the black poplar, on ſome of the moiſt places, which would furniſh bruſh-wood for theſe purpoſes in four or five years; and as the expenſe of planting theſe cuttings is trifling, there cannot be a greater advantage to an eſtate which wants draining, than to practiſe this method, which is in every perſon's power, ſince there is little expence attending it.

In countries where there is plenty of ſtone, that is the beſt material for making theſe under-ground drains; for when theſe are properly made, they will never want repairing.

The beſt time of the year for making theſe drains is about Michaelmas, before the heavy rains of autumn fall, becauſe at this ſeaſon the land is uſually dry, ſo that the drains may be dug to a proper depth; for when the ground is wet, it will be very difficult to dig to any depth, becauſe the water will drain in, wherever there is an opening in the ground. Miller. See BOG, DRAINS, and FEN.

By 11 Geo. II. cap. 34. 14 Geo. II. cap. 24. and 21 Geo. II. cap. 18. the ſecond offence in ſetting fire to engines for draining the ſeveral fens, to which theſe acts relate, is made felony without clergy. By 22 Geo. II. cap. 11. 16. 19. 29 Geo. II cap. 22. 30 Geo. II. cap. 32, 33, 35, 36. 31 Geo. II. cap. 18, 19. 32. Geo. II. cap. 13. 33 Geo. II. cap. 32. offenders maliciouſly ſetting fire to any of the works for draining the ſeveral fens to which theſe acts relate, may be tranſported for ſeven years.

LAND, *flooding of*. As the draining of cold wet *lands* is a great improvement to them, ſo the floating or watering of dry looſe *land* is not a leſs advantage to them. This may be eaſily effected where there are rivers, or reſervoirs of water, which are ſituated above the level of the ground deſigned to be floated, by under-ground drains made after the manner of thoſe before directed for draining of *land*, through which the water may be conveyed at proper ſeaſons, and let out on the ground: in order to this, there muſt be good ſluices made at the heads of the drains, ſo that the water may never get out, but at ſuch times as is required; for if this be not taken care of, the water, inſtead of improving the *land*, will greatly damage it.

The time for drowning of *land* is uſually from November to the end of April; but though this is the general practice, yet Miller ſays he cannot approve of it for many reaſons. The firſt is, that by the wet lying continually on the ground in winter, the roots of the finer ſort of graſs are rotted and deſtroyed; and by letting on of the water, at the ſeaſon when the ſeeds of docks, and other bad weeds, which commonly grow by river ſides, are falling, theſe ſeeds are carried upon the land, where they remain and grow, and fill the ground with bad weeds, which is commonly the caſe with moſt of the water-meadows in England, the graſs in general being deſtroyed; ſo that ruſhes, docks, and other trumpery, make up the burden of theſe lands; but if theſe meadows were judiciouſly managed, and never floted till March or April, the quantity of ſweet good graſs would be thereby greatly increaſed, and the beautiful verdure of the meadows preſerved. Miller. See Overflowing.

Land, *burning of.* Another great improvement of *land* is by burning of it, which for ſour, heathy, and ruſhy land, be it either hot or cold, wet or dry, is a very great improvement; ſo that ſuch *lands* will, in two or three years after burning, yield more, excluſive of the charges, than the inheritance was worth before; but this is not to be practiſed on rich fertile land; for as the fire deſtroys the acid juice, which occaſions ſterelity in the poor land, ſo it will in like manner conſume the good juices of the richer land, and thereby impoveriſh it, ſo that it hath been with great reaſon diſuſed in deep rich countries.

It is alſo a very great improvement, where land is overgrown with broom, furze, &c. to ſtub them up by the roots; and when they are dry, lay them on heaps, and cover them with the parings of the earth, and burn them, and ſpread the aſhes over the ground. By this method vaſt tracts of land, which at preſent produce little or nothing to their owners, might be made good at a ſmall expence, ſo as to become good eſtates to the proprietors. Miller. See Burning and Denshiring *of land.*

Land, *arable.* See Arable.
Land, *bog.* See Bog.
Land, *burning of.* See Burning.
Land, *catch.* See Catch-*land.*
Land, *chalk.* See Soil.
Lands, *champion.* See Champion.
Land, *charter.* See Charter-*land.*
Land, *chiſely.* See Chisely.
Land, *clay.* See Soil.
Lands, *court.* See Court-*lands.*
Lands, *fabric.* See Fabric-*lands.*
Land, *fardel of.* See Fardel.
Land, *folk.* See Folk-*land.*
Land, *fore.* See Fore-*land.*
Land, *glebe.* See Glebe-*land.*
Land, *gravelly.* See Soil.
Land, *head.* See Head-*land.*
Land *in peerage, holding.* See Peerage.
Land, *in.* See In-*land.*
Land, *incloſing of.* See Land, above.
Land, *lay.* See Lay.
Land, *marſh.* See Marshy *lands.*
Land, *meadow.* See Meadow.
Lands, *overflowing of.* See Overflowing, and *Flooding of* Land, above.
Land, *oxgang of.* See Oxgang.
Land, *plough.* See Carrucate.
Land, *road.* See Road.
Land, *ſandy.* See Soil.
Land-*teleſcope.* See Telescope.
Lands, *tenementary.* See Tenementary.
Lands, *thane.* See Thane-*lands.*
Land, *up.* See Up-*land.*
Lands, *wood.* See Wood-*lands.*
Land, *yard.* See Yard-*land.*
Land, *yoak.* See Yoak *of land.*

Land, *laying the*, in *Sea Language*, denotes that motion of a ſhip which increaſes its diſtance from the coaſt, ſo as to make it appear lower and ſmaller; a circumſtance ariſing from the intermediate convexity of the ſea. This is uſed in contradiſtinction to *raiſing* the *land*, which is produced by the oppoſite motion of approach towards it. When a ſhip is got out of ſight of *land*, they ſay the *land is laid.*

Land, *to make the.* See Make.

Land-*mark*, at *Sea*, is any mountain, rock, ſteeple, windmill, tree, or the like, near the ſea-ſide, which ſerve to direct ſhips paſſing by, how to ſteer, ſo as to avoid certain dangers, be they rocks, ſhoals, whirlpools, &c.

Land, *ſetting the*, at *Sea*, is obſerving by the compaſs how it bears.

Land, *ſhut in*, at *Sea.* When another point of *land* hinders the ſight of that which a ſhip came from, then they ſay the *land is ſhut in.*

Land-*to*, at *Sea.* When a ſhip lies ſo far from the ſhore, that ſhe can but juſt ken *land*, then ſhe is ſaid to lie *land to.*

Land-*turn*, at *Sea*, is a wind that blows from the ſhore in the night, at certain times, in moſt hot countries.

Land, *head* or *point of land*, in the *Sea Language*, is that which lies farther out into the ſea than the reſt. See Point, Cape, &c.

LAND-CHEAP, an ancient cuſtomary fine, paid either in cattle, or money, upon the alienating or ſelling of *land* in certain manors, or within the liberty of certain boroughs.

At Malden in Eſſex, a payment is ſtill made of 13*d.* in every mark of the purchaſe-money for lands and houſes ſold in that town; which is called *land-cheap.*

LAND-FALL, is a ſea-term, ſignifying, to fall in with the land, or the firſt land diſcovered after a ſea-voyage.

Land-fall, *good*, is when a ſhip makes or ſees the land, as ſhe expected, according to her reckoning. The contrary is called a *bad land fall.*

LAND-GABLE, an ancient term for a tax or rent, iſſuing out of a land; anſwering to what we now call *ground-rent.*

LAND-LOCKED, a ſhip is ſaid to ride *land-locked*, when ſhe is ſurrounded with land; that is, at anchor in a place where there is no point open to the ſea, ſo that ſhe is ſafe from the violence of winds and tides.

LAND-TAX is one of the uſual annual taxes, which has ſuperſeded all the former methods of rating either property, or perſons in reſpect of their property, whether by tenths, fifteenths, ſubſidies on land, hydage or hidage, ſcutage or eſcutage, or talliage. Tenths and fifteenths were temporary aids iſſuing out of perſonal property, and granted to the king by parliament, being the real tenth or fifteenth part of all the moveables belonging to the ſubject. We meet with the payment of fifteenths as far back as the ſtatute of Magna Charta; in the concluſion of which, the parliament grants to the king, for the conceſſions made by him, a fifteenth part of all their moveable goods. This taxation was originally charged upon the ſeveral individuals, but in the 8th year of Edward III. a certain ſum was rated in every town, &c. In proceſs of time this fifteenth being inſufficient for the public exigence, the number of fifteenths was augmented to two or three fifteenths. Whenever, in later years, the commons granted the king a fifteenth, every pariſh in England knew their proportion of it; i. e. the ſame identical ſum that was aſſeſſed by the ſame aid in the 8th of Edward III. and then raiſed it by a rate among themſelves, and returned it into the royal exchequer. See Fifteenth. See alſo Tenth. The other ancient levies were in the nature of a modern *land-tax*; for we may trace the original of that charge as high as to the introduction of our military tenures; when every tenant of a knight's fee was bound, if called upon, to attend the king in his army for forty days in every year. In lieu of this perſonal attendance, a pecuniary ſatisfaction came to be levied by aſſeſſments, at ſo much for every knight's fee, under the name of ſcutages. See Escuage. Of the ſame nature with theſe were the aſſeſſments of hydage or Hidage upon all other lands, and of Talliage upon cities and boroughs. But they all gradually fell into diſuſe upon the introduction of ſubſidies, about the time of king Richard II. and king Henry IV. See Subsidy. In lieu of ſubſidies, which were uſually raiſed by commiſſions appointed by the crown, or the great officers of ſtate, the parliament, in the beginning of the civil wars, introduced the practice of laying weekly and monthly aſſeſſments of a ſpecific ſum upon the ſeveral counties of the kingdom, to be levied by a pound rate on lands and perſonal eſtates; which were occaſionally continued during the whole uſurpation, ſometimes at the rate of 120,000*l.* a month, ſometimes at inferior rates. After the Reſtoration the ancient method of granting ſubſidies, inſtead of theſe monthly aſſeſſments, was twice, and twice only renewed, viz. in 1663, when four ſubſidies were granted by the laity and four by the clergy; and in 1670, when 800,000*l.* was raiſed by way of ſubſidy, which was the laſt time of raiſing ſupplies in this manner. The monthly aſſeſſments being eſtabliſhed by cuſtom, raiſed by commiſſioners named by parliament, and producing a more certain revenue, ſubſidies were diſcontinued, and occaſional aſſeſſments granted as emergencies required. Theſe periodical aſſeſſments, the ſubſidies which preceded them, and the more ancient ſcutage, hydage, and talliage, ſays judge Blackſtone, were to all intents and purpoſes a *land-tax*; and the aſſeſſments were ſometimes expreſsly called ſo. However, in the year 1692 a new aſſeſſment or valuation of eſtates was made throughout the kingdom, which, though by no means a perfect one, had this effect, that a ſupply of 500,000*l.* was equal to 1*s.* in the pound of the value of the eſtates given in. And, according to this enhanced valuation, from the year 1693 to the preſent, the *land-tax* has continued an annual charge upon the ſubject; above half the time at 4*s.* in the pound, ſometimes at 3*s.* ſometimes as 2*s.* twice, viz. in 1732 and 1733, at 1*s.* but without any total intermiſſion. The medium has been 3*s.* 3*d* in the pound, being equivalent to twenty-three ancient ſubſidies, and amounting annually to more than a million and a half of money. The method of raiſing it is by charging a particular ſum upon each county, according to the valuation of 1692; and this ſum is aſſeſſed and raiſed upon the perſonal as well as the real eſtates of individuals by commiſſioners appointed in the act, being the principle landholders of the county, and their officers. The general qualification of commiſſioners in counties, with ſome few exceptions, is 100*l.* a year of landed property: theſe commiſſioners before they can act, are required to take the oaths of allegiance, ſupremacy, and abjuration. When they firſt meet they direct the return and appointment of proper aſſeſſors: at their ſecond meeting they direct them how to proceed in ſettling the ſeveral rates and charges: the aſſeſſment on perſonal eſtates ſhall be 4*s.* in the pound, according to the true yearly value of them; i. e. for every 100*l.* of ready money and debts, and for every 100*l.* worth of goods, 20*s.* excepting ſuch ſums as are owing, and debts which the commiſſioner ſhall judge deſperate; and excepting ſtock upon lands and houſhold ſtuff, and debts and loans owing to his majeſty. Every perſon having a public office or employment, and their ſubſtitutes, ſhall pay 4*s.* for every 20*s.* of their ſalaries: military officers in the army or navy excepted. By 32 George II. c. 33. relating to the duty upon offices, it is provided, that in all future aſſeſſments to the *land-tax*, ſuch officers ſhall not be aſſeſſed at a higher rate to the *land-tax* than they were in 1758. Every perſon having an annuity or penſion out of the exchequer, or out of any branch of the revenue, ſhall pay 4*s.* for every 20*s.* except ſalaries charged upon lands which pay to the full, and annuities exempted by act of parliament; and except annuities paid to ſuperannuated commiſſioners or warrant ſea-officers, or to the widows of ſea-officers ſlain in the ſervice of the crown; and except money lent to the government on the ſecurity of the act; and except turnpike tolls, and the ſalaries of turnpike officers.

Real eſtates ſhall be charged with as much equality and indifference as poſſible by a pound-rate, to make up the ſeveral ſums charged by the act on each county or place. Colleges and hoſpitals are exempted, together with the buildings that are within the walls or limits of the ſame. All ſuch lands, revenues, or rents belonging to any hoſpital or alms-houſe, or ſettled to any charitable or pious uſe as were aſſeſſed in 4 W. and M. ſhall be liable; and no other lands, revenues, or rents, then belonging to any hoſpital or alms-houſe, or ſettled to any charitable or pious uſe, ſhall be charged or aſſeſſed: but lands given to charities ſince the 4th W. and M. ſhall not be exempted. No poor perſon ſhall be charged, whoſe lands, &c. are not of the full yearly value of 20*s.* in the whole. The aſſeſſors themſelves are aſſeſſed by the commiſſioners. The *land-tax* ſhall be paid by the tenant, who ſhall deduct it out of his rent. Papiſts and nonjurors ſhall pay double. At the third meeting of the commiſſioners the aſſeſſors ſhall deliver duplicates of the aſſeſſment in writing, ſigned by them, to the commiſſioners, with the names of proper collectors, for whom the pariſh or place ſhall be anſwerable. One of the duplicates, ſigned by three or more commiſſioners, ſhall be delivered to the collectors, with warrant for collecting; and the time and place of appeals ſhall then be appointed. The fourth meeting is that of appeal, notice of which ſhall be given in the church; and every perſon intending to appeal ſhall give a written notice to one or more aſſeſſors, that they may attend to juſtify the aſſeſſment. The commiſſioners are empowered to give relief in caſe of over-charge, and cauſe the ſum abated to be re-aſſeſſed: and when the appeal is determined, it is abſolutely final. If any perſon refuſe or neglect to pay to the collector on demand, he may levy the ſum aſſeſſed by diſtreſs and ſale of the goods of the perſon neglecting or refuſing to pay; and for want of diſtreſs, he may be committed by warrant of two commiſſioners to the common gaol, until payment of the money aſſeſſed and of the charges. The collector is required to pay the money received to the receiver-general or his deputy quarterly, on or before June 24, Sept. 29, Dec. 25, and March 25; who ſhall give a receipt gratis: the collectors are allowed 3*d.* in the pound, which they may detain out of the laſt payment; but if any collector detains the money longer than the time appointed, or pays it otherwiſe than directed, he ſhall forfeit 40*l.* and if he refuſe to pay it, two commiſſioners may impriſon him, ſeize his eſtates real and perſonal, and ſell them for payment. The receiver-general is appointed by the king, or in purſuance of his directions, and has a ſalary allowed him by the lords of the treaſury, not exceeding 2*d.* a pound; notice of his appointment is to be given to the commiſſioners, before the time of the firſt quarterly payment. The receiver, within twenty days after the receipt, ſhall pay the money into the exchequer, or forfeit 500*l.* to him who ſhall ſue. The clerks of the commiſſioners are allowed 1½*d.* in the pound for writing the aſſeſſments, duplicates, &c. to be paid by the receiver-general, according to the warrant of two commiſſioners. Aſſeſſors, collectors, &c. not doing their duty may be fined by three or more commiſſioners, in any ſum not exceeding 40*l.* Blackſt. Com. vol. i. p. 308, &c. Burn's Juſtice, art. LAND-*Tax*.

LAND-WAITER, an officer of the cuſtom-houſe, whoſe duty is, upon landing any merchandize, to examine, taſte, weigh, meaſure them, &c. and to take an account thereof. In ſome ports they alſo execute the office of a coaſt-waiter. They are likewiſe occaſionally ſtyled ſearchers, and are to attend and join with the patent ſearcher, in the execution of all cockets for the ſhipping of goods to be exported to foreign parts; and in caſes where drawbacks on bounties are to be paid to the merchant on the exportation of any goods, they, as well as the patent ſearchers, are to certify the ſhipping thereof on the debentures.

LANDAN, in *Phyſiology*. See SAGO.

LANDED *intereſt*, a term oppoſed to moneyed intereſt, in political conſiderations; though there is a near connexion between them: for, the *landed intereſt* is affected by foreign trade.

The foreign trade of every country muſt decline, that, 1. Lays unequal taxes in general on its people. 2. That cramps its commerce, the fountain of riches, by high duties, and impolitic prohibitions. 3. That ſuffers many monopolies. 4. That oppreſſes its people by prohibiting the importation of victuals under the pretence of raiſing the value of its lands. 5. That encourages idleneſs, by bad laws relation to its poor. 9. That tempts foreigners to carry away its coin for leſs than its intrinſic value. 7. That makes the obtaining juſtice chargeable. 8. That ſuffers a heavy national debt, contracted in time of war, to continue unpaid in time of peace.

The reaſon why the decline of foreign trade ſinks the value of land is, 1. becauſe it ſinks the markets at home. For, the produce of land being rendered exceſſively dear from the cauſes above enumerated, foreigners will not take its ſuperfluities; and labour being by the ſame cauſes rendered exceſſively dear, we cannot manufacture or improve that produce, becauſe nations which can afford cheaper ſupply the markets abroad; ſo that the produce of the lands, not being carried off as uſual, muſt become a dead ſtock on the farmer's hands, and cauſe great quanties to be crowded into markets, where, being encouragement but for few buyers, the price naturally falls; as, for inſtance, the declining demand of our woolen goods abroad falls the price of wool at home.

2. Becauſe it increaſes the number of poor, to burden the *land*.

3. Becauſe it diminiſhes the number of people: for as employment leſſens, the moſt induſtrious, rather than ſtarve here, will fly to other countries, where trade can maintain them. So the coſumption of theſe being taken away, the demand at market muſt grow leſs, and of courſe rents muſt fall, yet the farmer's charges muſt grow greater; for the fewer the hands, the higher wages are; this muſt break him in the end, and produce all the conſequences following that misfortune; beſides men who trade, bring in money; therefore the fewer they are, the leſs money will be brought; and the leſs money, the leſs rent can be given for *land*.

4. Becauſe the decline of trade diminiſhes *our riches*. This is a conſequence of the above remarks; for having fewer goods capable of being exported by reaſon of their dear price, and our manufactures declining, muſt in time be loſt: therefore the importation of foreign goods, muſt naturally increaſe, and more money go out to pay for them.

Nations that have no mines of gold and ſilver, have no means to get them but by foreign trade; and according to the quantity of theſe metals they poſſeſs, the price of their commodities, and therewith the value of their lands, riſe and fall in proportion, which ſhall now be proved.

According to Dr. Davenant, the whole rental of England, in 1600, did not exceed ſix millions per annum, and the price of *land* was twelve years purchaſe: in 1688 the rental was fourteen millions, and the price of *land* was eighteen years purchaſe; ſo that, within this period, the *landed* intereſt roſe from ſeventy-two to two hundred and fifty-two millions: and this advance was owing to an increaſe of trade.

The Britannia Languens, page 12, ſays, if there were but five hundred pounds in England, an ox could hardly be worth a penny: therefore the rent muſt bear its proportion to the riches. This appears by Maitland's Hiſtory of London; for he ſays that, in the year 961, *land* ſold at one ſhilling per acre. The reaſon that *land* then bore ſo low a price, was the low price the produce ſold at; for he ſays, that, in the year 1000, an ox ſold for 2*s.* 6*d.* a cow for 2*s.* a ſheep for 1*s.* and a ſwine for 8*d.* In 1445, wheat was at 4*s.* 6*d.* per quarter; in 1447, at

8*s.*; in 1448, at 6*s.* 8*d*; in 1449, at 5*s.* A bullock, in 1445, was 5*s.* a ſheep 2*s.* 5½*d*: a hog, 1*s.* 11½: clothing for a year at the ſame period, of a common ſervant of huſbandry 3*s.* 4*d.*; of a chief carter and ſhepherd, 4*s.*; of a bailiff of huſbandry, 5*s.* In 1512 the mean price of wheat in Yorkſhire was 6*s.* 2*d.*; the price of malt was 4*s.* and of oats 2*s.* ſo that the nominal price of grain at this time was about a ſeventh of its nominal price for the laſt twenty years. The price of a fat ox at the ſame time and in the ſame county was 13*s.* 4*d.* of a lean ox, 8*s.* of a wether, 1*s.* 8*d.* of a calf, 1*s.* 8*d.* of a hog, 2*s.* ſo that the nominal price of meat was no more than about a fifteenth of its preſent price, and bore the ſame proportion to the price of corn that it would now bear, were it at half its preſent price. In an act of parliament of the 25th of Henry VIII. beef, veal, pork, and mutton, are mentioned as the food of the poor, and their price limited to about a halfpenny a pound. Beef and pork in particular were ſold in London at 2½ lb. and 3 lb. for a penny; at the ſame time that wheat was at 7*s.* and 8*s.* a quarter, and bore the ſame proportion to the price of fleſh as it would bear now, were it about 4*l.* a quarter. In 1549, wheat was in London 12*s.* per quarter; malt, 10*s.* barley, 9*s.* rye, 6*s.* 6*d.* oats, 4*s.* a middling ox, 1*l.* 18*s.* a wether, 3*s.* butter, ¾ and a penny a pound; and cheeſe a halfpenny a pound. See the citations in the Supplement to Price's Obſ. on Reverſionary Payments, *&c.* p. 385, *&c.* This could be only owing to the little foreign trade the nation had at theſe reſpective periods, and, conſequently, to the little quantity of gold and ſilver which trade had then brought in.

But if it ſhould be aſked, what is the reaſon that, at preſent, all things are naturally ſo much advanced in price, to what they were in thoſe days? the anſwer is, that the quantities of gold and ſilver brought to Europe ſince the progreſs made by the Spaniards and Portugueſe in America, have made thoſe metals more common, and of leſs value than formerly, ſo that 20*s.* will hardly purchaſe what 1*s.* would before the diſcovery of the Weſt Indies. To which may be added the great increaſe of our national debt and taxes, together with the circulation of the intereſt of the principal money of the public funds, and likewiſe that great circulation of paper credit in trade, occaſioned by notes and bills, which, by promoting an artificial circulation of property, raiſe the price of commodities, and give the appearance of wealth to the nation; though they are really the characteriſtics of a declining ſtate. Poſt. Dict. Com.

The dearneſs of commodities and the cheapneſs of money are the ſame things.

LANDGRAVE, formed of the German *land*, *earth*, and *graff*, or *grave*, *judge*, or *count*, a name formerly given to thoſe who executed juſtice in behalf of the emperors, with regard to the internal policy of the country. The title does not ſeem to have been uſed before the eleventh century. Theſe judges were firſt appointed within a certain diſtrict of Germany: in proceſs of time the title became hereditary, and theſe judges aſſumed the ſovereignty of the ſeveral diſtricts or countries over which they preſided. *Landgrave* is now applied by way of eminence to thoſe ſovereign princes of the empire who poſſeſs by inheritance certain eſtates called *landgravates*, and of which they receive the inveſtiture of the emperor. There are four princes who have this title, viz. thoſe of Thuringia, Heſſia, Alſace, and Leuchtenberg. There are alſo other *landgraves* who are not princes, but counts of the empire. See COUNT.

LANDSKIP, or LANDSCAPE, the view, or proſpect, of a country, extended as far as the eye will reach.

LANDSKIPS, in *Painting*, are pieces repreſenting ſome champaign, or rural ſubject, as hills, vales, rivers, and country-houſes, where human figures are only introduced as accidents, or circumſtances.

Landſkip painting is eſteemed one of the loweſt branches of PAINTING.

LANE, in the *Military Art*, is uſed when men are drawn up in two ranks facing one another. This is called *making a lane*, and is generally done in the ſtreets through which a great perſon is to paſs, as a mark of honour. But ſoldiers are often drawn up in this manner, when an offender is to run the gantlope. See *Military* EXECUTION.

LANGREL-SHOT, is a ſort of ſhot ſometimes uſed at ſea, made of two bars of iron, with a joint, or ſhackle, in the middle; by which means it can be ſhortened, and ſo put the better into the gun; and at each end there is a half bullet, either of lead or iron.

This ſhot, when diſcharged, flies out expanded, and ſo does more execution among the enemies rigging, &c. It is never uſed in royal ſhips, but very often by privateers and merchantmen.

LANGUAGE, a ſet of words which any people have agreed upon, whereby to communicate their thoughts to each other.

The firſt principles of all *languages*, F. Buffier obſerves, may be reduced to expreſſions, ſignifying, firſt, the ſubject ſpoken of: ſecondly, the thing affirmed of it: thirdly, the circumſtances of the one and the other. But as each *language* has its particular ways of denoting each of theſe, a *language* is only to be looked on as an aſſemblage of expreſſions, which chance or caprice has eſtabliſhed among a certain people; juſt as we look on the mode of dreſſing, &c. Uſage and cuſtom are the rule of a *language*; and theſe hold their empire independent of reaſon, or any other cauſe: nor has reaſon any thing to do in *language*, unleſs to ſtudy or teach it, ſuch as it is. Here then commences grammar; a juſt plan of which ſuppoſes a *language* already introduced by uſe, and, without pretending to alter or amend a tittle, only furniſhes reflections, called *rules*, to which the manners of ſpeaking uſed in that *language*, may be reduced; which aſſemblage of reflections is what we call the *grammar of that language*. This remark may obviate an abuſe introduced among grammarians, who are ever crying out, "Uſage is, in this point, oppoſite to grammar; or the "*language* here frees itſelf from the rules of grammar, "&c."

It is chance then to which we owe uſage, and uſage that makes the rules and meaſures of *language*. Uſage, indeed, is ſomewhat dubious, and may be divided into *good* and *bad*. If it be aſked, wherein the difference between theſe lies? it is in this; that the one is better eſtabliſhed, or authorized, than the other: and if it be aſked, wherein that difference of authority conſiſts? it is anſwered, that in dead *languages*, that which makes the good uſage is the writings of the beſt authors in that *language*; and if it be farther queſtioned, which are the beſt? thoſe are allowed ſuch, who wrote when the ſtate was in its greateſt glory. Thus the age of Auguſtus, being the moſt diſtinguiſhed by great men, who then flouriſhed, we call that *good Latin* which is conformable to the manners of ſpeaking uſed by authors who wrote within fifty years before, and fifty after, the reign of that emperor. As to living *languages*, the good uſage, or mode, is that which obtains among the moſt eminent perſons, whether as to quality and authority, or as to learning, and the reputation of writing well.

With this view it is, that M. Vaugelas defines uſage of a *language*, the manner of ſpeaking uſed by the ſoundeſt or beſt part of the court, conformable to the manner of writing among the beſt part of the authors of the time. But this definition, how judicious ſoever, may occaſion infinite doubt; for which is to be deemed the beſt part of the court, and of the writers? each party, doubtleſs, thinks itſelf the beſt. F. Buffier, therefore, very juſtly, inſtead of the beſt part, ſubſtitutes the greateſt part, which brings the matter nearer to a certainty: the moſt numerous part being ſomething fixed and palpable; whereas the moſt ſound part may be inſenſible, or arbitrary. There is found a conſtant reſemblance between the genius or natural complexion of each people, and the *language* they ſpeak. Thus the Greeks, a polite, but voluptuous nation, had a *language* perfectly ſuitable, full of delicacy and ſweetneſs. The Romans, who ſeemed only born to command, had a *language* noble, nervous, and auguſt; and their deſcendants, the Italians, are ſunk into ſoftneſs and effeminacy, which is as viſible in their *language* as in their manners. The *language* of the Spaniards is full of that gravity and haughtineſs of air, which make the diſtinguiſhing character of that people. The French, who have great vivacity, have a *language* that runs extremely briſk and lively. And the Engliſh, who are naturally blunt, thoughtful, and of few words, have a *language* more conciſe and ſententious, though far from being deficient in reſpect of copiouſneſs.

As *to the origin* of *ſpeech* or *language*, learned writers have adopted different opinions. Diodorus Siculus, lib. i. and Vitruvius, Archit. lib. ii. cap. 21. imagined, that men at firſt lived like beaſts in woods and caves, forming only ſtrange and uncouth noiſes, until their fears cauſed them to aſſociate together; and that, upon becoming acquainted with one another, they came to correſpond about things, firſt by ſigns, then to make names for them, and in time to frame and perfect a *language*; and that the *languages* of the world are different, becauſe different companies of men aſſociating together in various places, would form different ſounds or names for things, and thereby cauſe a different ſpeech or *language*. But as this conjecture contradicts the Moſaic hiſtory, other writers have ſuppoſed that the primitive *language* was formed by God himſelf, and ſupernaturally communicated to Adam. Moſt of the Jews adopt this opinion; and ſome of them apprehend that this was done by acquainting him in general with the roots and fundamental parts of the tongue only; but others imagine, that the Creator revealed to him the whole extent and propriety of the *language*, even the letters, points, and accents. Onkelos paraphraſes the words, which we render, *man was made a living ſoul*, man was made a ſpeaking animal. Some have carried this opinion ſo far as not only to think that Adam had a particular *language* as innate to him as a power of thinking or of reaſoning, but that all his deſcendants have it too, and that they would of themſelves ſpeak this *language*. Plato, in Cratyl. p. 383. p. 425. ed. Serrani, ſeems to maintain, that the firſt *language* was of divine formation; for he ſuppoſes that the names of things had originally ſome natural connexion or congruity with the things themſelves, and that the firſt names muſt have been juſtly impoſed, becauſe they were impoſed by the gods. But there is another opinion, which ſeems more reaſonable in itſelf, and more conſonant to the Moſaic hiſtory, viz. that ſpeech was the immediate gift of God to the firſt man; not that God really inſpired him with any diſtinct or primitive *language*, but that he made him ſenſible of the power with which he was endued, of forming articulate ſounds, and the uſe he might make of them as ſigns of his ideas, and leaving the arbitrary impoſition of them to Adam himſelf. This ſeems to be intimated Gen. ii. 19. So that ſpeech was attained by gradual invention of arbitrary ſounds, to denote firſt the moſt obvious things, and afterwards the leſs obvious, as they occurred. However, though it does not ſeem impoſſible, that mankind might of themſelves, in proceſs of time, form a perfect *language*; yet it is not eaſily conceivable that Adam could attain the uſe of ſpeech ſo ſoon as is repreſented to us by Moſes, without divine aſſiſtance. Shuckford's Connect. vol. i. book ii. p. 111. See LETTERS.

There is an affinity between dialects of the ſame mother-tongue, but none between mother-tongues themſelves, as being ſuppoſed of entirely different origin.

Grammarians and etymologiſts find many affinities between *languages*, and imagine many more. Hebrew being the reputed ſource of all others, there are few *languages* but what have been obſerved to bear a near affinity to it, not only the Greek, the Latin, the Runic, Saxon, Swediſh, German, and Welſh, but even the Chineſe, and the Lapponic. Vide Thomaſſ. Meth. Etud. Gram. liv. i. chap. 7. Pref. p. 107. Id. liv. iii. chap. 9. ſeq. Rowl. Mon. Antiq. p. 275.

Beſides the conformity between words of different *languages*, grammarians conſider the affinity between words of the ſame *language* formed from each other, e. gr. adjectives from ſubſtantives, participles from verbs, &c. Hence the claſs of paronyma, or conjugates.

LANGUAGES, *the diverſity of*, is generally allowed to have taken its riſe from the confuſion at the building of the tower of Babel. See CONFUSION *of tongues*, and DISPERSION *of mankind*.

As to *the point of antiquity and priority* among *languages*, that has been extremely controverted. Herodotus tells us, that in the diſpute between the Egyptians and Phrygians about the antiquity of their *languages*, Pſammetichus, king of Egypt, ordered two children to be brought up, with expreſs prohibition not to have one word pronounced before them, but to leave nature to ſpeak of herſelf; and the firſt word they ſpoke happened to be *beccos*, which, in the Phrygian *language*, ſignifies *bread*. The Egyptians, however, were not convinced with this proof. The Arabs diſpute the point of antiquity with the Hebrews; but the Jews, jealous, even to exceſs, of the honour of their nation, poſitively inſiſt on it, that the Hebrew tongue, ſuch as it is found in the Holy Scriptures, is the primitive *language*, and that ſpoken by the firſt man.

Several Chriſtian writers, as Chryſoſtom, Auſtin, Origen, and Jerom, among the ancients; and among the moderns, Bochart, Heidegger, Selden, and Buxtorf, agree with the Jews in maintaining the antiquity of the Hebrew *language*. Some have urged the great ſimplicity of this *language*, when traced to what was probably its original form; alledging that it comprizes few names and radical words, and that its words, ſtripped of their appendages, are monoſyllables. Thus, ſays Dr. Sharpe, it is very remarkable, if not peculiar to the Hebrew, that ſcarce any theme or root exceeds three letters; which, producing eleven thouſand one hundred and fifty-four primitives, are the moſt natural, and proper number of letters. Hence it ſeems to follow, that the Hebrew, and ſuch other *languages* as abound with primitive words, not exceeding three letters in each, approach neareſt to, or have the moſt of original *language*. Origin of Languages, &c. p. 14.

But the chief argument is taken from the names of perſons mentioned before the confuſion of Babel, which, it is ſaid, are plainly of Hebrew derivation, and bear a juſt relation to the words from which they are derived: as אדם, *Adam*, from אדמה, *adamah, the ground*, becauſe God formed him out of the earth; חוה, *Eve*, or *Havah*, from חיה, *vixit*, becauſe ſhe was the mother of all living; קין, *Cain*, from קנה, *acquiſivit*, becauſe his mother obtained him from the Lord, &c. But the etymology of theſe names is loſt, if they are taken in any other language beſides the original one in which they were given. Nevertheleſs Grotius, in Gen. xi. 1. & Not. ad lib. i. De Verit. Rel. Chriſt. and others, have replied, that we have no certainty that the names uſed by Moſes were the original names, and not tranſlated by him from the primitive tongue into the Hebrew, or at leaſt altered, in order to accommodate what he wrote to the underſtandings of the Jews. Thus we find, in fact, that he altered his own name, which was *Mouſe*, of Egyptian original, and compoſed of two Coptic or old Egyptian words, *moſe, water*, and *ſe*, to *preſerve*, into משה, from משה, *to draw out*.

Beſides, if the names given by Moſes, were the true original names, ſome of them might accidentally admit of a Hebrew derivation; ſeveral of them are more pertinently derived from ſome other of the oriental tongues than from the Hebrew, as Abel from the Syriac יהב איל, *ihab el*, q. d. *Deus dedit*, and Babel from the Syriac *balbel, to confound*. Moreover, etymological alluſions may be accidental; and ſome of thoſe mentioned by Moſes may be deduced from other tongues as well as the Hebrew. Thus the Latin name for man, *homo*, is derived from *humus*, the ground. Le Clerk farther advances, that ſeveral of theſe names were not the proper names, by which the perſons were called from their birth, but cognomina or ſurnames, which were given to them afterwards, on account of ſomething remarkable in their lives.

Of all the oriental *languages*, except the Hebrew, the Syriac has had the greater number of advocates, eſpecially among the eaſtern authors. They have alledged, that a dialect of this *language* was ſpoken in Meſopotamia, Chaldæa, and Aſſyria, where mankind firſt ſettled after the flood, and where, it is preſumed, the *language* of Noah and his ſons remained: to which argument they add that the names of perſons and places mentioned by Moſes are eaſily derived from that *language*. Beſides thoſe kindred *languages*, which are commonly called the oriental tongues, the Armenian, the Celtic, and the COPHTIC, pleading the antiquity of their nations, and the Armenians, that the ark firſt reſted in their country, the GREEK, on account of its great extent and copiouſneſs, the TEUTONIC, from which ſome have pretended to derive even the Hebrew itſelf, and the CHINESE, have aſpired to preference, in point of antiquity.

The pretenſions of the Chineſe in particular, have been ſupported not only from the great antiquity of that nation, their early acquaintance with arts and ſciences, and their having preſerved themſelves ſo many ages from any conſiderable mixture or intercourſe with other nations; but alſo from the ſingularity of the tongue itſelf, which conſiſts of few words, all monoſyllables, and is moſt ſimple in its conſtruction, having no variety of declenſions, conjugations, or grammatical rules. Beſides, it is urged, that the Chineſe are the poſterity of Noah, and that Fohi, the firſt king of China, was Noah.

Mr. Webb, an ingenious writer in the reign of Charles II. ſtrenuouſly maintains, that this is the only original *language*, and that they now talk in China, the *language* of Paradiſe.

Others maintain, that the *language* ſpoken by Adam is loſt; and that the Hebrew, Chaldee, and Arabic, are only dialects of the original tongue. So far are they from giving the priority to the Hebrew, that they maintain Abraham ſpoke Chaldee before he paſſed the Euphrates; and that he firſt learned the Hebrew in the land of Canaan; ſo that this was not a ſpecial *language* conſecrated to the people of God, but was originally the *language* of the Canaanites.

M. Le Clerc is of opinion, the Hebrew is far inferior to the Greek both in copiouſneſs, elegance, and perſpicuity; it is dry, and deſtitute of ornaments, inſomuch that, wanting expreſſions to vary the phraſe, the ſame periods are perpetually returning. The rabbins, converting its poverty into an excellence, ſay, it is ſo pure and chaſte, that it has no proper names for the parts of generation, nor for thoſe by which the excrements are diſcharged. See HEBREW.

The Arabic is held the moſt copious of all *languages*. See the Preliminary Diſcourſe to Sale's Koran.

LANGUAGES are in general divided into *original* or *mother-tongues*; as the HEBREW and ARABIC, in the Eaſt; the TEUTONIC and SCLAVONIC, in the Weſt.

LANGUAGES, *ſecondary*, or *derivative*, which are thoſe formed out of a mixture of ſeveral others, as Latin, French, &c.

Kircher will have the COPHTIC a mother tongue, independent of all others.

Du Jon maintains the GOTHIC a primitive language, and the mother of all the Teutonic tongues; that is, of all thoſe ſpoken in the North.

Some add the Baſque, ro Biſcayan, andBas Briton, to the number of mother-tongues, imagining them to have been thoſe of the ancient Celtæ, or Gauls.

LANGUAGES, *learned* or *dead*, are thoſe which only ſubſiſt in books, and which muſt be learned by the rules of grammar; as the GREEK, HEBREW, SYRIAC, and CHALDEE.

Raimond Lully ſolicited the eſtabliſhment of the ſtudy of the learned *languages* a long time, in the thirteenth and fourteenth centuries. At length, in the year 1312, pope Clement, and the council of Vienne, appointed, that in the court of Rome, and in the univerſities of Paris, Oxford, Bologna, and Salamanca, there ſhould be inſtituted profeſſors of each, who ſhould have ſalaries from the reſpective courts. The monks, however, vigorouſly oppoſed the ſpreading of theſe ſtudies; and with ſo much ſucceſs, that Eraſmus tells us, in his time, *Græce noſſe ſuſpectum, Hebraice prope hæreticum.*

LANGUAGES, *living*, are thoſe ſtill ſpoken in ſome country or other; and which may be learned by converſation. The moſt popular among theſe are the FRENCH, ITALIAN, SPANISH, and ENGLISH.

The Spaniards ſeem to place the nobleneſs and gravity of their *language* in the number of ſyllables, and the ſwelling of words; and ſpeak leſs to be underſtood, than to be admired. Their terms are ſonorous; their expreſſions haughty; pomp and oſtentation run through all they ſay; their *language* cannot paint a thought to the life; it always magnifies it; frequently diſtorts it; and does nothing if it does not exceed nature.

The Italian tongue does not ſwell up things to that degree, but it adorns and embelliſhes them more; yet theſe ornaments and embelliſhments are not real beauties. The Italian expreſſions, thus rich and brilliant, are like thoſe faces covered with patch and paint, which make a fine ſhew, but the finery is all deceit.

The French *language* (as ſome of their authors expreſs themſelves) is ſimple, without lowneſs; bold, without indecency; elegant and florid, without affectation; harmonious, without ſwelling; majeſtic, without pride; delicate, without ſoftneſs, ; and ſtrong, without roughneſs. Though, as to the points of ſtrength and majeſty, the French muſt give way to the Engliſh; which in theſe, as well as in copiouſneſs, exceeds moſt of the living *languages*; as far as it is inferior to ſome of them in ſmoothneſs and delicacy.

Of all the modern *languages*, the French is generally allowed to be the moſt clear, and fit for philoſophical and critical ſubjects; the chaſteſt and moſt reſerved in its diction; the moſt judicious and ſevere in its ornaments. Of all others, the Engliſh is ſaid to be the moſt honeſt, open, and undeſigning. With all its ſublimity, it is gay and pleaſant on occaſion; but its gaiety is ſtill moderated and reſtrained by good ſenſe; it hates exceſſive ornaments; and, for the greater ſimplicity, would almoſt chooſe as ſome ſay of the French, to go naked; it never dreſſes more than decorum and neceſſity require.

The Engliſh *language* is derived from ſo many and ſuch different ſources, that, on this account, it is deficient in regularity and analogy. Yet we have this advantage to compenſate the defect, that what we want in elegance, we gain in copiouſneſs, in which laſt reſpect few *languages* will be found ſuperior to our own.

Ennius and Cecrops are celebrated for their knowledge of many *languages*. Mithridates, king of Pontus, it is ſaid, underſtood twenty-two tongues, which was the number of different people over whom he commanded; and thoſe *languages* he knew ſo well, that he was able to harangue each of his people in their own tongue. It was a ſaying of Charles the Fifth, "That ſo many *languages* "as a man underſtands, ſo many times he is a man." Sultan Soliman's interpreter ſpoke perfectly well ſeventeen different *languages*. But among the moderns, none has been more remarkable in this way than Poſtellus; who, beſides a perfect knowledge of all the dead *languages*, was ſo well acquainted with the living, that it is ſaid he could have made the tour of the globe, without the uſe of an interpreter.

Bibliander has written of the analogy and proportion of *languages* and letters, De Ratione Communi Linguarum, in 1518. Geſner, of the Difference of *Languages*, in 1572. Lazius publiſhed an Introduction to the Learning of the politer *Languages*, in a common Method, in 1548. Megiſſier, a ſcheme of forty different *languages*, and different dialects, ſpecimens of each whereof he gives in the Lord's prayer, in 1593. De Recoles, in his Addition to the World of Daviti, has publiſhed the Pater-noſter in all the *languages* ſpoken among Chriſtians; and Mr. Chamberlayne has propoſed to do the ſame in a hundred *languages*, a ſpecimen of which has been already publiſhed. Albericus Gentilis wrote of the mixture of *languages*, in 1633. And father Reignier's Diſcourſe on Etymologies, is a work of the ſame kind. In 1613, Durer publiſhed a hiſtory of all the *languages* in the univerſe. Guichart has a treatiſe of the etymological harmony of *languages*, publiſhed in 1619. Brerewood has given us curious inquiries into the diverſities of *languages* and religions, publiſhed in 1635.

LANGUAGE, *philoſophical*. See CHARACTERS, *univerſal*.

LANGUAGE is alſo uſed, in the order of Malta, for *nation*.

The knights of Malta are divided into eight *languages*: three whereof are for France; viz. the *language* of Provence, of Auvergne, and of France; two for Spain, thoſe of Caſtile and Arragon; the other three are the *languages* of Italy, England, and Germany.

Each of theſe *languages* has its chief, who preſides in aſſemblies of the *language* to which he belongs. See MALTA.

LANGUAGE, *Frank*. See FRANK.

LANGUAGE, *Helleniſtic*. See HELLENISTIC.

LANGUED, *langue*, in *Heraldry*, is applied to ſuch animals whoſe tongues appear out of their mouths: being of a colour different from that of the body of the animal.

LANGUENTE, in the *Italian Muſic*, is uſed to denote a languiſhing and ſoft manner of ſinging.

LANGUOR, in *Medicine*, ſignifies a *faintneſs*, or relaxation of the members, ariſing either from a want or decay of ſpirits, through indigeſtion, or too much exerciſe; or from an additional weight of fluids, cauſed by a diminution of the excretion by the common diſcharges.

LANIARDS. See LANNIERS.

LANIGEROUS, any thing that bears WOOL. Hence,

LANIGEROUS, or **LANUGINOUS** *trees*, among *Herbaliſts*, are thoſe trees that bear a woolly downy ſubſtance; as, the black, white, and trembling poplars, oſiers, and willows of all ſorts.

LANIS *de creſcentia Walliæ traducendis abſque cuſtuma, &c.* an ancient writ that lies to the cuſtomer of a port, to permit one to paſs wool without paying cuſtom, he having paid it before in Wales.

LANISTA, in *Antiquity*, is ſometimes uſed to ſignify an *executioner*, but more frequently for a maſter gladiator, who taught the uſe of arms, and had always people under them ready to exhibit ſhews of that kind. For which purpoſe they either purchaſed gladiators, or educated children that had been expoſed, in that art.

LANISTA was alſo uſed to denote one who taught gamecocks to fight.

LANIUS. See BUTCHER *Bird* and FLUSHER.

LANNARIUS, in *Ornithology*, the name of a bird of the long-winged hawk kind; the *falco lannarius* of Linnæus, called in Engliſh the *lanner*, and the male the *lanneret*. Its beak and legs are blue; and its head and neck variegated with large ſtreaks of black and white; its back, wings, and tail, are not variegated, unleſs with a few ſmall white ſpots; and its wings, when extended, are ſeen ſpeckled underneath with ſmall round white ſpots; its neck is very ſhort, as are alſo its legs. It is common in France, and abides the whole year there, and is very docile, and ſerves to all the purpoſes of hawking. In Italy the ſpecies ſeems ſomething different, having much of a yellowiſh brown about the ſhoulders, and being indocile, and of no uſe in ſporting. Ray. See HAWK. This ſpecies breeds in Ireland, and is thus deſcribed by Mr. Pennant: it is leſs than the buzzard; the ear is of a pale greeniſh blue; the crown of the head of a brown and yellow clay colour; above each eye to the hind part of the head paſſes a broad white line; and beneath each, a black mark pointing down; the throat white; the breaſt tinged with dull yellow, and marked with brown ſpots pointing downwards; the thighs and vent ſpotted in the ſame manner; the back and coverts of the wings deep brown, edged with a paler; quill-feathers duſky; the inner webs marked with oval ruſt-coloured ſpots; and the tail ſpotted like the wings. Brit. Zool. vol. i. p. 182.

LANNIERS, or **LANIARDS**, in a *Ship*, are ſmall ropes reeved into the dead-mens-eyes of all the ſhrouds and chains. Their uſe is to ſlacken, or ſet taught the ſhrouds. The ſtays alſo of all maſts are ſet taught by *lanniers*. That rope, which faſtens the ſtopper of the halliards to them, is called alſo a *lannier*: and the term is generally applied to any ſhort piece of cord or line, faſtened to ſeveral machines in a ſhip, and ſerving to ſecure them in a particular place, or to manage them more conveniently;

ly; ſuch are the *laniards* of the gun-ports, the *laniard* of the buoy, of the cat-hook, &c.

LANSPESSADE, in *Military Affairs*. See ANSPESSADE.

LANSQUENET is the name of a game at cards.

LANTANA, in *Botany*, the *American viburnum*, a genus of the *didynamia angioſpermia* claſs. Its characters are theſe: the empalement of the flower is cut into four ſegments; the flower is of an irregular ſhape, having a cylindrical tube ſpread open at the bottom, where it is divided into five parts; in the centre is ſituated the germen, attended by four ſtamina, two being longer than the other; the germen changes to a roundiſh fruit, opening into two cells, incloſing a roundiſh ſeed. There are nine ſpecies.

LANTER-LOO, or LOO, is the name of a common game at cards.

LANTERN, or LANTHORN, a cover for a luminary, made of ſome tranſparent matter; ſerving to tranſmit the light, and, at the ſame time, to ſcreen it from the wind and rain.

The word is derived from the French *lanterne*; and that from the Latin *laterna*, of *lateo*, *I am hidden*; *eo quod lucem habeat interius clauſam*, becauſe the light is hidden within, ſay Iſidore and Lambin. But, according to Pezron, *laterna* comes from the Celtic *latern*, and according to Salmaſius, *lantern* comes from *lato*, of *fero*, becauſe it bears a lamp, or a light.

Epictetus's *lantern* is ſaid to have been ſold for three thouſand drachms; that of Diogenes was held in great veneration among the ancients; and that of Judas is ſtill preſerved in the treaſury of St. Denys, as a very curious piece of antiquity.

Lanterns are made of glaſs, horn, paper, &c. Formerly they were made of the horn of a wild bull, called *urus*; which, when cut into thin laminæ, Pliny tells us, was very tranſparent. Thoſe of horn were firſt introduced into England by king Alfred, about the year 887, in order to preſerve his candle time-meaſurers from the wind. See LENS. And Hiſt. Com. vol. i. p. 45.

LANTERN, *dark*, is a *lantern* with only one opening or light, which, too, may be cloſed up, when the light is to be entirely hid; and may be preſented to the perſon one would ſee, without being perceived one's ſelf.

The ancients had their dark *lanterns*, but they differed from our's: they were covered with four ſkins, one on each ſide, or light, three whereof were black, and only the fourth tranſparent. Caſaubon, who gives us the deſcription, took it from a manuſcript of Julius Frontinus. Theſe were principally uſed in their armies, when they were to march privately off from their enemies in the night-time.

LANTERNS are uſed at ſieges in the night-time, upon the batteries; but theſe muſt be blind or dark *lanterns*. There is always great proviſion of them in all ſtorehouſes.

Lanterns are alſo uſed in a ſhip, particularly for the purpoſe of directing the courſe of other ſhips in a fleet or convoy: ſuch are the poop and top-*lanterns*, &c.

LANTERNS, *feaſt of*, in China, is a celebrated feaſt held on the fifteenth day of the firſt month; and is ſo called from the great number of *lanterns* hung out of the houſes, and in the ſtreets; inſomuch that it rather appears a fit of madneſs, than of feaſting. On this day are expoſed *lanterns* of all prices, whereof ſome are ſaid to coſt two thouſand crowns. Some of their grandees retrench ſomewhat every day out of their table, out of their dreſs, equipage, &c. to appear the more magnificent in *lanterns*. They are adorned with gilding, ſculpture, painting, japanning, &c. and as to their ſize, it is extravagant; ſome are from twenty-five to thirty feet diameter; they repreſent halls and chambers; and two or three ſuch machines together would make handſome houſes; ſo that in China they are able to eat, lodge, receive viſits, have balls, and act plays, in a *lantern*.

To illumine them, they ſhould have bonfires; but as that would be inconvenient, they content themſelves with lighting up in them a great number of torches or lamps, which at a diſtance have a beautiful effect. In theſe they exhibit various kinds of ſhews to divert the people.

Beſides theſe enormous *lanterns*, there is a multitude of other ſmaller: theſe uſually conſiſt of ſix faces or lights, each about four feet high, and one and a half broad, framed in wood finely gilt and adorned; over theſe they ſtretch a fine tranſparent ſilk, curiouſly painted with flowers, trees, and ſometimes human figures: the painting is very extraordinary, and the colours extremely bright; and when their torches are lighted, they appear highly beautiful and ſurpriſing.

LANTERN, in *Architecture*, denotes a kind of little DOME raiſed over a large one, or over the roof of a building, to give light, and to ſerve for an acroter to finiſh the building.

LANTERN is alſo uſed for a ſquare cage of timber, with glaſs in it, placed over the ridge of a corridor, or a gallery between two rows of ſhops to illuminate them.

LANTERN, *magic*, in *Optics*, the name of a machine, which, in the dark, repreſents various images and ſpectres on a wall, or other white ſurface, ſo odd and ſurpriſing, that thoſe who are not in the ſecret, think them the effect of MAGIC.

LANTERN-*fiſh*, the Engliſh name of a fiſh of the ſoal-kind, but ſmaller and ſmoother to the touch, called in Latin *amogloſſus*.

LANTERN-*fly*, in *Natural Hiſtory*, the name of a very ſingular kind of inſect produced in the Weſt Indies, and carrying a ſtrong light with it in the night. The ſtructure of the trunk in this inſect is of the ſame kind with that of the cicada; and as it wants the power of making the noiſe for which the cicada is ſo famous, it belongs, according to Mr. Reaumur's diſtinctions, to that ſpecies of inſect called the *procigale*, or *procicada*. *Tab. Inſects. fig.* 2. The glow-worm, and the luminous beetles, with all the other luminous inſects we are acquainted with in this part of the world, diffuſe their light from a part which is near the extremity of the body, and under the belly, but the *lantern-fly* gives it from its head. It differs alſo greatly in the degree of light; for this, in all the inſects we are acquainted with, is very feeble; whereas, in this fly it is ſo ſtrong, that Mrs. Merian, who is the firſt that well deſcribed it, ſays ſhe could read a ſmall print in a dark night by the light that one of them gave. The head of this creature, ſtrictly ſpeaking, is very ſhort, not exceeding the length of one of the rings of the body, if it be meaſured from its joining with the corcelet to its joining with the *lantern*; but if that part be accounted a portion of the head, then the head is equal in length to the whole body. This *lantern* is wider than it is deep, or thick, and has near its origin a large protuberance, which gives it a bunched or humped look. There are ſeveral tubercles and lines on it of a reddiſh colour. The ground colour is an olive brown, and underneath it has one large rib running all the way along it, from end to end, and dividing it into two, and by the ſides of that there are ſome others. Theſe are all reddiſh, and thoſe neareſt the edges have ſmall rows of ſpines running along them. Over each of the eyes there is a round granulated prominence, which ſeems to have been a collection of ſmaller eyes; and if ſo, the animal is ſupplied with the organs of viſion in a different manner from all other known creatures. But there requires an examination of the creature on the ſpot, and while alive, in order to find out this. The upper pair of wings are not perfectly tranſparent, they are dotted with white in ſome places, and are variegated near their origin with ſeveral blackiſh ſpots. The under pair are more tranſparent than the upper; they are much ſhorter, and are broader than the others: theſe have each a large and beautiful round ſpot near the extremity, reſembling that on the wing of the peacock-butterfly. The colours of the circles of theſe eyes are brown and olive; the laſt colour very bright and clear, the other very duſky and obſcure. The ſpots are ſo large, that they appear very beautiful. Reaumur, Hiſt. Inſ. vol. ix. p. 247.

LANTERNISTS, a name aſſumed by the academicians of Thoulouſe.

LANUGINOUS. See LANIGEROUS.

LANUGO, in *Botany*, *down*; that ſoft, hairy, or woolly covering, which grows on leaves, ſtalks, or fruits, of divers plants.

Such is that found on the leaves of the roſe-campion, and on the fruit of the peach-tree.

LANYARDS, on *ſhip board*. See LANNIERS.

LAOCOON, in the *Hiſtory of the Arts*, is a celebrated monument of Greek ſculpture, executed in marble by Polydorus, Athenodorus, and Ageſander, the three famous artiſts of Rhodes. This remain of antiquity was found at Rome in the ruins of the palace of Titus, in the beginning of the ſixteenth century, under the pontificate of Julius II. and ſince depoſited in the Farneſe palace. *Laocoon*, the prieſt of Apollo and Neptune, is here repreſented with his two ſons, with two hideous ſerpents clinging round his body, gnawing it, and injecting their poiſon: Virgil has given us the following deſcription of the fact:

Serpens amplexus uterque
Implicat & miſeros morſu depaſcitur artus:
Corripiunt, ſpiriſque ligant ingentibus, & jam
Bis medium amplexit, bis collo ſquamea circum
Terga dati, ſuperant capite, & cervicibus altis.

This ſtatue exhibits the moſt aſtoniſhing dignity and tranquility of mind in the midſt of the moſt excruciating torments: Pliny ſays of it, that it is, *opus omnibus, picturæ & ſtatuariæ artis, preferendum.* Lib. xxxvi. c. 5.

LAPACTICS, from λαπαζω, *I evacuate*, a term uſed by the old writers in medicine to expreſs ſuch things as purged by ſtool, or at leaſt gently looſened the belly. It was ſometimes applied to the cathartic medicines, and ſometimes to thoſe foods which were of this tendency.

LAPARA, Λαπαρα, a word uſed by ſome writers to expreſs the flanks, or that part which is ſituated on each ſide of the body, between the ſpurious ribs and the hips.

LAPATHUM, in *Botany*. See Dock.

LAP-DOG, called alſo *melitæus* or *fotor*, and by Dr. Caius, in his Syſtem of Britiſh dogs, the ſpaniel gentle or comforter, is a ſpecies of the moſt generous kind of dogs. See Dog.

Mr. Pennant obſerves, that the Malteſe little dogs were as much eſteemed by the fine ladies of paſt times as thoſe of Bologna are among the moderns. Old Hollingſhed is ridiculouſly ſevere on the fair of his days for their exceſſive paſſion for theſe little animals; which is ſufficient to prove it was in his time, viz. in the reign of queen Elizabeth, a novelty.

LAPHIATI, in *Zoology*, the name by which the people of Lemnos call a ſpecies of ſerpent, ſuppoſed by Bellonius to be the ſame with the elaps, or *elaphis*, of the ancients.

LAPIDARY, *Lapidarius*, an artificer, who cuts precious ſtones.

The art of cutting precious ſtones is very ancient; but, like other arts, its original was very imperfect. The French have ſucceeded in it the beſt; and the *lapidaries* of Paris, who have been a corporation ſince the year 1290, have carried it, eſpecially in cutting of diamonds called *brilliants*, to a very great perfection, but not ſuperior to that of the Engliſh.

There are various machines uſed in the cutting of precious ſtones, according to the quality of the matter to be cut: the diamond, which is extremely hard, is cut and formed on a wheel of ſoft ſteel, turned by a kind of mill, with diamond duſt tempered in oil of olives; and this ſerves to poliſh them as well as to cut them.

Oriental rubies, ſapphires, and topazes, are cut and formed on a copper wheel, with oil of olives, and diamond duſt: they are afterwards poliſhed on another copper wheel with tripoli and water.

Emeralds, hyacinths, amethyſts, garnets, agats, and other ſtones leſs hard, are cut on a leaden wheel, with ſmalt and water, and poliſhed on a tin wheel with tripoli.

Turquois, of the old and new rock, lapis giraſol, and opal, are cut and poliſhed on a wooden wheel with tripoli.

Lapidary is alſo uſed for a virtuoſo ſkilled in the nature, kinds, &c. of precious ſtones; or a merchant who deals in them.

Lapidary *ſtyle*, denotes the ſtyle proper for monumental or other inſcriptions.

This is a kind of medium between proſe and verſe; the jejune and the brilliant are here equally to be avoided. Cicero has preſcribed the rules of it: *Accedat oportet oratio varia, vehemens, plena ſpiritus. Omnium ſententiarum gravitate, omnium verborum ponderibus, eſt utendum.*

The *lapidary ſtyle*, which was loſt with the ancient monuments, has been retrieved, at the beginning of this age, by count Emanuel Teſoro: it is now uſed various ways at the beginning of books; and even epiſtles dedicatory are compoſed in it, of which we have no example among the ancients.

LAPIDESCENT, any thing which has the faculty of petrifying, or turning bodies to a ſtony nature.

Naturaliſts ſpeak of a *lapideſcent* principle, a *lapideſcent* ſpirit, a *lapideſcent* juice, &c.

Lapidescent *waters*, or *ſprings*, are ſuch as, having ſtony particles diſſolved and ſwimming in them, do depoſit the ſame on wood, leaves, and other bodies immerged therein; which, being incruſted herewith, are commonly miſtaken for petrifactions.

LAPIDIFICATION, in *Chemiſtry*, an operation whereby any ſubſtance is converted into a ſort of ſtone.

This is done by diſſolving a metal, for inſtance, in a corroſive ſpirit, or menſtruum; and afterwards reducing that diſſolution into the conſiſtence of a ſtone.

Lapidification is practiſed in metals, fixed ſalts, and ſalts of plants.

The term is alſo uſed for the making of artificial ſtones.

LAPIS, in the general ſenſe. See Stone.

Lapis *Arabicus*, in the *Natural Hiſtory of the Ancients*, the name of a ſtone of a fine white colour, reſembling the pureſt ivory; and which, though naturally of a firm, ſolid, and compact texture, yet, when burnt, became light, porous, and ſpungy, and aſſumed the figure and appearance of a pumice; and was uſed like it in the compoſitions of the ancient phyſicians for cleaning the teeth.

Lapis *æroſus*, in *Natural Hiſtory*, a name given to ſeveral ſorts of ſtones, and other foſſils, which had lain in the neighbourhood of copper-mines, and been impregnated with particles of copper, though not in a ſufficient degree, to be thought worthy the name of *copper-ores*. See Pyrites.

The ſame ſort of ſtones were alſo ſometimes called *chalcites*, which made ſome confuſion, as it gave occaſion to confound them with the true chalcitis.

Lapis *aſbeſtos*. See Asbestos.

Lapis *ætites*. See Ætites.

Lapis *Armenus*. See Armenian *Stone*.

Lapis *Aſſius*, in the *Natural Hiſtory of the Ancients*, the name of a ſtone, called alſo ſarcophagus, from its power of conſuming fleſh.

It was a ſtone much uſed among the Greeks in their ſepultures, and is recorded to have always perfectly conſumed the fleſh of human bodies, buried in it, in forty days. This property it was much famed for, and all the ancient naturaliſts mention it. There was another very ſingular quality alſo in it, but whether in all, or only in ſome peculiar pieces in it, is not known; that is, its turning into ſtone any thing that was put into veſſels made of it. This is recorded only by Mutianus and Theophraſtus, except that Pliny has copied it from theſe authors; and ſome of the later writers on theſe ſubjects from him.

This effect might probably be a kind of incruſtation, formed on ſubſtances incloſed in veſſels made of this ſtone, by water paſſing through its pores, diſlodging from the common maſs of the ſtone and carrying with it particles of ſuch ſpar as it contained; and afterwards falling in repeated drops on whatever lay in its way, it might again depoſit them in ſuch ſubſtances, in form of incruſtations.

The place from whence the ancients tell us they had this ſtone was Aſſos, a city in Lycia, in the neighbourhood of which it was dug: and De Boot informs us, that in that country, and in ſome parts of the Eaſt, there are alſo ſtones of this kind, which, if tied to the bodies of living perſons, would in the ſame manner conſume their fleſh. Hill's Notes on Theophraſtus, p. 14.

Lapis *atramentarius*, the *copper-ſtone*. See Pyrites.

Lapis *bezoardicus*. See Bezoar.

Lapis *Bononienſis*, the *Bolonian ſtone*, a peculiar ſpecies of ſtone found in Bolonia. See Bononian *ſtone*.

The whole art of preparing this ſtone, ſo as to make it ſhine in the dark, is deſcribed at large in Hook's Philoſophical Collections, by Sir Marc Antonio Cellio, and in a book of the ſame author, publiſhed at Rome in 1680, expreſsly on that ſubject.

The *ſtone* is found moſt eaſily after rain; when the earth being waſhed away, the ſeveral maſſes of it appear as bright as burniſhed ſilver, or with the glittering of talc, reſembling the gloſs of a looking-glaſs. Il Foſforo de Marc Anton. Cellio.

The *ſtone* is of no certain figure, but is ſometimes round, ſometimes oblong and cylindric, ſometimes lenticular; the laſt kind uſually proves the beſt of all, as being more ſhining and tranſparent. They are uſually as big as an orange, and ſometimes are found of five pounds weight, and are very light, conſidering their bulk. They are of various colours; ſome are aſh-coloured, ſome of a ſky-blue, ſome of a ferruginous colour, others yellow, others greyiſh white, and ſome almoſt perfectly white. The beſt for uſe are the ſky-coloured and the white. When this *ſtone* is prepared, it affords an effloreſcence, in which lies its principal virtue of receiving light; which it does either from the ſun, the moon, the common day-light, or a flame, but in different degrees. When carried into the dark, it appears exactly like a burning coal, and the light it gives is ſufficient to read by, if the letters be placed near the *ſtone*. It does not retain its light long, but requires often renewing; and when well prepared, its virtues will laſt five or ſix years, but ſeldom longer. The way of ſeeing it to the greateſt advantage, is after the eye has been kept for ſome time in a dark room, and the ſtone is brought in there immediately from being held in the ſun.

The beſt method of preparing it is this: make a cylindric furnace of iron or copper-plates, ſeven inches in diameter, and as many in height. Line the inſide of it with a ſtrong lute; ſo that the inſide may be ſix inches wide in the clear hollow; at the top of this there are to be made four notches of 2½ inches deep, and 1½ inch wide; to this make ſuch a cylindrical part of the ſame diameter, but a little higher, and make at the bottom two aſh-holes, or air-holes, big enough to put in one's hand. Line this, as the other, with good lute, and give it a bottom of lute, that it may the more ſtrongly reflect the heat; and make a cover for the top, lining it in the ſame manner with the lute: into this furnace put an iron-wire grate near the bottom, to ſuſtain the coals, and freely admit the air. On this grate lay ſome pieces of lighted charcoal, and on theſe put others not lighted, all broken to the ſize of a walnut, or thereabouts. Some of the ſtones muſt be powdered, and thoſe which are to be calcined muſt be dipped in ſtrong aqua vitæ, and while wet rolled in this powder, or the powder itſelf may be made up into thin cakes with mucilage of gum tragacanth. Theſe ſtones, thus covered, or the cakes, muſt be laid upon the bed of charcoal cloſe to one another, and another bed of charcoal, in the like ſmall pieces, muſt be laid over them up to the top of the furnace; the cover of the furnace is then to be put on, and the fire lighted. When the charcoal is all burnt away, and the whole is cold, take out the ſtones, and taking out the cruſt from them, wrap them up in ſilk or cotton, and keep them cloſe in a box for uſe.

The cruſt which is taken off from the ſtones is to be preſerved; it ſhines as well as the ſtone, and is to be beat to powder, and rubbed over any thing that is to be made to ſhine; the thing being firſt daubed over with the white of an egg: this will make it ſtick on, and the whole will ſhine like the ſtone.

The furnace here deſcribed is not abſolutely neceſſary to the ſucceſs of the operation; but it is convenient to know the quantity of charcoal neceſſary to give the ſhining quality to the ſtone, ſince an exceſs of heat deſtroys it, and too ſmall a degree is not ſufficient to raiſe it. See Light and Phosphorus.

Lapis *calaminaris*. See Calaminaris *lapis*.

Lapis *calcarius*. See Lime.

Lapis *caudæ cancri*, in *Natural Hiſtory*, a name given by Geſner, and ſome other writers, to the foſſile ſhells, ſince called *tubuli marini concamerati*, and by ſome *polythalamii* and *ortho-ceratitæ*. See Tubuli *concamerati*.

Lapis *ceratites*. See Unicornu *foſſile*.

Lapis *colicus*. See Colic-*ſtone*.

Lapis *corneus*, *horn-ſtone*, a name given by many of the German authors to flint, which ſome of them have alſo very improperly called *pyrites*, or the fire-ſtone, becauſe it is uſed to ſtrike fire with.

Butner, in his Corallographia Subterranea, has a remarkable ſyſtem in regard to flint. He is of opinion, that all flints are foſſile corals. But it is to be obſerved, that the reſemblance of flints and corals are but very ſlight and ſuperficial, and we have no proof from their internal ſtructure of their being at all alike.

Lapis *dentalis*. See Dentalis.

Lapis *divinus*, a ſpecies of jaſper, ſo called from its imaginary virtues, as a diuretic, and expeller of poiſons. It is found on the ſhores of the Ganges, and other parts of the Eaſt-Indies.

The Turks are extremely fond of it in their curious works, particularly for the handles of their ſabres. This is alſo called Jade and Nephritic *ſtone*.

Lapis *hæmatitis*. See Hæmatitis.

Lapis *hyænius*. See Hyænius *lapis*.

Lapis *Hybernicus*. See *Iriſh* Slate.

Lapis *infernalis*, a cauſtic ſtone prepared various ways; ſometimes of ſtrong ſoap-lees evaporated to a dryneſs, and the remainder kept in a glaſs well ſtopped from the air.

Sometimes it is made of calcined vitriol, tartar, and ſal ammoniac, and boiled in quick-lime water to a ſtrong lixivium; then ſtrained, and evaporated till dry.

The lunar cauſtic, or *lapis infernalis*, is made by putting cryſtals of ſilver into a Heſſian crucible, and placing the crucible in a furnace, which ought to draw little air, and ſurrounded by a very ſmall quantity of lighted coals. The heat at firſt ſhould be moderate; and while the ebullition gradually diminiſhes, the fire is to be increaſed; and when the matter is brought to a perfect and tranquil fuſion, it is to be caſt in an iron mould, previouſly heated, and greaſed in its inner ſurface, where it is to be left till it is fixed and cold, and then put into a bottle with a glaſs ſtopper.

The lunar cauſtic ought to be formed into ſmall cylindrical pieces, like pencils, of about a line in diameter, and the ſurgeon who uſes them puts them in a crayon or pencil caſe, to prevent his fingers being injured by touching them. The mould, for this purpoſe, conſiſts of five or ſix hollow cylinders, placed vertically and parallel to each other, to which a gutter is adapted, by means of which the matter is poured into them. This mould is compoſed of two pieces, which exactly fit each other, in each of which the ſame number of hollow ſemi-cylinders correſpond to thoſe of the other; and, therefore, when the lunar cauſtic is caſt and cooled, it is obtained in entire cylinders, by ſeparating the two pieces of the mould. See Caustic, *lunar*, and Crystals *of ſilver*.

Lapis *Iſlebeianus*. See Islebeianus *lapis*.

Lapis *Judaicus*. See Judaicus.

Lapis *lazuli*. See Lazuli.

Lapis *lucis*, the *ſtone of light*, in the *Materia Medica of the Arabs*, a name given to the braſſy marcaſite or pyrites.

The Arabians have adopted this. Avicenna ſuppoſes this ſubſtance to be called ſo, becauſe it was uſed, after calcination, for diſeaſes of the eyes. It is very probable, that where vitriolic medicines take place, the caput mortuum of this foſſil, which is only a colcothar of vitriol, may be of uſe. But its virtues in this reſpect can never be ſuppoſed ſo eminent, as to have intitled it to the pompous name it bears. It ſeems more probable, that it was called the *ſtone of light*, either from its glittering appearance where freſh broken, or from its giving large ſparks of fire, when ſtruck againſt a ſteel. It was from this quality that it obtained the name of *pyrites*, or fire-ſtone, it giving fire on the colliſion with ſteel much better than flint does.

Lapis *luminis*, is uſed by ſome authors in the ſame ſenſe as *lapis lucis*, that is, from the pyrites.

Lapis *Lydius*. See Lydius *lapis*.

Lapis *marmoreus*, a marble ſtone about twelve feet long and three feet broad, placed at the upper end of Weſtminſter-hall; where was likewiſe a marble chair erected on the middle thereof, in which our kings anciently ſat at their coronation dinner, and at other times the lord-chancellor. Over this marble table are now erected the courts of Chancery, and King's-bench. Orig. Juridical. 37.

Lapis *melitites*. See Melitites.

Lapis *morochthus*, or *French chalk*. See Morochthus.

Lapis *medicamentoſus*, or the medicinal ſtone, is a compoſition of roch alum, litharge, colcothar of vitriol, Armenial bole, and vinegar, boiled to the conſiſtence of a hard ſtone. It is uſed to faſten the teeth, preſerve the gums, heal and dry up ulcers and wounds; and is uſed in injections, and in compoſitions for ſore eyes.

Lapis *muſicalis*, the *muſic-ſtone*, in *Natural Hiſtory*, a name given by Mr. Sivers to a ſtone found in Pruſſia, carrying naturally on it all the muſical characters found on the ſhell, commonly called the *muſic-ſhell*. He deſcribes the ſtone, which ſeems to have been a ſingle ſpecimen, and as this author is the only one who ever met with it, it is much to be ſuſpected that either fraud or fancy has had a great ſhare in the matter.

Lapis *nephriticus*. See Nephritic *ſtone*.

Lapides *picti*, in *Natural Hiſtory*, a term uſed by Langius, to expreſs ſuch ſtones as are found with the delineations of fiſhes, trees, and ſhells, as well as leaves of ferns and other plants, very perfectly repreſenting the things themſelves, but ſcarce at all ſtanding out above the ſurface of the ſtone, and having in themſelves ſcarce any thickneſs. It is very evident, that the bodies repreſented are not here, in reality, but the whole configuration is owing to the natural veins of the ſtone, and the coaleſcence of the ſeveral ſmaller maſſes of which each large ſtone is compoſed, and to the vapours from within the earth, getting into the natural fine cracks in the ſtones, and tinging their ſides with blackneſs.

Lapis *ſpecularis*. See Specularis.

Lapis *thyites*. See Thyites.

LAPLYSIA, in *Natural Hiſtory*, a genus of the *molluſca* order of worms; the body is covered with reflex membranes; there is a ſhield-like membrane on the back, a lateral pore on the right ſide, for the genitals; the vent is on the extremity of the back, and it has four feelers, reſembling ears. There is only one ſpecies, which ſome have called the ſea-hare.

LAPPA, in *Botany*. See Burdock.

LAPPAGO, in *Botany*, a name given by the old Roman authors to the plant we call aparine, or cleavers, or ſome herb nearly allied to it.

LAPPULA, in *Botany*, a name given by ſome to the great caucalis, or rough-fruited ſtone-parſley, or *baſtard* Parsley.

LAPSANA, in *Botany*. See Nipple-*wort*.

LAPSARII. See Infralapsarii, Sublapsarii, and Supralapsarii.

LAPSE, a ſlip or omiſſion of a patron to preſent a clerk to a benefice within ſix months of its being void: in which caſe, the benefice is ſaid to be in *lapſe*, or lapſed, and the right of preſentation devolved to the ordinary.

And if the ordinary neglect to preſent during the ſame time, the right of preſentation accrues to the metropolitan, and to the king by neglect of the metropolitan. This right of *lapſe* was firſt eſtabliſhed in the reign of Henry II. when the biſhops firſt began to exerciſe univerſally the right of inſtitution to churches: and therefore, when there is no right of inſtitution, there is no right of *lapſe*; ſo that no donative can *lapſe* to the ordinary, unleſs it hath been augmented by the king's bounty; but no right of *lapſe* can accrue when the original preſentation is in the crown. In caſe the benefice becomes void by death, or ceſſion through plurality of benefices, there the patron is bound to take notice of the vacancy at his own peril; but in caſe of a vacancy by reſignation, or canonical deprivation, or if a clerk preſented be refuſed for inſufficiency, theſe being matters of which the biſhop alone is preſumed to be cognizant, here the law requires him to give notice thereof to the patron; otherwiſe he can take no advantage by way of *lapſe*. Neither ſhall any *lapſe* accrue thereby to the metropolitan or the king. If the biſhop refuſe or neglect to examine and admit the patron's clerk, without good reaſon aſſigned or notice given, he ſhall have no title to preſent by *lapſe*: and if the right of preſentation be litigious or conteſted, and an action be brought againſt the biſhop to try the title, no *lapſe* ſhall occur till the queſtion of right be decided. If the biſhop be both patron and ordinary, he ſhall not have a double time allowed him to collate in: and if the biſhop doth not collate his own clerk immediately to the living, and the patron preſents, though after the ſix months are lapſed, yet the preſentation is good, and the biſhop is bound to inſtitute the patron's clerk. If the biſhop ſuffer the preſentation to *lapſe* to the metropolitan, the patron alſo has the ſame advantage if he preſents before the archbiſhop has filled up the benefice: yet the ordinary cannot after *lapſe* to the metropolitan, collate his own clerk to the prejudice of the archbiſhop. But if the preſentation *lapſes* to the king, the patron ſhall never recover his right, till the king has ſatisfied his turn by preſentation; for *nullum tempus occurrit regi*. Blackſt. Com. vol. ii. p. 276, &c.

LAPSED *legacy*. See Legacy.

LAP-SIDED, in *Sea-Language*, denotes the ſtate of a ſhip, which is built in ſuch a manner as to have one ſide heavier than the other, and conſequently to retain a conſtant heel or tendency toward the heavier ſide, unleſs when ſhe is brought upright by placing a great quantity of the cargo or ballaſt on the other ſide.

LAPWING, *capella*, in *Ornithology*, the black breaſted *tringa*, with a hanging creſt, or TRINGA *vanellus* of Linnæus, commonly known in England by the name of lapwing or baſtard plover, and called by ſome, in Latin, *vanellus*. It is a very well-known bird, about the ſize of a pigeon, and has a beautiful creſt upon its head. Its legs are long and red, and it is remarkable for running ſwiftly: the female is rather leſs than the male.

Were the *lapwing* leſs common, it would be highly eſteemed for its beauty. It is very frequent in our fenny countries, and in the wet places of moſt other parts of Europe.

It lays four eggs, of an olive caſt, ſpotted with black, in a ſlight neſt made with a few bents. The young as ſoon as hatched run like chickens, and are preſerved with great anxiety and clamour by their parents from apprehending danger; which are ſaid to flutter along the ground to a conſiderable diſtance from their neſt, to elude purſuers, and to become more clamorous when moſt remote from it. The eggs are much valued for their delicacy, and are ſold by the London poulterers for three ſhillings per dozen. In winter, *lapwings* join in large flocks and are very wild; their fleſh is very good, their food being inſects and worms. During October and November, they are taken in the fens in nets, in the ſame manner as ruffs are, but are not preſerved for fattening, being killed as ſoon as caught. Ray and Pennant.

LAQUEARIUS, a kind of athleta among the ancients, who in one hand held a *laqueus*, i. e. a ſort of ſnare, wherewith to embarraſs and entangle his antagoniſt, and in the other a poignard to ſtab him.

LAQUER. See Lacquer.

LAQUEUS, in *Surgery*, a *nooſe* or *ſnare*; or a kind of ligature, ſo contrived, that when ſtretched, by any weight, or the like, it draws up cloſe.

It is uſed to extend broken or disjointed bones, to keep them in their places, when they are ſet, and to bind the parts cloſe together.

LAR-BOARD, the left-hand ſide of a ſhip, when you ſtand with your face toward the head.

LARCENY in *Law*, is a theft of perſonal goods or chattels, in the owner's abſence. See Theft.

The word comes from the French *larcin*; and that from the Latin *latrocinium*, *theft*.

Larceny is diſtinguiſhed by the law into two ſorts; the one called *ſimple larceny*, or plain theft unaccompanied with any other atrocious circumſtance; and *mixt* or *compound larceny*, which includes in it the aggravation of taking from one's houſe or perſon.

In reſpect of the things ſtolen, ſimple *larceny* is either *great* or *ſmall*.

Larceny, *Great*, is when the things ſtolen, though ſeverally, exceed the value of 12*d*.

Larceny, *Petty*, is when the goods ſtolen exceed not the value of 12*d*.

Simple larceny is defined the felonious taking, and carrying away, the perſonal goods of another: ſo that in order to conſtitute this crime, there muſt be a taking, which implies the conſent of the owner to be wanting; and therefore no delivery of the goods from the owner to the offender, upon truſt, can ground a *larceny*. By the common law it was no *larceny* in a ſervant to run away with the goods committed to him to keep, but only a breach of truſt: but by ſtatute 21 Hen. VIII. c. 7. if any ſervant embezzles his maſter's goods to the value of 40*s*. it is made felony, except in an apprentice and ſervants under eighteen years old. And if he had not the poſſeſſion, but only the care and overſight of the goods, as the butler of plate, the ſhepherd of ſheep, and the like; the embezzling of them is felony at common law. So if a gueſt robs his inn or tavern of a piece of plate, it is *larceny*; and ſo it is declared to be by 3 and 4 W. and M. c. 9. if a lodger runs away with the goods from his ready-furniſhed lodgings. There muſt alſo be a carrying away; and a bare removal from the place in which he found the goods, though the thief does not quite make off with them, is ſufficient. But this muſt be felonious, i. e. done, *animo furandi*, or as the civil law expreſſes it, *lucri cauſa*. The ordinary diſcovery of a felonious intent, is where the party doth it clandeſtinely, or being charged with the fact denies it: beſides which there are other circumſtances that evince a felonious intent, which are left to the conſideration of the court and jury. Moreover, this felonious taking and carrying away muſt be of the perſonal goods of another. Of things that adhere to a freehold, as corn, graſs, trees, and the like, or lead upon a houſe, no larceny could be committed by common law; but the ſeverance of them was and in many things is ſtill, merely a treſpaſs: however if the thief ſevers them at one time, whereby the treſpaſs is completed, and they are converted into perſonal chattels, in the conſtructive poſſeſſion of him on whoſe ſoil they are left or laid, and comes again at another time, when they are ſo turned into perſonalty, and takes them away, it is *larceny*; and alſo if the owner, or any one elſe, has ſevered them. And by 4 Geo. II. c. 32. to ſteal, or ſever with intent to ſteal any lead or iron fixed to a houſe, or in any court or garden belonging to it, is made felony, liable to tranſportation for ſeven years; and to ſteal underwood or hedges and the like, to rob orchards or gardens of fruit growing therein, to ſteal or otherwiſe deſtroy any turnips or the roots of madder when growing, are by 43 Eliz. c. 7. 15 Car. II. c. 2. 23 Geo. II. c. 26, and 31 Geo. II. c. 25, puniſhable criminally by whipping, ſmall fines, impriſonment and ſatisfaction to the party wronged, according to the nature of the offence. Moreover, the ſtealing by night of any trees, roots, ſhrubs, or plants, to the value of 5*s*. is by 6 Geo. III. c. 36. made felony in the principals, aiders, and abettors, and in the purchaſers knowing the ſame to be ſtolen: and by 6 Geo. III. c. 48. the ſtealing of any timber-trees, as oak, beech, cheſnut, walnut, aſh, elm, cedar, fir, aſp, lime, ſycamore and birch, and of any root, ſhrub, or plant, by day or night, is liable to pecuniary penalties for the firſt two offences, and for the third is conſtituted a felony, liable to tranſportation for ſeven years. Stealing ore out of mines is no *larceny*, except the ſtealing ore out of the mines of black lead, which is felony without benefit of the clergy by 25 Geo. II. c. 10. Stealing of writings relating to a real eſtate is no felony, but a treſpaſs: bonds, bills, and notes, are goods of which *larceny* cannot be committed by common law; but by 2 Geo. II. c. 25. they are put upon the ſame footing with reſpect to *larcenies*, as the money they were deſigned to ſecure. And by 7 Geo. III. c. 50. if any officer or ſervant of the poſt-office ſhall ſecrete, embezzle, or deſtroy any letter or pacquet, containing any bank-note or other valuable paper, ſpecified in the act; or ſhall ſteal the ſame out of any letter or pacquet, he ſhall be guilty of felony without benefit of clergy. Or if he ſhall deſtroy any letter or pacquet with which he has received money for the poſtage, or advance the rate of poſtage, and ſecrete the money, he ſhall be guilty of ſingle felony. By 26 Geo. II. c. 19. plundering or ſtealing from any ſhip in diſtreſs, whether wreck or no wreck, is felony, without benefit of clergy. For the laws relating to fiſh and game, ſee *Stealing of* Fish and Game.

Of all valuable domeſtic animals, as horſes, and of all animals *domitæ naturæ*, which ſerve for food, as ſwine, ſheep, poultry, and the like, *larceny* may be committed; and alſo of the fleſh of ſuch as are *feræ naturæ*, when killed.

By the Roman law, the penalty of *ſimple* and *ſecret larceny* was the returning it two-fold; and of *manifeſt larceny* four fold: *manifeſt larceny* was, where the criminal was taken in the fact; *ſimple*, where he was not. The Lacedæmonians never puniſhed *larceny* provided the perſon was not caught in the fact; but, on the contrary, it was applauded as a mark of dexterity and addreſs.

The laws of Draco at Athens, which are ſaid to be written in blood, puniſhed it with death; but Solon afterwards changed the penalty into a pecuniary mulct: and ſo the Attic laws in general continued. By the Jewiſh law, theft was only puniſhed with a pecuniary fine, and ſatisfaction

faction to the party injured. Exod. chap. xxii. From theſe examples, as well as the reaſon of the thing, many learned and ſcrupulous men have queſtioned the propriety, if not lawfulneſs, of inflicting capital puniſhment for ſimple theft; and propoſed either a pecuniary or a corporal puniſhment. Sir Thomas More in his Utopia, p. 42. and more lately the marquis Beccaria, Eſſ. on Crimes and Puniſhments, chap. xxii. have propoſed that kind of corporal puniſhment, which approaches neareſt to a pecuniary ſatisfaction, viz. a temporary impriſonment, with an obligation to labour, firſt for the party robbed, and afterwards for the public, in works of the moſt ſlaviſh kind: nevertheleſs the puniſhment of theft ſtill continues, through the greateſt part of Europe, to be capital. It is obſerved that our ancient Saxon laws nominally puniſhed theft with death, if above the value of 12*d*. but the criminal was permitted to redeem his life by a pecuniary ranſom. But in the ninth year of Henry I. this power of redemption was taken away, and perſons guilty of great *larceny* directed to be hanged. See FELONY. *Petit larceny* by common law is only puniſhable by whipping, or by 4 Geo. I. c. 11. the puniſhment may be extended to tranſportation for ſeven years; but the puniſhment of *grand larceny*, or ſtealing above the value of 12*d*. which ſum was the ſtandard in the time of king Athelſtan, eight hundred years ago, is at common law, regularly death: upon which ſir Henry Spelman obſerved, above a century ſince, when money was at twice its preſent rate, that while every thing elſe was riſen in its nominal value, and become dearer, the life of man had continually grown cheaper. And though the jury may exerciſe a kind of unwarrantable clemency, by bringing in *larceny* under the value of 12*d*. and the benefit of the clergy is allowed for the firſt offence; yet in many caſes of ſimple *larceny* this is taken away by the ſtatute; as from horſe-ſtealing, taking woollen-cloth from off the tenters, or linen from the place of manufacture, ſtealing ſheep or other cattle ſpecified in the acts, thefts on navigable rivers above the value of 40*s*. plundering veſſels in diſtreſs, or that have ſuffered ſhipwreck, ſtealing letters ſent by the poſt, and ſtealing deer, hares, and conies under the circumſtances recited in the *Waltham* BLACK *Act*.

The Circaſſians are ſaid to honour theft at this day; inſomuch that at their public feaſts, their youth are not ſuffered to drink, if they have not performed ſomething remarkable in that way. Solinus tells us, that in Sardinia there was a fountain that had the virtue of diſcovering a perſon that had committed *larceny*.

Compound or mixed larceny is that, which, beſides all the properties of the former, has the aggravation of taking from one's houſe or perſon. With reſpect to larceny from the houſe, ſee BURGLARY and HOUSE-*breaking*.

It may be obſerved, that the benefit of clergy is denied: 1. In all *larcenies* above the value of 12*d*. from a church, or from a dwelling-houſe, or both, any perſon being therein. 2. In all *larcenies*, to the value of 5*s*. committed by breaking the dwelling-houſe, though no perſon be therein. In all *larcenies* to the value of 40*s*. from a dwelling-houſe, or its out-houſes, without breaking in, and whether any perſon be therein or no. 4. In all *larcenies* to the value of 5*s*. from any ſhop, warehouſe, coach-houſe, or ſtable, whether the ſame be broke open or not, and whether any perſon be therein or no: whether theſe offences are committed by day or by night.

Larceny from the perſon is either by privately ſtealing; or by open and violent aſſault, uſually called robbery. The offence of privately ſtealing from a man's perſon, above the value of 12*d*. as by privately picking his pocket or the like, without his knowledge, was debarred of clergy, ſo early as by the ſtatute 8 Eliz. c. 14. For the other kind of *larceny* from the perſon, ſee ROBBERY. See alſo FELONY.

Perſons who buy or receive any ſtolen goods, knowing the ſame to be ſtolen, ſhall be deemed acceſſaries after the fact: 3 W. c. 9. and by 4. Geo. c. 11. they may be tranſported for fourteen years: and by 5 Anne, c. 31. ſuch perſons and thoſe who conceal any felons or thieves ſhall be deemed acceſſary to the felony, and being convicted on the teſtimony of one witneſs ſhall ſuffer death as a felon convict. Perſons offering for pawn or ſale goods ſuſpected to be ſtolen, may be ſeized and conveyed by a conſtable or other peace officer before a juſtice, who may commit them for any time not exceeding ſix days for examination, and afterwards, if the goods were ſtolen or clandeſtinely obtained, to the common gaol or houſe of correction. 30 Geo. II. c. 24. Perſons advertiſing a reward for helping to ſtolen goods, and alſo the printer and publiſher of ſuch advertiſement, ſhall reſpectively forfeit 50*l*. with coſts, 25 Geo. II. c. 36. And by 4 G. c. 11. thoſe who receive ſuch reward, without apprehending the felon and bringing him to trial, ſhall be guilty of felony in the ſame manner as if they had ſtolen the ſame.

The charges of proſecution and conviction in reſpect of any grand or petit *larceny* may, by order of court, and at the prayer of the proſecutor, be paid by the county treaſurer, with a reaſonable allowance for his time and trouble: 25 Geo. II. c. 36. And by 27 Geo. II. c. 3. reaſonable charges may be allowed and paid in the ſame manner, to a poor perſon who is required to give evidence: in Middleſex theſe charges ſhall be paid by the overſeers of the poor where the perſon was apprehended.

It is provided by ſtatute, that every perſon who ſhall apprehend any one guilty of houſe-breaking or private ſtealing, to the value of 5*s*. and proſecute him to conviction, and all the executors or adminiſtrators of a perſon ſlain in endeavouring to apprehend a houſebreaker or felon, ſhall have a certificate without fee, under the hand of the judge, certifying ſuch conviction, &c. which certificate ſhall be inrolled by the clerk of the peace of the county where it is granted, and may be once aſſigned over and no more. By virtue of this certificate the original proprietor, or aſſignee of the ſame, ſhall be diſcharged from all pariſh and ward offices, within the pariſh or ward where the felony was committed: 10 & 11 W. c. 23. Every ſuch perſon, and alſo the executors and adminiſtrators of a perſon killed as before, ſhall alſo have another certificate, which, on being tendered to the ſheriff and demand made, ſhall entitle him to the ſum of 40*l*. without fee, in one month after the tender and demand; on pain of forfeiting double with treble coſts. 5 Anne, c. 31. See DISCOVERY of *accomplices*.

The ſheriff on producing the certificates and the receipts for the ſaid rewards, may deduct the ſame from his accounts; and if he have not money in his hands, he ſhall be repaid out of the treaſury, on certificate from the clerk of the pipe; or he may immediately apply to the commiſſioners of the treaſury, who ſhall pay the ſame without fee. 3 Geo. c. 15.

LARCH-*tree*, *Larix*, in *Botany*. Linnæus refers this to the genus of PINE. The characters are theſe: it hath male and female flowers, growing ſeparate on the ſame tree; the male flowers are diſpoſed in a ſcaly katkin without a petal; the female flowers are diſpoſed in a conical ſhape, having no petals, but a ſmall germen, which afterward becomes a nut with a membranaceous wing, incloſed in the ſcales of the cones.

The common cone-bearing *larch-tree* grows naturally upon the Alps and Apennines, and has been lately much propagated in England. Thoſe trees raiſed from ſeeds thrive beſt in the worſt ſoil and ſituation. There are two varieties of this tree, one of which is a native of America, and the other of Siberia; neither of which thrive well in this climate. In Switzerland the wood of the common *larch-tree* is uſed for building and covering the houſes; and in other countries, where it abounds, it is preferred for every purpoſe to all the kinds of fir. In many places there are ſhips built of this wood, which are ſaid to be durable; and, therefore, this may be a very proper tree for planting upon ſome of the cold barren hills in many parts of England, which, beſides the profit they would yield to their proprietors, would alſo conduce to national benefit. The *Venice* TURPENTINE is extracted from the *larch-tree*. See CEDAR.

LARENTINALIA, in *Antiquity*, a feaſt held among the Romans on the 23d day of December, but ordered to be obſerved twice a year by Auguſtus; by ſome ſuppoſed to have been in honour of the Lares, but by others, with more probability, in honour of Acca Laurentia; and to have been the ſame with LAURENTALIA.

LARES, among the *Ancients*, derived by Apuleius, De Deo Socratis, p. 689, from *lar*, *familiaris*; a kind of domeſtic genii, or divinities, worſhipped in houſes, and eſteemed the guardians and protectors of families; ſuppoſed to reſide more immediately in the chimney corner.

The *Lares* were diſtinguiſhed from the PENATES, as the former were ſuppoſed to preſide over houſe-keeping, the ſervants in families, and domeſtic affairs, and the latter were the protectors of the maſters of families, their wives and children: accordingly the *Lares* were dreſſed in ſhort ſuccinct habits, to ſhew their readineſs to ſerve, and they held a ſort of cornucopia in their hands, as a ſignal of hoſpitality and good houſe-keeping. According to Ovid there were generally two of them, who were ſometimes repreſented with a dog at their feet. Faſt. 5. v. 146.

Plutarch diſtinguiſhes good and evil *Lares*, as he had before done good and evil Genii.

There were alſo ſome public, others private *Lares*.

Apuleius tells us the domeſtic *Lares* were no more than the ſouls of departed perſons, who had lived well, and diſcharged the duties of their ſtation; whereas thoſe who had done otherwiſe, were vagabonds, wandering about, and frightening people, called *Larvæ* and LEMURES.

The *Lares* were alſo called *Penates*, and were worſhipped under the figures of little marmouſets, or images of wax, ſilver, or earthen ware.

The public *Lares* were alſo called *Compitales*, from *compitum*, a croſs-way; and *Viales*, from *via*, a way, or public road; as being placed at the meetings of roads, and in the highways, and eſteemed the patrons and protectors of travellers.

Their private *Lares* took care of particular houſes and families: theſe they alſo called *Præſtites*, from *præſto*;

> *Quod præſtant oculis omnia tuta ſuis.* Ovid. Faſt.

They gave the name *Urbani*, i. e. *Lares* of cities, to thoſe who had cities under their care; and *Hoſtilii*, to thoſe who were to keep their enemies off. There were alſo *Lares* of the country, called *Rurales*, as appears by ſeveral antique inſcriptions.

The *Lares* were alſo genial gods, and were ſuppoſed to take care of children from their birth. It was for this reaſon that when Macrobius tells us the Egyptians had four gods who preſided over the birth of children, viz. the *Genius*, *Fortune*, *Love*, and *Neceſſity*, called *præſtites*, ſome interpret him as if he had ſaid, the Egyptians had *Lares*; but they have mentioned that there was a great difference between the *Lares* of the Romans, and the Præſtites of the Egyptians. However, the learned Mr. Bryant affirms that they were the ſame.

The ancients differ extremely about the origin of the *Lares*. Varro and Macrobius ſay, that they were the children of Mania; Ovid makes them the iſſue of Mercury, and the naiad Lara, whom Lactantius and Auſonius call *Larunda*; Apuleius aſſures us they were the poſterity of the Lemures; Nigridius, according to Arnobius, made them ſometimes the guardians and protectors of houſes, and ſometimes the ſame with the *Curetes* of Samothracia, which the Greeks call *Idæi dactyli*. Nor was Varro more conſiſtent in his opinion of theſe gods; ſometimes making them the names of heroes, and ſometimes gods of the air.

T. Tatius king of the Sabines, was the firſt who built a temple to the *Lares*. The chimney and fire-place in the houſe were particularly conſecrated to them.

Tertullian tells us the cuſtom of worſhipping the *Lares* aroſe from this, that they anciently interred their dead in their houſes; whence the credulous people took occaſion to imagine their ſouls continued there alſo, and proceeded to pay them divine honours. To this it may be added, that the cuſtom being afterwards introduced of burying in the highways, they might hence take occaſion to regard them as gods of the highways.

The victim offered to the *Lares*, in the public ſacrifices, was a hog: in private, they offered them wine, incenſe, a crown of wool, and a little of what was left at the table. They alſo crowned them with flowers, particularly the violet, myrtle, and roſemary. Their ſymbol was a dog, which was uſually repreſented by their ſide, on account of its fidelity, and the ſervice it does to man, in watching his houſe. They were ſometimes alſo repreſented as cloathed in a dog's ſkin.

See farther on the *Lares*, in Arnobius, Lactantius, Auguſtine De Civit. Natalis Comes, Lambin. on Plaut. Aulul. and on Hor. Caſaubon on Sueton, &c.

The term *Lares*, according to Mr. Bryant, was formed from *laren*, an ancient word by which the ark was repreſented: and he ſuppoſes that the *Lares* and MANES were the ſame domeſtic deities under different names; and that by theſe terms the Hetrurians and Latines denoted the *dii arkitæ*, who were no other than the arkite anceſtors, or the perſons preſerved in the *laren*, or ark; the genius of which was Iſis, the reputed parent of the world. He obſerves farther, that they are deſcribed as dæmons and genii, who once lived on earth, and were gifted with immortality. Arnobius, lib. iii. p. 124. ſtyles them *Lares quoſdam genios & functorum animas*; and he ſays, that according to Varro de Ling. Latin. lib. viii. p. 113, they were the children of Mania. Huetius Demonſt. Prop. 4. p. 139, adds, that Mania had alſo the name of Larunda; and ſhe is ſtyled the mother of the dæmons. By ſome ſhe is called Lara, and was ſuppoſed to preſide over families; and children were offered at her altar in order to procure her favour. Macrob. Sat. lib. i. c. 7. p. 154. In lieu of theſe they in after-times offered the heads of poppies, and pods of garlick. Anal. of ancient Mythol. vol. ii. p. 449, &c.

The pantheons, or images repreſenting ſeveral gods at once, were alſo called *Lares*. Harpocrates was one of theſe.

LARGE, a *Sea Term*, applied to the wind, when it croſſes the line of a ſhip's courſe in a favourable direction, particularly on the beam or quarter. Thus, if a ſhip ſteer weſt, then the wind in any point of the compaſs to the eaſtward of the ſouth or north, may be called *large*, unleſs when it is directly eaſt, and then it is ſaid to be right aſt. *Sailing large* is, therefore, advancing with a *large* wind, ſo as that the ſheets are ſlackened and flowing, and the bow-lines entirely diſuſed. This phraſe is generally oppoſed to ſailing CLOSE-*hauled*.

LARGE, in the *Manege*. A horſe is ſaid to go *large*, or wide, when he gains or takes in more ground in going wider from the centre of the volt, and deſcribing a greater circumference. To make a horſe go *large*, you muſt give him the aid of your inner heel. See ENLARGE.

LARGE, in *Muſic*. See CHARACTER.

LARGHETTO, in the *Italian Muſic*, ſignifies a movement ſomething ſlow, yet a little quicker than LARGO.

LARGO, in the *Italian Muſic*, a ſlow movement, one degree quicker than adajo, and two than grave. See TIME.

LARK, *alauda*, in the Linnæan ſyſtem of *Ornithology*, a diſtinct genus of birds, of the order of the *paſſeres*: the characters of which are, that the tongue, which is bifid, has a rim or margin round it, and is membranaceous and pointed; the beak is ſtraight and pointed, and bending towards the point; the maxillæ equal in ſize; and the claw of the hinder toe is longer than any of the other toes; their toes are alſo divided to their origin, and the noſtrils are covered with feathers or briſtles. We have in England four ſpecies of this bird. 1. The common *lark*. 2. The *wood-lark*. 3. The *tit-lark*. And, 4. The ſmall-creſted *lark*. And beſide theſe there are ſeveral exotic ſpecies of birds, properly reducible to this genus; as the LOCUSTELLA, CALANDRA, SPIPOLA, SPINOLETTA.

The common field *lark*, or *ſky-lark*, the *alauda arvenſis* of Linnæus, is well known, and not leſs eſteemed for its delicacy at table, than for its ſinging. This and the *wood-lark* are the only birds that ſing as they fly; this raiſing its note as it ſoars, and lowering it till it quite dies away as it deſcends. It will often ſoar to ſuch a height that we are charmed with the muſic when we loſe ſight of the ſongſter. It alſo begins its ſong befor the earlieſt dawn. It continues its harmony ſeveral months, beginning early in the ſpring, on pairing. It is very fat in winter, and taken in prodigious numbers; it builds on the ground, beneath ſome clod, and lays four or five eggs. Theſe birds are taken in greateſt number, in the neighbourhood of Dunſtable: the ſeaſon begins about the fourteenth of September, and ends the twenty-fifth of February; and during that time ſome thouſands are caught to ſupply the markets of London. Thoſe taken in the day are caught in CLAP-*nets*, till the fourteenth of November. See DORING. But when the weather becomes gloomy, and alſo in the night, the larker makes uſe of a trammel-net, twenty-ſeven or twenty eight feet long, and five broad, which is put on two poles eighteen feet long, and carried by men under each arm, who paſs over the fields, and quarter the ground as a ſetting dog. When they ſee or feel a *lark* ſtrike the net, they drop it down, and thus the birds are taken. The darkeſt nights are the propereſt for this ſport; and the net will not only take *larks*, but all other birds that rooſt on the ground, among which are woodcocks, ſnipes, partridges, quails, field-hares, and ſeveral others.

In the depth of winter people ſometimes take great numbers of *larks* by nooſes of horſe-hair. The method is this: take a hundred or two hundred yards of packthread; faſten at every ſix inches a nooſe made of double horſe-hair; at every twenty yards the line is to be pegged down to the ground, and ſo left ready to take them.

The time to uſe this is when the ground is covered with ſnow, and the *larks* are to be allured to it by ſome white oats, ſcattered all the way among the nooſes; they will ſoon fly to theſe, and in eating will be hung by the nooſes. They muſt be taken away as ſoon as three or four are hung, otherwiſe the reſt will be frighted: but though the others are ſcared away juſt where the ſportſman comes, they will be feeding at the other end of the line, and the ſport may be thus continued a long time.

The *ſky-lark* is a kind of mocking bird; for it will catch the note of any other which hangs near it, even after its own note is fixed. On this account, the bird-fanciers often place the *ſky-lark* next to one that hath not been long caught, in order, as they term it, to keep the caged *ſky-lark* honeſt.

The *wood-lark*, or *alauda arborea* of Linnæus, is ſmaller than the common *lark*, and is ſhorter bodied; the colours are paler, and its note is leſs ſonorous and leſs varied, though not leſs ſweet; it generally flies in large flocks, and as it is in the air ſings with a voice more like that of the blackbird, than of the common *lark*, and it will alſo ſing in the night; it has a circle of white feathers like a crown, reaching from one eye to the other acroſs the head; the tip of its tail is white, and it ſits on trees. Theſe are its diſtinctions from the common *lark*. This, like the other, builds on the ground, and makes its neſt on the outſide with moſs, and lays five eggs, which are duſky, and blotched with deep brown. The males of this and the laſt ſpecies are known from the females by their ſuperior ſize.

The *wood-lark* is one of the ſweeteſt of our ſinging-birds, and is indeed very little inferior to the nightingale when in good health; for we are not to judge by ſuch as are made feeble by improper food, or want of cleanlineſs in their cages.

It is one of the tendereſt birds we have, and yet it breeds the ſooneſt of any that we know of. They principally frequent gravel grounds, and the ſides of hills, that are expoſed full to the ſun; and if there be any ſtumps of oaks in theſe places, they always reſort to them. The females couple with the males in the beginning of February, at which time, and never before, they part with their laſt year's brood; immediately after coupling they betake themſelves to building their neſt. They generally build in lay, or grounds where the graſs is rank, and is grown brown. The principal material they uſe is dry graſs, and they always chooſe ſome place ſheltered by a good tuft for their neſt, to defend themſelves from the cold winds, which are very ſevere at that ſeaſon. They feed their young principally with a ſmall red worm; but it is very difficult to find this kind, to feed a neſt of them under our care, and they will not do well without it; ſo that they ſcarce ever come to any thing this way.

The young branchers are taken in June, July, and Auguſt. After this they may be taken in large numbers at the latter end of September, which is their general flight ſeaſon, and then from the beginning of January to the beginning of February, at which time they get together to couple for breeding. Thoſe that are taken in the ſummer months are uſually taken in nets, by the help of a hawk.

The ſportſman is to go out in a dewy morning, and fixing on ſome hill he is to go to that ſide of it which faces the riſing ſun; for this place they are ſure to frequent. He is to take out a hawk, and a ſmall net, at the end of a ſtick; when he eſpies a bird he is to ſhew the hawk, on which it will ſquat down, and on his approaching nearer, and making the hawk flutter over the place, the bird will only lie ſo much the cloſer, ſo that he may go up and lay the net over it, and thus take it, without hurting it.

The beſt *wood-larks* that are kept in cages have been caught in this manner. A better way of taking numbers of them is to prepare a net made in the ſame manner as the common net for taking partridges, only with the meſhes much ſmaller; three or four perſons are to go out with this, and one of them is to take out a hawk, which ſerves in the ſame manner for the *larks* as the ſetting-dog does for the partridges.

Wherever a flock of theſe *larks* are ſeen together, as is very common, the whole flight keeping with the female till the next coupling ſeaſon, the hawk is to be ſhewn, and on his hovering they will all lie ſtill, and the net may be eaſily drawn ſo completely over them, that not one can eſcape. The beſt time for taking this bird for the cage, is in July, or the preceding or following month; thoſe that are put into the cage at this time ſing preſently, but their ſong time is not laſting, for they ſoon fall to moulting, in which ſtate many die; but if they get over it, they commonly prove very healthful afterwards, and become very tame and familiar, and ſing ſweetly. Thoſe which are taken in the latter end of September, are generally very ſtrong and ſprightly; but they do not ſing till after Chriſtmas. Thoſe taken in January and February finally prove the beſt of all; they generally begin ſinging in two or three days, or at the utmoſt in a week after they are taken.

The method of keeping them in health in the cage, is this: there muſt be two pans of food, the one containing meat, the other oatmeal and hempſeed. A very good food is the following: boil an egg very hard, to which add the crumb of a halfpenny loaf, and as much hempſeed; let the egg be chopped very ſmall, and the hempſeed bruiſed in the mortar; when theſe are mixed, the bread is to be crumbled in among the reſt, and the whole to be rolled together with a common rolling-pin, and kept for uſe.

There muſt be ſome fine ſmall gravel ſtrewed at the bottom of the cage, and renewed at fartheſt once in a week. This will prevent the bird's feet from getting hurt by being clogged with the dung; and his baſking in this will keep him alſo from growing louſy, after which few come to good. There muſt be a perch in the cage, and it muſt either be lined with green bays, or made of fine matting, which the *lark* is very fond of.

When the bird is firſt taken, ſome meat muſt be ſtrewed upon the ſand in the bottom of the cage; for the bird will be ſometimes almoſt famiſhed before he finds the meat in the pan.

The cock-bird of this kind is known from the hen by the loudneſs and length of his call, by his tallneſs as he walks about the cage, and by his doubling his notes in the evening, as if he was going with his mate to rooſt. A better rule than all others, however, is his ſinging ſtrong; for the hen *wood-lark* ſings but very weakly.

Both the cock and hen of this kind are tender, and ſubject to many diſorders; the principal of theſe are cramps, giddineſs of the head, and breeding lice. Cleanlineſs is the beſt cure for the firſt and the laſt of theſe complaints, but we know of no cure for the other. A good ſtrong bird, however, will often laſt very well five or ſix years, and often improve all the time.

The lark is not only a very agreeable bird for the cage, but it will alſo live upon almoſt any food, ſo that it have once a week a freſh tuft of three leaved graſs put into the cage with it.

The *ſky* and *wood-lark* differ in the time of their breeding; the former not producing her young ones till May, the latter hatching them in March. In winter it is common to ſee vaſt flocks of *ſky-larks*; and yet it is obſerved, that there are fewer of their neſts found in the ſeaſon, than of any birds that are in any degree common among us. The *ſky-lark* ſometimes builds among corn, ſometimes among high graſs, and ſeldom has more than three young ones at a brood, ſcarce ever more than four; ſo that it is more wonderful whence the large flights we ſee come. The young may be taken out of the neſt at a fortnight old, and are ſo hardy, that they will eaſily be brought up. The beſt food is a ſheep's heart chopped with egg, and afterwards oatmeal, bruiſed hempſeed, and bread, with a little egg among it. They ſhould have clean ſand at the bottom of the cage, but they need no perches.

The *tit-lark* is called by authors the *alauda pratorum*, or *alauda pratenſis*. This ſits upon trees like the *wood-lark*, is ſmaller than the common *lark*, and has more of a duſky greeniſh hue, and is leſs beautiful in its colour than the common *lark*. This, like the other *larks*, builds its neſt among the graſs, and lays five or ſix eggs; it has a very remarkable fine note, ſinging in all ſituations, on trees, on the ground, while it is ſporting in the air, and particularly in its deſcent. This bird, and many others, ſuch as the thruſh, blackbird, willow-wren, &c. become ſilent about Midſummer, and reſume their notes in September. It is thought that we have in England, beſide the common ſpecies of *tit-lark*, another kind, which differs from the common kind, in that it is larger, has leſs greeneſs in its colouring, has paler-coloured feet, and ſhorter heels.

The laſt, or creſted *lark*, is the *alauda criſtata minor* of authors: this is like the large foreign creſted *larks*, but is much ſmaller, its creſt is very long in proportion to its ſize, and its feet are red; it is all over of a pale brown colour, and is ſeen in flocks in the northern parts of England.

There is another ſpecies, called the *red lark*, which is found in the neighbourhood of London, in North America, and in the South of Europe; though it is rarely met with in this country. It is equal in ſize to the common *lark*; a white line croſſes each eye, and another paſſes beneath; the bill is thick; the chin and throat whitiſh; the head, neck, back, and coverts of the wings, of a ruſty brown, ſpotted with black; breaſt whitiſh, with duſky ſpots; belly of a dirty white; the middle feather of the tail black, edged with brown; the two exterior white; and the legs of a pale brown. This ſpecies was firſt diſcovered by Mr. Edwards, who obſerves, that, when the wing is gathered up, the third primary feather reaches to the tip of the firſt. Ray and Pennant.

LARK, *graſshopper*. See LOCUSTELLA.

LARK, *ſea*, *charadrius hiaticula* of Linnæus, is common on our ſhores in ſummer, but the number is not conſiderable. The bill of this ſpecies is half an inch long; the upper half orange-colour, the lower black; from hence to the eyes is a black line; the cheeks are of the ſame colour; the forehead white, bounded by a black band that paſſes from eye to eye; the crown of the head is of a fine light brown; the upper part of the neck is encircled with a white collar, the lower part with a black one; the back and coverts of the wings of a light brown; the breaſt and belly white; the tail brown, tipt with a darker ſhade; and the legs yellow. This bird lays four eggs, of a dull whitiſh colour, ſparingly ſprinkled with black. At the approach of winter it diſappears. Pennant.

The *ſea-lark* is alſo a name given by ſome authors to the STINT.

LARK, *willow*. See *Leſſer Reed* SPARROW.

LARKSPUR, or **LARKS-HEEL**, *delphinium*, in *Botany*, a genus of the *polyandria trigynia* claſs. Its characters are theſe: the flower is compoſed of five unequal petals; the upper petal, extended at the hinder part into a tubular obtuſe tail; it has a bifid nectarium, ſituated in the centre of the petals, and many ſmall ſtamina, with three oval germina, which become ſo many connected capſules, each having one cell, filled with angular ſeeds.

Miller enumerates eleven ſpecies of this plant, cultivated in the gardens of the curious, for the beauty of the flowers; and beſide theſe a number of other varieties produced by a careful management of the ſeed ſaved from good flowers. They are to be raiſed by ſowing the ſeeds in autumn, ſoon after they are ripe. Some ſow them in ſpring, but the plants are thus never ſo ſtrong, nor are the flowers ſo large. When the young plants have got a little ſtrength, they ſhould either be pulled up, or tranſplanted, ſo as to have them at ten inches diſtance every way. They will now require no farther care, but will flower in July. See STAVESACRE.

LARMIER, in *Architecture*, a flat, ſquare, maſſive member, of the cornice, between the cymatium and the ovolo; ſo called from its uſe, which is to diſperſe the water, and cauſe it to fall at a diſtance from the wall, drop by drop, or, as it were, by tears; *larme*, in French, ſignifying a *tear*. See *Tab. Architect. Fig.* 9. *Fig.* 25, N° 4.

The *larmier* is alſo called CORONA; and in Engliſh, the DRIP.

LARVA, in *Natural Hiſtory*, a name given by Linnæus to inſects in that ſtate, called by other writers *eruca* or CATERPILLAR. See *Tranſformation* of INSECTS.

LARVÆ, in *Antiquity*, derived from the Hetruſcan word *lar* or *lars*, ſignifying *prince* or *lord*, denoted the ghoſts of the deceaſed, conſidered as wicked and miſchievous. Hence is formed the term *larvatus*, i. e. *larvâ indutus* or DEMONIAC. The ingenious Mr. Farmer urges the etymology and uſe of this term to prove, that the heathen demons were human ghoſts. Eſſ. on the Demoniacs, p. 27, &c.

The *larvæ* were alſo called LEMURES.

LARUS, in the *Linnæan Syſtem of Ornithology*, is a genus of the order of *anſeres*: the characters of which are, that the bill is ſtrong, ſtrait, and bending near the end; that there is an angular prominence in the lower mandible; the noſtrils are linear, wider in the fore part and ſituated in the middle of the bill; the tongue is a little cloven, the body light, and covered with a thick plumage, wings large, legs ſhort, and feet ſmall. They are great flyers, very clamorous and noiſy, and feed on fiſh. Linnæus enumerates eleven different ſpecies. Ray obſerves, that there are properly two ſubordinate genera of theſe birds; the firſt is of thoſe which are large, and have an even not forked tail, and have a tubercle in the lower chap of the bill: the other of the ſmaller ones, which have all forked tails without any tubercle. Of the firſt genus are the *great-gull*, the *herring-gull*, the *ſea-mall*, the *ſea-meb*, the *tarrock*, the *pewit*, the *gannet*, the *cataracta*, the *martinazzo*, the *coddy-moddy*, the *winder-meb*, the *cepphus*, the *brown-tern*, and the *gaviota*: and of the ſecond or ſmaller kind are the *ſterna*, which Linnæus has made a diſtinct genus, the *fiſcherlin*, the *ſcare-crow*, and four ſpecies of the *larus fidipes*: all which ſee under their ſeveral heads. See GULL.

LARUS *fidipes*, in *Ornithology*, the name of a peculiar kind of bird, accounted by many to be of the *larus* or gull-kind, but having its feet not webbed, as in the other birds of that genus, but the toes looſe, as in land fowls. There are four known ſpecies of this bird. 1. A black one, ſomething ſmaller than the common ſea-ſwallow, and having a forked tail. 2. A black kind, with a greyiſh white breaſt and belly, and remarkable for the length of its wings. 3. A grey kind of the ſize of a black-bird, with a very long tail and ſhort wings. 4. A brown one, with yellow ſpots. The firſt and laſt are common on our own coaſts, the two others are deſcribed by Aldrovand. They all feed on fiſh. Ray.

LARYNGOTOMIA, in *Surgery*, formed of λαϱυγξ, and τεμνω, *I cut*, the ſame with what is otherwiſe called BRONCHOTOMY.

LARYNX, Λαϱυγξ, in *Anatomy*, the upper part or head of the trachea, lying below the root of the tongue, and before the pharynx.

The *larynx* is one of the organs of reſpiration, and the principal inſtrument of voice.

Its body is almoſt wholly cartilaginous, and it is to be conſtantly open to give room for the air to paſs and repaſs. Its figure is circular, though it jets out a little before; and is a little flatted behind, leſt it ſhould incommode the œſophagus, whereon it is placed.

The *larynx* is of different diameters, according to the different ages; in young people it is narrow, whence their voice comes to be acute; in thoſe more advanced in years, it is more ample, which occaſions their voice to be ſtronger and deeper. In men it is bigger than in women, for which reaſon men's voice is more grave than that of women. It appears the leſs in women, becauſe the glands ſituate at the bottom of the *larynx*, are bigger in women than in men. The *larynx* moves at the time of deglution: when the œſophagus is lowered for the reception of the food, the *larynx* raiſes itſelf to compreſs it, and facilitate its deſcent.

There are five kinds of parts belonging to the *larynx*, viz. *cartilages*, *muſcles*, *membranes*, *nerves*, and *glands*. Its cartilages are the THYROIDES, CRICOIDES, ARYTÆNOIDES, GLOTTIS, and EPIGLOTTIS, by means of which it can eaſily dilate and contract, ſhut and open itſelf. Theſe form the whole body of the *larynx*, and grow dry, and harden, in proportion as the perſon grows old, when the *larynx* ſometimes appears as if it were bony.

The biggeſt of theſe is the *thyroides* or *ſcutiformis*: this guards the fore-part, and has its name from ſome ſuppoſed reſemblance that it bears to a ſhield. It is of a concavo-convex ſquare figure, the hollow part being inward, and the gibbous outward, having a little prominence in the middle, called *pomum Adami*, as if ſome of the forbidden fruit had ſtuck in Adam's throat, and occaſioned that ſwelling.

The ſecond is called *cricoides*, or *annularis*, from its reſemblance to a ring which the Turks put on their thumb for the drawing of their bows. The fore part of this is very narrow, coming under the other cartilage; but behind, it is broad, thick, and ſtrong, being as it were, the baſis of all the others.

The third and fourth are called *arytænoides*, or *guttales*, from the figure of an ewer, which theſe two together ſomewhat reſemble. At the juncture of theſe there is a little cleft, or chink, in form of a little tongue, and for that reaſon called *glottis*, or *lingula*. Through this chink the air deſcends into the lungs, and the pituitous matter ejected by coughing, in catarrhs, is let out. It ſerves alſo for modulating the voice, and is imitated in flutes, and the pipes of organs.

Over the glottis lies a fifth cartilage, called the *epiglottis*, which is very thin and ſoft, and in non-adults almoſt membranous, concave on the under-ſide, and convex on the upper: it defends the entrance of the *larynx*, and hinders the liquids, which in drinking ſlip over it into the œſophagus, from falling into the trachea.

The *larynx* has ſeveral pair of muſcles, which ſerve to move its ſeveral cartilages, and to contract or dilate them at pleaſure: two pair of them are common, the other proper: the proper are thoſe which have both their origination and inſertion in the *larynx*; the common have only their inſertion there.

Of the former kind are the cricothyroides, or CRICOTHYROIDÆUS, which moves the cruciform cartilage; the CRICO-ARYTÆNOIDÆUS poſticus, which ſerves, by its contraction, to draw the arytænoides cartilage, and to open the rima. The third is the ARYTÆNOIDÆUS, which ſerves to bring the two cartilages of that name together, and to ſhut the rima. The fourth is the CRICO-ARYTÆNOIDÆUS lateralis; and the fifth the THYREO-ARYTÆNOIDÆUS, which ſhuts the *larynx*.

The common muſcles are the STERNO-THYROIDÆUS, which ſerve to draw down the thyroide cartilage, and the HYO-THYROIDÆUS which lift up that cartilage.

Winſlow adds another claſs of muſcles, which he calls collateral, being thoſe that are inſerted by one portion in the *larynx*, without appearing to contribute any thing to the motions of it: of this kind are the THYRO-*pharyngæi*, CRICO-*pharyngæi*, &c.

The *larynx* has but two membranes: the one *external*, which is a continuation of that which covers the trachea; the other *internal*, which is the ſame that lines the whole mouth.

It receives two branches of nerves from the recurrents, and is moiſtened by four large glands; two ſituate above called TONSILS; and two underneath, called THYROIDEÆ.

The *larynx* is of very conſiderable uſe, not only in forming and modulating the voice, by the different aperture of its rima, or chink, but alſo in compreſſing the lungs to a greater or leſs degree, by the air; for if the internal diameter of the *larynx* had been equal to that of the trachea, the lungs could then have undergone little or no compreſſion at all; nor, conſequently, without the *larynx* could we have reaped any advantage from breathing, becauſe the air would not have reſiſted that force wherewith it is driven out in expiration; nor, conſeqently, could the compreſſion have been made in the lungs, which is found neceſſary for the comminution of the globules of the blood, and the mixing of the two fluids, air and blood, together.

For the action of the *larynx* in ſound, ſee GLOTTIS, and SOUND: ſee alſo EPIGLOTTIS, TRACHEA, &c.

LASANON, a word uſed by different authors in very different ſenſes; ſome applying it to the trivet commonly uſed in kitchens; others to a cloſe-ſtool; and others, among whom are Hippocrates, and the ancient phyſicians, for a ſort of chair, contrived for a woman in labour to ſit in, as being ſo made, that the weight of the child when born, ſhould help to draw away the ſecundines.

LASER *Cyrenaicum*, in the *Materia Medica*, a name ſuppoſed to be given by the ancient Greeks to the gum we at this time call ASSA *fœtida*. The word *aſſa*, or, as it was originally written, *aſa*, was evidently formed on the *laſer* of the Greeks; but there was alſo an *aſa* mentioned by the old authors very different from this, being a fragrant and ſweet-ſcented gum. This ſweet gum was evidently the *laſer* and *aſa*, or *aſſa*, of the ancient Greeks: and the *ſilphium* was the plant which produced it. This plant grew in Cyrene, and furniſhed it a long time; but in the days of Pliny it was in a manner loſt. The people of Cyrene found it more profitable to feed their cattle upon the *ſilphium*, than to gather its gum.

Pliny continues to tell us, that by the feeding cattle on this plant, it was ſo perfectly deſtroyed, in a courſe of years, that there had been, of a long time, only one plant of it ſeen, and that reckoned ſo great a curioſity, that it was ſent as a preſent to the emperor Nero.

When Cyrene no longer afforded the *ſilphium*, it was ſought for in other places. The original *aſa* or *laſer*, had the ſmell of myrrh, but more mild and agreeable; and the *aſa* of ſucceeding times had that of leeks or garlic, and thence was diſtinguiſhed by the name *ſcorado laſerum*.

LASERWORT, *laſerpitium*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: it hath an umbellated flower, compoſed of many ſmall umbels; the general umbel is uniform; the flowers have five equal heart-ſhaped petals, and five ſtamina; the roundiſh germen is ſituated under the flower, which afterward becomes an oblong fruit with eight longitudinal wings or membranes, reſembling the fliers of a water-mill; the fruit divides into two parts, each containing one ſeed. There are nine ſpecies.

Theſe plants grow naturally in the ſouth of France, in Italy, and Germany, and are preſerved in botanic gardens for the ſake of variety; they have no great beauty. It is generally ſuppoſed, that the *ſilphium* of the ancients was procured from one ſpecies of this genus, but from which of them we are at preſent ignorant. All the ſpecies if wounded, drop a very acrid juice, which turns to a reſinous gummy ſubſtance, very acrimonious. This was externally applied by the ancients to take away black and blue ſpots that came by bruiſes and blows, as alſo to take away excreſcences: it was alſo by ſome of the ancients preſcribed in internal medicines, but others have cautioned people not to make uſe of it this way, from the effects which they mention to have ſeen produced from the violence of its acrimony.

All theſe plants are extremely hardy, ſo will thrive in moſt ſoils and ſituations. They are propagated by ſeeds, which, ſown in autumn, will afford plants in the ſpring, that may be tranſplanted in the following autumn. Miller.

LASH, or LACE, in the *Sea-Language*, ſignifies to bind or make faſt.

Laſhing, which alſo denotes a piece of rope uſed to faſten or ſecure any moveable body in a ſhip, or about her maſts, ſails, and rigging, is chiefly uſed for binding up to the ſhip's ſide, muſkets, buts of water or beer, or pieces of timber, to make ſpare top-maſts.

LASHERS are properly thoſe ropes only which bind faſt the tackles, and the breeches of the ordnance, when they are haled or made faſt, within board.

LASK, a term uſed by *Farriers*, for a looſeneſs in horſes, often fatal to them.

LASKETS, or LATCHES, in a *ſhip*, are ſmall lines, like loops, faſtened by ſewing into the bonnets and drablers, in order to lace the bonnets to the courſes, or the drablers to the bonnets.

LASKING, a ſea-term for going large, or VEERING.

LASSITUDE, among *Phyſicians*, expreſſes that wearineſs, or heavineſs, of members, that proceeds from a diſtempered ſtate of body, and not from exerciſe; either from an increaſe of bulk, a diminution of proper evacuation, or too great a conſumption of that fluid which is neceſſary to maintain the force and ſpring of the ſolids; as in fevers, and convulſions: or from a vitiated ſecretion of that juice, whereby the fibres are not ſupplied either in due quantity or quality.

The remedy, in the firſt caſe, is evacuation; in the latter, a proper diet, or ſuch alterative medicines as influence ſuch a ſecretion.

LAST, or LEST, in general, ſignifies the burden or load of a ſhip.

LAST is alſo uſed for a certain weight and meaſure; which is various in various countries; though, in the general, the *laſt* is eſtimated at four thouſand pounds WEIGHT.

A *laſt* of cod-fiſh, white herrings, meal, and aſhes for ſoap, is twelve barrels; of corn, or rape-ſeed, ten quarters; of gunpowder, twenty-four barrels, or two thouſand four hundred pounds weight; of red-herrings, twenty cades; of hides, twelve dozen; of leather, twelve dickers; of pitch, or tar, fourteen barrels; of wool, twelve ſacks; of ſtock-fiſh, a thouſand; of flax, or feathers, one thouſand ſeven hundred pounds weight.

LAST, in the marſhes of Kent, a court held by the twenty-four jurats, and ſummoned by the bailiffs; wherein orders are made to lay and levy taxes, impoſe penalties, &c. for the preſervation of the ſaid marſhes.

LAST *Heir*, is he to whom lands come by eſcheat, for want of lawful heirs; which in many caſes, is the lord whereof they are held; but in others the king.

LAST *Will*. See WILL.

LAST, *Port*. See PORT-*Laſt*.

LASTAGE, or LESTAGE, according to Raſtal, is a duty exacted in ſome fairs and markets, for carrying things bought whither one will.

LASTAGE, according to another author, is properly that cuſtom which is paid for wares ſold by the *laſt*.

In the law of Ric. II. *laſtage* is taken for the BALLAST, or for lading of a ſhip.

LASTAGE is ſometimes alſo uſed for garbage, rubbiſh, or ſuch filth.

LATCHETS. See LASKETS.

LATE *Flowers*. See FLOWERS.

LATEEN-*Sail*, in *Sea Language*, a long triangular ſail extended by a *lateen*-yard, frequently uſed by xebecs, polacres, ſettees, and other veſſels navigated in the Mediterranean ſea.

LATENT *acids*. See ACID.

LATERAL. See COLLATERAL, MULTILATERAL, and QUADRILATERAL.

LATERAL *equation*, in *Algebra*, denotes a ſimple equation, an EQUATION whoſe root is only of one dimenſion.

LATERAL *line*. See LINE.

LATERAL *palſy*. See PALSY.

LATERAL *operation*. See LITHOTOMY.

LATERALIS *morbus*, a name given by ſome writers to the PLEURISY.

LATERALIS *naris muſculus*, in *Anatomy*, a name given by many authors to that muſcle of the face which Albinus has called from its office, the *levator labii ſuperioris alæque naſi*. It is alſo called the *obliquus naſi*.

LATERALIS *rectus capitis*. See RECTUS.

LATERAN was originally the proper name of a man, whence it deſcended to an ancient palace in Rome, and to the buildings ſince erected in its place; particularly a church called *St. John of Lateran*; which is the principal ſee of the popedom.

LATERAN, *councils of the*, are thoſe held in the baſilica of the *Lateran*: of theſe there have been five, held in 1123, 1139, 1179, 1215, and 1513.

LATERAN, *Canons regular of the Congregation of the*, is a congregation of regular canons, whereof that church is the principal place, or ſeat.

It is pretended there has been an uninterrupted ſucceſſion of clerks, living in community from the time of the apoſtles; and that a number of theſe were eſtabliſhed in the *Lateran* in the time of Conſtantine. But the canons were not introduced till the time of Leo I. and theſe held the church eight hundred years, till the reign of Boniface, who took it from them, and placed ſecular canons in their room: one hundred and fifty years after, the regulars were reinſtated.

A LATERE, a Latin term uſed to denote the qualification of cardinals, whom the pope ſends as legates into foreign courts; who are called cardinals *à latere*, as being his holineſs's counſellors in ordinary, and aſſiſtants. See LEGATE.

The guards of princes were heretofore called *laterones*, becauſe always attending at their ſides, *à latere*.

Du-Cange, in his Gloſſary, ſays there were anciently counts *à latere*, and monitors *à latere*.

LATERCULUM, among the *Romans*, was uſed for a roll or liſt of all the magiſtrates and military officers under the Roman emperors, with an account of their reſpective offices and fees.

LATEX, in *Chemiſtry*, a name by which Van Helmont has, in ſome of his writings, called the famous menſtruum, which he boaſts Paracelſus and himſelf to have been poſſeſſed of, and which he uſually calls ALKAHEST.

LATH, in *Building*, a long, thin, narrow ſlip of wood, nailed on the rafters of a roof, in order to ſuſtain the covering. Theſe are what Feſtus calls *ambrices*; in other Latin writers they are denominated *templa*; and by Gregory of Tours, *ligaturæ*.

Laths are divided into three kinds, with regard to the different woods they are made of; viz. *heart of oak laths*, *ſap laths*, and *deal laths*: the two laſt are uſed only for ceiling and partitioning, and the firſt only for tiling.—*Laths* are alſo diſtinguiſhed, with regard to their length, into *five* feet, *four* feet, and *three* feet *laths*: though the ſtatute allows but of two lengths; viz. thoſe of five feet, and of three; each of which are to be an inch and half in breadth, and half an inch in thickneſs.

Lath-*bricks*, a particular ſort of *bricks* made in ſome parts of England of twenty-two inches long, and ſix inches broad, which are uſed in the place of laths, or ſpars, ſupported by pillars in *caſts*, for the drying of malt. This is an excellent contrivance; for beſide that they are not liable to fire as the wooden *laths* are, they retain the heat vaſtly better; ſo that being once heated, a very ſmall quantity of fire will keep them ſo. Plott's Oxfordſhire, p. 257. See Brick.

LATHE, or **Leathe**, a very uſeful engine for the turning of wood, ivory, and other materials.

The invention of the *lathe* is very ancient: Diodorus Siculus ſays, the firſt who uſed it was a grandſon of Dædalus, named Talus. Pliny aſcribes it to Theodore of Samos; and mentions one Thericlis, who rendered himſelf very famous by his dexterity in managing the *lathe*.

The Greek and Latin authors make frequent mention of the *lathe*; and Cicero calls the workmen who uſed it *vaſcularii*. It was a proverb among the ancients, to ſay a thing was formed in the *lathe*, to expreſs its delicacy and juſtneſs.

The *lathe* is compoſed of two wooden cheeks or ſides, parallel to the horizon, having a groove, or opening, between; perpendicular to theſe are two other pieces, called *puppets*, made to ſlide between the cheeks, and to be fixed down at any point, at pleaſure.

Theſe have two points, between which the piece to be turned is ſuſtained; the piece is turned round, backwards and forwards, by means of a ſtring put round it, and faſtened above to the end of a pliable pole, and underneath to a treddle, or board moved with the foot: there is alſo a reſt which bears up the tool, and keeps it ſteady.

As it is the uſe and application of this inſtrument that makes the greateſt part of the art of turning, we refer the particular deſcription thereof, as well as the manner of applying it in various works, to that head. See Turning.

Lathe, in *Law*. See Lethe.

LATHRÆA, in *Botany*, the name given by Linnæus to the plant called by Tournefort *clandeſtina*. This, in the Linnæan ſyſtem of botany, is alſo a diſtinct genus of plants of the *didynamia angioſpermia* claſs; the characters of which are, that the cup is compoſed of one leaf, ſtanding erect, and repreſenting a bell, with its rim deeply divided into four ſegments; the flower is compoſed of a ſingle petal, in form of a tube, longer than the cup, with a gaping and bellied mouth; the upper lip of the flower is hooded, and is broad and concave, with a narrow crooked extremity; the under one is ſmaller, crooked, obtuſe, and divided into three parts; the ſtamina are two pointed filaments, of the length of the flower, hid beneath the upper lip; the antheræ are two on each filament, obtuſe above, and narrower below; the piſtil has a roundiſh germen, a thread-like ſtyle of the ſame length with the ſtamina, and placed in the ſame manner with them, and a truncated ſtigma; the fruit is a roundiſh, obtuſe, but pointed capſule, containing one cell, having two valves, and is very elaſtic.

LATHREVE, **Leidgreve**, or **Trithingreve**, was an officer under the Saxon government, who had authority over a third part of the county; and whoſe territory was therefore called trithing, otherwiſe a leid or leithin, in which manner the county of Kent is ſtill divided; and the rapes in Suſſex ſeem to anſwer to the ſame. As to the juriſdiction of this officer, thoſe matters that could not be determined in the hundred court, were thence brought to the trithing; where all the principal men of the three or more hundreds being aſſembled by the *lathreve*, or *trithingreve*, did debate and decide it: or if they could not, then the *lathreve* ſent it up to the county court, to be there finally determined.

LATHYRIS, in *Botany*, a name given by many authors to a ſpecies of tithymal, or spurge, commonly known by the name of *tithymalus latifolius*, the broad-leaved ſpurge, and called by ſome alſo catapuTIA.

LATHYRUS, in *Botany*. See *Chichling* Vetch.

LATIAR, a feaſt, or ceremony, inſtituted by Tarquinius Superbus, in honour of Jupiter Latiaris, or Latialis. Tarquin, having made a treaty of alliance with the Latins, propoſed, in order for perpetuating it, to erect a common temple, where all the allies, the Romans, Latins, Hernici, Volſci, &c. ſhould aſſemble themſelves every year, hold a kind of fair, exchange merchandizes, feaſt, ſacrifice, and make merry together. Such was the inſtitution of the *Latiar*. The founder only appointed one day for this feaſt; the firſt conſul added another to it, upon concluding the peace with the Latins; and a third was added, after the people who had retired to the Mons Sacer were returned to Rome; and a fourth, after appeaſing the ſedition raiſed on occaſion of the plebeians aſpiring to the conſulate.

Theſe four days were called the *Latin* feriæ; and all things done during the courſe of the feriæ, as feaſts, ſacrifices, offerings, &c. were called *Latiares*.

LATIBULUM, a word uſed by ſome medical writers for the fomes, or latent matter, which is the occaſion of fevers and other diſorders.

LATICLAVIUM, or **Latus-clavus**, a garment which was a diſtinction and dignity among the Romans, contradiſtinguiſhed from the anguſticlavium.

The *lati-clavium* was a kind of tunic or long coat, faced with one or two ſlips of purple, applied lengthwiſe to the two ſides of the tunic.

In the *latus-clavus* theſe ſlips were pretty broad, and in the anguſtus-clavus narrower; though there is nothing about which the learned differ more than the difference between thoſe two habits.

There were buttons ſet on the *latus-clavus*, which appeared like the heads of large nails; whence ſome think it took its name.

The ſenators, prætors, and the chief magiſtrates of colonies and municipal cities, had a right to wear it. The robe called prætexta was worn over the *latus-clavus*. When the prætor pronounced ſentence of death, he put off the prætexta; but retained the *latus-clavus*.

LATIN, a dead language, firſt ſpoken in Latium, and afterwards at Rome, and ſtill uſed in the Romiſh church, and among men of letters.

Some authors rank the *Latin* among the number of original languages, but by miſtake: it is formed principally from the Greek, and particularly from the Æolic dialect of that tongue; though it has a great number of words which it borrowed from the languages of the Etruſci, Oſci, and other ancient people of Italy; and foreign commerce and wars, in courſe of time, added a great many more.

The *Latin* is a ſtrong, nervous language, perfectly ſuitable to the character of the people who ſpoke it. The Romans were engaged in wars and commotions, foreign and domeſtic, which for ſeven hundred years engroſſed all their thoughts. Hence, therefore, ſays the ingenious Mr. Harris, their language became like their ideas, copious in all terms, expreſſive of things political, and well adapted to the purpoſes both of hiſtory and popular eloquence. But the Romans were no philoſophers; and hence the unfitneſs of their language to this ſubject; a defect, which even Cicero is compelled to confeſs, and more fully makes appear, when he writes philoſophy himſelf, from the number of terms he is obliged to invent. Harris's Hermes, p. 411, &c.

The *Latin* is more figurative than the Engliſh, leſs pliant than the French, leſs copious than the Greek, leſs pompous than the Spaniſh, leſs delicate than the Italian, but cloſer and more nervous than any of them.

For a while the *Latin* tongue was confined almoſt wholly within the walls of Rome; nor would the Romans allow the common uſe of it to their neighbours, or to the nations they ſubdued. Cicero obſerved, that even in his time, Greek was uſed almoſt among every people, but the *Latin* only confined to a very narrow compaſs. By degrees they were brought to grant the uſe of it as a favour; and, in time, became ſenſible of the neceſſity there was of its being generally underſtood, for the conveniency of commerce: and accordingly uſed their utmoſt endeavours, that all the nations ſubject to their empire ſhould be united by one common language: ſo that at length they impoſed that as a law, which they had before granted as a favour.

After the tranſlation of the ſeat of the empire from Rome to Conſtantinople, the emperors of the Eaſt, being always deſirous of retaining the title of Roman emperors, appointed the *Latin* to be ſtill retained in uſe, both in their reſcripts and edicts, as appears by the conſtitutions of the eaſtern emperors, collected in the Theodoſian Code; but at length the emperors, neglecting the empire of the Weſt, abandoned all care of the *Latin* tongue, and allowed their judges to paſs ſentence in Greek; and, accordingly, we find the emperor Juſtinian's Novels are compoſed in Greek.

Charlemagne, coming to the empire of the Weſt, appointed the law-proceedings in ſovereign courts to be made in *Latin*; and the notaries were to draw their acts and inſtruments in the ſame tongue: this practice continued a long time through a great part of Europe; but at length it gave way, and the French took place of the *Latin*, not only in France, but, in ſome meaſure, in England too; and the reaſon given for it was, that abundance of difficulties aroſe about the underſtanding of *Latin* terms.

The *Latin*, however, was prodigiouſly degenerated and corrupted, before it came to be laid aſide. The incurſions of the Goths and Vandals into Italy brought an inundation of foreign words and phraſes into it; inſomuch that Valla and Naud call Boethius the laſt *Latin* author. By command of Theodoric, king of the Goths, it was the hard fate of this worthy man, ſays Mr. Harris, to ſuffer death; with whom the *Latin* tongue, and the laſt remains of Roman dignity, may be ſaid to have ſunk in the weſtern world. But that was not all: when it once got into the courts of juſtice, it was ſtill worſe handled; till, at laſt, being introduced amongſt the monks, and become the common language of miſſals and breviaries, it was debauched to that degree, that it was almoſt become ſcandalous to uſe it.

In this condition it was found at the time of the Reformation, when Vives, Eraſmus, &c. began to open the way for its recovery; ſince which time monkiſh Latinity has been declining, and all endeavours have been uſed to retrieve the pure language of the Auguſtan age.

It was ſaid of cardinal Bembo, that he would never read the breviary for fear of corrupting his fine *Latin*.

LATIN *bible*. See BIBLE.

LATIN *character*. See CHARACTER.

LATIN *church*, is a term uſed for the *Romiſh* or *weſtern* CHURCH, by way of oppoſition to the GREEK *church*.

LATINÆ *feriæ*. See FERIÆ.

LATION, is uſed by ſome for the tranſlation or motion of a body from one place to another.

LATISSIMUS *dorſi*, in *Anatomy*, a muſcle, ſo called from its ſhape, covering almoſt the whole back.

It has a thin, broad, tendinous beginning, which comes from the poſterior part of the ſpine of the ilium, from the ſuperior ſpines of the os ſacrum, from all the ſpines of the vertebræ of the loins, and from the ſeven lower of the thorax; it paſſes by the inferior angle of the ſcapula, from which ſome of its fleſhy fibres ſometimes ariſe; and is inſerted with the teres major, by a ſtrong and broad tendon, with which it pulls the arm downwards.

It is alſo called *ani ſcalptor*, becauſe it carries the arm to the anus. See *Tab. Anat. (Myol.) fig.* 6. *n.* 28.

LATITAT, in *Law*, a writ, whereby all men in perſonal actions are called originally to the king's bench.

It has this name, as ſuppoſing the defendant lurks, lies hid, and cannot be found in the county of Middleſex, to be taken by bill; but is gone to ſome other county, to the ſheriff whereof this writ is directed.

LATI-TENDINIS *muſculus*, in *Anatomy*, a name given by Spigelius and others to a muſcle, called by Winſlow *muſculus faſciæ latæ*, and by Albinus the *muſculus vaginæ femoris*. See MEMBRANOSUS.

LATITUDE, LATITUDO, in *Geography*, the diſtance of a place from the equator; or an arch of the meridian, intercepted between the zenith of the place, and the equator. Hence *latitude* is either *northern* or *ſouthern*, according as the place, whoſe *latitude* is ſpoken of, is on this or that ſide of the equator. Thus London is ſaid to be in 51 degrees 32 minutes northern *latitude*.

Circles parallel to the equator are called *parallels of latitude*, becauſe they ſhew the *latitudes* of places by their interſection with the meridian.

If through the poles of the world we conceive innumerable great circles drawn, theſe are called *ſecondaries* of the equator; and, by their help, the poſition of every point, either on earth or in the heavens, with regard to the equinoctial, (that is, the *latitude* of any point), is determined. See SECONDARY.

One of theſe ſecondaries, paſſing through any place on the earth's ſurface, is called the meridian of that place; and on it the *latitude* of that place is meaſured. See MERIDIAN.

The *latitude* of a place, and the elevation of the pole of that place above the horizon, are terms uſed indifferently for each other, becauſe the *latitude*, and the elevation of the pole, are always equal.

This will appear from *Tab. Geography, fig.* 3.—where the circle H Z Q repreſents the meridian, H O the horizon, Æ C Q the equator, Z the zenith, and P the pole.

Here the *latitude* of the place, or its diſtance from the equator, is the arch Z Æ; and the elevation of the pole, or its diſtance from the horizon, the arch P O.—Now the arch P Æ between the pole and the equator, is a quadrant of a circle; and the arch Z O, from the zenith to the horizon, is likewiſe a quadrant, therefore the two arches P Æ, and Z O, muſt be equal; and taking away the arch Z P, which is common to both, there will remain the arch Z Æ, equal to the arch P O; that is, the latitude of the place equal to the elevation of the pole above the horizon. Hence we have a method of meaſuring the circumference of the earth, or of determining the quantity of a degree on its ſurface; for by going directly northward, or ſouthward, till the pole be elevated one degree more or leſs, and then meaſuring that interval accurately, we ſhall have the number of miles in a DEGREE of a great circle of the earth's globe.

The knowledge of the *latitude* of the place is of the utmoſt conſequence, in geography, navigation, and aſtronomy; the methods of determining it both at ſea and land, are as follow.

The altitude of the pole, it has been already ſhewn, is always equal to the *latitude*; for which reaſon the *latitude* might be beſt found by obſerving the pole's height; but as the pole is only a mathematical point, and no ways to be obſerved by our ſenſes, its height cannot be determined in the ſame manner as that of the ſun and ſtars, &c. for which reaſon another manner has been contrived.

In order to this, a meridian line is firſt drawn; the method of doing which, ſee under the word MERIDIAN. Place a quadrant on this line, ſo that its plane may be in the plane of the meridian; then take ſome ſtar near the pole, v. gr. the pole-ſtar (which never ſets), and obſerve both its greateſt and leaſt altitude.

Let the greateſt, v. gr. be S O (*Tab. Geography, fig.* 3.) and the leaſt *s* O; the half of the difference of which P S, or P *s*, deducted from the greateſt altitude S O, or added to the leaſt *s* O, will give P O, the altitude of the pole above the horizon, which is equal to the *latitude* of the place.

The *latitude* may alſo be found by having the ſun's, or a ſtar's, declination, and meridian altitude, taken with a QUADRANT, or aſtrolabe. The method is this:

Obſerve the meridian diſtance of the ſun from the vertex or zenith, which is always the complement of his meridian altitude; correct for the DIP of the horizon and REFRACTION; and add to this the ſun's declination, when the ſun and the place are on the ſame ſide of the equator; or ſubtract the declination, when they are on different ſides; the ſum, in the former caſe, and the difference in the latter, will be the *latitude* required. But when the declination of the ſun is greater than the *latitude* of the place, which is known from the ſun's being nearer to the elevated pole than the vertex of the place is, as it frequently happens in the torrid zone, then the difference between the ſun's declination, and his zenith diſtance, is the *latitude* of the place.

If the ſun or ſtar have no declination, but move in the equinoctial that day, then the elevation of the equator will be equal to his meridian altitude; and, conſequently, his meridian altitude is the complement of the *latitude* to 90.

This latter method is beſt accommodated to the uſes of navigation, as being practicable at ſea; but the former method preferable at land. But circumſtances frequently occur at ſea, which render it impoſſible to obſerve the meridian altitude of a celeſtial object: we ſhall, therefore, ſubjoin ſome of the readieſt and moſt approved practical methods of determining the *latitude* in caſes of this kind.

For this purpoſe take one, two, or more altitudes of the ſun in the forenoon, noting by a watch the time of each; and if the meridian altitude cannot be obtained, take one, two, or more altitudes of the ſun in the afternoon, noting alſo the times by the watch: if poſſible, let the morning altitudes, if 3, be taken at equal intervals of time; if not, let the afternoon obſervations be taken at the ſame altitudes with the morning ones. Then,

1. If one morning and one afternoon obſervation are taken, when the ſun has the ſame altitude, and the name of the elevated pole is known, to find the elevation, or *latitude*. To twelve hours add the morning and afternoon times ſhewn by the watch, and half the ſum gives the time by the watch, when the ſun was on the meridian of that place, ſuppoſing no change of declination. Let the interval of time between that noon, and the time of either obſervation, be turned into degrees and minutes for the hour-angle, which is ſuppoſed to be leſs than 90°, becauſe the obſervations are within ſix hours of noon: to the logarithmic coſine of the hour-angle add the logarithmic tangent of the ſun's diſtance from the elevated pole, their ſum is the logarithmic tangent of the firſt arc, of the ſame kind with the polar diſtance; add the arithmetical complement of the logarithmic coſine of the polar diſtance, the logarithmic ſine of the altitude, and the logarithmic coſine of the aforeſaid firſt arc, their ſum is the logarithmic coſine of a ſecond arc, always leſs than 90°: the difference of the firſt and ſecond arcs is the complement of the required *latitude*, when the firſt arc exceeds the ſecond; otherwiſe the difference is the *latitude*.

2. When three zenith diſtances between the limits of 30°

and 70° are taken within an hour of noon, at equal intervals of time between 15 and 30 minutes. If the firſt and third zenith diſtances are equal, the middle one is the meridian zenith diſtance. If the two firſt or two laſt zenith diſtances are equal, from one of theſe take one eighth of the difference between it and the greater zenith diſtance, and the remainder is that on the meridian. When the three zenith diſtances are unequal, let the difference between the greateſt and middle be called A, the difference between the greateſt and leaſt be called B, the difference between B and 4 A be called C, and the difference between B and C be called D: then $\frac{C^2}{4\,D}$, will give a number of minutes, which ſubtracted from the greateſt zenith diſtance, leaves the meridian zenith diſtance.

3. When three zenith diſtances, between the limits of 30° and 70° are taken within an hour and half of noon, at unequal intervals of time: let the difference in minutes between the greateſt and middle zenith diſtances be called A, and the interval of time *a*; the difference between the firſt and laſt be called B, and the correſponding interval of time *b*. From the logarithm of the difference of the products A *b* and B *a*, take the logarithm of *b*, and call the remainder N; then add the log. of N, twice the log. of the difference between *a* and $\frac{1}{2}$ *b*, the arithmetical complement of the difference between *a* and *b*, and the arithmetical complement of the log. of *a*, and the ſum will give a log. which call M. Find the numbers correſponding to N, M, and $\frac{1}{2}$ B, call their ſum E. From 4 E take B, and call the remainder C, and B—C call D. Then the log. of 4 D, taken from twice the log. of C, give the logarithm of the correction in minutes; and the greateſt zenith diſtance diminiſhed by the correction, will give the meridian zenith diſtance.

4. When three altitudes are taken at equal intervals of time, at any diſtance from noon; find the natural ſines of the three given altitudes; call the difference between the firſt and third, D; and between the ſecond and third F. Let $E=D+2\,F$, when the degrees of the third altitude fall between thoſe of the firſt and ſecond; otherwiſe let $E=D-2\,F$. Add the log. cotang. of half one interval of time in degrees, the log. of E, and the ar. co. log. of D, each in numbers: and their ſum is the logarithmic tangent of an angle A, or of its ſupplement, if the firſt altitude exceeds the third; convert the angle A into time; to A add one interval; then the difference between this ſum and ſix hours will ſhew the time from noon, when the laſt obſervation was made. Hence, by the intervals, the other times are known relative to the noon of the place of obſervation. Add together the ar. co. log. coſine of A, the ar. co. log. ſine of one interval obſerved, and the log. of D; and their ſum is the log. of a number B; to the log. of which add twice the logarithmic ſine of half the leaſt time from noon; ſeek the number, and add it to the natural ſine of the greateſt altitude, which will give the natural ſine of the meridian altitude. The number B, leſſened by the natural ſine of the meridian altitude, gives the natural ſine of the midnight depreſſion; then the half ſum and the half difference, being taken, of the degrees and minutes anſwering to the ſines of the meridian altitude and midnight depreſſion, will give the *co-latitude* and declination. If the zenith falls between the equator and the ſun, the half ſum is the co-declination, and the half difference is the *latitude*.

5. When three altitudes are taken at unequal intervals of time: call the interval between the firſt and third times M, between the firſt and ſecond, *m*, between the ſecond and third, *n*, and convert M, *m*, *n*, into degrees; find the natural ſines of the three obſerved altitudes; call the difference between the firſt and third D, and between the ſecond and third F; add the log. ſines of $\frac{1}{2}m$ and $\frac{1}{2}n$, for the log. of $\frac{1}{2}$ A; and the log. coſine of $\frac{1}{2}m$ to the log. ſine of $\frac{1}{2}n$ for the log. of $\frac{1}{2}$ B: add the ar. co. log. of D, the log. of F, and the log. ſine of $\frac{1}{2}$ M, for the log. of $\frac{1}{2}$ C: take the difference between $\frac{1}{2}$ B and $\frac{1}{2}$ C, and call it $\frac{1}{2}$ E: or let $\frac{1}{2}$ E be the ſum of $\frac{1}{2}$ B and $\frac{1}{2}$ C, when the degrees in the third altitude fall between thoſe of the firſt and ſecond. From the log. of $\frac{1}{2}$ E take the log. of $\frac{1}{2}$ A, the remainder, adding 10 to the index, is the logarithmic tangent of an arc G; or of its ſupplement, when the firſt altitude exceeds the ſecond. Take the difference between G, and the complement of $\frac{1}{2}$ M, the remainder is an arc H, ſhewing the time from noon when the laſt altitude was taken: hence the other times are known. Add the ar. co. log. coſine of G, the ar. co. log. ſine of $\frac{1}{2}$ M, and the log. of D, their ſum is the log. of a number I: to log. of I add twice the log. ſine of $\frac{1}{2}$ H for the log. of K, which, added to the natural ſine of the third altitude, will give the natural ſine of the meridian altitude; and the number I, diminiſhed by the natural ſine of the meridian altitude, gives the natural ſine of the midnight depreſſion; the half ſum and half difference of the degrees ſhewing the meridian altitude and midnight depreſſion, will give the *co-latitude* and declination, or co-declination and *latitude*, when the zenith falls between the ſun and the equator.

6. When two altitudes of the ſun, the interval of time between the two obſervations, the ſun's declination, and the *latitude* by dead reckoning, are given; to find the true *latitude*. 1. Convert the interval of time into degrees, and take its half; take alſo the half ſum and half difference of the two altitudes. 2. Add the five following logarithms; viz. log. coſine of the half ſum of the two altitude; log. ſine of the half difference of the two altitudes; ar. co. log. ſine of the half interval; ar. co. log. coſine of the declination, and ar. co. log. coſine of the *latitude* by account; their ſum is the log. ſine of an arc. 3. Half the difference between this arc and the half interval, is half a time from noon. 4. Then add the log. coſine of the declination, log. coſine of the *latitude* by account, and twice the log. ſine of half a time from noon, in degrees: the number anſwering to the log. of this ſum, doubled, is the correction; which being added to the natural ſine of the greateſt obſerved altitude, gives the natural ſine of the meridian altitude, whence the *latitude* is known. In order to know whether the *latitude* thus found be accurate, make a ſecond operation: thus, to the ſum of the firſt four logs. uſed in the ſecond article of the preceding operation, add the ar. co. log. coſine of the *latitude*, found by art. 4. the ſum is the log. ſine of an arc. Proceed by the third and fourth articles for a corrected *latitude*; and if it comes out the ſame, within a minute or two, as that found above, it may be eſteemed the true *latitude*; or, if the difference between the reſults of the two operations do not exceed about $\frac{1}{4}$th of the difference between the *latitude* aſſumed, and that firſt found, the laſt reſult may be accounted ſufficiently correct. But if the difference is much greater than the ſaid $\frac{1}{4}$th part, then a third operation with the laſt found *latitude* will generally give the *latitude* exact enough. When the *latitudes*, found by the firſt and ſecond operations, have one greater and one leſs than the *latitude* by account, or if they differ by a degree or more, make a third operation with the half ſum or mean of theſe two *latitudes*; and if the *latitude* found differs from the ſaid mean, then half their ſum will generally give the *latitude* very near the truth. When both obſervations are made in the forenoon, or both in the afternoon, the half interval is half the difference of the times from noon, and the firſt found arc is half the ſum of the times from noon: but when the obſervations occur, one before and the other after noon, the $\frac{1}{2}$ interval is the $\frac{1}{2}$ ſum, and the firſt found arc is the half difference of the times from noon; the $\frac{1}{2}$ difference added to the $\frac{1}{2}$ ſum, gives the time of the obſervation fartheſt from noon; and the $\frac{1}{2}$ difference taken from the $\frac{1}{2}$ ſum, gives the time of the obſervation neareſt to noon. The times of obſervation are beſt when taken to ſeconds, or at leaſt to quarters or thirds of a minute of time: they are alſo beſt when taken between the times of 9 h. A. M. and 3 h. P. M. and the interval between them ſhould not exceed five hours, nor be much leſs than the time from noon at the taking of the greateſt altitude; or, in general, the interval ſhould not be much leſs than about $\frac{3}{4}$ of an hour.

Mr. John Douwes of Amſterdam contrived, in 1740, ſolar tables for the ſolution of this problem, which were publiſhed in 1759. Dr. Pemberton communicated to the Royal Society the whole conſtruction of theſe tables, &c. in a paper publiſhed in the Phil. Tranſ. vol. li. art. 81. But the preceding ſolution requires no other tables than are found in the common books of navigation; though the ſolar tables, ſuch as may be found in the Nautical Almanack for 1771, may ſave ſome time in the computation. See the principles on which the preceding problems are founded, mathematically demonſtrated, and their uſe illuſtrated by examples, in Robertſon's Elm. of Navigation, book v. and book ix. See alſo Nautical Almanack for 1771.

Mr. Richard Graham contrived an inſtrument for taking the *latitude* of a place at any time of the day. For this purpoſe, to the meridian of a globe properly divided, he adapts a piece of a like meridian, called the beam-compaſs, divided in the ſame manner, and ſliding under the meridian: to theſe circles, and to five minutes of their degrees, are fitted two ſliding Vernier's ſcales, in ſuch a manner, that a wire fixed at 0 degree at the centre or end of the beam-compaſs, ſhall paſs through a hole at the beginning of the diviſions of one Vernier, which is to ſlide on the meridian, that wire ſerving as the centre of motion of the beam-compaſs, when the Vernier is ſcrewed to the meridian; the other Vernier is to ſlide on the beam-compaſs, and carry with it a pointer, or index, at the beginning of its diviſions.

With this inſtrument the problem is thus ſolved. At the time of the firſt obſervation, let the ſun's bearing be alſo obſerved, and take the difference between the rhumb on which the ſun was obſerved, and the rhumb on which the ſhip ſteered between the obſervations: then ſay,

As radius is to the coſine of that difference of rhumbs; ſo is the diſtance run between the obſervations, to the minutes of correction to be applied to the firſt zenith diſtance, and is to be added when the ſhip ſails from the ſun, otherwiſe it is to be ſubtracted.

Then ſlide the Vernier's ſcale on the meridian to the given declination, and the Vernier on the beam-compaſs to the firſt zenith diſtance as corrected, and let theſe ſcales be fixed by their ſcrews: rectify the globe for noon, turn it till the hour-index points at the time of the firſt obſervation, there hold the globe faſt, and move the beam-compaſs on its centre, nearly into the azimuth of the ſun at that obſervation, and deſcribe an arc on the globe with the pointer of the Vernier; ſlide the Vernier on the beam-compaſs to the ſecond obſerved zenith diſtance; turn the globe (the proper way) till the hour-index points at the time of the ſecond obſervation, there hold the globe faſt, and with the beam-compaſs cut the former arc, their interſection will ſhew the place of the ſhip at the time of the ſecond obſervation: bring the meridian over that point, and the *latitude* is found; alſo the hour-index will point at the true time of the day when the laſt obſervation was made. Phil. Tranſ. N° 435. or abridg. vol. viii. p. 371.

LATITUDE, in *Aſtronomy*, is the diſtance of a ſtar or planet from the ecliptic.

Or, it is an arch of a great circle, T S (*Tab. Aſtron. fig.* 14. *n.* 2.) intercepted between the centre of the ſtar S, and the ecliptic E L, and perpendicular thereto.

Through the poles of the ecliptic are ſuppoſed to paſs an indefinite number of great circles, cutting the ecliptic at right angles, called *circles of latitude*, or ſecondaries of the ecliptic; by means of which every ſtar, and point of the heavens, is reduced to the ecliptic, and has its place in regard thereto determined; the *latitude* of a ſtar being an arch of one of theſe ſecondaries, intercepted between that ſtar, and the point where it interſects the ecliptic.

In which the *latitude* differs from the *declination*, which is the diſtance of a ſtar from the equator, towards one of the poles of the world.

So that the geographical *latitude* is the ſame thing with the aſtronomical declination; and the aſtronomical *latitude* a quite different thing.

The *latitude* of a planet is an angle, as PTR (*Tab. Aſtronomy, fig.* 26.) under which a planet's diſtance from the ecliptic P R is ſeen on the earth.

The ſun never has any *latitude*, but the planets have; for which reaſon, in the common ſphere, the zodiac has ſome breadth. The ancients only allowed ſix degrees on each ſide the ecliptic, but the moderns have extended it to nine.

When they have no *latitude*, they are ſaid to be in the *nodes* of the ecliptic, or in the interſection of their orbit with that of the ſun; and in this ſituation it is that they eclipſe, or are eclipſed by, the ſun.

LATITUDE, *circle of*, is a great circle, M S T *m*, paſſing through the poles of the ecliptic. See CIRCLE.

LATITUDE *of the moon, north aſcending*, is when ſhe proceeds from the aſcending node towards her northern limit, or greateſt elongation.

LATITUDE, *north deſcending*, is when the moon returns from her northern limit to the deſcending node.

LATITUDE, *ſouth deſcending*, is when ſhe proceeds from the deſcending node to her ſouthern limit.

LATITUDE, *ſouth aſcending*, is when ſhe returns from her ſouthern limit to her aſcending node.

And the ſame holds good of the other planets. See ASCENDING and DESCENDING.

LATITUDE, *heliocentric, of a planet*, is its diſtance from the ecliptic, ſuch as it is ſeen from the ſun.

This when the planet comes to the ſame point of its orbit, is always the ſame, and unchangeable.

LATITUDE, *geocentric, of a planet*, is the diſtance of the planet from the ecliptic, as it is ſeen from the earth.

This, though the planet be in the ſame point of its orbit, yet is not conſtantly the ſame, but alters according to the poſition of the earth, in reſpect to the planet. See HELIOCENTRIC, and GEOCENTRIC.

Dr. Halley has ſome conſiderations, in the Philoſophical Tranſactions, which make it probable, the *latitudes* of ſome of the principal fixed ſtars, particularly Palilicium, Sirius, and ARCTURUS, alter in time; whence it may be argued, the reſt likewiſe alter, though the variation may be leſs conſpicuous in theſe; becauſe they are ſuppoſed at a greater diſtance from us.

LATITUDE, *difference of*, is an arc of the meridian, or the leaſt diſtance of the parallels of *latitude* of two places; and it is found when theſe have the ſame name, by ſubtracting the leſſer *latitude* from the greater; and when they have contrary names, by adding them together.

LATITUDE, *parallax of.* See PARALLAX.

LATITUDE, *refraction of.* See REFRACTION.

LATITUDINARIAN, among *Divines*, denotes a perſon of moderation, with regard to religious opinions, who believes there is a latitude in the road to heaven, which may admit people of different perſuaſions. This name was given by way of diſtinction to thoſe excellent perſons in England, who, about the middle and towards the cloſe of the laſt century, endeavoured to allay the conteſts that prevailed between the more violent epiſcopalians on the one hand, and the more rigid preſbyterians and independents on the other, with reſpect to the forms of church government and public worſhip, and alſo between the Arminians and Calviniſts, with reſpect to certain religious tenets. Many of them were zealouſly attached to the forms of eccleſiaſtical government and worſhip that were eſtabliſhed in the church of England, and they recommended epiſcopacy with all their eloquence; but they did not conſider it as of divine inſtitution, and abſolutely neceſſary to the conſtitution of a Chriſtian church; and therefore they maintained that thoſe who followed other forms of government and worſhip, were not, on that account, to be excluded from their communion, or to forfeit the title of brethren. Others had no great liking for the liturgy or ceremonies, or, indeed, the government of this church, but yet for the ſake of peace and order conformed. As to the doctrinal part of religion, they took the ſyſtem of the famous Epiſcopius for their model, and, like him, reduced the fundamental doctrines of Chriſtianity, i. e. thoſe doctrines, the belief of which is neceſſary to the ſalvation, to a few points. By this manner of proceeding they ſhewed that neither the epiſcopalians, who, generally ſpeaking, embraced the ſentiments of the Arminians, nor the preſbyterians and independents, who as generally adopted the doctrine of Calvin, had any reaſon to oppoſe each other with ſuch bitterneſs and animoſity, ſince the ſubjects of their debate were matters of indifference with reſpect to ſalvation, and might be variouſly explained and underſtood, without any prejudice to their eternal intereſts.

The chief leaders of theſe *Latitudinarians* were Hales and Chillingworth: to them may be added the reſpectable names of More, Cudworth, Gale, Whitchcot, Wilkins, and Tillotſon. The firſt fruits of their charitable zeal were the odious appellations of atheiſts, deiſts, and Socinians, liberally beſtowed upon them by the Roman catholics, and the more rigid of the proteſtant contending parties. However, they were afterwards raiſed to the firſt dignities of the church, and deſervedly held in general eſteem. And at this time the church of England is chiefly governed by *Latitudinarians* of this kind; and the ſpirit of moderation and mutual charity has generally prevailed, with that of liberal enquiry, among the various ſects and denominations of Chriſtians. Moſheim's Eccl. Hiſt. vol. iv. p. 535, &c. 8vo. and Birch's Life of Tillotſon, p. 407. See COMPREHENSION.

LATOMIA, Λατομια, derived from the Greek, λας, *ſtone*, and τεμνω, *I cut*, properly ſignifies a QUARRY, or place where ſtones are dug.

Theſe were anciently uſed as gaols for criminals. Dionyſius had a place of this kind dug in a rock near Syracuſe, where an infinite number of people were ſhut up. Cicero reproaches Verres with impriſoning Roman citizens in *latomiæ*; ſo that *latomia* became a general name for a priſon; ſo the priſoners incloſed in them were called *latomarii*.

LATONA, in *Mythology*, a goddeſs of paganiſm, whoſe hiſtory is very obſcure. Heſiod makes her the daughter of Titan Coëus and Phœbe, his ſiſter. The fable adds, that Apollo and Diana were her offspring by Jupiter, and that they advanced her to the rank of celeſtial deities in ſpite of Juno. According to Herodotus, ſhe was an Egyptian deity, and was worſhipped at Buto in Egypt. The inhabitants of Delos erected a temple for her; but that at Argos was the moſt magnificent, and celebrated for her ſtatue, executed by Praxiteles. *Latona*, Venus, and Diana, were the three goddeſſes moſt in veneration among the Roman women.

LATRIA, Λατρεια, in *Theology*, a religious worſhip, due only to God.

The Romaniſts ſay, “They honour God with the worſhip of *latria*; and the ſaints with the worſhip of *dulia*:” but the terms, however diſtinct, are uſually confounded.

The worſhip of *latria*, beſides its inner characters, has its external marks to diſtinguiſh it; the principal whereof is ſacrifice, which cannot be offered to any other but God himſelf, as being a ſolemn acknowledgment, or recognition, of the ſovereignty of God, and our dependence on him.

M. Daillé ſeems to own, that ſome of the fathers of the fourth century allowed the diſtinction between *latria* and *dulia*. See ADORATION and WORSHIP.

LATTIMO, in the *Glaſs-trade*, a name for a fine milk-white glaſs. There are ſeveral ways of making it, but the beſt of all is this: take four hundred weight of cryſtal frit, and ſixty pounds of calcined tin, and two pounds and a half of prepared manganeſe; mix theſe well with the frit, and ſet them in a pot and a furnace to melt and refine. At the end of eighteen hours this will be purified; then caſt it into water, purify it again afterwards in the furnace, and make a proof of it. If it be too clear add fifteen pounds more of calcined tin; mix it well with the metal, and let it ſtand one day to purify; it will then be of a whiteneſs ſurpaſſing even that of ſnow, and is fit to work into veſſels. Neri's Art of Glaſs, p. 98. See GLASS.

LATTIN, or LATTEN, a name by which we uſed to call the plates of iron covered with tin, and now uſually called *tin*, of which our mugs, and ſuch other things are made. The principal part of the work is to prepare the leaves, beat out to a proper thinneſs, ſo as that they ſhall readily receive the tin; for if there be but the ſmalleſt particle of duſt on them, or only the ſlighteſt ruſt in any part, the tin will never fix there.

This ſmoothing of the plates is effected by ſteeping them in acid water, till the ſurface is a little preyed upon by it, and then they are ſcowered with ſand, which makes them very ſmooth and fine. By this means a woman cleans more plates in an hour, than the moſt expert workman can do otherwiſe in many days. Mr. Reaumur, to whom the world owes the diſcovery of this proceſs, mentions ſeveral waters, any one of which will ſucceed, but the Germans themſelves uſe nothing but common water, made eager with rye. This they make a great ſecret of, but the preparation is very eaſy. After they have ground the rye groſsly, they leave it to ferment in common water for ſome time; and they are thus ſure of a ſharp and eager menſtruum, excellently fitted for their purpoſe. With this liquor they fill certain troughs, or tuns, and into theſe they put ſeveral bundles of the plates of iron: and to make the liquor be more eager, and act the better on them, they keep it in ſtoves, where it has little air, and is kept warm with ſmall charcoal fires.

There are ſeveral other ways of making iron ruſt, as keeping it in a moiſt cellar, expoſing it to the dew, ſprinkling it with ſimple water, or, which is ſtill better, with water in which ſal ammoniac has been diſſolved, ſeveral times a day: and in thoſe countries where the pyrites is common, the vitriolic waters, which partake of it, will do it very well. This water may be prepared at little or no expence, only by heaping up large quantities of the pyrites, and letting it moulder in the air, then putting it into common water, and making a lixivium of it. Whichever method of ruſting the plates be uſed, it is always neceſſary to ſcower them with ſand as ſoon as it is done; and when they are thus cleaned, they muſt be immediately plunged into water, to prevent their ruſting again, and they are to be left in this water till the inſtant in which they are to be tinned, or in the language of the workmen, *blanched*. The people, employed in this part of the operation, are called *blanchers*; and the others, who aſſiſt at the cleaning the plates, the *ſcalers*. The blancher makes as great a ſecret of his art, as the ſcaler does of his; and it was with great difficulty that Mr. Reaumur obtained it. The manner of doing it is this.

They flux the tin in a large iron crucible, which has the figure of an oblong pyramid with four faces, of which two oppoſite ones are leſs than the two others. The crucible is heated only from below, its upper part being luted with the furnace all round. The crucible is always deeper than the plates, which are to be tinned, are long; they always put them in downright, and the tin ought to ſwim over them. To this purpoſe artificers of different trades prepare plates of different ſhapes, but Mr. Reaumur thinks them all exceptionable. But the Germans uſe no ſort of preparation of the iron, to make it receive the tin, more than the keeping it always ſteeped in water till the time; only when the tin is melted in the crucible, they cover it with a layer of a ſort of ſuet, which is uſually two inches thick, and the plate muſt paſs through this before it can come to the melted tin. The firſt uſe of this covering is to keep the tin from burning: as if any part ſhould take fire, the ſuet would ſoon moiſten it, and reduce it to its primitive ſtate again. The blanchers ſay, this ſuet is a compounded matter. It is indeed of a black colour, but Mr. Reaumur ſuppoſed that to be only an artifice to make it a ſecret, and that it is only coloured with ſoot, or the ſmoke of a chimney; but he found it true ſo far, that the common unprepared ſuet was not ſufficient; for after ſeveral attempts, there was always ſomething wanting to render the ſucceſs of the operation certain. The whole ſecret of blanching, therefore, was found to lie in the preparation of this ſuet; and this he at length diſcovered to conſiſt only in the firſt frying and burning it. This ſimple operation not only gives it the colour, but puts it into a condition to give the iron a diſpoſition to be tinned, which it does ſurpriſingly.

The melted tin muſt alſo have a certain degree of heat, for if it is not hot enough, it will not ſtick to the iron; and if it is too hot, it will cover it with too thin a coat, and the plates will have ſeveral colours, as red, blue, and purple; and upon the whole will have a caſt of yellow. To prevent this, by knowing when the fire has a proper degree of heat, they might try with ſmall pieces of iron; but, in general, uſe teaches them to know the degree, and they put in the iron when the tin is at a different ſtandard of heat, according as they would give it a thicker or thinner coat. Sometimes alſo they give the plates a double layer, as they would have them very thickly covered. This they do by dipping them into the tin, when very hot, the firſt time, and when leſs hot, the ſecond. The tin, which is to give the ſecond coat, muſt be freſh covered with ſuet, and that with the common ſuet, not the prepared. Philoſ. Tranſ. Nº 406. p. 634.

LATUS, in *Ichthyology*, the name of a fiſh of the coracinus, or umbra kind, caught in the Nile, and in the Adriatic and Mediterranean ſeas. It much reſembles the common coracinus, but is larger, and has not the beard which hangs from the chin in that ſpecies; and its body is ſomewhat rounder. It is eſteemed a very delicate fiſh. Rondelet. de Piſc. p. 130.

LATUS, in *Anatomy*, a name given by many authors to one of the muſcles of the anus, now generally called the *levator ani*.

LATUS *muſculus*, in *Anatomy*, is alſo a name given by Riolanus, and others, to a muſcle called by Albinus *latiſſimus colli*, and by others *platyſma myodes*, and *quadratus genæ*. Part of this muſcle ariſing from the cheek, is called by Santorini the *muſculus riſorius novus*. See QUADRATUS.

LATUS *pulſus*, a *broad pulſe*, a term uſed to expreſs that ſort of *pulſe*, in which the artery is very ſenſibly dilated at every ſtroke.

LATUS *rectum*, in *Conics*, the ſame with PARAMETER.

LATUS *tranſverſum* of the hyperbola, is a right line, intercepted between the vertices of the two oppoſite ſections; or that part of the common axis, which is between the vertices of the upper and lower cone.

Such is the line ED (*Tab. Conics*, *fig.* 1.) where alſo D*d*, and E*e*, may be the parameters belonging to the two oppoſite ſections DLRO, and OEOR.

To this *latus tranſverſum* anſwers the longeſt diameter in the ellipſis; which Apollonius call the *tranſverſe axis*, or *diameter*.

LATUS *primarium* is a right line belonging to a conic ſection, drawn through the vertex of the ſection of the cone, and within it; as the line EE, or DD, in the figure above referred to.

LAVA, is a name given by the Italians to the liquid and vitrified matter diſcharged by Veſuvius, Ætna, and other volcanos, at the time of their ERUPTION.

This *lava* is a mixture of ſtones, ſand, earth, metallic ſubſtances, ſalts, &c. calcined, rendered fuſible, and vitrified by the fire of the volcanos: but as the maſs of which it originally conſiſts is very heterogeneous, the *lava*, when cold, appears under various forms and colours.

The pureſt *lava*, is a hard black, homogeneous, compact glaſs: of this kind is the ſtone found in many parts of Peru, and called by the Spaniards *pedra di Gallinaço*. There is another ſpecies of *lava*, which is hard, heavy, and compact, like marble, and which is ſuſceptible of a very fine poliſh. This is converted at Naples to a variety of domeſtic uſes. There is another kind which is a groſſer ſtone, and commonly aſh-coloured, uſed for building and paving the ſtreets. That which is found on the ſurface is ſtill more groſs and ſpongy, and reſembles the ſcoria of metals. According to Mr. Wiegleb's Analyſis, 100 parts of it contain 65 of ſilex, 16 of argill, 5 of iron: and the remaining 14 gr. were diſſipated. Kirwan's Elem. of Miner. p. 97.

LAVACRUM, in *Botany*, a name given by ſome authors to the common wild teaſel, or *dipſacus ſylveſtris major*. Ger. Emac. Ind. 2.

LAVARETUS, in *Ichthyology*, a name of a ſmall fiſh called by ſome the *gang-fiſh*, and the *rhingau*, and by Marcgrave the *curimata*. It ſeems of a middle nature, between the trout and herring-kind, and is caught in vaſt quantities in the month of March and April, in ſeveral of the lakes in Germany, and is pickled, and ſent to different parts of the world. It ſeldom grows to more than four inches long.

LAVATERA, *tree-mallow*, in *Botany*, a genus of the *monadelphia polyandria* claſs: the characters are, that the flower has a double empalement, the outer of one leaf, ſhort, obtuſe, and trifid, the inner of one leaf, and quinquefid, and both permanent; the flower hath five petals joined at their baſe, and ſpread open above; it has many ſtamina, joined in a column below, and looſe above; they are inſerted in the petal, and terminated by kidney-ſhaped ſummits; the germen is orbicular, and ſupporting a ſhort cylindrical ſtyle, crowned by many briſtly ſtigmas; the empalement afterwards becomes a fruit with ſeveral capſules, covered in front by a hollow kind of ſhield, each capſule having one kidney-ſhaped ſeed. Miller reckons eleven and Linnæus nine ſpecies.

LAVATION, in *Antiquity*, a feaſt of the Romans, in honour of the mother of the gods, inſtituted in memory of the day when the worſhip of Cybele was transferred from Phrygia to Rome, and celebrated on the twenty-fifth of March.

LAVATORY, or LAVADERO, a name given to certain places in Chili and Peru, where gold is got out of the earth by waſhing.

M. Frezier gives us the following deſcription of the *lavatories* of Chili: they dig deep into the earth, in ſuch places as they have reaſon to expect gold in; and, in order to facilitate this digging, they turn a ſtream of water upon the ſpot, looſening the earth as much as poſſible all the time, that the current may have the greater effect, and tear up the earth more ſtrongly. When they are got to the earth they want, they turn off the ſtream, and dig dry.

The earth that they now get is carried on mules, and diſcharged into a baſon, made ſomewhat in the manner of a ſmith's bellows, into which a little rivulet of water runs with a great deal of rapidity, diſſolving the parts of the earth, and carrying every thing away with it, excepting the particles of gold, which, by their great weight, precipitate to the bottom of the baſon, and mix with a fine black ſand, where they are almoſt as much hidden as they were before in the earth. See *Hiſtory of* GOLD.

Sometimes they find very conſiderable pieces in *lavatories*, particularly ſome pieces of twenty-four ounces each. There are ſeveral *lavatories* where they find theſe pepitas, or pieces of virgin gold, of a prodigious ſize. Among others, they tell of one that weighed five hundred and twelve ounces, bought by the count de la Moncloa, viceroy of Peru.

Nine or ten leagues to the eaſt of Coquimbo are the *lavatories* of Andacoll; the gold whereof is twenty-three carats fine. Their work here always turns to great profit, excepting when the water fails them. The natives maintain that the earth is creative *(creatrix)*; that is, it produces gold continually; becauſe, after having been waſhed ſixty or eighty years, they find it impregnated afreſh, and draw almoſt as much out of it as at firſt.

LAUDANUM, a name given by the chemiſts to certain preparations, chiefly extracts of opium, on account of their excellent qualities; the word being derived from *laudare, to praiſe*.

We have divers kinds of *laudanum*; as Sydenham's *liquid laudanum, tartarized liquid laudanum*, &c. See OPIUM.

LAUDICŒNI, among the *Romans*, formed of *laus, praiſe*, and *cœna, ſupper* or *entertainment*, applauders, or perſons who, for a reward, attended the rehearſal of plays and orations in order to raiſe, or join in the acclamation. See ACCLAMATION and APPLAUSE.

LAUDS, LAUDES, the ſecond part of the ordinary office of the breviary, ſaid after matins; though heretofore, it ended the office of the night.

The *laudes* conſiſt principally of pſalms, hymns, &c. whence they took their name, from *laus, laudis, praiſe*.

LAVENDER, *lavendula*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs. Its characters are theſe: the flower, which has an oval permanent empalement of one leaf, is of the lip kind, with one petal, having a cylindrical tube ſpreading above; the upper lip is bifid and open, the under lip cut into three equal ſegments; it has four ſhort ſtamina, two of which are ſhorter than the other; it has a germen divided into four parts, which turn to four oval ſeeds ſitting in the empalement.

We have three or four ſpecies of this plant in our gardens, all which are propagated by planting their cuttings or ſlips in March, in a place where they may be ſhaded. They muſt be watered till they have taken good root, which will be in about two months; after which they may be planted out where they are to remain. They thrive beſt in an open ſituation, and gravelly ſoil. They grow faſter in richer ground, but they are there very ſubject to be deſtroyed in hard winters, and their flowers are never ſo well ſcented.

The flowers and ſummits of the narrow-leaved *lavender* are, in a very eminent degree, cephalic and nervine. They are often employed as a perfume, and medicinally as mild ſtimulants and corroborants, in palſies, vertigoes, lethargies, and tremors of the limbs, both internally and externally.

The flowers are ſometimes uſed in the form of a conſerve, into which they are reduced by beating them, while freſh, with thrice their weight of double refined ſugar. Water extracts by infuſion nearly all the virtue both of the leaves and flowers: in diſtillation with water, the leaves yield a ſmall portion of eſſential oil; but the flowers in their moſt perfect ſtate about one ounce from ſixty. This oil is of a bright yellowiſh colour, a very pungent taſte, and poſſeſſes, if carefully diſtilled, the fragrance of the *lavender* in perfection: it is given internally from one drop to five, and employed in external applications for ſtimulating paralytic limbs, and for deſtroying cutaneous inſects. Rectified ſpirit extracts the virtue of *lavender* more completely than water. The ſimple ſpirit of *lavender*, prepared by pouring a gallon of proof ſpirit on a pound and a half of the freſh-gathered flowers, and drawing off five pints by the heat of a water-bath, is richly impregnated by the fragrance of the flowers. More compounded ſpirits, in which other aromatics are joined to the *lavender*, have been diſtinguiſhed by the name of Engliſh or palſy drops: the college of London directs three pints of the ſimple ſpirit of *lavender*, and one pint of ſpirit of roſemary, to be digeſted on half an ounce of cinnamon, half an ounce of nutmegs, and three drams of red ſaunders, as a colouring ingredient: the college of Edinburgh orders a gallon and half of rectified ſpirit of wine to be drawn over from three pounds of freſh *lavender* flowers, one pound of thoſe of roſemary, and three ounces of lemon peel; and afterwards three ounces of cinnamon, one of cloves, one of cubebs, and two of red ſaunders, to be macerated for three days in the diſtilled ſpirit. Theſe preparations are taken internally on ſugar or in any convenient vehicle from ten to one hundred drops, and uſed externally in imbrocations, &c. Lewis's Mat. Med.

The broad-leaved *leavender*, to which foreign writers have given the name of SPIKE, appropriated by ſome of ours to the firſt, is ſtronger both in ſmell and taſte than the other, and yields in diſtillation almoſt thrice as much eſſential oil; but the flavour of the oil and of the plant itſelf is much leſs grateful: the oil is likewiſe of a much darker colour, inclining to green. Lewis. See *Oil of* SPIKE.

LAVENDER, *cotton, ſantolina*, in *Botany*, a genus of the *ſyngeneſia polygamia æqualis* claſs. Its characters are theſe: it has a compound flower, with a ſcaly hemiſpherical empalement; the flower is uniform, compoſed of many funnel-ſhaped hermaphrodite florets, which are longer than the empalement, cut into five parts at the top, and which turn backward; they have five very ſhort hair-like ſtamina, terminated by cylindrical ſummits; and an oblong four-cornered germen, ſupporting a ſlender ſtyle, crowned by two oblong depreſſed torn ſtigmas; the germen becomes a ſingle oblong four cornered ſeed, which is either naked, or crowned with very ſhort down, and ripening in the common empalement. Miller enumerates twelve ſpecies, one of which is known by the name of *female* SOUTHERNWOOD.

LAVENDER, *French*. See CASSIDONY.

LAVENDER, *ſea, limonium*, in *Botany*, is joined by Linnæus to the genus of STATICE. Its characters are theſe: the flowers have an imbricated perianthium, and are funnel-ſhaped, compoſed of five petals; it has five awl-ſhaped ſtamina, crowned by proſtrate ſummits; and a ſmall germen crowned by pointed ſtigmas; the empalement of the flower becomes a capſule ſhut cloſe at the neck, but expanded above where the ſeeds are lodged. There are twelve ſpecies. Miller.

The common *ſea-lavender* is an aſtringent, and is given with good ſucceſs againſt diarrhœas, dyſenteries, profluvia of the menſes, and hæmorrhages of all kinds. The roots and leaves are the parts moſt uſed.

LAVENDER, *hollow-leaved ſea*, or SIDE-*ſaddle flower, ſarracena*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the flower has a double empalement, the under compoſed of three oval leaves which fall away, and the upper having five coloured leaves which are permanent; it has five oval inflexed petals, which incloſe the ſtamina, whoſe tails are oblong, oval, and erect, and a great number of ſmall ſtamina, terminated by target-ſhaped ſummits; in the centre is ſituated a roundiſh germen, ſupporting a ſhort cylindrical ſtyle, crowned by a target-ſhaped, five-cornered ſtigma covering the ſtamina, and is permanent; the germen becomes a roundiſh capſule, with five cells, filled with ſmall ſeeds. There are two ſpecies.

Theſe plants are eſteemed for the ſingular ſtructure of their leaves and flowers; but there is ſome difficulty in getting them to thrive in England. They grow naturally on the bogs of North America and Carolina.

LAVER, in *Botany*. See TREMELLA and ULVA.

LAVER *bread*, a ſort of food made of a ſea-plant, otherwiſe called the *oiſter-green*, or *ſea-liverwort*. It is ſaid to be uſed in the county of Glamorgan, and other parts of Wales.

LAVER, in *Scripture Hiſtory*, a ſacred utenſil placed in the court of the Jewiſh tabernacle, conſiſting of a baſon, whence they drew water by cocks, for waſhing the hands and feet of the officiating prieſts, and alſo the entrails and legs of the victims.

LAVERNA, in *Antiquity*, the goddeſs of thieves and cheats among the Romans, who honoured her with public worſhip, becauſe ſhe was ſuppoſed to favour thoſe who wiſhed that their deſigns might not be diſcovered. Varro ſays, that ſhe had an altar near one of the gates of Rome; hence called *Porta Lavernalis*.

LAUGERIA, in *Botany*, a genus of the *pentandria monogynia* claſs; the corolla is divided into five ſegments; and the fruit is a drupe, incloſing a five-celled nucleus.

LAUGHER, a name given to a particular ſpecies of pigeon, called by Moore the *columba ridens*. It is about the ſize of the common pigeon, and much of the ſame make; but it has a very bright pearl-coloured eye, almoſt white, and is a mottled red, or blue. They are ſaid to be brought from Jeruſalem, and the country thereabouts. When the cock of this ſpecies courts the hen, he has a guttural cooing, not unlike the guggling of a bottle of water, when poured out haſtily; and after this he always makes a noiſe not unlike laughing, from the ſingularity of which he has obtained his name.

LAUGHTER, an action or paſſion peculiar to man.

Authors attribute *laughter* to the fifth pair of nerves, which ſending branches to the eye, ear, lips, tongue, palate, and muſcles of the cheek, parts of the mouth, præcordia, *&c.* there hence ariſes a ſympathy, or conſent, between all theſe parts; ſo that when one of them is acted upon, the others are proportionably affected.

Hence a ſavoury thing ſeen or ſmelt, affects the glands and parts of the mouth, a thing ſeen or heard, that is ſhameful, affects the cheek with bluſhes; on the contrary, if it pleaſe and tickle the fancy, it affects the præcordia and muſcles of the mouth and face, with *laughter*; if it cauſes ſadneſs and melancholy, it likewiſe affects the præcordia, and demonſtrates itſelf by cauſing the glands of the eyes to emit tears.

Dr. Willis accounts for the pleaſure of kiſſing from the ſame cauſe; the branches of this fifth pair being ſpread to the lips, the præcordia, and the genital parts; whence ariſes a ſympathy between thoſe parts.

LAVIGNON, the name of a French ſhell fiſh, common on the coaſt of Poitou, of the chama kind, having a very thin pair of ſhells for its covering, and which never can ſhut cloſe, in the manner of the oiſter, or muſcle, or other common bivalve ſhells: the fiſh therefore always buries itſelf in the mud by way of ſecurity. The ſhells are very ſmooth and poliſhed, eſpecially on the inſide, and they are naturally white. This colour they always retain within, though their outer ſurface is often tinged black by the mud.

They are often buried five or ſix inches deep in the mud, but it is always eaſy to know where they are, becauſe they muſt keep a free communication with the water above, by means of a round aperture, of about a tenth of an inch diameter, which opens from the ſurface of the mud to every ſhell-fiſh. When the ſhells of this fiſh are opened to their utmoſt width, it is eaſy to ſee a ſort of arm with which each is furniſhed, in the manner of the common muſcle, for its progreſſive motion. This part ſerves them to bury themſelves in the mud, and to raiſe themſelves out of it again, when they are inclined to ſeek a new habitation; unto which it makes its way in a more ſpeedy manner than would eaſily be thought. When the creature is plunged to its proper depth under ground, it receives the benefit of the water above, by means of two pipes, or proboſcides, which have each a double aperture at their ends. Theſe take in water, and throw it out again, altenately, for the uſes of the animal, and either of the two is indifferently qualified to anſwer either purpoſe. The fiſh has a power of lengthening, or ſhortening theſe pipes at pleaſure, and, when it pleaſes, takes them wholly into the ſhell. Mem. Acad. Par. 1710.

LAVIN, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a ſpecies of hawk, a bird of great beauty, being variegated all over with yellow, black, and white. They call it alſo SICUB.

LAUNCE, in *Ichthyology*. See AMMODYTES.

LAUNCEGAYS, in our *Old Writers*, a kind of offenſive weapons now diſuſed, and prohibited by the ſtatute 7 Rich. II. cap. 13.

LAUNCH, in the ſea phraſe, is *to put out*: thus they ſay *launch the ſhip*; that is, put her out of the dock, or out of the key, &c.

To facilitate the operation of *launching*, the ſhip, when ſhe is firſt built, is ſupported by ſtrong platforms, laid with a gradual inclination to the water, on the oppoſite ſides of her keel, to which they are parallel. Upon the ſurface of this declivity are placed two correſponding ranges of planks, which compoſe the baſe of a frame, called the CRADLE, whoſe upper part envelopes the ſhip's bottom, to which it is ſecurely attached. Thus, the lower ſurface of the cradle, conforming exactly to that of the frame below, lies flat upon it, lengthways, under the oppoſite ſides of the ſhip's bottom; and as the former is intended to ſlide downwards upon the latter, carrying the ſhip along with it, the planes or faces of both are well daubed with ſoap and tallow. The neceſſary preparations for the *launch* being made, all the blocks and wedges by which the ſhip were formerly ſupported, are driven out from under her keel, till the whole weight gradually ſubſides upon the platforms, which are accordingly called the ways. The ſhores and ſtanchions, by which ſhe is retained upon the ſtocks till the time of *launching*, are at length cut away, and the ſcrews applied to move her, if neceſſary. The motion uſually begins at the inſtant when the ſhores are cut, and the ſhip ſlides downward along the ways, which are generally prolonged under the ſurface of the water to a ſufficient depth, to float her as ſoon as ſhe arrives at the fartheſt end thereof. When a ſhip is to be *launched*, the enſign, jack, and pendant, are always hoiſted, the laſt being diſplayed from a ſtaff erected in the middle of the ſhip. Ships of the firſt rate are commonly conſtructed in dry docks, and afterwards floated out, by throwing open the flood-gates, and ſuffering the tide to enter, as ſoon as they are finiſhed. Falconer.

LAUNDER, in *Mineralogy*, a name given in Devonſhire, and other places to a long and ſhallow trough, which receives the powdered ore, after it comes out of the box, or coffer, which is a ſort of mortar, in which it is powdered with iron peſtles.

The powdered ore, which is waſhed into the *launder* by the water from the coffer, is always fineſt neareſt the grate, and coarſer all the way down. See BUDDLE and *Dreſſing of* ORE.

LAURA, Λαυρα, primarily ſignifying *village*, *ſtreet*, or *hamlet*, a name given to the reſidence of the ancient monks. Authors cannot agree about the difference between a *laura* and a monaſtery: ſome pretend, that a *laura* was a monaſtery, wherein there lived at leaſt a thouſand monks; but this is no-wiſe credible. The more natural opinion is, that the ancient monaſteries were the ſame with the modern, conſiſting of large buildings divided into halls, chapels, and cells, poſſeſſed by the monks, each of whom had his apartment; but the *lauræ* were a kind of villages, whereof each houſe was inhabited by one or two monks at the moſt; ſo that the houſes of the Chartreux ſeem, in ſome meaſure, to repreſent the ancient *lauræ*, and thoſe of the other monks proper monaſteries. The term *laura* was only underſtood of the religious places in Egypt, and the Eaſt, where their houſes ſtood apart from each other, and were not joined by any common cloiſter, the monks that inhabited them only meeting in public once a week.

LAURACES *lapis*, in *Natural Hiſtory*, the name of a ſtone ſaid to be of great virtues againſt the head-ach, but not known among us, nor deſcribed by the ancients.

LAUREAT, *poet*, is a well known office in the king's houſhold. Sir John Hawkins obſerves, that there are no records which aſcertain the origin of the inſtitution of the office in this kingdom, though there are many that recognize it. It appears that as early as the reign of Henry III. there was a court poet, named Henry de Avranches, who is ſuppoſed to have had an appointment of a hundred ſhillings a year, by way of ſalary or ſtipend. In 1341 Petrarch was crowned with laurel in the Capitol by the ſenate of Rome; afterwards Frederic III. emperor of Germany, gave the laurel to Conradus Celtes; and ever ſince the counts palatine of the empire have claimed the privilege of ſolemnly inveſting poets with the bays. Chaucer, who was contemporary with Petrarch, and acquainted with him when abroad, aſſumed the title of *poet-laureat* on his return to England; and in the twelfth year of Richard II. obtained a grant of an annual allowance of wine. We read of perſons under the ſame title in the reigns of Edward IV. Henry VII. and VIII. and of James I. who, in 1615, granted to his *laureat* an annual penſion of one hundred marks. In the year 1630, this penſion was augmented, by letters patent of Charles I. to 100*l per annum*, with an additional grant of one terſe of Canary Spaniſh wine, to be taken out of the king's ſtore of wines yearly. Hawkins' Hiſt. of Muſic, vol. iv. p. 13.

LAUREATION, a term in the Scottiſh univerſities, uſed for the act of taking up the degree of a maſter of arts, to which the ſtudents are admitted after four years ſtudy in the univerſity.

LAUREL, *padus*, in *Botany*. Linnæus has joined this genus to the PLUM. Its characters are theſe: the empalement of the flower is bell-ſhaped, of one leaf, indented in five parts at the brim; and the flower has five large roundiſh petals which ſpread open, and are inſerted in the empalement; it has from twenty to thirty awl-ſhaped ſtamina, which are inſerted in the empalement; and a roundiſh germen ſupporting a ſlender ſtyle; the germen becomes a roundiſh fruit, incloſing an oval-pointed nut, having rough furrows. Miller enumerates ſix ſpecies, one of which is called in America baſtard mahogany.

This tree is very eaſily propagated, by planting cuttings of it in September, in a cool ſhady border, where they will very ſoon take root, and the year afterwards are to be removed into beds, and placed at two or three feet diſtance; and when they have ſtood here two years, they will be fit for tranſplanting into the places where they are to ſtand. The beſt ſeaſon for making this laſt removal is April. This is the better method when they are deſigned for dwarfs; but if they are intended for high trees, they ſhould be raiſed from berries, as they then always grow much faſter. The berries ſhould be ſown as ſoon as they are ripe, covering them an inch thick with earth, and the young plants will appear the ſpring following, when they ſhould be cleared of weeds, and watered in dry weather. In the following autumn they ſhould be tranſplanted, and ſet a foot diſtance; and when they are two years older, may be removed to the places where they are to remain.

Laurel berries are held to be carminative, emollient, and reſolvent. They are given internally in ſuppreſſions of urine and the menſes, in colics, in pains after delivery, and all nervous complaints. Externally they are uſed in emollient cataplaſms and fomentations.

The diſtilled water, and the infuſion of the leaves of the *laurel* are poiſonous; both the water and the infuſion having been obſerved to bring on convulſions, palſy, and death, when taken by the mouth, or anus.

This was diſcovered by the accident of two women dying ſuddenly at Dublin, after drinking ſome of the common diſtilled *laurel*-water. Several experiments were then made on dogs, and communicated to the Royal Society by Dr. Madden, and afterwards confirmed by Dr. Mortimer, which plainly ſhewed the poiſonous effect of *laurel*-water. See Phil. Tranſ. 418, 420.

The *laurel* being an ever-green, and abounding with a warm eſſential oil, it was at firſt imagined that other ever-greens might partake of the ſame poiſonous quality. But by Dr. Madden's experiments made on the leaves of the yew-tree, and on box-leaves, no ſuch quality appeared. Phil. Tranſ. N° 418.

The expreſſed juice of *laurel*-leaves had the like poiſonous effect with the diſtilled water and the decoction.

Several things were tried as antidotes to this poiſon, as bole, vinegar, and milk. The two former did little good, but the dog which drank the milk recovered, without any bad ſymptoms. However it is ſaid, that infuſions of the leaves, made properly very weak, are commonly uſed in Holland in diſorders of the lungs.

LAUREL, *Alexandrian*. See BUTCHERS *Broom*.

LAUREL, *dwarf*, of *America*. See KALMIA.

LAUREL, *ſea-ſide*, *phyllanthus*, in *Botany*, a genus of the *monoecia triandria* claſs. Its characters are theſe: it hath male and female flowers in the ſame plant; the empalements of the flowers in both ſexes are permanent, bell-ſhaped, and of one leaf, cut into ſix parts, which ſpread open; the flowers have no petals according to ſome, or no empalement according to others; the male flowers have three ſhort ſtamina, which join at their baſe, but ſpread aſunder at the top, and are terminated by twin ſummits; the female flowers have an angular nectarium ſurrounding the germen, which afterwards becomes a roundiſh capſule with three furrows, having three cells, each containing a ſingle roundiſh ſeed. Miller enumerates only one, and Linnæus ſix ſpecies. Miller.

LAUREL, *ſpurge*. See SPURGE *laurel*.

LAURELS, pieces of gold coined in the year 1619, with the king's head laureated, which gave them the name of *laurels*; the twenty-ſhilling pieces whereof were marked with XX. the ten-ſhillings X. and the five-ſhilling pieces with V.

LAURENCE, *canons of St.* an order of regular canons, ſo called from the monaſtery of St. Laurence d'Olux, in Dauphiné.

This congregation is ſaid to have been founded by St. Benedict. It was deſtroyed by the Vandals, and continued uninhabited till the middle of the eleventh century. In 1057, Odo, count of Savoy, gave it to one Gerard, and his canons. This donation was confirmed in 1065, by Cunibert, biſhop of Turin, who added to it above forty other churches; by which means a very conſiderable congregation was formed, to whom the ſucceeding popes, and counts of Savoy, granted a great many privileges.

It had thirty priories; the chief, who is the prior of the congregation, bears the title of provoſt, and exerciſes a ſpiritual juriſdiction throughout his provoſtſhip.

LAURENTALIA, or LARENTALIA, called alſo *Larentinalia*, *Laurentales*, and *Larentales*, feaſts celebrated among the Romans on the tenth of the calends of January, or twenty-third of December, in memory of Acca Laurentia, wife of the ſhepherd Fauſtulus, and nurſe of Romulus and Remus.

Acca Laurentia, from whom the ſolemnity took its name, is repreſented as no leſs remarkable for the beauty of her perſon, than her laſciviouſneſs; on account of which, ſhe was nick-named by her neighbours, *lupa*, *ſhe-wolf*; which is ſaid to have given riſe to the tradition of Romulus and Remus being ſuckled by a wolf. She afterwards married a very rich man, who brought her great wealth; which, at her death, ſhe left to the Roman people; in conſideration whereof they performed her theſe honours; though others repreſent the feaſt as held in honour of Jupiter Latiaris. See LARENTINALIA and LARES.

LAURENTIA. See LOBELIA.

LAUREOLA. See SPURGE *laurel*.

LAURINUM. See DAPHNELÆON.

LAURO *ceraſus*, in *Botany*. See LAUREL.

LAUROTAXA, in *Botany*, a name uſed by Columna, and ſome other authors, for the narrow-leaved kind of *ruſcus*, or butcher's broom, called by others *biſlingua*.

LAURUS. See BAY-*tree*.

The gum BENZOIN, CAMPHOR, and SASSAFRAS, are obtained from different ſpecies of this genus.

LAURUSTINE, in *Botany*. See WAYFARING-*tree*.

LAW, a command or precept, conſtituting a rule of action, and coming from ſome ſuperior authority, which an inferior is obliged to obey; or, according to ſome, *law* is a command or mandate of ſome perſon, or power, whoſe precept carries with it the reaſon of obedience.

The word is formed from the Saxon *lah*, *laga*, which ſignifies the ſame.

Thus, the commands of God with reſpect to men, of a city with reſpect to the citizens, and univerſally of all powerful beings in reſpect to thoſe who cannot reſiſt, are called their *laws*.

The nature of a *law* will be moſt clearly diſcovered by ſhewing wherein it differs from *covenant*, *counſel*, and *right of equity*; with all which it is frequently confounded.

Law is confounded with covenant, by thoſe who take *laws* to be nothing elſe but ὁμολογηματα, or forms of living determined by the conſent of mankind: among which is Ariſtotle, who defines a *law*, "a declaration determined by the common conſent of a city, ſhewing in what manner things are to be done:" which is not ſo much the definition of a *law*, as of a *civil law*; nor yet properly of a civil *law*; for this common conſent is no more than a mutual covenant, which does not oblige any perſon, and conſequently is not any *law*, till ſome ſupreme power be conſtituted with a power to compel, and to make it penal to tranſgreſs it. Here then the covenant is confounded with the *law*, which leads into abſurdities, for a covenant is a promiſe; a *law*, a command.

The difference between a counſel and a *law*, is this.

A couſel is a precept, wherein the reaſon of obedience is taken from the thing itſelf preſcribed; a command is a precept, wherein the reaſon of obedience depends on the will of the preſcriber; for we cannot properly ſay, *ſic volo, ſic jubeo*, unleſs *ſtet pro ratione voluntas*. A *law* comes from a perſon who has a power over thoſe whom he commands; a counſel, from him who has no ſuch power. To do what is enjoined by a *law*, is an act of duty; what by a counſel, an act of choice, or freewill.

Law is confounded with right or equity, by thoſe who perſiſt in doing what is permitted by the *divine law*, though prohibited by the *laws* of the country. What is prohibited by the *divine law*, cannot be permitted by the *civil law*; nor what is commanded by the *divine law*, be prohibited by the *civil law*: but what is permitted by the *divine law*, may, notwithſtanding, be prohibited by the *civil law*: for the inferior *laws* have a power of reſtraining the liberty left the ſuperior *laws*, though they cannot enlarge it. Now right or equity is a natural liberty, not conſtituted by *laws*, but free of them; for take away *laws*, and liberty is complete.

This liberty is firſt reſtrained by the *natural* and the *divine law*, the reſt reſtrained by the *civil laws*; and what remains unreſtrained by the *civil law*, may be again reſtrained by the conſtitution of particular cities and ſocieties. There is a great difference, therefore, between *law* and right, *lex & jus*; for *law* is a chain; but right a liberty; and they differ as two contraries.

Law may be divided, with reſpect to its different origins, into *divine* and *human*.

Law, *divine*, may be conſidered as twofold, with reſpect to the two different manners in which God notifies his will to man; viz. *natural* (or *moral*), and *poſitive*.

Law, *natural*, is that which he has made known to all mankind, by an innate light, called *natural reaſon*.

Law, *poſitive*, is that which he has revealed by his prophets, or by perſons ſupernaturally commiſſioned and inſpired, and found only in the holy ſcriptures: as thoſe *laws* delivered to the Jews, relating to the divine worſhip and polity, which may be called *divine civil laws*, as being peculiarly directed to that people.—Again,

Natural law may be divided into that *natural law* of men, which in a peculiar ſenſe is called the LAW *of nature*; and the *natural law* of countries, commonly called *the* LAW of *nations*.—The precepts are the ſame in both theſe; but becauſe, when ſocieties are once inſtituted, certain perſonal properties become veſted in men; that *law*, which, when we ſpeak of the duties of men ſeverally, we call *the natural law*, when transferred to cities or countries, we call *the law of nations*.

M. Regis ſays, that the *laws* of nature are the dictates of right reaſon, which teach every man how he is to uſe his natural right; and the *laws* of nations, the dictates, in like manner, of right reaſon, which teach every ſtate how to act and behave themſelves toward others.

Laws, *human*, are all civil. See Civil.

For, according to Hobbes, the ſtate of man, out of ſociety, is a ſtate of war; wherein no one being ſubject to another, there can be no other *law* beſides the dictates of natural reaſon, which is the *divine law*.

Laws, *civil*, may be divided, with regard to the difference of their ſubject-matter, into *ſacred* and *ſecular*.

Laws, *ſacred*, are thoſe that relate to religion; that is, to the ceremonies and worſhip of the Deity, and which are not preſcribed by any poſitive divine *law*.

Laws, *ſecular*, are thoſe that relate to property, *&c.* commonly called by the name *civil*.—Farther,

Civil laws, conſidered with regard to the two offices of the legiſlator; *viz.* to judge and to compel; may be divided into two branches; the one *diſtributive*, the other *vindictive* and *penal*.

Law, *diſtributive*, is that by which every man has his right; or, it is that which conſtitutes the rules and meaſures of things, whereby we know what belongs to us, and what to others; ſo as we may not diſturb or interrupt others in the enjoyment of their own, nor be interrupted by them; and what each man may lawfully do or not do.

Law, *vindictive*, is that branch by which the puniſhments to be inflicted on thoſe who violate the *laws*, are determined.

The diſtributive and vindictive are not two ſpecies of *laws*, but two parts of the ſame *law*. For if a *law* ſay no more than "Whatever you catch in your net, in the "ſea, ſhall be your's," it is in vain; for though another take from you what you have caught, it is ſtill your's; in regard, in the ſtate of nature, where all things are common, your's and another's are the ſame thing. So that what the *law* defines to be your's, was your's before that *law*, and will be your's after it, though poſſeſſed by another.—A *law*, therefore, is but an empty ſound, unleſs it determine the thing to be your's in ſuch a ſenſe as to forbid every body elſe from diſturbing you in the poſſeſſion of it. But ſuch prohibition will be vain, unleſs there be a penalty annexed to it.—A *law*, therefore, muſt contain both theſe parts, that which prohibits, and that which puniſhes. The firſt whereof, which is called *diſtributive*, is prohibitory, and ſpeaks to all; the latter, called *vindictive* or *penal*, is mandatory, and ſpeaks only to the public officers. Whence it follows, that to all *civil laws* there is annexed a penalty, either implicitly, or explicitly; and where that puniſhment is not aſcertained, either by writing, or by example, it is ſuppoſed to be arbitrary, and to depend on the pleaſure of the legiſlator: for that is no *law* which may be violated impune.

Civil or *municipal law* is well defined by judge Blackſtone to be "a rule of civil conduct, preſcribed by the "ſupreme power in a ſtate, commanding what is right, "and prohibiting what is wrong." And he obſerves, that every *law* may be ſaid to conſiſt of ſeveral parts: one, DECLARATORY, whereby the rights to be obſerved, and the wrongs to be eſchewed, are clearly defined and laid down: another *directory*, whereby the ſubject is inſtructed and enjoined to obſerve thoſe rights, and to abſtain from the commiſſion of thoſe wrongs; a third, *remedial*, whereby a method is pointed out to recover a man's private rights, or redreſs his private wrongs; to which may be added a fourth, uſually termed the *ſanction*, or *vindicatory* branch of the *law*, whereby it is ſignified what evil or penalty ſhall be incurred by ſuch as commit any public wrongs, and tranſgreſs or neglect their duty. Blackſt. Comm. book i. p 54.

Civil laws, conſidered with regard to the different manners of promulgating them, are of two kind; *ſcriptæ* and *non ſcriptæ*; or *written* and *unwritten*.

Laws, *written*, are thoſe which require either the voice, or ſome other ſign of the legiſlator's will to become *laws*.

Laws, *unwritten*, are ſuch as need no other promulgation beſides the voice of nature, or natural reaſon: of which kind are all natural *laws*.

Hence it appears, that though the natural *laws* be deſcribed in the writings of the philoſophers, they are not therefore to be called *written laws*: nor are the writings of lawyers, *laws*, for want of the ſupreme authority; nor the *reſponſa prudentum*, or opinions of judges, *laws*, excepting ſo far as they are allowed by the ſupreme power to paſs into uſe; and then they are called *leges ſcriptæ*, written *laws*; not becauſe of their uſe, but becauſe of the will of the ſupreme power, which is argued from their paſſing into uſe.

The firſt principle or *law* of nature, according to Hobbes, is ſelf-preſervation.—Thomaſius will have it to be our own happineſs, which falls in at laſt with the ſentiment of Hobbes.—Puffendorf maintains it to be ſociality.—Valentine Alberti, the belief that we are the image of God.—Henry and Samuel Cocceius, the will of God.—Grotius, right reaſon.—Velthemius, the intrinſic decency or turpitude of actions.—Strimeſius and Janus, that we are to love God, ourſelves, and our neighbour.

Law is alſo applied to the ſeveral policies of ſtates and people, or the maxims and rules they have agreed upon, or received from their magiſtrates, whereby to live in peace and mutual ſociety.

The *laws* of the twelve tables, were the ancient laws of the Romans, for which the Decemviri were ſent into Greece, and which ſerved them for the ground-work of all their juriſprudence.

The celebrated *laws* of the more modern days, are thoſe of the Angli, the Werini, or Thuringi; of the Boii, or Bavarians; thoſe of the Burgundi, Germans, Danes, and Norwegians; of the Franks, the Friſons, the Lombards, the Gothic *laws*, the Martina, or Mercian *law*; the *laws* of the Saxons, Scots, Sicilians, Viſigoths; the *laws* of Oleron, the Molmutin *law*, and the Salic *law*.

Law, *lex*, among the firſt Romans properly ſignified an ordinance of the people, made at the requeſt of a magiſtrate, particularly a conſul.

Theſe ordinances differed from the plebiſcita, and ſenatus conſulta, and even from other ordinances made at the requeſt of any other magiſtrate beſide a conſul, though thoſe too bore the name of *laws*.

Thus, though Aquilius and Falcidius were only tribunes when they made their requeſt, yet we ſtill ſay, the *Aquilian law*, the *Falcidian law*, &c.

The ſeveral *laws* of the Romans are diſtinguiſhed, 1. By the name of him at whoſe requeſt they were paſſed; as the *Cornelian law*, the JULIAN *law*, &c. 2. By the matter or ſubject of the *law*; and hence came the terms, *teſtamentary laws*, as the FURIAN, VOCONIAN, &c. *judiciary laws*, AGRARIAN *laws*, &c.

3. Sometimes by the crimes againſt which they were made. For inſtance: the *laws* touching *poiſoning*, *parricides*, &c. the *laws* of *concuſſion*, *peculate*, &c.

The CODEX and AUTHENTICÆ are the *laws* and conſtitutions of the Roman emperors; and the DIGEST is a compilation, made by the emperor Juſtinian's order, of the ſeveral opinions and judgments of the moſt learned in the Roman *law*; to which he gave the ſanction of *laws*, as appears by the epiſtle prefixed to the work; and it is this that properly conſtitutes the Roman *law*.

The *lex talionis*, or *law of like for like*, is the moſt ancient and equitable *law* in the world. It was obſerved by the Hebrews.

Law *of England* may be divided into two kinds; the *lex non ſcripta*, the *unwritten* or common *law*; and the *lex ſcripta*, the written or ſtatute *law*. The former, i. e. the unwritten or common *law*, is properly diſtinguiſhable into three kinds. 1. General cuſtoms, which are the univerſal rule of the whole kingdom, and form the COMMON *law* in its ſtricter and more uſual ſignification. 2. Particular cuſtoms, which, for the moſt part, affect only the inhabitants of particular diſtricts. See Custom and Common *law*. 3. Certain particular *laws*, which by cuſtom are adopted and uſed by ſome particular courts of pretty general and extenſive juriſdiction. See Canon *law* and Civil *law*.

The *leges ſcriptæ*, or written *laws* of the kingdom, are ſtatutes, acts, or edicts, made by the king's majeſty, by and with the advice and conſent of the lords ſpiritual and temporal and commons in parliament aſſembled. The oldeſt of theſe now extant, and printed in our ſtatute-books, is the famous MAGNA *charta*, as confirmed in parliament, 9 Hen. III. See STATUTE.

There is another diviſion of our laws, more large and particular; as into the prerogative or crown *law*; the *law* and cuſtom of parliament; the common *law*; the ſtatute *law*; reaſonable cuſtoms; the *law* of arms, war, and chivalry; eccleſiaſtical or canon *law*; civil *law*, in certain courts and caſes; foreſt *law*; the *law* of marque and repriſal, the *law* of merchants; the *law* and privilege of the ſtannaries, &c. But this large diviſion may be reduced to the common diviſion; and all is founded on the *law* of nature or reaſon, and the revealed *law* of God, as all other *laws* ought to be. 1 Co. Inſt. 11.

Law has alſo a more ſpecial ſignification, wherein it is taken for that which is lawful with us, and not elſewhere: as, "Tenant by the courteſy of England."

Thus we alſo ſay, to *wage law (vadiare legem)*, and to *make* or *do law (facere legem)*. See WAGER, and MAKE.

Law, *aſſignee by*. See ASSIGNEE.

Law, *covenant of*. See COVENANT.

Law, *foreſt*. See FOREST.

Law, *frank*. See FRANK.

Law, *intendment of*. See INTENDMENT.

Law, *martial*. See MARTIAL.

Law, *Poynings'*. See POYNINGS.

Law, *releaſe in*. See RELEASE.

Law, *ſalic*. See SALIC.

Law, *ſuit in*. See SUIT.

Law, *ſumptuary*. See SUMPTUARY.

Law, *ſurrender in*. See SURRENDER.

Laws, *by*. See BY-LAWS.

Laws, *cock-pit*. See COCKPIT.

Laws *of the ſtage*. See STAGE.

Law *of arms*, is that *law* which gives precepts how rightly to proclaim war, to make and obſerve leagues, to attack the enemy, and to puniſh offenders in the camp.

Common things concerning arms and war are under the cognizance of the conſtable and marſhal of England. 13 R. II.

Law *of marque*, a *law* by which thoſe who are driven to make uſe of it, take the goods, or ſhipping of the party that has done them wrong, and of whom they cannot get ordinary juſtice, whenever they can take him within their own bounds or precincts. 27 Ed. III. cap. 17.

Laws *of Molmutius*. See MOLMUTIN *laws*.

Laws *of Oleron*. See OLERON.

Law *of the ſtaple*, the ſame with LAW *merchant*.

Law *merchant*, a ſummary ſort of *law*, originally differing from the *common law*, though now adopted, and become a part of the *laws* of the kingdom. One point of it conſiſts in this, that if there be two joint merchants of wares, and one of them dies, his executor ſhall have the moiety; which is not allowed in the caſe of others, not merchants. See CUSTOM.

Law, *ſpiritual*, is the eccleſiaſtical or canon *law*, allowed and authorized in this realm, ſo far as it is not againſt the common *law*, nor againſt the ſtatutes and cuſtoms of the kingdom. And according to ſuch eccleſiaſtical *laws*, the ordinary and other eccleſiaſtical judges proceed in caſes within their cognizance.

Law is alſo uſed figuratively in ſpeaking of the rules or order wherein any thing is performed.

Thus we ſay, the *laws* of motion, the *laws* of mechanics, the *laws* of fluids, the *laws* of chance, of a game, &c. *Laws* of friction, of reſiſtance, of deſcent of bodies, &c. *Laws* of elaſticity, rarefaction, reflexion, refraction, &c. all which ſee under their proper heads.

Law, in *Scripture Hiſtory*, one of the three diviſions of the Old Teſtament, comprehending Geneſis, Exodus, Leviticus, Numbers, Deuteronomy. See CANON.

Law-*day*, *lagedayum*, in our old *Law Writers*, was any day of open court, and commonly uſed for the courts of a county or hundred. It is alſo called *view of frank-pledge*, or *court-leet*. *Et quieti ſint de ſectis comitatuum & hundredorum noſtrorum, de viſu franci plegii &* law-dayorum, &c.

LAWFUL. See UNLAWFUL.

Lawful *naam*. See NAAM.

LAWING *of dogs*, a phraſe uſed in our ancient law-writers. Thus, maſtiffs muſt be *lawed* every three years, Crompton Juriſd. fol. 163, that is, three claws of the fore-foot ſhall be cut off by the ſkin, or the ball of the fore-foot cut out. See EXPEDITATION.

LAWLESS *court*, a court held on King's-hill at Rochford in Eſſex, every Wedneſday morning next after Michaelmas day, at cock-crowing; at which court they whiſper, and have no candle, nor any pen and ink, but a coal. He that owes ſuit of ſervice there, forfeits double his rent, every hour he is miſſing. This court is called *lawleſs*, becauſe held at an unlawful hour; or, perhaps, *quia dicta ſine lege*, becauſe opened without any form. It is mentioned by Camden; who ſays, this ſervile attendance was impoſed on the tenants, for conſpiring at the like unſeaſonable time to raiſe a commotion.

Lawless *man, ex lex*. See OUTLAW.

LAWN, a ſpacious plain in a park or adjoining to a noble ſeat. Theſe ſpacious plains make a noble figure before grand houſes, and the great rule in regard to their dimenſions, is to make thoſe in large parks as large as the ground will admit, never leſs, if poſſible, than thirty or forty acres: but in gardens a *lawn* of eight or ten acres is ſufficient. *Lawns* ought always to lie open to the front of the houſe, and to be open to the neighbouring country, not pent up with trees; and the moſt happy ſituation is, when the beſt rooms of the houſe front the eaſt, or rather the ſouth-eaſt, and the *lawn* lies immediately before them; becauſe the ſun, in an afternoon, in this caſe, ſhines on the proſpect, and at the ſame time not into the rooms. The beſt ſituation for a *lawn*, except this, is on the ſouth ſide of a houſe; for if on the weſt, it expoſes the houſe to too much wind, and if on the north too much open to the cold. It is beſt therefore to plant trees and wilderneſſes on the weſt and north ſides of houſes.

As to the figure of a *lawn*, ſome recommend an exact ſquare, others an oblong ſquare, ſome an oval, and others a circular figure: but neither of theſe ſhould be invariably regarded; becauſe it ought to be contrived ſo as to ſuit the figure of the ground: and as there ſhould be trees planted for ſhade on the boundaries of the *lawns*, the ſide may be broken by irregular plantations of trees, ſome breaking forwarder than others, and not too cloſely crouded together, which make a better appearance than any regular plantations can do. When there are no good proſpects beyond the *lawn*, it will be proper to have it bounded on every ſide by plantations, which may be brought round pretty near to each end of the houſe, ſo that perſons may ſoon get into ſhade. For this purpoſe thoſe trees ſhould be preferred, which grow large, ſtraight and handſome. Of the deciduous trees, the moſt proper are the elm, oak, beech, and cheſnut; and if there are ſome clumps of ever-green trees intermixed with the others, they will add to the beauty of the whole, eſpecially in the winter-ſeaſon; the beſt ſorts for this purpoſe are lord Weymouth's pine, and the ſilver and ſpruce firs. Miller.

LAWNS, in *Commerce*. See CAMBRIC.

LAWSONIA, in *Botany*, a genus of the *octandria monogynia* claſs. Its characters are theſe: the flower, which has a ſmall permanent empalement divided into four parts at the top, is compoſed of four oval ſpear-ſhaped petals which ſpread open, and eight ſlender ſtamina ſtanding by pairs between them; it has a roundiſh germen, which becomes a globular capſule, ending in a point, having four cells filled with angular ſeeds. There are two ſpecies, natives of both the Indies.

The leaves of this ſhrub are much uſed by the Egyptian women to colour their nails yellow, which they eſteem an ornament.

LAWYER, *(legiſta, legiſperitus, juriſconſultus)* by the Saxons called *lahman*, is a counſellor, or one learned in the law: and *lawyers*, ſuch as counſellors, attornies, &c. are within the act 3 Jac. I. againſt extortion; but it has been held only to extend to officers. See COUNSELLOR, ATTORNEY, &c.

LAXATIVE, in *Medicine*, is uſed to ſignify a looſe ſtate or diſpoſition of the body; ſo as to go frequently to ſtool.

Laxatives, or **Laxative** *medicines*, are ſuch as promote this diſpoſition; which they do by ſome ſmooth, ſoftening quality, taking away the tenſity of the fibres, and facilitating the paſſage of the contents of the inteſtinal tube through it; for which reaſon all oily ſubſtances come under this claſs. See CATHARTICS, EMOLLIENTS, &c.

LAXIOR *toga*. See TOGA.

LAY, the name of a kind of ancient poeſy, or poem, among the French, conſiſting of very ſhort verſes.

There were two ſorts of *lays*, the *great*, and the *little*.

Lay, *greater*, was a poem conſiſting of twelve couplets of verſes of different meaſures.

Lay, *little*, was a poem conſiſting of ſixteen or twenty verſes, divided into four couplets.

Theſe lays were the lyric poetry of the old French poets, who were imitated by ſome among the Engliſh. They were principally uſed on melancholy ſubjects, and are ſaid to have been formed on the model of the trochaic verſes of the Greek and Latin tragedies.

Father Mourgues gives us an extraordinary inſtance of one of theſe ancient *lays* in his Treatiſe of French Poetry.

Sur l'appuis du monde
Que faut il qu'on fonde
D'eſpoir ?
Cette mer profonde,
En debris feconde
Fait voir
Calme au matin, l'onde
Et l'orage y gronde
Le ſoir.

LAY *the land*, in *Sea Language*. See LAND.

LAY-*land*, in *Huſbandry*, denotes fallow ground, which lies untilled. See FALLOW, and PLOUGHING.

LAY-*brother*, among the *Romaniſts*, a pious, but illiterate perſon, who devotes himſelf, in ſome convent, to the ſervice of the religious.

The *lay-brother* wears a habit different from that of the religious, nor ever enters into the choir, or the chapter. He is not in any orders, nor does he make any vow, excepting of conſtancy and obedience.

Theſe *lay-brothers* make the three vows of religion.

In the nunneries are alſo *lay-ſiſters*, who never enter the choir, &c. and who are only retained for the ſervice of the convent.

The inſtitution of *lay-brothers* began in the eleventh century. The perſons on whom this title was conferred, were ſuch as were too ignorant to become clerks, and who therefore applied themſelves wholly to bodily labour. It ſeems to have taken its riſe from hence, that the laity in thoſe days had not, for the generality, the leaſt tincture of learning; whence alſo thoſe came to be called *clerks*, by way of diſtinction, who had ſtudied a little, and were able to read.

In ſome orders they are only retained by a civil contract, which, however, binds them for life; in other orders they are to paſs through four years of probation, as among the Jacobins; or ſeven, as among the Feuillants. The Capuchins admit none before nineteen years of age. The Jeſuits call them *coadjutors*.

LAY-*canons*. See CANON.

LAY *communities*. See COMMUNITY.

LAY-*corporation*. See CORPORATION.

LAY-*fee*, *feodum laicum*, land held in fee from a *lay*-lord, by the common ſervices to which military tenure was ſubject, as diſtinguiſhed from the *eccleſiaſtical* holding in *frankalmoign*, diſcharged from thoſe burdens.

LAY-*patronage*. See PATRONAGE.

LAYS, *ſide*. See SIDE-*lays*.

LAY, *vaunt*. See VAUNT-*lay*.

LAYER, in *Huſbandry* and *Gardening*, a young tender ſhoot or twig of a plant, not far from the ground, which is bent down, and ſeveral joints or knots buried under ground, till, having ſtruck root below, it is cut and ſeparated from the parent ſtock, and commences a new plant.

Many trees may be propagated by *layers*, which do not produce ſeeds here. The young branches of the former year's ſhoots of trees, ſhould be choſen to make *layers*, becauſe they are generally more inclined to put out roots than the older wood. When theſe are produced near the ground, they may with greater facility be layed. Theſe ſhoots ſhould be diveſted of their ſide-branches, if they have any; and thoſe ſorts of trees which put out roots with difficulty, ſhould have a ſlip made upward at a joint, in that part which is to lie in the ground; or a piece of wire twiſted cloſe round the branch at the ſame place, which will check the mounting ſap, and cauſe them to put out roots; the ground ſhould be well dug, and the clods broken; then the ſhoots ſhould be laid five or ſix inches under the ſurface, driving down a peg at each to prevent their riſing, leaving the end of the ſhoots twelve or eighteen inches above ground in an erect poſition.

The ſeaſon for laying hardy trees that ſhed their leaves, is in October, but for ſuch as are tender, in March; but for ever-greens, July or Auguſt are good ſeaſons.

If you would *lay* young trees from a high ſtandard, the boughs of which cannot be bent down to the ground, then you muſt make uſe of ozier baſkets, boxes, or pots, filled with fine-ſifted mould mixed with a little rotten willow-duſt, which will keep moiſture to aſſiſt the *layer* in taking root: this muſt be ſet upon a poſt or treſſel, and the bough be laid as before; covering the ſurface with moſs to prevent the earth from drying.

There are many kinds of trees and plants which will not put out roots from their woody branches, though laid down with the utmoſt care; yet if the young ſhoots of the ſame year are laid in July, they will often put out roots very freely: ſo that when any plants are found difficult to propagate by *layers* in the common way, they ſhould be tried at this ſeaſon; but as theſe ſhoots will be ſoft and herbaceous, they muſt not have too much wet, for that will cauſe them to rot. Miller.

LAYES, or **LEYES**, a term uſed in many parts of England for ſuch paſture ground as has been formerly tilled and ſown.

LAYMAN, a perſon not engaged in any order of eccleſiaſtics: accordingly, in the diſtribution of the people, *laity* is oppoſed to the CLERGY, and may be divided into three diſtinct ſtates, viz. the CIVIL, the MILITARY, and the MARITIME.

LAYMAN, among *Painters*, a little ſtatue, or model, either of wax or wood, whoſe joints are ſo made, that it may be put into any attitude, or poſture. Its chief uſe is for the caſting and adjuſting draperies, for the cloathing of figures.

Some call it, after the French, *manequin*, q. d. *a little man.*

LAYR. See LAIR.

LAZARETTO, or **LAZAR-HOUSE**, a public building, in manner of an hoſpital, for the reception of poor ſick.

LAZARETTO, in ſome countries, is an edifice appointed for perſons coming from places ſuſpected of the plague, to perform QUARANTINE.

This is uſually a large building, at a diſtance from any city, whoſe apartments ſtand detached from each other, &c. where ſhips are unladen, and their crew is laid up for forty days, more or leſs, according to the time and place of their departure.

LAZARI *morbus*, a name given by ſome writers to the ELEPHANTIASIS.

LAZAROLE, in *Botany*. See MEDLAR.

LAZARUS, *St.* or **LAZARO**, a military order, inſtituted at Jeruſalem by the Chriſtians of the Weſt, when they became maſters of the Holy Land; whoſe buſineſs was, to receive pilgrims under their care, guard them on the roads, and defend them from the inſults of the Mahometans.

Some ſay, this order was inſtituted in 1119. Pope Alexander IV. confirmed it by a bull in 1255, giving it the rule of St. Auguſtine.

The knights of this order, being driven out of the Holy Land, part of them retired into France, and were eſtabliſhed there under Louis VII. who beſtowed on them the country of Boigny, near Orleans. Innocent VIII. ſuppreſſed the order of St. *Lazaro* in Italy in 1490, or, rather, he united it to that of Malta. Leo X. re-eſtabliſhed it in Italy in the beginning of the ſixteenth century. In 1572, Gregory XIII. united it in Savoy to that of St. Maurice, juſt inſtituted by duke Emanuel Philibert.

In France, this order was united to that of Notre Dame, of Mount Carmel in 1608, and had ſome new advantages conferred on it by Louis XIV. The knights of *St. Lazarus* are allowed to marry, and yet have penſions upon benefices.

LAZARUS, *Fathers of St.* called alſo **LAZARITES**, a name given to certain regular clerks of a congregation inſtituted in France, in the ſeventeenth century, by M. Vincent. They take the denomination from a houſe in the Fauxbourg St. Denis of Paris: they have a ſeminary in Paris, called the ſeminary *des bons enfans*. The vows they make are ſimple, and may be diſpenſed with on occaſion.

LAZIVRAD, in *Natural Hiſtory*, one of the oldeſt names by which we find the *lapis lazuli* expreſſed in authors.

LAZZI, a denomination given by the Saxons to that rank of people who were born to labour, and being of a more ſervile ſtate than our ſervants, becauſe they could not depart from their ſervice without leave of the lord, but were fixed to the land where born and in the nature of ſlaves: hence the word *lazzi* or *lazy*, ſignifies thoſe of a ſervile condition. See EDHILING.

LAZULI. *Lapis* LAZULI, a ſort of precious ſtone, of a blue colour, veined and ſpotted with white and yellow. Its ſpecific gravity is 3054.

This is the ſame with what is otherwiſe called *azure* ſtone, by the ancients *cyaneus*, and *cæruleum*; by Meſue, the *ſtarry* ſtone; and by Pliny, and many of the ancients, *ſapphirus*.

Waltherius conſiders this ſtone as a ſpecies of jaſper; and Conſtradt, more juſtly, as a ſpecies of that order of earths which have been lately called ZEOLITES. It is found in ſeveral parts of Europe, in mines of gold, ſilver, and copper; as alſo in quarries of marble; which laſt is that generally in uſe. But the moſt coſtly comes from Perſia and the Eaſt Indies.

Naturaliſts diſtinguiſh three kinds of *lapis lazuli*: the firſt called of the *old rock*, which is pure, ſmooth, a fine blue, with beautiful yellow ſtreaks like veins of gold, which yet are frequently no more then veins of pyrites. The ſecond, called that of the *new rock*, is debaſed by a mixture of common ſtones; its colour is weaker, and its price lower: theſe two kinds are brought from Perſia and Siam. The third kind is brought from the mountains of Auvergne: this is mixed with the common rock whence it is dug; it is of a pale blue, and is ſprinkled with greeniſh ſpots, with veins of pyrites. This, when ſufficiently charged with ſpots of green, is often ſold for the Armenian ſtone, which may be readily diſtinguiſhed by its being leſs hard than the *lazuli*, ſoon loſing its blue colour in moderate fire, and raiſing an efferveſcence with acids; its baſis ſeeming to be a calcareous earth.

M. Margraaf, and alſo M. Cronſtedt, have made experiments on this ſtone, carefully cleanſed from all white pyritous, or heterogeneous matters. From theſe experiments, we learn, 1. That this ſtone is ſoluble in acids, without efferveſcence; and when it has been previouſly calcined, it forms gelatinous maſſes with acids. 2. That by calcination it is not deprived of its blue colour, till at leaſt that operation has been long continued. 3. By a violent fire it is fuſible, and forms a frothy glaſs, ſometimes whitiſh, and ſometimes of a duſky yellow colour, but always clouded with blue ſpots. 4. Fuſed with nitre, and thrown red hot into water, it tinged the water with a blue colour, which diſappeared in ſome hours. By this operation the ſtone loſt its blue colour. 5. Some of this ſtone powdered and mixed with glaſs frit, produced a tranſparent citron-coloured glaſs. With borax, it produced a glaſs of a chryſolite colour. 6. It gave no ſigns of its containing copper, notwithſtanding it has been conſidered as an ore of copper by moſt authors. 7. It ſhewed marks of iron, by forming a blue precipitate, like Pruſſian blue, when a phlogiſticated alkali was added to a ſolution of this ſtone in acids. 8. Margraaf ſays, that by adding vitriolic acid to ſolutions of this ſtone in nitrous and marine acids, a white percipitate was formed, which he ſuppoſes was calcareous earth. Neverthele ſs, Mr. Cronſtedt affirms, that this ſtone does not efferveſce with acids. Perhaps the calcareous earth was not eſſential, but only accidental. 9. Cronſtedt ſays, that a precipitate is formed by adding a fixed alkali to a ſolution of this ſtone in vitriolic acid, which, being ſcorified with borax, yields a regulus of ſilver. He ſays, that by ſcorification with lead, two ounces of ſilver have been obtained from a hundred pounds of the ſtone. Mr. Margraaf does not mention that he found any ſilver, or that he ſearched for any. Perhaps it is only accidental. Dict. Chem. art. *Lapis Lazuli*, note *(q)*. Mr. Margraaf concludes from his experiments, that this ſtone contains only calcareous earth, gypſum, iron, and ſilex. Mr. Rinman lately found it to contain the ſparry acid.

The goldſmiths, lapidaries, and thoſe who make inlaid works, with precious ſtone, uſe the *lapis lazuli* in ſeveral pieces of workmanſhip; but its moſt common uſe is in making that fine blue, ſo much valued by limners, which is called ultramarine, and which is ſold ſo dear.

This blue is prepared according to Wallerius, in the following manner. The ſtone, firſt finely levigated and mixed with linſeed oil, is to be added to a paſte, made by mixing together equal parts of yellow wax, colophony, and pitch, i. e. half a pound of each, with half an ounce of linſeed oil, two ounces of turpentine, and two ounces of maſtich. To three or four parts of this paſte one part of the levigated ſtone, mixed with linſeed oil, is to be added, and after this mixture has been digeſted together during three or four weeks, it is to be thrown into hot water, and ſtirred till the blue colour ſeparates and diffuſes in the water, which is then to be poured off. The blue matter is left to ſettle, and, when dry, is the ultramarine required. See *Ultramarine* BLUE.

The *azure-ſtone*, or *lapis lazuli*, in order to be of a good quality, and proper to make the ultramarine, ought to be heavy, but little mixed with common rock, and to have veins of copper, of a deep blue, inclining to that of indigo. Care muſt be taken that it has not been rubbed with olive oil, which makes it look of a deeper blue than it would be naturally. This impoſition may be diſcovered by breaking the ſtone; if its colour be paler within than without, it is a proof that it was falſified. You may alſo know whether the azure ſtone be of good quality, by heating it in the fire, till it be red-hot, which ought not to change its colour; it ought, on the contrary, to receive a new degree of brightneſs from that trial.

Azure in powder, which is alſo called aſhes of azure, is nothing but the azure in ſtone, or ſmalt, pulverized, which comes from ſeveral places, and particularly from Germany and Holland. The latter is dearer, and more valued; becauſe in the uſe, its colour comes nearer to that of the ultramarine; whence it is called common, or Dutch ultramarine. The powder azure of Germany ought to be ſandy, well grained, and of as deep a colour as poſſible. As for the Dutch azure, the finer and paler it is, the more it is valued: for though its colour ſeems to be loſt, as it were, by being ground very fine, yet when uſed by the limner it recovers a very bright blue. At Amſterdam they diſtinguiſh its different qualities and degrees of goodneſs by certain letters; the beſt is marked with F F C; the ſecond with F C, and the third M C. There are alſo ſome inferior ſorts, which are valued according as they come nearer this laſt.

The *lapis lazuli* is of ſome uſe in medicine: they prepare it by calcining and waſhing it ſeveral times; which done, it makes an ingredient in the famous confection of alkermes. It has been thus given in doſes of half a dram and a dram, and ſaid to operate ſtrongly by ſtool and vomit. Some have recommended it in epilepſies and intermitting fevers: Dolæus tells us, that in this laſt diſorder, the above doſes, taken on the approach of a fit, with two or three ſpoonfuls of brandy, were with him a ſingular ſecret.

It has been alſo recommended againſt apoplexies, and melancholy, as well as epileptic and quartan agues; but its violent operation as a purgative and emetic, has frighted people out of the uſe of it; and the preſent practice takes no notice of it in any of the above intentions. The chemical writers give us proceſſes for magiſteries, tinctures, and elixirs of *lapis lazuli*, but they are wholly out of uſe.

There is alſo factitious or artificial azure, made with indigo or the juice of violets, mixed and ground with a ſort of chalk. The common ſort is made with ſal ammoniac and ſilver plates; or with ſulphur, quickſilver, and ſal ammoniac.

The method of making the Venetian counterfeit *lapis lazuli* is this: melt in a pot, in a glaſs-houſe furnace, equal quantities of the faireſt LATTIMO, and the whiteſt cryſtalline glaſs; when this is in fuſion, mix into it, by ſmall parcels at a time, the blue ſmalt uſed by the painters; make frequent proofs of the colour, and when it is right, let the whole ſtand twelve hours, and then work it. If the metal riſe in the pot, put in a piece of leaf gold to keep it down. This makes a fine plain blue ſubſtance, repreſenting the plain blue parts of the natural *lapis lazuli*. Neri's Art of Glaſs, p. 117.

A counterfeit *lapis lazuli* may be alſo made by fuſing ten pounds of either of the compoſitions for hard glaſs, (ſee *Colouring of* GLASS) with an ounce and a half of zaffer, and half an ounce of magneſia, till a very deep tranſparent blue glaſs be produced. When the maſs is cold, powder it, and mix it with three quarters of a pound of calcined bones, horn, or ivory, by grinding them together: then fuſe this mixture with a moderate heat, till the ingredients are thoroughly incorporated, and form the melted maſs into cakes, by pouring it on a clean bright plate of copper or iron. In order to give it veins of gold, mix GOLD-*powder* with an equal weight of calcined borax, and temper them with oil of ſpike: let the cakes be painted with this mixture with freſh veins as are deſired, and put into a furnace of a moderate heat; and the gold will be cemented to the glaſs as firmly as if the veins had been natural.

LE *roy le veut.* }
LE *roy s'adviſera.* } See LE ROY.

LEA *of yarn*, is uſed in ſome parts of England for a certain quantity of *yarn*. At Kidderminſter it ought to contain two hundred threads, on a reel four yards about. Stat. 22 & 23 Car. II.

LEACH-*brine*, a word uſed by the Engliſh ſalt-workers to expreſs the BRINE which runs out from the ſalt, when it ſtands in the baſket to drain, immediately after being taken out of the pan; and alſo the liquor left in the pan, when no more ſalt will ſhoot. This is alſo called the *mother-brine*, and BITTERN. In the German ſalt-works they always throw this liquor away. In our *brine*-ſalt works in Cheſhire they always preſerve it, and add it to the next boiling; and in the Newcaſtle, and other ſea-water ſalt-works, they ſave it for the making the bitter purging ſalt, called *Epſom-ſalt*.

LEAD, called by the chemiſts *Saturn*, a coarſe, heavy, impure metal, of a pale and livid white colour, the ſofteſt, and moſt flexible, the leaſt ductile and tenacious, leaſt elaſtic, and leaſt ſonorous of all the metals. Next to gold, platina, and mercury, it is the heavieſt metal, being upwards of eleven times heavier than an equal bulk of water. See *Specific* GRAVITY.

Lead is ſo ſoft and flexible, that it is eaſily cut with a knife, ſhaved with a plane, grooved for windows, by being drawn through the glazier's vice, and flatted, by paſſing betwixt wooden rollers, into large thin ſheets. When broke by repeated bendings, each piece appears drawn out ſmooth to an edge, like the fracture of well nealed gold and ſilver. It is not, however, ductile to any great degree, either in the form of wire or of leaf, being much inferior in this reſpect to all the other malleable metals; though its ſurface, when cut by a ſharp inſtrument, appears ſmooth, compact, and ſhining, it quickly tarniſhes in the air, and becomes covered by a ſlight greyiſh ruſt. Nevertheleſs it reſiſts much longer than iron or copper the combined action of air and water, before it is decompoſed and deſtroyed. *Lead* is very fuſible, and melts, long before it becomes red-hot, a little later than tin or biſmuth, but ſooner than any other metal;

tal; the degree of heat neceſſary for this purpoſe being about the 540th degree of Fahrenheit's thermometer. It loſes of its malleability in proportion as it is heated; and as ſoon as it melts, it calcines, and greyiſh aſhes are formed upon its ſurface. The calcination and fuſion of *lead*, in particular circumſtances, produce MASSICOT, MINUM, LITHARGE, and GLASS *of lead*. In a ſtate of incipient fuſion, or when it is returning from a fluid to a conſiſtent ſtate, it may be eaſily divided into ſmall grains or powder by GRANULATION, or formed into SHOT.

Lead is well known to be in its natural ſtate a metal ſo little ſonorous, that it is even a proverbial expreſſion uſed of any metal that is leſs ſonorous than others, that it is almoſt as mute as *lead*.

Mr. Lemery, however, once ſhewed Mr. de Reaumur, and afterwards to the Academy of Sciences at Paris, a lump of *lead*, which had been left in one of his veſſels, after ſome chemical operation, which, when ſtruck, gave a very loud and acute ſound

Mr. Lemery had no occaſion afterwards to repeat the experiment, which had afforded him this remarkable *lead*, and left it to Mr. Reaumur to diſcover the manner of doing it, who luckily hit upon it, without the difficulty he had expected from the reſearch; and, it appears, that we have a thouſand times met with ſonorous *lead*, without knowing it to be ſo.

The common way of melting *lead*, in order to the caſting it into moulds, is in iron ladles. It very rarely happens, that all that is melted in the ladle is caſt into the mould; but a ſmall quantity remains, which ſoon forms itſelf into a maſs in the ladle, and this maſs is always ſonorous. Its figure is uſually either that of the ſegment of a ſphere or of a ſpheroid, and it is plane or flat on one ſide, and convex on the other. The maſſes of this kind, examined by Mr. Reaumur, were all very ſonorous: there are, doubtleſs, certain proportions of their thickneſs to their diameter, which may make them more or leſs ſonorous, but all are conſiderably ſo: poſſibly, alſo, figures of a different kind may prove ſonorous; but Mr. Reaumur tried one convex on each ſide, and found it to have no ſound at all. Larger and thicker diſks of *lead* are ſometimes found ſonorous, but never ſo much ſo, as the figures firſt deſcribed. There are alſo two circumſtances, in which the maſs from the ladle itſelf is not ſonorous; the one is, when it is covered with a coarſe ſpungy cruſt, and the other, when its edges are extremely thin for any conſiderable ſpace. It is not the form, however, which does this alone, ſince pieces of the ſame figure, made by hammering and cutting, have no more ſound than *lead* in any other ſhape.

Theſe ſpeculations are not without their uſe. It is not to be ſuppoſed, indeed, that any form, into which *lead* can be caſt, can make it capable of anſwering the purpoſe of the more ſonorous metals in bells, &c. but it is very probable, that the caſting metals, naturally ſonorous, into a ſhape or figure, which alone can render a metal, naturally mute, highly ſounding, would make their ſounds much more perfect, more loud and clear. Experiment alone can determine this, and diſtinguiſh what is only probable, and what is true. It ſhould ſeem that the preſent form of bells, had their origin from the obſerving that pots, and other veſſels, made for more immediately neceſſary uſes, gave a great ſound; and thence, when bells were to be made, they caſt them, as nearly as conveniently might be, of that figure. Had they had equal opportunities of obſerving the ſonorous quality of metals caſt into the ſhape of ſegments of ſpheres, it is very probable that all the bells in the world had now been of that form. The figure of bells, uſed at preſent, is indeed very convenient for the ſuſpending them in churches; poſſibly a proper metal, caſt into the form above mentioned, would be more fit than in any other for houſe clocks, where a great ſound is required.

Thoſe who have made an analyſis of *lead*, find it to contain a little mercury, ſome ſulphur, and a great deal of bituminous earth.

It has been proved, by the experiments of different chemiſts, that *lead* contains a real running mercury. Kunkel and Becher both ſeparated mercury from it; and Mr. Groſſe, of the Paris Academy, has juſtified their experiments by producing the ſame effect; by means not only very different from their's, but abſolutely oppoſite and contrary. They ſuppoſe that the mercury contained in *lead* is fixed there, either by acids or by ſulphurs, and therefore they uſed alkaline materials to diſengage and ſupport it. On the contrary Mr. Groſſe uſed only acids, and by means of theſe procured a pure running mercury from this metal. His method was to diſſolve thin plates of *lead* in ſpirit of nitre, weakened with an equal quantity of water. He then obſerved a grey-coloured powder precipitate, which when tried on gold or copper, ſhewed itſelf to be mercurial, and even in the powder he ſaw ſmall globules of quickſilver. Mem. de l'Acad. des Scienc. 1733.

As there could be no poſſibility of the acids forming mercury with *lead*, it is very plain that it muſt have been originally there. But this proceſs probably does not ſucceed with every kind of *lead*: or that aqua fortis made uſe of in this experiment has been impregnated with quickſilver, in which caſe the mercury would precipitate in proportion as the *lead* diſſolved: for Macquer and Beaumé ſay, that they have, with all poſſible attention, repeated this experiment of Mr. Groſſe without having obtained mercury.

In the trying *lead* by the teſt of the burning glaſs, a piece of that metal laid on a charcoal very readily melts, and afterwards wholly diſſipates itſelf in fumes; if it be placed on a piece of ſtone it fumes very much, and becomes at length a thin fluid reſembling oil, or melted reſin; and this liquor, in cooling, fixes itſelf into a ſort of glaſs, which has this peculiar quality, that it is always compoſed of plates, or ſcales, in the manner of talc; it is of a greeniſh or yellowiſh colour, with ſome reddiſh ſpots, and is very ſoft to the touch. If it be kept longer in the focus of the glaſs it ſpreads abroad upon the ſtone, and by degrees penetrates its ſubſtance and promotes its fuſion. If the common calx of *lead*, red-*lead*, or litharge, be uſed inſtead of plain *lead* in this experiment, the event is the ſame: the whole becomes a thin fluid matter, which in cooling affords a flaky glaſs, like talc. Mem. Acad. Paris, 1709.

If this talcky glaſs of *lead* be expoſed to the ſame focus, laid on a piece of charcoal, it preſently melts, and reaſſumes the form of *lead*; and if then taken away, and ſuffered to cool, is no way different from common *lead*.

If the calx of *lead*, or red-*lead*, or litharge, be in the ſame manner melted in the focus of the burning-glaſs on a piece of charcoal, they in the ſame manner immediately re-aſſume the form of *lead*.

It appears from the whole, that there is in *lead* an oily inflammable matter, which is eaſily driven off either by the ſolar or by a common fire; that the baſis of *lead*, which appears alone, when this is driven off, is a ſcaly or talcky earth; and that this oily matter of *lead* is no way different from the oils of vegetables, ſince the oil of charcoal is able perfectly well to ſupply its place, and to reſtore this talcky earth to the form of *lead* again. See PHLOGISTON.

Lead is found in various countries, but it abounds particularly in England. It is found, too, in ſeveral kinds of ſoils, and ſtones, ſome whereof, beſides, contain gold, ſome ſilver, others tin, &c.

It is melted in a furnace provided for that purpoſe, with a ſtrong coal-fire upon it; as it melts, it runs through a canal on one ſide; leaving the earth, ſtone, and ſcoria, with the aſhes of the coals.

It is purified by ſkimming it before it be cold, and throwing ſuet and other fat bodies into it. See REFINING *of lead*.

The common ores of *lead* are nearly of the ſame colour of *lead* itſelf, and appear compoſed of cubes or parallelepipeds, ſometimes large and regular, ſometimes irregular and ſmall. The ores of ſilver, copper, and other metals, except tin and iron, have often a *lead* ore intermixed: the common *lead* ores conſiſt of *lead* in the ſtate of a calx, blended with ſulphur: minium, litharge, or other cakes of *lead*, melted with ſulphur, form a compound ſimilar to them both in appearance and quality. There are alſo white or greyiſh, and yellowiſh-green ores; but they are rarely met with. They are very ponderous and rich in metal. On barely expoſing them to the flame of a candle, the *lead* quickly and plentifully melts out: they are ſometimes cryſtalline and ſemi-tranſparent; ſometimes opake, and little different in appearance from common ſtones.

Mr. Boyle obſerves that there is great difference, diſcernible by the eye, between different *lead-ores*. Some is ſo like ſteel that the workmen call it *ſteel-ore*: and this being of more difficult fuſion than ordinary, they mix it with other ore, by them called *firm-ore*, when they commit it to the furnace. He ſays, he likewiſe took notice of an ore, which, for its aptneſs to vitrify, and ſerve potters to glaze their veſſels, the miners call *pottern-ore*, and ſell it dearer than other ore. *Lead-ore* often yields ſilver, but not always. Mr. Boyle mentions ſome *lead-ore*, he tried, ſo rich, as to yield ſeventy *per cent.* of *lead*; yet did not, though tried by one of the moſt expert artiſts, give one grain of ſilver. Boyle's Works Abr. vol. i. p. 156.

It is pretended by ſome, that the famous *lead*-mineral found near Freyung, in the Upper Palatinate, is *native lead*; but this is an error: we have an account of it in the Philoſophical Tranſactions, which does not give any ground for this opinion. All that is there ſaid of it, is that it was at that time much eſteemed among the aſſayers of metals, as containing no mixture of any other metal with the *lead:* this might well recommend it to them, as ſaving much confuſion, or much trouble in ſeparating its heterogene contents; but it is ſaid expreſsly there, that it is an ore, not a *native* metal: there being two kinds of it, one a cryſtalline ſtone, almoſt all pure *lead;* the other not ſo rich, but of a more rough and coarſe texture. Neither of theſe could be *native lead;* and it is remarkable, that they had leſs appearance of being ſo than many of our common ores. Phil. Tranſ. Nº 3.

However, Dr. Morris relates that native *lead* is found intermixed with the *lead* ore of a mine in Monmouthſhire. Phil. Tranſ. vol. lxiii. and Linnæus ſays, that he has ſeen what externally appeared to be ſuch.

This metal, as in common uſe, always contains ſome ſilver, which is not in quantity enough to be worth the charges of ſeparating. The moſt common proportion is not more than two drams to a centner. This, though of little conſequence on any other occaſion, is carefully inquired into by the aſſayers of the ores of metals, particularly in regard to the ores of ſilver, for the ſeparation of which from its ore *lead* is employed; and it occaſions a very great error, when its computation is neglected, in eſtimating the value of an ore from the aſſay. This increaſing ſilver is therefore always ſubtracted by the more accurate aſſayers; and in order to do this with the leſs trouble, a large quantity of *lead* is granulated at once for this uſe, and mixed by ſifting; then the uſual quantity employed in the aſſaying an ore is to be tried alone in a copel, and the bead of ſilver it affords carefully preſerved. After this, when the bead produced from a ſilver ore is weighed; that bead of ſilver, given by the *lead,* is to be put in the oppoſite ſcale among the weights, and then the weights balancing the bead, will, without more trouble, give the weight of the ſilver from the given quantity of its ore. Cramer's Art of Aſſaying, p. 216.

When the *lead*-ore is dug out, they beat it ſmall, then waſh it clean in a running ſtream, and ſift it in iron rudders. Their hearth or furnace is made of the clay or fireſtone; this they ſet in the ground, and on it build their fire, which they light with charcoal, continuing it with young oaken gads, blown with bellows, worked by men's treading on them. After the fire is lighted, and the fireplace hot, they throw their *lead* ore on the wood, which melts down into the furnace, and then with an iron ladle they take it out, and upon ſand caſt it into what form they pleaſe.

The mine-men ſometimes find the vein run up into the roots of trees, and yet do not obſerve any difference between thoſe and other trees. When the mine is near the ſurface, the graſs is ſometimes found yellow. They make no account of the virgula divinatoria; yet ſay, that when a mine is open, they may gueſs by it how far the vein will lead. The ore runs ſometimes in a vein, ſometimes diſperſed in banks; it lies many times between rocks; ſome of it is harder, others milder; ſometimes they have branched ore in the ſpar; about the ore is ſpar and cauk; and another ſubſtance, which they call *crootes.*

The method of ſeparating *lead* from its common fuſible ore by aſſaying, is this: beat the ore into a coarſe powder, like grains of coarſe ſand; weigh two docimaſtical centners of this powder, and put it into a teſt. Put upon this a tile, or elſe another teſt: the ore muſt be ſpread wide all over the bottom of the teſt: roaſt it in a fire moderate at firſt, but afterwards increaſed, ſo far as to make the teſt red-hot; leave it thus for a few minutes, then take off the tile, and in a ſhort time the ore will change its blackiſh to a yellowiſh colour. This ſhews that great part of the ſulphur is now diſſipated.

Beat this roaſted ore into a fine powder, and add twice as much of the black flux, and of filings of iron not ruſty, and of ſandiver, of each half a centner; powder all theſe in a mortar to mix them well; then put them into a crucible large enough to contain twice or three times as much; cover them over a quarter of an inch thick with common ſalt, and preſs all down with a finger; put a tile on a ſmall crucible, and ſtop the joint with a lute that will bear the fire; then dry the veſſel with a moderate heat; then put the crucible into a wind-furnace, and heap coals upon it, covering it ſome inches high; when the crucible is red-hot, you will hear the ſalt crackle, and this will be ſucceeded by a gentle hiſſing noiſe; ſo long as this laſts, keep the ſame degree of fire, but when it is over, increaſe the fire till the whole maſs is melted, which will be done in a quarter of an hour, in a moderate melting fire; then take out the crucible, put it upon the hearth of the furnace, which muſt be very dry, ſtrike it a few times with a hammer, to get all the *lead* together in the bottom; when it is cold take it out, and you will find by the weight of the regulus how much *lead* the ore contains. Cramer's Art of Aſſaying, p. 287.

This metal may be procured from its ore, of whatever kind that be, by a ſtratification with charcoal.

Lead ores may be aſſayed by the following proceſs of Mr. Gellert: mix a quintal of roaſted *lead ore* with a quintal of calcined borax, half a quintal of glaſs finely pulverized, a quarter of a quintal of pitch, and as much of clean iron filings; put this mixture into a crucible wetted with charcoal duſt and water; place the crucible before the nozzle of the bellows of a forge, and when it is red, raiſe the fire for fifteen or twenty minutes; then withdraw the crucible, and break it when cold. Some very fuſible ores, as the galena of Derbyſhire, may be aſſayed, as large quantities of it are ſmelted without previous roaſting, and without addition, merely by fuſion, during a certain time. For this purpoſe nothing more is requiſite than to keep the ore melted in a crucible with a moderate heat, till all the ſulphur is deſtroyed, and the metal be collected. To prevent the deſtruction of any part of the metal after it is ſeparated from the ſulphur, ſome charcoal duſt may be thrown over the ore, when put into the crucible; but if the galena be mixed with pyrites, eſpecially arſenical pyrites, it requires much roaſting and ſaline fluxes.

The ores of *lead* are known to be ſoftened, in a moderate red heat, into the conſiſtence of a paſte, but do not flow thin in a ſtrong fire: if iron filings are mixed, the iron abſorbs the ſulphur, and at the ſame time revives the *lead* into its metallic form. This is one of the moſt compendious methods of ſmelting *lead ores,* where the operation is performed in veſſels; and is the method uſed with the *lead ores* at Dal in Sweden, which, containing from twenty to twenty-ſix ounces of ſilver on the hundred pounds, are thus ſmelted in crucibles, without any loſs of the ſilver; and Mr. Scheffer obſerves, that the produce of *lead* is greater than that obtained by any other means. The ordinary yield of *lead* is from about one-third to upwards of two-thirds of the weight of the ore, according as it is leſs or more free from ſpar, or other heterogeneous earthy matters.

Lead is found of a lighter or deeper colour, according as it is more or leſs purified; though ſome make a difference in the colour of the ore, always eſteeming that moſt which is the whiteſt.

Some very able naturaliſts obſerve, that the weight of *lead* increaſes on long keeping, either in the open air, or underground. Mr. Boyle obſerves this particularly of the *lead* of churches, which, he ſays, frequently grow both in bulk and weight, ſo as to become too ponderous for the timber that before ſuſtained it; which ſome account for from the impurity, heterogeneity, and looſe texture of its parts, by means whereof the particles of the air, getting admiſſion within its pores, are attracted, and eaſily aſſimilated to it. But others, who rely wholly on experience, abſolutely deny the fact, as alſo that it is reproduced in mines before exhauſted, by letting them lie long to the open air; which others aſſert.

Lead is ſoluble with all acids. When combined to ſaturation with nitrous acid, it forms, as ſilver does, a cryſtallizable nitrous ſalt, with metallic baſe, called nitre of *lead,* which is capable of decrepitating and detonating, without the addition of inflammable matter, in conſequence of the phlogiſton retained by the *lead.* Pure vitriolic acid, and that contained in neutral vitriolic ſalts, when mixed with a ſolution of *lead* in nitrous acid, unites with the *lead,* ſeparating it from the acid, and forming with it a metallic ſalt, or vitriol of *lead,* which cryſtallizes and appears in form of a white precipitate, when the liquors do not contain a ſufficient quantity of water to diſſolve it. This ſalt is the ſame as that made by directly diſſolving *lead* in vitriolic acid. Marine acid, and all the neutral ſalts containing it, precipitate *lead* from its ſolution in nitrous acid, and unite with it, forming a metallic ſalt, called PLUMBUM *corneum,* or *Saturnus corneus,* from its reſemblance to the LUNA *cornea.* Vegetable acids alſo diſſolve *lead,* and particularly its calces, with eaſe; but only the combinations of this metal with vinegar are known, becauſe theſe are uſed in medicine and the arts. Of theſe there are the CERUSS or *white* LEAD, the VINEGAR *of lead,* and *ſalt* or *ſugar of* LEAD. Cauſtic alkaline lixivia, boiled on plates of *lead,* diſſolve a ſmall portion, and corrode a conſiderable quantity: the ſolution ſtains hair black. Expreſſed oils diſſolve calces of *lead* by boiling, in ſuch large quantity as to become thick or conſiſtent. The *drying* OIL uſed by painters is linſeed oil, thus thickened with *lead;* and in this way are formed plaſters, cements for water-works, paint for preſerving nets, &c. Theſe maſſes of *lead* combined with oil may be decompoſed by acids, which unite with the *lead,* and ſeparate the oil from them; and this oil proves ſoluble, like eſſential oils, in ſpirit of wine; a phenomenon tion firſt taken notice of by Mr. Geoffroy. *Lead* is eaſily united to ſulphur, and burnt and calcined by expoſing it at once to the action of ſulphur, fire, and air.

All the metals may be conſidered, in certain circumſtances, as acting in the manner of menſtruums on one another, and of theſe none has ſo much power as *lead*. When *lead* is expoſed to a moderate fire in an earthen veſſel, the ſurface of the melted maſs is ſoon covered with ſcoriæ, in form of a thin ſkin of many colours: when the fire is ſo far increaſed as to make the veſſel quite red-hot, this ſkin melts a little, and is thrown to the ſides of the veſſel in form of a ſurfuraceous matter, of various yellowiſh or whitiſh colours, called *litharge*. After this the melted *lead* ſmokes, and ſmall drops, reſembling the firſt ſcoriæ, riſe, and ſwim like globules of oil upon the ſurface; theſe are one after another added to the litharge at the ſides; and if the fire be kept in this degree, the whole ſubſtance of the *lead* is finally turned into litharge.

If copper be added to *lead* thus ſmoking, it cauſes a much briſker ebullition than before, and the copper burſts, and divides, and ſeems to become one homogene maſs with the *lead*; this maſs is brittle, and if made with equal parts of *lead* and copper, reſembles tempered ſteel when broken. On expoſing the mixture to a fire no greater than that in which *lead* melts, the *lead* almoſt entirely runs off by itſelf; and the little *lead* that is retained in the pores of the copper, may be ſcorified and melted out by a fire conſiderably leſs than is ſufficient to make copper flow. Gold and ſilver melted thus with *lead* become brittle alſo, and gold becomes pale by the ſmalleſt admixture of it. They are diſſolved by melted *lead* in a ſlight red heat.

Tin and *lead* melt together with a fire ſtrong enough to melt the *lead* alone, and form a compound more fuſible than *lead* by itſelf, and is therefore employed as a SOLDER for *lead*; but when this is increaſed, ſo as to make the veſſels red, the tin immediately riſes up above the *lead*, in form of little whitiſh duſty hillocks, ſo that the whole looks as if aſhes had fallen into the veſſel; and the tin thus calcined, when cold, is variegated in colour, with white, yellow, and red. *Lead*, ſo long as it keeps its metallic form, can never be made to join with iron, though urged by ever ſo violent a fire: on continuing the fire, the *lead* ſcorifying or calcining, abſorbs the phlogiſton of the iron, and conſequently promotes the calcination of that metal; and when both are reduced into calces, the fuſible ſaturnine calx diſſolves the chalybeate into an opake brown or bluiſh glaſs: hence *lead* may be employed to purify the perfect metals from iron, as well as from other imperfect metals.

The ſemi-metals are all eaſily melted with *lead* by fire, and added in too large a quantity they take away its malleability.

Lead and all its products turn into glaſs by a ſtrong fire; and this glaſs, or in the place of it litharge melted with ſtones, and other vitrifiable ſubſtances, makes them run into glaſs with a much leſs fire than they otherwiſe would do; and if a very large quantity of this glaſs or litharge be added, they become ſo far attenuated as to run through the ſides of the veſſels. Lime-ſtones ſuffer the ſame change by means of this matter; and the incombuſtible ſtones, with proper management, are ſubject to the ſame fate; but unleſs theſe proceſſes are carefully conducted, the litharge or glaſs of *lead* gets away alone through the veſſel. Among the metals litharge facilitates the fuſion of copper and iron by the fire, but it conſumes a conſiderable quantity of them, and runs itſelf, with what it poſſeſſes, into glaſs; and finally, the whole tin and its calx are with difficulty vitrified by glaſs of *lead*, and they loſe nothing by it: but if gold and ſilver are very frequently melted with litharge, they will at length be found to have loſt a little of their weight; but this ſmall quantity is not deſtroyed, but may, by the proper operations, be again regained out of the litharge. For the affinities of *lead*, ſee AFFINITY.

Lead is a metal of much uſe: it eaſily melts, and mixes with gold, ſilver, and copper; but not being able to endure the violence of the fire which they undergo, it riſes to the ſurface, and carries with it all that was heterogeneous in them; ſo that neither gold nor ſilver are refined without *lead*. Hence *lead* is called by the chemiſts *balneum ſolis & lunæ, lavacrum regis & reginæ, ſapo metallorum*, &c. See REFINING.

To which may be added, that the coarſer kind of precious ſtones, heated in *lead*, are ſaid to be thereby rendered much more brilliant.

Borrichius aſſerts, that *lead* reverberated in minium, converted into glaſs, reduced into ceruſs, or burnt into litharge, immediately reſumes its original figure, upon the dexterous application of a lixivial ſalt.

All theſe calces and glaſſes of *lead* are more eaſily revived than thoſe of any other metal. They can ſcarcely be melted but ſome part of the *lead* is revived, although no inflammable principle has been added, which proves that they retain much phlogiſton. If a piece of common flint-glaſs be ſurrounded in a crucible with ſoot, powdered charcoal, or other ſuch inflammable matters, and cemented for ſome time with a fire ſufficient to melt it, the *lead* will be revived through the whole internal ſubſtance of the glaſs, into little drops; and if the matter is brought into fuſion, the *lead* ſubſides, collected into one butter at the bottom. From this glaſs Dr. Lewis has extracted one fourth of its weight of perfect malleable *lead*. The calces and glaſs of *lead* abſorb the inflammable principle even from ſome other metallic bodies: if glaſs of *lead* be melted in an iron veſſel, or ſtirred in fuſion with an iron rod, great part of the *lead* will reſume its metallic form, a proportionable quantity of the iron ſcorifying. It is ſaid, that *lead*, recovered from its calces, proves ſomewhat harder and lighter than at firſt, and leſs ſubject to tarniſh in the air. But Dr. Lewis obſerves, that the difference, if any, is certainly very ſmall. Neumann's Chem. by Lewis, p. 55.

Lead is much uſed in building, particularly for covering, gutters, pipes, and in glaſs-windows. For which uſes, it is either caſt into ſheets in a mould, or milled; which laſt, ſome have pretended, is the leaſt ſerviceable, not only on account of its thinneſs, but alſo becauſe it is ſo exceedingly ſtretched in milling, and rendered ſo porous and ſpongy, that, when it comes to lie in the hot ſun, is apt to ſhrink and crack, and conſequently will not keep out the water. Others have preferred the milled *lead*, or flatted metal, to the caſt, becauſe it is more equal, ſmooth, and ſolid.

The *lead* uſed by glaziers is firſt caſt into ſlender rods, twelve or fourteen inches long, called *canes*; and theſe, being afterwards drawn through their vice, come to have a groove on either ſide for the panes of glaſs; and this they call *turned lead*.

The method of paling or ſoldering *lead* for fitting on of imboſſed figures, *&c.* is by placing the part whereon the figure is to be paled, horizontal, and ſtrewing on it ſome pulverized reſin; under this they place a chafing-diſh of coals till ſuch time as the reſin becomes reddiſh, and riſes in pimples; they apply the figure, and rub ſome ſoft ſolder into the jointing: when this is done, the figure will be paled on, and as firm as if it had been caſt on.

Lead is much uſed in varniſhes and painting with oil, both as a colour and as a dryer. It is alſo uſed in the preparations of ENAMELS and of PORCELAIN as a flux, and makes the baſis of the GLAZING of almoſt all pottery wares; and by means of *lead* the moſt perfect metals are refined and aſſayed. See REFINING and ASSAYING.

LEAD, in *Medicine*. This metal is celebrated by ſome chemical writers for its great medical virtues; but after all, it ſeems to be a metal which ought to be given internally with the greateſt caution, and to be rather calculated for outward application. Its ore is ſo poiſonous, that the ſteam, ariſing from the furnaces where it is worked, infects the graſs of all the neighbouring places, and kills the animals which feed on it. Its beſt preparation is *ſaccharum ſaturni*; which, though capable of doing great good in hæmorrhages, and ſome other caſes, is apt, however, to bring on colics of ſo violent a kind, that the remedy often proves worſe than the diſeaſe.

The poiſonous quality of this *ore* is ſuch, that the people who live in the countries where it is dug, and near the places where it is waſhed, can keep neither dog nor cat, nor any kind of fowl, but all die in a ſhort time; and it has been known that a little houſe, in which *lead ore* had been kept for ſome time, though afterwards made very clean, and bedded with fern, infected calves which were put into it, ſo that all died in a very ſhort time; and it is a too melancholy obſervation, that children often die ſtrangely and ſuddenly about theſe places. Philoſophical Collections, N° 2. p. 6.

The internal uſe of *lead* is dangerous on account of the colics and palſies that are occaſioned by it. Culinary veſſels, lined with a mixture of tin and lead, which is the uſual tinning, are apt to communicate to acid foods pernicious qualities, and require to be uſed with great precaution. The ſame thing has been alſo ſaid of liquors kept in glazed ware, and of cyder made in veſſels, where *lead* is uſed, and of wines adulterated with litharge, *&c.* See COLICA *Dammoniorum*.

M. Navier has lately diſcovered, that the liver of ſulphur, and particularly liver of ſulphur of Mars, is an excellent antidote againſt the poiſon of *lead*; and he adviſes patients labouring under its pernicious effects to drink largely of acidulated liquors, to make afterwards the liver of ſulphur the principal part of the cure, and to finiſh the cure with gentle purgatives.

The Dutch have been charged with correcting the more offenſive expreſſed oils, as that of rape-ſeed, ſo as to ſubſtitute them for oil olive or oil of almonds, by impregnating them with lead: in order to detect this abuſe, mix a little of the ſuſpected oil with a ſolution of orpiment made in lime-water: on ſhaking them together, and ſuffering them to reſt, the oil, if it has any ſaturnine taint, will appear of an orange-red colour: if pure of a pale yellowiſh. The *lead* is diſcovered in wines by the ſame ſulphureous ſolution, which changes the colour of wines impregnated with this metal to a browniſh red or a blackiſh hue. However, the various preparations of *lead* are applied externally with ſafety and great benefit, on account of its ſedative, drying, and repellent qualities. The vinegar and ſugar of *lead*, and all the ointments and plaſters which contain ceruſs, minium, or litharge, eminently poſſeſs theſe qualities. See the following articles and references.

For the laws relating to *lead*, and the ſtealing of it, ſee 27 Ed. III. ſtat. 2 c. 1. 3. 15. 38 Edw. III. ſtat. 1. c. 6. 4. Geo. II. c. 32. 29 Geo. II. c. 30.

LEAD, for the *manufacture of*, ſee PLUMBERY.

There are various preparations of *lead*, ſerving for various purpoſes.

LEAD, *balſam of*, an external medicine, greatly famed for its effects in old and ſharp ulcers. It is made by mixing one ounce of ſugar of *lead* with two of oil of turpentine, and ſetting this mixture in a ſand-heat till the ſalt is diſſolved. By this means the oil acquires a red colour, and is called *balſam of lead*.

LEAD, *burnt*, *plumbum uſtum*, is a chemical preparation uſed in medicine, made of plates of *lead* melted in a pot with ſulphur, and reduced by fire into a brown powder.

Lead continued in fuſion and ſtirred, ſo that freſh ſurfaces may be expoſed to the air, will gradually change into a powdery duſky-coloured calx, bearing this name.

Burnt lead is only intended for external uſe. It has the ſame virtues aſcribed to it, in ointments and plaſters, as litharge or minium. Mixed into an unguent with lard alone it makes a good ointment for the piles.

LEAD, *butter of*, is a kind of liquid unguent made of vinegar and lead, incorporated with roſate oil and commended for the cure of tetters. It is called *butyrum ſaturni*.

LEAD, *calcined*, or *calx* of *lead*. See CALX, CERUSSE, GLASS *of Lead*, LITHARGE, MASSICOT, MINIUM, &c.

LEAD, *caſting of*. See CASTING.

LEAD, *coheſion of*. See COHESION

LEAD *duſt* is a preparation uſed by the potters; made by throwing charcoal duſt into melted *lead*, and ſtirring them a long time together: to ſeparate the coal again, they only waſh it in water, and dry it afreſh.—Its uſe is, to give a varniſh and gloſs to their works.

LEAD, *extract of*, or *Saturn*, is prepared by ſimmering together as many pounds of the LITHARGE of gold as quarts of vinegar, for an hour and a quarter, and often ſtirring them; then taking it from the fire, and as ſoon as it is cool enough, pouring the clear liquor into bottles to be kept for uſe. If this liquor be made into the common conſiſtence of an extract, it muſt boil yet longer after its ſeparation from the maſs, and will acquire a reddiſh colour. This is Goulard's extract and the baſis of all his preparations of *lead*. It evidently differs in no reſpect from ſugar of *lead*, and vinegar of litharge, but in the degree of concentration. The only circumſtance in which the extract ſeems to have the advantage of ſugar of *lead*, appears to be in the greater quantity of the acetous acid contained in it, which proves an excellent aſſiſtant in many caſes, and the ſugar of *lead*, when once cryſtallized, cannot be brought back to that ſtate of ſolution in vinegar in which it was before; yet where a large quantity of watery menſtruum is added, as in Mr. Goulard's ſaturnine water, it is as well to make a ſolution of ſugar of *lead* in the water, and add the vinegar afterwards, as to mix them both together in the form of extract. Aikin's Obſ. on the external Uſe of Preparations of *Lead*, &c. p. 2. See VINEGAR of *Lead*.

LEAD, *glaſs of*, ſee GLASS *of Lead*.

LEAD, *magiſtery of*, is the calx of *lead* purified and ſubtilized. It is made of *lead* diſſolved in aqua fortis, pouring filtrated ſalt water into it; whence reſults a magiſtery extremely white, which when ſoftened by ſeveral lotions, is mixed with pomatums for the face and complexion.

LEAD, *mock*, a name given to a glittering ſubſtance found in *lead*-mines. See GALENA *inanis*, and BLINDE.

LEAD, *native*. See LEAD *ſupra*.

LEAD, *ointments of*, *preparations of*. See UNGUENT.

LEAD, *red*, a preparation of mineral *lead* calcined, and rubified; uſed by painters, potters, and ſurgeons. See MINIUM.

LEAD, *ſalt* or *ſugar of*, *ſaccharum Saturni*, is an eſſential ſalt of vinegar, incorporated with the proper ſubſtance of *lead*, or ceruſs, diſſolved in ſpirit of vinegar. See SACCHARUM *Saturni*.

LEAD, *tincture of*. See TINCTURA *Saturnina*.

LEAD, *vinegar of*, or of *litharge*. See VINEGAR.

LEAD, *water of*, *aqua Saturni*, is called by Mr. Goulard vegeto-mineral water, who makes it by dropping into a quart of pure water, a hundred drops of the extract of ſaturn, and then adding to them four tea-ſpoonfuls of brandy. This is his ſpecific in external inflammations, particularly of the eye, for waſhing ulcers, cancers, ſcrophulas, contuſions, phlegmons, eryſipelas, piles, chilblains, tetters, gangrenes, &c. But a ſolution of the SACCHARUM *Saturni* will have the ſame effect.

LEAD, *white*. See CERUSSE.

LEAD *nails*. See NAILS.

LEAD, *black*, is a kind of mineral of a black or rather of a deep ſhining blue colour, but ſoft and unctuous, inſomuch that it has been uſed, inſtead of oil or ſoap, to prevent the friction of machines, found chiefly in England, and appearing to be nothing elſe but a peculiar talcky earth. It is much uſed for pencils, or crayons for deſigning.

It is inſoluble by acids; unfuſible by fire; and, in cloſe veſſels, reſiſts vehement degrees of it: but by long calcination in an open fire it is moſtly volatilized, emitting, according to Lawſon, Diſſ. de Nihilo, inflammable blue flowers, and the reſiduum is a yellow calx, which being reduced by Mr. Quiſt, (ſee Swediſh Acts, 1754) ſeemed to be a mixture of tin and iron. Hence it has been lately claſſed among the ſulphureous minerals, and called ſulphur ſatiated with iron and tin. Black *lead* in fine powder may be readily mixed with melted ſulphur, and though the compound remains fluid enough to be poured into moulds, it looks nearly like the coarſer ſorts of *black lead* itſelf. This was probably the method by which prince Rupert is ſaid to have made *black lead* run like a metal in a mould, ſo as to ſerve for *black lead* again. Birch's Hiſt. Royal Soc. vol. iii.

The German *black lead* pencils, and thoſe which are hawked about among us, are prepared in this manner: their melting or ſoftening, when held in a candle, or applied to a red-hot iron, and yielding a bluiſh flame, with a ſtrong ſmell like that of brimſtone, diſcovers their compoſition. Pencils of this kind are hard, and brittle, and cut or ſcratch the paper or wood inſtead of marking them. The true Engliſh pencils are formed of *black lead* alone, ſawed into ſlips, which are fitted into a groove made of the ſofteſt wood, as cedar, and another ſlip of wood glued over them. Theſe pencils, however, are of different quality, on account of different ſorts of the mineral being fraudulently joined together in one pencil, the fore-part being commonly pretty good, and the reſt of an inferior kind. To avoid theſe inconveniences, ſome take the finer pieces of *black lead* itſelf, which they ſaw into ſlips, and fix for uſe in port-crayons. Lewis's Commerce of Arts, p. 328.

The name ſeems given to this ſubſtance with ſome impropriety, the common *lead* being the true *black lead*, ſo called by way of contradiſtinction from tin, otherwiſe called *white lead*. Plott, in Phil. Tranſ. N° 240. p. 183. See LEAD and TIN. *Black lead* is otherwiſe popularly denominated *wad* or *wadt*, and *kellow*; by naturaliſts *nigrica fabrilis*, from its uſe in ſcoring; by analogy to the *rubrica fabrilis*, or ruddle, which has the ſame uſe. Woodw. Meth. Foſſ. cl. 5. p. 43. See RUDDLE.

Black lead was known to the ancients under the names of *plumbage*, *galena*, and *molybdena*. Vide Ruland. Lex. Alchem. p. 370. voc. *Plumbago*. Caſt. Lex. Med. p. 355. voc. *Galena*. See PLUMBAGO, &c.

It is found in divers parts of Germany, &c. but the better ſort is the produce of England alone, and that reſtrained to the mines near Keſwick in Cumberland; beſides which, Dr. Woodward aſſures us, there is none found worth any thing in any other country. Woodw. Nat. Hiſt. Eng. Foſſ. tom. i. p. 5.

It is ſomewhat difficult to aſcertain what claſs of minerals *black lead* belongs to. Metal it is not, as not being either ductile or even fuſible; nor can it be reckoned among ſtones, for want of hardneſs: it remains, therefore, that it muſt be placed among the earths, though it diſſolve not in water, as moſt earths will, except ſtiff clays and ochres; among the latter whereof Dr. Plott judges it may be reckoned, it ſeeming to be a ſort of cloſe earth, of very fine and looſe parts, ſo burnt as to become *black* and ſhining, diſcolouring the hands, as all ochres do. Whence the moſt proper name that can be given it, according to this author, is *ochra nigra*, or *black* OCHRE. Phil. Tranſ. N° 240. p. 183.

Some writers ſpeak alſo of a fictitious *black lead*, or *plumbago*, produced in furnaces, being found adhering to the ſides of thoſe where gold or ſilver is melted. Ruland. Lex. Alch. p. 373. voc. *plumbago*.

By our laws, entering mines of *lack lead*, with intent to ſteal it, is made felony. See 25 Geo. II. c. 10. See Larceny.

Lead, in the *Manege*, is a term uſed to expreſs the part that begins any motion firſt. A horſe going in a ſtraight line always *leads*, or cuts the way with his right foot. This is called in French *entamer le chemin*.

Lead-*walling*, in the *Salt-works*, on the ſalt-ſprings in ſome parts of England, is the term uſed for that quantity of brine that is neceſſary for twenty-four hours boiling in one houſe. The whole government of the works is in the hands of certain lords, who proportion the quantity to be worked by theſe *lead wallings* to the ſeveral perſons who work it. At Namptwich, in Cheſhire, two hundred and ſixteen *lead-wallings* belong to all the owners of the pit, and no tradeſman, bachelor, or widow, can rent more than eighteen *lead wallings*. All is under the direction of four ſworn officers, choſen every year, and theſe appoint how much ſalt ſhall be made each year, and how many houſes ſhall work at a time. Ray's Engliſh Words, p. 142.

LEADWORT, *plumbago*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower has a tubulous permanent empalement, which is indented at the top in five parts, and has one funnel-ſhaped petal, with a cylindrical tube, narrow at the top; the brim is cut into five oval parts, and it has five awl-ſhaped ſtamina, ſituated in the tube, ſitting upon the valves of the nectarium, which includes the germen; the ſmall oval germen ſuſtains a ſingle ſtyle, the length of the tube, crowned by a ſlender five-pointed ſtigma; the germen becomes a ſingle oval ſeed, included in the empalement. Miller enumerates two, and Linnæus four ſpecies.

This is a plant ſeldom or never uſed, being of a hot, and even of a cauſtic nature, like pellitory of Spain, and has been made uſe of, like that, for the tooth ach, and thence called *dentillaria*, or tooth-wort.

LEADERS, in the *Military Art*. See File-*leaders*.

LEÆNA, the *lioneſs*. See Lioness.

LEAF, *folium*, in *Botany*, a part of a plant ordinarily very thin and flat, growing in the ſpring, and uſually falling off in autumn. See Plant.

The *leaf* of a plant or tree is diſtinguiſhed from that of flowers: the firſt is called *folium* and the other *petalum*: in this article the term is uſed in the former ſenſe.

There are ſome plants without *leaves*, as truffles and muſhrooms.

As to the ſtructure of *leaves*, Dr. Grew obſerves, that their fibres never ſtand on the ſtalk in an even line, but always in an angular or circular poſture, and their vaſcular fibres or threads are 3, 5, or 7. The reaſon of which poſition is for their more erect growth, and the greater ſtrength of the *leaf*. Another circumſtance obſervable in the fibres of *leaves* is, their orderly poſition: ſo as in ſome to take an eighth part of a circle, as in mallows; in ſome a tenth, but in moſt a twelfth. The ſame author obſerves ſix ſeveral parts intended by nature for the preſervation of germs, *viz.* *leaves*, furſoils, interſoils, ſtalks of *leaves*, hoods, and mantlings that cover them.

The ſkin or coat of the *leaves* is no more than that of the branches extended, as gold, by beating, is reduced into *leaves*. In the germ, the *leaves* are folded, ſometimes in two, and ſometimes in ſeveral plaits, ſomewhat after the manner of a fan. If the leaves be too thick to plait commodiouſly in two, and to be ranged againſt each other; or if they be in too ſmall a number, and their fibres too delicate, inſtead of being plaited, they are rolled up, and form either a ſingle roll, as the *leaves* of the mountain cowſlip, which are thick; or two rolls, which begin at each extremity of the *leaf*, and meet in the middle. There are alſo ſome plants, whoſe *leaves* form three rolls, as fern: ſeveral *leaves* are covered with hair of ſeveral figures; thoſe of lavender, and the olive-tree have hairs reſembling ſtars. See Lanugo.

Botaniſts have obſerved, that ſome plants have very thick fleſhy *leaves*, whoſe pulpy ſubſtance is always moiſt: theſe are ſuch as naturally grow upon dry barren rocks, and are generally natives of warm countries, which, as they can draw in very little nouriſhment from the earth, preſpire only in a ſmall quantity. The *leaves* of ſuch plants have a thin compact ſkin over their ſurface, with minute pores, which prevent the deſcending moiſture from penetrating into their ſubſtance and deſtroying them. The ſame ſtructure is alſo obſervable in the *leaves* of thoſe trees and ſhrubs, which retain their verdure all the year; and they are known to imbibe and perſpire little moiſture in compariſon with the deciduous trees and ſhrubs: moreover, their nutritive juices are of an oily quality, which ſecures them from the froſt. In all *leaves* there are two orders of veins or nerves, one belonging to each ſurface: thoſe on the under-ſide of the *leaf* have their ramifications larger than thoſe on the upper. And the two orders of veins are inoſculated in ſeveral places. Their uſes are ſuppoſed to be different: the upper laminæ are conceived to be air-veſſels or tracheæ, through which the perſpirable matter is diſcharged, which often appears in the form of Honey-dew, and the air is inſpired.

Plants are known to receive and tranſpire more, in equal time, than large animals; hence it appears that the leaves are neceſſary to preſerve the plants in perfect health: becauſe it has been found by accurate calculation and repeated experiments, that a plant of the ſun-flower receives and perſpires in twenty-four hours, ſeventeen times more than a man.

The lower laminæ are deſtined, as it is imagined, for receiving, preparing and conveying the moiſture imbibed from the riſing vapours of the earth, by which trees and plants are greatly nouriſhed: ſo that one principal uſe of *leaves* is to perform, in ſome meaſure, the ſame office for the ſupport of vegetable life, as the lungs of animals do for the ſubſiſtence of animal life; plants drawing through their leaves ſome part of their nouriſhment from the air.

The *leaves* of plants are of the utmoſt conſequence to the life of the whole. Air evidently paſſes in at the *leaves*, and goes through the whole plant, and out again at the roots. If the *leaves* have no air, the whole plant will die, as is eaſily proved by the air-pump; but in theſe experiments, if the *leaves* be left on the outſide of the receiver, and parted by a hole cemented with wax, and have air, the plant will thrive, and grow, though its roots and ſtalk are kept in vacuo in water. The *leaves* of plants perform the neceſſary work of altering the water received in at the roots, into the nature of the juices of the plant; and hence it is, that the life of the plants depends ſo immediately on their *leaves*. The huſbandman often ſuffers for want of this knowledge. A crop of ſaint-foin is a very valuable thing, and its root being perennial, will yield him increaſe many years; but it is often deſtroyed at firſt, by ſuffering it to be indiſcreetly fed upon by the ſheep, which eating up all the *leaves*, the root remains without the means of a ſupply of air, and the whole periſhes.

Leaves being thus neceſſary to plants, nature has, in all perennial plants, provided a reverſionary ſtock of them. The *leaves* of theſe plants are always formed in autumn, though they are not unfolded till the following ſpring. They then open and increaſe gradually, in proportion to the motion of the ſap, and the quantity of pabulum it then receives to be circulated. Theſe *leaves* may alſo, though not wholly appearing out of the bud, be ſufficient for the extremely ſmall motion of life, which the ſap of perennial plants, that drop their leaves, has in winter. Tull's Horſe-hoeing Huſbandry, p. 19.

Dr. Grew obſerved the formation of theſe autumnal *leaves*; but beſide theſe, there is another ſet of them formed in the ſpring, and expanded about midſummer. Theſe are of infinite ſervice to many particular trees, particularly to the mulberry, as they ſave its life when the ſpring *leaves* have been all eaten up by the ſilk-worms. People who ſtrip that tree for the food of theſe animals find, however, that ſome caution is neceſſary, in order to make the new ſupply of ſpring *leaves* ſave the life of the tree. For if they pull off the old *leaves* downward, ſtripping away ſtalk and all, the tree often dies, but if they pull them upwards, the tree lives without hurt; becauſe the ſtalk, in this caſe, is left, and often a piece of the bottom of the *leaf* upon it. Theſe ſerve, in ſome degree, in the place of the whole *leaves*, till the new ones are formed.

It is certain that no plant, to which nature has allotted *leaves*, can live without them, but will certainly die if they are pulled off as ſoon as they appear. The common graſs of our meadows and paſtures might ſeem an exception to this general rule; but it is to be conſidered, that though the ſheep eat this down very cloſe, and take off its *leaves* as ſoon as they grow, yet when it is thus devoured by cattle, it is only in the *leaf*, very little of it growing up into ſtalk at that time, and therefore leſs ſap is to be purified, and conſequently leſs of the operation allotted to the *leaves* required; and there is a conſtant ſucceſſion of new *leaves* growing up in the place of the old ones, and many of theſe being too ſhort to be bitten off, ſerve in the place of thoſe which are eaten.

The *leaves* of trees and plants afford the curious in microſcopic obſervations many very beautiful objects.

All *leaves* are full of innumerable veſſels, which convey perſpirable juices to the pores for their diſcharge. Whether there be any circulation in them, is not yet determined; but as their juices all become ſtiff and coagulated;

lated, when let out, it is probable that they have ſome motion, which keeps them fluid while in the veſſels of the plant.

The pores in the *leaves* of plants are almoſt innumerable. Mr. Leewenhock found an hundred and ſeventy-two thouſand and ninety pores on one ſide of a *leaf* of box. The *leaves* of rue ſeem full of holes, like a honey-comb; all the kinds of St. John's wort appear likewiſe ſtuck full of pin-holes to the naked eye, but the microſcope diſcovers, that the places where thoſe holes ſeem to be, are really covered with a very thin and white membrane. The backſide of the herb mercury looks, as if rough-caſt with ſilver, and all the ribs are full of white, round, tranſparent balls, faſtened by ſlender ſtalks, like ſo many grapes. A ſage-*leaf* appears like a rug, or ſhag, full of knots and tufts of ſilver thrums, and embelliſhed with fine round cryſtal beeds, or pendants, and theſe faſtened by ſlender foot-ſtalks. The back-ſide of a roſe-*leaf*, and particularly of that kind called *ſweet-briar*, appears diapered with ſilver. Every one knows, that the *leaves* of ſtinging-nettles are thick-ſet with ſharp prickles, which penetrate the ſkin when touched, and occaſion heat, pain, and ſwelling. Theſe ſymptoms were imagined formerly to be owing to the prickles being left in the wounds they make, but the microſcope diſcovers ſomething much more wonderful in this plant, and ſhews that its prickles are formed for acting, in the ſame manner as the ſtings of animals; for every one of them is found to be a rigid body, hollow, and terminating in a very fine point, with an opening near its end. At the bottom of this prickle there lies a pellucid bag, containing a limpid liquor, which, upon the leaſt touching the prickle, is ſquirted out at the little outlet, and if it enters the ſkin produces the miſchiefs before mentioned by the pungency of its ſalts. And hence it is, that the *leaves* of nettles, when they have dried a little in the ſun, ſting ſcarce at all. Baker's Microſcope, p. 259.

Beſides, the *leaf* ſerves, in a ſingular manner, to nouriſh the eye or germ of the plant, until, growing by degrees to a greater bulk, it preſſes the veſſels of the foot-ſtalk together, whereby the juice is by little and little ſtopped in the *leaf* till it cannot any more return through the foot-ſtalk; which by the ceſſation of the afflux and reflux of the nutritious juice, grows putrid, and the *leaf* dies and falls off; which is the chief cauſe of the falling of the *leaves* in autumn. *Leaves* likewiſe ſhade the buds for the future ſhoots from the ſun, which would otherwiſe exhale and dry up their moiſture, and alſo the young fruit. Miller. See *Perſpiration* of Plants.

Botaniſts conſider the *leaves* of plants, with regard to their ſtructure, ſurface, conſiſtence, edges, ſituation, ſize, and figure. With regard to their ſtructure, *leaves* are either ſingle, as thoſe of the apple-tree, pear-tree, &c. or *double*, as thoſe of angelica, parſley, &c.

With regard to their ſurface, *leaves* are either *flat*, as the nummularia, aſarum, origany, &c. or *hollow*, as thoſe of the onion and aſphodel; or thick and ſolid, as ſeveral kinds of kali, and houſe-leeks.

With regard to their conſiſtence, *leaves* are either *thin* and fine, as thoſe of St. John's-wort, and dog's-graſs; or *thick* and groſs, as thoſe of portulaca; or *fleſhy*, as thoſe of ſeveral kinds of houſe-leeks; or *woolly*, as thoſe of the mullein.

With regard to the verge, or edges, *leaves* are either *cut ſlightly*, as ſome ſpecies of geum, and cannabis; or *deep*, as trefoil, &c.

With regard to their ſituation, *leaves* are either *alternate*, that is, ranged alternately, as the hounds-tongue; or oppoſite to each other, as the phillyrea; or ſtellated, as in the rubia. With regard to their ſize, *leaves* are either very *big*, as thoſe of the colocaſia, and ſphondylium; *moderate*, as thoſe of the fig-tree; *ſmall*, as thoſe of the apple-tree, pear-tree, peach-tree; or *very ſmall*, as thoſe of the mille-pertuis, or St. John's wort.

The figure of the *leaves* of plants may be repreſented by holding one in the ſmoke of reſin, camphor, a candle, &c. whereby the *leaf* acquires a blackneſs, which, when preſſed on white paper, gives the exact ſize, ſhape, and particular ramifications of the fibres. This method may be of uſe to botaniſts, when they have no ſkill in drawing. Boyle's Works abr. vol. i. p. 132.

The *leaves* of plants have ſeveral diſtinctions among botaniſts, according to their ſhape and diviſion, each of which has its peculiar name. See *Tab. of Leaves, Botany, Tab.* III. and IV.

Leaves are uſually divided into *ſimple* and *compound*, to which ſome alſo add *determinate*; each of which has its ſeveral ſubdiviſions.

Leaf, *acerose*, is a ſimple linear *leaf*, which ſtays on the tree, and is ever-green; as in the fir, yew, &c.

Leaf, *acinaciform*, or *faulchion-ſhaped*, is a ſimple *leaf*, which is fleſhy and compreſſed, with one of its edges convex and narrow, the other thick and ſtraight.

Leaf, *aculeated*, is a ſimple *leaf*, whoſe ſurface is covered with cartilaginous points, ſharp, rigid, and ſtrong enough to wound any tender part of the fleſh; and which adhere but ſlightly to the *leaf*, and may be eaſily ſeparated from it.

Leaf, *acuminated*, a ſimple *leaf*, terminated by a pointed and ſharp extremity, like an awl.

Leaf, *acute*, a ſimple *leaf*, which terminates in a ſharp point.

Leaf, *adpreſt*, *folium adpreſſum*, is when the diſk of the *leaf* lies cloſe to the ſtem.

Leaf, *adverſe*, is one whoſe ſides reſpect the meridian, and not the heavens, as ginger.

Leaves, *alated*, are thoſe divided into, or compoſed of ſeveral complete pinnated *leaves*, whether equal or unequal, uniform or difform, as in the orobus, and other the like plants.

Leaves, *alternate*, thoſe which do not ſtand oppoſite, but one over another, all the way up the ſtalk.

Leaf, *amplexicaule*, expreſſes a *leaf*, the baſe of which extends itſelf in ſuch a manner, that it environs and ſurrounds the ſtalk every way. In this caſe, the *leaf* is generally of a ſagittated, or heart-faſhioned ſhape, and is ſeſſile.

Leaf, *articulated*, is a compound *leaf*, formed by one growing on the top of another.

Leaf, *axillary*, is a determinate *leaf*, that grows from the inſertion of the branches.

Leaf, *bifid*, one divided into two parts at the top. When a leaf is thus divided into three parts, it is ſaid to be *trifid*; when into four, *quadrifid*, and ſo on. *Multifid* expreſſes a *leaf* divided into a great number of ſegments.

Leaf, *bigeminate*, a compound *leaf*, formed of a double conjugation of leſſer *leaves*; or one whoſe foot-ſtalk divides in parts, and connects four ſmall *leaves* on the top.

Leaf, *binated*, *binatum folium*, a kind of compound *leaf*, formed only of two folioles on one petiole.

Leaf, *bipartite*. See *Quinque-partite* Leaf, infra.

Leaf, *canaliculated*, a ſimple *leaf*, which is hollowed all the way of its length with a channel.

Leaf, *carinated*, or *keel-ſhaped*, is a ſimple *leaf* that has the under part of the diſk prominent through the whole length, and the upper concave, like the keel of a boat.

Leaf, *carnous*, a ſimple *leaf*, which is full of pulp, or of a fleſhy ſubſtance, contained between the membranes which form the upper and under ſurface.

Leaf, *cartilaginous*, a ſimple *leaf*, whoſe edge is ſurrounded with a kind of cartilage or border, thicker than the reſt, but of a different ſubſtance from the *leaf*.

Leaf, *cauline*, a determinate *leaf*, which grows not immediately from the root, but on the ſtalk of a plant.

Leaf, *ciliated*, a ſimple *leaf*, ſurrounded all the way with parallel hairs, or filaments, ſo as to give ſome reſemblance of the haírineſs of the eye-lids.

Leaf, *cirrhoſe*, or *claſper*, is a ſimple *leaf*, that terminates with a claſper or tendril.

Leaf, *cloven*, *folium fiſſum*, a ſimple *leaf*, divided by linear ſinuſſes, and a ſtraight margin; from the number of which diviſions they are called bifid, trifid, &c.

Leaf, *coloured*, is that which has other colours than green.

Leaf, *compound*, is that which is divided to the middle rib into ſeveral ſegments, and ſeems made up of ſeveral ſmaller *leaves*, as in liquorice, &c.

Compound leaf expreſſes, in general, a *leaf* that is formed of ſeveral other leſſer ones, ſtanding upon the ſame foot-ſtalk. In this large ſenſe, however, it is diviſible into ſeveral kinds. 1. The *compound* ones, properly and diſtinctly ſo called. 2. The *decompound*. And, 3. The *ſupradecompound*. Of each of which in its place.

In deſcribing theſe kinds of *leaves*, the whole *leaf* which is the reſult of the combination, is called *folium*, and the ſmall *leaves*, which together compoſe it, are called *foliola*.

Compound leaf, properly ſo called, is only formed of one ſeries of foliola, or of one compoſition.

Leaf, *compreſſed*, a ſimple *leaf*, whoſe marginal ſides are ſo preſſed, that the ſubſtance of the *leaf* is larger than the diſk.

Leaf, *concave*, a ſimple *leaf*, whoſe middle is ſunk or hollowed.

Conferta **Folia**, *leaves* placed in cluſters, or ſo cloſe to one another, that it is not eaſy to diſcover their exact ſituation.

Leaf, *conjugate*, is a compound pinnate *leaf*, conſiſting of two folioles only.

Connata **Folia**, *leaves* cohering together, or whoſe baſes unite, ſo as to form but one body.

Leaf, *convex*, a ſimple *leaf*, whoſe middle riſes into a protuberant form.

Leaf, *cordated*, expreſſes a ſimple *leaf* of an ovated ſhape, hollowed a little on each ſide at the baſe, but without any angles.

LEAF, *obverſely-cordated*, one of the ſame figure with the former, but affixed to its petiole not by the cordated part, which is the baſe in the former, but by the oppoſite end.

LEAF, *cordato-ſagittated*, a *ſagittated leaf*, the ſides of which are convex.

LEAF, *crenated*, *crenatum folium*, a ſimple *leaf*, whoſe edges are furniſhed with indentings, which are contiguous to one another, and are neither turned toward the point, nor toward the baſe.

LEAF, *acute-crenated*, a *crenated leaf*, in which the indentings are ſharp at the ends.

Obtuſe-crenated, that whoſe indentings terminate obtuſely.

LEAF, *criſp*, *criſpum folium*, a ſimple *leaf*, which is undulated or folded over and over at the edge, which muſt alſo be in ſome manner divided, not entire, viz. either dentated, ſerrated, or lacerated.

LEAF, *cuneiform*, is a ſimple *leaf*, of the ſhape of a wedge; or the length of which greatly exceeds its breadth, and the lower part of which grows ſmaller all the way.

LEAF, *decompoſite*, expreſſes a compound *leaf*, the common petiole of which divides itſelf twice before it is furniſhed with *leaves*.

LEAF *decurrent*, one which adheres immediately to the ſtalk or branch of a plant, without any pedicle; and which has its lower part extended and running along the branch.

LEAF, *deltoid*, a ſimple *leaf* with four angles, whereof thoſe of the ſummit are farther diſtant from the centre than thoſe of the ſides.

LEAF, *demerſe*, is one which is hid beneath the ſurface of the water.

LEAF, *dentated*, a ſimple *leaf* whoſe edge is beſet with horizontal points of the ſame matter with the *leaf* itſelf, and diſtinct and ſeparate one from another.

LEAF, *dependent*, is one whoſe ſummits point to the ground.

LEAF, *depreſſed*, is a ſimple *leaf*, whoſe diſk is more depreſſed than the ſides.

LEAF, *determinate*, is that which derives its character from ſome circumſtance foreign to its own particular ſtructure or configuration, as from its place, ſituation, inſertion, or direction.

LEAF, *digitated*, expreſſes a compound *leaf*, formed of a number of ſimple foliola, placed regularly on a common petiole. In a ſtrict ſenſe, however, it is uſed only to expreſs ſuch a *leaf* as is compoſed of more than four foliola.

LEAVES, *diſtich*, are thoſe which are ranged along only upon two ſides of the branches, as in the fir-tree.

LEAF, *dolabriform*, or *hatchet-ſhaped*, is a ſimple *leaf*, which is roundiſh, compreſſed, and obtuſe, gibbous on the outſide, the inſide ſharp-edged, and taper below.

Duplicato-pinnatum, or *pinnato-pinnatum*, expreſſes a *leaf* compoſed of ſeveral others, each of which is itſelf compoſed of ſeveral ſmaller *leaves* or foliola.

LEAF, *duplicate-ternated*, a compound *leaf*, conſiſting of *leaves*, which are themſelves compoſed of three *leaves* each.

LEAF, *emerginated*, a ſimple *leaf*, which has a little indenting on the ſummit. *Obtuſely emerginated*, is the term when the two points which form the indenting are obtuſe. When they are acute, it is ſaid to be *acutely emarginated*.

LEAF, *enſiform*, a compreſſed ſimple *leaf* of the ſhape of a ſword, which is thin, and edged, as it were, on the ſides, and which has a high rib running down its middle.

LEAF, *erect*, one ſo ſituated as to make an acute angle with the ſtalk.

LEAF, *eroſe*, *eroſum folium*, a ſimple *leaf*, which has ſeveral ſinuſes in its diſk, and alſo in the edge or border.

LEAVES, *faſciculate*, expreſs *leaves*, many of which ariſe together from the ſame point.

LEAF, *floral*, expreſſes one found near the flower, and which never appears but with the flower.

Frondes expreſs *leaves* conſiſting of ſeveral other *leaves*, and forming the whole plant; as is the caſe in the fern-kind, in which the fructification being on the back of the *leaves*, the ſingle *leaf* makes the whole plant.

LEAF, *gibbous*, is a ſimple *leaf*, which is convex on both ſides, the middle being fuller of pulp.

LEAF, *haſtated*, a ſimple *leaf*, in form like a ſpear's point. This expreſſes a triangular *leaf*, the ſides and the baſe of which are both hollowed, ſo as in ſome meaſure to give the reſemblance of a *leaf*, compoſed of three parts.

Hirſutum folium. See *Piloſe* LEAF, infra.

LEAF, *hiſpid*, a ſimple *leaf*, whoſe ſurface is covered with more thick and rigid hairs than the *piloſe* LEAF.

LEAF, *horizontal*. See *Patent* LEAF, infra.

LEAF, *jagged*. See *Laciniated* LEAF, infra.

LEAVES, *imbricated*, *imbricata folia*, *leaves* placed over one another in the manner of the tiles of a houſe, or like the ſcales of fiſhes.

LEAF, *inflex*, *inflexum folium*, that which in growing from its baſe, turns its point again toward the plant.

LEAF, *intire*, *integrum*, or *indiviſum folium*, a ſimple *leaf*, which is not cut in with any ſinus in its diſk.

The term *integerrimum* applied to a *leaf*, denotes that it is free from all diviſions or inſinuations of any kind in the border any more than in the diſks.

LEAF, *lacerated*, *lacerum folium*, a ſimple *leaf*, the edge of which is compoſed of ſegments of different ſhape and figure.

LEAVES, *laciniated*, are ſimple *leaves*, which are very deeply cut in, though not quite to the middle rib, yet are divided into ſeveral jagged portions: theſe are called alſo jagged *leaves*; and of this kind are thoſe of the horned-poppy, ragwort, and the like.

LEAF, *lanate*, or *woolly*, is a ſimple *leaf*, whoſe ſurface is covered with a kind of woolly ſubſtance, like the ſhort wool of lambs.

LEAF, *lanceolated*, a ſimple *leaf*, which is ſhaped like a ſpear's point, or which is oblong, and growing ſmaller and narrower from the middle to the extremity, where it terminates in a point.

LEAF, *linear*, a ſimple *leaf*, the two ſides of which run almoſt parallel to one another: the *linear leaves* are uſually narrow, and ſomewhat broader in the middle than at either end.

LEAF, *linguiform*, a ſimple linear *leaf*, in ſhape of a tongue, which is obtuſe, fleſhy, depreſſed, convex on the under ſide, and uſually cartilaginous at the edge.

LEAF, *lobated*, is a ſimple *leaf*, divided to the middle into parts that ſtand wide from each other, and have their margins convex. From the number of theſe lobes they are called *bilobe*, *trilobe*, &c.

LEAF, *lunulated*, a ſimple *leaf*, in form of a creſcent: it is a ſuborbicular *leaf*, hollowed at the baſe, with two curvilinear angles in form of ſickles at its hinder part or baſe.

LEAF, *lyrated*, *folium lyratum*, a ſimple *leaf*, in form of a lyre; or it is a *leaf*, which divides itſelf in its lower part in ſuch a manner, that the inciſions below make ſegments, which ſtand out from the body of the *leaf*, and are detached from the larger ſegment, which forms the upper part.

LEAF, *membranaceous*, a ſimple *leaf*, merely compoſed of membranes, with no pulp between.

LEAF, *naked*, *nudum folium*, expreſſes a *leaf*, whoſe ſurface is ſmooth and equal, without any particular marks.

LEAF, *natant*, one which floats upon the ſurface of the water.

LEAF, *nervoſe*, a ſimple *leaf*, whoſe veſſels are ſimple, and extend themſelves parallely from the baſe toward the ſummit, without any ramifications.

Nitidum folium, expreſſes a ſimple *leaf*, of a ſmooth and gloſſy ſurface, looking as if poliſhed by art.

LEAF, *oblique*, is one whoſe baſe regards the ſky, and ſummit of the horizon.

LEAF, *oblong*, a ſimple *leaf*, the length of which is many times equal to its breadth, and the extremities of which are both too narrow to form ſegments of circles.

LEAF, *obtuſe*, a ſimple *leaf*, terminated by the ſegment of a circle. When the ſummit of a *leaf* is obtuſe, but terminated by a ſharp point, affixed, as it were, upon it, it is ſaid to be *obtuſum cum acumine*.

LEAF, *obverſely-ovated*, *obverſè ovatum folium*, a *leaf* of the ſame figure with the ovated *leaf*, only fixed to the petiole by its ſmaller end.

LEAVES, *oppoſite*, are thoſe which ſtand by pairs on each ſide of the ſtalk.

LEAF, *orbicular*, a ſimple *leaf* of a round figure, the breadth of which is equal to its length, and every part of its edges equally diſtant from the centre.

LEAF, *oval*, a ſimple *leaf*, approaching to round, but too long for its breadth; its two ends forming the ſame ſegments of circles. This might be more diſtinctly called *elliptic*.

LEAF, *ovated*, *folium ovatum*, expreſſes a ſimple *leaf*, the ſhape of which is like that of an egg, or which is longer than broad, and the baſe or lower part of which forms the ſegment of a circle, though the other extremity is too ſmall to be in proportion to it.

LEAF, *palmated*, a ſimple *leaf*, in form of an open hand. This expreſſes a *leaf*, divided into ſeveral ſegments, from the top down to the middle, or to the baſe.

LEAF, *panduriform*, one of the ſhape of a violin. This is an oblong *leaf*, larger at both ends than in the middle, where it is deeply cut, in a rounded manner.

LEAF, *papilloſe*, a ſimple *leaf*, whoſe ſurface is covered with little roundiſh protuberances, or veſicles.

LEAF, *parabolical*, is a ſimple *leaf*, whoſe length exceeds its breadth, and is narrowed from the baſe upward.

LEAF, *partite*, or *divided*, is a ſimple *leaf*, divided into many parts to the baſe, ſo as to appear like many *leaves*, till they are examined. From the number of diviſions they are bipartite, tripartite, &c.

Leaf, *patent*, one which ſtands almoſt ſtraight out from the ſtalk, or nearly at right angles with it. When it forms perfectly right angles, it is called *horizontal*.

Leaf, *pedate*, or *footed*, a compound *leaf*, whoſe footſtalk or petiole is divided, and has ſome ſmall *leaves* placed on the inner ſide.

Leaf, *peltated*, expreſſes a *leaf*, the petiole of which is affixed to the diſk, and not to the baſe, or to the edge of the *leaf*.

Leaf, *pentagonal*. See *Trigonal* **Leaf**, infra.

Leaf, *perfoliate*, that whoſe diſk is pierced by the ſtalk, the branch, or the peduncle; and does not any where touch or adhere to its edges.

Leaf, *petiolate*, one affixed to a plant by means of a peculiar pedicle, which in the caſe of a *leaf* is called *petiole*, though in caſe of fruit a *peduncle*. See **Petiole**, &c.

Leaf, *piloſe*, a ſimple *leaf*, whoſe ſurface is furniſhed with hairs ſo large and long, as to be diſtinguiſhable by the eye ſeparately. A *leaf* hairy to a greater degree is expreſſed by the term *hirſutum*; and when it is covered with a coarſer hair or ſhag, *villoſum*, and with a ſhorter and finer, *lanigerum*.

Leaf, *pinnated*, or *pennated*, a compound *leaf*, formed in manner of a wing, and compoſed of two ranges, or ſeries of folioles, annexed to the two ſides of one common oblong petiole.

Of the *pinnated leaves* there are ſeveral kinds.

Pinnate with an odd one, when it is terminated by an odd foliole; *cirrhoſe pinnate*, when it terminates in a cirrhus or claſper; *abrupt pinnate*, when it is terminated neither by a foliole nor cirrhus; *oppoſitely pinnate*, when the folioles ſtand oppoſite to each other; *alternately pinnate*, when the folioles are produced alternately; *interruptedly pinnate*, when they are alternately leſs; *articulately pinnate*, when the petiole common to all the folioles is articulate or joined; *decurſively pinnate*, when the folioles are decurrent, or extend themſelves downwards along the petiole.

Leaf, *pinnatifid*, expreſſes a ſimple *leaf*, divided into ſeveral parts, in form of alæ; or which has three, four, or more lateral ſinuſes, ſeparated by long horizontal ſegments.

Leaf, *plane*, is a ſimple *leaf*, which has both ſurfaces every where parallel.

Leaf, *plicated*, a ſimple *leaf*, from the baſe or petiole of which there run at ſeveral diſtances, veſſels or fibres, which extend themſelves to the extreme ſides, and ſome of which raiſe, and others depreſs the diſk of the *leaf* in an alternate order, making acute angles.

Leaf, *præmorſe*, *præmorſum folium*, a ſimple *leaf*, which is truncated and terminated by very blunt unequal cuts.

Leaf, *punctated* or *dotted*, is a ſimple *leaf*, beſprinkled with hollow points or dots.

Leaf, *quadrangular*, is a ſimple *leaf*, with four prominent angles round the diſk.

Leaf, *quadrifid*. See *Bifid* **Leaf**.

Leaves, *quaternate*. See *Ternate* **Leaf**.

Quina **Folia**. See *Ternate* **Leaf**.

Leaf, *quinquangular*, is a ſimple *leaf*, with ſtraight ſides, and five angles.

Leaf, *quinquefoliate*, is a compound *leaf* of the ſame form with the *trifoliate*, but made up of five ſegments; ſuch are the *leaves* of cinquefoil, &c.

Leaf, *quinquepartite*, one of which is ſeparated into five parts down to the very baſe, ſo as to ſeem made up of five ſeparate *leaves*, till cloſely examined. In the ſame manner a *leaf* is ſaid to be *bipartite*, &c. when it is divided into two, three, &c. parts.

Leaf, *radical*, a determinate *leaf*, which grows immediately from the root of a plant, not from the ſtalk.

Leaf, *radicant*, one which puſhes out roots from its ſummits, as ſome of the ferns do.

Leaf, *radicated*, *folium radicatum*, one which puſhes out roots from its diſk or lower ſurface.

Leaves, *ramoſe*, thoſe which are ſtill more divided than the winged or alated *leaves*, and compoſed in one ſeries farther in their diviſion. Of this ſort are the *leaves* of female fern, and the like. Or,

Ramoſe leaf is a *leaf* of the claſs of determinate *leaves*, which grows not on its main ſtalk, but on its branches.

Leaf, *ramuloſe*, a kind of compound *leaf*, in which there are ſeveral foliola ſuſtained on a branched petiole.

Leaf, *reclinate* or *reflex*, one which has its ſummit lower than its baſe.

Leaf, *reniform*, a ſimple *leaf*, of the ſhape of a kidney; or, it is a *leaf* of a ſuborbicular figure, hollowed a little at the baſe, but without any angle.

Leaf, *repanded*, *folium rapandum*, a ſimple *leaf*, the border of which is marked all round with ſhort lobes, each making a ſegment of a circle, with obtuſe ſinuſes.

Leaf, *retuſe*, *retuſum folium*, a ſimple *leaf*, whoſe extremity is terminated by an obtuſe ſinus.

Leaf, *revolute*, *folium revolutum*, a *leaf*, the upper part of which rolls itſelf downward.

Leaf, *round*, *teres folium*, a ſimple *leaf*, which is not flatted as moſt are, but is of a cylindric figure, except the point. A *round leaf* denotes alſo one that has no angles.

Leaf, *rugoſe*, a ſimple *leaf*, whoſe veins are ſunk deep, and between which the membranous and fleſhy part of the *leaf* riſes in irregular forms, ſo as to give upon the whole a wrinkled ſurface.

Leaf, *ſagittated*, a ſimple *leaf*, formed like the iron head of an arrow. This is the triangular *leaf*, hollowed at its baſe for the inſertion of the petiole.

Leaf, *ſcabrous*, a ſimple *leaf*, which has ſeveral irregular prominences on its ſurface.

Leaf, *ſemamplexicaule*, one reſembling the *amplexicaule*, but with its lobes at the baſe too ſmall to entirely ſurround the ſtalk.

Leaf, *ſemicylindric*, is a ſimple *leaf*, which is round on one ſide, and flat on the other.

Leaf, *ſeminal*, a determinate *leaf*, which appears firſt from the ſeed of a plant, and is uſually different from the reſt.

Leaf, *ſerrated*, *folium ſerratum*, a ſimple *leaf*, whoſe edge or border is notched like a ſaw, or furniſhed with points which make acute angles, and placed one bending toward another, and all toward the top.

Retrorſum ſerratum folium, expreſſes a *leaf*, whoſe edge is furniſhed with the ſame ſort of indentings, but in which they are turned backwards, or all look toward the baſe of the *leaf*.

Obſoletè ſerratum folium, expreſſes a *leaf*, indented in the ſame manner, but the indentings obtuſe and weak.

Folium duplicato-ſerratum, denotes a *leaf ſerrated* as the firſt, but with the ſerratures large, and their edges *ſerrated* again with indentings of the ſame kind.

Leaf, *ſeſſile*, one which riſes immediately from the ſtalk, without any pedicle.

Leaf, *ſimple*, is that which is whole, or not divided to the middle rib, or ſeeming to be made up of different ſmaller *leaves*; as in ſage, mint, &c.

Simple leaf is otherwiſe defined, that of which the **Petiole** carries only one.

Leaf, *ſinuated*, a ſimple *leaf*, which has a number of ſinuſes on its ſides, but theſe ſeparated by lobes not very long, nor themſelves indented or notched at the edges.

Sinuato-dentated leaf, expreſſes a *leaf* like the former, but with the lateral lobes of a linear figure.

Retrorſum ſinuatum folium, a *leaf* with ſinuſes at the ſides, and with the lobes which divide them, pointed and turned toward the baſe, like the barbs of an arrow.

Leaf, *ſmooth*, *folium glabrum*, is that whoſe ſurface is ſmooth and has no inequalities.

Leaves, *ſparſe*, thoſe which are placed irregularly over the ſeveral parts of the plant.

Leaf, *ſpatulated*, is a ſimple *leaf*, of a roundiſh figure, but narrow at the baſe, and linearly lengthened.

Leaf, *ſpinoſe*, a ſimple *leaf*, whoſe diſk or edge is armed with cartilaginous points ſo firmly affixed, that they cannot be ſeparated without injuring the *leaf* itſelf: to which is oppoſed an unarmed or ſmooth *leaf*.

Leaves, *ſtellate*, thoſe which grow more than ſix at a joint, and are arranged like the rays of a ſtar, called alſo *verticillate* or whorled.

Leaf, *ſtriated*, a ſimple *leaf*, with a number of longitudinal furrows on its ſurface.

Leaf *ſubrotund* or *roundiſh*, a ſimple *leaf*, approaching to the figure of the orbicular *leaf*, but departing from it, either in being too long or too broad, or prominent, in ſome one or more parts.

Leaf, *ſubular*, that which grows at the ramifications, or under that part of the ſtalk, from whence there grows one on ſeveral branches.

Leaf, *ſubulated*, is a ſimple *leaf*, of the ſhape of an awl. This expreſſes a *leaf* oblong and narrow, broadeſt at the baſe, and thence gradually decreaſing, till it terminates in a point.

Leaf, *ſulcated*, a ſimple *leaf*, which has a great number of ridges all round it, with obtuſe ſinuſes.

Leaf, *ſupradecompoſite*, a compound *leaf*, which has the common petiole divided more than twice, before it is charged with *leaves* or foliola.

Leaf, *ternated*, a compound one, conſiſting only of three *leaves* on a common petiole.

Ternate alſo expreſſes *leaves* which grow three at a joint, ſurrounding the ſtalk. When there are four or five, they are called *quaterna* and *quina*, and ſo on.

Leaf, *tetragonal*. See *Trigonal* **Leaf**, infra.

Leaf, *tomentoſe*, a ſimple *leaf*, whoſe ſurface is covered with hairs ſo ſhort and fine, that the eye does not diſtinguiſh them ſingly, though the *leaf* in general is evidently downy, both to the ſight and the touch.

Leaf, *triangular*, a ſimple *leaf*, compoſed of three rectilinear ſides, and three angles, the two inferior ones of which are on a level with the baſe.

Leaf, *trifid*. See *Bifid* **Leaf**.

Leaf, *trifoliate*, is a compound *leaf*, made up of ſegments, placed in the ſame order as in the digitated *leaf*; but theſe ſegments are uſually ſhort, and are always three in number. Of this ſort are the *leaves* of clover, graſs, &c.

Leaf *trigonal*, a ſimple *leaf*, much like the triquetrous, only that in this the ſeveral faces are each hollowed in form of channels, and the ribs are ſharp and membranaceous.

A *leaf* that has, inſtead of three ribs or edges, four or five, is in the ſame manner called *tetragonal*, *pentagonal*, &c.

Leaf, *trilobous*, one divided into three lobes. This is a *leaf* divided juſt down to the middle into three parts, which ſtand apart from one another, and are rounded at the edges.

Leaf, *tripartite*. See *Quinquepartite* **Leaf**, ſupra.

Tripinnate, or *triplicato-pinnate*, is a compound *leaf*, whoſe petiole bears many folioles, each of which are bipinnate.

Triplicato-ternatum, or *ternato-ternatum*, a compound *leaf*, the petiole of which divides three times into three branches, before any *leaves* or foliola are placed on it.

Leaf, *triquetrous*, expreſſes a ſimple *leaf*, which has three faces or ſides, all flat. This is uſually alſo ſubulated, or grows ſmaller gradually from the baſe to the point.

Leaf, *truncated*, a ſimple *leaf*, whoſe ſummit or point ſeems to have been cut off, or is terminated by a ſtraight line in a tranſverſe direction.

Leaf, *tubuloſe*, a ſimple *leaf*, which is hollow within, and makes a kind of tube.

Vaginans expreſſes a *leaf*, the baſe of which is formed like a cylinder, and ſurrounds the ſtalk, as is the caſe in many of the graſſes.

Leaf, *venoſe*, a ſimple *leaf*, on the ſurface of which there are a vaſt number of branched veſſels, which frequently unite in an odd manner one with another.

Leaf *villoſe*. See *Piloſe* **Leaf**, ſupra.

Leaf, *viſcous*, is a ſimple *leaf*, which has its ſurface covered with a clammy moiſture, that is not fluid.

Leaf, *undulated*, a ſimple *leaf*, whoſe exterior part of the diſk is of more extent than a circle of the ſame diameter, ſo that the edges are neceſſitated to riſe and fall in a regular manner.

The following remarks concerning the colouring ſubſtances of *leaves* are taken from Dr. Lewis. The green colour of the *leaves* of plants may be extracted by rectified ſpirit of wine and by oils. The ſpirituous tinctures are generally of a fine deep green, even when the *leaves* themſelves are dull coloured, or yellowiſh, or hoary. The colour however ſeldom remains long in theſe liquors; and it remains a much ſhorter time when the colouring matter is ſeparated in a ſolid form, and expoſed to the air. The acanthus gives a more durable green colour to ſpirit than any other herb. Alkalis heighten the colours of the tinctures and of the juices; and acids weaken, deſtroy, or change them to a browniſh colour. Lime water improves the colour, and alſo the durability of the colour. By means of lime, not inelegant green lakes may be obtained from the leaves of acanthus, lily of the valley, and of ſeveral other plants. Few herbs communicate any part of their green colour to water; perhaps none give a green conſiderably deep. Neverthe-leſs, a green dye is ſaid to be given to woollen by the leaves of ſome plants, as of the wild chervil, or cow-weed, the common rag wort and devil's-bit. The leaves of many kinds of herbs and trees give a yellow dye to wool, previouſly boiled in a ſolution of alum and tartar. Weld particularly affords a fine yellow dye. Mr. Hellot obſerves, that all *leaves*, barks, and roots, which have an aſtringent taſte, as the *leaves* of the almond, peach, and pear-tree, aſh-bark, roots of wild patience, &c. yield durable yellows. From the *leaves* of two plants, blue colouring ſubſtances are produced, namely, INDIGO and WOAD. Mr. Hellot ſuſpects that a ſimilar blue fecula might be produced from many other vegetables. He ſuppoſes the green colour of vegetables to proceed from a mixture of blue and yellow particles, and that the former are more frequently permanent than the latter, ſo as to be capable of reſiſting the fermentation of the juice of the plants, while the yellow are deſtroyed by that fermentation. Dr. Lewis has tried, without ſucceſs, to obtain blue dyes from other plants, by putrefying them in water.

Leaf, *Indian*, in *Botany*. See Tamalapatra.

Leaf, *water*, in *Botany*, *hydrophyllum*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower has a permanent empalement of one leaf, cut into five ſegments; it has one bell-ſhaped petal, divided into five parts; under each of theſe ſegments is fixed a nectarium, which is ſituated about the middle; it has five ſtamina, which are longer than the petal, and an oval pointed germen, which becomes a globular capſule with one cell, incloſing one large round ſeed. We know but one ſpecies, which grows naturally in boggy grounds in North America. Miller.

Linnæus reckonst wo ſpeeies, one growing in Virginia, and the other in Canada.

Leaf is alſo applied to the fineſt and moſt beautiful parts of flowers, more properly called *petals*.

It is true, all flowers have not *leaves* or petals; and it is ſometimes difficult to determine which is to be called the *leaves*, and which the calyx of the ſame flower.

To prevent confounding the *leaves* of the flower with thoſe of the reſt of the plant, the former are called by botaniſts *petala*, the latter *folia*.

Leaves, in *Architecture*, are an ornament of the Corinthian capital, and thence borrowed into the Compoſite; conſiſting in the repreſentation of a double row of *leaves* covering the vaſe, tympanum, or neck of the column.

Theſe *leaves* are uſually formed in imitation of thoſe of the acanthus; ſometimes of thoſe of olive, and ſometimes of laurel.

The *leaves* are divided; each making three ranges of leſſer, and are bent atop, one third of their height.—See *Tab. Archit. fig.* 28.

Leaf-*gold*. See Gold-*leaf*.

Leaves, in clocks and watches, are uſed for the notches of their PINIONS.

Leaf-*ſilver*. See Silver.

LEAGUE, an extent of ground, conſidered lengthwiſe; ſerving to meaſure the diſtances of one place from another; and containing more or leſs geometrical paces, according to the different uſages and cuſtoms of countries.

The word comes from *leuca*, or *leuga*, an ancient Gauliſh word, for an itinerary meaſure, and adopted in that ſenſe by the Romans. Some derive the word *leuca* from λευκος, *white*; becauſe the Gauls, in imitation of the Romans, marked the ſpaces and diſtances of their roads with white ſtones.

A *ſea-league*, is uſually reckoned 3000 geometrical paces, or three Engliſh miles; the large leagues of France are uſually 3000, and in ſome places 3500 paces; the mean or common *league* is 2500 paces, and the little *league* 2000. Chorier obſerves, that the ancient Gauliſh *leagues* were but 1500 paces.

The Spaniſh *leagues* are larger than the French, 17 Spaniſh *leagues* making a degree or 20 French *leagues*, or 69½ Engliſh ſtatute miles. The *leagues* of Germany and Holland contain four geographical miles each.

The Perſian *leagues* are nearly the ſame with the Spaniſh; that is, each is equivalent to four Italian miles; which come nearly to what Herodotus mentions of the paraſanga, an ancient meaſure among the Perſians, containing thirty ſtadia; eight whereof, according to Strabo, make a mile.

The Perſians mark their *leagues* by trees, as the ancient Romans did by ſtones, *lapides*; for which reaſon they are alſo called *agag*, a Turkiſh word ſignifying a *tree*. In Japan, the *league* conſiſts of 1800 fathoms. Theſe are all diſtinguiſhed by little hillocks, raiſed on purpoſe by the road-ſide. See the *leagues* of moſt countries reduced to the Roman foot, under Mile.

League alſo denotes an alliance or a confederacy between princes and ſtates for their mutual aid, either in attacking ſome common enemy, or in defending themſelves.

The word comes from *liga*; which, in the corrupt Latin, was uſed for a *confederacy*: *Qua quis cum alio ligatur*.

There have been ſeveral holy *leagues* entered into by the Chriſtians, againſt the Saracens and Infidels; called alſo *cruſados*, or CROISADES.

The League, by way of eminence, denotes that famous one on foot in France, from the year 1576, to 1593. Its intent was to prevent the ſucceſſion of Henry IV. who was of the Reformed religion, to the crown; and it ended with his abjuration of that faith.

The *leaguers* or confederates, were of three kinds: the *zealous leaguers* aimed at the utter deſtruction, not only of the Huguenots, but alſo of the miniſtry. The *Spaniſh leaguers* had principally in view the transferring the crown of France to the king of Spain, or the infanta his daughter. The *moderate leaguers* aimed only at the extirpation of Calviniſm, without any alteration of the government.

League *ſolemn*. See Covenant.

LEAK, in *Sea-Language*, is a chink or breach in the decks, ſides, or bottom of a ſhip, through which the water comes in. A ſhip is ſaid to *ſpring a leak* when ſhe begins to *leak*, or let in the water.

The manner of ſtopping a *leak* is, to put into it a plug wrapt in oakum, and well tarred, or in a tarpaulingclout, which keeps the water out; or nailing a piece of ſheet lead on the place.

Seamen ſometimes ſtop a *leak* by thruſting a piece of ſalt beef into it. The ſea-water, ſays Mr. Boyle, being freſher than the brine imbibed by the beef, penetrates into its body, and cauſes it to ſwell ſo, as to bear ſtrongly againſt the edges of the broken plank, and thereby ſtops the influx of the water. Works Abr. vol. i. p. 147.

A ready way to find a *leak* in a ſhip, is to apply the narrow end of a ſpeaking trumpet to the ear, and the other to the ſide of the ſhip where the *leak* is ſuppoſed to be; then the noiſe of the water iſſuing in at the *leak* will be heard diſtinctly, whereby it may be diſcovered. See Philoſ. Tranſ. Nº 201.

LEAKAGE, the ſtate of a veſſel that *leaks*; that is, lets water, or other liquid ouze, in or out.

LEAKAGE alſo denotes an allowance of twelve per cent. to merchants importing wine out of the cuſtoms thereof; and of two barrels in twenty-two, and three in twenty-three, to brewers, &c. out of the exciſe, 12 C II. c. 24.

LEAO, in *Natural Hiſtory*, a mineral ſubſtance approaching to the nature of the *lapis* LAZULI, found in the Eaſt-Indies, and of great uſe in the Chineſe porcelain manufacture, being the fineſt blue they are poſſeſſed of. This ſtone is found in the ſtrata of pit-coal, or in thoſe of a yellowiſh or reddiſh earth in the neighbourhood of the veins of coal. There are often found pieces of it lying on the ſurface of the ground, and theſe are a ſure indication, that more will be found on digging. It is generally found in oblong pieces of the ſize of a finger, not round, but flat. Some of this is very fine, and ſome coarſe, and of a bad colour. The latter is very common, but the fine ſort is ſcarce, and greatly valued. It is not eaſy to diſtinguiſh them at ſight, but they are found by experiment, and the trying one piece is generally ſufficient for judging of the whole mine: for all that is found in the ſame place is uſually of the ſame ſort.

Their manner of preparing it for uſe is this: they firſt waſh it very clean, to ſeparate it from the earth, or any other foulneſs it may have; they then lay it at the bottom of their baking furnaces; and when it has been thus calcined for three or four hours, it is taken out and powdered very fine in large mortars of porcelain with peſtles of ſtone faced with iron. When the powder is perfectly fine, they pour in ſome boiling water, and grind that with the reſt, and when it is thoroughly incorporated, they add more, and finally pour it off, after ſome time ſettling. The remainder at the bottom of the mortar, which is the coarſer part, they grind again with more water, and ſo on, till they have made the whole fine, excepting a little dirt or grit. When this is done, all the liquors are mixed together, and well ſtirred. They are ſuffered to ſtand two or three minutes after this, and then poured off, with the powder remaining in them. This is ſuffered to ſubſide gradually, and is the fine blue they uſe in their beſt works, our common ſmalt ſerving for the blue of all the common low-priced China-ware. Obſervat. ſur les Coutumes de l'Aſie, p. 326.

It is plain that this ſtone is a ſort of *lapis lazuli*; and the ultramarine blue, uſed by our painters, is made in a manner not wholly unlike this. It is much to be wiſhed, that England were well ſearched for ſuch a ſtone as this *leao*, ſince our mines in Derbyſhire afford many blue ſubſtances, which have not been ſufficiently conſidered; and if it ſhould be found that either this, or any other European nation, produces it, it will be a fine diſcovery, as we ſhould not only have the means of giving a fine colour to our own manufactures of this kind, but we might trade with it in China to a vaſt advantage. If England does not poſſeſs it, it is very probable that Germany does, the mines there affording an almoſt inexhauſtible ſtore of coloured ſtones: and this being certainly no other than the ſtony matter of ſome cryſtalline nodule, accidentally tinged with ſome particles of copper. See LAZULI *lapis*.

LEAP, in *Muſic*, is when the ſong does not proceed by conjoint degrees. For inſtance, when there is an interval of a third, fourth, fifth, &c. between two notes, the Italians call it a *leap*, *ſalto*.

It is to be obſerved, that there are two kinds of *leaps*, regular and irregular, called by the Italians, *ſalti regolari & irregolari*.

The *regular leaps* are thoſe of a third major or minor, whether natural or accidental, fourth, fifth, ſixth minor, and octave, and theſe either aſcending or deſcending.

Irregular leaps are the triton, ſixth major, ſeventh major, the ninth, tenth, and in general all beyond the compaſs of an octave; at leaſt in vocal muſic.

Beſides theſe there are others which may be uſed, but with diſcretion; ſuch as the diminiſhed fourth, the falſe fifth, and flat ſeventh. The difference between the regular and irregular *leaps* is, that the former are performed by the voice, without any great difficulty or effort; whereas the latter require more attention and pains to execute.

LEAP, in *Fiſhing*, is uſed for a net, engine, or wheel, made of twigs to catch fiſh in. Stat. 4 and 5 Will. and Mary. cap. 23.

LEAP, in the *Manege*, an air of a STEP and a *leap*.

LEAP-YEAR, the ſame with BISSEXTILE.

It is thus called, becauſe, in the common year any fixed day of the month changes ſucceſſively one day of the week; but in the *leap-year*, it ſkips or *leaps* over one day.

The common year hath three hundred and ſixty-five days in it, but the *leap-year* three hundred and ſixty-ſix days; and in this caſe February hath twenty-nine days; which, in the common year, hath but twenty-eight.

To find the *leap-year*, the rule is,

Divide by 4, *what's left ſhall be*,
For leap-year, 0; *for paſt*, 1, 2, *or* 3.

For example; is the year 1788 a *leap-year*, or common-year?

4)1788(447.

There is 0 remainder, ſo that it is *leap-year*.

LEAPING-*horſe*, in the *Manege*, is one that works in the high manege, or one that makes his *leaps* with order and obedience between two pillars upon a ſtraight line, in volts, caprioles, balotades, or croupades. Uſe excludes a gallop *a terra a terra*, and corvets from the number of *leaps*; becauſe the horſe does not riſe ſo very high in theſe. Each *leap* of the horſe ought not to gain, or make above a foot and a half of ground forward.

LEASE, from the French *laiſer*, *dimittere*, *to lett*, in *Law*, a demiſe, or letting of lands, tenements, or hereditaments, unto another for life, term of years, or at will, for a rent reſerved.

A *leaſe* is either written, called an *indenture*, *deed-poll*, or *leaſe* in writing; or by word of mouth called *leaſe-parol*. See PAROL.

All eſtates, intereſts of freehold, or terms for years in lands, &c. not put in writing and ſigned by the parties, ſhall have no greater effect than as eſtates at will; unleſs it be of *leaſes* not exceeding three years from the making; wherein the rent reſerved ſhall be two thirds of the value of the things demiſed. Stat. 29 Car. II. cap 3. *Leaſes* exceeding three years muſt be made in writing, and if the ſubſtance of a *leaſe* be put in writing, and ſigned by the parties, though it be not ſealed, it ſhall have the effect of a *leaſe* for years, &c.

The party who letts a *leaſe*, is called the *leſſor*; and the party to whom it is let the *leſſee*.

LEASE *by ſtatute*. There are three kinds of perſons, who may make *leaſes* for three lives or twenty-one years, and not exceeding this term, by ſtatutes, that could not do ſo heretofore, viz. tenants in tail, binding their iſſue in tail, but not in remainder or reverſion; huſband and wife, of the wife's land; and perſons ſeized of an eſtate in fee-ſimple in right of the church, except parſons and vicars; by the ſtat. 32 Hen. VIII. called the enabling ſtatute.

But this ſtatute ſpecifies ſeveral requiſites in order to render the *leaſes* binding: they muſt be by indenture, and not by deed poll, or by any poll. They muſt commence from the day of making, and not at any greater diſtance of time: the old leaſe, if there be any, muſt be firſt abſolutely ſurrendered, or be within a year of expiring: the *leaſe* muſt be of corporeal hereditaments, and not of ſuch things as lie merely in grant; for no rent can be reſerved out of theſe by the common law, as the leſſor cannot reſort to them to diſtrain: though now by 5 Geo. III. c. 17. a *leaſe* of tithes or other incorporeal hereditaments alone, may be granted by any biſhop or eccleſiaſtical or eleemoſynary corporation, and the ſucceſſor ſhall be entitled to recover the rent by an action of debt, which, in caſe of a freehold *leaſe*, he could not have brought at the common law. The *leaſe* muſt alſo be of lands and tenements commonly letten for twenty years paſt; and the cuſtomary rent for that term reſerved; and *leaſes* muſt not be made without impeachment of waſte.

By 1 Eliz. c. 19. called the diſabling or reſtraining ſtatute, it is enacted, that all grants by archbiſhops and biſhops, other than for the term of twenty-one years or three lives from the time of making, or without reſerving the uſual rent, ſhall be void: but this ſtatute did not extend to grants made by any biſhop to the crown; however theſe as well as thoſe made to any ſubject, were comprehended in the prohibition of the ſtatute 1 Jac. I. c. 3. The reſtrictious of this ſtatute were extended by 13 Eliz. c. 10. explained and enforced by 14. Eliz. c. 11. and 14. 18 Eliz. c. 11. and 43 Eliz. c. 29. to certain other inferior corporations, both ſole and aggregate. From all theſe it is collected, that all colleges, cathedrals and other eccleſiaſtical or eleemoſynary corporations, and all parſons and vicars are reſtrained from making any *leaſes* of any kind, of their land, unleſs under the following regulations:

lations: 1. They muſt not exceed twenty-one years or three lives from the making. 2. The accuſtomed rent, or more, muſt be yearly reſerved upon them. 3. Houſes in corporations or market-towns may be lett for forty years; provided they be not the manſion-houſes of the leſſors, nor have above ten acres of ground belonging to them, and provided the leſſee be bound to keep them in repair; and they may alſo be aliened in fee-ſimple for lands of equal value in recompenſe. 4. Where there is an old *leaſe* in being, no concurrent *leaſe* ſhall be made, unleſs where the old one will expire within three years. 5. No *leaſe* by the equity of the ſtatute ſhall be made without impeachment of waſte. 6. All bonds and covenants tending to fruſtrate the proviſions of the ſtatutes 13 and 18 Eliz. ſhall be void. There is another reſtriction with regard to college *leaſes*, by ſtat. 18 Eliz. c. 6. which directs, that one third of the old rent, then paid, ſhould for the future be reſerved in wheat or malt, reſerving a quarter of wheat for each 6*s.* 8*d.* or a quarter of malt for every 5*s.* or that the leſſees ſhould pay for the ſame according to the price that wheat and malt ſhould be ſold for, in the market next adjoining to the reſpective colleges, on the market day before the rent becomes due. This money ariſing from corn rents is now, *communibus annis*, almoſt double to the rents reſerved in money. The *leaſes* of beneficed clergymen are further reſtrained, in caſe of their non-reſidence, by ſtatutes 13. Eliz. c. 20. 14 Eliz. c. 11. and 18 Eliz. c. 11. which direct, that, if any beneficed clergyman be abſent from his cure above fourſcore days in any one year, he ſhall not only forfeit one year's profit of his benefice to be diſtributed among the poor of the pariſh; but all *leaſes* made by him of the profits of ſuch benefice, and all covenants and agreements of like nature, ſhall ceaſe and be void; except in the caſe of licenſed pluraliſts, who are allowed to demiſe the living, on which they are non-reſident, to their curates only, provided ſuch curates do not abſent themſelves above forty days in any one year. Blackſt. Com. vol. ii. p. 321, &c.

An ASSIGNMENT differs from a *leaſe* only in this; that by a *leaſe* one grants an intereſt leſs than his own, reſerving to himſelf a reverſion; in aſſignments he parts with the whole property, and the aſſignee ſtands to all intents and purpoſes in the place of the aſſignor.

LEASES *of the king*. *Leaſes* made by the king, of part of the duchy of Cornwall, are to be for three lives, or thirty-one years; and not to be made diſpuniſhable of waſte, whereon the ancient rent is to be reſerved; and eſtates in reverſion, with thoſe in poſſeſſion, are not to exceed three lives, &c. 12 Car. II. c. 4.

LEASE *and Releaſe*, is a conveyance of right or intereſt in lands or tenements, to another that hath the poſſeſſion thereof. Though the deed of feoffment was the uſual conveyance at common law; yet ſince the ſtat. of 27 Hen. VIII. of uſes, the conveyance by *leaſe and releaſe* has taken place of it, and is become a very common aſſurance to paſs lands and tenements; for it amounts to a feoffment, the uſe drawing after it the poſſeſſion without actual entry, &c. and ſupplying the place of livery and ſeiſin, required in that deed: in the making it, a *leaſe*, or bargain, and ſale for a year, or ſuch like term, is firſt prepared and executed, to the intent that by virtue thereof the leſſee may be in actual poſſeſſion of the lands intended to be conveyed by the *releaſe*, and thereby and by force of the ſtatute 27 Hen. VIII. c. 10. for transferring of uſes into poſſeſſion, be enabled to take and accept a grant of the reverſion and inheritance of the ſaid lands, &c. to the uſe of himſelf and his heirs for ever. See RELEASE.

LEASH, or LEASHE, among *Sportſmen*, denotes three creatures of any kind; but chiefly greyhounds, foxes, bucks, and hares.

We ſay a *leaſh* of greyhounds, a couple and a half of hounds.

LEAT, is uſed for a trench to convey water to or from a mill. It is mentioned in the ſtatute 7 Jac. I. cap. 19.

LEATHER, in *Commerce*, the ſkins of ſeveral ſorts of beaſts dreſſed and prepared for the uſe of various manufacturers, whoſe buſineſs is to make them up, according to their different employments. The butcher and others, who flay them off the carcaſes diſpoſe of them raw or ſalted to the tanner and tawyer; they to the ſhamoy, morocco, and other kind of *leather*-dreſſers, who prepare them according to their reſpective arts, in order to vent them among the curriers and *leather*-cutters, glovers, harneſs-makers, coach-makers, ſaddlers, breeches-makers, gilt-*leather*-makers, chair-makers, ſhoe-makers, bookbinders, and all in any way concerned in the article of *leather*.

Leather has divers names according to the ſtate wherein it is, and according to the different kinds of ſkins whereof it is prepared, and its peculiar qualities when ſo prepared. 1. The ſkin is raw as it comes off the animal. 2. Some are ſalted with ſea-ſalt and alum, or with natron, which is a ſpecies of ſalt-petre, or white ſalt-wort to prevent corruption in keeping, or ſending to diſtant tanneries during hot ſeaſons.

Skins dried with the hair on, are commonly thoſe of oxen and cows, or buffaloes, either tame or wild. Moſt of thoſe in France come from foreign countries. The places which furniſh the largeſt quantity, are Peru, the iſle of St. Domingo, Barbary, Cape Verd Iſles, the river Senegal in Africa, Muſcovy, Ireland, the iſland of Cuba. Thoſe of this latter place are the moſt eſteemed; they are called Havanna ſkins, from the name of the capital city of that iſland, whither they are carried in order to be ſent to Spain, and from thence into other parts of Europe. After theſe ſkins are ſtript of their hair, they are ſold to the tanners. See CURRYING, TANNING, and SKINS.

The three principal aſſortments of *leather* are tanned or tawed, and oil and alum *leather*, all which are dreſſed in ſome yards.

The art of dreſſing *leather* in oil conſiſts in firſt ſoaking the ſkins; then throwing them into the lime-pit; and when they are taken hence, pulling them and delivering them to the friezer: they are then ſtruck with the oil and ſent to the mill; when they are milled ſufficiently, they are thrown into the ditch to be ſcoured, and by ſome ſcudded, and afterwards hung upon the hooks to dry. When they have been weighed and marked by the proper officers, in order to fix the exciſe duty, they are fit for ſale. The ſorts of ſkins dreſſed in oil are thoſe of deer, ſheep, and lambs, and ſome few of goat, and the oil uſed for this purpoſe is Newfoundland or cod's liver oil. The alum *leather*-dreſſers art conſiſts in properly ſoaking, liming, wringing, (an operation ſometimes omitted), and ſtriking them in a liquor compoſed of water, ſalt, and alum, and then drying them properly. The ſorts of ſkins dreſſed in alum are thoſe of ſheep and lambs, and a large quantity of kid. Poſtleth. Dict. Com. art. *Leather*.

There are ſeveral ſtatutes relating to *leather*; the 27 Hen. VIII. c. 14. directs packers to be appointed for *leather* to be tranſported: but the 18 Eliz. c. 9. prohibits the ſhipping of *leather* on penalty of forfeiture, &c. Though by 20 Car. c. 5. tranſportation of *leather* is allowed to Scotland, Ireland, or any foreign countries, paying a cuſtom or duty; which ſtatute is continued by divers ſubſequent acts.

On exportation of hides or ſkins, tanned, tawed, or dreſſed and marked, and of boots, ſhoes, gloves, and other manufactures made of *leather*, chargeable for the duty by weight, a drawback ſhall be allowed of two thirds of the duty. 9 Ann. c. 11. 12 Ann. ſtat. 2. c. 9. Except that for tanned *leather* manufactured into boots, ſhoes, gloves and other wares, a drawback of 1½*d.* for a pound weight ſhall be allowed inſtead of the ſaid two-thirds of the duty. 12 Ann. ſtat. 2. c. 9. And a drawback of 1*d.* for a pound weight of ſeal-ſkins tanned or tawed ſhall be allowed in lieu of any other draw-back. 9 Geo. III. c. 39.

No perſon ſhall ingroſs *leather* to ſell again, under the penalty of forfeiture. None but tanners are to buy any rough hides of *leather*, or calves ſkin in the hair, on pain of forfeiture; and no perſon ſhall foreſtall hides, under the penalty of 6*s.* 8*d.* a hide. *Leather* not ſufficiently tanned is to be forfeited. In London, the lord mayor and aldermen are to appoint and ſwear ſearchers and ſealers of *leather*, out of the company of cordwainers, &c. And alſo triers of the ſufficiency of *leather*; and the ſame is to be done by mayors, &c. in other towns and corporations; and ſearchers allowing inſufficient *leather*, incur a forfeitute of 40*s.* Shoemakers making ſhoes or boots of inſufficient *leather*, are liable to forfeit for every pair 3*s.* 4*d.* and the value thereof. 1 Jac. I. c. 22. Red tanned *leather* is to be brought into open *leather* markets, and ſearched and ſealed before it be expoſed to ſale, and on ſale is to be regiſtered, or ſhall be forfeited; and contracts for ſale otherwiſe to be void, 13 and 14 Car II. c. 7. Hides of *leather* are adjudged the ware and manufacture of the currier, and ſubject to ſearch, &c. All perſons dealing in *leather* may buy tanned *leather*, ſearched in open market; and any perſon may buy or ſell *leather*, hides, or ſkins, by weight. 1 W. & M. c. 33. Duties are granted on *leather*, and entries to be made of tan-yards under the penalty of 50*l.* And tanners and *leather*-dreſſers uſing any private tan-yards, or concealing ſkins, &c. ſhall forfeit 20*l.* leviable by juſtices of the peace, by diſtreſs, &c. 9 Ann. c. 11. 10 Ann. c. 26. See 5 Geo. I. c. 2. and 9 Geo. I. c. 27. Vide TANNERS. Foreign manufactured gloves imported ſhall be forfeited, and may be ſearched for and ſeized by any officer of the cuſtoms or exciſe; and every perſon importing or vending the ſame, ſhall alſo forfeit 200*l.* with double coſts. 6 Geo. III. c. 19.

Leather, *blacking for*. See Blacking.

Leather, *buff*. See Buff.

Leather, *foſſil, alluta montana*, is a foliated Amianthus, conſiſting of ſoft fibres interwoven together and frequently containing ſparry cryſtals incloſed in it.

Leather, *gilt*. See *Japanner's* Gilding, and Lacquer.

Leather *mills*. See Mill.

Leather *money*. See Money.

Leather-*mouthed*, in *Ichthyography*, a term uſed as the Engliſh for malacostomous, the diſtinctive epithet of ſuch fiſhes as have thick lips and no teeth in their jaws; as the carp, tench, bream, roach, &c.

Leather-*ſellers, company of*. See Company.

Leather, *ſhamoy*, or *ſhammy*. See Shammy.

Leather, *Turkey, method of preparing*, &c. See Dying *of Leather*.

LEAVE *and take*. See Take.

LEAVEN, any thing that will make a body ſwell and ferment.

The word is formed of the French *levain*, which ſignifies the ſame, of the verb *lever*, or Latin *levare*, *to raiſe*.

Beer, ale, wine, and cyder, only work by means of the *leaven* in them. Sour paſte, barm, rennet, &c. are *leavens* uſed in baking bread, brewing beer, making cheeſe, &c.

LEAVER. See Lever.

LEBERIS, in ſome *Medical Writers*, a word uſed to expreſs the exuviæ of ſerpents, or the ſkins which ſnakes caſt off every year; theſe are by ſome greatly recommended for taking off freckles and ſun-burns from the face.

LEBNI, in the *Materia Medica of the Ancients*, a name given by ſome to ſtorax. Avicenna has treated of this drug in three ſeparate chapters. The Greeks were very nice in diſtinguiſhing the ſeveral kinds of ſtorax, and the Arabians ſeem to have followed their example; nay, they have even borrowed ſome of the terms, by which they called the particular ſorts. The ſoft, or liquid ſtorax of the Greeks, ſeems to have been very common among theſe people, and they have called it *mel lebni*, the honey of ſtorax. This was a common word with them to expreſs any thing ſoft.

LECANOMANTIA, Λεκανομαντεια, in *Antiquity*, a kind of divination performed in a baſon with wedges of gold or ſilver. See Hydromancy.

LECCIA, in *Ichthyology*, a name given by ſeveral to a large fiſh caught in the Mediterranean, and known among the generality of writers by the name of amia; though by Aldrovand, and ſome others, called *glaucus*. See Lechia.

LECH, in *Metallurgy*, a term uſed by the miners to expreſs the gold ore which has been powdered and waſhed, and afterwards run with the aſſiſtance of lime-ſtone. The *lech* is afterwards burnt in a fire of charcoal, in order to render it fit for the ſeparation of the metal, by means of lead, which abſorbing and ſcorifying the extraneous matter, renders the gold pure.

LECHEA, in *Botany*, a genus of the *triandria trigynia* claſs, with a three-leaved calyx, three linear petals, and a triple-celled three-valved capſule, including a ſingle ſeed.

LECHIA, in *Ichthyology*, a name given by Paulus Jovius, and others, to the fiſh called by others *amia* and *glaucus*, and by the ancient Greeks *amia* and *troctus*. It is properly a ſpecies of the ſcomber, and is diſtinguiſhed by Artedi by the name of the *ſcomber* with two fins on the back, and with the laſt bone, or ray of the hinder fin, very long. The Italians call it *leccia*, whence Jovius's name.

LECITHOS, a word uſed by the old medical writers, and plainly ſignifying a ſort of pulſe: but authors have variouſly underſtood it; ſome applying it to the decorticated ſeed of the lentil; others to the meal of the ſame pulſe; and others to the fruit of a peculiar ſpecies of *aracus*, or wild vetch.

LECTICA, among the Romans, a litter, or vehicle, in which people were carried. The *ſella* differed from the *lectica*, as being higher, and becauſe people always ſat in it; on which account the *ſella*, from the time it was firſt brought into uſe, was eſteemed the more honourable carriage of the two. See Litter.

The *lectica* was alſo uſed as a bier for carrying out the dead, who were dreſſed in habits ſuitable to their quality and ſex. Pitiſc. in voc. See Burying.

LECTICARII, among the Romans, ſervants who carried the lectica.

LECTICARIUS was alſo an officer in the Greek church, whoſe buſineſs it was to bear off the bodies of thoſe who died, and to bury them. Theſe were otherwiſe denominated *decani* and *copiatæ*.

LECTIO, *reading*. Conſidered in a medicinal view, it is ſaid by Celſus, lib. i. cap. 4. to be bad, eſpecially after ſupper, for thoſe whoſe heads are weak: and in lib. i. cap. 8. he recommends reading with an audible voice, for ſuch as have weak ſtomachs. It is alſo directed by Paulus Ægineta as an exerciſe, lib. i. cap. 19.

LECTISTERNIUM, a religious ceremony among the ancient Romans; being a feſtival prepared, and ſolemnly ſerved up, in a temple, at a time of public calamity and danger.

And becauſe, according to the cuſtoms of thoſe times, they placed beds around the tables, and ſet the ſtatues of the gods on thoſe beds, in the ſame manner as men ſat at meals, they called the ſolemnity *lectiſternium*, from *lectus*, *bed*, and *ſternere*, of *ſterno*, *to ſpread*, *prepare*.

In this ceremony the Sibylline decemvirs preſided, till the year of Rome 558, and afterwards the Epulones. See Epulo.

Caſaubon has obſerved, from a paſſage in the ſcholiaſt of Pindar, that the Greeks had alſo a ſort of *lectiſternium* in uſe.

Livy obſerves, that the firſt *lectiſternium* ſeen in Rome, was that which held for eight days ſucceſſively, in honour of Apollo, Latona, Diana, Hercules, Mercury, and Neptune; on occaſion of a contagious diſeaſe which killed almoſt all their cattle, in the year of Rome 354; though Valerius Maximus mentions one before that.

LECTORES, among the Romans, ſervants in great men's houſes, who were employed in reading while their maſters were at ſupper. They were called by the Greeks anagnostæ.

LECTURERS, in England, are an order of preachers in pariſh churches, diſtinct from the rector, vicar, and curate. They are choſen by the veſtry, or chief inhabitants of the pariſh, ſupported by voluntary ſubſcriptions and legacies, and are uſually the afternoon preachers in the Sunday ſervice. The term is alſo more generally applied to thoſe who preach on Sunday, or on any ſtated day of the week, in churches, or other places of public worſhip. By 13 & 14 Car. II. cap. 4. *lecturers* in churches, unlicenſed, and not conforming to the liturgy, ſhall be diſabled, and ſhall alſo ſuffer three months impriſonment in the common gaol; and two juſtices, or the mayor in a town corporate, ſhall, upon certificate from the ordinary, commit them accordingly. Where there are lectures founded by the donations of pious perſons, the *lecturers* are appointed by the founders, without any interpoſition or conſent of rectors of churches, &c. though with the leave and approbation of the biſhop; ſuch as that of lady Moyer's at St. Paul's. But the *lecturer* is not entitled to the pulpit, without the conſent of the rector or vicar, who is poſſeſſed of the freehold of the church.

LECTURES. See Boyle's *Lectures*.

Lectures *of divinity*, &c. in the univerſities. See Regius *profeſſors*.

LECTUS *igneus*, among the Romans, a kind of inſtrument of torture firſt invented by Decius. The bottom of it was ſet with ſerrated teeth or ſpikes, and ſtrewed with ſalt; while melted tallow was poured from above on the unhappy tortured perſon.

LECYTHIS, in *Botany*, a genus of the *poliandria monogynia* claſs: the calyx is compoſed of ſix leaves; the corolla has ſix petals; the nectarium is ligulated and ſtaminiferous; and the pericarpium, whoſe circumference is cut, is polyſpermous.

LEDGER. See Book.

LEDGERS, among *Builders*. See Putlogs.

LEDGES, in a *Ship*, ſmall pieces of timber lying athwart ſhips, from the waſte-trees to the roof-trees, which ſerve to bear up the nettings, or the gratings over the half-deck. See Gutter-*ledge*.

LEDUM, in *Botany*. See *Wild* Rosemary.

LEE, a term variouſly uſed at ſea; though its general uſe be to ſignify the part towards, or oppoſite to the wind. This expreſſion is chiefly uſed when the wind croſſes the line of a ſhip's courſe, ſo that all on one ſide of her is called *to-windward*, and all on the oppoſite ſide, *to-leeward*. Hence,

Lee-*ſhore* is that on which the wind blows; ſo that to be under the *lee* of the ſhore, is to be cloſe under the weather-ſhore, or under wind; or at a ſhort diſtance from the ſhore which lies to windward.

A Lee *the helm*. See A-Lee.

Lee, *hard a*. See Hard.

Lee-*latch*, *take care of the*, is a word of command to the man at the helm, to take care that the ſhip do not go to the lee-ward of her courſe.

To Lee-*ward*, denotes towards that part of the horizon which lies under the *lee*, or whither the wind bloweth.

Lee-*ward ſhip*, is one that is not faſt by the wind, or which doth not fail ſo near the wind, nor make ſo good way as ſhe ſhould: or which is much to *leeward* of her courſe, when ſailing cloſe-hauled.

Lee, *to lay a ſhip by the*, or *to come up by the* Lee, is to bring her ſo, that all her ſails may lie flat againſt her maſts and ſhrouds, and that the wind may come right upon her broadſide.

Lee-*fangs*, are ropes reeved into the cringles of a yacht's or hoy's ſails.

Lee-*larches*, ſignify the ſudden and violent rolls which a ſhip often takes to the *leeward* in a high ſea, particularly when a large wave ſtrikes her on the weather-ſide.

Lee-*ſide*, denotes all that part of a ſhip or boat, which lies between the maſt, and the ſide fartheſt from the direction of the wind; or that half of a ſhip which is preſſed down towards the water by the effort of the ſails, as ſeparated from the other half by a line drawn through the middle of her length; that part of the ſhip, which lies to the windward of this line, is accordingly called the weather-ſide. Thus, if a ſhip ſails ſouthward, with the wind at eaſt, then is her ſtarboard, or right ſide, the *lee-ſide*; and the larboard, or left, the weather-ſide.

Lee-*way*, or **Lee**-*ward way of a ſhip*, is the angle made by the line on which the ſhip ſhould run according to her courſe, or the point of the compaſs ſteered upon, and the real line of the ſhip's way occaſioned by contrary winds, and a rough ſea.

All ſhips are apt to make ſome *lee-way*; ſo that in caſting up the log-board, ſomething muſt be allowed for *lee-way*. But the *lee-way* made by different ſhips, under the ſame circumſtances of wind and ſails, will be different; and even the ſame ſhip, with different lading, and having more or leſs ſail abroad, will make more or leſs *lee-way*. The ordinary rules of allowing for it are theſe: they were given by Mr. John Buckler to the late Mr. William Jones, who firſt publiſhed them about the year 1702.

1. When a ſhip is cloſe-hauled, has all her ſails ſet, the water ſmooth, and a moderate gale of wind, ſhe is then ſuppoſed to make little or no *lee-way*. 2. Allow one point, when it blows ſo freſh, that the ſmall ſails are taken in. 3. Allow two points, when the top-ſail muſt be cloſe reefed. 4. Allow two points and a half, when one top ſail muſt be handed. 5. Allow three points and a half, when both top-ſails are to be taken in. 6. Allow four points, when the fore-courſe is handed. 7. Allow five points, when trying under the main-ſail only. 8. Allow ſix points, when both main and fore-courſes are taken in. 9. Allow ſeven points, when the ſhip tries a-hull, or all ſails are handed. When the wind has blowed hard in either quarter, and ſhifts acroſs the meridian into the next quarter, the *lee-way* will be leſſened. But in all theſe caſes, reſpect muſt be had to the roughneſs of the ſea with the trim of the ſhip; and hence the mariner will be able to correct his courſe.

LEEA, in *Botany*, a genus of the *monoecia pentandria* claſs. This genus has male and female flowers; the calyx and corolla of both are divided into five ſegments; the corolla has a cylindric nectarium; the fruit is a ſix-celled pericarpium, including a ſingle ſeed.

LEECH, *hirudo*, in *Zoology*, an oblong animal, deſtitute of feet, and of a black colour, with various ſpots and lines, and a mouth with three diſtinct openings.

This, in the Linnæan ſyſtem, is a genus of the inteſtine worms, comprehending nine different ſpecies. It moves by dilating the head and tail, and raiſing the body into an arched form.

The *leech* is a well known inſect, common in waters, and uſed to draw blood in medicine. The common ſtanding waters afford us two ſpecies of this inſect; a larger, called the *horſe-leech*, and a ſmaller, diſtinguiſhed from this not only in ſize, but by its whole ſurface, being covered with ſmall tubercles. The larger kind grows to five inches long, and is yellowiſh on the belly, and black upon the back; it is divided, in the manner of the earth-worm, into a number of annular joints, not leſs than an hundred, and is ſmaller toward the mouth than toward the tail. The ſmaller kind has a broad ſtreak of a greeniſh black running down its back, and on each ſide of that a reddiſh line, and beyond theſe there are other lines formed of large black ſpots; the belly is blackiſh, with a caſt of green. This is the kind that ſhould be uſed in medicine, and is eaſily diſtinguiſhed from the other. Mr. Ray obſerves, that there are ſometimes found great numbers of young *leeches* ſticking in cluſters to the belly of the old one.

The hiſtory of this animal, and the ſtructure of its parts, by means of which it becomes uſeful to us, in ſupplying very happily the place of the lancet, with every other particular circumſtance of its life and food, have been very accurately given by Mr. Morand, in the Memoirs of the Academy of Sciences, in the year 1739.

The more vulgarly known particulars of this animal are briefly mentioned by this gentleman; ſuch are the cutaneous annules of its outer coat, the beautiful arrangement of the ſeveral rays, the colours, the pyramids, and points, with which it is ornamented; the avidity with which this creature ſeizes the fleſh of animals; the manner of its applying its mouth; the vermicular motion obſerved within it while ſucking, which reſembles the common motion of deglutition; the time they have been known to live in the water without any viſible food; and the faculty they have in common with many other animals, of moving when cut into ſeveral pieces: theſe the author ſuppoſes already ſufficiently known, and paſſes on to what is leſs ſo, the ſtructure of its inner parts.

The part of this animal, by which it pierces the ſkin of any creature to get at its blood, is generally called, ſimply, its *mouth*; but it really conſiſts of five different parts, which are confounded under that general name. Theſe are two regular lips, a cavity, which is properly the mouth, certain inſtruments to pierce with, others which ſerve it for ſucking, and finally a ſort of throat, or œſophagus, through which it ſwallows the blood. When the *leech* is in a ſtate of reſt, its upper lip forms a regular ſemicircle, and the lower a portion of a much larger circle.

When the creature lengthens its head to move, the ſemicircle of the upper lip becomes two oblique lines, the junction of which makes a ſaliant angle, which the creature applies to whatever it would fix itſelf to. That angle is marked by a regular black ſpot on the outer edge of the lip. The extreme ſoftneſs of the fibres of this part makes it very ſerviceable to the animal, in that it readily aſſumes any figure, according to the occaſion of ſeizing any thing ſolid, in order to move the reſt of its body; or on the fleſh of an animal, to give opportunity to the piercing inſtruments to exert their force and action.

Whether it be for either of theſe purpoſes, that the creature fixes its mouth, the two lips regularly fix, and make in this ſtate a ſort of acetabulum, like the hollow of the tail. This may be ſeen in their fixing on the ſides of a glaſs-veſſel in which they are kept, and the mouth, or aperture between the lips, is diſtinctly ſeen. This mouth is formed, like the lips, of ſuch extremely ſupple fibres, that it takes the figure of the part to which it is applied, and fixes perfectly cloſe to it. When the lips are fixed on the fleſh, in order to ſuck, this little mouth continues moveable under them, and ſearches over the compaſs of fleſh, incloſed in the larger circle of the lips, for the ſpot where it will be eaſieſt to draw much blood.

Within this mouth is placed the inſtrument for piercing the ſkin, which is more than the mere ſucker of the gnat, or the like kind of flies; ſince the quantity of blood to be ſucked by the *leech*, is much larger, and the aperture of the veſſel muſt therefore alſo be larger. The ſhape of this weapon may be diſcovered by examining the wound it leaves. This is compoſed of three cuts, making three rays, and uniting in a centre, under equal angles. This ſtructure of the wound is moſt diſtinctly ſeen when the ſwelling is gone down, and the ſkin is clean; and this is uſually on the fourth day after the application. The three openings are then plainly ſeen not to be punctures, but abſolute wounds, or cuts, as if made by a fine lancet. In examining the creature, the organ, deſtined for making the wound, is found to be placed between the aperture of the lips and the bottom of the mouth; and on cutting up the animal, and drawing the finger carefully over this part of it, there is felt a roughneſs like that of a fine file, which evidently is owing to ſome rough ſubſtance, of the hardneſs of bone. This is, in reality, a number of fine and ſharp teeth: and when examined by a microſcope, they are found to be diſpoſed in three ſeries on three ribs, or, as they may be called, jaws; each of which is placed along the middle of a ſtrong muſcle of its own length; and theſe correſponding regularly to a triangular opening, which the creature has in its mouth. When that has ſeized on a proper part for the getting blood, and is fixed, theſe muſcles exert their action, and ſtrike in the teeth through the ſkin.

Theſe are the inſtruments which pierce the veſſel which is to afford the blood; and for the receiving it into the body of the animal, there is between theſe rows of teeth, or in the common centre of the mouth, a ſmall aperture; and within this there is a little body to be diſcovered, which by its motion ſeems very plainly to be a tongue, and which probably acts as a piſton to take up the blood flowing from the triple wound, in the centre of which it naturally ſtands, while the larger circle of the lips, &c. perform the office of the body of the pump, and the blood is eaſily, by this means, conveyed into the body of the animal. Finally, between the root of the tongue and the beginning of the ſtomach, there is a ſpace of two lines in length, in which it is eaſy to diſcover two different arrangements of fibres; the one ſet are flat and plain, the others are circular. Theſe evidently have a power of widening or contracting the cavity of the pump, and by that means facilitate its office;

the plane ones contracting in length, to enlarge the capacity, and the circular ones determining the blood towards the ſtomach, by their power of contracting the hollow, when the blood is received. The blood from hence enters into a membranaceous ſort of ſack, which ſerves the animal for the ſtomach and guts, and occupies the greateſt parts of the body of the creature. If the air is admitted into the body by the mouth, it may be ſeen to make its way down a longitudinal canal, and fill, as it goes, a number of ſacks, or little bags, which are on each ſide. Theſe veſicles receive the blood, and becoming filled with it, ſwell out the body of the animal to a great ſize. It remains here many months, and nouriſhes the creature; and if any thing is excreted from it, it muſt be merely by an inſenſible perſpiration; ſince the creature has no anus, ſo far as can be yet diſcovered, nor any aperture which can ſupply the place of one.

Leeches are able to live in oil; and when removed out of this liquor into water again, they throw off a tender ſkin, or film, of the regular ſhape of their body, and reſembling the ſkin of an eel in miniature. Their living in oil ſeems a proof, that their organs of reſpiration are not placed on the outſide of their bodies, as they are in many ſmall animals, which therefore die on being only rubbed over with oil. But the *leech* ſeems to reſpire by the mouth; and this may be the more plainly diſcovered, if the water, in which it is kept, be gently heated; for then the animal being uneaſy, breathes hard, and very viſibly.

We have on the coaſt of Cornwall another inſect, much approaching to the nature of the *leech*. It is about ſix inches long, of a greyiſh colour, ſpotted with black, and is divided into about nineteen rings. It has a great number of a ſort of tubercles on the body, and is uſually found full of blood, or of a ſubſtance reſembling blood in colour. Ray's Hiſt. Inſect. p. 3.

If a *leech* be kept in an eight-ounce glaſs phial, about three-fourths filled with water, it will indicate the changes of the weather in the manner of a weather-glaſs. Thus, if the weather continues ſerene and beautiful, the *leech* lies motionleſs at the bottom of the phial, rolled in a ſpiral form: if it rains either before or after noon, it is found at the top of its lodging, where it will remain until the weather be ſettled: if we are to have wind, the *leech* gallops about its limpid habitation with amazing ſwiftneſs, and ſeldom reſts until it begins to blow hard: if a remarkable ſtorm of thunder or rain is to ſucceed, for ſome days before it lodges almoſt continually without the water, and diſcovers great uneaſineſs, in violent throws and convulſive-like motions. In froſt, as in clear ſummer weather, it lies conſtantly at the bottom; and in ſnow, as in rainy weather, it dwells at the very mouth of the phial.

The phial ſhould be covered at the mouth with a piece of linen rag, and the water ſhould be changed once a week in the ſummer, and once a fortnight in the winter. Gent. Mag. vol. xxiii. p. 28.

Leech, *ſea*. See **Hirudella** *marina*.

Leeches, *bleeding with*. The method of bleeding by theſe animals was very early introduced into the practice of phyſic. *Leeches* ſhould always be choſen from clear and running waters; for thoſe from ſtagnant ones, and dirty ponds, ſeem to have ſomething malignant in their bite. The ſurgeons uſually chooſe ſuch as have ſlender heads, green lines on their backs, and bellies of a reddiſh yellow. But from whatever waters theſe creatures have been taken, the beſt method is to keep them many days in a glaſs of water, changing it often, that they may cleanſe themſelves.

Before the *leech* is applied to the ſkin, it ſhould be taken out of the water, and kept an hour in an empty cup to drain itſelf, that it may thus be rendered thirſty and empty. They may be properly applied to the temples, or behind the ears, in diſorders of the head, and to the veins of the rectum in the blind piles. And applied to this part alſo, they often prove of great ſervice in hæmorrhages, ſpittings of blood, or bleeding by the noſe, eſpecially when theſe have been occaſioned by a ſtoppage of the uſual diſcharges that way; though where this is not the caſe, they do great ſervice merely by revulſion.

Before the *leech* is applied, the ſkin muſt be well rubbed till it become hot and red, and then either hold the *leech* by the tail to the part, or let it crawl of itſelf out of the cup upon it. By this means they readily lay hold; but if they refuſe, the blood of a chicken or pigeon ſhould be rubbed on the part; and if that does not allure them, they muſt be laid aſide as uſeleſs, and others taken in their ſtead.

If much blood is required to be drawn, the tails of the *leeches* may be cut off as they are ſucking; by which means, the blood they have already ſucked will be diſcharged, as well as what they continue to take in; for they will not let go their hold, but continue ſucking as before.

If they do not let go after a ſufficient quantity of blood be drawn, they are not to be pulled off, for that often occaſions tumours and inflammations; but if a little ſalt be ſprinkled on the place, they quit their hold. The orifices ſhould be waſhed with warm wine or water, and they uſually heal readily of themſelves. Heiſter's Surgery, p. 312.

Leech is alſo a name given by Boccone to a very particular water-animal, which he found ſticking to the ſides of the *xiphias*, or ſword-fiſh.

He calls it *hirudo*, or *acus cauda utrinque pennata*, and obſerves that it is ſlightly mentioned by Geſner, and by Johnſon, in their books of fiſhes. It is about four inches long; the belly is white and cartilaginous, and tranſparent; there is no regular head to be ſeen, but only a hollow ſnout, in the place of the head; this is covered with a very hard membrane, and differs extremely from the ſkin of the belly; this ſnout it thruſts up to the end into the body of the fiſh, and ſucks its blood with it; it has a tail ſhaped like a feather, and under it two ſlender filaments of fibres, longer than its whole body. By means of theſe, when it is not faſtened to the body of the fiſh, it clings to ſtones, or ſea-plants, to prevent its being carried away by the motion of the water; and when it is on the body of the fiſh, theſe ſerve to hold it much more faſtly with, than it otherwiſe could do. This creature miſerably afflicts the ſword-fiſh, but it is itſelf as much tormented by an animal that preys on its blood and juices. This is a ſort of louſe, which is always found upon it; it is of a browniſh colour, and it is generally found faſtened toward the tail of the creature, ſticking as firmly as a limpet to a rock; it is nearly of the bigneſs of a pea, and when cruſhed a little, will thruſt out ſeveral ſlender filaments. This *leech* is not found, ſo far as has yet been obſerved, on any other fiſh but the ſword-fiſh; nor this louſe among other creatures, beſides this *leech*. Phil. Tranſ. Nº 100.

Leech, or **Leetch** *of a ſail*, in a *Ship*, the outward edge or ſkirt of the ſail from the earing to the clew, or rather the middle of the ſail between theſe two.

The *leeches* of all ſails, whoſe tops and bottoms are parallel to the deck, and at right angles with the maſts, are denominated from the ſhip's ſide, and the ſail to which they belong, as the ſtarboard *leech* of the main-ſail, the *lee-leech* of the fore-top-ſail, &c. But the ſails which are fixed obliquely upon the maſts, have their *leeches* named from their ſituation with reſpect to the ſhip's length; as the *fore-leech* of the mizen, the *after-leech* of the jib, or fore-ſtay-ſail, &c. Falconer.

Leech, or **Leetch**-*lines*, in a *Ship*, are certain ropes faſtened to the *leeches* of the main-ſail and fore-ſail, and communicating with blocks under the oppoſite ſides of the top, whence they paſs downwards to the deck, ſerving to truſs up thoſe ſails to the yard, as occaſion requires. See **Brails**.

Leech-*rope*, is a name given to that part of the **bolt**-*rope*, to which the border of a ſail is ſewed. In all ſails, whoſe oppoſite *leeches* are of the ſame length, it is terminated above by the **earing**, and below by the **clue**. Falconer.

LEEK, *porrum*, in *Botany*. Linnæus joins this to the genus of **allium**. Its characters are theſe: the flower is bell-ſhaped, and hath ſix petals, collected into a ſpherical head, covered by a common roundiſh ſpatha or ſheath, which withers; they have ſix ſtamina, three of them alternately broader than the others; and have forked ſummits in their middle; they have a ſhort, round, three-cornered germen, ſupporting a ſingle ſtyle, crowned by an acute ſtigma; the germen becomes a ſhort broad capſule, with three lobes, having the cell filled with angular ſeeds.

We have two kinds of *leek* commonly cultivated in our gardens, the one called the common *leek*, and the other a broader-leaved one, commonly called the London *leek*. There are ſome reaſons to ſuſpect that theſe are only varieties of the ſame ſpecies of plant, both ariſing from the ſame ſeeds.

The method of propagating theſe is by ſeeds, and they are commonly ſown along with onions; the onions growing up firſt; and after they are pulled up, the *leeks* have time enough to grow to their ſize. Miller.

Leeks are more uſed in the kitchen among ſoups and broths, than in medicine; they are warming and attenuating, good to cleanſe the lungs from tough phlegm, and to help ſhortneſs of breath, and ſtoppage of the ſtomach; they are likewiſe reckoned good againſt the bites of venomous creatures. The juice of them is uſed to diſſolve the gums in the *pilulæ fœtidæ*.

Leek, *houſe*. See **House**-*leek*.

Leek-*head*, in the *Manege*. See **Wart**.

LEER, in *Glaſs-making*, a ſort of thrid furnace, intended to anneal and cool, by proper degrees, the veſſels when made. This properly comprehends two parts, the tower and *leer*. The tower is that part which lies directly above the melting-furnace, with a partition between them of a foot thick, in the midſt whereof there is a round hole, placed exactly over the furnace, through which the flame and heat paſs into the tower: on the floor of this tower the veſſels are ſet to anneal. There are two openings, by which the veſſels are put into this tower, and after ſtanding there ſome time, they are put into iron pans, which by degrees are drawn out all along that part of this furnace, which is properly called the *leer*; which is five or ſix yards long, that the veſſels may cool by degrees. This *leer* is continued to its tower, and arched all along, and is about four feet wide, and high within. The glaſſes are cool by that time they are come to the mouth of this, which enters into a room where the glaſſes are placed when taken out. Neri's Art of Glaſs, p. 243. See Furnace and Glass.

LEES, the groſſeſt and thickeſt parts of wine, oil, and other liquors; or the ſediment found at the bottom of the veſſel.

The word comes from the French *lie*, and that either from *limus*, *mud*, or from *Lyæus*, one of the ſurnames of Bacchus; or, according to Du-Cange, from *lia*, a corrupt Latin word, ſignifying the ſame.

A kind of pot aſh, called *cineres clavellati*, is made with the *lees* of wine burnt, and prepared, uſed by dyers, &c. which ought to be remembered by people troubled with the ſtone, &c.

The vinegar-makers make a great trade of the *lees* of wine dried, and made into cakes, after having ſqueezed out the remains of the liquor in preſſes.

LEET, *leta*. See Court-*leet*, and Frank-*pledge*.

The buſineſs of the *leet* hath declined for many years, and is devolved upon the quarter-ſeſſions. All freemen between the age of twelve and ſixty, except peers, clergymen, and the king's tenants in ancient demeſne, were bound to appear at this court.

LEG, *crus*. See Legs.

LEGACY, *legatum*, in the *Civil Law*, a donation by teſtament; anſwering to what in common law is called a *demiſe*; and the perſon to whom it is given is ſtyled the Legatee.

Legacy is uſually defined ſome particular thing given by a laſt will and teſtament; becauſe if a man thus diſpoſe, or transfer his whole eſtate on another, it is called *hæreditas*; and he to whom it is given, is called *hæres*. Though in common law, the diſtinction is this: that he to whom all a man's lands and hereditaments deſcend by right of blood, is *hæres natus*; the other, to whom it is bequeathed, is called *hæres factus*.

With regard to the payment of *legacies*, if a *legacy* when due be paid to the father of an infant, it is no good payment; and the executor may be obliged in equity to pay it again; and where any *legacy* is bequeathed to a feme-covert, paying it to her alone is not ſufficient, without her huſband.

Legacy, *contingent*. See Contingent.

Legacies, *intereſt on*. See Interest.

Legacy, *lapſed*, is where the legatee dies before the teſtator. See Contingent.

Legacy, in an *Eccleſiaſtical Senſe*, was a ſoul-ſeat, a bequeſt to the church, or accuſtomed mortuary; which was to hold good, even though the teſtament itſelf were declared null and invalid.

LEGAL *column*, *œconomy*, *ſubrogation*, and *tutorage*. See the ſeveral ſubſtantives.

LEGALIS *homo*, in *law*, a perſon who ſtands rectus in curia, not outlawed, nor excommunicated, nor infamous. And in this ſenſe are thoſe words ſo often uſed, *probi & legales homines*.

Hence all *legality* is taken for the condition of ſuch a man.

LEGATE, a prelate, whom the pope ſends as ambaſſador to any ſovereign prince.

The term *legate* comes from *legatus*, which Varro derives from *legere*, *to chooſe*; and others from *legare*, *delegare*, *to ſend*, or *delegate*. Wicquefort.

There are three kinds of *legates*; viz. *legates à latere*, *legates de latere*, and *legates* by office, or *legati nati*.

Of theſe, the moſt conſiderable are the *legates à latere*; ſuch are thoſe whom the pope commiſſions to take his place in councils; who are thus called, becauſe the pope never gives this office to any but his greateſt favourites and confidants, who are always at his ſide, *à latere*; that is to the cardinals.

A *legate à latere* may confer benefices without mandate, legitimate baſtards to hold offices, and has a croſs carried before him, as the enſign of his authority.

The *legates de latere* are thoſe who, not being cardinals, are yet entruſted with an apoſtolical legation.

Legates by office, *legati nati*, are thoſe who have not any particular legation given them; but who, by virtue of their dignity, and place in the church, become *legates*. Such are the archbiſhop of Rheims and Arles. But the authority of theſe *legates* is much inferior to that of the *legates à latere*. The power of a *legate* is ſometimes alſo given without the title; ſome of the nuncios are inveſted with it.

Legate, *court of the*. See Court.

Legate-*note*, in the *Italian Muſic*. Notes are ſaid to be *legate*, when this ‿, or this ⁀ mark is found over or under the heads of them. This is what we call *tying* them, and is done when they are properly but one note, but obliged to be ſeparated into two, becauſe part is found at the end of one bar, and the other part in the beginning of the following bar; or becauſe the two halves of a note are in different parts of the meaſure. See Sancope.

LEGATEE, or Legatary, in *Law*, the perſon to whom a Legacy is left; which every perſon is capable of being, unleſs particularly diſabled by the common law or ſtatutes, as traitors, papiſts, and ſome others.

Legatee, *reſiduary*, in *Law*, is the perſon to whom the *reſiduum*, or what remains of an eſtate, after funeral charges, debts, and legacies, are paid, is left by will. See Executor.

LEGATINE *conſtitutions*. See Constitutions.

LEGATIS *tenementis*. See Tenementis.

LEGATO, in the *Italian Muſic*, ſignifies confined or conſtrained by certain rules for ſome deſign; thus they ſay, *canone legato*, &c.

LEGATORY, or Legatary, a term uſed in ſpeaking of the government of the ancient Romans: Auguſtus divided the provinces of the empire into conſular, *legatory*, and preſidial.

Legatory *provinces* were thoſe whereof the emperor himſelf was governor, but where he did not reſide, but adminiſtered affairs by his lieutenant, or *legatus*.

Legatory, or Legatary, the ſame with *legatee* of a will. 27 Eliz. cap. 16. It is derived from the Latin *legatarius*.

LEGATUS, among the Romans, a military officer, who commanded as deputy of the chief general.

Of theſe there were divers kinds; viz. a *legatus* in the army under the imperator, or general, anſwering to our lieutenant-general; and a *legatus* in the provinces, under the proconſul, or governor.

When any conſiderable perſon among the Roman citizens had occaſion to paſs through any of the provinces, the ſenate gave him the title of *legatus*; that is, of envoy from the ſenate, to the end that he might be received with the greater reſpect, and that the cities and towns, through which he travelled, might defray his expences. This they called a *free legation*, *libera legatio*; becauſe the perſon was not incumbered with any truſt, and might lay it aſide as ſoon as he pleaſed.

LEGEM, *ad communem*, *entry*, in *Law*, a writ of entry which lies where tenant for term of life, or for term of another's life, or by courteſy, &c. aliens and dies, when he in the reverſion, ſhall have his writ againſt any one that is in poſſeſſion of the land. New Nat. Brev. 461.

LEGEND, *legenda*, was originally a book uſed in the old Romiſh churches, containing the leſſons that were to be read in divine ſervice.

Hence alſo the lives of ſaints and martyrs came to be called *legends*; becauſe the chapters were read out of them at matins, and in the refectories of the religious houſes.

The firſt Greek *legend* which is known is that of Simon Metaphraſtus of the tenth century, who writ the lives of ſaints adapted to every day of the year. The firſt Latin *legend* is,

Legend *golden*, or a collection of the lives of the ſaints, compiled by James de Varaſe, better known by his Latin name of J. de Voragine, vicar-general of the Dominicans, and afterwards archbiſhop of Genoa, who died in 1298.

It was received into the church with great applauſe, which it maintained for two hundred years; but in effect, it is ſo full of ridiculous and romantic accounts, that the Romaniſts themſelves are now generally aſhamed of it. The word *legend* itſelf is, on that account, come into diſrepute.

Legend is alſo uſed by authors to ſignify the words or letters engraven about the margins, &c. of coins.

Thus, the *legend* of a French crown is, SIT NOMEN DOMINI BENEDICTVM; that of a moidore, IN HOC SIGNO VINCES: on thoſe of the laſt emperors of Conſtantinople, we find IESVS CHRISTVS BASILEVS BASILEON, IHS XPS NICA, IESVS CHRISTVS VINCIT.

Legend is alſo applied to the inſcription of medals, which ſerve to explain the figures or devices thereof.

In ſtrictneſs, the *legend* differs from the *inſcription*; this laſt properly ſignifying words placed on the reverſe of a medal, in lieu of figures.

It ſeems as if the ancients had intended their medals ſhould ſerve both as images, and as emblems: the one for the common people, and the other for perſons of taſte and parts; the images to repreſent the faces of princes; and emblems to repreſent their virtues, and great actions; ſo that the *legend* is to be looked on as the ſoul of the medal, and the figures as the body.

Every medal has properly two *legends*; that on the front, and that on the reverſe. The firſt generally ſerves only to diſtinguiſh the perſon by his name, titles, offices, &c. the latter is intended to expreſs his noble and virtuous ſentiments, his good deeds, and the advantages the public has reaped by him. This, however, does not hold univerſally; for ſometimes we find the titles ſhared between both ſides, and ſometimes alſo the *legend*.

In the medals of cities and provinces, as the head is uſually the genius of the place, or, at leaſt, ſome deity adored there: the *legend* is the name of the city, province, or deity, or of both together; and the reverſe is ſome ſymbol of the city, &c. frequently without a *legend*; ſometimes with that of one of its magiſtrates.

The ordinary ſubjects of *legends* are, the virtues of princes, the honours they have received, conſecrations, ſignal events, public monuments, deities, public vows, privileges, &c.

Legends, and inſcriptions of medals, are either in Latin, or Greek. The Greek character, conſiſting of majuſcule, or capital letters, appears uniform on all the medals; no change or alteration being found in confronting the ſeveral characters; though it is certain there was in the ordinary uſe and pronunciation. All we obſerve on medals is ſometimes a mixture of Greek and Latin letters. The character was preſerved in all its beauty, till the time of Gallienus.

From the time of Conſtantine, and for the ſpace of five hundred years, the Latin tongue was alone uſed in the *legends* of medals, even in thoſe ſtruck at Conſtantinople. Michael began the firſt whoſe *legend* was in Greek; and from his time the language, as well as the characters, began to alter for the worſe. See MEDAL.

The Latin *legends* are all read from the left to the right: but the *legends* of ſome Greek medals are wrote the contrary way, from the right to the left. The letters of the circular *legends* are commonly placed with the bottoms inward; but ſometimes with the bottoms towards the edge.

LEGER-*line*, in *Muſic*, is uſed to ſignify a line added to the ſtaff of five lines, when the aſcending and deſcending notes run very high or very low. We often meet with ſeveral of theſe lines both above and below the ſtaff.

LEGGIARDO, or LEGGIARDAMENTE, in the *Italian Muſic*, is uſed to intimate, that the muſician is to ſing or play in a gay, briſk, and lively manner. See ALLEGRO.

LEGION, a kind of regiment, or body of forces, of a number whereof the Roman armies were chiefly compoſed.

The word comes from the Latin *legere, to chooſe*; becauſe when the *legions* were raiſed they made choice of ſuch of their youths as were the moſt proper to bear arms.

The number of ſoldiers and officers whereof the *legion* conſiſted, was different at different times: but it is impoſſible to determine the preciſe time and manner of their alteration. In the time of Romulus, the inſtitutor of this corps, each *legion* contained three thouſand foot, and three hundred equites, or horſe: theſe were divided into three bodies, which make as many orders of battle: each body conſiſting of ten companies, or manipules, ranged at ſome diſtance from each other, though in the ſame front. Each body had two general officers to command it, called *tribunes*; and each manipule, two centurions.

Under the conſuls, the *legion* conſiſted of four thouſand, or four thouſand two hundred foot-ſoldiers, who made four bodies, commanded by a conſul, or one of his lieutenants; and each *legion* had its ſhare of cavalry, which was three hundred horſe.

About the year of Rome 412, it was compoſed of five thouſand foot: which was the number of a *legion* during Julius Cæſar's wars with the Gauls. Under Auguſtus, each *legion* conſiſted of ſix thouſand one hundred foot, and ſeven hundred and twenty-ſix horſe. After his death, they were reduced to five thouſand foot and ſix hundred horſe. Under Tiberius, the *legion* was raiſed again to ſix thouſand foot and ſix hundred horſe. In the time of Septimius Severus, the *legion* was compoſed of five thouſand men: under the following emperors, it was the ſame as it had been under Auguſtus.

In the time of Marius, thoſe four diviſions of the *legion* which had taken place under the conſuls, were united into one, and augmented; and cohorts were appointed from five to ſix hundred men, each under the command of a tribune. Each cohort conſiſted of three companies of manipules, each manipule of two centuries, and the *legion* was divided into ten cohorts, who made as many diſtinct battalions, diſpoſed in three lines; ſo that the *legion*, then, conſiſted of ſix thouſand men.

Iſidore tells us, that the *legion* conſiſted of ſix thouſand men, and was divided into ſix centuries, thirty manipules, twelve cohorts, and two hundred troops. According to the French academy, the *legion* conſiſted of ſix thouſand foot, and ſeven hundred and twenty-five horſe.

The *legion* conſiſted of four ſorts of ſoldiers, who differed in their age, arms, and names: they were called VELITES, HASTATI, PRINCIPES, and TRIARII. Till the deſtruction at Carthage, theſe were citizens of Rome, but after the Social War, the freedom of the city was granted to other towns in Italy, and legionary troops were raiſed, which were called Roman, becauſe as they ſhared the privilege of Roman citizens, they were incorporated in the republic.

The *legions* were by far the moſt conſiderable part of the Roman army; their number in the time of Auguſtus, was thirty-three; they were compoſed wholly of Roman citizens. The allies formed a body of auxiliary forces.

The ſtandard borne by the *legions* was various: at firſt, a wolf, in honour of that which ſuckled Romulus; afterwards an hog; by reaſon, ſays Feſtus, war is only undertaken with a view to peace, which was concluded by ſacrificing a hog. Sometimes they bore the minotaur, to remind their generals, that their deſigns were to be kept ſecret, and inacceſſible as the minotaur in the labyrinth. They alſo bore a horſe, a boar, &c. Pliny tells us, that Marius was the firſt who changed all theſe ſtandards into EAGLES.

The different *legions* were diſtinguiſhed according to the order in which they were raiſed into firſt, ſecond, and third, &c. by the names of the emperors who formed them into *legio Auguſta, Claudia, Flavia, Trajana*, &c. by the provinces where they had ſerved, as *legio Parthica, Macedonica*, &c. and by ſome famous exploit or diſplay of valour.

LEGION, *ſquare, legio quadrata*, was a *legion* conſiſting of four thouſand men.

LEGIONUM, *domeſticus*. See DOMESTICUS.

LEGION, *thundering*. See THUNDERING.

LEGION, *Thebean*, is a name given by ſome authors to a *legion* of Roman ſoldiers, who reſolving not to ſacrifice to idols, ſuffered martyrdom under the emperors Diocleſian and Maximilian, about the year of Chriſt 297. But the whole account of them ſeems to be fabulous.

LEGISLATOR, *lawgiver*; a perſon who frames the laws of a kingdom or ſtate founded by him.

The principal ancient *legiſlators* are—Moſes, *legiſlator* of the Hebrews; Mercurius Triſmegiſtus, and Bocchyris, of the Egyptians; Italus, of the Œnotrians; Theſeus, Draco, and Solon, of the Athenians; Zoroaſter, of the Bactrians; Charondas, of the Cappadocians; and Charondas or Phaleas, of the Carthaginians; Androdamas, of the Chalcidians; Eudoxus, of the Cnidians; Phido, of the Corinthians; Minos, of the Cretans; Pythagoras, of the Crotoniates, and moſt of the cities of the Græcia Major; Parmenides and Zeno, of Elea, in Lucania; Xamolxis, of the Getæ; Phoroneus, of the Greeks; Bacchus, of the Indians; Saturn, of Italy; Macarius, of the iſle of Leſbos; Zaleucus, of the Locrians; Nicodorus Athleta, of the city of Mutina; Hippodamia, of Miletus; Charondas, of Rheggio; Lycurgus, of the Lacedæmonians; Archytas, of Tarentum; Philolaus, of the Thebans.

At Rome the people were in a great meaſure their own *legiſlators*; though Solon may be ſaid, in ſome ſenſe, to have been their *legiſlator*, as the decemviri, who were created for the making of laws, borrowed a great number from thoſe of Solon.

With us the legiſlative power is lodged in the king, lords, and commons aſſembled in PARLIAMENT.

LEGITIMATE *delivery*. See DELIVERY.

LEGITIMATE *tertian*. See FEVER.

LEGITIMATION, an act by which natural or illegitimate children are rendered legitimate. See BASTARD, &c.

By the French law, the father and mother, by marrying, render their children, begotten before marriage, legitimate; and this is called *legitimatio per ſubſequens matrimonium*.

The right of *legitimation* was a thing unknown to princes till the time of Conſtantine; but, ſince his time, has been exerciſed by moſt of them. The Greek emperors invented ſeveral kinds of *legitimation*.

Anaſtaſius put it in the power of the father to *legitimate* his natural children, by a bare adoption, provided he had no legitimate children. But Juſtin, by his conſtitution,

tion, and Juſtinian, by his Novel 74, aboliſhed this *legitimation*, as fearing the too eaſy acceſs to *legitimation* ſhould encourage concubinage.

In lieu of this, he eſtabliſhed a way of *legitimation* by the emperor's letters. This rendered baſtards capable of attaining to honours, and even of ſucceeding to inheritances, provided the perſons were *legitimated* with the conſent of their father and mother: which is agreeable to the canon law.

LEGNA, Λεγνα, among the *Ancients*, a name given to the borders of the *toga* and *pallium*, that were on each hand; the extremities above and below being called ORA.

LEGS, the lower extremes of the bodies of moſt animals, ſerving them for ſupport and motion. See ANIMAL, and EXTREME.

Some anatomiſts divide the foot of man into three parts, viz. the *thigh*, the *leg*, and the leſſer FOOT.

In the leg there are two conſiderable bones; the one called the *great focile*, or TIBIA; the other the *little focile*, or FIBULA.

In fractures of the two bones of the *tibia* and fibula, or either of them alone, the limb is to be extended, by aſſiſtants, both ways, while the ſurgeon replaces the bones, which done, the limb is to be rolled up with the proper bandage, and retained in the moſt proper poſture.

When both theſe bones are broken, they are ſeldom both broken juſt in the ſame place, but one a little higher than the other. If the *tibia* be broken alone, it is eaſily diſcovered by its lying ſo near the ſkin; but if the *fibula* alone, it is buried under ſo many muſcles that the fracture is not always ſo eaſily diſcovered, and the patient is ſo much leſs afflicted by it, as to be ſometimes able to walk.

If a fracture of the *tibia* be accompanied with an external wound, this muſt be firſt well cleanſed, and the ſplinters of the bones carefully removed, and then the broken bone, by the help of a proper extenſion, reduced to its proper place, the hæmorrhage ſtopped, and the whole bound up with the eighteen-headed bandage; but if any fragments of the bone ſtick out, ſo as to hinder its reduction, they muſt be firſt removed by a pair of ſharp forceps, or if neceſſary, a fine ſaw. The limb, when ſet, is to be laid in a proper frame, or in a caſe of ſtraw, renewing the dreſſing and bandage daily till the wound be healed. Heiſter, p. 136.

LEGS, *ulcers of the*. Although no part of the body is free from inveterate and obſtinate ulcers, yet the *legs* are found to be much more ſubject to them than the reſt. The general cauſes of ulcers in the *legs* are the ſame with thoſe with ulcers in other parts, a bad habit of body, too great a thinneſs and acrimony in the juices, and obſtruction of the menſes in women; to theſe alſo may be added calloſity of the lips in wounds, and caries of the bones within.

In perſons advanced in years, and naturally of a bad habit of body, it is moſt adviſable not to attempt to heal theſe, ſince the effect of cure is often much worſe than the diſeaſe, and not unfrequently even death itſelf: for theſe ulcers are, in many caſes, rather to be looked on as a relief to nature, than a diſorder, as they ſerve to drain off a vaſt quantity of noxious humours from the body. This, however, ſhould not be extended to young robuſt habits, though bad, becauſe theſe may be corrected in ſuch ſubjects, and the firſt cauſe of the ſtubbornneſs of the ulcers removed by abſtinence, or a regular way of living, or by opening iſſues, with the help of internal remedies; and the cauſe thus removed, the ulcer may be removed with perfect ſafety: and though in old perſons theſe ulcers are not to be healed, yet palliative methods may be taken with them, to the great comfort of the afflicted perſons, that pain, and other violent ſymptoms may be removed, and the ulcer kept from ſpreading, or new bad ſymptoms from coming on.

Abſtinence and a ſtrict regimen are the great objects, and gentle doſes of purging medicines are to be taken at times, and internal medicines, likely to do good in regard to the cauſe of the ulcer, may be alſo given: of this kind are eſſence of myrrh, balſam of Peru, and the like. Externally, care muſt be taken to keep the ulcer perfectly clean; twice a day it ought to be dreſſed, and every time wiped clean from the ſanies; it ſhould then be dreſſed either with dry lint, or with lint dipped in a decoction of walnut leaves, or of birthwort, and over this a lead-plaſter, as that of the minium, or any of a like kind may be applied. Theſe ulcers treated in this eaſy manner will become very mild, of little trouble, and of great ſervice to the preſerving the life of the patient.

When inflammations and violent pains come on in theſe caſes, as they very frequently do from a blow, from cold, from dipping the *leg* in cold water, or from violent paſſions of the mind, or irregularity of diet, a linen compreſs muſt be applied in this caſe, dipped in Hungary-water, or ſpirit of wine with camphor, or with a mixture of equal parts of lime water, and either of theſe liquors; theſe ſhould be applied warm; the patient ſhould be confined to his bed, and the limb carefully defended from the injuries of the external air, and ſmall liquors ſhould be frequently drank warm to promote gentle ſweating; when the inflammation runs very high, and threatens a gangrene, great care is to be taken, and the methods uſed in inflammations and gangrenes regularly applied, otherwiſe there is the greateſt danger that a ſphacelus and death will be the conſequence.

When the ulcers dry up of themſelves in old people, nauſeas, horrors, and great weakneſs, uſually ſucceed, which ſhew death at hand: in this caſe the patient's ſtrength and ſpirits muſt be kept up as much as poſſible, and gentian and florentine iris-root muſt be applied in powder to the wound; and if theſe are of too little force, black hellebore-root, either in powder or formed into little balls; and laſtly, powder of cantharides, or ſmall pieces of the common bliſtering-plaſter. If theſe applications ſucceed, and produce a running of the ulcer again, the methods before directed muſt be again cautiouſly purſued; but if theſe fail of ſucceſs, there is little hope of life. Heiſter's Surgery, p. 253.

The *legs* and feet of the ſeveral animals, Mr. Derham obſerves, are exactly conformable to the poſture, make, nay to the motion and exerciſes, of thoſe animals. In ſome they are made for ſtrength only, in others for agility and ſwiftneſs; in ſome for walking and running, in others for ſwimming, in others for digging, and in others for flying. In ſome, more lax and weak, for traverſing the plain land; in others, ſtiff and rigid, for ice and precipices. In ſome ſhod with tough and hard hoofs, ſome whole, ſome cleft. In ſome the feet are compoſed of toes; ſome ſhort, for only going, others long, to ſupply the place of hands; ſome are armed with talons, to catch and tear their prey; and ſome with ſhort tails, to confirm their ſteps in running and walking.

In birds, the *legs* are curved, for their eaſy perching, rooſting, and reſt: as alſo to help them on the wing in taking their flight, and to be therein commodiouſly tucked up to the body, ſo as not to obſtruct their flight. In ſome they are long, for wading, &c.

LEGS *of flies*. Theſe furniſh us with ſeveral diſtinctions for this large claſs of inſects. All flies have indeed ſix *legs*, but though they are the ſame in number, they differ ſufficiently in many other reſpects. Some flies have very long *legs*, and others as remarkably ſhort ones.

The gnats and tipulæ ſeem mounted on ſtilts, and by that differ from other flies, whoſe form of body is the ſame; but what is yet more obſervable in regard to the *legs* of theſe inſects is, that though they are uſually all fixed to the corcelet, there are ſome ſpecies of flies which have the hinder pair faſtened to the rings of their body.

The *legs* of flies are often not only large or ſmall according to the ſize of the creature, but every portion of them comprized between two of the articulations, differs often from the other in length and thickneſs. What they all have in common is, that the foot, or bottom part of them, on which the creature reſts itſelf, is always provided with at leaſt two claws, or hooks, which terminate in points ſo extremely fine, that they are able to lay hold of what appears to us the moſt ſmooth and poliſhed bodies.

The blue fleſh-fly, and ſeveral other ſpecies, have alſo, as it were, two ſoles of feet; theſe are each of them nearly of a boat figure, and reſemble two ſmall balls; theſe touch at the part where they are connected to the foot, and leave between them an angular ſpace afterwards. Their external inferior ſurface is ſomewhat convex, and covered with very ſhort hairs very cloſely arranged; theſe hairs, like the points of two claws, can find themſelves a paſſage into the pores of what appear to us the moſt poliſhed ſurfaces, and are of great uſe to the creatures, in their placing themſelves on vertical panes of glaſs.

Mr. Homberg has ſometimes found flies which could not walk upon glaſs in this poſition; and is of opinion, that theſe are ſuch as by age had loſt the hairs from theſe balls on their feet. Thoſe alſo whoſe claws or hooks were become ſoft or blunt, muſt find themſelves in the ſame ſituation: yet there are ſeveral ſpecies of flies which have not theſe balls: ſuch as the bee claſs, which yet are able to walk up our window glaſſes with great caſe. Reaumur, Hiſt. Inſ. vol. iv. p. 259.

LEGS, in the *Manege*, the members that ſupport a horſe's body, and perform the motion when he goes. Of the four *legs*, the two before have ſeveral parts, each of which has a peculiar name: ſo that by the name of *fore-legs*, we commonly underſtand that part of the fore-quarters that extends from the hough to the paſtern-joint, and call it the ſhank; the part that correſponds to this in the hind-quarters is called the *inſtep*. But in common diſcourſe we confound the fore and the hind-quarters; and without any diſtinction ſay the *four legs* of a horſe. The French call a horſe *droit ſur les jambes*, i. e. ſtraight membered, or ſtraight upon his *legs*, when the fore-part of the paſtern falls perpendicularly upon the *coronet*, and the ſhank and the paſtern are in a ſtraight line. See STRAIGHT and LONG-*jointed*.

The horſeman's legs are likewiſe of ſingular concern in the manege, for the action of theſe given ſeaſonably, and with a little judgment, conſtitutes one of the principal aids, which conſiſts in approaching more or leſs with the calf of the *leg* to the horſe's flank, and in bearing it more or leſs off as there is occaſion. This aid a horſeman ought to give very nicely, in order to animate a horſe: and it is ſo much the finer, that it is hidden and private: for in ſtretching the ham he makes the horſe dread the ſpur, and this aid has as much effect as the ſpur itſelf. See AID.

LEGS *of the martinets*, in a *Ship*, is uſed for thoſe ſmall ropes, which are put through the bolt-ropes of the main and fore-ſail, in the leech of each. They are above a foot in length, and at either end are ſpliced into themſelves: they have alſo a ſmall eye, into which the *martinets* are faſtened by two nitches, and the end is ſeized into the ſtanding part of the *martinets*.

LEGS, *long*, in *Natural Hiſtory*. See TIPULA.

LEGS *of a triangle*.—When one ſide of a triangle is taken as a baſe, the other two are called *legs*. See TRIANGLE.

LEGS, *arched*. See ARCHED.

LEGS, *compaſſes of three*. See COMPASSES.

LEGS, *hyperbolic*. See HYPERBOLIC.

LEGUME, among *Botaniſts*, a *pericarpium* of an oblong compreſſed figure, formed of two valves, joined by a viſible ſuture, both on the upper and under part, and having the ſeeds affixed to the upper limbs of the two valves in an alternate order. See PERICARPIUM.

LEGUME or **LEGUMEN**, is applied, by botaniſts, to beans, peas, vetches, &c. otherwiſe called *pulſe*.

Some will have them thus called, in regard they are gathered with the hand; by which they are diſtinguiſhed from corn, &c. which are moved or reaped: *eo quod manu legitur & non ſecatur*.

Yet the ancient writers on huſbandry conſider corn, and even turnips, and all grains and roots for family-uſe, as *legumina*.

LEGUMINOUS, an appellation given to thoſe plants which yield legumes, or pulſe.

Of this kind are moſt plants which grow in pods, as beans, peas, &c.

Ray ranks all plants as *leguminous*, which have a papilionaceous or butterfly-like flower.

LEGUMINOUS *flowers*. See FLOWER.

LEIBNITZIAN *philoſophy*, or the philoſophy of Leibnitz, is a ſyſtem of philoſophy formed and publiſhed by its author in the laſt century, partly in emendation of the CARTESIAN and partly in oppoſition to the NEWTONIAN. The very ingenious and learned author was born at Leipſick, in Saxony, in the year 1646; and though he loſt his father, who was a profeſſor in the univerſity, at ſix years of age, yet availing himſelf of his father's library which was left him, and other advantages, he made a very conſiderable proficiency in general ſcience, and was much taken notice of by the learned men of his time, when very young. In more advanced life, he was no leſs diſtinguiſhed by his writings on the ſubjects of juriſprudence aud theology than on thoſe of mathematics, metaphyſics, and philoſophy. He died in the year 1716. The baſis of Mr. Leibnitz's philoſophy was that of Des Cartes; for he retained the Carteſian ſubtile matter, with the univerſal plenitude and vortices; and repreſented the univerſe as a machine that ſhould proceed for ever, by the laws of mechaniſm, in the moſt perfect ſtate, by an abſolute inviolable neceſſity, though in ſome things he differs from Des Cartes. After ſir Iſaac Newton's philoſophy was publiſhed in 1687, he printed an eſſay on the celeſtial motions (Act. Erud. 1689), where he admits of the circulation of the ether with Des Cartes, and of gravity with ſir Iſaac Newton; though he has not reconciled theſe principles, nor ſhewn how gravity aroſe from the impulſe of this ether, nor how to account for the planetary revolutions and the laws of the planetary motions in their reſpective orbits. That which he calls the harmonical circulation is the angular velocity of any one planet, which decreaſes from the perihelium to the aphelium in the ſame proportion as its diſtance from the ſun increaſes; but this law does not apply to the motions of the different planets compared together; becauſe the velocities of the planets, at their mean diſtances, decreaſe in the ſame proportion as the ſquare roots of the numbers expreſſing thoſe diſtances. Beſides his ſyſtem is defective, as it does not reconcile the circulation of the ether with the free motions of the comets in all directions, or with the obliquity of the planes of the planetary orbits; nor reſolve other objections to which the hypotheſis of the plenum and vortices is liable. Soon after the period juſt mentioned, the diſpute commenced concerning the invention of the method of FLUXIONS, which led Mr. Leibnitz to take a very decided part in oppoſition to the philoſophy of ſir Iſaac Newton. From the wiſdom and goodneſs of the Deity and his principle of a *ſufficient reaſon*, he concluded that the univerſe was a perfect work, or the beſt that could poſſibly have been made; and that other things, which were incommodious and evil, were permitted as neceſſary conſequences of what was beſt: the material ſyſtem, conſidered as a perfect machine, can never fall into diſorder, or require to be ſet right; and to ſuppoſe that God interpoſes in it, is to leſſen the ſkill of the author, and the perfection of his work. He expreſsly charges an impious tendency on the philoſophy of ſir Iſaac Newton, becauſe he aſſerts, that the fabric of the univerſe and courſe of nature could not continue for ever in its preſent ſtate, but would require, in proceſs of time, to be re-eſtabliſhed or renewed by the hand of its Former. The perfection of the univerſe, by reaſon of which it is capable of continuing for ever by mechanical laws in its preſent ſtate, led Mr. Leibnitz to diſtinguiſh between the quantity of motion and the force of bodies: and, whilſt he owns in oppoſition to Des Cartes that the former varies, to maintain that the quantity of force is for ever the ſame in the univerſe, and to meaſure the forces of bodies by the ſquares of their velocities. See FORCE.

This ſyſtem alſo requires the utter excluſion of atoms, or of any perfectly hard and inflexible bodies; the advocates of it alledge, that, according to the law of continuity, as they call a law of nature invented for the ſake of the theory, all changes in nature are produced by inſenſible and infinitely ſmall degrees; ſo that no body can, in any caſe, paſs from motion to reſt, or from reſt to motion, without paſſing through all poſſible intermediate degrees of motion: whence they conclude that atoms or perfectly HARD *bodies* are impoſſible: becauſe if two of them ſhould meet with equal motions, in contrary directions, they would neceſſarily ſtop at once, in violation of the law of CONTINUITY.

Mr. Leibnitz propoſes two principles as the foundation of all our knowledge; the firſt, that it is impoſſible for a thing to be, and not to be at the ſame time, which, he ſays, is the foundation of ſpeculative truth: the other is, that nothing is without a *ſufficient reaſon* why it ſhould be ſo rather than otherwiſe; and by this principle, according to him, we make a tranſition from abſtracted truths to natural philoſophy. Hence, he concludes, that the mind is naturally determined, in its volitions and elections, by the greateſt apparent good, and that it is impoſſible to make a choice between things perfectly like, which he calls *indiſcernibles*; from whence he infers, that two things perfectly like could not have been produced even by the Deity: and he rejects a vacuum, partly becauſe the parts of it muſt be ſuppoſed perfectly like to each other. For the ſame reaſon he alſo rejects atoms, and all ſimilar particles of matter, to each of which, though diviſible *in infinitum*, he aſcribes a *monad* (Act. Lipſiæ, 1698, p. 435.) or active kind of principle, endued, as he ſays, with perception and appetite. The eſſence of ſubſtance he places in action or activity, or, as he expreſſes it, in ſomething that is between acting and the faculty of acting. He affirms abſolute reſt to be impoſſible, and holds motion, or a ſort of *niſus*, to be eſſential to all material ſubſtances. Each monad he deſcribes as repreſentative of the whole univerſe from its point of ſight; and after all, in one of his letters he tells us, that matter is not a ſubſtance, but a *ſubſtantiatum*, or *phenomené bien fondé*. He frequently urges the compariſon between the effects of oppoſite motives on the mind, and of weights placed in the ſcales of a balance, or of powers acting upon the ſame body with contrary directions. His learned antagoniſt Dr. Clarke denies that there is a ſimilitude between a balance moved by weights, and a mind acting upon the view of certain motives; becauſe the one is entirely paſſive, and the other not only is acted upon, but acts alſo. The mind, he owns, is purely paſſive in receiving the impreſſion of the motive, which is only a perception, and is not to be confounded with the power of acting after, or in conſequence of, that perception. The difference between a man and a machine does not conſiſt only in ſenſation and intelligence; but in this power of acting alſo. The balance for want of this power cannot move at all, when the weights are equal; but a free agent, he ſays, when there appear two perfectly alike reaſonable ways of acting, has ſtill within itſelf a power of chuſing; and it may have ſtrong and every good reaſons not to forbear. Collection of Papers which paſſed between Mr. Leibnitz and Dr. Clarke in 1715 and 1716, &c. 8vo. 1717. p. 121. See LIBERTY.

The tranſlator of Moſheim's Eccleſiaſtical Hiſtory obſerves, that the progreſs of Arminianiſm has declined in Germany and ſeveral parts of Smitzerland, in conſequence of the influence of the *Leibnitzian* and Wolfian philoſophy. Leibnitz and Wolf, by attacking that liberty of indifference, which is ſuppoſed to imply the power of acting not only without, but againſt motives, ſtruck, he ſays, at the very foundation of the Arminian ſyſtem. He adds, that the greateſt poſſible perfection of the univerſe, conſidered as the ultimate end of creating goodneſs, removes from the doctrine of PREDESTINATION thoſe arbitrary procedures and narrow views, with which the Calviniſts are ſuppoſed to have loaded it, and gives it a new, a more pleaſing, and a more philoſophical aſpect. As the Leibnitzians laid down this great end as the ſupreme object of God's univerſal dominion, and the hope to which all his diſpenſations are directed; ſo they concluded, that, if this end was propoſed, it muſt be accompliſhed. Hence the doctrine of NECESSITY, to fulfil the purpoſes of a predeſtination founded in wiſdom and goodneſs; a neceſſity, phyſical and mechanical, in the motions of material and inanimate things, but a neceſſity moral and ſpiritual in the voluntary determinations of intelligent beings, in conſequence of prepollent motives, which produce their effects with certainty, though theſe effects be contingent, and by no means the offspring of an abſolute and eſſentially immutable fatality. Theſe principles, ſays the ſame writer, are evidently applicable to the main doctrines of Calviniſm; by them predeſtination is confirmed, though modified with reſpect to its reaſons and its end; by them irreſiſtible grace (irreſiſtible in a moral ſenſe) is maintained upon the hypotheſis of prepollent motives and a moral neceſſity; the perſeverance of the ſaints is alſo explicable upon the ſame ſyſtem, by a ſeries of moral cauſes producing a ſeries of moral effects. Moſheim's Eccl. Hiſt. by Dr. Macleane, vol. v. p. 24. 8vo. edition.

For an account of Leibnitz's famous doctrine of a *pre-eſtabliſhed* HARMONY, we refer to that article.

See on the ſubject of this article Maclaurin's View of Sir Iſaac Newton's Philoſophical Diſcoveries, &c. book i. chap. 4. or p. 79, &c. quarto edition.

LEIOBATUS, in *Ichthyology*, a name given by Ariſtotle and Athenæus to a ſpecies of the ray-fiſh, called by many of the old authors *bos marinus*, and by the later authors *læviraia*, or *raia oxyrynchus*. It is accurately diſtinguiſhed by Artedi, by the name of the variegated ray, with ten prickly tubercles on the middle of the back.

LEIOPODES, formed of λειος, *light*, and πȣς, *foot*, an epithet uſed by the old medical writers, to expreſs ſuch perſons who had feet perfectly ſmooth and even at the bottom, without the uſual hollow between the heel and the fore part of the foot.

LEITURGI, Λειτȣργοι, among the *Athenians*, perſons of conſiderable eſtates; who, by their own tribe, or the whole people, were ordered to perform ſome public duty, or ſupply the commonwealth with neceſſaries at their own expences.

LEMMA, Λημμα, of λαμϐανω, *I aſſume*, in *Mathematics*, denotes a previous propoſition, laid down in order to clear the way for ſome following demonſtration; and prefixed either to theorems, in order to render their demonſtration leſs perplexed and intricate; or to problems, to make their reſolution more eaſy and ſhort. Thus, to prove a pyramid one third of a priſm, or parallelepiped, of the ſame baſe and height with it, the demonſtration whereof in the ordinary way is difficult and troubleſome, this *lemma* may be premiſed, which is proved in the rules of progreſſion, that the ſum of the ſeries of the ſquares, in numbers in arithmetical progreſſion, beginning from 0, and going on 1, 4, 9, 16, 25, 36, &c. is always ſubtriple of the ſum of as many terms, each equal to the greateſt; or is always one-third of the greateſt term multiplied by the number of terms. Thus, to find the inflection of a curve line, this *lemma* is firſt premiſed, that a tangent may be drawn to the given curve, in a given point.

So, in phyſics, to the demonſtration of moſt propoſitions, ſuch *lemmata* as theſe are neceſſary firſt to be allowed: that there is no penetration of dimenſions; that all matter is diviſible; and the like. As alſo in the theory of medicine, that where the blood circulates, there is life, &c.

LEMMA, λεμμα, in *Pharmacy*, a term uſed to expreſs the huſk or ſhell of certain fruits, as the almond, and the like; and in general, whatever is taken off in decortication: thus the huſks of oats, barley, &c. are the *lemmata* of thoſe ſeeds.

LEMMA is alſo a name given by ſome of the lower claſs of writers, in *Natural Hiſtory*, to an imaginary animal, which they deſcribe, as living in the woods of Aſia, and having the face of a woman and the body of a beaſt of prey.

LEMMA, in *Botany*, is alſo the name of a ſmall water-plant, well known to the ancients, and called by Theophraſtus by this diſtinct name; but very improperly confounded by late writers among the duck-weed kinds, and called by Bauhine, Ray, Parkinſon, and others, *lenticula paluſtris quadrifolia*, the four-leaved duck-weed; and by Petiver, in his Gazophylacium Naturæ & Artis, *ſtratiotes paluſtris foliis lujulæ*, or the water-ſoldier with leaves like thoſe of wood-ſorrel.

Mr. Bernard Juſſieu has been at the pains of thoroughly inquiring into the nature and fructification of this plant, and to him alone we owe its true hiſtory; its flowers having never been ſeen or regarded, till that gentleman gave an account of them in the Memoirs of the Academy of Sciences of Paris; and many of the more eminent botaniſts, from its different appearance when in the water and when out of it, having miſtaken it for two different plants. It indeed differs extremely from itſelf in three different ſituations in which it is found. It is ſometimes found in the middle of large ponds of freſh water, and is then very large, fair, and full; ſometimes it is found in ſhallow-water, and is then conſiderably poorer, and ſometimes it is found on dry land, in which caſe it makes an extremely different figure; and is ſo ſtarved, and poor, as ſcarce to be known for the ſame herb. The middle ſtate of theſe, that is when it grows in ſhallow water, ſeems its moſt natural appearance, and is the only condition in which it is found to produce its flowers and ſeeds. It is a ſpreading plant, its branches extend a great way far and wide; theſe ſend from their under part roots at certain diſtances, and from their upper four leaves ſuſtained by a long and ſlender ſtalk, and uſually there are ſeveral of theſe ſtalks from the ſame part of the plant, from the ſame parts of the branches from whence the leaves ariſe; there are alſo ſeen to ariſe other very ſlender and very ſhort ſtalks which bear ſmall capſules, within which is incloſed the flower, and afterwards the ſeed. The flowers are placed in ſeveral lodgments in this ſhell, and are compoſed of ſtamina and piſtils, but have no petals. The piſtils are various in number in the different flowers from three to eight; the ſtamina are always very minute and very numerous. Mem. de l'Acad. Scien. Par. 1740.

Plukenet has deſcribed this plant very differently from this writer, but the difference ſeems only owing to this, that Plukenet deſcribed one he found in deep water, whereas Mr. Juſſieu formed his account from the more ordinary and perfect appearance of the plant in ſhallow water, where alone it ripens its flowers and ſeeds. We have it not in England, ſo far as is yet known, but it is common in the Eaſt and Weſt-Indies, and in France.

LEMMER, or LEMMING, in *Zoology*. See *Sable* MOUSE.

LEMNA. See DUCK-*meat*.

LEMNIAN *earth*, *Lemnia terra*, a kind of BOLE or fine earth uſed in medicine, of which there are three ſpecies, the white, the yellow and the red; but the red is moſt uſed. The characters by which they may be diſtinguiſhed from all other earths of the ſame colours are theſe:

Red *Lemnian earth* is a denſe compact earth of a cloſe firm texture, and pale red colour, and, when ſcraped, of a ſmooth and even, but not gloſſy ſurface. It does not break readily between the fingers, nor at all ſtain the hands; it is not readily diffuſible in water; melts ſlowly in the mouth; is very aſtringent to the taſte, and when in its native ſtate, is always ſomewhat harſh and gritty between the teeth; for what we find of it that is perfectly pure and free from ſand, is ſuch as has been waſhed and ſeparated from it, all the genuine earth naturally containing ſome. It adheres firmly to the tongue, raiſes a ſlight efferveſcence with aqua fortis, and acquires a conſiderable hardneſs, and burns to a fine deep red colour in the fire.

This is dug in the iſland of Lemnos, and in no other place, ſo far as is yet known; and the fine and true earth only in one pit, which is opened once every year, and no oftener, with great ſolemnity; and the earth, ſuppoſed ſufficient for the year's demand, is taken out and ſold to the merchants; ſome ſealed with various figures, other quantities unſealed; but what is there bought unſealed, is generally formed into ſmall maſſes, and ſealed before it is offered to ſale in Europe, the druggiſts always expecting to find *Lemnian earth* ſealed.

This is a valuable earth, but it is too often adulterated frequently by the Turks upon the ſpot, either by mixing it with other earths, or another earth alone being ſold in its place; but more frequently in Europe, where every wholeſale dealer knows how to make a compoſition of our own clays, and properly tinge them with ochre, and afterwards give an impreſſion reſembling that of the genuine.

This earth was celebrated by the ancients as a ſovereign redemy againſt poiſons: and the Turks ſtill retain that notion, for the cups out of which the grand ſeignior drinks, are made of this red earth, ſo that it is reſerved chiefly for the ſultan's uſe. But the alexipharmic and aſtringent property of this and the other boles is now in little or no eſteem.

The white *Lemnian earth* is a fine bole of a dirty whitiſh hue with an aſhen caſt, and ſome very ſlight reddiſh ſtreaks, of a coarſe firm texture, and very heavy. It is not in the leaſt unctuous or ſmooth, not even when prepared, but of a rough harſh ſurface; it ſcarce at all ſtains the fingers in handling, crumbles to pieces with difficulty, is diffuſible in water, and melts in the mouth alſo, with difficulty; is extremely impure and gritty, has a fine aſtringent taſte, and ſcarcely adheres to the tongue when applied to it. This makes no efferveſcence with acids. In burning it acquires a great hardneſs, and outwardly is of a deep blackiſh brown, but inwardly of a deep browniſh yellow colour. It is dug in the iſland of Lemnos, and uſed in the German ſhops as an aſtringent and ſudorific, and ſaid to be of great efficacy in dyſenteries, hæmorrhages, and malignant fevers. The ancients knew this kind, but never uſed it in medicine, eſteeming the other ſuperior, but they employed it as the cimolia in cleaning linen and woollen cloths.

The yellow *Lemnian earth* is a very valuable earth, common in the ſhops, and more than all the other ſubſtances of this kind ſubject to be counterfeited.

It is a very pure and fine earth, of a lively florid yellow, of a cloſe compact texture, and ſmooth ſurface, conſiderably hard, and not at all ſtaining the fingers in handling. It ſticks firmly to the tongue, and melts pretty readily in the mouth, leaving not the leaſt harſhneſs between the teeth, and does not ferment with acid menſtrua. In the fire it acquires a conſiderable hardneſs, and duſky-colour. It is counterfeited two ways, the one by a yellow ochre, which may be diſcovered by its ſtaining the hands, and the other by a yellow clay; but this is eaſily known by its want of the true florid colour, and having all the characters of a clay, not a bole. The genuine is found only in the iſland of Lemnos, and is the ſtratum next above the red. It is eſteemed a ſudorific, aſtringent and vulnerary. Hill's Hiſt. of Foſſils, p. 8. and 13. Da Coſta's Hiſt. of Foſſils, p. 1. 14 and 22.

LEMNISCATE, in the *Higher Geometry*, is the name of a curve which has the form of the figure of 8. If we call A P, x, *Tab.* III. *Analyſis*, *fig.* 62. and P M, y, and the conſtant line B C, a, the equation of the curve will be $ay = x\sqrt{aa-xx}$ or $a^2\, yy = a^2\, x^2 - x^4$, which is an equation of the fourth degree: it is alſo evident that a right line which paſſes through the double point A will cut this curve in four points, the double point being reckoned equal to two. See CURVE.

LEMON, *limon*, in *Botany*, derives its name from λειμων, *a meadow*, becauſe the leaves of this tree and its fruit before it comes to maturity are of a green colour. Linnæus has joined this genus to the *citrus* or CITRON-*tree*. Indeed the terms citron and *lemon* have been often confounded together. What is commonly called citron by the French and Germans being our *lemon*, and their *lemon* our citron. Its characters are theſe: the flower is compoſed of five oblong thick petals which are a little concave and ſpread open; theſe ſit in a ſmall empalement of one leaf, indented in five parts at the top: it has about ten or twelve ſtamina, which are joined in three or four bodies; terminated by oblong ſummits; and an oval germen, which becomes an oval fruit with a fleſhy rind, incloſing a thin pulp with ſeveral cells, each having two hard ſeeds: there are three ſpecies.

There are great varieties of this fruit, which are preſerved in ſome of the Italian gardens; and in both the Indies there are ſeveral which have not yet been introduced into the European gardens: but theſe, like apples and pears, may be multiplied without end from ſeeds.

The common *lemon* and the ſweet *lemon*, are brought to England from Spain and Portugal in great plenty: but the fruit of the latter is not much eſteemed. The lime is not often brought to England, nor is that fruit much cultivated in Europe: but in the Weſt Indies it is preferred to the *lemon*; the juice being reckoned wholſomer, and the acid more agreeable to the palate. The *lemon* and lime appear to be of different ſpecies.

The culture of the *lemon* is much the ſame with that of the ORANGE, but being ſomewhat hardier, they will bring their fruit better to maturity with us, and require a greater ſhare of freſh air in winter. Miller.

Lemons are cooling and grateful to the ſtomach, quenching thirſt, and increaſing appetite; uſeful in fevers, as well common as malignant and peſtilential: they alſo provoke urine. The juice mixed with ſalt of wormwood, is an excellent medicine to ſtop vomiting, and to ſtrengthen the ſtomach. The yellow rind is a grateful aromatic, and commonly uſed in ſtomachic tinctures and infuſions, and for rendering other medicines acceptable to the palate and ſtomach. In diſtillation it yields an eſſential oil, extremely light, almoſt colourleſs, frequently employed as a perfume, and brought to us from the ſouthern parts of Europe, under the name of eſſence of *lemons*. Six drams of the juice of *lemons* ſaturated with about half a dram of fixt alkaline ſalt, with the addition of a ſmall quantity of ſome grateful aromatic water, as tincture of ſimple cinnamon water, is given in caſes of nauſeæ, reachings, and generally abates, in a little time, the ſevere vomitings that happen in fevers, when moſt other liquors and medicines are thrown up as ſoon as taken. It is alſo uſed as a ſaline aperient in icterical, hydropical, inflammatory, and other diſorders. A ſyrup made by diſſolving forty-eight or fifty ounces of fine ſugar in a quart of the depurated juice, is mixed occaſionally with draughts and juleps, as a mild antiphlogiſtic, and ſometimes uſed in gargariſms for inflammations of the mouth and tonſils. Lewis Mat. Med.

LEMONADE, a drink prepared of water, ſugar, and citron, or lemon-juice.

This factitious liquor is ſo popular in Paris, that is has given its name to a new eſtabliſhed company, called *lemonadiers*.

LEMUR, in *Zoology*, is a genus of the order of PRIMATES, in the claſs of *mammalia*. The animals of this genus have four upper fore-teeth, ſeparate from each other, and ſix lower ones, which are longer, compreſſed, and paralled; the laniarii are ſingle ones, and the morares are many, the fore ones being longer and ſharper than the others. See LORIS, MAUCUACO, and MONGOOZ.

LEMURES, in *Antiquity*, *ſprites* or *hobgoblins*; reſtleſs ghoſts of departed perſons, who return to terrify and torment the living.

Theſe are the ſame with *lorvæ*, which the ancients imagined to wander round the world, to frighten good people, and plague the bad. For which reaſon, at Rome they had *Lemuria*, or feaſts inſtituted to appeaſe the manes of the defunct. See LARES.

Apuleius explains the ancient notion of manes thus: the ſouls of men, releaſed from the bands of the body, and freed from performing their bodily functions, become a kind of dæmons or genii, formerly called *lemures*. Of theſe *lemures*, thoſe that were kind to their families, were called *lares familiares*; but thoſe who, for their crimes, were condemned to wander continually, without meeting with any place of reſt, and terrified good men, and hurt the bad, are vulgarly called LARVÆ.

An ancient commentator on Horace mentions, that the Romans wrote *lemures* for *remures*; which laſt word was formed from Remus, who was killed by his brother Romulus, and who returned to earth to torment him.

But Apuleius obſerves, that in the ancient Latin tongue *lemures* ſignifies the ſoul of a man ſeparated from the body by death.

LEMURIA, or LEMURALIA, a feaſt ſolemnized at Rome on the ninth of May, to pacify the manes of the dead, or in honour of the lemures.

The inſtitution of this feaſt is aſcribed to Romulus, who, to rid himſelf of the phantom of his brother Remus (whom he had ordered to be murdered) appearing always before him, ordained a feaſt, called after his name *Remuria*, or *Lemuria*.

In the *Lemuria* they offered ſacrifices for three nights together, during all which time all the temples of the gods were ſhut up, nor were any marriages permitted. There were many ceremonies in this feaſt, chiefly intended to exorciſe the lemures, and prevent their appearing, or giving any diſturbance, to the living.

LENÆA, Δηναια, in *Antiquity*, a feſtival of Bacchus, ſurnamed *Lenæus*, from ληνος, i. e. a *vine-preſs*. Beſides the uſual ceremonies at feaſts ſacred to this god, it was remarkable for poetical contentions, and tragedies acted at this time. Potter's Archæol. lib. ii. cap. 20. tom. i. p. 412.

LENGTH, in the *Manege*. *To paſſage a horſe upon his own length*, is to make him go round in two treads, at a walk or trot, upon a ſpot of ground ſo narrow, that the horſe's haunches being in the centre of the volt, his own *length* is much about the ſemidiameter of the VOLT; the horſe ſtill working between the two heels, without putting out his croupe, or going at laſt faſter or ſlower than at firſt.

LENGTHENING, in *Naval Architecture*, denotes the operation of cutting a ſhip down acroſs the middle, and adding a certain portion to her length. This is performed by ſawing her planks aſunder, in different places of her length, on each ſide of the midſhip frame, to prevent her from being weakened too much in one place; the two ends are then drawn apart, to a limited diſtance, which muſt be equal to the propoſed addition at length. An intermediate piece of timber is next added to the keel, upon which a ſufficient number of timbers are erected, to fill up the vacancy produced by the ſeparation. The two parts of the kelſon are afterwards united by an additional piece, which is ſcored down upon the floor-timbers; and as many beams as may be neceſſary are fixed acroſs the ſhip in the new interval. Finally, the planks of the ſide are prolonged, ſo as to unite with each other, and thoſe of the cieling refitted in the ſame manner; by which the whole proceſs is completed. Falconer.

LENIS *ſpiritus*, in *Proſody*. See SPIRIT.

LENITIVE, in *Phyſic*, ſometimes denotes a ſoftening, reſolutive remedy, that moiſtens the parts diſeaſed, and diſſipates any ſharp humour collected there.

LENITIVE is more frequently uſed for LAXATIVE.

LENITIVE *electary* is more peculiarly uſed for a gentle purging electary, compoſed of eight ounces of ſena, in powder, coriander-ſeeds, in powder, four ounces, mixed with pulp of tamarinds and of French prunes, of each a pound, and a ſufficient quantity of ſimple ſyrup, to reduce the whole into an electary. It is ſo called becauſe it purges eaſily, and by reſolving.

A tea-ſpoonful of this electary taken two or three times a day generally proves an agreeable laxative. It likewiſe ſerves as a convenient vehicle for exhibiting more active medicines, as jalap, ſcammony, &c.

LENS, in *Dioptrics*, properly ſignifies a ſmall, roundiſh glaſs, of the figure of a *lentil*; but is extended to any optic glaſs, not very thick, which either collects the rays of light into a point, in their paſſage through it, or diſperſes them farther apart, according to the laws of refraction.

Lenſes have various figures; that is, are terminated by various ſurfaces, from which they acquire various names. Some are plane on one ſide, and convex on the other; others convex on both ſides; both which are ordinarily called *convex lenſes*; though, when we ſpeak accurately, the former are called *plano-convex*, and the latter *double convex*. Again, ſome are plane on one ſide, and concave on the other; and others are concave on both ſides, which are both uſually ranked among the concave *lenſes*; though, when diſtinguiſhed, the former is called a *plano-concave*, and the latter a *double-concave*. Others, again, are concave on one ſide, and convex on the other; which are called *convexo-concave*, or *concavo-convex lenſes*, according as the one or the other ſurface is more curve, or a portion of a leſs ſphere.

When the particular figure is not conſidered, a *lens* that is thickeſt in the middle is called a *convex lens*; and that which is thinneſt in the middle is called a *concave lens*, without farther diſtinction.

It is to be here obſerved, that in every *lens* terminated in any of the forementioned manners, a right line perpendicular to the two ſurfaces is called the AXIS of the *lens*; which axis, when both ſurfaces are ſpherical, paſſes through both their centres; but if one of them be plane, it falls perpendicularly upon that, and goes through the centre of the other. The points where the axis cuts the ſurface are called the vertices of the *lens*, and the middle points between them is called the centre.

A *lens*, one of whoſe ſurfaces is convex, and the other concave, is called a *meniſcus*; the properties of which, ſee under MENISCUS.

See alſo the *Theory of* LENSES *demonſtrated* under REFRACTION; and the application thereof under MICROSCOPE, TELESCOPE, BURNING-GLASS, and FOCUS.

Some confine *lenſes* within the diameter of five or ſix lines, and will have ſuch as exceed that diameter called *lenticular glaſſes*.

Lenſes are diſtinguiſhed, with regard to the manner of their preparation, into *ground* and *blown*.

LENSES, *blown*, are little globules of glaſs, melted in the flame of a lamp, or taper. See MICROSCOPE.

LENSES, *manner of grinding*. A little piece of copper is cemented to the end of the arbor of a lathe, and turned, till it form a diſh, or baſon, of the diameter of the *lens* required. Then a piece of clear glaſs is cemented on one of its flat ſides, to the end of a little maundrel, with black Spaniſh wax; and thus ground, on the ſide not cemented, on a grindſtone, with water, till it hath nearly acquired a convex figure. It is finiſhed in the lathe, by turning it in the baſon, with fine wet ſand, or gritſtone. The grit muſt be often repeated freſh till the *lens* appear very round; when it is come to that point, they ceaſe to take any freſh ſtone, but continue to turn it in the baſon, till the remains of the ſand be become ſo fine as to have poliſhed it. This they perceive, when, upon wiping it, the image of the window of the place is ſeen painted on its ſurface; if it does not, it is wetted in water without any ſand, and turned till it hath got a poliſh. The baſon is then covered, withinſide, with two or three folds of linen, and the poliſh finiſhed with putty, or tripoly of Venice ſteeped in water. It is known to be perfectly poliſhed when, viewing it with a magnifier, there appear no ſcratches of the ſand. The cement is then broken off, and the ſide poliſhed cemented, to work and grind the other, as before, till the edges of the *lens* be become ſharp, and it be perfectly poliſhed on either ſide. When finiſhed, it is waſhed in ſpirit of wine, to take off all remains of the wax.

In the Philoſophical Tranſactions we have the figure of a machine for grinding *lenſes* ſpherically. It is a contrivance to turn a ſphere at one and the ſame time on two axes, interſecting each other at right angles, with an equal velocity and preſſure on each. See the Tranſactions, N° 459. ſect. 1. See GRINDING *of Optic Glaſſes*.

LENSES, *for convex*, the laws of their refraction, and their effects of depending thereon, are as follow.—1. A ray of light, E G, near the axis (*Tab. Optics*, *fig.* 1.) and parallel thereto, ſtriking on the plane ſurface of a plano-convex *lens*, directly oppoſite to the luminous body, after refraction concurs with the axis in the point F: and if C be the centre of the convexity, C F will be to F L, that is, the diſtance of the centre from the point of concourſe, or focus, will be to the diſtance of the centre in the convex ſurface, in the ratio of the refraction.

For the plane ſurface being directly oppoſed to the luminous body, the ray E G is perpendicular to A B, and therefore will paſs unrefracted to H: thus it ſtrikes on A H B, ſtill parallel to the axis; and therefore coming out of a denſer medium into a rarer, it will meet with the axis of the *lens* in F: and ſo as that C F will be to F L in the ratio of the ſine of the refracted angle to the ſine of the angle of incidence: as will be demonſtrated under the head REFRACTION.

And, therefore, C F − F L or C L is to F L as the difference of theſe ſines is to the ſine of the angle of incidence; and C F − F L or C L is to C F as the ſame difference is to the ſine of the refracted angle.

If then the refraction be out of a glaſs *lens* into air, C F : F L : : 3 : 2, or C L : F L : : 1 : 2; and therefore F L = 2 C L; that is, parallel rays, near the axis, will concur with it at the diſtance of the diameter. Again, if the refraction were out of a water *lens*, i. e. out of a plano-convex *lens* filled with water, C F : F L : : 4 : 3, or C L : F L : : 1 : 3; and therefore F L = 3 C L; i. e. parallel rays, near the axis, will concur with it at the diſtance of a diameter and a half. So that if a lighted candle be placed in the focus of a plano-convex *lens*, that is, in the point F, diſtant from the ſurface of the *lens* A L B, by the length of the diameter; and from the ſurface of the water *lens*, by a diameter and a half, its rays, after refraction, will become parallel.

2. If the ray K I, (*Tab. Optics*, *fig.* 2.) near the axis of a plano-convex *lens*, and parallel thereto, ſtrike on its convex ſurface A H B, after a double refraction, it will meet the axis in F; ſo as that H G will be to G C, and G D to F D, in the ratio of the refraction.

For the ray K I, parallel to the axis E G, by virtue of the firſt refraction in I, will tend to the point G, ſo that G H will be to G C in the ratio of the ſine of the angle of incidence to the ſine of the refracted angle: therefore, by virtue of the ſecond refraction in L, it will concur with the axis in F; ſo that G D will be to F D in the ratio of the ſine of the refracted angle, to the ſine of the angle of incidence. See REFRACTION.

So that the ſemidiameter, and thickneſs of the plano-convex *lens*, with the ratio of refraction, being given, hence ariſes a method of determining the focus of parallel rays ſtriking on the convex ſurface. For, if the ratio of refraction be expreſſed by $n:m$, $HG : GC :: n:m$; therefore $n-m : n :: HC : HG$; and $HG = \frac{n}{n-m} \times HC$: from which ſubtracting the thickneſs of the *lens* DH, and $GD = \frac{n}{n-m} \times HC - HD$. Then ſince the ratio of G D to F D is the given ratio of refraction, $FD = \frac{m}{n-m} CH - \frac{m}{n} HD =$ (rejecting the quantity $\frac{m}{n} HD$ as very ſmall) $\frac{m}{n-m} CH$.

Hence, if the *lens* be glaſs, $FD = 2\,CH - \frac{3}{2}\,HD$. So that if two-thirds of the thickneſs of the *lens* be inconſiderable (as in practice it uſually happens), parallel rays meet with the axis at the diſtance of the diameter from the *lens*, even when they ſtrike at a convex ſurface.

So that, as to the place of the focus, it is the ſame thing whether the plane ſurface, or the convex one, be turned to a luminary of parallel rays; though it appears, both from experience and trigonometrical calculations, that there are more rays united in a leſs ſpace, if the convex ſurface, than if the plane one be turned towards the ſun.

If the *lens* were full of water, $FD = 3\,CH - \frac{3}{4}\,HD$, whereof if $\frac{3}{4}\,HD$ be inconſiderable, $FD = 3\,CH$, or if $\frac{3}{4}\,HD$ be inconſiderable, $FH = 3\,CH$. Parallel, and near rays, therefore, are united at the diſtance of a diameter and a half, if the refraction be in water, even when the convex ſurface is oppoſed to the luminous body.

3. Hence, alſo, ariſes a method of determining the focus of parallel rays ſtriking on a *lens* convex on both ſides, the two ſemidiameters, and the thickneſs of the *lens*, being given.

For if the ray HI, (*Tab.* II. *Optics*, *fig.* 32.) near the axis DG and parallel to it, fall on a *lens* convex on both ſides, after a double refraction, it will meet the axis in F, provided that $GE : GC$ and $DK : DO$ have the ratio of refraction. And GD will be to GK as GO to GF. Since $EG : GC$ in the ratio of refraction, the ray HI will tend to the point G; and if DK be to DO in the ratio of refraction, after the ſecond refraction at its egreſs, it will meet the axis in F, and $GD : GK :: GO : GF$. See Refraction.

And therefore, $GK : DK :: GO : FO$. Let the ratio of refraction be that of $n : m$, then $GE : GC :: n : m$, and $DK : DO :: n : m$; and, therefore, $n - m : n :: CE : GE$, and $n - m : n :: KO : DK$; wherefore if the ratio of refraction and the ſemidiameters CE and KO are given, GE and DK may be found: and ſince $GD = DK + EG - EK$ and $GK = GE - EK$, and $GO = GE + KO - EK$, and $GD : GK :: GO : GF$; GF may be found: moreover $GE - GF = EF$. If EK be rejected as very ſmall, $GD = DK + EG$, $GK = GE$, and $GO = GE + KO$; and therefore, $DK + EG : GE :: GE + KO : GF$.

Hence, if the *lens* be glaſs, ſince $GE = 3\,CE$, and $DK = 3\,KO$, $3\,KO + 3\,CE : 3\,CE :: 3\,CE + KO : GF$; conſequently $KO + CE : CE :: 3\,CE + KO : GF$. And ſubſtituting for KO, a, CE, b, and GF, x, $x = \frac{3bb + ab}{a + b}$ and FE or FK, (rejecting EK) $= 3b - \frac{3bb + ab}{a + b}$, $= \frac{3ab + 3bb - 3bb - ab}{a + b} = \frac{2ab}{a + b}$: therefore the ſum of the ſemidiameters $KO + CE$ is to the double of one of them, or $2\,CE$, as the other KO is to FK the diſtance of the focus from the *lens*.

If the glaſs *lens* were equally convex on both ſides, then $KO = CE$, and $2C : CE :: 4\,CE : GF$, and therefore, $GF = 2\,CE$; and $FK = \frac{2a^2}{2a} = a = EC$; i. e. the diſtance of the focus from the *lens* is equal to the radius of convexity.

If the *lens* were full of water, ſince $GE = 4\,CE$, and $DK = 4\,KO$, $4\,KO + 4\,CE : 4\,CE :: 4\,CE + KO : GF$; conſequently $KO + CE : CE :: 4\,CE + KO : GF$. Wherefore ſubſtituting as before $x = \frac{4bb + ab}{a + b}$, and FE or FK $= 4b - \frac{4bb + ab}{a + b} = \frac{3ab}{a + b}$: conſequently the ſum of the ſemidiameters $KO + CE$ is to the triple of either $3\,CE$ as the other KO is to FK, the diſtance of the focus from the *lens*.

If this *lens* were equally convex on both ſides, we ſhould have $2\,CE : CE :: 5\,CE : GF$; therefore $GF = \frac{5}{2}\,CE$; and $FK = \frac{3aa}{2a} = \frac{3}{2}a$: i. e. the diſtance of the focus from the *lens* is two-fifths of the radius.

On theſe principles is founded the ſtructure of refracting burning-*glaſſes*, the ſun's light and heat being exceedingly augmented in the focus of the *lens*, whether convex or plano-convex; ſince the rays, falling parallel to the axis of the *lens*, are reduced into a much narrower compaſs; ſo that it is no wonder they burn ſome bodies, melt others, and produce other extraordinary phenomena.

4. If a luminous body be placed in a focus behind a *lens*, whether plano-convex, or convex on both ſides; or whether equally or unequally; the rays, after refraction, become parallel. In this caſe the refracted rays become the incident rays, and *vice verſa*, and conſequently the refracted are parallel.

Hence, by means of a convex *lens*, or a little glaſs bubble full of water, a very intenſe light may be projected to a vaſt diſtance.

And this furniſhes us with the ſtructure of a lamp, or lantern, to project an intenſe light to an immenſe diſtance: for a *lens*, convex on both ſides, being placed oppoſite to a concave mirror, if in the common focus of both be placed a lighted candle, or wick, the rays reflected back from the mirror to the *lens* will be parallel to each other; and after refraction will converge, till they concur at the diſtance of the ſemidiameter, after which they will again diverge.—But the candle being likewiſe in the focus of the *lens*, the rays it throws on the *lens* will be parallel: and therefore a very intenſe light meeting with another equally intenſe, at the diſtance of the diameter from the *lens*, the light will be ſurpriſing: and though it afterwards decreaſe, yet the parallel and diverging rays going a long way together, it will be very great at a very great diſtance. Lanterns of this kind are of conſiderable ſervice in the night time to diſcover remote objects, and are uſed with ſucceſs, by fowlers and fiſhermen, to gather their prey together, in order to take them.

If it be required to have the light, at the ſame time, tranſmitted to ſeveral places, as through ſeveral ſtreets, &c. the number of *lenſes* and mirrors is to be increaſed.

If the luminous body, placed in the focus, be of a larger extent, the rays flowing from points ſenſibly diſtant from each other, cannot be parallel; but they will conſtitue ſeveral trains, or parcels of rays, parallel to each other.

5. The images of objects, oppoſed in any manner to a convex *lens*, are exhibited, invertedly, in its focus.

Hence, if a paper be applied to a convex *lens* (eſpecially in a dark room) at the diſtance of its focus, the images of objects ſhining upon it will be repreſented diſtinctly, and in their natural colours, thereon; nor is the focus of the ſun's rays any thing elſe, in effect, but the image of the ſun.—Hence, in ſolar eclipſes, the ſun's image, eclipſed as it is, may be burnt by a large *lens* on a board, &c. and exhibit a very entertaining phenomenon.

Hence alſo, if a convex *lens*, of any kind, be expoſed both to nearer and remoter objects, and a paper at the ſame time be applied, ſo as to receive the images of objects diſtinctly, the diſtance of the focus from the *lens*, and thence the diameter of the convexity, may be determined.

6. If a concave mirror be ſo placed, as that an inverted image, formed by refraction through a *lens*, be found between the centre of the focus, or even beyond the centre, it will again be inverted by reflection, and ſo appear erect in the firſt caſe beyond the centre; and in the latter, between the centre and the focus. On theſe principles is conſtructed the camera *obſcura*.

7. The diameter of the image of an object delineated beyond a convex *lens*, is to the object itſelf in the ratio of the diſtance of the image to that of the object.

Since then the image of a remoter object is leſs diſtant from the *lens* than that of the nearer, the image of the more remote will be leſs than that of the nearer. And becauſe the diſtance of the image from the *lens* is greater, if the *lens* be a ſegment of a greater ſphere than of a leſs; hence the image will be greater in the former caſe than in the latter. The image therefore will be of ſuch a magnitude, as it would be of, were the object to ſhine into a dark room through a little hole upon a wall, at the ſame diſtance from the hole, at which the focus is from the *lens*.—When an object is leſs diſtant from a *lens* than the focus of parallel rays, the diſtance of the image is greater than that of the object; otherwiſe, the diſtance of the image is leſs than that of the object; in the former caſe, therefore, the image is greater than the object; in the latter, leſs.

If the images be made greater than the objects, they will not appear diſtinctly; becauſe in that caſe there are fewer rays which meet after refraction in the ſame point; whence it happens, that rays proceeding from different points of an object terminate in the ſame point of an image, which is the cauſe of confuſion.—Hence it appears that the ſame aperture of a *lens* may be admitted in every caſe, if we would keep off the rays which produce confuſion. However, though the image is then more diſtinct when no rays are admitted but thoſe near the axis, yet for want of rays the image is apt to be dim.

8. If the eye be placed in the focus of a convex *lens*, an object viewed through it appears erect, and enlarged in the ratio of the diſtance of the object from the eye, to that of the eye from the *lens*, if it be near; but infinitely, if remote.

Lenses, *for concave*, *their laws* are as follow.—1. If parallel rays ſtrike on a plano-convex *lens* KL, and FC be to FB in the ratio of refraction, the rays will diverge from the axis; and the point of divergency, or diſperſion, called the virtual focus, will be F. See *Tab. Optics*, *fig.* 3.

For the ray HI, parallel to the axis, is perpendicular to KL, and will therefore paſs unrefracted to E. Wherefore, FC being to FB in the ratio of refraction, F will be the virtual focus.

If then the *lens* be glaſs, $FB = 2\,BC$; i. e. the virtual focus F will be diſtant from the *lens* KL by the ſpace of the diameter $2\,BC$.

If the refraction be in water, $FB = 3\,BC$; i. e. the virtual focus F will be diſtant from the *lens* KL a diameter and a half 3 BC.

2. If the ray AE, parallel to the axis FP, ſtrike on a *lens* concave on both ſides; and both FC be to FB, and IP to PH in the ratio of refraction; and FP : PH :: FB : BG; G will be the point of diſperſion, or the virtual focus. See *Tab. Optics*, *fig.* 4.

If therefore, the ratio of the refraction be $= n : m$, CB $= a$, and $IH = b$; $FB = \frac{ma}{n-m}$, and $PI = \frac{nb}{n-m}$; conſequently, diſregarding the thickneſs of the *lens*, $FP = FB + IP = \frac{na+nb}{n-m}$, and $PH = PI - IH = \frac{nb}{n-m} - b = \frac{mb}{n-m}$: therefore, $\frac{n\times\overline{a+b}}{n-m} : \frac{mb}{n-m} :: \frac{na}{n-m} : BG$; i. e. $a+b : \frac{mb}{n-m} :: a : BG$, or $\overline{n-m} \times \overline{a+b} : mb :: a : BG$; i. e. $\overline{n-m} \times \overline{CB+IH} : m\,IH :: CB : BG$.

If therefore the refraction be in a glaſs *lens*, ſo that $m=2$, $n=3$, and $\overline{a+b} : 2b :: a : BG$; the ſums of the ſemidiameters CB and HI, will be to the diameter of the concavity of either, 2HI, as the ſemidiameter of the other CB, to the diſtance of the virtual focus from the *lens*, BG.

But if the ſemidiameters HI and CB are equal, or $a=b$, $BG = \frac{2a^2}{2a} = a$; or BG, the diſtance of the virtual focus from the *lens*, is equal to the ſemidiameter CB or HI. If the refraction be made in water, $m=3$ and $n=4$, and therefore, $a+b : 3b :: a : BG$; i. e. the ſum of the ſemidiameters CB and HI will be to a diameter and a half of either concavity, 3HI, as the ſemidiameter of the other CB to BG, the diſtance of the virtual focus from the *lens*: in this caſe, if $a=b$ or $HI = CB$, $BG = \frac{3a^2}{2a} = \frac{3}{2}a = \frac{3}{2}CB$ i. e. the diſtance of the virtual focus from the *lens*, BG, is to the ſemidiameter BC in a ſeſquialteral ratio.

Hence, the ſun's rays ſtriking on a concave *lens*, their light, after refraction, will be conſiderably weakened; ſo that the effect of concave *lenſes* is oppoſite to that of the convex ones.

3. An object viewed through a concave *lens* appears erect, and diminiſhed in a ratio compounded of the ratios of the ſpace in the axis between the point of incidence, and the point to which an oblique ray would paſs without refraction, to the ſpace of the axis between the eye, and middle of the object; and the ſpace in the ſame axis between the eye and the point of incidence, to the ſpace between the middle of the object, and the point the oblique ray would paſs to without refraction.

Though the properties of *lenſes* have been here conſidered principally with regard to rays falling near the axis, and parallel thereto; yet the reaſoning will be eaſily transferred to rays remoter from the axis, and falling in any direction.—Thus we may ſay univerſally, that in a convex *lens*, all parallel rays become converging, and concur in a focus: that diverging rays either become leſs diverging, or run parallel, or converge; and that converging rays converge the more: all which alterations are more ſenſible in oblique rays than in perpendicular ones, becauſe the angles of incidence in that caſe are greater.

In concave *lenſes* all parallel rays become diverging, and all diverging rays diverge more; converging rays either converge leſs, or become parallel, or go out diverging; all which things hold of oblique as well as direct rays, but more ſenſibly in the firſt.

LENS, or **LENTICULA**, was alſo the name of a kind of weight among the Romans; being the hundred and eighth part of a drachm; equal to a grain and a half.

LENS, the *lentil*, in *Botany*. See LENTIL.

LENS *plauſtris*, in *Botany*. See DUCK's *meat*.

LENT, *Quadrageſima*, a time of mortification, during the ſpace of forty days, wherein Chriſtians are enjoined to faſt, in commemoration of our Saviour's miraculous faſting ſo long in the deſert, and by way of preparation for the feaſt of Eaſter.

In the ancient Latin church, *Lent* only conſiſted of thirty-ſix days. In the ninth century, to come ſomewhat nearer to the miracle, ſeveral took upon them to add four days more; which in time became a general practice; though the church of Milan is ſaid ſtill to take up with the ancient thirty-ſix.

According to S. Jerom, S. Leo, S. Auguſtine, and others, *Lent* muſt have been inſtituted by the apoſtles. Their way of reaſoning is thus: whatever is generally received throughout the whole church, and whoſe inſtitution we do not find in any council, muſt be eſteemed to have been eſtabliſhed by the apoſtles. Now ſuch, they ſay, is the faſt of *Lent*. Its inſtitution is not ſpoken of in any council; but many of the ancient councils, particularly that of Nice, that of Laodicea, &c. and ſome of the oldeſt fathers, particularly Tertullian, ſpeak of it as a thing of ſome ſtanding.

The Reformed, generally, hold *Lent* to be a ſuperſtitious inſtitution, ſet on foot by ſome vain enthuſiaſts, who durſt undertake to ape the miracles of Jeſus Chriſt; as, in effect, it appears to have been from a paſſage of Irenæus, quoted by Euſebius.

Some will have it to have been firſt inſtituted by pope Teleſphorus, in the ſecond century: others, who own that there was a kind of abſtinence obſerved in the ancient church before Eaſter, yet contend that it was entirely voluntary, and was never enjoined by any law till the third century. See FAST.

This religious ſeaſon is ſaid to have been firſt obſerved in England by our Saxon anceſtors in the year 640. Anderſon's Hiſt. of Commerce, vol. i. p. 25.

Political *Lents* have been often enjoined by ſtatute and royal proclamation. See ABSTINENCE.

King James I. iſſued a proclamation againſt eating fleſh in *Lent* in 1619, and another in 1625. A ſimilar proclamation was alſo iſſued by Charles I. in 1627 and another in 1631.

There was ſome difference between the practice of the Greek and Latin churches as to the buſineſs of *Lent*; the Greeks beginning it a week ſooner, but at the ſame time allowing more days of intermiſſion than the Latins: thoſe who held it ſeven weeks did not faſt on Saturdays, as thoſe who obſerved it but ſix did.

The ancient Latin Monks had three *Lents*; the grand *Lent* before Eaſter, another before Chriſtmas called the *Lent of S. Martin*; and a third after Whitſunday, called the *Lent of St. John Baptiſt*; each of which conſiſted of forty days.

The Greeks, beſide that before Eaſter, obſerved four others; that of the *Apoſtles*, of the *Aſſumption*, of *Chriſtmas*, and of the *Transfiguration*: but they reduced each of them to the ſpace of ſeven days.—The Jacobites added a fifth, which they called the *Repentance of Nineveh*; and the Maronites a ſixth, called the *Exaltation of the Holy Croſs*.

By the ninth canon of the eighth council of Toledo, it is ordained, "That if any perſon, without evident neceſſity, "eat fleſh in *Lent*, they ſhall be deprived the uſe of it all "the reſt of the year."

By the fifth chapter of the fourteenth ſeſſion of the council of Trent, confeſſion is enjoined as peculiarly fit and acceptable at this ſeaſon. Hard. Conc. tom. x. p. 93.

The forty days in *Lent*, ſay ſome, are obſerved in remembrance of the forty days wherein the world was drowned; or, as others ſay, of the forty years wherein the Jews wandered in the deſert; others, of the forty days allowed Nineveh for repentance; others, of the forty ſtripes by which malefactors were to be corrected; or, the forty days during which Moſes faſted at the receiving of the law; or the forty days faſt of Elias; or, finally, the forty days faſt of our Saviour.

LENTES *lapideæ*, *foſſile lentils*, the name given by many writers to a very remarkable foſſile ſubſtance, uſually found immerſed in hard ſtones, and of a roundiſh but flatted ſhape, reſembling not unaptly a pea or *lentil* flatted by preſſure. They generally lie in great quantities in the ſame maſs of ſtone; and are of very different appearance when their ſides or ends are ſeen, from that which they exhibit when their flat ſurfaces come in view.

They are generally ſuppoſed to be *lentils* petrified and bedded in ſtone, and as their ſides come in view in ſome parts of the maſſes, they are not perceived to be a part of the ſame ſubſtance, but are called the remains of ſeeds of other plants, and the whole ſtone is uſually named *lapis frumentarius*.

We are not to ſuppoſe, that ſo ſoft a body as the *lentil* ſeed, or a common pea, could be eaſily petrified and preſerved in its own form in ſtone; ſince if theſe ſoft ſubſtances were readily capable of ſuch a change, they are ſo very common in their recent ſtate, that they muſt be expected to be found in this foſſile condition very frequently alſo, and in great variety. This, however, is not the caſe. But this improbability is not all the reaſon we have to conjecture, that theſe are not what they are vulgarly ſuppoſed to be, that is, foſſile ſeeds; for a ſtricter examination of the things themſelves proves this to be impoſſible. Seeds, and other ſuch things, are of ſome determinate growth; the ſize of which we know, and are well acquainted with their internal ſtructure, which is only a farinaceous matter contained in a thick ſuperficial ſkin or covering.

On the contrary, theſe foſſils, when examined, prove to be of various ſizes, from the minuteſt ſpeck viſible to the eye, to near an inch in diameter, a ſize that no *lentil* could be ſuppoſed to arrive at. They are of two kinds; the one convex on both ſides, the other convex on one ſide only, and plane on the other. The firſt are thickeſt in the middle, and gradually leſſen in thickneſs all round, till they terminate in a thin edge; the others are juſt like the halves of theſe when ſplit horizontally. Thoſe which are convex on both ſides, have uſually ſeveral crooked lines, riſing from the umbilicus on each ſide, and tending toward the circumference; and the flat ones have uſually on the flatted ſide a number of concentric circles ſurrounding the umbilicus, and one another to the edge. When theſe are broken they are found to conſiſt of a number of caſes, or coats, one within another, all of the ſame ſhape with the outer one; and ſome of them are ſtriated, or made up of tranſverſe fibres. They are plainly of animal origin, though they differ from all the parts of animals hitherto known. Woodward's Cat. of Foſſils, vol. ii.

Dr. Woodward, in one place, ſuppoſes them to have been the looſe bones which are found in the heads of ſome ſea-fiſhes, and are ſuppoſed to ſerve for hearing; but that they belong to ſome fiſh at preſent unknown, or that has not been yet examined in this particular: there is, however, another much more probable opinion, which he mentions afterwards, that they may have been opercula of ſhell-fiſhes, of the nature of the umbilicus Veneris, of which the fiſhes we know afford us a great variety; and the many others we are yet unacquainted with, may furniſh numbers of other kinds very different from all we do know.

Theſe bodies are found in a hard greyiſh ſtone, and ſome of the large ones, which are flatted on one ſide, give great reaſon to judge that they are of this origin, as ſome of the large ones have on the flat ſide a reddiſh line, beginning at the centre, and thence continuing, in a ſpiral form for eleven or twelve turns, till it reaches the edge of the ſtone. This is exactly the formation and lineation of the common umbilicus Veneris, only that it has fewer ſpires. The ſtone, called by authors *lapis numiſmalis*, is generally allowed to be of the nature of theſe opercula, and this differs very little from theſe large *lentes lapideæ*, as they are called.

LENTICULAR, in *Surgery*. See TREPANNING and *Tab.* III. *Surgery. fig.* 44.

LENTIGO, a cutaneous diſorder, popularly called FRECKLES.

LENTIGO is alſo uſed by Dr. Quincy for a brown, ſcaly, or ſcurfy eruption upon the ſkin; ſuch, eſpecially, as is common to women in the time of child-bearing.

LENTIL, *lens*, in *Botany*, the name of a genus of plants, according to Tournefort, the characters of which are theſe: the flower is of the papilionaceous kind, and from the cup there ariſes a piſtil, which finally becomes a ſhort pod, containing orbicular ſeeds, and thicker toward the middle than at the edges.

In the Linnæan ſyſtem, this is a ſpecies of ERVUM.

The common *lentil* or *ervum*, with compreſſed ſeeds, which are convex, is cultivated in many parts of England, either as fodder for cattle, or for the ſeeds, which are frequently uſed for meagre ſoups. This is an annual plant. It riſes with weak ſtalks a foot and a half high, garniſhed with winged leaves at each joint, compoſed of ſeveral pair of narrow lobes, terminated by a tendril or claſper, which faſtens to any neighbouring plant, and is thereby ſupported; the flowers come out in May upon ſhort foot-ſtalks from the ſide of the branches; they are ſmall, of a pale purple colour, and are ſucceeded by ſhort flat pods, containing two or three ſeeds, which are flat, round, and a little convex in the middle. The ſeeds of this plant are ſown in March on dry land, and in April on wet land, and ripen in July: the uſual quantity allowed is from a buſhel and a half to two buſhels to an acre. If theſe are ſown in drills like peas, they will ſucceed better than when ſowed the common way; the drills ſhould be a foot and a half aſunder, to allow room for the Dutch hoe to clear the intervals.

Lentils make excellent ſweet fodder; and are therefore to be preferred to all other kinds for calves and other young cattle. They are likewiſe the beſt as well as cheapeſt food for pigeons.

The ſeeds of *lentils* are frequently the common food of the poor in ſome of the iſlands of the Archipelago, and other warm countries, when they can meet with no better fare. Another ſort of *lentil* has of late years been cultivated in England, under the name of French *lentil*. This is the *lens major* of Caſpar Bauhine; and being twice the ſize of the common *lentil*, is by ſo much the better worth cultivating. This is called *tills* in many parts of England. Miller's Gard. Dict.

The ancients affirm, that *lentils*, eaten with their ſkins on, bind the body, and ſtop a looſeneſs; and yet at the ſame time, that the liquor they are boiled in looſens the belly. They are but rarely uſed in phyſic, though the flour of them may be uſed outwardly in cataplaſms, for the ſame purpoſes as bean-flour.

LENTISCUS, the wood of an ever-green tree of the ſame name, of ſome uſe in phyſic: it is an aſtringent and fortifying, and is much uſed for tooth-picks. See MASTIC-*tree*.

It contains a kind of gum, or reſin, which is maſtic; the ſame with the incenſe of Perſia, ſo highly commended by Strabo.

The *lentiſcus* has nearly the ſame properties with the ſaunders; but it has more turpentine in it, and ſometimes paſſes by urine.

LENTISK, in *Botany*. See MASTIC-*tree*.

LENTISK, *African* and *Peruvian*. See *Indian* MASTIC.

LENTOR, in *Medicine*, a viſcidity or ſizineſs.

A viſcid or ſizy ſtate of the animal fluids is productive of many diſtempers, Thus, Boerhaave informs us, that a pingueous viſcidity, from vegetable aliment, is cauſed, firſt, by a diet of crude and unfermented farinaceous ſubſtance, and auſtere, immature vegetables. Secondly, by a defect of good blood; a ſufficient quantity of which is neceſſary to the aſſimilation of the aliment, and the converſion of their juices into good blood. Thirdly, by a debility of the veſſels and viſcera, or a defect or inactivity of the bile; which laſt is very powerful, when in a due ſtate and quantity, in attenuating viſcidities of alimentary ſubſtance. Fourthly, by a diminution of animal motion; for motion ſtrengthens the ſolids, attenuates the fluids, and promotes the due digeſtion and aſſimilation of the aliments. Fifthly, by a diſſipation of the moſt fluid parts of the blood, through the relaxed ſecerning veſſels; for it is evident, that when the moſt fluid parts are loſt, what remains muſt become more thick and viſcid. Hence the error of thoſe is obvious, who prepoſterouſly carry off the fineſt particles of the blood by enormous quantities of ſudorifics and diuretics. Sixthly, by the retention of the thicker parts of the fluids, on account of the debility of the excretory organs.

This viſcidity is originally formed in the firſt organs of digeſtion; from whence it is propagated to the blood, and the fluids thence derived; and when any of theſe viſcid particles paſs the lacteals, and get into the blood, their immediate effects are principally manifeſt in the lungs, where they cauſe a dyſpnœa, not being able to paſs readily through the ſmall veſſels thereof.

The effects of ſuch a viſcidity in the firſt organs of digeſtion, are an utter proſtration of appetite, ſometimes attended with the diſcharge of a viſcid ſubſtance, much reſembling frogs ſpawn; a ſenſe of repletion, nauſea, and inclination to vomit; becauſe theſe acidities, adhering to the coats of the ſtomach, excite an uneaſy ſenſation, in the manner a feather does, when thruſt down the throat; and a crudity of the aliments taken in, becauſe they cannot be digeſted.

Hence, likewiſe, the bile is rendered inert and inactive, being, as it were, inviſcated by theſe viſcidities, and carried along with them through the inteſtinal tube, and loſt. Hence, alſo, ariſe pituitous, and, as it were, vitreous concretions of the ſtomach and inteſtinal tube, which are productive of exceſſive pains, when adhering to the coats of theſe organs. Coſtiveneſs, and tumors of the belly, are moreover excited, for want of a proper ſtimulus from the bile, and a retention of the groſs viſcid fæces: this is frequent in children. Hence alſo, a due preparation, perfection, and ſecretion of the chyle, is prevented. In the blood, ſizineſs, paleneſs, and immeability, are generated; in the veſſels, obſtructions and concretions: hence, alſo, pale and inſipid urine, viſcid ſaliva, and leucophlegmatic tumors. The due ſecretions are likewiſe prevented; and the more ſubtle parts of the fluids become deficient; whence a coalition of the ſmalleſt canals is induced.

With reſpect to the cure, it is to be performed, firſt, by a conſtant uſe of aliments and drink well fermented, and duly ſeaſoned with attenuating ſalts and aromatics; for fermentation deſtroys the viſcidity of all the farinaceous vegetables. Rice or oats, boiled, make a kind of jelly or glue, which is deſtroyed by fermentation. Beer well fermented does not cauſe phlegm, but ptiſans will: therefore, in cold languid diſeaſes ſtrong beer is proper; and in hot, inflammatory diſorders, ptiſans. Secondly, by broths made of animals abounding with exalted volatile ſalts; and theſe broths muſt be ſeaſoned with acrid vegetables. Thirdly, by ſtrengthening the veſſels and viſcera. Fourthly, by exerciſe and motion; for without a due degree of theſe, nothing can relieve, much leſs cure. Fifthly, by diluting, reſolvent, ſtimulating, bilious, and ſaponaceous medicines. James, Med. Dict.

LEO, *Lion*, the fifth of the twelve ſigns of the zodiac.

The ſtars in the conſtellation *Leo* in Ptolemy's Catalogue are 27, beſides the informes, which are 8; in Tycho's

30, in the Britannic Catalogue 95; the names, places, longitudes, latitudes, and magnitudes whereof, are as follow.

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longit.			Latitude.			Magnitude.
			°	′	″	°	′	″	
That in the noſtrils	κ	♌	10	57	28	10	23	51 N	4
In the foremoſt toe of the ſouthern fore-foot	a		17	12	57	5	35	27 S	5
			17	29	46	6	24	22 S	6
In the aperture of the mouth	λ		13	32	13	7	51	27 N	4
In third toe of northern fore-foot	ξ		17	19	44	3	11	22 S	4
5.									
Northern and following in claw	b		17	50	1	4	41	12 S	6
			17	14	26	0	1	52 N	6
			16	51	10	2	4	54 N	6
			14	21	5	9	55	48 N	6
			19	59	58	6	59	54 S	5
10.									
			17	44	24	0	10	48 N	6
			14	24	14	10	41	9 N	7.8
			14	45	16	11	23	26 N	6
Following in ſouthern fore-foot	o		19	56	8	3	46	50 S	3.4
	f		13	42	32	15	21	3 N	6
15.									
In the preceding knee	ψ		19	10	4	0	19	3 N	6
South. of three in the head	ε		16	22	16	9	41	4 N	3
			20	30	28	1	33	23 S	6
			20	49	20	1	42	11 S	7
			18	7	32	7	32	58 N	6
20.									
			21	31	2	1	9	33 S	7
Middle one of the head	g		17	27	45	10	45	1 N	6
			21	9	26	0	1	7 N	6
North in the head	μ		17	6	26	12	19	29 N	3.4
			23	15	36	1	4	24 S	6.7
25.									
			22	3	5	2	37	58 N	7
Juſt before the heart	ν		23	0	52	0	1	25 N	4.5
			24	51	29	3	42	16 S	7
In the following knee	π		24	59	4	3	56	18 S	4
South. of three in the neck	η		23	34	24	4	50	20 N	3.4
30.									
In the breaſt below the heart	A		26	5	36	1	26	15 S	5
The lion's heart, called alſo Regulus.	α		25	31	20	0	26	38 N	1
			24	44	0	4	8	45 N	6.7
			25	45	10	2	1	10 N	7
			23	11	28	11	54	55 N	6
35.									
North. in the neck	ζ		23	13	41	11	50	13 N	3
			26	46	1	2	48	7 N	6
			24	48	4	8	26	8 N	6
			23	30	52	11	37	13 N	6
			25	22	25	8	26	51 N	6
40.									
Middle and ſubſeq. in the neck	γ		25	15	5	8	47	27 N	2
			27	29	23	4	24	54 N	6
		♍	0	47	10	3	20	14 S	6
			0	30	39	1	2	27 S	5.6
Preceding and leſſer			0	42	45	0	5	8 N	6
45.									
Preced. of three in the belly	i		0	7	58	4	33	27 N	6
In the axilla	S		2	3	50	0	7	48 N	4
			3	24	5	1	52	27 S	6
			2	49	25	0	16	10 S	6
			0	54	21	7	0	48 N	7.6
50.									
In the middle of the back	m		1	30	14	10	14	52 N	6
North. of three in the belly	K		3	19	21	5	54	48 N	6
South. and ſubſeq. in the belly	l		5	21	19	2	47	40 N	6
Subſeq. over the back			1	10	21	16	28	40 N	4.5
			10	34	32	5	39	57 S	6.5
55.									
			8	33	28	0	35	51 S	6.7
			10	48	37	5	54	3 S	6
South. of three under the belly	d		10	35	34	2	31	51 S	6.5
Middle under the belly	c		9	40	33	0	13	16 S	5
Preceding in the loins	b		4	31	0	12	54	5 N	5
60.									
			13	13	40	8	3	1 S	5
	g		12	42	21	5	34	35 S	6
North. of three under the belly	χ		10	12	9	1	20	21 N	4.5
			4	23	30	16	16	29 N	6
			12	43	44	3	26	1 S	6
65.									
			14	8	56	6	24	8 S	6
			4	4	56	17	35	54 N	6
A bright one following in the loins	δ		6	57	21	14	19	4 N	2.3
			15	4	39	4	38	53 S	5.6
North. in the hip	θ		9	5	31	9	39	50 N	3
70.									
			8	26	34	11	35	5 N	6
That over the bright one in the loins			6	8	13	16	46	2 N	5
South. of two in the hip	ι		10	18	7	7	51	41 N	6
That before the hindmoſt claw	φ		17	10	19	7	39	5 S	4
			15	3	39	2	22	53 S	6
		♍	15	35	19	2	33	21 S	7
In the ham	σ		14	22	35	1	40	56 N	4.5
South. in the thigh	ι		13	12	58	6	5	10 N	4
			16	51	53	2	16	55 S	5.6
			15	57	51	0	0	35 N	6
80.									
			11	14	0	11	41	40 N	7
			16	27	27	0	18	5 S	7.8
			16	53	22	0	32	7 S	8
More ſouth. as in the leg	τ		17	11	2	0	34	4 S	4
			12	34	10	11	8	9 N	6
85.									
			11	30	49	11	57	10 N	6
South. in the nail of the hind-foot	e		20	3	13	5	42	22 S	4.5
			13	29	27	10	23	53 N	6
			18	35	11	0	16	9 N	6
			13	6	41	12	53	8 N	6
90.									
North. in the nail of the hind-foot	υ		20	42	52	3	3	35 S	4
			12	32	21	17	38	0 N	6
That over the tail			14	38	5	17	18	9 N	4
In the extremity of the tail	β		17	19	14	12	16	51 N	1.2
That following the tail	o		18	19	27	13	53	21 N	6

Cor **Leonis**, *Lion's Heart*, a fixed ſtar, of the firſt magnitude, in the ſign *Leo*; called alſo *Regulus*, *Baſilicus*, &c.

Leo *Minor*, the *Little Lion*, in *Aſtronomy*, a conſtellation of the northern hemiſphere, including, in the Britiſh Catalogue, fifty-three ſtars, which are as follow:

Names and ſituations of the ſtars.	Signs.	Longit.			Latitude. N.			Magnitude.
		°	′	″	°	′	″	
	♋	29	8	34	13	49	35	7
		29	33	4	13	37	5	6
		29	34	20	13	51	31	6
		29	51	59	13	7	25	7
	♌	1	38	9	14	59	28	7
5.								
		11	0	41	9	21	57	6
Anterior in left foot		9	45	57	17	54	6	6
		9	25	1	19	19	30	5
		9	18	57	20	45	37	6
In the opening of the mouth		9	28	32	20	42	40	4.5
10.								
		10	2	12	20	17	40	6
		10	28	15	19	57	53	5
		11	44	27	20	6	25	6
		11	17	21	29	42	34	6
		8	20	33	30	50	6	6
15.								
		11	26	35	24	52	19	6
		12	37	33	23	25	41	6
		15	33	42	18	34	48	6
In the head		12	18	40	26	43	22	5.6
Cor Leonis minoris		16	41	39	18	32	12	6
20.								
In the neck		16	39	30	12	4	9	5
		19	46	56	19	11	22	6.7
In the belly		20	52	52	17	16	42	5.6
		21	11	25	16	43	48	6
		16	30	33	29	12	8	6
25.								
		19	52	50	23	17	4	6
		20	27	27	22	5	25	6
		20	43	50	21	59	26	6
		20	21	16	23	41	56	6
		21	3	44	22	12	35	5.4
30.								
In the hinder part of the neck		20	11	36	25	2	43	5
		19	37	30	27	14	20	6
		22	53	10	21	23	45	4.5
Firſt in the back		22	6	10	23	55	27	4.5
		22	4	40	25	23	15	5.6
35.								
		23	23	31	23	27	32	6
In the middle of the body		24	29	50	21	36	28	3
		21	58	50	27	5	17	6
		26	43	30	17	39	52	6
In the left foot		27	50	24	16	46	16	6
40.								
In the end of the tail.		29	9	13	13	56	46	5
In the hip		26	33	43	21	2	47	4.5
		27	44	5	20	8	14	6
		28	32	32	18	54	12	6
		28	24	50	19	4	43	6
45.								
Second in the back		26	30	4	24	55	30	4.5
		26	58	10	24	53	50	6
	♍	0	40	4	17	0	55	6
		3	52	18	10	25	39	6
		1	52	10	17	14	40	6
50.								
		3	4	0	17	46	40	6
		3	18	20	18	14	26	5.6
		4	4	56	17	35	54	5.6

Leo, in *Botany*, a name uſed by ſome authors for the COLUMBINE, or *aquilegia*. Columella, beſide others, calls it by this name.

Leo, the *lion*, in *Zoology*. See **Lion**.

Leo *pulex*, a name given by Mr. Reaumur to a ſpecies of inſects, which feeds on the *pulex arboreus*, or common tree-puceron, in the ſame manner that the creature called the *formica leo* does on the ants: this being alſo, like that, an animal, yet in an imperfect ſtate, and finally to be changed into a different creature. This author has kept up the reſemblance of this analogy between them, by giving this a ſimilar name.

The *leo pulex* is uſually bred among the herds of the pulices, which he devours moſt unmercifully. He is a worm of the hexapode, or ſix legged kind, and very ſoon arrives at the time of his change; after which he becomes a green fly with four wings. Another animal of this kind and not leſs deſtructive of this ſmall race of animals, is a ſix-legged worm of a whitiſh colour, and ſmaller than the former, which finally becomes a round-bodied beetle. Another ſpecies of theſe devourers this author calls *vermis hyſtrix*, the porcupine-worm, from the vaſt number of ſpiculæ, or tender prickles, with which he is armed. This alſo finally becomes a round and ſmall beetle. Reaumur, Hiſt. Inſect. tom. i. See **Lion** *puceron*

LEOCROCOTTA, in *Natural Hiſtory*, a name given by the ancients to an animal, ſaid to be the ſwifteſt of all creatures in the world. It is deſcribed as a mongrel or baſtard animal, unable to propagate its own ſpecies, being begotten upon the lioneſs by the male hyæna of ſome of the larger kinds: but is one of thoſe animals, the exiſtence of which is much to be doubted. The Latin authors have made ſome confuſion between this creature and the MANTICHORA, attributing the things that have been ſaid of one to the other.

LEONINE, in *Poetry*, is applied to a kind of verſes which rhyme at every hemiſtich, the middle always chiming to the end.

In this kind of verſe we find ſeveral ancient hymns, epigrams, prophecies, &c. For inſtance; Muretus, ſpeaking of the poetry of Lorenzo Gambara of Breſſe, ſays,

Brixia veſtrates, quæ condunt carmina vates
Non ſunt noſtrates tergere digna nates.

The following one is from the ſchool of Salernum:

Ut vites pœnam, *de potibus incipe* cœnam.

The origin of the word is ſomewhat obſcure: Paſquier derives it from one Leoninus, or Leonius, who excelled in this way, and dedicated ſeveral pieces to pope Alexander III others derive it from pope Leo; and others, from the beaſt called *lion*, becauſe it is the loftieſt of all verſes.

M. Fauchet makes the *leonine* rhyme the ſame with what the French call the *rich*, and we the *double rhyme*, i. e. where two ſyllables have the ſame orthography, accentuation, and pronunciation, with two others.

LEONTESERES, in the *Natural Hiſtory of the Ancients*, the name of a ſpecies of agate, famous in early times for its imaginary virtues in taming the rage of wild beaſts, and not a little eſteemed among us for its beauty. It is the moſt variegated of all the agates. Its ground colour is yellow, and its variegations are flamed-coloured, white, black, and green.

Sometimes it is one irregular congeries of all theſe colours, but more frequently it is very beautifully variegated with them in form of clouds and veins; the black and green particularly are uſually diſpoſed in concentric circles round one or more points. It is found only in the Eaſt Indies, and is very ſcarce. Hill's Hiſt. of Foſſ. p. 487.

LEONTIASIS, a name uſed by ſome authors for the ELEPHANTIASIS.

LEONTICA, feaſts, or ſacrifices celebrated, among the ancients, in honour of the ſun.

They were called *Leontica*, and the prieſts who officiated at them *Leones*, becauſe they repreſented the ſun under the figure of a lion radiant, bearing a tiara, and griping in his two fore-paws the horns of a bull, who ſtruggled with him, in vain, to diſengage himſelf.

The critics are extremely divided about this feaſt: ſome will have it anniverſary, and to have made its return not in a ſolar, but in a lunar year; but others hold its return more frequent, and give inſtances where the period was not above two hundred and twenty days.

The ceremony was ſometimes alſo called *Mithriaca*; Mithras being the name of the ſun among the ancient Perſians.

There was always a man ſacrificed at theſe feaſts, till the time of Hadrian, who prohibited it by a law. Commodus introduced the cuſtom afreſh, after whoſe time it was again exploded.

LEONTICE, in *Botany*, the name given by Linnæus to that genus of plants which Tournefort and others have called LEONTOPETALON.

Leontice is alſo a plant mentioned by the ancient Greeks and called by them CACALIA.

Dioſcorides tells us it had theſe names in common, and that it was of great virtue in curing diſeaſes of the *aſpera arteria*, or wind-pipe.

This medicinal plant of the Greeks was very different from that we now call CACALIA. Some have deſcribed it to have flowers like the oak, others like the olive-tree, but the old manuſcripts of Dioſcorides all ſay, the flowers were like thoſe of bryony. Hence it could by no means be the *cacalia* of the moderns; nor is it eaſy to ſay, from ſuch ſhort and uncertain accounts, what it was.

LEONTODERON, in *Natural Hiſtory*, a name given by ſeveral authors to a ſpecies of agate, of a plain yellowiſh colour, without variegations.

LEONTODON, in *Botany*. See **Dandelion**.

LEONTOPETALOIDES, in *Botany*, the name of a genus of plants deſcribed by Dr. Amman, being a ſpecies of the *leontice* of Linnæus. The characters of which are theſe; the flower is monopetalous, of the funnel-faſhioned kind, and divided into ſeveral ſegments at the edge; this is ſucceeded by a bladder, or inflated fruit, which contains a number of oval ſeeds.

The plant is a native of the Eaſt Indies; its root is tuberoſe, and two inches thick in the middle; it is grey on the outſide, and white within, and ſends out but few fibres. There uſually ariſe four ſtalks from each root; theſe are very tall, and of a finger's thickneſs; two of them uſually bear each one large and beautiful leaf, very thin in its ſubſtance, variouſly jagged, and of a beautiful green. The two others bear each a tuft of flowers, which are large and yellow, and ſtand in cups of a fine green, compoſed each of one leaf, divided into ſome ſegments at the end: each flower is ſuſtained on a pedicle of about an inch in length; theſe are ſucceeded by the fruit, which are green inflated bladders of an angular form, and of an inch diameter in the largeſt part, from whence they run to a point, where they are purple. The ſeeds are large, ſtriated, and of a pale brick-colour. Act. Petrop. vol. viii. p. 209.

LEONTOPETALON, in *Botany*, the name of a genus of plants, called *leontice*, by Linnæus. See **Lion**'s *leaf*.

The *artanita*, or *leontopetalon*, of the ancients, is generally eſteemed a ſynonymous name for the *cyclamen*, or SOW-*bread*, and is uſed as ſuch by moſt authors; but if the Arabian writers are underſtood of it in this ſenſe, it will be hard to reconcile their works with thoſe of the Greeks on the ſubject of this plant.

LEONTOPODIUM, *lion's foot*, in *Botany*, a name given by ſome to a genus of plants, otherwiſe called ~~*gnaphalium*~~. See **Cud**-*weed*.

LEONURUS, in *Botany*. See **Lion**'s *tail*.

LEOPARD, in *Zoology*, the Engliſh name of the long-tailed *felis*, or *felis pardus* of Linnæus; a beaſt of prey, with the ſpots on the back and ſides round, diſpoſed in circles, from four to five in each, with a ſingle black ſpot in the centre of each; the lower ones variegated. It is a very nimble as well as fierce animal, ſo that ſcarcely any thing eſcapes it. Authors call the male PARDUS, and the female PANTHERA.

This creature, when carefully examined, is found to be very like a cat, particularly its head, teeth, tongue, feet, and claws. Its actions alſo are all like a cat's; it boxes with its fore-feet, as a cat does her kittens; leaps at its prey as the cat does; and will ſpit much in the ſame manner.

All the *leopard* kind as they walk, keep the claws of their fore-feet, turned up from the ground, and ſheathed, as it were in the ſkin of the toes, whereby they preſerve them ſharp for ſeizing their prey.

Notwithſtanding the natural fierceneſs of the *leopard*, numbers of them are bred up tame, and kept for the Great Cham of Tartary's uſe, for the hunting of deer and other beaſts. Pennant ſays, that the *leopard* is an untameable ſpecies, always retaining its fierce, malevolent aſpect, and its growl or murmur. It is next in ſize to the tiger, and next to it in cruelty, and in its general enmity to the animal creation.

They are moſt numerous in Africa and Syria.

The *leopard* of Buffon has its hair of a lively yellow colour; is marked on the back and ſides with ſmall ſpots, diſpoſed in circles and pretty cloſe together; the face and legs are marked with ſingle ſpots; the breaſt and belly covered with longer hairs than the reſt of the body, of a whitiſh colour; the ſpots on the tail are large and oblong: the length of this ſpecies, from noſe to tail, is four feet, and that of the tail is 2½ feet.

This animal inhabits Senegal and Guinea, and ſpares neither man nor beaſt. The PANTHER deſtroys numbers of them: the negro women make collars of their teeth, to which they aſcribe certain virtues. Theſe animals

30, in the Britannic Catalogue 95; the names, places, longitudes, latitudes, and magnitudes whereof, are as follow.

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longit.			Latitude.				Magnitude.
			°	′	″	°	′	″		
That in the noſtrils	κ	♌	10	57	28	10	23	51	N	4
In the foremoſt toe of the ſouthern fore-foot	a		17	12	57	5	35	27	S	5
			17	29	46	6	24	22	S	6
In the aperture of the mouth	λ		13	32	13	7	51	27	N	4
In third toe of northern fore-foot	ξ		17	19	44	3	11	22	S	4
5.										
Northern and following in claw	b		17	50	1	4	41	12	S	6
			17	14	26	0	1	52	N	6
			16	51	10	2	4	54	N	6
			14	21	5	9	55	48	N	6
			19	59	58	6	59	54	S	5
10.										
			17	44	24	0	10	48	N	6
			14	24	14	10	41	9	N	7.8
			14	45	16	11	23	26	N	6
Following in ſouthern fore-foot	o		19	56	8	3	46	50	S	3.4
	f		13	42	32	15	21	3	N	6
15.										
In the preceding knee	ψ		19	10	4	0	19	3	N	6
South. of three in the head	ε		16	22	16	9	41	4	N	3
			20	30	28	1	33	23	S	6
			20	49	20	1	42	11	S	7
			18	7	32	7	32	58	N	6
20.										
			21	31	2	1	9	33	S	7
Middle one of the head	g		17	27	45	10	45	1	N	6
			21	9	26	0	1	7	N	6
North in the head	μ		17	6	26	12	19	29	N	3.4
			23	15	36	1	4	24	S	6.7
25.										
			22	3	5	2	37	58	N	7
Juſt before the heart	[illegible]		23	0	52	0	1	25	N	4.5
			24	51	29	3	42	16	S	7
In the following knee	π		24	59	4	3	56	18	S	4
South. of three in the neck	η		23	34	24	4	50	20	N	3.4
30.										
In the breaſt below the heart	A		26	5	36	1	26	15	S	5
The lion's heart, called alſo Regulus.	α		25	31	20	0	26	38	N	1
			24	44	0	4	8	45	N	6.7
			25	45	10	2	1	10	N	7
			23	11	28	11	54	55	N	6
35.										
North. in the neck	ζ		23	13	41	11	50	13	N	3
			26	46	1	2	48	7	N	6
			24	48	4	8	26	8	N	6
			23	30	52	11	37	13	N	6
			25	22	25	8	26	51	N	6
40.										
Middle and ſubſeq. in the neck	γ		25	15	5	8	47	27	N	2
			27	29	23	4	24	54	N	6
		♍	0	47	10	3	20	14	S	6
			0	30	39	1	2	27	S	5.6
Preceding and leſſer			0	42	45	0	5	8	N	6
45.										
Preced. of three in the belly	i		0	7	58	4	33	27	N	6
In the axilla	S		2	3	50	0	7	48	N	4
			3	24	5	1	52	27	S	6
			2	49	25	0	16	10	S	6
			0	54	21	7	0	48	N	7.6
50.										
In the middle of the back	m		1	30	14	10	14	52	N	6
North. of three in the belly	K		3	19	21	5	54	48	N	6
South. and ſubſeq. in the belly	l		5	21	19	2	47	40	N	6
Subſeq. over the back			1	10	21	16	28	40	N	4.5
			10	34	32	5	39	57	S	6.5
55.										
			8	33	28	0	35	51	S	6.7
			10	48	37	5	54	3	S	6
South. of three under the belly	d		10	35	34	2	31	51	S	6.5
Middle under the belly	c		9	40	33	0	13	16	S	5
Preceding in the loins	b		4	31	0	12	54	5	N	5
60.										
			13	13	40	8	3	1	S	5
	g		12	42	21	5	34	35	S	6
North. of three under the belly	χ		10	12	9	1	20	21	N	4.5
			4	23	30	16	16	29	N	6
			12	43	44	3	26	1	S	6
65.										
			14	8	56	6	24	8	S	6
			4	4	56	17	35	54	N	6
A bright one following in the loins	δ		6	57	21	14	19	4	N	2.3
			15	4	39	4	38	53	S	5.6
North. in the hip	θ		9	5	31	9	39	50	N	3
70.										
			8	26	34	11	35	5	N	6
That over the bright one in the loins			6	8	13	16	46	2	N	5
South. of two in the hip	[illegible]		10	18	7	7	51	41	N	6
That before the hindmoſt claw	φ		17	10	19	7	39	5	S	4
			15	3	39	2	22	53	S	6
		♍	15	35	19	2	33	21	S	7
In the ham	σ		14	22	35	1	40	56	N	4.5
South. in the thigh	ι		13	12	58	6	5	10	N	4
			16	51	53	2	16	55	S	5.6
			15	57	51	0	0	35	N	6
80.										
			11	14	0	11	41	40	N	7
			16	27	27	0	18	5	S	7.8
			16	53	22	0	32	7	S	8
More ſouth. as in the leg	τ		17	11	2	0	34	4	S	4
			12	34	10	11	8	9	N	6
85.										
			11	30	49	11	57	10	N	6
South. in the nail of the hind-foot	e		20	3	13	5	42	22	S	4.5
			13	29	27	10	23	53	N	6
			18	35	11	0	16	9	N	6
			13	6	41	12	53	8	N	6
90.										
North. in the nail of the hind-foot	υ		20	42	52	3	3	35	S	4
			12	32	21	17	38	0	N	6
That over the tail			14	38	5	17	18	9	N	4
In the extremity of the tail	β		17	19	14	12	16	51	N	1.2
That following the tail	o		18	19	27	13	53	21	N	6

Cor **Leonis**, *Lion's Heart*, a fixed ſtar, of the firſt magnitude, in the ſign *Leo*; called alſo *Regulus*, *Baſilicus*, &c.

Leo *Minor*, the *Little Lion*, in *Aſtronomy*, a conſtellation of the northern hemiſphere, including, in the Britiſh Catalogue, fifty-three ſtars, which are as follow:

Names and ſituations of the ſtars.	Signs.	Longit.			Latitude. N.			Magnitude.
		°	′	″	°	′	″	
	♋	29	8	34	13	49	35	7
		29	33	4	13	37	5	6
		29	34	20	13	51	31	6
		29	51	59	13	7	25	7
	♌	1	38	9	14	59	28	7
5.								
		11	0	41	9	21	57	6
Anterior in left foot		9	45	57	17	54	6	6
		9	25	1	19	19	30	5
		9	18	57	20	45	37	6
In the opening of the mouth		9	28	32	20	42	40	4.5
10.								
		10	2	12	20	17	40	6
		10	28	15	19	57	53	5
		11	44	27	20	6	25	6
		11	17	21	29	42	34	6
		8	20	33	30	50	6	6
15.								
		11	26	33	24	52	29	6
		12	37	33	23	25	41	6
		15	33	42	18	34	48	6
In the head		12	18	40	26	43	22	5.6
Cor Leonis minoris		16	41	39	18	32	12	6
20.								
In the neck		16	39	30	12	4	9	5
		19	46	56	19	11	22	6.7
In the belly		20	52	52	17	16	42	5.6
		21	11	25	16	43	48	6
		16	30	33	29	12	8	6
25.								
		19	52	50	23	17	4	6
		20	27	27	22	5	25	6
		20	43	50	21	59	26	6
		20	21	16	23	42	56	6
		21	3	44	22	12	35	5.4
30.								
In the hinder part of the neck		20	11	36	25	2	43	5
		19	37	30	27	14	20	6
		22	53	10	21	23	45	4.5
Firſt in the back		22	6	10	23	55	27	4.5
		22	4	40	25	23	15	5.6
35.								
		23	23	31	23	27	32	6
In the middle of the body		24	29	50	21	36	28	3
		21	58	50	27	5	17	6
		26	43	30	17	39	52	6
In the left foot		27	50	24	16	46	16	6
40.								
In the end of the tail.		29	9	13	13	56	46	5
In the hip		26	33	43	21	2	47	4.5
		27	44	5	20	8	14	6
		28	32	32	18	54	12	6
		28	24	50	19	4	43	6
45.								
Second in the back		26	30	4	24	55	30	4.5
		26	58	10	24	55	50	6
	♍	0	40	4	27	0	55	6
		3	52	8	10	25	39	6
		1	52	10	17	14	40	6
50.								
		3	4	0	17	46	40	6
		3	18	20	18	14	26	5.6
		4	4	56	17	35	54	5.6

LEO, in *Botany*, a name uſed by ſome authors for the COLUMBINE, or *aquilegia*. Columella, beſide others, calls it by this name.

LEO, the *lion*, in *Zoology*. See LION.

LEO *pulex*, a name given by Mr. Reaumur to a ſpecies of inſects, which feeds on the *pulex arboreus*, or common tree-puceron, in the ſame manner that the creature called the *formica leo* does on the ants: this being alſo, like that, an animal, yet in an imperfect ſtate, and finally to be changed into a different creature. This author has kept up the reſemblance of this analogy between them, by giving this a ſimilar name.

The *leo pulex* is uſually bred among the herds of the pulices, which he devours moſt unmercifully. He is a worm of the hexapode, or ſix legged kind, and very ſoon arrives at the time of his change; after which he becomes a green fly with four wings. Another animal of this kind and not leſs deſtructive of this ſmall race of animals, is a ſix-legged worm of a whitiſh colour, and ſmaller than the former, which finally becomes a round-bodied beetle. Another ſpecies of theſe devourers this author calls *vermis hyſtrix*, the porcupine-worm, from the vaſt number of ſpiculæ, or tender prickles, with which he is armed. This alſo finally becomes a round and ſmall beetle. Reaumur, Hiſt. Inſect. tom. i. See LION *puceron*

LEOCROCOTTA, in *Natural Hiſtory*, a name given by the ancients to an animal, ſaid to be the ſwifteſt of all creatures in the world. It is deſcribed as a mongrel or baſtard animal, unable to propagate its own ſpecies, being begotten upon the lioneſs by the male hyæna of ſome of the larger kinds: but is one of thoſe animals, the exiſtence of which is much to be doubted. The Latin authors have made ſome confuſion between this creature and the MANTICHORA, attributing the things that have been ſaid of one to the other.

LEONINE, in *Poetry*, is applied to a kind of verſes which rhyme at every hemiſtich, the middle always chiming to the end.

In this kind of verſe we find ſeveral ancient hymns, epigrams, propheeies, &c. For inſtance; Muretus, ſpeaking of the poetry of Lorenzo Gambara of Breſſe, ſays,

Brixia veſtrates, quæ condunt carmina vates
Non ſunt noſtrates tergere digna nates.

The following one is from the ſchool of Salernum:

Ut vites pœnam, *de potibus incipe* cœnam.

The origin of the word is ſomewhat obſcure: Paſquier derives it from one Leoninus, or Leonius, who excelled in this way, and dedicated ſeveral pieces to pope Alexander III others derive it from pope Leo; and others, from the beaſt called *lion*, becauſe it is the loftieſt of all verſes.

M. Fauchet makes the *leonine* rhyme the ſame with what the French call the *rich*, and we the *double rhyme*, i. e. where two ſyllables have the ſame orthography, accentuation, and pronunciation, with two others.

LEONTESERES, in the *Natural Hiſtory of the Ancients*, the name of a ſpecies of agate, famous in early times for its imaginary virtues in taming the rage of wild beaſts, and not a little eſteemed among us for its beauty. It is the moſt variegated of all the agates. Its ground colour is yellow, and its variegations are flamed-coloured, white, black, and green.

Sometimes it is one irregular congeries of all theſe colours, but more frequently it is very beautifully variegated with them in form of clouds and veins; the black and green particularly are uſually diſpoſed in concentric circles round one or more points. It is found only in the Eaſt Indies, and is very ſcarce. Hill's Hiſt. of Foſſ. p. 487.

LEONTIASIS, a name uſed by ſome authors for the ELEPHANTIASIS.

LEONTICA, feaſts, or ſacrifices celebrated, among the ancients, in honour of the ſun.

They were called *Leontica*, and the prieſts who officiated at them *Leones*, becauſe they repreſented the ſun under the figure of a lion radiant, bearing a tiara, and griping in his two fore-paws the horns of a bull, who ſtruggled with him, in vain, to diſengage himſelf.

The critics are extremely divided about this feaſt: ſome will have it anniverſary, and to have made its return not in a ſolar, but in a lunar year; but others hold its return more frequent, and give inſtances where the period was not above two hundred and twenty days.

The ceremony was ſometimes alſo called *Mithriaca*; Mithras being the name of the ſun among the ancient Perſians.

There was always a man ſacrificed at theſe feaſts, till the time of Hadrian, who prohibited it by a law. Commodus introduced the cuſtom afreſh, after whoſe time it was again exploded.

LEONTICE, in *Botany*, the name given by Linnæus to that genus of plants which Tournefort and others have called LEONTOPETALON.

LEONTICE is alſo a plant mentioned by the ancient Greeks and called by them CACALIA.

Dioſcorides tells us it had theſe names in common, and that it was of great virtue in curing diſeaſes of the *aſpera arteria*, or wind-pipe.

This medicinal plant of the Greeks was very different from that we now call CACALIA. Some have deſcribed it to have flowers like the oak, others like the olive-tree, but the old manuſcripts of Dioſcorides all ſay, the flowers were like thoſe of bryony. Hence it could by no means be the *cacalia* of the moderns; nor is it eaſy to ſay, from ſuch ſhort and uncertain accounts, what it was.

LEONTODERON, in *Natural Hiſtory*, a name given by ſeveral authors to a ſpecies of agate, of a plain yellowiſh colour, without variegations.

LEONTODON, in *Botany*. See DANDELION.

LEONTOPETALOIDES, in *Botany*, the name of a genus of plants deſcribed by Dr. Amman, being a ſpecies of the *leontice* of Linnæus. The characters of which are theſe; the flower is monopetalous, of the funnel-faſhioned kind, and divided into ſeveral ſegments at the edge; this is ſucceeded by a bladder, or inflated fruit, which contains a number of oval ſeeds.

The plant is a native of the Eaſt Indies; its root is tuberoſe, and two inches thick in the middle; it is grey on the outſide, and white within, and ſends out but few fibres. There uſually ariſe four ſtalks from each root; theſe are very tall, and of a finger's thickneſs; two of them uſually bear each one large and beautiful leaf, very thin in its ſubſtance, variouſly jagged, and of a beautiful green. The two others bear each a tuft of flowers, which are large and yellow, and ſtand in cups of a fine green, compoſed each of one leaf, divided into ſome ſegments at the end: each flower is ſuſtained on a pedicle of about an inch in length; theſe are ſucceeded by the fruit, which are green inflated bladders of an angular form, and of an inch diameter in the largeſt part, from whence they run to a point, where they are purple. The ſeeds are large, ſtriated, and of a pale brick-colour. Act. Petrop. vol. viii. p. 209.

LEONTOPETALON, in *Botany*, the name of a genus of plants, called *leontice*, by Linnæus. See LION's *leaf*.

The *artanita*, or *leontopetalon*, of the ancients, is generally eſteemed a ſynonymous name for the *cyclamen*, or SOW-*bread*, and is uſed as ſuch by moſt authors; but if the Arabian writers are underſtood of it in this ſenſe, it will be hard to reconcile their works with thoſe of the Greeks on the ſubject of this plant.

LEONTOPODIUM, *lion's foot*, in *Botany*, a name given by ſome to a genus of plants, otherwiſe called ~~*gnaphalium*~~. See CUD-*weed*.

LEONURUS, in *Botany*. See LION's *tail*.

LEOPARD, in *Zoology*, the Engliſh name of the long-tailed *felis*, or *felis pardus* of Linnæus; a beaſt of prey, with the ſpots on the back and ſides round, diſpoſed in circles, from four to five in each, with a ſingle black ſpot in the centre of each; the lower ones variegated. It is a very nimble as well as fierce animal, ſo that ſcarcely any thing eſcapes it. Authors call the male PARDUS, and the female PANTHERA.

This creature, when carefully examined, is found to be very like a cat, particularly its head, teeth, tongue, feet, and claws. Its actions alſo are all like a cat's; it boxes with its fore-feet, as a cat does her kittens; leaps at its prey as the cat does; and will ſpit much in the ſame manner.

All the *leopard* kind as they walk, keep the claws of their fore-feet, turned up from the ground, and ſheathed, as it were in the ſkin of the toes, whereby they preſerve them ſharp for ſeizing their prey.

Notwithſtanding the natural fierceneſs of the *leopard*, numbers of them are bred up tame, and kept for the Great Cham of Tartary's uſe, for the hunting of deer and other beaſts. Pennant ſays, that the *leopard* is an untameable ſpecies, always retaining its fierce, malevolent aſpect, and its growl or murmur. It is next in ſize to the tiger, and next to it in cruelty, and in its general enmity to the animal creation.

They are moſt numerous in Africa and Syria.

The *leopard* of Buffon has its hair of a lively yellow colour; is marked on the back and ſides with ſmall ſpots, diſpoſed in circles and pretty cloſe together; the face and legs are marked with ſingle ſpots; the breaſt and belly covered with longer hairs than the reſt of the body, of a whitiſh colour; the ſpots on the tail are large and oblong: the length of this ſpecies, from noſe to tail, is four feet, and that of the tail is 2¼ feet.

This animal inhabits Senegal and Guinea, and ſpares neither man nor beaſt. The PANTHER deſtroys numbers of them: the negro women make collars of their teeth, to which they aſcribe certain virtues. Theſe animals are taken by the negroes in pit-falls, covered at the top with ſlight hurdles, on which they place a bait of fleſh. The fleſh is white and well-taſted, and eaten by them. The ſkins are valuable, and brought to Europe. The leſſer *leopard*, kept a few years ago in the Tower, inhabits the Eaſt Indies; it has its face ſpotted with black; the ſkin white, and a large black ſpot on each ſide of the upper lip; the breaſt white ſpotted with black; the back. ſides, and rump covered with hair of a bright yellow colour: the ſpots reſemble thoſe of the former, but are ſmaller; and the tail is ſhorter, tapering to a point, covered with ſhort hair.

The *hunting leopard* of India has a ſmall head, with the tip of the noſe black, and from each corner of the mouth to that of the eye, a duſky line; the ears are ſhorter and tawny, and marked with a brown bar; the face, chin, and throat, are of a pale yellowiſh brown; the body of a light tawny brown, marked with many ſmall round, black ſpots: the hair on the top of the neck is longer than the reſt; that on the belly white and very long; the tail is longer than the body, of a reddiſh brown colour, marked above with large black ſpots. This animal is of the ſize of a greyhound, of a long make, narrow cheſt and very long legs. It is tamed and trained for the chace of antelopes, which it overtakes by its rapidity. Pennant.

Leopard's *bane, doronicum*, in *Botany*, a genus of the *ſyngeneſia polygamia ſuperflua* claſs. It has a flower compoſed of ſeveral hermaphrodite florets, which form the diſk, and female florets which compoſe the rays; theſe are included in one common empalement which has a double ſeries of leaves as long as the rays; in the bottom of the hermaphrodite florets is ſituated the germen, which becomes a ſingle, oval, compreſſed ſeed, crowned with hairy down; the female florets are formed like a tongue, and compoſe the border; theſe have a germen crowned by two reflex ſtigmas, but have no ſtamina; the germen becomes a ſingle furrowed ſeed without down. Miller enumerates four ſpecies, natives of Hungary and the Helvetian mountains, and of the Alps and Pyrenees.

The root has been ſometimes uſed in medicine; ſome have commended it as an expeller of the poiſon of ſcorpions; while others reckon it a poiſon itſelf; and affirm that it will deſtroy wolves and dogs. See Doronicum.

LEPA, in our *Old Writers*, a meaſure which contained the third part of two buſhels. Whence we derive a *ſeed-leap*

LEPAS, in *Natural Hiſtory*, the name of a genus of ſhell-fiſh, the ſame as PATELLA, in the Linnæan ſyſtem, is a genus of the teſtaceous worms, comprehending ten different ſpecies: its animal is the Triton; and the ſhell is multivalve, unequal, and fixed by a ſtem. The common Engliſh BARNACLE is of this genus.

LEPASTRUM, in *Natural Hiſtory*, the name of a genus of foſſils, of the claſs of the SELENITÆ, compoſed of filaments arranged into broad plates, and thoſe diſpoſed in the form of a radiated ſtar. *Tab. Foſſils. Claſs* 2.

The word is derived from the Greek λεπις, *a ſcale* or *plate*, and αστηρ, *a ſtar*.

Of this genus there are two known ſpecies; the one a bright browniſh white kind, with thinner flakes, the other a white dull-looking kind, with thick flakes. They are both found on the ſhores of Sheppey Iſland in Kent, and form themſelves in the cavities of the ſeptariæ called by authors *ludus Helmontii*; and the ſeptariæ with theſe affixed to them, have been accounted a ſeparate ſpecies of that body, and called the *ſtarred waxed vein*, or *ludus Helmontii ſtellatus*. The world in general has erred as to the origin of theſe beautiful foſſils, they having been ſuppoſed to be talcky ſpars; whereas their want of elaſticity, the great character of talc, and their not fermenting with acids, which is the fundamental diſtinction of the ſpars, prove them to be not at all of the nature of either of theſe bodies; and experiments on them plainly ſhew them to be a *ſelenites* of a particular kind. Hill's Hiſt. of Foſſ. p. 129, 148.

LEPERS. See Elephantiasis, and Leprosy.

LEPIDIUM. See Dittander.

LEPIDOCARPODENDRON, a name given by Boerhaave to a genus of plants, called by Linnæus LEUCADENDRON.

LEPIDOIDES, Λεπιδοειδες, formed of λεπις, *ſcale*, and ειδος, *form*, *figure*, or Lepidoeides, in *Anatomy*, a name of the ſquamous or ſcaly ſuture of the CRANIUM.

LEPIDOPTERA, from λεπις, *a ſcale*, and πτερον, *wing*, in the *Linnæan Syſtem*, an order of INSECTS, with four wings, imbricated with ſcales: in the mouth is contained a ſpiral tongue, and the body is hairy. This order comprehends three genera, viz. the papilio or butterfly, the ſphinx and the phalæna, or moth; and each genus includes a number of ſpecies.

LEPIDOTES, in *Natural Hiſtory*, the name of a ſtone bearing a reſemblance to the ſcales of fiſhes. The word has been uſed by ſome, as the name of thoſe ſtones which are compoſed of ſmall flakes, or ſcales of talc, and by others to expreſs the ſtones containing fiſh, or the impreſſions of fiſh, found in many parts of Germany. *Tab. Foſſils, Claſs* 5.

LEPISMA, in *Natural Hiſtory*, a genus of the *aptera* order of inſects; with ſix feet formed for running, a mouth having two ſetaceous palpi or feelers, and two rounded at their extremity, a ſetoſe tail, and a body covered with ſcales. This genus includes three ſpecies.

LEPIUM, in *Natural Hiſtory*, the name of a genus of foſſils of the claſs of the GYPSUMS; the characters of which are, that the bodies of it are moderately hard, compoſed of very ſmall particles, and of a duſky hue.

It is found in great plenty in Germany, and is one of the many ſubſtances which, from their uſe in fuſion and caſting, the Germans call *ſpaad*. We have it in great plenty in Derbyſhire, and it is burnt into a ſort of plaſter of Paris for the coarſer works; but it calcines very ſlowly and unequally. Hill's Hiſt. of Foſſ. p. 114.

LEPORARIA *aquila*, a name given by ſome authors to the *melanoëtos*, or *black* EAGLE, from its deſtroying great numbers of hares.

LEPORINUM *genus*, in *Zoology*, the name of a genus of animals, ſo called from their general reſemblance to the hare in ſhape, and other particulars; the characters by which they are diſtinguiſhed from other quadrupeds are theſe: they have feet divided into claws; they feed on vegetables; and they have two very long teeth in the fore-part of their mouths. Ray's Syn. Quad. p. 204.

LEPRAS, in *Ichthyology*, the name of a ſea-fiſh of the TURDUS, or wraſſe-kind, remarkable for the great variety and beauty of its colouring. It is ſeldom caught of more than five or ſix inches in length, and is conſiderably broad and flat. It ſometimes grows to a foot long, but that only in the ocean, never in the Mediterranean ſea where it is uſually caught; and even there very rarely. It is ſpotted all over like the body of a leopard. It is one of the moſt beautiful fiſh of the Mediterranean, but is not much eſteemed at table, being of an inſipid and watery taſte.

LEPROSO *amovendo*, in *Law*, an ancient writ that lay to remove a *leper*, or *lazer*, who thruſt himſelf into the company of his neighbours in any pariſh, either in the church or at other public meetings, to their annoyance. The writ lies againſt thoſe *lepers* that appear outwardly to be ſuch, by ſores on their bodies, ſmell, &c. and not againſt others: and if a man be a *leper*, and keep within his houſe, ſo as not to converſe with his neighbours, he ſhall not be removed.

LEPROSY, Lepra, in *Medicine*, a foul, cutaneous diſeaſe, appearing in dry, white, thin, ſcurfy ſcabs, either over the whole body, or only ſome part of it; and uſually attended with a vehement itching and other pains.

The word is derived from the Greek λεπρα, which ſignifies the ſame; and that from λεπις, *ſquamma*, *ſcale*.

The *leproſy* ſeems to ariſe from a great obſtruction of perſpiration, and a faulty ſerum; whereby the thin ſaline humours are thrown off from the blood, and detained by the denſity and cloſeneſs of the cuticula.

Hoffman thinks the ſeat of the various kinds of *leproſy* to be chiefly the fatty membrane of the ſkin, where the fomes of the corrupt matter principally reſides; inſomuch that by corroding and inflaming the nervous fibrillæ of the ſkin, various kinds of puſtules are generated. In warm countries the *leproſy* was very infectious, but it does not appear to have been the caſe, at leaſt in the ſame degree, in colder climates. It is an hereditary diſeaſe, and has been ſometimes occaſioned by exceſſive terror, two inſtances of which occur in the Med. Obſ. vol. i. art. 18. The remoter cauſes are whatever diminiſh the vital heat and reduce the general ſtrength of the body. This diſtemper has been much more frequent in former times than it is at preſent, and much more in the hot countries of the Eaſt, particularly among the Jews, than among us: perhaps becauſe the ſalts, which, by the appointment of nature, are to be eliminated through the pores of the ſkin, along with the recrementitious ſerum, their proper vehicle, are, in hot countries, conveyed in greater plenty to the ſurface of the body than in theſe northern regions they ordinarily are; and, ſticking in their paſſage in the thin dry membrane of the cuticle, the aqueous parts, which are their vehicle, ſlip away from them by inſenſible evaporation, and leave them there to corrode and fret it, till at length, through the quantity ſo gathered, the membrane becomes dry, brittle and white, which is the cauſe of that deſquamation, or falling away in white ſcales; that whiteneſs, as well as the brittleneſs, proceeding merely from the quantity of theſe ſalts, which are themſelves white; and when the moiſture is drawn from them, being aculeated, and having inſinuated themſelves into the pores of the cuticle, they diſſolve the continuity of it by their points and edges; which thus mortified and broken, is apt, on the leaſt friction, to fall off, as above mentioned.

The ancients diſtinguiſhed two kinds of *leproſy*, viz. the *lepra Græcorum*, and *lepra Arabum*: though the two ſeem only to have differed in degree; the ſymptoms of the Grecian being farther heightened and aggravated in the Arabian.

Lucretius ſuppoſes the elephantiaſis to be generated in Egypt, and no where elſe: but if the *leproſy* of the Jews is the ſame as that of the negroes, which is highly probable, then it may be affirmed, that it is indemial to the ſouthern and inland parts of Africa.

That it was contagious, all hiſtories ſacred and prophane, agree. Pliny acquaints us, that it did not invade Italy till the time of Pompey the Great, and that it was brought from Egypt, and is peculiar to that kingdom.

Some have thought that the *leproſy* of the Arabians, or more properly of the Africans, was the parent of the lues venerea: however that be, it is certain, that ſince the pox has been curable, the elephantiaſis ſeems to have diſappeared, and the *leproſy* of the Greeks has been much leſs frequent than before.

In the Weſt Indies this diſorder is known by the name of the black SCURVY. Its approach is obſerved to be gradual; at firſt there are many ſpots of a yellow-brown caſt, which ſoon turn purple, and of a copper-colour; theſe increaſe and become thick and rough, with hard ſcales; a numbneſs is felt on the fingers and toes; the breath is fetid, the voice hoarſe, the hard and ſcaly parts crack, and ulcers appear in different parts; but at length a fever comes on, which terminates in death.

An inveterate *leproſy* was judged to be abſolutely incurable: but Aretæus ſays, when the diſeaſe is new and recent, there are great hopes of a cure. What he and Celſus preſcribe in order to the cure is not worth repeating; for if any medicines will do, they muſt be of the Herculean kind. Authors are exceſſive in the praiſe of viper's fleſh, which Hoffman judges to be quite inſignificant. Joel adviſes bleeding, and purging with twelve grains of the extract of black hellebore, or three grains of the glaſs of antimony, in conſerve of roſes: but the vitrum ceratum is more ſafe, and may be given in a larger doſe. Towne confeſſes, that the antimonial preparations yielded moſt relief in Barbadoes, but he could not ſay that they perfected the cure. On the other hand, mercury exaſperated the diſtemper, irritated the ulcers, and made them ſpread the faſter.

The impetigo or *leproſy* of the Greeks, begins with red pimples or puſtules breaking out in various parts of the body; ſometimes they appear ſingle, ſometimes a great number ariſe together, eſpecially on the arms and legs. As the diſeaſe increaſes, freſh pimples ariſe, which joining the former, make a ſort of cluſter, all which enlarge their borders, and ſpread in an orbicular form. This *leproſy*, according to Turner, breaks out firſt in the elbows and knees, but ſoon ſpreads farther, and gradually ſhews itſelf over the whole body. The cauſes and ſeat of this diſeaſe are ſaid to be the ſame as the former. Willis blames all dried and ſalted meats, eſpecially hog's fleſh, and fiſh, particularly ſhell-fiſh: becauſe the poor people in Cornwall, inhabiting near the ſea-coaſt, were formerly much ſubject to leprous diſeaſes, and had many hoſpitals erected on that account.

In the method of cure, ſays Hoffman, we ſhould endeavour to diſcharge out of the body, the maſs of corrupt, glutinous, and acrid humours, by ſufficient bleeding, and abſtinence, by purges, as well gentle as draſtic; then by proper aliment, and a good regimen, promote the generation of wholeſome juices; and likewiſe by external, deterſive, conſolidating, and drying remedies, to free the part from pain, tumors, itching, and ulcers. The purges may conſiſt of the root and the reſin of jalap, the extract of black hellebore, elaterium mixed with calomel, or æthiops mineral, and gum ammoniac. Among thoſe things which ſtimulate the parts to an excretroy motion, and more powerfully melt down the tenacious humours, the wood and bark of guaiacum exceed all others: the moſt conſiderable beſides theſe, are the tartarized and acrid tincture of antimony, ſulphur of antimony, cinnabar, and, if a venereal taint is ſuſpected, a decoction of crude antimony; which medicines, in a convenient doſe in the morning, with purifying decoction drank in bed, afford great relief. But if theſe fail, recourſe muſt be had to mercury, which ſome, after extinction, mix with flowers of ſulphur and camphor, and rub it on the joints to promote ſalivation. Others more properly give mercurius dulcis, with double the quantity of crab's-eyes, and calx of antimony, riſing gradually from three or four grains to a ſcruple, in order to ſalivate with proper precautions.

The leſſer degrees of *leproſy*, ſays ſir John Pringle, in his Obſ. on Diſeaſes of the Army, p. 306, are frequently confounded with the ſcurvy, and even itch; from which however, it may be diſtinguiſhed by the hardneſs of the ſkin in one or more parts of the body, attended with a dry ſcurf, ſometimes oozing puſtules, or dry ſcabs, and always with ſome degree of itching; whereas the true ſcorbutic ſpots are of a livid colour, not commonly ſcurfy or raiſed above the ſkin, and are attended with manifeſt ſigns of a lax ſtate of the fibres, and corruption of the blood. For a real ſcurvy imports a ſlow, but general reſolution or putrefaction of the whole frame; whereas the ſcabies, impetigo, or *leproſy*, may be found to affect thoſe of a very different conſtitution.

This diſorder is ſo far from being curable by externals only, that it is ſometimes dangerous to attempt to move the ſcurfs of *leprous* people in that manner. On the contrary, it is neceſſary to change the humours, by a ſpare diet, exerciſe, alterative mercurials, or frequent purges of the ſaline kind. Ibid.

Dr. Mead recommends the tincture of cantharides in this diſtemper.

Dr. Lyſons has met with great ſucceſs in the uſe of the following decoction, viz. ℞ cort. interior ulmi rec. ℥ iv. coq. in aq. pur. ℔ iv. ad ℔ ij. colatur. cap. ℔ ſs die; continued for ſeveral weeks. If after uſing it, the effloreſcences increaſe, the ſymptom is favourable.

Others have adviſed the ſame general courſe of the diet and medicine for the cure of the leproſy as the ſcurvy. This diſtemper, which was common in our country long ago, appears very ſeldom at preſent; which may be owing to the inhabitants of Britain eating more vegetable food than formerly, living more upon tea, and other diluting diet, uſing leſs ſalted meat, being more cleanly, better lodged and clothed, &c.

Lepra Arabum, is the ſame with what is otherwiſe called *elephantiaſis*, becauſe in this the patient's ſkin is rough and wrinkled like an elephant's hide. See ELEPHANTIASIS.

LEPTODECARHOMBIS, in *Natural Hiſtory*, the name of a genus of foſſils of the claſs of the SELENITÆ. *Tab. Foſſils, Claſs* 2.

The word is derived from *λεπτος, thin, δεκας, ten* and *ῥομβος, a rhomboid figure*, and expreſſes a thin or ſlender rhomboidal body, conſiſting of ten planes or ſides, each of which is ſo nearly equal to that oppoſite to it, as very much to approach to a decahedral parallelopiped; but as the broader and flatter planes, which form the top and bottom in this genus, are not regularly equal to each other, ſo neither are the eight narrower to their oppoſites; but they uſually differ in breadth, and in the angles they make. Of this genus there are five ſpecies enumerated by Dr. Hill in his Hiſt. of Foſſils, p. 118 to 129.

LEPTOS *libanotis*, in the *Materia Medica of the Ancients*, a name given by ſome of the Greek writers to the ſmall frankincenſe, that is, ſuch as come to their hands in ſmall flakes, broken from the larger maſſes in the gathering or packing up. This was alſo called *manna thuris*, the manna of frankincenſe, the word *manna* being of old uſed to expreſs any thing formed of granules, or ſmall pieces. The ancients eſteemed this *leptos libanotis*, or *manna thuris*, when pure, beyond any other kind, for they always valued that frankincenſe moſt, which was drieſt and moſt brittle; and ſuch only as was ſo, could break off in theſe ſmall flakes. The medicine, however, ſoon grew ſubject to adulteration, and loſt its credit; for the duſt of the frankincenſe being allowed to be put up among this *manna thuris*, Dioſcorides tells us, that in his time people, greedy of gain, had found the way to adulterate it, by adding, inſtead of this genuine duſt, the ſifted powder of the reſin of the pine-tree.

LEPTUM, in *Antiquity*, a ſmall piece of money, which, according to ſome, was only the eighth part of an obolus; but others will have it to be a ſilver or braſs drachm.

LEPTURA, in the *Hiſtory of Inſects*, the name of a genus of four-winged flies, the antennæ of which are oblong, ſlender, and ſetaceous; the exterior wings are truncated at their extremity, and the thorax is of a ſubcylindric figure.

This genus, in the Linnæan ſyſtem, belongs to the order of *coleoptera*, and comprehends twenty-five ſpecies.

Theſe flies have been, by the generality of authors, reckoned among the beetles. See SCARABÆUS.

LEPTURUS. The name is of Greek origin, and is formed of *λεπτος, ſlender*, and *ουρα, a tail*, expreſſing that the fiſh bearing this name, has a very long and ſlender tail.

LEPUS, in *Zoology*. See HARE.

LEPUS, the *Hare*, in *Aſtronomy*, a conſtellation of the ſouthern hemiſphere; whoſe ſtars in Ptolemy's catalogue are twelve; in that of Tycho thirteen; in the Britannic catalogue nineteen: the names, places, longitudes, latitudes, and magnitudes whereof are as follow:

Names and ſituations of the ſtars.	Bayer's Cha.	Signs	Longitud. °	′	″	Latitude S. °	′	″	Magnitude.
		Π	6	44	2	45	20	17	6
In the preceding anterior foot	ε		7	45	6	45	0	18	4
North. in the preceding ear	ι		11	27	20	34	45	39	5
South. in the ſame ear	κ		11	35	43	35	50	2	5
In the ſkin	μ		11	4	35	39	5	28	4
5.									
South. of the following ear	λ		13	27	47	36	13	59	4.5
North. of the following ear	ν		13	40	32	35	23	10	5.6
			14	34	52	37	3	42	6
That under the belly	β		15	22	25	43	57	24	3
			16	18	14	44	6	50	6
10.									
In the middle of the body	α		17	4	47	41	6	28	3
			19	50	0	45	46	6	6
Preced. and ſouth. in the poſterior foot	γ		20	36	20	45	49	58	4.3
In the loins	ζ		21	39	52	38	15	30	4
North. and ſubſeq. in poſterior foot	δ		22	51	9	44	17	19	4.3
15.									
Preceding in the tail	η		24	35	48	37	39	27	4
			27	15	13	39	57	35	6
Subſequent in the tail	θ		27	37	34	38	24	26	4
		Π	28	9	50	42	38	23	6

Lepus *aqueus*, the *water-hare*, a name given to the creſted **diver**, or colymbus of America, which is the ſame ſpecies with the large European kind, though deſcribed by many authors as a different bird. It has the name of the *ſea-hare* or *water-hare*, from its great nimbleneſs in the water. It is caught with much difficulty; and the Mexicans have a thouſand fabulous ſtories about it.

LE ROY *le veut*, a form of words, by which the royal aſſent is ſignified by the clerk of the parliament to public bills: to private bills this aſſent is expreſſed by *ſoit fait comme il eſt deſiré*.

Le Roy *s'aviſera*. By theſe words to a bill, preſented to the king by his parliament, is underſtood his abſolute denial of that bill in a more civil way; and the bill thereby becomes wholly null and void. See **Royal** and **Parliament**.

LESBIAN *Cymatium*. See **Cymatium**.

LESBIUM *marmor*, a name given by the ancients to a ſpecies of marble of a bluiſh-white, ſometimes uſed for the vaſes and other ornamental works, but principally in the walls of public buildings.

LESSEES, a term uſed by ſportſmen for the dung of a wild boar.

LESSON, in the *Manege*, is uſed for any piece of inſtruction in that art, whether given to the ſcholar or the horſe.

Lesson, among *Eccleſiaſtical Writers*, portions of the holy ſcripture, read in Chriſtian churches, at the time of divine ſervice.

In the ancient church, reading the ſcriptures was one part of the ſervice of the catechumens, at which all perſons were allowed to be preſent, in order to obtain inſtruction.

The church of England, in the choice of *leſſons*, proceeds as follows; for the firſt *leſſon* on ordinary days, ſhe directs, to begin at the beginning of the year with Geneſis, and ſo continue on, till the books of the Old Teſtament are read over, only omitting the Chronicles, which are for the moſt part the ſame with the books of Samuel and Kings, and other particular chapters in other books, either becauſe they contain names of perſons, places, or other matters leſs profitable to ordinary readers.

The courſe of the firſt *leſſons* for Sundays is regulated after a different manner. From Advent to Septuageſima Sunday, ſome particular chapters of Iſaiah are appointed to be read, becauſe that book contains the cleareſt propheſies concerning Chriſt. Upon Septuageſima Sunday, Geneſis is begun, becauſe that book, which treats of the fall of man, and the ſevere judgment of God inflicted on the world for ſin, beſt ſuits with a time of repentance and mortification. After Geneſis, follow chapters out of the books of the Old Teſtament, as they lie in order; only on feſtival Sundays, ſuch as Eaſter, Whitſunday, &c. the particular hiſtory relating to that day is appointed to be read; and on the Saints days, the church appoints *leſſons* out of the moral books, ſuch as Proverbs, Eccleſiaſtes, Eccleſiaſticus, &c. as containing excellent inſtructions for the conduct of life.

As to the ſecond *leſſons*, the church obſerves the ſame courſe both on Sundays and week-days; reading the goſpels and Acts of the Apoſtles in the morning, and the epiſtles in the evening, in the order they ſtand in the New Teſtament; excepting on ſaints-days and holy-days, when ſuch *leſſons* are appoined, as either explain the myſtery, relate the hiſtory, or apply the example to us.

LESSOR and **Lessee**. See **Lease**.

LET-*fall*, in *Sea-Language*, the word of command for putting out a ſail, when the yards are aloft, and the ſail is to come down from the yard; but when the yards are ſtricken down, then the ſail is looſed below, before they hoiſt the yard.

Let-fall is not properly ſaid of top-ſails, becauſe they lie on the top; and therefore the word for them is, *Heave out your topſails*. Nor can it be applied to the mizzen; for the word is, *Strike the mizzen and ſet it*. So that in ſtrictneſs the term *let-fall* belongs only to the main-ſail, fore-ſail, and ſprit-ſail, when their yards are hoiſted up aloft.

To **Let** *in*, among *Shipwrights*, is to fix a diminiſhed part of one plank or piece of timber into a vacancy, formed in another for this purpoſe. See **Rabbeting**.

LETHARGY, Λεθαργια, in *Medicine*, from λεθη, *oblivion*, and αργια, *numbneſs, lazineſs*, a diſeaſe conſiſting of a profound drowſineſs or ſleepineſs, from which the patient can ſcarce be awaked; or, if awaked, he remains ſtupid, without ſenſe or memory, and preſently ſinks again into his former ſleep. See **Coma**.

The *lethargy* is uſually accompanied with a fever and delirium. Boerhaave makes the *lethargy* a gentle **apoplexy** ariſing from the ſame cauſes, and to be known and cured in the ſame manner.

Some authors diſtinguiſh the *lethargy* from the **carus**, becauſe this latter is without a fever, or at moſt is preceded with a violent one; whereas the *lethargy* is attended with a ſlow one, manifeſted by the frequency of the pulſe and a leſs frequent and febrile reſpiration. Celſus ranges the *lethargy* in the number of acute diſeaſes, the patient uſually dying on the ſeventh day. A *lethargy* frequently ſucceeds a frenzy. It does not invade ſo ſuddenly as in apoplexy, nor kill ſo ſoon: the worſt ſymptoms attending it are, a tremor of the limbs, and a cold ſweat of the face.

From phyſiology, we learn, that natural ſleep depends upon a more diminiſhed and more languid influx of the nervous fluid into the nerves deſtined to ſenſation and voluntary motions; and that this languid influx is partly owing to a want of nervous fluid, partly to the ſlow circulation of the blood through the veſſels of the brain, and membranes. It follows, that the immediate cauſe of ſleepy affections is a very languid and diminiſhed influx of the nervous fluid, from the cortical ſubſtance of the brain, into its medulla; and from thence into the nerves deſtined to ſenſe and motion. The cauſes of the preternatural impediments of this influx ſeem principally three; firſt, either a too great want of the fluid itſelf; or ſecondly, a laxity of the tubes which convey it; or laſtly a preſſure upon the cortical ſubſtance of the brain; and this ariſes either from the blood paſſing ſlowly through the brain, and the meninges thereof, or abſolutely ſtagnating, or ſome foreign matter incumbent on the ſaid cortical ſubſtance, by which the medulla, every where joined to the cortex, is preſſed together, and, conſequently, cannot receive a ſufficient quantity of the fluid. The remote cauſes of theſe diſeaſes are whatever diminiſhes the vis vitæ or obſtructs its influence, as tumors preſſing on the brain or turgeſcency of the veſſels, from obſtructed menſes, hæmorhoids, long abſence of the gout, &c. a too free uſe of ſpiritous liquors, offenſive vapours, blows on the head, &c.

A phyſician, in the cure of ſleepy diſeaſes, ſhould regard theſe three intentions; firſt to rouſe the patient from his ſleep; next to remove the difficulty of circulation, the ſtagnation or extravaſation of the blood or ſerum in the head; and thirdly, to reſtore the loſt ſtrength of the membranes and veſſels of the brain.

For ſhaking off drowſineſs, and awaking the patient, thoſe remedies are efficacious which act upon the nervous parts by agitating them, vellicating and inducing a tremulous and oſcillatory motion through the whole nervous ſyſtem; ſuch are, 1. Powerful acids; and of theſe the preference muſt be given to the ſpirit of verdigriſe, which is nothing but a moſt concentred ſpirit of vinegar, mixed with the eſſence of caſtor: this applied to the noſe, in ſtimulating and penetrating, is ſuperior to all others. 2. Volatile ſalts, as urinous ſpirit of ſal ammoniac, prepared with quick-lime; which being applied to the vertex, or, what is ſtill better, put into the noſe, excites ſternutation, and greatly ſhakes off the torpor and drowſineſs. 3. Fœtid things, as galbanum, partridge-feathers, and others burnt, ſo that the ſtrong ſcent may affect the noſe. 4. Cold water ſuddenly poured all over the head, which, by ſtrengthening at the ſame time the membranes of the brain, readily diſpels ſleep. 5. Cataplaſms prepared of ſtrong vinegar, rue, bay-leaves, tops of ſavory, muſtard-ſeed, caſtor, and camphor, applied to the head, when ſhaved, the forehead, and the temples. The efficacy of theſe is promoted, and, at the ſame time, the ſerous colluvies, if it is offenſive, is derived from the head, by ſternutatories; the beſt of which is ſalt of white vitriol, if ten grains of it are diſſolved in half an ounce of marjoram water, and drawn up the noſe; by veſicatories of cantharides, ſome what large, and laid on the feet and neck; for theſe both give motion to the ſolid nervous parts, and make a revulſion of the ſerous humours; by cupping-glaſſes, either with or without ſcarification. 4. By ſtrong frictions of the inferior parts. 5. By acrid and ſtimulating glyſters which are, in ſuch caſes, of very great ſervice, to which ſal gemmæ, common ſalt, or the roos of ſquills are added, with a view of increaſing the ſtimulation.

The patient by the help of theſe, being rouſed from his drowſineſs, it remains, that an equal circulation of the humours through the whole body be reſtored, and then the debilitated parts ſtrengthened. The firſt end is anſwered by frequent bleeding, whilſt the ſleepineſs laſts, if the veſſels are turgid with blood; and much more ſhould it be performed, when the ſleepineſs is conquered, in order to prevent a relapſe; then likewiſe if the firſt paſſages are loaded with excrements, or ſeized with ſpaſms, the body ought to be opened with a gentle laxative. Nervous, mixed with diaphoretic medicines, contribute to diſperſe ſtagnations of the humours, and alſo to ſtrengthen the infirm parts; among theſe the eſſence of aloes-wood and amber, with the ſpirit of lilies of the valley, of ſal ammoniac, and acrid tincture of antimony, are of great efficacy, and ſalt of hartſhorn, with ſalt of amber, cinnamon of antimony, and bezoardic mineral in the form of a powder, have very great and ſalutary effects.

Laſtly, relapſes into ſleepy diſorders may be prevented partly by a removal of the cauſes producing them: and ſince a ſuppreſſion of the ſanguine excretions, or habitual arthritic paroxyſms, contribute very much to the generation of thoſe diſorders, he will not do amiſs who endeavours to recall theſe fluxes and pains, and preſerve a regular ſucceſſion of them In diet, idleneſs, drunkenneſs, meats difficult of digeſtion, and ſpirituous things, muſt be avoided; let the body be exerciſed carefully: all repletion is to be avoided; and faſting, and eating ſparingly, is of uſe: the patient muſt entirely abſtain from fiſh, milk, and cheeſe; and among fruits, all that are watery muſt be abſtained from: he muſt eat more roaſted than boiled fleſh. Bread muſt be entirely cleanſed of the darnel, with which it is often intermixed. Let old infirm men uſe wine, as their milk; let them not protract their ſleep too long; let them be cautious of affections of the mind; let them frequently enjoy the converſation of their freinds; let them amuſe themſelves with convenient journeys; let them take care to preſerve the excretions, as well by ſtool as by the pores of the ſkin; and let them not forget the uſual bleedings at their ſtated times. In every ſleepy diſorder it is proper to avoid warm baths, vaporous ſubſtances, and ſuch as incline, by their fragrant and ſtrong ſmell, to ſleep. Much more abſurd it is to uſe narcotics, ſulphureous remedies, opiates, or medicines in which ſaffron or poppies are ingredients; to this claſs belong theriacal medicines which the ancients uſed to preſcribe in theſe affections; for this is adding fuel to the fire.

We muſt above all things take care not to uſe ſternutatories in the beginning of this diſorder, to rouze the patient from ſleep, eſpecially in plethoric perſons; becauſe, by an unſeaſonable remedy of this kind, a greater afflux of humours to the head is cauſed, and from thence there is great danger of an apoplexy. James from Hoffman.

LETHE, Ληθη, in the *Ancient Mythology*, one of the rivers of hell, ſignifying oblivion or forgetfulneſs: its waters, according to poetic fiction, having the peculiar quality of making thoſe who drank them entirely forget every thing that was paſt; or, according to Virgil, *longa potant oblivia vitæ*.

Lethe, Leth, or Lathe, a meaſure or portion of lands making one of the ancient diviſions in England.

King Alfred divided England into COUNTIES, as it ſtands at preſent; thoſe counties he ſubdivided into hundreds or tithings. The hundred was a diviſion, wherein were a hundred officers to ſecure the peace; the *lethe* or *lathe* comprehended three or four of theſe hundreds.

Lethe was alſo the juriſdiction of a viſcount; or a kind of aſſize, held once a year in each village, about Michaelmas. Whether this was inſtituted by Alfred, or not, is a queſtion.

LETHUM, in *Ancient Mythology*, was diſtinguiſhed by the Roman poets from *mors*, or DEATH. See Petronius Arb. ver. 263.

Mr. Spence conjectures, that by *Lethum* they meant that general principle, or ſource of mortality, which they ſuppoſed to have its proper reſidence in hell; and by *mors* or *mortes*, the immediate cauſe of each particular inſtance of mortality on our earth. The poets give him a robe, but mention his arms being exerted out of it, as reaching at his prey. They hint at his catching people in a net, and his hunting them as they did beaſts, within his toils. They repreſent *Lethum* as nearly related to ſleep; and Valerius Flaccus, in particular, acquaints us that they were brothers. Val. Flac. viii. ver. 74. Spence's Polymetis, p. 261. 263.

LETTER, *litera*, a character either in print or writing, by which any people have agreed to expreſs one of the ſounds, uſed in conveying their thoughts to each other in ſpeech.

Letter is by ſome defined a ſimple uncompounded ſound of the voice, that cannot be ſubdivided into any more ſimple, and generally marked with a particular character.

But it muſt be owned that, ſtrictly ſpeaking, a *letter* is not the ſound itſelf, bvt rather the ſign of a ſound; for *γραμμα*, *litera*, is derived from *γεγραμμαι*, of *γραφω*, to *write*; and *litera* is formed from *litus*, the participle of *linere*, *to ſmear*, or *mark*; whence *obliterare* ſignifies *to blot out*.

Where a ſign or character does not expreſs a ſound entirely ſimple, but one reſolvable into ſeveral, it is not ſo properly a *letter* as an abbreviation, containing in itſelf as many *letters* as its power does ſimple ſounds. This is evident in the Latin &, *x*, and the Greek ξ, ψ, ϛ, &c. which are compoſed of *e*, *t*, *k*, *s*, κσ, ϖσ, στ, &c.

On the contrary, a ſimple ſound, though expreſſed by ſeveral characters, is yet to be eſteemed one *letter*; for *th*, *ph*, are ſingle *letters*; as much as φ, θ, and *f*.

The *letters f*, *g*, *h*, *k*, *q*, *x*, *y*, *z*, were unknown to the ancient Romani, as is proved by Dauſquius in his Orthography, where he traces the origin of the ſeveral *letters*. See F, G, H, &c.

Grammarians diſtinguiſh *letters* into *vowels* and *conſonants*; into *mutes*, *diphthongs*, *liquids*, and *characteriſtics*.

The Hebrews divide their *letters* into *guttural*, as *a*, *h*, *eh*, *gn*, aleph, he, chaph, hain, expreſſed by אֶהֶחַע; *dental*, as *z*, *s*, *ts*, *r*, *sh*, zain, ſamech, tſade, reſh, ſchin, expreſſed by זְסַצְרֶשׁ; *labial*, as *b*, *m*, *u*, *p*, beth, mem vau, phe, expreſſed by the word בּוּמָף; *lingual*, or thoſe chiefly formed by the tongue, as *d*, *t*, *l*, *n*, *th*, daleth, teth, lamed, nun, thau, expreſſed by דְטֻלְנַת; and *palatal*, as *g*, *i*, *c*, *k*, ghimel, jod, caph, koph, expreſſed by גִיכַק.

Printers diſtinguiſh their *letters* into capital, majuſcule, initial, or upper caſe *letters*, which ſerve for the titles of books, proper names, &c. And minuſcule, *ſmall*, or under caſe *letters*; which are again divided, according to their ſize, into *pearl*, *nonpareil*, *pica*, *great canon*, &c. They have alſo their flouriſhed *letters*, engraven on wood or metal, which take place of the illumined *letters* of the ancient manuſcripts.

There are *letters* of various ſizes, or bodies; each of which, again, are ſometimes caſt with the Roman, ſometimes an Italic, and ſometimes an Engliſh, or Black *letter* face. There are alſo bodies with Greek, Hebrew, Arabic, the muſic face, &c.

Letters make the firſt parts or elements of grammar; an aſſemblage of theſe compoſe *ſyllables*, of thoſe *words*, and of theſe *ſentences*.

The ALPHABET of every language conſiſts of a certain number of theſe *letters*, which ought to have a different ſound, figure, and ſignification.

As the difference of articulare ſounds was intended to expreſs the different ideas of the mind, ſo one *letter* was originally intended to ſignify only one ſound, and not, as at preſent, to expreſs ſometimes one ſound, and ſometimes another: which practice has brought a great deal of confuſion into the languages, and rendered the learning of the modern tongues infinitely more difficult than it would otherwiſe have been. This conſideration, together with the poverty of all the known alphabets, and their want of ſome *letters* to expreſs certain ſounds by, has occaſioned ſeveral attempts towards an univerſal alphabet to contain an enumeration of all ſuch ſingle ſounds or *letters* as are uſed in any language. A thing of very conſiderable uſe; a ſpecimen of which is given us by Mr. Lodwick, in the Philoſophical Tranſactions. See *Univerſal* CHARACTER.

According to Crinitus, Moſes invented the Hebrew *letters*, Abraham the Syriac and Chaldee; the Phœnicians thoſe of Attica, brought into Greece by Cadmus, and thence by the Pelaſgians into Italy; Nicoſtrata the Latin; Iſis the Egyptian; and Ulphilas, about three hundred and ſeventy years after our Saviour, thoſe of the Goths.

Yet as to the firſt *letters*, what they were, who firſt invented them, and among what people they were firſt in uſe, there is ſtill room to doubt; however, ſetting aſide conjectures and prejudice, the buſineſs of antiquity ſeems to lie between the Egyptians and Chineſe. Philo attributes the firſt invention of *letters* to Abraham; Joſephus, St. Irenæus, and others, to Enoch; Bibliander, to Adam; Euſebius, Clement Alexandrinus, Corn. Agrippa, &c. to Moſes; Pomponius Mela, Herodian, Rufus Feſtus, Pliny, Lucan, &c. to the Phœnicians; St. Cyprian, to Saturn; Tacitus to the Egyptians; and ſome to the Ethiopians.

The Egyptian mummies and obeliſks prove a great antiquity on the ſide of the hieroglyphics; but if the Chineſe chronology may be credited, their characters are much more ancient than thoſe of the Egyptians. The Chineſe make Fohi, the firſt of their kings, ſuppoſed by many learned and judicious writers to have been no other than the patriarch Noah, the inventor of their *letters*, and compute him to have lived two thouſand nine hundred and fifty years before Chriſt; during all which time they pretend to have certain and written accounts in their books. If this holds true, their character muſt be older than Moſes by fourteen hundred years, and even prior to Menes, the firſt king of Egypt, by five hundred years; ſo that the Chineſe *letters* appear to be the moſt ancient of that kind; and the book Yekim, ſaid to be written by Fohi, the moſt ancient book.

But as China is ſo remote, and had ſo little communication with theſe parts of the world, we may reaſonably make another inquiry into the original of *letters* in the hither parts of Aſia, Egypt, and Europe. Here indeed, the Egyptians ſeem to have the beſt title. It is more than probable, from the obeliſks, &c. that their hieroglyphics were the firſt manner of writing, and the original characters in theſe parts, as being prior to Moſes; and were made, at leaſt in a great meaſure, while the Iſraelites were ſlaves among them, and conſequently not well qualified for inventions ſo very curious and judicious.

To this ſource the learned biſhop Warburton aſcribes the origin of alphabetical writing among the Egyptians: for as philoſophy advanced and their learned men wrote much, the exact delineation of hieroglyphic figures became too tedious and too voluminous; and they, therefore, by degrees perfected another character which he calls the running hand of HIEROGLYPHICS, reſembling the Chineſe characters, which being at firſt formed only by the outlines of each figure, became at length a kind of marks.

This running character was denominated by the ancients *hieroglyphical*, and led to the compendious uſe of *letters* by an alphabet, which method of writing, as the ancients inform us, was invented by the ſecretary of an Egyptian king, and firſt uſed for ſecrecy in the conveyance of letters of ſtate, whence it was called epiſtolary writing: but afterwards letters became common, and, as he obſerves, hieroglyphics ſecret and myſterious. This political alphabet, he adds, ſoon occaſioned the invention of a ſacred one, uſed by the prieſts and called *hierogrammatical*. But the preciſe time of the invention of Egyptian *letters* cannot be ſo much as gueſſed at, becauſe hieroglyphics continued in uſe long after *letters* had been found out: it is certain that they were very early, becauſe the invention of them was aſcribed to their Gods. Biſhop Warburton farther conjectures, that Moſes brought *letters* with the reſt of his learning from Egypt, and that he both enlarged the alphabet, becauſe the Hebrew alphabet which he employed in the compoſition of the Pentateuch is conſiderably fuller than that which Cadmus brought into Greece; and altered the ſhapes of the *letters*, reducing them into ſomething like thoſe ſimple forms in which we now find them, in order to prevent the abuſe to which they would be liable as hieroglyphic marks and ſymbolic images. He argues, that, conſidering the importance of *letters* among the Hebrews, with regard to the integrity of their religion, if God had been the immediate author of them, Moſes would have recorded the hiſtory of their invention, as the beſt ſanction of their uſe and beſt ſecurity from the danger of hieroglyphic writing, to which this people, ſo fond of the Egyptian manners, were very powerfully inclined. Divine Legation, vol. ii. p. 1. 124, &c. See alſo on this ſubject Sharpe's Origin of Languages, p. 56, &c.

Many of the fathers and ſome learned men among the moderns, have imagined that the knowledge of alphabetic writing was either ſupernaturally imparted to our firſt parents, or diſcovered very ſoon after the creation by the effort of their own powers. Others have ſuppoſed that alphabetical *letters* were introduced very early after the deluge, about the time of the diſperſion of mankind, to which period the records of the Chaldean aſtronomy very nearly extend. Mr. Shuckford, who ſuppoſes that they were invented both in Aſſyria and Egypt, conjectures that the great project of Babel, next to the building of the Tower, was the improvement of language, by diſſolving the monoſyllables, of which the firſt language of mankind conſiſted, into words of various lengths, in order to obtain new ſets of names for new things; and that a project of this kind might gradually lead to the invention of alphabetical *letters*. Conn. of Sacred and Prof. Hiſt. vol. i. p. 248.

But to theſe conjectures it may replied, that we have no authentic relation of any alphabetic character before the flood; the account of the inſcription upon pillars by the firſt Mercury from Manetho, or of Seth mentioned by Joſephus, being too fabulous to deſerve credit. Beſides, if they had been in uſe among the patriarchs after the deluge, many occaſions occur, in which they would not have been omitted: and as we have no account of the uſe of alphabetic characters in epiſtles or contracts, or for other purpoſes to which they would naturally be applied, we may infer that they were not known. To which we may add, that none of the revelations of God to the patriarchs, were enjoined to be recorded till the giving of the law. Others have aſcribed the invention of *letters* to the Arabs, before the time of Moſes; but when we conſider the rudneſs of their lives and manners, this opinion is by no means probable: and, therefore, the greater number of writers, among Jews and Chriſtians, both ancient and modern, have contented themſelves with tracing their origin to Moſes, ſuppoſed to be the ſame with the Egyptian Thoth or Hermes, mentioned in the hiſtory of that nation; alledging that God taught him the uſe of alphebatic *letters*, in the exemplar of the two tables, wrote, as the text aſſures us, with the finger of God; which words can be underſtood to mean only that they were written by a divine order and direction, as is evident by comparing Exod. xxxiv. 27, 28. and ch. x. 4. It has been ſaid by ſome of the advocates of this opinion, that the elements or languages were thus ſupernaturally revealed to Moſes upon the firſt arrival of the Iſraelites before Horeb, but that their characters, with the arrangement of them, might be left to his diſcretion. But it ſeems more probable, that *letters* were at this time well known to the Iſraelites, as God thought fit to deliver the firſt elements of their religion in that kind of writing: more eſpecially as the hiſtory of ſo momentous a circumſtance is not recorded; a circumſtance, the memory of which would have been one of the greateſt barriers againſt idolatry. From the Iſraelites, it is ſuppoſed this art of alphabetical writing paſſed to the Syrians, and from them it was communicated to the Phœnicians and Egyptians; though it ſeems probable that it was of a more ancient date among the latter than the time of the decalogue or the delivery of the law on mount Sinai.

Sir Iſaac Newton, in his Chronology, allows the Midianites, ſprung from Abraham by his concubine Keturah, to have inſtructed Moſes in the knowledge of writing.

Nevertheleſs, whether Cadmus and the Phœnicians learnt *letters* from the Egyptians, or from their nearer neighbours of Judea and Samaria, is a queſtion; ſince ſome of the books of the Old Teſtament, being written in *letters*, is more likely to have given them the hint than the hieroglyphics of Egypt. But when or whereſoever the Phœnicians learnt this art, it is generally agreed, that Cadmus, the ſon of Agenor, firſt brought *letters* to Greece; whence in the following ages, they ſpread over the reſt of Europe.

Herodotus in his fifth book intitled Terpſichore, informs us, that thoſe Phœnicians who accompanied Cadmus into Greece, and ſettled there, among many other arts and ſciences, introduced into that country the knowledge of *letters*, which the Greeks in his opinion were ignorant of till that time: their firſt *letters* were ſuch as were in uſe among the Phœnicians; but ſome time after they altered them a little, both with regard to their make and ſound; which alteration ſome have ſuppoſed to have been the change of the Hebrew Characters into thoſe that were afterwards called the Samaritan: and as at that time many of the neighbouring parts were inhabited by ſuch as were originally Ionians, who alſo had received their *letters* from the Phœnicians, they mixed the one with the other; and hence thoſe characters were termed Phœnician, becauſe they were brought out of Phœnicia into Greece. Herodotus alſo adds, that he ſaw at Thebes in Bœotia, in the temple of Iſmenian Apollo, three tripods, that had inſcriptions upon them in Cadmeian *letters* which very much reſembled the Ionic. The time of this expedition of Cadmus into Greece is fixed by ſir Iſaac Newton to about the 1045th year before Chriſt. The number of *letters* which Cadmus brought into Greece, according to Ariſtotle, as cited by Pliny, was eighteen; but according to Plutarch and Pliny himſelf, ſixteen; to which Palamedes, in the time of the Trojan war, added four, and Simonides four: ſo that the Greek alphabet was gradually perfected. The alterations and improvements introduced inte Greece have led ſome writers to aſcribe the invention of the alphabet to the Greeks; thus Voſſius, de Arte Gram. lib. i. cap. 10. aſſerts that Cecrops, who was much older than Cadmus, was the firſt author of the Greek *letters*; and others aſcribe them to Lincus or to Palamedes. Diod. Sic. lib. iii. Tacitus lib. xi. cap. 14. But the more general opinion of the ancient writers is, that they were derived from the Phœnicians and Egyptians. Diodorus, lib. v. ſays expreſsly, that they were invented by the Syrians, and communicated by them to the Phœnicians, who changed the forms of the characters, brought into Europe by Cadmus. Pliny, Nat. Hiſt. lib. vii. cap. 56. ſays, that he is of opinion that they were Aſſyrian, though he acknowledges that others thought they were invented by the Egyptians, and that Mercury was their firſt author. Diodorus, lib. ii. aſcribes the invention of them to the ſame perſon; and likewiſe Plutarch Sympoſ. lib. xx. cap. 3. and Cicero de Natura Deorum, lib. iii. And the æra of this invention is computed by Chronologers to be as early as the year of the world 2054, and before the incarnation 1950 years. The Greeks retained the names and orders of ſeveral of the oriental or Cadmean *letters*, though they altered the form of them; and there are ſeven *letters*, viz. Γ, Δ, Η, Κ, Λ, Ρ, Τ, whoſe original figures were retained by the Greeks with little variation.

As to the Latins, all writers agree, that they received their *letters* from the Greeks, being firſt taught the uſe of them by ſome of the followers of Pelaſgus, who came into Italy about one hundred and fifty years after Cadmus came into Greece; or by the Arcadians, whom Evander led into theſe parts about ſixty years after Pelaſgus. Pliny, lib. vii. cap. 56. and Solinus imagined the Pelaſgi to have been the firſt authors of the Latin *letters*; but Tacitus lib xi. p. 131. was of opinion that the firſt Italians were taught *letters* by the Arcadians; and Dionyſius Halicarnaſſus, lib. ii. expreſly affirms the ſame thing. That the Latin *letters* were derived from the Greek ſeems very probable, from the ſimilitude which the ancient *letters* of each nation bore to one another. Tacitus, Annal. lib. xi. obſerves, that the ſhape of the Latin *letters* reſembled that of the moſt ancient Greek ones; and the ſame obſervation was made by Pliny, lib. vii. cap. 58. and confirmed from an ancient table of braſs inſcribed to Minerva. Scalliger Digreſſ. ad Annum Euſeb. 1617, and Voſſius, lib. i. cap. 24, 25. have adopted and ſupported the ſame opinions. ſee thoſe citations in Shuckford's Conn. vol. i. p. 223, &c.

Thus we find, that Greece was the centre from which the rays of ſcience ſhot into the weſtern world; and the barbarous nations who penetrated into Italy towards the cloſe of the Roman empire, carried arts and learning back into the North; or the knowledge of *letters* might be introduced among the northern nations from the borders of Aſia in an earlier age. Sharpe's Original Powers of *Letters*. Obſervations on Alphabetical Writing, 1772. See Writing.

Rudbecs, who, in his Atlantica, claims the glory of all inventions, from all other nations, for the Swedes, maintains that the Ionians had *letters* before Cadmus; that at the time of the ſiege of Troy, the Greeks had but ſixteen *letters*, whereas the Phœnicians had twenty-two; whence he concludes, that it was not either Cadmus, or the Phœnicians that taught this art to the Greeks. But, becauſe the ancient northern nations had juſt ſixteen *letters*, like the Greeks, he concludes, the Greeks muſt either have taught them to the people of the North, or have learnt them of them. But becauſe the form and make of the Runic *letters* is more artleſs and coarſe than that of the Greek *letters*, he concludes, that theſe laſt muſt be derived from the former; taking it as a principle that thoſe who derive any thing from another, poliſh and improve it. He even aſſerts that by the golden apples which Hercules was obliged to ſteal, muſt be underſtood the *letters* in uſe among the Hyperboreans.

There are few things on which there has been ſo much written as on the original Hebrew *letters*. Origen, Euſebius Cæſarienſis, St. Jerom, &c. have made it the ſubject of their enquiry. See HEBREW and SAMARITAN.

The art of joining *letters* to form words, and of combining the one and the other an infinite number of different ways is a ſecret unknown to the Chineſe. Inſtead of the alphabetical *letters*, they at firſt, like the Egyptians, uſed hieroglyphics; they painted rather than wrote; ſtriving, by the natural image of things drawn on paper, to expreſs and communicate their ideas to one another.

To remedy the inconveniences of this method, they changed, by little and little their manner of writing, making it more ſimple, though leſs natural. They even invented ſeveral characters, to expreſs things that did not come within the reach of painting to repreſent: as voice ſmell, thoughts, paſſions, and a thouſand other objects that have no body or figure. From ſeveral ſimple ſtrokes they afterwards framed others more compound; and in this manner multiplied the *letters* and characters to infinity, contriving one, or more, for every word.

This multitude of *letters* ſeems the ſource of that ignorance which we find among the Chineſe; their whole lives being ſpent in learning their *letters*, they have no time to apply themſelves to the ſtudy of things, but think themſelves very learned when they are able to read. There are ſcarce any of them that know all their *letters*; they think it is a great progreſs they have made, when, after forty or fifty years hard ſtudy, they are able to underſtand fifteen or twenty thouſand. But the generality of their learned men come ſhort of this. Father Le Compte is of opinion that the greateſt doctor among them never underſtood half of their letters well; for the whole number he reckons eighty thouſand. This is a prodigious inconvenience to foreigners, of which the miſſionaries in that country make loud complaints.

Among the Chineſe *letters* there are ſome now almoſt worn out of uſe, and only preſerved out of reſpect to antiquity. There is a ſecond claſs much leſs ancient than the former, only uſed in public inſcriptions. A third, much more regular and beautiful, uſed in printing, and even in ordinary writing. However, as the ſtrokes are to be diſtinctly formed, they cannot be wrote with any expedition. For this reaſon they have invented a fourth kind, where the ſtrokes, being cloſer, and leſs diſtant from each other, allow them to be writ with more eaſe and readineſs; and this they call the *running letter*. See CHINESE *tongue*.

The Americans had no *letters* before the dicovery of that country by the Spaniards. The Acaanibas engrave their memorable events and epochas on ſtones and metals; their ſongs ſupply the reſt. In Peru and Chili, to keep an account of their goods and chattels, and to preſerve the memory of their particular affairs, the Indians have recourſe to certain knots of wool; which, by the variety of their colours and ties, ſerve inſtead of characters, and writing. The knowledge of theſe knots which they call *quipos*, is one of their great ſciences; but which is always kept as a ſecret, and never revealed to the children, till the fathers think themſelves at the end of their days.

LETTER, *dominical*. See DOMINICAL.

LETTER *double*. See DOUBLE.

LETTER, *final*. See FINAL.

LETTER, *guttural*. See GUTTURAL.

LETTER, *foundery*. See FOUNDERY.

LETTER *founders furnace*. See FURNACE.

LETTER *founders mould*. See MOULD.

LETTER *labial*. See LABIAL.

LETTERS, *numeral*, are thoſe uſed inſtead of ciphers, to expreſs numbers.

The Roman numerals are, C, D, I, L, M, V, X; which are all formed by deſcribing a circle, and drawing two lines through it, croſſing each other at right angles in the centre. See CHARACTER.

LETTER, *nundinal*. See NUNDINAL.

LETTER is alſo a writing addreſſed and ſent to one. See EPISTLE.

By 9 Geo. I. cap. 22. amended by 27 Geo. II. cap. 15. knowingly to ſend any *letter* without name, or with a fictitious name, demanding money, &c. or threatening, without any demand, to kill or fire the houſe of any perſon, is made felony, without benefit of clergy. And by 30 Geo. II. cap. 24. perſons ſending *letters* with or without a name, or with a fictitious name, threatening to accuſe any one of a crime puniſhable by law with death, tranſportation, pillory, or any other infamous puniſhment, in order to extort money or goods, ſhall be puniſhed at the diſcretion of the court, by fine and impriſonment, pillory, whipping, or tranſportation for ſeven years.

LETTERS *of abſolution*, were formerly granted by an abbot to releaſe any of his brethren from the obligation of ſubjection and obedience, and to make them capable of entering into any other religious order.

LETTER *of attorney*, in *Law*, a writing authorizing an attorney to do ſome legal act in our ſtead: as, to give ſeiſin of lands, to receive debts, to ſue a third perſon, &c. And *letters of attorney* are either general or ſpecial. Weſt. Symb. par. i. ſtat. 7. R. II. cap. 13.

The nature of this inſtrument is to give the atorney the full power and authority of the maker, to accompliſh the act intended to be performed. Sometimes theſe writings are revocable, and ſometimes not ſo; but when they are revocable, it is uſually a bare authority only; and they are irrevocable, when debts, &c. are aſſigned to another; in which caſe the word irrevocable is inſerted.

LETTERS *claus*, or *cloſe*, in *Law*, are oppoſed to LETTERS-*patent*. See CLOSE-*rolls*.

LETTER *of credit*, among *Merchants*. See CREDIT.

LETTERS *communicatory*. See See LITERÆ *communicatoriæ*.

LETTER *of exchange*. See BILL and EXCHANGE.

LETTER *of licence*, in *Trade*, an inſtrument, or writing, granted to a man who has failed, or broke, ſigned and ſealed by his creditors; which *letter* uſually gives a longer time for payment: ſo that the debtor, having ſuch an aſſurance, may go about his buſineſs, without ſearing an arreſt.

LETTERS *of mart*, or *marque*, are *letters* under the privy ſeal, granted to the king's ſubjects; impowering them to take, by force of arms, what was formerly taken from them by the ſubjects of ſome other ſtate, contrary to the law of mart. See MARQUE.

LETTERS *of marque*, in the Britiſh dominions, are to be granted by the admiralty; and they empower the commander of a merchant ſhip or privateer, to cruiſe againſt and make prizes of the enemies ſhips and veſſels, either at ſea, or in their harbours.

LETTER *miſſive*, in the *Election of a Biſhop*. See BISHOP

LETTER *miſſive*, in *Chancery*. If a peer is defendant in this court the lord chancellor ſends a *letter miſſive* to him, to requeſt his appearance, together with a copy of the bill: if he neglects to appear, then he may be ſerved with a ſubpœna; if he continues ſtill in contempt, a ſequeſtration iſſues out immediately againſt his lands and goods, without any of the meſne proceſs of attachments, &c. which are directed only againſt the perſon, and therefore cannot affect a lord of parliament. The ſame proceſs iſſues againſt a member of the houſe of commons, except that the lord chancellor does not ſend him any *letter miſſive*.

LETTERS *patent*, or *overt*, are writings ſealed with the great-ſeal of England, whereby a man is authorized to do or enjoy any thing, which of himſelf he could not do. They are ſo called, on account of their form; as being open with the ſeal affixed, ready to be ſhewn for the confirmation of the authority given by them.

Common perſons may grant *letters patent*; but they are rather called *patents*, than *letters patent*; yet for diſtinction, thoſe granted by the king, are ſometimes called *letters patent royal*.

Letters patent conclude with *teſte meipſo*; charters, with *hiis teſtibus*. See PATENT.

LETTERS *of reſpite*, *letters* iſſued out by a prince, in favour of honeſt unfortunate debtors. againſt too rigorous creditors, whereby payment is delayed for a certain term.

The uſe of theſe *letters* is very ancieut. Caſſiodorus obſerves, they were in uſe in the time of Theodoric, king of the Goths; others will have them introduced towards the end of the eleventh century, by pope Urban II. in favour of thoſe who went on the croiſades.

They are ſtill in uſe in France and ſome other countries, and take their name, *à reſpirando*, becauſe they give the debtor a breathing time.

St. Louis granted three years reſpite to all who made the voyage of the Holy-Land with him.

LETTERS *circular*, *dimiſſory*, *frank*, *monitory*, *pacific*, *paſchal*. See the ſeveral adjectives.

LETTERS *of ſafe-conduct*. See SAFE-*conduct*.

LETTERED, *letrados*. See LITERATI.

LETTUCE, *lactuca*, in *Botany*, a genus of the *ſyngeneſia polygamia æqualis* claſs. Its characters are theſe: the flowers are compoſed of ſeveral hermaphrodite florets, incloſed in a ſcaly oblong impalement; the florets have one petal, which is ſtretched out on one ſide like a tongue, and ſlightly indented at the end in three or four parts; theſe have five ſhort hairy ſtamina; the germen afterwards becomes one oblong pointed ſeed, crowned with a ſingle down.

We have the ſeveral ſpecies of *lettuce* cultivated in the kitchen-gardens about London, all which are excellent ſallad herbs, and ſucceed one another in their ſeveral ſeaſons. The ſeveral kinds are, 1. The common *lettuce*. 2. The cabbage-kind. 3. The Sileſia or Cilicia. 4. the Dutch-brown. 5. The Aleppo. 6. The imperial. 7. The green capuchin-*lettuce*. 8. The Verſailles, or upright white cos-*lettuce*. 9. The black cos. 10. The white cos-*lettuce*. 11. The red capuchin-*lettuce*. 12. The Roman-*lettuce*. 13. Prince-*lettuce*. 14. The royal-*lettuce*, and 15. The Egyptian cos-*lettuce*.

The firſt of theſe ſorts is very common in all gardens, and is commonly ſown for cutting very young, to mix with other ſallad herbs in ſpring; and the ſecond, or cabbage-*lettuce* is only this, mended by culture. It may be ſown at all times in the year, but in the hot months requires to be ſown in ſhady borders. The cabbage-*lettuce* may alſo be ſown at different ſeaſons to have a continuation of it through the ſummer. The firſt crop ſhould be ſown in February in an open ſituation; the others, at three weeks diſtance, but the latter ones under covert, but not under the drippings of trees.

The Sileſia, imperial, royal, black, white, and upright cos-*lettuces*, may be ſown firſt in the latter end of February or the beginning of March, on a warm light ſoil, and in an open ſituation; when the plants are come up they muſt be either hoed out, or tranſplanted into another ſpot of ground, leaving them fifteen inches diſtance apart every way. They will then require no farther care than the keeping them clear of weeds; and the black cos, as it grows large, ſhould have its leaves tied together to whiten the inner part. Succeeding crops of theſe ſhou'd be ſown in April, May, and June, and toward the middle of September they may be ſowed for a winter crop, to be preſerved under glaſſes, or in a bed arched over with hoops, and covered with mats: and in ſpring they ſhould be planted out in a rich light ſoil, allowing them at leaſt eighteen inches diſtance every way.

The moſt valuable of all the Engliſh *lettuces*, are the Egyptian green cos, the white cos, or the Verſailles, the Sileſia, and the black cos. The brown Dutch, and the green capuchin are very hardy, and may be ſown late, under walls, where they will ſtand the winter, and be valuable when no others are to be had. The red capuchin Roman, and prince-*lettuce*, are very early kinds, and are ſown for variety, as are alſo the Aleppo ones for the the beauty of their ſpotted leaves.

The young leaves of the ſeveral varieties of garden-*lettuce* are emollient, cooling, in ſome ſmall degree laxative and apperient, eaſy of digeſtion, but of little nouriſhment; ſalubrious in hot bilious indiſpoſitions, but leſs proper in cold phlegmatic temperaments. In ſome caſes they tend to promote ſleep by virtue of their refrigerating and demulcent quality. Lewis.

The milk of the common garden *lettuces* is hypnotic, while the root of the plant is cooling, diluent, and nouriſhing. Dr. Alſton. ap. Med. Eſſ. Edinb. vol. v. art. 12.

LETTUCE, *hare's*. See SOW'S *Thiſtle*.

LETTUCE, *lamb*. See VALERIAN.

LETTUCE, *wild*, *prenanthes*, in *Botany*. Its characters are theſe: it hath a ſmooth cylindrical empalement, having many ſcales which are equal, but have three at the baſe unequal; this common empalement includes from five to eight hermaphrodite florets, diſpoſed in a ſingle round order; they have one petal, which is ſtretched out like a tongue, and indented in four parts at the end, they have five ſhort hair-like ſtamina, terminated by cylindrical ſummits; the germen is ſituated under the petal, ſupporting a ſlender ſtyle longer than the ſtamina, crowned by a bifid reflexed ſtigma; the germen afterwards becomes a ſingle heart-ſhaped ſeed, crowned with hairy down. Miller enumerates four, and Linnæus nine ſpecies.

Theſe plants are ſeldom admitted into gardens, but if any perſon is deſirous to cultivate them, and will ſow the ſeeds ſoon after they are ripe in a ſhady ſituation, the plants will require no other care than to keep them clear from weeds. Miller.

LEVANDIS *militum expenſis*. See EXPENSIS.

LEVANT, in *Geography*, ſignifies any country ſituate to the eaſt of us, or the eaſtern ſide of any continent or country, or that on which the ſun riſes.

LEVANT, in *Matters of Commerce*, &c. is generally reſtrained to the Mediterranean ſea; or, rather, to the country on the eaſtern part of it.

Hence, our trade thither is called the *Levant trade*; and a wind that blows from thence, out of the Streights mouth, is called a *Levant wind*.

France was the firſt nation that made treaties of commerce with the Porte. The ſieur de la Foret ſigned them in 1535, in the name of Francis I. and thereby obtained many privileges in favour of that kingdom; which they alone enjoyed, until the Venetians, the Engliſh, the Hollanders, and at length the Genoeſe, likewiſe, obtained particular privileges for themſelves.

LEVANT, *meaſures*. See MEASURE.

LEVANT, *bole of the*. See BOLE.

LEVANT *and couchant*, in *Law*, is, when cattle have been ſo long in another man's ground, that they have laid down, and riſen again to feed, which in general is held to be one night at leaſt.

LEVARE *antiphonum*, in the *Muſic of the Romiſh Church*, is to begin or open the firſt note of an anthem.

LEVARI *facias*, in *Law*, a writ directed to the ſheriff for levying a ſum of money on a man's lands and tenements, who has forfeited his recognizance; in virtue of which the ſheriff may ſeize all his goods, and receive the rents and profits of the lands, till ſatisfaction be made to the plaintiff: but this writ has now given way to the remedy by ELEGIT. There is alſo a *levari facias damna diſſeiſitoribus*, for the levying of damages, wherein the diſſeiſor has been formerly condemned to the diſſeiſee; and alſo a *levari facias reſiduum debiti*, to levy the remainder of a debt upon lands and tenements, or chattels of the debtor, where part has been ſatisfied before. And farther, a *levari facias quando vicecomes returnavit quod non habuit emptores*, commanding the ſheriff to ſell the goods of the debtor which he has taken, and returned that he could not ſell.

LEVATIO *arietum*. See ARIETUM.

LEVATOR, in *Anatomy*, an epithet which anatomiſts give to ſeveral muſcles, whoſe uſe is to raiſe, or lift up, the parts to which they belong. See ELEVATOR.

There are *levators* of the eye-lids, of the omoplate, of the anus, of the ſcapula, &c.—See *Tab. Anat. (Myol.) fig.* 2. *n.* 3.

LEVATORES *ani*, in *Anatomy*. Theſe muſcles ariſe fleſhy from each ſide of the oſſa pubis, internally within the pelvis; as alſo from part of the os iſchium and ſacrum. From theſe places like lines drawn from a circumference toward a centre, their fibres deſcend over the muſculi marſupiales, to their implantation at the lower end of the inteſtinum rectum in the anus. The uſe of theſe muſcles is principally to ſuſpend and draw the anus upwards, leſt the fæces ſhould be burthenſome to the ſphincter. In their deſcent on each ſide forward, from the oſſa pubis, they paſs cloſely over the glandulæ proſtatæ, in a manner embracing them: by which mechaniſm they are rendered capable of compreſſing them; and by a retraction of the anus, at the ſame time act on the veſiculæ ſeminales, in order to promote the emiſſion of the ſeminal juices in coition.

LEVATOR *coccygis*, in *Anatomy*, a name given by many to the muſcle, now generally known by the name of COCCYGÆUS.

LEVATORES *breviores coſtarum*, in *Anatomy*, the modern name introduced by Albinus for certain muſcles of the ribs, called by others the *ſupracoſtales*, the *ſur coſtaux* of the French, and the *ſcaleni quarti* by ſome. Steno was the firſt who called them *levatores coſtarum*, from their office; he is followed in this by Morgagni and Albinus, who adding the word *breviores*, by way of diſtinction from ſome other longer ones, called *ſupracoſtales longi* by authors, have formed the modern name.

LEVATOR *internus*, in *Anatomy*, a name given by Douglas, and ſome others, to a muſcule, now generally called only the *levator ani*.

LEVATOR *labii ſuperioris*, in *Anatomy*, a name given by Albinus to a muſcle, called by Santorini and Winſlow the *inciſorius*, and by Cowper the ELEVATOR *labii ſuperioris*, and by Spigelius *alas naſi abducens*.

LEVATOR *menti*, in *Anatomy*, a name given by Albinus to a muſcle of the face, called by Cowper and others ELEVATOR *labii inferioris*, and by ſome the INCISIVUS *inferior*.

LEVATOR *palpebræ ſuperioris*, in *Anatomy*, a name given by Albinus to a muſcle in the face, called by Cowper, Douglas, and the generality of writers, *aperiens palpebram* and APERIENS *palpebram rectus*.

LEVATOR *proſtatæ*, in *Anatomy*, a name given by Santorini, and ſome others, to a muſcle, called by Winſlow, *proſtaticus ſuperior*, by Albinus *compreſſor proſtatæ*.

LEVATOR *ſcapulæ proprior*, in *Anatomy*, a long and pretty thick muſcle, about two fingers in breadth, lying above the ſuperior angle of the ſcapula, along the poſterior lateral part of the neck of that bone. It is inſerted above, in the extremities of the tranſverſe apophyſes of the four firſt vertebræ of the neck by four fleſhy branches, ending in ſhort tendons. Sometimes the ſecond, ſometimes the third, or both; and ſometimes the third of theſe branches is wanting, theſe defects being made up by the largeneſs of the reſt: from thence theſe branches run down a little obliquely, and then uniting together, they are inſerted in the ſuperior angle of the ſcapula, and in the edge of its baſis from thence to the ſmall triangular ſpace, being there covered a little by the rhomboides. This muſcle is eaſily divided into two through its whole length. It is covered by the trapezius, and its inſertions in the neck are ſometimes mixed with thoſe of the neighbouring muſcles. Winſlow.

LEVATUM. See TERRIS & *Catalis tentis ultra debitum*.

LEUCACANTHA, in *Botany*, a name uſed by Dioſcorides and the other Greek writers, for the acacia tree, which produces the gum arabic, but it was alſo uſed for a kind of prickly plant, called alſo AMGAILA by ſome of the Arabians; as being a plant whoſe roots were knotted and jointed. Theſe joints were ſeparated and dried, and then uſed in medicine as cardiacs and carminatives, under the names of BUNK or *bunken*. They were of a very agreeable aromatic ſmell, and very little taſte; and the ancients always preferred ſuch of them as were yellow and light, rejecting thoſe which were heavy and white, and which wanted ſmell. It is not well known at this time what theſe roots were; but it is neceſſary, in order to the right underſtanding the works of the ancients, to know that there were ſuch roots; and that though called by the ſame name with the gum arabic tree, they were of a very different nature.

LEUCACHATES, in the *Naturvl Hiſtory of the Ancients*, the name of an agate, not a peculiar ſpecies, but only a particular appearance of the lead-coloured agate called PHASSACHATES.

LEUCADENDRON, in *Botany*, a genus of the *tetrandri monogynia* claſs: the corolla of which is floſculous, conſiſting of two petals, joined to another which is trifid: the receptacle is hairy; this genus has no proper calyx, and the antheræ are connected at their baſe. Linnæus enumerates ſixteen ſpecies.

LEUCANTHEMUM, in *Botany*. See DAISY, and *Corn* MARYGOLD.

LEUCELECTRUM, a name given by ſome authors to that ſort of AMBER, which is white and opake, and uſually of a fatty look.

LEUCISCUS, in *Ichthyology*. See DACE.

LEUCOCROTTA, in *Natural Hiſtory*, the name given by many authors to a beaſt, ſuppoſed to be the ſwifteſt of all creatures in the world: others have called it *leucrocrotta*, but the true name is LEOCROCOTTA.

LEUCODENDROS, in *Botany*, a name given to the SILVER PINE-*tree*.

LEUCOGÆA, in *Natural Hiſtory*, a name by which ſome authors have called the ſubſtance, more uſually known by the name of MOROCHTHUS, and called in Engliſh, French chalk, or Briançon chalk.

LEUCOGRAPHIS, in *Natural Hiſtory*, the name uſed by ſome of the ancient writers, for the ſubſtance commonly called MOROCHTHUS, or *French chalk*.

LEUCOIUM, in *Botany*. See *Great* SNOW *Drop*.

LEUCOIUM *bulboſum*. See SNOW-*Drop*.

LEUCOINM *Indicum and luteum*. See STOCK *Gilly Flower*.

LEUCOLIBANON, in the *Materia Medica of the Ancients*, a name given to the white olibanum, or FRANKINCENSE, which they carefully diſtinguiſh from the reddiſh or yellowiſh olibanum. This was alſo called *argyolibanum*, or the ſilver-coloured olibanum; and the yellow one *chalcolibanum*. This latter word is uſed in the Apocalypſe of St. John, and is miſunderſtood ſo far as to be tranſlated braſs, and ſuppoſed to be a kind of braſs from mount Lebanon. See CHALCOLIBANON.

LEUCOLITHOS, in *Natural Hiſtory*, a name given by ſome of the Greek writers to the *pyrites argenteus*, or ſilvery PYRITES. The ancients had a great opinion of theſe foſſils in diſeaſes of the eyes; they uſed all the kinds of pyrites, or marcaſite, after calcination, for this purpoſe; but as they diſtinguiſhed four kinds of them, they attributed theſe virtues, in different degrees, to the different kinds; therefore they had recourſe to ſo many peculiar names for diſtinguiſhing them; and the white kind was called *leucolithos*, to diſtinguiſh it from the duſky one called the *iron pyrites*, and the deeper and paler yellow kinds, called the *gold* and *braſſy marcaſites*.

LEUCOMA, Λευκωμα, among the Athenians, ſignified a public regiſter of the whole city, in which were written the names of all the citizens, as ſoon as they came to be of age to enter upon their paternal inheritance.

LEUCOMA, Λευκωμα, from λευκος, *white*, in *Surgery*, a little white ſpot on the cornea of the eye; called by the Latins ALBUGO.

LEUCOMÆNAS, in *Ichthyology*, a name by which ſome have called the SMARIS, a ſmall fiſh caught in great plenty in the Mediterranean.

LEUCO *narciſſa lirion*. See SNOW-*Drop*.

LEUCOPETALOS, in *Natural Hiſtory*, the name of a beautiful ſtone deſcribed by Pliny, as being of a fine gold yellow, variegated with white.

LEUCOPETRIANS, in *Eccleſiaſtical Hiſtory*, the name of a fanatical ſect which ſprung up in the Greek and Eaſtern churches towards the cloſe of the twelfth century: the fanatics of this denomination profeſſed to believe in a double Trinity, rejected wedlock, abſtained from fleſh, treated with the utmoſt contempt the ſacraments of baptiſm and the Lord's ſupper, and all the various branches of external worſhip, placed the eſſence of religion in internal prayer alone, and maintained, as it is ſaid, that an evil being, or genius, dwelt in the breaſt of every mortal, and could be expelled from thence by no other method than by perpetual ſupplication to the ſupreme Being. The founder of this enthuſiaſtical ſect is ſaid to have been a perſon callec Leucopetrus, and his chief diſciple Tychicus, who corrupted, by fanatical interpretations, ſeveral books of ſcripture, and particularly St. Matthew's goſpel. Moſheim.

LEUCOPHAGIUM, a name given by ſome phyſicians to a ſort of medical aliment good in conſumptions, and other general decays. It is compoſed of ſweet almonds macerated in roſe-water, with the tender fleſh of a capon, all being finally boiled together to a pulp, capable of being paſſed through a ſieve.

LEUCOPHLEGMATIA, Λευκοφλεγματια, formed from λευκος, *white*, and φλεγμα, *pituita*, *phlegm*, a kind of dropſy, otherwiſe called ANASARCA.

The *leucophlegmatia* conſiſts in a tumor, or bloating, of the whole outer ſurface of the body, or ſome of its parts; white and ſoft, eaſily giving way to the touch, and preſerving the impreſſion made by the finger for ſome time. It may either be owing to ſome diſorder of the blood; which in this diſeaſe, is of a pale colour, viſcid, and cold; or to an aqueous humour extravaſated, and gathered together in the muſcles, and the pores of the ſkin. See Dropsy.

LEUCOPIPER, in the *Materia Medica*, a name by which ſome authors have diſtinguiſhed the white pepper.

LEUCORHŒA, a name given by ſome medical writers to the whites, or fluor *albus*, a very troubleſome diſeaſe to women.

LEUCORODIUS, in *Ornithology*, a name by which ſome have called the platea, or spoonbill, a very remarkable kind of ſtork or heron.

LEUCOSTAPHYLOS, in *Botany*, a name given by ſome authors to the water-elder, or opulus.

LEVEL, an inſtrument wherewith to draw a line parallel to the horizon, and continue it out at pleaſure; and, by this means, to find the true *level*, or the difference of aſcent or deſcent, between ſeveral places, for conveying water, draining fens, &c.

The word comes from the Latin *libella*, the croſs beam that forms the brachia of a balance; which, to be juſt, muſt ſtand horizontally.

There are ſeveral inſtruments, of different contrivance and matter, invented for the perfection of *levelling*; all of which, for the practice, may be reduced to theſe that follow.

Level, *air*, that which ſhews the line of *level*, by means of a bubble of air, incloſed with ſome liquor in a glaſs tube of an indeterminate length and thickneſs, whoſe two ends are ſealed hermetically, that is, are cloſed with the glaſs itſelf, by heating it with the flame of a lamp, till it becomes ſoft and tractable. When the bubble of air fixes itſelf at a certain mark, made exactly in the middle of the tube, the plane, or ruler, wherein it is fixed, is *level*. When it is not *level*, the bubble will riſe to one end.

This glaſs tube may be ſet in another of braſs, having an aperture in the middle, whence the bubble of air may be obſerved.

The liquor wherewith the tube is filled, is ordinarily either oil of tartar, or aqua ſecunda; thoſe not being ſo liable to freeze as common water; nor to rarefaction and condenſation, as ſpirit of wine is.

The invention of this inſtrument is aſcribed to M. Thevenot.

Level, *air, with ſights*, is an improvement of that laſt deſcribed; which, by the addition of more apparatus, becomes more commodious and exact.

It conſiſts of an *air-level* (*Tab. Surveying, fig.* 13) about eight inches long, and ſeven or eight inches in diameter, ſet in a braſs tube, with an aperture in the middle. The tubes are carried in a ſtrong, ſtrait ruler, a foot long, at whoſe ends are fixed two ſights, exactly perpendicular to the tubes, and of an equal height, having a ſquare hole, formed by two fillets of braſs, croſſing each other at right angles; in the middle whereof is drilled a very little hole, through which a point on a *level* with the inſtrument is deſcried. The braſs tube is faſtened on the ruler by means of two ſcrews; one, whereof, marked 4, ſerves to raiſe or depreſs the tube at pleaſure, for bringing it towards a *level*. The top of the ball and ſocket is rivetted to a little ruler that ſprings; one end whereof is faſtened with ſcrews to the great ruler, and the other end has a ſcrew 5, ſerving to raiſe and depreſs the inſtrument, when nearly *level*.

This inſtrument is yet leſs commodious than the following one, becauſe, though the holes be ever ſo ſmall, yet they will ſtill take in too great a ſpace to determine the point of *level* preciſely.

Level, *air, with teleſcope ſights*. This *level*, repreſented in *Tab. Surveying, fig.* 14. is like the laſt; with this difference, that, inſtead of plain ſights, it carries a teleſcope, to determine exactly a point of *level* at a good diſtance.

The teleſcope is in a little braſs tube, about fifteen inches long, faſtened on the ſame rule as the *level*. At the end of the tube of the teleſcope marked 1, enters the little tube 1, carrying the eye-glaſs and a hair horizontally placed in the focus of the object-glaſs 2; which little tube may be drawn out, or puſhed into the great one, for adjuſting the teleſcope to different ſights. At the other end of the teleſcope is placed the object-glaſs; the ſcrew 3 is for raiſing or lowering the little fork carrying the hair, and making it agree with the bubble of air when the inſtrument is *level*; and the ſcrew 4 is for making the bubble of air agree with the teleſcope. The whole is fitted to a ball and ſocket.

M. Huygens is ſaid to have been the inventor of this *level*; which has this advantage, that it may be inverted, by turning the ruler and teleſcope half round; and if then, the hair cut the ſame point that it did before the turn, it is a proof the operation is juſt.

It may be obſerved, that one may add a teleſcope to any kind of *level*, by applying it upon, or parallel to, the baſe, or ruler, when there is occaſion to take the *level* of remote objects.

For the method of adapting a *level* to the meridian teleſcope. See Telescope.

Mr. Hadley has contrived a ſpirit *level* to be fixed to a quadrant for taking a meridional altitude at ſea, when the horizon is not viſible. See the deſcription and figure of it in the Phil. Tranſ. N° 430, p. 167, &c. or Martyn's Abridg. vol. viii. p. 358, &c. See alſo the method of preparing and uſing a water *level*, and a mercurial *level*, annexed to Davis's quadrant, for the ſame purpoſe, by Mr. Leigh, in Phil. Tranſ. N° 451. p. 413. or Abr. vol. viii. p. 360, &c.

Level, *foot*. See Foot-*level*.

Level, *artillery-foot*, is in form of a ſquare, having its two legs or branches, of an equal length; at a juncture whereof is a little hole, whence hangs a thread and plumbet, playing on a perpendicular line in the middle of a quadrant; it is frequently divided into 90 degrees, or rather into twice 45 degrees from the middle. See *fig.* 18. *lit.* F.

This inſtrument may be uſed on other occaſions, by placing the end of its two branches on a plane; for when the thread plays perpendicularly over the middle diviſion of the quadrant, that plane is aſſuredly *level*.

To uſe it in gunnery, place the two ends on the piece of artillery, which you may raiſe to any propoſed height by means of the plumbet, whoſe thread will give the degree above the *level*.

Level, *carpenters and paviors*, conſiſts of a long ruler, in the middle whereof is fitted, at right angles, another ſomewhat bigger, at the top of which is faſtened a line with a plumbet; which, when it hangs over a fiducial line at right angles with the baſe, ſhews that the ſaid baſe is horizontal.

This and the maſon's *level*, though very common, are eſteemed the beſt for the practice of building, though the operations by them can only be ſhort.

Level, *gunners*, for levelling cannons and mortars, is an inſtrument repreſented *Tab. Surveying, fig.* 16. conſiſting of a triangular braſs plate, about four inches high: at the bottom of which is a portion of a circle, divided into 45°, which number is ſufficient for the higheſt elevation of cannons and mortars, and for giving ſhot the greateſt range. On the centre of this ſegment of a circle is ſcrewed a piece of braſs, by means whereof it may be fixed, or moved, at pleaſure. The end of this piece of braſs is made ſo as to ſerve for a plumbet and index, in order to ſhew the different degrees of elevation of pieces of artillery. This inſtrument has alſo a braſs foot to ſet upon cannon or mortars, ſo as when thoſe pieces are horizontal, the whole inſtrument will be perpendicular.

The uſe of this *level* is obvious, and conſiſts in placing the foot thereof on the piece to be elevated; in ſuch manner as that the point of the plumbet may fall on the proper degree: this is what they call *levelling* the piece.

Level, *maſons*, is compoſed of three rules, ſo joined as to form an iſoſceles triangle, ſomewhat like a Roman A; at the vertex whereof is faſtened a thread, from which hangs a plumbet, which paſſes over a fiducial line marked in the middle of the baſe, when the thing to which the *level* is applied is horizontal; but declines from the mark when the thing is lower on one ſide than the other.

Level, *plumb*, or *pendulum*, that which ſhews the horizontal line by means of another line perpendicular to that deſcribed by its plumbet, or pendulum.

This inſtrument, repreſented *Tab. Surveying, fig.* 18. conſiſts of two legs, or branches, joined together at right angles, whereof that which carries the thread or plumbet is about a foot and a half long. This thread is hung towards the top of the branch, at the point 2. The middle of the branch where the thread paſſes is hollow, that ſo it may hang free every where but towards the bottom, where there is a little blade of ſilver, whereon is drawn a line perpendicular to the teleſcope. The ſaid cavity is covered by two pieces of braſs, making, as it were, a kind of caſe, leſt the wind ſhould agitate the thread; for which reaſon the ſilver blade is covered with a glaſs G, to the end that it may be ſeen when the thread and plumbet play upon the perpendicular. The teleſcope 1 is faſtened to the other branch, or leg, of the inſtrument, and is about two feet long, having a hair placed horizontally acroſs the focus of the object-glaſs, which determines the point of *level*, when the ſtring and plumbet hang againſt the line on the ſilver blade.

All the accuracy of this inſtrument depends on the teleſcope's being fitted at right angles to the perpendicular. It has a ball and ſocket, by which it is faſtened to its foot; and is ſaid to have been the invention of M. Picard.

Level, *reflecting*, is that made by means of a pretty long ſurface of water, repreſenting the ſame object inverted, which we ſee erect by the eye; ſo that the point where thoſe two objects appear to meet, is in a *level* with the place where the ſurface of water is found. This is the invention of M. Mariotte.

There is alſo another *reflecting level*, conſiſting of a mirror of ſteel, or the like, well poliſhed, and placed a little before the object-glaſs of a teleſcope ſuſpended perpendicularly. This mirror muſt make an angle of 45 degrees with the teleſcope; in which caſe, the perpendicular line of the ſaid teleſcope is converted into a horizontal line; which is the ſame with the line of *level*. The invention of this is owing to M. Caſſini.

Level, *water*, that which ſhews the horizontal line by means of a ſurface of water, or other liquid: founded on this principle, that water always naturally places itſelf *level*.

The moſt ſimple is made of a long wooden trough, or canal, whoſe ſides are parallel to its baſs; ſo that being equally filled with water, the ſurface thereof ſhews the line of *level*. This is the chorobates of the ancients, deſcribed by Vitruvius, lib. viii. cap. 6.

This ſort of *level* is alſo made with two cups fitted to the two ends of a pipe three or four feet long, about an inch in diameter; by means whereof the water communicates from the one to the other cup: and this pipe being moveable on its ſtand, by means of a ball and ſocket, when the two cups become equally full of water, their two ſurfaces mark the line of *level*.

This inſtrument, inſtead of cups, may alſo be made with two ſhort cylinders of glaſs, three or four inches long, faſtened to each extreme of the pipe with wax, or maſtic. Into the pipe is filled ſome common or coloured water, which ſhews itſelf through the cylinders, by means whereof the line of *level* is determined; the height of the water with reſpect to the centre of the earth, being always the ſame in both cylinders. This *level*, though very ſimple, is yet very commodious for levelling ſmall diſtances.

Level *of M. Huygens's Invention* conſiſts of a teleſcope, *a* (*Tab. Surveying, fig.* 17.), in form of a cylinder; going through a ferril, in which it is faſtened by the middle. This ferril has two flat branches, *b b*, one above, and the other below; at the ends whereof are faſtened little moving pieces, which carry two rings, by one of which the teleſcope is ſuſpended to a hook at the end of the ſcrew 3; and by the other, a pretty heavy weight is ſuſpended, in order to keep the teleſcope in equilibrio. This weight hangs in the box 5, which is almoſt filled with linſeed oil, oil of walnuts, or other matter that will not eaſily coagulate, for more aptly ſettling the balance of the weight and teleſcope. The inſtrument carries two teleſcopes, cloſe and very parallel to each other, the eye-glaſs of the one being againſt the object-glaſs of the other, that one may ſee each way without turning the *level*. In the focus of the object-glaſs of each teleſcope, muſt a little hair be ſtrained horizontally, to be raiſed or lowered as occaſion requires, by a little ſcrew. If the tube of the teleſcope be not found level when ſuſpended, a ferril, or ring, 4, is put on it, and is to be ſlid along till it fixes to a *level*. The hook on which the inſtrument is hung, is fixed to a flat wooden croſs; at the ends of each arm whereof there is a hook, ſerving to keep the teleſcope from too much agitation in uſing, or in carriage. To the ſaid flat croſs is applied another hollow croſs, that ſerves as a caſe for the inſtrument; but the two ends are left open, that the teleſcope may be ſecured from the weather, and always in a condition to uſe. The foot of this inſtrument is a round braſs plate, to which are faſtened three braſs ferrils, moveable by means of joints, wherein are put ſtaves: and on this foot is placed the box.

LEVELLING, the art or act of finding a line parallel to the horizon, at one or more ſtations, in order to determine the height of one place with reſpect to another; for the laying grounds even, regulating deſcents, draining moraſſes, conducting waters, &c.

One place is ſaid to be higher than another, or *out of level* with it, when it is more remote from the centre of the earth; and a line equally diſtant from the centre of it in all its points, is called the *line of true level*: whence, becauſe the earth is round, that line muſt be a curve, and make a part of the earth's circumference, or an arch concentrical with it, as the line B C F G, *Tab.* II. *Surveying, fig.* 21. all the points whereof are equally diſtant from the centre of the earth A.

But the line of ſight, which the operations of levels give, is a tangent, or a right line perpendicular to the ſemidiameter of the earth; one extreme of which tangent being the point of contact, the other will be that of a ſecant drawn from the centre of the earth: and the point which determines it, will be above the ſurface of the earth, and of the true *level*, as much as that ſecant exceeds the radius, or ſemidiameter of the earth.

This extremity of the tangent is ſaid to be in the *apparent level*; as being that given by the ſight; but is eaſily reduced to the *true level*, becauſe we know by trigonometry, how much each ſecant exceeds the radius; and becauſe, by meaſuring, we have diſcovered the preciſe length of that radius. Or, ſince the apparent *level* between the places B and C is B D, and the true *level* is the arch B C; it is plain that the former riſes above the latter by the line C D. But by a well-known property of the circle $\overline{2\,AC + CD} \times CD = BD^2$, and the diameter of the earth being ſo great with reſpect to the line C D at all diſtances to which the operation of *levelling* commonly extends that 2 A C may be ſafely taken for 2 A C + C D without any ſenſible error, we ſhall have $2\,AC \times CD = BD^2$, and $CD = \frac{BD^2}{2AC}$ i. e. the difference between the true and apparent level is equal to the ſquare of the diſtance between the places divided by the diameter of the earth, or the riſe of the apparent above the true level is proportional to the ſquare of the diſtance. It was for want of the knowledge of this, that the ancients were not able to reduce the apparent level to the true one; and accordingly, to prevent falling into an error, never levelled above 20 feet at once, where ſuch reduction was not neceſſary.

By the table ſince made, it appears, that at the diſtance of 100 yards the apparent level is raiſed above the true one about one third of a line; ſo that the ancients, in this reſpect, were more ſcrupulous than needful. By means of this reduction we are now able to level diſtances of one or two miles, at a ſingle operation, which the ancients could not do in leſs than three hundred.

The following table, for ſhewing the height of the apparent level above the true, was calculated by Mr. Ferguſon, to the extent of a whole degree of a great circle on the earth's ſurface, and it agrees ſo nearly with one of the ſame ſort in Dr. Long's Aſtronomy, as not to differ quite two inches therefrom at the end of the whole degree, which contains 60 geographical miles, equal to $69\frac{1}{4}$ Engliſh miles. The uſe of this table is as follows: If the quantity of an arc of a great circle on the earth's ſurface is given in minutes or ſeconds of a degree, its meaſure may be found in feet and inches. Thus, ſuppoſe the arc contains ten ſeconds, which is the ſixth part of a geographical mile, its meaſure is 1015 feet 8 inches. So an arc of one minute of a degree, which is one geographical mile, contains 6094 feet, or 2031 yards 1 foot; which is 271 yards 1 foot longer than an Engliſh mile.

To find how far one can ſee in a true horizon (as at ſea) when the eye is raiſed to any given height above the horizon. Suppoſe the eye of an obſerver upon a ſhip at ſea to be 22 feet 2 inches above the ſurface of the water, he will then ſee 30470 feet all around him, or to the diſtance of 5 geographical miles.

Suppoſe the top of a mountain in the ſea to be ſeen at the diſtance of 60 geographical miles, or one degree, by an obſerver, whoſe eye is cloſe at the ſurface of the ſea; the height of that mountain is 3191 feet 1 inch, nearly, above the ſurface of the ſea. An Engliſh mile is 5280 feet, a geographical mile 6094.

Suppoſe a ſpring to be on one ſide of a hill, and a houſe on an oppoſite hill, with a valley between them; and that the ſpring, ſeen from the houſe, appears by a *levelling* inſtrument to be on a level with the foundation of the houſe, and is a mile from it; the apparent level of the ſpring is $10\frac{6}{10}$ inches above the true level of the houſe; and this difference would be ſufficient for the water to be brought in pipes from the ſpring to the houſe; the pipes being laid all the way in the ground.

If the diſtance of the object be greater than 60 minutes, or geographical miles, its height above the true level may be found thus. Suppoſe an eye at the ſurface of the ſea ſees the top of a mountain, which he knows to be 90 geographical miles, or a degree and a half, diſtant from him: take half that number of miles, and multiply the height of the apparent level above the true, anſwering to that half diſtance by 4; and the product will give the perpendicular height of that mountain. Thus, the half of 90 is 45, againſt which (in the table) ſtands 1794 feet 11,763 inches; which being multiplied by 4, gives 7179 feet 11 inches for the perpendicular height of the mountain above the level of the ſea.

According to theſe meaſures, the earth's circumference is 131,630,400 feet, or 24,930 Engliſh miles.

At the diſtance of 1 ſecond of a degree (or $\frac{1}{60}$ of a geographical mile) the height of the apparent LEVEL above the true is .0029547 parts of an inch; at 2 ſeconds diſtance it is four times as much; at 3 ſeconds, 9 times; at 4 ſeconds, 16 times as much; and ſo on, always increaſing in proportion to the ſquare of the diſtance.

A Table ſhewing the height of the apparent level above the true, at any diſtance within a degree of a great circle on the earth's ſurface, calculated to the 1000dth part of an inch.

Seconds	Feet	Inches	Inches	Minutes	Feet	Feet	Inches
If the diſtance of the object from the place of the ſpectator be	which meaſured in a great circle upon the earth, amounts to		the height of the apparent level above the true will be	If the diſtance of the object from the place of the ſpectator be	which meaſured in a great circle upon the earth, amounts to	the height of the apparent level above the true will be	
1	101	6,8	0,003	1	6094	0	10,637
2	203	1,6	0,012	2	12188	3	6,548
3	304	8,4	0,027	3	18282	7	11,732
4	406	3,2	0,047	4	24376	14	2,191
5	507	10.0	0,074	5	30470	22	1,923
6	609	4,8	0,106	6	36564	31	10,929
7	710	11,6	0,145	7	42658	43	5,209
8	812	6,4	0,189	8	48752	56	8,763
9	914	1,2	0,239	9	54846	71	9,591
10	1015	8,0	0,295	10	60940	88	7,692
11	1117	2,8	0,357	11	67034	107	3,067
12	1218	9,6	0,425	12	73128	127	7,716
13	1320	4,4	0,499	13	79222	149	10,025
14	1421	11,2	0,579	14	85316	173	8,836
15	1523	6,0	0,665	15	91410	199	5,307
16	1625	0,8	0,756	16	97504	226	11,052
17	1726	7,6	0,854	17	103598	256	2,079
18	1828	2,4	0,947	18	109692	287	2,362
19	1929	9,2	1,067	19	115786	319	11,928
20	2031	4,0	1,182	20	121880	354	6,768
21	2132	10,8	1,303	21	127974	390	10,882
22	2234	5,6	1,420	22	134068	429	0,267
23	2336	0,4	1,563	23	140162	468	10,931
24	2437	7,2	1,702	24	146256	510	6,866
25	2539	2,0	1,847	25	152350	554	0,075
26	2640	8,8	2,001	26	158444	599	2,558
27	2742	3,6	2,154	27	164538	646	2,315
28	2843	10,4	2,316	28	170632	694	11,345
29	2945	5,2	2,485	29	176726	745	5,649
30	3047	0,0	2,659	30	182820	797	9,228
31	3148	6,8	2,839	31	188914	851	10,080
32	3250	1,6	3,026	32	195008	907	8,206
33	3351	8,4	3,218	33	201102	965	3,606
34	3453	3,0	3,416	34	207196	1024	8,280
35	3554	10,0	3,619	35	213290	1085	10,227
36	3656	4,8	3,829	36	219384	1148	9,448
37	3757	11,6	4,045	37	225478	1213	5,943
38	3859	6,4	4,267	38	231572	1279	11,712
39	3961	1,2	4,494	39	237666	1348	2,755
40	4062	8,0	4,728	40	243760	1418	3,072
41	4164	2,8	4,967	41	249854	1490	0,663
42	4265	9,6	5,212	42	255948	1563	7,527
43	4367	4,4	5,463	43	262042	1638	11,655
44	4468	11,2	5,720	44	268136	1716	1,077
45	4570	6,0	5,983	45	274230	1794	11,763
46	4672	0,8	6,252	46	280324	1875	7,723
47	4773	7,6	6,527	47	286148	1958	0,956
48	4875	2,4	6,808	48	292512	2042	3,464
49	4976	9,2	7,094	49	298606	2128	3,245
50	5078	4,0	7,387	50	304700	2216	0,300
51	5179	10,8	7,685	51	310794	2305	6,629
52	5281	5,6	7,989	52	316888	2396	10,232
53	5383	0,4	8,300	53	322982	2489	11,108
54	5484	7,2	8,616	54	329076	2584	9,259
55	5586	2,0	8,938	55	335170	2681	4,683
56	5687	8,8	9,266	56	341264	2779	9,381
57	5789	3,6	9,660	57	347358	2879	11,353
58	5890	10,4	9,940	58	353452	2981	10,598
59	5992	5,2	10,285	59	359546	3085	7,119
60	6094	0,0	10,637	60	365640	3191	0,912

Ferguſon's Tables and Tracts, p. 243, &c. See Depression *of the horizon*.

The operation of *levelling* is as follows: ſuppoſe the height of the point A (*Tab.* II. *Surveying fig.* 22), on the top of a mountain, above that of the point B, and at the foot thereof, required: place the level about the middle diſtance, between the two points, as in D, and ſtaffs in A and B, and let there be perſons inſtructed with ſignals for raiſing and lowering, on the ſaid ſtaffs, little marks of paſteboard, or other matter. The level being placed horizontally by the bubble, &c. look towards the ſtaff A E, and cauſe the mark ſo raiſed to be lowered, till the middle, upper edge, or other moſt conſpicuous part, appear in the viſual ray. Then meaſuring exactly the perpendicular height of the point E, above the point A, which ſuppoſe 6 feet 4 inches, ſet that down in your book: then turn the level horizontally about, that the eye-glaſs of the teleſcope may be ſtill next the eye when you look the other way (if you have only plain ſights, the inſtrument need not be turned); and cauſe the perſon at the ſtaff B to raiſe or lower his mark, till ſome conſpicuous part of it fall in the viſual ray, as at C; then meaſure the perpendicular height of C above B, which ſuppoſe 16 feet 16 inches: ſet this alſo down in the book above the other number of the firſt obſervation; ſubtract the one from the other, the remainder will be ten feet four inches, which is the difference of level between A and B, or the height of the point A above the point B.

Note, If the point D, where the inſtrument is fixed, be in the middle between the two points A and B, there will be no neceſſity for reducing the apparent level to the true level: the viſual ray, in that caſe, being raiſed equally above the true level.

If it be farther required to know whether there be a ſufficient deſcent for conveying water from the ſpring A, to the point B, *Tab.* II. *Surveying*, *fig.* 23.—Here, in regard the diſtance from A to B is conſiderable, it is required that ſeveral operations be made. Having then choſen a proper place for the firſt ſtation as at I, ſet up a ſtaff in the point A, near the ſpring, with a proper mark to ſlide up and down the ſtaff, as L; and meaſure the diſtance from A to I, which ſuppoſe 2000 yards. Then the level being adjuſted in the point I, let the mark L be raiſed and lowered till ſuch time as you ſpy ſome conſpicuous part of it through the teleſcope, or ſights of the level, and meaſure the height A L, which ſuppoſe 13 feet 5 inches. But in regard to the diſtance A I is 2000 yards, you muſt have recourſe to your table for a reduction, ſubtracting 10 inches 3 lines, which will leave the height A L, 12 feet 6 inches 9 lines; and this note down in your book. Now turn the level horizontally about, ſo as the eye glaſs of the teleſcope may be towards the ſtaff at A; and fixing up another ſtaff at H, cauſe the mark G to be moved up and down, till you ſpy ſome conſpicuous part through the teleſcope, or ſights. Meaſure the height H G, which ſuppoſe 6 yards 4 feet 2 inches. Meaſure likewiſe the diſtance of the points I H, which ſuppoſe 1300 yards; from which diſtance, according to the table, 4 inches 3 lines muſt be ſubtracted from the height H G, which conſequently will but leave 6 yards 3 feet 9 inches 9 lines, to be taken down in your book.

This done, remove the level forwards to ſome other eminence, as E, whence the ſtaff H may be viewed; as alſo another ſtaff at D, near the place where the water is to be conveyed. The level being again adjuſted in the point E, look back to the ſtaff H; and managing the mark as before, the viſual ray will give the point F. Meaſure the height H F, which ſuppoſe 11 feet 6 inches. Meaſure likewiſe the diſtance H E, which ſuppoſe 1000 yards; for which diſtance the table gives 2 inches 5 lines of abatement; which being taken from the height H F, there will remain 11 feet 3 inches 7 lines, which enter in your book. Laſtly, turning the level to look at the next ſtaff D, the viſual ray will give the point D. Meaſure the height of D from the ground, which ſuppoſe 8 feet 3 inches. Meaſure alſo the diſtance from the ſtation E to B, which ſuppoſe 900 yards; for which diſtance the table gives 2 inches 1 line of abatement; which being taken from the height B D, there will remain 8 feet 11 lines, which enter as before.

For the manner of entering down obſervations in your book, obſerve that when a proper place or ſtation for the level, between the two points, has been pitched upon, you muſt write down the two heights obſerved at that ſtation, in two different columns, viz. under the firſt column, thoſe obſerved in looking through the teleſcope when the eye was from the ſpring, or towards the point, which we may call *back-ſights*; and under the ſecond column thoſe obſerved when the eye was next the ſpring, which we call *foreſights*, in the manner following:

Back-ſights.	*feet in. line.*	Fore-ſights.	*feet in. line.*
Firſt height corrected	12 : 6 : 9	Second height	21 : 09 : 9
Third height	11 : 3 : 7	Fourth height	8 : 00 : 11
	23 : 10 : 4		29 : 10 : 8

Having ſummed up the heights of each column ſeparately, ſubtract the leſſer from the greater, the remainder will be the difference of level between the points A and B; as in this example,

feet. inch. line.
29 : 10 : 08
23 : 10 : 04
6 : 00 : 04—The difference of height, or level, between the points A and B.

If the diſtannce of the two points be required, add all the diſtances meaſured together; and dividing the difference of height by the yards of the diſtances; for each 200 yards you will have a deſcent of about 2 inches 9 lines.

This problem may be otherwiſe ſolved in the following manner: let the line *f g*, *Tab. Surveying*, *fig.* 24, repreſent the line of ſight of the teleſcope, drawn from *f*, the interſection of the croſs-hairs, through *g* the centre of the object glaſs; and the points *b*, *b*, be the marks on the glaſs tube or ſpirit level *a b c*. While theſe parts of the inſtrument are immutably fixed with reſpect to each other, it is manifeſt, that as often as the air-bubble is exactly reduced to the marks *b*, *b*, the line of ſight will be always reduced to the ſame poſition with reſpect to the horizon or to a plumb line. Nor is it at all neceſſary in the buſineſs of *levelling* that the line of ſight and plumb line ſhould be exactly at right angles; but only that the angles they make ſhall be always the ſame. Let *p* and *q*, *fig.* 25, be two given points in two remote places, and let it be required to find which is the lower and how much. Let *p a* and *q b* repreſent two ſtraight ſtaffs or poles fixt upright, by means of a plumb line. Having placed the teleſcope by the ſide of the pole *p a*, and directed the line of ſight to the pole *q b*, alter its elevation by the ſcrew adapted to this purpoſe, till the air-bubble reſts exactly at the marks upon the tube. Then let an aſſiſtant mark the point *b*, which appears to be covered by the croſs hairs; and alſo the point *a* exactly upon a level with the croſs hairs; which is eaſily done by a common ſquare applied to the ſide of the pole *p a*. Then remove the teleſcope to the pole *b q*, and here let the ſame things be repeated; that is, let *d* be the place upon a level with the croſs hairs, and *e* the point upon the other pole *p a*, that appears to be covered by them while the air-bubble reſts at the ſame mark as before. Biſect the interval *a e* in *g*, and the interval *b d* in *h*, and the points *g*, *h* will be upon a level: that is, if we ſuppoſe *g p q h* to repreſent a long canal full of ſtagnating water, the points *g*, *h* will both be in its ſurface; and conſequently taking the leſſer depth *p g* from the greater *q h*, their difference *q r* ſhews how much the point *q* is below the point *p* or *r*.

If the places *p*, *q* cannot be ſeen from each other, or if the difference of their heights be greater than the length of any common poles, then one or more intermediate ſtations muſt be choſen; and by repeating the ſame practice between every two ſucceſſive ſtations, we ſhall find the level of the extremes.

When the points *g*, *h* are once found upon two poles not far aſunder, it will be convenient by moving the croſs hairs, to rectify the line of ſight, ſo as to be nearly coincident with the line *g h*, or with a line parallel to it; for then in future levellings, at greater diſtances, the marks *b*, *e* will be leſs ſubject to fall above or below the poles.

This reciprocal way of levelling ſeems to be the moſt exact of any, eſpecially if it be performed by two inſtruments made to agree together beforehand; which may be done by placing them together, and by altering the croſs hairs in either of them, till the ſame mark upon a remote object is covered by both the croſſes, while both the bubbles reſt at their marks upon the tubes. Then may two obſervers find the marks upon the oppoſite poles at the ſame time; and conſequently the refractions of the rays in the air, whatever be their quantities, will be equal as near as poſſible; and then the reſult of the practice will be as accurate as if there had been no refractions at all. For let the curve *b i a*, *fig.* 26, repreſent the courſe of the viſual ray from *b* to *a*; and let the lines *a k*, *b l* touch it at *a* and *b*. Then becauſe the points *a*, *b* are very nearly upon a level, the denſity and conſtitution of the air and vapours at the ſame inſtant will be nearly the ſame in each place; and by conſequence the curve *a i b* and its tangents at *a* and *b*, will be equally inclined to the chord *a b*. For the ſame reaſons the curve *e m d* will be ſimilar and equal to the curve *a i b*, being ſituated ſo very near to it. Therefore the angle *e d n*, under the chord *e d* and tangent *d n*, will be equal to the angle *a b l*, or *b a k*; and conſequently ſince the angles *q d n*, *p a k* are made equal in the two obſervations, by taking away the equal angles *e d n*, *b a k*, cauſed by the equal refractions, the remaining angles *q d e*, *p a b* will be equal to each other, as if there were no refractions at all.

If the reciprocal obſervations be made about the middle of the ſame day, when the air is the pureſt, there will ſcarce be any occaſion for two inſtruments; but if they be made near the morning or evening, even on the ſame day, an equality of refractions cannot be depended upon, unleſs they are made at the ſame inſtant. The members of the Royal Academy of Sciences at Paris tell us, in their account of the Meaſure of the Earth, they often found, that an object which at break of day appeared in the level, and ſometimes a little above it, did afterwards, when the ſun was up, appear below it. And on the contrary, after the ſetting of the ſun, objects far diſtant appeared to be raiſed ſo ſenſibly, that in leſs than half an hour their apparent height was augmented more than three minutes. As to the cauſe of theſe appearances they add, that the coolneſs of the night condenſes the vapours, which deſcend to a lower place, leaving the air in the higher ſtations more pure than in the day time. And, on the contrary, when the heat of the ſun has made a part of the vapours to mount to more elevated ſtations, there muſt be leſs difference of the mediums, and conſequently a leſs refraction.

Setting aſide the curvity of a ray, which Mr. Picard tells us is ſcarce ſenſible about noon, when the diſtance of the object does not exceed 1000 toiſes, the line of ſight through the teleſcope may be ſet perpendicular to a plumb-line or parallel to the horizon in this manner. Having found two points *g*, *h*, *fig.* 27. upon a level as before, let *g i* be perpendicular to *g c* and cut *c h* in *i*, and having computed the line *h i* (as follows) and made a mark at *i*, place the level at *g*, and alter the place of the croſs hairs in the focus, till they appear to cover the point *i* when the air-bubble is at its marks, and the buſineſs is done. Now the line *h i* is equal to the ſquare of *g h* applied to 2 *g c*, and conſequently may be found by meaſuring the diſtance *g h*, and dividing its ſquare by the diameter of the earth, which may be ſuppoſed equal to 2 *g c* though it is not exactly ſo, the earth being not exactly ſpherical. For biſecting *g h* in *k*, draw *c k* cutting *g i* in *l*; and ſince the triangles *k g l*, *k c g* are ſimilar, we have *k l* : *k g* : : *k g* : *k c*, and by doubling them all, we have *k i* : *g h* : : *g h* : 2 *k c*. Mr. Piccard computes that when the diſtance *g h* is 300 toiſes or 1800 Paris feet, the line *h i* is one inch: and hence any other *h i* may be found for any other known diſtance; it being as the ſquare of the diſtance *g h*.

Hence when the inſtrument is thus rectified, the point *h* upon the level with *g*, may be found by one obſervation; that is my marking the point *i* covered by the croſs hairs, and by computing *i h* by the rule above. As the intervals between the ſtations muſt be but ſmall in this method, becauſe of refractions, as was ſaid above, the readieſt way is to make them all equal; which may be known exact enough for this purpoſe, by obſerving whether the pole be removed to ſuch a diſtance, that its image (or the image of any given part of it) in the focus of the teleſcope ſhall be always of the ſame length, being meaſured by the diſtance between two parallel hairs in the focus: and then the ſame allowance muſt always be made for the depth of the point *h* below *i*.

Laſtly, by means of theſe parallel hairs, it is eaſy to find when the teleſcope is placed in the middle between two ſtations; and then the points upon a level at each pole are preſently found, by directing the teleſcope firſt to one pole and then to the other, and by marking the points covered by the croſs hairs. And theſe points will be upon a level, notwithſtanding any refractions of the viſual rays, becauſe the refraction of each ray will be equal. Smith's Optics, book iii. chap. 14.

Dr. Halley ſuggeſts a new method of *levelling*, which has been put in practice by ſome of the French academy; this is performed wholly by means of the barometer, in which the mercury is found to be ſuſpended to ſo much the leſs height as the place is farther remote from the centre of the earth. Hence it follows, that the different heights of the mercury, in two places, give the difference of level.

Mr. Derham, from ſome obſervations he made at the top and bottom of the Monument, found that the mercury fell one tenth of an inch at every 82 feet of perpendicular aſcent, when the mercury was at 30 inches. Dr. Halley allows of one tenth of an inch for every 30 yards; which, conſidering how accurately the barometers are now made, an inch, in ſome of them, being divided into an hundred, or more parts, all very ſenſible, he thinks this method ſufficiently exact to take the levels for the conveyance of water, and leſs liable to errors than the common levels.

The ſame author found a difference of three inches eight tenths, between the height of the mercury at the top and bottom of Snowdon-hill in Wales.

Mr. Ferguſon has calculated the following table, for ſhewing how much the mercury would ſink in a barometer at given heights above the earth's plane ſurface; and conſequently, how the perpendicular height of any hill may be found thereby.

At the height of	Merc. ſinks		At the height of	Merc. ſinks.		At the height of	Merc. ſinks.		At the height of	Merc. ſinks.	
Feet.	Inches.	100 parts.	Feet.	Inches.	100 parts.	Feet.	Inches.	100 parts.	Feet.	Inches.	100 parts.
100	0	11	3400	3	54	6700	6	54	10000	9	20
200	0	22	3500	3	63	6800	6	63	10100	9	27
300	0	33	3600	3	73	6900	6	71	10200	9	34
400	0	44	3700	3	82	7000	6	80	10300	9	42
500	0	54	3800	3	92	7100	6	88	10400	9	50
600	0	65	3900	4	02	7200	6	97	10500	9	57
700	0	76	4000	4	12	7300	7	05	10600	9	64
800	0	87	4100	4	21	7400	7	13	10700	9	72
900	0	98	4200	4	30	7500	7	22	10800	9	79
1000	1	09	4300	4	39	7600	7	30	10900	9	87
1100	1	19	4400	4	49	7700	7	38	11000	9	94
1200	1	30	4500	4	58	7800	7	46	11100	10	01
1300	1	40	4600	4	67	7900	7	55	11200	10	08
1400	1	51	4700	4	77	8000	7	63	11300	10	16
1500	1	61	4800	4	86	8100	7	71	11400	10	23
1600	1	72	4900	4	95	8200	7	79	11500	10	30
1700	1	82	5000	5	04	8300	7	87	11600	10	37
1800	1	95	5100	5	13	8400	7	95	11700	10	44
1900	2	03	5200	5	22	8500	8	03	11800	10	52
2000	2	14	5300	5	31	8600	8	11	11900	10	59
2100	2	24	5400	5	40	8700	8	19	12000	10	66
2200	2	34	5500	5	49	8800	8	27	12100	10	73
2300	2	44	5600	5	58	8900	8	35	12200	10	80
2400	2	54	5700	5	67	9000	8	43	12300	10	87
2500	2	64	5800	5	76	9100	8	51	12400	10	94
2600	2	75	5900	5	85	9200	8	58	12500	11	01
2700	2	85	6000	5	94	9300	8	66	12600	11	08
2800	2	95	6100	6	02	9400	8	74	12700	11	15
2900	3	05	6200	6	11	9500	8	82	12800	11	22
3000	3	15	6300	6	20	9600	8	89	12900	11	39
3100	3	25	6400	6	28	9700	8	97	13000	11	40
3200	3	34	6500	6	37	9800	9	05	13100	11	43
3300	3	44	6600	6	45	9900	9	12	13200	11	50

At the height of	Merc. ſinks.		At the height of	Merc. ſinks.		At the height of	Merc. ſinks		At the height of	Merc. ſinks.	
Feet.	Inches.	100 parts.	Feet.	Inches.	100 parts.	Feet.	Inches.	100 parts.	Feet.	Inches.	100 parts.
13300	11	56	16000	13	34	18700	14	99	21400	16	57
13400	11	63	16100	13	40	18800	15	05	21500	16	63
13500	11	70	16200	13	47	18900	15	11	21600	16	68
13600	11	77	16300	13	53	19000	15	17	21700	16	74
13700	11	84	16400	13	59	19100	15	23	21800	16	80
13800	11	90	16500	13	65	19200	15	29	21900	16	86
13900	11	97	16600	13	71	19300	15	35	22000	16	91
14000	12	04	16700	13	78	19400	15	41	22100	16	97
14100	12	11	16800	13	84	19500	15	47	22200	17	02
14200	12	17	16900	13	90	19600	15	53	22300	17	08
14300	12	24	17000	13	96	19700	15	59	22400	17	14
14400	12	30	17100	14	02	19800	15	64	22500	17	19
14500	12	37	17200	14	08	19900	15	70	22600	17	25
14600	12	44	17300	14	15	20000	15	76	22700	17	30
14700	12	50	17400	14	21	20100	15	82	2280	17	36
14800	12	57	17500	14	27	20200	15	88	22900	17	42
14900	12	63	17600	14	33	20300	15	94	23000	17	47
15000	12	70	17700	14	39	20400	15	99	23100	17	53
15100	12	76	17800	14	45	20500	16	05	23200	17	58
15200	12	83	17900	14	51	20600	16	11	23300	17	64
15300	12	89	18000	14	57	20700	16	17	23400	17	69
15400	12	96	18100	14	63	20800	16	23	23500	17	75
15500	13	02	18200	14	69	20900	16	29	23600	17	80
15600	13	09	18300	14	75	21000	16	34	23700	17	86
15700	13	15	18400	14	81	21100	16	40	23800	17	91
15800	13	21	18500	14	87	21200	16	46	23900	17	97
15900	13	28	18600	14	93	21300	16	51	24000	18	02

By this table, and a common barometer tube, the perpendicular height of any hill may be found in the following manner.

The lower end of the tube being immerſed in quickſilver in the common way, and the tube fixed to a board, let a ſcale, eighteen inches in length, be divided into inches, and each inch into a hundred equal parts, by diagonal lines, the diviſions to be numbered downward from the top. The ſcale muſt be made to ſlide in a groove on the board, and have a croſs index to ſlide upon it to any diviſion.

Then, at the bottom or foot of the hill, place the ſcale ſo as the beginning of the diviſions at its top may be juſt even with the top or ſurface of the mercury in the tube. This done, carry the machine up to the top of the hill; then ſet the index to the ſurface of the mercury, and it will ſhew how much the mercury has ſunk in the tube, at the top of the hill, from the point where it ſtood when at the bottom; and the number of feet expreſſed in the table, againſt the like ſinking of the mercury, will be the perpendicular height of the hill.

Thus, ſuppoſing the mercury has ſunk 8 inches and 3 hundredth parts of an inch, the height of the hill muſt be 8500 feet, or a mile, and ſomewhat more than a quarter. Proportionable allowance is eaſily made for intermediate heights in the table, which are only to whole hundredths of feet.

As Mr. Derham found the difference of height of the mercury at the bottom and top of Snowdon-hill in Wales to be 3 inches and 8 tenths (the ſame as 3 inches 80 hundreths) it ſhews that the height of that hill is 3700 feet, or almoſt three quarters of a mile.

N. B. 660 feet make an eighth part of a mile, 1320 feet a quarter of a mile, 2640 feet half a mile, 3960 feet three quarters of a mile, and 5280 feet make a whole mile. See BAROMETER and ATMOSPHERE.

Dr. Deſaguliers contrived an inſtrument, by which the difference of level of two places, which could not be taken in leſs than four or five days with the beſt teleſcope levels, may be taken in a few hours. The inſtrument is as follows:

To the ball C (*Tab.* II. *Surveying*, *fig*. 28.) is joined a recurved tube B A, of a very fine bore, with a ſmall bubble at the top A, whoſe upper part is open. From the conſtruction of this inſtrument, it is evident, that if it be inclined in carrying, no prejudice will be done to the liquor, which will always be right both in the ball and the tube, when the inſtrument is ſet upright. If the air at C be ſo expanded by heat, as to drive the liquor to the top of the tube, the cavity A will receive the liquor, which will come down again, and ſettle at D, or near it, according to the level of the place where the inſtrument is, as ſoon as the air at C returns at the ſame temperament as to heat and cold. For preſerving the ſame degree of heat, when the different obſervations are made, the machine is fixed in a tin veſſel, E F, filled with water up to *g h*, above the ball, and a very ſenſible thermometer has alſo its ball under water, that one may obſerve the liquor at D, in each experiment, when the liquor in the thermometer ſtands at the ſame height as before. The water is poured out when the inſtrument is carried, which may be done conveniently by means of the wooden frame, (*fig*. 29.) which is ſet upright by three ſcrews, S, S, S, and a line and plummet P P (*fig*. 30.) At the back part of the wooden frame (*fig*. 31.) from the piece at top K, hangs the plummet P, over the braſs point at N. M, *m*, are brackets for keeping the upright board, K N, at right angles with the horizontal one at N. The machine ſeen in front is repreſented *fig*. 32. ſuppoſing the fore part of the tin veſſel tranſparent; and here the braſs ſocket of the recurved tube, into which the ball is ſcrewed, has two wings at I I, fixed at the bottom, that the ball may not break the tube by its endeavour to emerge, when the water is poured in as high as *g h*.

After Dr. Deſaguliers had contrived this machine, he conſidered, that as the tube is of a very ſmall bore, if the liquor ſhould riſe into the ball at A (*fig*. 28.) in carrying the inſtrument from one place to another, ſome of it would adhere to the ſides of the ball A, and upon its deſcent in making the experiment, ſo much might be left behind, that the liquor would not be high enough at D, to ſhew the difference of the level; therefore, to prevent that inconveniency, he contrived a blank ſcrew, to ſhut up the hole at A, as ſoon as one experiment is made, that in carrying the machine, the air in A may balance that in C, ſo that the liquor ſhall not run up and down the tube, whatever degree of heat and cold may act upon the inſtrument in going from one place to another. Now becauſe one experiment may be made in the morning, and the water may be ſo cold, that when a ſecond experiment is made at noon, the water cannot be brought to the ſame degree of cold it had in the morning; therefore, in making the firſt experiment, warm water muſt be mixed with the cold, and when the water has ſtood ſome time before it comes to be as cold as it is likely to be at the warmeſt part of that day, obſerve and ſet down the degree of the thermometer at which the ſpirit ſtands, and likewiſe the degree of the water in the barometer at D; then ſcrew on the cap at A, pour out the water, and carry the inſtrument to the place whoſe level you would know; then pour in your water, and when the thermometer is come to the ſame degree as before, open the ſcrew at top, and obſerve the liquor in the barometer.

The doctor's ſcale for the barometer is ten inches long, and divided into tenths; ſo that ſuch an inſtrument will ſerve for any heights not exceeding ten feet, each tenth of an inch anſwering to a foot in height.

The doctor made no allowance for the decreaſe of denſity in the air, becauſe he did not propoſe this machine for meaſuring mountains (though with a proper allowance for the decreaſing denſity of the air, it will do very well), but for heights to be known in gardens, plantations, and the conveyance of water; where an experiment that anſwers to two or three feet in a diſtance of twenty miles, will render this a very uſeful inſtrument. Deſaguliers' Exp. Phil. vol. ii. p. 372, &c.

For the common occaſion of *levelling* to be performed without much apparatus of inſtruments, time, or trouble, the following method may ſerve: ſet a pole upright in a ſpring, pond, river, or other place, whence water is to be brought, and mark how many feet, and inches, are above water. Then ſet up another pole, of equal length with the other, in the place to which the water is to come. Place the centre of a quadrant on the top of this laſt pole, the plummet hanging freely; ſpy through the ſights the top of the pole that is in the water, and if the thread cuts any degree of the quadrant, the water may be conveyed by a pipe laid in the earth. If you cannot ſee from one extreme to the other, the operation may be repeated in the manner already directed.

LEVEL-*range*. See HORIZONTAL *range*.

LEVELLING-*ſtaves*, are inſtruments uſed in *levelling*; ſerving to carry the marks to be obſerved, and at the ſame time ſo meaſure the heights of thoſe marks from the ground. They uſually conſiſt each of two long ſquare wooden rulers, made to ſlide over one another, and divided into feet, inches, &c.

LEVEN, in *Natural Hiſtory*, a term uſed by Boccone for the milky juice contained in the globules placed at the tops of the ſtalks of red coral. Theſe round buttons are the only part of the coral which are ſoft while under water, and from theſe the milky juice is eaſily expreſſed by a gentle ſqueezing between the fingers. The globules are each made up of five or ſix little cells, not communicating with one another, and its containing its own ſeparate quantity of this white and thick fluid. When the coral is newly taken up out of the ſea, this juice is of a ſharp, acrimonious, and aſtringent taſte; but when it has been ſome time expoſed to the air, it loſes the acrimony, and the aſtringency of the taſte only remains. This change in the taſte is made in ſix or eight hours, in hot weather, and the juice in the ſame time, looſes its colour and conſiſtence, growing hard and brown. Phil. Tranſ. N° 100.

LEVER, or LEAVER, in *Mechanics*, an inflexible ſtraight bar, ſupported, in a ſingle point, on a fulcrum, or prop, and uſed for the raiſing of weights.

The word is formed of the French *levier*, which ſignifies the ſame; formed of the verb *lever*, or Latin *levare*, *to raiſe*.

The *lever* is the firſt of thoſe called mechanical powers, or ſimple machines, as being, of all ſuch, the moſt ſimple; and is chiefly applied for raiſing weights to ſmall heights.

In a *lever* there are three things conſidered: the weight to be raiſed, or ſuſtained, as O (*Tab. Mechanics, fig.* 1.) The power by which it is to be raiſed, or ſuſtained, as B. And the fulcrum or prop, D, whereon the *lever* is ſuſtained, or rather on which it moves round, the fulcrum remaining fixed.

Levers are of three kinds; ſometimes the fulcrum, or centre of motion is placed between the weight and the power, as in *fig.* 1. this we call a *lever of the firſt kind*, or *vectis* HETERODROMUS; to which may be reduced ſciſſars, pincers, ſnuffers, &c. ſometimes the weight is between the fulcrum and the power, which is called a *lever of the ſecond kind*, as in *fig.* 2. Of this kind are the oars and rudder of a boat, the maſts of ſhips, cutting knives fixed at one end, and doors whoſe hinges are as the fixed point. And ſometimes the power acts between the weight and the fulcrum, which is the *lever of the third kind* Such is a ladder lifted by the middle to rear it up againſt a wall; theſe two are called *vectes* HOMODROMI.

In this laſt, the power muſt exceed the weight in proportion as its diſtance from the centre of motion is leſs than the diſtance of the centre from the weight. And as the firſt two kinds of *lever* ſerve for producing a ſlow motion by a ſwift one, ſo the laſt ſerves for producing a ſwift motion of the weight by a ſlow motion of the power. It is by this kind of *levers* that the muſcular motions of animals are performed, the muſcles being inſerted much nearer to the centre of motion than the point where the centre of gravity of the weight to be raiſed is applied; ſo that the power of the muſcle is many times greater than the weight which it is able to ſuſtain. Though this may appear at firſt ſight a diſadvantage to animals, becauſe it makes their ſtrength leſs; it is, however, the effect of excellent contrivance; for if the power was, in this caſe, applied at a greater diſtance than the weight, the figure of animals would be not only aukward and ugly, but altogether unfit for motion; as Borelli has ſhewn in his treatiſe De Motu Animalium.

The power of the *lever* is founded on the following therorem; viz. "That the ſpace, or arch, deſcribed by each point of a *lever*, and conſequently the velocity of each point of a *lever*, is as its diſtance from the fulcrum, or prop."

From hence it follows, that the action of a power, and the reſiſtance of the weight, increaſe in proportion to their diſtance from the fulcrum.

And hence alſo it follows, that a power will be able to ſuſtain a weight, if the diſtance of the point in the *lever* to which it is applied, be to the diſtance of the weight, as the weight to the intenſity of the power which, if it be ever ſo little increaſed, muſt raiſe the weight. See this doctrine demonſtrated under the word MECHANIC *Powers*; and farther illuſtrated under the word BALANCE; between which, and the *lever*, there is a great analogy; a *lever* of the firſt kind being a ſort of ſteelyard to raiſe weights.

The power and action of the *lever* will be fully illuſtrated by the following propoſitions:

1. If the power applied to a *lever* of any kind ſuſtain a weight, the power is to the weight in a reciprocal ratio of their diſtances from the fulcrum.

2. The weight of a *lever* of the firſt or ſecond kind A B, *fig.* 1. the diſtance of the centre of gravity from the fulcrum C V, and the diſtances of the weight, and the power A C and C B, being all given, to find the power that will ſuſtain it. Suppoſe the *lever* void of gravity, but in lieu thereof a weight hung at V: if then A C be made to C V, as the gravity of the *lever* to a fourth number, we ſhall have the weight which the *lever* is able to ſuſtain; and this ſubtracted from the given weight, the remainder will be the weight to be ſuſtained by the power. Let C B then be to C A, as the remaining weight to a fourth weight, and we ſhall have the power to be applied in B, in order to ſuſtain the given weight with the given *lever*.

3. The gravity of a *lever* of the firſt or ſecond kind A B, the diſtance of the centre of gravity from the fulcrum C V, the diſtances of the power, and the weight B C and C A, being all given, to find the weight to be ſuſtained. Find the part of the weight ſuſtained by the *lever* alone, as in the former problem: in the ſame manner find the other part of the weight, which the power applied in B is able to ſuſtain; add the two numbers together, and the ſum is the weight required.

4 The gravity, and centre of gravity F, of a *lever* of the ſecond kind C B, *fig.* 2. with the weight G, its diſtance from the fulcrum C A, and from the power C B, being given, to find the power capable of ſuſtaining the weight. Suppoſe the *lever* void of gravity, but in lieu thereof a weight equal thereto hung in F, the power required to ſuſtain the *lever* alone; then find the power requiſite to ſuſtain the given weight G; add the powers together, and the ſum will be the power required.

5. If a power applied to a *lever* of any kind lift a weight, the ſpace of the firſt is to that of the laſt, as is this laſt to a power able to ſuſtain the ſame weight; whence it follows, that the gain of force is always attended with the loſs of time, and *vice verſâ*.

When the two arms of a *lever* are not in a right line, but contain any invariable angle at C (*Tab* IV. *Mechanics, fig.* 49.) the *lever* is called a bended *lever*; and is evidently of the firſt kind, and the law of the equilibrium is the ſame; i. e. if the power P be applied at B to the arm C B, and the weight W acts by means of a pulley M, in the direction A M, perpendicular to the arm A, the power and weight will ſuſtain each other, if P be to W, as C A to C B, or $P \times CB = W \times CA$. If ſeveral powers act upon the arm C A, find their centre of gravity, A, on the arm C A, and ſuppoſe all the powers to be united there; and if the power P be to their ſum as C A to C B, it will ſuſtain them. The ſum of the powers being given, it is manifeſt that the farther their centre of gravity A is removed from the centre of motion C, the greater reſiſtance they will oppoſe againſt the power P, and it will require the greater force in the power to overcome them. Hence Galileo juſtly concludes, that the bones of animals are the ſtronger for their being hollow, their weight being given; or if the arm C B F repreſents their length, the circle C H D a ſection perpendicular to the length, P any power applied along their length, tending to break them; then the ſtrength or force of all their longitudinal fibres, by which the adheſion of the parts is preſerved, may be conceived to be united in A, the centre of the circle C H D, which is the common centre of gravity of thoſe forces, whether the ſection be a circle or annulus. But it is plain that when the area of the ſection, or the number of ſuch fibres is given, the diſtance C A is greater when the ſection is an annulus than when it is a circle without any cavity; conſequently the power with which the parts adhere, and which reſiſts againſt P, that endeavours to ſeparate them, is greater in the ſame proportion. For the ſame reaſon, the ſtalks of corn, the feathers of fowls, and hollow ſpears, are leſs liable to accidents that tend to break them than if they were of the ſame weight and length, but ſolid, without any cavity. In this inſtance, ſays Mr. Maclaurin, (View of Sir I. Newton's Phil. Diſc. book ii. chap. 3. § 13.) art only imitates the wiſdom of nature.

LEVERET, amongſt *Sportſmen*, a young hare, in the firſt year of its age.

LEVIGATION, the reduction of hard and ponderous bodies, as coral, tutty, precious ſtones, &c. into a fine ſubtil powder, by grinding them with water upon porphyry, or the like, as painters do their colours.

Levigation is much uſed in pharmacy and chemiſtry; but unleſs the grinding inſtruments be extremely hard, they will wear away, ſo as ſometimes to double the weight of the medicine thus managed.

LEVIRATE, in the *Jewiſh Cuſtoms*, a term uſed by authors who have written on the law and cuſtoms of the Jews, to denote particularly that law of Moſes, which obliges one brother to marry the widow of another, who died without children, to raiſe up ſeed to him.

The word is derived from *levir*, which ſignifies, in Latin, the huſband's brother, or the brother-in law; and the word *levirate* has been hence formed, to expreſs the law whereof we have been ſpeaking.

This law, which is an exception to that which condemns marriages between brothers and ſiſters, and between brothers-in-law, and ſiſters-in-law, ſeems to have been in uſe among the Hebrews and Canaanites before the time of Moſes; ſince Judah gave his firſt-born Er, and Onan his ſecond ſon, ſucceſſively to Tamar, and obliges himſelf to give her likewiſe to Selah his third ſon. Calm. Dict. Bibl.

LEVISTICUM, in *Botany*, a name given by ſome to *liguſticum*, or LOVAGE.

LEVITE, an inferior kind of miniſter in the Jewiſh tabernacle and temple, who had the care and management of the ſacred utenſils.

The word comes from the Greek λευιτης, the root of which is the name *Levi*; which was given to that patriarch by his mother Leah, from the Hebrew לוה, *lavah*, *to be tied*, or *united*; Leah hoping, by the birth of this ſon, to be more cloſely linked to her huſband Jacob; and, therefore, in a large ſenſe, the *Levites* were the poſterity of this patriarch, and conſtituted one of the twelve tribes of Iſrael. But the ſons of Levi were appointed to this office, in conſequence of the extraordinary zeal they diſcovered againſt idolatry, in the caſe of the golden calf. Exod. xxxii. 26. 28. They were originally divided into three claſſes or families, from the three ſons of Levi, Kohath, Gerſhon, and Merari, but afterwards by David in twenty-four courſes.

The *Levites*, in the Jewiſh church, were an order inferior to the prieſts; and anſwered, in ſome meaſure, to deacons, in the Chriſtian church.

The *Levites* of the old law had no ſettled lands allotted them for their maintenance, as the other tribes had, but lived chiefly on the offerings made to God. They were diſtributed through all the tribes, each of which gave ſome of their cities to the *Levites*, amounting in all to the number of thirty-five, with grounds in their neighbourhood for the ſubſiſtence of their flocks. In the weeks of their attendance at the ſanctuary, they were maintained by the dues ariſing from the ſacrifices; beſides theſe dues, the firſt-fruits, which were brought to the temple, and the money paid for the redemption of the firſt born, contributed to their ſubſiſtence. But their maintenance chiefly aroſe from the tithes of the produce of the whole country, which was the law allotted to the tribe of Levi, Numb. xviii. 21. a tenth of which they paid to the prieſts.

According to the numeration made by Solomon, from the age of twenty there were thirty-eight thouſand *Levites* capable of ſerving; twenty-four thouſand of theſe he appointed for the daily miniſtry under the prieſts, ſix thouſand to be inferior judges in the cities and to decide matters relating to religion, and of no great conſequence to the ſtate; four thouſand to be door-keepers, and to take care of the riches of the temple; and the reſt to do the office of chanters, or ſingers.

LEVITICI, in *Church Hiſtory*, a ſect of heretics, who ſprung from the Gnoſtics and Nicolaitans.

LEVITICUS, a canonical book of the Old Teſtament, ſo called from its containing the laws and regulations relating to the prieſts, Levites, and ſacrifices.

LEVITY, the privation or want of weight in any body, when compared with another that is heavier.

In which ſenſe, *levity* ſtands oppoſed to GRAVITY.

The ſchools maintain, that there is ſuch a thing as *poſitive*, and *abſolute levity*, and impute to this the riſe, or emergency of bodies lighter in ſpecie then the bodies wherein they riſe.

But we find by experience, that all bodies tend towards the earth, ſome ſlower, and ſome faſter, in all fluids, or mediums, whether water, air, &c. Thus, cork is only ſaid to be lighter than gold, becauſe, under equal dimenſions, the gold will ſink in, and the cork ſwim upon water.

Archimedes has demonſtrated, that a ſolid body will float any where in a fluid of the ſame ſpecific gravity; and that a lighter body will keep above a heavier. The reaſon is, that of bodies falling towards the earth, thoſe which have a like number of equal parts, have equal gravity; ſince the gravity of the whole is the ſum of the gravity of all its parts. Now two bodies have an equal number of equal parts, if under the ſame dimenſions there be no intervals deſtitute of matter; whence it follows, that as no portion of matter is ſo ſmall, but that the body wherein it is contained may be wholly divided into parts equally ſmall, there can be no reaſon for the deſcent of theſe, which will not equally hold for the deſcent of that.

Hence it may be concluded, that thoſe bodies which do not equally gravitate under the ſame dimenſions, do not contain equal portions of matter; and, therefore, when we ſee, that a cube of gold ſubſides in water at the ſame time that an equal bulk of cork ſwims upon it, it is evident, that the gold muſt have a greater number of equal parts of matter, under the ſame bulk, than the cork; or the cork muſt have a greater number of vacuities than the gold; and that there is alſo in the water a greater number of vacuities than in gold. See FLUIDS, and *Specific* GRAVITY.

Hence we have a clear idea both of denſity or gravity, and of *levity*; and know, that the latter cannot, in a ſtrict ſenſe, be accounted any thing poſitive, but only a mere negation, or abſence, of body; which determines that body to be lighter than another which contains more matter.

Dr. Hook, it is true, ſeems to maintain ſomething like a poſitive *levity*; which, if we miſtake not, is what he means by the term *levitation*; viz. a property of bodies directly contrary to that of gravitation towards the ſun.

This, he thinks, he has diſcovered in the ſtreams of ſeveral comets; which, though they had a deſcent from the nucleus of the comet towards the ſun, yet they quickly returned, and went oppoſite to the ſun, and that to a prodigious extent. In effect, where the power of gravitation ceaſes, it ſhould ſeem ſome ſuch contrary force does begin; whereof we have inſtances in the phenomena of attraction. This is what ſir Iſaac Newton calls the *vis repellens*, and appears to be one of the laws of nature; without which it would be hard to account for rarefaction and ſome other appearances.

LEVY, *levare*, in *Law*, ſignifies to gather, or collect; as to *levy* money, to *levy* troops, &c.

LEVY ſometimes alſo denotes to erect, or ſet up; as, to *levy* a mill. *Levy* alſo ſignifies to raiſe or caſt up; as, to *levy* a ditch. To *levy* a fine of lands, is to paſs a fine.

LEWDNESS is puniſhable by our law by fine, impriſonment, &c. And Mich. 15 Car. II. a perſon was indicted for open *lewdneſs*, in ſhewing his naked body in a balcony, and other miſdemeanors, and was fined two thouſand marks, impriſoned for a week, and bound to his good behaviour for three years. 1 Sid. 168. In times paſt, when any man granted a leaſe of his houſe, it was uſual to inſert an expreſs covenant, that the tenant ſhould not entertain any lewd women, &c. See BAWD, INCEST, &c.

LEWING, in *Metallurgy*, the ſifting the ores of metal in water. This is done in fine ſieves moved backward and forward under water; and this is the method of ſeparating the finer parts of the ores which had ſubſided among the larger lumps, under that part of it ſeparated for uſe in the various waſhings. The coarſer matter, left in the ſieve, is powdered again with the larger maſſes, and all thus ſifted together for the blowing-houſe.

LEX, *Law*. See LAW.

LEX *amiſſa*, or *legem amittere*, in *Law*, is underſtood of an infamous, perjured perſon, who is ſaid to *loſe his law*; or, as Bracton has it, *non eſt ulterius dignus lege*. See INFAMOUS.

LEX *judicialis*, is properly *purgatio, per judicium ferri*; ſometimes called ſimply JUDICIUM.

LEX *ſacramentalis, purgatio per ſacramentum*. See OATH, and PURGATION.

LEX *talionis*. See TALIO.

LEX *terræ*, the law and cuſtom of the land; by which name it is diſtinguiſhed from the *civil law*. See COMMON *law*.

LEGEM *terræ amittere*. See AMITTERE.

LEXIARCHI, Δεξιαρχοι, at Athens, ſix officers, aſſiſted by thirty inferior ones, whoſe buſineſs it was to lay fines upon ſuch as came not to the public aſſemblies, and alſo to make ſcrutiny among ſuch as were preſent.

The *lexiarchi* kept a regiſter of the age, manners, and abilities of all the citizens, who were always enrolled at the age of twenty.

LEXICON, Λεξικον, the ſame with dictionary.

The word is chiefly uſed in ſpeaking of Greek dictionaries: it is derived from the Greek λεξις, *word, diction*, of λεγω, *I ſpeak*.

LEY. See LIXIVIUM.

LEYDEN *phial*, in *Electricity*, is a glaſs phial or jar coated both on the inſide and outſide with ſome conducting ſubſtance, for the purpoſe of being charged, and employed in a variety of entertaining and uſeful experiments. See COATING and CHARGE.

It was thus called becauſe Mr. Cunæus, a native of Leyden, was ſuppoſed to have firſt contrived, about the cloſe of the year 1745, to accumulate the electrical power in glaſs by this method; and hence the operation of charging and diſcharging coated glaſs, in general, has been denominated the *Leyden* experiment; and a vacuum produced in a jar of this kind has been called the *Leyden vacuum*. But Dr. Prieſtley, the hiſtorian of electricity, informs us, that the perſon who firſt made this great diſcovery was Mr. Von Kleiſt, dean of the cathedral in Camin; who, on the fourth of November, 1745, ſent an account of it to Dr. Leiberkuhn at Berlin: however, thoſe, to whom Mr. Kleiſt's account was communicated, could not ſucceed in performing his experiments. The views which led to this diſcovery in Holland are ſtated by Dr. Prieſtley in the following manner: profeſſor Muſchenbroek and his friends, obſerving, that electrified bodies, expoſed to the common atmoſphere, which is always replete with conducting particles of various kinds, ſoon loſt their electricity, and were capable of retaining but a ſmall quantity of it, imagined, that if the electrified bodies were terminated on all ſides by original electrics, they might be capable of receiving a ſtronger power, and retaining it a longer time. Glaſs being the moſt convenient electric for this purpoſe, and water the moſt convenient non-electric, they firſt made theſe experiments with water in glaſs bottles; but no conſiderable diſcovery was made, till Mr. Cunæus, happening to hold his glaſs veſſel in one hand, containing water, which had a communication with the prime conductor by means of a wire; and with the other hand diſengaging it from the conductor, when he imagined the water had received as much electricity as the machine could give it, was ſurpriſed by a ſudden ſhock in his arms and breaſt, which he had not in the leaſt expected from the experiment. This experiment was repeated, and the firſt account of it publiſhed in Holland by Mr. Allamand and Mr. Muſchenbroeck; by the abbé Nollet, and M. Monnier, in France; and by Meſſrs. Gralath and Rugger, in Germany. Mr. Gralath contrived to increaſe the ſtrength of the ſhock, by altering the ſhape and ſize of the phial, and alſo by charging ſeveral phials at the ſame time, ſo as to form what is now called the *electrical* BATTERY. He likewiſe made the ſhock to paſs through a number of perſons connected in a CIRCUIT from the outſide to the inſide of the phial. He obſerved that a cracked phial would not admit of being charged; and he diſcovered what is now called the RESIDUUM *of a charge*. Dr. Watſon, about this time, obſerved a circumſtance attending the operation of charging the phial, which, if purſued, would have led him to the diſcovery, which was afterwards made by Dr. Franklin. He ſays, that when the phial is well electrified, and you apply your hand to it, you ſee the fire flaſh from the outſide of the glaſs, wherever you touch it, and it crackles in your hand. He alſo obſerved, that when a ſingle wire only was faſtened round a phial, properly filled with warm water, and charged; upon the inſtant of its exploſion, the electrical coruſcations were ſeen to dart from the wire, and to illuminate the water contained in the phial. He likewiſe found, that the ſtroke, in the diſcharge of the phial, was, *cæteris paribus*, as the points of contact of the non-electrics of the outſide of the glaſs, which led to the method of COATING glaſs: in conſequence of which he made experiments, that led him to conclude, that the effect of the *Leyden* bottle was greatly increaſed, if it was not principally owing to, not ſo much the quantity of non-electric matter contained in the glaſs, as the number of points of non-electric contact within the glaſs, and the denſity of the matter of which theſe points conſiſted; provided the matter was, in its own nature, a ready conductor of electricity. He farther obſerved, that the exploſion was greater from hot water incloſed in glaſſes, than from cold, and from his coated jars, warmed, than cold. For his manner of explaining the ſhock of the *Leyden* phial, ſee AFFLUX.

Mr. Wilſon, in 1746, diſcovered a method of giving the ſhock to any particular part of the body, without affecting the reſt; he alſo increaſed the ſtrength of the ſhock by plunging the phial in water, thereby giving it a coating of water on the outſide as high as it was filled on the inſide; he likewiſe found, that the law of accumulation of the electric matter in the *Leyden* bottle was always in proportion to the thinneſs of the glaſs, the ſurface of the glaſs, and that of the non-electrics in contact with the inſide and outſide thereof. Mr. Wilſon made a variety of other experiments with the *Leyden* phial, which our limits will now allow us to recite.

Mr. Canton found, that if a charged phial was placed upon electrics, the wire and the coating would give a ſpark or two alternately; and that, by continuing this operation, the phial would be diſcharged; though he did not obſerve that theſe alternate ſparks proceeded from the two contrary electricities diſcovered by Dr. Franklin.

The abbé Nollet made ſeveral experiments with this phial. He received a ſhock from a bottle, out of which the air had been exhauſted, and into which the end of his conductor had been inſerted. He aſcribed the force of the glaſs in giving a ſhock, to that property of it, whereby it retained it more ſtrongly than conductors do, and was not ſo eaſily diveſted of it as they are. He alſo firſt tried the effect of the electric ſhock on brute animals, and enlarged the CIRCUIT of its conveyance.

M. Monier is ſaid to have been the firſt who diſcovered that the *Leyden* phial would retain its electricity for a conſiderable time after it was charged, and to have found it to do ſo for thirty-ſix hours, in time of froſt; and it is remarkable that the French as well as the Engliſh philoſophers made ſeveral experiments, which, with a little greater degree of attention, would have led them to the diſcovery of the different quality of electricity on different ſides of the glaſs. But this was reſerved for the ingenious doctor Franklin, who, in explaining the method of charging the *Leyden* phial, obſerves, that when one ſide of the glaſs is electrified poſitively, or *plus*, the other ſide is electrified negatively, or *minus*; ſo that whatever quantity of fire is thrown upon one ſide of the glaſs, the ſame is thrown out of the other; and in a phial not charged, none can be thrown into the inſide, when none can be got out from the outſide; and there is really no more electric fire in the phial after it is charged than before; all that can be done by charging being to take from one ſide and convey to the other. Dr. Franklin alſo obſerved, that glaſs was impervious to electricity, and that, therefore, ſince the equilibrium could not be reſtored to the charged phial by an internal communication, it muſt be done by conductors externally joining the inſide and the outſide. Theſe capital diſcoveries he made by obſerving that when a phial was charged, a cork-ball, ſuſpended on ſilk, would be attracted by the outſide coating, when it was repelled by a wire communicating with the inſide, and *vice verſâ*. But the truth of this maxim appeared more evident, when he brought the knob of the wire communicating with the outſide coating within a few inches of the wire communicating with the inſide coating, and ſuſpended a cork-ball between them; for, in that caſe, the ball was attracted by them alternately, till the phial was diſcharged.

Dr. Franklin alſo ſhewed, that when the phial was charged, one ſide loſt exactly as much as the other gained, in reſtoring the equilibrium. Hanging a ſmall linen thread near the coating of an electrical phial, he obſerved that whenever he brought his finger near the wire, the thread was attracted by the coating: for as the fire was taken from the inſide, by touching the wire, the outſide drew in an equal quantity by the thread. He likewiſe proved, that the coating on one ſide of a phial received juſt as much electricity as was emitted from the diſcharge of the other, in the following manner: he inſulated his rubber, and then, hanging a phial to his conductor, he found it could not be charged, even though his hand was held conſtantly to it; becauſe, though the electric fire might leave the outſide of the phial, there was none collected by the rubber to be conveyed to the inſide. He then took away his hand from the phial, and forming a communication by a wire from the outſide coating to the inſulated rubber, he found that it was charged with eaſe. In this caſe, it was plain, that very ſame fire which left the outſide coating, was conveyed by the way of the rubber, the globe and the conductor, and the wire of the fire into the inſide. This new theory of charging the *Leyden* phial led Dr. Franklin to obſerve a greater variety of facts, relating both to charging and diſcharging it, than other philoſophers had attended to. This maxim, that whatever the phial takes in at one ſurface it loſes at the other, led Dr. Franklin to think of charging ſeveral phials together with the ſame trouble, by connecting the outſide of one with the inſide of another; whereby the fluid that was driven out of the firſt would be received by the ſecond, &c. By this means he found, that a great number of bottles might be charged with the ſame labour as one only; and that they might be charged equally high, were it not that every bottle receives the new fire, and loſes its old with ſome reluctance, or rather gives ſome ſmall reſiſtance to the charging. On this principle he conſtructed an *electrical* BATTERY.

When Dr. Franklin firſt began his experiments upon the *Leyden* phial, he imagined that the electric fire was all crowded into the ſubſtance of the non-electric, in contact with the glaſs; but he afterwards found that its power of giving a ſhock lay in the glaſs itſelf, and not in the coating, by the following ingenious analyſis of the bottle. In order to find where the ſtrength of the charged bottle lay, he placed it upon glaſs; then firſt took out the cork and the wire, and finding the virtue was not in them, he touched the outſide coating with one hand, and put the finger of the other into the mouth of the bottle; when the ſhock was felt quite as ſtrong as if the cork and wire had been in it. He then charged the phial again, and pouring out the water into an empty bottle, inſulated, expected, that if the force reſided in the water, it would give the ſhock, but he found it gave none. He then judged that the electric fire muſt either have been loſt in decanting, or muſt remain in the bottle; and the latter he found to be true; for, filling the charged bottle with freſh water, he found the ſhock, and was ſatiſfied that the power of giving it, reſided in the glaſs itſelf. The ſame experiment was made with panes of glaſs, laying the coating on lightly, and changing it, as the water had been before changed in the bottle, and the reſult was preciſely the ſame. He proved in other ways that the electric fire reſided in the glaſs. Franklin's Letters and Obſervations, &c. Prieſtley's Hiſt. of Electricity, vol. i. p. 191, &c.

From the above account of Dr. Franklin's method of analyſing the *Leyden* phial, the matter of charging and diſcharging it, and the reaſon of the proceſs, are eaſily underſtood. Thus, if a coated phial be placed near the prime conductor, (*Tab. Electricity*, *fig.* 4.) ſo that the knob of its wire may be in contact with it; and the winch of the machine (*fig.* 5.) be turned, the index of the ELECTROMETER, E, fixed to the conductor, will gradually riſe as far as 90° nearly, and then reſt; which ſhews that the phial has received its full charge; then if the diſcharger (*fig.* 3.) be held by its glaſs handle, and one of its knobs be applied to the outſide coating of the phial, and the other be brought near the knob of the wire, or near the prime conductor that communicates with it, a report will be heard, and luminous ſparks will be diſcovered between the diſcharger, and the conducting ſubſtances communicating with the ſides of the phial, and by this operation the phial will be diſcharged. If, inſtead of uſing the diſcharger, a perſon touches the outſide of the phial with one hand, and brings the other hand near the wire of the phial, the ſame ſpark and report will be obſerved, and a ſhock will be felt, that affects the wriſts and elbows; and when the ſhock is ſtrong, the breaſt likewiſe; and a ſhock may be given to any ſingle part of the body, if that part alone be brought into the circuit. If a number of perſons join hands, and the firſt of them touches the outſide of the phial, and the laſt touches the wire communicating with the inſide, they will feel the ſhock at the ſame time. If the coated phial be held by the wire, and the outſide coating be preſented to the prime conductor, it will be charged as readily, only with this difference, that in this caſe the outſide will be poſitive, and the inſide negative; and if the prime conductor, by being connected with the rubber of the machine, be electrified negatively, the phial would be charged in the ſame manner; but the ſide that touches the conductor would be electrified negatively, and the oppoſite ſide would be electrified poſitively. But if the phial be INSULATED, and the ſame proceſs repeated, the index of the electrometer will ſoon riſe to 90°, yet the phial will remain uncharged; becauſe the outſide, having no communication with the earth, &c. cannot part with its own electricity, and, therefore the inſide can acquire no additional quantity; but when a chain, or any other conductor, connects the outſide of the phial with the table, the phial may be charged as before. Moreover, if a phial be inſulated, and one ſide of it, inſtead of being connected with the earth, be connected with the inſulated rubber, whilſt the other ſide, communicates with the prime conductor, the phial will be expeditiouſly charged; becauſe, whilſt the rubber exhauſts one ſide, the other ſide is ſupplied by the prime conductor; and in this way the phial is charged with its own electricity; or the natural electric matter of one of its ſides is thus thrown on its other ſide. This laſt experiment may be diverſified, by inſulating the phial, and placing it, with its wire, at the diſtance of about half an inch from the prime conductor, and holding the knob of another wire at the ſame diſtance from its outſide coating; then turning the winch of the machine, and a ſpark will be obſerved to proceed from the prime conductor to the wire of the phial, and another ſpark will paſs at the ſame time from the outſide coating to the knob of the wire, preſented towards it; and thus it is ſeen, that as a quantity of the electric matter is entering the inſide of the phial, an equal quantity of it is leaving the outſide. If the wire preſented to the outſide of the phial be pointed, it will appear illuminated with a STAR; but if the pointed wire be connected with the coating of the phial, it will appear illuminated with a BRUSH of rays. See CHARGE, ELECTRICAL *ſhock*, and *Experiments*, &c. in ELECTRICITY.

Mr. Cavallo has deſcribed the conſtruction of a phial, which, when charged by an electrical kite, in examining the ſtate of the clouds, or in any other way, may be put into the pocket, and which will retain its charge for a conſiderable time. Beſides the coating on the inſide and outſide, which this phial has like others of the ſame kind, a glaſs tube open at both ends is cemented into its neck, and paſſes, within the phial, having a ſmall wire faſtened to its lower extremity, which touches the inſide non-electric coating. The wire, with the knob of this phial, is cemented into another glaſs tube, which is nearly twice as long, and ſmaller than the tube cemented into the neck of the phial. The wire is cemented in ſuch a manner, that only its knob projects out of one end, and a ſmall length of it out of the other end of the tube. If this piece, with the wire, be held by the middle of the glaſs tube, it may be put in or out of the tube, which is in the neck of the phial, ſo as to touch the ſmall wire at the lower extremity of it; and this may be done without diſcharging the phial, if it be charged. A phial of this kind has been kept in a charged ſtate for ſix weeks Cavallo's Elect. p. 340.

We ſhall cloſe this article with an account of the method by which Mr. Cavallo repairs coated phials, that have been cracked or perforated, either by a ſpontaneous diſcharge, or other accident. He removes the outſide coating from the fractured part, and then makes it moderately hot, by holding it to the flame of a candle; and whilſt it remains hot, he applies burning ſealing-wax to the part, ſo as to cover the fracture entirely; taking care that the thickneſs of this wax coating may be greater than that of the glaſs. Laſtly, he covers all the ſealing-wax, and alſo part of the ſurface of the glaſs beyond it, with a compoſition made with four parts of bees wax, one of reſin, one of turpentine, and a very little oil of olives. This he ſpreads upon a piece of oiled ſilk, which he applies in the manner of a plaſter. In this way ſeveral phials have been ſo effectually repaired, that, after being frequently charged, they were at laſt broken by a ſpontaneous diſcharge, but in a different part of the glaſs. Phil. Tranſ. vol. lxviii. part ii. p. 1011.

LEYGAGER, is uſed for wager of law.

LEYSERA, in *Botany*, a genus of the *ſygeneſia polygamia ſuperflua* claſs, the receptacle of which is naked, the down chaffy, but plumoſe at the diſc, and the calyx compoſed of leaves, dry at the margin, and ſounding when touched.

LIBADION, in *Botany*, a name by which Pliny, and ſome other authors, have called the centaureum, or centaury.

LIBANIUM, in *Botany*, a name given by Apuleius, and ſome other authors, to the common borago, or borrage.

LIBANOMANTIA, Λιβανομαντεια, in *Antiquity*, a ſpecies of divination performed with frankincenſe; which, if it preſently caught fire, and ſent forth a grateful odour, was eſteemed a happy omen, and *vice verſâ*.

LIBATION, LIBATIO, a ceremony in the heathen ſacrifices, wherein the prieſt ſpilt ſome wine, milk, or other liquor, in honour of the deity to whom the ſacrifice was offered; after having firſt taſted it himſelf.

Alexander is ſaid to have ſacrificed a bull to Neptune; and, for an offering to the ſea-gods, to have thrown the golden veſſels uſed for the *libation* into the ſea.

Libations were alſo in uſe under the law of Moſes, being enjoined by God in Exodus xxix. and Numbers xv.

LIBAVIUS, *liquor of*. See LIQUOR.

LIBEL, *Famoſus* LIBELLUS, a writing or report, unlawfully publiſhed abroad, containing injurious reproaches, or accuſations againſt the honour and reputation of any perſon, particularly of a ſuperior, or governor.

Platina is of opinion, that a writing, how injurious ſoever it is, cannot be called a *libel*, if the author's name be to it. Libellers, among the ancient Romans, were puniſhed with death, but in after-times they were only whipped. Auguſtus ranked *famoſos libellos*, defamatory *libels*, among the crimes *læſæ majeſtatis*, of high treaſon; and under the emperor Valentinian it was made capital, not only to write, but to publiſh or even omit deſtroying them. F. Baldwin has publiſhed a comment on the imperial laws againſt *libels*. Scandalous pictures are reckoned amongſt *libels*.

A *libel*, the lawyers ſay, may be either *in ſcriptis*, or *ſine ſcriptis*: *in ſcriptis*, when a writing is compoſed, or publiſhed to another's diſgrace; which may be done either *verbis aut cantalenis*; as where this is maliciouſly repeated, or ſung, in the preſence of others: or elſe *traditione*, when the *libel*, or any copy of it, is delivered out, to ſcandalize the party.

A *libel ſine ſcriptis*; may be twofold. 1. *Picturis*, as to paint the party in a ſhameful or ignominious manner: or, 2. *Signis*, as to fix a gallows, or other ignominious ſigns, at the door of the party, or elſewhere.

With regard to *libels* in general, there are two remedies; one by indictment and another by action. The former for the public offence; for every *libel* has a tendency to break the peace, or to provoke others to break it; which offence is the ſame, whether the matter contained be true or falſe: and, therefore, the defendant on an indictment for publiſhing a *libel*, is not allowed to alledge the truth of it by way of juſtification. In ſuch proſecutions the only facts to be conſidered are, firſt, the making or publiſhing of the book or writing; and ſecondly whether the matter be criminal. The puniſhment of libellers, for making, repeating, printing, or publiſhing the *libel*, is fine, and ſuch corporal puniſhment as the court in their diſcretion ſhall inflict, according to the offence and quality of the offender. But in the remedy by action on the caſe, which is to repair the party in damages for the injury done him, the defendant may, as for words ſpoken, juſtify the truth of the fact, and ſhew that the plaintiff has received no injury at all. Blackſt. Com. vol. iii. p. 126. and vol. iv. p. 150.

LIBEL, of *libellus*, *a little book*, alſo ſignifies the original declaration of any action in the civil law.

LIBEL, in *the Law of Scotland*, is uſed for a criminal accuſation or INDICTMENT.

LIBELLA, in *Natural Hiſtory*. See DRAGON *Fly*.

LIBELLA, among the Romans, was the tenth part of the DENARIUS.

LIBELLATICI, an ancient kind of apoſtates from Chriſtianity, under the perſecution of Decius; who, to prevent their being obliged to renounce the faith, and ſacrifice to idols in public, made application to the magiſtrates, and abjured their faith in private; obtaining certificates of them, either by intreaty, or by money; by which they were atteſted to have complied with the orders of the emperor; and were thereby ſheltered from any farther moleſtation on account of their religion.

Theſe certificates were called *libelli*; whence the people who obtained them came to be denominated *Libellatici*.

Others, particularly the centuriators of Madgebourg, are of opinion, that the *Libellatici* were only ſuch as furniſhed the magiſtrates with money, to ſcreen them from proſecution, and being obliged to renounce Chriſtianity.

M. Tillemont retains ſomething of each opinion; he thinks, the *Libellatici*, applying themſelves to the magigiſtrates, brought off the ſacrificing and abjuration; and obtained letters, by which they were declared to have renounced Chriſt, and ſacrificed to idols; though, in effect, they have done neither.

LIBELLULA, in *Zoology*, the name of a genus of the *neuroptera* claſs of inſects: the mouth of which is furniſhed with jaws, the antennæ ſhorter than the thorax, the wings extended, and the tail terminated by a kind of forceps.

The ſpecies of this genus are very numerous, by Linnæus reckoned twenty-one, ſome carrying their wings erect when they ſit, and others horizontally.

LIBER, in *Botany*, the bark or rind, principally of trees. This is to be conceived as conſiſting of a number of cylindric and concentric ſurfaces, whoſe texture is reticular, and in ſome trees plainly extruſible every way, by reaſon that the fibres are ſoft and flexible. While in this condition they are either hollow regular canals, or, if not ſo, they have interſticial ſpaces, which ſerves the office of canals. The nutritious juice, which they are continually receiving, remains in part in them, and makes them grow in length and thickneſs, and ſtrengthens and brings them cloſer together; and by this means the texture, which was before reticular, becomes an aſſemblage of ſtraight fibres, ranged vertically, and parallel to each other; that is, as they are thus altered behind one another, they, by degrees, become a new ſubſtance more woody, and called BLEA. See Bark.

LIBERA, in *Mythology*, the name of a goddeſs, which Cicero, in his book of the Gods, repreſents as the daughter of Jupiter and Ceres. Ovid in his Faſti ſays, that the name was given by Bacchus to Ariadne.

Libera is exhibited on medals, as a kind of female Bacchus, crowned with vine-leaves.

LIBERAL *arts*, are ſuch as depend more on the labour of the mind than on that of the hand; or, that conſiſt more in ſpeculation than operation; and have a greater regard to amuſement and curioſity than to neceſſity.

The word comes from the Latin *liberalis*; which, among the Romans, ſignified a perſon who was not a ſlave; and whoſe will, of conſequence, was not checked by the command of any maſter.

Such are grammar, rhetoric, painting, ſculpture, architecture, muſic, &c. The *liberal arts* uſed formerly to be ſummed up in the following Latin verſe:

Lingua, Tropus, Ratio, Numerus, Tonus, Angulus, Aſtra.

And the *mechanical arts*, which, however, are innumerable, under this:

Rus, Nemus, Arma, Faber, Vulnera, Lana, Rates.

See Arts.

LIBERALIA, feaſts celebrated by the ancient Romans, in honour of Liber, or Bacchus, the ſame with thoſe which the Greeks called Dionysia, and *Dionyſiaca*.

They took their name from *liber*, i. e. *free*, a title conferred on Bacchus, in memory of the liberty or freedom which he granted to the people of Bœotia; or, perhaps, becauſe wine, whereof he was the reputed deity, delivers men from care, and ſets their mind at eaſe and freedom. Varro derives the name of this feaſt from *liber*, conſidered as a noun adjective, and ſignifying *free*; becauſe the prieſts were free from their function, and eaſed of all care, during the time of the *Liberalia*, as the old women officiated in the ceremonies and ſacrifices of theſe feaſts.

LIBERANDIS *terris*. See Terris.

LIBERATE, in *Law*, a writ that lies for the payment of yearly penſion, or ſum of money, granted under the great ſeal, and directed to the treaſurer, chamberlains, and barons of the exchequer, &c. for that purpoſe.

In another ſenſe it is a writ to the ſheriff of a county, for the delivery of poſſeſſion of lands, and goods extended, or taken upon the forfeiture of a recognizance.

Liberate is alſo uſed for a writ iſſuing out of the chancery, directed to a gaoler for delivery of a priſoner, who hath put in bail for his appearance.

LIBERI *tauri libertas*. See Tauri.

LIBERIA, a feaſt held among the Romans, on the day whereon their children laid aſide their juvenile habits, and aſſumed the robe called *toga liberia*.

The *liberia* were kept on the ſixteenth of the kalends of April; that is, on the ſeventeenth of March.

LIBERTAS *eccleſiaſtica*, *church liberty*, a frequent phraſe in old writers, who treat of eccleſiaſtical immunities. The right of inveſtiture, extorted from our kings by the papal power, was at firſt the only thing challenged by the clergy, as their *libertas eccleſiaſtica*, but by degrees, under the title of *church liberty*, they contended for a freedom of their perſons and poſſeſſions, from all ſecular power and juriſdiction; as appears by the canons and decrees of the councils held by Boniface, archbiſhop of Canterbury, at Merton, ann. 1258, and at London, ann. 1260, &c.

LIBERTATE *probanda*, in *Law*, an ancient writ that lay for ſuch as being demanded for villains, offered to prove themſelves free; directed to the ſheriff, that he ſhould take ſecurity of them for their proving of their freedom before the juſtices of aſſize, and that in the mean time they ſhould be unmoleſted.

LIBERTATIBUS *allocandis*, in *Law*, a writ lying for a citizen or burgeſs, impleaded contrary to his liberty, to have his privilege allowed.

If any do claim a ſpecial liberty to be impleaded within a city or borough, and not elſewhere, where may be a ſpecial writ *de libertatibus allocandis*, to permit the burgeſſes to uſe their liberties, &c. Theſe writs are of ſeveral forms, and may be ſued by a corporation, or by any ſingle perſon, as the caſe ſhall happen.

LIBERTATIS *Angliæ cuſtodes*. See Custodes.

LIBERTUS, or Libertinus, among the Romans, a *freedman*, or a perſon ſet free from a legal ſervitude.

Theſe ſtill retained ſome mark of their ancient ſtate: he who made a ſlave free having a right of patronage over the *libertus*; ſo that if the latter failed of ſhewing due reſpect to his patron, he was reſtored to his ſervitude; and if the *libertus* died without children, his patron was his heir. See Slave.

In the beginning of the republic, *libertinus* denoted the ſon of a *libertus* or freed-man; but afterwards, before the time of Cicero, and under the emperors, the terms *libertus* and *libertinus*, as Suetonius has remarked, were uſed as ſynonymous.

LIBERTINES, Libertini, in *Eccleſiaſtical Hiſtory*, a religious ſect, which aroſe in the year 1525, whoſe principal tenets were, that the Deity was the ſole operating cauſe in the mind of man, and the immediate author of all human actions: that conſequently the diſtinctions of good and evil, which had been eſtabliſhed with regard to thoſe actions, were falſe and groundleſs, and that men, could not, properly ſpeaking, commit ſin; that religion conſiſted in the union of the ſpirit or rational ſoul with the ſupreme Being; that all thoſe who had attained this happy union, by ſublime contemplation and elevation of mind, were then allowed to indulge, without exception or reſtraint, their appetites or paſſions; that all their actions and purſuits were then perfectly innocent; and that, after the death of the body, they were to be united to the Deity.

They likewiſe ſaid that Jeſus Chriſt was nothing but a mere *je ne ſçai quoi*, compoſed of the ſpirit of God, and of the opinion of men.

Theſe maxims occaſioned their being called *Libertines*; and the word has been uſed in an ill ſenſe ever ſince.

The *Libertini* ſpread principally in Holland and Brabant. Their leaders were one Quintin, a Picard, Pockeſius, Ruffus, and another called Chopin, who joined with Quintin, and became his diſciple.

This ſect obtained a certain footing in France through the favour and protection of Margaret, queen of Navarre, and ſiſter of Francis I. and found parons in ſeveral of the reformed churches. This ſect was probably a remnant of the more ancient Beghards or Brethren *of the Free Spirit*.

Libertines *of Geneva*, were a cabal of rakes rather than of fanatics: for they made no pretences to any religious ſyſtem, but pleaded only for the liberty of leading voluptuous and immoral lives. This cabal was compoſed of a certain number of licentious citizens, who could not bear the ſevere diſcipline of Calvin, who puniſhed with rigour not only diſſolute manners, but alſo whatever bore the aſpect of irreligion and impiety. In this turbulent cabal there were ſeveral perſons who were not only notorious for their diſſolute and ſcandalous manner of living, but alſo for their atheiſtical impiety, and contempt of all religion. To this odious claſs belonged one Gruet, who denied the divinity of the Chriſtian religion, the immortality of the ſoul, the difference between moral good and evil, and rejected with diſdain the doctrines that are held moſt ſacred among Chriſtians; for which impieties he was at laſt brought before the civil tribunal, in the year 1550, and condemned to death. The Genevan ſpirit of reformation, improperly directed by the violence

lence and zeal of Calvin, did at this time operate to a degree, which has marked the character of this great reformer with reproach. For in 1544, Sebaſtian Caſtalio, maſter of the public ſchool at Geneva, who was a man of probity, and diſtinguiſhed by his learning and taſte, was, nevertheleſs, depoſed from his office and baniſhed the city, becauſe he diſapproved ſome of the meaſures that were purſued and ſome of the opinions entertained by Calvin and his colleagues, and particularly that of abſolute and unconditional predeſtination. Jerome Bolſec alſo a man of genius and learning, who became a convert to the proteſtant religion and fled to Geneva for protection, was caſt into priſon, and ſoon after, ſent into baniſhment, becauſe, in 1551, he imprudently and indecently declaimed in full congregation and at the cloſe of public worſhip againſt the doctrine of abſolute decrees. Moſheim.

LIBERTY, Libertas, is uſually underſtood of that ſtate wherein a man acts freely; or that power by which he determines himſelf voluntarily either to good or evil, to this thing or that.

In this ſenſe *liberty* amounts to the ſame with FREEDOM, and ſtands oppoſite to NECESSITY.

Liberty may be defined an active indifference of the will, to will or not to will any thing.

Moſt of the ſchoolmen confounded *liberty* and the will together, and make one definition ſerve for both. Whereas Mr. Locke obſerves, that *liberty* does not belong to the will, but to the man or agent; and therefore, that the queſtion, in the uſual manner of ſtating it, whether man's will be free or no, is abſurd and unintelligible. *Liberty*, which is but a power, belongs only to agents, and cannot be an attribute, or modification of the will, which is alſo but a power. They diſtinguiſh *liberty* into a great many kinds; as,

LIBERTY *of contrariety*, *contrarietatis*, which is a freedom of of doing two things, not only different, but contrary to each other.

LIBERTY *of contradiction*, a power either of doing a thing, or letting it alone. See FREEDOM.

LIBERTY, *next*, *proxima*, is a full abſolute freedom of doing any thing.

LIBERTY, *remote*, is a *liberty* that comprehends a natural power, though embarraſſed with obſtacles, which it is in our power to remove, and to attain to a next *liberty*.

LIBERTY *of conſcience*, a right or power of making profeſſion of any religion, or of ſerving God in any manner that a man ſees fit.

This ſeems to be a natural right; it is vigorouſly oppoſed by the generality of the Romaniſts, and even by many of the reformed, though it ſeems as if the reformation could ſcarce ſubſiſt without it. See TOLERATION and PERSECUTION.

The nature of liberty may be better underſtood by dividing it, with an excellent writer, into *phyſical*, *moral*, *religious*, and *civil*.

LIBERTY, *phyſical*, is that principal of ſpontaneity or ſelf-determination, which conſtitutes us agents; or which gives us a command over our actions, rendering them properly our's and not effects of the operation of any foreign cauſe. Without this *liberty*, or being under a neceſſity of always following ſome will different from his own, man would be a machine acted upon by mechanical ſprings, having no principle of motion in himſelf or command over events; and, therefore, incapable of all merit and demerit.

Whether man is endued with this kind of *liberty* or ſelf-determining power has been a ſubject of much controverſy: it was agitated at the beginning of this century between Leibnitz, Collins, &c. on one ſide, and Clarke, Jackſon, &c. on the other; and has been lately revived by Dr. Prieſtley.

Cicero defines *liberty*, the power of living after a man's own wiſh, without any cauſe or impediment to oblige him to do any thing rather than another.

F. Mallebranche gives us a ſtill more philoſophical definition: the will he defines to be that impreſſion or natural motion, which inclines towards good in the general; and by *liberty*, he underſtands, that power which the mind has of determining this general impreſſion towards ſuch objects as pleaſe us; and ſo of directing our general inclinations to ſome particular things.

Whence it is eaſy to perceive, that though all natural inclinations be voluntary, yet they are not all free; not, we mean, with a liberty of indifference, which includes a power of willing, or not willing; or of willing quite the contrary to that which our natural inclinations lead us to. For, though it is voluntarily and freely that we love good in general, it is abſurd to ſuppoſe we ſhould love any thing without the will, or that the will can ever be conſtrained; yet we do not love it freely (in the ſenſe juſt laid down) becauſe it is not in the power of the will not to deſire to be happy.

It muſt be obſerved, however, that the mind, conſidered as determined towards good in general, cannot divert its motion to any particular good, unleſs the ſame mind, conſidered as capable of ideas, have ſome knowledge of that particular good; that is, in plainer terms, the will is a blind power, that cannot direct itſelf to any thing but what the underſtanding repreſents to it; ſo that the power which the will has to determine its impreſſion towards general good, or its natural inclinations, variouſly, conſiſts in the power it has to command the underſtanding to repreſent ſome particular good.

Thus, a perſon, for inſtance, repreſents ſome dignity to himſelf as a good to be wiſhed for, immediately the will deſires this good; that is, the impreſſion which the mind continually receives towards good in general, determines it to this dignity. But as that dignity is not the univerſal good, nor is perceived clearly and diſtinctly as ſuch by the mind (for the mind cannot conceive a thing clearly which is not), the impreſſion we have towards good in general, is not entirely exhauſted by that particular good; the mind has an inclination to go farther; it does not love that dignity neceſſarily or invincibly, and in this reſpect is free.

Now its *liberty* conſiſts in this, that, not being fully convinced that this good contains in it all the good it is capable of enjoying, it may ſuſpend its judgment and its deſire.

The caſe is nearly the ſame with regard to the knowledge of truth: we love this, as we do the enjoyment of good, by a natural impreſſion; which impreſſion is not invincible in the latter, excepting evidence be full, and our knowledge of the object complete. We have the ſame *liberty* in our falſe judgments, that we have in our irregular appetites. See JUDGMENT, and WILL.

Mr. Locke defines the *liberty* to be the power which a man has to do or forbear doing any particular action, according as its doing or forbearance has the actual preference in the mind, which is the ſame thing as to ſay, according as he himſelf wills it: and he obſerves, that ſo far as a man has power to think or not to think, to move or not to move, according to the preference or direction of his own mind, ſo far is a man free. The will he acknowledges, is always determined by ſome, and for the moſt part, by the moſt preſſing uneaſineſs or deſire of happineſs. The *liberty* for which he contends, and for the exiſtence of which he appeals to experience, is a *liberty* of ſuſpending our determinations. The mind, he ſays, having in moſt caſes, as is evident in experience, power to ſuſpend the execution and ſatisfaction of any of its deſires, and ſo all, one after another, is at *liberty* to conſider the objects of them, examine them on all ſides, and weigh them with others. In this lies the *liberty* a man has. He has a power to ſuſpend the proſecution of this or that deſire, as every one daily may experience in himſelf. This ſeems to be the ſource of all *liberty*. In this ſeems to conſiſt, as he thinks, that which is improperly called free-will. And he adds farther, that perfect indifference in the mind, not determinable by its laſt judgment of the good or evil, that is thought to attend its choice, would be ſo far from being an advantage and excellency of an intellectual nature, that it would be as great an imperfection as the want of indifferency to act or not to act, till determined by the will, would be an imperfection on the other ſide. Eſſ. vol. i. book i. chap. 21. From theſe conceſſions the advocates for neceſſity have pleaded the authority of Mr. Locke, though he does not ſeem to have been appriſed of the conſequences of his principles. Mr. Hobbes, who ſeems to have been the firſt who underſtood and maintained the proper doctrine of philoſophical neceſſity, defines *liberty* to be the abſence of all impediments to action, that are not contained in the nature and intrinſic quality of the agent. And Mr. Collins, the principal writer on the ſide of neceſſity, defines *liberty* to be a power in man to do as he wills, or pleaſes; though he denies, that we are at *liberty* to will, or not to will; or to will one or the other of two or more objects, between which, all things conſidered, we perceive a difference; or that we are free in our choice among things different or alike.

Dr. Clarke has remarked, that, in the above definition, there is an ambiguity in the words, "wills or pleaſes;" becauſe they may either denote the laſt preception or judgment of the underſtanding, which is entirely paſſive; or the firſt exertion of the ſelf-moving power, which is eſſentially active. Now, though the ſelf-moving power is an adequate cauſe of action, yet underſtanding, or judgment, or aſſent, or approbation, or liking, or whatever name it is called by, can no more poſſibly be the efficient cauſe of action, than reſt can be the cauſe of motion. Nothing can poſſibly be the cauſe of an effect more conſiderable than itſelf. Nothing that is paſſive can poſſibly be the cauſe of any thing that is active: an occaſion indeed it may be; and action may be conſequent upon perception or judgment; it may eaſily be ſuppoſed to be always conſequent upon it, and yet at the ſame time there may be no manner of phyſical or neceſſary connexion between them. Beſides, the word "do" in this definition of Mr. Collins, has no ſignification. For his meaning is not, that the man "acts or "does" any thing; but the *liberty* or power in man to do as he wills or pleaſes, is with him exactly and only the ſame as the *liberty* or power in a balance would be to move as it wills or pleaſes; ſuppoſing the balance endued with ſuch a ſenſation, or intelligence, as enabled it to perceive which way the weights turned it, and to approve the motion, ſo as to fancy that it moved itſelf, when indeed it was only moved by the weights. Mr. Collins makes the difference between a man and a clock to conſiſt only in ſenſation and intelligence, not in any power of acting: whereas the whole eſſence of *liberty* conſiſts in the power of acting: ſo that action and *liberty* are identical terms.

The principal arguments in favour of *liberty*, as it is popularly underſtood, and as it is defined in the beginning of this article, are the following: this principle is neceſſary to conſtitute man an AGENT; for, as far as it is true of a being that he acts, ſo far he muſt himſelf be the cauſe of the action; and, therefore, not neceſſarily determined to act: but if he has no abſolute power over his own actions, i. e. if he be not a free agent, the actions, which he performs, cannot properly be ſaid to be his own, but muſt be aſcribed to ſome other power, by which he is led on to perform them; as a good clock or watch performs the motions aſſigned to it by the artiſt. This argument is excellently illuſtrated by Dr. Clarke: man, ſays he, either has within himſelf a principle of action properly ſpeaking, i. e. a ſelf-moving faculty, a principle or power of beginning motion; or he has not. If he has within himſelf ſuch a principle, then he is a free, and not a neceſſary agent: for every neceſſary agent is moved neceſſarily by ſomething elſe; and then that which moved it, not the thing itſelf which is moved, is the true and only cauſe of the action. That any other thing operating upon an agent, ſhould efficiently and neceſſarily produce ſelf-motion in that agent, is a direct contradiction in terms. If man has not within himſelf a principle or power of ſelf-motion, then every motion and action of man is chiefly and properly produced by the efficiency of ſome extrinſic cauſe; which cauſe muſt be either what we uſually call the motive or reaſon upon which a man acts; or elſe it muſt be ſome inſenſible ſubtile matter, or ſome other being or ſubſtance making an impreſſion upon him. If the reaſons or motives upon which a man acts be the immediate and efficient cauſe of the action, then either abſtract notions, ſuch as all reaſons and motives are, have a real ſubſiſtence, that is, are themſelves ſubſtances; or elſe that which has itſelf no real ſubſiſtence can put a body into motion; either of which is manifeſtly abſurd. If inſenſible ſubtile matter, or any other being or ſubſtance, continually making impreſſion upon a man, be the immediate and efficient cauſe of his acting; then the motion of that ſubtile matter or ſubſtance muſt be cauſed by ſome other ſubſtance, and the motion of that by ſome other, till at laſt we arrive at a free agent; and then *liberty* is a poſſible thing, and man poſſibly may have *liberty*: and if he may poſſibly have it, then experience will prove that he probably, nay, that he certainly has it. If we never arrive at any free cauſe, then there is either *in infinitum* a progreſſion of motions without any mover, of effects without any cauſe, or of things acted without any agent; which is a manifeſt contradiction: or elſe motion exiſts neceſſarily of itſelf. If motion exiſts neceſſarily of itſelf, it muſt be either with a determination every way, or one certain way; if with a determination every way, this is no motion at all: if with a determination one certain way, then that determination is either neceſſary, and conſequently all other determinations impoſſible, which is contrary to experience; or elſe there muſt be a particular reaſon of that determination, and ſo backwards *in infinitum*, which comes to the forementioned abſurdity, of effects exiſting without any cauſe.

Farther, *liberty* is the dictate of our own conſciouſneſs; we have, really, the ſame conſtant and neceſſary conſciouſneſs of *liberty* that we have that we think, chooſe, will, or even exiſt; and whatever men may ſay to the contrary, it is impoſſible for them, in earneſt, to think they have no active ſelf-moving powers, and are not the cauſes of their own volitions, or not to aſcribe to themſelves what they muſt be conſcious they think and do. Mr. Hume, though he denies the reality of *liberty*, grants that we have a feeling of it; that the divine plan required that we ſhould be ſo made, as to ſeem to ourſelves free; that the whole conſtitution of things is as if we were free; and that being under a neceſſity of approving and diſapproving actions and characters, we are ſo far under a neceſſity of believing ourſelves and others free. After theſe conceſſions, it can hardly be imagined that the conſtitution of nature ſhould be altogether impoſition and deceit.

Beſides, if man be not, in the ſtricteſt ſenſe of the word, a free agent, he can be no moral agent. It is hard to ſay, what virtue and vice, commendation and blame, mean, if they do not ſuppoſe agency, voluntary motion, free choice, and an abſolute dominion over our reſolutions. Can we applaud or reproach ourſelves for what we were no more the cauſes of than of our own beings, and what it was no more poſſible for us to prevent than the returns of the ſeaſons, or the revolutions of the planets? On the ſyſtem of neceſſity, conſcience is an inexplicable principle: its cenſures or applauſe are equally futile and groundleſs: the approbation of mankind is an inſult with regard to thoſe on whom it is beſtowed, becauſe they can have no merit; and the reproach of men unjuſt and cruel, becauſe there can be no demerit and ground of blame. Whatever difficulties, therefore, may attend the nature of that influence which we aſcribe to motives, they cannot be the efficient neceſſitating cauſe of human actions: ſince, on this ſuppoſition, there could be but one agent in the univerſe; who muſt equally be the author of all the good and evil in the world, and on whom muſt ultimately be charged the ſin and miſery, as well as the virtue and happineſs of his creatures.

Moreover, it has been urged by the advocates of *liberty*, that if men's determinations and actions flow neceſſarily from the previous ſtate of their minds, and the motives or influences reſulting from a nature or condition, impoſed upon them without their own conſent or choice, the idea of reſponſibility or accountableneſs muſt vaniſh, and there can be no propriety or uſe of rewards or puniſhments. God cannot reward without virtue, and there can be no virtue without a ſelf-determining power: he cannot puniſh without guilt, and there can be no guilt when men do what they cannot avoid doing, and when their actions ariſe from circumſtances in which their Creator placed them.

It is alſo equally unjuſt and uſeleſs to threaten puniſhment or inflict it on men to prevent crimes, when they are neceſſarily determined in all their actions. And if men are neceſſary agents, though we cannot well admit this verbal contradiction, it can be of no uſe to reaſon with them, to admoniſh or intreat them; and God muſt be inſincere in his addreſſes and invitations, and cruel in his requirements and commands. But ſuch is the whole tenour of revelation; and, therefore, the concluſion is neceſſary, that man is a free agent, capable of good or evil, and of determining his purſuit of either, from the ſole power of his own judgment or will. See on this ſubject Collins's Enquiry concerning Human Liberty, firſt printed in 1717. Clark's Remarks, 1717, and Collection of Papers which paſſed between Mr. Leibnitz and Dr. Clarke, in 1715 and 1716. Jackſon's Vindication and Defence of Human Liberty, 1730. Price's Review of the principal Queſtions, &c. in Morals, p. 315, &c. edit. 1758. Prieſtley's Doctrine of Philoſophical Neceſſity, 1777. For the objections againſt *liberty*, and the arguments in ſupport of neceſſity, ſee NECESSITY.

LIBERTY, *moral*, is the power of following, in all circumſtances, our ſenſe of right and wrong; or of acting in conformity to our reflecting and moral principles, without being controlled by any contrary principles.

LIBERTY, *religious*, is the ſame with LIBERTY *of conſcience*, and ſignifies the power of exerciſing, without moleſtation, that mode of religion which we think beſt; or of making the deciſions of our own conſciences, reſpecting religious truths, the rule of our conduct, and not any of the deciſions of others.

LIBERTY, *civil*, is the power of a civil ſociety or ſtate, to govern itſelf by its own diſcretion; or by laws of its own making, without being ſubject to any foreign diſcretion, or to the impoſitions of any extraneous will or power. Civil *liberty*, ſays judge Blackſtone, adopting the definitions of the Inſtitutes, conſiſts in the power of doing whatever the laws permit; or it is natural *liberty*, or a power of acting as one thinks fit, without any reſtraint or controul, unleſs by the law of nature, ſo far reſtrained by human laws, and no farther, as is neceſſary and expedient for the general advantage of the public. Others have defined *civil liberty*, in contradiſtinction from *political* LIBERTY, to be that power over their own actions, which the members of the ſtate reſerve to themſelves, and which their officers muſt not infringe. This extends no farther than to a man's own conduct, and ſignifies the right he has to be exempt from the control of the ſociety or its agents, that is, the power he has of providing for his own advantage and happineſs. It is a man's civil *liberty*, which is originally in its full force, and part of which he ſacrifices when he enters into a ſtate of ſociety.

LIBERTY, *political*, ſometimes uſed as ſynonymous with civil

civil *liberty*, in a diſtinct ſenſe, conſiſts in the power, which the members of the ſtate reſerve to themſelves of arriving at the public offices, or at leaſt, of having votes in the nomination of thoſe who fill them: and this is that which a man may or may not acquire in the compenſation he receives for it. In countries where every member of the ſociety enjoys an equal power of arriving at the ſupreme offices, and conſequently of directing the ſtrength and the ſentiments of the whole community, there is a ſtate of the moſt perfect political *liberty*. On the other hand, in countries where a man is, by his birth or fortune, excluded from theſe offices, or from a power of voting for proper perſons to fill them; that man, whatever be the form of the government, or whatever civil *liberty* or power over his own actions he may have, has no power over thoſe of another; he has no ſhare in the government, and therefore has no political *liberty* at all. Nay, his own conduct, as far as the ſociety does interfere, is, in all caſes, directed by others.

Liberty, *perſonal*, conſiſts in the power of loco-motion, or of changing ſituation, or removing one's perſon to whatſoever place one's own inclination may direct, without impriſonment or reſtraint, unleſs by due courſe of law. See **Habeas** *corpus*.

Liberty *of the tongue*, in the *Manege*, is a void ſpace left in the middle of a bit, to give place to the tongue of a horſe, made by the bit's arching in the middle, and riſing towards the roof of the mouth. The bit, according to the various forms of the *liberty*, acquires different names; hence we ſay a *ſnatch-mouth*, a *Pignatelli*, i. e. with the *liberty* after Pignatelli's faſhion, and a *canon-mouth*, with the *liberty* like a pigeon's neck.

In forging the bit, care muſt be taken not to make the *liberty* too high, leſt it hurt, or at leaſt tickle the palate, and make the horſe carry low.

Liberty, in *Mythology*, was a goddeſs both among the Greeks and Romans. Among the former ſhe was invoked under the title Eleutheria; and by the latter ſhe was called *Libertas*, and held in ſingular veneration; temples, altars, and ſtatues, were erected in honour of this deity. A very magnificent temple was conſecrated to her on mount Aventin, by Tiberius Gracchus, before which was a ſpacious court, called *atrium libertatis*. The Romans alſo erected a new temple in honour of *Liberty*, when Julius Cæſar eſtabliſhed his empire over them, as if their *liberty* had been ſecured by an event which proved fatal to it. In a medal of Brutus, *Liberty* is exhibited under the figure of a woman, holding in one hand a cap, the ſymbol of *liberty*, and two poniards in the other, with the inſcription IDIBVS MARTIIS.

LIBETHRIDES, in *Mythology*, a ſurname given to certain nymphs which were ſuppoſed to inhabit near mount Libethra in Bœotia; and the Libethreian fountain in Theſſaly, led the poets to call the Muſes by this name. Virgil, Eclog. vii. v. 21.

LIBITINA, in the *Roman Mythology*, a goddeſs which preſided over funerals. This goddeſs was the ſame with the *Venus infera* or *Epithymbia* of the Greeks. She had a temple at Rome, where was lodged a certain piece of money for every perſon who died, whoſe name was recorded in a regiſter called *Libitinæ ratio*. This practice was eſtabliſhed by Servius Tullius, in order to obtain an account of the number of annual deaths, in the city of Rome, and conſequently the rate of increaſe or decreaſe of its inhabitants.

LIBONOTUS, in *Phyſiology*, one of the twelve winds of the ancients. See **Wind**.

LIBRA, *balance*, one of the mechanical powers. See **Balance**.

Libra is one of the twelve ſigns of the zodiac; exactly oppoſite to Aries; ſo called, becauſe when the ſun is in this ſign, at the autumnal equinox, the days and nights are equal, as if weighed in a balance.

The ſtars in this conſtellation, according to Ptolemy, are ſeventeen; Tycho, ten; Hevelius, twenty; and Flamſtead, fifty-one. Their names, &c. are as follow:

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longitud. °	′	″	Latitude. °	′	″	Magnitude.
		♏	6	44	44	12	45	33 S	5.6
			3	5	16	2	26	33 N	7
			10	52	46	9	1	22 S	6
			11	43	17	8	43	9 S	6
			9	28	7	0	35	38 N	6
5.									
			14	10	0	11	3	20 S	5
Preced. in ſouth. ſcale	μ		9	51	43	2	3	54 N	5
			10	42	55	0	24	26 N	6
Bright ſtar of ſouth. ſcale	α		10	46	40	0	22	51 N	2
			11	39	14	1	45	30 S	6
		♏	6	41	9	3	30	17 N	6
			14	2	47	7	37	33 S	6
Firſt north. of ſouth. ſcale	ξ		10	22	31	4	34	38 N	6
			10	58	48	8	11	5 S	6
Second	ξ		10	47	59	5	12	27 N	6
15.									
			8	50	18	12	00	48 N	5.6
			11	3	19	5	33	48 N	7
			11	12	55	5	37	3 N	6
That preced. in north ſcale	δ		10	58	34	8	16	34 N	4.5
South of inform. preced. below ſcales	γ		16	22	31	7	35	56 S	3
20.									
Firſt ſouth. following ſcale	ν		14	28	1	1	13	43 N	5
Second	ν		14	34	16	1	1	32 N	6
			17	11	25	7	25	50 S	7
North of inform. preced. below ſcale	ι		16	41	43	1	48	23 S	4.3
	ι		16	54	37	1	35	58 S	6
25.									
			16	41	20	0	18	3 N	6
Northern ſcale	β		5	3	40	8	32	3 N	2
			18	14	26	0	18	56 N	6
Second following ſouth. ſcale	ο		17	36	48	2	49	46 N	7
Another	ο		17	58	32	3	22	18 N	6
30.									
Next after north. ſcale	ε		17	1	43	8	5	44 N	4
	ζ		19	35	30	2	8	17 N	6
	ζ		20	2	23	1	40	27 N	7
	ζ		20	6	40	2	23	6 N	6
Third following ſouth ſcale	ζ		20	42	5	2	16	39 N	4
35.									
			23	44	54	8	30	16 S	6
Following in north. ſcale			19	19	41	8	56	50 N	6
	γ		20	48	53	4	25	27 N	3.4
Nor. of 2 inf. follow. below ſcale, or before feet of ſouth			24	17	28	8	28	9 S	4
			25	1	17	9	58	50 S	4
40.									
			22	39	2	0	14	7 N	6
			24	0	34	4	5	38 S	6
Fourth of follow. ſouth. ſcale	κ		23	27	00	0	1	54 N	4
Second below north. ſcale	η		23	2	38	4	2	52 N	4
Laſt follow. ſouth. ſcale	λ		26	9	43	0	7	50 N	4
45.									
Follow. below north. ſcale	θ		25	33	4	3	30	4 N	4
			26	22	37	0	9	12 N	6
South. of follow. north. ſcale	ψ		26	4	4	6	7	48 N	4
			27	4	53	4	4	20 N	6
			25	32	16	12	00	9 N	6
50.									
Midd. of thoſe follow. north. ſcale.	ξ		26	58	43	9	16	29 N	4.5

Libra alſo denotes the ancient Roman pound, borrowed from the Sicilians, who called it *litra*, λιτρα.

The *libra* was divided into twelve uncia, or ounces, and the ounce into twenty-four ſcruples.

The diviſions of the *libra* were, the *uncia*, one twelfth; the *ſextans*, one ſixth; the *quadrans*, one fourth; the *triens*, one third; the *quincunx*, five ounces; the *ſemis*, ſix; the *ſeptunx*, ſeven; the *bes*, eight; the *dodrans*, nine; the *dextans*, ten; the *deunx*, eleven; laſtly, the *as* weighed twelve ounces, or one *libra*.

Learned writers were not agreed as to the true weight of the Roman pound. Villalpandus and Greaves, relying on the congius of Veſpaſian for its ſtandard weight, have from hence attempted to determine this intricate queſtion. This Roman congius contained ten pounds weight of wine: Villalpandus found by filling it with ſpring water, that it contained juſt ten modern Roman pounds, which are equal to 52560 Troy grains. Azout filled it to the ſame height, and, having weighed its contents twice, found a reſult very nearly agreeing with Greaves's meaſure, ſtated by Millet, in Phil. Tranſ. vol. li. p. 790. His greater weight was 63024 Paris grains, equal to 51699$\frac{3}{8}$ Troy; his leſſer, 62760 Paris grains, equal to 51482$\frac{4}{5}$ Troy. The mean between both is 51591$\frac{1}{16}$ Troy grains, which, divided by 10, give 5159$\frac{1}{10}$ ſuch grains for the weight of the ancient Roman pound. Several objections have been made to this pound derived from the congius, which Mr. Raper, *ubi infra*, has collected into one view; from which he infers, that it is more probable, that this ſtandard ſhould give too great a Roman pound, than too ſmall a one. But as the reſult from hence muſt be uncertain, he has recourſe to the coins. Having weighed nine gold pieces in the Pembroke collection, containing 34$\frac{1}{2}$ Roman ſcruples, he found their weight to amount to 608 Troy grains, which divided by 34$\frac{1}{2}$, give 17$\frac{43}{69}$ for the ſcruple, whence the Roman pound ſhould weigh 5075$\frac{11}{23}$ grains. From ſome other coins of the ſame kind, a ſcruple appears to be 17$\frac{1}{2}$ grains,

grains. Inſtead of this ſcrupular ſtandard, another was introduced by Sylla; and from the heavieſt of four pieces of this ſtandard, allowing thirty of them to have been coined out of the Roman pound, its weight is found to be 5040 grains. The ſtandard of forty in the pound, mentioned by Pliny, ſucceeded this of Sylla, and continued to the eſtabliſhment of the monarchy under Auguſtus: and from ten different coins of this ſtandard, he deduces a mean AUREUS of $126\frac{1}{17}$ grains; and ſuppoſing the aureus of forty in the pound to weigh 126 Troy grains, the Roman pound muſt weigh 5040. In Pliny's time forty-five aurei were ſtruck out of the pound; and the mean aureus from Nero to Titus, in whoſe reign Pliny died, was under 112 grains: and if the ſtandard weight of the imperial aureus of forty-five in the pound did not exceed 112 grains, the Roman pound will weigh 5040 grains, as it is found from the conſular aureus. Soon after the reign of Alexander Severus, in whoſe time the aureus came to be called ſolidus, the coinage became very irregular, till Conſtantine entirely modelled it anew, by coining ſeventy-two ſolidi of four ſcruples out of the pound of gold. From twenty-nine of theſe ſolidi in the interval from Conſtantine to Heraclius, it appears, that the mean weight is 69 grains, which, multiplied by 72, gives but 4968 grains for the Roman pound. But if the ſtandard weight of this kind amounted to 70 grains, the pound will weigh 5040, as before. If we take 5040 Troy grains for the weight of the Roman pound, the ſcruple will weigh $17\frac{1}{2}$ grains; the conſular aureus 126; the imperial aureus 112, and the ſolidus 70; and the conſular denarius of 84 in the pound will weigh juſt 60 Troy grains. Phil. Tranſ. vol. lxi. part ii. p. 462, &c. See farther on this ſubject the articles DENARIUS and MILIARENSIS.

The Roman *libra* was uſed in France for the proportions of their coin, till the time of Charlemagne, or perhaps till that of Philip. I. in 1093. their ſols being ſo proportioned, as that twenty of them are equal to the *libra*.

By degrees, it became a term of account; and every thing of the value of twenty ſols, was called a *livre*.

LIBRA *penſa*, in our *Law Books*, denotes a pound of money in weight.

It was uſual, in former days, not only to tell the money, but to weigh it; becauſe many cities, lords, and biſhops, having their mints, coined money, and often very bad too; for which reaſon, though the pound conſiſted of twenty ſhillings, they always weighed it.

LIBRARII, among the ancients, were a ſort of copyiſts, who tranſcribed in beautiful, or, at leaſt, legible characters, what had been written by the notarii in notes and abbreviatures.

LIBRARY, an edifice or apartment deſtined for the placing of books; or the collection of books themſelves lodged therein. See BOOK.

Some authors refer the origin of *libraries* to the Hebrews; and obſerve, that the care theſe took for the preſervation of their ſacred books, and the memory of what concerned the actions of their anceſtors, became an example to other nations, particularly to the Egyptians. Oſmanduas, king of Egypt, is ſaid to have taken the hint firſt: who, according to Diodorus, had a *library* built in his palace, with this inſcription over the door, ΨΥΧΗΣ ΙΑΤΡΕΙΟΝ. Nor were the Ptolemies, who reigned in the ſame country, leſs curious and magnificent in books. The Scripture alſo ſpeaks of a *library* of the kings of Perſia, Ezra v. 17. vi. 1. which ſome imagine to have conſiſted of the hiſtorians of that nation, and of memoirs of the affairs of ſtate; but, in effect, it appears rather to have been a depoſitory of laws, charters, and ordinances, of the kings. The Hebrew text calls it the *houſe of treaſures*, and afterwards the *houſe of the rolls*, where the treaſures were laid up. We may, with more juſtice, call that a *library*, mentioned in the ſecond of Eſdras to have been built by Nehemiah, and in which were preſerved the books of the prophets, and of David, and the letters of their kings.

The firſt who erected a *library* at Athens was the tyrant Piſiſtratus; and yet Strabo refers the honour of it to Ariſtotle. That of Piſiſtratus was tranſported by Xerxes into Perſia, and was afterwards brought back by Seleucus Nicanor to Athens. Long after, it was plundered by Sylla, and re-eſtabliſhed by Hadrian. Plutarch ſays, that under Eumenes there was a *library* at Pergamus, containing two hundred thouſand books. Tyrannian, a celebrated grammarian, contemporary with Pompey, had a *library* of three thouſand volumes. That of Ptolemy Philadelphus, according to A. Gellius, contained ſeven hundred thouſand, all in rolls, burnt by Cæſar's ſoldiers. See ALEXANDRIAN.

Conſtantine, and his ſucceſſors, erected a magnificent one at Conſtantinople; which, in the eighth century, contained three hundred thouſand volumes, all burnt by order of Leo Iſaurus; and, among the reſt, one wherein the Iliad and Odyſſey were written in letters of gold, on the guts of a ſerpent.

The moſt celebrated *libraries* of ancient Rome, were the Ulpian, and the Palatine. They alſo boaſt much of the *libraries* of Paulus Æmilius, who conquered Perſeus; of Lucilius Lucullus, of Aſinius Pollio, Atticus, Julius Severus, Domitius, Serenus, Pamphilus Martyr, and the emperors Gordian and Trajan.

Anciently, every large church had its *library*; as appears by the writings of St. Jerom, Anaſtaſius, and others. Pope Nicholas laid the firſt foundation of that of the VATICAN, in 1450. It was deſtroyed by the conſtable Bourbon, in the ſacking of Rome, and reſtored by pope Sixtus V. and has been conſiderably enriched with the ruins of that of Heidelberg, plundered by count Tilly in 1622. One of the moſt complete *libraries* in Europe, was ſaid to be that erected at Florence by Coſmo de Medicis; over the gate whereof is written, LABOR ABSQVE LABORE; though it is now exceeded by that of the French king; begun by Francis I. augmented by cardinal Richlieu, and completed by M. Colbert.

The emperor's *library* at Vienna, according to Lambecius, conſiſts of eighty thouſand volumes, and fifteen thouſand nine hundred and forty curious medals.

The Bodleiam *library* at Oxford, built on the foundation of that of duke Humphry, exceeds that of any univerſity in Europe, and even thoſe of all the ſovereigns of Europe, except the emperor's, and French king's, which are each of them older by a hundred years. It was firſt opened in 1602, and has ſince found a great number of benefactors; particularly ſir Robert Cotton, ſir H. Savil, archbiſhop Laud, ſir Kenelm Digby, Mr. Allen, Dr. Pococke, Mr. Selden, and others. The Vatican, the Medicean, that of Beſſarion at Venice, and thoſe juſt mentioned, exceed the Bodleian in Greek manuſcripts; which yet outdoes them all in Oriental manuſcripts.

As to printed books, the Ambroſian at Milan, and that of Wolfembuttle, are two of the moſt famous, and yet both inferior to the Bodleian.

LIBRARY, *king's*, at St James's, was founded by Henry, eldeſt ſon of James I. and made up partly of books, and partly of manuſcripts, with many other curioſities, for the advancement of learning. It has received many additions from the *libraries* of Iſaac Caſaubon, and others.

LIBRARY, *Cottonian*, originally conſiſted of nine hundred and fifty-eight volumes of original charters, grants, inſtruments, letters of ſovereign princes, tranſactions between this and other kingdoms and ſtates, genealogies, hiſtories, regiſters of monaſteries, remains of Saxon laws, the book of Geneſis, thought to be the moſt ancient Greek copy extant, and ſaid to have been writ by Origen in the ſecond century, and the curious Alexandrian copy or manuſcript, in Greek capitals. This *library* is kept in the Britiſh Muſeum, with the large and valuable *library* of ſir Hans Sloane, amounting to upwards of forty-two thouſand volumes, &c. There are many public *libraries* belonging to the ſeveral colleges at Oxford and Cambridge, and the univerſities in North Britain. The principal public *libraries* in London, beſide that of the Muſeum, are thoſe of the college of heralds, of the college of phyſicians, of Doctors Commons, to which every biſhop, at the time of his conſecration, gives at leaſt 20*l.* ſometimes 50*l.* for the purchaſe of books; thoſe of Gray's Inn, Lincoln's Inn, the Inner Temple, and Middle Temple; that of Lambeth, founded by archbiſhop Bancroft in 1610, for the uſe of ſucceeding archbiſhops of Canterbury, and increaſed by the benefactions of archbiſhops Abbot, Sheldon, and Tenniſon, and ſaid to conſiſt of, at leaſt, fifteen thouſand printed books, and ſix hundred and ſeventeen volumes in manuſcript; that of Red-Croſs ſtreet, founded by Dr. Daniel Williams, a preſbyterian divine, and ſince enriched by many private benefactions; that of the *Royal* SOCIETY, called the Arundelian or Norfolk *library*, becauſe the principal part of the collection formerly belonged to the family of Arundel, and was given to the ſociety by Henry Howard, afterwards duke of Norfolk, in 1666, which *library* has been increaſed by the valuable collection of Francis Aſton, eſq. in 1715, and is continually increaſing by the numerous benefactions of the works of its learned members, and others; that of St. Paul's, of *Sion* COLLEGE, the queen's *library*, erected by queen Caroline in 1737; and the ſurgeon's *library*, kept in their hall in the Old Bailey, &c.

Where a *library* is erected in any pariſh, it ſhall be preſerved for the uſes directed by the founder; and incumbents and miniſters of pariſhes, &c. are to give ſecurity for it, and make catalogues of the books, &c. None of the books ſhall be alienable, without conſent of the biſhop, and then only when there is a duplicate of ſuch books. If any book ſhall be taken away and detained, a juſtice's warrant may be iſſued to ſearch for, and reſtore the ſame: alſo action of trover may be brought in the name of the proper ordinary, &c. And biſhops have power to make rules and orders concerning *libraries*, appoint perſons to view their condition, and enquire for the ſtate of them in their viſitations. Stat. 7 Anne, cap. 14.

LIBRATA *terræ*, a portion of ground, containing four oxgangs, and every oxgang thirteen acres.

With us, it is ſo much land as is yearly worth 20s. In Henry the Third's time, he that had *quindecim libratos terræ*, was to receive the order of knighthood.

Some ſay, that as money is divided into pounds, ſhillings, pence, and farthings, the ſame degrees are to be obſerved in the diviſion of lands; and, therefore, as *quadrans* ſignifies a farthing, ſo *quadrantata* is the fourth part of an acre; *obolata*, an half; *denariata*, a whole acre: *ſolidata*, 12 acres; and *librata*, 20 times 12 acres; i. e. 240 acres.

This is the ſame with what in Scotland is called POUND-*land* of old extent.

LIBRATION, in *Aſtronomy*, an apparent irregularity in the motion of the moon, by which ſhe ſeems to *librate* or waver about her own axis; ſometimes from the eaſt to the weſt; and ſometimes from the weſt to the eaſt. See Moon.

Hence it is, that ſome parts of the moon's weſtern limb, or margin at one time, recede from the centre of the diſk, and at another, move towards it; by which means ſome of thoſe parts, which were before viſible, ſet and hide themſelves in the inviſible ſide of the moon, and afterwards become again conſpicuous.

This *libration* of the moon is owing to her equable rotation round her own axis, and her unequal motion in the perimeter of her orbit. For if the moon moved in a circle, whoſe centre coincided with the centre of the earth, and turned round its axis in the preciſe time of its period round the earth, the plane of the ſame lunar meridian would always paſs through the earth, and the ſame face of the moon would be conſtantly and exactly turned towards us. But ſince the real motion of the moon is in an ellipſis, in whoſe focus is the earth, and the motion of the moon about the earth is equable; or, which is the ſame thing, every meridian of the moon, by the rotation, deſcribes angles proportional to the times, the plane of no one meridian will conſtantly paſs through the earth.

Libration *of the earth*, is a term applied by ſome aſtronomers to that motion, whereby the earth is ſo retained in its orbit, as that its axis continues conſtantly parallel to the axis of the world. See Parallelism.

This Copernicus calls the *motion of libration*; and may be illuſtrated thus: ſupppoſe a globe, with its axis parallel to that of the earth, painted on the flag of a maſt, moveable on its axis, and conſtantly driven by an eaſt wind, while it ſails round an iſland; it is evident, the painted globe will be ſo *librated*, as that its axis will be parallel to that of the world, in every ſituation of the ſhip.

LICE. See Louse.

Lice *of trees*. See Aphis.

LICENCE, *licentia*, in *Law*, a power or authority given to another to do ſome lawful act.

A *licence* is a perſonal power, and cannot be transferred to another; though a *licence* may be granted to a man and his aſſigns.

Licence *to alien in mortmain*. Alienations in mortmain to eccleſiaſtical perſons, &c. are reſtrained by ſeveral ſtatutes; but the king may grant *licence* to any perſon or bodies politic, &c. to alien or hold lands in MORTMAIN 27 Ed. I 7 & 8 W. III. cap. 37.

Licence is alſo uſed, in the *Civil Law*, for a permiſſion or leave granted by a ſuperior.

Juſtinian appointed four years to be ſpent in the ſtudy of the law; after which, thoſe who had diſcharged this obligation, were ſaid to have *licence* or permiſſion to retire from ſtudy.

Licence is alſo applied to the letters, or certificates, taken out in univerſities, whether in law, phyſic, or divinity.

Licence, in the Sorbonne, denotes a period of two years which the bachelors are obliged to paſs in aſſiſting at acts, and diſputing in them, to qualify themſelves for being admitted doctors. See Degree.

Licence, *letter of*. See Letter.

Licence *to ariſe*, in *Law*, Licentia *ſurgendi*, is a liberty, or ſpace of time given by the court to a tenant, who is eſſoined *de malo lecti* in a real action, to riſe out of his bed, and go about his buſineſs.

Licence *for election of biſhops*. See Conge *d'elire*.

Licence *of marriage*. Biſhops have power to grant *licences* for this purpoſe; and parſons marrying any perſon without publiſhing the banns of matrimony, or without *licence*, incur a forfeiture of 100*l.* &c. by 7 & 8 W. III. cap. 35. See Marriage.

Licence, in *Painting*, are the liberties which the painter takes in diſpenſing with the rules of perſpective, and the other laws of this art.

Licence, *poetical*, is the liberty which poets claim of diſpenſing with the ordinary rules of grammar.

Anciently, poets had much greater *licences* than are now allowed. The Greeks, by having recourſe to the ſeveral dialects of their tongue, could lengthen cut a word, if it were too ſhort, or retrench ſomething from it, if it were too long. The old poets did what they pleaſed with their language, and ſubjected it not only to all their neceſſities, but their caprices too:

> *Et data Romanis venia eſt indigna poetis.*

But theſe became ridiculous in courſe of time; and the poets are now deſpoiled of moſt of their ancient privileges.

Licenced *curate*. See Curate.

LICENTIA *concordandi*, in *Law*, is that *licence* for which the *king's* SILVER is paid in paſſing a fine, mentioned in 12 Car. II. cap. 12.

Licentia *loquendi*. See Emparlance.

LICENCIATE, or Licentiate, he who has obtained the degree of a *licence*.

Moſt of the officers of judicature in Spain are known by no other name than that of *licentiates*. To paſs *licentiate* in common law, civil law, or phyſic, they muſt have ſtudied ſeven years; in divinity, ten.

Licentiate, among us, is uſually underſtood of a phyſician, who has a *licence* to practiſe, granted him by the COLLEGE *of phyſicians*, or by the biſhop of the dioceſe.

A perſon practiſing phyſic without ſuch *licence*, in caſe his patient dies under his hands is guilty of a felony in the eye of the law.

LICETO, in *Ornithology*. See Cenotzqui.

LICHANUS, in the *Ancient Muſic*, the name of one of the ſounds of a tetrachord. It was next to the nete.

The word is Greek, λιχανος, and ſignifies *index*.

The reaſon of the appellation was, that the *lichanus* ſhewed whether, and how far the genus was *molle* or *intenſum*. For the more remote the *lichanus* was from the moſt acute ſound in the tetrachord, the more did the genus partake of the *molle*. And, on the contrary, the nearer the *lichanus* approached to this higheſt note, the genus was reckoned the more intenſe. Vide Wallis, Append. ad Ptolem. Harm. p. 160.

This is Dr. Wallis's account of the matter. And, indeed, the reaſon of the name *lichanus* is not at all myſterious, if we conſider that the ſound of this chord was different in every one of the genera, whereas the ſound of the parypate remained the ſame in three different genera, and could not therefore be an index or characteriſtic of thoſe genera, which were, the *chromaticum toniæum*, the *diatonicum molle*, and the *diatonicum intenſum*. See Chromatic and Diatonic.

Lichanus *hypaton*, λιχανος ὑπατον, in the Greek ſcale of muſic, was the penultimate note of the hypaton tetrachord, and anſwers to *D ſol re* of Guido's ſcale. See Diagram.

Lichanus *meſon*, λιχανος μεσων, in the Greek muſic, was the penultimate note of the *meſon* tetrachord, and anſwers to Guido's *G ſol re ut*. See Diagram.

LICHEN, in *Botany*. See Liver-*wort*.

Lichen, Λειχην, in *Medicine*, a cutaneous diſtemper, otherwiſe called IMPETIGO.

LICHENASTRUM, in *Botany*, the name of a genus of plants, called JUNGERMANNIA, in the Linnæan ſyſtem, ſo called from the *lichens* or *liver-worts*, the flowers of which thoſe of this genus ſomewhat reſemble. The characters of the *lichenaſtra* are theſe: the flower is naked, and of the antheraceous kind, globoſe at its firſt appearance, but ſoon after burſting open into a ſtellate or cruciform four-leaved flower, or the reſemblance of one, much like that of the galliums; this ſheds a fine duſt, or true farina, and is ſuſtained on a pedicle ſingly, and coming out of a theca or cup, which in ſome is undivided, in others is divided into two or more ſegments, repreſents a true flower. All the moſſes which have this ſort of flower are to be ranked in this genus, however widely they differ from one another in their external general form. *Tab.* XV. *Botany*, N° 19.

The firſt order of the *lichenaſtra*, according to Dillenius contains thoſe with ſhoots and branches of a determinate figure; and of theſe the firſt ſeries conſiſts of ſuch as have leaves all ſet one way. Dillen. Hiſt. Muſc. p. 486.

The ſecond ſeries of theſe *lichenaſtra* comprehends thoſe which have their leaves ſet on each ſide the ſtalks, and reſemble in miniature the ſeveral kinds of the trichomanes and aſplenium: the firſt diviſion of theſe comprehends thoſe which have ſimple pinnæ, placed alternately againſt one another, and the middle rib naked.

The firſt ſubdiviſion comprehends thoſe which have whole pinnæ, or at the utmoſt ſuch as are only lightly crenated.

The ſecond diviſion of theſe *lichenaſtra* comprehends thoſe which have pinnæ cut into two or three ſegments, or as it were prickly.

The third diviſion of theſe *lichenaſtra* takes in thoſe which are pinnated and reſemble the trichomanes, but which have their middle rib hid, or covered by the auriculæ of the pinnæ, or elſe by ſecondary ones.

The firſt ſubdiviſion of theſe comprehends thoſe which have the middle rib covered by the auriculæ of the pinnæ.

The ſecond ſubdiviſion of theſe *lichenaſtra*, comprehends thoſe which have the lower part of their middle rib covered with either one ſingle foliage, or with a ſeries of intermediate pinnæ.

The third ſeries of theſe *lichenaſtra*, comprehends thoſe which are imbricated, or have their pinnæ ſtanding cloſer upon, and lying over one another, and ſtanding leſs out from the ſurface of the ſtalks. The firſt diviſion of theſe takes in thoſe which have ſcales or pinnæ as it were furniſhed with a ſecondary ſcale below.

The ſecond diviſion of theſe *lichenaſtra* contains thoſe which have the ribs or nerves of the branches covered underneath by a ſort of ſecondary ſquamæ.

The fourth ſeries of theſe *lichenaſtra* takes in thoſe which are every way ſurrounded with leaves.

The ſecond order of theſe *lichenaſtra* comprehends thoſe which have leaves variouſly and indeterminately divided, which creep upon the ground, and have no ſtalks except the pedicles.

The third order of the *lichenaſtra* comprehends a few ſpecies, of which the author was leſs perfectly informed than of the reſt, not having ſeen their heads, or abſolutely depending on the accounts of them.

LICHENOIDES, in *Botany*, the name of a genus of *algæ* the characters of which are theſe: they are compoſed of parts of different figure and ſtructure, not ſimple and uniform as the byſſi; they have uſually no ſtalk but grow on the branches of trees, on ſtones, and other bodies, either in form of a mere cruſt, or of leaves variouſly divided, and raiſed. They have tubercles on the ſeveral parts of theſe, ſerving in the place of flowers or ſeeds, and growing cloſely upon the leaves without pedicles. Micheli has deſcribed the flowers and ſeeds of theſe plants from microſcopic obſervations, but theſe are too minute to form generical diſtinctions on. Theſe plants have the name *lichenoides*, from their reſemblance to the *lichen*, or liverwort, as they conſiſt, like it, of leaves diffuſed every way. They have hence been called by ſome *lichens*; but the difference between the two genera is very great, theſe having very imperfect flowers, the others the moſt perfect of all the moſſes.

The *lichenoides* are a very numerous genus, and are therefore divided into ſeveral ſubordinate ſeries, or orders.

Of the firſt order, are thoſe which have no leaves, but are merely cruſtaceous. Dillen. Hiſt. Muſc. p. 124.

The ſecond order of the *lichenoides* comprehends thoſe which have regular ſcutellæ appearing in manner of flowers; theſe are little hollowed cups, as it were, ſurrounded with a kind of rim.

This order comprehends the foliaceous *lichenoides*. Of theſe ſome are of a gelatinous ſubſtance, and have tubercles and ſcutellæ.

Of the gelatinous *lichenoides*, the following are the known ſpecies of the dry and more rigid kinds, which have regular ſcutellæ.

Theſe have their ſcutellæ ſtanding on pedicles, more or leſs long; the other kinds have them applied cloſe to the ſurface of the leaves, and uſually of one colour: the leaves of theſe are more or leſs broad, and generally grow out from ſtones, or the branches of trees.

Theſe have all their leaves, more or leſs free; but there are ſome ſpecies which have them cloſely adhering in every part, to the ſtone or wood on which they grow.

The third ſeries of the *lichenoides* takes in thoſe which are dry and peltated, or clypeated, which have tubercles of a roundiſh, or oblong figure, ſometimes flat, ſometimes convex, but never concave, nor ſurrounded with any rim or margin, in the manner of the ſcutellæ of the former kinds.

The ſecond diviſion of theſe *lichenoides* contains thoſe which have pileated heads or peltæ, ſuſtained on ſhort pedicles which are fixed to their middle.

To all theſe are to be added ſome other ſpecies, the peltæ or ſhields of which very rarely, if ever, appear, ſo that they have not yet been obſerved.

LICINIUM, a word uſed by many chirurgical writers to expreſs a tent.

LICNON, Λικνον, in the Dionyſian ſolemnities, the myſtical van of Bacchus; a thing ſo eſſential to all the ſolemnities of this god, that they could not be duly celebrated without it. See Dionysia.

LICNOPHORI, Λικνοφοροι, in the Dionyſian ſolemnity, thoſe who carried the Licnon.

LICTORS, among the Romans, were officers eſtabliſhed by Romulus, who always attended the chief magiſtrates when they appeared in public.

The duty of their office conſiſted in the three following particulars: 1. *Submotio*, or clearing the way for the magiſtrate they attended: this they did by word of mouth; or, if there was occaſion, by uſing the rods they always carried along with them. 2. *Animadverſio*, or cauſing the people to pay the uſual reſpect to the magiſtrate, as to alight, if on horſeback, or in a chariot; to riſe up, uncover, make way, and the like. 3. *Præitio*, or walking before the magiſtrates: this they did not confuſedly, or all together, nor by two or three abreaſt, but ſingly following one another in a ſtraight line. They alſo preceded the triumphal car in public triumphs: and it was alſo part of their office to arreſt criminals, and to be public executioners in beheading, &c. The enſigns were the Fasces and Securis.

As to the number of *lictors* allowed each magiſtrate, a dictator had twenty-four, a maſter of the horſe ſix, a conſul twelve, a prætor ſix; and each Veſtal virgin, when ſhe appeared abroad, had one.

LIE, or Lye *under the ſea*. See Lying, &c.

LIEGE, Ligius, properly ſignifies a *vaſſal*, who holds a kind of fee that binds him in a cloſer obligation to his lord than other people.

The term ſeems to be derived from the French *lier*, *to bind*; on account of a ceremony uſed in rendering faith or homage; which was by locking the vaſſal's thumb, or his hand, in that of the lord, to ſhew that he was faſt bound by his oath of fidelity—Cujas, Vigenere, and Bignon, chooſe rather to derive the word from the ſame ſource with *leudis*, or *leodi*, *loyal*, *faithful*.—But Du-Cange falls in with the opinion of thoſe who derive it from *liti*, a kind of vaſſals, ſo firmly attached to their lord, on account of lands or fees held of him, that they were obliged to do him all manner of ſervice, as if they were his domeſtics. He adds, this was formerly called *ligium ſervitium*, and the perſon *liege*. In this ſenſe, the word is uſed, Leg. Edw. cap. 29. *Judæi ſub tutela regis ligea debent eſſe*; that is, wholly under his protection.

By *liege* Homage, the vaſſal was obliged to ſerve his lord towards all, and againſt all, excepting his father. In which ſenſe, the word was uſed in oppoſition to *ſimple homage*; which laſt only obliged the vaſſal to pay the rights and accuſtomed dues to his lord; and not to bear arms againſt the emperor, prince, or other ſuperior lord: ſo that a *liege man* was a perſon wholly devoted to his lord, and entirely under his command.

Omnibus, &c. Reginaldus, rex Inſularum, ſalutem, Sciatis quod deveni homo ligeus *domini regis Angliæ Johannis, contra omnes mortales, quamdiu vixero; & inde ei fidelitatem & ſacramentum præſtiti, &c.* MS. penes W. Dugdale.

But it muſt be obſerved, there were formerly two kinds of *liege homage*: the one, by which the vaſſal was obliged to ſerve his lord againſt all, without exception even of his ſovereign; the other, by which he was to ſerve him againſt all, except ſuch other lords as he had formerly owed *liege homage* to.

In our old ſtatutes, *lieges*, and *liege people*, are terms peculiarly appropriated to the king's ſubjects; as being *lieges*, *ligi*, or *ligati*, obliged to pay allegiance to him; 8 Hen. VI. 14 Hen. VIII. &c. though private perſons had their *lieges* too.

Reinaldus, Dei gratia, abbas Rameſiæ, præpoſito & hominibus de Branceſtre, & omnibus vicinis Francis & Anglis, ſalutem. Sciatis me dediſſe terram Ulfe, in depedene (hodie depedale) huic Boſelino, & uxori ejus Alfniæ—ea conditione quod effecti ſint homines. Lib. Rameſ.

Liege *vaſſalage*. See Vassalage.

LIENIS *infarctus*. See Spleen.

LIENTERY, Λειεντερια, in *Phyſic*, a kind of looſeneſs or Diarrhoea, wherein the food paſſes ſo ſuddenly through the ſtomach and guts, as to be thrown out by ſtool, with little or no alteration.

The ancients were of opinion, that the *lientery* was owing to the too great ſmoothneſs and ſlipperineſs of the inſide of the inteſtines, by which they let the food ſlip off before it was digeſted: and hence they gave it this name, which is formed from λειος, *ſmooth*, *poliſhed*, and εντερον, *inteſtine*.

The *lientery* is generally owing either to a defect in the ferment of the ſtomach, or to a relaxation of the pylorus, attended with ſo briſk an irritation of the fibres of the ſtomach, that, inſtead of retaining the aliment, it lets it paſs, or to an obſtruction of the inteſtinal glands.

Exceſs of drinking ſometimes occaſions this diſeaſe, by relaxing the ſtomach, and eſpecially the pylorus, too immoderately.

Etmuller propoſes to ſtrengthen the ſtomach with rhubarb, quinces, and ſuch means as check vomiting. Dr. Freind adviſes to gently ſtimulate the inteſtinal tube, and to deterge

terge the obſtructed glands by means of gentle purges, and vomits of ipecacuanha at proper intervals. To theſe may be added moderate riding, and ſtomachic, warm, and ſtrengthening medicines. See COELIAC *paſſion* and DYSENTERY.

LIEUTENANT, *locumtenens*, a deputy, or officer, who holds the place of a ſuperior, and diſcharges in his abſence the duties of the office which he ought to exerciſe in perſon.

Of theſe, ſome are civil; as lords *lieutenants* of kingdoms; who are the king's viceroys, and govern in his ſtead, ſuch as the lord *lieutenant* of Ireland; and LORDS *lieutenants* of counties.

But the term is moſt frequent among military men, among whom there is a variety of *lieutenants*.

LIEUTENANT is the ſecond commiſſioned officer in every company of both foot and horſe, and next to the captain, who takes the command upon the death or abſence of the captain.

LIEUTENANT *of artillery*, is an officer of the *artillery* in each company of which there are one firſt and three ſecond *lieutenants*. The firſt *lieutenant* has the ſame detail of duty with the captain, becauſe in his abſence he commands the company. The ſecond *lieutenant* is the ſame as the enſign in an infantry regiment, being the youngeſt commiſſioned officer in the company, and it is his duty to aſſiſt the firſt *lieutenant*.

LIEUTENANT *of engineers*. See ENGINEER.

LIEUTENANT-*general*, a great officer, the next in rank to the GENERAL of an army: theſe officers ſerve in the field, or in ſieges, according to the dates of their commiſſions. In battle, the oldeſt commands the right wing of the army, the ſecond the left wing, the third the centre, the fourth the right wing of the ſecond line, the fifth the left wing, the ſixth the centre, &c. In ſieges, the *lieutenant*-generals always command the right of the principal attack, and order what they think proper for the advancement of the ſiege, during the twenty-four hours they are in the trenches, except the attack, which they are not to make without an order from the general in chief.

In France they have alſo *lieutenant-generals* of their naval forces, who command immediately under the admirals.

In Holland they have a *lieutenant-admiral*, which is the ſame with what we call a *vice-admiral*.

LIEUTENANT-*general of the ordnance*, is he who has the charge of the artillery, batteries, &c. under the maſter-general, or in his abſence. This officer was firſt eſtablied in 1597. See ORDNANCE.

LIEUTENANT-*colonel of foot*, is the ſecond officer in a regiment; he commands in the abſence of the COLONEL, and in battle takes poſt at his colonel's left.

The dragoons have alſo a *lieutenant-colonel*; but the horſe have not, properly, any; the firſt captain of the regiment ſupplies the office.

LIEUTENANT-*colonel of horſe*, is only the firſt captain of the regiment, who commands in the abſence of the colonel, taking place of all other captains.

LIEUTENANT-*captain*. See CAPTAIN.

This denomination was aboliſhed in the Engliſh army in 1772, when it was ordered that for the future all *captain-lieutenants* ſhould have the rank and title of captains in the army.

LIEUTENANT *of a ſhip of war*, is the officer next in rank and power to the captain, in whoſe abſence he is charged with the command of the ſhip, and alſo the execution of any orders which he may have received from the commanders relating to the king's ſervice. The *lieutenant*, who commands the watch at ſea, keeps a liſt of all the officers and men belonging to it, in order to muſter it and report to the captain the names of thoſe who are abſent from their duty. During the night-watch, he occaſionally viſits the lower deck, or ſends thither a proper officer to ſee that order is obſerved. He is always to be upon deck in his watch, to give orders for trimming the ſails and ſuperintending the navigation, and for preſerving order; but he is never to change the ſhip's courſe without the captain's direction, unleſs it be to avoid an immediate danger. In time of battle, he is to ſee, that all the men are preſent in their quarters, to order and exhort them to perform their duty, and to inform the captain of any miſbehaviour. The youngeſt *lieutenant* of the ſhip, who is alſo called *lieutenant* at arms, is, beſides his common duty, to train the ſeamen to the uſe of ſmall arms, and in time of battle to attend and direct them for this purpoſe.

LIEUTENANT *de roy*, the deputy governor of all ſtrong towns in France, who is a check upon the governor, and commands in his abſence.

LIEUTENANT *reformed*, is he whoſe company or troop is broke or diſbanded, but continued in whole or half-pay, and ſtill preſerves his right of ſeniority and rank in the army.

LIFE, *vita*, is a very ambiguous term. For both God and man, and a ſoul, and an animal, and a plant, are ſaid *to live*: yet there is not any thing common to all theſe beſides a kind of active exiſtence; which, however, is of very different kinds. See ANIMAL and VEGETABLE.

Life, then, in the general, expreſſes a kind of active, operative exiſtence; and it is therefore conceived to conſiſt in motion. But particularly,

LIFE *of body*, *vita corporis*, conſiſts in an uninterrupted motion therein. A body, therefore, ſaid to be *living*, muſt conſiſt of various parts or members, both internal and external, ſo framed and put together, as to conſtitute one whole. And theſe members may be moved and warmed by ſome fluid ſubſtance, permeating the whole frame; by which heat and motion, the vital functions are to be performed. Such are nutrition, generation, local motion, &c.

LIFE *of mind*, *vita mentis*, is held, by the Carteſians, to conſiſt in a perpetual cogitation, or uninterrupted courſe of thinking; which ſeems likewiſe to have been Ariſtotle's meaning when he calls the ſoul εντελεχεια; which his interpreters call *actus*; thinking being the only proper act of the mind.

But Mr. Locke endeavours to refute this principle. See THINKING and SOUL.

LIFE *of man*, *vita hominis*, conſiſts of a continued communication of body and mind; or in operations, to which both the motions of the body and ideas of the mind contribute.

Thus, e. gr. the mind now thinking of ſomething, on occaſion of that thought there ariſes a certain motion in the body: and now again, the body moves firſt, which motion is followed by ſome thought of the mind.

In ſuch alternate or reciprocal operation does the *life* of man conſiſt; conſidered as he is a compound of body and mind. See SENSATION and MOTION.

LIFE is more particularly uſed for the duration of an animal's being; or the ſpace of time that paſſeth between its birth and death.

Some contend that the *life of animals* is preſerved by the acid parts of the air mixing with the blood in the lungs; which parts diſſolve or attenuate the blood, and preſerve its heat, and by both theſe keep up the motion of the heart. See Dr. Bryan Robertſon's Treat. of the Animal Oeconomy.

LIFE is alſo uſed for the conſtitution; or, that principle of heat and motion which animates bodies, and makes them perceive, act, and grow.

In which ſenſe, *life* is divided into *animal*, *ſenſitive*, and *vegetative*.

LIFE, in a medical ſenſe, is defined, the CIRCULATION of the blood.

LIFE, *prolongation of*, is made, by lord Bacon, one of the three branches of medicine; the other two relating to the preſervation of health, and the cure of diſeaſes.

The theory of prolonging *life* he numbers among the deſiderata. Some means, or indications, that ſeem to lead to it, he lays down as follow.

Things are preſerved in two manners; either in their *identity*, or by *reparation*. In their *identity*, as a fly, or ant, in amber; a flower, or fruit, or wood, in a conſervatory of ſnow; a dead carcaſe, in balſams. By *reparation*, as a flame, or a mechanical engine, &c. To attain to the prolongation of *life*, both theſe methods muſt be uſed; and the human body muſt be preſerved both as inanimates, as flame, and as mechanical inſtruments are preſerved.

Hence ariſe three intentions for the prolongation of *life*: *retardation* of conſumption, proper *reparation*, and *renovation* of what begins to grow old. Conſumption is occaſioned by two kinds of depredation; a depredation of the innate ſpirit, and a depredation of the ambient air. Theſe may be each prevented two ways; either by rendering thoſe agents leſs predatory, or by rendering the paſſive parts (viz. the juices of the body) leſs liable to be preyed on. The ſpirit will be rendered leſs predatory, if either its ſubſtance be condenſed, as by the uſe of opiates, grief, &c. or its quantity diminiſhed, as in ſpare and monaſtic diets; or its motion calmed, as in idleneſs and tranquillity. The ambient air becomes leſs predatory if it be either leſs heated by the rays of the ſun, as in cold climates, in caves, mountains, and anchoret cells: or be kept off from the body, as by a denſe ſkin, the feathers of birds, and the uſe of oils and unguents, without aromatics. The juices of the body are rendered leſs liable to be preyed on, either by making them harder, or more moiſt and oily; harder, as by a coarſe ſharp diet, living in the cold, robuſt exerciſes, and ſome mineral baths: moiſter, as by the uſe of ſweet foods, &c. abſtaining from ſalts and acids; and eſpecially by ſuch a mixture of drink, as conſiſts wholly of fine ſubtile particles, without any acrimony or acidity.

Reparation is performed by means of aliment; alimentation is promoted four ways; by the concoction of the viſcera, ſo as to extrude the aliment; by exciting the exterior parts to the attraction of the aliment, as in proper exerciſes and frications, and ſome unctions and baths; by the preparation of the food itſelf, ſo as it may more eaſily inſinuate itſelf, and in ſome meaſure, anticipate the digeſtion; as in various ways of dreſſing meats, mixing drinks, fermenting breads, and reducing the virtues of theſe three into one; by promoting the act of aſſimilation itſelf, as in ſeaſonable ſleep, ſome external application, &c. The renovation of what begins to grow old, is performed two ways; by the inteneration of the habit of the body, as in the uſe of emollients, emplaſters, unctions, &c. of ſuch a nature as do not extract, but impreſs; or by purging off the old juices and ſubſtituting freſh ones; as in ſeaſonable evacuations, attenuating diets, &c.

The ſame author adds theſe three axioms; that the prolongation of *life* is to be expected rather from ſome ſtated diets, than either from any ordinary regimen, or any extraordinary medicines, more from operating on the ſpirits, and mollifying the parts, than from the manner of feeding; and this mollifying of the parts without, is to be performed by ſubſtantials, impriments, and occludents. See LONGÆVITY.

LIFE-ANNUITIES, are annuities the payments of which are ſuſpended on the continuance of any given life or lives; and they may be diſtinguiſhed into annuities to commence *immediately*, and annuities to commence at ſome future period, or *reverſionary life-annuities*.

The value of a *life-annuity* is properly the ſum that will be ſufficient to enable a *ſeller* (allowing for the chances of mortality) to pay the annuity without loſs; and, ſuppoſing money to bear no intereſt, it is always equal to the *expectation* of the life.

For example. Obſervations ſhew, that, according to the *mean* probabilities of the duration of human life, the *expectation* of a life aged ten is nearly forty years; or, in other words, that a ſet of lives at this age, will one with another enjoy forty years each of exiſtence, ſome of them enjoying a duration as much longer as others enjoy a ſhorter. It is obvious, therefore, that ſuppoſing money to bear no intereſt, 40 *l.* in hand for each life, would be ſufficient to enable a *ſeller* to pay to any number of ſuch lives 1 *l. per ann.* for their whole duration; or, in other words, that 40 *l.* is, on this ſuppoſition, the value of a life aged ten.

But if any improvement is made of money by putting it out to intereſt this will be *more* than the value; becauſe it will be more than ſufficient to pay the annuity; and as much more than ſufficient as the improvement or the intereſt is greater. If, for inſtance, any ſum now in hand may be ſo improved, by being put out to intereſt, at 4 *per cent.* as to double itſelf in eighteen years; the ſeller of ſuch an annuity will (in conſequence of putting out *half* the purchaſe-money to intereſt) find himſelf at the end of eighteen years in poſſeſſion of 42 *l.* or of 20 *l.* more than is ſufficient to pay the remainder of the annuities, though he ſhould make no farther improvement of the purchaſe-money. If he puts out the money to higher intereſt he will be a greater gainer, if to leſs, he will be a leſs gainer; but at any rate of intereſt he muſt be a gainer. The truth is, that ſuppoſing the intereſt to be that juſt mentioned, or 4 *per cent.* and all the improvement poſſible made of the money at this intereſt, he will find 17 *l.* 10 *s.* 6 *d.* for each annuity (inſtead of 40 *l*) to be ſufficient to enable him to make all his payments. (See the table at the end of this article.) But that if he improves the money at 5 *per cent.* he will find 15 *l.* to be ſufficient.

It may ſeem to follow from hence, that we have nothing to do to find the value of a *life-annuity*, but to find the *expectation* of the life, and then to take out of the common tables the value of an annuity *certain* for a term of years equal to the expectation; and it may appear ſtrange that this ſhould not give the true value.

The truth is, that it will give the value *greater* than it is; or that a leſs ſum than that found in this way will be ſufficient to pay the annuity. Suppoſing the intereſt 4 *per cent.* the value of an annuity certain for forty years is 19*l.* 16*s.* (ſee *Tab.* III. ANNUITIES); but the value of a life aged ten, at this rate of intereſt is, as has been juſt ſaid, no more than 17 *l.* 10 *s.* 6 *d.* The principal reaſon of this is the difference between the value of forty payments of an annuity to be made *every* year regularly one after another, till in forty years they are all made; and the value of the ſame number of payments to be made at greater diſtances of time from one another, and not to be all made till the end of ſeventy or eighty years. In this laſt caſe there is more time given for the improvement of the purchaſe-money, and therefore a leſs ſum will be ſufficient to enable a ſeller to make his payments. All that is learned from knowing the expectation of a number of lives, is the *mean* number of payments that will be made to each of them, and not the time in which they will be made. For example. The expectation of a *life* at ten being forty years, it follows that to a hundred lives at this age, forty payments for each *life*, or four thouſand in all, will be made. But, as all the lives will not be extinct in leſs than ſeventy or eighty years, many of the payments will not be made till after the expiration of forty years; and, therefore, a part of the purchaſe-money will be improved for a longer time than forty years. In general, it may be obſerved that about a *quarter* of the payments of a ſet of *life-annuities* will be made after the expiration of a term of years equal to the *expectations* of the lives; and that this quarter having a longer time for accumulation than the expectations of the lives, the value of the lives muſt be leſs than the value of annuities to be paid regularly every year for a time equal to the expectations. Thus 1980 *l.* will, in conſequence of being improved at 4 *per cent.* pay a hundred annuities of 1 *l.* for forty years. But a leſs ſum (or 1750 *l.*) will pay a hundred ſuch annuities to a ſet of lives whoſe common expectation is forty years; becauſe a *quarter* of the payment will not be made till after the end of forty years, and ſome not till after the end of ſeventy or eighty years; and conſequently a *quarter* of the purchaſe-money will be improved for more than forty-years, and ſome of it for more than ſeventy or eighty years.

Theſe obſervations demonſtrate, that it is a miſtake to reckon the value of a *life-annuity* the ſame with the value of an annuity certain for a term of years equal to the *expectation* of the *life*. But it is a greater miſtake to reckon it the ſame with the value of an annuity for a term certain, equal to that which a life has an even chance of exiſting. This is the error into which Mr. Weyman Lee, Mr. Dale, and ſome others have fallen. The former, in particular, has taken great pains to ſupport this error in a book which is entitled, An Eſſay to aſcertain the Value of Annuities for Years and Lives; and which affords a remarkable inſtance of pains miſapplied and groſs ignorance united to an over-bearing confidence.

The reaſoning juſt ſtated is ſufficient to prove this method of calculating the value of *life-annuities* to be wrong. But there is a particular conſideration which ſets the abſurdity of it in the ſtrongeſt light. Were it a right method of calculation, it would follow that an annuity on a *life* expoſed to ſuch danger in a particular year as to create an equal chance whether it will not fail in that year, would, at the beginning of the year, be worth *nothing*, though ſuppoſed to be ſure of continuing for ever, if it eſcaped that danger.

The true method of computing the values of *life-annuities* may be explained in the following manner. Let us ſuppoſe that the duration of the annuity is to be only *one* year. That is, that 1 *l.* is to be paid a year hence, provided a *life* now of a given age ſhould be then in being. Were it *certain* that this *life* would not fail in the year, the value of the annuity would be the ſame with the value of it payable a year hence, or with the ſum which, now put out to intereſt, would increaſe to 1 *l.* in a year; and this ſum, ſuppoſing intereſt at 4 *per cent.* is 19*s.* 3*d.* as may be ſeen in the table of the values of 1 *l.* payable at the end of any number of years given under the article ANNUITIES.

But the payment not being to be made, ſhould the *life* happen to fail in the year, this ſum ought to be diminiſhed in proportion to the degree of the uncertainty, which there is, whether the *life* will continue to exiſt through the year; and it is eaſy to ſee that this *uncertainty* or *chance* is in the proportion of the number of perſons at that age living at the *end* of the year, to the number living at the *beginuing* of it, as ſhewn by obſervations. For example: if it has been found in any ſituation that but half the number of perſons of the given age living at the *beginning* of the year, are living at the end of it, the uncertainty will be as $\frac{1}{2}$; and the value juſt mentioned ought to be leſſened one half. If it appears that two thirds, or nine tenths, or ninety-nine hundredths, are living at the end of the year, the ſame value muſt be diminiſhed only one-third, one-tenth, or one hundredth. That is, it will be neceſſary to multiply it by $\frac{2}{3}$, $\frac{9}{10}$ or $\frac{99}{100}$. Univerſally then, the preſent value of any ſum to be paid a year hence, provided a given *life* ſhould be then exiſting, is that ſum multiplied by the value of 1 *l.* payable at the end of the year (taken out of *Tab* II. under the article ANNUITIES) and alſo by the fraction formed by making the number of the living at the age of the given *life* (taken out of the Table of *Obſervations*) the *denominator*, and the number of the living at the next ſucceeding age (or at the end of the year) the *numerator*. For example. Let the value be ſought of 1 *l.* payable a year hence, if a child aged ten ſhould be then living, reckoning intereſt at 4 *per cent.* The value of 1 *l.* reckoning this intereſt, and payable a year hence, is (as has been juſt ſaid) 19*s.* 3*d* or (in decimal parts of a pound, as given in the common tables of intereſt) .9615. (See *Tab.* II. under the article ANNUITIES) The number of the living at the age of ten (in *Tab.* III. at the end of this article) is 5675; and at the next ſucceeding age (or eleven) is 5623. It follows, thefore, that according to this table, out of 5675 living at the age of ten, only 5623 are living at the and of the year; or, in other words, that the chance or probability of a life aged ten exiſting through the year is as $\frac{5623}{5675}$, which fraction, therefore, multiplied by .9615 gives the value ſought, or .9526 equal to 19*s.* 0½*d.*

Again, let us ſuppoſe that the duration of a *life-annuity* of 1*l.* is to be two years, or that one payment of 1*l.* is to be made a year hence, provided a given *life* ſhould exiſt a year, and a ſecond payment of the ſame ſum at the end of two years, provided the ſame life ſhould be in exiſtence at the end of two years. The method of finding the value of the firſt payment has been already explained; and by the very ſame reaſoning it may be eaſily diſcovered, that the value of the ſecond payment muſt be the value of 1*l.* payable at the end of two years, *diminiſhed* in proportion to the uncertainty that the given *life* will exiſt two years; or (which is the ſame) *multiplied* by the fraction formed by making the number of the living at the given age the *denominator*, and the number of the living at the next ſucceeding age but one, or at the end of two years, the *numerator*.

Example. Let the value be required of 1*l.* payable yearly for two years, provided a child aged ten ſhould live two years, reckoning intereſt at 4 *per cent.*

The value of the payment at the end of the firſt year has been juſt found to be .9526 in decimal parts of a pound, or 19*s.* 0½*d.*

The value of the payment at the end of the ſecond year, is the value of 1*l.* payable two years hence, leſſened by the uncertainty that a *life* aged ten will live two years; or in the proportion of the number of the living in the table of the obſervations at the age of twelve to the number of the living at the age of ten. That is, it is .9245 (the ſaid value of 1*l.* payable at the end of two years, taken out of Table II. under the article ANNUITIES) *multiplied* by the fraction $\frac{5573}{5675}$, or .9078 equal to 18*s.* 2*d.* See Table III. at the end of this article. To this value add the former value, or .9526*l.* and the total, or 1.8604*l.* will be the value of both payments, or of an annuity of 1*l.* on a *life* aged ten for two years.

By proceeding in this way it will appear that the value of the ſame annuity for three years is $.8889 \times \frac{5573}{5675} + 1.8604 = 2.725$*l.* and for eighty-ſix years (or the whole duration of *life*, according to the table of obſervations) 17.5238*l.*

It is evident, that in the ſame method the value of an annuity of 1*l.* on a *life* at any other age is to be found; and that ſuppoſing the annuity any other ſum than 1*l.* its value will be this ſum multiplied by the value of an annuity of 1*l.*

The calculation of the values of *life-annuities* may be otherwiſe explained in the following manner. Suppoſe a *life* annuity of 1*l.* payable yearly to every one of 5075 perſons, all now aged ten, the firſt payment of which is to be made a year hence. It appears from the *Northampton* Table of Obſervations (or Table III. in the following collection of Tables) that only 5623 of theſe perſons will be living at the end of the year; and, conſequently, that the money then to be paid will be only 5623*l.* The preſent value, therefore, of the firſt payment of the annuities will be the ſum which, now put out to intereſt, will increaſe in a year to 5623*l.* That is, it is 5623*l.* diſcounted for a year, or 5406*l.* 10*s.* for this ſum added to its intereſt for a year (reckoned at 4 *per cent.*) will juſt make up 5623*l.* From the ſame Table of Obſervations, it appears farther, that of 5675 perſons living at ten years of age, only 5573 will be living at the end of *two* years. The preſent value, therefore, of the *ſecond* payment of the annuities will be the ſum which being now put out to compound intereſt, at 4 *per cent.* will increaſe to 5573*l.* in two years. The ſum is 5152*l.* 4*s.* In like manner, 5523, 5473, 5423, &c. being the number living at the end of three, four, five, &c. years, the value of the third, fourth, fifth, &c. payments of the annuities will be 5523*l.* 5473*l.* 5423*l.* &c. diſcounted for three, four, five, &c. years reſpectively, and continued to the year in which all the lives become extinct. The total of all theſe values is 99443*l.* which, therefore, is the ſum that would be ſufficient, if improved at 4 *per cent.* to make good the payment of an annuity of 1*l.* for *life* to every one of 5675 perſons aged ten, according to the *Northampton* Table of Obſervations. The value, therefore, of ſuch an annuity payable to only one of this number muſt be the 5675th part of 99443*l.* or 17*l.* 10*s.* 6*d.*

In the Table of Obſervations, from which the examples here given have been taken, and alſo in the Table framed by Dr. Halley, from the bills of mortality at Breſlaw in Sileſia, it may be obſerved, that the numbers dying every year out of a given number born, continue in the middle ſtages of *life* nearly the ſame for many years together. It was this circumſtance that led Mr. De Moivre to form his hypotheſis of an equal decrement of *life* through all its ſtages after ten. In this hypotheſis, the limit or utmoſt probable extent of *life* is fixed to the age of eighty-ſix; and out of any number living at a given age, an equal number is reckoned to die every year, till at eighty-ſix all the lives become extinct. Thus, for inſtance, if there are ſeventy-ſix perſons living at ten, one of them by this hypotheſis will die annually during the term of ſeventy-ſix years, at the end of which time the laſt ſurviving *life* will have failed. Or, in other words, ſeventy-five will be living at the end of the firſt year, ſeventy-four at the end of the ſecond year, ſeventy-three at the end of the third year, and ſo on for ſeventy-ſix years; from whence it follows, that the probability of one perſon's living to the end of the firſt, or ſecond, or third year will be $\frac{75}{76}$, $\frac{74}{76}$, $\frac{73}{76}$, &c. reſpectively, where it appears that the fractions, and conſequently the probabilities they expreſs, decreaſe *arithmetically*. The number of years which a *life* wants of the age of eighty-ſix is in this hypotheſis called the COMPLEMENT of the *life*, and half this complement is always the EXPECTATION of the *life*. That is, according to what has been already ſaid, it is the number of years which, one with another, a ſet of lives at that age will exiſt; or, as the writers on this ſubject ſometimes ſpeak, it is the *ſhare* of *life* due to each of them.

It is extremely eaſy to calculate the values of *life-annuities* on this hypotheſis. For, by what has been juſt ſaid, the value of an annuity on *life* aged 10, is the ſum of the ſeries $\frac{75}{76} \times .9615 + \frac{74}{76} \times .9245 + \frac{73}{76} \times .8889$, &c. continued to $\frac{1}{76} \times .0527$*l.* — .9615*l.* — .9245*l.* —.8889*l.* &c. and .0527*l.* being the values (reckoning intereſt at 4 *per cent.*) of 1*l.* payable at the end of 1, 2, 3, &c. to 76 years; or, calling 1*l.* with its intereſt for a year, *r*, and 76, *n*, the value of the *life* is $\frac{n-1}{nr} + \frac{n-2}{nr^2} + \frac{n-3}{nr^3} +$, &c. to $\frac{n-75}{nr^{75}}$. (See Tab. II. ANNUITIES.) Now, as in this ſeries the probabilities of living are made to decreaſe equally, the ſum of it may be found at once by the following rule.

"Find in Table III. under ANNUITIES, the value of an
"annuity of 1*l.* certain for a number of years equal to
"the *complement*. Multiply this value by the *perpetuity*
"increaſed by unity, and divide the product by the
"complement. The quotient ſubtracted from the per-
"petuity will be the value."

The complement in the preſent caſe being 76, the value of an annuity for 76 years being (ſee Tab. III. ANNUITIES) 23.7311, and the perpetuity 25, the ſum of the ſeries $\frac{n-1}{nr} + \frac{n-2}{nr^2} + \frac{n-3}{nr^3}$, &c. or the value of a *life* aged 10, will come out 16.881. In the ſame manner may the value of a *life* at any other age be computed, according to this hypotheſis; and theſe values are the ſame with thoſe in Mr. De Moivre's table of the values of lives.

But it is a neceſſary obſervation, that in the firſt and laſt ſtages of life, this hypotheſis differs too much from fact. This may be eaſily ſeen, by comparing it with the following tables of the probabilities of human life, formed from real obſervations. The rejection of it will indeed render calculations of the values of *lives* (eſpecially joint *lives*) a work of more labour and difficulty; but there is an eaſy theorem given by Mr. Simpſon, in his book on the Doctrine of Annuities and Reverſions, and ſince by Dr. Price, in his book on Reverſionary Payments, note (O), p. 312, 3d edit. which will remove much of this labour. We ſhall here give the explanation and proof of this theorem from Mr. Morgan's Treatiſe on Annuities and Aſſurances, chap. ii. § 2. p. 56.

"Was it *certain* that a perſon of a given age would live
"to the end of a year, the value of an annuity of 1*l.*
"on ſuch a *life* would be the preſent ſum which would
"increaſe in a year to the value of a *life* one year older,
"together with the value of the ſingle payment of 1*l.*
"to be made at the end of a year; that is, it would be
"1*l.* together with the value of a *life* aged one year
"older than the given *life*, multiplied by the value of
"1*l.* payable at the end of a year. Call the value of a
"*life* one year older than the given *life* N, and the va-
"lue of 1*l.* payable at the end of the year $\frac{1}{r}$; then will
"the value of an annuity on the given *life*, on the ſup-
"poſition of a *certainty* that it will exiſt a year, be
"$\frac{1}{r} + \frac{1}{r} \times N$. But the fact is, that it is *uncertain* whe-
"ther the given *life* will exiſt to the end of the year.
"This laſt value, therefore, muſt be diminiſhed in the
"proportion of this uncertainty; that is, it muſt be
"multiplied by the probability that the given *life* will
"ſurvive

“ ſurvive one year, which ſuppoſing $\frac{b}{a}$ to expreſs this “ probability, will make it $\frac{b}{ar}\times\overline{1+N}$.”

The great utility of this theorem will appear from the following examples. Suppoſe the probabilities of *life*, as they are given in the third of the following tables, or the tables of obſervations for Northampton, and the rate of intereſt 4 *per cent.* or $r=1.04$. By reaſoning in the manner already explained, the value of a *life* aged 95 will be expreſſed by the ſingle fraction $\frac{1}{4}\times.9615=.2403$. The value of a *life* one year younger will be, by this theorem, $\frac{4}{9\times1.04}\times\overline{1+.2403}=.5300$. The value of a *life* two years younger, by the ſame theorem will be $\frac{9}{16\times1.04}\times\overline{1+.5300}=.8270l$. The value of a *life* three years younger, or at the age of 92, will be $\frac{16}{24\times1.04}\times\overline{1+.8270}=1.171l$. If we proceed in this manner, the value of every younger *life* will be deduced from that next preceding; nor will the number of multiplications neceſſary to determine the values (agreeably to any table of obſervations) of all *lives*, at all ages, much exceed the number of thoſe which muſt otherwiſe have been uſed for finding the ſingle value of the youngeſt *life*. See Tab. VIII.

Mr. Morgan, after giving this account of this theorem, and explaining the method of verifying all the operations in proceeding by it from one *life* to another, goes on to apply the theorem to the calculation of the values of joint *lives*, and whoever will conſult this part of Mr. Morgan's Treatiſe, will be abundantly inſtructed in the beſt and moſt expeditious methods of making all calculations of this ſort.

But inſtead of following him in this, we ſhall reſume our account of the general principles on which the values of *life-annuities* are calculated. We have already explained theſe, as far as annuities on ſingle *lives* are concerned. From the ſame principles the method of finding the value of annuities on the *joint continuance* of any two *lives*, may be underſtood. Suppoſe the ages of two perſons to be 50 and 60. It appears in Table III. that of 2857 perſons living at 50, only 2776 will live to be 51; or, in other words, that the probability that a perſon at this age will live a year, is $\frac{2776}{2857}$. Alſo, it appears from the ſame table, that the probability that a perſon aged 60 will live to 61, is $\frac{1956}{2038}$. The probability therefore, that they will *both* live a year (or the former to be 51, and the latter 61) is the product of theſe two probabilities (or $\frac{2776}{2857}\times\frac{1956}{2038}=\frac{4420559}{3822566}$). For it is well known, that the probability that any two independent events will both happen, is always the product ariſing from multiplying the probability of one event by the probability of the other. See EXPECTATION.

In like manner, the probability that the former of theſe *lives* will live to be 52, 53, 54, &c. and the latter to be 62, 63, 64, &c. or that they will both live two, three, four, &c. years, is by the ſame table $\frac{2694}{2857}\times\frac{1874}{2038}$, $\frac{2612\times1793}{2857\times2038}$, $\frac{2530\times1712}{2857\times2038}$, &c. And according to the reaſoning already uſed, theſe probabilities multiplied by the values (in Tab. II. ANNUITIES) of 1*l.* payable at the end of 1, 2, 3, 4, &c. years, will give the preſent value of the firſt, ſecond, third, fourth, &c. payments of an annuity dependent on the joint continuance of the two *lives*; and the ſum of theſe products for 1, 2, 3, 4, &c. years, will be the value of an annuity of 1*l.* on the joint continuance of the two *lives* for 1, 2, 3, 4, &c. years; and if the products are continued to the extremity of the oldeſt *life*, their ſum will be the value of an annuity on the whole duration of the joint *lives*.

The values of annuities on the joint continuance of three, or any other number of *lives*, are found in a ſimilar manner. The ſeveral fractions expreſſing the reſpective probabilities of their continuing 1, 2, 3, 4, &c. years, being multiplied into one another, and alſo into 1*l.* diſcounted as before; and the ſum of the products ariſing from theſe multiplications continued to 1, 2, 3, 4, &c. years, or to the extremity of the oldeſt of the *lives*, will be the values of the annuity for 1, 2, 3, 4, &c. years, or for the whole duration of the joint *lives*.

With reſpect to annuities on the *longeſt* of any number of *lives*, the reaſoning is not ſo ſimple. The following explanation, however, of the method of determining their values, when only *two* lives are concerned, will be eaſily underſtood. Suppoſe the ages of the two perſons to be 50 and 60; and for the ſake of more perſpicuity, let us ſuppoſe that the decrements of life are equal, according to Mr. De Moivre's hypotheſis, already explained. The chance of the youngeſt perſon's living one year is expreſſed by $\frac{35}{36}$; and the ſame chance with reſpect to the oldeſt by $\frac{25}{26}$. The chance of the youngeſt perſon's not living one year is $\frac{35}{36}$, ſubtracted from unity, or $\overline{1-\frac{35}{36}}$, and the ſame chance with regard to the oldeſt is alſo $\overline{1-\frac{25}{26}}$; for it muſt be remembered, that in the doctrine of chances, *certainty* is always denoted by *unity*; and that, conſequently, the difference between the probability of an event's happening, and unity muſt expreſs the probability of the event's *not* happening. Theſe two expreſſions, therefore, being multiplied into each other, will, according to what has been already obſerved, give the probability of their *both* dying in the year, which is equal to $1-\frac{35}{36}-\frac{25}{26}+\frac{35\times25}{26\times36}$. For ſuppoſe the firſt fraction $1-\frac{35}{36}$ to be multiplied into unity, it will ſtill remain equal to $1-\frac{35}{36}$. Let it again be multiplied into $\frac{25}{26}$, and it will become equal to $\frac{25}{26}-\frac{25\times35}{26\times36}$. But $\frac{25}{26}$ was a *negative* quantity; therefore the ſigns of the two laſt fractions muſt be changed, or they muſt be wrote down $-\frac{25}{26}+\frac{25\times35}{26\times36}$. Theſe being added to $1-\frac{35}{36}$ will give $1-\frac{35}{36}-\frac{25}{26}+\frac{25\times35}{26\times36}$ for the whole product of $1-\frac{35}{36}$ into $1-\frac{25}{26}$. Now ſince thoſe expreſſions give the probability that the two *lives* ſhall *both* fail in the year, it follows, that if they are ſubtracted from unity, they will give the probability that they ſhall *not* both fail in the year; that is, that one of them, at leaſt, will live to the end of the year. In order to ſubtract $1-\frac{35}{36}-\frac{25}{26}+\frac{25\times35}{26\times36}$ from unity, it is evident, that nothing more is neceſſary than to change the ſigns of this expreſſion, and then add it to unity, in which caſe we ſhall have $1-1+\frac{35}{36}+\frac{25}{26}-\frac{25\times35}{26\times36}=\frac{35}{36}+\frac{25}{26}-\frac{25\times35}{26\times36}$, for the true value of the above probability. In the ſame manner the chance of one of them at leaſt living to the end of the *ſecond* year, is expreſſed by $\frac{34}{36}+\frac{24}{26}-\frac{24\times34}{26\times36}$. The chance of one of them, at leaſt, living to the end of the *third* year, by $\frac{33}{36}+\frac{23}{26}-\frac{33\times23}{36\times26}$, and ſo on for a number of years equal to the complement of the youngeſt *life*, as it is plain that all the fractions will not vaniſh ſooner. If theſe ſeveral expreſſions are reſpectively multiplied into the ſum diſcounted for 1, 2, 3, &c. years, and the products are added together, we ſhall have the whole value of the annuity for the continuance of the longeſt of the two *lives*, whoſe ages are 50 and 60. By reaſoning in the ſame manner, the value of an annuity on the longeſt of *any* other the two *lives*, and by any table of obſervations, may be determined. But if the values of the ſingle and joint *lives* are given, the value of an annuity during the continuance of the longeſt of them is immediately found; for it appears from what has been ſaid on ſingle and joint *lives*, that $\frac{35}{36}$ multiplied into 1*l.* diſcounted for a year, expreſſes the value of the firſt payment of an annuity on a *life* whoſe age is 50; that $\frac{25}{26}$ multiplied into the ſame ſum, expreſſes the like value for a *life* of 60; and that $\frac{25\times35}{26\times36}$, multiplied into 1*l.* expreſſes the value of the firſt payment of an annuity on the joint continuance of thoſe lives. It follows, therefore, that $\frac{35}{36}+\frac{25}{26}-\frac{25\times35}{26\times36}$ multiplied into 1*l.* diſcounted for a year, and expreſſing the value of an annuity on the *longeſt* of two *lives* for one year, is equal to the difference between the value of the joint *lives*, and the *ſum* of the values of the ſingle *lives* for the ſame term. The like may be obſerved with reſpect to the *ſecond*, *third*, &c. years, from whence the general rule for finding the value of the longeſt of two *lives* is obvious. See *Problem* VI. in the following collection of problems. See Mr. Morgan on Annuities and Aſſurances, p. 52, &c.

This account leads to an eaſy explanation of the method of finding the value of *reverſionary life-annuities* mentioned at the beginning of this article, that is of *life annuities* which are to commence on the ſurvivorſhip of one or more lives beyond others. For example: the value of an annuity on any ſingle *life* dependent on its ſurviving another ſingle *life*, and to commence at the time the ſurvivorſhip takes place; or, in other words, the value of an annuity for what may happen to remain of a ſingle *life* after another muſt be the value of the *life* in expectation diminiſhed by the value of the joint lives. For it is evident that the value of a ſingle life may be divided into its value during its *joint* continuance with any other, and its value during its ſurvivorſhip beyond that other *life*, and that conſequently its value during its joint continuance deducted from its whole value will give its value during ſurvivorſhip. See more on this ſubject under SURVIVORSHIP and REVERSION.

Problem I. To find the *expectation* of any given *life* according to any table of obſervations.

Solution. Find the ſum of all the living in the table from the age of the given *life*. Divide this ſum by the number of the living at that age; and the quotient leſſened by half unity will be the expectation.

Example. The ſum of all the living from the age of 10, in the Northampton Table of Obſervations (ſee Tab. III.) is 228599. This ſum divided by 5675 (the number living at the age of ten) gives 40.28, which leſſened by half unity, gives 39.78, or the expectation of a *life* at the age of ten according to the *Northampton* Table of Obſervations.

Problem II. To approximate to the value of a given *life* according to any given table of obſervations.

Solution. Take the difference between twice the expectation of the given *life* by the given table, and 86; and the value deduced from Mr. De Moivre's Table of the values of *lives* correſponding to that difference, provided it is not leſs than ten, will be the value of the *life*.

Example. The expectation of a *life* aged 15 is, by the Northampton Table of Obſervations (or Table III. in the following collection of tables) 36½. The difference between twice this number and 86 is 13. And the value correſponding to the age of 13 in Mr De Moivre's Table of the values of *lives* (or Table V.) is 16.604, reckoning intereſt at 4 *per cent.* and this is nearly the value of a *life* aged 15, by the Northampton Table.

Scholium. It muſt be remembered that this rule is only an *approximation*, and ſhould not be uſed except when recourſe cannot be had to tables giving the values of *lives* agreeable to given obſervations. The method of calculating ſuch tables has been before particularly explained.

Problem III. To determine the value of any two joint *lives* by Mr De Moivre's hypotheſis, or on the ſuppoſition of an equal decrement of *life*, through all its ſtages.

Solution. Reſerve the *difference* between the complement of the *youngeſt life* and the complement of the *oldeſt life* increaſed by unity and by twice the perpetuity. Multiply this difference by the value of an annuity certain for a time equal to the complement of the oldeſt *life*; and by this complement divide the product reſerving the quotient. From twice the perpetuity ſubtract the reſerved quotient, and multiply the remainder by the perpertuity increaſed by unity. This laſt product divided by the complement of the *youngeſt life*, and then ſubtracted from the perpetuity will be the required value. *Example.* Let the joint *lives* be 10 and 15. Their complements by Mr. De Moivre's hypotheſis are 76 and 71. The complement of the oldeſt *life* increaſed by unity and twice the perpetuity (or twice 25, reckoning intereſt at 4 *per cent.*) is 122; which leſſened by 76, the complement of the *youngeſt life*, leaves 46 for the *reſerved difference.* This difference multiplied by 23 456 (the value of an annuity certain for 71 years by Table III. ANNUITIES) and the product divided by 71, (the complement of the *oldeſt life*) gives 15.196, the *quotient* to be reſerved; which ſubtracted from double the perpetuity (or from 50) and the remainder (or 34.803) multiplied by the perpetuity increaſed by unity (or by 26) gives 904.878; which, divided by 76 (the complement of the youngeſt *life*) and the quotient ſubtracted from the perpetuity, we have 13.093 for the value of two joint *lives* aged 10 to 15 by Mr. De Moivre's hypotheſis.

By this rule, Table V. in the following collection of tables, has been computed by Dr. Price. See his Treatiſe on Reverſionary Payments, p. 309, and p. 328. 3d edit. There is no other table extant at preſent of the values of joint *lives* except Mr. Simpſon's for London, publiſhed in his Select Exerciſes, p. 266. But this table being founded on the ſtate of human mortality in one of the worſt of all ſituations, or among the inhabitants of London taken in the groſs, it is by no means fitted for general uſe. The truth alſo is, as has been before obſerved, that neither do the tables formed from Mr. De Moivre's hypotheſis give the values of ſingle and joint *lives* with the exactneſs neceſſary to adapt them properly to general uſe. Being, however, the tables beſt known, and which have hitherto been moſt uſed, we have given them in the following collection of tables, together with Mr. Simpſon's tables for London, and one table of the values of ſingle *lives* at Northampton, calculated at an intereſt of 4 *per cent.* in perfect agreement to the obſervations.

Problem IV. To determine the value of an annuity on a given *life* for any number of years.

Solution. Find the value of a *life* as many years older than the given *life* as are equal to the term for which the annuity is propoſed. Multiply this value by 1*l.* payable at the end of this term, and alſo by the probability that the *life* will continue ſo long. Subtract the product from the preſent value of the *life*; and the remainder multiplied by the annuity will be the anſwer.

Example. Let the annuity be 10*l.* The age of the given *life* 30 years, and the term propoſed 15 years. The value of a *life* aged 45 (or 15 years older than the given *life*) appears by Table VIII. to be 12.283. The value of 1*l.* payable at the end of 15 years (by Table II. under ANNUITIES) is .5553, and the probability that the *life* will exiſt ſo long is (by Table III. in the following collection) $\frac{3243}{4385}$. Theſe three quantities multiplied into each other are equal to 5.051, which being ſubtracted from 14.781 (the preſent value of the given *life* by Table VIII.) we have 9.730; and this remainder multiplied into 10 (the annuity) gives 97.30*l.* for the value required.

Problem V. To find the value of an annuity for three joint *lives*, A, B, and C.

Solution. Let A be the youngeſt and C the oldeſt of three propoſed *lives*. Take the value of the two joint *lives* B and C, and find the age of a ſingle *life* D of the ſame value. Then find the value of the joint *lives* A and D, which will be the anſwer.

Example. Let the three given ages be 20, 30, and 60. The value, reckoning intereſt at 4 *per cent.* of the two oldeſt joint *lives* B and C (by Table VII.) is 7.779, anſwering to a ſingle *life* D of 65 years (by Table VIII.) and the value of the joint *lives* A and D (by Table VII.) is 6.882, which will be the value required.

Problem VI. To find the value of the longeſt of any two *lives*.

Solution. From the ſum of the values of the two ſingle *lives* ſubtract the value of the two joint *lives*, and the remainder will be the value required.

Example. Let the ages of the two *lives* be 25 and 30, and let intereſt be reckoned at 4 *per cent.* The value (by Table VI.) of a *life* aged 25 is 15.31; and of a *life* aged 30 is 14.68. The ſum of theſe two values is 29.99. The value of the joint *lives* is (by Table VII.) 11.46; and this value ſubtracted from 29.99, gives 18.53, or the value of an annuity on the longeſt of the two *lives*.

Problem VII. To find the value of an annuity on the longeſt of three *lives*, A, B, and C.

Solution. Let A be the youngeſt, and C the oldeſt of the three propoſed *lives*. Find the value of the joint *lives* B and C, and find the age of the ſingle *life* D of the ſame value. Moreover, find by the rule in the laſt problem the value of the longeſt of the *lives* A and B, alſo that of the longeſt of the *lives* A and C, and likewiſe that of the longeſt of the *lives* A and D; then the laſt of theſe three values ſubtracted from the ſum of the two former, leaves the value ſought.

Example. Let the three given ages be 20, 30, and 60. The value, reckoning intereſt at 4 *per cent.* of the oldeſt joint *lives* B and C, (by Table VII.) is 7.779 anſwering to a ſingle *life* D (in Table VIII.) of 65 years. The value of the longeſt of the two *lives* A and B by the ſame tables, is 18.864. Alſo that of the longeſt of the two *lives* A and C is 16.941; and that of the longeſt of the two *lives* A and D is 16.64. Therefore 19.165 is the value required.

Problem VIII. To find the value of an annuity granted upon three *lives*, A, B, and C, on condition of its ceaſing as ſoon as any two of them become extinct.

Solution. Find the value of each pair of joint *lives*, viz. of A and B, of A and C, and of B and C. Then from the ſum of theſe three values let twice the value of the three joint *lives*, A, B, and C, be deducted, and the remainder will be the anſwer.

Example. Let the ages of A, B, and C, reſpectively be 20, 30, and 60. By Table VII. the value of the joint *lives*

$$\left.\begin{matrix}\text{A, B}\\ \text{A, C}\\ \text{B, C}\end{matrix}\right\}\text{ will be }\left\{\begin{matrix}11.711\\ 7.967\\ 7.779\end{matrix}\right.$$

the ſum of which three numbers is 27.457. Moreover the value of the three joint *lives* A, B, and C, by problem V. is 6.882; therefore 13.693 is the value required.

He that would inform himſelf more completely on this ſubject ſhould read the following books, viz. Mr. Simpſon's Doctrine of Life Annuities and Reverſions, and Select Exerciſes; Mr. Morgan's Treatiſe on Annuities and Aſſurances; and Dr. Price on Reverſionary Payments.

TABLE I. Shewing the probability of the duration of *life* in London, deduced by Mr. Simpſon from obſervations on the bills of mortality in London for ten years, from 1728 to 1737. See this table under EXPECTATION.

TABLE II. Shewing the probabilities of the duration of *life* as deduced by Dr. Halley from the bills of mortality at Breſlaw in Sileſia,

Ages	Perſons living.	Decr. of Life	Ages.	Perſons living.	Dec. of Life.	Ages.	Perſons iving.	Decr. of Life.
1	1000	145	31	523	8	61	232	10
2	855	57	32	515	8	62	222	10
3	798	38	33	507	8	63	212	10
4	760	28	34	499	9	64	202	10
5	732	22	35	490	9	65	102	10
6	710	18	36	481	9	66	182	10
7	692	12	37	472	9	67	172	10
8	680	10	38	463	9	68	162	10
9	670	9	39	454	9	69	152	10
10	661	8	40	445	9	70	142	11
11	653	7	41	436	9	71	131	11
12	646	6	42	427	10	72	120	11
13	640	6	43	417	10	73	109	11
14	634	6	44	407	10	74	98	10
15	628	6	45	397	10	75	88	10
16	622	6	46	387	10	76	78	10
17	616	6	47	377	10	77	68	10
18	610	6	48	367	10	78	58	9
19	604	6	49	357	11	79	49	8
20	598	6	50	346	11	80	41	7
21	592	6	51	335	11	81	34	6
22	586	7	52	324	11	82	28	5
23	579	6	53	313	11	83	23	4
24	573	6	54	302	10	84	19	4
25	567	7	55	292	10	85	15	4
26	560	7	56	282	10	86	11	3
27	553	7	57	272	10	87	8	3
28	546	7	58	262	10	88	5	2
29	539	8	59	252	10	89	3	2
30	531	8	60	242	10	90	1	1

TABLE III. Shewing the probabilities of the duration of human *life*, formed from the regiſter of mortality at Northampton for 46 years, from 1735 to 1780.

N. B. This Table has been communicated by Dr. Price, and will be publiſhed in a new edition of his Treatiſe on Reverſionary Payments, now in the preſs. It has been adopted by the EQUITABLE SOCIETY in Chatham Square, and is to form the baſis of all the future buſineſs of that ſociety. See ASSURANCE.

Age	Living	Decrements	
0	11650	1340	
¼	10310	554	
½	9756	553	
¾	9203	553	
			3000
Years			
1	8650	1357	
2	7283	502	
3	6781	335	
4	6446	197	
			5401
5	6249	184	
6	6065	140	
7	5925	110	
8	5815	80	
9	5735	60	
			5975
10	5675	52	
11	5623	50	
12	5573	50	
13	5523	50	
14	5473	50	
15	5423	50	
16	5373	53	
17	5320	58	
18	5262	63	
19	5199	67	
			6518
20	5132	72	
21	5060	75	
22	4985	75	
23	4910	75	
24	4835	75	
25	4760	75	
26	4685	75	
27	4610	75	
28	4535	75	
29	4460	75	
			7265
30	4385	75	
31	4310	75	
32	4235	75	
33	4160	75	
Yrs.			
34	4085	75	
35	4010	75	
36	3935	75	
37	3860	75	
38	3785	75	
39	3710	75	
			8015
40	3635	76	
41	3559	77	
42	3482	78	
43	3404	78	
44	3326	78	
45	3248	78	
46	3170	78	
47	3092	78	
48	3014	78	
49	2936	79	
			8793
50	2857	81	
51	2776	82	
52	2694	82	
53	2612	82	
54	2530	82	
55	2448	82	
56	2366	82	
57	2284	82	
58	2202	82	
59	2120	82	
			9612
60	2038	82	
61	1956	82	
62	1874	81	
63	1793	81	
64	1712	80	
65	1632	80	
66	1552	80	
67	1472	80	
68	1392	80	
69	1312	80	
			10418
70	1232	80	
71	1152	80	
Yrs.			
72	1072	80	
73	992	80	
74	912	80	
75	832	80	
76	752	77	
77	675	73	
78	602	68	
79	534	65	
			11181
80	469	63	
81	406	60	
82	346	57	
83	289	55	
84	234	48	
85	186	41	
86	145	34	
87	111	28	
88	83	21	
89	62	16	
			11604
90	46	12	
91	34	10	
92	24	8	
93	16	7	
94	9	5	
95	4	3	
96	1	1	
			11650

TABLE IV. Shewing the value of an annuity on *one life*, according to the probabilities of *life* in London, as given in Table I. See EXPECTATION.

Age.	Yr. purchaſe at 3 per Cent.	Yrs purchaſe at 4 per Cent.	Yrs. purchaſe at 5 per Cent.	Age.	Yrs. Purchaſe at 3 per Cent	Yrs. purchaſe at 4 per Cent	Yrs. purchaſe at 5 per Cent.	Age.	Yrs. purchaſe at 3 per Cent.	Yrs. purchaſe at 4 per Cen	Yrs. purchaſe at 5 per Cent.
6	18,8	16,2	14,1	31	14,8	12,9	11,4	56	10,1	9,1	8,4
7	18,9	16,3	14,2	32	14,6	12,7	11,3	57	9,9	8,9	8.2
8	19,0	16,4	14,3	33	14,4	12,6	11,2	58	9,6	8,7	8,1
9	19,0	16,4	14,3	34	14,2	12,4	11,0	59	9,4	8,6	8,0
10	19,0	16,4	14,3	35	14,1	12,3	10,9	60	9,2	8,4	7,9
11	19,0	16,4	14,3	36	13,9	12,1	10,8	61	8,9	8,2	7,7
12	18,9	16,3	14,2	37	13,7	11,9	10,6	62	8,7	8,1	7,6
13	18,7	16,2	14,1	38	13,5	11,8	10,5	63	8,5	7,9	7,4
14	18,5	16,0	14,0	39	13,3	11,6	10,4	64	8,3	7,7	7,3
15	18,3	15,8	13,9	40	13,2	11,5	10,3	65	8,0	7.5	7.1
16	18,1	15,6	13,7	41	13,0	11,4	10,2	66	7,8	7,3	6,9
17	17,9	15,4	13,5	42	12,8	11,2	10,1	67	7,6	7,1	6,7
18	17,6	15,2	13,4	43	12,6	11,1	10,0	68	7,4	6,9	6,6
19	17,4	15,0	13,2	44	12,5	11,0	9,9	69	7,1	6,7	6,4
20	17,2	14,8	13,0	45	12,3	10,8	9,8	70	6,9	6,5	6,2
21	17,0	14,7	12,9	46	12,1	10,7	9,7	71	6,7	6,3	6,0
22	16,8	14,5	12,7	47	11,9	10,5	9,5	72	6,5	6,1	5,8
23	16,5	14,3	12,6	48	11,8	10,4	9.4	73	6,2	5,9	5,6
24	16,3	14,1	12,4	49	11,6	10,2	9,3	74	5.9	5,6	5,4
25	16,1	14,0	12,3	50	11,4	10,1	9,2	75	5,6	5,4	5,2
26	15,9	13,8	12,1	51	11,2	9,9	9,0				
27	15,6	13,6	12,0	52	11,0	9,8	8,9				
28	15,4	13,4	11,8	53	10,7	9,6	8,8				
29	15,2	13,2	11,7	54	10,5	9,4	8,6				
30	15.0	13,1	11,6	55	10,3	9,3	8,5				

TABLE V. Shewing the value of an annuity on the joint continuance of any two *lives*, according to the probabilities of *life* in London, as given in Table I. See EXPECTATION.

Age of the youngeſt.	Age of the eldeſt.	Value at 3 per Cent.	Value at 4 per Cent.	Value at 5 per Cent.	Age of the youngeſt.	Age of the eldeſt.	Value at 3 per Cent.	Value at 4 per Cent.	Value at 5 per Cent.
10	10	14,7	13,0	11,6	20	20	12,8	11,3	10,1
	15	14,3	12,7	11,3		25	12,2	10,8	9,7
	20	13,8	12,2	10,8		30	11,6	10,3	9,2
	25	13,1	11,6	10,2		35	10,9	9,8	8,8
	30	12,3	10,9	9,7		40	10,2	9,2	8,4
	35	11,5	10,2	9,1		45	9,5	8,6	7,9
	40	10,7	9,6	8,6		50	8,8	8,0	7,4
	45	10,0	9,0	8,1		55	8,1	7,5	6,9
	50	9,3	8,4	7,6		60	7,4	6,9	6,4
	55	8,0	7,8	7,1		65	6,7	6,3	5,9
	60	7,8	7,2	6,6		70	6,0	5,7	5,4
	65	6,9	6,5	6,1		75	5,2	5,0	4,8
	70	6,1	5,8	5,5	25	25	11,8	10,5	9,4
	75	5,3	5,1	4,9		30	11,3	10,0	9,0
15	15	13,9	12,3	11,0		35	10,7	9,6	8,6
	20	13,3	11,8	10,5		40	10,0	9,1	8,2
	25	12,6	11,2	10,1		45	9,4	8,5	7,8
	30	11,9	10,6	9,5		50	8,7	7,9	7,3
	35	11,2	10,0	9,0		55	8,0	7,4	6,8
	40	10,4	9,4	8,5		60	7,3	6,8	6,3
	45	9,6	8,8	8,0		65	6,6	6,2	5,8
	50	8,9	8,2	7,5		70	5,9	5,6	5,3
	55	8,2	7,6	7,0		75	5,1	4,9	4,7
	60	7,5	7,0	6,5	30	30	10,8	9,6	8,6
	65	6,8	6.4	6,0		35	10,3	9,2	8,3
	70	6,0	6,7	5,4		40	9,7	8,8	8,0
	75	5,2	5,0	4,8		45	9,1	8,3	7,6

Age of the youngeſt.	Age of the eldeſt.	Value at 3 per Cent.	Value at 4 per Cent.	Value at 5 per Cent.
30	50	8,5	7,8	7,2
	55	7,9	7,3	6,7
	60	7,2	6,7	6,2
	65	6,5	6,1	5,7
	70	5,8	5,5	5,2
	75	5,1	4,5	4,7
35	35	9,9	8,8	8,0
	40	9,4	8,5	7,7
	45	8,9	8,1	7.4
	50	8,3	7,6	7,0
	55	7,7	7,1	6,6
	60	7,1	6,5	6,1
	65	6,4	6,0	5,6
	70	5,7	5,4	5,1
	75	5,0	4,8	4,6
40	40	9,1	8,1	7,3
	45	8,7	7,8	7,1
	50	8,2	7,4	6,8
	55	7,6	6,9	6,4
	60	7,0	6,4	6,0
	65	6,4	5,9	5,5
	70	5,7	5,4	5,1
	75	5,0	4,8	4,6
45	45	8,3	7,4	6,7
	50	7,9	7,1	6,5
	55	7,4	6,7	6,2
	60	6,8	6,3	5,8
	65	6,3	5,8	5,4
45	70	5,6	5,3	5,0
	75	4,9	4,7	4.5
50	50	7,6	6,8	6,2
	55	7,2	6,5	6,0
	60	6,7	6,1	5,7
	65	6,2	5,7	5,3
	70	5,5	5,2	4,9
	75	4,8	4,6	4,4
55	55	6,9	6,2	5,7
	60	6,5	5,9	5,5
	65	6,0	5,6	5,4
	70	5,4	5,1	4.8
	75	4,7	4,5	4,3
60	60	6,1	5,6	5,2
	65	5,7	5,3	4,9
	70	5,2	4,9	4,6
	75	4,6	4,4	4,2
65	65	5,2	5,0	4,7
	70	4,9	4,6	4,4
	75	4,4	4,2	4,0
70	70	4,6	4,4	4,2
	75	4,2	4,0	3,9
75	75	3,8	3,7	3,6

TABLE VI. Shewing the preſent value of an annuity on a ſingle *life*, according to Mr. De Moivre's hypotheſis.

Age.	3 per Ct.	3 ½ per Ct.	4 per Ct.	4 ½ per Ct.	5 per Ct.	6 per Ct.
8	19,736	18,160	16,791	15,595	14,544	12,790
9	19,868	18,269	16,882	15,672	14,607	12,839
10	19,868	18,269	16,882	15,672	14,607	12,839
11	19,736	18,160	16,791	15,595	14,544	12,790
12	19,604	18,049	16,698	15,51	14,480	12,741
13	19,469	17,937	16,604	15,437	14,412	12,691
14	19,331	17,823	16,508	15,356	14,342	12,639
15	19,192	17,707	16,410	15,273	14,271	12,586
16	19,050	17,588	16,311	15,189	14,197	12,532
17	18,905	17,467	16,209	15,102	14,123	12,476
18	18,759	17,344	16,105	15,015	14,047	12,419
19	18,610	17,220	15,999	14,923	13,970	12,361
20	18,458	17,093	15,891	14,831	13,891	12,301
21	18,305	16,963	15,781	14,737	13,810	12,239
22	18,148	16,830	15,669	14,641	13,727	12,177
23	17,990	16,696	15,554	14,543	13,642	12,112
24	17,827	16,559	15,437	14,442	13,555	12,045
25	17,664	19,419	15,318	14,340	13,466	11,978
26	17,497	16,277	15,197	14,235	13,375	11,908
27	17,327	16,133	15,073	14,128	13,282	11,837
28	17,154	15,985	14,946	14,018	13,186	11,763
29	16,979	15,835	14,816	13,905	13,088	17,688
30	16,800	15.682	14,684	13,791	12,988	11,610
31	16,620	15,526	14,549	13,673	12,855	11,530
32	16,436	15,367	14,411	13,553	12,780	11,449
33	16,248	15,204	14,270	13,430	12,673	11,365
34	16,057	15,039	14,126	13,304	12,562	11,278
35	15,864	14,871	13,979	13,175	12,449	11,189
36	15,666	14,699	13,829	13,044	12,333	11,098
37	15,465	14,524	13,676	12,909	12,214	11,003
38	15,260	14,345	13,519	12,771	12,091	10,907
39	15,053	14,163	13,359	12,630	11,966	10,807
40	14,842	13,978	13,196	12,485	11,837	10,704
41	14,626	13,789	13,028	12,337	11,705	10,599
42	14,407	13,596	12,858	12,185	11,570	10,490
43	14,185	13,399	12,683	12,029	11,431	10,378
44	13,958	13,199	12,504	11,870	11,288	10,263
45	13,728	12,993	12,322	11,707	11,142	10,144
46	13,493	12,784	12,135	11,540	10,992	10,021
47	13,254	12,571	11,944	11,368	10,837	9,895
48	13,012	12,354	11,748	11,192	10,679	9,765
49	12,764	12,131	11,548	11,012	10,515	9,630
50	12,511	12,004	11,344	10,827	10,348	9,492
51	12,255	11,673	11,135	10,648	10,176	9,349
52	11,994	11,437	10,921	10,443	9,999	9,201
53	11,729	11,195	10,702	10,243	9,817	9,049
54	11,457	10,950	10,478	10,039	9,630	8,891
55	11,183	10,698	10,248	9,829	9,437	8,729
56	10,902	10,443	10,014	9,614	9,239	8,561
57	10,616	10,181	9,773	9,393	9,036	8,387
58	10,325	9,613	9,527	9,166	8,826	8,208
59	10,029	9,640	9,275	8,933	8,611	8,023
60	9,727	9,361	9,017	8,694	8,389	7,831
61	9,419	9,076	8,753	8,449	8,161	7,633
62	9,107	8,786	8,482	8,197	7,926	7,428
63	8,787	8,488	8,205	7,938	7,684	7,116
64	8,462	8,185	7,921	7,672	7,435	6,997
65	8,132	7,875	7,631	7,399	7,179	6,770
66	7,794	7,558	7,333	7,119	6,915	6,535
67	7,450	7,234	7,027	6,831	6,643	6,292
68	7,099	6,902	6,714	6,534	6,362	6,040
69	6,743	6,565	6,394	6,230	6,073	5,779
70	6,378	6,217	6 065	5,918	5,775	5,508
71	6,008	5,865	5,728	5,596	5,468	5,228
72	5,631	5,506	5,383	5,265	5,152	4,937
73	5,246	5,136	5,029	4,926	4,826	4,636
74	4,854	4,759	4,666	4,576	4,489	4,324
75	4,451	4,373	4,293	4,217	4,143	4,000
76	4,046	3,978	3,912	3,847	3,784	3,664
77	3,632	3,375	3,520	3,466	3,415	3,315
78	3,207	3,163	3,111	3,076	3,034	2,953
79	2,776	2,741	2,707	2,673	2,641	2,578
80	2 334	2,309	2,284	2,259	2,255	2,188
81	1,886	1,867	1,850	1,832	1,816	1,783
82	1,429	1,411	1,406	1,394	1,384	1,362
83	0,961	0,955	0,950	0,937	0,937	0,925
84	0,484	0,483	0,481	0,479	0,476	0,472
85	0,000	0,000	0,000	0,000	0,000	0,000

This Table is the ſame with Mr. De Moivre's Table of the values of ſingle *lives*, publiſhed in his Treatiſe on *Life Annuities*, and carried as far as the age of 79 to three places of decimals, by Mr. Dodſon, in his Mathematical Repoſitory, vol. ii. p. 169.

TABLE VII. Shewing the value of an annuity, on the joint continuance of two *lives*, accordiuy to M. De Moivrc's hypotheſis.

Age of the yongeſt.	Age of the eldeſt.	Value at 3 per Cent.	Value at 4 per Cent.	Value at 5 per Cent.
10	10	15,206	13,342	11,855
	15	14,878	13,093	11,661
	20	14,503	12,808	11,430
	25	14,074	12,480	11,182
	30	13,585	12,102	10,884
	35	13,025	11,665	10,537
	40	12,381	11,156	10,128
	45	11,644	10,564	9,646
	50	10,796	9,871	9,074
	55	9,822	9.059	8,391
	60	8,704	8,105	7,572
	65	7,417	6,980	6,585
	70	5,936	5,652	5,391
15	15	14,574	12,860	11,478
	20	14,225	12,593	11,266
	25	13,822	12,281	11,022
	30	13,359	11,921	10,736
	35	12,824	11,501	10,402
	40	12,207	11,013	10,008
	45	11,496	10,440	9,541
	50	10,675	9,767	8,985
	55	9,727	8,975	8,318
	60	8,632	8,041	7,515
	65	7,377	6,934	6,544
	70	5,932	5,623	5,364
20	20	13,904	12,341	11,067
	25	13,531	12,051	10,840
	30	13,098	11,711	10,565
	35	12,594	11,314	10,278
	40	12,008	10,847	9,870
	45	11,325	10,297	9,420
	50	10,536	9,648	8,880
	55	9,617	8,879	8,233
	60	8,549	7,967	7,448
	65	7,308	6,882	6,495
	70	5,868	5,590	5,333
25	25	13,192	11,786	10,621
	30	12,794	11,468	10,367
	35	12,333	11,095	10,067
	40	11,776	10,655	9,708
	45	11,130	10,131	9,278
	50	10,374	9,509	8,761
	55	9,488	8,766	8,134
	60	8,452	7,880	7,371
	65	7,241	6,826	6,440
	70	5,826	5,551	5,294
30	30	12,434	11,182	10,133
	35	12,010	10,838	9,854
	40	11,502	10,428	9,514
	45	10,898	9,936	9,112
	50	10,183	9,345	8,620
	55	9,338	8,634	8,018
	60	8,338	7,779	7,280
	65	7,161	6,748	6,373
	70	5,777	5,505	5,254
35	35	11,632	10,530	9,600
	40	11,175	10,157	9,291
	45	10,622	9,702	8,913
	50	9,955	9,149	8,450
	55	9,156	8,476	7,879
	60	8,202	7,658	7,177
	65	7,066	6,662	6,294
	70	5,718	5,450	5,203
40	40	10,777	9,826	9,014
	45	10,283	9,418	8,671
	50	9,677	8,911	8,244
	55	8,936	8,283	7,710
	60	8,038	7,510	7,039
	65	6,951	6,556	6,198
	70	5,646	5,583	5,141

Age of the youngeſt.	Age of the eldeſt.	Value at 3 per Cent.	Value at 4 per Cent.	Value at 5 per Cent.
45	45	9.863	9.063	8.370
	50	9.331	8.619	7.987
	55	8.662	8.044	7.500
	60	7.831	7.332	6.875
	65	6.807	6.425	6.080
	70	5.556	5.300	5.063
50	50	8.892	8.235	7.660
	55	8.312	7.738	7.230
	60	7.568	7.091	6.664
	65	6.623	6.258	5.926
	70	5 442	5.193	4.964
55	55	7.849	7.332	6.873
	60	7.220	6.781	6.386
	65	6.379	6.036	5.724
	70	5.291	5.053	4.833
60	60	6.737	6.351	6.001
	65	6.043	5.730	5.444
	70	5.081	4.858	4.653
65	65	5.547	5.277	5.031
	70	4.773	4.751	4.385
70	70	4.270	4 104	3.952

TABLE VIII. Shewing the value of an annuity on any ſingle *life*, according to the probabilities of living at Northampton, as given in Table III. Intereſt reckoned at 4 *per cent.*

Age.	Value.	Age.	Value.	Age.	Value.	Age.	Value.
1	13.465	25	15.438	49	11.475	73	5.507
2	15.633	26	15.312	50	11.264	74	5.230
3	16.462	27	15.184	51	11.057	75	4.962
4	17.010	28	15.053	52	10.849	76	4.710
5	17.248	29	14.918	53	10.637	77	4.457
6	17.482	30	14.781	54	1 .421	78	4.197
7	17.611	31	14.639	55	10.201	79	3 921
8	17.662	32	14.495	56	9.977	80	3.643
9	17.625	33	14.347	57	9.749	81	3.377
10	17.523	34	14.195	58	9.516	82	3.121
11	17.393	35	14 039	59	9.280	83	2.887
12	17.251	36	13 880	60	9.039	84	2.708
13	17.103	37	13.716	61	8.795	85	2.543
14	16.950	38	13.548	62	8.547	86	2.393
15	16.791	39	13.375	63	8.299	87	2.251
16	16.625	40	13.197	64	8.030	88	2.131
17	16.462	41	13.018	65	7.761	89	1.967
18	16.309	42	12.838	66	7.488	90	1.758
19	16.167	43	12.667	67	7.210	91	1.473
20	16.033	44	12.472	68	6.930	92	1.171
21	15.912	45	12.283	69	6.646	93	0.827
22	15.797	46	12.089	70	6.361	94	0.530
23	15.680	47	11.889	71	6.075	95	0.240
24	15.560	48	11.685	72	5.790		

LIFE-*annuities, payable half yearly.* Theſe are more valuable than *life annuities* payable yearly, on the two following accounts. Firſt, the annuitant in this caſe receives one half of every payment half a year ſooner; and ſecondly, he has the chance of receiving one half year's payment more than if he had been paid yearly. Mr. Simpſon, in his Select Exerciſes, p. 283. obſerves, that the value of theſe two advantages put together (let the rate of intereſt and the number of *lives* on which the annuity depends be what they will) will always amount to ¼ of a year's purchaſe; and that if the payments are to be made *quarterly*, theſe advantages will be always worth ⅜ of a year's purchaſe. But Dr. Price, in an eſſay in the Philoſophical Tranſactions, vol. lxvi. part i. p. 109. has ſtated the differences of value between *life-annuities* as they are made payable yearly, half yearly, or quarterly, with more preciſion; and from his inveſtigations it appears, that *a fifth* of a year's purchaſe is generally an addition more than ſufficient to the yearly value of an annuity, in order to obtain its value, payable half-yearly; and *three-tenths* of a year's purchaſe, in order to obtain its value, payable quarterly.

Dr. Price has given the following ſhort and eaſy theorems for finding in all caſes theſe differences of value.

Let *r* be (not 1*l.* with its intereſt, but merely) the intereſt of 1*l.* for a year, *n* the complement of a given *life*; *y*, *h*, *q* the values reſpectively of an annuity *certain* for *n* years, payable yearly, half-yearly, or quarterly; P the perpetuity; Y the preſent value of an annuity on a *life*, whoſe complement is *n*, payable yearly; H the value of the ſame annuity payable half-yearly; and L the value of the ſame annuity payable quarterly.

Then, $Y = P - \frac{1 + r}{r\,n} \times y$

$$H = P - \frac{1 + \frac{r}{2}}{n\,r} \times h$$

$$Q = P - \frac{1 + \frac{r}{4}}{n\,r} \times q$$

Example. Let the *life* ſuppoſed be of the age of 36. The complement of ſuch a *life* is (by what has been already ſaid) 50, according to M. De Moivre's hypotheſis; and alſo nearly, according to Tables II. and III. in the preceding collection; therefore, *n* will be 50. Let the rate of intereſt be 4 *per cent.* or $r = 0.04$, $P = 25$, $Y = 21.482$ (ſee Table III. ANNUITIES) $h = 21.549$ (by the theorems given under annuities) $q = 21.582$, by the ſame theorems. Therefore,

$$Y = 25 - \frac{1.04}{50 \times 0.04} \times 21.482 = 13.829$$

$$H = 25 - \frac{1.02}{50 \times 0.04} \times 21.949 = 14.010$$

$$Q = 25 - \frac{1.01}{50 \times 0.04} \times 21.582 = 14.101$$

LIFE-*annuities ſecured by land* differ from other *life-annuities* only in the ſingle circumſtance, that the annuitant, whenever he dies, is entitled to a payment for the time which has lapſed between the payment laſt due, and the moment of his death; whereas other annuities ſuppoſe nothing due for this time. In order to obtain the value of ſuch an annuity, $\frac{y}{2n}$ muſt be added to the expreſſion in the firſt theorem, if it is payable yearly; $\frac{h}{4\,n}$ muſt be added to the expreſſion in the ſecond theorem, if it is payable half-yearly; and $\frac{q}{8\,n}$ muſt be added to the expreſſion in the third theorem, if the annuity is payable quarterly. See Dr. Price's Eſſay, before quoted.

The value, therefore, in the laſt example, of an annuity payable *yearly* on a *life* aged 36, being, 13.829; its value, if ſecured by *land*, or to be enjoyed to the laſt moment of *life*, will be $13.829 + \frac{21.482}{100} = 14.043$; if ſecured by *land*, and payable half-yearly, its value will be $14.010 + \frac{21.549}{200} = 14\ 117$; if ſecured by land, and payable quarterly, its value will be $14.101 + \frac{21.582}{400} = 14.155$.

LIFE, *complement of.* See COMPLEMENT.

LIFE, *expectation of.* See EXPECTATION.

LIVES, *inſurance* or *aſſurance on.* See ASSURANCES *on lives.*

LIFE-*eſtates*, in our *Law*, are either for the *life* of the owner, or for the *life* of another, or others.

LIFE-*everlaſting*, a name by which the *ilichryſum*, or *gnaphalium*, of botanical writers, is ſometimes called. See CUDWEED.

LIFE-*guards.* See GUARDS.

LIFTING-*pieces*, in a clock, are thoſe parts which lift up and unlock the detents in the clock part.

LIFTS, in a *Ship*, ropes belonging to the yard-arms of all yards. Their uſe is to ſtop the yard-arms, i. e. to make the end of the yards hang higher or lower, as occaſion ſerves. The top-ſail-*lifts* ſerve as ſheets for the top-gallant-yards, as well as for *lifts* to the top-ſail yards. The hailing of theſe ropes is called *topping the lifts*: thus they ſay *top a ſtarboard*, or *top a port*, i. e. hale upon the ſtarboard or larboard *lift*,

The *lifts* for the ſprit-ſail-yard, are called *ſtanding lifts.*

LIGAMENT, in its general ſenſe, denotes any thing that ties or binds one part to another.

In which ſenſe the ancients applied the word to membranes, ſkin, fleſh, veins, and arteries; as being common *ligaments.*

LIGAMENT, in its more proper ſignification, denotes a white, tough, ſolid, inflexible part, ſerving to incloſe, and keep together, the junctures of the body.

It has no conſpicuous cavities, nor has it any ſenſe, leſt it ſhould ſuffer on the moving of the bones. It is found very different, according to the different parts where it is uſed. It is harder than a membrane, yet ſofter than a cartilage: its principal uſe is to gird and ſtrengthen the junctures, to prevent the diſlocation of the bones, and even to faſten them together, when they have no articulation. It alſo ſerves as a covering to the tendons to ſeparate them from the muſcles, and to hold up the ſuſpended entrails, leſt their weight ſhould throw them down. Such are the *ligaments* of the liver, the bladder, and matrix.

Ligaments are of different ſubſtances; ſome hard, others ſoft, membranous, nervous, and cartilaginous; as alſo of different figures and ſituations: ſome ariſe from bones; others from cartilages, and others from membranes.

The *ligament* is held the moſt terreſtrial of all the parts of the body after the bone and cartilage; being cold, dry, hard, and inſenſible, like them.

The principal *ligaments* of the body, are the cartilaginous *ligaments*, which bind the four bones of the metacarpus with the carpus.

The *ligaments* of the ſpine are very ſtrong, being fitted to the articulations of the vertebræ, to prevent their luxation in violent motions. They are of two kinds; the one thick and fibrous, in form of a creſcent, which bind them both at top and bottom; and the other membranous, ſerving to faſten them more ſecurely.

The *ligaments* of the liver are two in number; the firſt, called *ligamentum ſuſpenſorium*, holds it ſuſpended to the diaphragm, penetrating into the ſubſtance of the liver, to hold it the more firmely; the latter is larger, but more lax; it comes from the external coat of the liver, and is faſtened to the cartilago xiphoides. Some add a third, which is formed out of the umbilical veſſels; which, in adults, dry up, and become a *ligament*.

There are two *ligaments* belonging to the tongue; one which faſtens it, by its root, to the os hyoides; and another larger, inſerted into the middle and inferior part; this laſt is called the *frænum*, or bridle of the tongue. There are alſo *ligaments* belonging to the ſpleen.

The penis has a ſtrong *ligament*, called *ſuſpenſorium penis*, from its office in holding up the penis to the oſſa pubis; it ariſes from the fore parts of thoſe bones, and is faſtened to the upper-part of the corpora cavernoſa penis; it has another *ligament*, which faſtens the prepuce to the glans. The uterus has four *ligaments*; two of them called *lata*, or *broad*, and two *rotunda*, or *round*, from their figure: the broad *ligaments* are membranous, and ariſe from the proceſſes of the peritonæum, and are faſtened to the lateral parts of the bottom of the uterus; and ſerve to prevent it from falling down upon the neck, as ſometimes happens, when theſe *ligaments* are too much relaxed.

The round *ligaments* ariſe from the ſides of the womb, at the place where the tubæ Fallopianæ are joined to it At their firſt riſe they are broad; but, by degrees, as they recede farther from the womb, grow round and ſmooth; and, as the ſpermatic veſſels do in men, paſs betwixt the duplicate of the peritonæum, and ſo out of the abdomen, through the formina of the oblique and tranſverſe muſcles of the abdomen, and, running obliquely on the os pubis, terminate under the fat of the clitoris. By the paſſages of theſe *ligaments*, women, and girls eſpecially, are expoſed to inguinal ruptures, as men are by the paſſages of the ſpermatic veſſels.

The ſubſtance of the broad *ligaments* is membranous, looſe, and ſoft; whence ſome have compared them to the wings of a bat, and called them the *alæ veſpertilionum*. The round *ligaments* are of a firmer texture, and conſiſt of a double membrane, wrapping up in it veins, arteries, nerves, and lympheducts; and both theſe, and the former have been ſometimes taken for muſcles. By theſe *ligaments* the uterus is kept ſo tight, that no violence of internal flatus, or humours, can raiſe it above its place. See *Tab. Anat.* (*Splanch*) *fig.* 9. *lit. b. b. fig.* 11. *lit. i. i.* &c.

LIGAMENTS *of the hand*. See HAND.

LIGAMENTS *of the vertebræ*. Mr. du Vernoi has mentioned more *ligaments* of the vertebræ of the back than are commonly deſcribed. See Comment. Acad. Petrop. tom. vi.

LIGAMENTUM *annulare*. See ANNULAR and WRIST.

LIGAMENTUM *ciliare*. See CILIARE *ligamentum*.

LIGAMENTUM *cutaneum oſſis coccygis* goes out anteriorly from the extremity of the os occygis: it is very ſlender, and divides into two portions at the orifice of the anus, which run into the membrana adipoſa, and are inſerted in the ſkin on each ſide of the anus, by a kind of expanſion, and continuing to divaricate, are loſt on the two ſides of the perinæum.

LIGAMENTUM *Fallopii*. See *Ligamentum* FALLOPII and INGUINAL *ligament*.

LIGAMENTUM *inter maxillare*, is a ligament on each ſide of the face, thus called by Winſlow. It connects the two jaws, and gives inſertion to the poſterior fibres of the buccinator muſcle. It is ſtrong and broad, fixed to the outſide of the upper jaw, above the laſt dens molaris, and at the ſide of the apophyſis perigoidæus internus. By the lower end it is fixed on the outſide of the lower jaw, below the laſt dens molaris.

LIGAMENTNM *Poupartii*, or *Poupart's ligament*, is only the lower border of the deſcending oblique muſcle of the belly, ſtretched from the fore part of the os ileum to the pubes.

LIGAMENTUM *pubis interoſſeum*, is a ſtrong triangular membrane, fixed by two of its edges in the inferior branches of thoſe bones, all the way up to their common ſymphyſis; the third edge, which is loweſt, is looſe, and this whole membrane, the middle of which is perforated by a particular hole, is ſtretched very tight between th two bones, and under the cartilaginous arch, to which it adheres very cloſely.

LIGAMENTUM *peculiare ſtapidis*, in *Anatomy*, a name given by Schelhammer, and ſome others, to what is properly a muſcle, and is called by Albinus *ſtapedium*, and by Cowper, and others, *muſculus ſtapides* and *ſtapedaceus*.

LIGATURE, in *Surgery*, any thing tied about a part of the body, more eſpecially a bandage, or fillet of cloth or linen, ſerving to bind the arm, and facilitate the operation of bleeding.

They are called alſo chords, bands, or ſtrings, and are of different kinds, ſome fine, others coarſe and ſtrong, and are made either of flax, or hemp, or cloth, or ſilk, or horſe-hair, according to the nature of the diſorder; for theſe things are almoſt conſtantly required. They are uſed to replace or extend bones that are broken or diſlocated; to tie the patients down in lithotomy, amputations, and operations of that kind; to tie up the veins in phlebotomy; to tie up arteries after amputations, or in large wounds; to ſecure the ſplints that are applied to fractures; to tie up the proceſſes of the peritoneum, with the ſpermatic veſſels, in caſtration; and laſtly, in taking off warts, and other excreſcences by *ligature*, and in all other operations of this kind.

LIGATURE, LIGATURA, or LIGATIO, denotes alſo the art or manner of diſpoſing and applying bandages for the cloſing of wounds, and performing many of the operations in ſurgery.

LIGATURE, is alſo uſed to ſignify a kind of bandage or fillet, tied round the neck, arm, leg, or other part of the bodies of men, or beaſts, to divert, or drive off, ſome diſeaſe, accident, &c.

LIGATURE, among *Myſtic Divines*, ſignifies a total ſuſpenſion of the ſuperior faculties, or intellectual powers of the ſoul. They pretend, that when the ſoul is arrived at a perfect contemplation, ſhe remains deprived of all her operations, and ceaſes to act, in order to be more ready and prepared to receive the impulſe and communications of divine grace. This paſſive ſtate of theſe contemplative people, they call their *ligature*.

LIGATURE is alſo uſed for a ſtate of impotency, in reſpect to venery, pretended to be cauſed by ſome charm, or witchcraft.

Kæmpfer tells of an uncommon kind of *ligature*, or knotting, in uſe among the people of Maſſacar, Java, Malaja, Siam, &c. By this charm, or ſpell, a man binds up a woman, and a woman a man, ſo as to put it out of their power to have to do with any other perſon; the man being thereby rendered impotent to any other woman, and all other men impotent with reſpect to the woman.

Some of their philoſophers pretend that this *ligature* may be effected by the ſhutting of a lock, the drawing of a knot, or the ſticking of a knife in the wall, at the point of time wherein the prieſt is joining a couple together; and that a *ligature*, thus effected, may be diſſolved, by the ſpouſe's urining through a ring. This piece of ſuperſtition is ſaid to obtain alſo among the Chriſtians of the Eaſt.

The ſame author tells us, that during the ceremony of marriage in Ruſſia, he obſerved an old fellow lurking behind the church-door, and mumbling over a ſtring of words; and, at the ſame time, cutting a long rod which he held under his arm, into pieces; which, it ſeems, is a common practice at the marriages of great perſons, and done with deſign to elude and counterwork any other perſon, that might poſſibly be inducing the *ligature*.

The ſecret of inducing a *ligature*, is delivered, by the ſame author, as he was taught it on the ſpot, by one of their adepts; which, being a curioſity, we ſhall not ſcruple to add in his own words; not daring to make it ſpeak Engliſh. *Puella amaſium, vel conjux maritum* ligaturus, *abſterget a concubitus actu, priapum, induſio—ut ſeminis quantum poteſt excipiet. Hoc probe convolutum ſublimine domus ſuæ in terram ſepeliat. Ibi quamdiu ſepultum reliqueret, tamdiu ejus haſta in nullius præterquam ſui (faſcinantis) ſervitium obediet, et prius ab hoc nexu non liberabitur quam ex clauſtro liminis liberetur ipſum linteum: vice verſa, vir lecti ſociam* ligaturus, *menſtruatum ab eo lintuum comburit; ex cineribus cum propria urina ſubactis, efformato figuram priapi, vel, ſi cineres icunculæ fingendæ non ſufficiant, eoſdem ſubigito cum parte terræ, quam recent perminxerit. Formatum iconem caute exſiccato, ſiccamque aſſervato loco ſicco, ne humorem contrahat. Quamdiu ſic ſervaveris, omnes artus, dum ad ſcopam ſociæ collimaverint, momento contabeſcent: ipſe vero dominus. Abrunum hunc ſuum prius humectato, quamdiu ſic manebit, tamdiu ſuſpenſo nexu priapus ipſi parebit, quin & alios quotquot fæmina properantes admiſerit.*

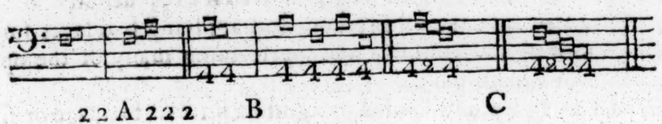
M. Marſhal mentions another ridiculous form of *ligature*, which he received from a bramin at Indoſtan: "If, "ſays he, the little worm in the wood lukerara kara, be "cut into two, and the one part ſtirs, and the other

“ not, if the ſtirring part be bruiſed, and given with half
“ a beetle to a man, and the other half to a woman, the
“ charm will keep each from ever having to do with any
“ other perſon.” Phil. Tranſ. N° 268.

Ligature, *ligatura*, in the *Italian Muſic*, ſignifies a tying or binding together of notes.

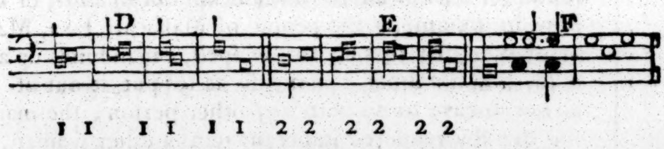
Hence ſyncopes are often called *ligatures*, becauſe they are made by the *ligature* of many notes. There is another ſort of *ligatures* for breves, when there are many of theſe on different lines, or in different ſpaces, to be ſung to one ſyllable.

To underſtand this, it muſt be obſerved, that only breves are capable of this ſpecies of *ligature*, becauſe their figure admits of their being placed ſo cloſe together, as to ſeem one character only, though placed on different degrees, unleſs there be occaſion to place a ſemi-circle either above or below them, to ſhew that they are tied. This kind of *ligature* regards common time only. Breves again muſt be conſidered as ſimple, as having a tail, and as being of different colours. Firſt, if they be ſimple and aſcend, they contain their natural quantity, i. e. each two ſemi-breves, as in example A. But if they deſcend, then each is equivalent to four ſemi-breves, if only two follow one another, as in B. If there are three or four following ones, the firſt and laſt contain each four ſemi-breves, and thoſe in the middle but two, as in C.



Secondly, if they have tails and the tail be turned upwards, the breves contain only one meaſure, as well aſcending as deſcending. See Ex. D. But if it be marked downwards, the breve then contains its natural quantity. See Ex. E. This ſpecies of *ligature* was invented only becauſe the minim, being round, could not be uſed in this manner. And the ſemi-circle was not at that time in uſe.

It may be here remarked, that ordinarily the firſt breve alone of every *ligature* has a tail, and that uſually placed on the left ſide. Laſtly, if they be of different colours, i. e. if the firſt be white, or open in the middle, and the ſecond black, the firſt contains a ſemibreve, and the ſecond a pointed minim. Example F.



Theſe are the principal *ligatures*, beſides which there are many others, for which ſee **Character**.

Ligatures, among *Printers*, are types conſiſting of two letters or characters joined together, as *ct*, *&*, *ff*, *ſt*, *fi*. The old editions of Greek authors are extremely full of *ligatures*; the *ligatures* of Stephens are, by much, the moſt beautiful.

Some editions have been lately printed without any *ligatures* at all: and there was a deſign to explode them quite out of printing. Had this ſucceeded, the fineſt ancient editions would in time, have grown uſeleſs; and the reading of old manuſcripts would have been rendered almoſt impracticable to the learned themſelves.

LIGEANCE, *ligeantia*, in *Law*, is the true and faithful obedience of a ſubject to his ſovereign; and is alſo applied to the dominion or territory of the liege lord: thus children are ſaid to be born in or out of the *ligeance* of the king, &c. Stat. 25 Edw. III.

LIGHT, that ſenſation occaſioned in the mind by the view of luminous bodies; or that property in bodies, whereby they are fitted to excite thoſe ſenſations in us.

Light is alſo uſed to denote a certain action of the luminous body, on a medium between it and the eye; by means whereof, ſome ſuppoſe the one to act on the other. This they call *ſecondary*, or *derivative light*; to diſtinguiſh it from that of luminous bodies, which is called *primary*, or *innate*.

Ariſtotle explains the nature of *light*, by ſuppoſing ſome bodies to be tranſparent, as air, water, ice, &c. but ſince, in the night-time we do not ſee any thing through thoſe bodies, he ſays, they are only tranſparent potentially; whereas, in the day, they become really and actually tranſparent: and ſince it is *light* alone that can reduce that power into act, he defines *light* to be the act of a tranſparent body, conſidered as ſuch. He adds, that *light* is not fire, nor is it any thing bodily radiating from the luminous body, and tranſmitted through the tranſparent one; but the mere preſence of fire, or ſome other luminous body, at the tranſparent one.

This is Ariſtotle's doctrine of *light*, which his followers miſtaking, have charged on him another, very different; making *light* and colours to be qualities of the luminous and coloured bodies themſelves, and, in all reſpects, like thoſe ſenſations which they occaſion in us: adding, that things lucid, or coloured, could not produce any ſenſation in us, unleſs they had ſomething ſimilar in themſelves, ſince *nihil dat quod in ſe non habet*.

But the ſophiſm is apparent; for we find, that a needle, in pricking the fleſh, gives us pain, which no body ever imagined to exiſt in the needle. But that it is not neceſſary there ſhould be any ſimilitude between the quality of the object, and the ſenſation it produces, appears ſtill more evident from a glaſs priſm, which is found to exhibit blue, yellow, red, and other colours extremely vivid; and yet no body will ſay there is any thing in the glaſs priſms like to thoſe ſenſations.

The Carteſians have refined conſiderably on this notion; and own that *light*, as it exiſts in the luminous body, is nothing but a power or faculty of exciting in us a very clear and vivid ſenſation; adding, that what is required to the perception of *light*, is, that we be ſo formed, as to be capable of ſuch ſenſations; that in the hidden pores of tranſparent bodies, there be a certain ſubtile matter, which, by reaſon of its exceeding ſmallneſs, may penetrate even glaſs, and yet be ſtrong enough to ſhake certain capillaments at the bottom of the eye; and, laſtly, that this matter be impelled by the luminous body, ſo as to move the organ of ſight.

Primary *light*, therefore, they ſay, conſiſts in a certain motion of the particles of the luminous body, whereby they are enabled to propel, every way, the materia ſubtilis, lodged in the pores of tranſparent bodies; and ſecondary or derivative *light*, in a conatus to motion, or an inclination of that matter to recede from the centre of the luminous body in right lines.

Father Mallebranche explains the nature of *light*, from a ſuppoſed analogy between it and **sound**.

Thus he ſuppoſes all the parts of a luminous body are in a rapid motion, which, by very quick pulſes, is conſtantly compreſſing the ſubtile matter between the luminous body, and the eye, and excites vibrations of preſſion. As theſe vibrations are greater, the body appears more luminous; and as they are more quick, or more ſlow, the body is of this or that colour.

This hypotheſis, how ingenious ſoever, is now deſervedly diſcarded, ſince the great diſcoveries made by ſir Iſaac Newton, on the nature of *light*. The primary *light* they talk of, we now know, conſiſts wholly in a certain motion of the particles of the lucid body, whereby they do not propel any fictitious matter, ſuppoſed to be lodged in the hidden pores of tranſparent bodies; but throw off from the luminous body, certain very ſmall particles, which are emitted every way with great force; and the ſecondary or derivative *light* conſiſts not in a conatus, but a real motion of theſe particles, receding every way from the luminous body, in right lines, and that with an incredible velocity.

For if *light* conſiſted in a mere preſſion, or pulſe, it would be propagated to all diſtances, in the ſame inſtant of time; the contrary of which appears, from the phenomena of the eclipſes of Jupiter's ſatellites, whoſe immerſions, as the earth approaches towards Jupiter, are found to anticipate ſomewhat on the true time, and to commence ſooner; and again, as the earth retires from Jupiter, their immerſions, which alone in that caſe can be obſerved, happen later and later, or loſe time: deviating thus, very conſiderably on either ſide, from the true time marked by the tables.

This was firſt obſerved by Mr. Roemer, and ſince by other aſtronomers; the reaſon of which is not owing to any eccentricity; but does apparently follow from this, that the *light* of the ſun, reflected from the ſatellites, has farther to travel, before it reaches the eye, in the one caſe than in the other, by a ſpace equal to the diameter of the earth's annual orbit.

The obſervations, whence this concluſion was deduced, were made at the obſervatory belonging to the Royal Academy of Sciences at Paris, from 1670 to 1675: the principal fact was, that the firſt ſatellite ſometimes emerged exactly at the times calculated by the tables, and ſometimes not, inſomuch that the greateſt variation was about fourteen minutes. The particular obſervation that was the moſt ſtriking was the emerſion of this ſatellite obſerved at Paris, Nov. 9, 1676, ten minutes later than it had been obſerved in the month of Auguſt, when the earth was much nearer to Jupiter. Hence Caſſini and Roemer both concluded, that this circumſtance depended on the diſtance of Jupiter with reſpect to the earth; and that in order to account for it, they muſt ſuppoſe that the *light* was about fourteen minutes in croſſing the earth's orbit. But the concluſion was afterwards abandoned and attacked by Monſieur Caſſini. Mr. Roemer's opinion found an able advocate in Dr. Halley; who removed Caſſini's difficulty, and left M. Roemer's concluſion in its full force. In a memoir preſented to the Academy in 1707, Monſieur Maraldi endeavoured to give a new force to Caſſini's arguments; but Monſieur Roemer's doctrine found a new defender in Mr. Pound. See Phil. Tranſ. N° 136. Phil. Tranſ. abr. by Lowth, vol. i. p. 409, 422. s'Grav. Phyſ. Elem. N° 2636, ſeq.

It has been ſince found, that when the earth is between the ſun and Jupiter, his ſatellites are eclipſed about eight minutes ſooner than they could be according to the tables, and that when the earth is nearly in the oppoſite point of its orbit, theſe eclipſes happen about eight minutes later than the tables predict them. Hence it is undeniably certain, that the motion of *light* is not inſtantaneous, ſince it takes about 16 ½ minutes of time to go through a ſpace equal to the diameter of the earth's orbit, which is at leaſt 190 millions of miles in length; and conſequently the particles of *light* fly about 191919 miles every ſecond of time, which is near a million of miles ſwifter than the motion of a cannon-ball. And as *light* is to 16 ½ minutes in travelling acroſs the earth's orbit, it muſt be 8 ¼ minutes, in coming from the ſun to us; therefore, if the ſun were annihilated, we ſhould ſee him for 8 ¼ minutes after; and if he were again created, he would be 8 ¼ minutes old before we could ſee him.

In order to explain this progreſſive motion of *light*, let A and B, *Tab.* III. *Optics*, *fig.* 33, be the earth in two different parts of its orbit, whoſe diſtance from each other is 95 millions of miles, equal to the earth's diſtance from the ſun S.

It is plain, that if the motion of *light* were inſtantaneous, the ſatellite 1 would appear to enter into Jupiter's ſhadow FF, at the ſame moment of time to a ſpectator in A, as to another in B. But it is now well known that the immerſion of the ſatellite into the ſhadow is ſeen 8 ½ minutes ſooner when the earth is at B, than when it is at A. As the earth moves from D to C, through the ſide AB of its orbit, it is conſtantly meeting the *light* of Jupiter's ſatellites ſooner, which occaſions an apparent acceleration of their eclipſes; and as it moves through the other half H of its orbit, from C to D, it is receding from their *light*, which occaſions an apparent retardation of their eclipſes, becauſe their *light* is then longer before it overtakes the earth. That theſe accelerations and retardations are not occaſioned by any inequality ariſing from the motions of the ſatellites in excentric orbits is plain, becauſe it affects them all alike, in whatever parts of their orbits they are eclipſed. Beſides they go often round their orbits every year, and their motions are no way commenſurate to the earth's. Therefore a phenomenon not to be accounted for from the real motions of the ſatellites, but ſo eaſily deducible from the *motion of the* EARTH, and ſo anſwerable to it, muſt be allowed to reſult from it. And this affords one very good proof of the earth's annual motion. See the ſequel of this article.

We ſhall here obſerve, that the firſt perſon, who conceived the thought of meaſuring the velocity of *light* was Galileo, who has given a particular deſcription of his contrivance for this purpoſe, in this Treatiſe on Mechanics, p. 39. He had two men with lights, one of whom was to obſerve when the other uncovered his *light*, and to exhibit his own the moment that he perceived it: this experiment was tried, as may naturally be imagined without ſucceſs, at the diſtance of one mile; but the members of the academy Del Cimento, reſumed the experiment, and placed the obſervers to as little purpoſe, at the diſtance of two miles. However the method uſed by M. Roemer, already mentioned, was the only one adequate to the diſcovery of the velocity of *light*.

Our excellent aſtronomer, Dr. Bradley, has found nearly the ſame velocity of *light*, from his accurate obſervations, and moſt ingenious theory, to account for ſome apparent motions in the fixed ſtars. Phil. Tranſ. N° 406. or Abridg vol. vi. p. 150. And for a ſummary account of theſe obſervations, &c. ſee STAR.

To underſtand this, it muſt be premiſed, that the fixed ſtars are luminous bodies, and at reſt, with reſpect to our planetary ſyſtem, from which they are vaſtly remote. In this ſyſtem alſo the earth is conſidered as one of the planets, and moving about the ſun.

Suppoſe the ſun repreſented in S, (*Tab.* III. *Optics*, *fig.* 34.) and that the circle ABCD repreſents the path of the earth, or the ecliptic. At the centre S ſuppoſe a perpendicular SP raiſed to the plane of the ecliptic, and that this perpendicular paſſes through any fixed ſtar. If a ſpectator were placed in S, he would ſee the ſtar in the ſame perpendicular; but if the ſpectator paſſes over the circle ABCD, the diameter of which is ſuppoſed to bear a ſenſible though ſmall proportion to the diſtance of the ſtar, it will be perceived to change its ſituation in the heavens. For a ſpectator in A would ſee the ſtar in the line AP*a*; in C he would ſee the ſame ſtar in the line CP*c*; and ſo in any other point of his progreſs; whence it follows, that the ſtar would ſeem to deſcribe a circle in the heavens repreſented by *a b c d*. If the diſtance of the ſtar was ſo very great, that in reſpect of it the diameter of the earth's orbit AC might be eſteemed a point; in this caſe, the foreſaid circle would be entirely inſenſible; all the lines drawn from the points of the orbit to the ſtar might paſs for perpendiculars to the plane of the ecliptic, and in appearance would correſpond to the ſame point in the heavens with the perpendicular in S, in which point the ſtar would always appear, if its *light* could reach us in an inſtant. But if in this caſe, where the ſtar is ſo remote, the light is ſuppoſed to be propagated from the ſtar with a certain velocity, at the ſame time that the earth proceeds in its orbit, the ſtar will be ſeen in an oblique direction to the plane of the orbit; becauſe of the motion compounded of the motion of *light*, and that of the ſpectator.

Suppoſe the *light* to move in the line EG (*fig.* 35.) making an angle with the line FG, in which the ſpectator is carried along; whom we ſhall conceive placed in F. Let the velocity of the ſpectator be to the velocity of the *light*, as FG to EG. While the ſpectator moves along FG, the *light* does the ſame along EG; and the particle of *light* which is in E, when the ſpectator is in F, enters the eye only when he arrives at G. Now the direction of the *light*, with reſpect to the eye, makes with the line F G the angle E F G. For if we conceive the line F E drawn, and be carried with a parallel motion along with the eye, ſo that in reſpect thereof it be at reſt, while this continues moving, the light will reach the eye in the direction of the ſaid line; for when the eye ſhall be in *f*, the middle point between F and G, the transferred line will cut EG in its middle point *g*, to which the particle of *light* has reached, and which is likewiſe the middle point of the transferred line *f e*; wherefore the particle of *light*, which was in E, in the extremity of the line E F, arrives at, and will enter the eye in the direction *e g*.

Let the angle EGF (*fig.* 36.) be a right one, and EG to FG as the velocity of the *light* to the velocity of the earth in its orbit; then EFG will be the angle, which the ray of *light* entering the eye, makes with the plane in which the earth moves round the ſun.

If the earth be in B (*fig.* 37) it moves in the direction of the tangent to its orbit in this point; that is, if we ſuppoſe the ſpectator in the ſun, the direction of the earth's motion is parallel to SC; and making the angle *a* S C equal to the angle EGF, in the former figure, the line S*a* will repreſent the line in which the ſpectator would ſee the ſtar.

In the ſame manner when the earth is in D, the ſpectator in the ſun will ſee the ſtar in S*c*, the angles P S *c* and P S *a* being equal; and the line S *a* or S *c*, by its revolution about PS, would deſcribe a cone, whoſe baſe in the heavens would be a circle repreſenting the apparent path of the ſtar through a whole year. Let us ſuppoſe this circle to be *a b c d*, as in *fig.* 37.

When the ſtar is not in the perpendicular to the plane of the ecliptic, but the line PS (*fig.* 38.) is inclined to that plane, the lines which determine the apparent motion of the ſtar in the heavens, will form cones, as in the caſes already explained; only they would be oblique, and in both caſes the apparent path of the ſtar in the heavens would be determined as above; but in this laſt caſe it would be an ellipſis, the greater diameter of which would be equal to the diameter of the circle *a b c d*, of the former figures; ſo that knowing this ellipſis, the circle might eaſily be found which the ſtar would deſcribe, if placed in the perpendicular to the plane of the ecliptic.

The only way to determine, whether the ſtars deſcribe ſuch ellipſis, is by obſervations; in making which there are great difficulties, which, however, Dr. Bradley has with incomparable induſtry ſurmounted.

Nothing can immediately be determined concerning the foreſaid elliptic motion. The diſtance of the ſtar from the pole of the world muſt be meaſured at different times of the year; and from the different diſtances, the elliptic motion is to be determined by calculation, allowing for the motion of the pole itſelf during the ſpace of time between the obſervations; for the pole moves in a leſſer circle, one degree of which it paſſes over in ſeventy-two years.

Dr. Bradley, making all neceſſary allowances, obſerved ſeveral ſtars at different times of the year, whereby he immediately diſcovered, that their diſtances from the pole of the world varied; and was convinced that this variation could not be attributed to the nutation of the pole; for he examined two ſtars at equal diſtances from the pole, but ſo oppoſite, that the one ought to have receded from the pole as much as the other acceded to it, if the motion was in the pole itſelf. But this did not fall out ſo; for the change of the one ſtar was double of that of the other; a proper allowance being always made for the pole's motion ariſing from the above revolution. However, this indefatigable obſerver inferred from his obſervations, that the ſtars in certain times receded from, and acceded to, the pole of the world with a motion entirely analogous to that which is performed in an ellipſis; and alſo that they move in ſuch curves, for each of which the motion in the ſame little circle, as *a b c d* (*fig.* 38.) anſwers, when the ſtars are referred to the perpendicular in S to the plane of the ecliptic; and the diameter of this minute circle for them all is $40'' \frac{1}{2}$.

It is plain from obſervations, to which of the above mentioned cauſes we are to aſcribe the motion of the ſtar. For if the firſt takes place, the ſtar would be carried from *a* to *c*, while the earth paſſed over the part A B C of its orbit: but this being contrary to obſervation, is cannot be the true cauſe. But this change in the ſituation of the ſtar takes place according to the obſervations, while the earth deſcribes the part B C D of its orbit, which is juſt what the ſecond cauſe requires.

If both the cauſes took place at the ſame time, the arc deſcribed by the earth, would differ from that indicated by either of them; beſides, this concurrence of the cauſes is contrary to the obſervations; unleſs, perhaps, it may be thought reaſonable to attribute a little influence to the firſt cauſe, but ſo very ſmall a portion, as not to be ſenſibly perceived in the obſervations.

Dr. Bradley himſelf conſidered this matter in the following manner: he imagined C A (*Tab.* III. *Optics*, *fig.* 39.) to be a ray of *light* falling perpendicularly upon the line B D; that, if the eye is at reſt at A, the object muſt appear in the direction A C, whether *light* be propagated in time or in an inſtant. But if the eye is moving from B towards A, and *light* is propagated in time, with a velocity that is to the velocity of the eye as C A to B A, then *light*, moving from C to A, whilſt the eye moves from B to A, that particle of it by which the object will be diſcerned when the eye comes to A, is at C when the eye is at B. Joining the points B, C, he ſuppoſed the line C B to be a tube, inclined to the line B D in the angle D B C, of ſuch a diameter as to admit but one particle of *light*. Then it was eaſy to conceive, that the particle of *light* at C, by which the object muſt be ſeen, when the eye, as it moves along, arrives at A, would paſs through the tube B C, if it is inclined to B D in the angle D B C, and accompanies the eye in its motion from B to A; and that it could not come to the eye placed behind ſuch a tube, if it had any other inclination to the line B D. If, inſtead of ſuppoſing C B ſo ſmall a tube, we imagine it to be the axis of a larger; then, for the ſame reaſon, the particle of *light* at C would not paſs through that axis, unleſs it is inclined to B D in the angle C B D. In like manner, if the eye moved a contrary way, from D towards A, with the ſame velocity, then the tube muſt be inclined in the angle B D C. Although, therefore, the true, or *real* place of an object is perpendicular to the line in which the eye is moving, yet the *viſible* place will not be ſo, ſince that, no doubt, muſt be in the direction of the tube; but the difference between the true and apparent place will be, *cæteris paribus*, greater or leſs, according to the different proportion between the velocity of *light* and that of the eye. So that if we could ſuppoſe that *light* was propagated in an inſtant, then there would be no difference between the real and viſible place of an object, although the eye were in motion; for in that caſe, A C being infinite with reſpect to A B, the angle A C B, the difference between the real and viſible place, vaniſhes. But if *light* be propagated in time, it is evident, from the foregoing conſiderations, that there will be always a difference between the true and viſible place of an object, unleſs the eye is moving either directly towards or from the object. And in all caſes the ſine of the difference between the real and viſible place of the object will be to the ſine of the viſible inclination of the object to the line in which the eye is moving, as the velocity of the eye is to the velocity of *light*.

He then ſhews, that if the earth revolve round the ſun annually, and the velocity of *light* be to the velocity of the earth's motion in its orbit, as one thouſand to one, that a ſtar really placed in the very pole of the ecliptic, would, to an eye carried along with the earth, ſeem to change its place continually; and neglecting the ſmall difference on the account of the earth's diurnal revolution on its axis, would ſeem to deſcribe a circle round that pole every way diſtant from it $3' \frac{1}{2}$; ſo that its longitude would be varied through all the points of the ecliptic every year, but its latitude would always remain the ſame. Its right aſcenſion would alſo change, and its declination, according to the different ſituation of the ſun with reſpect to the equinoctial points, and its apparent diſtance from the north pole of the equator would be $7'$ leſs at the autumnal than at the vernal equinox.

The greateſt alteration of the place of a ſtar in the pole of the ecliptic, or which, in effect, amounts to the ſame thing, the proportion between the velocity of *light* and the earth's motion in its orbit being known, it will not be difficult, he obſerves, to find what would be the difference, upon this account, between the true and apparent place of any other ſtar at any time; and, on the contrary, the difference between the true and apparent place being given, the proportion between the velocity of *light* and the earth's motion in its orbit may be found.

From all which the following concluſions may be deduced: 1. That the ſecond cauſe above mentioned alone takes place in this caſe, viz. that the diſtance of the ſtars is ſo great, that the diameter of the earth's orbit has no ſenſible proportion to it. 2. That the angle F E G (*fig.* 35.) in the above mentioned triangle, is $20'' \frac{1}{4}$; or, ſince the apparent declination of the ſtar γ Draconis, obſerved by Dr. Bradley, on account of the ſucceſſive propagation of *light*, would be to the diameter of the little circle which a ſtar would ſeem to deſcribe about the pole of the ecliptic as $39''$ to $40'',4$; the half of this is the angle A C B (*fig.* 39.) which is equal to $20'',2$; and conſequently the ratio of E G to F G (*fig.* 35.) or of A C to A B (*fig.* 39.) or the velocity of the *light* to the velocity of the earth in its orbit, as 10210 to 1; whence it follows, that the *light* comes from the ſun to the earth in eight minutes and twelve ſeconds. This, Dr. Bradley obſerves, is very probably the truth, becauſe it is a medium between 7 and 11, which were the times which it had before been ſuppoſed to take up, according to different obſervations of the eclipſes of Jupiter's ſatellites. Comparing his obſervations on other ſtars, he afterwards concluded, that *light* is propagated from the ſun to the earth in $8'\ 13''$; and the near agreement of his obſervations induced him to think, that this ſuppoſition could not differ ſo much as a ſecond of a degree from the truth; ſo that the time which *light* ſpends in paſſing from the ſun to us may be determined by theſe obſervations within $5''$ or $10''$, which is ſuch a degree of exactneſs as we can never hope to attain from the eclipſes of Jupiter's ſatellites. 3. That the *light* proceeds with the ſame velocity from all the ſtars; for all have the ſame angle F E G. Whence (if we ſuppoſe that all the ſtars are not equally diſtant from us, as many arguments prove) it will follow, that the motion of *light*, all the way it paſſes through the immenſe ſpace above our atmoſphere, is equable or uniform. And ſince the different methods of determining the velocity of *light* thus agree in the reſult, it is reaſonable to conclude, not only that the phenomena above recited are owing to the cauſes to which they are aſcribed, but alſo that, in the ſame medium, *light* is propagated with the ſame velocity after it has been reflected, as before. 4. Laſtly, it muſt be conſidered, that very ſmall differences cannot be perceived; and no body will deny, but that, in meaſuring a ſmall angle, an error of a ſecond may be committed, whatever care is uſed to prevent it; and therefore, although we have ſaid, that the firſt cauſe is to be rejected, we do not deny that the ſtars may poſſibly by its influence deſcribe a minute circle, whoſe diameter is $1''$, or even a little more. s'Graveſand Phyſ. Elem. Math. lib. ii. cap. 1. p. 708, ſeq.

Hence it appears, that the ſucceſſive propagation of *light* will cauſe an *aberration* in the appearances of the ſtars, planets, and comets. After Mr. Bradley had diſcovered this cauſe of error in the apparent places of the fixed ſtars, Mr. Clairaut and others inveſtigated ſeveral rules for the computation of this aberration. Mr. Euler alſo has lately given us a paper on this object. Mem. Acad. Scienc. 1756. Mr. Simpſon, in his Eſſays. Mem. de l'Acad. de Berlin, tom. ii. p. 141, ſeq.

See remarks on the effect of the aberration of *light* on the time of a tranſit of Venus over the ſun, by Dr. Price, in Phil. Tranſ. vol. lx. art. 47. p 536.

For an account of Mr. Melville's hypotheſis of the different velocities of differently coloured rays, ſee COLOUR.

But to return to the hypotheſis of preſſure, by which ſome have accounted for the propagation of *light*, it might be obſerved farther, if *light* were not a body, but conſiſted in a mere preſſion, or pulſion, it would never be propagated in right lines, but would be continually inflected ad umbram. Thus ſir Iſaac Newton: "A preſſure on "a fluid medium, i. e. a motion propagated by ſuch a "medium, beyond any obſtacles which impedes any part "of its motion, cannot be propagated in right lines, but "will be always inflecting and diffuſing itſelf every way "to the quieſcent medium beyond that obſtacle. The "power of gravity tends downwards; but the preſſure of

“ water ariſing from it tends every way with an equable “ force, and is propagated with equal eaſe, and equal “ ſtrength, in curves, as in ſtrait lines. Waves, on the “ ſurface of the water, gliding by the extremes of any “ very large obſtacle, inflect and dilate themſelves, ſtill “ diffuſing, gradually, into the quieſcent water beyond “ that obſtacle. The waves, pulſes, or vibrations of the “ air, wherein ſound conſiſts, are manifeſtly inflected, “ though not ſo conſiderably as the waves of water; and “ ſounds are propagated with equal eaſe, through crooked “ tubes, and through ſtrait lines; but *light* was never “ known to move in any curve, nor to inflect itſelf ad “ umbram.” The rays of *light*, therefore, are ſmall corpuſcles, emitted with exceeding celerity from the luminous body. As to the force wherewith theſe corpuſcles are emitted, ſo as to enable them to move at the inconceivable rate of 11,000,000 miles in a minute; the ſame great author obſerves, “ Among bodies of the ſame “ kind and virtue, by how much any one is ſmaller, by “ ſo much is its attractive power greater in proportion “ to its bulk. This power we find ſtronger in ſmall “ magnets than in large ones, regard being had to the “ difference of their weights; and the reaſon is, that the “ particles of ſmall magnets, being nearer each other, “ more eaſily unite their forces intimately together, and “ act conjunctly. For the ſame reaſon, the rays of *light* “ being of all other bodies the moſt minute, it may be “ expected that their attractive powers ſhould be, of all “ others, the ſtrongeſt; and how ſtrong in effect they “ are, may be gathered from the following rules: the “ attraction of a ray of *light*, according to the quantity “ of its matter, is, to the gravity which any projected “ body has, according, likewiſe, to the quantity of its “ matter, in a ratio compounded of the velocity of the “ ray of *light*, to the velocity of that projected body, and “ of the bending or curvature of the line, which the ray “ deſcribes in the place of refraction, to the bending of “ the curvature, deſcribed by that projected body; pro“vided, however, the inclination of the ray to the re“fracting ſurface be the ſame with that of the projected “ body to the horizon. From which proportion I ga“ther, that the attraction of the rays of *light* is above “ 1,000,000,000,000,000 times greater, than the gravity “ of bodies on the ſurface of the earth, in proportion to “ the quantity of matter in each, if the *light* paſs from “ the ſun to the earth in the ſpace of ſeven minutes. “ But now, as in algebra, where affirmative quantities “ ceaſe, there negative ones begin; ſo in mechanics, “ where attraction ceaſes, there the repelling power muſt “ ſucceed; therefore a ray of *light*, as ſoon as it is caſt “ off from the luminous body, by the vibrating motion “ of its parts, and is got out of the ſphere of its attrac“tion, is propelled with an immenſe velocity.”

The wonderful diviſibility of the parts of matter is no where more apparent than in the minuteneſs of the particles of *light*. Dr. Nieuwentyt has computed, that an inch of candle, when converted to *light*, becomes divided into 269,617,040 parts, with 40 ciphers annexed; at which rate, there muſt iſſue out of it, when burning, 418,660, with 39 ciphers more, particles in the ſecond of a minute; vaſtly more than a thouſand times a thouſand million times the number of ſands the whole earth can contain; reckoning ten inches to one foot, and that 100 ſands are equal to one inch. See Relig. Philoſ. vol. iii. p. 865.

It muſt be acknowledged, that many difficulties and objections have been urged againſt the materiality of *light*, or the hypotheſis of *light's* conſiſting of ſmall particles emitted from luminous bodies; and that many eminent philoſophers, both foreigners and Engliſh, have recurred to the opinion, that *light* conſiſts of vibrations propagated from the luminous body, through a ſubtle ætherial medium.

The ingenious Dr. Franklin, in a letter dated April 23, 1752, expreſſes his diſſatisfaction with the doctrine, that ſuppoſes particles of matter, called *light*, continually driven off from the ſun's ſurface, with a ſwiftneſs ſo prodigious. “ Muſt not, ſays he, the ſmalleſt portion “ conceivable, have, with ſuch a motion, a force exceed“ing that of a twenty-four pounder, diſcharged from a “ cannon? Muſt not the ſun diminiſh exceedingly by “ ſuch a waſte of matter; and the planets, inſtead of “ drawing nearer to him, as ſome have feared, recede to “ greater diſtances through the leſſened attraction? Yet “ theſe particles, with this amazing motion, will not “ drive before them, or remove, the leaſt and lighteſt “ duſt they meet with; and the ſun appears to continue “ of his ancient dimenſions, and his attendants move in “ their ancient orbits.” Accordingly he conjectures, that all the phenomena of *light* may be more conveniently ſolved, by ſuppoſing univerſal ſpace filled with a ſubtile elaſtic fluid, which, when at reſt, is not viſible, but whoſe vibrations affect that fine ſenſe in the eye, as thoſe of air do the groſſer organs of the ear; and that different degrees of the vibration of this medium may occaſion the appearances of different colours. The elaſtic fluid, he ſays, is always the ſame, and yet weaker and ſtronger ſparks differ in apparent colour, ſome white, blue, purple, red; the ſtrongeſt, white; the weak ones, red. Franklin's Exp. and Obſ. &c. p. 264, &c. ed. 1769.

The celebrated Mr. Euler has alſo ſtrenuouſly maintained the ſame hypotheſis, in his Theoria Lucis & Colorum. In the ſummary of his arguments againſt the common opinion, recited in Acad. Berl. 1752, p. 271, beſides the objections above mentioned, he diſputes the poſſibility, that particles of matter, allowed to move with the amazing velocity of *light*, ſhould penetrate tranſparent ſubſtances with ſo much eaſe. In whatever manner they are tranſmitted, thoſe bodies muſt have pores, diſpoſed in right lines, and in all poſſible directions, in order to form canals for the paſſage of the rays: but ſuch a ſtructure muſt take away all ſolid matter from thoſe bodies, and all coherence among their parts, if they do contain any ſolid matter.

Dr. Horſley has taken conſiderable pains to obviate the difficulties ſuggeſted by Dr. Franklin; and ſuppoſing that the diameter of each particle of *light* does not exceed one millionth of one millionth of an inch, and that the denſity of each particle is three times that of iron, that the *light* of the ſun traverſes the ſemidiameter of the orbis magnus in 7′, and that this ſemidiameter is 22919 ſemidiameters of the earth, he calculates, that the momentum of force of motion in each particle of *light* coming from the ſun, is leſs than that in an iron ball of $\frac{1}{4}$ of an inch diameter, moving at the rate of leſs than an inch in twelve thouſand millions of millions of Egyptian years. Hence he concludes, that a particle of matter, which is probably larger than any particle of *light*, moving with the velocity of *light*, has a force of motion, which, inſtead of exceeding the force of a twenty-four pounder diſcharged from a cannon, is infinitely leſs than that of the ſmalleſt ſhot diſcharged from a pocket-piſtol, or leſs than any that art can create. Moreover, he thinks it poſſible, that *light* may be produced by a continual emiſſion of matter from the ſun, without any ſuch waſte of his ſubſtance as ſhould ſenſibly contract his dimenſions, or alter the motion of the planets, within any moderate length of time. In proof of this, he obſerves, that it is not neceſſary to the production of any of the phenomena of *light*, that the emanation from the ſun ſhould be continual in a ſtrict mathematical ſenſe, or without any interval; and likewiſe that part of the *light* which iſſues from the ſun is continually returning to him by reflection from the planets, and other *light* is continually coming to him from the ſuns of other ſyſtems. He proceeds by calculation to ſhew, that in 385,130,000 Egyptian years, the ſun would loſe $\frac{1}{131232}$d of his matter, and, therefore, that the gravitation towards the ſun, at any given diſtance, would diminiſh in the ſame proportion. But this alteration is much too ſmall to diſcover itſelf in the motion of the earth, or of any of the planets. He alſo computes, that the greateſt ſtroke which the retina of a common eye ſuſtains, when the eye, in a bright day, is turned up directly to the ſun, does not exceed that which an iron ſhot $\frac{1}{4}$ of an inch diameter, would give, moving only at the rate of 16,16 inches in a year; but the ordinary ſtroke is leſs than the $\frac{1}{2034}$th part of this. Phil. Tranſ. vol. lx. art. 35. vol. lxi. part ii. art. 50.

One of the principal difficulties attending the hypotheſis of the materiality of *light*, is the non-interference of its particles with each other. There is probably, ſays Mr. Melville, Edinb. Eſſ. vol. ii. p. 17, &c. no phyſical point in the viſible horizon, that does not ſend rays to every other point, unleſs where opaque bodies interpoſe. *Light*, in its paſſage from one ſyſtem to another, often paſſes through torrents of *light* iſſuing from other ſuns and ſyſtems, without ever interfering, or being diverted from its courſe, either by it, or by the particles of that elaſtic medium, which ſome have ſuppoſed to be diffuſed through all the mundane ſpace. In accounting for this fact, he ſuppoſes that the particles of *light* muſt be incomparably rare, even when they are the moſt denſe; that is, that the ſemidiameters of two of the neareſt particles, in the ſame, or in different beams, ſoon after their emiſſion, are incomparably leſs than their diſtance from one another. This conſideration obviates the objection urged by Euler and others againſt the materiality of *light*, from its influence in diſturbing the freedom and perpetuity of the celeſtial motions. Boſcovich and others ſolve the difficulty concerning the non-interference of the particles of *light*, by ſuppoſing that each particle is endued with an inſuperable impulſive force; but in this caſe, their ſpheres of impulſion would be more liable to interfere, and they would, on that account, be more likely to diſturb one another. This difficulty, attending the ſuppoſition, that particles of *light* move through other *light* in all imaginable directions, without perpetual colliſions among the particles, and continual deflections from a rectilinear courſe, is, in a great degree, obviated, by an eaſy computation of Mr. Canton. He obſerves, that it is neceſſary to allow only a very ſmall portion of time between the emiſſion of every particle, and the next that follows in the ſame direction. Suppoſe, for inſtance, that one lucid point of the ſun's ſurface emits 150 particles in one ſecond, which are more that ſufficient to give continual *light* to the eye, without the leaſt appearance of intermiſſion; yet ſtill the particles of which it conſiſts will, on account of their great velocity, be more than a thouſand miles behind one another, and thereby leave room enough for others to paſs in all directions. Phil. Tranſ. vol. lviii. art. 45. p. 344.

If we adopt the concluſions drawn from the chevalier D'Arcy's experiments on the duration of the ſenſations excited by *light*, who ſtates it at the ſeventh part of a ſecond (Hiſt. Acad. Scienc. 1765. Mem. 2.) we may admit an interval of more than 20,000 miles between each particle. Some, in order to anſwer the chief objections of this kind againſt the materiality of *light*, have adopted the hypotheſis of M. Boſcovich; who advances, in his Theoria Philoſophiæ Naturalis, that MATTER is not impenetrable, but that it conſiſts of phyſical points only, endued with powers of attraction and repulſion, taking place at different diſtances; that is, ſurrounded with various ſpheres of attraction and repulſion, in the ſame manner as ſolid matter is generally ſuppoſed to be; provided, therefore, that any body move with a ſufficient degree of velocity, or have ſufficient momentum, to overcome any powers of repulſion it may meet with, it will find no difficulty in making its way through any body whatever; for nothing will interfere or penetrate one another, but powers, ſuch as we know, do, in fact, exiſt in the ſame place, and counterbalance, or over-rule one another. Prieſtley's Hiſtory, &c. of *Light*, &c. p. 391.

That *light* is a real ſubſtance, notwithſtanding the objections that have been urged againſt this hypotheſis, ſeems to be eſtabliſhed by the phenomena of the Bolognian ſtone, and of other ſubſtances, which poſſeſs the remarkable property of imbibing *light*, of retaining it for ſome time, and afterwards of emitting it. See PHOSPHORUS.

The doctrine of the materiality of *light* is farther confirmed by thoſe experiments, which demonſtrate, that the colour and inward texture of ſome bodies are changed, in conſequence of their being expoſed to the *light*.

The firſt obſervation of this kind appears to have been made by M. Duhamel, who found, that the juice of a certain ſhell-fiſh in Provence contracted a fine purple colour when it was expoſed to the *light* of the ſun, and that the ſtronger was the *light*, the more ſplendid was the colour. Pieces of cloth dipped in this liquor, and expoſed to the ſun, became red, though they were incloſed in glaſs; but they acquired none of this colour in the ſame expoſure, if they were covered with the thinneſt plates of metal. It was afterwards obſerved by Beccarius, Com. Bonon. vol. iv. p. 75. that a quantity of luna cornea, expoſed to the rays of the ſun, became of a violet colour, whilſt part of the ſame compoſition, covered with black paper, remained white. This effect was found by M. H. Schulze to depend on the ſilver that happened to be in it. Ac. Cæſar. vol. i. p. 528, &c. G. Bonzius was thus led to ſome ſubſequent experiments, which ſeem to prove, that various colours are conſiderably affected by *light*, excluſive of heat, or any thing elſe. By expoſing ribbons of different colours to the rays of the ſun, for ſeveral days, in the open air, he found that all except the yellow and light green, loſt part of their luſtre, and were conſiderably faded; but when the ſame ribbons were expoſed to a much greater degree of heat, in a dark room, none of the colours were affected, except that a ſmall part of their luſtre was loſt; nor was any ſenſible change made in them after remaining, for a conſiderable time, in a room that faced the north. By incloſing them in an exhauſted receiver, he found that the change was not occaſioned by the air; but no change could be produced in them by the light of torches. Beccarius alſo found by experiments on paper, and a great variety of ſubſtances, mineral, vegetable, and animal, that the *light* of the ſun produced many changes in the internal ſtructure of bodies, and that thoſe ſubſtances which imbibed *light* were much injured. The ſtronger the *light*, and the longer they were expoſed to it, the more injury they received; and the injury thus ſuſtained was found to be laſting. Com. Bon. vol. vi. p. 77, &c. See Prieſtley's Hiſtory, &c. p. 378, &c.

Some writers have attempted to prove the materiality of *light*, by determining the momentum of their compotent particles, or by ſhewing that they had a force, ſo as, by their impulſe, to give motion, to *light* bodies. M. Homberg, Ac. Par. 1708. H. p. 25, imagined, that he could not only diſperſe pieces of amianthus, and other light ſubſtances, by the impulſe of the ſolar rays, but alſo that by throwing them upon the end of a kind of lever, connected with the ſpring of a watch, he could make it move ſenſibly quicker; whence, and from other experiments, was inferred the weight of the particles of *light*. But M. Du Fay, and M. Mairan, made other experiments of a more accurate kind, which exhibited no ſuch effects as M. Homberg imagined. However, Dr. Prieſtley informs us, that Mr. Mitchell endeavoured to aſcertain the momentum of *light* with ſtill greater accuracy, and that his endeavours were not altogether unſucceſsful. Having found, that the inſtrument which he uſed, acquired from the impulſe of the rays of *light*, a velocity of one inch in a ſecond, he inferred, that the quantity of matter contained in the rays falling upon the inſtrument at that time, amounted to no more than one twelve hundred millionth part of a grain. In the experiment, the *light* was collected from a ſurface of about three ſquare feet; and as this ſurface reflected only about half what falls upon it, the quantity of matter contained in the rays of the ſun, incident upon a ſquare foot and half of ſurface, in one ſecond of time, ought to be no more than the twelve hundred millionth part of a grain, or upon one ſquare foot only, the eighteen hundred millionth part of a grain. But the denſity of the rays of *light* at the ſurface of the ſun is greater than at the earth, in the proportion of 45000 to 1; there ought, therefore, to iſſue from one ſquare foot of the ſun's ſurface in one ſecond of time, in order to ſupply the waſte by *light*, one forty thouſandth part of a grain of matter; that is, a little more than two grains a day, or about four millions ſeven hundred and fifty-two thouſand grains, which is about ſix hundred and ſeventy pounds, avoirdupoiſe, in ſix thouſand years; a quantity which would have ſhortened the ſun's ſemidiameter no more than about ten feet, if it was formed of matter of the denſity of water only. Prieſtley, ubi ſupra, p. 389.

The expanſion or extenſion of any portion of *light*, is inconceivable. Dr. Hook ſhews, it is as unlimited as the univerſe; proving it from the immenſe diſtance of ſome of the fixed ſtars, the *light* whereof becomes ſenſible to the eye, by means of a teleſcope: nor, adds he, are they only the great bodies of the ſun or ſtars that are thus liable to diſperſe their *light* through the vaſt expanſe of the univerſe, but the ſmalleſt ſpark of a lucid body muſt do the ſame, even the ſmalleſt globule ſtruck from a ſteel by a flint.

The method of meaſuring the intenſity of different *lights*, or of the ſame *light* in different circumſtances, affords a curious ſubject of inveſtigation. M. Bouguer has purſued it with particular attention, and deſcribed an apparatus which he has contrived for this purpoſe, in his Traité de Optique, publiſhed at Paris 1760. It is well known that the action of a ſtrong *light* upon the eye, and alſo the impreſſion which it leaves upon the eye, makes it inſenſible to the effect of a weaker *light*. M. Bouguer found, that when one *light* is ſixty-four times leſs than another, its preſſure or abſence will not be perceived; and, allowing for different effects on different eyes, he ſuppoſes that the boundaries, with reſpect to different perſons, may lie between ſixty and eighty. Being unable to determine the variation of the *light* of the ſun, becauſe it is too ſtrong, and that of the ſtars, becauſe it is too weak, at different altitudes, he made his obſervations on the moon, the diminution of the *light* being in the ſame proportion in this caſe and in the others, and found that its *light* at 19° 16′ is to its *light* at 66° 11′ as 1681 to 2500; or the one is nearly one third of the other. When one limb of the moon touched the horizon of the ſea, its *light* was two thouſand times leſs than at the altitude of 66° 11′. But this proportion, he ſays, is liable to variations, the atmoſphere near the ſurface of the earth varying ſo much in its denſity. Hence he concludes, that, at a medium, *light* is diminiſhed in the proportion of about 2500 to 1681, in traverſing 7469 toiſes of denſe air. He alſo found, that the centre of the ſun is conſiderably more luminous than the extremities of it; whereas both the primary and ſecondary planets are more luminous at their edges than near their centres. In comparing the *light* of the ſun and moon, he compared each of them to that of a candle in a dark room, one in the day time, and the other in the night following, when the moon was at her mean diſtance from the earth; and, after many trials, he concluded, that the *light* of the ſun is about three hundred thouſand times greater than that of the moon; and, therefore, it is no wonder that philoſophers have had ſo little ſucceſs in their attempts to collect the *light* of the moon with burning-glaſſes; for the largeſt of them will not increaſe the *light* a thouſand times, which will ſtill leave the *light* of the moon, in the focus of the mirror, three hundred times leſs than the intenſity of the common *light* of the ſun. Dr. Smith, in his Optics, vol. i. p 29. thought that he had proved, from two different conſiderations, that the *light* of the full moon would be to our day-*light* as 1 to about 90900, if no rays were loſt at the moon. His method of calculation follows, as far as it is juſt, ſays Mr. Robins, Math. Tracts, vol. ii. p. 225, directly from the propoſition for the ſame purpoſe of that excellent geometer, James Gregory, in his Geom. Par. Univerſ. p. 144. and the general propoſition there mentioned for diſtinguiſhing the proportion between the degrees of *light* received from any planet, and from the ſun as repeated in David Gregory's Aſtronomy, lib. iii. prop. 58. Mr. Robins remarks, that though his eſtimate is founded on the ſuppoſition, that the moon reflects all the *light* it receives from the ſun; yet his argument is drawn from comparing the *light* of the moon ſeen in the day with the *light* of the clouds; that is, is deduced from the quantity of *light* actually reflected by the moon. In the firſt place he ſuppoſes, that the moon, enlighened by the ſun, is as luminous as the clouds are at a medium. He, therefore, ſuppoſes the *light* of the ſun to be equal to that of a whole hemiſphere of clouds, or as many moons as would cover the ſurface of the heavens. But upon this it may be obſerved, that the *light* of the ſun, ſhining perpendicularly upon any ſurface, would be equal to the *light* reflected from the whole hemiſphere, if every part of it reflected all the *light* that fell upon it; but the *light* that would, in fact, be received from the whole hemiſphere (part of it being received obliquely) would be only one half as much as would be received from the whole hemiſphere, if every part of it ſhone directly upon the ſurface to be illuminated. In his Remarks, &c. p. 17. he draws the ſame concluſion from a different method of induction; but in this caſe alſo he made a miſtake of one half, ſuppoſing all the enlightened hemiſphere of the moon to receive the direct rays of the ſun; whereas, in fact, no more can be received than would fall perpendicularly in the ſuperficial ſection of one great circle, which is juſt one half of the ſurface of the hemiſphere. Prieſtley, ubi ſupra, p. 540, &c.

Mr. Mitchell made this computation in a more eaſy and accurate manner. Conſidering the diſtance of the moon from the ſun, and that the denſity of the *light* muſt decreaſe in the proportion of the ſquare of that diſtance, he calculated the denſity of the ſun's *light* at that diſtance, in proportion to its denſity at the ſurface of the ſun: and in this manner he found that, if the moon reflected all the *light* it receives from the ſun, it would be only the 45000th part of the *light* we receive from that greater luminary. Admitting, therefore, with M. Bouguer, that the moon reflects only a 300000th part of it, Mr. Mitchell concludes, that it reflects no more than betwixth the ſixth and ſeventh part of the *light* that falls upon it. Phil. Tranſ. vol. lvii. art. 27. p. 234, &c.

Dr. Pemberton, in his Courſe of Chemiſtry, Lect. 2. ſtates the greateſt light which we can receive from the moon, when at the full, and neareſt to the earth, to exceed the *light* of the ſun more than 87,000 times, ſuppoſing that the moon reflected all the *light* of the ſun which falls upon it; but it reflects only half the *light* that falls upon its ſurface, which is the moſt that can be ſuppoſed, then the *light* of the moon will be exceeded by the ſun's *light* more than 170,000 times; and in the mean diſtance of the moon from the earth, her *light* will be exceeded by the ſun more thon 190,000 times.

Dr. s'Graveſande aſſerts, a lucid body to be, that which emits, or gives fire a motion in right lines; and makes the difference between *light* and heat to conſiſt in this, that to produce the former, the fiery particles muſt enter the eye in a rectilinear motion, which is not required in the latter: on the contrary, irregular motion ſeems more proper for it, as appears from the rays coming directly from the ſun to the tops of mountains, which have not near that effect with thoſe in the valley, agitated with an irregular motion, by ſeveral reflections.

Whether or no there be always *light*, where there is fire, is diſputed among authors; as alſo, whether or no there be any luminous body without heat; heat being a motion that may be infinitely diminiſhed, and *light* a matter that may be infinitely rare: to which we may add, that no heat is ſenſible to us, unleſs it be more intenſe than that of our organs of ſenſe. M. de Luc, in his Lettres Phyſiques et Morales, &c. 1780. obſerves, that the rays of the ſun, though not warm in themſelves, occaſion heat, by giving activity to a ſubſtance, which reſides in all bodies and conſtitutes a part of their maſs, and which in certain circumſtances is capable of producing heat: and that in conſequence of this influence, this ſubſtance becomes an elaſtic or igneous fluid. See HEAT.

Sir Iſaac Newton obſerves, that bodies of *light* act mutually on one another; bodies on *light*, in emitting, reflecting, refracting, and inflecting it; and *light* on bodies, by heating them, and putting their parts into a vibrating motion, wherein heat principally conſiſts. For all fixed bodies, he obſerves, when heated beyond a certain degree, do emit *light*, and ſhine; which ſhining, &c. appears to be owing to the vibrating motion of their parts; and all bodies, abounding in earthy and ſulphureous particles, if ſufficiently agitated, emit *light*, which way ſoever that agitation be effected. Thus, ſea-water ſhines in a ſtorm; quickſilver, when ſhaken in vacuo; cats, or horſes, when rubbed in the dark; and wood, fiſh, and fleſh, when putrefied.

Light proceeding from putreſcent animal and vegetable ſubſtances, as well as from glow-worms, is mentioned by Ariſtotle. Bartholin mentions four kinds of luminous inſects, two with wings, and two without; but in hot climates, travellers ſay they are found in much greater numbers, and of different ſpecies. Columna, an induſtrious naturaliſt, obſerves, that their *light* is not extinguiſhed immediately upon the death of the animal. The firſt diſtinct account that occurs of *light* proceeding from putreſcent animal fleſh, is that which is given by Fabricius ab Aquapendente in 1592. De Viſione, &c. p. 45. Bartholin gives an account of a ſimilar appearance, which happened at Montpellier in 1641, in his treatiſe De Luce Animalium.

Mr. Boyle tells us of a piece of ſhining rotten wood, which, upon exhauſting the air from it, was extinguiſhed; but, upon its re-admiſſion, ſeemed to come to life again, and ſhone as before; being, no doubt, a real flame, and, like other flames, not to be preſerved without air. But he could not perceive that it was increaſed in condenſed air; though we have an account in Birch's Hiſt. of the Royal Society, vol. ii. p. 254. of the *light* of a ſhining fiſh, which, when the fiſh was put into a condenſing engine, was rendered more vivid by that means. The principal of Mr. Boyle's experiments were made in 1667. See his Works, vol. iii. p. 156, &c.

Whitings were the fiſh generally uſed by Mr. Boyle in his experiments; though in a diſcourſe delivered before the Royal Society in 1681, it was aſſerted, that of all fiſhy ſubſtances, the eggs of lobſters, after they had been boiled, ſhone the brighteſt. Birch's Hiſt. vol. ii. p. 70.

Mr Boyle, in 1672, accidentally obſerved the *light* iſſuing from fleſh meat; and among other remarks on this ſubject, he takes notice that extreme cold extinguiſhes the *light* of ſhining wood, as appeared, when a piece of it was put into a glaſs tube, and held in a frigorific mixture; probably, becauſe the extreme cold checked the putrefaction, which was the cauſe of the *light*. The ſhell-fiſh, called PHOLAS, is remarkable for its luminous quality. The *luminouſneſs* of the SEA has been alſo a ſubject of frequent obſervation. See IGNIS *fatuus*, PHOSPHORUS, and PUTREFACTION.

Mr. Haukſbee, and many writers on the ſubject of ELECTRICITY ſince his time, have furniſhed us with a great variety of inſtances of the artificial production of *light*, by the attrition of bodies naturally not luminous; as of amber rubbed on woollen cloth in vacuo; of glaſs on woollen, of glaſs on glaſs, of oyſter-ſhells on woollen, and of woollen on woollen, all in vacuo.

On the ſeveral experiments of this kind, he makes the following reflections: that different ſorts of bodies afford remarkably different kinds of *light*, different both in colour, and in force; that the effects of an attrition are various, according to the different preparations and managements of the bodies that are to endure it; and that bodies which have yielded a particular *light*, may be brought by friction to yield no more of that *light*.

Mr. Bernouilli found by experiment, that mercury amalgamated with tin, and rubbed on glaſs, produced a conſiderable *light* in the air; that gold rubbed on glaſs did it ſtill in a greater degree; but that, of all others, the moſt exquiſite *light* was that produced by the attrition of a diamond; being equally vivid with that of a burning coal briſkly agitated with the bellows.

"That the particles of *light* are attracted by thoſe of "other bodies," is evident from innumerable experiments. This phenomenon was obſerved by ſir Iſaac Newton, who found, by repeated trials, that the rays of *light* in their paſſage near the edges of bodies, whether opaque or tranſparent, as pieces of metals, the edges of knives, broken glaſſes, &c. are diverted out of the right lines, and always inflected or bent towards thoſe bodies. See INFLECTION and RAYS.

The curious obſervations that had been made on this ſubject by Dr. Hook and Grimaldi, led ſir Iſaac Newton to repeat and diverſify their experiments, and to purſue them much farther than they had done. Having made in a piece of lead a ſmall hole with a pin, the breadth of which was the forty-ſecond part of an inch, he let into his darkened chamber, through this hole a beam of the ſun's *light*, and found that the ſhadow of hairs, and other ſlender ſubſtances placed in it, were conſiderably broader than they would have been, if the rays of *light* had paſſed by thoſe bodies in right lines. He, therefore, concluded, that they muſt have paſſed as they are repreſented in *Tab.* III. *Optics, fig.* 40. in which X repreſents a ſection of the hair, and A D, B E, &c. rays of *light* paſſing by at different diſtances, and then falling upon the wall Q Q. Since, when the paper which receives the rays is at a great diſtance from the hair, the ſhadow is broad, it muſt follow, as he obſerves, that the hair acts upon the rays of *light* at ſome conſiderable diſtance from it; the action being ſtrongeſt on thoſe rays which are at the leaſt diſtance, and growing weaker and weaker on thoſe which are farther off, as is repreſented in the figure; and from hence it comes to paſs, that the ſhadow of the hair is much broader in proportion to the diſtance of the paper from the hair when it is nearer than when it is at a great diſtance. It is of no moment, whether the hair be ſurrounded with air, or with any other pellucid ſubſtance. The ſhadows of ſcratches made in poliſhed plates of glaſs, and the veins in the glaſs, caſt the like broad ſhadows; ſo that the breadth of ſhadow muſt proceed from ſome other cauſe than the refraction of the air.

The ſhadows of all bodies, metals, ſtones, glaſs, wood, horn, &c. in this *light*, were bordered with three parallel fringes, or bands of coloured *light*, of which that which was contiguous to the ſhadow was the broadeſt and moſt luminous, while that which was the moſt remote was the narroweſt, and ſo faint, as not eaſily to be viſible. The firſt or innermoſt fringe was violet, and deep blue next the ſhadow, light blue, green, and yellow in the middle, and red without. The ſecond fringe was almoſt contiguous to the firſt, and the third to the ſecond; and both were blue within, and yellow and red without; but their colours were very faint, eſpecially thoſe of the third. The colours, therefore, proceeded in the following order from the ſhadow: violet, indigo, pale blue, green, yellow, red; blue, yellow, red; pale blue, pale yellow, and red. The ſhadows made by ſcratches and bubbles in poliſhed plates of glaſs, were bordered with the like fringes of coloured *light*. He alſo obſerves, that by looking on the ſun through a feather, or black ribbon, held cloſe to the eye, ſeveral rainbows will appear, the ſhadows which the fibres or threads caſt on the retina, being bordered with the like fringes of colours.

From comparing other experiments, in which a ray of *light* was made to paſs through a hole into a darkened chamber, and then through a hole in a paſte-board, firſt by the edge of a ſingle knife, and then by the edges of two knives placed parallel to one another, ſir Iſaac Newton concluded, that the *light* of the firſt fringe paſſed by the edge of the knife at a diſtance greater than the eight hundredth part of an inch, that the *light* of the ſecond fringe paſſed by the edge of the knife at a greater diſtance than the *light* of the firſt fringe, and that of the third at a greater diſtance than that of the ſecond; and that the *light* of which the ſtreams, obſerved in theſe experiments, conſiſted, paſſed by the edges of the knives at leſs diſtances than that of any of the fringes.

In another experiment, he placed at the hole a priſm to refract the *light*, and to form, on the oppoſite wall, the coloured image of the ſun; and he found that the ſhadows of all bodies, held in the coloured *light* between the priſm and the wall, were bordered with fringes, of the colour of that *light* in which they were held; and comparing the fringes made in the ſeveral coloured *lights*, he found, that thoſe made in the red *light* were the largeſt, thoſe made in the violet the leaſt, and thoſe made in the green were of a middle ſize. Whence he inferred, that the rays which made the fringes in the red *light*, paſſed by the hair at a greater diſtance than thoſe which made the like fringes in the violet; ſo that the hair, in cauſing theſe fringes, acted alike upon the red *light*, or leaſt refrangible rays, at a greater diſtance, and upon the violet or moſt refrangible rays at a leſs diſtance, and thereby occaſioned fringes of different ſizes, without any change in the colour of any ſort of *light*. It may, therefore, be concluded, that when the hair in the firſt obſervation was held in the white beams of the ſun's *light*, and caſt a ſhadow, which was bordered with three fringes of coloured *light*, thoſe colours aroſe not from any new modifications impreſſed upon the rays of *light* by the hair, but only from the various inflections, whereby the ſeveral ſorts of rays were ſeparated from one another, which before ſeparation, by the mixture of all their colours, compoſed the white beam of the ſun's *light*, but when ſeparated, compoſed *lights* of the ſeveral colours which they are originally diſpoſed to exhibit. But for a fuller account of the author's curious experiments, and the concluſions drawn from them with regard to the inflection of *light*, we muſt refer to his well known Treatiſe on Optics, p. 293, &c.

This action of bodies on *light* is found to exert itſelf at a ſenſible diſtance, though it always increaſes as the diſtance is diminiſhed, as appears very ſenſibly in the paſſage of a ray between the edges of two thin planes at different apertures; in which there is ſomething very peculiar; the attraction of one edge being increaſed as the other is brought nearer it. The rays of *light*, in their paſſage out of glaſs into vacuum, are not only inflected towards the glaſs, but, if they fall too obliquely, they will revert back again to the glaſs, and be totally reflected.

The cauſe of which reflection cannot be attributed to any reſiſtance of the vacuum, but muſt be entirely owing to ſome force or power in the glaſs, which attracts or draws back the rays as they are paſſing into the vacuum. And this appears farther from hence, that if you wet the poſterior ſurface of the glaſs with water, oil, honey, or a ſolution of quickſilver, then the rays which would otherwiſe have been reflected, will paſs into and through that liquor; which ſhews that the rays are not reflected till they come to the poſterior ſurface of the glaſs, nor even till they begin to go out of it; for if at their going out they fall into any of the aforeſaid mediums, they will not then be reflected, but perſiſt in their former courſe, the attraction of the glaſs being in this caſe counterbalanced by that of the liquor.

Experiments ſimilar to thoſe of ſir Iſaac Newton on inflected *light*, were proſecuted by M. Maraldi, whoſe obſervations chiefly reſpect the inflection of *light* towards other bodies, whereby their ſhadows are partially illuminated. Ac. Paris. 1723. M. p. 159. For an abſtract, ſee Prieſtley's Hiſtory, &c. of *Light*, &c. p. 521, &c.

M. Mairan, without attempting the diſcovery of new facts, endeavoured to explain the old ones, by the hypotheſis of an atmoſphere ſurrounding all bodies; and conſequently making two reflections and refractions of *light* that impinges upon them, one at the ſurface of the atmoſphere, and the other at that of the body itſelf. This atmoſphere he ſuppoſed to be of a variable denſity, and refractive power, like the air. M. du Tour ſucceeded Mairan, and imagined that he could account for all the phenomena by the help of an atmoſphere of an uniform denſity, and of a leſs refractive power than the air, ſurrounding all bodies. Du Tour varied the Newtonian experiments, and diſcovered in the colours produced by the inflection of *light* more than three fringes, which he exhibited diſtinctly in the following manner. He took a circular board, A B E D (*Tab.* III. *Optics, fig.* 41.) thirteen inches in diameter, the ſurface of which was black, except at the edge, where there was a ring of white paper, about three lines broad, in order to trace the circumference of a circle, divided into 360 degrees, beginning at the point A, and reckoning 180 degrees on each hand to the point E; B and D being each of them placed at 90 degrees. A ſlip of parchment three inches broad, and diſpoſed in the form of an hoop, was faſtened round the board, and pierced at the point E with a ſquare hole, each ſide being four or five lines, in order to introduce a ray of the ſun's *light*. Laſtly, in the centre of the board C, and perpendicular to it, he fixed a pin, about one third of a line in diameter.

This hoop being ſo diſpoſed, that a ray of *light* entering the dark chamber, through a vertical cleft of two lines and a half in length, and about as wide as the diameter of the pin, went through the hole at E, and paſſing parallel to the plane of the board, projected the image of the ſun and ſhadow of the pin at A.

In theſe circumſtances he obſerved, 1ſt, that quite round the concave ſurface of this hoop, there was a multitude of coloured ſtreaks; but that the ſpace *m*A*n*, of about eighteen degrees, the middle of which was occupied by the image of the ſun, was covered with a faint *light* only.

2. The order of the colours in theſe ſtreaks was generally ſuch, that the moſt refrangible rays were the neareſt to the incident ray E C A; ſo that beginning from the point A, the violet was the firſt, and the red the laſt colour in each of the ſtreaks. In ſome of them, however, the colours were diſpoſed in a contrary order.

3. The image of the ſun projected on each ſide of the point A, was divided by the ſhadow of the pin, which was bordered by two luminous ſtreaks.

4. The coloured ſtreaks were narrower in ſome parts of the hoop than others, and generally decreaſed in breadth in receding from the point A.

5. Among theſe coloured ſtreaks, there were ſometimes others which were white, a line, or a line and a half in breadth, which were always bordered on both ſides by a ſtreak of orange colour, at leaſt when the light of the ſun was intenſe, and the chamber ſufficiently dark.

From this experiment he thought it was evident, that the rays which paſſed beyond the pin were not the only ones that were decompoſed; for that thoſe which are reflected back from the pin were decompoſed alſo: from which he concluded, that they muſt have undergone ſome refraction. He alſo thought that thoſe which went beyond the pin ſuffered a reflection, ſo that they were all affected in a ſimilar manner.

In order to account for theſe facts, our author deſcribes the progreſs of a ray of *light* through an uniform atmoſphere, which he ſuppoſes to ſurround the pin, and ſhews that the differently refrangible rays will be ſeparated at their emergence from it; but he refers to ſome experiments and obſervations in a future memoir, to demonſtrate that all the coloured ſtreaks are produced by rays that are both reflected and refracted. Memoires Preſentés, vol. v. p. 636. 641.

From other obſervations, M. Du Tour concludes, that the refracting atmoſpheres, ſurrounding all kinds of bodies, are of the ſame ſize; for when he placed a great variety of ſubſtances, and of different ſizes alſo, he always found the coloured ſtreaks of the ſame dimenſions. He alſo obſerves, that his hypotheſis contradicts an obſervation of ſir Iſaac Newton, viz. that thoſe rays which paſs the neareſt to any body are moſt inflected. Mem. de Mathem. and de Phyſ. vol. v. p. 650, &c. or Prieſtley, ubi ſupra, p. 531, &c.

M. Le Cat found that in ſome caſes, objects appear magnified by means of the inflection of *light*. Looking at a diſtant ſteeple, when a wire of leſs diameter than the pupil of his eye, was held pretty near to it, and drawing it ſeveral times betwixt his eye and that object, he was ſurpriſed to find that, every time the wire paſſed before his pupil, the ſteeple ſeemed to change its place, and ſome hills beyond the ſteeple ſeemed to have the ſame motion, juſt as if a lens had been drawn betwixt his eye and them. This diſcovery led him to ſeveral others depending upon the inflection of the rays of *light*. Thus, he magnified ſmall objects, as the head of a pin, by looking at them through a ſmall hole in a card; ſo that the rays which formed the image, muſt neceſſarily paſs ſo near the circumference of the hole, as to be attracted by it: he alſo exhibited other appearances of a ſimilar nature. Traité des Sens, p. 299, &c. Prieſtley, ubi ſupra, p. 537, &c.

From the mutual attraction between the particles of *light* and other bodies, ariſe two other grand phenomena, beſide the inflection of *light*, which we call the *reflexion* and *refraction* of *light*. We know that the determination of a body in motion is changed by the interpoſition of another body in its way; thus *light*, impinging on the ſurface of ſolid bodies, ſhould be turned out of its courſe, and beaten back or reflected, ſo as, like other falling bodies, to make the angle of its reflexions equal to that of incidence. This, it is found by experience, *light* does; and yet the cauſe of that effect is different from that juſt now aſſigned: the rays of *light* are not reflected by ſtriking on the very parts of the reflecting bodies, but by ſome power equally diffuſed throughout the whole ſurface of the body, whereby it acts on the *light*, either attracting or repelling it, without contact: by which ſame power, in other circumſtances, the rays are refracted; and by which alſo, the rays are firſt emitted from the luminous body; as is abundantly proved by a great variety of arguments, by ſir Iſaac Newton. See REFLECTION and REFRACTION.

That great author puts it paſt doubt, that all thoſe rays which are reflected, though they approach the body infinitely near, yet never touch it; and that thoſe which do really ſtrike on the ſolid parts of bodies, adhere to them, and are as it were extinguiſhed and loſt.

If it be aſked, how it happens, ſince we aſcribe the reflexion of the rays to the action of the whole ſurface of the body without contact, that all the rays are not reflected from every ſurface; but, while ſome are reflected others paſs through, and are refracted? the anſwer given by ſir Iſaac Newton is as follows:—Every ray of *light*, in its paſſage through any refracting ſurface, is put into a certain tranſient conſtitution or ſtate, which in the progreſs of the ray returns at equal intervals, and diſpoſes the ray at every return to be eaſily tranſmitted through the next refracting ſurface, and between the returns to be eaſily reflected by it: which alternation of reflexion and tranſmiſſion appears to be propagated from every ſurface, and to all diſtances. What kind of action or diſpoſition this is, and whether it conſiſts in a circulating or vibrating motion of the ray, or the medium, or ſomewhat elſe, he does not inquire; but allows thoſe who are fond of hypotheſes to ſuppoſe, that the rays of *light*, by impinging on any reflecting or refracting ſurface, excite vibrations in the reflecting or refracting medium, and by that means agitate the ſolid parts of the body. Theſe vibrations, thus propagated in the medium, move faſter than the rays, ſo as to overtake them; and when any ray is in that part of the vibration which conſpires with its motion, its velocity is increaſed, ſo that it eaſily breaks through a refracting ſurface: but when it is in a contrary part of the vibration, which impedes its motion, it is eaſily reflected; and conſequently, that every ray is ſucceſſively diſpoſed to be eaſily reflected or tranſmitted by every vibration which overtakes it. The returns of which diſpoſition of any ray to be reflected, he calls *fits of eaſy reflexion*; and thoſe of its diſpoſition to be tranſmitted, he calls *fits of eaſy tranſmiſſion*; and the ſpace between the returns, *the interval of the fits*. The reaſon, then, why the ſurfaces of all thick tranſparent bodies reflect part of the *light* incident on them, and refract the reſt, is that ſome rays in their incidence are in fits of eaſy reflection, and others of eaſy tranſmiſſion.

LIGHT, *for the properties of reflected*. See REFLECTION, MIRROR, &c.

Farther, a ray of *light*, paſſing out of one medium into another of different denſity, and in its paſſage making an oblique angle with the ſurface that ſeparates the mediums, will be refracted, or turned out of its right line; becauſe the rays are more ſtrongly attracted by a denſer than by a rarer medium.

That theſe rays are not refracted by ſtriking on the ſolid parts of bodies, but without any contact, by that ſame force wherewith they are emitted and reflected, exerting itſelf differently in different circumſtances, is proved in great meaſure by the ſame arguments which demonſtrate reflection to be formed without contact.

LIGHT, *for the properties, &c. of reflected*, ſee REFRACTION, LENS, &c.

In *iſland* CRYSTAL is obſerved a kind of double refraction, very different from what we find in any other body: the rays that fall obliquely being not only diſperſed, with a double refraction in one and the ſame ſurface, but even the perpendicular rays themſelves are moſt of them divided into two beams, by means of the ſame double refraction; which beams are of the ſame colour with the incident beams, and are equal in degree of *light*, at leaſt nearly, to each other; whence the great philoſopher ſo often cited takes occaſion to ſuſpect, that there are in *light* ſome other original properties beſides thoſe hitherto deſcribed; and particularly, that the rays have different ſides, endued with ſeveral original properties.

For, of theſe refractions, the one is performed in the uſual manner, i. e. the ſine of incidence is to that of refraction, as 5 is to 3; and the other in an unuſual manner: and yet the ſame ray is refracted ſometimes in the one manner, and ſometimes in the other, according to the various poſitions which its ſeveral ſides have, in reſpect to cryſtal. Theſe diſpoſitions, he ſhews, muſt have exiſted originally in the rays, without having undergone any alteration, in that reſpect, by the cryſtal.

Every ray of *light*, therefore, has two oppoſite ſides, the one originally endued with a property whereon its unuſual refraction depends, and the other not endued with that property.

Sir Iſaac Newton, having obſerved the vividly coloured image projected on the wall of a darkened room, by the ſun-beams tranſmitted through a priſm, to be five times as long as broad; ſetting himſelf to enquire into the reaſon of this diſproportion, was led from other experiments to the *experimentum crucis*; whence he diſcovered the cauſe of the phenomenon to be, that ſome of the rays of *light* were more refracted than others, and therefore exhibited ſeveral images of the ſun under the appearance of one, extended lengthwiſe.

Thence he proceeded to conclude, that *light* itſelf is an heterogenous mixture of rays differently refrangible: and hence he diſtinguiſhes *light* into two kinds, viz. that whoſe rays are equally refrangible, which he calls *homogeneal*, *ſimilar*, or *uniform light*; and that whoſe rays are unequally refrangible, which he calls *heterogeneal light*.

There are but three affections of *light*, wherein he obſerved its rays to differ, viz. refrangibility, reflexibility, and colour; and thoſe rays which agree in refrangibility, agree alſo in the other two: whence they may be well defined homogeneal, though, in ſome other reſpects, they may poſſibly be heterogeneal.

Again, the colours exhibited by homogeneal *light*, he calls *homogeneal* colours; and thoſe produced by heterogeneal *light*, *heterogeneal* colours. Theſe definitions laid down, he advances ſeveral propoſitions.

As, firſt, that the ſun's *light* conſiſts of rays differing by indefinite degrees of refrangibility. Secondly, that rays, which differ in refrangibility, when parted from one another, do proportionably differ in the colours which they exhibit. Thirdly, that there are as many ſimple and homogeneal colours, as degrees of refrangibility; for to every degree of refrangibility belongs a different colour. Fourthly, whiteneſs, in all reſpects like that of the ſun's immediate *light*, and of the uſual objects of our ſenſes, cannot be compounded of ſimple colours, without an indefinite variety of them; for to ſuch a compoſition there are required rays endued with all the indefinite degrees of refrangibility, which infer as many ſimple colours. Fifthly, the rays of *light*, do not act on one another in paſſing through the ſame medium. Sixthly, the rays of *light* do not ſuffer any alteration of their qualities from refraction, nor from the adjacent quieſcent medium. Seventhly, there can no homogeneal colours be produced out of *light* by refraction, which are not commixed in it before: ſince refraction, as was before obſerved, changes not the qualities of the rays, but only ſeparates thoſe which have divers qualities, by means of their different refrangibility. Eighthly, the ſun's *light* is an aggregate of homogeneal colours; whence homogeneal colours may be called *primitive*, or *original.*

We have already obſerved, that the rays of light are compoſed of diſſimilar or heterogeneous parts: ſome of them being, in all probability, greater, others leſs. Now the ſmaller the parts are, by ſo much the more refrangible they are, i. e. they are ſo much the more eaſily diverted out of the rectilinear courſe; and thoſe parts which differ in refrangibility (conſequently in bulk), he has alſo obſerved, differ in colour.

Hence ariſes the whole theory of colours; thoſe parts, v. gr. which are the moſt refrangible, conſtitute violet-colour; that is, the moſt minute particles of *light*, when ſeparately impelled on the organ, do there excite the ſhorteſt vibrations of the retina, which are thence communicated by the ſolid part of the optic nerve into the brain, and excite in us the ſenſation of violet colour, the dimmeſt and moſt languid of all colours: and thoſe particles, on the contrary, which are the leaſt refrangible, conſtitute a ray of red colour; i. e. the greateſt particles of *light* excite the longeſt vibrations in the retina, and ſo convey the ſenſation of a red colour; as being the moſt bright and vivid of all others. The other particles, being diſtinguiſhed into little rays, according to their reſpective magnitudes and degrees of refrangibility, excite intermediate vibrations, and ſo occaſion ſenſations of the intermediate colours, in like manner as the vibrations of the air, according to their different magnitude, excite ſenſations of different ſounds. The colours then of theſe little rays not being any adventitious modifications of them but connate, primitive and neceſſary properties, reſulting, in all probability, from their different magnitudes, muſt be perpetual, and immutable, not to be altered by any reflection, refraction, or other ſubſequent modification.

Mr. Euler has advanced a new notion with reſpect to the origin of colours in opaque bodies: he ſuppoſed that coloured bodies reflect the ſun's incident white *light* from their anterior ſurface, but that the particular ſpecies of *light* by which they appear of different colours, is emitted by the parts of the body: e. g. he imagines that vermillion does not appear red by a more copious reflection of red than of other incident rays, but by the new emiſſion of red rays, from the particular velocity of vibration, which its elaſtic parts are capable of being thrown into, by the impulſe of the incident *light.* Of this theory it is a ſufficient refutation, that no phenomena prove or require its exiſtence: beſides, according to this hypotheſis, a body of one colour placed in the homogeneous light of the other, ought not to appear of the colour of the *light*, but of a middle one beween that and its own natural colour, which is contrary to experience. Edinb. Eſſ. vol. ii. p. 39.

For the doctrine of the colours of LIGHT, ſee COLOUR.

For the manner in which LIGHT *affects our ſenſes, and how it contributes to viſion*, ſee VISION.

LIGHT *from diamonds and other bodies.* *Light* has of late ages become in a manner more common than it uſed to be among us. The chemical phoſphori have greatly increaſed its kinds, many electrical bodies are luminous, and many other bodies there are which are luminous without being electric.

The ancient naturaliſts, and ſince their time, ſeveral other writers, at different periods of time, have been acquainted with many of theſe properties in ſeveral bodies, though very imperfectly. They have obſerved them too careleſly, often exaggerated them in their accounts, and frequently deſtroyed the whole credit of the narration, by a mixture of falſity with the truth. Mr. du Fay, who laboured extremely in theſe diſquiſitions, has been at the pains of collecting all the accounts of this kind from authors, and ſeparating truth and probability from what is falſe and abſurd in theſe accounts, has with them given many experiments of his own to the Academy of Sciences at Paris.

Among luminous bodies the DIAMOND is to be reckoned, as ſome diamonds are known to ſhine in the dark. But on account of the feebleneſs of their ſplendor, it is neceſſary for the perſon, who is to obſerve them, previouſly to ſtay in the dark at leaſt a quarter of an hour; that the pupil of the eye may be dilated and enlarged, and ſo rendered capable of receiving a larger quantity of the rays of *light.* M. du Fay has alſo obſerved, that the eyes ought to be ſhut for this time, or at leaſt one of them; and that, in that caſe, the light of the diamond is afterwards only ſeen by that eye, which has been ſhut. Before the diamond is brought into the dark room, it muſt be expoſed to the ſun-ſhine, or at leaſt to the open day-light, to imbibe a ſufficient quantity of rays; and this is done in one minute, or even leſs; eight or ten ſeconds having been found to furniſh as much *light* as a ſtone is capable of receiving; and when brought into the dark, its *light* continues about twelve or thirteen minutes, weakening all the while by inſenſible degrees. It is very remarkable, that in bodies ſo extremely ſimilar to each other as diamonds are, ſome ſhould have this property of imbibing the ſun's rays, and ſhining in the dark, and that others ſhould not; yet ſo it is found to be by experiment, and the moſt nearly reſembling ſtones ſhall be found one to have this property, and another to be deſtitute of it; while many of the moſt diſſimilar have this property in common. There ſeems to be no rule, nor even the leaſt traces of any imperfect rule of judging, which diamonds have, and which have not this property; their natural brightneſs, their purity, their ſize, or their ſhape, contribute nothing to it; and all that has been yet diſcovered of the leaſt regularity among them, is, that all the yellow diamonds have this propery. This may probably ariſe from their having more ſulphur in their compoſition, and therefore illuminating more readily, or emitting a moſt viſible flame.

The burning of diamonds is a term uſed among the jewellers, for putting them into a fierce fire, as they frequently do, when they are fouled with brown, or yellow, or the like; this always diveſts them of their colour, without doing them the leaſt ſenſible injury. M. du Fay, having been informed of this common practice, formed a conjecture, that the difference of diamonds in their ſhining, or not ſhining in the dark, was owing to it; and that either all thoſe which had beed burnt, or all thoſe which had not, were thoſe which alone ſhone in the dark. But this was found an erroneous conjecture; for two diamonds, one lucid in the dark, the other not, were both burnt, and afterwards both were found to retain the ſame properties they had before. It is not only the open ſun-ſhine, or open day-*light*, which gives to theſe diamonds the power of ſhining in the dark; they receive it in the ſame manner, even if laid under a glaſs, or plunged in water or in milk.

Mr. du Fay tried whether it was poſſible to make the diamond retain, for any longer time, the *light* it naturally parts with ſo ſoon; and found, that if the diamond after being expoſed to the *light*, be covered with black wax, it will ſhine in the dark, as well ſix hours afterwards, as at the time it was firſt impregnated with the *light.* Mem. Acad. Scien. Par. 1735.

The imbibing *light*, in this manner, being ſo nice a property as not to be found in ſeveral diamonds, it was not to be ſuppoſed that it would be found in any other ſtones: accordingly, on trial, the ruby, the ſapphire, and the topaz, were found wholly deſtitute of it; and among a large number of rough emeralds, one only was found to poſſeſs it. Such is the ſtrange uncertainty of theſe accidents.

All the other leſs precious ſtones were tried, and found not to poſſeſs this property of imbibing *light* from the day-*light*, or ſun-ſhine, but they all become luminous, by the different means of heating, or friction; with this difference, that ſome acquired it by one of theſe methods, and others by the other; each being unaffected by that, which gave the property to the other. The diamond becomes luminous by all theſe ways.

Beccarus alſo diſcovered that diamonds have the property of the Bolognian phoſphorus, about the ſame time that it occurred to Mr. du Fay. Com. Bonon. vol. ii. p. 276. M. du Fay likewiſe obſerved, that the common topaz, when calcined, had all the properties of this phoſphorus; and purſuing the diſcovery, he found the ſame property in a great degree, in the belemnites, gypſum, lime-ſtone, and marble. Though he was obliged to diſſolve ſome very hard ſubſtances of this kind in acids, before calcinations could produce this change in them. And with ſome ſubſtances he could not ſucceed even by this means, eſpecially with flint-ſtones, river-ſand, jaſpers, agates, and rock-cryſtal. Ac. Paris, 1730. See more on the ſubject of this article under PHOSPHORUS.

LIGHT is alſo uſed to ſignify the diſpoſition of objects with regard to the receiving of *light.*

Thus we ſay, a painting is ſeen in its proper *light*, when its ſituation with regard to the *light*, is the ſame with that for which it was painted.

LIGHT, in *Sea Language*, is uſed in contradiſtinction to laden. A ſhip is accordingly called *light*, either when ſhe has no cargo, or when ſhe is not ſufficiently ballaſted.

LIGHT, in the *Manege*. A horſe is ſaid to be *light*, in French *un cheval leger*, that is a ſwift, nimble runner. We likewiſe call a horſe *light* that is well made, though he is neither ſwift nor active: for in this laſt expreſſion we conſider only the ſhape and make of a horſe, without regard to his qualities.

Light upon the hand; a horſe is ſaid to be ſuch, that has a good tractable mouth, and does not reſt too heavy upon the bit.

A coach-horſe is ſaid to be *light*, when he ſtirs nimbly, and dreads the whip; or when he has a *light* trot.

LIGHT-*hand*. See HAND.

LIGHT-*bellied*, in the *Manege*. A horſe is thus called that commonly has flat, narrow, contracted ſides, which makes the flank turn up like that of a grey-hound.

LIGHTS, in *Architecture*, denote doors, windows, and other places, through which the air and *light* have a paſſage.

In the PANTHEON, all the *light* comes from on high; it has no *lights* but in the dome.

LIGHTS, *ſtopping*, *of a houſe*, is a nuiſance; but ſtopping a proſpect is not, being only matter of delight, not of neceſſity. If a man has a vacant piece of ground, and builds thereupon a houſe, with good *lights*, which he ſells, or lets to another; and afterwards builds upon ground contiguous, or lets the ſame to another perſon, who builds thereupon to the nuiſance of the *lights*, of the firſt houſe; the leſſee of the firſt houſe may have an action of the caſe againſt ſuch builder, &c. And though formerly they were to be *lights* of an ancient meſſuage, that is now altered.

LIGHTS, in *Painting*, are thoſe parts of a piece which are illuminated, or that lie open to the luminary by which the piece is ſuppoſed to be enlightened: and which, for this reaſon, is painted in white vivid colours.

In this ſenſe, *light* is oppoſed to *ſhadow*.

Different lights have very different effects on a picture, and occaſion a difference in the management of every part. A great deal therefore depends on the painter's chuſing a proper *light* for his piece to be illuminated by; and a great deal more, in the conduct of the *lights* and ſhadows, when the luminary is pitched upon.

The ſtrength and relievo of a figure, as well as its gracefulneſs, depend entirely on the management of the *lights*, and the joining of thoſe to the ſhadows.

The *light* a figure receives is either direct or reflected; to each of which ſpecial regard muſt be had. The doctrine of lights and ſhadows makes that part of painting called CLAIR-*obſcure*.

LIGHTS, *feaſt of*. See DEDICATION.

LIGHT is alſo uſed for the luminous body that emits it. There are various kinds of *lights*; *general lights*, as the air; *particular lights*, as a fire, a candle, and even the ſun.

LIGHT-*horſe*, an ancient term in our Engliſh cuſtoms, ſignifying an ordinary cavalier, or horſeman lightly armed, and ſo as to enter a corpſe or regiment; in oppoſition to the men at arms, who were heavily accoutred, and armed at all points. See *Light*-HORSE.

LIGHT-*houſe*, is erected upon a cape or promontory on the ſea-coaſt, or upon ſome rock in the ſea, and having a great fire, or *light* formed by candles, upon its top, in the night time, which is conſtantly attended by ſome careful perſon, ſo as to be ſeen at a great diſtance from the land. It is uſed to direct the ſhipping on the coaſt, that might otherwiſe run aſhore, or ſteer an improper courſe when the darkneſs of the night, and the uncertainty of currents, &c. might render their ſituation, with regard to the ſhore, extremely doubtful. Lamp-lights are, on many accounts, preferable to coal-fires or candles; and the effect of theſe may be increaſed by placing them either behind glaſs hemiſpheres, or before properly diſpoſed glaſs or metal reflectors. See an account of the *light-houſes* at Liverpool, in their preſent improved ſtate, in Hutchinſon's Treatiſe on Practical Seamanſhip, 4to. 1777. See BEACONS.

LIGHT-*room*, is a ſmall apartment incloſed with glaſs windows, near the magazine of a ſhip of war. It is uſed to contain the lights by which the gunner and his aſſiſtants are enabled to fill the cartridges with powder, to be ready for action.

LIGHTEN, in the *Manege*. To *lighten* a horſe, or make him *light* in the fore hand, is to make him freer and *lighter* in the fore-hand than behind. If you would have your horſe *light*, you ought to keep him always diſpoſed to a gallop, when you put him to a trot; and after galloping ſome time, you ſhould put him back to the trot again.

LIGHTER, a large open veſſel, generally managed with oars, common on the river Thames; where it is uſed for the carriage of timber, coals, ballaſt, and any goods to or from a ſhip, when ſhe is to be laden or delivered. There are alſo ſome *lighters* furniſhed with a deck throughout, in order to contain thoſe merchandizes, which would be damaged in rainy weather: theſe are uſually called cloſe-*lighters*.

LIGHTER-*men*. See COMPANY.

LIGHTNESS. See LEVITY.

LIGHTNING, in *Phyſiology*, is a large bright flame, darting ſwiftly through the air, and extending every way to a conſiderable diſtance, of momentary duration, and commonly attended with THUNDER. Some have accounted for this phenomenon by ſuppoſing, that, from the particles of ſulphur, nitre, and other combuſtible matter, which are exhaled from the earth, and carried into the higher regions of the atmoſphere, is formed an inflammable ſubſtance, which, when a ſufficient quantity of fiery particles is ſeparated from the vapour buoyed up into the air, with theſe particles adhering to them by the colliſion of two clouds or otherwiſe, take fire, and ſhoots out into a train of light, larger or leſs, according to the ſtrength and quantity of the materials. Others have explained *lightning* by the fermentation of ſulphureous ſubſtances with nitrous acids: ſee THUNDER. But in the preſent advanced ſtate of the ſcience of ELECTRICITY, this is univerſally allowed to be an electrical phenomenon. Philoſophers had not proceeded far in their experiments and enquiries on this ſubject, before they were ſtruck with the obvious analogy between *lightning* and electricity, and they produced many arguments, *à priori*, to aſcertain their ſimilarity. But the method of verifying this hypotheſis was firſt propoſed by Dr. Franklin, who, towards the cloſe of the year 1749, conceived the practicability of drawing *lightning* from the clouds: having found, by previous experiments, that the electric fluid is attracted by points, he apprehended, that *lightning* might likewiſe poſſeſs the ſame property; though the effect of the latter muſt, in an aſtoniſhing degree, ſurpaſs thoſe of the former. The other circumſtances of reſemblance between *lightning* and electricity remarked by this ingenious philoſopher, and abundantly confirmed by later diſcoveries, are the following: flaſhes of *lightning*, he obſerved, are generally ſeen crooked and waving in the air; and the electric ſpark drawn from an irregular body at ſome diſtance, and when it is drawn by an irregular body, or through a ſpace in which the beſt conductors are diſpoſed in an irregular manner, always exhibits the ſame appearance.

Lightning ſtrikes the higheſt and moſt pointed objects in its way, preferable to others, as high hills, trees, ſpires, maſts of ſhips, &c. and all pointed conductors receive and throw off the electric fluid more readily than thoſe which are terminated by flat ſurfaces. *Lightning* is obſerved to take the readieſt and beſt conductor; and this is the caſe with electricity in the diſcharge of the LEYDEN phial; whence the doctor infers, that in a thunder ſtorm, it would be ſafer to have one's cloaths wet than dry. *Lightning* burns, diſſolves metals, (ſee FUSION) rends ſome bodies, has been often known to ſtrike people blind, deſtroys animal life, deprives magnets of their virtue and reverſes their poles; and theſe are well-known properties of electricity.

Lightning not only gives polarity to the magnetic needle, but to all bodies, that have any thing of iron in them, as brick, &c. and by obſerving which way the poles of theſe bodies lie, it may be known, with the utmoſt certainty, in what direction the ſtroke paſſed. Signior Beccari ſuppoſes, that perſons are ſometimes killed by *lightning*, without being really touched by it; a vacuum of air only being ſuddenly made near them, and the air ruſhing out of their lungs to ſupply it; and with ſo much violence that they could never recover their breath. In proof of this opinion he alledges, that the lungs of ſuch perſons are found flaccid; whereas, when they are properly killed by the electrical ſhock, the lungs are found inflated: but this hypotheſis is controverted by Dr. Prieſtley. In order to demonſtrate the identity of the electric fluid with the matter of *lightning*, by actual experiment, Dr. Franklin contrived to bring lightning from the heavens, by means of an electric kite, which he raiſed, when a ſtorm of thunder was perceived to be coming on; and with the electricity thus obtained, he charged phials, kindled ſpirits, and performed all other electrical experiments, which are uſually exhibited by an excited globe or tube. This happened in June, 1752, a month after the electricians in France, of whom the moſt active were Meſſrs. Dalibard and Delor, followed by Mr. Mazeas and M. Monnier, purſued the method which he had propoſed, had verified the ſame theory; but without any knowledge of what they had done. In April and June, 1753, he diſcovered that the air was ſometimes electrified poſitively, and ſometimes negatively; and found that the clouds would change from poſitive to negative electricity ſeveral times in the courſe of one thunder guſt. He ſoon perceived that this important diſcovery was capable of being applied to practical uſe, and propoſed a method which he ſoon accompliſhed, of ſecuring buildings from being damaged by *lightning*, by means of CONDUCTORS. The Engliſh philoſophers had not been leſs attentive to this ſubject than their neighbours on the continent; but for want of proper opportunities for trying the neceſſary experiments, and from ſome incidental circumſtances that were unfavourable, they had failed of ſucceſs. However, in July, 1752, Mr. Canton ſucceeded; and in the following month, Mr. Wilſon and Dr. Bevis obſerved nearly the ſame appearances which Mr. Canton had obſerved before. Mr. Canton alſo ſoon after obſerved, in a number of experiments, that ſome clouds were in a poſitive, and ſome in a negative ſtate of electricity, and that the electricity of his conductor would ſometimes change from one ſtate to the other, five or ſix times in leſs than half an hour. This variable ſtate of thunder clouds was diſcovered by S. Beccaria, before he heard of its having been obſerved by Dr. Franklin or any other perſon: and he has given a very exact and circumſtantial account of the external appearances of theſe clouds. From his obſervations of the *lightning* abroad, and of his apparatus within doors, he inferred, that the quantity of electric matter, in an uſual ſtorm of thunder, is almoſt inconceivably great, conſidering how many pointed bodies, as trees, ſpires, &c. are perpetually drawing it off, and what a prodigious quantity is repeatedly diſcharged to or from the earth. This quantity is ſo great, that he thinks it impoſſible for any cloud or number of clouds to contain it all, ſo as either to diſcharge or receive it. Beſides, he obſerves, that, during the progreſs and increaſe of the ſtorm, though the *lightning* frequently ſtruck to the earth, the ſame clouds were the next moment ready to make a ſtill greater diſcharge, and his apparatus continued to be as much affected as ever; and, therefore, the clouds muſt have received at one place, in the ſame moment when a diſcharge was made from them in another: and, upon the whole, he infers, that the clouds ſerve as conductors to convey the electric fluid from thoſe places of the earth that are overloaded with it, to thoſe which are exhauſted of it. This electric matter, the riſe of which, from the earth into the higher regions of the atmoſphere, is aſcertained by the great quantities of ſand, aſhes, and other light ſubſtances, carried up with it, and ſcattered uniformly over a large tract of country, wherever it iſſues, attracts to it, and bears up with it the watery particles that are diſperſed in the atmoſphere. It aſcends into the higher regions of the atmoſphere, being ſolicited by the leſs reſiſtance it finds there than in the common maſs of the earth, which, at theſe times, is generally very dry, and conſequently highly electric. The ſame cauſe which firſt raiſed a cloud, from vapours diſperſed in the atmoſphere, draws to it thoſe that are already formed, and continues to form new ones, till the whole collected maſs extends ſo far as to reach a part of the earth where there is a deficiency of the electric fluid. Thither too, will thoſe clouds, replete with electricity, be ſtrongly attracted, and there will the electric matter diſcharge itſelf upon the earth: a channel of communication being, in this manner, formed, a freſh ſupply of electric matter will be raiſed from the overloaded part, and will continue to be conveyed by the medium of the clouds, till the equilibrium of the fluid between the two places of the earth be reſtored. When the clouds are attracted in their paſſage by thoſe parts of the earth, where there is a deficiency of the fluid, thoſe detached fragments are formed, and alſo thoſe uniform deſcending protuberances, which are, in ſome caſes, the cauſe of WATER-SPOUTS and HURRICANES.

That the electric matter, which forms and animates the thunder-clouds, iſſues from places far below the ſurface of the earth, and that it buries itſelf there, is probable from the deep holes, that have, in many places, been made by *lightning*; and from the flaſhes that have been ſeen to ariſe from ſubterraneous cavities and from wells; as well as from the inundations accompanying thunder-ſtorms, and occaſioned by water burſting out of the bowels of the earth. The greateſt difficulty attending this theory of the origin of thunder-ſtorms relates to the collection and inſulation of electric matter within the body of the earth. With reſpect to the former, this ingenious philoſopher has nothing to ſay: ſome operations in nature are certainly attended with a loſs of the equilibrium in the electric fluid, but no perſon has yet aſſigned a more probable cauſe of the redundancy of the electric matter, which, in fact, often abounds in the clouds, than what we may ſuppoſe poſſible to take place in the bowels of the earth: and ſuppoſing the loſs of the equilibrium poſſible, the ſame cauſe that produced the effect, would prevent the reſtoring of it; ſo that not being able to force a way, at leaſt one ſufficiently ready, through the body of the earth, it would iſſue at the ſame convenient vent into the higher regions of the air, as the better paſſage. S. Beccaria obſerves, that a wind always blows from the place from which the thunder-cloud proceeds; and it is certain, that the ſudden congregation of ſuch a prodigious quantity of vapours muſt diſplace the air, and repel it on all ſides. A great number of obſervations relating to the deſcent of *lightning*, confirm his theory of the manner of its aſcent: for, in many caſes, it throws before it the parts of conducting bodies, and diſtributes them along the reſiſting medium, through which it muſt force its paſſage. Upon this principle, the longeſt flaſhes of *lightning* ſeem to be made, by its forcing into its way part of the vapours in the air. One of the principal reaſons why thoſe flaſhes make ſo long a rumbling, is their being occaſioned by the vaſt length of a vacuum, made by the paſſage of the electric matter. For although the air collapſes the moment after it has paſſed, and the vibration, on which the ſound depends, commences at the ſame moment; yet, if the flaſh was directed towards the perſon who hears the report, the vibrations excited at the nearer end of the track will reach his ear much ſooner than thoſe excited at the more remote end; and the ſound will, without any repercuſſion or echo, continue till all the vibrations have ſucceſſively reached him. Mr. Lullin, in order to account for the production of electricity in the clouds, made a long inſulated pole to project from one ſide of the Alps, and obſerved, that when ſmall clouds of vapour, raiſed by the heat of the ſun, roſe near the foot of the mountain, and aſcended along the ſide of it; if they touched the extremity of the pole only, it was electrified; but if the whole pole, and conſequently part of the hill on which it ſtood, was likewiſe involved, it was not electrified. Whence he concludes, that the electricity of the clouds is produced by their paſſing through the air while the ſun ſhines upon them. But to which of theſe two circumſtances, namely, the motion through the air, or the action of the ſun's rays, this was owing, he could not determine, though he made ſeveral experiments for this purpoſe.

Upon the whole, it is eaſy to conceive, that when particular clouds or different parts of the earth poſſeſs oppoſite electricities, ſome being electrified poſitively, and others negatively, a diſcharge will take place within a certain diſtance; or the one will ſtrike into the other, and in the diſcharge a flaſh of *lightning* will be obſerved. But how the clouds or earth acquire this ſtate, is ſtill a queſtion not abſolutely determined. Mr. Canton queries, whether the clouds become poſſeſſed of electricity by the gradual heating and cooling of the air; and whether air ſuddenly rarefied, may not give electric fire to, and air ſuddenly condenſed receive electric fire from, clouds and vapours paſſing through it. Mr. Wilcke ſuppoſes the air to contract its electricity, in the ſame manner as ſulphur and other ſubſtances do, when they are heated and cooled in contact with various bodies. Thus the air, being heated or cooled in the neighbourhood of the earth, gives electricity to the earth, or takes it from it, and the electrified air, being conveyed upwards by various means, communicates its electricity to the clouds. Others have queried, whether, ſince thunder generally happens in a ſultry ſtate of the air, when it ſeems repleniſhed with ſome ſulphureous vapours, the electric matter then in the clouds may not be generated by the fermentation of ſulphureous vapours with mineral or acid vapours in the air.

Dr. Franklin adviſes perſons who are apprehenſive of danger from *lightning*, to ſit in the middle of a room, provided it be not under a metal luſtre ſuſpended by a chain, ſitting on one chair, and laying their feet on another. It is ſtill ſafer, he ſays, to bring two or three mattraſſes, or beds into the middle of the room, and folding them double, to place the chairs upon them, for as they are not ſo good conductors as the wall, the *lightning* will not chuſe to paſs through them: but the ſafeſt place of all is in a hammock hung with ſilken cords, at an equal diſtance from all the ſides of a room. Doctor Prieſtley obſerves, that the place of moſt abſolute ſafety muſt be the cellar, and eſpecially the middle of it; for when a perſon is lower than the ſurface of the earth, the *lightning* muſt ſtrike it before it can poſſibly reach him. In the fields, the place of ſafety is within a few yards of a tree, but not quite near it. Neverthelеſs, S. Beccaria cautions perſons not to depend upon the neighbourhood of a higher, or, in all caſes, a better conductor than their own body; ſince, according to his repeated obſervations, the *lightning* by no means deſcends in one undivided track; but bodies of various kinds conduct their ſhare of it at the ſame time, in proportion to their quantity and conducting power. See on the ſubject of this article Franklin's Letters; Beccaria's Lettre dell'

Elettriciſmo; Prieſtley's Hiſtory, &c. of Electricity paſſim. Lord Mahon obſerves, that damage may be done by *lightning*, not only by the main ſtroke and lateral exploſion, but likewiſe by that which he calls the returning ſtroke, that is, by the ſudden violent return of that part of the natural ſhare of electricity (of any conducting body, or of any combination of conducting bodies) which had been gradually expelled from ſuch body or bodies reſpectively, by the ſuperinduced elaſtic electrical preſſure of a thunder cloud's electrical atmoſphere. See an account of his theory and experiments, relating to this ſubject, in his Principles of Electricity, &c. quarto, 1779.

LIGHTNING, *artificial*. The phoſphorus, when newly made, gives a ſort of artificial *lightning* viſible in the dark, which would ſurpriſe thoſe who are not uſed to ſuch a phenomenon: the uſual method of keeping this preparation is under water, and if the coruſcations are deſired to be ſeen to the greateſt advantage, the glaſs in which it is kept ſhould be deep and cylindric, and not more than three-fourths filled with water. The phoſphorous put into this water will ſend up coruſcations at times, which will pierce through the incumbent water, and expand themſelves with great brightneſs in the empty upper part of the bottle.

If we compare this artificial coruſcation to the real *lightning*, we ſhall find, that as in this the fire paſſes unaltered through the water, ſo in that the flaſhes of *lightning*, which come at intervals, paſs uninterrupted through the moſt denſe clouds, and are not obſtructed by the heavieſt ſtorms of rain, but like the beams of the ſun, or any other fire, paſs uninterrupted through glaſs and water. The ſeaſon of the weather, as well as the newneſs of the phoſphorous, muſt concur to produce theſe flaſhes; for they are as uncommon in winter as *lightning* is, but in warm weather both are very frequent.

The flame of *lightning* is generally inoffenſive, and does not, except upon particular circumſtances, ſet fire to any thing that it falls upon; and, in like manner, the flaſhings of the phoſphorus through the water will not burn the fleſh, nor even fire the moſt combuſtible things; though the phoſphorus itſelf, like the *lightning*, under proper circumſtances, may be a very conſuming and terrible fire. The warmth of the air, or the immediate beams of the ſun, will ſet fire to the condenſed body of the phoſphorus, and it then becomes this terrible fire; and in the ſame manner, *lightning* when condenſed and contracted, and wrapped up in a vehicle of air, ſo that it does not ſo eaſily diffuſe itſelf through the yielding ether, ſets fire to trees, houſes, or whatever it comes near.

The phoſphorus, while burning, acts the part of a corroſive, and when it goes out reſolves into a menſtruum, which diſſolves gold, iron, and other metals; and *lightning*, in the ſame manner, melts the ſame ſubſtances. From the whole, it appears that there is much more reſemblance between this phoſphorus and *lightning* than between gunpowder or aurum fulminans, and that fire, though theſe have often been ſuppoſed to be nearly allied to its nature. See PHOSPHORUS.

LIGNEA *caſſia*. See CASSIA.

LIGNICENSIS *terra*, in the *Materia Medica*, the name of a fine yellow bole dug in many parts of Germany, particularly about Emeric, in the circle of Weſtphalia, and uſed in cordial and aſtringent compoſitions. It is a common ſuccedaneum for the yellow Sileſian bole, where that is not to be had, and is generally eſteemed very nearly, if not abſolutely equal to it in its virtues.

It is moderately heavy, naturally of a ſmooth ſurface, and of a beautiful gold colour. It eaſily breaks between the fingers, and does not ſtain the ſkin in handling, melts freely in the mouth, and leaves no grittineſs between the teeth, and is immediately diffuſible in water. It makes no efferveſcence with acids; and burns to a fine red colour, and almoſt to a ſtony hardneſs.

Charlton (Foſſ. p. 5.) ſays it is more frequently known by the name of *terra ſigillata Goltbergenſis*.

There is another white bole known by this name. See GOLTBERGENSIS *terra*.

LIGNITES, the name of a ſtone deſcribed by Ludovicus Dulcis, as having the veins and appearance of wood, and the tranſparence of glaſs. He celebrates it for many imaginary virtues, nor does the ſtone itſelf indeed ſeem much leſs imaginary; this author, as De Boet obſerves, having deſcribed many ſtones which he never ſaw, and no ſmall number that never exiſted.

LIGNUM *aloes*, or *wood of aloes*. See ALOES.

LIGNUM *balſami*. See BALSAM.

LIGNUM *Campechianum*. See LOG-WOOD.

LIGNUM *caſſiæ*. See CASSIA.

LIGNUM *colubrinum*. See STRYCHNUS. Garcias tells us of the wonderful effects of this drug againſt the bites of venomous ſerpents, and deſcribes two kinds of the plant which produces it; one having leaves like the pomegranate, and the other like the peach-tree: theſe, he ſays, both grow in the iſland of Ceylon; and Acoſta mentions two other ſpecies of plants producing this wood, both different from either of thoſe deſcribed by Garcias, and both growing in Malabar. We have alſo accounts in the Geographus Nubienſis of another *lignum colubrinum*, different from theſe, growing in Æthiopia, and poſſeſſed of the ſame virtues againſt the bites of ſerpents as the others. This laſt is called in the Arabic *haud albaic*, the plain verbal tranſlation of which is ſnake-wood, or *lignum colubrinum*. He tells us, that it has ſome reſemblance in form to pyrethrum, and that the wood is always contorted.

Alla cararha is another of its Arabic names, and this is the word by which Avicenna, and the other Arabian writers interpret the *pyrethrum* of Dioſcorides; but it is not certain whether the ſimilitude of ſounds between two or more Arabic words, may not have occaſioned ſome confuſion or error here. Dicæarchus, in his fragment of mount Pelion, deſcribes the root of a tree growing there, which is not only a ſovereign remedy for the bites of ſerpents, but even deſtroys them by its ſmell. This is alſo a *lignum colubrinum*; but whether the ſame with any of the others, or different from them all, we have not deſcriptions enough to determine.

It appears, upon the whole, that little can be depended on in the accounts of the medicine called *lignum colubrinum* by any author, unleſs he has himſelf experimented what he relates, and deſcribed the plant which produces the drug; for much imaginary virtue has been at all times given to many things againſt the bitings of ſerpents, and the *lignum colubrinum* of one author is not the *lignum colubrinum* of another.

LIGNUM *nephriticum*. See NEPHRITIC.

LIGNUM *vitæ*, the wood of a genus of trees, called by botaniſts *thuya*. See TREE *of life*.

Lignum vitæ is much valued by turners: making extremely beautiful cups, bowls, boxes, and other curioſities.

Lignum vitæ is alſo a name given to GUAIACUM.

LIGULA, a word uſed by medical writers in very different ſenſes. Some expreſs by it the clavicle, others the glottis; others uſe it as the name of a meaſure, for things either liquid or dry, being a quarter of a cyathus, equal to a forty-eighth part of a pint with us; others finally uſe it for a weight, leſs than half an ounce by two ſcruples, or ten ſcruples.

LIGULA *marina*, a name given by ſome botanical writers to a plant of the fucus or ſea-wrack kind, called by others *fucus in lingulas diviſus*. It uſually grows in places always covered by the ſea, not on the banks, which are dry at the ebbing of the tides, and is for the moſt part compoſed of a ſort of long cords or ſtrings. The ſtalk is ſolid, and not hollow, as in the *fucus chordam referens*, or the ſtringy fucus of Mr. Ray; at leaſt the ſtalk of this plant is full of a thick and tough viſcous matter, like that found in the bladders, at the extremities of the branches of the common fucus, at the time when the ſeeds are ready to fall. This gluey matter is of a whitiſh green, and the colour of the plant itſelf is a deep olive; there is no rib or nerve to be ſeen in any part, but its texture is very cloſe and compact.

The indefatigable Mr. Reaumur diſcovered irregular flowers in this plant; they are each compoſed of a number of ſhort and ſlender filaments, iſſuing out of a little hole which ſerve them as a cup. Theſe filaments are diſpoſed in circular order upon the ſtalk; and reſemble, in miniature, the common radiated flowers of the hawkweed, and the like plants; but their diameter is not more than the twentieth part of an inch. Notwithſtanding the ſmallneſs of theſe flowers, they are however eaſily diſtinguiſhed, becauſe they are green; whereas the ſtalk is olive-coloured. Mem. Acad. Par. 1712.

LIGULATED *floſcules*, *ligulati floſculi*, in *Botany*, a term uſed by authors to expreſs a part of the floſcules, or ſmall ſeparate flowers, which together form the whole head or flower of the compound flowered plants. The *ligulated floſcules* generally ſtand on the hedge, and have a flat ſtraight end turned downwards, and armed with three teeth, but not divided into any ſegments.

LIGURINUS, *in Ornithology*, a name uſed by many authors for the bird more commonly known by the name of SPINUS, and called in England the *ſiſkin*.

LIGURIUS, in *Jewiſh Antiquity*, a precious ſtone on the high prieſt's breaſt-plate. It is called *leſchem* in Hebrew. Theophraſtus and Pliny deſcribe the *ligurius* to be a ſtone like a carbuncle, of a brightneſs ſparkling like fire.

The *ligurius* was the firſt ſtone in the third row upon the high prieſt's pectoral, and the name of God was inſcribed upon it. Ælian, De Animal. lib. iv. cap. 17. Pliny, lib. viii. cap. 38. & lib. xxxvii. cap. 3. Calm. Dict. Bibl. See LYNCURIUS *lapis*.

LIGUSTICUM, or Leviſticum, in *Botany*. See Lovage.

Liguſticum *marmor*, in *Natural Hiſtory*, a name by which ſome authors have called the *Carrara marble*, the *marmor lunenſe* of the ancients. It is a fine white marble, harder than the Parian or ſtatuary kind, and uſed fot tables, chimneys, &c. as the other for carving. See Lunenſe *marmor*.

LIGUSTRUM, in *Botany*. See Privet.

LIKE *quantities*, in *Algebra*, are thoſe which are expreſſed by the ſame letters, under the ſame power, or equally repeated in each quantity.

Thus $2b$, and $3b$, and $9ff$, and $3ff$, are *like quantities*; but $2b$, and $3bb$, and $9ff$, and $3fff$, are unlike ones, becauſe the quantities have not every where the ſame dimenſions, nor are the letters equally repeated.

Like *ſigns*, or *ſymbols*, in *Algebra*, are when both are affirmative, or both negative.

If one be affirmative, and the other negative, they are unlike ſigns.

Thus $+64d$ and $+5d$, have *like* ſigns; but $+9f$ and $-7f$, have unlike ſigns.

Like *figures*, in *Geometry*, are ſuch as have their angles equal, and the ſides about thoſe equal angles proportional. See Similar.

Like *arches*, in the projection of the ſphere in plano, are parts of leſſer circles, containing an equal number of degrees with the correſponding arches of greater ones.

Like *ſolid figures*, in *Geometry*, are ſuch as are contained under *like* planes, equal in number.

LILAC, *ſyringa*, in *Botany*, a genus of the *diandria monogynia* claſs. Its characters are theſe: the flower has a ſmall tubulous permanent empalement of one leaf, indented in four parts; it has one petal with a long cylindrical tube, cut into four obtuſe ſegments at the brim, which ſpread open, and two very ſhort ſtamina, terminated by ſmall ſummits, ſtanding within the tube; it has an oblong germen, ſupporting a ſhort, ſlender ſtyle, crowned by a thick, bifid ſtigma; the germen afterwards turns to an oblong, compreſſed, acute-pointed capſule, with two cells, opening with two valves, contrary to the partition, including in each cell one oblong acute-pointed ſeed, with a membranaceous border. Linnæus reckons two ſpecies, and Miller three.

Theſe are frequently cultivated in gardens; and ſome growing, with good management, to eighteen or twenty feet high, are with their large tufts of flowers very ornamental.

The common way of propagating theſe ſhrubs is by ſuckers, which they always produce in very great abundance; theſe ſhould be taken off from the old plants in October, and carefully planted in a nurſery, in rows three feet aſunder, and one foot diſtance in the rows, where, after they have ſtood a year or two to get ſtrength, they will be fit to plant in autumn, where they are to remain; after which they require no farther care than the digging about their roots once a year, and taking away their ſuckers, which are not only very unſightly, but ſtarve the plant. Miller. They will grow almoſt any where; but they are obſerved to flower beſt in a light, rich ſoil, as indeed do moſt other ſhrubs, though they grow faſteſt in a wet one.

LILI, the name of one of the favourite remedies of Paracelſus, the baſis of which is antimony; but he has not given us the proceſs for preparing it.

LILIAGO, in *Botany*, a name uſed by Cordus and ſome other authors for the phalangium or spiderwort.

LILIACEOUS, in *Botany*, a term uſed to expreſs the flowers of ſome plants, which approach to thoſe of the lily in ſhape.

The characters of a *liliaceous* flower are theſe: it is compoſed of ſix leaves, or elſe of three leaves divided into ſix; but this is more rarely the caſe; the piſtil, or cup of this flower, always becomes finally a ſeed-veſſel divided into three cells.

Of this ſort are the flowers of the tulip, hyacinth, aſphodel, ephemerum, and the like; many of which, though they leſs reſemble the lily flowers than the others, yet are to be diſtinguiſhed by this title, becauſe they leave behind them the *liliaceous* ſeed-veſſel which is long, and divided into three cells. Tourn. Inſt. p. 343. See *Tab.* IX. *of Botany*, *Claſs* 9.

LILIASTRUM, in *Botany*. See *Aſphodel* Lily.

LILIO *aſphodelus*. See *Aſphodel* Lily.

Lilio *fritillaria*. See Fritillary.

Lilio *hyacinthus*. See Squills.

Lilio *narciſſus*. See Amaryllis.

LILIUM *lapideum*, a name given by the writers, in *Natural Hiſtory*, to a foſſile body found in ſome parts of Germany; which plainly ſhews, that it was once a ſpecies of ſtar-fiſh; though the animal be not, at this time, known in its recent ſtate. Klein, who has well conſidered this body, in compliance to the vulgarly received names of things, calls this the *entrochus ramoſus*, or *branched entrochus*; and the reſemblance ſome of its parts have to the common entrochi, ſhews plainly, that their origin has been the ſame, and that they are fragments either of this ſpecies or of the Magellanic ſtar-fiſh. The recent fiſh not being found from which the *lilium lapideum* is formed is no peculiar fate, but is common to it, and to the *cornua Ammonis*, and many other animal remains.

LILLO, in *Ichthyology*, a name given by the Rhodians to the labrus.

LILLY of *Paracelſus*. See Tincture *of metals*.

LILY, *lilium*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flower, which is of the open bell-ſhape, has no empalement, but has ſix petals reflexed at their points; each petal having a narrow longitudinal nectarium at its baſe; it has ſix erect ſtamina with a cylindrical oblong germen, which afterward becomes an oblong capſule, with ſix rough furrows hollowed at the top, having three cells filled with flat ſeeds lying above each other in a double order. Miller enumerates thirteen and Linnæus nine ſpecies.

All the ſorts of *lilies* may be propagated by off-ſets from their roots; or by ſowing their ſeeds: and if the ſeeds are carefully ſaved from good flowers, the martagons very frequently afford very beautiful varieties.

The manner of ſowing them is this: ſome ſquare boxes ſhould be provided of about ſix inches deep, with holes bored in the bottoms to let out the wet; theſe muſt be filled with freſh light ſandy earth, and the ſeeds muſt be ſown on them pretty thick in the beginning of October, ſoon after they are ripe, and covered over about half an inch deep with light ſifted earth of the ſame kind. They ſhould be then placed where they may have the morning ſun; and, if the weather prove dry, they muſt be watered at times, and the weeds carefully picked out. In the beginning of November, the boxes are to be removed to a place where they have as much ſun as poſſible, and be ſecured from the north and eaſt winds. In ſpring about the beginning of April, the young plants will appear, and the boxes are then to be removed into their former ſituation; they ſhould be watered at times during the ſummer; and in Auguſt the ſmalleſt roots are to be emptied out of theſe boxes, and ſtrewed over a bed of light earth, and covered with about half an inch depth of light earth ſifted over them; they muſt here be watered and ſhaded at times, and defended from the ſeverity of the winter, by a light covering of ſtraw, or peas haulm, in the hardeſt weather. In February the ſurface of the bed ſhould be cleared, and a little light earth ſifted over it. When the leaves are decayed, the earth ſhould be a little ſtirred over the roots, and in the month of September following a little more light earth ſifted on. In the September of the following year, the roots muſt be tranſplanted to the places where they are to remain, and ſet at eight inches diſtance, the roots with their buds uppermoſt, being placed four inches below the ſurface: this ſhould be done in moiſt weather. They will now require the ſame care as in the preceding winters; and the ſecond after they are tranſplanted, the ſtrongeſt roots will begin to flower. The fine ones ſhould then be removed at the proper ſeaſon into flower-beds, and planted at great diſtances from one another, that they may flower ſtrong.

The roots of the *white lily* are emollient, maturating, and greatly ſuppurative. They are uſed externally in cataplaſms for theſe purpoſes with ſucceſs. The common form of applying them is boiled and bruiſed; but ſome prefer the roaſting them till tender, and then beating them to a paſte with oil, in which form they are ſaid to be excellent againſt burns. Gerard recommends them internally in dropſies.

For this purpoſe, bread was made of barley-meal, with the juice of the roots, and conſtantly uſed for a month or ſix weeks; but Dr. Lewis obſerves, that there are inſtances of ſimilar cures by the uſe of common bread; and that probably in one caſe, as well as in the other, abſtinence from liquids was the remedy. The flowers are chiefly uſed for flavouring expreſſed oils, which, by inſolation with freſh parcels of them, continued about three days each time, are ſuppoſed to receive from them, along with their ſmell, an anodyne and nervine virtue. The diſtilled water has been ſometimes uſed as a coſmetic.

Lily, *belladonna*, *daffodil*, *Guernſey*, *Mexican*, and *Japan*, names uſed by different authors for the amaryllis, or *lilio Narciſſus* of Linnæus and Tournefort.

Lily, *aſphodel*, *crinum*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flower has one petal, funnel-ſhaped, deeply cut at the top into ſix parts, which are reflexed; and has ſix long ſtamina, which are inſerted in the tube of the petal, ſpreading open; the germen is ſituated at the bottom of the flower, which afterward becomes an oval capſule with three cells, each containing one oval ſeed; the flowers are included in a two-leaved ſheath. There are four ſpecies. See *Tab.* IX. *of Botany*, *Claſs* 9.

Lily, *daffodil*. See *Sea*-DAFFODIL, and AMARYLLIS.

Lily, *day*, or *St. Bruno's lily*, *hemerocallis*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flower has no empalement; in ſome ſpecies the flower is of one petal, cut into ſix parts; in others it has ſix petals; there are ſix awl-ſhaped declining ſtamina ſurronnding the ſtyle; the roundiſh furrowed germen is ſituated in the middle, and becomes an oval three-cornered capſule, with three lobes opening with two valves, filled with roundiſh ſeeds. Miller reckons four, and Linnæus two ſpecies.

Lily, *hyacinth*. See SQUILLS.

Lily, *May*. See LILY *of the valley*, infra.

Lily, *Perſian*. See FRITILLARY.

Lily, *ſuperb*, *glorioſa*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flower has no empalement; but has ſix ſpear-ſhaped petals, which are waved and reflexed to the bottom; it has ſix ſtamina, which ſpread each way, terminated by proſtrate ſummits; in the centre is ſituated a globular germen, which becomes an oval thin capſule with three cells, filled with globular ſeeds diſpoſed in a double range. There are two ſpecies, natives of the Eaſt.

Lily-*thorn*. See *Lily*-THORN.

Lily *of the valley*, *convallaria*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flower has one petal, which is bell-ſhaped, ſpread open and reflexed, but has no empalement; it has ſix ſtamina inſerted into the petal; in the centre is ſituated a globular germen, which becomes a globular berry with three cells, containing one roundiſh ſeed. Miller enumerates ten and Linnæus eight ſpecies.

The plant commonly called *one-blade*, and by Caſpar Bauhine *lilium convallium minus*, is uſually eſteemed a ſpecies of this genus, but improperly; it being one of the ſmilaxes. Tourn. Inſt. p. 77. See SMILAX.

The name *lily* is very improperly given to this genus of plants, as they have not the leaſt affinity to the *lily*.

The flowers of the white *lily of the valley* are cephalic and nervine, and preſcribed for vertigoes, apoplexies, palſies, &c.

It is principally from the volatile parts of theſe flowers, that medicinal virtues have been expected in nervous and catarrhous diſorders; but probably their fixed parts alſo have no ſmall, perhaps the greateſt, ſhare in their efficacy: the flowers, dried and powdered, and thus diveſted of their odoriferous principle, prove ſtrongly ſternutatory. Watery or ſpirituous extracts made from them, given in doſes of a ſcruple or half a dram, act as gentle ſtimulating aperients and laxatives; and ſeem to partake of the purgative virtue, as well as of the bitterneſs of aloes. Lewis's Mat. Med.

Lily, *water*, *nymphæa*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the empalement of the flower is compoſed of four or five coloured leaves; the flower has many petals ſitting on the ſide of the germen, for the moſt part in a ſingle ſeries; and it has a great number of ſhort, plain, incurved ſtamina, with oblong ſummits; it has a large oval germen, but no ſtyle; with an orbicular, plain, target-ſhaped ſtigma; the germen becomes a hard, oval, fleſhy fruit with a narrow neck, crowned at the top; and divided into ten or fifteen cells full of pulp, with many roundiſh ſeeds. There are two ſpecies, which grow naturally in ſtanding waters; Linnæus reckons four.

The beſt method to propagate theſe plants is to procure ſome of the ſeed-veſſels juſt as they are ripe and ready to open; theſe ſhould be thrown into canals or large ditches or ſtanding water, where they will ſink to the bottom, and in the following ſpring the plants will appear floating on the ſurface of the water, and in June or July produce their beautiful large flowers: when they are once fixed to a place, they will multiply exceedingly; in ſmall gardens they are cultivated in large troughs of water lined with lead; where they thrive very well; but few perſons care to be at that charge. Miller.

The roots, flowers, and ſometimes the leaves, have been employed both internally and externally, as demulcent, anti-inflammatory, and in ſome degree anodyne: they are cooling and drying, and accounted good to ſtay all kinds of fluxes and looſeneſſes, and the gonorrhoea and nocturnal emiſſions; by their ſoftening cooling qualities allaying the acrimony of the ſemen, and thereby rendering perſons leſs diſpoſed to venery. The leaves are good to be applied to hot humours and inflammations.

Lily, *leſſer yellow water*. See *Bog*-BEAN.

LIMANDA, in *Ichthyology*, a name by which ſome authors have called the flat-fiſh, which we in Engliſh call the DAB, the *paſſer aſper* of authors.

LIMARIA, in *Ichthyology*, a name given by Gaza and ſome other writers to the THYNNUS or TUNNY-*fiſh*, called the *Spaniſh mackrel*.

LIMATURA *martis præparata*. See IRON.

LIMAX, in the *Hiſtory of Inſects*, the name of a genus of theſe animals, comprehending all the naked ſnails. See SNAIL.

This belongs to the order of molluſca or ſoft worms in the Linnæan ſyſtem. The animals of this genus have no ſhell, and are furniſhed with members.

The body of the *limax* is of an oblong figure, approaching to cylindric, and is perforated at the ſide with a hole, which ſerves for its genitals and diſcharge of excrements; above is a fleſhy kind of buckler, formed convexly, and flat beneath; the tentacula are four in number, and two of them have the appearance of eyes.

Of this genus authors enumerated eight ſpecies.

Limax *marinus*, in *Zoology*, a name given by ſome to the *lipparis*, or, as it is commonly termed in Engliſh, the *ſea-ſnail*, caught in plenty at the mouths of rivers in Yorkſhire, and ſome other places. See CYLINDRUS.

LIMB, in *Anatomy*, is uſed to denote certain parts of the human body, proceeding from the trunk.

Limbs, *motions of the*. By a ſort of natural mechaniſm, and that without any acquired habitude, we are capable of eaſily making with one hand, or even with both hands at once, exactly the counter-action to that motion, which the other hand naturally and moſt eaſily is found to make, and the contrary of which it cannot itſelf make without difficulty, and repeated trials and cuſtom. It is owing to this, that we can with the left hand eaſily make the very contrary ſtrokes with the pen, that we are accuſtomed to make with the right; if we ſuffer that left hand to move, without giving our particular attention to what it is doing, as in the playing on ſome inſtruments of muſic, the fingers being after practice left, as it were, to themſelves, ſucceed more happily than when the attention is more engaged in what they are doing. The letters or figures thus made by counter ſtrokes from the unforced action of the left hand, though they appear ſtrange and confuſed at firſt ſight, yet if held up againſt a looking-glaſs, they will be found ſufficiently determinate and expreſs.

This difficulty of making motions, at the ſame time, contrary to one another with two *limbs*, either of which motions ſingly would be no difficulty to either, is not peculiar to the arms; if we ſit down and try the experiment with the feet, the ſucceſs is found the ſame, and even the moving differently the like fingers or toes of the different hands or feet, is found of proportionate difficulty. We, in the ſame manner, are not able, by any means, to direct our two eyes to two different objects, placed in contrary ſituations at the ſame time; but in this the difficulty, though great in the ſtructure of our eyes, is not univerſal to all creatures. The chamæleon being able to do this, and to look before and behind, or in any other ever ſo different directions, both at the ſame time. Mr. Winſlow was led by a great number of obſervations of this kind, diligently to examine the diſpoſitions of the nerves, and their different origins in the brain, the cerebellum, the medulla oblongata, and the ſpinal marrow. The firſt thing on which this accurate anatomiſt made his obſervation, was the crucial interlacement of the nerves in the medulla oblongata, firſt diſcovered by M. Petit, and accurately deſcribed and figured by him; and the obſervations of the ſame author, of different perſons, who, within his own knowledge, had become paralytic in the *limbs* on the contrary ſide of their body to the affected parts of the brain alſo. The being able determinately to bring on the like ſymptoms in brutes, from injuries to the contrary ſides of the brain, and the regular croſſing of the filaments which paſs tranſverſely on the medullary arch, commonly called the callous body of the brain, and of other of the nervous fibres, ſeemed to promiſe to give ſome light into the explication of the difficulty of theſe contrary motions being performed at the ſame time. When this accurate obſerver had ſufficiently informed himſelf of theſe croſſings of the nerves, and the other reciprocal communications of the ſeveral parts of the brain, or its two lateral halves, as well by the two large tranſverſe cords, as by the thick tranſverſe fibres of the ſmall inferior and triangular ſurface of the arch, he beſtowed his particular obſervation on the ſtructure of the ſpinal marrow. This he carefully examined by the microſcope; and beſide the tranſverſe fibres, which make the communication between the two columns of this marrow, and which M. Petit had before nicely deſcribed, there appeared to M. Winſlow, in the thickneſs of each of theſe columns, a long train very diſtinct, and made up of a leſs white and more cloudy matter than the reſt; or a medullary cord, which had not been before obſerved by any body, any more than the ſmall cords and trnſverſe fibres of the ſummit of the arch of the brain, or the croſſing of its tranſverſe fibres.

By theſe ſeveral croſſings, and reciprocal communications of the medullary filaments, which are, as it were, the roots of the nerves of each half, or each ſeveral ſide of the human body, it ſeems not impoſſible to explain the reaſon of the before obſerved difficulty of making the contrary motions with the two oppoſite *limbs* at the ſame time; eſpecially when it is obſerved, that the two ſmall parcels of medullary filaments, which compoſe the primitive trunks of every pair of nerves that are propagated from the ſpinal marrow, have their paſſage through the lateral apertures of the vertebræ, and before that ſeem to proceed partly from the neighbouring column or moiety of the ſpinal marrow, and partly from the other column or moiety, by means of the croſſing before mentioned; and conſequently, that by this reciprocal croſſing, or interlacing, one of the primitive parcels or bundles of filaments of each primitive trunk of the nerves of one ſide of the body, muſt communicate with the fellow-parcel or bundle of filaments of the nerves of the other ſide.

Every body almoſt knows that the motion of the muſcles, and ſenſation by the touch, are performed by means of the nerves and their filaments; but no one has ever yet diſcovered the true means: this, however, is certain, that when we would put in motion, at one time, the two legs, or the two arms, or the finger or toes of each hand or foot; at that time the croſſed filaments of the primitive trunks of the nerves, which grow to their correſpondent muſcles on each ſide, immediately come mutually into contact and conſent with one another; and their ſo meeting, in the time of their motion, communicates certain impreſſions reciprocally to the ſeveral nerves, which from them are propagated to the two different ſides of the body, and continue them to act in concert on the ſeveral muſcles of both the arms and legs at the ſame time, and communicate to both that principle of motion, which we meant to give alone to one. Mem. Acad. Scienc. Par. 1739.

The *limbs*, as well as the life of a man, are of ſuch high value, in the eſtimation of the law of England, that it pardons even HOMICIDE, if committed *ſe defendendo*, or in order to preſerve them.

LIMB, LIMBUS, the outermoſt border, or graduated edge, of an aſtrolabe, quadrant, or the like mathematical inſtrument.

The word is alſo uſed for the primitive circle in any projection of the ſphere in plano.

LIMB alſo ſignifies the outermoſt border or edge of the ſun or moon, when the middle or diſk is hid in an eclipſe of either luminary.

Aſtronomers obſerve the lower and upper *limb* of the ſun in order to find out its true height, which is that of the centre.

LIMB is alſo uſed, among *Botaniſts*, for the outer edge or border of plants, their leaves and flowers. See PETAL.

LIMBECK. See ALEMBIC.

LIMBERS, in *Artillery*, a ſort of advanced train joined to the carriage of a cannon, upon a march. It is compoſed of two ſhafts, wide enough to receive a horſe betwixt them, which is called the *fillet horſe*; theſe ſhafts are joined by two bars of wood, and a bolt of iron at one end, and have a pair of ſmall wheels; upon the axletree riſes a ſtrong iron ſpike, upon which the train of the carriage is put. But when a gun is upon action, the *limbers* are run out behind it.

See the dimenſions and figure of a *limber* carriage, in Muller's Treatiſe of Artillery, p. 187, &c.

LIMBER-*holes*, in a ſhip, little ſquare holes cut through her floor-timbers, ſerving to let the water to the well of the pump, which otherwiſe would lie between thoſe timbers, where the keel rope runs.

Every floor-timber has two *limber*-holes cut through it; viz. one on each ſide of the keelſon.

LIMBER-*boards*, are ſhort pieces of plank, which form a part of the cieling or lining of a ſhip's floor, cloſe to the keelſon, and immediately above the *limbers*. They are occaſionally removed, in order to examine and clear the *limber*-holes.

LIMBER-*rope*, is a long rope, frequently retained in the *limber*-holes of a ſhip, and communicating from one to another, in order to clear them, by pulling the rope backwards and forwards, ſo as to looſen the ſand or dirt by which they may occaſionally be choaked.

LIMBUS, or LIMB, is a term in the *Roman Theology*, uſed for that place where the patriarchs are ſuppoſed to have waited for the redemption of mankind, and where they imagine our Saviour continued from the time of his death to that of his reſurrection.

Du-Cange ſays, the fathers call this place *lembus*, *eo quod ſit limbus inferiorum*, as being the margin or frontier of the other world.

LIMBUS is alſo uſed by catholics for the place deſtined to receive the ſouls of infants, who die without baptiſm; who have not deſerved hell, as dying in innocence: nor yet are worthy of heaven, becauſe of the imputation of original ſin.

LIME, *calx of ſtone*, a white, ſoft, friable ſubſtance, prepared of ſtone, marble, chalk, or ſome other ſtony ſubſtance, by burning in a KILN.

The great uſe of *lime* is in the compoſition of mortar for building; the fire taking away a great part of its humidity, and opening its pores, ſo that it becomes eaſily reducible to powder, and miſcible with ſand or burnt clay. See MORTAR.

LIME, *quick*, or *calx viva*, is ſuch as it comes out of the kiln, or furnace. And thoſe earths or ſtones, which yield this acrimonious, friable ſubſtance, are called CALCAREOUS or calcinable. The method of converting earths and ſtones into *quick-lime* is very ſimple: it conſiſts in expoſing them to the action of fire, in kilns made for this purpoſe, till they become of a white-red heat, and in keeping them in this degree of heat during twelve or fifteen hours: good *quick-lime* may alſo be made with a leſs heat continued for a longer time, or in leſs time with a more intenſe heat; but care muſt be taken that the heat is not ſufficiently violent to vitrify the calcareous ſtone. The effects of CALCINATION, and the principal properties that diſtinguiſh *quick-lime* from uncalcined calcareous earths, are the following: the earths and ſtones, from which *quick-lime* is produced, contain a large quantity of air in a fixed ſtate, called *fixed* AIR, and by ſome writers calcareous gas, which, in calcination, is expelled; and therefore, in this proceſs, they are rendered more friable, and their weight is very conſiderably diminiſhed. See HEAT *Potential*,

Mr. Jacquin, in his Examen Doctrinæ Meyerianæ, (ſee ACIDUM *Pingue)* obſerves that *lime-ſtone* contains $\frac{13}{32}$ of its weight of gas, and $\frac{3}{32}$ of water. In conſequence of this diſcharge of air, ſtrong *quick-lime*, though diſſoluble in all the acids, with conſiderable heat, raiſes no effervеſcence, or emits no air-bubbles, which the uncalcined earths do in great abundance. Moreover, if the calcined ſtones be left expoſed to the air, they crumble into a fine white powder, called *lime ſlaked in the air*, and recover great part of their original weight. If the *quick-lime*, while newly made and very ſtrong, be put into water, inſtead of expoſing it to the air, it preſently cracks and ſplits with noiſe, exhaling a hot watery vapour and ſoon crumbling to as fine a powder as if it had been a long time expoſed to the air. But the crude *lime*-ſtone, before its calcination, exhibits none of theſe phenomena, with air or with water. *Lime*-water, not decompoſed, which is nothing elſe but water ſaturated with *quick-lime*, produces the ſame appearances with acids and other ſubſtances as the *quick-lime* itſelf, excepting that its combination with theſe ſubſtances is not accompanied with ſo much heat. *Quick-lime* and *lime*-water have not only the acrimonious taſte, but alſo all the other properties of fixed alkalis. Thus *quick-lime* changes the blue colours of flowers to a green, precipitates all metallic ſolutions, and even ſome ſalts with earthy baſes, ſuch as alum, and decompoſes ammoniacal ſalts, from which it diſengages the volatile alkali. It has ſome action upon oils, ſpirit of wine, and eſpecially upon ſulphur, which it reduces to an hepar. Theſe alkaline ſaline properties diſtinguiſh *quick-lime* from uncalcined calcareous earths, which, however, in a ſmall degree poſſeſs ſome of the ſame properties. The theory of *quick-lime* has been very much improved by the modern diſcoveries relating to *fixed* AIR. We learn from the experiments of Hales, Black, Jacquin, and others, that if calcareous ſtones are calcined in an apparatus of cloſe veſſels, ſo that whatever is expelled by fire may be retained, they may be converted into *quick-lime*, without the concurrence of the external air; that, during this calcination, a certain quantity of aqueous liquor is expelled from calcareous ſtones, though they have been previouſly well dried, and moreover, that a conſiderable quantity of a volatile vapour is diſengaged during the calcination, and that this vapour is the ſame as the gas or fixed air, which is expelled by adding acids to calcareous earth, and which occaſions the efferveſcence that ariſes upon mixing theſe ſubſtances. From this diſcovery of the exiſtence of gas in calcareous earths, and of the total privation of this fluid in *quick-lime*, we obtain a clear and ſatisfactory explication of the various properties of *quick-lime*, and alſo of other ſimilar ſubſtances. Dr. Black has taught us, that *lime* ſtone and other calcareous earths become *quick-lime*, when they are deprived by calcination in fire, ſolution in acids, precipitation with ſubſtances void of air, of the gas or air uſually combined with them in their natural ſtate. His experiments likewiſe prove, that when alkalis, fixed or volatile, are deprived of their gas, by any means, and particularly

particularly by combination with *quick-lime*, they are thereby rendered more cauſtic, incapable of efferveſcing with acids, and of cryſtallization, and more powerfully ſolvent: and the *quick-lime*, &c. by thus communicating cauſticity to alkalis, loſes its own cauſticity, and acquires all the properties of uncalcined calcareous earth: and he has ſhewn more generally, that by recombining this gas with *quick-lime*, magneſia, or alkalis, which had been previouſly deprived of it, their former weight and properties are deſtroyed. From the greater acrimony communicated to *quick-lime* and to alkalis, by thus depriving them of their contained gas, he has diſtinguiſhed them, when thus deprived, or uncombined with gas, by the epithet cauſtic, as cauſtic calcareous earth, or cauſtic fixed alkali, or cauſtic volatile alkali; and when theſe earths or alkalis are combined with gas, he calls them mild. See ALCALI.

Dr. Black contrived an apparatus by which the gas extricated from an efferveſcing mixture, could be conveyed into a cauſtic alkaline liquor, and ſhewed that by this method the cauſtic alkali could be rendered mild, and recover its efferveſcing and cryſtallizing properties.

His apparatus conſiſted of two phials communicating by means of a bent tube, one end of which is inſerted into the mouth of one phial, and the other end into the mouth of the other phial. In one of the phials he put ſome cauſtic ſpirit of ſal ammoniac, and into the other phial ſome mild alkali or mild calcareous earth. Upon this mild alkali or mild calcareous earth, he poured through a hole made in the ſide of the phial, ſome acid liquor, which immediately produced an efferveſcence as uſual, that is, it extricated from the alkali or earth their contained gas. The gas thus diſengaged, paſſed through the bent tube into the phial containing the ſpirit of ſal ammoniac, with which it combined, and which it changed from a cauſtic into a mild ſtate. For the ſpirit is, by this proceſs, rendered capable of efferveſcing with acids, and if it be much concentrated, it will be ſeen to cryſtallize during its impregnation with gas.

Dr. Macbride employed a ſimilar apparatus to impregnate *lime*-water with gas, by which means he changed the cauſtic earth or *quick-lime*, which was diſſolved in the water, to a mild calcareous earth, which, not being ſoluble in water, as *quick-lime* is, was therefore precipitated: he has alſo ſhewn, that this gas is capable of being abſorbed in water, and that the water thus impregnated, precipitates the *lime* from *lime*-water. See ſome other properties of this gas recited under the article *fixed* AIR.

Dr. Black has farther determined, by experiments, the relative powers of the ſeveral alkaline ſubſtances to unite with this elaſtic fluid, or the AFFINITIES of this fluid towards theſe ſubſtances. He found that this gas was more diſpoſed to unite with cauſtic calcareous earth or *quick-lime* than with any other ſubſtance; next with fixed alkali; then with magneſia; and laſtly with volatile alkali. Whence he ſhews, that mild volatile alkali may be deprived of its gas, or rendered cauſtic by applying to it magneſia deprived of its gas, or cauſtic fixed alkali, or *quick-lime*; and at the ſame time the magneſia, fixed alkali, or *quick-lime*, are thereby rendered mild. Magneſia alſo may be deprived of its gas by means of cauſtic fixed alkali, or of *quick-lime*; and laſtly, mild fixed alkali may be rendered cauſtic by means of *quick-lime*, which is at the ſame time rendered mild. Hence ſoap-boilers in order to increaſe the activity or diſſolving power of their alkali, boil it in water with *quick-lime*. According to this doctrine fully eſtabliſhed by many experiments, the cauſticity and other peculiar properties of *quick-lime* and cauſtic alkali are the original properties of theſe ſubſtances, while they are pure and uncombined, and not communicated to them by any ſuppoſed abſorption of matter from the fire in calcination, as Meyer and other chemiſts maintain. See ACIDUM *Pingue*.

From the now well-known property of fixed air in correcting air which has been injured by animal reſpiration or putrefaction, Dr. Prieſtley is led to conjecture, that *lime-kilns*, which diſcharge great quantities of fixed air, may be wholeſome in the neighbourhood of populous cities, the atmoſphere of which abounds with putrid effluvia. See on the ſubject of this article, Edinburgh Eſſays, vol. ii. Macbride's Eſſays, eſſ. v. and Chemical Dict. art. *Quick-lime*, and Appendix, ed. 2d.

LIME, *ſlaked*, is that diluted or drenched in water, and reſerved for the making of mortar.

The beſt *lime* is that made of the hardeſt, firmeſt, and whiteſt ſtones; and which is ſlaked at its coming out of the furnace.

It may eaſily be determined whether a ſtone will calcine, by letting fall a few drops of aqua fortis, or any ſtrong acid, on the ſtone, which will boil, and diſſolve a part of it, if the ſtone is calcinable; but will lie upon the ſtone, like oil, and not ferment, if it will not calcine.

Sir H. Wotton looks on it as a great error in the Engliſh, to make *lime*, as they do, of refuſe and ſtuff, without any choice; whereas the Italians, at this day, and much more the ancients, burnt their firmeſt ſtones, and even fragments of marble, where it was plentiful; which, in time, became almoſt marble again for its hardneſs, as appears in their ſtanding theatres, &c.

We have two kinds of *lime* in common uſe in England; the one made of hard ſtone, the other of a ſoft calcareous, or chalky ſtone; whereof the former is much the ſtrongeſt. That made of ſoft ſtone, or chalk, is fitteſt for plaiſtering of ceiling, and walls within doors; and that made of hard ſtones for buildings, and for plaiſterings without doors.

Good *lime* may alſo be made of mill-ſtone, not coarſe and ſandy, but fine and greaſy; as alſo of all kinds of flints; though it is hard to burn them, unleſs in a reverberatory furnace, as being apt to run to glaſs.

Dieuſſant recommends *lime* made of ſea-ſhells as the beſt; but Goldman finds fault with it, as being impatient of moiſture, and therefore eaſily peeling off from the outſide of walls; it is, however, the common *lime* uſed in the Indies.

Before the ſtones be thrown into the kiln, they are to be broken to pieces; otherwiſe the air contained in their cavities, too much expanded by the heat, makes them fly with ſo much violence, as to damage the kiln. According to Alberti and Palladio, *lime* will not be ſufficiently burnt in leſs than ſixty hours intenſe heat.

The marks of a well-burnt *lime*, according to Alberti, are, that its weight be to that of the ſtone in a ſeſquialterate proportion; that it be white, light, and ſonorous; that when ſlaked, it ſticks to the ſides of the veſſels; to which Boeckler adds, that, when ſlaked, it ſends forth a copious thick ſmoke; and Dieuſſant, that it needs a great deal of water to ſlake it. To preſerve *lime* ſeveral years, ſlake, and work it up; dig a pit under ground, into which let it paſs through a hole open at the bottom of the veſſel. As ſoon as the pit is full, cover it up with ſand, to prevent its drying; thus keeping it moiſt till it be uſed. Boeckler gives another method: cover a ſtratum of *lime* two or three feet high with another of ſand of the like height; pour on water enough to ſlake the *lime*, but not to reduce it to duſt after ſlaking. If the ſand cleave into chinks, as the ſmoke aſcends, cover them up, ſo as no vent may be given thereto. This *lime*, he adds, kept ten or twelve years, will be like glue; and will, farther, be of particular uſe in painting on walls, as being no way prejudicial to the colours. See MORTAR.

Lime is much uſed by tanners, ſkinners, &c. in the preparation of their leather; by ſoap boilers for diſſolving the oil, and facilitating its union with the alkaline ſalt; and by ſugar-bakers for refining their ſugar.

It is alſo of ſome medicinal uſe; being applied externally in deſiccative and epulotic medicines.

It is uſed alſo as a depilatory; and has been ſometimes made into an unguent with honey for rheumatic and other obſtinate fixed pains of the joints or limbs: this unguent is much commended by Fuller, who obſerves, that it is almoſt cauſtic. As an abſorbent earth, it is anti-acid, and capable of abſorbing the acid matters which are produced in digeſtion from the weakneſs of the ſtomach, in diſeaſes proceeding from a ſpontaneous acid, ſo well deſcribed by Boerhaave. It is the fitter in theſe diſeaſes, which are commonly the effect of the inactivity and weakneſs of the fibres, as it poſſeſſes a tonic quality, which other abſorbent earths have not. Beſides, perſons afflicted with theſe diſeaſes are ſubject to much wind, which is perhaps nothing elſe but gas; and *quick-lime* is very capable of abſorbing that fluid. As *quick-lime* is alſo drying, a little cauſtic, and conſequently cicatriſing, it may contribute to cure certain ulcers, eſpecially thoſe of the ſoft parts. Accordingly, ſeveral able phyſicians have preſcribed it ſucceſsfully for internal ſuppurations, and in the phthiſis pulmonalis. Moreover, the property which *quick-lime* has of attenuating viſcid matters, and of decompoſing ammoniacal ſalts, has been advantageouſly applied to diſſolve ſtones in the bladder and kidneys. But the beſt method of adminiſtering *quick-lime* internally has been thought to be by giving the LIME-*water*; becauſe this water is ſuppoſed to poſſeſs all the medicinal virtues of *quick-lime*, and becauſe the earthy particles are thus reduced to the greateſt fineneſs, and are conſequently ſuſceptible of the moſt perfect diſtribution. However, this ſhould be adminiſtered with great caution, and much diluted; and, after all, it is doubted, whether the *lime-water*, thus diluted, has all the medicinal qualities which might be expected from *quick-lime*. Macquer.

Lime affords a great variety of figures in its ſalts. The moſt perfect concretions among them ſeem to be double pointed figures, thick toward one end, and growing thin toward the other; ſome are flat and of a quadrilateral figure, and others flat and very thin, but hexangular; ſome are of the ſhape of a wedge, being cut off taper near one end, and blunt at the other. *Soda*, or pot-aſh, made of the plant *kali*, is very elegant and various in its ſhoots. Some are beautiful priſms, with the angles cut off near each end; others are oblong, and leſs regularly formed, ſome ſquare and very thin; others oblong, with a tendency to a rhomboidal ſhape, and ſome roundiſh. Theſe are a few, out of a great number of experiments, made by the accurate Leewenhoek, and ſince repeated by other obſervers. The reſt, with the figures of theſe ſhoots, are publiſhed at large in the Philoſophical Tranſactions. *Lime* makes the greateſt improvement upon light ſandy lands, or upon a dry gravel; but a cold clay ſeldom is much benefited by it. If it be mixed with dung, or with mud, drawn from the bottom of the rivers, it makes an excellent mixture, eſpecially where the ſoil is very ſandy; and in Weſtmoreland they procure fine crops of barley from their ſandy lands, by manuring them with *lime* and cow-dung mixed together. The nature of *lime* on land is like that of chalk, it works downwards, as the farmers expreſs it: it is therefore beſt to treat it in the ſame manner, laying it upon a lay the year before it is to be plowed up. *Lime* is reckoned to make corn grow with a thin huſk; but it is not a laſting manure, ſeldom holding for more than five crops. When *lime* is uſed to land, which lies upon a deſcent, it ſhould be mixed with dung, and laid principally on the higher part of the land; the conſequence of which will be, that the rain will waſh out the virtue of the *lime* and dung together, and carry the whole to the lower parts as it runs down. Dung and *lime* mixed together will do better for any land than either of them alone.

All *lime* is a very good manure, but that made of ſtone is much better than what is made of chalk. The common allowance is a buſhel to a pole ſquare, or a hundred and ſixty buſhels to an acre.

This they cover with earth, and ſo leave it till the rains fall and ſlake it, and after that they ſpread it as evenly as poſſible upon the ground. They always find that if it be carried hot out of the kiln, and laid upon the land to cool, it does much better than in any other way.

The improvement it makes upon land is owing chiefly to its heat, and the ſalt it contains. It is in much the ſame manner that coal-aſhes, and the ſoot of coal become uſeful upon the like ſort of lands; but the farmers always find that a mixture of good earth and *lime*, that has lain a conſiderable time together, is better for this purpoſe than freſh *lime* alone. Moreton's Northampt. p. 481.

Lime, *bird*. See Bird-*lime*.

Lime, *cream of*. See Cream.

Lime-*galls*, in *Natural Hiſtory*, a ſort of *galls* or vegetable protuberances, formed on the edges of the leaves of the *lime*-tree in ſpring time; they are very common in the plantations of *limes*, and are irregularly ſhaped, but uſually oblong and rugged, and of a reddiſh colour, they occupy only the edges of the leaves, and are of a red colour, ſometimes very beautiful. As theſe are very plentiful, Mr. Reaumur was of opinion, that they might be of ſervice in the dying trade; he made trial by rubbing them on ſome parts of his linen, and found that they gave a very beautiful red colour, which did not come out in the firſt waſhings afterwards. It is extremely probable, that there wants only inquiry to prove that we have many valuable productions of this kind, which, though diſregarded at preſent, might prove of great uſe in the ſeveral mechanical arts as well as in medicine.

Theſe *galls* of the *lime* leaves are formed by a worm, which inhabits them during its term of life, being found in them of all ſizes, from the moſt minute to that of the full growth, which is about half an inch in length; but when its period of life, as a worm, draws near, it deſerts this habitation, and goes elſewhere to paſs into its chryſalis ſtate. This alſo is the caſe with the worms that inhabit many *galls*, which are frequently found to contain them in the worm ſtate, but never in that of the chryſalis, which they always paſs into elſewhere.

Beſides theſe *galls* of the leaves of the *lime*-tree, they have ſometimes another appearance not leſs ſingular, and this is alſo owing to an inſect; though many curious obſervers have miſſed the finding it there. In this ſtate the whole leaf of the *lime*-tree reſembles a common ſpoon, being ſunk into a hollow in the middle, and in its pedicle making the handle. The edge of the leaf in this caſe is always tumid, and forms a rib or ridge, running round the whole circumference in the ſhape of a chord: this is uſually found during the time that the leaf is growing to its ſize, and to this is owing the whole figure it aſſumes afterward; for the leaf being unable to extend itſelf farther toward the circumference by reaſon of this ring, naturally forms a ſort of hollow or baſon in its ſucceeding growth. The protuberance, in this caſe, ſurrounding the leaf is a kind of *gall*, and owes its origin in the manner of all the other excreſcences of that kind to an inſect. This, however, has been ſought for in vain by many, who inquired after it too late; but Mr. Reaumur ſearching the leaves in the beginning of May, found in every protuberance of this kind, ſeveral ſmall worms of a white colour, and conſiderable length, though not exceeding a horſe-hair in thickneſs. The reaſon that theſe are not found in the ſame place afterwards, probably, is, that they either go out of it, as the inhabitants of many other *galls* do, in order to paſs into their chryſalis ſtate, or elſe that this life in the worm ſtate, and the duration of that in the chryſalis, are both very ſhort, and that they have generally eſcaped in the form of flies before the time that they are ſought for in the leaves. See *Tab. of Inſects*, Nº 27. and Reaumur's Hiſt. of Inſ. vol. vi. p. 189.

Lime-*kiln*. See Kiln.

Lime-*ammoniacal*, a kind of phoſphorus, invented by Mr. Homberg, and made of ſal ammoniac and lime. See *Ammoniacal* Phosphorus.

Lime, *in Botany*. See Lemon.

Lime, *brook*. See Brook-*Lime*.

Lime-*ſtone*, *lapis calcarius*, is a ſtone of a coarſe grain, which being burnt in a kiln, makes an ingredient in mortar, plaiſter, &c.

Lime-*tree*, or **Linden**-*tree*, *tilia*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the flower has a concave coloured empalement, which is cut into five parts; it has five oblong blunt petals, which are crenated at their points; and many awl-ſhaped ſtamina, terminated by ſingle ſummits; it has a roundiſh germen, ſupporting a ſlender ſtyle of the length of the ſtamina, crowned by an obtuſe five-cornered ſtigma; the germen becomes a thick globular capſule with five cells, opening at the baſe with five valves, each containing one roundiſh ſeed. There are four ſpecies according to Miller, and two in the Linnæan ſyſtem.

The ſeveral ſpecies of the *tilia* or *lime-tree* are all eaſily propagated by layers, which in one year will take good root, and ſhould then be removed to the nurſery, planting them at two fee tdiſtance in rows, and the plants two feet aſunder in each row. The beſt ſeaſon for removing them is Michaelmas. They ſhould remain four or five years in the nurſery, and ſhould afterwards be removed to the places where they are to remain. The ſoil they love is a ſtrong fat loam, in which they grow very faſt.

The timber of the *lime-tree* is uſed by the carvers, becauſe it is a ſoft light wood; and alſo by architects for framing the models of their buildings: the turners likewiſe uſe it for making light bowls, diſhes, &c. but it is too ſoft for any ſtrong purpoſes. Miller.

Lime-tree flowers are ſuppoſed to have an anodyne and anti-ſpaſmodic virtue: Hoffman ſeems to entertain a great opinion of them in theſe intentions, and as his theory deduces moſt diſeaſes from ſpaſms and ſpaſmodic ſtrictures, they are accordingly very frequent in his preſcriptions. He ſays he knew a chronicle epilepſy cured by the uſe of an infuſion of them drank as tea.

Lime-*water*. The general opinion of *lime* acting as a cauſtic, and conſuming the bodies it was made to act upon, by means of the great quantity of particles of fire it contained, long denied any preparation of it a place among internal medicines; at length water poured upon it was found to take in a part of its virtues, and to be a valuable medicine, and very ſafely to be given internally in large quantities.

For this purpoſe, a gallon and a half, or two gallons of water, are poured by degrees upon a pound of freſh burnt *quick-lime*; the veſſel ſhaken when the ebullition ceaſes, and then ſet by, till the undiſſolved *lime* has ſettled; after which, the liquor is poured off, and paſſed through a filter. Only a ſmall portion of the *lime* is diſſolved by the water, and the remainder gives a ſtrong impregnation to large quantities of freſh water, though not ſo ſtrong as the firſt; great part remaining at laſt undiſſolved: this reſiduum, calcined again, becomes *quick-lime* as before; and by repetitions of this proceſs, nearly the whole may be diſſolved. The ſolution has a ſtrong, ſtyptic taſte; and its effects in chemical mixtures are ſimilar to thoſe produced by *quick*-Lime. In veſſels quite filled with *lime-water*, and exactly cloſed, it may be kept unchanged for many months; but in open veſſels, the calcareous matter ſoon ſeparates from the aqueous fluid, and forms a cruſt or Cream upon the ſurface, inſipid and indiſſoluble as the earth in its natural ſtate, and again convertible into *quick-lime* by repeated calcination. It is obſerved, that the quantity of calcareous matter that is thus ſeparated from *lime-water*, is even greater than it ought to be, if it was exactly proportioned to the evaporation of the water; the cauſe of which is, that the quick-lime gradually recovers from the air as much gas as is neceſſary to deprive it of its properties of *quick-lime*, and to reſtore it to its ſtate of ſimple calcareous earth, mild, efferveſcing, and unſoluble in water. Hence, *lime-water*, by long expoſure to air, loſes much of its ſtrength, and at laſt becomes almoſt inſipid. It is neceſſary alſo, when this liquor is employed as a menſtruum, to add ſome *quick-lime* in ſubſtance, in order to continue the impregnation of the water with the *lime*.

All *lime* is not equally good for the making this water; but the ſeveral kinds differ, according to the ſubſtances they are made from. In Holland they at this time make *lime* of ſea-ſhells, which they find in vaſt abundance on their ſea-ſhores. This was alſo a practice in the time of Dioſcorides; but the *lime* thus made is not fit for making *lime-water*. The water made from it does not keep long, and is leſs ſtyptic, and ſweetiſh to the taſte, and is greatly inferior to the water made with *lime* burnt from ſtones. The newer the *lime* is, the leſs it has been expoſed to the air, and the drier it has been kept, and finally, the more it has held together without crumbling, or mouldering to powder, the better it is for making *lime*-water. Mem. Acad. Par. 1700.

It appears now from the ingenious Dr. Alſton's experiments, that one part of quick-*lime* is ſufficient for five or ſix hundred parts of water. Water will diſſolve but a certain portion of quick-*lime*; and how much that is cannot be eaſily aſcertained. So far ſeems certain from Dr. Alſton's experiments, that one pound of quick *lime* is ſufficient for making ſix hundred pounds of good *lime-water*: and that thoſe who with Charas have ſuppoſed, that the ſecond and third *lime-water* is weaker than the firſt, have been led into an error by the ſmall quantity of water they uſed. And it has been generally believed, that in order to obtain good *lime-water*, the quick-*lime* muſt not only be recent and fully calcined, but alſo for one part of quick-*lime* only eight, ten, or, at moſt twelve parts of water taken; as if it could impregnate no more. But the Doctor ſays he has found by many experiments, that it is alogether indifferent whether the water be hot or cold, poured on gradually, or at once, the water poured on the *lime*, or the *lime* thrown into the water; whether the quick-*lime* be in ſhells, or flaked; or even expoſed to the air for ſeveral months, for ſuch quantities of the water as are commonly uſed; and if the quick-*lime* be freſh, whether for one pound of it, eight, ten, twenty, fifty, or five hundred pounds of water be taken. Only it is neceſſary, even for the firſt water after the ebullition is over, to ſtir and mix the *lime* with the water, and allow it time to impregnate itſelf; which is beſt known by the cruſt formed on its ſurface. Filtration indeed is not neceſſary, if it be not to prevent any undiſſolved *lime* being mixed with it; or cruſts diminiſhing its tranſparency.

The Doctor, for his own uſe, poured about eight pounds of boiling water upon a pound of ſtone quick-*lime* in a glazed earthen veſſel. He drank about a pint and an half of this *lime-water*, daily for about ſixteen months; filling up the veſſel, when neceſſary, with freſh water, ſometimes hot and ſometimes cold, without obſerving any difference in the *lime-water*, which he conſtantly filtered through grey paper, before he drank it. He obſerved, that the *lime* was not exhauſted after two years and two months, nor was the water ſenſibly weaker, when it ſtood a ſufficient time on the *lime*, which he knew by the cruſts that were formed. But the *lime* becoming conſiderably lighter, after it is long thus uſed, it at length requires ſeveral days to ſubſide, and form the cruſts, and after the cruſts are formed, it does not leave half the water clear, as it did at firſt. On the whole, this ſingle pound of *lime* afforded the Doctor about ſix hundred pounds of *lime-water*. He adds, that having taken lime-*water* made indifferently of *lime* ſtone, or of chalk, or of ſhells, and ſometimes made of all the three together, he was never able to diſcover any difference in their effects. But ſo much *lime-water* is not to be obtained from *quick-lime*, unleſs it be freſh, completely calcined, and free from heterogeneous ſubſtances; for if defective in any of theſe, it will yield proportionably leſs *lime-water*. Lewis's Mat. Med. and Chem. Dict.

M. Burlet has given an ample account of its effects in the French Memoirs, chiefly from its own experience. But he obſerves, it ſucceeded much better in Holland, &c. than in France. It is a powerful alterant, and, like a pure alkaline water, fitted to blunt and deſtroy acid ferments, which are the principles of all obſtructions, and the cauſe of moſt chronic diſeaſes. Its principal uſe is in cachexies, green-ſickneſs, dropſy, ſcurvy, obſtructions of the liver, ſpleen, &c.

Experience has ſhewn *lime-water*, to be an excellent medicine in many caſes; in the gravel and ſtone particularly. And it has alſo been found very ſerviceable in the gout, in habitual relaxations of the bowels, and in other caſes of relaxation. In ſome kinds of the ſcurvy likewiſe it is of uſe; and is often applied with ſucceſs, externally, to ulcers, &c.

Fabricius ab Aquapendente aſſures us, he cured a ſcirrhous ſpleen, and the dropſy, by a continued uſe of ſponges dipped in common *lime-water*, and placed near the part affected. Boyle's Works abr. vol. i. p. 80.

Lime-water, which was long looked on as a cauſtic, was, in the laſt century, found to be a very ſafe and valuable remedy. It is uncertain who firſt ventured to give it inwardly, but Willis, Bates, and Moreton, ſeem to have uſed it much.

Lime-water kills worms, and many other, if not all, inſects. Hence, Dr. Alſton concludes, it might prove a good anthelmintic for children; and experience has confirmed this notion.

It is probable, that *lime-water* may be of great uſe in long ſea-voyages, in preventing the corruption of water, or inſects breeding in it, as well as curing the diſeaſes to which ſea-faring people are moſt ſubject. The experiment is certainly ſafe, eaſy, and attended with no expence; one pound of freſh well-burnt quick-lime of any kind being enough for a hogſhead of water, which may not only be uſed for common drink by the diſeaſed, or for prevention by the healthy; but alſo by boiling and expoſing it to the air for a ſhort time, it may be reduced to ſweet water, and uſed in dreſſing the victuals of the moſt delicate.

The virtues of *lime-water* do not depend on its abſorbency; and it may as juſtly be called antalkaline, as antacid.

Lime-water prevents or long protracts the putrefaction of animal ſubſtances. Dr. Alſton alſo thinks that *quick-lime* in a ſhip's well, would effectually prevent the corruption of the water, and conſequently the putrid ſteams, or foul air, thence ariſing, which ſometimes prove fatal to the crew.

The virtues of *lime-water* outwardly applied in many diſeaſes of the ſkin, in excoriations, ulcers, gangrenes, &c. are well known. Perhaps there is not a better gargariſm for ſeveral ſorts of ſores in the mouth and throat than *lime-water*. It has alſo been known to be of great uſe in the tooth-ach. Inwardly taken, *lime-water* has all the virtues of pure element, which are not a few; and on which probably depend the good effects of mineral waters, more than on the minerals they contain. Dr. Alſton never found it cauſed thirſt; on the contrary, he found it quenched thirſt, as well as ſimple water, and cuſtom rendered it agreeable. *Lime-water* is notably detergent and attenuating, even more ſo than ſoap itſelf, of mucous, viſcid, and other animal ſordes, which makes it preferable, in many caſes, to the pureſt, as well as to mineral waters. In a word, *lime-water* may be ſaid, in general, to purify the blood with as good reaſon, as any one medicine whatever, eſpecially from any putrid, purulent, or ſcorbutic foulneſſes.

Dr. Lewis obſerves, that *lime-water*, drank to the quantity of a quarter of a pint three or four times a day, has been found ſerviceable in ſcrophulous complaints, fluxes, ſeminal weakneſſes, and other diſorders proceeding from an impurity of the fluids, or laxity and debility of the ſolids. It generally promotes urine; oftentimes the cuticular diſcharge; and where the ſtomach is oppreſſed with viſcid phlegm, expectoration. It for the moſt part binds the belly, and ſometimes occaſions a troubleſome coſtiveneſs, unleſs this effect be occaſionally provided againſt by the interpoſition of proper laxatives. It anſwers beſt in cold, ſluggiſh, phlegmatic, and corpulent habits; and is to be uſed more cautiouſly in hot, bilious diſpoſitions, and where the patient is much emaciated, or the appetite weak, and at the time of any critical or periodical evacuation. It has been cuſtomary to impregnate *lime-water* with different materials, partly for rendering it more acceptable to the palate and ſtomach, and partly for improving its medicinal efficacy againſt cutaneous defedations. The college of Edinburgh directs, in this view, three ounces of the ſhavings of the wood and bark of ſaſſafras, one ounce and a half of ſhaved liquorice, and four drams and a half of bruiſed nutmegs; the college of London, half an ounce of ſaſſafras bark, and one ounce of liquorice, with the addition, in ſome caſes, of four ounces of raſped guaiacum wood, and three drams of coriander ſeeds; to be macerated for four days in three quarts of *lime-water*, and the liquor ſtrained off for uſe. Theſe infuſions are taken in the ſame quantities as the ſimple *lime-water*, by themſelves, or with the addition of milk. Lewis's Mat. Med.

But Dr. Macbride obſerves, that the activity of *lime-water* is impaired by infuſing vegetable ſubſtances therein, which contain much fixed air, ſuch as the guaiacum or ſaſſafras; for theſe woods, abounding in reſin, give out their cementing principle, which, uniting with the diſſolved *quick-lime* reſtores it to its original ſtate of an inactive calcareous earth: therefore, when it is intended that theſe woods, or any other ſubſtance of the like nature, ſhould give out their virtue to *lime-water*, and that the water ſhould, at the ſame time, contain its due proportion of diſſolved *lime*, ſome *quick-lime* ought to be added, during the time of maceration. He alſo obſerves, that as milk contains a large proportion of fixed air, it ought not to be mixed with *lime-water*, ſince it muſt neceſſarily take off from its activity. To the ſame purpoſe, Dr. Alſton has obſerved, that there is ſcarce any thing that is uſually mixed and given along with *lime-water*, that does not, more or leſs, deſtroy its efficacy; for which reaſon he recommended it always to be taken alone. Macbride's Eſſays, p. 250. 271.

It is obſerved by Dr. Lewis, that *lime-water* diſſolves, by the aſſiſtance of heat, mineral ſulphur, vegetable oils and reſin, and animal fats. Its extracts alſo, in the cold, the virtues of ſundry reſinous and oily vegetables, aad diſſolves thick phlegm, and mucous matters, and the curd of milk, with which laſt it forms a white liquid, nearly ſimilar to milk in its natural ſtate. But the diſſolvent power of *quick-lime* has been evinced by Dr. Macbride, and ſhewn to extend to a variety of different ſubſtances, as camphor, myrrh, gum guaiacum, aſa fœtida, aloes, caſtor, balſam of Tolu, maſtich, jalap, and the cortex Peruvianus, which were found to yield ſtrong ſolutions and tinctures; and theſe, he ſays, are more elegant medicines, and perhaps may be found more efficacious than the ſpiritous tinctures, ſince they will never become turbid, or ſeparate on being mixed in any watery vehicle. And ſince the ſolvent power of *quick-lime* is found to depend on its depriving certain ſubſtances of that fixed air, which is their cementing principle, it was natural to imagine that it might be uſefully applied to the ſolution of the human calculus or ſtone.

Of all the various ſubſtances examined by Dr. Hales, with a view of determining their reſpective quantities of fixed air, the human calculus was found to contain the largeſt proportion; above one half of this maſs conſiſting of fixed air. Nevertheleſs, if the cauſtic alkali, or *lime-water*, could be ſafely conveyed to it, theſe would abſorb the fixed air, and the earthy parts, deprived of what bound them together, muſt preſently fall to pieces. That *lime-water* is lithontriptic, has been ſhewn ſufficiently by Dr. Hales, and more fully by Dr. Whytt. See his Eſſay on the Virtues of *Lime-water*, in the Cure of the Stone, and Edinb. Eſſ. &c. vol. i. art 13. p. 383. vol. v. art. 69.

This gentleman prefers calcined oyſter-ſhell *lime-water* to any other; which, he ſays proves a more active menſtruum for this concrete than that made from the ſtone *lime*; the diſſolving power of the oyſter-ſhell *lime-water* ſeeming, from Dr. Whytt's experiments, to be more than double to that of the ſtone *lime-waters*. Dr. Alſton ſeems to think this a matter of indifference; and was himſelf cured chiefly by the ſtone *quick-lime water* before mentioned. This lithontriptic quality of *lime-water* has been farther confirmed by Dr. Alſton, who has ſhewn the efficacy of *lime-water* in this reſpect, not only when made by the firſt infuſion, and aſſiſted by artificial heat, but even after fifty or more infuſions, and in the common air. The doctor thinks that the energy of *lime-water* in this caſe probably conſiſts in its penetrating detergency, whereby inſinuating itſelf among the ſolid parts of the calculi, or into their pores, it ſeparates them, or, diminiſhes their coheſion, but does not diſſolve them. See LITHONTRIPTICS.

But the efficacy of *quick-lime* and cauſtic alkali in this intention, is now known to depend principally, if not entirely, on its power of abſorbing the air, which binds caculous ſubſtances together. However, the alkali, when combined with oil, and made into ſoap, is not only ſo greatly obtunded thereby, as to loſe much of its power, but the ſoap itſelf is ſo nauſeous, that few perſons can be induced to take it in a quantity ſufficient to prove of much effect: it would, therefore, be a happy diſcovery if any vehicle could be found out that would ſheathe the acrimony of the cauſtic alkali, ſo as to allow it to be taken in large and continued doſes. Poſſibly, ſays Dr. Macbride, veal broth, or a decocton of marſhmallow-roots, might be found to anſwer this purpoſe; and *lime-water* might be taken at the ſame time, which would not at all interfere with the operation of the alkali, but rather add to its activity. Dr. Chittick's noſtrum, which is found, after a perſeverance of ſome months, actually to diſſolve the ſtone, as ſaid to be nothing more than the cauſtic alkali, given in veal broth. But *lime-water*, when taken alone, muſt often fail in producing any conſiderable effect as a lithontriptic, becauſe it will loſe much of its power, as Dr. Macbride has ſhewn, from the fixed air of the alimentary ſubſtances in the firſt paſſages, who, therefore, recommends it to be drank when the ſtomach is empty; and alſo, as Dr. Whytt and Dr. Macbridge have proved by experiments, from the fixed air of the urine itſelf, which will ſaturate great part of the *quick-lime*, even when it hath reached the bladder. Macbride's Eſſays, eſſ. v. paſſim.

Since there is but a ſmall proportion of *lime* in the water, it may be thought that taking a few grains of the *quick-lime* in ſubſtance, would prove much more effectual in the ſtone than large quantities of *lime-water*. But this is a miſtake; and hence Mrs. Stephens's egg-ſhells and ſnail-ſhells, if burnt to *quick-lime*, can never be equally ſucceſsful with *lime-water* for the STONE.

As for the *aquæ benedictæ compoſitæ*, or *compound lime-waters*, they are not to be compared with ſimple *lime-water* in the gravel; nor, in Dr. Alſton's opinion, in any diſeaſe requiring this water.

The doctor adds, in his appendix, that though he cannot yet determine how far *lime-water* may be proper, even in acute diſtempers, yet he has found it ſafe in feveriſh colds; and by the caſes he there mentions, it ſeems probable that *lime-water*, by its diluent and diuretic qualities, may prove more uſeful in fevers than is at preſent believed.

However this may prove on farther trials, it may be ſaid, in general, that *lime-water*, is diluent, detergent, antiſeptic, anthelmintic, diuretic, and vulnerary; uſeful in all diſeaſes proceeding from, or accompanied with obſtructions in the bowels or glands, viſcid phlegm, calculous concretions or putrefaction; and commended for the ſcurvy, ſcrophulæ, gravel, conſumptions, empyema, aſthma, arthritis vaga, œdematous ſwellings, diabetes, fluor albus, fluxes, &c. and outwardly for diſeaſes of the ſkin, ulcers, gangrenes, &c. It may be taken to the quantity of a pound, once, twice, or thrice a day; or uſed for common drink. See Dr. Alſton's Diſſertation or *Quick-lime*, and *Lime-water*. Edinb. 1752.

LIMER, or LIME-*hound*. See *Blood*-HOUND.

LIDEUM, in *Botany*, a genus of the *heptandria digynia* claſs. Its characters are, that the calyx is compoſed of five leaves; that it has five equal petals; and that the fruit is a globular capſule, with two cells. There is only one ſpecies.

LIMIT *of diſtinct viſion*, in *Optics*. See *Diſtinct* VISION.

LIMITATION, *limitatio*, in *Law*, is a certain time aſſigned by ſtatute, within which an action muſt be brought; and *limitation* of time is two-fold; viz. to make title to an inheritance by the common law; and in writs by ſeveral ſtatutes. There is a *limitation* in real and perſonal actions; and in the former, he that will ſue for any lands or hereditaments, ought to prove that he or his anceſtors were ſeiſed of the lands ſued for by writ of aſſize, or he cannot maintain his action; and this is called *limitation* of aſſize. Stat. Weſt. 1.

The 21 Jac. I. cap. 16. ordains, that all writs of formedon, &c. for title to lands *in eſſe*, ſhall be ſued and proſecuted within twenty years after the title had; but there is a proviſo in the ſtatutes, to relieve infants, feme coverts, perſons beyond ſea, or in priſon, and the heirs of ſuch perſons ſo as they commence their ſuits within the times limited after their impediments are removed.

By ſtatute, actions of debt, actions upon the caſe, except for words, actions of account (except concerning merchandize), of detinue, trover, and treſpaſs, are to be commenced within ſix years aſter the cauſe of action, and not after; actions of aſſault and battery, wounding and impriſoning, within four years; and for ſlander within two years after the cauſe of action, &c. 21 Jac. I. cap. 16.

LIMITATION *of eſtate*, in a legal ſenſe, imports how long the eſtate ſhall continue, or is rather a qualification of a precedent eſtate. As where one doth give lands to a man to hold to him and his heirs male, and to him and the heirs female, &c. here the daughters ſhall not have any thing in it, ſo long as there is a male; for the eſtate to the heirs male is firſt limited. Co. Lit. 313.

LIMITATION *of the crown*. The ſtatutes 1 W. and M. cap. 8. 12 W. III. cap. 2. and 1 & 2 Ann. cap. 17. 4 Ann. cap. 8, &c. are acts for the *limitation of the crown*, and ſettling it on proteſtant heirs in the houſe of Hanover. See CROWN.

LIMITED *problem*, is that which admits but of one ſolution, or which can only be ſolved one way: as to make a circle paſs through three points given, not lying in a right line, to deſcribe an equilateral triangle on a line given, &c. See PROBLEM, and DETERMINATE.

LIMITROPHOUS *column*. See COLUMN.

LIMITS, in *Mathematics*, is ſometimes uſed, in general, for quantities, one of which is greater, and the other leſs than another quantity. Thus, in the quantities a, x, b, if a be leſs than x, and b be greater than x, a and b are ſaid to be *limits* of x. The word occurs in this ſenſe, when we ſpeak of the *limits* of the roots of equations.

Sometimes a quantity is ſaid to be a *limit* between two others, when it is greater than the one and leſs than the other. So a ratio is ſaid to be a *limit* between two other ratios, when it is greater than the one and leſs than the other.

But *limit* is often uſed in a more reſtricted ſenſe; thus, when a variable quantity approaches continually to ſome determinate quantity, and may come nearer to it than to have any given difference, but can never go beyond it; then is the determinate quantity ſaid to be the *limit* of the variable quantity.

Hence, the circle may be ſaid to be the *limit* of its circumſcribed and inſcribed polygons; becauſe theſe, by increaſing the number of their ſides, can be made to differ from the circle leſs than by any ſpace that can be propoſed, how ſmall ſoever.

The *limit* of a variable ratio, is ſome determinate ratio, to which the variable ratio may continually approach, and come nearer to it than to have any given difference, but can never go beyond it. Hence, the ratio of the ordinate to the ſub-tangent of a curve, is ſaid to be the *limit* of the variable ratio of the differences of the ordinates, to the differences of the abſciſſæ.

The word *limit*, in this ſenſe, ſignifies the ſame as what ſir Iſaac Newton calls a firſt or prime, and a laſt or ultimate ratio.

There are two caſes of a variable quantity, or variable ratio, tending to ſuch a *limit*, as we have been deſcribing

In the firſt caſe, the variable quantity, or ratio, will not only approach to its *limit* within leſs than any given differences, but will actually arrive at its *limit*.

In the ſecond caſe, the variable quantity, or ratio, will only approach its *limit* within leſs than any given difference, but will never actually arrive at it.

Sir Iſaac Newton, to avoid the harſhneſs of the hypotheſis of indiviſibles, and the tediouſneſs of demonſtrations, according to the method of the ancients, by deductions *ad abſurdum*, has premiſed ſeveral lemmata, in the firſt ſection of the firſt book of his Principles, relating to the firſt and laſt ſums, and ratios of naſcent and evaneſcent quantities; that is, to the *limits* of ſums and ratios. This doctrine chiefly depends on the firſt of thoſe lemmata; the words of which are, *Quantitates ut & quantitatum rationes, quæ ad æqualitatem tempore quovis finito conſtanter tendunt, & ante finem temporis illius propius ad invicem accedunt quam pro data quavis differentia, fiunt ultimo æquales.*

The learned gentlemen, who have written in defence of ſir Iſaac, againſt the author of the Analyſt, are not agreed among themſelves as to the preciſe meaning of this lemma. One of thoſe gentlemen ſays, that the genuine meaning of this propoſition is, that thoſe quantities are to be eſteemed ultimately equal, and thoſe ratios ultimately the ſame, which are perpetually to each other, in ſuch a manner, that any difference, how minute ſoever, being given, a finite time may be aſſigned, before the end of which, the difference of thoſe quantities, or ratios ſhall become leſs than that given difference. See Preſ. State of the Rep. of Letters for Oct. 1735, and for Oct. 1736.

What ſir Iſaac Newton intends we ſhould underſtand by the ultimate equality of magnitudes, and the ultimate indentity of the ratios propoſed in this lemma, will be beſt known from the demonſtration annexed to it. By that it appears, ſir Iſaac Newton did not mean, that any point of time was aſſignable, wherein theſe varying magnitudes would become actually equal, or the ratios really the ſame; but only that no difference whatever could be named, which they ſhould not paſs. The ordinate of any diameter of an hyperbola, is always leſs than the ſame continued to the aſymptote; yet the demonſtration of this lemma can be applied, without changing a ſingle word, to prove their ultimate equality. The ſame is evident from the lemma immediately following, where parallelograms are inſcribed, and others circumſcribed to a curvilinear ſpace. Here the firſt lemma is applied to prove, that by multiplying the number, and diminiſhing the breadth of theſe parallelograms *in infinitum*, that is, perpetually and without end, the inſcribed and circumſcribed figures become ultimately equal to the curvilinear ſpace, and to each other; whereas, it is evident, that no point of time can be aſſigned, wherein they are actually equal; to ſuppoſe this were to aſſert, that the variation aſcribed to the figures, though endleſs, could be brought to a period, and to be perfectly accompliſhed; and thus we ſhould return to the unintelligible language of indiviſibles. The excellence of this method conſiſts in making the ſame advantage of this endleſs approximation towards equality, as by the uſe of indiviſibles, without being involved in the abſurdities of that doctrine. In ſhort, the difference between theſe two may be thus explained.

There are but three ways in nature of comparing ſpaces; one is by ſhewing them to conſiſt of ſuch, as by impoſition on each other will appear to occupy the ſame place: another is, by ſhewing their proportion to ſome third and this method can only be directly applied to the like ſpaces as the former; for this proportion muſt be finally determined by ſhewing when the multiples of ſuch ſpaces are equal, and when they differ: the third method to be uſed where theſe other two fail, is by deſcribing upon the ſpaces in queſtion ſuch figures as may be compared by the former methods; and thence deducing the relation between thoſe ſpaces, by that indirect manner of proof, commonly called *deductio ad abſurdum*; and this is as concluſive a demonſtration, as any other, it being indubitable, that thoſe things are equal, which have no difference. Thus Euclid and Archimedes demonſtrate all they have written concerning the compariſon and menſuration of curvilinear ſpaces. The method advanced by ſir Iſaac Newton for the ſame purpoſe differs from their's, only by applying this indirect form of proof to ſome general propoſitions, and from thence deducing the reſt by a direct form of reaſoning. Whoever compares the fourth of ſir Iſaac Newton's lemmas with the firſt, will ſee, that the proof of the curvilinear ſpaces, there conſidered, having the proportion named, depends wholly upon this, that if otherwiſe the figure inſcribed within one of them, could not approach, by ſome certain diſtance, to the magnitude of this ſpace: and this is preciſely the form of reaſoning, whereby Euclid proves the proportion between the different circles. As this method of reaſoning is very diffuſively ſet out in the writings of the ancients; and ſir Iſaac Newton has here expreſſed himſelf with that brevity, that the turn of his argument may poſſibly eſcape the unwary, the reading of the ancients muſt be the beſt introduction to the knowledge of his method. The impoſſible attempt of comparing curvilinear ſpaces, without having any recourſe to the forementioned indirect method of arguing, produced the abſurdity of indiviſibles.

As the magnitudes, called in this lemma ultimately equal, may never abſolutely exiſt under that equality; ſo the varying magnitudes holding to each other the variable ratios, here conſidered, may never exiſt under that, which is here called the ultimate ratio. Of this ſir Iſaac Newton gives an inſtance, from lines increaſing together by equal additions, and having from the firſt a given difference. For the ultimate ratio of theſe lines, in the ſenſe of this lemma, as ſir Iſaac Newton himſelf obſerves, will be the ratio of equality, though theſe lines can never have this ratio: ſince no point of time can be aſſigned, when one does not exceed the other.

In like manner, the quantities called by ſir Iſaac Newton vaniſhing, may never ſubſiſt under that proportion here eſteemed their ultimate.

In the caſe of drawing tangents to curves, where the ordinate bears the ſame proportion to the ſubtangent, as that wherewith the difference of the ordinates, to the difference of the abſciſſæ, vaniſh; theſe lines muſt not be conceived, by the name of an evaneſcent, or any other appellation, ever to ſubſiſt under that proportion: for ſhould we conceive theſe lines, in any manner, to ſubſiſt under this proportion, though at the inſtant of their vaniſhing, we ſhall fall into the unintelligible notion of indiviſibles, by endeavouring to repreſent, to the imagination, ſome inconceivable kind of exiſtence of theſe lines between their having a real magnitude, and becoming abſolutely nothing. Sir Iſaac Newton was himſelf apprehenſive, that this miſtake might be made; for as he thought fit (in compliance with the bad taſte which then prevailed) to continue the uſe of ſome looſe and indiſtinct expreſſions reſembling thoſe of indiviſibles, for which he has himſelf apologized, he expreſly cautions us againſt miſinterpreting him in this manner, when he ſays: *Si quando dixero quantitates quam minimas vel evaneſcentes, vel ultimas, cave intelligas quantitates magnitudine determinatas, ſed cogita ſemper diminuendas ſine limite.* Thus expreſly has he declared to us, that vaniſhing quantities, or whatever other leſs accurate appellation he names them by, are to be conſidered as indeterminate quantities bearing to each other under their different magnitudes, different proportions; which the quantities themſelves can never obtain, and the *limit* of theſe proportions is that, for the ſake of which theſe quantities are conſidered: inſomuch, that ſince theſe quantities have different proportions, while they obtain the name of vaniſhing quantities, the term ultimate is neceſſarily added to denote that proportion, which is the *limit* of an endleſs number of varying ones. The like remark is neceſſary, when theſe quantities are conſidered in the other light, as ariſing before the imagination: for then the proportion intended muſt be ſpecified, by calling it the firſt, or prime proportion of theſe quantities. And as this additional epithet is neceſſary to expreſs the proportion intended, ſo it is abſurd to apply it to the quantities themſelves; as ſir Iſaac Newton ſays, there are *rationes primæ quantitatum naſcentium*, but not *quantitates primæ naſcentes*. Philoſoph. Tranſactions, N° 342, p. 205.

So that, according to the author we have been quoting, all the examples given by ſir Iſaac in the before mentioned ſection, are to be underſtood of ſuch *limits* or ultimate ratios, as are never attained to by the quantities and ratios limited, but to which theſe may approach indefinitely, that is, ſo as to differ leſs than by a given quantity.

On the other hand, a learned gentleman, who aſſumed the name of *Philalethes Cantabrigienſis*, thinks that ſir Iſaac means, by the words of the lemma, and proves, in his demonſtration, not that the quantities or ratios are barely to be conſidered as ultimately becoming equal, or are to be eſteemed as ultimately equal; though, in reality, they can never have that proportion to each other; but that they do at laſt become actually, perfectly, and abſolutely equal. Pref. State of the Republic of Letters for November 1735, p. 371.

He alſo diſtinguiſhes, as above, between quantities and ratios which arrive at their *limits*, and thoſe which do not. And it is inſiſted on, that every one of the examples given in the lemmata of this firſt ſection of the firſt book of ſir Iſaac's Principles, are of ſuch quantities and ratios as actually arrive at their reſpective *limits*; nor is there an inſtance there given of a quantity, or ratio, which never arrives at its *limit*, except one at the latter end of the ſcholium of this ſection (and that by way of illuſtration of a particular objection only) of two quantities, having a given difference, and being equally increaſed, *ad infinitum*, and whoſe ratio, it is admitted, never arrives at its *limit*. But decreaſing quantities may really, and, in fact, be diminiſhed *ad infinitum*: for they may vaniſh and come to nothing. The ratio therefore of theſe, ſays hc, may arrive at its *limit*, though that of the others cannot.

Neither are theſe learned gentlemen agreed as to the ſenſe of the word *vaniſhing* or *evaneſcent*, in the ſcholium of this firſt ſection of ſir Iſaac's Principles.

The queſtion is, whether the quantities that vaniſh, are underſtood ro ſpend ſome finite time in vaniſhing, or to vaniſh in an inſtant, or point of time; and conſequently, whether they bear to one another an infinite number of different ſucceſſive ratios during the vaniſhing, or one ratio only, at the point, or inſtant of their evaneſcence.

This laſt is the ſenſe in which *Philalethes* takes the word evaneſcent, or vaniſhing; and the diſpute, on this head, as he obſerves, is of no other conſequence than to determine, whether the ſenſe in which he uſes the word be agreeable to ſir Iſaac Newton's. For, if the quantities vaniſh in an inſtant, I take the only ratio with which they vaniſh; or they ſpend a finite time in vaniſhing, and I take the laſt of the ratios, which they ſucceſſively bear to one another during that time; ſtill the ratio, taken in either of theſe caſes, will be one and the ſame. Preſent State of the Republic of Letters for November 1735, p. 383, 384.

We cannot pretend to give the whole detail of this controverſy, but muſt refer the curious to the Preſent State of the Republic of Letters for 1735. We ſhall only obſerve, that this diſquiſition is partly critical and partly ſcientificial. The critical inquiry is into the ſenſe of ſir Iſaac, ſo far as it may be determined from his own words, and here we cannot help thinking that this is ſomewhat doubtful. The other inquiry is about the true or ſcientifical notion, upon which this doctrine ought to be founded. With reſpect to which we ſhall only aſk two queſtions, which every reader may reſolve for himſelf, to wit, whether the conception or notion he has of the ratio or proportion of evaneſcent quantities, at the point or inſtance of their evaneſcence, be more clear and diſtinct than the notion of infiniteſimals? And whether the notion of inſcribed or circumſcribed polygons to any curve, attaining their laſt form, and thereby conciding with their curvilinear *limit*, be more clear and diſtinct than the notion of polygons of an infinite number of ſides, in the method of infiniteſimals?

Before we leave this ſubject, it may be proper to give the ſentiments of an eminent mathematician about the doctrine of *limits*, or of prime and ultimate ratios, and to ſhew the connection of this doctrine with that of fluxions. Mr. Maclaurin, in his Treat. of Flux. art. 502. Sir Iſaac Newton conſiders the ſimultaneous increments of flowing quantities as finite, and then inveſtigates the ratio, which is the *limit* of the various proportions which thoſe increments bear to each other, while he ſuppoſes them to decreaſe together till they vaniſh; which ratio is the ſame with the ratio of the fluxions. In order to diſcover this *limit*, he firſt determines the ratio of the increments in general, and reduces it to the moſt ſimple terms, ſo as that (generally ſpeaking) a part at leaſt of each term may be independent of the value of the increments themſelves; then, by ſuppoſing the increments to decreaſe till they vaniſh, the *limit* readily appears.

For example, let a be an invariable quantity, x a flowing quantity, and o any increment of x; when the ſimultaneous increments of xx and ax will be $2xo + oo$ and ao, which are in the ſame ratio to each other, as $2x+o$ is to a. This ratio of $2x+o$ to a, continually decreaſes while o decreaſes, and is always greater than the ratio of $2x$ to a, while o is any real increment; but it is manifeſt, that it continually approaches to the ratio of $2x$ to a as its *limit*; whence it follows, that the fluxion of xx is to the fluxion of ax, as $2x$ is to a. If x be ſuppoſed to flow uniformly, ax will likewiſe flow uniformly, but xx with a motion continually accelerated; the motion with which ax flows, may be meaſured by ao; but the motion with which $2x$ flows is not to be meaſured by its increment $2xo+oo$, but by the part $2xo$ only, which is generated in conſequence of that motion; and the part oo is to be rejected, becauſe it is generated in conſequence only of the acceleration of the motion with which the variable ſquare flows, while o, the increment of its ſide, is generated: and the ratio of $2xo$ to ao is that of $2x$ to a, which was found to be the *limit* of the ratio of the increments $2xo+oo$ and ao. See FLUXION.

It is objected againſt ſir Iſaac Newton's method of inveſtigating this *limit*, that he firſt ſuppoſes that there are increments; that when it is ſaid *let the increment vaniſh*, the former ſuppoſition is deſtroyed, and yet a conſequence of this ſuppoſition, i. e. an expreſſion got by virtue thereof, is retained. But the ſuppoſitions that are made in this method of inveſtigating the *limit*, are not ſo contradictory as this objection ſeems to import. He firſt ſuppoſes that there are increments generated, and repreſents their ratios by that of two quantities, one of which is given ſo as not to vary with the increments. If he had afterwards ſuppoſed that no increments had been generated, this indeed had been a ſuppoſition directly contradictory to the former. But when be ſuppoſes thoſe increments to be diminiſhed till they vaniſh, this ſuppoſition ſurely cannot be ſaid to be ſo contradictory to the former, as to hinder us from knowiug what was the ratio of thoſe increments, at any term of the time while they had a real exiſtence; how this ratio varied, and to what *limit* it approached, while the increments, were continually diminiſhed? On the contrary, this is a very conciſe and juſt method of diſcovering the *limit* which is required.

It is obſerved, that the limiting, prime, or ultimate ratio of increments, ſtrictly ſpeaking, is not the ratio of any real increments whatſoever. But as the tangent of an arch is the right line that *limits* the poſition of all the ſecants that can paſs through the point of contact, though ſtrictly ſpeaking it be no ſecant; ſo a ratio may *limit* the variable ratios of the increments, though it cannot be ſaid to be the ratio of any real increments. The ratio of the generating motions may be likewiſe ſaid to be the laſt or ultimate ratio of the increments, while they are ſuppoſed to be diminiſhed till they vaniſh, for a like reaſon.

It may juſt be added, that there being two caſes of variable quantities and ratios tending to a *limit*, it might have conduced to perſpicuity, and preventing diſputes, to have diſtinguiſhed theſe different *limits* by ſome addition. As in the firſt caſe to have called it a *limit* or ultimate ratio *incluſive*; becauſe the limit is the laſt of the quantities or ratios limited: and in the ſecond, to have called it a *limit* or ultimate ratio *excluſive*; becauſe the quantities limited never attain to the *limit*, though they approach to it indefinitely.

This diſtinction may perhaps receive ſome farther illuſtration from the following example. It is known that the oſculatory circle is a circle that touches a curve ſo cloſely that no other circle can be drawn through the point of contact between them, all other circles paſſing within or without them both; and hence the oſculatory circle is ſuppoſed to have an equal curvature with the curve at that point. See Mr. Maclaurin's Flux. art. 364. Now if we conceive the oſculatory circle at the end of the great axis of an ellipſis, it will fall entirely within the ellipſis; and the curvatures of the ellipſis and oſculatory circle may both be ſaid to be *limits* of the curvatures of all the circles falling wholly within, and touching the ellipſis at the end of its great axis. But the term *limit* will not in both caſes have preciſely the ſame meaning; for the oſculatory circle is a *limit incluſive*, being the laſt of the circles limited; and the ellipſis is a *limit excluſive*, none of the circles limited ever coinciding with it. As to the circles which falls wholly without the ellipſis, and touch it at the end of its great axis, they have no *limit incluſive*, no circle touching the ellipſis ſo cloſely, that no other can paſs between; the only *limit* here is *excluſive*, the ellipſis itſelf.

The contrary of this happens at the end of the leſſer axis. At any other point of the ellipſis one half of every oſculatory circle is a *limit incluſive* of the ſemicircles that fall within, and the other half is a *limit excluſive* of thoſe that fall without.

May we not aſk, if a curve is the *limit* of its inſcribed or circumſcribed polygons in any other ſenſe, than the curvature of the ellipſis is the *limit* of the curvatures of the circles before deſcribed, which approach nearer and nearer to the curve, but never coincide with it? It is true we hear it often ſaid, that the oſculatory circle is æquicurval, and ſo coincide with the ellipſes, but this ſeems a conſequence of the language of infiniteſimals. It would be more accurate to ſay, that the curvature of the ellipſis is the *limit excluſive* of all the before mentioned circles, and that the oſculatory circle is their *limit incluſive*. That excellent geometer, Mr. Simpſon, in his Conic Sections, lib. v. prop 36. cor. ſays only, after demonſtrating the chief property of the oſculatory circle, that *eandem habere cum ſectione conica curvaturum dicitur*, giving this only as an appellation, but not as a propoſition. See on the ſubject of this article, Robins's Diſc. on Fluxions, in his Tracts, vol. ii.

Limits, in a *Military Senſe*, denote the diſtance which a centry is allowed on his poſt, viz. fifty paces to the right, and as many to the left; and though the weather be ever ſo bad, he muſt not get under cover.

Limits *of a planet*, its greateſt excurſions or diſtances from the ecliptic. See Planet.

LIMITANEI, among the Romans, an appellation given to the ſoldiers who were ſtationed on the frontiers of the empire.

LIMITOTROPHI, among the Romans, the ſame with limitanei.

LIMMA, Λειμμα, *reſiduum*, in the *Ancient Muſic*, is the difference of the diateſſaron and the ditonus. It is expreſſed by $\frac{256}{243}$.

Euclid demonſtrates it to be leſs than the hemitone. Boethius calls the *limma*, *hemitonium minus*. Wallis's Appendix to Ptolemy's Harmon. p. 169, 170. Ibid. p. 170.

The *limma* here defined is that of Ptolemy. Modern muſicians have applied this name to ſeveral other intervals, ariſing from the ſubtraction of ſemi-tones from the tone major. Thus the difference between the ſemi-tone minor and the tone major which is $\frac{9}{8} : \frac{25}{24} = \frac{7}{25}$ is by Mr. Euler called *limma majus*; and the difference between the ſemi-tone major and tone major, he calls *limma minus*. This laſt is expreſſed by $\frac{135}{128} = \frac{9}{8} : \frac{16}{15}$. The octave is nearly equal to nine greater *limmas*, and to thirteen leſſer. Euler, Tentam. Nov. Theor. Muſic. p. 107, 108. Ibid. p. 108. See Interval.

LIMNING, the art of painting in water-colours.

In which ſenſe *limning* ſtands contradiſtinguiſhed from painting, properly ſo called, which is done in oil-colours.

Limning is much the more ancient kind of painting. Till a Flemiſh painter, one John Van Eyck, better known by the name of John of Bruges, found out the art of painting in oil, the painters all painted in water, and in freſco, both on their walls, or wooden boards, and elſewhere. When they made uſe of boards, they uſually glued a fine linen cloth over them, to prevent their opening; then laid on a ground of white; and, laſtly, they mixed up their colours with water and ſize, or with water and yolks of eggs, well beaten with the branches of a fig-tree, the juice whereof thus mixed with the eggs; and with this mixture they painted their pieces.

In *limning*, all the uſual colours are proper enough, excepting the white made of lime, which is only uſed in freſco. But the azure and ultramarine muſt always be mixed up with ſize, or with gum, becauſe the yolks of eggs give yellow colours a greeniſh tincture. But there are always applied two lays of hot ſize, before the colours mixed even with ſize, are laid on; the compoſition made with eggs, and the juice of the fig-tree, being only uſed for touching up and finiſhing, and to prevent the neceſſity of having a fire always at hand to keep the ſize hot; yet it is certain, that the ſize-colours hold the beſt, and are accordingly always uſed in cartoons, &c. This ſize is made of ſhreds of thin leather, or of parchment.

To *limn* on linen, they chooſe that which is old, half-worn, and cloſe. This they cover with white lead, or a fine plaiſter beaten up with ſize; which once dry, they go over it with a layer of the ſame ſize.

The colours are all ground in water, each by itſelf; and in proportion, as they are required in working, are diluted with ſize-water. If the yolks of eggs are deſired, they dilute them with a liquor made of equal quantities of common water and vinegar, with the yolk, white, and ſhell of an egg, and the ends of the little branches of a fig-tree cut ſmall, all well beaten together in an earthen pan.

If it be deſired to varniſh the piece when finiſhed, they go over it with the white of an egg well beaten, and then with varniſh. This, however, is only to preſerve it from the wet: for the great advantage of *limning* conſiſts in its being without gloſs; becauſe all its colours, thus void of luſtre, may be ſeen in all kinds of lights; which colours in oil, or covered with varniſh, cannot.

LIMNITIS, a word uſed by the ancients to expreſs the concretion round reeds, or water plants, by ſome called adarce, or ſomewhat analogous to that.

LIMOCINCTI, among the Romans a kind of prieſts, who officiated at public ſacrifices, and were dreſſed with a garment called limus.

LIMNOPEUCE, in *Botany*. See Hippuris.

LIMODORUM, in *Botany*. See *Baſtard* Hellebore and Orchis.

LIMON, in *Botany*. See Lemon.

LIMONIA, in *Botany*, a genus of the *decandria monogynia* claſs. Its characters are that the empalement is divided into five parts; that it has five petals; and that the fruit is a three-celled berry, containing a ſingle ſeed: there is only one ſpecies.

LIMONIUM, in *Botany*. See *Sea*-Lavender.

Limonium-*gall*, in *Natural Hiſtory*, the name of a ſpecies of gall or vegetable protuberance, ſerving for the lodging of an inſect, affording a very beautiful appearance on the plant, and very common in the eaſtern parts of the world.

This of the *limonium* is ſingular, in that it is produced from a butterfly egg, and is inhabited by a true caterpillar. The butterfly depoſits her eggs on ſeveral parts of the leaves and ſtalks of this plant, and the young caterpillar, as ſoon as hatched, eats its way through the ſurface; and continuing to eat when within, his depredations occaſion an abundant derivation of juices to the part, by means of which a gall, or protuberance, is formed, which is ſuſtained by a pedicle, and in all reſpects reſembles a fruit. This is of a roundiſh figure, and by degrees grows to the ſize of a nutmeg. It is compoſed of ſeveral coats, or cruſts: the exterior ones are ſoft and ſpungy, but the interior are harder, and more woody than the galls of the oak. As the generality of other caterpillars feed on the ſubſtance of the leaves of trees and plants, this eats only the inſide of its lodgment; and nature ſo readily ſupplies this defect by new matter, that the cavity, in which it is lodged, is never found to be very great.

This ſeems the only known inſtance of a gall formed by a genuine caterpillar, the inhabitants of the willow-galls, though uſually eſteemed ſmooth carterpillars, being not ſo, but the worms of a four-winged fly. Reaumur's Hiſt. of Inſects, vol. vi. p. 227.

LIMOSA, in *Ornithology*, the scolopax *glottis* of Linnæus, the name of a long-legged water-bird, common in Italy, and called by ſome *glottis*, *totano*, and *pluvialis major*. It is but a ſmall bird, its uſual weight being about ſix or ſeven ounces. Its beak is black, but ſomewhat reddiſh near the angle of the under jaw, which reflects a little upwards; the upper part of its head, neck, ſhoulders, wings, and the forepart of its back, are variegated with brown and grey; the middle of the head-fathers are black, and their ends whitiſh; over each eye paſſes a white line; its rump, and its whole breaſt, belly, and throat, are white; the long wing-feathers are brown; the inner coverts of the wings are finely croſſed with double and treble rows of a duſky colour; the tail-feathers are variegated with brown and grey; its legs are very long, and are naked for two fingers breadth above the knee. Theſe birds appear on our coaſts and wet grounds, in the winter, in ſmall flocks. Ray and Pennant.

Limosa, in *Ichthyology*, a name given by Salvian to the common mackerel, and in his figures to the *thynnus*, or tunny-fiſh, called the *Spaniſh mackerel*.

LIMOSELLA, in *Botany*, *leaſt water-plantain*, a name given by Linnæus to a genus of plants of the *didynamia angioſpermia* claſs, called by Dillenius, and others, *plantaginella*; the characters of which are theſe: the perianthium is erect, one-leaved, ſlightly divided into five ſegments at the edge, and remaining after the flower is fallen; the flower conſiſts of one petal, which is ſmall, erect, acute, and ſlightly divided into five ſegments at the end; the ſtamina are four erect filaments; the antheræ are ſimple; the germen of the piſtil is oblong and obtuſe; the ſtyle is ſingle, and of the length of the ſtamina, and the ſtigma is globular; the fruit is an oval capſule, affixed to the baſe of the cup, compoſed of two valves, and including two cells, in which are a great number of ſmall ſeeds of an oval figure. There is only one ſpecies.

LIMPET, *patella*, in *Conchyliology*, the name of a genus of ſhell-fiſh, of the *teſtacea* claſs of worms in the Linnæan ſyſtem, the characters of which are theſe: it is an univalve ſhell, of a gibbous ſhape, almoſt conic, without ſpires, always fixed in its natural ſtate to a rock or to ſome hard body, and having its apex or ſummit ſometimes ſharp-pointed, ſometimes obtuſe, ſometimes ſtrait, ſometimes crooked, ſometimes whole, and ſometimes perforated. There are ſeveral ſpecies of each of theſe kinds. See *Tab. of Shells*, N° 1, 2.

The animal inhabiting this ſhell is a ſlug. Linnæus enumerates thirty-ſix different ſpecies.

The Latins call this ſhell *patella* from its reſemblance to a diſh, and the Greeks named it *lepas*, as if they meant to call it a ſcale or flake of the ſtone. Indeed this fiſh always adheres to rocks, as if a part of the ſtone; and the rock ſerves it in the place of a ſecond ſhell, to defend it from the injuries of the weather. Aldrovand and Rondeletius have carried this thought ſo far, as to place the *limpet* among the bivalve ſhells; but no author has followed them in this.

The manner of the *limpet*'s faſtening itſelf to the rocks has not been well underſtood till the time of Mr. Reaumur, though the fact was ſo well known as to become in ſome places a proverbial compariſon.

The ſhell of the *limpet* approaches to the figure of a cone; the baſe of this cone is occupied by a large muſcle, which alone has nearly as much fleſh in it as the whole body of the fiſh. This muſcle is not covered by the ſhell, but ſerves the creature equally to move forward, or to fix itſelf by at pleaſure. When it is in a ſtate of reſt, which is the common caſe, it applies this muſcle everyway round to the ſurface of ſome ſtone, and holds itſelf by that means fixed very firmly to it, inſomuch that it is impoſſible to take it off with the hands, and thoſe who would remove them are forced to uſe a knife for that purpoſe, and the removing the fiſh this way is not eaſy; for every where that the blade of the knife attempts to enter, the fiſh fixes its muſcle with double force to the ſtone. Mr. Reaumur, to try the force of the adheſion of this fiſh tied lines with weights at their ends to the ſhells, when placed in a horizontal direction on the ſtone, and found that thirty pounds was the leaſt weight that would tear them off, and that they would reſiſt that for ſeveral minutes. It might be naturally ſuppoſed, that the cauſe of this ſtrong adheſion was the animal's thruſting the fibres of this muſcle into every ſmall pore of the ſtone, and there keeping them forcibly inflated: but were this the caſe, the adheſion muſt ceaſe with the life of the animal; but it does not ſo, for if a *limpet* be cut into ſeveral portions through the ſhell and body, yet every portion, thus ſeparated, will adhere with its due proportion of force to the ſtone. Neither can this force be reſolved on the principles of the adheſion of two poliſhed marbles, or that of leather to ſtone; for in both theſe caſes, whatever perpendicular force the adheſion can bear, the leaſt force applied horizontally makes them ſlip, or ſlide off from one another. But this is not the caſe in the adheſion of this fiſh, it equally reſiſting horizontal and perpendicular force.

The true cauſe of this adheſion is a viſcous juice, a ſort of glue thrown out by this muſcle, which, though imperceptible to the eye, is able to produce theſe great effects. This is eaſily perceived by the touch, however; for if immediately after removing a *limpet* from a ſtone, the finger be applied to the place, it is faſtened very ſtrongly to it by means of the glue left there. If any wet, however, have touched the ſtone, after the fiſh was removed, there is no viſcoſity perceived on it, the whole ſubſtance of the glue being immediately diſſolved, and its effects wholly taken off by it.

Water is therefore made a ſolvent for this glue; the cloſe adheſion of the outer rim of the great circular muſcle prevents the external water from acting upon it, elſe it muſt always be deſtroyed as ſoon as diſcharged, and ſo be of no uſe; but the under ſurface of the body of the animal is all over covered with ſmall tubercles, containing water, at leaſt many of them do ſo. When the creature then has a mind to unfix itſelf for motion, it only diſcharges a quantity of this water, and the whole cement diſſolves before it, and ſets the creature free. Thoſe tubercles which do not contain water, probably contain the viſcous matter, or glue, whence it may be conveyed by proper veſſels to the circumference; ſo that when the animal has a mind to fix itſelf to a ſtone, it needs only ſqueeze the one ſet of theſe tubercles; and when it would unlooſe itſelf, the other.

This viſcous humidity allotted to this animal, for the fixing itſelf to the rocks, is not peculiar to it; the urtica *marina* has the ſame, and the horns of the *ſea*-URCHINS, by which they fix themſelves, are endued with a power of diſcharging a liquor of the ſame kind, which ſerves them for the ſame purpoſe. Mem. Acad. Par. 1711.

LIMUS, among the Romans, a garment reaching to the ground, and worn by the prieſts, who on that account were called LIMOCINCTI.

LINARIA, in *Botany*. See *Toad*-FLAX.

LINARIA, in *Ornithology*. See LINNET.

LINCH-*clout*, in *Artillery*, the flat iron under the ends of the arms of an axle-tree, to ſtrengthen them, and diminiſh the friction of the wheels. See CLOUTS.

LINCH-*pins*. See LINSPINS.

LINCOLNSHIRE *plough*. See PLOUGH.

LINCTUS, a form of medicine, the ſame as LAMBATIVE *lohoch*, and *eclegma*.

LINE, in *Geometry*, a quantity extended in length only, without either breadth or thickneſs.

A *line* is ſuppoſed to be formed by the flux or motion of a point; and is to be conceived as the termination or limit of a ſurface, and not as a part of that ſurface, however ſmall. Hobbes, and ſome others, who have taken it in the latter ſenſe, have fallen into many abſurdities.

There are two kinds of *lines*; viz. *right lines*, and *curve lines*.

If the point A move towards B (*Tab.* III. *Geometry*, *fig.* 58.) by its motion it deſcribes a *line*; and this, if the point go the neareſt way towards B, will be a right or ſtraight *line*, whoſe definition therefore is the neareſt or ſhorteſt diſtance between any two points, or a *line*, all whoſe points tend the ſame way. If the point go any way about, as in the *lines* A C B, or A *c* B, it will trace out either a crooked *line*, as the upper A *c* B; or elſe two or more ſtraight ones, as in the lower A C, C B.

Right lines are all of the ſame ſpecies: but curves are of an infinite number of different ſpecies. We may conceive as many as there are different compound motions, or as many as there may be different ratios between their ordinates and abſciſſes.

Curve lines are uſually divided into *geometrical* and *mechanical*.

LINES, *geometrical*, are thoſe which may be found exactly and ſecurely in all their points. See GEOMETRICAL *line*.

LINES, *mechanical*, are thoſe, ſome or all of whoſe points are not to be found preciſely, but only tentatively or nearly.

Agreeably hereto, Deſcartes and his followers define *geometrical lines* thoſe which may be expreſſed by an algebraic equation of a determinate degree; which equation is alſo called *locus*.

The ſame perſons define *mechanical lines* thoſe which cannot be expreſſed by an equation of a determinate degree. Others, conſidering that thoſe called by Deſcartes *mechanical lines*, notwithſtanding their not being of a determinate degree, are not leſs preciſe and exact, and conſequently not leſs geometrical than the others; it being this preciſion which conſtitutes the geometricity of the *line*: for this reaſon, they chooſe rather to call thoſe *lines* which are reducible to a determinate degree, *algebraical lines*; and thoſe which are not, *tranſcendental lines*.

Lines are alſo divided into thoſe of the *firſt order*, *ſecond order*, *third order*, &c. See CURVE.

Sir Iſaac Newton enumerated ſeventy-two *lines* of the third order, and Mr. Stirling found four more; ſince that Mr. Stone has found two others, which had eſcaped ſir Iſaac and Mr. Stirling. The two ſpecies added are to be reckoned among the hyperbolico-parabolical curves. Enumer. Lin. Tert. Ordin. Linea. Tert. Ordin. Neutonianæ, Oxon. 1717. 8vo. Phil. Tranſ. N° 456. § 6. See CURVE.

Lines, conſidered as to their poſitions, are either *parallel*, *perpendicular*, or *oblique*; the conſtruction and properties of each whereof, ſee under PARALLEL, PERPENDICULAR, &c.

Euclid's ſecond book treats moſtly of *lines*, and of the effects of their being divided, and again multiplied into one another.

LINES, *algebraic*, are divided into different orders, according to the degree of their equations. Theſe degrees are eſtimated, as in determined equations, by the degree of the higheſt term of the equation.

Thus $a+by+cx=0$, is a general equation, expreſſing the nature of *lines* of the firſt order, or of ſtraight *lines*.

The equation $a+by+cx+dyy+exy+fxx=0$. repreſents the *lines* of the ſecond order; that is, the conic ſections, and the circle, which is one of them.

And the equation $a+by+cx+dyy+exy+fxx+gy^3+hxyy+ix^2y+lx^3=0$, expreſſes in general the *lines* of the third order. And the *lines* of the fourth and higher orders may be expreſſed in the like manner. See Cramer Introd. à l' Analyſe des Lignes Courbes, p. 52, ſeq. Mr. Cramer uſes the terms, *line* of the ſecond, third, fourth, &c. order, and *curve* of the ſecond, third, fourth, &c. order, indifferently. Sir Iſaac Newton has made a diſtinction, according to him. See Curve.

Lines, *circular*, *converging*, *diverging*, *generating*, *beliſpherical*, *hyperbolic*, *logiſtic*, *magnetical*, *normal*, *proportional*, *quadrature*, *reciprocal*, *robervalian*, and *vertical*. See the reſpective adjectives.

Line *of the apſides*, in *Aſtronomy*, is the *line* which joins the apsides; or it is the greater axis of the orbit of a planet.

Line, *fiducial*, the *line* or ruler which paſſes through the middle of an aſtrolabe, or the like inſtrument; and on which the ſights are fitted; otherwiſe called *alhidade*, *index*, *dioptra*, and *mediclinium*.

Line, *horizontal*, a line parallel to the horizon.

Lines, *iſocronal* and *meridian*. See the adjectives.

Line *of the nodes*, in *Aſtronomy*, is the *line* which joins the nodes of the orbit of a planet, or the common ſection of the plane of the orbit with the plane of the ecliptic.

Line, *horizontal*, in *Dialling*, is the common ſection of the horizon, and the dial-plane.

Lines, *horary*, or *hour-lines*, are the common interſections of the hour-circles of the ſphere, with the plane of the dial, See Horary, and Hour-*circles*.

Line, *ſubſtylar*. See Substylar.

Line, *equinoctial*, in *Dialling*, is the common interſection of the equinoctial, and the plane of the dial.

Line, *contingent*. See Contingent.

Lines, *dialling*, and *meridian*. See the reſpective adjectives.

Line, in *Fencing*, is that part of the body directly oppoſite to the enemy, wherein the ſhoulders, the right arm, and the ſword, ought always to be found; and wherein are alſo to be placed the two feet, at the diſtance of eighteen inches from each other.

In this ſenſe, a man is ſaid to be in his *line*, to go out of his *line*, &c.

Line, in *Fortification*, is ſometimes taken for a ditch, bordered with its parapet; and ſometimes for a row of gabions, or ſacks of earth, extended lengthwiſe on the ground, to ſerve as a ſhelter againſt the enemies fire.

When the trenches were carried on within thirty paces of the glacis, they draw two *lines*, one on the right, and the other on the left, for a place of arms.

For the difference between trenches or approaches, and *lines*, ſee Intrenchment.

Lines are generally made to ſhut up an avenue or entrance to ſome place; the ſides of that entrance being covered by rivers, woods, mountains, moraſſes, or other obſtructions, not eaſy to be paſſed over by an army. When they are conſtructed in an open country, they are carried round the place to be defended, and reſemble the *lines* ſurrounding a camp, called *lines* of circumvallation. *Lines* are likewiſe thrown up to ſtop the progreſs of an army; but the term is moſt commonly applied to the *line* which covers a paſs that can only be attacked in front. For conſtructing ſuch a *line*, in the place moſt convenient for the purpoſe, let a rope be run quite acroſs the way along the intended place of the *line*, pegging it it to the ground at the diſtance of every four or five yards; and at the diſtance of about ten or twelve feet before the *line*, towards the enemy, let ſuch another *line* or row of ſtakes be carried in a poſition parallel to the firſt rope. When the labourers are properly ranged within theſe limits, let them dig up the earth in its breadth, and throw it on the other ſide of the firſt rope, until a bank of about five or ſix feet thick, and ſix or ſeven feet high, be raiſed, ſloping the ſides according to the declivity neceſſary for the earth's rolling naturally down the bank; and let the digging be continued till the ditch is about five or ſix feet deep, the breath of the bottom being about one-third of the breadth ſtaked out at top; the bank may be rendered more firm by being trod or rammed down. Let the inner ſide of the bank be pared with the ſpade into ſuch a ſlope, as a man ſtanding upright may eaſily touch with his arm extended ſtrait before him; and at the foot of this bank, let a foot-bank or ſtep be raiſed, of ſuch a height, as a man ſtanding on it may eaſily fire his muſket over the bank, or let it be about four feet and a half lower than the top of the bank or breaſt-work. A gentle ſlope may alſo be made to the foot-bank, that the troops may more eaſily aſcend it; and let the crown or top of the breaſt-work be ſloped ſo, that a muſket laid flat on it may ſtrike the ground with its ſhot, about five or ſix feet beyond the ditch. The bank or breaſt-work will, in this caſe, ſecure the troops behind the *lines* from the enemy's fire: and when they ſtand on the foot-bank, they are more than two-thirds covered, and, conſequently, the troops within may make three of their ſhots tell for one of the enemy; and by going off the foot-bank, they may be quite covered, while they load again; ſo that with this advantage, they are in no great danger of being forced from the *lines*, unleſs the enemy are greatly ſuperior in number and cannon.

The following table ſhews the dimenſions of *lines* commonly conſtructed, and the rate of expence attending the conſtruction of them.

Breaſt-work.			Ditch.			Expence	
Thickneſs at top.	Height within	Height without	Upper breadth	Lower breadth	Depth	Solid content	Days works
Feet	Feet	Feet	Feet	Feet	Feet	Feet	
4	$7\frac{1}{2}$	6	8	$2\frac{2}{3}$	5	$4\frac{2}{3}$	1
5	$7\frac{1}{2}$	6	10	$3\frac{1}{4}$	$5\frac{1}{2}$	$6\frac{1}{12}$	$1\frac{1}{2}$
6	$7\frac{1}{2}$	6	12	4	6	8	2
7	$7\frac{1}{2}$	6	14	$4\frac{2}{5}$	$6\frac{1}{2}$	10	$2\frac{1}{2}$
8	$7\frac{1}{2}$	6	16	$5\frac{1}{2}$	7	12	3
9	$7\frac{1}{2}$	6	18	6	$7\frac{1}{2}$	15	$3\frac{1}{2}$

The day's work here is for one yard in length; and in the firſt a hundred men will complete a hundred yards in length of this kind of *lines* in one day; two hundred men in half a day, &c. The *lines* above deſcribed are called temporary *lines*, and chiefly ſerve a preſent emergency. When *lines* are thrown up at leiſure, and deſigned for longer duration, then the ditch is uſually eighteen feet broad at top, ſeven or eight feet deep, and the ſides of the ditch are ſloped, ſo as to leave only ſix feet breadth at bottom; the breaſt-work, or parapet, is about ſeven feet thick on the top or crown, and ſeven or eight feet high. The heights, depths, and breadths, of the ſeveral parts of a *line* well deſigned and finiſhed, are exhibited in *Tab.* VII. *Fortification*, *fig.* 44. in which I L repreſents the ground *line*, or ſurface of the place; A B the breadth of the ditch at the top; C D its breadth at the bottom; F A C the ſlope or ſcarp of the parapet and ditch; D B K the counterſcarp; E F the top or crown of the parapet or breaſt-work; E G the inner ſlope of the parapet; H G the top of the foot-bank; H I the ſlope of the foot-bank; and B K L a ſmall ſloping bank called the glacis. This ſection or profile may be drawn, by laying off in the ground-*line*, from any ſcale of equal parts, the diſtances $1\,a=6$ feet, $ab=4$, $bc=1\frac{1}{2}$, $cd=7$, $dA=4\frac{1}{2}$, $Af=6$, $fg=6$, $gB=6$, and $BL=5$ feet. Through a, b, c, d, f, g, B, draw lines perpendicular to I L. Make $aH=2\frac{1}{2}$ feet $=bG$, $cE=7$ feet, $dF=6$, $fC=8$ feet $=gD$. Draw I H, H G, G E, E F, F A C, C D, and D B, which continue, till it meets the line F L, and the profile is conſtructed.

When *lines* are made to cover a camp, or a large tract of land, where a conſiderable body of troops is poſted, the work is not made in one ſtrait, or uniformly bending *line*; but at certain diſtances, the *lines* project in ſaliant angles, called redents, redans, or flankers, towards the enemy. The diſtance between theſe angles is uſually between the limits of two hundred and two hundred and ſixty yards; the ordinary flight of a muſk-ball, point-blank, being generally within thoſe limits; although muſkets, a little elevated, will do effectual ſervice at the diſtance of three hundred and ſixty yards. In *Tab.* VII. *Fortification*, *fig.* 45, are ſhewn the forms of the uſual *lines*, where the figures C A B, *c a b*, are the redents or flankers; A C, A B, *a c*, *a b*, the faces; C B, *c b*, the gorges; A D, *a d*, the capitals; B *b* the curtin; and the angles C A B, *c a b*, the ſaliant or flanked angles. The diſtance of the ſaliant angles is about two hundred and forty yards at a mean; the length of the capital is uſually between forty and fifty yards, and the length of the gorges is alſo about ſixty or ſeventy yards.

To make a plan of *lines* with redents: draw the *line* E E E E, &c. (*Tab.* VII. *Fort. fig.* 46.) in ſuch a manner, that wherever there is a bend or angle, it may be either at once, twice, or thrice, &c. the length of about two hundred and forty yards from one another; ſo that there may be a redent where there is an angle. In this *line*, lay off the diſtance of two hundred and forty yards from E to E, E to E, &c. reckoning from the bends towards each end, whether it happens that the *line* will or will not be exactly meaſured by a repetition of the two hundred and forty yards. At each point, E, draw the capital E F in a perpendicular poſition to the direction of the *line* in that point, and make the capitals about forty or fifty yards long. On each ſide of E, take the half gorges E G, E G, each of about thirty or thirty-five yards, and draw the faces F G, F G; and thus the outline, or maſter-line of the curtins and redents is formed. Parallel to each curtin and face draw *lines*, within, at the diſtances from the maſter-line of ſeven feet, eight feet, twelve feet, and eighteen feet; then the breadth of ſeven feet repreſents the plan of the parapet, that of one foot its inner ſlope, that of four feet the top of the foot-bank, and that of ſix feet the foot-bank ſlope. On the outſide of the maſter-line, draw *lines* at the diſtances of 10½, 16½, and 22½ feet, parallel to each curtain and face; and theſe will repreſent the plans of the ſcarp, ditch, and counterſcarp; obſerving that the ſaliant angles of the counterſcarp are rounded before the angles of the redents. A plan of this kind formed from a ſmall ſcale, as of twenty yards to an inch, is uſually repreſented by four parallel *lines*; one without the maſter-line repreſenting the counterſcarp or out-line of the ditch, and two within, repreſenting the breadths of the parapet of the foot-bank. In ſome caſes, a ſhort *line* is haſtily formed by a number of CHEVAUX *de friſe* chained together; and in countries abounding with wood, a *line* may be formed by laying, in a poſition pointing to the enemy, the ſtems of trees and their larger branches, piled on one another to a ſufficient height, and the interſtices filled with earth; ſuch a work is called an ABBATIS. See Robertſon's Marine Fort. p. 2, &c.

Line, *fundamental*, is the firſt *line* drawn for the plan of a place, and which ſhews its area.

Line, *capital*, in *Fortification*. See Capital.

Line, *central*, is that drawn from the angle of the centre, to that of the baſtion.

Line *of defence*. See Defence.

Line *of defence fichant*. See Defence.

Line *of defence razant*. See Defence.

Line *of approach*, or *attack*, ſignifies the work which the beſiegers carry on under covert, to gain the moat, and the body of the place. See Approaches.

Line *of counter-approach*. See Counter-*approach*. See *Tab.* VII. *Fortification*, *fig.* 33.

Line *of circumvallation*, is a *line* or trench cut by the beſiegers, within cannon-ſhot of the place, which ranges round their camp, and ſecures their quarters againſt any relief to be brought to the beſieged. See Circumvallation.

Line *of contravallation*, is a ditch bordered with a parapet, which ſerves to cover the beſiegers on the ſide of the place, and to ſtop the ſallies of the garriſon. See Contravallation.

Lines *of communication*, are thoſe which run from one work to another. See *Tab. Fortif. fig.* 21. *n.* 2. 2. &c. See alſo Communication. But

The **Line** *of communication*, more eſpecially ſo called, is a continued trench, with which a circumvallation, or contravallation is ſurrounded; and which maintains a communication with all its forts, redoubts, and tenailles.

Line *of the baſe*, is a right *line*, which joins the points of the two neareſt baſtions.

To **Line** *a work*, ſignifies to face it, chiefly with brick or ſtone; e. gr. to ſtrengthen a rampart with a firm wall, or to encompaſs a parapet or moat with good turf, &c.

Line, *indented*, in *Fortification*. See Redens.

Lines, among *Fowlers*, is uſed to expreſs the ſtrings by which they catch birds. The large and ſmall land birds are equally eaſy to be taken by them, and ſometimes the water-fowl.

Theſe lines are made of long and ſmall cords, knotted in different places, and containing in length as many fathom as the places where they are to be laid require. Plovers, and the larger wild fowl, are very conveniently taken by them. When theſe ſtrings are to be uſed, they muſt be limed with the ſtrongeſt bird-lime, that can be got, and then coming to their haunts before the evening flights, that is before ſun-ſet; or, for the morning flights, at leaſt two hours before day, the ſportſman is to carry a parcel of ſmall ſticks, each about two feet long, and ſharpened at both ends, but having a little ſlit at one end like a fork. The plain end of each ſtick is to be ſtuck into the ground, in ſuch a manner, that the ſtick ſtanding aſlant, its upper, or forked end, may be about a foot and a half from the ſurface. The limed ſtrings are then to be carried along all theſe ſticks, in different rows, ſome higher than others. Every row of the ſticks is thus to be filled, and the whole haunt covered with the *lines*. The plover, and other birds that fly low, when they come to their haunts, fly directly in amongſt the ſtrings, and are taken in great numbers; the whole flight coming in at once, and covering all the place, ſo that thoſe which are not yet alighted, have no opportunity of ſeeing the diſtreſs of their companions. There is no need for the ſportſman to be conſtantly upon the watch for the taking of the birds; for when once they are taken they cannot looſen themſelves, ſo that he may come and take them up at his own time. The water-fowl may be eaſily taken, in the ſame manner, by obſerving their haunts, and ſtretching theſe *lines*, in ſeveral rows, acroſs the brook, or river, ſome higher, and ſome lower, the loweſt lying almoſt at the edge of the water. Theſe muſt never be uſed on moonlight nights on the occaſion; for the ſhadow of the ſtrings in the water will then fright them away.

Line, in *Genealogy*, is a ſeries or ſucceſſion of relations in various degrees, all deſcending from the ſame common father.

Line, *direct*, is that which goes from father to ſon; which is the order of aſcendants and deſcendants. See Direct.

Line, *collateral*, is the order of thoſe who deſcend from ſome common father, related to the former, but out of the *line* of aſcendants and deſcendants. In this are placed uncles, aunts, couſins, nephews, &c. See Collateral.

Line, in *Geography* and *Navigation*, is uſed by way of eminence for the EQUATOR, or EQUINOCTIAL *line*.

The *line* in the heavens, is a circle deſcribed by the ſun in his courſe on the 20th day of March, and the 23d of September. The *line* on the earth is an imaginary circle, anſwering to that in the heavens. It divides the earth from eaſt to weſt, into two equal parts, and is at an equal diſtance from the two poles; ſo that thoſe who live under the line have the poles always in their horizon.

The latitudes commence from the *line*.

The ſeamen uſe to chriſten their freſh men, and paſſengers, the firſt time they croſs the *line*. See Baptiſm.

Lines, in *Heraldry*, the figures uſed in armories to divide the ſhield into different parts, and to compoſe different figures.

They are of different forms, and were it not for this, many arms would be one and the ſame, for a chief wavey differs from a plain chief, by the *lines* which compoſe them, and the heralds ſhow particular reaſons for all theſe different forms of *lines*.

Theſe *lines*, according to their forms and names, give denomination to the pieces or figures which they form, except the ſtrait or plain *lines*, which are carried evenly through the eſcutcheon, and are four, viz. the perpendicular *line*, the horizontal, the diagonal *line* dexter, and the diagonal *line* ſiniſter.

The crooked *lines*, which are carried unevenly through the eſcutcheon, riſing and falling, are theſe: firſt the ingrailed or ENGRAILED, and inverted or INVECTED; theſe, when repreſented together, are ſomewhat known the one from the other, being oppoſite to one another, both being made, as it were of ſemicircles. The ingrailed with the points upward, the invected with the points downward. But this is not a ſufficient diſtinction; for ſuppoſe the ſpace between them which they form be a feſs, then the whole is only ingrailed, not invected; for the feſs ingrailed muſt have the points on both ſides turned toward the field, and the convex or gibboſe parts toward the feſs itſelf, and ſo of a bend, chevron, and other proper figures of heraldry; and if theſe be invected, then the convex parts of the *lines* are towards the field; but theſe *lines* are better diſtinguiſhed when placed by way of bordure, with the letters within a bordure ingrailed or invected.

Theſe two *lines* are more hard to be diſtinguiſhed, when the field is divided into two equal parts, of different colours, as parted per pale, parted per feſs, &c. Here we know not whether the *line* be ingrailed or invected, except we follow this rule, that the form of the *line* muſt be applied to the colour firſt named. The French terms for theſe two lines are for the engrailed, *engrele*, and for the invected, *canele*; and the Latin writers expreſs ingrailed by *ingrediatus*, *imbricatus*, and *ſtriatus*, and the invected by the words *invertus* and *canaliculatus*.

The wavy, or WAVED *line*, is ſuch an one as is formed in repreſentation of the waves of the ſea, as parted per feſs wavy in arms and other waved *lines*, as the wavy bars all expreſs that the perſon got his honours by ſea ſervice.

Nebulee is another name of a *line* in heraldry; it expreſſes a clowded *line*, the French call it *nuance*, and the Latins *nebuloſa linea*; this alſo has been given to perſons who have been eminently ſkilled in navigation. 9

Crenele, or EMBATTLED *lines*, repreſent the battlements of a houſe, and are ſaid to repreſent in heraldry the ſkill in architecture, for which the firſt of the family was famous; they were alſo given ſometimes for eminent ſervices, in aſſaulting or defending caſtles in time of war, and ſometimes only as emblems of a houſe to expreſs a perſon who bore them being of a noble houſe or family; for of old, none were ſuffered to embattle their houſes but perſons of great diſtinction.

The Latin writers in heraldry uſe for the word *crenele*, the terms *pinnatus* and *pinnis aſperatus*, according to Uredus in his blazons, and Sylveſter Petra Sancta in his *murales pinnalee*.

There is another *line* of this kind in heraldry, which Leigh calls the battle-embattled *line*; this has one degree of embattling above another. When the upper points in this kind of *line* are repreſented ſharp, it is called campagne, as if the lines ending in points, repreſented baſtions, or the outer works of cities and camps;

and when the upper points are rounded, it is called crenele embattled arrondi.

The INDENTED *line* is notched ſo at the edges, that it repreſents the teeth of a ſaw, and has its name from the Latin *dens*, a tooth, or from the law term *indenture*, a ſort of deed, the top of which is always notched like the teeth of a ſaw.

The dancette is another *line*, very much reſembling the indented *line*, but that it is always much ſmaller; it is therefore ſaid by the heralds to be the ſame in quality, but not in quantity. The dancette differs alſo from the indented *line*, in that it always conſiſts but of a few teeth, though never leſs than three, according to Mr. Holmes, in his Office of Armory; whereas the indented *line* has always a great many teeth. The French expreſs our indented *line* by the term *danche* or *dentille*; and the dancette, when it has but very few teeth, and thoſe very long, by the term *vivere*, which Meneſtrier takes to be the letter M, with its legs extended from ſide to ſide of the ſhield, becauſe many who carry a partition or feſs, after that form, have the family name beginning with that letter. The Latin writers expreſs the term indented by *dentatus*, *indentatus*, and *denticulatus*, and when the teeth are very long, as in the dancette, they call them *dentes decumani*. See alſo NEBULY and RAGULED.

There are yet two other *lines* mentioned by the heraldry writers; the firſt is the PATEE or DOVETAIL *line*, ſo called from its reſemblance to a ſort of joint uſed by our carpenters, in which one part goes alternately all the way down between two others; this is called by Morgan the inclave, or labelled *line*, becauſe the points, as they proceed from the ordinary, ſuch as the chief or feſs, repreſent not amiſs the points, or rather the ends of the labels. The other *line* is called URDEE or *champagne* by Freſne; and by Upton, *vair*, becauſe its points, are formed like pieces of the fur, called by heralds *vair*.

The two laſt of theſe are of very little uſe, the others are the common *lines* of arms, and are called the attributes or accidents of armorial figures which they form; and if any other *lines* are found in the figures or engravings of arms, which are not reducible to the one or the other of theſe, they are called *irregular*, and by the French heralds *clatie*. The knowledge and uſe of theſe forms of *lines* are neceſſary in the ſcience of heraldry to diſtinguiſh and difference many armorial bearings.

LINE, *labelled*. See LABELLED.

LINE, *lateral*, *linea lateralis*, in *Ichthyology*, a name given by naturaliſts to a line or ſtreak, with which many kinds of fiſh are marked, paſſing along their ſides. Few fiſh are without this *line*; but it is variouſly formed in the ſeveral kinds, and makes a very conſiderable article in their deſcription, if not in the diſtinction of the ſpecies. In ſome ſpecies it is made of a ſeries of little points, or holes, as appears to the eye; of this nature is the *line* in eels, &c. In ſome others it is formed of a ſort of duct, running along the centre of a great number of ſcales. This is its ſtructure in the generality of fiſhes. This *line*, in various kinds of fiſh, varies alſo in regard to number, ſituation, figure, and other properties. In regard to number, there is no *line* obſerved in the ſyngnathi and petromyza, in almoſt all other fiſh there is one on each ſide; and, finally, in ſome there are as it were two *lines* on each ſide: an inſtance of this we have in the ammodytæ. In regard to the ſituation, the differences are theſe. 1. In ſome it is near the back, as in the clupea, ſalmons, pearch, and the like. 2. In others it is placed nearer the belly, and runs parallel with it, as in the cyprini. 3. In ſome it is placed in the centre of each ſide between the back and the belly, as in the caraſſius. 4. In ſome it is placed againſt the interſtices of the the muſcles, or ſpina dorſalis, as in the muræna. And, 5. In ſome it is placed above the interſtices, as in the ammodytæ, &c. It has been ſuppoſed, by many, that this *linea lateralis* was always parallel to the interſtices of muſcles, but this is evinced to be an erroneous opinion, by the obſervation of the pearch and mackerel. In regard to the differences of figure, this *line* is in ſome ſtraight, as in the coregone, ſalmons, &c. 2. In others it is crooked, as in the cyprini, the pearch, &c. and in the generality of fiſh is ſmooth to the touch, but in ſome it is rough and aculeated, as in the trachurus and pleuronecti.

LINE *of the banquet* in the *Manege*. See BANQUET.

LINE *of a volt*, in the *Manege*. See SQUARE and VOLT.

LINE *of direction*, in *Mechanics* and *Gunnery*. See DIRECTION.

LINE *of gravitation of a heavy body*, is a *line* drawn through its centre of gravity, and according to which it tends downwards.

LINE *of the ſwifteſt deſcent of a heavy body*. See DESCENT, and CYCLOID.

LINE *of a projectile*. See PROJECTILE.

LINES, in *Muſic*, are uſed for thoſe ſtrokes drawn horizontally on a piece of paper, on and between which the characters and notes of muſic are diſpoſed. Their number is commonly five: when another is added for one, two, or more notes, it is called a LEGER-*line*.

Some ſay that it is to Guido Aretine that we owe their invention: they are very commodious, and greatly aſſiſt the imagination in diſtinguiſhing the low notes from the high. Upon their firſt introduction, the *lines* only were uſed, and the ſpaces between them entirely neglected.

Originally there were as many *lines* drawn for a ſong as it required notes aſcending; but at length the notes being placed in the intervals of the *lines*, theſe were reduced to four; ſo that there were nine places or degrees for nine different ſounds, which was their extent: at laſt they raiſed the number to five, of which the loweſt is reckoned firſt; and hereon they placed the characters for eleven different ſounds, including the ſpaces above the fifth and below the firſt; and at the ſame time they had the liberty at pleaſure, to add more *lines*, if the ſong ran to a greater compaſs.

LINE, *geometrical*, *in Perſpective*, is a right *line* drawn in any manner on the geometrical plane.

LINE, *horizontal*. See HORIZONTAL.

LINE, *terreſtrial*, or *fundamental line*, in *Perſpective*, is a right *line* wherein the geometrical plane, and that of the picture or draught interſect one another.

Such is the *line* N I (*Tab. Perſpective*, *fig*. 12.) formed by the interſection of the geometrical plane L M, and the perſpective plane H L.

LINE *of the front* in *Perſpective*, is any right *line* parallel to the terreſtrial *line*.

LINE, *vertical*, is the common ſection of the vertical, and of the draught.

LINE, *viſual*, is the *line*, or ray, imagined to paſs from the object to the eye.

LINE *of ſtation*, in *Perſpective*, according to ſome writers, is the common ſection of the vertical and geometrical planes. Others mean by it, the perpendicular height of the eye above the geometrical plane; others a *line* drawn on that plane, and perpendicular to the *line* expreſſing the height of the eye.

LINE, *objective*, in *Perſpective*, is any *line* drawn on the geometrical plane, whoſe repreſentation is ſought for in the draught or picture.

LINE *of diſtance*. See DISTANCE.

LINES *on the plain ſcale*, in *Trigonometry*, are the *line* of chords, *line* of ſines, *line* of tangents, *line* of ſecants, *line* of ſemi-tangents, *line* of leagues. The conſtruction and application whereof, ſee under SCALE, SAILING, &c.

LINES *on Gunter's ſcale*, are the *line* of numbers, *line* of artificial ſines, *line* of artificial tangents, *line* of artificial verſed ſines, *line* of artificial ſines of rhumbs, *line* of artificial tangents of the meridian *line*, and *line* of equal parts. The conſtruction and application whereof, ſee under GUNTER'S *ſcale*.

LINES *of the ſector*, are the *line* of equal parts, or *line* of *lines*; *line* of chords, *line* of ſines, *line* of tangents, *line* of ſecants, *line* of polygons, *line* of numbers, *line* of hours, *line* of latitudes, *line* of meridians, *line* of metals, *line* of ſolids, *line* of planes; the conſtruction and uſe whereof, ſee under SECTOR.

LINE, in the *Art of War*, is underſtood of the diſpoſition of an army ranged in order of battle; with the front extended as far as may be, that it may not be flanked.

An army uſually conſiſts of three *lines*; the *firſt* is the front, van, or advance-guard; the main body forms the *ſecond*, in which is the general's poſt; the *third* is a reſerved body, or rear-guard.

The ſecond *line* ſhould be about three hundred paces behind the firſt, and the reſerve at about five or ſix hundred paces behind the ſecond.

The artillery is likewiſe diſtributed along the front of the firſt *line*. The front *line* ſhould be ſtronger than the ſecond, that its ſhock may be more violent, and that, by having a greater front, it may more eaſily cloſe on the enemy's flanks. See ARMY.

LINE, *to break the*, is to change the direction from that of a ſtrait *line*, in order to obtain a croſs fire.

LINE, *turning out of the*. The *line* turns out without arms whenever the general commander in chief comes along the front of the camp. When the *lines* turn out, the private men are drawn up in a *line* with the bells-of-arms; the corporals on the right and left of their reſpective companies; the picquet forms behind the colours, with their accoutrements on, but without arms. The ſerjeants draw up one pace in the front of the men, dividing themſelves equally. The officers draw up in ranks according to their commiſſions, in the front of the colours; two enſigns taking hold of the colours. The field-officers advance before the captains. The camp-colours on the flanks of the parade are to be ſtruck, and planted oppoſite to the bells-of-arms; the officers ſpontoons are to be placed between the colours, and the drums, piled up behind them; the halberts are to be planted between and on each ſide the bells-of-arms, and the hatchets turned from the colours. Milit. Dict.

Line, or **Line** *of battle*, is alſo applied to the diſpoſition of a fleet on the day of ENGAGEMENT; on which occaſion the veſſels are uſually drawn up, as much as poſſible, in a ſtraight *line*, as well to gain and keep advantage of the wind, as to run the ſame board.

This right *line*, or long file, is prolonged from the keel of the hindmoſt to that of the foremoſt, and paſſes longitudinally through the keels of all the others, from the van to the rear; ſo that they are, according to the ſea-phraſe, in the wake of each other. In the *line* or order of battle, all the ſhips of which it is compoſed are cloſe-hauled, upon the ſtarboard or larbord tack, about fifty fathoms diſtant from each other. When a fleet is drawn up in *line*, in preſence of an enemy, it ſhould be formed in ſuch a manner as that the ſhips may mutually ſuſtain and reinforce each other, and yet preſerve a ſufficient ſpace in their ſtations, to work or direct their movements with facility during the action. The *line* cloſe-hauled is peculiarly choſen as the order of battle, becauſe if the fleet, which is to windward, were arranged in any other *line*, the enemy might ſoon gaiu the weather gage of it; and even if he thinks it expedient to decline that advantage, it will yet be in his power to determine the diſtance between the adverſe fleets, in an engagement, and to compel the other to action. The fleet to lee-ward, being in a *line* cloſe-hauled, parallel to the enemy, can more readily avail itſelf of a change of the wind, or of the neglect of its adverſary, ſo as to get to windward of him; or, at leaſt, ſo as to avoid coming to action, if the enemy is much ſuperior, or to prevent him from eſcaping, if he ſhould attempt it. Beſides, in this order, the ſails of each ſhip are ſo diſpoſed as to counteract each other, and, therefore, the ſhips in general neither advance nor retreat during the action, and are thus enabled to keep their ſtations, and to proſecute the battle with vigour, and without diſorder. Whilſt the uniformity of the *line* is preſerved, the admiral's orders may be readily communicated by ſignals from the van to the rear; diſtreſſed ſhips may be more eaſily diſcovered and relieved, and the ſituation and circumſtances of the enemy's *line* will be open to the view of the commander in chief. Moreover, the ſhips of the *line* ſhould not only to be ſufficiently cloſe to ſuſtain each other, but they ſhould be of the larger ſort, with the weightier metal. Many advantages concur to recommend the larger ſhips in a *line* of battle; they overlook thoſe of an inferior rate, which are accordingly laid open to the fire of their muſquetry. In a high ſea they can more ſafely employ the artillery of their lower deck than a ſmaller ſhip; and if both are obliged to ſhut their lower-deck ports, the advantage of the three-decked ſhips, with regard to their cannon, will yet be conſiderable; they have three tier againſt two, and two againſt one. The ſame ſuperiority ſubſiſts, in caſe they are diſmaſted, when the upper deck is encumbered with the ruins; the large ſhips being higher between decks, are leſs incommoded with the ſmoke, and their cannon is managed with greater facility; the large ſhips, having greater ſolidity of frame, are better calculated to reſiſt the effects of battle and tempeſt. In general alſo they ſail better than the ſmall ones, except in fine weather; for in a freſh wind, when the ſea becomes agitated, they have always the ſuperiority. The fire ſhips do not ſucceed ſo well againſt large ſhips as the ſmaller ones; the artillery will ſink them, or oblige them ſooner to relinquiſh their deſign; and they are eaſily towed away by the great long-boats. The *line* of a fleet, which has many capital ſhips, need not be ſo much encloſed as that of an enemy which has fewer. The former may be alſo leſs numerous, without being weaker. This circumſtance, however, ſhould not exclude a certain number of the third and fourth rates, which are neceſſary in all naval armaments.

The weather-*line* and the *line* to leward have their ſeveral advantages and inconveniences. The chief advantage of the former are, that it may approach the enemy, ſo as to determine the time and diſtance of the action; if it is more numerous than the lee-*line*, it may eaſily appoint a detachment to fall upon the van and rear of the latter, and incloſe it between two fires; it is little incommoded by the fire or ſmoke of the cannon, and may diſpatch the fire-ſhips, under the cover of the ſmoke, upon the diſabled ſhips of the lee-*line*, or ſo as to oblige the enemy to break the *line*, and bear away. But the weather-*line* as alſo its defects; when the ſea is rough, and the wind boiſterous, it cannot readily fight with the lower deck battery; it cannot decline the action, without the dangerous expedient of forcing through the enemy's *line*; and if it keeps the wind, the lee-*line* may incloſe and totally deſtroy it. The diſabled ſhips of the weather-*line* muſt tack, to avoid falling into the enemy's fleet; and if they are much ſhattered, they may be altogether ſeparated from their own fleet, particularly if they are in the rear of the *line*.

The advantages of the *line* to leeward are theſe: the ſhips of the former may uſe the guns of their lower decks, without the hazard of taking in much water at the ports in ſtormy weather, which the *line* to windward cannot do without great danger. The lee-*line*, though it cannot ſo eaſily double upon the van and rear of the enemy, and incloſe them between two fires, may nevertheleſs have opportunities of tacking, and cutting off a part of the enemy's rear. The diſabled ſhips to leeward are more eaſily removed from the *line* than thoſe to windward; and the lee-*line* can with greater facility avoid the action than its adverſary, which is a circumſtance very favourable to an inferior ſquadron. But the defects of the lee-*line* are, that it cannot decide the time and diſtance of the battle, which may commence before it is ſufficiently formed; and it will perhaps be attacked by an enemy bearing down upon it in regular order. The fire and ſmoke of the weather-*line* are a great inconvenience to it; and it cannot eaſily break the enemy's *line* with its fire-ſhips, which are very ſlowly aud with great difficulty conveyed to windward. The admiral's ſhip always preſerves her ſtation in the centre of the *line*. The *line* is ſaid to be formed a-breaſt, when the ſhips ſides are all parallel to each other, on a *line* which croſſes their keels at right angles. This is moſt frequently uſed in purſuing or retreating, with the wind right aſt, ſo that the *line* forms a perpendicular with the direction of the wind. Falconer's Mar. Dict.

Line is alſo a name given to ſeveral ſmall cords, of different ſizes, and uſed for various purpoſes at ſea.

Line, *ſhip of the*, is a veſſel large enough to be drawn up in the *line*, and to have a place in a ſea-fight. See Ship.

Line, *knave*, in a ſhip. See Knave.

Line *of meaſures*, is uſed by Oughtred to denote the diameter of the primitive circle in the projection of the ſphere in plano, or that *line* in which the diameter of any circle to be projected falls.

In the ſtereographic projection of the ſphere in plano, the *line of meaſures* is that *line* in which the plane of a great circle, perpendicular to the plane of the projection, and that oblique circle which is to be projected, interſects the plane of the projection; or it is the common ſection of a plane, paſſing through the eye-point, and the centre of the primitive; and at right angles to any oblique circle, which is to be projected, and in which the centre and pole of ſuch circle will be found.

Line, *meaſure of a*. See Measure.

Line *of demarcation*, or *Alexandrian line*, is a meridian paſſing over the mouth of the river Maragnon, and by the capes of Houmas and Malabrigo; ſo called from pope Alexander VI. who, to end the diſputes between the crowns of Caſtile and Portugal about their boundaries in 1493, drew an imaginary *line* on the globe, which was to terminate the pretenſions of each. By which partition, the Eaſt Indies fell to the lot of the Portugueſe; and the Weſt Indies, then newly diſcovered, to the Caſtilians.

Lines, *bowling*, *bunt*, *crane*, *furling*, *log*, *rhumb*, and *water*, ſee under their reſpective adjectives.

Line alſo denotes a ſmall French meaſure, containing the 12th part of an INCH, or 144th part of a FOOT.

The geometricians, notwithſtanding its ſmallneſs, conceive the *line* ſubdivided into ſix points.

The French *line* anſwers to the Engliſh *barley-corn*.

Line, *angling*. The beſt materials for making theſe *lines* are fine and even horſe-hairs: the hair ſhould be round and twiſted even, for that greatly ſtrengthens it; and all the hairs ſhould be of an equal bigneſs, or as nearly ſo as may be. They ſhould be laid in the water about a quarter of an hour after twiſting, that it may be ſeen which will ſhrink; they are then to be twiſted over again. In this laſt twiſting ſome intermingle ſilk among them, but that is not ſo well. *Lines* made entirely of ſilk are not bad; but thoſe of ſilk and hair mixed are never found to do well. The beſt colours for a *line* are ſorrel, white, and grey; the two laſt are beſt for angling in clear waters; the former in muddy ones. The pale watery-green is alſo a very good colour, and may be made thus: boil in a quart of alum-water a large handful of marygold-flowers; there will ariſe a ſcum, which muſt be taken off; then add to this liquor copperas and verdigris, of each half a pound, beat to powder together; boil theſe up together; then put the hair into this liquor, and let it lie ten or twelve hours; it will obtain a watery bluiſh green colour, which will not waſh out afterwards.

Line *of equated bodies*. See Equated *bodies*.

Lines, *gauge*, *plumb*, and *rear*. See the ſeveral adjectives.

Line, *white*, in *Printing*. See White.

LINEA *alba*, in *Anatomy*, the concourſe of the tendons of the oblique and tranſverſe muſcles of the abdomen; dividing the abdomen in two, in the middle.

It is called *linea*, *line*, as being ſtraight; and *alba*, from its colour, which is white.

The *linea alba* receives a twig of a nerve from the intercoſtals in each of its digitations or indentings, which are viſible to the eye, in lean perſons eſpecially.

Linea *mediana*. See Mediana.

Linea *nubeloſa*. See Nubelosa *linea*.

LINEAL *deſcent*. See Descent.

Lineal *exegeſis*. See Exegesis.

LINEAMENT, a fine ſtroke or line obſerved in the face, and forming the delicacy thereof; being that which preſerves the reſemblance, and occaſions the relation of likeneſs, or unlikeneſs, to any other face.

It is by theſe that phyſiognomiſts pretend to judge of the temper and manners of people.

Lineament is alſo uſed by the painters for the out-line of a face. See Contour.

LINEANS *punctum*. See Punctum.

LINEAR *leaf*. See Leaf.

Linear *problem*, in *Mathematics*, is that which may be ſolved geometrically, by the interſection of two right lines. E. gr. To meaſure an inacceſſible height by the means of two unequal ſticks, &c.

This is alſo called a *ſimple* problem, and is capable but of one ſolution.

Linear *numbers*, are ſuch as have relation to length only. See Number.

Such, e. gr is a number which repreſents one ſide of a plane figure. If the plane figure be a ſquare, the *linear number* is called a *root*.

LINEATORES, in the Hippodrome at Conſtantinople, were the ſame with the *deſignatores* in the Circus at Rome. See Hippodrome, Circus, Designator.

LINEN. There are various ſorts of *linen*, the principal materials of which are cotton, flax, and hemp. The *linen* trade of Europe is chiefly in the hand of the Ruſſians, Germans, Swiſs, Flemings, Hollanders, and French.

Linen is the ſtaple of Scotland; but it was long neglected. The Scots at preſent are not, however, in ſo bad a ſituation in reſpect to this trade, as the French were in the reign of king Henry IV. or the Iriſh at the Revolution; where, by the force of public encouragement, it has arrived to an extraordinary pitch, and it is to be hoped will daily advance: the Scots have it not to begin, they want only to improve and extend it to the height it will admit.

The balance of trade between England and Scotland, and England and Ireland, is on the Engliſh ſide; and ſo far as England and its dependencies can be ſerved with *linen* from Scotland and Ireland, inſtead of Holland, France, Germany, and Ruſſia, ſo far will England be a gainer by this change in the courſe of trade. The more *linen* the Scots and Iriſh can ſell in England, the more of the Engliſh commodities will they be able to purchaſe; and it may be reaſonably ſuppoſed that their demands from England will always increaſe in proportion to the increaſe of their people and *linen* manufactures. It is then evidently the intereſt of England to promote and advance the manufacture of *linen* in Scotland and Ireland, and to give them all reaſonable advantages in the trade, in preference to foreigners; where the balance of trade is againſt us, and this ſeems to be the ſenſe of the nation, ſince all foreign *linen*, for home conſumption, pays a duty. Poſt. Dict Com.

The *linen* trade of this country is regulated by ſeveral ſtatutes.

No perſon ſhall put to ſale any piece of dowlas *linen*, &c. unleſs the juſt length be expreſſed thereon, on pain of forfeiting the ſame. 28 Hen. VIII. cap. 4. Uſing means whereby *linen*-cloth ſhall be made deceitfully, incurs a forfeiture of the *linen*, and a month's impriſonment. Stat. 1 Eliz. cap. 12. Any perſons may ſet up trades for dreſſing hemp or flax, and making thread for *linen*-cloth, &c. 15 Car. II. cap. 15.

By 10 Ann. cap. 19. and 12 Ann. ſtat. 2. cap. 9. a duty of 30*l.* for every 100*l.* value, over and above other duties, is laid on all ſtriped and printed *linens* imported; and the ſaid printed *linens* are required to be ſtamped by the officers of the cuſtoms: and alſo by the ſame ſtatutes, a home duty of 3*d.* a yard in length, reckoning yard-wide, is laid on all *linen*-ſtuffs, printed, &c. in Great Britain; and for all callicoes 6*d.* a yard, excepting thoſe callicoes, *linens*, which ſhall be dyed throughout of one colour only; and on all cottons, wholly made of cotton ſpun in Great Britain, printed, &c. 3*d.* a yard, 14 Geo. III. cap 72. By 7 Geo. III. cap. 28. certain additional duties on importation are impoſed, viz. for every ell of *linen*-cloth or ſheeting, above one yard wide, except Flanders Holland cloth, 3*d.* and for every ell of *linen*-cloth called drilling 3*d.* And by 7 Geo. III. cap. 58. for every ell of foreign *linen*, called packing-canvas, ſpruce-elbing, or Queenſborough-canvas, one farthing; for every ell of Dutch barras, and Heſſian canvas, one halfpenny; and for every yard of foreign lawn, bleached in Holland, commonly called Holland whited lawn, one penny. Houſes for printing, &c. *linen*, are to be entered, on pain of 30*l.* 10 Ann. cap. 19. And if other places are made uſe of beſides the uſual abode of the printer, &c. they are to be entered on pain of 50*l.* and forfeiture of goods. 1 Geo. ſtat. 2. cap. 36. Officers are to enter and take account without obſtruction, on pain of 20*l.* and the goods ſhall be entered once in ſix weeks, on oath, on pain of 50*l.* Concealment of goods to avoid the duty incurs a forfeiture of 20*l.* The duties ſhall be paid within ſix weeks after entry on pain of forfeiting double; and the goods ſhall not be removed before they are ſtamped, on pain of 20*l.* the ſurveyed goods are to be kept ſeparate from the others, and warrants may be iſſued in order to ſearch for goods unſtamped. 10 Ann. cap. 19. Such goods may be ſeized, and the perſons in whoſe cuſtody they are found ſhall forfeit 50*l.* 5 Geo. cap 21. Counterfeiting the ſtamp is felony without benefit of clergy; and a perſon knowingly ſelling goods with a counterfeit ſtamp ſhall forfeit 100*l.* and ſtand in the pillory. 10 Ann. cap. 19. 13 Geo. III. cap. 56. Theſe goods having paid the duty may by exported, and there ſhall be a drawback of the duties. 10 Ann. cap. 19. 12 Ann. ſtat. 2. cap. 9. *Linen* of all ſorts made of flax or hemp, of the manufacture of this kingdom, may be exported duty free. 3 Geo. I. cap. 7. Cambrics and lawns made in England are to be marked by the exciſe officers, and are regulated under ſeveral penalties. 4 Geo. III. cap. 37. 7 Geo. III. cap. 43. Stealing of *linen*, fuſtian, cotton goods, &c. from whitening-grounds or drying-houſes, to the value of 10*s.* or knowingly buying or receiving ſuch ſtolen goods, is felony without benefit of clergy. 18 Geo. II. cap. 27. Such alſo is breaking into houſes, ſhops, &c. and deſtroying any *linen*-cloth, or implements uſed in the manufacturing of it, by 4 Geo. III. cap. 37. Affixing counterfeit ſtamps on foreign *linens* imported, in imitation of the ſtamps put on Scotch or Iriſh *linens*, and expoſing them to ſale, and affixing any counterfeit ſtamp on any *linen* of the manufacture of Great Britain or Ireland, in order to vend the ſame as *linens* duly ſtamped, and expoſing ſuch to ſale incur forfeiture and a penalty of 5*l.* for each piece by 17 Geo. II. cap. 30. The reſtrictions relating to the importation, wearing, and ſelling of foreign cambrics and French lawns, are enacted by 18 Geo. II. cap. 36. 21 Geo. II. cap. 27. 32 Geo. II. cap. 32. and 7 Geo. III. cap. 43. See Cambric.

A new manufacture has been lately ſet on foot in London, for embelliſhing *linen* with flowers and other ornaments of gold leaf. The *linen* looks whiter than moſt of the printed *linens*; the gold is extremely beautiful, and is ſaid to bear waſhing well. See Stuff.

There are many ſubſtances from which a juice or dye is obtained, that will ſtain *linen* of different colours. The juice of the anacardium, rubbed on *linen* or cotton, gives a reddiſh-brown ſtain, which ſoon deepens in the air into a black, and which has not been diſcharged by waſhing and boiling, with ſoap or alkaline ley. Hence the anacardium is ſaid to be uſed for marking *linen* and cotton cloths, and to be known all over India by the name of marking nut. The juice of the cashew-*nut*, called by ſome the anacardium of the Weſt Indies, differs from the oriental anacardium in its colouring quality; that lodged between its ſhells being much paler, and giving to *linen*, cotton, or paper, only a browniſh ſtain, which is durable, but does not change at all towards blackneſs.

Several ſpecies of the toxicodendron or poison-*wood*, contain in the leaves a milky juice, which in drying, becomes of a deep black, and communicates the ſame colour to the *linen* on which it is dropped: the *linen* thus ſtained, boiled with ſoap, came out without the leaſt diminution of its colour; nor does ſtrong ley or wood-aſhes make any change in it. Phil. Tranſ. vol. xlix. for 1755.

Dr. Lewis has found, that the milks of wild poppies, garden poppies, dandelion, hawk-weed, and ſow-thiſtle, gave brown, or browniſh-red ſtains, which were diſcharged by waſhing with ſoap: the colourleſs juice which iſſues from hop-ſtalks when cut, ſtains *linen* of a pale-reddiſh or browniſh-red, extremely durable; the juice of ſloes gave likewiſe a pale browniſh ſtain, which, by repeated waſhings with ſoap, and wetting with ſtrong ſolution of alkaline ſalt, was darkened to a deeper brown: on baking the ſloes, their juice turns red, and the red ſtain which it then imparts to *linen* is, on waſhing with ſoap, changed to a pale-bluiſh, which alſo proves durable. See DYING of *Thread*.

The late Dr. Smellie has recommended the following method of marking *linen*, ſo has not to waſh out again: take vermillion, as much as will lie on a half crown piece, of the ſalt of ſteel a piece about the ſize of a ſmall nutmeg, grind or levigate them well together with linſeed oil; the compoſition may be diluted or thickened at pleaſure.

LINEN, *foſſil*. See AMIANTHUS and ASLESTOS.

LINEN-*mills*. See MILL.

LINEN, *white*. See WHITE.

LINEN, *bleaching of*. See BLEACHING.

LING, in *Ichthyology*, the Engliſh name for a kind of fiſh, which is a ſpecies of the ASELLUS, according to the generality of authors, and is generally called *aſellus longus*. According to the new Artedian ſyſtem, it is a ſpecies of the *gadi*, and is diſtinguiſhed by the expreſſive name of the GADUS with two fins on the back, with a bearded mouth, and with the upper jaw longeſt.

Ling, which is the *gadus molva* of Linnæus, is eſteemed, both freſh and cured, for the table. It is a long-bodied fiſh, whence its name by corruption of *long*, being uſually from three to four feet, more approaching to the *merlucius* or hake, than to any other ſpecies; it is covered with very ſmall ſcales, which adhere cloſely to the ſkin; the back and ſides are of a bluiſh or greeniſh brown, and the belly white; its head is flat and large, and its ſnout conſiderably long; the upper jaw is longer than the under, and both are furniſhed with ſeveral rows of ſhort teeth, and the lower with one range of longer; and in the palate there are a large number of ſmall teeth, among which there are four or five large and long ones intermixed; the mouth opens very wide, and in the angle of the lower jaw has a ſingle ſhort beard; it has two fins upon the back, one near the head, conſiſting of fifteen rays, the other not far behind it, and reaching down almoſt to the tail, conſiſting of ſixty-five rays; the gill-fins are ſmall, the belly-fins are placed high, and the tail is rounded at the end, marked with a tranſverſe black bar, and tipt with white. See *Table* II. *of Fiſhes*, N° 18.

The *ling* abounds about the Scilly iſles, on the coaſts of Scarborough, and thoſe of Scotland and Ireland, and forms a conſiderable article of commerce. In the Yorkſhire ſeas they are in perfection from the beginning of February to the beginning of May, and ſome till the end of that month. They ſpawn in June, at which time the males ſeparate from the females. When ths *ling* is in ſeaſon, its liver is very white and abounds with a fine flavoured oil, which afterwards becomes red like that of a bullock, and affords no oil. This oil is ſaid to be hoarded up in the cellular membranes of fiſhes, to return into their blood, and ſupport them in the engendering ſeaſon. Great quantities of this fiſh are ſalted for exportation, and for home-conſumption: for this purpoſe it muſt meaſure twenty-ſix inches or upwards from the ſhoulder to the tail, in order to be entitled to the bounty on exportation. Thoſe under that ſize are called *drizzles*. Pennant.

LINGUA, in *Anatomy*. See TONGUE.

LINGUA *avis*, *birds-tongue*, in the *Materia Medica*, the ſeed of the aſh tree, or aſhen keys.

LINGUÆ *frænum*. See FRÆNUM.

LINGUÆ *medietas*. See MEDIETAS.

LINGUÆ *ſecundum par*, a name given by Caſſerius to a pair of muſcles of the tongue, called by the generality of authors STYLOGLOSSUS.

LINGUADO, in *Ichthyology*, the name of a Weſt Indian fiſh, in ſhape reſembling a ſoal.

LINGUATULA, in *Icthyology*, the name of a ſpecies of fiſh, ſomewhat reſembling the ſoal, but ſmaller and ſhorter, and much inferior to it in taſte. It is common in the Mediterranean, and brought to market at Rome, Venice, and elſewhere, and is called by other authors CYNOGLOSSUS, and *citharus flavus*, or *citharus aſper*.

LINGUIFORM-*leaf*, among *Botaniſts*. See LEAF.

LINGULA, in *Ichthyology*, the name of an extremely ſmall fiſh of the ſoal-kind. It is known from the reſt of this genus not only by its ſmallneſs, but by a ridge of ſmall ſcales which run along the line over the ſpine, and are much more elevated and diſtinguiſhable, both to the eye and touch, than thoſe of the reſt of the body. It is a well-taſted fiſh, and much firmer in its fleſh than the ſoal, but is very ſcarce, and is of little value, becauſe of its thinneſs. It is caught in the Mediterranean.

LINGULACA, in *Ichthyology*, a name by which ſeveral authors, particularly ſome of the older naturaliſts, have called the *ſoal fiſh*.

LINIFICUS *lapis*, a name given by ſome authors to a ſtone, which was ſaid to cure the epilepſy when taken internally. It ſeems to have been a name given by ſome fanciful writers to the ALUMEN *plumoſum*.

LINIMENT, *linimentum*, from the Latin *linire*, *to anoint gently*, in *Pharmacy*, a form of external medicine, made of unctuous ſubſtances, uſed to rub on any diſtempered part.

The *liniment* is of a mean conſiſtence between an oil and an unguent.

The uſe of *liniments* is to ſoften aſperities of the ſkin, moiſten parts that need humectation, reſolve the humours that afflict the patient, and give him pain. There are various kinds of *liniments* uſed, according to the various occaſions.

LINIMENTUM *album*, a form of medicine differing in nothing from the *unguentum album*, but in that it is a little ſofter: they are both preſcribed in the late London Pharmacopœia, and both made of the ſame ingredients. The preſcription for this is as follows: take oil-olive three ounces, ſpermaceti ſix drachms, white wax two drachms; melt all together over a gentle fire, ſtirring it till it is perfectly cold.

This *linimentum* may be applied in caſes of excoriation, where, on account of the largeneſs of the ſurface, the ointment with lead or calamine, might be improper.

LINIMENTUM *arcæi*. See ELEMI.

LINIMENTUM *ſaponaceum*, or the ſoap-*liniment*, a form of medicine preſcribed in the late London Pharmacopœia, and meant to ſupply the place of the ointment well known by the name of *opodeldoc*. It is made thus: take ſpirit of roſemary a pint, hard Spaniſh ſoap three ounces, camphor one ounce; digeſt the ſoap with the roſemary ſpirit, till it is diſſolved, and then add the camphor; when this is melted, the whole is finiſhed.

A *liniment* of this kind may be prepared by rubbing an ounce of camphor, with two ounces of Florence oil, in a mortar, till the camphor be diſſolved. This anti-ſpaſmodic *linement* may be uſed in obſtinate rheumatiſms, and in ſome other caſes, accompanied with extreme pain and tenſion of the parts.

LINIMENTUM *volatile*, a form of medicine preſcribed in the late London Diſpenſatory, and ordered to be made of oil of almonds, an ounce; ſpirit of ſal ammoniac, made without lime, two drachms; theſe are to be ſhook together in a wide-mouthed vial, till they are perfectly mixed. Or this *liniment* may be prepared by ſhaking together an ounce of Florence oil, and half an ounce of ſpirit of hartſhorn. If the patient's ſkin is able to bear it, the *liniment*, made with equal parts of the ſpirit and oil, will be more efficacious. Sir John Pringle obſerves, that in the inflammatory quinſey, a piece of flannel moiſtened with the *liniment* and applied to the throat, to be renewed every four or five hours, is one of the moſt efficacious remedies; and that it ſeldom fails, after bleeding, either to leſſen or carry off the complaint.

A *liniment* for burns may be made by ſhaking well together in a wide-mouthed bottle equal parts of Florence oil, or of freſh drawn linſeed oil, and lime-water. This is found to be an exceeding proper application for recent ſcalds or burns. It may either be ſpread upon a cloth, or the parts affected may be anointed with it twice or thrice a day.

A *liniment* for the piles may be made by mixing two ounces of emollient ointment, and half an ounce of liquid laudanum, with the yolk of an egg, and working them well together.

LINKIO, in *Botany*, a kind of water-plant among the Chineſe, the fruit of which is of a triangular pyramidical form, prominent every way, with a green thick rind, that grows reddiſh towards the apex, and, when the fruit is dried, grows black. The internal ſubſtance is exceeding white, its taſte like that of the cheſnut, three or four of which it equals in bulk. The plant is found in ſtanding waters, and has very ſlender leaves, that ſpread themſelves over a large extent on the ſurface of the water, and the fruit lies concealed under water in great numbers.

LINNÆA, in *Botany*, the name of a genus of plants of the *didynamia angioſpermia* claſs, given by Gronovius in honour of his friend Linnæus, the characters of which are theſe: the cup is a double perianthium; the perianthium of the fruit conſiſts of two leaves; the perianthium of the flower ſtands upon the germen, and is narrow, erect, and acute, and compoſed of one leaf divided into five ſegments; the flower is monopetalous, of a campanulated form; it is twice as large as the cup, and is ſlightly divided into five ſegments at the edge; the ſtamina are four ſubulated filaments, inſerted in the baſe of the flower; two of theſe are very ſhort, but the two longer are not ſo long as the flower; the antheræ are of a very compreſſed figure, and can turn round upon the ſtamina; the germen of the piſtil is roundiſh, and is placed within the cup; the ſtyle is ſtraight and ſlender, and is of the lenght of the flower; it always bends toward one ſide, and is terminated by a globoſe ſtigma; the fruit is a dry oval berry of three cells, and is covered with the hairy and glutinous cup of the flower; the ſeeds are ſingle and roundiſh. There is only one ſpecies.

LINNÆAN *ſyſtem of Botany*. See BOTANY, FLOWERS, and SEXUAL *ſyſtem*.

LINNET, *linaria*, in *Ornithology*, a genus of birds, of which there are ſeveral ſpecies. The general characters of the genus are theſe: the birds of it are ſomewhat ſmaller than the chaffinch; their general colour is a greyiſh-brown; their tail is a little forked, the outer feathers of it having white extremities; and they all ſing very ſweetly. We have in England four ſpecies of this bird.

1. The common brown *linnet*, well known to every one. Theſe birds are much eſteemed for their ſong: they feed on ſeeds of different kinds, which they peel before they eat: the ſeed of the *linum* or flax is their favourite food, whence the name of the *linnet* tribe.

2. The *linaria rubra major*, or greater red-headed *linnet*; the FRINGILLA *cannabina*, of Linnæus. This has a fine red head, a grey neck, a duſky reddiſh-brown back, and its breaſt and belly are ſomewhat reddiſh. The female of this ſpecies, however, has no redneſs in its head or breaſt, but has ſomewhat of a greeniſh caſt on the brown of its back, and is yellowiſh on the breaſt, with ſome browniſh ſpots. It is a common fraud in the bird-ſhops in London, when a male bird is diſtinguiſhed from a female by a red breaſt, as in the caſe of this bird, to ſtain or paint the feathers, ſo that the deceit is not eaſily diſcovered, without cloſe inſpection. This ſpecies of *linnet* is frequent on our ſea-coaſts, and is often taken in flight-time near London. It is a familiar bird, and becomes chearful in five minutes after it is caught.

3. The *linaria rubra minor*, or leſſer red-headed *linnet*; the FRINGILLA *linaria* of Linnæus. This is the leaſt of all the *linnets*, and on the back is of the ſame colour with the common *linnet*; the back part of its head is red, and alſo its breaſt, but the lower part of its belly is whitiſh. In this ſpecies, the female as well as the male, has a red head, that of the male being ornamented with a rich ſhining ſpot of a purpliſh red, and that of the female of a ſaffron colour; and both have their beaks much ſharper, and their feet and legs blacker than in the larger kind. This is a gregarious bird, whereas the larger ſpecies commonly flies ſingle. This ſeems to be the ſpecies known about London by the name of ſtone red-poll.

4. The laſt ſpecies is the *linaria montana*, or mountain-*linnet*. This is the largeſt of all the *linnets*, according to Willughby's deſcription, though Mr. Pennant ſays that it is in ſize rather inferior to the common *linnet*. Its beak is very ſmall; its head and back are of the ſame colour with thoſe of the common *linnet*, and the feathers of its breaſt and belly are black, edged with white; the rump of the male is of a fine and beautiful red, and thus diſtinguiſhes it from the female. This ſpecies is common in Derbyſhire, but ſeems not ſo frequent in other places. However it is taken in the flight ſeaſon near London with the *linnets*, and called a *twite*. It breeds, according to Mr. Pennant, only in the northern parts of our iſland. Ray and Pennant.

It is remarkable of the *linnet*, that when it builds in hedges, and when in furze-buſhes on heaths, in both which places the neſts are very common, they are made of different materials. When they build in hedges, they uſe the ſlender filaments of the roots of trees, and the down of feathers and thiſtles; but when they build in heaths, they uſe moſs, principally, for the outer part, finiſhing it within with ſuch things as the place will afford, chiefly with wool and hair. Theſe birds will have young ones three or four times a year, eſpecially if they are taken away before they are able to leave the neſts. They lay five whitiſh eggs, ſpotted like thoſe of the gold-finch.

When they are intended to be taught to whiſtle tunes, or to imitate the notes of any other bird, they are to be taken from the old one when they are not more than four days old; for at this time they have no idea of the note of the old ones, and will readily be taught to modulate their voice like any thing that is moſt familiar to their ears, and within the compaſs of their throats. The honourable Mr. Barrington obſerves, that in order to be certain that a neſtling will not have the call of its ſpecies, it ſhould be taken from the neſt when only a day or two old; though a bird of this age requires great trouble in breeding, and the chance is greatly againſt its being reared. There requires more care in the feeding them when they are taken thus young, than when they are left in the neſt till nearly fledged, but they will be reared very well upon a food half bread and half rape-ſeed, boiled and bruiſed: this muſt be given them ſeveral times a day. It muſt be made freſh every day, and given them ſufficiently moiſt, but not in the extreme. If it be in the leaſt ſour, it gripes and kills them; and if too ſtiff, it is as miſchievous, by binding them up.

They muſt be hung up as ſoon as taken from the neſt, under the bird whoſe note they are intended to learn; or if they are to be taught to whiſtle tunes, it muſt be done by giving them leſſons at the time of feeding; for they will profit more while young in a few days, than in a long time afterwards, and will take in the whole method of their notes before they are able to crack hard ſeeds. Some have attempted to teach them to ſpeak, in the manner of the parrot, or other birds, and they will arrive at ſome ſort of perfection in it with great pains.

Mr. Barrington mentions a *linnet*, which, being taken from its neſt when only two or three days old, almoſt articulated the words *pretty boy*, as well as ſome other ſhort ſentences. See SONG *of birds*.

LINOZOSTIS, in *Botany*, a name given by the ancient Greek writers to two plants very different from one another; the one is the *mercurialis*, or Engliſh mercury, a plant common in uncultivated places, and eaten by many boiled in the manner of aſparagus: the other the *epilinum*, or dodder, growing upon the plants of flax.

Theophraſtus, Dioſcorides, and the ancient Greeks, uſe the word in the firſt ſenſe, and the modern Greeks in the latter.

The Latin authors call this *linozoſtis*, or *epilinum*, ſome times *angina lini*, and *podagra lini*, looking on it as a diſeaſe which choaks the plant it grows on, and cauſes gouty tumors on the ſtalks. See DODDER.

LINSEED, or LINE-SEED, a ſort of grain, being the ſeeds of the common FLAX, which enters the compoſition of ſeveral medicines, and yields, by expreſſion, an oil, that has moſt of the qualities of nut oil, and is according generally uſed, in lieu thereof, in painting, and for burning.

Thoſe who manufacture it in large quantities have mills turned by horſes or water, for the more expeditious diſpatch of their work.

That drawn without the aſſiſtance of fire, is of much eſteem in medicine, and ſuppoſed good in the cure of catarrhs, coughs, aſthmas, and other diſeaſes of the breaſt, &c.

The quantity of *linſeed* annually imported into England, Scotland and Ireland, is not leſs than 240,000 buſhels.

Linſeed, from which the oil has been expreſſed, boiled in milk, and applied warm in a cloth to herniæ, is much recommended in the Satyr. Sileſiac. ſpecim. 4. obſ. 4.

Theſe ſeeds, in this ſtate, are frequently employed in emollient and maturing cataplaſms. The ſeeds, boiled in water, yield a large proportion of a ſtrong flavourleſs mucilage; but to rectified ſpirit they give out little or nothing. Theſe ſeeds have been ſometimes uſed in a ſeaſon of ſcarcity, inſtead of grain; but they appear to be an unwholeſome as well as an unpalatable food. Tragus relates, that thoſe who fed upon them in Zealand, had the hypochondres in a ſhort time diſtended, and the face and other parts ſwelled; and that not a few died of theſe complaints.

LINSEED, *infuſion of*. See INFUSION.

LINSPINS, or LINCHPINS, are ſmall pins of iron, which keep the wheel of a cannon, or waggon, on the axle-tree; for when the end of the axle-tree is put through the nave, the *linſpin* is put in to keep the wheel from falling off.

LINSTOCK, a ſhort ſtaff of wood, about three feet long, having at one end a piece of iron divided into two branches, each of which has a notch to hold a piece of match, and a ſcrew to faſten it there; the other end being alſo ſhod with iron, and pointed, to ſtick into the ground, or in the deck when it is uſed at ſea. It is uſed by the gunners in firing cannon. It is frequently uſed in ſmall veſſels, in an engagement, where there is commonly one fixed between every two guns, by which the match is always kept dry and ready for firing.

LINT, in *Surgery*, is the ſcraping of finen linen, uſed by ſurgeons in dreſſing wounds. It is made into various forms, which acquire different names, according to the difference of their figures.

Lint made up in an oval, or orbicular forms, is called a PLEDGIT; if in a cylindrical form, or in the ſhape of a date or olive-ſtone, it is called a DOSSIL.

Theſe different forms of *lint* are required for many purpoſes; as, 1. To ſtop blood in freſh wounds, by filling them up with dry *lint* before the application of a bandage; though if ſcraped *lint* be not at hand, a piece of fine linen may be torn into ſmall rags, and applied in the ſame manner. In very large hæmorrhages the *lint*, or rags, ſhould be firſt dipt in ſome ſtyptic liquor, alcohol, or oil of turpentine, or ſprinkled with a ſtyptic powder.

2. To agglutinate and heal wounds; to which end *lint* is very ſerviceable, if ſpread with ſome digeſtive ointment, or balſam, or dipt in ſome vulnerary liquor. 3. In drying up wounds and ulcers, and forwarding the formation of a cicatrix. 4. In keeping the lips of wounds at a proper diſtance, that they may not haſtily unite, before the bottom is well digeſted and healed. 5. They are highly neceſſary to preſerve wounds from the injuries of the air. Small portions of *lint* tied round with thread are chiefly uſed in dreſſing wounds and ulcers of the deeper kind. They are always applied to the bottom of ſuch wounds, the remaining cavity being filled up with other portions of *lint*. By this means, the immediate removal of the dreſſings is not only provided for, but the poſſibility of leaving any part of them in the bottom of the wound is prevented.

In very large wounds, and eſpecially in amputations of the limbs, which operations are frequently required in the army and navy, at times when *lint* is very ſcarce, it will be very ſufficient to dreſs the bare bone and face of the wound with ſcraped *lint*, filling up the cavity with tow, and covering all with a large compreſs.

Surgeons of former ages formed compreſſes of ſponge, feathers, wool, or cotton, linen being ſcarce; but *lint* is far preferable to all theſe, and is at preſent univerſally uſed. Heiſt Surg. Introd. ſect. 54.

LINTEL, in *Architecture*, the piece of timber which lies horizontally over door-poſts and window-jambs; as well to bear the thickneſs of the wall over it, as to bind the ſides of the walls together.

LINUFAR, in *Botany*, a name uſed by ſome of the writers of the middle ages, to expreſs the water-lily. The Arabians gave this genus of plants the name of NILUFAR, and this word *linufar* is only formed of that, by tranſpoſing ſome of the letters.

LINUM, in *Botany*. See FLAX.

LINUM *carpaſium*, *carpaſian flax*, or *linen*, a term often occurring in the old writers, and uſed by different authors in very different ſenſes.

The firſt uſe we find made of the word, is for the expreſſing a kind of *flax* which was finer and ſmaller, as well as brighter and more gloſſy, than any other. Pliny uſes the word in this ſenſe, and tells us, that ſuch *flax* was principally brought from Spain; and that both it, and the *linen* made of it, were, in his time, called by the name *carpaſian*: from this it became a cuſtom to call all very fine flax, or fine *linen*, *carpaſian linen*, and the word ſignified no more than delicate, or fine.

The modern Greeks uſe the word in this ſenſe, and Suidas expreſſes the fineſt *linen* veils by the term *carpaſian*. The author of the Periplus Maris Erythræi, who was contemporary with Pliny, calls the *flax*, of which the Indian *linens* were made, *carpaſos*; but none of the older Greeks have the word. This author is not, however, to be appealed to for aſcertaining the purity of the language of the ancients; for it is plain that he has taken in many words which are not good Greek, nor ever were uſed by any author of credit, but are the mere technical terms of the tradeſmen and merchants of that time.

Pauſanias uſed the word *carpaſium linum* in a very different ſenſe from all theſe; for with him it is made to expreſs the *flax* made of the ſtone ASBESTOS, and the *linen* made of this, which was thrown into the fire to be cleaned. Solinus uſes the word alſo in the ſame ſenſe: he ſays, that in Caryſtos there was found that kind of *flax* which remained unhurt in the fire; and Hieronymus Mercurialis thinks that the *carbaſis* of the ancient Romans was a word properly uſed only to ſignify the *carpaſian flax* of Pauſanias, which was not to be deſtroyed by the fire, and was the true *linum incombuſtibile*, or threads of the aſbeſtos ſtone, or *linen* made of that material. This, however, is not the ſenſe of the word in later times, for we find it evidently uſed for all *linen* manufactures of whatever kind.

LINUM, *caryſtium*, in *Natural Hiſtory*, a name given by Pauſanias to the ASBESTOS. It was found plentifully in this author's time, near Caryſtos, a town in the Negropont, and thence obtained its name.

LINUM *catharticum*, *purging flax*, in *Medicine*, makes a common purge among the country people. It is almoſt as rough as that of *gratiola*.

It is a ſpecies of wild *flax*, diſtinguiſhed by the name of meadow *flax*, with ſmall flowers which appear in July, and commonly called mountain-*flax*, growing without culture on chalky hills and dry paſture ground in many parts of England, and is taken in infuſion in ale.

This herb is ſaid to be an effectual and ſafe cathartic; an infuſion of a handful of the freſh leaves in whey or white wine, or a dram of the leaves in ſubſtance with a little cream of tartar and aniſeeds, are directed for a doſe. Linnæus recommends an infuſion of two drams of the dry leaves as a mild laxative. It is greatly recommended by ſome in dropſies, and to prevent its griping they mix aniſe or ſome other of the carminative ſeeds with it. It is given in moſt chronic caſes, where people's conſtitutions are ſtrong enough to bear it, and often with great ſucceſs.

LINUM *vivum*, or *incombuſtibile*, cloth made of a foſſile, ſtony ſubſtance, of a whitiſh colour, and woolly texture, ſeparable into threads, or filaments, which will endure the fire without conſuming. See ASBESTOS.

As to the art of managing this mineral, and of ſpinning and weaving it, &c. the accounts we have are various.

Marco Polo, the Venetian, gives us the manufacture of the *linum*, found in the province of Chinchinthelas in Tartary, from one Curſica, a Turk, ſuperintendant of the mines of that country, as follows. The lanuginous mineral, being firſt dried in the ſun, is then pounded in a braſs mortar, and the earthy part ſeparated from the woolly, which is afterwards well ſeparated from filth; being thus purged, it is ſpun into thread like other wool, and after woven into cloth, which if foul or ſpotted, they cleanſe, he ſays, by throwing it into the fire for an hour's time, whence it comes out unhurt, as white as ſnow: which very method, according to the account given us by Strabo, ſeems to have been uſed, in ordering the Cretan amianthus; with this addition, that after it was pounded, and the earthy part ſeparated from the woolly, he ſays it was combed; and ſo does Agricola.

Signior Ciampani, after deſcribing four ſorts of the *linum*, whereof he had ſpecimens in his muſeum; the firſt ſent him from Corfu, the ſecond from Seſtri di Ponente, the third coarſer and darker than the reſt, and the fourth from the Pyreneans; and after obſerving, that though he kept it three weeks in a glaſs-houſe fire, yet he found it unaltered, though it could not preſerve a ſtick wrapped in it, from the fire; he proceeds to ſhew the manner of ſpinning, and making it into cloth, which he effected thus:—He firſt laid the ſtone in water, if warm the better, for ſome time to ſoak; then opened and divided it with his hands, that the earthy parts might fall out of it, which are whitiſh like chalk, and ſerve to bind the thready parts together. This makes the water thick and milky. That operation he repeated ſix or ſeven times, with freſh water, opening and ſqueezing it again and again, till all the heterogeneous parts were waſhed out, and then the flax-like parts were collected, and laid in a ſieve to dry. As to the ſpinning, he firſt ſhews a method diſcovered to him, which is thus:—Lay the *linum*, cleanſed as before, between two cards, ſuch as they card wool withal, where let it be gently carded, and then clapped in between the cards, ſo that ſome of it may hang out of the ſides; then lay the cards faſt on a table, or bench; take a ſmall reel, made with a little hook at the end, and a part to turn it by, ſo that it may be eaſily turned round; this reel muſt be wound over with white thread: then, having a ſmall veſſel of oil ready, with which the fore finger and thumb are conſtantly to be kept wet, both to preſerve the ſkin from the corroſive quality of the ſtone, and to render the filaments thereof more ſoft and pliant; by continuing to twiſt about the thread on the reel in the aſbeſtos hanging out of the cards, ſome of the latter will be worked up together in it; and, by little and little, the thread may, with care, be woven into a coarſe ſort of cloth; and, by putting it into the fire, the thread and oil will be burnt away, and the incombuſtible cloth remain.

But finding this way, of uniting the ſtone with the thread, very tedious; inſtead of the thread, he put ſome flax on a diſtaff, and, by taking three or four filaments of the aſbeſtos, and mixing them with the flax, he found they might be eaſily twiſted together, and the thread thus made much more durable and ſtrong; ſo that there is no need of carding, which rather breaks the filaments, than does any good: only open and ſeparate the filaments, after waſhing, on a table, and take them up with the flax, which is ſufficient.

As to the making of paper, he ſays, in the waſhing of the ſtone there will remain ſeveral ſhort pieces in the bottom of the water, of which paper may be made in the common method. He concludes with the beſt way of preſerving the cloth, or any thing made of the linen, which, by reaſon of its exceſſive dryneſs, is very apt to break, and twiſt; and it conſiſts in keeping it always well oiled, which is the only preſervative. When the cloth is put in the fire, the oil burns off, and the cloth comes out white and purified. See ASBESTOS.

LION, *leo*, in the Linnæan ſyſtem of *Zoology*, is a ſpecies of quadrupeds belonging to the FELIS or *cat* kind, with a long tail and pale-red or tawny body.

The head of the *lion* appears very large in proportion to its body, and is the moſt fleſhy of the heads of all the known animals; its jaw-bones are alſo remarkably large; the breaſt alſo appears very large, but this is only owing to the great quantity of long hair that covers it, for the ſternum is ſmaller than that of moſt animals of the ſame ſize; the tail, which is very long, appears alſo of the ſame thickneſs all the way, but this is wholly owing to the growth of the hair; the tail itſelf is largeſt at the baſe, and thence goes taper to the point; but the hair being very ſhort near its baſe, and continuing to grow longer all the way, as that decreaſes in thickneſs, is ſo exactly proportioned in its growth, that it always gives the whole tail this regular appearance. The length of the largeſt *lion* from noſe to tail is above eight feet: the tail is four feet. See *Tab.* III. *of Quadrupeds*, N° 27.

The long hair that grows about the neck and breaſt, and makes what is called the mane of a *lion*, only differs from the hair of the reſt of the body in length, having no greater thickneſs or rigidity, like that of the manes of other animals. The claws of the *lion* have no caſes, as Pliny pretends that they have, for the animal to withdraw them into in walking; but Plutarch, Solinus, and ſome others, are much more in the right in ſaying that the *lion* draws them up backwards when he walks, and places them cloſely among the articulations of the toes.

The tongue of the *lion* is very rough and rigid, being covered with a great number of prominences of a hard matter, reſembling that of a cat's claws, and theſe are much in the ſhape of thoſe claws, and nearly of the ſame ſize, the baſe of each being a round fleſhy prominence on the ſurface of the tongue.

The eyes of the *lion* are clear and bright, even after the creature is dead. The common obſervation that this creature ſleeps with its eyes open, are founded on this, that it has a very thick membrane lodged in the greater canthus of the eye, which it can extend over the whole eye upon occaſion, as birds do their *membrana nictitans*, and thus will have no occaſion to ſhut its eye-lids, in order to exclude the light. It is very remarkable, that the common cat has all the ſingular ſtructure of the ſeveral parts as the *lion* has, its claws, feet, tongue, and eyes, being of the ſame kind, and its internal parts bearing as ſtrong a reſemblance.

The heart of a *lion* is much larger than that of any other creature of the ſame ſize, being ſix inches long, and four in diameter, in the largeſt part, and terminating in a very ſharp point; and the brain is as remarkably ſmall.

The *lioneſs* has no mane, or long hairs upon the neck and breaſt, which ſo remarkably characteriſes the *lion*. The noſe alſo is longer in the *lioneſs*, and the head more flatted in the upper part; the claws alſo are much ſmaller than thoſe of the male *lion*. This creature, when full grown, is about three feet high, from the-fore feet to the ridge of the back, and about five feet long from the end of the noſe to the inſertion of the tail, which is about two feet and a half long; the claws are of a fibroſe texture, the fibres being very hard in themſelves, but eaſily ſeparable from one another. In other particulars, the *lioneſs* very little differs from the *lion*. See *Tab.* III. *of Quadrupeds*, N° 28.

The *lion* is an inhabitant of all parts of Africa, and the hot parts of Aſia, ſuch as India and Perſia, and ſome few are found in the deſarts between Bagdat and Baſſorah, on the banks of the Euphrates; but they moſt abound in the torrid zone, where the ſize is the largeſt, and their rage moſt tremendous, being inflamed by the influence of a burning ſun and a very dry ſoil. It is obſerved, that, though they reign abſolute maſters over every beaſt, their rage diminiſhes, and their timidity increaſes as they approach the habitation of the human race. They have been alſo known to ſpare the weaker animals, and many inſtances are related by A. Gellius, Ælian, and Pliny, &c. of their gratitude. *Lions* are capable of being tamed; and the monarch of Perſia is ſaid on days of audience, to have two large *lions* chained on each ſide of the paſſage to the room of ſtate, led there by keepers in chains of gold. The lion preys on all kinds of animals; having rouſed them into view by his roar, he ſtarts on his prey, ſtriking it with his talons, and tearing it to pieces. He alſo invades the folds, leaping over the fences with his prey, and his ſtrength is ſo great, that he can carry off a middling ox with the utmoſt eaſe. He ſometimes ſeizes his prey by ſurprize, and mankind falls a victim to his hunger, more through neceſſity, as it is ſaid, than choice. The Arabs have a notion of his ſparing the tender ſex, but Dr. Shaw informs us in his Travels, p. 244, that the *lion* obſerves no diſtinction in theſe days. The fleſh is often eaten in Barbary, and is ſaid to reſemble veal in taſte. Pennant's Brit. Zool. p. 165, &c.

The French, when they had once a ſick *lion*, attempted to recover him from his ſickneſs by ſuch foods as nature never intended him, that is, by the tender and pure fleſh of young animals, without any of the external coat. They gave him young lambs flead alive for this purpoſe; but nature not having given this animal the ſubtilty to flay his food, and the hair, wool, feathers, &c. being as neceſſary to theſe beaſts of prey with the fleſh, as that fleſh itſelf, the new food bred too much blood, and proved a worſe diſeaſe than that he had before, ſo that he ſoon died.

Lion, *ſea*. See Sea-*lion*.

Lion-*puceron*, in *Natural Hiſtory*, the name given by Mr. Reaumur to a genus of worms which deſtroy the *pucerons* in the ſame manner that the *formica leo* does the ants.

Theſe little inſects are a prey alſo to a ſort of worm hatched from the egg of a two-winged fly. This has no legs, and is of ſeveral colours. See Ver-*puceron*.

Though theſe *lion-pucerons* be all hexapodes, yet they are of different origin; ſome being produced from the eggs of a four-winged fly, others from thoſe of a beetle. As the *formica leo* has two horns, the extremities of which ſerve him by way of mouths, our *lion-puceron* has the ſame kind alſo; but as the former of theſe inſects can only move backwards, and is forced to make ſnares for his prey, not being able to hunt it, this creature runs very nimbly in the common way, and ſeizes its prey, without having recourſe to ſuch ſtratagems.

The body of the *lion-puceron* is longer than that of the *formica leo*, and is flat; the breaſt is the thickeſt, and broadeſt part of it, and from this it gradually tapers off to a point at the tail; it has two legs fixed to the breaſt, the other four to the anterior rings of the body, and when it moves, the poſterior end of the body ſerves it in the place of a ſeventh leg, for it always bends it downward and draws it along the ſurface it walks upon. The back of this creature is not ſmooth or gloſſy, but is every where rough, and full of wrinkles, and ſeems as if every ring of it was compoſed of ſeveral other ſmaller rings.

This is the general deſcription of the creature, treating of it in the general way, theſe characters ſuiting all the kinds of it. There are others, however, by which the whole claſs may be divided into three principal kinds.

Theſe are much more voracious devourers of the *pucerons*, than the worms which feed on them. A ſmall *puceron*, ſeized by one of them, is eaten in an inſtant, and the very largeſt is not the work of half a minute for them. Theſe creatures are very ſmall when firſt produced from the egg, and yet they immediately begin to feed. They are ſo ravenous of food alſo, that whenever they can they catch and eat one another. But as the *pucerons*, among which they live, are eaſier to be caught, they uſually eſcape one another's fury pretty well; unleſs where there is a ſcarcity of the *pucerons*, or when they offend one another.

It is eaſy to conceive that a creature, which feeds ſo very faſt, muſt ſoon arrive at its full growth; and this is the caſe with theſe animals, for within five or ſix days of their being hatched from the egg, they are ready for their final transformation, or the putting on the form of the animals to whoſe eggs they owed their origin. In order to this, the creature leaves the place where he has hitherto fed, and ſeeks the folds of a leaf, or ſome other ſuch convenient receptacle, where it ſpins a web of very fine ſilk, every way ſurrounding its body with it, and under this cover paſſes the ſtate of a nymph or chryſalis. The ſilk of this web is not only very ſtrong, but the threads are very cloſely laid together, ſo that it is much firmer than the webs of any of the caterpillar kind. It is of a roundiſh figure, and is ſomewhat ſmaller than a pea.

This round figure is owing to the form into which they roll up their body, which ſerves as a mould for it; and the orifice, out of which the ſilky matter is produced, is at the extremity of the poſterior part of the body. The creature continues in this ſtate about three weeks, if it be in the beginning of ſummer that it goes into it; but if toward autumn, it remains in it all the following winter; and is afterwards, in ſpring, ſeen to come out in the form of a very beautiful fly, of a remarkable large ſize, in proportion to the creature it is produced from, and the web out of which it comes. It is a very long-bodied one, and much reſembles the libella or dragon-fly, only that its wings are larger in proportion to its body: theſe wings are of a moſt delicately fine ſtructure, the fineſt gawſe being coarſe and thick in compariſon to them. Theſe, when the creature is at reſt, are placed in an angle over the body, and form a ſort of canopy or tent for it, but they are ſo perfectly tranſparent that the body is eaſily ſeen through them. The body and breaſt are all green, and that of a very beautiful tinge; but the moſt remarkable beauty of this creature is its eyes; theſe are large and prominent, and are of a fine gold colour, and of greater luſtre than the moſt highly poliſhed metal.

The eggs of this fly are a very ſingular object, and cannot have eſcaped the eye of any perſon who is converſant among the inſects which live on trees; though of the many who have ſeen them, perhaps few or none ever found what they really were. It is common to ſee on the leaves and pedicles of the leaves of the plum-tree, and ſeveral other trees, as alſo on their young branches, a number of long and ſlender filaments, running out to about an inch in length, and being of the thickneſs of a hair; ten or twelve of theſe are uſually ſeen placed near one another, and a vaſt number of theſe cluſters are often found on the ſame tree. The end of each of theſe filaments is terminated by a ſort of ſwelling or tubercle of the ſhape of an egg. People who have obſerved theſe, have generally ſuppoſed them to be of vegetable origin, and that they were a ſort of paraſitical plants, growing out of others, as the miſletoe, moſſes, &c. from the oak and other trees. They very much reſemble in figure thoſe ſpecies of mouldineſs, which Malpighi and others have figured under the ſhape of little muſhrooms, only they are much larger than thoſe little plants, and bear the heat of the ſun and other accidents uninjured, which would deſtroy the tender plants of that kind. There is a time, when theſe egg-like balls, which terminate every one of theſe filaments, are found open at their ends, and in this ſtate they very much reſemble flowers, and they are in this ſtate figured by ſome authors under the name of flowers of a ſingular kind, found on the leaves of the willow. All this, however, is wholly erroneous, and the purſuing the hiſtory of our *lion-pucerons*, ſhews their true origin to be from the fly of that creature. What theſe authors took for flowers of the willow were only the eggs of this fly, out of which the young animals had been hatched, and had made their eſcape. The leaves and branches on which theſe eggs are found, are uſually ſeen covered over with the *pucerons*; and the creature providing a place where her young ſhall find nouriſhment as ſoon as hatched, places her eggs in the midſt of theſe harmleſs and defenceleſs animals, fixing each on a ſlender pedicle, yet ſufficiently ſtrong to bear its weight. If theſe eggs be nicely examined, a worm may be diſcovered in them while yet whole; but the moſt certain way of judging of them is, to put ſeveral of them into a box, in which caſe every one of them is found at a proper time to hatch, and to give an inſect; which, when viewed by the microſcope, appears plainly to be a *lion-puceron* in all its parts, and requiring only increaſe in ſize, without any change of ſhape, to be one of thoſe we have already deſcribed, as feeding ſo voraciouſly on the *pucerons*. Reaumur's Hiſt. Inſ. vol. vi. p. 142.

LION, *ant*, in *Zoology*. See FORMICA *Leo*.

Candia LION's *foot*, *catananche*, in *Botany*, a genus of the *ſyngeneſia polygamia æqualis* claſs. Its characters are theſe: the flower is compoſed of many hermaphrodite florets, included in one common ſcaly empalement, which is permanent and elegant; the florets are of one leaf, tongue-ſhaped, indented in five parts, and they have each five ſhort hairy ſtamina; the germen is ſituated below the flower, and becomes a ſingle oval ſeed, compreſſed and crowned with briſtles, incloſed in the empalement. There are two ſpecies.

LION's *leaf*, *leontice*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the empalement of the flower is made up of ſix very narrow leaves; the flower has ſix oval acute petals, and ſix nectaria, which are fixed by ſmall foot-ſtalks to the baſe of the petals; it has ſix ſtamina; in the centre is placed an oval germen, which becomes a globular, ſwollen, ſucculent berry, with one cell incloſing two or three globular ſeeds. Miller reckons two ſpecies, and Linnæus four.

LION's *tail*, *leonurus*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs. Its characters are theſe: the flowers have one petal of the lip kind, the upper lip cylindrical, hairy, and entire; the lower lip reflexed and cut into three parts; it has four ſtamina, two of which are ſhorter than the other; in the bottom of the tube, are ſituated four germina, which become four oblong angular ſeeds, ſitting in the empalement. Linnæus has joined the ſpecies of this genus to the PHLOMIS, and has applied this title to the *cardiaca*. See MOTHER-*wort*.

LIONCELES, in *Heraldry*, a term for lions when there are more than two of them borne in any coat of arms, and no ordinary between them.

LIONINE, or LIONADE, in the hiſtory of the *Coins* current in Ireland, a name given to certain coins, imported privately from France and other places. There were beſide theſe many others of the ſame ſort, impreſſed with eagles, roſes, and the like, and called by names ſignifying thoſe impreſſions. They were a very baſe and poor ſort of money; the penny *lionade* or *lionine*, not coming up to the value of the halfpenny of the coin of the kingdom. They were diſcountenanced in the year 1300; and good money being ſtruck there, it was made death, and confiſcation of goods, to import any of them, and the run of them was thus ſtopped.

LIP, in *Anatomy*. See LIPS.

LIP *of a horſe*, in the *Manege*, is the ſkin that covers the ſides of the mouth, and ſurrounds his jaws. A horſe is ſaid to arm or guard himſelf with his *lips*, when his *lips* are ſo thick, that they cover their bars, and keep off the preſſure of the curb.

LIPA, of λιπος, *fat*, a word uſed frequently by Hippocrates to expreſs any thing fat or oily. He calls certain ſtools, which have a fatty appearance, by this name. Theſe are eſteemed a ſign of great colliquation. He alſo applies it to a ſort of fatty ſubſtance, often ſeen ſwimming on the ſurface of the urine like a ſpider's web: this the ſame great author gives as a ſign of a conſumption.

LIPARÆUS *lapis*, in the *Natural Hiſtory of the Ancients*, the name of a ſtone uſually found in Lipara, one of the Æolian Iſlands, and brought thence in the time of the Greeks among the pumices, of which that place always afforded them a large quantity.

It was a ſmall ſtone, about the bigneſs of a filbert, of an irregular and uncertain ſhape, and porous and friable conſtitution, like that of the pumices, but more eaſily falling to pieces on rubbing between the fingers than even the ſofteſt of them; the colour was a duſky grey, and the whole external ſurface plainly ſhewed that it had ſuffered changes by the means of fire. The ſtone at preſent, however, is ſo little regarded, that the writers on ſuch ſubjects have even forgot to name it. They are ſometimes brought to us, to this day, among the pumices from the burning mountains, but are not regarded.

LIPARIS, in *Ichthyology*, the name of a fiſh of the general order of the anguilliformes, or eel-ſhaped, and moſt approaching to the alauda, of any ſpecies. Its head is ſhaped ſomewhat like that of a rabbit. It is brought to the table among other ſmall fiſh, but is of an inſipid taſte, and generally either offends the ſtomach, or urges to ſtool. It is caught in the Mediterranean and other ſeas. The name is originally Greek, and is formed of the adjective λιπαρος, *fat*.

The *liparis* is a ſpecies of the CYCLOPTERUS in the Linnæan ſyſtem.

LIPARIS is alſo uſed by ſome for the fiſh, called by authors the GUNNELLUS, and by the people of Cornwall the *butter-fiſh*.

LIPARIS, in *Botany*, a name given by ſome authors to the pinguicula, butterwort, or Yorkſhire ſanicle.

LIPARIS *noſtras*, in *Ichthyology*, the name of a ſmall fiſh common on the coaſts of Yorkſhire and ſome other parts of England, and called in Engliſh the *ſnail*, and LIMAX *marinus* by ſome authors. It is about five fingers long; on its back and ſides it is of a bright brown, and on the belly of a fine white: theſe are its colours, when freſh taken, for when it has been kept ten or twelve hours, the whole ſurface of the body, except the fins, becomes of a paler and bright brown. The head is thick, and not flat, but rounded; it has no teeth, but its jaws are both rough like files.

The whole fiſh, head as well as body, is very ſoft and unctuous, and eaſily melts into a ſort of oily liquor. It is caught principally at the mouths of great rivers where they open into the ſea.

LIPOTHYMIA, or LIPOPSYCHIA, in *Medicine*, a ſudden diminution, or failure, of animal and vital actions; otherwiſe called a *ſwooning* or *deliquium*.

The word *lipothymia* comes from the Greek λειπω, *deficio*, and θυμος, *animus*; and *lipopſychia* from λειπω, and ψυχη, *the ſoul*.

This diſeaſe is uſually confounded with the SYNCOPE, but is really different from it in many particulars.

The *lipothymia* is a very conſiderable abolition of the vital and animal faculties, at leaſt to appearance: and the ſyncope is a plenary or total abolition of them, as far as appears to us at the time. It is eaſy to ſee, however, that theſe are only two different ſtages of the ſame diſtemperature. The *lipothymy* is ſometimes an idiopathic, ſometimes a ſymptomatic diſeaſe, and moſt frequently attends the ſcurvy, malignant fevers, and other diſorders; the ſyncope is idiopathic, and attacks perſons in health as well as thoſe that are diſeaſed. The *lipothymy* is always eaſily diſtinguiſhed from a convulſed ſtate of the body, by this, that the limbs are all flaccid in it. The ſyncope differs from death only in degree; and the body being flaccid in this, and growing rigid under the laſt convulſions in death, is the only diſtinction of them in extreme caſes.

Cauſes of it. The general cauſes of ſwooning are ſudden tranſitions from heat to cold, breathing hot foul *phlogiſticated* AIR, great fatigue, exceſſive weakneſs, loſs of blood, long faſting, fear, grief, and other violent paſſions of the mind.

Signs of it. The *lipothymia* is uſually preceded by a remarkable anxiety about the heart, and this is ſucceeded by an immediate loſs of life and motion for a time: the ſenſes, and the animal motions, and even the pulſe, ſeeming all to be loſt for a time; and the heart flutters weakly, or trembles, and reſpiration is ſcarce ſenſible. In the ſyncope, the reſpiration as well as the pulſe ſeem wholly impeded, and the patient appears wholly dead; the face looks as pale as in a corpſe, and the limbs are wholly flaccid, and without motion. The extremities grow cold, and the eyes are either ſhut, or turgid, and inflamed; the mouth is ſometimes ſhut, but not clenched firmly together as in convulſions, and ſometimes it continues frightfully open; and as ſoon as the patient comes to himſelf he uſually ſighs ſeveral times, and reſpiration ſeems very much laboured.

Perſons ſubject to it. The idiopathic *lipothymy* is a very uncommon complaint, and the perſons ſubject to it are thoſe of weak nerves, delicate conſtitution, and of a tender and ſenſible diſpoſition, who are eaſily affected by the ſeveral paſſions, and particularly by fear; or ſuch as have been before frequently ſubject to it in diſeaſes, or are of a melancholic habit. People who uſe inceſſant ſtudy for a long time on many occaſions, alſo ſometimes fall into it, women with child are alſo ſubject to it from the preſſure of the breaſt from the abdomen; and unmarried women, when they faint at meals, give too much cauſe to ſuſpect this to be the caſe with them. Some people who are paſſionate, and ſuppreſs violent fits of it while at their meals, fall into faintings alſo.

The ſymptomatic *lipothymy* is a very common diſorder, and ariſes from a great number of different cauſes. Women who have ſuppreſſion of the menſes are very frequently ſubject to it. People fatigued with violent emetics alſo often fall into it, as do alſo perſons exhauſted by violent hæmorrhages, by profuſe ſweats, diarrhœas, violent pains of any kind, and by want of food. People, on the contrary, who are very voracious, and load the ſtomach with great quantities of food as often fall into it; and women after hard child-birth, or too great a flux of the lochia, are very ſubject to it. People who have taken poiſons, and ſuch as have taken violently cooling medicines, alſo ſometimes are ſubject to it; and thoſe, who in fevers, ſuddenly cool themſelves, and check their ſweats, or who once load the ſtomach with great quantities of food immediately after recovering from illneſſes. The approach of epidemical malignant fevers is often preſaged by faintings; and finally, people are ſometimes ſubject to them from omitting any cuſtomary evacuations.

Prognoſtics in it. An idiopathic *lipothymy*, which happens in healthy, but very tender and ſenſible, or melancholic perſons, and has had a fright, or ſome other paſſion for its origin, is a thing of no great conſequence for the preſent; but it is apt to grow upon people if not taken care of, and they will be perhaps always ſubject to it afterwards. *Lipothymies*, when ſymptomatic, are of much more conſequence. In chronic diſeaſes they are leſs dangerous ſymptoms than in acute ones, if attended with faintings in the beginning; for theſe often prove dangerous. In other ſtages of acute diſeaſes, faintings are always bad ſymptoms; but when they are owing to the ſuppreſſion of ſome habitual excretion, during the courſe of the diſeaſe, they are of leſs danger than when they appear without ſuch cauſes. All faintings that attend other diſeaſes are however to be regarded only as ſymptoms, not treated diſtinctly; and when the diſtemper which occaſioned them goes off, they naturally follow it. Syncopes that often return upon a perſon, and continue for a long time, frequently leave fevers behind them. Syncopes from hæmorrhages are often dangerous, eſpecially in perſons not accuſtomed to them, and to ſuch as are of a timid diſpoſition; whence women in child-bed, who are ſubject to faint, are to be carefully watched, for they ſometimes die in theſe fits.

Method of cure. In idiopathic *lipothymies*, ſtimulating glyſters, the ſprinkling of cold water upon the face, and the penetrating ſmells, ſuch as thoſe of the volatile ſalts, ſpirit of hartſhorn, free air, and Hungary-water, all tend to recover the loſt motion. To theſe are to be added undreſſing, or looſening the cloaths, lying down in a warm bed, frictions, ſternutatory powders, and the laying a little pepper, or a ſmall morſel of ſome pungent volatile ſalt upon the tongue. The hands and face ſhould alſo be ſprinkled with vinegar; and the patient ſhould have a ſpoonful or two of water, if he can ſwallow, with about a third part of vinegar mixed with it, poured into his mouth: if theſe ſhould not remove the complaint, it will be neceſſary to bleed the patient and to give him a clyſter: but with reſpect to perſons who are weak and delicate, and ſubject to nervous diſorders, bleeding is dangerous; perſons who faint in cloſe rooms ſhould be immediately carried into the open air; their temples ſhould be rubbed with ſtrong vinegar, or brandy, and volatile ſpirits or ſalt held to the noſe. They ſhould be laid on their backs with their head low, and have a little wine or other cordial poured into their mouths, as ſoon as they are able to ſwallow it. If they have been ſubject to hyſteric fits, caſtor or aſſafœtida ſhould be applied to the noſe, or burnt feathers, horn, or leather, &c. After the patient is, by theſe means, brought to himſelf, a glaſs of warm wine, with ſome tincture of ſaffron, is very proper to recruit the ſtrength; and if there be danger of a fever coming on, that is to be guarded againſt, by giving powders of nitre, crabs eyes, diaphoretic antimony, and a little cinnabar. In caſes where faintings happen from an undue repletion of the ſtomach, or from a weakneſs of the primæ viæ, with crudities lodged there, and attended with eructations, the uſe of digeſtive medicines is proper; and vomits ſhould be now and then given with them. When the faintings happen from the violence of emetic medicines, burnt wine, with the ſpices, is to be taken occaſionally in the day-time, and a moderate doſe of the theriaca at night. When faintings have been brought on by violent paſſions, the patient ſhould be ſuffered to remain at reſt, and made to ſmell to ſome vinegar: after he is come to himſelf, he may drink freely of warm lemonade, or baum tea, with ſome orange or lemon put in it. If the fainting fits have been long and ſevere, the ſtomach and bowels may be cleanſed by a vomit or an emollient clyſter; and when the operation of theſe is over, the nitrous and abſorbent medicines ſhould be given for a day or two, to prevent a fever, which often attends faintings from ſuch cauſes. When they happen to people exhauſted by repeated hæmorrhages, or by diarrhœas, profuſe ſweats, or other evacuations, the analeptics are the proper medicines to carry them off, and reſtorative electaries, with coral and the like, are to be given; and the frequent eating of jellies, nouriſhing broths, ſago gruel with wine, new milk, and other things of a light and cordial nature recommended by way of prevention. All that can be done in the fit is to let the patient ſmell to a bottle of Hungary-water, eau de luce, or ſpirits of hartſhorn; to rub his temples with brandy, or to lay a compreſs dipped in it to the pit of the ſtomach. The crudities of the primæ viæ muſt be cleared off by digeſtive and purging medicines; the mind muſt be unbent from ſtudy, and kept free from the violence of all paſſions; the neceſſary and habitual excretions muſt be, by all means, promoted; and the patients ſhould always have ſalts, and volatile ſpirits about them, to uſe on occaſion of being threatened with a fit. Finally, moderate exerciſe is always to be adviſed. In the time of the fit ſtimulating glyſters are never to be given, before it has continued a quarter of an hour; and in general, where there remains any ſign of life, they are not neceſſary; and during the time of the fit, an internal medicine muſt be given with the greateſt caution; for they are apt to paſs into the aſpera arteria. People, juſt recovered out of a fainting fit, are not to be ſuffered to ſleep, if they ever ſo much deſire it; and after the paroxyſm is thoroughly over, a chearfulneſs of temper will do more towards a thorough cure, and the prevention of returns, than all the medicines in the world. If a fever comes on immediately after the fainting, then the uſe of a glaſs of wine, ſo beneficial on all other occaſions of this kind, is not to be allowed, but recourſe is immediately to be had to antiſebrific medicines. Vomits are very proper in faintings occaſioned by paſſion or terror, in the time of eating a hearty meal, or immediately after it; for it is much better that the food ſhould be thrown up undigeſted, than remain ſo in the ſtomach.

Many people are ſubject to faintings after bleeding; in this caſe the arm ſhould be but gently tied up, and they ſhould never be blooded after a full meal, nor get up immediately after the bleeding is over.

It is very obſervable, that in faintings ariſing from a preſent cauſe, as in the juſt mentioned article of bleeding, the patient has as at firſt ſome power of motion, though on a confuſed principle, and will often, before he faints, violently attempt to prevent the ſurgeon from tying up the arm; but in thoſe faintings, which are preſages of future miſchief, the patient always falls down at once to the ground, and has no power of motion, or ſenſe of it, in its approach. Junker's Conſp. Med. p. 673, and Buchan's Dom. Med. p. 479.

LIPPIA, in *Botany*, a genus of the *didynamia angioſpermia* claſs. Its characters are theſe: the empalement of the flower is permanent, roundiſh, compreſſed, and divided into four notches; the flower hath one petal, which is of the ringent kind; and hath four ſhort ſtamina, two of which are longer than the other; and an oval germen, which afterward turns to a compreſſed capſule with one cell, opening with two valves, which appear like the ſcales of the empalement, incloſing two ſeeds which are joined. Linnæus enumerates three ſpecies of this plant.

LIPPITUDO is uſed, by Celſus, for a diſeaſe in the eyes, otherwiſe called ophthalmia.

LIPPITUDO is alſo uſed, by modern writers, for a diſorder popularly called *bleer-eyed*; ariſing from a decay of the natural moiſture of the eyes, which then feel dry, and appear red and angry. See SCLEROPHTHALMIA.

LIPS, *labia*, the edge, or exterior part, of the mouth; or that muſculous extremity which ſhuts and covers the mouth, both above and below.

The *lips*, beſides the common integuments, conſiſt of two parts; the *exterior*, hard and muſculous; the *interior*, ſoft, ſpongy, and glandulous, covered with a fine membrane, which ſeems to be both a continuation of the epidermis, and of that pellicle which covers the glandulous membrane of the cavity of the mouth, the fore and protuberant parts of which are red, and called *prolabia*; the ſubſtance that forms theſe parts being a collection of very fine, long, villous papillæ, is extremely ſenſible, and very painful, when the outer membrane is by any accident deſtroyed. The internal membrane of the upper *lip* forms a ſmall middle FRÆNUM, above the firſt dentes inciſorii. Authors generally content themſelves with calling the ſubſtance of the prolabia, ſpongy; but, in reality, it is glandulous, as appears by the ſcrophulous and cancerous humours to which it is ſubject. The muſcles, of which the outer parts of the *lips* conſiſt, are either *common* to them with other parts, or *proper*: the common are, the *ſemi-orbiculares*, of which the ſuperior is often broader than the inferior, having alſo this peculiarity, that all its fibres do not go to the corner of the mouth, but terminate by degrees between the middle and the extremities of the arch of the *lip*, nearly like the ſemi-oval fibres of the upper palpebra; but the inferior is commonly more uniform in the diſpoſition of its fibres; the *ſupra-ſemi-orbiculares* being fibres, which increaſe the breadth of the two lateral portions of the ſuperior ſemi-orbicularis upward; the BUCCINATORES, which are two in number, each of them ſituated tranſverſely between the poſterior part of the two jaws and the corner of the mouth; and the ZYGOMATICI *majores*, which are two muſcules ſituated, one on each ſide, between the zygoma and the corner of the mouth. The upper *lip* has four pair of proper muſcles, viz. the *zygomatici minores*, which are two ſmall ſlender muſcles, lying above the great *zygomatici*, and almoſt parallel to them; the two *canini*, each of which is fixed by a broad inſertion in the upper jaw, above the ſocket of the *dens caninus*, in a depreſſion below the inferior edge of the orbit, near the *os malæ*, running down from thence a little obliquely, and croſſing the lower extremity of the *zygomaticus major*, which covers it at this place; and terminating at the extremity of the arch of the ſemi-orbicularis ſuperior, and communicating by ſome fibres with the triangularis; the *inciſorii laterales*, each of which is a ſort of biceps, its upper part being divided into two portions, which unite below; and the *inciſorii medii*, which are two ſmall ſhort muſcles ſituated near each other, below the ſeptum narium. The proper muſcles of the lower *lip* are four pair; viz. the *triangulares*, each of which is fixed by a broad extremity in the outſide of the baſis of the lower jaw, from the maſſeter to the hole near the chin, ſeeming to be a continuation of the caninus major; the *triangularium collaterales*; the *inciſorii inferiores*, each of which is fixed by the ſuperior extremity on the alveoli of the lateral inciſores of the lower jaw; and the *cutanei*, forming a kind of fleſhy membrane, that covers the whole foreſide of the throat and neck, from the cheek and chin, all the way down below the clavicles; beſides the *quadratus*, which forms the thick part of the chin, below the under *lip*. The common muſcles of the *lips* either draw both the corners of the mouth at once, or only one at a time, according to the different direction of their fibres. The proper muſcles pull the different parts of the *lips*, in which they are inſerted; the buccinators, in particular, may ſerve to move the food in maſtication. Winſlow. See ATTOLLENS, DEPRIMENS, and DEPRESSOR *labiorum*, ZYGOMATICUS, ORBICULARIS, &c.

All theſe parts are ſerved with blood by ſome branches of the carotids, which the veins carry back to the external jugulars. Their nerves come from the fifth, ſixth, and eighth pair of the head, and ſome from the *par acceſſorium*. The *lips* have a great ſhare in the action of ſpeech, and are of good uſe in taking in the food, &c.

Hare-LIP, a diſorder, in which the upper *lip* is in a manner ſlit or divided, ſo as to reſemble the upper *lip* of a hare; whence the name.

Sometimes the diviſion is ſo large, that it appears as if part of the *lip* was wanting; and ſometimes again the diviſion is double. A like fiſſure is alſo ſometimes made in the lower *lip* by a wound that has been neglected, or improperly treated: this laſt ſpecies of the diſorder is termed the ſpurious *hare-lip*; the true kind is born with the infant. The leſs and more equal the fiſſure of the *hare-lip* is, it is generally ſo much the more eaſily cured. In ſome infants the diviſion of the *lip* is ſo large and irregular, that there can be but little hopes of a cure, which may, however, be eaſily performed on the very ſame *lip*, when adult. Sometimes too we meet with a tooth projecting forward into the fiſſure; in this caſe it cannot be cured, without taking out the tooth. In a recent *hare-lip*, or one made by a wound, the cure is to be performed by the knotted ſuture. See *Intertwiſted* SUTURE, and WOUND.

In curing the *hare-lip*, where part of the *lip* is wanting, no attempt can be made to ſupply what is deficient, but only to unite thoſe parts which are divided; by taking off the ſkin from the edges of the fiſſure, and then cauſing them to unite and grow together, by paſſing through them two or three needles, made of gold or ſilver, pointed with ſteel, from the right to the left, beginning with the upper part of the fiſſure, and inſerting them at about a ſtraw's breadth from each other. The ſurgeon having thus entered the needle, and cleanſed the bleeding *lips* with a ſponge, he takes a piece of ſtrong waxed thread or ſilk; and faſtening it about one end of the needle, he winds it over the other end, and back again, and afterwards ſecures it by a knot: by this means the edges of the *lips* are brought cloſe together, and the upper part or ſurface kept ſmooth and even. To heal the wound internally, it is dreſſed with ſoft lint, dipped in honey of roſes, and put between the gums and *lip*; but this practice can only be followed with adults; the external part of the wound is at the ſame time dreſſed with balſam of Peru, or ſome other vulnerary unguent, covered with lint and compreſs, and over that a ſticking plaſter, with four heads, two of which are faſtened on the left ſide of the *lip*, and two upon the right, and the whole ſecured by a ſling or fillet, whoſe extremities may be faſtened about the head, either by a knot or pins. But it muſt here be obſerved, that when the fiſſure appears large and deep, ſo that the two parts of the *lip* cannot be eaſily joined, it will be neceſſary, before the above operation, to divide the frænulum of the upper *lip* from the gum, with a pair of ſciſſars, but without wounding the gum, or uncovering the jaw. Though the hæmorrhage is often very plentiful in performing theſe operations on young infants, yet it is not dangerous, ſince it prevents an inflammation, and generally ceaſes after tying the bandages.

The dreſſings ought not to be moved before the third day, unleſs ſome accident makes it neceſſary; and then it muſt be done with great caution, to avoid ſeparating the parts in contact. If the *lips* of the wound appear conjoined, three or four days after the operation, you may then venture to draw out the middle needle, when there are three, or the upper one, when there are only two; and two or three days after draw out the other: the cure muſt be completed, by dreſſing every day as at firſt.

LIPS, *wounded.* Wounds of the *lips* are made either with ſharp or with blunt inſtruments, or elſe with bullets. Thoſe of the firſt ſort, whether longitudinal or tranſverſe, are generally to be cured by the dry ſuture. The patient, while under cure, muſt avoid talking and chewing; his diet therefore muſt be ſpoon-meat. But in caſes where the wound is very large, the bloody ſuture is ſometimes neceſſary. In wounds of the *lips* made by blunt inſtruments, by falls, or by bullets, the ſhattered parts muſt be brought to digeſtion; and the *lips* of the wound, after being cleaned, brought together, either by means of ſticking plaſters, or by the ſuture uſed in the *hare-lip*. Heiſter's Surg. p. 81.

LIPS, *cancer of the.* See CANCER.

LIPS is alſo applied to the two extreme parts of the *pudendum muliebre*; between which is the rima, or fiſſure of the part.

Theſe are more peculiarly called *labia pudendi*; being ſoft, oblong bodies; of a peculiar ſubſtance, not found in any other part of the body.

LIPS are alſo uſed to ſignify the two edges of a wound.

LIPTOTES, in *Rhetoric*, a figure, wherein, by denying the contrary of what we intend, more is ſignified than we would ſeem to expreſs. Thus in the following verſe of Virgil,

Quid prodeſt, quod me ipſe animo non ſpernis, Amynta?

See Voſſius, Rhet. lib. iv. p. 183.

LIPYRIA, a name given by ſome medical writers to a dangerous ſpecies of fever, in which the outſide of the fleſh is cold, while the inſide is very hot.

LIQUAMEN *pyriticum*, in *Natural Hiſtory*, a name given by ſome authors to the liquid matter remaining in the pans in which the common vitriol is made; after which no more of that ſalt will ſhoot. It is otherwiſe called *liquamen of* VITRIOL.

LIQUAMUMIA, a term invented by ſome of the diſpenſatory writers, to ſignify human fat.

LIQUEFACTION, an operation, by which a ſolid body is reduced into a liquid; or the action of fire or heat on fat, and other fuſible bodies, which puts their parts into a mutual inteſtine motion.

The *liquefaction* of wax, &c. is performed by a moderate heat, that of ſal tartari, by the mere moiſture of the air. All ſalts liquefy; ſand, mixed with alkalis, becomes liquefied by a reverberatory fire, in the making of GLASS. In ſpeaking of metals, inſtead of *liquefaction*, we ordinarily uſe the word FUSION.

LIQUET. See Non Liquet.

LIQUID, a body which has the property of fluidity; and, beſides that, a peculiar quality of wetting other bodies immerged in it, ariſing from ſome configuration of its particles, which diſpoſes them to adhere to the ſurfaces of bodies contiguous to them. See Fluid.

Liquids, *denſity of*. See De[illegible]ty.

Liquid *allum*, *amber*, *confects*, [illegible]*udanum*, *meaſures*, *ſtorax*, *ſulphur*. See the reſpective ſubſtantives.

Liquid, among *Grammarians*, is a name applied to certain conſonants oppoſed to *mutes*.

L, *m*, *n*, and *r*, are *liquids*. See L, M, N, &c.

Liquid *amber*, in *Botany*, *ſweet gum*, a genus of the *monoecia polyandria* claſs. Its characters are theſe: it hath male and female flowers on the ſame tree; the male flowers are diſpoſed in long, looſe, conical catkins; theſe have four-leaved empalements, no petals, but a great number of ſhort ſtamina joined in one body; the female flowers are ſituated at the baſe of the male ſpike, collected in a globe, and have a double empalement: they have no petals, but an oblong germen faſtened to the empalement, which turns to a roundiſh capſule of one cell, with two valves at the top, which are collected in a ligneous globe, containing many oblong acute-pointed ſeeds. There are two ſpecies.

LIQUIDATE *an action*. See Action.

LIQUIDATION, the act of reducing and aſcertaining either ſome dubious diſputable ſum, or the reſpective pretenſions which two perſons may have to the ſame ſum.

LIQUOR. See Drink, Fluid, &c.

Liquors, *fermented*. See Fermented *liquors*.

Liquor, *teſt*, among the *Dealers in Brandy*. See Spirit and Test-*liquors*.

Liquor *mineralis anodynus*, the name given by Hoffman to a *liquor* of his own invention, famous at this time in Germany, and ſuppoſed by Burggrave to be made in this manner: take oil of vitriol and Indian nitre, of each four ounces; diſtil the ſpirit gradually from this by a retort; pour two ounces of this ſpirit cautiouſly and ſucceſſively into fifteen ounces of ſpirit of wine highly rectified; diſtil this, and there comes over a very fragrant ſpirit. This is to be again diſtilled, to render it perfectly pure, adding firſt to it a ſmall quantity of oil of cloves, and a quantity of water, equal to that of the ſpirit; after this, as ſoon as the watery vapours begin to ariſe, the whole proceſs is to be ſtopped, and the ſpirit kept alone in a bottle well ſtopt. This has great virtues, as an anodyne, diaphoretic, antiſeptic, and carminative. It is not certain that it is exactly the ſame with Hoffman's, that author having never publiſhed his manner of making it; but it appears the ſame to the ſmell and taſte, and has the ſame virtues.

M. Macquer ſays, that it is a mixture of very rectified ſpirit of wine, of æther, and of a little of the ſweet oil of vitriol; and that it is made by mixing an ounce of the ſpirit of wine, which riſes firſt in the diſtillation of æther, with as much of the *liquor* which riſes next, and which contains the æther, and afterwards by diſſolving in this mixture twelve drops of the oil which riſes after the æther has paſſed. This *liquor* has preciſely the ſame virtues with the æther, which phyſicians now ſubſtitute for it. See Æther.

Liquor *of flints*. See Flints.

Liquor, or *ſmoaking ſpirit of Libavius*, is a marine acid, very concentrated, ſmoaking, and impregnated with much tin. It is made by well mixing an amalgam of four parts of tin, and five parts of mercury with an equal weight of corroſive ſublimate, by triturating the whole together in a glaſs mortar. This mixture is to be put into a glaſs retort, which is to be placed in a reverberatory furnace. To the retort is to be luted, with fat lute, a receiver, with a ſmall hole in it, in the ſame manner as is done for the diſtillation of concentrated mineral acids; the diſtillation is begun with a graduated and well managed fire. A very ſmoaking *liquor* paſſes into the receiver, and towards the end of the diſtillation a very thick and even concrete matter. When the operation is finiſhed, the *liquor* in the receiver is to be poured quickly into a cryſtal glaſs bottle, with a glaſs ſtopper. When this bottle is opened, a white, copious, thick, and poignant fume iſſues, which remains long in the air, without diſappearing. Chem. Dict. See Æther.

Liquors, *Stygian*. See Stygian *liquors*.

Liquors, *clearing of*. See Clarification.

LIQUORICE, *glycyrrhiza*, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are theſe: the flower has a permanent empalement of one leaf, divided into two lips; the flower is of the butterfly-kind, having a long erect ſtandard, with oblong wings, and a two-leaved keel, which is acute; it has ten ſtamina, nine joined, and one ſtanding ſingle; in the bottom is ſituated a ſhort germen, which becomes an oblong or oval compreſſed pod with one cell, including two or three kidney-ſhaped ſeeds. There are three ſpecies.

The common *liquorice* is a plant propagated in many parts of England to very great advantage. It delights in a rich light ſandy ſoil, which ſhould be three feet deep at leaſt; for the greateſt advantage conſiſts in the length of the roots. The greateſt quantities of it propagated in England are about Pontefract in Yorkſhire, and about Godalmin in Surry; though there is no inconſiderable quantity propagated in the gardens about London.

The ground deſigned for *liquorice* muſt be well dug, and dunged the year before, that the dung may be thoroughly rotted in it; and juſt before it is planted, the earth is to be dug three ſpades deep, and laid very light. The plants to be ſet ſhould be taken from the ſides or heads of the old roots, and each muſt have a very good bud, or eye, otherwiſe they are very ſubject to miſcarry: they ſhould alſo be about ten inches long, and perfectly ſound. The beſt ſeaſon for planting them is the end of February, or the beginning of March, and this muſt be done in the following manner: the rows muſt be marked by a line drawn acroſs the bed, at two feet diſtance, and the plants muſt be ſet in theſe by making a hole of their full depth, and ſomething more, that the eye of the root may be an inch below the ſurface: they muſt alſo be ſet at two feet diſtance from each other in each row. When this is done, the ground may be ſowed over with onions, which not rooting deep, will do the *liquorice*-roots no injury for the firſt year. In October, when the ſtalks of the *liquorice* are dead, a little very rotten dung ſhould be ſpread over the ſurface of the ground. Three years after the time of planting, the *liquorice* will be fit to take up for uſe; and this ſhould be done juſt when the ſtalks are dead off; for if taken up ſooner, the roots are very apt to ſhrink greatly in their weight. The roots about London look browner than thoſe which have been propagated in a leſs rich ſoil; but then they are much larger, and grow quicker in their ſize. Miller.

New green *liquorice* ſhould be choſen ſmooth and even, about the thickneſs of the middle-finger, ruddy without, yellowiſh within, eaſy to cut, and of an agreeable ſmell. The root carefully dried and powdered is of a richer and more agreeable taſte than when freſh, and of a dull yellow colour, with a caſt of brown. The *liquorice* powder commonly ſold is of a weaker taſte, and a paler and bright yellow colour, probably from a mixture of other ſubſtances.

This root being lightly boiled in water, till the fluid has acquired a deep yellow tincture, and the water at length evaporated over a moderate fire, there remains a black, ſolid ſediment, of a pleaſant ſmell, of a dark reddiſh brown colour in the maſs, and, when drawn out into ſtrings, of a golden colour, which we alſo call *liquorice*, or *liquorice juice*, or ſometimes *Spaniſh juice*. Its quantity amounts to near half the weight of the root. Long boiling impairs the ſweetneſs of the juice, and gives it an unpleaſant bitterneſs.

The whitiſh and yellowiſh *liquorice* juices are good for nothing, being uſually no other than compoſitions of ſugar, ſtarch, a little gum tragacanth, and *liquorice* powder. The *liquorice* root yields its ſweetneſs alſo to rectified ſpirit; but the quantity of ſpirituous extract amounts only to about one half of the aqueous; and rectified ſpirit, digeſted on the aqueous extract, diſſolves about one half of it.

The native *liquorice* juice is very ſweet upon the palate, even more than ſugar, or honey; and is yet accounted a great quencher of thirſt: on which account Galen preſcribes it in dropſies. It is very balſamic and detergent; inſomuch that there is ſcarce any medicinal compoſition for diſeaſes of the breaſt, in which it is not an ingredient.

Liquorice, *vetch*. See *Bitter* Vetch.

Liquorice, *wild*, *Liquorice* Vetch, or *Milk* Vetch, *aſtragalus*, in *Botany*. See Astragalus. See alſo Capraria.

Liquorice-*vetch*, *knobbed-rooted*. See Glycine.

LIRIODENDRUM, in *Botany*. See Tulip-*tree*.

LISIANTHUS, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the flower is encompaſſed by a kind of ventricoſe tube, with recurved ſegments; the empalement is keel-ſhaped; the ſtigma has two lobes; and the fruit is an oblong capſule, with two cells. There are two ſpecies.

LISSA, or Thynnus Lyssa, in *Ichthyology*, a name by which ſome authors have called the fiſh more uſually called *gliſſa*, a large ſea-fiſh of the tunny kind.

LIST, in the *Manufactures*, denotes the border of a ſtuff, or that which bounds its width on each ſide.

Du-Cange derives the word from *liciæ*, which, in the age of corrupt Latin, was uſed for the incloſures of fields and cities, as being anciently made with cords interlaced; or from *liſtæ, quia campum claudebant inſtar liſtarum panni*; as incloſing the ground after the manner that a *liſt* does a piece of cloth.

All cloths, and ſtuffs of ſilk, wool, or cotton, have *liſts*. *Liſts* contribute to the goodneſs of the ſtuff, and farther ſerve to ſhew their quality; which has given occaſion to ſeveral regulations relating to their matter, colour, work, &c.

List is alſo uſed to ſignify the incloſed field, or ground, wherein the ancient knights held their juſts and combats. It was ſo called, as being hemmed round with pales, barriers, or ſtakes, as with a *liſt*.

Some of theſe were double, one for each cavalier; which kept them apart, ſo that they could not come nearer each other than a ſpear's length. See Tournament, and Duel.

List, Listel, or **Listello**, in *Architecture*, called alſo cincture, fillet, square, and reglet, is a little ſquare moulding, ſerving to crown or accompany larger mouldings; and, on occaſion, to ſeparate the flutings of columns.

List, in the *Sea Language*, the ſame with lust.

List, *civil*. See Civil *liſt*, and Revenue.

LISTENING, according to Rohault, conſiſts in extending or bracing the tympanum of the ear, and putting it into ſuch a condition as that it ſhall be the more affected by any tremulous motion of the external air. See Ear.

Listening, in the *Manege*, as when we ſay a horſe goes a *liſtening* pace. See Ecoute.

Listening *trumpet*. See Trumpet.

LISTING, or Inlisting, in *Military Language*, denotes the retaining and enrolling ſoldiers, as volunteers, for the national ſervice. When any perſon is *inliſted* as a ſoldier, he ſhall within four days be taken before the next juſtice of peace, or chief magiſtrate of a town; and before him ſhall be at liberty to declare his diſſent to ſuch *inliſting*; and on ſuch declaration, and returning the *inliſting* money, and paying 20*s*. for the charges expended on him, he ſhall be forthwith diſcharged, in preſence of ſuch magiſtrate. But if he ſhall refuſe or neglect in twenty-four hours to return and pay ſuch money, he ſhall be deemed to be *inliſted*, as if he had given his aſſent before the magiſtrate. If he declare that he voluntarily *inliſted* himſelf, the magiſtrate ſhall certify under his hand, that ſuch perſon is duly *inliſted*, ſetting forth the place of his birth, age, and calling, if known; and that the ſecond and ſixth ſections of the articles of war againſt mutinity and deſertion were read to him, and that he has taken the oath mentioned in the ſaid articles of war; and if any perſon ſo certified as duly *inliſted* ſhall refuſe to take the ſaid oath of fidelity before ſuch magiſtrate, the officer, from whom he hath received ſuch money, may detain and confine him till he ſhall take it; and every military officer that ſhall herein offend, ſhall be caſhiered and diſplaced from their office, and diſabled from holding any military poſt, and forfeit 50*l*. See Foreign *ſervice*.

LITANY, an old church term, applied to the proceſſions, prayers, and ſupplications, uſed for appeaſing the wrath of God, averting his judgments, or procuring his mercies.

The word comes from the Greek λιτανεια, *ſupplication*; of λιτανευω, *I beſeech*. Pezron would go farther, and derive the λιτομαι, or λισσομαι, of the Greeks, from the Celtic *lit, feaſt, ſolemnity*.

Eccleſiaſtic authors, and the Roman order, by the word *litany* uſually mean the people who compoſe the proceſſion, and aſſiſt at it; and Du-Cange obſerves, that the word anciently ſignified procession.

Simeon of Theſſalonica mentions, that, in the ancient *litanies*, the people went out of the church, to denote the fall of Adam; and returned into it again, to ſhew the return of a pious ſoul to God, by repentance.

Litany, in a modern ſenſe, denotes a form of prayer, ſung or ſaid in churches; conſiſting of ſeveral periods, or articles; at the end of each whereof is an invocation in the ſame terms.

Before the laſt review of the common prayer, the *litany* was a diſtinct ſervice by itſelf, and uſed ſome time after the morning prayer was over. At preſent it is made one office with the morning ſervice, being ordered to be read after the third collect for grace, inſtead of the interceſſional prayers in the daily ſervice.

LITCHI, in *Botany*, the name of an Oriental fruit very common in China, and greatly eſteemed by the Chineſe. They ſay it is of the exact middle temperature between hot and cold; and that, beyond all other vegetables, it gives vigour and ſtrength to the body; they alſo commend it for the gravel, when properly prepared. This is a fruit that muſt be nicely watched, to find the time of its ripening, and when that comes it muſt be gathered, for it ſoon decays.

LITE, the name of a plaſter much commended by the ancients; it conſiſted of verdegris, wax, and reſin. Whatever virtues this plaſter poſſeſſed might be probably found in the melilot plaſter of the ſhops in general, till the late reformation made by the London Pharmacopœia, the colour being generally given by our wholeſale dealers with verdigris; not with the juice of the herb from which it took its name.

LITERÆ *communicatoriæ*, in *Church Hiſtory*, letters granted by the biſhops to penitents, when the time of their penance was finiſhed, by which they were again received into the communion of the faithful.

LITERAL *algebra*. See Algebra.

Literal *character*. See Character.

Literalis *calculus*. See Calculus.

LITERARY *property*, is that property which an author, or his aſſignee, may be ſuppoſed to have in his own *literary* compoſition; ſo that no other perſon without his leave may publiſh or make profit of the copies. In caſe of a bargain for a ſingle impreſſion, or a ſale or gift of the copyright the reverſion is plainly continued in the original proprietor, or the whole property is transferred to another. It has been a queſtion much agitated of late in our ſuperior courts of judicature, and at length determined by the houſe of lords againſt authors and their aſſigns, whether the copy-right of a book belongs to the author by common law. But, excluſive of ſuch copyrights as may ſubſiſt by the rules of the common law, the ſtatute 8 Ann. cap. 19. has protected by additional penalties, the property of authors and their aſſigns for the term of fourteen years, and hath directed, that if, at the end of that term, the author himſelf be living, the right ſhall then return to him for another term of the ſame duration: and this is the ſole right now veſted in the proprietors of copies. A ſimilar privilege is extended to the inventor of prints and engravings, for the term of twenty-eight years, by 8 Geo. II. cap. 13. and 7 Geo. III. cap. 38.

Literary *criticiſm*. See Criticism.

LITERATI, *letrados*, lettered, an epithet given to ſuch perſons, among the Chineſe, as are able to read and write their language.

The *literati* alone are capable of being made mandarins.

Literati is alſo the name of a particular ſect, either in religion, philoſophy, or politics; conſiſting principally of the learned men of that country: among whom it is called *jukiao*, i. e. *learned*.

It had its riſe in the year of Chriſt 1400, when the emperor, to awaken the native affection of the people for knowledge, which had been quite baniſhed by the preceding civil wars among them, and to ſtir up emulation among the mandarins, choſe out forty-two of the ableſt among their doctors, to whom he gave a commiſſion to compoſe a body of doctrine, agreeable to that of the ancients, which was then become the rule, or ſtandard, of the learned. The delegates applied themſelves to the buſineſs with very great attention; but ſome fancied them rather to have wreſted the doctrine of the ancients, to make it conſiſt with their's, than to have built up their's on the model of the ancients.

They ſpeak of the Deity, as if it were no more than mere nature, or the natural power or virtue that produces, diſpoſes, and preſerves the ſeveral parts of the univerſe. It is, ſay they, a pure, perfect principle, without beginning or end; it is the ſource of all things, the eſſence of every being, and that which determines it to be what it is. They make God the ſoul of the world: they ſay, he is diffuſed throughout all matter, and produces all the changes that happen there. In ſhort, it is not eaſy to determine, whether they reſolve God into nature, or lift up nature into God; for they aſcribe to it many of thoſe things which we attribute to God.

This doctrine, in lieu of the idolatry that prevailed before, introduced a refined kind of atheiſm. The work, being compoſed by ſo many perſons of learning and parts, and approved by the emperor himſelf, was received with infinite applauſe by all the people. Many were pleaſed with it, becauſe it ſeemed to ſubvert all religion; others approved

proved it, becauſe the little religion that is left them, could not give them much trouble. And thus was formed the ſect of the *Literati*; which conſiſts of the maintainers and adherents to this doctrine.

The court, the mandarins, and the perſons of fortune and quality, &c. are generally retainers to it; but a great part of the common people ſtill hold to their worſhip of idols.

The *literati* freely tolerate the Mahometans, becauſe they adore, with them, the king of heaven, and author of nature; but they bear a perfect averſion to all ſorts of idolaters among them: and it was once reſolved to extirpate them. But the diſorder this would have occaſioned in the empire prevented it: they now content themſelves with condemning them, in general, as hereſies; which they do ſolemnly every year at Pekin.

LITHAGOGI, of λιθος, *ſtone*, and αγω, *I bring away*, an epithet given by ſome medical writers to ſuch medicines as work by urine, and are ſuppoſed to have the virtue of expelling the ſtone.

LITHANTHRAX, of λιθος, *ſtone*, and ανθραξ, *coal*, in *Natural Hiſtory*, is uſed as the name of the common pit coal. See Coal.

LITHARGE, compoſed of λιθος, *a ſtone*, and αργυρος, *ſilver*, a metalline ſubſtance, formed of the ſpume of lead; uſed in the compoſition of plaſters, to give them a due conſiſtence: or, it is lead deprived of great part of its phlogiſton by fire, and in a ſtate of imperfect vitrification.

This preparation of lead is of great uſe in roaſting the ſtubborn ores of gold, ſilver, and copper; for it melts all kinds of ſtones and earth into glaſs, ſooner than the metals; and by this means the metal, which is heavier, will fall through the glaſs, which is a thin and light ſubſtance, and will be collected under it into a regulus, with only a few duſty ſcoriœ adhering to it. But if it be copper that is thus ſeparated, a ſmall portion of it is always deſtroyed; and if gold or ſilver, a like ſmall portion is always lodged and detained in the ſcoriæ.

But as the *litharge* penetrates through all ſorts of veſſels, and while melting riſes into a ſcum, that often runs over their edges, the aſſayers never uſe it alone, but always mix with it ſuch ſubſtances as may give it a clammineſs, ſuch as flints, ſands, clay, or the like: they mix two parts of *litharge* with one part of any of theſe ſubſtances, and add ſome nitre, or common ſalt, that the whole may run the more eaſily. They ſhut up the veſſels, which muſt be made very thick and ſolid, with a ſmall cover or lid, cut cloſe, and placing this in a wind-furnace, they keep it in fuſion a quarter of an hour, looking at times into the aſh-hole, to ſee if the glaſs have not eſcaped through the veſſel, and run down thither. Very often it is found ſweating through the ſides of the veſſel, like water, and falling in drops into the aſh-hole; and in this caſe, there is no way to preſerve the remainder, but to take the veſſel out of the fire.

When the whole is cool, the veſſel muſt be broke, and at the bottom there will be found a ſmall quantity of a regulus of lead, revived by means of the ſalt; in the middle, the glaſs of lead, which muſt be kept for uſe; and at the top a ſaline cruſt, which is to be thrown away.

Some authors ſpeak of two kinds of *litharge*; the one *natural* the other *artificial*.

Litharge, *natural*, they ſay, is a mineral, ſometimes found in lead mines, reddiſh, ſcaly, brittle, and ſomewhat reſembling white-lead. This *litharge* is ſo exceeding rare, that the ſhops ſell none but the

Litharge, *artificial*, which is of two kinds; viz. that *of gold*, and that of *ſilver*; or rather, it is the ſame, with this difference, that the one has undergone a greater degree of fire than the other.

Indeed naturaliſts are not very well agreed what the *artificial litharge* is: ſome conſider it as a metallic ſcum, raiſed on the ſurface of *lead*, when melted; after having ſerved to purify gold, ſilver, or copper.

Others conſider it as a metallic ſoot, or ſmoke, ariſing from thoſe metals mixed with the lead uſed in purifying them; which, ſticking to the top of the chimneys of furnaces, is there formed in a kind of ſcales.

Laſtly, Others conſider it as the lead itſelf uſed in refining of thoſe metals, and eſpecially copper; which laſt opinion appears the moſt credible: and the rather, on account of the great quantities of theſe *litharges* brought from Poland, Sweden, and Denmark; where copper mines are much more frequent than thoſe of gold and ſilver. The droſſy or recrementitious parts, fixing to the ſides of the teſt, are the *litharge*; and, according to the degree of calcination, becomes of divers ſhades of a red colour: the deep is called *litharge of gold*, and the paler, *litharge of ſilver*.

Litharge may be eaſily revived into lead; accordingly, much of that which is produced by refining in great is reduced, by being melted upon burning coals. The part which is leaſt altered by mixture with other metals is thus reduced, and thus good and ſaleable lead is obtained. The reſt of the *litharge* of theſe refineries is ſold and uſed for various purpoſes.

Litharges are deſiccative, deterſive, and cooling: they make the conſiſtence of ſeveral plaſters. The potters uſe them to give a beautiful gloſs to their wares; they are employed in the compoſition of ſome glaſſes, for they are very fuſible, and aſſiſt the fuſion of other ſubſtances; and they are alſo uſed by painters, dyers, ſkinners, and glaziers. When mixed with wine, they give it a bright ſprightly colour, but render it extremely unwholeſome. See Lead.

Litharge, *plaiſter of*. See Emplastrum *commune*.

Litharge, *vinegar of*. See Vinegar *of Lead*.

LITHIASIS, Λιθιασις, in *Phyſic*, the diſeaſe of the ſtone. See Stone and Calculus.

LITHIDIA, in *Natural Hiſtory*, the name of a large claſs of foſſils, including the flint and pebble kinds.

The *lithidia* are defined to be ſtones of a debaſed cryſtalline matter, covered by, and ſurrounded with an opake cruſt, and frequently of great beauty, and conſiderable brightneſs within, though of but a ſlight degree of tranſparence, approaching to the nature of the ſemipellucid gems, and like them found not in very large maſſes.

The bodies of this claſs are divided into two general orders, and under thoſe into three genera. The firſt order of the *lithidia* contains thoſe compoſed of a cryſtalline matter, but ſlightly debaſed, and that ever by one and the ſame earth, though diffuſed through them in different degrees, and always free from veins. The ſecond order comprehends thoſe of a more debaſed cryſtalline matter, blended with different portions of differently coloured earths. Of the firſt of theſe orders there is only one genus, which is that of the common flint.

Of the ſecond order there are two genera. 1. The homochroa, which are of one plain and ſimple colour; and, 2. The *calculi*, which are compoſed of cruſts of ſeveral different colours. Both theſe genera are compriſed under the common Engliſh names of pebbles. Hill's Hiſt. of Foſſ. p. 505.

LITHOBOLIA, Λιθοϐολια, in *Antiquity*, a feſtival celebrated by the Træzenians, in memory of Lamia and Auxeſia, two virgins, that coming from Crete to Træzene, in a time of tumult and ſedition, became a ſacrifice to the fury of the people, by whom they were ſtoned to death.

Lithobolia, or *lapidation*, was alſo a common puniſhment inflicted by the primitive Greeks upon ſuch as were taken in adultery.

LITHOCOLLA, or Lithocollum, formed of the Greek λιθος, *ſtone*, and κολλα, *glue*, a cement uſed by the lapidaries to faſten their precious ſtones, in order for cutting them.

It is compoſed of reſin and brick-duſt. For diamonds, they uſe melted lead, putting them into it before it be quite cold: for other cements, they mix marble-duſt with ſtrong glue; and, to faſten their ſparks, add the white of an egg, and pitch. See Cement.

LITHODÆMON, or Lapis *dæmonum*, a name given by ſome authors to jet.

LITHODENDRON, a name by which, according to Dioſcorides, many of the ancients expreſs the common red coral.

LITHOGENESIA, a term uſed by ſome authors to expreſs the formation and original of stones.

LITHOLABON, a name given by ſome chirurgical writers to an inſtrument uſed in the operation of lithotomy; it is a forceps intended for taking hold of the ſtone.

LITHOMANTIA, Λιθομαντεια, in *Antiquity*, a ſpecies of divination performed with ſtones. Sometimes the ſtone called *ſiderites*, was uſed; this they waſhed in ſpring-water in the night by candle-light; the perſon that conſulted it, was to be purified from all manner of pollution, and to have his face covered: this done, he repeated divers prayers, and placed certain characters in an appointed order; and then the ſtone moved of itſelf, and in a ſoft, gentle murmur (or as ſome ſay) in a voice like that of a child, returned an anſwer. By a ſtone of this nature, Helena is reported to have foretold the deſtruction of Troy.

LITHOMARGA, *ſtone-marle*, a name given by ſome authors to a ſparry ſubſtance highly debaſed by earth, which is found in great plenty in the caves of the Hartz Foreſt in Germany, and uſed there in medicine, under the name of the *unicornu foſſile*, or foſſile unicorn's horn, from its ſometimes emulating that figure. See *Mineral* Agaric.

LITHONTRIPTICON *Tulpii*, the name of a famous diuretic medicine, invented by Tulpius, and given with great ſucceſs in caſes of the ſtone, but requiring great judgment and caution in the adminiſtering it.

The preparation is this: take a drachm of cantharides without their wings, and a drachm of leſſer cardamoms without their huſks, powder them fine, and pour upon them an ounce of rectified ſpirit of wine, and half an ounce of ſpirit of nitre: ſet them to infuſe, without heat, for five or ſix days, ſtirring them from time to time. The vial muſt not be ſtopped cloſe; becauſe if it be, the continual fermentation will burſt it. The doſe is from fourteen to fifteen or twenty drops, in a glaſs of wine and water. It is to be taken in a morning, an hour after eating a meſs of both, and may be repeated for three or four days.

It is remarkable, that this mixture never ceaſes fermenting for many years; but if it be too faſt corked, will break the glaſs; if but ſlightly ſtopped, it only throws out the cork with an exploſion. Mem. de l'Acad. Par 1709. p. 358. edit. Par.

LITHONTRIPTICS, from the Greek λιθος, *ſtone*, and θρυπτω, *I break*, medicines proper to diſſolve the ſtone in the bladder and kidneys. See CALCULUS and STONE.

The reward which the parliament of England gave to Mrs. Stephens, the inventreſs of ſome medicines, which were ſaid to be a perfect and certain cure for the *ſtone*, made the generality of the world believe, that they were really as efficacious as they were pretended to be; but it appeared, on examiation, that the opinion of a cure in the very inſtances on the ſucceſs of which the reward was given, was erroneous; and that the *ſtones* had all the time remained in the bladders of the patients, though ſuppoſed to have been voided, after being diſſolved and waſhed away by the medicines.

The principal inſtance of a ſuppoſed cure was Mr. Gardiner. This man was, in December, 1748, examined by able ſurgeons, and found to have a ſtone in his bladder; after thi she took Mrs. Stephens's medicines for eight months without intermiſſion; and at the end of that time he declared himſelf free from all his uſual complaints; and on ſearching him there could no ſtone be found in the bladder. Mr. Gardiner died about three years afterwards, and his body was opened. When the bladder was examined, there was found in it ſix preternatural apertures of different ſizes; but the biggeſt capable of admitting the end of a finger. Each of theſe apertures led to a ſeparate bag formed by an enlargement of the internal membrane of the bladder, protruded between the fibres of its muſcular coat. Theſe bags were eaſily ſeen on the back part of the bladder a little above the veſiculæ ſeminales, and when viewed on the outſide, they ſeemed to be but two, though in reality equal in number to the openings within, and divided from one another by the duplicature of the internal membrane, which formed a ſeptum between each of them. Philoſ. Tranſ. Nº 462. p. 12.

As to Mrs. Stephens's medicine, it is a compoſition of ſoap and LIME made of different ſhells, which every body knows to be highly cauſtic; and is therefore condemned by Dr. Mead, ſince its corroſive quality muſt be injurious to the bladder. However, under proper management, he thinks it may be of ſome ſervice in expelling gravel by the urinary paſſages; though it will never be able to break calculi of the hardneſs of ſtone: and beſides, its long continued uſe muſt be attended with great danger, for the reaſons above given. And as for its ſubſtitute, the ſoap-lees, though it be a medicine of a more commodious form for taking, yet it will not prove much ſafer in its conſequences, for the ſame reaſons.

Dr. Whytt of Edinburgh, after conſidering the inconveniences, and ſometimes the miſchiefs alſo of this celebrated ſpecific, reſolved to omit the ſoap, and try what virtues LIME-*water* might have in diſſolving the calculus. His firſt experiments were made on ſeveral fragments of calculi, with lime-water from the common quick-lime; and afterwards reſolving to try the power of animal-lime; he repeated them with lime-water made with oyſter-ſhells and cockle-ſhells well calcined, by pouring ſeven or eight pints of water on one pound of the freſh calined ſhells. The experiments ſucceeded with both ſorts; but he ſoon found, that the oyſter and cockle-ſhell lime-water poſſeſſed a much greater power of diſſolving the calculus than that of the ſtone-lime.

He therefore propoſes the drinking of ſhell-lime-water to the quantity of four pints, every day, for adults; and for children leſs in proportion: and he concludes with inſtances of the happy effects of this method. However, as ſtones of great hardneſs can never be diſſolved by any medicine whatſoever, Dr. Mead recommends, in theſe caſes, a new method of cutting for the ſtone. See LITHOTOMY.

Dr. Hartley has publiſhed, in the London Gazette, the following receipt for making a *lithontriptic* electary. Take five pounds of Alicant ſoap, ſhaved, and one pound of oyer-ſhell-lime; put them into a tin veſſel, and pour upon them five quarts of water; make the water boil, till the ſoap be perfectly diſſolved in it, and then ſtrain all into a glazed earthen veſſel. Expoſe this maſs to the air, ſtirring it every day till it becomes both mild to the taſte, and of a proper conſiſtence to be formed into pills, or long pellets, without ſticking to the fingers. This may be expected to happen in two or three months. If it becomes ſufficiently mild before it has acquired a due conſiſtence, it may be brought to this, by being heated over the fire, in a tin veſſel: if it acquires a too hard conſiſtence, before it is ſufficiently mild, it muſt be ſoftened with water. This is what the Doctor calls the *lithontriptic* maſs or electary; which he orders to be made in a tin veſſel, becauſe a braſs or copper one would make it emetic.

He gives another more expeditious way of making it; which is this: pour two gallons of water upon a pound of oyſter-ſhell-lime; ſtir it two or three times, and when it has fallen to the bottom, pour off the clear part of the water. Repeat this fifteen or twenty times, or till the clear water, which is poured off, be almoſt taſteleſs; leaving about five pints of water upon the lime, after the laſt ablution. Then pour this mixture of water and dulcified lime upon five pounds of Alicant ſoap, ſhaved; and proceed as directed in the firſt receipt. The maſs, prepared in this manner, will be fit for uſe in a few days, or even immediately; but then the doctor prefers the foregoing receipt, where time can be allowed for it.

If the maſs of ſoap, and oyſter-ſhell-lime, dulcified in either of the above-mentioned ways, be made of the conſiſtence of an electary, it has been called the *lithontriptic* electary; which for the cure is more convenient than the maſs, for thoſe who deſire to take the medicine diſſolved in a liquid vehicle, as milk, water ſweetened with honey or ſugar, water flavoured with brandy or rum, and ſmall beer.

Where a perſon is ſuppoſed to have a large ſtone in the kidneys or bladder, he ought to take every day as much of the maſs or electary, as contains two ounces of the ſoap, unleſs his pain and provocation to make water be violent; in which caſe it will be proper to begin with about half this quantity, and to increaſe it as he can bear. The medicine ought alſo in this caſe to be dulcified in an extraordinary degree.

By this medicine, the Doctor thinks the generation of gravel, and gravel-ſtones, may be entirely prevented. See STONE.

It is likewiſe recommended in diſorders of the ſtomach and bowels, ariſing from, or attending acidities there; and in gouty habits. The patient may, in many of theſe caſes, begin with ſuch a quantity every day as contains an ounce of ſoap, and afterwards increaſe or leſſen this quantity as he finds occaſion.

LITHOPAEDION, a word uſed by ſome medical writers, to expreſs a recent calculous concretion in the bladder.

The ſtone in this ſtate, is ſuppoſed to be more eaſily worked upon by medicines than when of longer ſtanding; but the cruſtated ſtructure of theſe ſtones, when examined, plainly ſhews that they arrive at their bigneſs only by ſlow degrees, and therefore, that there is properly no ſuch thing as a recent calculous concretion capable of giving pain.

LITHOPHAGIA, of λιθος, *ſtone*, and φαγω, *to eat*, a name given to thoſe who are capable of eating and digeſting ſtones; inſtances of which are given by Boyle, Exp. Phil. p. ii. eſſ. iii. p. 86. Bulwer. Artificial Changeling, p. 307. and Paulian, Dict. Phyſique, art. *Digeſtion*.

LITHOPHYTA, in the Linnæan ſyſtem of *Natural Hiſtory*, the fourth order of *vermes* or *worms*, being compoſite animals, affixed to and fabricating a fixed calcareous baſe, called CORAL: this order contains fifty-nine ſpecies, under four genera, viz. the *tubipora* or red tubular coral, *madrepora* or brain-ſtones, *milepora*, and CELIPORA.

One of the moſt remarkable ſpecies of the ſmall *lithophyta* we have any where an account of, is that deſcribed by Mr. Leewenhoek, though without any particular name, in the Philoſophical Tranſactions, Nº 286. p. 1430.

LITHOPHYTON, *terreſtre*, a name given by Mr. Marchant to a ſpecies of plant, approaching to the muſhroom-kind, reſembling that fungous production, compared by ſome authors to the cluſters of Æthiopian pepper.

Mr. Marchant's curious obſervations on this little regarded ſubject give many valuable hints towards the explaining the vegetation of great numbers of the other plants, whoſe fructification is leſs obvious to the eyes, and may lead to a knowledge of many of the fructifications of ſea plants; which all our enquiries, on other foundations, have as yet left us unacquainted with.

This gentleman having cut down a maple in his garden, found after ſome months a number of little tubercles, of a fungous ſubſtance on the ſtump; they ſomewhat approached to the figure of an olive, with its ſtalk, and were then of a brown colour.

The outſide of theſe tubercles was porous, and they appeared ſomewhat ſpongy though rigid, and on ſqueezing a little there iſſued out of the pores a ſmall quantity of an aqueous humidity; the inſide, when it was cut open, appeared compoſed of fine and cloſely compacted fibres. Theſe plants, as they may properly be called, ſtood the whole winter, and in the following ſpring were found to be grown to their full ſize, which was about an inch and half long, and half an inch thick; they ſtood in cluſters, of near twenty together, and reſembled a ſet of irregular and ill-proportioned fingers, and when preſſed were found to be much harder than while young. Mem. Acad. Par. 1711.

The pores on their ſurface, which ſtill continued viſible, and were very different from any known plant of the muſhroom-kind, gave the obſerver hopes of a diſcovery of ſomething new in the fructification, and the ſtump of the tree being now perfectly dry, and unable to furniſh any more nouriſhment to them, he cut them all off, with part of the ſtump, and carried them to his cloſet for obſervation.

Each plant was nearly circular in figure, and terminated in a roundiſh or pointed end, and had at ſeveral diſtances two or three circular lines, by means of which it reſembled a toe or finger with its joints. The outer ſkin was now become wrinkled, and the pores were all ſurrounded with a ſort of roſaceous rim, and within them there often appeared a number of fine ſlender filaments, having the appearance of ſtamina. On cutting the plants vertically, theſe pores were all found to correſpond with certain round cavities within the plant, which were lined with a black matter. Theſe cavities were formed in a white fibrous matter; all the fibres of which took their origin at the centre, and tended to the circumference, and of theſe was the whole inner ſubſtance of the plant compoſed.

Some months after this, on cutting more of theſe plants, the round cavities in ſome of them, were found filled with a black matter, in form of a powder, compoſed of ſmall granules, and looked as if filled up with very fine gunpowder. The help of a microſcope ſhewed this matter to be compoſed of ſmall black particles, reſembling the ſeeds of the vanilla pods, only much leſs, and not ſo ſhining. On the whole, Mr. Marchant, notwithſtanding the external reſemblance of this plant to ſome of the muſhrooms, thinks, that when cloſely examined, it approaches more to the nature of the marine *lithophytons*.

It grows, as he obſerves, on hard bodies, without any appearance of roots in the manner of thoſe ſea-plants. Its bark, or outer covering, ſeems a ſort of coriaceous or tartareous ſubſtance, much more reſembling the bark of the ſea-*lithophytons* than that of any land-plant: and its pores ſurrounded with roſaceous rims, and anſwering to certain cavities containing ſeeds within the body of the plant, bring it to a near reſemblance with the ſea-*lithophytons*, though they do not at all reſemble any known land plant.

LITHOPHOSPHORUS *Sublenſis*, in *Natural Hiſtory*, a name given by ſome authors to a ſpecies of ſpar, which, when it has been heated over the fire, retains a property of giving light in the dark. This is a quality that ſeems more or leſs in degree to be inherent in ſeveral ſorts of ſpars. The Bononian ſtone is a foſſil of this kind; and ſeveral of the green ſpars of the German mines have been found to poſſeſs this quality in ſome degree.

The *lithophoſphorus* here meant has the appearance of a common purple ſpar. There is another kind of an opake white colour, ſo common about the edge of the Hartz foreſt, that it is uſed as a flux for ſome of the copper-ores, readily burning into lime, and then acting as an alkali, and abſorbing their ſulphurs; this kind, when moderately heated, ſhews an elegant light on being put into a dark room, but when it is heated too much it burſts to pieces.

LITHOPTERIS, *ſtone-fern*, in *Natural Hiſtory*, a name given by Mr. Lhuyd to ſome of the *foſſile* PLANTS of the fern kind.

LITHOSPERMUM, in *Botany*. See GROMWELL.

LITHOSTROTA, among the *Ancients*, pavements made up of ſmall pieces of cut marble of different kinds and colour. See TESSELATED.

LITHOSTROTION, in *Natural Hiſtory*, the name of a ſpecies of foſſile coral, compoſed of a great number of long and ſlender columns, ſometimes round, ſometimes angular, jointed nicely to one another, and of a ſtarry or radiated ſurface at their tops. Theſe are found in conſiderable quantities in the northern and weſtern parts of this kingdom, ſometimes in ſingle, ſometimes in complex ſpecimens. See *Tab. of Foſſils, Claſs* 7.

LITHOTOMY, formed of λιθος, *ſtone*, and τεμνω, *I cut*, in *Surgery*, an operation performed upon a human body, in order to extract the ſtone out of the bladder.

It appears, that cutting was in uſe for the ſtone, even in the time of Hippocrates, though we are perfectly in the dark as to the manner in which they performed it: it was however, wholly diſuſed in the after ages; inſomuch, that in the beginning of the ſixteenth century, there was no body durſt practiſe it. The faculty of medicine at Paris were obliged to petition the parliament to obtain leave to make a trial on a criminal condemned to death, who had the ſtone in the bladder: the operation ſucceeding, the practice became popular.

When a STONE is ſuſpected to be lodged in the bladder, beſides the common ſymptoms in this caſe, it is uſual for a ſurgeon to make a farther examination, by introducing a catheter, or ſound, into the bladder, by which it is poſſible to feel the ſtone. In order to this, Mr. Sharp directs the following method: the patient being laid on a horizontal table, with his thighs elevated, and a little extended, paſs the inſtrument, with the concave part towards you, until it meets with ſome reſiſtance in perinæo, a little above the anus; then turning it without much force, puſh it gently on into the bladder, and if it meets with an obſtruction at the neck, raiſes its extremity upwards, by inclining the handle of it towards you; and if it does not then ſlip in, withdraw it a quarter of an inch, and introduce your fore-finger into the rectum, liſt it up, and it will ſeldom fail to enter. There is ſome art in turning the ſound, in the proper place of the urethra, which ſurgeons not well verſed in this operation cannot ſo well execute; therefore they may paſs the inſtrument, with the concave ſide always towards the abdomen of the patient. If the ſtone is large, the operator, by introducing the ſound, may perceive it ſtrike againſt it, though he cannot thus certainly determine whether it be large or ſmall. Sometimes the operator cannot diſcover a ſtone by examination, though there be one; for inſtances occur in which it is lodged in a ſac. Before a patient is examined, he may uſe a little exerciſe, ſuch as riding or jumping, by which means the ſtone may fall down to the neck of the bladder, and be more readily diſcovered. It is obſerved, that after the operation children relapſe more frequently than adults; and that adults run greater hazards in the operation than children do.

There are four principal ways of performing the operation; the *apparatus minor*, *apparatus major*, *apparatus altus*, and the *lateral* operation.

The firſt is by cutting through the perinæum near the ſuture, on the left ſide, after the ſtone, by the fingers of the operator, has been brought to that part. This is called *cutting upon the gripe*; but it is almoſt diſuſed, becauſe it ſubjects the patient to great hazards and inconveniences.

This method was preſcribed and practiſed by Celſus and by Guido Cauliaco, and hence ſometimes denominated the Celſian and the Guidonian method. Heiſter obſerves, that this method is practicable in boys under fourteen years of age, becauſe the ſtone in them may be brought to the perinæum. He ſays, that he always performed it on children; and that it may be practiſed on adults, when the ſtone cauſes a ſuppreſſion of urine, by its adhering to the neck of the bladder, but otherwiſe it is dangerous.

In the *great apparatus*, which is that ordinarily practiſed, after the patient is conveniently placed and bound, the operator introduces a proper inſtrument through the urinary paſſage into the bladder, in order to ſearch for the ſtone; which being found, that inſtrument is withdrawn, and another grooved one is introduced the ſame way; which bulging in the perinæum, ſerves to direct the knife to the neck of the bladder: after the inciſion, a third inſtrument is thruſt into the aperture, till it join the former that was laſt introduced through the urinary paſſage, at which time that is withdrawn, whilſt this remains to guide the forceps directly into the bladder, to bring away the ſtone. This way is called *cutting upon the ſtaff*. It was invented by Franciſcus De Romanis, a celebrated Italian phyſician of Cremona, and afterwards improved and publiſhed by his pupil Marianus Sanctus, and denominated Marianus's method; and from the large number of inſtruments uſed in it, *apparatus major*. But ſince other methods have been introduced, it has been called the vulgar or old method.

The third method, called alſo the *high operation*, becauſe it is performed above the oſſa pubis in the ſuperior and anterior part of the bladder; and the *ſectio hypogaſtrica*, becauſe the place of the ſection is in the middle of the hypogaſtrium, firſt practiſed by Pet. Franco, has been ſince deſcribed, and ſtrenuouſly pleaded for by a chirurgical writer, Roſſet; but it ſoon fell into oblivion; from which it was only recalled about the year 1719, by Mr. Douglas, a ſurgeon of London, who collecting what ſcattered hints he could find relating to it, and improving them with his own obſervations, paved the way for its being brought into regular uſe, which before it never had been. He was ſoon followed by Mr. Cheſelden, and ſome others. Of thirty-one patients cut by them in this manner, in a few years, twenty-five recovered. It is true, Mr. Cheſelden afterwards quitted this method for the lateral operation. Of late years, the French have begun to adopt the high operation; and M. Morand, a ſurgeon of Paris, has written a book on the ſubject, chiefly taken from the Engliſh writers.

He argues, that the methods of Celſus, Frere Jacques, Raw, and Cheſelden, are in the main the ſame. See Mem. de l'Acad. des Sciences, 1731.

Mr. Cheſelden's method is deſcribed in his Anatomy, chap. vi. of the fifth edit.

The manner of proceeding herein, is this: after the bladder is injected with a ſufficient quantity of warm water, and the patient conveniently placed, the operator ſlowly makes an inciſion above the os pubis, along the linea alba, till he gets ſight of the bladder, into which he directly plunges his knife, and afterwards draws out the ſtone.

The advantages attending this method are, that it is performed in a very ſhort time; that the wound eaſily heals; that the dilaceration of parts frequent in the other ways is prevented; and that there is no danger of the incontinentia urinæ. On the other hand, it is thought to be chiefly practicable upon young perſons, and ſuch as are lean; the wound in old and fat perſons being apt to mortify: moreover, if the operator is not very cautious, he may eaſily let out the inteſtines. But Dr. Mead aſſures us, that now not only children and youths, but alſo perſons advanced in years, may ſubmit to this operation, without great danger; and in caſe the ſtone prove too big to be extracted without tearing the neck of the bladder, it is now no longer neceſſary to ſplit the ſtone, before the extraction: the invention of which is aſcribed to Ammonius, a Greek phyſician, who from thence was ſurnamed Λιθοτομος, *the Lithotomiſt*.

Mr. Houſtet has collected a great many inſtances of ſtones lodged in ſacs formed in the bladder, from which it was impoſſible to extract them, without tearing the bladder, or cutting on one ſide of the ſac, which M. Garengeot did once with ſucceſs. In ſome of the caſes which he mentions, the veſſels of the bladder were in appearance grown into the ſtone, and the extraction of the ſtone was attended with a mortal hæmorrhage. See Mem. de l'Acad. de Chirurg. tom. i.

The diſtenſion of the bladder with a liquor in performing the high operation for the ſtone, is attended with difficulties, eſpecially in women. Dr. Kulm has therefore contrived an elevatory catheter for that ſex. The bending of the inſtrument is fitted to the turn of the os pubis, and its great curve, inſtead of being only furrowed, is pierced quite through. He introduces this with its convexity to one ſide, then gently raiſes it to the hypogaſtrium, and cuts ſecurely upon it. See Nov. Act. Erudit. Lipſ. Mart. 1732.

To theſe may be added the *lateral operation*, invented by Frere Jaques, a religious of the third order of St. Francis, towards the cloſe of the laſt cantury, and practiſed by him with great reputation in the Franche Compté. But this reputation it loſt again at Paris; which, however, did not hinder Mr. Raw, anatomy-profeſſor at Leyden, from undertaking to rectify what was amiſs in it: in which he ſucceeded, inſomuch that the method is now known by his name, which has taken place of that of the firſt inventor. See Hiſt. Acad. Roy. Scien. ann. 1699. p. 34. item, an. 1728. p. 31.

Various improvements have been made in this method, and it is yet continued in practice. Mr. Sharp directs it to be performed in the following manner, from Mr. Cheſelden, who adopted and improved it: the patient being laid on a table, with his hands and feet tied, and the ſtaff paſſed, as in the old way, let an aſſiſtant hold it a little ſlanting on one ſide, ſo that the direction of it run exactly through the middle of the left erector penis, and accelerator urinæ muſcles; then make an inciſion through the ſkin and fat very large, beginning in one ſide of the ſeam in perinæo, a little above the place wounded in the old way, and terminating a little below the anus, between it and the tuberoſity of the iſchium. This wound muſt be carried on deeper between the muſcles, till the proſtatæ can be felt, when ſearching for the ſtaff, and fixing it properly, if it hath ſlipped, turn the edge of the knife upwards, and cut the whole length of that gland from within outwards, at the ſame time preſſing down the rectum with a finger or two of the left hand, by which precautions the gut will eſcape being wounded; after this introduce the forceps to take out the ſtone. After the operation is finiſhed, if there be an hæmorrhage from the proſtate gland, a ſilver canula, three or four inches long, covered with fine rag, may be introduced into the bladder, and left there two or three days, for it rarely fails to check it: the patient may alſo take an opiate. If the wound does not bleed, a little dry lint, or a pledgit of digeſtive may be laid in it. If a pain be felt near the bladder, ſoon after the dreſſings are finiſhed, a bladder of warm water may be applied over it; and if it increaſes, as there will be much danger from it, bleeding and clyſters will be neceſſary.

Among Cheſelden's emendations, Douglas enumerates theſe: if he finds the patient's pulſe low after the operation, he applies bliſters to the arms, which effectually raiſe his ſpirits: if the wound becomes callous, he lays on a piece of a bliſter plaſter to erode it, by which new fleſh pullulates, and the wound unites: if the wound be putrid, he mixes a little verdigris with ſome digeſtive ointment.

Women are rarely afflicted with a ſtone in the bladder; but when they are, it may generally be extracted through the urethra, which may gradually be dilated to an incredible ſize. Stones have been extracted through dilated urethræ, which weighed more than five ounces.

Mr. Gooch, in his Caſes, &c. vol. ii. p. 182, &c. gives an inſtance of extracting a ſtone four ounces in weight, through an inciſion which he made from the vagina into the bladder. This procedure was attended with very little trouble, either to himſelf or the patient; the ulcer ſoon healed by the uſe of ſoft balſamic injections, and no inconvenience was obſerved after the parts were healed. Sharp's Operations of Surgery, Heiſter's Surgery, part ii. ſect. 5. See NEPHROTOMY. For a view of the inſtruments uſed in *lithotomy*, ſee *Tab. Surgery*.

LITHOXOS. See COLAPTICE.

LITHOXYLUM, in *Botany*, a term uſed by Linnæus to expreſs a heterogeneous ſubſtance on ſea-plants, or marine productions, which has fructifications in impreſſed points. See KERATOPHYTON.

LITHOZUGIA, in *Natural Hiſtory*, the name of a genus of foſſils, of the claſs of the SCRUPI, compoſed of a cryſtalline matter a little debaſed, and containing within them various extraneous bodies, as pebbles, &c.

Dr. Woodward has ranked this genus among the pebbles, becauſe of the pebbles they contain; which is by no means a ſufficient reaſon for confounding two ſuch different foſſils; the *lithozugia* approaching to the nature of flint.

Mercatus and other naturaliſts have called the *lithozugia*, *oculati lapides*; and among Engliſh lapidaries they are known by the name of *pudding-ſtones*. See OCULATUS *lapis*.

Of this genus we have three ſpecies.

Beſides theſe, there are other *lithozugia* of a coarſer texture, approaching to the nature of quarry ſtone; of theſe we have four ſpecies. Hill's Hiſt. of Foſſ. p. 560. 562.

LITHUS, a name given by ſome authors to the magnet.

LITMUS, or LACHMUS, in the *Arts*, is a blue pigment, formed from ARCHIL. It is brought from Holland at a cheap rate; but may be prepared by adding quick-lime, and purified urine, or ſpirit of urine diſtilled from lime, to the archil previouſly bruiſed by grinding. The mixture, having cooled, and the fluid ſuffered to evaporate, becomes a maſs of the conſiſtence of a paſte, which is laid on boards to dry, in ſquare lumps. It is only uſed in miniature paintings, and cannot be well depended on, becauſe the leaſt approach of acid changes it inſtantly from blue to red. The beſt *litmus* is very apt to change and fly.

LITOTES, Λιτοτης, in *Rhetoric*. See LIPTOTES.

LITTER, *lectica*, a kind of vehicle borne upon ſhafts; anciently eſteemed the moſt eaſy and genteel way of carriage.

Du-Cange derives the word from the barbarous Latin *lectiria*, *ſtraw*, or *bedding for beaſts*. Others will rather have it come from *lectus*, *bed*, there being ordinarily a quilt and a pillow to a *litter*; in the ſame manner as to a bed.

Pliny calls the *litter* the traveller's chamber; it was much in uſe among the Romans, among whom it was borne by ſlaves kept for that purpoſe; as it ſtill continues to be in the Eaſt, where it is called a PALANQUIN.

The Roman *lectica*, made to be borne by four men, was called *tetraphorum*; that borne by ſix, *hexaphorum*; and that borne by eight, *octaphorum*.

The invention of *litters*, according to Cicero, was owing to the kings of Bithynia: in the time of Tiberius they were become very frequent at Rome, as appears from Seneca; and even ſlaves themſelves were borne in them, though never by more than two perſons, whereas men of quality had ſix or eight.

LITTLE *bairam*. See BAIRAM.

LITTLE *capſtan*. See CAPSTAN.

LITTLE *maſs*. See MASS.

LITTORAL *ſhells*, among writers of *Natura Hiſtory*, are ſuch ſea-ſhells as are always found near the ſhores, and never far off in the deep.

Thoſe which are found in the bottom of the ſea, remote from the ſhore, are called *pelagian*.

LITUITES, a name given to the ſtones formed in the lituus-ſhell.

LITURGY, denotes all the ceremonies in general belonging to divine ſervice.

The word comes from the Greek λειτουργια, *ſervice, public miniſtry*, formed of λειτος, *public*, and εργον, *work*.

In a more reſtrained ſignification, *liturgy* is uſed among the Romaniſts to ſignify the maſs; and among us the common-prayer.

All who have written on *liturgies* agree, that in the primitive days, divine ſervice was extremely ſimple, only clogged with very few ceremonies, and conſiſting of but a ſmall number of prayers; but, by degrees, they increaſed the number of external ceremonies, and added new prayers, to make the office look more awful and venerable to the people. At length things were carried to ſuch a pitch, that regulation became neceſſary; and it was found proper to put the ſervice, and the manner of performing it, into writing; and this was what they called a *liturgy*.

Liturgies have been different at different times, and in different countries. We have the *liturgy* of St. Chryſoſtom, that of St. Peter, of St. James, the *liturgy* of St. Baſil, the Armenian *liturgy*, the *liturgy* of the Maronites, of the Cophtæ, the Roman *liturgy*, the Gallican *liturgy*, the Engliſh *liturgy*, the Ambroſian *liturgy*, the Spaniſh and African *liturgies*, &c.

In the more early ages of the church, every biſhop had a power to form a *liturgy* for his own dioceſe: and if he kept to the analogy of faith and doctrine, all circumſtances were left to his own diſcretion. Afterwards the practice was for the whole province to follow the metropolitan church, which alſo became the general rule of the church: and this Lindwood acknowledges to be the common law of the church: intimating, that the uſe of ſeveral ſervices in the ſame province, which was the caſe in England, was not to be warranted but by long cuſtom.

The *liturgy* of the church of England was compoſed in the year 1547, and eſtabliſhed in the 2d year of king Edward VI. ſtat. 2. and 3 Ed. VI. cap. 1.

In the fifth year of this king it was reviewed: becauſe ſome things were contained in that *liturgy*, which ſhewed a compliance with the ſuperſtition of thoſe times, and ſome exceptions were taken againſt it by ſome learned men at home, and by Calvin abroad. Some alterations were made in it, which conſiſted in adding the general confeſſion and abſolution, and the communion to begin with the ten commandments. The uſe of oil in confirmation, and extreme unction were left out, and alſo prayers for ſouls departed, and what tended to a belief of Chriſt's real preſence in the euchariſt. This *liturgy* ſo reformed, was eſtabliſhed by the act of 5 and 6 Ed. VI. cap. 1. However, it was aboliſhed by Queen Mary, who enacted that the ſervice ſhould ſtand as it was moſt commonly uſed in the laſt year of the reign of king Henry VIII. The *liturgy* of 5 and 6 Ed. VI. was re-eſtabliſhed with ſome few alterations and additions, by 1 Eliz. cap. 2. Some farther alterations were introduced, in conſequence of the review of the Common Prayer Book, by order of king James, in the firſt year of his reign; particularly in the office of private baptiſm, in ſeveral rubricks and other paſſages, with the addition of five or ſix new prayers and thankſgivings, and all that part of the catechiſm which contains the doctrine of the ſacraments. The Book of Common Prayer, ſo altered, remained in force from the firſt year of king James, to the fourteenth of Charles II. But the laſt review of the *liturgy*, was in the year 1661, and the laſt act of uniformity enjoining the obſervance of it, is 13 and 14 Car. II. cap. 4. See COMMON *Prayer*. Many applications have been ſince made for a review, but hitherto without ſucceſs.

LITUS, in *Medicine*, the ſame as LINIMENT.

LITUUS, among *Medalliſts*, the ſtaff uſed by the augurs, made in the form of a crozier.

We frequently ſee it on medals, along with other pontifical inſtruments. Aulus Gellius ſays, it was bigger in the place where it was crooked, than elſewhere.

LITUUS, in *Natural Hiſtory*, a name given to a genus of ſhells of the claſs of the *polythalamii*, or thoſe which conſiſt of ſeveral concamerations or chambers, parted from one another by ſhelly diaphragms, and communicating with one another by means of a ſiphunculus, which runs through the whole length of the ſhell. To this general character of the claſs, it is to be added, that the *lituus* is always a conic ſhell, running in a ſtraight line from the mouth, through a great part of the length, and from the end of this ſtraight part to the extremity, twiſting into the ſhape of a cornu Ammonis, or ſpiral ſhell of that kind.

It is thus named from its reſembling the inſtrument called *lituus* among the ancients. The ſtony matter often found caſt in this ſhell, and reſembling all its lineaments, is called by authors *lituites*, as thoſe ſtones formed in the pecten *pectinites*, and thoſe in the echini marini *echinitæ*.

LIVE *caves*, in *Mining*, a phraſe uſed by many people to expreſs ſuch caverns in the earth as have but little communication with the external air, and are found to abound with mineral productions. The workers in the lead-mines on Mendip-hills diſtinguiſh the numerous caverns in thoſe places into the *live* or *quick caves*, and the *dead caves*; the latter are ſuch as admit the air into them two or three ways, and are barrren of any thing valuable; the others have only one paſſage, and that but narrow and winding, and generally lie at great depths. Theſe abound in numerous elegant productions. They almoſt always contain ore in ſome form or other, and uſually abound in elegant ſpars. Mr. Beaumont mentions one of theſe in the Philoſophical Tranſactions, which lay at thirty-five fathom perpendicular depth, in which there was found a fine liver-coloured earth, of the nature of bole armenic, which in many places ſhoot up in a wonderful manner in a ſort of ſpires of the height of three or four inches, formed with ridges and furrows, and uſually covered with ſpar at the top: ſometimes all the way down, to the bed of earth. Phil. Tranſ. Nº 129.

LIVE *ever*, in *Botany*. See ORPINE.

LIVE *in idleneſs*. See VIOLET.

LIVER, in *Anatomy*, a large, glandulous viſcus, of a dark red colour, a little inclined to yellow, ſituated immediately under the diaphragm, partly in the right hypochondrium, which it almoſt fills, and partly in the epigaſtrium; ſtretching itſelf over the right ſide of the ſtomach, towards the left hypochondrium, and reaching behind the cartilago enſiformis, growing gradually thinner and narrower: it ſerves to purify the maſs of blood, by making a ſecretion of the bilious humour it contains. See *Tab. Anat.* (*Splanch.*) *fig.* 1. *lit. a. b. fig.* 3. *lit. k.* (*Angeiol.*) *fig.* 4. *lit. a e e*, &c. *fig.* 5.

Plato, and others of the ancients, fix the principle of love in the *liver*; whence the Latin proverb, *Cogit amare jecur*: and in this ſenſe Horace frequently uſes the word, as when he ſays, *Si torrere jecur quæris idoneum*. The Greeks, from its concave figure, called it ηπαρ, *vaulted*, *ſuſpended*; the Latins call it *jecur*, q. d. *juxta cor*, as being near the heart. The French call it *foye*, from *foyer*, *focus* or fire-place; agreeable to the doctrine of the ancients, who believed the blood to be boiled and prepared in it. Eraſiſtratus, at firſt, called it *parenchyma*, i. e. *effuſion*, or *maſs of blood*: and Hippocrates, by way of eminence, frequently calls it the *hypochondrium*.

The upper part of the liver is convex, and perfectly ſmooth: the under is concave, and ſomewhat more uneven, having four large fiſſures; one, through which the umbilical ligament paſſes; a ſecond on the left ſide, receiving the pylorus, and the beginning of the duodenum; a third on the right ſide, near the margin, in which the gall bladder is lodged; and the laſt in the upper part, affording the paſſage to the vena cava.

Its figure is ſomewhat approaching to round, with thin edges, not altogether even, but notched in ſome places. Its magnitude is various in different ſubjects, according to the proportion of the body: though in a fœtus, or very young animal, it is always larger, in proportion, than in adults. In dogs, and other animals of the quadruped kind, it is divided into ſeveral diſtinct lobes; but in men is generally continued; having one ſmall protuberance, which ſome account a little lobe. It is ſometimes, however, obſerved, in men, to have been divided into two or three lobes.

The two lateral parts are uſually called the lobes, and diſtinguiſhed above by a membranous ligament, and below by a conſiderable ſciſſure lying in the ſame direction with the ſuperior ligament. The right or great lobe of the *liver*, which lies in the right hypochondrium, reſts on the right kidney, and covers a portion of the arch of the colon and pylorus: about two third parts of the ſmall or left lobe, lie in the middle of the epigaſtrium, and the remaining thick part advances over the ſtomach, towards the left hypochondrium. This ſmall lobe is ſituated almoſt horizontally; the great lobe is very much inclined; and its thick extremity runs down almoſt in a perpendicular direction to the right kidney, on which it lies.

The *liver* is connected to ſeveral parts, but eſpecially to the diaphragm, to which it is faſtened by a broad, thin, but ſtrong ſemicircular ligament, called the *ſuſpenſory ligament*, derived from the common capſula of the porta and gall-ducts. The continuity of this ligament, being interrupted by the perforation of the vena cava, has given occaſion to ſome anatomiſts to divide it into two. It is likewiſe, by another ſtrong ligament, which has its original from the external coat of the *liver*, or, which amounts to the ſame, from the peritonæum, tied to the cartilago xiphoides; and by a third, which is formed out of the umbilical veſſels, which, in adults, dry up, and become a ligament, it is connected to the tendons of the abdominal muſcles in the linea alba, at the navel. Theſe ſeveral ligaments ſerve to keep it in its due ſituation: beſides which, it has ſome other connexions by the blood-veſſels.

When the ſtomach is empty, or when we faſt longer than ordinary, it is commonly ſaid that the ſtomach pinches us: as the *liver* is not then ſuſtained by the ſtomach and inteſtines, it deſcends by its own weight, and chiefly by means of the ſuſpenſory ligament, pulls the diaphragm along with it: it is in that place, therefore, that we have this uneaſy ſenſation, and not the ſuperior orifice of the ſtomach, as is commonly believed.

The *liver* has a motion, though not proper to itſelf, but depending on that of the diaphragm; to which being very firmly connected, it muſt needs obey its motion; and in expiration be drawn up, and in inſpiration be let down again. It is covered with a thin ſmooth membrane, derived from the peritonæum, which may be ſeparated from the ſubſtance of the *liver*, though not without ſome danger of laceration. The ſubſtance of the *liver* is vaſcular and glandulous; which latter part is very ſoft and friable, and pretty eaſily ſcraped off from the veſſels, to which the glands every where adhere, as it were in bunches; which has made the anatomiſts call the conſiderable ones, the *internal lobes of the liver*.

The glands adhering thus to the veſſels, and conſtituting thoſe lobes, are wrapped up together in proper membranes; whence this appearance of diſtinct lobes. Every one of theſe glands, according to Malpighi, is compoſed of ſix unequal ſides or faces. They are all clothed with their proper membranes, and have each an excretory duct; ſeveral of which, joining together, form little trunks, which run all along with the branches of the porta; and theſe again, uniting, form longer trunks, which are always found full of bile, and conſtitute the porus bilarius; which, being diſtributed all over the *liver*, receives, in the foregoing manner, the bile, which is ſeparated by theſe glands: and, terminating in the meatus hepaticus, and in the ductus communis, at length diſcharges the bile into the duodenum.

Beſides this diſcharge by the porus bilarius, which is ſuppoſed to be the great one, the *liver* alſo delivers part of its bile into the gall-bladder, by a duct, called the *cyſt-hepatic duct*, firſt diſcovered by Dr. Gliſſon; by means whereof, there is an immediate communication between the porus bilarius and the gall-bladder; a particular deſcription of which laſt part ſee under the words GALL, CYST-HEPATIC, &c.

Each lobule of the *liver* conſiſts of an external friable, yellowiſh-red, cortical ſubſtance, and of an internal ſoft, pulpous, medullary part. Ths medullary ſubſtance is the pulpy extremities of the biliary ducts, proceeding from the cortical part. See Mr. Ferren in Hiſt. de l'Acad. des Scienc. 1733.

The blood in the hepatic artery has bile ſecreted from it, and its remaining blood is conveyed by veins into the vena portarum, where a ſecond ſecretion is made from it. Beſides, the ſecretion of bile made from the hepatic artery and vena portarum, Mr. Ferren has ſeen biliary ducts coming from the left ligament of the liver, the diaphragm, coats of the gall-bladder, and part of the vena cava; all which are viſible upon injecting coloured liquors into the trunks of the hepatic ducts. The bile is equally bitter and ſtrong in the ſmalleſt biliary canals as in the larger trunks; the thick yellow bile, ſometimes found in the trunks, being the cyſtic bile, remounting from the common into the hepatic duct, on which account the hepatic is often larger than the common duct. The lymphatic veſſels may be traced to the extreme branches of the vena portarum, and to the biliary ducts, by injecting liquors into the larger trunks of the external lymphatics. Ferren, ubi ſupra.

Beſides theſe gall-veſſels, which are peculiar to the *liver*, it abounds with blood-veſſels, eſpecially veins; whereof the porta and cava are diſſeminated through the whole ſubſtance of it. And here it is particularly remarkable of the porta, that after the manner of arteries, it ſhoots itſelf from a trunk into branches; and being at laſt loſt in capillaries, delivers the blood into the cava, by which it is immediately reconveyed to the heart.

The porta is formed out of the concurrence of divers veins, which, meeting together, make one of the moſt conſiderable venous trunks of the body, as to its bulk; though, contrary to the courſe of other veins, it runs not far in a trunk, but is ſoon diſturbed again by ramifications into the *liver*.

The blood conveyed into the *liver* by the porta, after the manner of the arteries, is received again, after having been purged of its bile in the glands of the *liver*, into innumerable veins, which empty themſelves into the cava; and are vulgarly, though improperly, called *branches* of the cava; but they ought to be eſteemed the proper blood-veſſels of the *liver*, as the emulgents are of the kidneys; and which, as all the reſt do, except the plumonary vein, empty themſelves into the cava; the common channel by which the blood returns to the heart.

The arteries, which are called the *hepatic*, come from the right branch of the cœliac. Dr. Gliſſon thinks the porta does ſo much the office of an artery, that no more arteries are neceſſary than thoſe which furniſh nouriſhment to the membranes and capſula; but Dr. Drake judges they ſerve for the nouriſhment of the whole part. Theſe arteries are much bigger in men, than in other animals. Mr. Cowper had ſeveral preparations, wherein the ſtem of each hepatic artery was as large as a gooſe-quill, and the branches in the *liver* every where equal in magnitude to thoſe of the porus bilarius, which they accompany. Dr. Drake conjectures, that in this viſcus in a human body, a larger ſtream, and more direct impetus, of arterious blood is required to drive on the venous, becauſe of the erect poſture, than in animals of a horizonal poſition of body. For which reaſon horſes, &c. though of much larger ſize, and having much bigger *livers*, have theſe arteries much ſmaller than men; and not only ſo, but curled like the tendrils of a vine, to break the impetus, which, in that poſture, is not ſo neceſſary as in the erect.

The *liver* has its nerves from the hepatic plexus, formed on the right hypochondrium by the branches of the intercoſtal, which, wrapping themſelves about the arteries, make a ſort of net-work; and after ſpreading themſelves on the membrane and ſurface, diſappear. The lymphe-ducts are numerous, though not eaſily diſcernible in human ſubjects, for want of live diſſections; but in other animals, that may be diſſected alive, they become very conſpicuous, by applying a ligature to the porta, and the biliary duct.

LIVER, *for the uſe of the, in the ſecretion of bile*, ſee BILE.

Thoſe things which increaſe or leſſen the proportion of the weight of the heart to the weight of the body, do at the ſame time leſſen or increaſe the proportion of the weight of the *liver* to the weight of the HEART. And conſequently, when an animal grows fat from much food, much ſleep, and little exerciſe, its heart leſſens, and its *liver* increaſes; and, on the contrary, when an animal grows lean from little food, little ſleep, and much exerciſe, its heart increaſes, and its *liver* leſſens. When the weight of the heart is too little for the weight of the body, the *liver* enlarges beyond its juſt magnitude, and preſſes too much on the contiguous parts, particularly on the ſtomach, inteſtines, and diaphragm, and by the preſſure leſſens the capacities of the ſtomach, inteſtines, and thorax; whence the appetite grows leſs, the periſtaltic motion leſs, and reſpiration more difficult and uneaſy.

The weight of the *liver* in proportion to the quantity of blood, is leſs at a medium in wild beaſts than in tame, and in round fiſh than in flat fiſh.

In moſt chronical diſeaſes the *liver* is larger than in health, as has been found by diſſections. And it ſeems probable, that the weight of the heart and quantity of blood, in thoſe diſtempers, are both leſs than in health; moſt chronical diſeaſes ariſing from too much food and too little exerciſe, leſſen the weight of the heart and quantity of blood, but increaſe the *liver*. Hence, when this part is grown too large by intemperance and inactivity, it may be leſſened and brought to a healthful magnitude by temperance and exerciſe. It may indeed alſo be emptied by art, but nothing can prevent its filling again, and conſequently ſecure good and conſtant health, but an exact diet and exerciſe. Thus purging and vomiting may leſſen the *liver*, but cannot prevent its increaſing again, ſo long as perſons live too full and uſe too little exerciſe. Dr. Robinſon's Diſſ. on the Food, &c. of Hum. Bod. p. 111, &c.

The *liver* in fiſhes is generally very large in proportion to the reſt of the body, and is generally placed in the left ſide of the abdomen; but this is not the caſe in all. In figure and proportion it differs greatly in the different kinds; it is in ſome ſimple and undivided, as in the pleuronecti, petromyza, ſalmons, &c. In ſome it is divided into two lobes, as in pearch, and moſt of the cartilaginous kinds: As alſo in the torpedo, the ſquali, the lamiæ, the perilophus, the paſtinacha of authors, the clupeæ, the eels, the ſtromateus of Rondeletius, the dolphins, and ſome of the ligyri. In ſome it is divided into three lobes, at in the cyprini, ſome of the gadi, the ſcorpæna, the rays, the ſquatina, the tunny, the gaſteroſteus, and the faber, or Solen doree. Artedi, Ichthyol.

In regard to proportion, it is in ſome fiſh much ſhorter than the abdomen, as in pearch, clupeæ, oſmari, coregones, ſalmons, eſoces, and the greater part of fiſhes. In ſome it is nearly of the ſame length with the abdomen, as in the gaſteroſteus, &c.

The gall-bladder, which is an appendage to the *liver*, is never wanting in any kind of fiſh, but it is very differently ſituated in the different kinds. In the cartilaginous fiſhes, it is immerſed in the ſubſtance of the *liver*; in other fiſh, it ſometimes adheres cloſely to the lower part of it, as in the eſoces, cyprini, pearch, and the greater part of fiſhes. In others it is hung to the *liver* by a long neck, as in the muræna, conger, and ammodytes.

LIVER, *abſceſs in the*. Abſceſſes in the *liver* have been uſually accounted mortal, and wholly beyond the reach of remedy; we have, however, in the Hiſtory of the Academy of Paris, an account of a very remarkable one, perfectly cured by Mr. Souiller, a ſurgeon of Montpelier, in the following manner. The patient was a young gentleman of about fourteen, who had contracted a violent fever, by putting his feet while very hot into ſome cold water. The conſequence of this fever was a large tumor in the middle of the epigaſtric region, which raiſed the xiphoide cartilage, and puſhed it two inches out of its place, and terminated below, two inches under the navel. The common means failing to do any ſervice, the patient was ſent to Montpelier, where the before mentioned ſurgeon opened the tumor; on this the *liver* was found abſceſſed in its anterior or convex part, and a cavity was found there capable of receiving half a hen's egg, and there iſſued out of it on a gentle preſſure a thick and bloody, ſometimes a yellowiſh bitter and inflammable matter. This laſt was true bile, and both with this and with the other diſcharge, there always came away ſmall portions of the ſubſtance of the *liver*, and the ſmall extremities of numbers of veſſels might be perceived, ſome ſanguineous, ſome bilious.

The great buſineſs for the ſurgeon, in this caſe, was the getting the matter out of the abſceſs, the preventing its remaining in the ſubſtance of the *liver*, or being again received into the blood. For this purpoſe, M. Souiller invented a particular canula, made very ſoft at the end, where it was to be paſſed into the *liver*, and having there ſix lateral holes capable of receiving the matter. This canula was of ſilver, and under its other end there was placed a thin plate of lead, to receive the matter which was diſcharged through it, which would otherwiſe have excoriated any part on which it fell. The abſceſs, which was, by this means, always kept perfectly clean, ſoon began to heal; the fever went off by degrees, the patient every day grew into a better ſtate, and finally, the wound was cicatrized, and all perfectly cured in a very ſhort time. Hiſt. Acad. Par. 1730.

One thing obſervable in the courſe of the cure, was the refutation of a common opinion, that the bile is neither bitter nor coloured, till it gets into the gall bladder; for, in this caſe, it was diſcharged yellow and bitter from the wounded veſſels of the *liver*.

Whenever an abſceſs or impoſthume is formed in the *liver*, all methods ſhould be tried to make it break and diſcharge itſelf outwardly, as fomentations, poultices, ripening cataplaſms, &c. Sometimes the matter of an abſceſs comes away in the urine, and ſometimes it is diſcharged by ſtool; but theſe are efforts of nature, which no means can promote. When the abſceſs burſts into the cavity of the abdomen at large, death muſt enſue; nor will the event be more favourable when the abſceſs is opened by an inciſion, unleſs in caſes where the *liver* adheres to the peritonæum, ſo as to form a bag for the matter, and prevent it from falling into the cavity of the abdomen; in which caſe, opening the abceſs by a ſufficiently large inciſion, will probably ſave the patient's life. Buchan. Dom. Med. p. 335. See HEPATITIS.

LIVER, *infarction of the*. See HEPATIS *Infarctio*.

LIVER, in *Antiquity*, was much uſed in divination. See HEPATOSCOPIA.

LIVER *of antimony*, in *Chemiſtry*, reſults from the detonation of antimony with an equal weight of nitre. Theſe two matters reduced into powder are to be mixed together, and put into a large crucible. The maſs is then to be kindled, and the detonation to be made. When it has detonated, it is to be kept in fuſion, and then cooled. When the crucible is broken, at the bottom two diſtinct matters are found, which may be ſeparated from each other by the ſtroke of a hammer. The upper matter is a ſaline ſcoria, nearly of the ſame nature as the ſcoria of the regulus of antimony. This is a true antimonial *liver* of ſulphur, mixed with a certain quantity of vitriolated tartar. The lower matter is heavier. It is opake, compact, red, and brittle. This is the *liver* of antimony. Its colour and appearance have been ſuppoſed ſimilar to thoſe of the *livers* of animals, whence its name. It is principally compoſed of the metallic part of antimony, half deprived of its ſulphur, and dephlogiſticated by nitre. This ſubſtance is of no uſe in chemiſtry, nor in medicine, ſince the kermes mineral and emetic tartar have been introduced. Dict. Chem. See ANTIMONY.

LIVER *of arſenic*, is a combination of white arſenic with liquid fixed vegetable alkali, or by the humid way. The operation for making *liver* of arſenic is eaſy and ſimple: to ſtrong and concentrated liquid fixed alkali, previouſly heated, fine powder of white arſenic muſt be added, till the alkali is ſaturated, or has loſt its alkaline properties. While the alkali diſſolves the arſenic, it acquires a browniſh colour, and a ſingularly diſagreeable ſmell; and the mixture gradually thickens into a gluey conſiſtence. Dict. Chem. See ARSENIC.

LIVER *of ſulphur* is the combination of ſulphur with alkaline matters: and this combination may be made either in the dry or humid way. In the dry way, or by fuſion, a mixture of equal parts of fixed alkali and ſulphur is put into a crucible, and quickly fuſed. The melted maſs is then poured on a greaſed ſtone, and then the *liver* of ſulphur congeals and acquires a brown colour. If it be required to be kept dry, it muſt be ſoon broken to pieces, and put, while it is hot, into a bottle well corked, becauſe it readily imbibes moiſture from the air. In the humid way, which is leſs common, concentrated liquid fixed alkali, and fine powder of ſulphur, are to be boiled together, till the alkali has diſſolved as much as it can: the liquor is then to be filtrated and evaporated.

Liver of ſulphur is an important combination in chemiſtry, becauſe it is in general a very powerful ſolvent of metallic matters; all which, excepting zinc, it attaches, particularly in fuſion. It ſeems to diſſolve GOLD more effectually than other metals. It diſſolves alſo vegetable coals, even by the humid way; and the ſolution is of a green colour. Particular kinds of *livers* of ſulphur may be formed by the combination of volatile alkali, of quicklime, or of abſorbent earths, all which attack ſulphur more or leſs. Dict. Chem. See SULPHUR.

M. Navier has lately diſcovered, that the *liver* of ſulphur, and particularly of *liver* of ſulphur of Mars, hath the moſt ſalutary effects as an antidote againſt arſenic, corroſive ſublimate, verdigriſe, and LEAD. Nav. Contre Poiſons de l'Arſenic, &c. 1777.

LIVER-*wort*, *Lichen*, in *Botany*, the name of a large genus of *cryptogamia flags*, according to Linnæus, but of moſſes according to other writers; the characters of which are theſe: they have the moſt perfect fructification of all the moſſes, having evident flowers as well as ſeeds; their flowering heads are of various figures, and have a number of monopetalous flowers in them, divided into a different number of ſegments; theſe have ſeveral filaments, and among them have a large quantity of farina, which, when examined by the microſcope, appears of a globular figure; the ſeeds are produced in other parts of the plant, and are contained in certain cups, which ſtand without pedicles on the ſurface of the leaves; theſe are ſometimes on the ſame individual plant with the flowering heads, but ſometimes they are on different plants of the ſame ſpecies. Beſides theſe and the flowering heads, there are alſo in ſome ſpecies of *lichen*, certain other heads of the ſhape of a button, ſtanding on pedicles, and containing neither flowers nor ſeeds; theſe are always found on ſuch plants as have no male flowers; the pedicles of theſe, as well as of the male flowers, are uſually naked, or without any covering at the baſe. To this it may be added, that the leaves of the *lichens* are leſs pellucid, and more like the leaves of the larger plants than thoſe of the other moſſes; and that they are of an irregular and indeterminate figure, ſpreading themſelves every way upon the ground, and ſending out roots from the underſide in various places. Dillen. Hiſt. Muſc. p. 516. *Tab.* XV. *Botany*, N° 20.

The *lichens* being a numerous family of plants, are, by Dillenius, divided into different orders.

The firſt order comprehends the pileated *lichens*, or ſuch as have not the ſtarry flowering heads of the more common kinds; of theſe there are only five known ſpecies.

The ſecond order of the *liver-worts* comprehends thoſe which have radiated or ſtellated heads.

The third order of the *lichens* comprehends thoſe, the flowers and ſeeds of which are leſs accurately diſtinguiſhed than thoſe of the former kinds.

There is ſcarcely any genus of plants, of which botanical writers have given more various accounts than that which is the ſubject of this article. Mr. Ray has interſperſed the *lichens* among other moſſes, under the character of *muſci ſteriles ſeu aſpermi*. Dr. Moriſon ſeparated them from the herbaceous moſſes; and, from the analogy they had with the fungus tribe, formed them into a genus under the name of *muſco-fungus*, and enumerated above fifty ſpecies of them, dividing them into five orders, according to their different appearances. Tournefort was the firſt who adapted the generical term *lichen* to them, in conſequence of his joining them to the *lichen* of the ſhops. Dr. Dillenius called them *lichenoides*, appropriating the word *lichen* to the *liver-wort* of the ſhops. Micheli, after Tournefort, adopts the term *lichen*, and comprehends all the ſpecies under it, except one or two, which he calls *lichenoides*. This author deſcribes the *liver-wort* of the materia medica under the name of *marchantia*. In his Nova Plantarum Genera, they are divided into thirty-eight orders or ſubdiviſions. Dr. Haller retains Micheli's term, and enumerates one hundred and ſixty kinds, in his Enumeratio Stirpium Helvetiæ, dividing them into ſeven different orders. Linnæus, and the followers of his method, who ſeem to have eſtabliſhed their generical character from Micheli's diſcoveries, retain alſo his generical title. Micheli enumerates two hundred and ninety-eight ſpecies, but Linnæus recounts only ninety-five ſpecies belonging to this genus, which he diſtributes into nine orders, according to their different appearance, little or no regard being had to what are uſually called the parts of fructification: they are as follow, 1. *Leproſi tuberculati*. 2. *Leproſi ſcutellati*, 3. *Imbricati*. 4. *Foliacei*. 5. *Coriacei*. 6. *Umbellicati*, *ſqualentes quaſi fuligine*. 7. *Schyphiferi*. 8. *Fructiculoſi*. 9. *Filamentoſi*. Dillenius, in his Hiſtoria Muſcorum, has divided this Michelian genus into three, under the names of *uſnea*, *coralloides*, and *lichenoides*. Under the firſt he comprehends the hairy tree-moſſes; under *coralloides*, he deſcribes thirty-nine ſpecies, diſtributed into three orders; and the genus of *lichenoides* comprehends one hundred and thirty-five ſpecies, divided into two orders, and ſubdivided into diſtinct ſeries or claſſes. Dr. Hill has diſpoſed them into five genera, viz. *uſnea*, comprehending the hairy tree-moſſes; *platyſma*, including the flat-branched tree-moſſes, lung-wort, and others; *cladonia*, including the arched and coralline moſſes: *pyxidium*, the cup-moſſes; and *placodium*, the cruſtaceous moſſes. The plants of this extenſive genus are very different in their form, manner of growing, and general appearance; on which account, thoſe authors who preſerve them under the ſame name, were conſtrained to arrange them into different orders and ſubdiviſions, for the eaſier diſtinction of the ſpecies. So far as the parts of fructification are diſtinguiſhable in theſe plants, thy appear in different forms upon different ſpecies; on ſome, in the form of tubercles; on others, in the form of little concave diſhes, called *ſcutellæ*; on others, of oblong flat ſhields or pelts. All theſe are conceived by Micheli and Linnæus to be receptacles of male flowers. The female flowers and ſeeds are ſuſpected by the ſame authors to be diſperſed in the form of farina or duſt, upon the ſame plants, and in ſome inſtances in ſeparate ones. Dr. Watſon has diſtributed them into ſeveral orders: viz. 1. The *lichenes filamentoſi*, conſiſting of mere ſolid filaments, of a ſolid but flexible texture, having the appearance of fructification in the form of ſcutellæ, or flat round bodies growing from the ſides or extremities of theſe filaments; to this order he has reduced the uſnea of Dillenius and Hill, ſeveral of the ſpecies of the fifth order of *lichen* of Micheli, and the *lichenes filamentoſi* of Linnæus. 2. The *lichenes fructiculoſi*, conſiſting of a tough flexible matter, formed into ramifications, in ſome ſpecies almoſt ſimple, in others reſembling ſmall ſhrubs; in ſome of the ſpecies the branches are quite ſolid, in others tubular. This order comprehends the third of Dillenius's genus of *coralloides*; the whole *cladonia* of Hill; the ſecond and ſeveral ſpecies of the third order of Haller's *lichens*; ſeveral ſpecies of the fifth, and the whole ſixth order of Micheli; and the *lichenes fructiculoſi* of Linnæus: the orchel or argol belongs to this order. 3. The *lychenes pyxidati*, conſiſting of a firm, tough, flexible matter, formed into ſimple tubular ſtalks, whoſe tops are extended into the form of little cups. This diviſion contains the cup-moſſes of authors; the ſecond order of *coralloides* of Dillenius; great part of the firſt order of *lichens* in Haller; the ſeventh, eight, ninth, and tenth order of Micheli, and the *lichenes ſchyphiferi* of Linnæus: 4. The *lichenes cruſtacei*, conſiſting of a dry and friable matter, more or leſs thick, formed into flat cruſts, very cloſely adhering to whatever they grow upon. This diviſion contains the firſt order of the *lichenoides* of Dillenius; the fifth, ſixth, and ſeventh orders of Haller's *lichenes*, the *lichenes leproſi* and cruſtacei of Linnæus, and ſeveral of the placodium of Hill. 5. The *lichenes foliacei ſcutellati*, conſiſting of a more lax flexible matter, formed into a foliaceous appearance, having the parts of fructification in the form of *ſcutellæ*. This diviſion contains, in general, the whole firſt ſeries of the ſecond order of *lichenoides* in Dillenius; the firſt diviſion of the ſecond ſeries, and the latter part of the ſecond diviſion of the ſame; the *lichenes* imbricati and *umbilicati* of Linnæus, and many of the *placodium* of Hill. 6. The *lichenes erecti ramoſi plani*, conſiſting of a firm tough matter, diſpoſed into flat and thin ramifications growing erect, and bearing their *ſcutellæ* upon the edges, ſurfaces, and at the extremities. This diviſion comprehends the flat-branched tree-moſſes of authors; many of the fourth order of Haller's *lichens*; the firſt part of the ſecond diviſion of the two ſeries in Dillenius; and the *platiſma* of Hill; and, 7. The *lichenes peltati*, conſiſting of a tough or coriaceous matter, diſpoſed into a foliaceous appearance; on the edges of which, in general, the parts of fructification are placed, in the form of flattiſh oblong bodies, in theſe moſſes called ſhields or pelts. This diviſion contains the third ſeries of the ſecond order of Dillenius's *lichenoides*; the *lichenes coriacei* of Linnæus, and ſeveral of the *placodium* of Hill. The aſh-coloured ground *liver-wort* of Ray, ſo famous for the cure of the bite of a mad dog, belongs to this order. See an elaborate article on this ſubject in the Phil. Tranſ. vol. i. art. 91. p. 652.

There are two ſpecies of *liver-wort*, which have been, in a more diſtinguiſhed manner, uſed in medicine; viz. the common broad-leaved *liver-wort*, or *hepatica fontana*, and the aſh-coloured ground *liver-wort*. The firſt ſort grows on the ſides of wells, and in moſt ſhady places, not only on the ground, but on ſtones, bricks, or wood. The ſecond ſort grows on commons and open heaths, where the graſs is ſhort, in moſt parts of England, eſpecially in the declivities and the ſides of pits.

The Engliſh name *liver-wort* expreſſes the good opinion the world has of it in all diſorders of the liver. It is grown out of uſe with us at preſent, but the German phyſicians preſcribe it, and it is ſaid with ſucceſs, in jaundices, and alſo in hectics. There are authors alſo who recommend it greatly in inflammatory fevers, in cutaneous eruptions, and in a gonorrhœa, but we have not ſo good accounts of the benefit received by it in theſe as in the other. Externally, it is recommended for ſtaunching the blood in freſh wounds; given in powder, in a doſe of about two ſcruples, it is excellent to ſtop the bleeding at the noſe, profluviæ of the menſes, or any other hæmorrhage; it acts by incraſſating the blood. There are ſome families in the weſt of England who prepare a medicated drink, which they pretend to be a cure for cancers, in which this plant is the principal ingredient. The ancients recommended it as a remedy againſt laſſitude: they uſed it in baths and ointments. It has an Engliſh name, *cheeſe-renning*, from its property of coagulating, or curdling freſh milk, and by a dry diſtillation it yields a manifeſt acid. See LAVER-*bread*.

The grey ground *lichen* is famous for its virtues againſt the bite of a mad dog. It makes the baſis of the *pulvis* ANTILYSSUS of the diſpenſatories.

The *lichen* is a principal ingredient in Dr. Mead's recipe for the bite of a mad dog. See MADNESS.

LIVER-*wort*, *noble*, *hepatica*, a ſpecies of the ANEMONE.

LIVERY, properly ſignifies a colour, to which a perſon has ſome particular fancy, and by which he chooſes to diſtinguiſh himſelf, or his retainers, from others.

Liveries are uſually taken from fancy, or continued in families by ſucceſſion. The ancient cavaliers, at their tournaments, diſtinguiſhed themſelves by wearing the *liveries* of their miſtreſſes: thus people of quality make their domeſtics wear their *livery*.

Father Meneſtrier, in his Treatiſe of Carouſals, has given a very ample account of the mixtures of colours in *liveries*. Dion tells us, that Oenamaus was the firſt who invented green and blue colours for the troops which, in the Circus, were to repreſent land and ſea-fights.

The Romiſh church has alſo her ſeveral colours and *liveries*; white, for confeſſors and virgins, and in times of rejoicing; black, for the dead; red, for the apoſtles and martyrs; blue or violet, for penitents; and green, in times of hope.

Formerly, great men gave *liveries* to ſeveral, who were not of their family or ſervants, to engage them in their quarrels for that year; but this was prohibited by the ſtatutes 1 Rich. II. 1 Hen. IV. cap. 27. 2 & 7 Hen. IV. 8 Hen. VI. cap. 4. 8 Ed. IV. cap. 2. and no man, of whatever condition, was allowed to give any *livery*, but to his domeſtic officers, and counſel learned in the law. However, moſt of the above ſtatutes are repealed by 3 Car I. cap. 4.

LIVERY, in *Law*, alſo denotes the delivery of poſſeſſion to thoſe tenants which held of the king in capite, or by knights ſervice. See POSSESSION.

LIVERY is alſo uſed for the writ, which lies for an heir to to obtain the poſſeſſion or ſeiſin of his lands at the king's hands. By 12 Car. II. cap. 24. all wardſhips, *liveries*, &c. are taken away.

LIVERY *of ſeiſin*, is a delivery of poſſeſſion of land or tenements, or things corporeal, to him who hath right, or probability of right, to them.

Livery of ſeiſin, is a ceremony uſed in the common law, in conveyance of lands, tenements, &c. where an eſtate in fee-ſimple, fee-tail, or other freehold, ſhall paſs; and is a teſtimonial of the willing departing of him who makes the *livery*, from the thing whereof the *livery* is made, as well as of a willing acceptance by the other party, of all that whereof the firſt has diveſted himſelf.

Livery of ſeiſin is either in *deed* or in *law*.

The uſual manner of *livery of ſeiſin in deed* is thus performed. If it be in the open field, where is no houſe nor building, and if the eſtate paſs by deed, the feoffor, leſſor, or his attorney, openly reads it, or declares the effect of it; and after that is ſealed, the feoffor takes it in his hand, with a clod of earth, or a twig or bough, which he delivers to the feoffee, in the name of poſſeſſion, or ſeiſin, according to the purport of the deed. If there be a houſe or building on the land, the ceremony is to be done at the door of it, none being then left within; and the ring of the door is delivered to the feoffee, who enters alone, ſhuts the door, and preſently opens it again. If it be a houſe without land or ground, the *livery* is made, and poſſeſſion given, by delivery of the ring of the door and deed only; and where it is without deed, either of lands or tenements, there the party declares by word of mouth, before witneſſes, the eſtate he parts with; and then delivers ſeiſin, or poſſeſſion, as aforeſaid: in which caſe the land paſſes as well as by deed, by virtue of the *livery of ſeiſin*.

If the conveyance or feoffment be of divers lands, ſcattered in one and the ſame county, *livery of ſeiſin* of any parcel in the name of the reſt, ſuffereth for all; but if they be in ſeveral counties, there muſt be as many *liveries* as there are counties. If the lands be out on leaſe, though all lie in the ſame county, there muſt be as many *liveries* ar there are tenants. In all theſe caſes it is prudent to endorſe the *livery of ſeiſin* on the back of the deed, ſpecifying the manner, time, and place of making it, together with the names of the witneſſes.

LIVERY, in *Law*, is where the ſame is not made *on* the land, but only *in ſight* of it; the feoffor ſaying to the feoffee, "I give you yonder land, enter and take poſ-"ſeſſion." However, this *livery* in law cannot be given or received by attorney, but only by the parties themſelves.

Anciently, there were a pair of gloves, a ring, knife, an ear of wheat, &c. delivered in ſign of *livery* and *ſeiſin*.

LIVERYMEN *of London*, are a number of perſons choſen out of the freemen of each COMPANY. Out of this body the common-council, ſheriffs, aldermen, and other officers for the government of the city, are elected; and they only have the privilege of giving their votes in common-hall for members of parliament, &c. from which the reſt of the citizens are excluded. If any one of the company refuſe to become a *liveryman*, he may be fined, and an action of debt will lie for the ſum.

LIVERYMEN, in *Natural Hiſtory*, a name given by authors to a ſort of caterpillars, remarkable for their variety of colours. Theſe are of that claſs of caterpillars which live in communities, and build themſelves neſts to defend them from the injuries of the weather. They may be ranked among the proceſſionary kinds, always following one another with great order in their marches; but what is moſt ſurpriſing, is to ſee them ſtraggle very far from their neſts, and this often, by ſeveral repeated windings and turnings, without loſing their way. Their art, in doing this, deſerves notice, and is the ſame by which Theſeus got out of the labyrinth of Crete. Phil. Tranſ. No. 470. p. 459.

Theſe creatures ſpin all the way they go. The firſt ſpins a thread as he crawls along, the ſecond follows him in the ſame tract, and a third follows that, and ſo on, all ſpinning as they go; and their threads being all laid cloſe together, by means of their all purſuing the ſame tract, they at length furniſh a fine ſhining track all the way they have gone. Theſe make a ſort of path, and ſeveral of theſe paths are ſeen running ſeveral ways from the neſt, which is the common centre of them all. By means of theſe paths the creatures are able, at pleaſure, to run back directly to the neſt through all the ways they have gone from it.

If any one of theſe congeries of threads be broken in any part, all the caterpillars that are beyond that part, will be found at a terrible loſs, and running about in different directions, when they come to the place, without any knowledge of the true road to the neſt, till they are led by ſome one, who happens to find the way to the other broken end of the path, and by drawing his threads acroſs the breach, unites the path again; as ſoon as this is done, all the reſt go on the ſame road, and arrive at the neſt.

LIVIA, in *Ornithology*, a name given by ſome authors to a particular ſpecies of pigeon called *pelæas* by the Greeks. It is very like the common pigeon in ſhape, but is ſomewhat ſmaller, its legs are red, and its beak white, except that it is a little purpliſh about the noſtrils.

It is all over grey, but the ends of its tail-feathers are black, and there is a purpliſh and greeniſh variegation about the ſides and ſhoulders; and its wing-feathers have ſome white variegations, as has alſo the lower part of the neck. It is ſuppoſed by Mr. Ray, and ſome others, to be the ſame with the SASSOROLLA of the Italians, or *columba rupicola*.

LIVONICA *terra*, in the *Materia Medica*, a kind of fine bole uſed in the ſhops of Germany and Italy, of which there are two ſpecies, the yellow and the red. The diſtinguiſhing characters of which are theſe.

The yellow Livonian earth is a pure and perfectly fine bole, of a ſhattery friable texture, conſiderably heavy, and of a dull duſky yellow, which has uſually ſome faint bluſh of redneſs in it. It is of a ſmooth ſurface, and does not ſtain the hands; it adheres firmly to the tongue, and melts freely in the mouth, leaving no grittineſs between the teeth, and ferments not at all with acid menſtrua. In a moderate fire it acquires ſome additional hardneſs, and a darker colour. It is eſteemed a ſudorific and an aſtringent.

The red Livonian earth is an impure bole of a looſe texture, and of a dull red. It is of a ſmooth ſurface, breaks eaſily between the fingers, and ſlightly ſtains the hands. It melts freely in the mouth, has a very ſtrongly aſtringent taſte, but leaves a grittineſs between the teeth, and is alkaline. It acquires a conſiderable hardneſs in the fire, and becomes of a paler colour with a ſtrong caſt of yellowiſh-brown.

Theſe earths are both dug out of the ſame pit, in the place from whence they have their name, and in ſome other parts of the world. They are generally brought to us made up in little cakes, and ſealed with the impreſſion of a church, and an eſcutcheon with two croſs keys, and is recommended in diarrhœas, dyſenteries, &c.

LIVRE, a French money of account conſiſting of twenty ſols; each ſol containing twelve deniers.

The origin of the word is derived hence, that anciently the Roman *libra*, or pound, was the ſtandard by which the French money was regulated; twenty ſols being made equal to the *libra*. By degrees the *libra* became a term of account; ſo that any coin juſt worth twenty ſols was a *livre*, or *libra*; and ſince the time of Charlemagne, all contracts have been made on the foot of this imaginary coin; though the ſols have frequently changed their weight and alloy.

The *livre* is of two kinds, *Tournois* and *Pariſis*.

LIVRE *Tournois*, as above, contains twenty ſols Tournois, and each ſol twelve deniers Tournois.

LIVRE *Pariſis*, is twenty ſols Pariſis, each ſol Pariſis worth twelve deniers Pariſis, or fifteen deniers Tournois; ſo that a *livre Pariſis* is equivalent to twenty-five ſols Tournois; the word *Pariſis* being uſed in oppoſition to *Tournois*, on account of the rate of money, which was one fourth higher at Paris than at Tours.

One penny ſterling was equal to thirteen and a half deniers Tournois; ſo that the Engliſh pound ſterling was equal to thirteen *livres* ſix ſols eight deniers, of French money; while the exchange was on the foot of fifty-four pence ſterling, to a French crown of ſixty ſols Tournois; which was the late par between England and France; but at preſent, the French crown is but equal to 27*d.* ½ ſterling; on which ſooting the *livre* is but equivalent to 10*d.* ½ ſterling. See COINS, and EXCHANGE.

There have ſince been pieces of gold ſtruck of twenty ſols value; and under Henry III. in 1575, pieces of ſilver of like value: both the one and the other were called *francs*; and thus the imaginary coin became real.

It appears that the Romans had alſo a kind of money, which they called LIBRA, or *libella*; which was the tenth part of their denarius; ſo called, becauſe equivalent to an *as*, which at firſt weighed a *libra* or pound of copper. Scaliger adds, that they uſed libra as a term of account, not as a coin: *Libra erat collectio nummorum, non nummus.*

LIXIVIOUS, **LIXIVIAL**, or **LIXIVIATE**, in *Chemiſtry*, is underſtood of ſalts extracted from burnt vegetables by lotion.

Lixivious ſalts are the fixed ſalts of plants, &c. extracted by calcining the plants, or reducing them to aſhes, and afterwards making a lixivium of thoſe aſhes with water.

Mr. Boyle obſerves, that the difference between *lixivious* and urinous ſalts, conſiſts in this, that the former change the diſſolution of ſublimate in common water into a yellow colour, which the latter do not. See ALKALI, and SALT.

LIXIVIUM, *ley*, a liquor made by the infuſion of wood-aſhes; and which is more or leſs pungent and penetrating, as it is more or leſs impregnated with ſalts, and fiery particles abounding therein.

What is left after the evaporation of ſuch a liquor is called a *lixivious ſalt*; ſuch as all thoſe are, which are made by incineration.

Lixiviums are of notable uſe, not only in medicine, but alſo in bleaching, ſugar-works, &c. See BLEACHING, SUGAR, aud POT-ASHES.

LIXIVIUM *martis*, in *Medicine*, a new form of medicine introduced into practice in the London Diſpenſatory. The manner of preparing it is to ſet the matter remaining in the retort after the ſubliming the *flores martis*, in a damp place, where by means of the moiſture of the air it will run into a liquor. See FLORES *martiales*, and IRON.

LIXIVIUM *ſaponarium*, *ſoap-lees*, a liquor now much uſed in medicine in caſes of the ſtone; and when intended for this uſe, it is to be made ſomething leſs ſtrong than for the ſoap-boiler's uſe, and ſhould be prepared in the following manner. Take Ruſſia pot-aſh, and quick-lime, of each an equal quantity; though pure alkaline ſalt requires commonly about twice its weight of quick-lime to render it completely cauſtic, which is known by the ley making no efferveſcence with acids: throw water on them in ſmall quantities till the lime is ſlacked; then throw on more water, and ſtir the whole together, ſuffering it to ſtand for a day or two, that the ſalt of the aſhes may be diſſolved; after ſome time pour the liquor, filtered through paper, if needful, into another veſſel. A true ſtandard wine-pint of this liquor meaſured with the greateſt exactneſs, ought to weigh juſt ſixteen ounces Troy. If it be found on trial to be heavier than this, for every drachm it exceeds that weight, an ounce and a half of water is to be added to each pint: but if it be lighter than this, it muſt be either boiled to this ſtandard, or elſe poured upon freſh lime and aſhes.

The makers of ſoft ſoap with us prepare their *lees* ſo much ſtronger than this, that to be reduced to this ſtandard, it requires to be diluted with an equal quantity of fair water.

Quick-lime has the property of increaſing conſiderably the cauſticity of all fixed alkalis, by abſorbing their fixable air or gas. See *Quick*-LIME.

This cauſtic ley evaporated to dryneſs, furniſhes an alkaline ſalt exceedingly acrid, which being melted in a crucible becomes what is called common CAUSTIC; becauſe when it is applied to the ſkin, it makes an eſchar, pierces it, and leaves an ulcer, the ſuppuration of which, when continued, is called an ISSUE. Cauſtic alkali has not only much greater diſſolving power, but it is alſo much more deliqueſcent, and attracts much more powerfully the moiſture of the air, than ordinary alkali. This inconvenience is avoided by boiling down the ſoap ley only to one fourth part, and then, while the liquor continues boiling, ſprinkling in, by little and little, ſo much powdered quick-lime as will abſorb it ſo as to form a kind of paſte.

LIXIVIUM *tartari*, the name given in the London Diſpenſatory to the liquor called by moſt authors *oil of tartar per deliquium*. This is made of tartar, which is to be calcined to a whiteneſs, and then ſet in a damp place, where it will liquify by the moiſture of the air. The liquor thus procured is more pure than if the calcined tartar were diſſolved directly in water.

LIZARD, in *Aſtronomy*. See LACERTA.

LIZARD, in *Zoology*. See LACERTA.

LIZARD, *devil*. See MABOUJAS.

LIZARD, *fly-catching*. See GOBEMOUCH.

LIZARD'S *tail*, *ſaururus*, in *Botany*, a genus of the *heptandria tetragynia* claſs. Its characters are theſe: the flowers are diſpoſed in a katkin or tail; they have an oblong permanent empalement of one leaf; they have no petal, but have ſix long hair-like ſtamina, placed three on each ſide oppoſite, terminated by oblong erect ſummits; and an oval germen, with three lobes having no ſtyle, but crowned by three blunt permanent ſtigmas; the germen becomes an oval berry with one cell, incloſing one oval ſeed. We have but one ſpecies in the Engliſh gardens, which is a native of North America, but is a plant of no great beauty. See PEPPER.

LIZIERE, the ſame with BERME, *foreland*, or *relais*.

When this ſpace is covered with a parapet, it is called a FAUSSE-*braye*, or low wall.

LLAMA, in *Zoology*. See GLAMA.

LLECH, the Welch name of a kind of monumental ſtone found in that country. See PILLAR.

LOACH, in *Ichthyology*, the Engliſh name of a fiſh, called alſo the *groundling*, and by the Germans the *ſmorle* or *ſmorling*. It is a ſpecies of the COBITIS, and is diſtinguiſhed by Artedi, by the name of the *ſmooth-ſpotted cobitis* with a cylindric body.

LOAD, LODE, an Anglo-Saxon word, ſignifying *lead*, in *Mining*, is uſed, eſpecially in the tin-mines, for any regular vein or courſe, whether metallic or not; but moſt commonly *lode* means a metallic vein. See TIN.

It is to be obſerved, that mines in general are veins or cavities within the earth, whoſe ſides receding from or approaching to each other, make them of unequal breadths in different places, ſome times forming large ſpaces, which are called *holes*; theſe holes are filled like the reſt with ſubſtances, which, whether metallic, or of any other nature, are called *loads*. When the ſubſtances forming theſe *loads* are reducible to metal, the *loads* are by the Engliſh miners ſaid to be alive, otherwiſe they are termed dead *loads*.

In Cornwall and Devonſhire the *loads* all hold their courſe from eaſtward to weſtward, though in other parts of England they frequently run from north to ſouth. The miners report that the ſides of the *load* never bear in a perpendicular, but always overhang either to the north or ſouth above. The mines ſeem to have been ſo many channels, through which the waters paſs within the earth; and like rivers they have their ſmall branches opening into them, in all directions; theſe are by the miners termed the feeders of the *load*. Moſt mines have ſtreams of water running through them, and when they are found dry, it ſeems owing to the water having changed its courſe, which it ſeems ſometimes to have been compelled to by the *load*'s having filled up the courſe, and ſometimes to have fallen into other more eaſy channels. Phil. Tranſ. N° 401. p. 404. Price's Mineralogia Cornubienſis, 1778. p. 80, &c.

The *load* is frequently intercepted by the croſſing of a vein of earth, or ſtone, or ſome other metalline ſubſtance, in which caſe it generally happens, that one part of the *load* is moved to a conſiderable diſtance on one ſide. This tranſient *load* is, by the miners termed a *flooking*; and the part of the *load* which is moved, is by them ſaid to be heaved. This fracture or heave of a *load*, according to Mr. Price, ubi ſupra, p. 97. is produced by a ſubſidence of the ſtrata, from their primary poſitions, which he ſuppoſes to have been horizontal or parallel to the ſurface of the earth, and therefore ſhould more properly be called a depreſſion than a heave. This heaving of the *load* would be an inexpreſſible loſs to the miner, did not experience teach him, that as the *loads* always run on the ſides of the hills, ſo the part heaved is always moved toward the deſcent of the hill; ſo that the miner working toward the aſcent of the hill, and meeting a flooking, conſiders himſelf as working in the heaved part; wherefore, cutting through the flooking, he works upon its back up the aſcent of the hill, till he recovers the load, and *vice verſa*.

Sometimes, though not univerſally, the mine is lined with an intermediate ſubſtance between the *load* and itſelf. This is properly ſpeaking the wall of the *load*; though, in the common acceptation of that term, it ſignifies either ſuch intermediate ſubſtance, or the ſide of the mine where the *load* immediately unites itſelf to it. The ſprings in theſe parts are always hard, as they abound in ſtony or other mineral particles. From theſe particles, which are ſuſtained in large quantities in all theſe places. we frequently find the paſſages quite choaked up; the ſtony matter ſeparated from the water of the ſpring, gradually concreting to the walls of the mine, till it has in time blocked up the whole cavity, with a maſs of ſpar, of a coarſe texture and irregular figure: at other times this ſtony matter concretes more diſtinctly; in which caſe it ſeems to be governed in its formation by a plaſtic power, or peculiar modus of attraction, by which the particles before ſuſpended in the water are brought together under a peculiar form. This power in general ſo exerts itſelf over the harder particles of matter contained in the water, as to range them into the form of an hexangular pyramid, terminating an hexangular column of four, five, or more times its length. Thus is the common rock cryſtal formed; and when this power is unmoleſted the columns in this body are carried to a great ſize.

Theſe cryſtals are of different tranſparences and colours, as the pure matter of which they are compoſed, is more or leſs diſengaged from the mixture of foreign particles; or as thoſe, or other ſubſtances, are found capable of imparting theſe tinctures or other qualities to them: but when the plaſtic particles are more numerous, there ſeems reaſon to believe that theſe very plaſtic particles, before they are fixed, are ſubject to the control and direction of any fixed plaſtic particle, within the verge of whoſe activity they happen to move. Notwithſtanding which, after they are once fixed, they exert their own plaſtic powers, and, in conjunction with the firſt plaſtic principle, govern the future concretion in ſuch manner, as to form a ſeemingly irregular cryſtal, though compoſed of two or more regular cryſtals.

Theſe cryſtalline concretions exert a ſtrong attraction on many metallic ſubſtances, ſo as frequently to contain lead, copper, and other metals, in very conſiderable quantities, embodied in them.

The waters of mines are, beſide cryſtal, impregnated alſo with a great quantity of ſulphureo-ſaline particles, and theſe are in ſome of a vitriolic, and in others of an arſenical nature. The firſt of theſe, when pure, concrete into white cubes, reſembling grains of ſilver; while the other, or arſenical ſulphur, concretes into yellow cubes, reſembling grains of pure gold. Both theſe concretions, whether ſingle or in large confuſed cluſters, are called by the miners *mundic*. The ſulphureo-ſaline principle of concretion ſeems of the ſame nature with the plaſtic power in the formation of cryſtals; and theſe bodies, like the others, are in the ſame manner found ſometimes ſimple, ſometimes compound. On the ſides of theſe the concretion may always be obſerved forming itſelf into threads, which in three ſides run in different directions, but are always ſimilar in the oppoſite ſides. Phil. Tranſ. Nº 401. p. 403. See Mineralogy.

Load is alſo uſed for nine diſhes of ore, each diſh being about half a hundred weight.

Load, *maſter*, among *Miners*. See Master-*load*.

Load, *training a*. See Training.

LOADING. See Cargo and Lading.

LOADMANAGE, in *Maritime Affairs*: the hire is ſometimes ſo called, which the pilot of a ſhip receives of a maſter, for conducting a ſhip up the river, or into port.

LOADSTONE. See Magnet.

Loadstone, *floating*, an inſtrument invented and ſo called by Mr. Boyle, which he uſed to diſcover whether guineas or other coins were counterfeit, by putting the inſtrument with the piece of coin to be tried and faſtened to the bottom of it, into a tall glaſs or other veſſel of water: marks being ſo made on the ſlender metalline pipe, which forms the upper part of the inſtrument, that the hollow ball which made the lower part of it, would ſink much lower, at leaſt two inches, if the coin be true gold than if it be not: and according as the water reaches to one or other of the aforeſaid marks, an eſtimate may be made, whether the piece of coin, if counterfeit, be made of tin, braſs, copper, ſilver, or lead. The inſtrument might be applied to any coins, either of gold or ſilver, provided that they were of any conſiderable bulk. Birch's Hiſt. of the Royal Society, vol. iii. p. 115.

LOAM, in *Natural Hiſtory*, the name of a claſs of foſſile bodies, the characters of which are theſe: they are compound earths compoſed of diſſimilar particles, hard, ſtiff, denſe, harſh, and rough to the touch, not eaſily ductile while moiſt readily diffuſible in water, and uſually compoſed of ſand and a tough viſcid clay.

Of this claſs there are two genera. 1. The thraustomicthes; and, 2. The glischromicthes. The firſt are compoſed of ſand and a leſs viſcid clay, and are of a friable or crumbly nature; the ſecond are compoſed of ſand and a more viſcid clay, and are of a more tough and viſcid texture. Hill's Hiſt. of Foſſils.

Da Coſta diſtinguiſhes them by their colour into black and white, which are not acted upon by acids; yellow *loams*, ſome of which are not acted upon by acids; and other alkaline, brown *loams*, ſome acted upon by acids, to which claſs belongs the Windſor *loam*, ſo well known and ſo much uſed for making bricks, building furnaces, lutes, &c. and others alkaline; and the green *loams* not acted upon by acids. Hiſt. of Foſſils, p. 112, &c.

Loam is alſo uſed for a ſort of mortar made of this earth, by tempering it with water, ſtraw, &c.

LOASA, in *Botany*, a genus of the *polyandria monogynia* claſs: the characters are, that the calyx is a five-leaved permanent perianthium; the corolla has five large and very wide petals: the ſtamina are capillary filaments, longer than the nectarium, which is compoſed of five ſmall leaves, the fruit is an oval germen, which becomes a ſingle-celled, three-valved capſule, containing ſeveral ſmall ſeeds; there is only one ſpecies.

LOBBY, in *Architecture*, is a ſmall hall or waiting-room: it is alſo an entrance into a principal apartment, where there is a conſiderable ſpace between that and a portico or veſtibule, and the length or dimenſions will not allow it to be conſidered as a veſtibule or an anti-room. See Antichamber.

LOBE, Λοβος, among *Anatomiſts*, is applied to each of the two parts whereof the lungs conſiſt.

This ſeparation into *lobes* is of uſe in dilating the lungs, by cauſing them to receive more air, and preventing their being too much ſqueezed, when the back is bent. For this reaſon it is, that beaſts, which are always inclining towards the earth, have more *lobes* in their lungs than men: even their *liver* is divided into *lobes*, whereas that of man is continued. See *Tab. Anat. (Splanch.) fig.* 14. *lit. d d*, &c. See Liver.

Lobe is alſo uſed for the tip of the ear; which is more fat and fleſhy than any other part thereof.

Du Laurent ſays, that the word *lobe*, in this laſt ſenſe, comes from the Greek, λωβειν, *to ſhame*, or *be aſhamed*; this part of the ear being ſaid to bluſh when the perſon is aſhamed.

Lobe is alſo uſed in ſpeaking of fruits and grains.

Thus the bean conſiſts of two equal parts, called *lobes*, which compoſe the body thereof, and are encompaſſed with the outer ſkin.—And all other grains, even the ſmalleſt are divided, like the bean, into the two *lobes*, or equal parts; as Dr. Grew has ſhewn in his Anatomy of Plants.

LOBELIA, in *Botany*, a genus of the *ſyngeneſia monogamia* claſs. Its characters are theſe: the empalement of the flower is indented into five parts; the flower has one petal, irregular, and the fruit is a capſule under the petal, with two cells, and two ſeeds: the ſpecies are twenty-eight according to Linnæus, who has joined this genus to the *Rapuntium*, or Cardinal's-flower of Tournefort, but Mr. Miller maintains that they ſhould be diſtinguiſhed.

LOBLOLLY, a ſea-faring diſh, otherwiſe called burgoo.

Loblolly-*bay*, in *Botany*. See Gordonia.

LOBS, in *Mining*, are ſteps that aſcend or deſcend within the mines, as ſtairs up to and down from a chamber.

LOBSTER, in *Zoology*, a ſpecies of the squilla, according to ſome writers; but in the Linnæan ſyſtem a ſpecies of the cancer or crab. The common *lobſter* is diſtinguiſhed by a ſmooth thorax; ſhort ſerrated ſnout; very long antennæ, and between them two ſhorter, bifid, claws and fangs large, the greater tuberculated, the leſſer ſerrated in the inner edge; four pair of legs; ſix joints in the tail; and caudal fins rounded.

Lobſters inhabit all the rocky ſhores of our iſland, but chiefly in the deepeſt and cleareſt water at the foot of rocks that impend over the ſea. In ſummer they are found near the ſhore, and thence to about ſix fathoms deep in water: in winter they are ſeldom taken in leſs than twelves or fifteen fathoms. They are brought in vaſt quantities from the Orkney iſles, and many parts of the eaſtern coaſt of Scotland to the London markets. Sixty or ſeventy thouſand are annually brought in well-boats, from the neighbourhood of Montroſe alone. Some of them are taken by the hand; but moſt in pots, which are a ſort of trap formed of twigs, and baited with garbage, reſembling a wire mouſe-trap, ſo that when the *lobſter* gets in, there is no return. Theſe are faſtened to a cord, ſunk into the ſea, and their place marked by a buoy. In the neighbourhood of Scarborough, the fiſhermen uſe a bag-net fixed to an iron hoop, about two feet in diameter, and ſuſpended by three lines like a ſcale, and baited with fiſh guts tied to the bottom and middle of the net. They are caught in the night, and ſeldom in the day unleſs the water be thick and opake. *Lobſters* begin to breed in the ſpring, and continue breeding moſt part of the ſummer. They propagate *more humano*, and are extremely prolific. Dr. Baſter counted twelve thouſand four hundred and forty-four eggs under the tail, beſides thoſe that remained in the body, unprotruded. See *Fecundity of* Fish. Theſe eggs are depoſited in the ſand where they are ſoon hatched. When they firſt appear under the tail of the female or hen *lobſter*, they are very ſmall and black; but become as large as ripe elder berries before they are depoſited, and change into a dark-brown colour. When ſhe depoſits her eggs, ſhe is ſaid to be in berry, and this is the caſe at all times of the year, but chiefly in winter; though they ſeem to come to life only during the warm ſummer months of July and Auguſt. *Lobſters* change their cruſt annually; but the female does not caſt her ſhell in the ſame year in which ſhe depoſits her eggs. Previous to this change, they appear ſick, languid, and reſtleſs: they acquire a new coat in a few days; and whilſt the ſhell is ſoft, they ſeek ſome lonely place for ſecurity, and they only grow in ſize when their ſhells are membranous and ſoft. *Lobſters* and crabs will alſo renew their claws in a few weeks, if they are torn off by accident. They are ſaid to fear thunder and any great noiſe, and are apt to caſt their claws on ſuch occaſion. When frightened, they will ſpring tail foremoſt, from a conſiderable diſtance to their hold in the rock; the fiſhermen can ſee them paſs about thirty feet, and by the ſwiftneſs of their motion, ſuppoſe they may go much farther. They are more active in warm weather than cold.

The large *lobſters* are generally in their beſt ſeaſon from the middle of October, till the beginning of May. Many of the ſmall ones, and ſome few of the larger ſort, are good all the ſummer. They are choſe for the table, by their being heavy in proportion to their ſize, and by the hardneſs of their ſhells on their ſides, which, in perfection, will not yield to moderate preſſure. Barnacles and other ſmall ſhell-fiſh, adhering to them, ſhew likewiſe their ſuperior goodneſs. Cock-*lobſters* are in general better than the hens in winter; they are diſtinguiſhed by the narrowneſs of their tails, and by their having a ſtrong ſpine upon the centre of each of the tranſparent proceſſes beneath the tail, which ſupport the four middle plates of their tails. The fleſh of a *lobſter's* claw is more tender, delicate, and eaſy of digeſtion than that of the tail. Pennant's Brit. Zool. vol. iv. p. 9, &c.

The ſhell calcined and drank in wine, is ſaid to break and carry off concretions in the kidneys; and it is likely enough to have ſome effect in ſuch caſes, becauſe the ſhells of fiſh calcined, are a ſort of lime; and the ſalts of lime are the grand diſſolvents of ſtony concretions. It is now well known, that whatever good effects Mrs. Stephens's medicine for the ſtone may have, are owing to the ſalts of lime. See LIME-*water*, and LITHONTRIPTICS.

Lobſters, as a food, are highly alcaleſcent, and of conſequence muſt be very proper when an acid acrimony prevails in the ſtomach and general habit: but the contrary in caſe of a tendency to an alkaline putrefaction. They are eſteemed very nouriſhing and good in a conſumption. James.

LOBULE, LOBELLUS, in *Anatomy*, a little *lobe*.

Each lobe of the lungs is divided into ſeveral leſſer lobes, or *lobules*, which are faſtened on each ſide, to the largeſt branches of the trachea.—Each *lobule* conſiſts of a great number of little round veſicles, which have all a communication with one another. It is into theſe veſicles that the air enters, by the trachea, in inſpiration; ſtill quitting them again in reſpiration. See *Tab. Anat. (Splanch.) fig.* 14. *lit. f f*, &c.

LOBUS *echinatus*, in the *Materia Medica*, a name by which ſome authors have called the *bonduch*, or bezoar-nut.

LOCAL, ſomething ſuppoſed to be tied or annexed to ſome particular place.

Thus, in *Law*, a thing is ſaid to be *local*, i. e. annexed or fixed to the freehold. An action of treſpaſs for battery, &c. is tranſitory, not *local*; that is, it is not neceſſary, that the place where battery was committed ſhould be ſet down as material in the declaration; or if it be ſet down, the defendant cannot traverſe it, by ſaying, he did not commit the battery in the place mentioned in the declaration, and ſo avoid the action.

LOCAL, *choſe*. See CHOSE.

LOCAL *cuſtoms*, are thoſe peculiar to ſome lordſhip, or other diſtrict, and not agreeable to the general cuſtoms of the country. See CUSTOM.

LOCAL, *treſpaſs*. See TRESPASS.

LOCAL *problem*, in mathematics, is ſuch an one, as is capable of an infinite number of different ſolutions; becauſe the point, that is to ſolve it, may be indifferently taken within a certain extent; e. gr. any where in ſuch a line, within ſuch a plane, figure, &c. which is called a *geometrical locus*.

A *local problem* may be either *ſimple*, as when the point ſought is in a right line; *plane*, as when the point ſought is in the circumference of a circle; *ſolid*, as when the point required is in the circumference of a conic ſection; or *ſurſolid*, as when the point is in the perimeter of a line of a *higher kind*, as the geometers call it.

LOCAL, or *artificial memory*. See MEMORY.

LOCAL *colours*, in *Painting*. are ſuch as are natural and proper for each particular object in a picture.

They are ſo called to diſtinguiſh them from the clair obſcure, which conſiſts wholly of black and white.

LOCAL *motion*. See MOTION.

LOCATION, in the *Civil Law*, an act by which any thing is let out, on rent.

The ſecond title of the nineteenth book of the *Digeſt* is on the ſubject of *location* and conduction. *Location* and *conduction* are relative terms, and are uſed as well for the action of him that lets, as for that of him who takes on that letting.

LOCATION, *tacit*, is, when the perſon who takes, continues on the premiſes beyond the term of his leaſe; which by the civil law he is allowed to do, at leaſt for the ſpace of a year, on the ſame terms.

LOCH, in the *Materia Medica*, a name given by Avicenna, and others to the gum lac. They call it alſo *keikem* and *kenkem*, and are too apt to confound it with the CANCAMUM, ſandarich, and other gums, with which they made their ſeveral ſorts of varniſh.

LOCH, or LOHOCH, in *Pharmacy*, a compoſition of a middle conſiſtence between a ſyrup and a ſoft electary; chiefly uſed for the diſeaſes of the lungs.

The word is originally Arabic; but continues ſtill in uſe among the apothecaries.

The Latins call it *linctus*, and the Greeks, ἐκλειγμα, becauſe the manner of taking it is by licking.

LOCHE, or *Sea*-LOCHE, a name uſed in ſome parts of England for the MUSTELA, called in other places, particularly in Cornwall, the WHISTLE *fiſh*.

LOCHIA, or LOCHES, Λοχια, the evacuations conſequent on the delivery of a woman in child-bed.

As ſoon as the uterus is eaſed of its load, its fibres, as alſo thoſe of the peritonæum, the muſcles of the abdomen, &c. which have been extremely diſtended during the laſt period of geſtation, begin to contract themſelves, and their veſſels; particularly the uterus, which by this means expels the blood amaſſed in it.

The flux of the *lochia*, or of blood and humours from the uterus about the time of parturition, is of two kinds; the one called *legitimate*, which happens after the excluſion of the fœtus, as its proper time; the other *abortive*, which attends miſcarriages, and does not indeed follow them, but either precedes, or happens immediately in the act of abortion, and that uſually in a very violent and terrible manner. The legitimate is alſo often too copious.

Signs of it. The legitimate *lochial* flux is an excretion of blood from the genitals for eight, ten, twelve, or fourteen days after child-birth, and ſometimes for a longer time than that. During the firſt days, pure blood, grumous, and coagulated, is diſcharged, or at leaſt a fluid coloured with blood; after the fourth or fifth day, this diſcharge is attended with a diſagreeable, and ſometimes with a plainly fœtid ſmell; in the ſucceeding days the humour becomes leſs bloody, and more and more yellowiſh, and after this it gradually becomes pale and watery, till it loſes all colour and ſmell: all this while alſo the flux becomes more and more moderate in quantity, till at length it wholly ceaſes of itſelf. This is the natural ſtate of this flux; but if the ſecundines are too long retained, or if a part of them be torn off and left in the uterus, then the flux frequently exceeds its due bounds, and many pains and ſpaſtic motions are felt about the uterus, and throughout the abdomen.

In the *lochial* fluxes attending abortions, the blood uſually flows out gently and moderately before the act, then it comes on, during the excluſion of the fœtus, with great violence. Sometimes alſo, when violent paſſions of the mind have preceded, it comes on with all this violence at the firſt attack, before the fœtus is excluded; this is followed by the fœtus, or falſe conception, whichever is in the uterus, and this is attended uſually with faintings, and with violent pains in the belly. Perſons ſubject to frequent abortions, have leſs trouble and pain with them than others, and the *lochial* flux is with them in leſs quantity.

The too great flux of the *lochia* is a thing of dangerous conſequence, and the perſons principally ſubject to it are thoſe of plethoric habits, and ſuch as are ſubject to violent paſſions; ſuch as are uſed to much wine; or other ſtrong liquors, and to high-ſeaſoned foods, as alſo ſuch as have omitted bleeding at the proper times during their being with child, and ſuch as have been accuſtomed to too copious fluxes of the menſes. In caſes of abortions, thoſe are moſt of all ſubject to immoderate fluxes of them who have not been duly treated, or properly purged and cleanſed after a former lying-in. The principal occaſions of large fluxes of the *lochia* after child-birth, are either a plethoric habit, or the uſe of violent medicines to promote delivery, or the retention of part of the ſecundines in the uterus.

Prognoſtics from it. The flux of the *lochia*, when moderate and regular, is of the utmoſt benefit to the perſon, and the ſuppreſſion of it is ever attended with danger. This is of all other fluxes of blood, the moſt ſubject to exceed the uſual quantity: and in abortions, after the third month of pregnancy, is uſually greater than in parturitions at the full time. When this flux is immoderately great, the patient's ſtrength is conſumed by it in a very little time; and when it is not thus violent for a continuance, but returns, after ſhort intervals, with violent effects, it is a ſign that the womb is not properly cleanſed, and the perſon is afterwards frequently either barren, or ſubject to repeated abortions. In caſes of a threatened abortion, when there has once been a copious diſcharge of blood, there ſhould be no attempt made to retain the fœtus in its place.

Method of treating. When the flux of the *lochia* is moderate, it requires no aſſiſtance from the phyſician, but nature is to be left to her own courſe; if they flow too immoderately the patient ſhould be laid with her head low, kept cool, and the ſame means are to be uſed as in caſes of violent fluxes of the MENSES. If the flooding proves violent, linen cloths, which have been wrung out of a mixture of equal parts of vinegar and water, or red wine, ſhould be applied to the belly, the loins, and the thighs: theſe muſt be changed as they grow dry; and may be diſcontinued as ſoon as the flooding abates. The medicines which have power to quiet the violent emotions of the blood are to be often repeated, ſuch are nitre, the alkaline abſorbents, as crabs eyes, and the like, and a little cinnabar: if theſe are inſufficient, recourſe is to be had to the milder aſtringents, ſuch as the *crocus martis antimonialis*, and tincture of ſalt of ſteel, and the decoction, or extract of the common yarrow. In a violent flooding after delivery, Dr. Buchan ſays, that he has ſeen very good effects from the following mixture: take of pennyroyal water, ſimple cinnamon-water, and ſyrup of poppies.

pies, each two ounces, acid elixir of vitriol, a dram; mix them, and take two table-ſpoonfuls every two hours, or oftener if neceſſary. The abortive flux of the *lochia* is to be treated in the ſame manner with the too violent one attending parturition at the full time. The abortion is always to be haſtened, and the fœtus, mole, or whatever, to be taken out as ſoon as poſſible, when the flux becomes violent, leſt the patient faint and periſh under it. The way to prevent an immoderate flux of the *lochia* in parturition, is to bleed often during the time of pregnancy, and, if neceſſary, this may be done even juſt before delivery. The proper ligatures on the belly, after the excluſion of the fœtus, are alſo of great ſervice in this view, and the keeping perfectly quiet, and avoiding much talking, are greatly conducive to it. The return of abortions is principally guarded againſt by a ſufficient cleanſing of the womb at the time, and by bleeding in the arm about the time of pregnancy at which the abortion happened before.

Child-bearing women are to be conſidered, after parturition, as wounded perſons, in whom fevers are very eaſily brought on, and every thing that makes any commotion in the blood is to be carefully avoided by them. Aſtringent medicines are to be avoided as much as poſſible in theſe caſes; and where they are found abſolutely neceſſary, the milder only are to be given, and attemperating medicines muſt always be given between; and if this is neglected, inflammatory fevers, hectics, and often dropſies, are the conſequence.

Lochia, *ſuppreſſions of the.* Theſe are either plenary or partial. In the plenary ſuppreſſion there is no blood diſcharged at all, or if there was a beginning of a proper diſcharge, it ſtops during the firſt day. In the partial ſuppreſſion, or, as it is called by ſome writers, *the imminution of the lochia*, they keep their period of eight, ten, or twelve days, but are ſo ſmall in quantity, as to be ſcarce allowable under the name of a flux of this kind. In the judging of this immunition, it is neceſſary to conſider the natural ſtate and conſtitution of the patient; and if in the time of her not being pregnant, ſhe has been uſed but to ſmall diſcharges by the menſtrual flux, there is not to be expected a large flux of the *lochia*; if the perſon has had children before, inquiry is alſo to be made into the quantity diſcharged at thoſe times, and from that is to be determined what is to be expected. The perſons ſubject to *ſuppreſſions of the lochia* are principally thoſe of a plethoric habit, and whoſe veins are ſmall; thoſe who are of a timid diſpoſition, and eaſily ſubject to fear, ſorrow, and the like paſſions. Theſe are principally the natural cauſes of a *ſuppreſſion of the lochia*, but to theſe are to be joined many accidental and adventitious ones; ſuch as the ſudden cooling of the body, the giving very forcing medicines to forward the delivery, and the improper uſe of hot medicines. Theſe are often given to promote the *lochia*, when they are judged not to flow in ſufficient quantity, and they often produce a plenary ſuppreſſion of them, inſtead of a cure. Myrrh, ſaffron, and the volatile ſalts when given injudiciouſly, are of this tribe. Sometimes alſo ſuppreſſions of them are brought on by violent paſſions, and by the repeated and forcible efforts the perſon has been obliged to make during a hard labour.

Prognoſtics from it. There is no kind of hæmorrhage, the ſuppreſſion of which is attended with ſuch great or ſuch imminent danger as this of the *lochia*. The natural ſuppreſſions are uſually either from too great a quantity of blood, with a ſpiſſitude of it, or from a turgeſcence and violent emotion of it. In the firſt caſe, the ſymptoms which ſucceed are leſs violent, in the latter they are more terrible. Of the firſt kind are inquietude, toſſing and turning about, anxiety, and ſtraitneſs of the præcordia, pains of the head, and want of appetite. In the latter caſe, fevers of the inflammatory kind often immediately enſue, and ſometimes miliary and purple fevers, with great malignity; ſome alſo immediately fall into deliriums of the moſt violent kinds, and into quinſeys. Such are the ſudden effects of theſe ſuppreſſions; but beſide theſe, there are often leſs coagulations, or grumes of blood in the uterus; theſe prevent future conception, or prevent the fœtus, when conceived, from receiving due nouriſhment, and bring on, by that means, abortion; and when this is not the caſe, they ſubject the patient to various hyſteric and convulſive diſorders, and frequent faintings.

Method of cure. When the ſuppreſſion is but partial, and the *lochia* do flow, though in too ſmall a quantity; in this caſe the more gently ſtimulating medicines are to be given, and even theſe in very ſmall doſes. The tincture of myrrh and ſaffron, and eſſence of amber, may in this caſe be mixt and given, twenty, or twenty-five drops at a doſe twice a day; theſe often have a very ſpeedy and happy effect. When the ſuppreſſion is plenary, and eſpecially when it has already held the patient ſome days, it is in vain to expect to bring on a regular diſcharge of them at once by ſtimulating medicines; the cauſes of the ſuppreſſion are then to be enquired into, and the febrile emotions of the blood allayed by febrifuges, and by nitrous medicines; and when the blood is reſtored to its proper ſtate, they will again begin to flow regularly. The common method of bleeding to bring them on again, is ſeldom attended with much ſucceſs; when indeed the patient has omitted bleeding at proper times during pregnancy, this ſometimes proves ſerviceable; but rarely when the blood is faulty in quality, rather than in quantity. The generality of the world are afraid of nitre in theſe caſes, leſt it ſhould bring on diarrhœas, but it is only an immoderate uſe of it that is liable to this objection; for given in doſes of four, five, or ſix grains, it will rather prevent than occaſion a diarrhœa in theſe caſes. Junker's Conſp. Med. p. 60, 80, &c. Buchan's Dom. Med. p. 584, &c. See Delivery, and Inflammation *of the womb.*

LOCHIAL *fevers*, a term uſed by medical writers to expreſs ſuch fevers as ariſe from ſuppreſſions or imminutions of the *lochial* diſcharges in lying-in women, or from any other irregularities during the time of that diſcharge. Junker's Conſp. Med. p 252.

LOCIS *communibus.* See Communibus.

LOCK, a little inſtrument uſed for the ſhutting and faſtening of doors, cheſts, &c. only to be opened by a key. The *lock* is reckoned the maſter-piece in ſmithery; a great deal of art and delicacy being required in contriving and varying the wards, ſprings, bolts, &c. and adjuſting them to the places where they are to be uſed, and to the various occaſions of uſing them.

From the various ſtructure of *locks*, accommodated to their different intentions, they acquire various names. Thoſe placed on outer doors are called *ſtock-locks*; thoſe on chamber-doors, *ſpring-locks*; thoſe on trunks, *trunk-locks, padlocks*, &c.

Of theſe, the *ſpring-lock* is the moſt conſiderable, both for its frequency, and the curioſity of its ſtructure. Its principal parts are, the main-plate, the cover-plate, and the pin-hole: to the main-plate belong the key-hole, top-hook, croſs-wards, bolt-toe or bolt-nab, drawback-ſpring, tumbler, pin of the tumbler, and the ſtaples; to the cover-plate belong the pin, main-ward, croſs-ward, ſtep-ward, or dap-ward; to the pin-hole belong the hook-ward, main croſs-ward, ſhank, the pot or bread, bow-ward, and bit.

Lock, or **Weir**, in *Inland Navigation*, the general name for all thoſe works of wood and ſtone, made to confine and raiſe the water of a river: the banks alſo which are made to divert the courſe of a river, are called by theſe names in ſome places. But the term *lock* is more particularly appropriated to expreſs a kind of canal incloſed between two gates; the upper called by workmen the ſluice-gate, and the lower called the flood-gate. Theſe ſerve in artificial navigations to confine the water, and render the paſſage of boats eaſy both in paſſing up or down the ſtream.

To **Lock**, in *Fencing*, is to ſeize your adverſary's ſword-arm, by twining your left arm round it, after you cloſe your parade, ſhell to ſhell, in order to diſarm him.

LOCKER, in a *ſhip*, a kind of box or cheſt made along the ſide of a ſhip, to put or ſtow any thing in.

Locker, *Gowlans.* See Hellbore, and Trollius.

Locker, *ſhot*, in *Sea-Language.* See Garland.

LOCKMAN, in the Iſle of Man, the officer who executes the orders of the government, much like our under-ſheriff.

LOCKS, in the *Manege*, in French called *entravons*, are pieces of leather two fingers broad, turned round, and ſtuffed on the inſide, to prevent their hurting the paſtern of a horſe, round which they are clapped. An *entrave* is compoſed of two *entravons* joined by an iron chain, ſeven or eight inches long.

LOCKSPIT, among *Miners*, is the ſmall cut or trench, made with a ſpace of about a foot wide, to mark out the firſt lines of a work.

LOCRIAN, in *Ancient Muſic*, the ſeventh ſpecies of the Diapason. It was alſo called *hypodorian*, and *common*.

LOCULAMENTUM, in *Botany*, denotes a ceil or partition, in a ſeed-pod, for the Seed of a plant.

In ſome plants we only find one *loculamentum* in a pod; in ſome others two, three, or more.

LOCUS, *place*, in the general ſenſe. See Place.

Locus, among *Ancient Muſicians*, was uſed to ſignify the interval between one degree of acuteneſs or gravity of ſound and another. The Greeks uſed the word τοπος in the ſame ſenſe, for the ſpace through which the voice moved. See Motion.

This motion the Greeks diſtinguiſhed into two kinds; one continued, συνεχη, the other disjunct, διαστηματικη.

Inſtances of the firſt kind are in ſpeaking; of the ſecond, in ſinging; and this they called melodic motion, or what was adapted to ſinging. Ptolemy in like manner divides ſounds of unequal pitch, ψοφȣς ἀνισοτονȣς, into continued and diſcrete, and ſays the firſt kind are improper, and the ſecond proper, for harmony.

Ariſtides Quintilianus interpoſes a third kind of motion between the two here mentioned, ſuch as that of a perſon reciting a poem.

Locus, the *locuſt-tree*, in *Botany*, is uſed by ſome for the tree whoſe juices afford us the gum anime of the ſhops. See Locust-*tree*.

Locus, in *Rhetoric*, a topic, or head, whence arguments are brought to prove the queſtion in hand. Some of theſe are called *loci communes*, or common topics, as being common to all ſorts of arguments: thus, whether a thing be poſſible or impoſſible, more or leſs than ſomething elſe, &c.

Beſides theſe, three others are mentioned by rhetoricians, *juſtum*, *utile*, and *honeſtum*; to which ſome add *jucundum*; but Voſſius will have this laſt to be comprehended under *utile*. See Topic.

Locus *geometricus* denotes a line, by which a local or indeterminate problem is ſolved. See Local *problem*.

A *locus* is a line, any point of which may equally ſolve an indeterminate problem.

This, if a right line ſuffice for the conſtruction of the equation, is called *locus ad rectum*; if a circle, *locus ad circulum*; if a parabola, *locus ad parabolam*; if an ellipſis, *locus ad ellipſim*; and ſo of the reſt of the conic ſections.

The *loci* of ſuch equations as are right lines, or circles, the ancients called *plain loci*; and of thoſe that are parabolas, hyperbolas, &c. *ſolid loci*.

Wolfius, and other moderns, divide the *loci* more commodiouſly into orders, according to the number of dimenſions to which the indeterminate quantities riſe. Thus it will be a *locus of the firſt order*, if the equation be $x = ay$; a *locus of the ſecond* or quadrate order, if $y^2 = ax$, or $y^2 = a^2 - x^2$, &c. a *locus of the third* or cubic order, if $y^3 = a^2 x$, or $y^3 = ax^2 - x^3$, &c.

The better to conceive the nature of the *locus*, ſuppoſe two unknown and variable right lines A P, P M, (*Tab. Analyſis*, *fig.* 29, 30.) making any given angle A P M with each other; the one whereof, as A P, we call x, having a fixed origin in the point A, and extending itſelf indefinitely along a right line given in poſition; the other P M, which we call y, continually changing its poſition, but always parallel to itſelf; and moreover an equation only containing theſe two unknown quantities x and y, mixed with known ones, which expreſſes the relation of every variable quantity A P (x) to its correſpondent variable quantity P M (y): the line paſſing through the extremities of all the values of y, i. e. through all the points M, is called a *geometrical locus*, in general, and the *locus* of that equation in particular.

All equations, whoſe *loci* are of the *firſt order*, may be reduced to ſome one of the four following formulæ:

$$1.\ y = \frac{bx}{a},\quad 2.\ y = \frac{bx}{a} + c.\quad 3.\ y = \frac{bx}{a} - c.\quad 4.\ y = c - \frac{bx}{a},$$

where the unknown quantity y is ſuppoſed always to be freed from fractions, and the fraction that multiplies the other unknown quantity x to be reduced to this expreſſion $\frac{b}{a}$, and all the known terms to this c.

The *locus* of the firſt formula being already determined; ſince it is evident, that it is a right line which cuts the axis in A, and which makes with it an angle, ſuch that the two unknown quantities $x\ y$, may be always to one another in the proportion of a to b; to find that of the ſecond, $y = \frac{bx}{a} + c$; in the line A P (*fig.* 31.) take A B $= a$, and draw B E $= b$, A D $= c$, parallel to P M. On the ſame ſide A P, draw the line A E of an indefinite length towards E, and the indefinite ſtraight line D M parallel to A E. I ſay the line D M is the *locus* of the aforeſaid equation or formula; for if the line M P be drawn from any point M thereof parallel to Q A, the triangles A B E, A P F, will be ſimilar; and therefore A B (a) : B E (b) : : A P (x) : P F $= \frac{bx}{a}$; and conſequently P M (y) $=$ P F $\left(\frac{bx}{a}\right) +$ F M (c).

To find the *locus* of the third form, $y = \frac{bx}{a} - c$, proceed thus. Aſſume A B $= a$ (*fig.* 32.) and draw the right lines B E $= b$, A D $= c$, parallel to P M, the one on one ſide A P, and the other on the other ſide; and through the points A, E, draw the right line A E of an indefinite length towards E, and through the point D, the line D M parallel to A E: I ſay, the indefinite right line G M ſhall be the *locus* ſought; for we ſhall have always P M (y) $=$ P F $\left(\frac{bx}{a}\right) -$ F M c.

Laſtly, to find the *locus* of the fourth formula, $y = c - \frac{bx}{a}$: in A P (*fig.* 33.) take A B $= a$, and draw B E $= b$, A D $= c$, parallel to P M, the one on one ſide A P, and the other on the other ſide; and through the points A, E, draw the line A E indefinitely towards E, and through the point D draw the line D M parallel to A E. I ſay D G ſhall be the *locus* ſought; for if the line M P be drawn from any point M thereof, parallel to A Q, then we ſhall have always P M (y) $=$ F M (c) $-$ P F $\left(\frac{bx}{a}\right)$.

Hence it appears, that all the *loci* of the firſt degree are ſtraight lines; which may be eaſily found, becauſe all their equations may be reduced to ſome one of the foregoing formulæ.

All *loci* of the *ſecond* degree are conic ſections, viz. either the parabola, the circle, ellipſis, or hyperbola: if an equation therefore be given, whoſe *locus* is of the ſecond degree, and it be required to draw the conic ſection, which is the *locus* thereof; firſt draw a parabola, ellipſis, and hyperbola; ſo as that the equation expreſſing the natures thereof may be as compound as poſſible: in order to get general equations, or formulæ, by examining the peculiar properties whereof we may know which of theſe formulæ the given equation ought to have regard to; that is, which of the conic ſections will be the *locus* of the propoſed equation. This known, compare all the terms of the propoſed equation with the terms of the general formula of that conic ſection, which you have found will be the *locus* of the given equation; by which means you will know how to draw the ſection, which is the *locus* of the equation given.

For example: let A P (x), P M (y), be unknown, and variable ſtraight lines (*fig.* 34.) and let m, n, p, r, s, be given right lines: in the line A P take A B $= m$, and draw B E $= n$, A D $= r$, parallel to P M; and through the point A draw A E $= e$, and through the point D the indefinite right line D G parallel to A E. In D G take D C $= s$, and with C G, as a diameter, having it ordinates parallel to P M, and the line C H $= p$, as the parameter, deſcribe a parabola C M; and it will be the *locus* of the following general formula:

$$\begin{aligned} yy - \frac{2n}{m}xy + \frac{nn}{mm}xx - 2ry + \frac{2nr}{m}x + rr &= 0. \\ -\frac{ep}{m}x + ps. \quad & \end{aligned}$$

For if from any point M there be drawn the right line M P, making any angle A P M with A P; the triangles A B E, A P F, ſhall be ſimilar; therefore A B (m) : A E (e) : : A P (x) : A F or D G $= \frac{ex}{m}$; and A B (m) : B E (n) : : A P (x) : P F $= \frac{nx}{m}$. And conſequently G M or P M $-$ P F $-$ F G $= y - \frac{nx}{m} - r$, and C G or D G $-$ D C $= \frac{ex}{m} - s$. But from the nature of the parabola $GM^2 = CG \times CH$; which equation will become that of the general formula, by putting the literal values of thoſe lines.

Again: if through the fixed point A you draw the indefinite right line A Q (*fig.* 35.) parallel to P M, and you take A B $= m$, and draw B E $= n$, parallel to A P, and through the determinate points A, E, the line A E $= e$; and if in A P you take A D $= r$, and draw the indefinite ſtraight line D G parallel to A E, and take D C $= s$; this being done, if with the diameter C G, whoſe ordinates are parallel to A P, and parameter the line C H $= p$, you deſcribe a parabola C M; this parabola ſhall be the *locus* of this ſecond equation, or formula:

$$\begin{aligned} xx - \frac{2n}{m}yx + \frac{nn}{mm}yy - 2rx + \frac{2nr}{m}y + rr &= 0. \\ -\frac{ep}{m}y + ps. \quad & \end{aligned}$$

For if the line M Q be drawn from any point M, therein, parallel to A P; then will A B (m) : A E (e) : : A Q or B M (y) : A F or D G $= \frac{ey}{m}$. And A B (m) : B E (n) : : A Q (y) : Q F $= \frac{ny}{m}$. And therefore G M or Q M $-$ Q F $-$ F G $= x - \frac{ny}{m} - r$; and C G or D G $-$ D C $= \frac{ey}{m} - s$. And ſo by the common property of the parabola, you will have the foregoing ſecond equation, or formula. So likewiſe may be found general equations, or formulæ, to the other conic ſections.

Now if it be required to draw the parabola, which we find to be the *locus* of this propoſed equation $yy - 2ay - bx + cc = 0$; compare every term of the firſt formula with the terms of the equation, becauſe yy in both is without fractions; and then will $\frac{2n}{m} = 0$, becauſe the rectangle xy not being in the propoſed equation, the ſaid rectangle may be eſteemed as multiplied by 0; whence $n = 0$, and $m = e$; becauſe the line A E falling in A B, that is, in A P in the conſtruction of the formula, the points B, E, do coincide. Therefore, deſtroying all the terms adfected with $\frac{n}{m}$ in the formula, and ſubſtituting m for e, we ſhall get $yy - 2ry - px + rr + ps = 0$. Again, by comparing the correſpondent terms $-2ry$, and $-2ay$, as alſo $-px$, and $-bx$, we have $r = a$, and $p = b$; and comparing the terms wherein are neither of the unknown quantities x, y, we get $rr + ps = cc$; and ſubſtituting a and b for r and p, then will $s = \frac{cc - aa}{b}$, which is a negative expreſſion, when a is greater than c, as is here ſuppoſed. There is no need of comparing the firſt terms yy and yy, becauſe they are the very ſame. Now the values of m, n, r, p, s, being thus found, the ſought *locus* may be conſtructed by means of the conſtruction of the formula, and after the following manner.

Becauſe B E $(n) = 0$ (*fig.* 36.) the points B, E, do coincide, and the line A E falls in A P; therefore through the fixed point A draw the line A D $r = a$ parallel to P M, and draw D G parallel to A P, in which take D C $(s) = \frac{aa - cc}{b}$; then with D C, as a diameter, whoſe ordinates are right lines parallel to P M, and parameter the line C H $(p) = b$, deſcribe a parabola: I ſay, this will be the *locus* of the given equation, as is eaſily proved.

If in a given equation, whoſe *locus* is a parabola, xx be without a fraction; then the terms of the ſecond formula muſt be compared with thoſe of the given equation.

Thus much for the method of conſtructing the *loci* of equations which are conic ſections. If, now, an equation, whoſe *locus* is a conic ſection, be given, and the particular ſection whereof it is the *locus*, be required:

All the terms of the given equation being brought over to one ſide, ſo that the other be equal to 0, there will be two caſes.

Caſe 1. When the rectangle xy is not in the given equation. 1. If either yy or xx be in the ſame equation, the *locus* will be a parabola. 2. If both xx and yy are in the equation with the ſame ſigns, the *locus* will be an ellipſis, or a circle. 3. If xx and yy have different ſigns, the *locus* will be an hyperbola, or the oppoſite ſections regarding their diameters.

Caſe 2. When the rectangle xy is in the given equation. 1. If neither of the ſquares xx or yy, or only one of them, be in the ſame, the *locus* of it will be an hyperbola between the aſymptotes. 2. If yy and xx be therein, having different ſigns, the *locus* will be an hyperbola, regarding its diameters. 3. If both the ſquares xx and yy are in the equation, having the ſame ſigns, then, according as the co-efficient of x^2 is greater, equal or leſs than the ſquare of half the co-efficient of xy, the *locus* ſhall be an ellipſe, parabola, or hyperbola. And in any caſe the *locus* of the equation is ſome conic ſection.

This method of conſtructing geometrical *loci*, by reducing them to equations as compound as poſſible, we owe to Mr. Craig, who firſt publiſhed it in his Treatiſe of the Quadrature of Curves, in 1693. It is explained at large in the ſeventh and eighth books of the Conic Sections of the marquis de l'Hoſpital. See this ſubject particularly illuſtrated in Maclaurin's Algebra, part iii.

LOCUST, *locuſta*, a genus of inſects, comprehending the *locuſt*, ſimply ſo called, the ſeveral ſpecies of other *locuſts* and graſhoppers, with the crickets of the houſe and field. Linnæus has claſſed all theſe under the genus of GRYLLUS.

Willoughby obſerves, that in theſe animals there are always more males than females, which is contrary to the order of nature in other inſects, where the females are much the moſt numerous; and Swammerdam obſerves, that it is only the males that make a noiſe, which he ſays they do by a ſwift vibration of their wings, either againſt one another, or againſt their legs. See *Tab. of Inſects*, N° 3. ſeq.

The nympha, or worm of the *locuſt*, ſcarce at all differs from the creature in its perfect ſtate. It moves and eats in the nymph ſtate; and all the viſible difference is, that the wings are not expanded as in the perfect *locuſt*, but are gathered up in a ſmall compaſs, and form four little buttons on the ſhoulders. Swammerdam obſerves, that the want of attention to this particular in former writers had been the occaſion of a very unneceſſary multiplication of names; as Aldrovand, Johnſon, Mouffat, and others, have deſcribed theſe *locuſts* in the nymph ſtate under the names of *bruchi*, *attebali*, and *aſelli*, ſuppoſing them to be ſo many diſtinct ſpecies of animals. It is obſerved, that toward the end of ſummer the males are very tender of the females, three or four of them being frequently ſeen gathered about one of that ſex, and ſeeming to do her all the kind offices in their power, fluttering about with their wings, and rubbing her with their fore-legs. The males are always more briſk and nimble than the females; and among all the kinds of *locuſts*, there are a great many naturally imperfect; particularly many have only one hinder leg, yet theſe hop almoſt as well as the reſt. Swammerd. Bibl. Natur.

We have in England but very few inſects of this kind. The ſpecies mentioned by Mr. Ray are ſeven.

1. The common ſmall green graſhopper. This has articulated antennæ, very flexile, and nearly half an inch long; its belly is green; its outer wing brown, and its inner ones membranaceous, tranſparent, and reticulated; its back is divided into eight or nine rings, and is of a browniſh colour; the hinder legs are very long, and ſtrong. There is a great variety in the colour of this ſpecies; ſome have more, ſome leſs green, and ſome have a little yellow about them. 2. The larger grey-winged graſhopper. This is diſtinguiſhed by having grey wings ſpotted with black. 3. The ſmall brown graſhopper, with a long rhomboidal head; the antennæ in this ſpecies are very ſhort. 4. The great green graſhopper. This is accurately deſcribed by Joan. de Muralto in the German Ephemerides, and Mr. Ray has taken the whole into his hiſtory: the antennæ are long and ſlender, the eyes black and prominent, and the breaſt is remarkably high and narrow. 5 The great Spaniſh *locuſt*, of a browniſh grey, with ſpotted wings: this is about three inches long, and is the ſpecies lately found in England. 6. The great African *locuſt*, with ſtriated ſhoulders: this differs from the former only in theſe ſtreaks. 7. The great African *locuſt*: this is four inches long, and is of a green colour; under the ſhoulders there are only ſmall rudiments of wings; and it has two ſtrong yellow forceps under the tail, which terminate in black points. Thoſe ſpecies of this genus, commonly called *crickets*, ſee under the article CRICKET. Ephem. Germ. anno 12. obſ. 16. Ray's Hiſt. Inſ. p. 64. See alſo CICADA and HARVEST-*fly*.

The country of the Coſſacks or Ukrain is, in dry ſummers, much infeſted with ſwarms of *locuſts*, driven thither by an eaſt or ſouth-eaſt wind. The number of theſe inſects is ſo great, that they darken the air, and devour all the corn of the country. They lay their eggs in autumn, and then die. It is ſaid that each of theſe creatures lays two or three hundred eggs, which hatching the enſuing ſpring, produce ſuch a number of *locuſts*, that they do far more miſchief than before, unleſs the rains fall, which kill both the eggs and the inſects, or unleſs a ſtrong north, or north-weſt wind ariſes, which drives them all into the Euxine ſea. The hogs of the country are fond of theſe eggs, and devour great quantities of them. In the night, when theſe inſects reſt on the ground, they cover it to the height of three or four inches. If a wheel paſs over them, they emit an intolerable ſtench. Phil. Tranſ. N° 8. p. 137. where Monſieur Beauplan's Deſcription of Poland, and Thevenot's Voyages, part i. are referred to.

Graſhoppers ſometimes come in ſwarms to particular places in the ſame manner that *locuſts* do. They appeared ſome years ago in Languedoc, and ſome other places, in very formidable ſwarms, and eat up all the harveſt of ſeveral years. They took their flight like birds, and were about an inch long, and of a grey colour, in ſhape wholly like the common graſhoppers. They were found in many places covering the whole ſurface of the earth four or five inches deep, and uſed to lie quite till toward noon; but when the ſun then ſhone warmly upon them, they uſed to ariſe and take wing, and ſettling on the corn-fields, they would in a few hours eat up the whole produce, ears, leaves, and even the more tender parts of the ſtalks.

When they had deſtroyed one field in this manner, they uſed to take wing and fly to another. They uſually flew very high in the air, and directly againſt the wind; but as ſoon as they ſaw a new crop of corn, they dropped together in a ſwarm, and cleared it as they had done the firſt. This practiſe they continued the whole day, and toward evening they ſettled upon the ground, where they remained quiet, till the heat of the following day raiſed them again. When they had deſtroyed all the corn in the country, they ſeized upon the vines, garden-herbs, and willows, and at laſt upon the hemp, whole fields of which

which they eat up, notwithſtanding its great bitterneſs. Towards autumn they left off feeding, and were found in copulation, and ſoon after this the females were every where ſeen laying their eggs, which they depoſited in the ground, making a hole with their tail long enough to receive a gooſe quill.

In theſe holes every female would lay forty or fifty eggs, each of the ſize of a millet ſeed; and when they had finiſhed the laying, they covered up the hole to keep out the water; after this they died apace, and the multitudes of their carcaſes ſtunk intolerably, poiſoning the air. The next year they hatched in April; and from this one ſwarm there were ſuch prodigious numbers hatched, that fifteen tuns of them were deſtroyed, while no bigger than flies, and nine tuns of their eggs before the hatching, and yet there remained enough of them to deſtroy, in a great meaſure, the ſucceeding harveſt. After this they gradually decreaſed for ſeveral years, till they were not more numerous there than elſewhere. This was attributed to the induſtry of the farmers in killing them; but it is more probable, that unfavourable ſeaſons deſtroyed them. Phil. Tranſ. N° 182. p. 146.

LOCUST, *water*, *locuſta aquatica*, the name given by authors to a ſpecies of water-inſect, ſomewhat reſembling the *locuſt* kind in ſhape. It is about three inches long, its tail an inch and a quarter, and its legs are of different lengths, the anterior part being the ſhorteſt of all; its body is ſlender, and the fore-legs are always carried ſtraight forward, ſo as to reach beyond the head in the form of antennæ; theſe, as well as the other legs, end each in two claws; the eyes are ſmall, and not very prominent, and the upper wings are cruſtaceous; the under ones membranaceous, thin, and tranſparent; the middle joint of the leg is ſuch, that the creature can only move them upwards, not downwards, and there runs an acute tongue or proboſcis under the belly, as is the caſe in the water-ſcorpion and notonecta.

LOCUST, in *Botany*. See CAROB. See alſo HONEY-*flower*.

LOCUST *tree*, *hymenæa*, in *Botany*, a genus of the *decandria monogynia* claſs. Its characters are theſe: the outward involucrum of the flower is divided into two parts, the inner is of one leaf, indented in five parts; the flower has five equal petals, and ten ſhort declining ſtamina; in the centre is ſituated an oblong germen, which becomes a large oblong pod, wirh a thick ligneous ſhell, divided tranſverſely into ſeveral partitions; in each of which is lodged one compreſſed large ſeed, ſurrounded with a farinaceous pulp. We know but one ſpecies of this tree, which is a large ſpreading tree in the Weſt Indies, the wood of which is eſteemed good timber; it yields a fine clear reſin, which is the GUM *anime* of the ſhops, and makes an excellent varniſh.

LOCUST-*tree*, *honey*. See HONEY *locuſt*.

LOCUSTA-*pulex*, a name given by Swammerdam to a genus of inſects, deſcribed ſince by Mr. Ray under the name CICADULA.

LOCUSTÆ, is uſed by botaniſts for the tender extremities of the branches of trees; ſuch as, it is ſuppoſed, John the Baptiſt fed on in the Wilderneſs.

Some alſo uſed *locuſtæ* for the beards and pendulous ſeeds of oats, and of the gramina paniculata; to which the name is given on account of their figure, which ſomething reſembles that of a locuſt.

LOCUSTELLA, the *graſs-hopper lark*, in *Ornithology*, the name of a ſmall bird of the lark kind, the *alauda trivalis* of Linnæus. It is ſmaller than the common wren, and of a browniſh-yellow colour, ſpotted with black; its tail is long and brown, and its belly and thighs are variegated with oblong ſtreaks of a blackiſh-brown; its legs are very long, ſlender, and brown; it feeds on flies, and makes the ſame ſort of noiſe that the graſhopper does, only much louder; and uſually, as it ſings, ſits on the ſummit of ſome prickly ſhrub, and vibrates its wings about very briſkly; in the midſt of ſummer it chirps the whole night, and ceaſes about the latter end of July.

LOCUTIUS, in *Mythology*, the god of ſpeech among the Romans, called by Livy *Aius Locutius*.

LOCUTORIUM. The monks and other religious in monaſteries, after they had dined in their common hall, had a withdrawing-room, where they met and talked together among themſelves, which room, for that ſociable uſe and converſation, they called *locutorium*, *a loquendo*; as we call ſuch a place in our houſes parlour, from the French *parler*; and they had another room, which was called *locutorium forinſecum*, where they might talk with laymen.

LODESMAN, or LOCKMAN, a pilot eſtabliſhed for conducting veſſels in and out of harbours, or up and down navigable rivers. See PILOT.

LODGMENT, in *Military Affairs*, ſometimes denotes an encampment made by an army.

LODGMENT is more frequently uſed for a work caſt up by the beſiegers, during their approachess, in ſome dangerous poſt, which they have gained, and where it is abſolutely neceſſary to ſecure themſelves againſt the enemies fire; as in a covert-way, in a breach, the bottom of a moat, or any other part gained from the beſieged.

Lodgments are made by caſting up earth, or by gabions, or paliſades, woolpacks, faſcines, mantelets, or any thing capable of covering ſoldiers in the place they have gained, and are determined to keep.

LOEFLINGIA, in *Botany*, a genus of the *triandria monogynia* claſs. Its characters are theſe: the calyx is compoſed of five leaves; the flower has five very ſmall petals; and the fruit is a ſingle-celled capſule with three valves. There is only one ſpecies.

LOESELIA, in *Botany*, the name of a genus of plants of the *didynamia angioſpermia* claſs, called alſo *royenia* by Houſton. The characters are theſe: the perianthium is one-leaved, and tubular; it is ſhort, and divided into four ſegments, and remains after the flower is fallen; the flower conſiſts of one irregular petal; it is formed into a tube of the length of the cup, and its verge is divided into five equal ſegments, all bending towards one ſide, and of an oval figure; the ſtamina are four filaments, of the length of the flower; two of theſe are ſhorter than the others; the antheræ are ſimple, and the germen of the piſtil is oval; the ſtyle is ſimple, the ſtigma thick, the capſule is of an oval figure, divided into three cells, and containing a number of ſeeds of an angular figure.

LOG, in the *Jewiſh Antiquities*, a meaſure which held a quarter of a cab, and conſequently five-ſixths of a pint. There is mention of a *log*, 2 Kings vi. 25. under the name of a *fourth part of a cab*. But in Leviticus the word *log* is often met with, and ſignifies that meaſure of oil, which lepers were to offer at the temple after they were cured of any diſeaſe.

Dr. Arbuthnot ſays, that the *log* was a meaſure of liquids, the ſeventy-ſecond part of the bath or ephah, and twelfth part of the hin, according to all the accounts of the Jewiſh writers.

LOG, a ſea term, ſignifying a ſmall piece of timber, of a triangular, ſectoral, or quadrantal figure, on board a ſhip, generally about a quarter of an inch thick, and five or ſix inches from the angular point to the circumference. It is balanced by a thin plate of lead, nailed upon the arch, or circular ſide, ſo as to ſwim perpendicularly in the water, with about two-thirds immerſed under the ſurface.

LOG-*line*, a little cord, or line, about a hundred and fifty fathoms long, faſtened to the *log*, by means of two legs, one of which paſſes through a hole at the corner, and is knotted on the oppoſite ſide, while the other leg is attached to the arch by a pin fixed into another hole, ſo as to draw out occaſionally. By theſe legs the *log* is hung in equilibrio; and the line thus annexed to it is wound round a reel fixed for that purpoſe in the gallery of the ſhip.

This line, from the diſtance of about ten, twelve, or fifteen fathoms off the *log*, has certain knots or diviſions, which ought to be at leaſt fifty feet from each other; though it was the common practice at ſea, not to have them above forty-two feet aſunder.

The length of each knot ought to be the ſame part of a ſea-mile as half a minute is of an hour; and admitting the meaſurement of Mr. Norwood, who makes a degree on a great circle of the earth to contain 367,200 Engliſh feet, or about $69\frac{1}{2}$ Engliſh ſtatute miles, and, therefore, $\frac{1}{60}$ of it, or a nautical mile, will be 6120 feet; $\frac{1}{120}$th of 6120, or 51 feet, ſhould be the length of each knot. But becauſe it is ſafer to have the reckoning rather before the ſhip than after it, therefore fifty feet may be taken as the proper length of each knot. The knots are ſometimes made to conſiſt only of forty-two feet each, even in the preſent practice; and this method of dividing the *log-line* was founded on the ſuppoſition, that ſixty miles, each of 5000 Engliſh feet, made a degree; for $\frac{1}{120}$th of 5000 is $41\frac{2}{3}$, or, in round numbers, 42 feet. Mariners, rather than quit the old way, though known to be erroneous, uſe glaſſes for half minute ones, that run but 24 or 25 ſeconds. They have alſo uſed a line of 45 feet to 30 ſeconds, or a glaſs of 28 ſeconds to 42 feet. When this is the caſe, the diſtance between the knots ſhould be corrected by the following proportion: as 30 is to 50, ſo is the number of ſeconds of the glaſs to the diſtance between the knots upon the line. The heat or moiſture of the weather has often a conſiderable effect upon the glaſs, ſo as to make it run ſlower or faſter; it ſhould, therefore, be frequently tried by the pendulum in the following manner. On a round nail hang a ſtring that has a muſket-ball fixed to one end, carefully meaſuring between the centre of the ball and the ſtring's loop over the peg $39\frac{1}{8}$ inches, being the length of a ſecond pendulum; then ſwing it, and count one for every time it paſſes under the peg, beginning at the ſecond time it paſſes, and the number of ſwings made during the time the glaſs is running out, ſhews the ſeconds it contains. The lines alſo is liable to relax and ſhrink, and ſhould, therefore, be occaſionally meaſured.

The uſe of the *log* and *line* is, to keep account, and make an eſtimate of the ſhip's way, or diſtance run; which is done by obſerving the length of line unwound in half a minute's time, told by a half-minute glaſs; for ſo many knots as run out in that time, ſo many miles the ſhip ſails in an hour. Thus, if there be four knots veered out in half a minute, the ſhip is computed to run four miles an hour.

The author of this device for meaſuring the ſhip's way is not known; and no mention of it occurs till the year 1607, in an Eaſt-India voyage, publiſhed by Purchas; but from that time its name occurs in other voyages among his collections: and henceforward it became famous, being taken notice of both by our own authors, and by foreigners; as by Gunter in 1623; Snellius, in 1624; Metius, in 1631; Oughtred, in 1633; Herigone, in 1634; Saltonſtall, in 1636; Norwood, in 1637; Fournier, in 1643; and almoſt by all the ſucceeding writers on navigation of every country.

Log, *to heave the*, as they call it, they throw it into the water, on the lee-ſide, letting it run, till it comes without the eddy of the ſhip's wake; then one, holding a half-minute glaſs, turns it up juſt as the firſt knot, or the mark from which the knots begin to be reckoned, turns off the reel, or paſſes over the ſtern. As ſoon as the glaſs is out, the reel is ſtopped, and the knots run off are told, and their parts eſtimated.

It is uſual to heave the *log* once every hour in ſhips of war and Eaſt Indiamen; and in all other veſſels, once in two hours; and if at any time of the watch the wind has increaſed or abated at the intervals, ſo as to affect the ſhip's velocity, the officer generally makes a ſuitable allowance for it at the cloſe of the watch.

The *log* is a very precarious way of computing, and muſt always be corrected by experience, and good ſenſe; there being a great deal of uncertainty in the yawing of the ſhip going with the wind aft, or upon the quarter, in the heaving of it, by its coming home, or being drawn after the ſhip, on account of the friction of the reel, and lightneſs of the *log*, in the courſe of the current, and in the ſtrength of the wind, which ſeldom keeps the ſame tenor for two hours together; which is the interval between the times of uſing the *log*, in ſhort voyages, though in longer ones they heave it every hour. Yet is this a much more exact way of computing than any other in uſe; much preferable certainly to that of the Spaniards and Portugueſe, who gueſſed at the ſhip's way, by the running of the froth or water by the ſhip's ſide; or to that of the Dutch, who uſed to heave a chip overboard, and to number the paces they walk on the deck, while the chip ſwims between any two marks, or bulk-heads on the ſide.

The above mentioned errors, and particularly the *log*'s being ſubject to drive with the motion which the water may have at its ſurface, whereas the experiment requires it to be fixed in the place where it is when the mark commencing the knots goes off the reel, have been conſidered by writers, and many methods have been propoſed to remove, or at leaſt to leſſen them. The late M. Bouguer propoſed a method, which has been thought deſerving of particular attention, in the Mem. Acad. Sc. 1747; afterwards in his Treatiſe on Navigation, publiſhed at Paris in 1753, and ſince reprinted in 1760, by the Abbé de la Caille. For this purpoſe, take for the *log* a conical piece of wood, which fix to the *log-line* paſſed through or along its axis, at about forty, fifty, or ſixty, or more feet, from one end; and to this end fix the diver, which is a body formed of two equal ſquare pieces of tin, or of thin iron plate, fixed at right angles to one another along their diagonals; and its ſize ſo fitted to that of the cone, that the whole may float. A cone of three inches diameter in the baſe, and of ſix inches in the ſlant height, is propoſed by M. Bouguer to ſuit a diver made of plates about 9¼ inches ſquare; the interſection of the diagonals is joined to the *log-line*, and the loop and peg fixed as the common *log*. However, it has been found, that no kind of wood uſed in Britiſh dock-yards, when formed into a cone or the above dimenſions, will float a diver made of ſtout tin plates, one ſide of the ſquare being 9¼ inches. Such a diver weighing 1⅞ ℔ avoirdupoiſe, required to float it a cone of five inches diameter, and twelve inches on the ſlant ſide, ſo as the point of the cone, which was made of light fir, ſhould juſt appear above the water. Now ſuppoſing one ſide of ſuch a ſquare tin diver to be about ten inches, and made of plates only two-thirds of the thickneſs of the former, ſuch a diver would weigh, with its ſolder, about twenty ounces, and can be floated by a light fir cone of four inches diameter in the baſe, and ten inches in the ſlant height or length; and ſuch a compound *log* might, perhaps, be found on trial to be affected by about as much again as that propoſed by M. Bouguer, and conſequently the difference between the numbers given by the common *log*, and compound *log*, muſt be augmented by two thirds of itſelf, for the neceſſary correction, as below.

When the compound *log* of Bouguer, above deſcribed, is hove overboard, the diver will ſink too deep to be much affected by the current, or motion of the water at the ſurface; and the *log* will thereby keep more ſteadily in the place where it firſt fell; and conſequently, the knots run off the reel, will ſhew more accurately the ſhip's rate of ſailing. As the common *log* is affected by the whole motion of the current, ſo this compound *log* will feel only a part thereof, viz. ſuch a part nearly as the reſiſtance of the cone is of the reſiſtance of the diver; then the reſiſtances of the above cone and diver are about as 1 to 5; and conſequently this *log* will drive but one-fifth part of what the common *log* would do; and ſo the ſhip's true run will be affected by one-fifth part only of the motion of the waters. To obtain the true rate of ſailing, it will be proper to heave alternately hour and hour, the common *log*, and this compound *log*; then the difference of their knots run off, augmented by its one-fourth part, is the correction; which applied to the knots of the common *log*, will give the ſhip's true rate of ſailing, at the middle time between the hours when theſe *logs* were hove. The correction is additive, when the compound *log*'s run is the greateſt, otherwiſe it is ſubtractive. To find the courſe made good: increaſe the obſerved angle between the *log-lines* by one-fourth part; and this gives the correction to be applied to the apparent courſe, or the oppoſite of that ſhewn by the common *log*; the correction is to be applied to the $\left\{\begin{matrix}\text{right}\\ \text{left}\end{matrix}\right\}$ of the apparent courſe, when the bearing of the common *log* is to the $\left\{\begin{matrix}\text{left}\\ \text{right}\end{matrix}\right\}$ of the compound *log*.

Or thus: the lengths run off both *logs*, together with their bearings, being known; in a card or compaſs apply the knots run off, taken from a ſcale of equal parts along their reſpective bearings, from the centre; join the ends, and in this line produced, on the ſide next the compound *log*'s length, take one-fourth of the interval; then a line drawn from the end, thus produced, to the centre of the card, will ſhew the true courſe and diſtance made good.

When a current, ſuch as a tide, runs to any depth the velocity of that current may be much better aſcertained by the compound *log* than by the common one, provided the diver does not deſcend lower than the run of the current; for as thoſe ſhips which are deepeſt immerged, drive faſteſt with the tide; ſo the diver, by being acted on below, as well as the *log* on the ſurface, their joint motion will give the total effect to the current's motion better than what could be derived from the motion at the ſurface only. Alſo by ſuch a compound *log*, the depth to which any current runs, may be eaſily tried. Robertſon's Nav. book ix. § 1.

We have an account in the Voyage to the North Pole, p. 97. of two other *logs*, which were tried by captain Phipps: one invented by Mr. Ruſſel, the other by Foxon; both conſtructed upon this principle, that a ſpiral, in proceeding its own length in the direction of its axis through a reſiſting medium, makes one revolution round the axis; if, therefore, the revolutions of the ſpiral are regiſtered, the number of times it has gone its own length through the water will be known. In both theſe the motion of the ſpiral in the water is communicated to the clock-work within-board, by means of a ſmall line, faſtened at one end of the ſpiral, which tows it after the ſhip, and at the other to a ſpindle, which ſets the clock-work in motion. That invented by Mr. Ruſſel has a half ſpiral of two threads, made of copper, and a ſmall dial with clock-work, to regiſter the number of turns of the ſpiral. The other *log* has a whole ſpiral of wood with one thread, and a larger piece of clock-work; with three dials, two of them to mark the diſtance, and the other divided into knots and fathoms, to ſhew the rate by the half-minute glaſs for the convenience of comparing it with the *log*. This kind of *log* will have the advantage of every other in ſmooth water and moderate weather; and it will be uſeful in finding the trim of the ſhip when alone, in ſurveying a coaſt in a ſingle ſhip, or in meaſuring diſtances in a boat between headlands and ſhoals; but it is ſubject to other inconveniences, which will not render it a proper ſubſtitute for the common *log*. See Phil. Tranſ. vol. xlviii. p. 532.

Log-*board* is a table divided into four or five columns, whereon are marked the reckonings of every day; from whence they are entered into the *log-book* or traverſe-book; whence it may be tranſcribed into the journals, and how much the ſhip gains in her courſe be eſtimated daily.

in the firſt column of the *log-board*, is entered the hour of the day, from the noon of one day to the noon of the next; in the ſecond and third, the number of knots and fathoms the ſhip is found to run per hour, ſet againſt the hours when the *log* was hove: in the fourth, the courſes which the ſhip ſteers: and in the fifth, or right hand column, the winds, the alterations of the ſails, the buſineſs doing aboard, obſervations made of the weather, variation of the compaſs, &c. See JOURNAL.

LOG-*book*, at ſea, a book ruled and columned like the *log-board*. It is uſed by ſome to enter the *log-board's* account in, every day at noon, with the obſervations then made; and from hence it is corrected and entered into the JOURNALS. The intermediate diviſions or watches of the *log-book*, containing four hours each, are uſually ſigned by the commanding officer in ſhips of war, or Eaſt India men.

LOG-*wood*, in *Botany*, the wood of a tree, called by Ray *arbor ſiliquoſa floribus papilionaceis*. It is deſcribed by Breynius under the name of *criſta pavonis coronillæ folio ſecunda*, and *erythroxylum indicum ſpinoſiſſimum coluteæ foliis floribus luteis, ſiliquis maximis*. Linnæus calls it *hæmatoxylon*, and makes it a genus of the *decandria monogynia* claſs. Its characters are theſe; the flower hath a permanent empalement, cut into five oval ſegments, and has five oval petals, and ten awl-ſhaped ſtamina, which are longer than the petals; in the centre is ſituated an oblong, oval germen, which becomes an obtuſe, compreſſed capſule, with one cell, opening with two valves, containing two or three oblong, flat, kidney-ſhaped ſeeds. We know but one ſpecies of this genus, which grows naturally in the bay of Campeachy, at Honduras, and other parts of the Spaniſh Weſt Indies. The wood of this tree is brought to Europe, where it is uſed for dying purples, and for the fineſt blacks; and therefore it is a very valuable commodity.

The uſe of *log-wood* in dying was eſtabliſhed in this country by 13 & 14 Car. II. cap. 11. before which time it was prohibited as a pernicious material. *Log-wood* is uſed in miniature painting, to make a purple waſh; which may be varied to a more red or blue colour by the addition or omiſſion of BRASIL-*wood*. The waſh may be prepared by boiling an ounce of ground *log-wood* in a pint of water, till one half of the fluid be waſted; ſtrain it then through flannel, while of a boiling heat; and add to it, when ſtrained, about ten grains of pearl-aſhes. To make it more red, add half an ounce of Braſil-wood, or in proportion as the colour wanted may require; uſing in this caſe the pearl-aſhes very ſparingly.

Beſides its uſe among dyers, it is found to be an excellent aſtringent, and is given, in doſes of from ten grains to a ſcruple and upwards, with ſucceſs in form of extract, obtained by inſpiſſating the decoctions, in diarrhœas, dyſenteries, and other diſorders proceeding from the laxity of the ſolids. To promote the extraction, the wood ſhould be reduced into a fine powder, which is to be boiled in the water, in the proportion of a pound to a gallon, till half the liquor is waſted. Some digeſt the powdered wood in as much ſpirit as will cover it to the height of about four inches, and afterwards boil it in water; the matters taken up by the watery and ſpirituous menſtrua may be united into one extract, by inſpiſſating the watery decoction to the conſiſtence of honey, and then gradually ſtirring in the ſpirituous tincture.

LOGARITHMIC, *atmoſpherical*, is a curve (*Tab*. II. *Analyſis*, *fig*. 56.) deſcribed in the following manner: let the point C repreſent the centre of the earth, CA the earth's ſemidiameter, and AB any height above the ſurface; at A place a right line AD, of any finite length, at right angles with AC. In the right line AC, towards C, take Aβ ſuch, that CA may be to Aβ in the proportion of CB to BA. In a right line drawn through β, at right angles with AC, take βE, of ſuch length, as to be to AD in the proportion of the denſity of the air at B to the denſity at A, the earth's ſurface. The curve, which the point E always touches, is a *logarithmic*, of which AC is the aſymptote; and is called by Dr. Horſley the *atmoſpherical logarithmic*.

Imagine this curve deſcribed, and take another height A*b*, and take $A\text{ϐ} = \frac{CA \times Ab}{Cb}$, and draw ϐ*e* parallel to βE, meeting the curve in *e*. Then βϐ is the logarithm of the ratio of βE to ϐ*e*, or of the denſity at B to the denſity at *b*. But if the greater of the two heights, AB and A*b*, bear but a very ſmall proportion to the ſemidiameter of the earth, their difference B*b* will be very nearly equal to βϐ.

For, becauſe CB : BA = CA : Aβ by conſtruction.

Therefore by converſion, CB : CA = CA : Cβ.

In like manner, and by inverſion, CA : C*b* = Cϐ : CA.

by equi-diſtance perturbate, CB : C*b* = Cϐ : Cβ.

and converting, CB : B*b* = Cϐ : βϐ

by permutation, B*b* : βϐ = CB : Cϐ.

But when AB is infinitely diminiſhed, CB = CA ultimately. Alſo A*b* being infinitely diminiſhed, Cϐ = CA ultimately. Therefore CB, = Cϐ ultimately, and B*b* = βϐ ultimately. Q. E. D.

Now AB and A*b* will always be ſo ſmall, with reſpect to CA, if B and *b* be ſuppoſed to repreſent any acceſſible places, that CB, Cϐ, and B*b*, βϐ, may always in this caſe, be conſidered as in their ultimate proportion of equality.

It is ſtill, therefore, to be admitted as a principle, in practice, that the difference of elevation of any two places, is as the difference of the tabular logarithms of the heights of the quickſilver in the barometer at the ſame time, at both places; that is, it is the logarithm of the ratio of thoſe heights in *ſome* ſyſtem of logarithms. And the heights of the quickſilver being given, by obſervation, the difference of elevation will be known, if that particular ſyſtem can be determined; that is, if the *modulus* of the ſyſtem, or the length of the ſubtangent of the curve DE*e* of that ſyſtem can be aſcertained, in ſome known meaſure, as Engliſh fathoms, or Paris toiſes.

The eaſieſt method of doing this, that theory ſuggeſts, is to compare barometers at two ſtations, ſuppoſe B and *b*, each of a known elevation AB and A*b*, above the level of the ſea. For the logarithms of any given ratio, in different ſyſtems, are proportional to the ſubtangents; and the difference of elevation B*b* diminiſhed in the proportion of CB, (the diſtance of the higher ſtation from the earth's centre) to Cϐ, (a third proportional to C*b*, the diſtance of the lower ſtation from the earth's centre, and CA, the earth's ſemidiameter) is the logarithm of the ratio of the denſity at B, to the denſity at *b* (that is, of the columns of quickſilver ſuſtained in the barometer at B and *b*) in the atmoſpherical ſyſtem. Therefore, as the difference of the tabular logarithms of theſe columns to the ſubtangent of the tabular ſyſtem, ſo ſhould B*b*, diminiſhed as hath been ſaid (that is, ſo ſhould βϐ) be to the ſubtangent of the atmoſpherical *logarithmic*. The utmoſt height, to which we can aſcend, above the level of the ſea, is ſo ſmall that the reduction of B*b* may, even in this inveſtigation, always be neglected. For, if AB were four Engliſh miles, which exceeds the greateſt acceſſible heights, even of the Peruvian mountains, and Aϐ three, βϐ would be ſcarce one part in 500 leſs than B*b*. So that, by comparing barometers at different elevations, within a mile above the level of the ſea, the ſubtagent of the atmoſpherical curve might be determined, as it ſhould ſeem, without ſenſible error, by taking ſimply the difference of elevation, without reduction for the logarithm of the ratio of the obſerved heights of the quickſilver in the atmoſpherical ſyſtem.

This ſubtangent is different in length at different times; though M. de Luc has ſhewn, that it is conſtant in a given temperature; ſo that if the temperature of the air is $+16\frac{3}{4}$ of his ſcale, the difference of the tabular logarithms of the heights of the quickſilver in the barometer, gives the difference of elevation in 1000ths of a Paris toiſe; whence the number which is the ***modulus*** of Briggs's ſyſtem, expreſſes the length of the ſubtangent of the atmoſpherical curve, ſuch as it is in that temperature, in 1000ths of a Paris toiſe. Phil. Tranſ. vol lxiv. part i. p. 231, &c.

LOGARITHMIC, or *logarithmical*, relating to logarithms. Thus we ſay, *logarithmic* arithmetic, curve, line, ſcale, ſpiral. See ARITHMETIC, &c.

LOGARITHMS, formed from the Greek λογος, *ratio*, and αριθμος, *number*; q. d. *ratio of numbers*; the indices of the ratios of numbers one to another; or a ſeries of artificial numbers proceeding in arithmetical proportion, correſponding to as many others proceeding in geometrical proportion; contrived for the eaſing and expediting of calculation.

LOGARITHMS have been uſually defined *numerorum proportionalium æquidifferentes comites*; but this definition Dr. Halley and Stifelius think deficient, and more acurately define them, *the indices or exponents of the ratios of numbers*; ratio being conſidered as a quantity *ſui generis*, beginning from the ratio of equality, or 1 to 1 = 0, and being affirmative when the ratio is increaſing, and negative when it is decreaſing.

Thus, if unity be made the common conſequent of all ratios, or the common ſtandard, to which all other numbers are to be referred, then every *logarithm* will be the numeral exponent of the ratio of its natural number to unity. E. g. the ratio of 81 to 1 contains the four following ratios, viz. that of 81 to 27, 27 to 9, 9 to 3, and 3 to 1, or $\frac{81}{1} = \frac{81}{27} \times \frac{27}{9} \times \frac{9}{3} \times \frac{3}{1}$; but all theſe ratios are equal to one another, and $\frac{81}{1} = \frac{3}{1} \times \frac{3}{1} \times \frac{3}{1} \times \frac{3}{1} = \overline{\tfrac{3}{1}\Big|}^{4}$: conſequently the *logarithm* of 81, is four times as great as that

that of 3. In the ſame manner, the ratio of 24 to 1 or $\frac{24}{1} = \frac{24}{12} \times \frac{12}{4} \times \frac{4}{1} = \frac{2}{1} \times \frac{3}{1} \times \frac{4}{1}$; and, therefore the *logarithm* of 24 is equal to the ſum of the *logarithms* of 2, 3, and 4. And, univerſally, the magnitude of the ratio of A to 1, is to the magnitude of the ratio of B to 1, as the *logarithm* of A to the *logarithm* of B. Hence we derive a method of meaſuring all ratios whatever, let their conſequents be what they will: e. g. the ratio of A to B, is the exceſs of the ratio of A to 1, above the ratio of B to 1; therefore the numeral exponent of the ratio of A to B, will be the exceſs of the numeral exponent of the ratio of A to 1, above the numeral exponent of the ratio of B to 1, that is, the exceſs of the *logarithm* of A above the *logarithm* of B: therefore the magnitude of the ratio of A to B is to the magnitude of the ratio of C to D as the exceſs of the *logarithm* of A above the *logarithm* of B, which is the meaſure of the former ratio, is to the exceſs of the *logarithm* of C above that of D, which is the meaſure of the latter ratio; and thus we ſee that *logarithms* are as true and proper meaſures of ratios, as circular arcs are of angles. See the ſequel of this article.

The nature and genius of *logarithms* will be eaſily conceived from what follows:—a ſeries of quantities increaſing or decreaſing according to the ſame ratio is called a *geometrical progreſſion*; e. g. 1. 2. 4. 8. 16. 32, &c. A ſeries of quantities increaſing or decreaſing, according to the ſame difference, is called an *arithmetical progreſſion*; e. gr. 3. 6. 9. 12. 15. 18. 21. Now, if underneath the numbers proceeding in a geometrical ratio, be added as many of thoſe proceeding in the arithmetical one, theſe laſt are called the *logarithms* of the firſt.

Suppoſe e. g. two progreſſions:

Geomet.	1.	2.	4.	8.	16.	32.	64.	128.	256.	512.
Arithmet.	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.

Logarithms.

0 will be the *logarithm* of the firſt term; viz. 1; 5, of the 6th, 32; 7 the *logarithm* of the 8th, 128, &c.

Theſe indices or *logarithms* may be adapted to any geometric ſeries; and, therefore, there may be as many kinds of indices or *logarithms*, as there can be taken kinds of geometric ſeries; but the *logarithms* moſt convenient for common uſe, are thoſe adapted to a geometrical ſeries increaſing in a ten-fold progreſſion, as in the ſequel. The doctrine and uſe of *logarithms* may be conceived from the following propoſitions.

1. *If the* logarithm *of unity be* 0, *the* logarithm *of the factum or product will be equal to the ſum of the* logarithms *of the factors.*—For as unity is to one of the factors, ſo is the other factor to the product. So that the *logarithm* of the product, is a fourth equidifferent term to the *logarithm* of unity, and thoſe of the factors: but the *logarithm* of unity being 0, the ſum of the *logarithms* of the factors muſt be the *logarithm* of the factum, or product. Q. E. D. Hence, ſince the factors of a ſquare are equal to each other, i. e. a ſquare is the factum or product of its root multiplied into itſelf, the *logarithm* of the ſquare will be double the *logarithm* of the root.

In the ſame manner it appears, that the *logarithm* of the cube is triple; of the biquadrate, quadruple; of the fifth power, quintuple; of the ſixth, ſextuple, &c. of the *logarithm* of the root.

Unity, therefore, is to the exponent of the power, as the *logarithm* of the root to the *logarithm* of the power.

So that the *logarithm* of the power is had, if the *logarithm* of the root be multiplied by its exponent; and the *logarithm* of the root is had, if the *logarithm* of the power be divided by its exponent.

And hence we derive one of the great uſes of *logarithms*, which is to expedite and facilitate the buſineſs of multiplication, involution of powers, and extraction of roots; the former of which is here performed by mere addition, and the two latter by multiplication and diviſion.—Thus 3, the ſum of the *logarithms* 1 and 2, is the *logarithm* of 8, the product of 2 and 4. In like manner 7, the ſum of the *logarithms* 2 and 5, is the the *logarithm* of 128, the product of 4 and 32. Again, 6, the *logarithm* of 64, which is the third power of 4 or $\overline{4)}^{3}$, is equal to 3×2. And 8, the *logarithm* of 256, which is the fourth power of 4 or $\overline{4)}^{4}$, is equal to 4×2. Moreover, 3, the *logarithm* of the ſquare root 8, is half the *logarithm* 6, of the ſquare 64; and 2, the *logarithm* of the cube root 4, is ſubtriple the *logarithm* 6 of the cube 64.

2. *If the* logarithm *of unity be* 0, *the* logarithm *of the quotient will be equal to the difference of the* logarithms *of the diviſor and dividend.*—For as the diviſor is to the dividend ſo is unity to the quotient; therefore the *logarithm* of the quotient is a fourth equidifferent number to the *logarithms* of the diviſor, the dividend, and the *logarithm* of unity. The *logarithm* of unity, therefore, being 0, the difference of the *logarithm of* a diviſor, and that of the dividend, is the *logarithm* of the quotient. Q. E. D.

Hence appears another great advantage of *logarithms*; viz. their expediting the buſineſs of diviſion, and performing it by a bare ſubtraction. E. gr. 2. the difference between 7 and 5, is the *logarithm* of the quotient 4, obtained by dividing 128 by 32. In like manner, 5, the difference between 8 and 3, is the *logarithm* of the quotient 32, obtained by dividing 256 by 8.

An example or two will render the uſe of *logarithms* in multiplication, diviſion, &c. obvious.

	Num.	Log.		Num.	Log.
Multiply	68	1.832509	Divide	816	2.911690
by	12	+ 1.079181	by	12	— 1.079181
	816	2.911690		68	1.832509
	9	0.954242		9	0.954242
	9	0.954242		9	0.954242
Sq.	81	2)1.908484(0.954242		9	0.954242
		log. of ſq. R. Cub.		729	3)2.862726(0.954242
					log. of Cube R.

The properties of *logarithms* hitherto mentioned, and their various uſes are taken notice of by Stifelius: but they come all far ſhort of the uſe of *logarithms* in trigonometry, firſt diſcovered by John Napier, baron of Merchiſton in Scotland, and firſt publiſhed at Edinburgh in 1614, in his Mirifici Logarithmorum Canonis Deſcriptio. This work was tranſlated by Mr. Edward Wright, and publiſhed by his ſon, with the aſſiſtance of Mr. Briggs, in the year 1616 or 1618. The method of conſtructing the table was reſerved by the ingenious author, till the ſenſe of the learned upon his invention ſhould be known; nevertheleſs Kepler, in his Chilias Logarithmorum ad totidem Numeros rotundos, publiſhed at Marpurg in 1724; Speidell in his New Logarithms, publiſhed in 1619, and republiſhed with conſiderable additions, in a ſixth impreſſion in 1624; Benj. Urſinius, in his Table of *Logarithms*, printed at Cologne, in 1625, and others, at home and abroad, laboured at the computation of *logarithms*, and conſtructed ſmall tables, conformable to the plan of lord Napier.

To find the logarithm *of any number, and to conſtruct a canon of* logarithms *for natural numbers.*—1. Becauſe 1. 10. 100. 1000. 10000, &c. conſtitute a geometrical progreſſion, their *logarithms* may be taken at pleaſure; to be able, then, to expreſs the *logarithms* of the intermediate numbers by decimal fractions, take 0.00000000, 1.00000000, 2.00000000, 3.00000000, 4.00000000, &c. 2. It is manifeſt, that for thoſe numbers which are not contained in the ſcale of geometrical progreſſion, the juſt *logarithms* cannot be had: yet may they be had ſo near the truth, that, as to matters of uſe, they ſhall be altogether as good as if ſtrictly juſt. To make this appear, ſuppoſe the *logarithm* of the number 9 were required; between 1.0000000 and 10.0000000, find a mean proportional, and between their *logarithms* 0.00000000, and 1.00000000 an equidifferent mean, which will be the *logarithm* thereof; that is of a number exceeding three by $\frac{1622777}{10000000}$, and therefore far remote from nine. Between 3 and 10, therefore find another mean proportional, which may come ſomewhat nearer 9; and between 10 and this mean another ſtill; and ſo on between the numbers next above and next underneath 9, till at laſt you arrive at 9 $\frac{1}{10000000}$; which not being one millionth part from 9 its *logarithm* may, without any ſenſible error, be taken for that of 9 itſelf. Seeking then in each caſe for the *logarithms* of the mean proportionals, you will at laſt have 0.954251, which is exceedingly near the true *logarithm* of 9. 3. If in like manner you find mean proportionals between 1.0000000 and 3.1622777, and aſſign convenient *logarithms* to each, you will at length have the *logarithm* of the number 2, and ſo of the reſt. 4. There needs not, however, be ſo much pains taken in inveſtigating the *logarithms* of all numbers; ſince thoſe that conſiſt of aliquot parts being divided, and others mutually multiplying each other, their *logarithms* are eaſily found. Thus if the *logarithm* of the number 9 be biſected, we ſhall have the *logarithm* 0.47712125 of the number 3.

The indices, or charactariſtics of *logarithms*, correſpond to the denominative part of the natural numbers, as the other member of the *logarithm* does to the numerative part of the number: i. e. the index ſhews the denomination, or place of the laſt (or left hand) figure of the number, and conſequently of all the reſt. Thus 0, prefixed to a *logarithm*, denotes the laſt figure of the number, to which the *logarithm* anſwers, to be nothing diſtant from (i. e. in) the place of units. The index 1 ſhews the laſt figure of its number to be diſtant 1 place from the place of units, i. e. to be in the place of tens, and conſequently the number itſelf to be either 10, or ſome number between that and 100, and ſo of the other indices. Hence all numbers, which have the ſame denominative, but not the ſame numerative parts, as all numbers from 1 to 10, from 10 to 100, &c. will have *logorithms*, whoſe indices are the ſame, but the other members different. Again, all numbers which have the ſame numerative, but not denominative part, will have different indices; but the reſt of the *logarithms* the ſame. If a number be purely decimal, to its *logarithm* is affixed a negative index, ſhewing the diſtance of its firſt ſignificative figure, from the place of units. Thus the *logarithm* of the decimal .256 is $\bar{1}.408240$, of the decimal .0256 is $\bar{2}.408240$, &c.

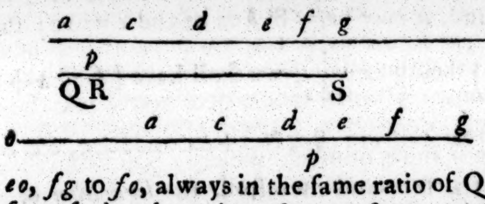
Inſtead of theſe negative indices, ſome uſe their complements to 10, ſet down with a point on each ſide thus, .9. .8. .7. i.e. ſuch a figure is made the index, as when ſubtracted from 9, leaves a remainder expreſſing the number of cyphers prefixed to the decimal: thus the *log.* of

.256 is .9.408240
of .0256, .8. 408240.

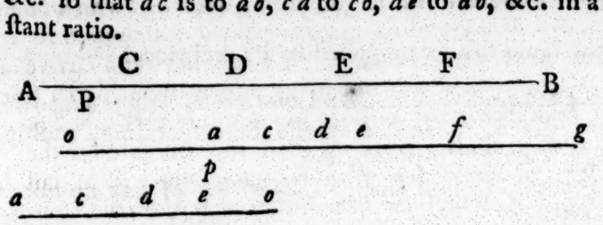
Logarithms are not only of great uſe for facilitating computations in arithmetic and trigonometry, but have been found of extenſive ſervice in the higher geometry, particularly in the method of fluxions. The nature and geneſis of *logarithms* are explained above, after the manner made uſe of in moſt elementary treatiſes; but it may be proper to add ſomething more on this ſubject from Mr. Maclaurin's Treatiſe of Fluxions, who has explained the nature and geneſis of *logarithms*, agreeably to the notion of their firſt inventor, lord Napier, delivered in his Mirif. Logar. Canon. Deſcript.

Logarithms, and the quantities to which they correſpond, may be ſuppoſed to be generated by the motion of a point. If this point moves over equal ſpaces in equal times, the line deſcribed by it increaſes equally.

Again, a line decreaſes proportionally, when the point that moves over it deſcribes ſuch parts in equal times as are always in the ſame conſtant ration to the lines from which they are ſubducted, or to the diſtances of that point at the beginning of thoſe times, from a given term in the line. In like manner, a line may increaſe proportionally, if in equal time the moving point deſcribes ſpaces proportional to its diſtances from a certain term, at the beginning of each time. Thus, in the firſt caſe, let ac be to ao, cd to co, de, to do, ef to eo, fg to fo, always in the ſame ratio of QR to QS; and ſuppoſe that the point p ſets out from a, deſcribing ac, cd, de, ef, fg, in equal parts of the time; and let the ſpace deſcribed by p, in any given time, be always in the ſame ratio to the diſtance of p from o, at the beginning of that time, then will the right line ao decreaſe proportionally; and the lines ao, co, do, eo, fo, &c. or the diſtances of the point p from o, at equal ſucceeding intervals of time, are in a continued geometrical progreſſion.



In like manner the line oa increaſes proportionally, if the point p in equal times deſcribes ſpaces ac, cd, de, ef, fg, &c. ſo that ac is to ao, cd to co, de to do, &c. in a conſtant ratio.



If we now ſuppoſe a point P deſcribing the line A B with an uniform motion, equal to that with which p ſets out from a, in deſcribing the line ao, while the point p deſcribes a line increaſing or decreaſing proportionally, the line A P deſcribed by P with this uniform motion, in the ſame time that oa, by increaſing or decreaſing proportionally, becomes equal to op, in the *logarithm* of op. Thus AC, AD, AE, &c. are the *logarithms* of oc, od, oe, &c. reſpectively; and oa is the quantity whoſe *logarithm* is ſuppoſed equal to nothing.

We have here abſtracted from numbers, that the doctrine may be the more general; but it is plain, that if AC, AD, A E, &c. be ſuppoſed 1, 2, 3, &c. in arithmetic progreſſion; oc, od, oe, &c. will be in geometric progreſſion; and that the *logarithm* of oa, which may be taken for unity, is nothing.

Lord Napier, in his firſt ſcheme of *logarithms*, ſuppoſes, that while op increaſes or decreaſes proportionally, the uniform motion of the point P, by which the *logarithm* of op is generated, is equal to the velocity of p at a; that is, at the term of time when the *logarithms* begin to be generated. Hence *logarithms*, formed after this model, are called *Napier's logarithms*, and ſometimes *natural logarithms*.

When a ratio is given, the point p deſcribes the difference of the terms of the ratio in the ſame time. When a ratio is duplicate of another ratio, the point p deſcribes the difference of the terms in a double time. When a ratio is triplicate of another, it deſcribes the difference of the terms in a triple time; and ſo on. Alſo when a ratio is compounded of two or more ratios, the point p deſcribes the difference of the terms of that ratio, in a time equal to the ſum of the times in which it deſcribes the differences of the terms of the ſimple ratios of which it is compounded. And what is here ſaid of the times of the motion of p, when op increaſes proportionally, is to be applied to the ſpaces deſcribed by P in thoſe times, with its uniform motion.

Hence the chief properties of *logarithms* are deduced. They are the meaſures of ratios. The exceſs of the *logarithms* of the antecedent above the *logarithm* of the conſequent meaſures the ratio of thoſe terms. The meaſure of the ratio of a greater quantity to a leſſer is poſitive, as this ratio compounded with any other ratio increaſes it. The ratio of equality, compounded with any other ratio, neither increaſes nor diminiſhes it; and its meaſure is nothing. The meaſure of the ratio of a leſſer quantity to a greater is negative, as this ratio compounded with any other ratio diminiſhes it. The ratio of any quantity A to unity, compounded with the ratio of unity to A, produces the ratio of A to A, or the ratio of equality; and the meaſures of thoſe two ratios deſtroy each other, when added together; ſo that when one is conſidered as poſitive, the other is to be conſidered as negative.

When op increaſes proportionally, the motion of p is perpetually accelerated; and, on the contrary, when op decreaſes proportionally, the motion of p is perpetually retarded.

If the velocity of the point p be always as the diſtance op, then will this line increaſe or decreaſe in the manner ſuppoſed by lord Napier: and the velocity of the point p being the fluxion of the line op, will always vary in the ſame ratio as this quantity itſelf. See Maclaurin's Flux. art. 151—160.

The fluxion of any quantity is to the fluxion of its *logarithm*, as the quantity itſelf is to unity.

Hence the FLUXION of the *logarithm* of x will be $\frac{\dot{x}}{x}$

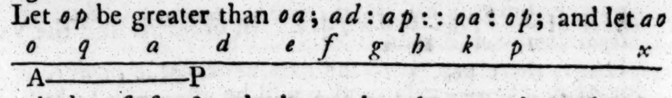
For $x : 1 :: \dot{x} : \frac{\dot{x}}{x} =$ the fluxion of the *logarithm* required.

When op increaſes proportionally, the increments generated in any equal times, are accurately in the ſame ratio as the velocities of p, or the fluxions of op, at the beginning, end, or at any ſimilar terms of thoſe times.

When op increaſes or decreaſes proportionally, the fluxions of this line, in all the higher orders, increaſe or decreaſe in the ſame proportion as the line itſelf increaſes or decreaſes; ſo that one rule ſerves for comparing together thoſe of any kind at different terms of time: and in this caſe we never arrive at any conſtant or invariable fluxion.

If the *logarithms* of two quantities be always to each other in any invariable ratio, the fluxions of thoſe quantities ſhall be in a ratio that is compounded of a ratio of the quantities themſelves, and of the invariable ratio of the *logarithms*.

Let op be greater than oa; $ad : ap :: oa : op$; and let ao



ad, de, ef, fg, &c. be in continued proportion: then by adding together ad, $\frac{1}{2}de$, $\frac{1}{3}ef$, $\frac{1}{4}fg$, &c. we approximate continually to the value of AP, the *logarithm* of op. And we approximate continually to the *logarithm* of od, by ſumming up the differences betwixt ad and $\frac{1}{2}de$, $\frac{1}{3}ef$, and $\frac{1}{4}fg$, $\frac{1}{5}gh$, $\frac{1}{6}hk$, &c.

Theſe theorems are demonſtrated geometrically by Mr. Maclaurin, lib. cit. art. 171, 172. From what has been ſaid, it follows, that if $oa : od :: op : ox$, then the *logarithm* of ox will be equal to the ſum of the *logarithms* of op and od: that is, to the ſum of $ad + \frac{1}{2}de + \frac{1}{3}ef + \frac{1}{4}fg + \frac{1}{5}gh + \frac{1}{6}hk$, &c. and $ad - \frac{1}{2}de + \frac{1}{3}ef - \frac{1}{4}fg + \frac{1}{5}gh - \frac{1}{6}hk$, &c. which ſum is $2ad + \frac{2}{3}ef + \frac{2}{5}gh$, &c.

Let $aq = ad$; then the *logarithm* of ox will meaſure the ratio of od to oq. But od and oq have half their ſum equal to oa, and half their difference equal to ad, which are the two firſt terms of the geometric progreſſion oa, ad, de, ef, fg, gh, hk, &c. Hence, if $oa = 1$, and $ad = x$, de, ef, fg, &c, will be reſpectively, x^2, x^3, x^4, &c. and the ratio of $1 + x$ to $1 - x$ will be equal to that of od to oq. But the *logarithm* of this ratio is $2ad + \frac{2}{3}ef + \frac{2}{5}gh +$, &c. therefore the *logarithm* of $\frac{1+x}{1-x} = 2 \times \overline{x + \frac{1}{3}x^3 + \frac{1}{5}x^5 + \frac{1}{7}x^7} + \&c.$ agreeably to what has been ſhewn by Dr. Halley and others.

This ſeries is analytically deduced from the nature of *logarithms*, by Mr. Simpſon in his Trigonometry, p. 40, &c.

The hyperbolic *logarithm* of any number is the index of that term of the logarithmic progreſſion, agreeing with the propoſed number, multiplied by the exceſs of the common ratio above unity: thus, if e be an indefinite ſmall quantity, the hyperbolic *logarithm* of the natural number agreeing with any term $\overline{1+e}|^{n}$ of the logarithmic progreſſion $1,\ 1+\overline{e,\ +e}|^{2},\ \overline{1+e}|^{3}$, &c. will be expreſſed by ne. And ſince $\overline{1+e}|^{n}=N$ or the number, we ſhall have $1+e=N^{\frac{1}{n}}=\overline{1+x}|^{m}$, by putting $1+x=N$, and $m=\frac{1}{n}$. Therefore $\overline{1+x}|^{m}$ being $=1+mx+m\times\frac{m-1}{2}\times x^{2}+m\times\frac{m-1}{2}\times\frac{m-2}{3}\times x^{3}$, &c. we have $e=mx+m\times\frac{m-1}{2}\times x^{2}$, &c. where m being rejected in the factors $m-1$, $m-2$, &c. as indefinitely ſmall in compariſon of 1, 2, &c. becauſe n is, from the nature of *logarithms*, indefinitely great, the equation will become $e=mx-\frac{mx^{2}}{2}+\frac{mx^{3}}{3}-\frac{mx^{4}}{4}$, &c. whence $\frac{e}{m}(=ne=L)=x-\frac{x^{2}}{2}+\frac{x^{3}}{3}-\frac{x^{4}}{4}$, &c. But this ſeries, though the moſt eaſy and natural, is of little uſe in determining the *logarithms* of large numbers, becauſe, in all ſuch caſes, it diverges, inſtead of converging.

In order to obtain a ſeries that will always converge, let the number whoſe *logarithm* is wanted, be denoted by $\frac{1}{1-x}$, in which quantity x will be always leſs than unity, and let $\overline{1+e}|^{n}$ as before be $=\frac{1}{1-x}$; then $1+e=\frac{1}{\overline{1-x}|^{\frac{1}{n}}}=\overline{1-x}|^{-\frac{1}{n}}=\overline{1-x}|^{m}$ $\left(\text{by making } m=-\frac{1}{n}\right)=$ $1-mx+m\times\frac{m-1}{2}\times x^{2}-m\times\frac{m-1}{2}\times\frac{m-2}{3}\times x^{3}$, where m being rejected in the factors $m-1$, $m-2$, &c. as before, the equation will become $1+e=1-mx-\frac{mx^{2}}{2}-\frac{mx^{3}}{3}$, &c. whence $x+\frac{x^{2}}{2}+\frac{x^{3}}{3}$, &c. $=\frac{e}{-m}=ne=$ the hyperbolic *logarithm* of $\frac{1}{1-x}$; which ſeries will always converge, let the value of $\frac{1}{1-x}$ be ever ſo great, becauſe x will be always leſs than unity. But this ſeries being added to the former, expreſſing the *logarithm* of $1+x$, the ſeries $2x+\frac{2x^{3}}{3}+\frac{2x^{3}}{5}+\frac{2x^{7}}{7}$, &c. thence ariſing will be more ſimple than either of them, ſince one half of the terms will be entirely deſtroyed thereby: conſequently, as the ſum of the *logarithm* of any two numbers is equal to the *logarithm* of the product of thoſe numbers, the ſeries $2x+\frac{2x^{3}}{3}+\frac{2x^{3}}{5}$, &c. will truly expreſs the *logarithm* of $\frac{1+x}{1-x}$, or $\frac{1}{1-x}\times 1+x$. In order to find the value of x, let $\frac{1+x}{1-x}=N$, and x will be $=\frac{N-1}{N-2}$: but if the quantity propoſed be a fraction $-\frac{P}{Q}$, make $\frac{P}{Q}=\frac{1+x}{1-x}$, and x will be $=\frac{P-Q}{P+Q}$; either of which values ſubſtituted in the foregoing ſeries $2x+\frac{2x^{3}}{3}$, &c. will give the hyperbolic *logarithm* of the reſpective number.

To find, for example, the *logarithm* of 2, from this expreſſion of the *logarithm* of $\frac{1+x}{1-x}$. Then $\frac{1+x}{1-x}=2$, or $1+x=2-2x$, and $3x=1$, or $x=\frac{1}{3}$; that is in decimals:

$$\begin{aligned}
x\ \left(=\tfrac{1}{3}\right) &= 0{\cdot}333333333,\ \text{\&c.}\\
x^{3}\ \left(=\tfrac{1}{9}x\right) &= .037037037,\ \text{\&c.}\\
x^{5}\ \left(=\tfrac{1}{9}x^{3}\right) &= .004115226,\ \text{\&c.}\\
x^{7}\ \left(=\tfrac{1}{9}x^{5}\right) &= .000457247,\ \text{\&c.}\\
x^{9}\ \left(=\tfrac{1}{9}x^{7}\right) &= .000050805,\ \text{\&c.}\\
x^{11}\ \left(=\tfrac{1}{9}x^{9}\right) &= .000005645,\ \text{\&c.}\\
x^{13}\ \left(=\tfrac{1}{9}x^{11}\right) &= .000000627,\ \text{\&c.}\\
x^{15}\ \left(=\tfrac{1}{9}x^{13}\right) &= .000000069,\ \text{\&c.}
\end{aligned}$$

Theſe values being reſpectively divided by the numbers 1, 3, 5, 7, 9, &c. and the ſeveral quotients added together, we ſhall have .346573590, &c. whoſe double being .693147180, &c. is the hyperbolical or Napier's *logarithm* of the number 2. In the ſame manner the hyperbolic *logarithms* of any other numbers may be determined; but the moſt ready way of deriving *logarithms* from others already known, is the following: let a, b, c, denote any three numbers in arithmetical progreſſion, whoſe common difference is unity; then a being $=b-1$, and $c=b+1$, we ſhall have $ac=b^{2}-1$, and $\frac{b^{2}}{ac}=\frac{ac+1}{ac}$: whence, by the nature of *logarithms*, we ſhall have $2\ log.\ b-log.\ a-log.\ c=log.\ \frac{ac+1}{ac}$ but the *logarithm* of $\frac{ac+1}{ac}$ putting $\frac{1}{2ac+1}=x$, ſince $\frac{P}{Q}=\frac{ac+1}{ac}=\frac{1+x}{1-x}$, and $x=\frac{P-Q}{P+Q}=\frac{1}{2ac+1}$, will be $\frac{2x}{1}+\frac{2x^{3}}{3}+\frac{2x^{5}}{5}+\frac{2x^{7}}{7}$, &c. which being denoted by S, we ſhall have

$$\left\{\begin{array}{l}
log.\ b=\tfrac{1}{2}\ log.\ a+\tfrac{1}{2}log.\ c+\tfrac{1}{2}S.\\
log.\ a=2\ log.\ b-\ log.\ c-\ S.\\
log.\ c=2\ log.\ b-\ log.\ a-\ S.
\end{array}\right\}$$

E. g. To find the hyperbolic *logarithm* of 3.

The *logarithm* of 2 being known, that of 4, which is the double of the former, will alſo be known. Therefore taking $a=2$, $b=3$, and $c=4$, we ſhall have $x\left(\frac{1}{2ac+1}\right)=\frac{1}{17}$, and $x^{2}=\frac{1}{289}$. Whence,

$$x\left(=\frac{1}{17}\right)=.058823529,\ \text{\&c.}$$

$$x^{3}\left(=\frac{x}{289}\right)=.000203542,\ \text{\&c.}$$

$x^{5}\left(=\frac{x^{3}}{289}\right)=.000000704$, &c. Therefore, $\frac{1}{2}S$ $\left(x+\frac{x^{5}}{3}+\frac{x^{5}}{5},\ \text{\&c.}\right)=.058891517$, &c. and conſequently the hyperbolic *log.* of 3 $\left(\frac{\text{hyp. } log.\ 2+\text{hyp. } log.\ 4}{2}+\frac{1}{2}S\right)$ $=1.098612288$, &c.

If the hyperbolic *logarithm* of 10 were required; the *logarithms* of 8 and 9 being given from thoſe of 2 and 3 already found, a may be $=8$, $b=9$, and $c=10$; then $x\left(\frac{1}{2ac+1}\right)$ being $=\frac{1}{161}$, we ſhall have $\frac{1}{2}S\left(x+\frac{x^{3}}{3}+\frac{x^{5}}{5},\ \text{\&c.}\right)=.006211180$, &c. $+.000000079$, &c. &c. $=.006211259$, &c. and therefore, the *logarithm* of 10 $(2\ log.\ 9-log.\ 8-S)=2.302585092$, &c.

Logarithms of any other kind may be derived from theſe by multiplying the proper multiplicator or modulus.

Thus to convert any of Napier's, or of the natural *logarithms* into Briggs's, or thoſe of the common form, where the *logarithm* of 10 is unity, ſince the *logarithms* of all forms preſerve the ſame proportion with reſpect to each other, ſay, as Napier's *logarithm* of 10 is to 1, ſo is any other of Napier's *logarithms* to Briggs's *logarithm* of the ſame number. Hence, Briggs's *logarithm* will be equal to Napier's divided by 2.30258509, &c. or, which comes to the ſame thing multiplied by its reciprocal $\frac{1}{2.30258509}$ or 0.434294481, &c. And *vice verſa*, Briggs's *logarithm* being given, to find Napier's correſponding, multiply Briggs's by 2.30258509, &c.

In general, to find Briggs's *logarithm* of any number n. Let $\frac{1+x}{1-x}=n$, and conſequently $x=\frac{n-1}{n+1}$. Multiply x by 0.86858896, &c. $(=2\times 0.43429$, &c.) and then continually multiply this product by xx, and divide the reſulting products, reſpectively, by the terms of the progreſſion 1, 3, 5, 7, &c. The ſum of theſe quotients will be Briggs's *logarithm* required.

Thus, $2x+\frac{2x^{3}}{3}+\frac{2x^{5}}{5}$, &c. $\times$ 0.434294481, &c. expreſſing the common *logarithm* of $\frac{1+x}{1-x}$, this ſeries, by making $R=.868588963$, &c. will be $Rx+\frac{Rx^{3}}{3}+\frac{Rx^{5}}{5}+\frac{Rx^{7}}{7}$, &c. Therefore, to find the *logarithm* of 7, thoſe of 8 and 9 being known, we ſhall have $log.\ 7=2\ log.\ 8.-log.\ 9-S$; and $S=Rx+\frac{Rx^{3}}{3}+\frac{Rx^{5}}{5}$, &c. $=$ the common *logarithm* of $\frac{64}{63}$, $\frac{ac+1}{ac}$ being $=\frac{64}{63}$; and $x=\frac{64-63}{64+63}=\frac{1}{127}$; whence $\left(x^{2}\text{ being }=\frac{1}{16129}\right)$ we ſhall have,

$$Rx\left(=\frac{.8685,\ \text{\&c.}}{127}\right)=.006839283,\ \text{\&c.}$$

$$Rx^{3}\left(=\frac{Rx}{16129}\right)=.000000424,\ \text{\&c.}$$

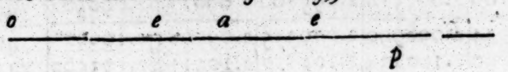
$Rx^5 \left(=\frac{Rx^3}{16129}\right)=.00000000002$, &c. Conſequently S $\left(Rx+\frac{Rx^3}{3}+\frac{Rx^5}{5}, \text{\&c.}\right)=.006839424$, &c. and 2 *log.* 8 − *log.* 9 − S = .845098040, &c. = the common *logarithm* of 7 required. But this may be obtained by fewer terms of the ſeries from the *logarithms* of the 3 firſt primes 2, 3, and 5; becauſe thoſe of 48 and 50, compoſed of them, will alſo be known: therefore the *logarithm* of 7 $\left(=\frac{1}{2}\,log.\,49=\frac{log.\,48+log.\,50+S}{4}\right)$ will be = .845098040, &c. as before, true from the firſt term of the ſeries only, to 11 places of figures.

Thus alſo the *logarithm* of the next prime number 11 may be obtained: by making $a=10$, $b=11$, and $c=12$; or by making $a=98$ or $2\times7\times7$, $b=99$ or $3\times3\times11$, and $c=100$ or $2\times2\times5\times5$; and then, by the firſt term of the ſeries, the *logarithm* of 99 will be found true to 14 places; whence that of 11 (*log.* 99 − *log* 9) is alſo known. Simpſon ubi ſupra. Cotes's Harm. Menſ. prop. I and II. Saunderſon's Algebra, vol. ii. part 2. p. 616.

As to the various compendia ariſing in the practice of conſtructing a table of *logarithms*, we refer to Gardiner's, and to Sherwin's Tables.

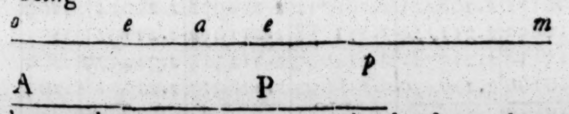
We have already obſerved, that Napier's, or the natural *logarithm* of any quantity, is found by ſuppoſing the uniform motion of the point P, by which the *logarithm* of *op* is generated, to be equal to the velocity of *p*, at the term of time when the *logarithms* begin to be generated.

But the uniform motion of P may be ſuppoſed equal to the motion of *p* at any other term, as when it comes to *e*; in which caſe, the conſtant velocity of P is to the velocity with which *p* ſets out from *a*, when the *logarithm* begins to be generated, as *oe* is to *oa*. Thus, we may have as many *logarithms* as we pleaſe; and the line *o e* is what Mr. Cotes calls the *modulus of the ſyſtem.*



The meaſures of a given ratio in the different ſyſtems are in the ſame proportion as the lines *oe*, *e* being always the term where the velocity of *p* becomes equal to the conſtant velocity of P. Hence, the *logarithm* of any quantity in Napier's firſt ſyſtem becomes equal to the *logarithm* of the ſame quantity in any other ſyſtem, whoſe modulus is *oe*, by multiplying by the number which expreſſes the ratio of *oe* to *oa*; and the modulus of any ſyſtem is to the modulus of any other ſyſtem, as the *logarithm* of any given quantity in the firſt is to its *logarithm* in the ſecond. Thus in Napier's firſt ſcheme, in the ſame time that *op*, from being equal to *o a*, becomes equal to ten times *o a*, the point P deſcribes a line, the ratio of which to *o a* is that of 2.30258509, &c. to unity. But it was found convenient, that the *logarithm* of 10 ſhould be 1; and the motion of P was ſuppoſed to be ſo far dimiſhed, that the ſpace deſcribed by it in that time might be equal only to *oa*; that is, its velocity, in this caſe, was ſuppoſed leſs than its velocity in the former, in the ſame ratio, as 1 is leſs than 2.30258, &c. If *oe* be taken leſs than *oa* in the ſame ratio, the velocity of P ſhall be equal, in this caſe, to the velocity of *p* at *e*; and *oe* will be the modulus of this ſyſtem, which will therefore be expreſſed by $0.43429448, \text{\&c.} = \frac{1}{2.30258509, \text{\&c.}}$, *o a* being unity. Maclaurin, lib. cit. art. 174.

When a ratio is given, its meaſure is always as the modulus of the ſyſtem. It is therefore the ſame invariable ratio that is always meaſured by the modulus of the ſyſtem, which is called by Mr. Cotes *ratio modularis.* This ratio is that of *om* to *oe*, if *op* by increaſing proportionally, from being

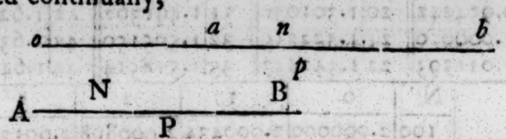


equal to *oe*, becomes equal to *om*, in the ſame time that P, by its uniform motion, deſcribes a line equal to the modulus *oe*. Ibid. art. 175, 753.

This *ratio modularis* is found to be that of 2.718281828459, &c. to 1; or of 1 to 0.367879441171, &c. Cotes, Harm. Menſur. p. 7.

If a *logarithm* z be given, the number coreſponding, if z be a natural *logarithm*, will be expreſſed by this ſeries, $1+z+\frac{1}{2}z^2+\frac{1}{6}z^3+\frac{1}{24}z^4+\frac{1}{120}z^5+\frac{1}{720}z^6+$, &c. or generally, if the modulus be M, by this, $1+\frac{z}{M}+\frac{z^2}{2M^2}+\frac{z^3}{6M^3}+$, &c. which, when, $z=M$, is changed into $1+1+\frac{1}{2}+\frac{1}{6}+\frac{1}{24}+\frac{1}{120}+$, &c. or $1+\frac{1}{1}+\frac{1}{1.2}+\frac{1}{1.2.3}+\frac{1}{1.2.3.4}+\frac{1}{1.2.3.4.5}+\frac{1}{1.2.3.4.5.6}+$. &c. = 2.7182818, &c. the ratio of which to 1 is the ratio modulans. See Maclaurin, Flux. art. 753. Cotes, Harm. Menſ. p. 6, 7.

We have ſaid, that in lord Napier's firſt ſyſtem, the conſtant velocity of P, by which the *logarithm* AP is generated, is equal to the velocity with which *p* ſets out from *a*. Therefore, if we ſuppoſe AP and *a p* to be diminiſhed continually,



AP being always the *logarithm* of *op*, their ratio ſhall continually approach to a ratio of equality as its LIMIT. And, *oa* being ſuppoſed to repreſent unity, if *ap* be very ſmall compared with *oa*, it may be ſuppoſed in approximations to be the *logarithm* of *op*, in this ſyſtem; and any very ſmall fraction may be ſuppoſed to be the *logarithm* of the ſum of unity and that fraction added together. From this it follows, that if a ſeries of mean proportionals be interpoſed between *oa* and any given line *ob*, and the number of all the terms, excluſive of *oa*, be *x*; and *on* being the ſecond term of the ſeries, *a n* be to *ab* as unity is to the number *q*: then, by increaſing continually the number of mean proportionals betwixt *oa* and *ob*, the ratio of *x* to *q* ſhall approach continually to the ratio of AB (the *logarithm* of *ob*) to *ab*, as its limit. For the number *x* is to unity as AB is to AN (the *logarithm* of *on*;) and unity is to *q* as *a n* (which approaches continually to AN) is to *ab*. Therefore the ratio of *x* to *q* approaches continually to that of AB to *ab*. For inſtance, if *o b* be double of *oa*, the ratio of *x* to *q* approaches continually to the ratio of the natural *logarithm* of 2 to unity, which is nearly that of 7 to 10. Maclaurin lib. cit. art. 179, and De Moivre Doctr. of Chances, probl. 5.

The firſt canon of *logarithms* for natural numbers, from 1 to 20000, and from 90000 to 10,1000, was conſtructed by Hen. Briggs, with the approbation of the inventor, the lord Napier, and in purſuance of a hint ſuggeſted by him in 1616, who propoſed altering his firſt canon, by making 0 the *logarithm* of unity, and 10 that of the ſine total, and the manner of conſtructing them ſhewn in his Arithmetica *Logarithmica*, publiſhed in 1624. Of this method Dr. Halley ſays, that to have his *logarithm* true to 14 places of figures, Mr. Briggs, by continual extraction, was obliged to find the root of more than 140 million of millionth power. Briggs lived to complete a table of logarithmic ſines and tangents, to the 100th part of every degree, and to 14 places of figures, beſides the index; to which he intended to have added a full deſcription and uſe; but, being prevented by death, this was done by Mr. Henry Gellibrand, in his Trigonometria Britannica, publiſhed at London, or as ſome ſay, at Gouda, in 1633. The chaſm between 20000 and 90000, was filled up by Adrian Ulacq, who publiſhed a ſecond edition of the Arithmetica *Logarithmica*, at Tergou, in 1628, in which was contained all the *logarithms* from 1 to 100000 to 10 places of figures, together with a table of artificial ſines, tangents, and ſecants, to every minute of the quadrant. Some copies of Ulacq's tables were purchaſed by our bookſellers, and publiſhed at London, with an Engliſh explanation premiſed, dated 1631. Ulacq alſo publiſhed at the ſame place, in 1633, his Trigonometria Artificialis, with tables of logarithmic ſines and tangents to every tenth ſecond of the quadrant. Ulacq's tables are in in high eſteem for their exactneſs, as are alſo amongſt us Sherwin's firſt edition, in 1706, in which we have the *logarithms* of numbers from 1 to 101000, together with the differences and proportional parts, whereby the *logarithm* of any number under 10.000.000 may eaſily be found; and Gardiner's in 1752, containing the *logarithms* for all numbers from 1 to 102100, with the differences and proportional parts. M. de Fontenelle, in the Hiſtory of the Academy of Sciences, for 1717, commends an edition of Ulacq's ſmaller tables, made at Lyons, in 1670, and M. de a Lande, in his Aſtronomy, printed at Paris in 1764, tables publiſhed there in 1760.

In the common tables we have only a canon from 1 to 10000.—There are various other methods of conſtructing *logarithms*, by Dr. Halley, Mercator, Mr. Cotes, Dr. Brook Taylor, &c. which the reader may find in the Philoſophical Tranſactions, and other treatiſes on this ſubject.

As we have frequent occaſion for recurring to tables of *logarithms*, in the courſe of this work, we ſhall here, with a view of rendering the work more complete, annex thoſe in common uſe.

A TABLE of LOGARITHMS, from 1 to 10000.

N°	Logar.	N°	Logar.	N°	Logar.	N°	Logar.	N°	Logar.	N°	Logar.	N°	Logar.	N°	Logar.	N°	Logar.
1	0.000000	12	1.079181	23	1.361728	34	1.531479	45	1.653212	56	1.748188	67	1.826075	78	1.892095	89	1.949390
2	0.301030	13	1.113943	24	1.380211	35	1.544068	46	1.662758	57	1.755875	68	1.832508	79	1.897627	90	1.954242
3	0.477121	14	1.146128	25	1.397940	36	1.556302	47	1.672098	58	1.763428	69	1.838849	80	1.903090	91	1.959041
4	0.602060	15	1.176091	26	1.414973	37	1.568202	48	1.681241	59	1.770852	70	1.845098	81	1.908485	92	1.963788
5	0.698970	16	1.204120	27	1.431364	38	1.579784	49	1.690196	60	1.778151	71	1.851258	82	1.913814	93	1.968483
6	0.778151	17	1.230449	28	1.447158	39	1.591065	50	1.698970	61	1.785330	72	1.857332	83	1.919078	94	1.973128
7	0.845098	18	1.255272	29	1.462398	40	1.602060	51	1.707570	62	1.792392	73	1.863323	84	1.924279	95	1.977724
8	0.903090	19	1.278754	30	1.477121	41	1.612784	52	1.716003	63	1.799340	74	1.869232	85	1.929419	96	1.982271
9	0.954242	20	1.301030	31	1.491362	42	1.623249	53	1.724276	64	1.806180	75	1.875061	86	1.934498	97	1.986772
10	1.000000	21	1.322219	32	1.505150	43	1.633468	54	1.732394	65	1.812913	76	1.880814	87	1.939519	98	1.991226
11	1.041393	22	1.342423	33	1.518514	44	1.643453	55	1.740363	66	1.819544	77	1.886491	88	1.944483	99	1.995635

N°	0	1	2	3	4	5	6	7	8	9	Diff.
100	2.000000	2.000434	2.000868	2.001301	2.001734	2.002166	2.002598	2.003029	2.003460	2.003891	432
101	2.004321	2.004751	2.005180	2.005609	2.006038	2.006466	2.006894	2.007321	2.007748	2.008174	428
102	2.008600	2.009026	2.009451	2.009876	2.010300	2.010724	2.011147	2.011570	2.011993	2.012415	424
103	2.012837	2.013259	2.013680	2.014100	2.014520	2.014940	2.015360	2.015779	2.016197	2.016615	419
104	2.017033	2.017451	2.017868	2.018284	2.018700	2.019116	2.019532	2.019947	2.020361	2.020775	416
105	2.021189	2.021603	2.022016	2.022438	2.022841	2.023252	2.023664	2.024075	2.024486	2.024896	412
106	2.025306	2.025715	2.026124	2.026533	2.026942	2.027350	2.027757	2.028164	2.028571	2.028978	408
107	2.029384	2.029789	2.030195	2.030600	2.031004	2.031408	2.031812	2.032216	2.032619	2.033021	404
108	1.033424	2.033826	2.034227	2.034628	2.035029	2.035430	2.035830	2.036229	2.036629	2.037028	400
109	2.037426	2.037825	2.038223	2.038620	2.039017	2.039414	2.039811	2.040207	2.040602	2.040998	396
110	2.041393	2.041787	2.042182	2.042575	2.042969	2.043362	2.043755	2.044148	2.044540	2.044931	393
111	2.045323	2.045714	2.046105	2.046495	2.046885	2.047275	2.047664	2.048053	2.048442	2.048830	389
112	2.049218	2.049606	2.049993	2.050380	2.050766	2.051152	2.051538	2.051924	2.052309	2.052694	385
113	2.053078	2.053463	2.053846	2.054230	2.054613	2.054996	2.055378	2.055760	2.056142	2.056524	382
114	2.056905	2.057286	2.057666	2.058046	2.058426	2.058805	2.059185	2.059563	2.059942	2.060320	379
115	2.060698	2.061075	2.061452	2.061829	2.062206	2.062582	2.062958	2.063333	2.063709	2.064083	376
116	2.064458	2.064832	2.065206	2.065580	2.065953	2.066326	2.066698	2.067071	2.067443	2.067814	372
117	2.068186	2.068557	2.068928	2.069298	2.069668	2.070038	2.070407	2.070766	2.071145	2.071514	369
118	2.071882	2.072250	2.072617	2.072985	2.073352	2.073718	2.074085	2.074451	2.074816	2.075182	366
119	2.075547	2.075912	2.076276	2.076640	2.077004	2.077368	2.077731	2.078094	2.078457	2.078819	363
120	2.079181	2.079543	2.079904	2.080266	2.080626	2.080987	2.081347	2.081707	2.082067	2.082426	360
121	2.082785	2.083144	2.083503	2.083861	2.084219	2.084576	2.084934	2.085291	2.085647	2.086004	357
122	2.086360	2.086716	2.087071	2.087426	2.087781	2.088136	2.088490	2.088845	2.089198	2.089552	355
123	2.089905	2.090258	2.090611	2.090963	2.091315	2.091667	2.092018	2.092370	2.092721	2.093071	351
124	2.093422	2.093772	2.094122	2.094471	2.094820	2.095169	2.095518	2.095866	2.096215	2.096562	349
125	2.096910	2.097257	2.097604	2.097951	2.098297	2.098644	2.098990	2.099335	2.099681	2.100026	346
126	2.100371	2.100715	2.101059	2.101403	2.101747	2.102090	2.102434	2.102777	2.103119	2.103462	343
127	2.103804	2.104145	2.104487	2.104828	2.105169	2.105510	2.105851	2.106191	2.106531	2.106870	340
128	2.107210	2.107549	2.107888	2.108227	2.108565	2.108903	2.109241	2.109578	2.109916	2.110253	338
129	2.110590	2.110926	2.111262	2.111598	2.111934	2.112270	2.112605	2.112940	2.113275	2.113609	335
130	2.113943	2.114277	2.114611	2.114944	2.115278	2.115610	2.115943	2.116276	2.116608	2.116940	333
131	2.117271	2.117603	2.117934	2.118265	2.118595	2.118926	2.119256	2.119586	2.119915	2.120245	330
132	2.120574	2.120903	2.121231	2.121560	2.121888	2.122216	2.122543	2.122871	2.123198	2.123525	328
133	2.123852	2.124178	2.124504	2.124830	2.125156	2.125481	2.125806	2.128131	2.126456	2.126781	325
134	2.127105	2.127429	2.127752	2.128076	2.128399	2.128722	2.129045	2.129368	2.129690	2.130012	323
135	2.130334	2.130655	2.130977	2.131298	2.131619	2.131939	2.132260	2.132580	2.132900	2.133219	321
136	2.133539	2.133858	2.134177	2.134496	2.134814	2.135133	2.135451	2.135768	2.136086	2.136403	318
137	2.136721	2.137037	2.137354	2.137670	2.137987	2.138303	2.138618	2.138934	2.139249	2.139564	315
138	2.139879	2.140194	2.140508	2.140822	2.141136	2.141450	2.141763	2.142076	2.142389	2.142702	314
139	2.143015	2.143327	2.143639	2.142951	2.144263	2.144574	2.144885	2.145196	2.145507	2.145818	311
140	2.146128	2.146438	2.146748	2.147058	2.147367	2.147676	2.147985	2.148294	2.148603	2.148911	309
141	2.149219	2.149527	2.149835	2.150142	2.150449	2.150756	2.151063	2.151370	2.151676	2.151982	307
142	2.152288	2.152594	2.152900	2.153205	2.153510	2.153815	2.154119	2.154424	2.154728	2.155032	305
143	2.155336	2.155640	2.155943	2.156246	2.156549	2.156852	2.157154	2.157457	2.157759	2.158061	303
144	2.158362	2.158664	2.158965	2.159266	2.159567	2.159868	2.160168	2.160468	2.160769	2.161068	301
145	2.161368	2.161667	2.161967	2.162266	2.162564	2.162863	2.163161	2.163459	2.163757	2.164055	299
146	2.164353	2.164650	2.164947	2.165244	2.165541	2.165838	2.166134	2.166430	2.166726	2.167022	297
147	2.167317	2.167613	2.167908	2.168203	2.168497	2.168792	2.169086	2.169380	2.169674	2.169968	295
148	2.170262	2.170555	2.170848	2.171141	2.171434	2.171726	2.172019	2.172311	2.172603	2.172895	293
149	2.173186	2.173478	2.173769	2.174060	2.174351	2.174641	2.174932	2.175222	2.175512	2.175802	291
150	2.176091	2.176381	2.176670	2.176959	2.177248	2.177536	2.177825	2.178113	2.178401	2.178689	289
151	2.178977	2.179264	2.179552	2.179839	2.180126	2.180413	2.180699	2.180986	2.181272	2.181558	287
152	2.181844	2.182129	2.182415	2.182700	2.182985	2.183270	2.183554	2.183839	2.184123	2.184407	285
153	2.184691	2.184975	2.185259	2.185542	2.185826	2.186108	2.186391	2.186674	2.186956	2.187239	283
154	2.187521	2.187803	2.188084	2.188366	2.188647	2.188928	2.189209	2.189490	2.189771	2.190051	281
155	2.190332	2.190612	2.190892	2.191171	2.191451	2.191730	2.192010	2.192289	2.192567	2.192846	279
156	2.193125	2.193403	2.193681	2.193959	2.194237	2.194514	2.194792	2.195069	2.195346	2.195623	278
157	2.195900	2.196176	2.196452	2.196729	2.197005	2.197280	2.197556	2.197832	2.198107	2.198382	276
158	2.198657	2.198932	2.199206	2.199481	2.199755	2.200029	2.200303	2.200577	2.200850	2.201124	274
159	2.201397	2.201670	2.201943	2.202216	2.202488	2.202761	2.203033	2.203305	2.203577	2.203848	272
160	2.204120	2.204391	2.204662	2.204933	2.205204	2.205475	2.205745	2.206016	2.206286	2.206556	271
161	2.206826	2.207095	2.207365	2.207634	2.207903	2.208172	2.208441	2.208710	2.208978	2.209247	269
162	2.209515	2.209783	2.210051	2.210318	2.210586	2.210853	2.211120	2.211388	2.211654	2.211921	267
163	2.212188	2.212454	2.212720	2.212986	2.213252	2.213518	2.213783	2.214049	2.214314	2.214579	266
164	2.214844	2.215109	2.215373	2.215638	2.215902	2.216166	2.216430	2.216694	2.216957	2.217221	264
165	2.217484	2.217747	2.218010	2.218273	2.218535	2.218798	2.219060	2.219322	2.219584	2.219846	262
166	2.220108	2.220370	2.220631	2.220892	2.221153	2.221414	2.221675	2.221936	2.222196	2.222456	261
167	2.222716	2.222976	2.223236	2.223496	2.223755	2.224015	2.224274	2.224533	2.224792	2.225051	259
168	2.225309	2.225568	2.225826	2.226084	2.226342	2.226600	2.226858	2.227115	2.227372	2.227630	258
169	2.227887	2.228143	2.228400	2.228657	2.228913	2.229170	2.229426	2.229682	2.229938	2.230193	256
170	2.230449	2.230704	2.230960	2.231215	2.231470	2.231724	2.231979	2.232233	2.232488	2.232742	254
171	2.232996	2.233250	2.233504	2.233757	2.234011	2.234264	2.234517	2.234770	2.235023	2.235276	253
172	2.235528	2.235781	2.236033	2.236285	2.236537	2.236789	2.337041	2.237292	2.237544	2.237795	252
173	2.238046	2.238297	2.238548	2.238799	2.239049	2.239299	2.239549	2.239800	2.240050	2.240299	250
174	2.240549	2.240799	2.241048	2.241297	2.241546	2.241795	2.242044	2.242293	2.242541	2.242790	249
175	2.243038	2.243286	2.243534	2.243782	2.244030	2.244277	2.244524	2.244772	2.245010	2.245266	248
176	2.245513	2.245759	2.246006	2.246252	2.246499	2.246745	2.246991	2.247236	2.247482	2.247728	246
177	2.247973	2.248219	2.248464	2.248709	2.248954	2.249198	2.249443	2.249687	2.249932	2.250176	245
178	2.250420	2.250664	2.250908	2.251151	2.251395	2.251638	2.251881	2.252125	2.252367	2.252610	243
179	2.252853	2.253096	2.253338	2.253580	2.253822	2.254064	2.254306	2.254548	2.254790	2.255031	242

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
180	2.255272	2.255514	2.255755	2.255996	2.256236	2.256477	2.256718	2.256958	2.257189	2.257439	241
181	2.257679	2.257918	2.258158	2.258398	2.258637	2.258877	2.259116	2.259355	2.259594	2.259833	239
182	2.260071	2.260310	2.260548	2.260787	2.261025	2.261263	2.261501	2.261738	2.261976	2.262214	238
183	2.262451	2.262688	2.262925	2.263162	2.263399	2.263636	2.263873	2.264109	2.264345	2.264582	237
184	2.264818	2.265054	2.265290	2.265525	2.265761	2.265996	2.266232	2.266467	2.266702	2.266937	235
185	2.267172	2.267406	2.267641	2.267875	2.268110	2.268344	2.268578	2.268812	2.269046	2.269279	234
186	2.269513	2.269746	2.269980	2.270213	2.270446	2.270679	2.270912	2.271144	2.271377	2.271609	233
187	2.271842	2.272074	2.272306	2.272538	2.272770	2.273001	2.273233	2.273464	2.273696	2.273927	232
188	2.274158	2.274389	2.274620	2.274850	2.275081	2.275311	2.275542	2.275772	2.276002	2.276232	230
189	2.276462	2.276691	2.276921	2.277151	2.277380	2.277609	2.277838	2.278067	2.278296	2.278525	229
190	2.278574	2.278982	2.279210	2.279439	2.279667	2.279895	2.280123	2.280351	2.280578	2.280806	228
191	2.281033	2.281261	2.281488	2.281715	2.281942	2.282169	2.282395	2.282622	2.282849	2.283075	227
192	2.283301	2.283527	2.283753	2.283979	2.284205	2.284431	2.284656	2.284882	2.285107	2.285332	226
193	2.285557	2.285782	2.286007	2.286232	2.286456	2.286681	2.286905	2.287130	2.287354	2.287578	225
194	2.287802	2.288025	2.288249	2.288473	2.288696	2.288920	2.289143	2.289366	2.289589	2.289812	223
195	2.290035	2.290257	2.290480	2.290702	2.290925	2.291147	2.291369	2.291591	2.291813	2.292034	222
196	2.292256	2.292478	2.292699	2.292920	2.293141	2.293362	2.293583	2.293804	2.294025	2.294246	221
197	2.294466	2.294687	2.294907	2.295127	2.295347	2.295567	2.295787	2.296007	2.296226	2.296446	220
198	2.296665	2.296884	2.297104	2.297323	2.297542	2.297760	2.297979	2.298198	2.298416	2.298635	219
199	2.298853	2.299071	2.299289	2.299507	2.299725	2.299943	2.300160	2.300378	2.300595	2.300813	218
200	2.301030	2.301247	2.301464	2.301681	2.301898	2.302114	2.302331	2.302547	2.302764	2.302980	217
201	2.303196	2.303412	2.303628	2.303844	2.304059	2.304275	2.304490	2.304706	2.304921	2.305136	216
202	2.305351	2.305566	2.305781	2.305996	2.306210	2.306425	2.306639	2.306854	2.307068	2.307282	215
203	2.307496	2.307710	2.307924	2.308137	2.308351	2.308564	2.308778	2.308991	2.309204	2.309417	213
204	2.309630	2.309843	2.310056	2.310268	2.310481	2.310693	2.310906	2.311118	2.311330	2.311542	212
205	2.311754	2.311966	2.312177	2.312389	2.312600	2.312812	2.313023	2.313324	2.313445	2.313656	211
206	2.313867	2.314078	2.314289	2.314499	2.314710	2.314920	2.315130	2.315340	2.315550	2.315760	210
207	2.315970	2.316180	2.316390	2.316599	2.316809	2.317018	2.317227	2.317436	2.317645	2.317854	209
208	2.318063	2.318272	2.318481	2.318689	2.318898	2.319106	2.319314	2.319523	2.319730	2.319938	208
209	2.320146	2.320354	2.320562	2.320769	2.320977	2.321184	2.321391	2.321598	2.321805	2.322012	207
210	2.322219	2.322426	2.322633	2.322839	2.323046	2.323252	2.323458	2.323664	2.323871	2.324077	206
211	2.324282	2.324488	2.324694	2.32489	2.325105	2.325310	2.325516	2.325721	2.325926	2.326131	205
212	2.326336	2.326541	2.326745	2.326950	2.327154	2.327359	2.327563	2.327767	2.327972	2.328176	204
213	2.328380	2.328583	2.328787	2.328991	2.329194	2.329398	2.329601	2.329804	2.330008	2.330211	203
214	2.330414	2.330617	2.330819	2.331022	2.331225	2.331427	2.331629	2.331832	2.332034	2.332236	202
215	2.332438	2.332640	2.332842	2.333044	2.333264	2.333447	2.333649	2.333850	2.334051	2.334253	202
216	2.334454	2.334655	2.334856	2.335056	2.335257	2.335458	2.335658	2.335859	2.336059	2.336259	201
217	2.336460	2.336660	2.336860	2.337060	2.337260	2.337459	2.337659	2.337858	2.338058	2.338257	200
218	2.338456	2.338656	2.338855	2.339054	2.339253	2.339451	2.339650	2.339849	2.340047	2.340246	199
219	2.340444	2.340642	2.340840	2.341039	2.341235	2.341434	2.341632	2.341830	2.342028	2.342225	198
220	2.342423	2.342620	2.342817	2.343014	2.343212	2.343409	2.343605	2.343802	2.343999	2.344196	197
221	2.344392	2.344589	2.344785	2.344981	2.345178	2.345374	2.345570	2.345766	2.345961	2.346157	196
222	2.346353	2.346549	2.346744	2.346939	2.347135	2.347330	2.347525	2.347720	2.347915	2.348110	195
223	2.348305	2.348500	2.348694	2.348889	2.349083	2.349277	2.349472	2.349660	2.349860	2.350054	194
224	2.350248	2.350442	2.350636	2.350829	2.351023	2.351216	2.351500	2.351603	2.341796	2.351989	193
225	2.352182	2.352375	2.352568	2.352761	2.352954	2.353146	2.353339	2.353532	2.353724	2.353916	193
226	2.354108	2.354301	2.354493	2.354684	2.354876	2.355068	2.355260	2.355451	2.355643	2.355834	192
227	2.356026	2.356217	2.356408	2.356599	2.356790	2.356981	2.357172	2.357363	2.357554	2.357744	191
228	2.357935	2.358125	2.358316	2.358506	2.358696	2.358886	2.359076	2.359266	2.359456	2.359646	190
229	2.359835	2.360025	2.360215	2.360404	2.360593	2.360783	2.360972	2.361161	2.361350	2.361539	189
230	2.361728	2.361917	2.362105	2.362294	2.362482	2.362671	2.362859	2.363048	2.363236	2.363424	188
231	2.363612	2.363800	2.363988	2.364176	2.364363	2.364551	2.364739	2.364926	2.365113	2.365301	188
232	2.365488	2.365675	2.365862	2.366040	2.366236	2.366423	2.366700	2.366796	2.366983	2.367169	187
233	2.367356	2.367542	2.367728	2.367915	2.368101	2.368287	2.368473	2.368659	2.368844	2.369030	186
234	2.369216	2.369401	2.369587	2.369772	2.369958	2.370143	2.370328	2.370513	2.370698	2.370883	185
235	2.371068	2.371253	2.371437	2.371622	2.371806	2.371991	2.372175	2.372360	2.372544	2.372728	184
236	2.372912	2.373096	2.373280	2.373464	2.373647	2.373831	2.374015	2.374198	2.374382	2.374565	184
237	2.374748	2.374931	2.375115	2.375298	2.375481	2.375664	2.375846	2.376029	2.376212	2.376394	183
238	2.376577	2.376759	2.376942	2.377124	2.377306	2.377488	2.377670	2.377852	2.378034	2.378216	182
239	2.378398	2.378580	2.378761	2.378943	2.379124	2.379305	2.379487	2.379668	2.379849	2.380030	181
240	2.380211	2.380392	2.380573	2.380754	2.380934	2.381115	2.381296	2.381476	2.381656	2.381837	181
241	2.382017	2.382197	2.382377	2.382557	2.382737	2.382917	2.383097	2.382277	2.383456	2.383636	180
242	2.383815	2.383995	2.384175	2.384353	2.384533	2.384712	2.384891	2.385070	2.385249	2.385427	179
243	2.385606	2.385785	2.385964	2.386142	2.386321	2.386499	2.386677	2.386855	2.387034	2.387212	178
244	2.387390	2.387568	2.387746	2.387923	2.388101	2.388279	2.388456	2.388634	2.388811	2.388989	178
245	2.389166	2.389343	2.389520	2.389697	2.389874	2.390051	2.390228	2.390405	2.390582	2.390758	177
246	2.390935	2.391112	2.391288	2.391464	2.391641	2.391817	2.391993	2.392169	2.392345	2.392521	176
247	2.392697	2.392873	2.393048	2.393224	2.393400	2.393575	2.393751	2.393926	2.394101	2.394276	176
248	2.394452	2.394627	2.394802	2.394977	2.395152	2.395326	2.395501	2.395676	2.395850	2.396025	175
249	2.396199	2.396374	2.396548	2.396722	2.396869	2.397070	2.397245	2.397419	2.397592	2.397766	174
250	2.397940	2.398114	2.398287	2.398461	2.398634	2.398808	2.398981	2.399154	2.399327	2.399501	173
251	2.399674	2.399847	2.400020	2.400192	2.400365	2.400538	2.400711	2.400883	2.401056	2.401228	173
252	2.401400	2.401573	2.401745	2.401917	2.402089	2.402261	2.402433	2.402605	2.402777	2.402949	172
253	2.403120	2.403292	2.403464	2.403635	2.403807	2.403978	2.404149	2.404320	2.404492	2.404663	171
254	2.404834	2.405005	2.405175	2.405346	2.405517	2.405688	2.405858	2.406029	2.406199	2.406370	171
255	2.406540	2.406710	2.406881	2.407051	2.407221	2.407391	2.407561	2.407731	2.407900	2.408070	170
256	2.408240	2.408409	2.408579	2.408749	2.408918	2.409087	2.409257	2.409426	2.409595	2.409764	169
257	2.409933	2.410102	2.410271	2.410440	2.410608	2.410777	2.410946	2.411114	2.411283	2.411451	169
258	2.411620	2.411788	2.411956	2.412124	2.412292	2.412460	2.412628	2.412796	2.412964	2.413132	168
259	2.413300	2.413467	2.413635	2.413802	2.413970	2.414137	2.414305	2.414472	2.414639	2.414806	167
260	2.414973	2.415140	2.415307	2.415474	2.415641	2.415808	2.415974	2.416141	2.416308	2.416474	167
261	2.416640	2.416807	2.416973	2.417139	2.417306	2.417472	2.417638	2.417804	2.417970	2.418135	166
262	2.418301	2.418467	2.418632	2.418798	2.418964	2.419129	2.419295	2.419460	2.419625	2.419791	165
263	2.419956	2.420121	2.420286	2.420451	2.420616	2.420781	2.420945	2.421110	2.421275	2.421439	165
264	2.421604	2.421768	2.421933	2.42209	2.422261	2.422426	2.422590	2.422750	2.422918	2.423082	164
265	2.423246	2.423410	2.423573	2.423737	2.423901	2.424064	2.424228	2.424393	2.424555	2.424718	164
266	2.424882	2.425045	2.425208	2.425371	2.425534	2.425697	2.425860	2.426023	2.426186	2.426349	163
267	2.426511	2.426674	2.426836	2.426999	2.427161	2.427324	2.427486	2.427648	2.427811	2.427973	162
268	2.428135	2.428297	2.428459	2.428021	2.428782	2.428844	2.429106	2.429268	2.429429	2.429591	162
269	2.429752	2.429914	2.430075	2.430236	2.430398	2.430559	2.430720	2.430881	2.431042	2.431203	161
270	2.431364	2.431525	2.431685	2.431846	2.432007	2.432167	2.432328	2.432488	2.432649	2.43280	160
271	2.432965	2.433129	2.433290	2.433450	2.433610	2.433770	2.433930	2.434090	2.434249	2.434409	160
272	2.434569	2.434728	2.434888	2.435048	2.435207	2.435366	2.435526	2.435685	2.435844	2.43600	159
273	2.436163	2.436322	2.436481	2.436640	2.436798	2.436957	2.437116	2.437275	2.437433	2.437592	159
274	2.437751	2.437909	2.438067	2.438226	2.438384	2.438542	2.438705	2.438859	2.439010	2.439175	158

N°	0	1	2	3	4	5	6	7	8	9	Diff.
275	2.439333	2.439491	2.439648	2.439806	2.439964	2.440122	2.440279	2.440439	2.440594	2.440752	158
276	2.440909	2.441066	2.441224	2.441381	2.441538	2.441695	2.441852	2.442009	2.442166	2.442323	157
277	2.442480	2.442636	2.442793	2.442950	2.443106	2.443263	2.443419	2.443576	2.443732	2.443888	157
278	2.444045	2.444201	2.444357	2.444513	2.444660	2.444825	2.447891	2.445137	2.445293	2.445448	156
279	2.445604	2.445760	2.445915	2.446071	2.446226	2.446382	2.446537	2.446692	2.446848	2.447003	155
280	2.447158	2.447313	2.447468	2.447623	2.447778	2.447933	2.448088	2.448242	2.448397	2.448552	155
281	2.448706	2.448861	2.449015	2.449170	2.449324	2.449478	2.449633	2.449787	2.449941	2.450095	154
282	2.450259	2.450403	2.450557	2.450711	2.450865	2.451018	2.451172	2.451326	2.451479	2.451633	154
283	2.451786	2.451940	2.452993	2.452247	2.452400	2.452553	2.452706	2.452859	2.453012	2.453165	153
284	2.453318	2.453471	2.453624	2.453777	2.453930	2.454082	2.454235	2.454387	2.454540	2.454692	153
285	2.454845	2.454997	2.455149	2.455302	2.455454	2.455606	2.455758	2.455910	2.456062	2.456214	152
286	2.456366	2.456518	2.456670	2.456821	2.456973	2.457125	2.457276	2.457428	2.457579	2.457730	152
287	2.457882	2.458033	2.458184	2.458336	2.458487	2 458638	2.458789	2.458940	2.459091	2.469242	151
288	2.459392	2.459643	2.459694	2.459845	2.459995	2.460146	2.460296	2.460447	2.460597	2.460747	151
289	2.460898	2.461084	2.461198	2.461348	2.461498	2.461649	2.461799	2.461948	2.462098	2.462248	150
290	2.462398	2.462548	2.462697	2.462847	2.462997	2.463146	2.463295	2.463445	2.463594	2.463744	150
291	2.463893	2.464042	2.464191	2.464340	2.464489	2.464638	2.464787	2.464936	2.465085	2.465234	149
292	2.465383	2.465532	2.465680	2.465829	2.465977	2.466125	2.466274	2.466423	2.466571	2.466719	148
293	2.466868	2.467016	2.467164	2.467312	2.467460	2.467608	2.467756	2.467904	2.468052	2.468199	148
294	2.468347	2.468495	2.468643	2.468790	2.468938	2.469085	2.469233	2.469380	2.469527	2.469675	147
295	2.469822	2.469969	2.470116	2.470263	2.470410	2.470557	2.470704	2.470851	2.470998	2.471145	147
296	2.471292	2.471438	2.471585	2.471732	2.471878	2.472024	2.472171	2.472317	2.472464	2.472610	146
297	2.472756	2.472903	2.473049	2.473195	2.473341	2.473487	2.473633	2.473779	2.473925	2.474070	146
298	2.474216	2.474362	2.474508	2.474653	2.474799	2.474944	2.475080	2 475235	2.475381	2.475526	146
299	2.475671	2.475816	2.475962	2.476107	2.476252	2.476396	2.476542	2.476687	2.470832	2.476976	145
300	2.477121	2.477266	2.477411	2.477555	2.477700	2.477844	2.477989	2.478133	2.478278	2.478422	145
301	2.478566	2.478711	2.478855	2.478999	2.479143	2.479287	2.479431	2.479575	2.479719	2.479863	144
302	2.480007	2.480151	2.480294	2.480438	2.480582	2.480725	2.480869	2.481012	2.481156	2.481299	144
303	2.481443	2.481586	2.481729	2.481872	2.482016	2.482159	2.482302	2.482445	2.482588	2.482731	143
304	2.482874	2.483016	2.483159	2.483302	2.483445	2.483587	2.483720	2.483872	2.484015	2.484157	143
305	2.484300	2.484442	2.484584	2.484727	2.484869	2.485011	2.485153	2.485295	2.485437	2.485579	142
306	2.485721	2.485863	2.486005	2.486147	2.486289	2.486430	2.486572	2.486714	2.486855	2.486997	142
307	2.487138	2.487280	2.487421	2.487563	2.487704	2.487845	2.487986	2.488127	2.488269	2.488409	141
308	2.488551	2.488692	2.488833	2.488973	2.489114	2.489255	2.489396	2.489537	2.489677	2.489818	141
309	2.489958	2.490099	2.490230	2.490280	2.490520	2.490661	2.490801	2.490941	2.491081	2.491222	140
310	2.491362	2.491502	2.491642	2.491782	2.491922	2.492062	2.492201	2.492341	2.492481	2.492621	140
311	2.492760	2.492900	2.493040	2.493179	2.493319	2.493458	2.493597	2.493737	2.493876	2.494015	139
312	2.494155	2.494294	2.494433	2.494572	2.494711	2.494850	2.494989	2.495128	2.495267	2.495406	139
313	2.495544	2.495683	2.495822	2.495960	2.496099	2.496237	2.496376	2.496514	2.496653	2.496791	139
314	2.496930	2.497068	2.497206	2.497344	2.497482	2.497621	2.497759	2.497897	2.498035	2.498173	138
315	2.498311	2.498448	2.498586	2.498724	2.498862	2.498999	2.499137	2.499275	2.499412	2.499549	138
316	2.499687	2.499824	2.499962	2.500099	2.500236	2.500374	2.500511	2.500684	2.500785	2.500922	137
317	2.501059	2.501196	2.501333	2.501470	2.501607	2.501744	2.501880	2.502017	2.502154	2.502290	137
318	2.502427	2.502564	2.502700	2.502837	2.502973	2.503109	2 503246	2.503382	2.503518	2.503654	136
319	2.503791	2.503927	2.504063	2.504199	2.504335	2.504471	2.504607	2.504743	2.504878	2.505014	136
320	2.505150	2.505286	2.505421	2.505557	2.505692	2.505828	2.505963	2.506099	2.506234	2.506369	136
321	2.506505	2.506640	2.506775	2.506911	2.507046	2.507181	2.507316	2.507451	2.507586	2.507721	135
322	2.507856	2.507991	2.508125	2.508260	2.508395	2.508510	2.508664	2.508799	2.508933	2.509068	135
323	2.509202	2.509337	2.509471	2.509606	2.509740	2.509874	2.510008	2.510143	2.510277	2.510411	134
324	2.510545	2.510679	2.510813	2.510947	2.511081	2.511215	2.511348	2.511482	2.511616	2.511749	134
325	2.511883	2.512017	2.512150	2.512284	2.512417	2.512551	2.512684	2.512818	2.512951	2.513084	133
326	2.513218	2.513351	2.513484	2.513617	2.513750	2.513883	2.514016	2.514149	2.514282	2.514415	133
327	2.514548	2.514680	2.514813	2.514946	2.515079	2.515211	2.515344	2.515476	2.515609	2.515741	133
328	2.515874	2.516006	2.516139	2.516271	2.516403	2.516535	2.516668	2.516799	2.516932	2.517064	132
329	2.517196	2.517328	2.517460	2.517592	2.517724	2.517855	2.517987	2.518119	2.518251	2.518382	132
330	2.518514	2.518645	2.518777	2.518909	2.519040	2.519171	2.519303	2.519434	2.519565	2.519697	131
331	2.519828	2.519959	2.520090	2.520221	2.520352	2.520483	2.520614	2.520745	2.520876	2.521007	131
332	2.521138	2.521269	2.521400	2.521530	2.521661	2.521792	2.521922	2.522053	2.522183	2.522314	131
333	2.522444	2.522575	2.522705	2.522835	2.522966	2.523096	2.523226	2.523356	2.523486	2.523616	130
334	2.523746	2.523876	2.524006	2.524136	2.524266	2.524396	2.524526	2.524656	2.524785	2.524915	130
335	2.525045	2.525174	2.525304	2.525433	2.525563	2.525692	2.525822	2.525951	2.526081	2.526210	129
336	2.526339	2.526468	2.526598	2.526727	2.526856	2.526985	2.527114	2.527243	2.527372	2.527501	129
337	2.527630	2.527759	2.527888	2.528016	2.528145	2.528274	2.528402	2.528531	2.528060	2.528788	129
338	2.528917	2.529045	2.529174	2.529302	2.529430	2.529559	2.529687	2.529815	2.529943	2.530072	128
339	2.530200	2.530328	2.530416	2.530584	2.530712	2.530839	2.530968	2.531095	2.531223	2.531351	128
340	2.531479	2.531607	2.531734	2.531862	2.531989	2.532117	2.532245	2.532372	2.532499	2.532627	128
341	2.532754	2.532881	2.533009	2.533136	2.533263	2.533391	2.533518	2.533645	2.533772	2.533899	127
342	2.534026	2.534153	2.534280	2.534407	2.534534	2.534661	2.534787	2.534914	2.535041	2.535167	127
343	2.535294	2.535421	2.535547	2.535674	2.535800	2.535927	2.536053	2.536179	2.536306	2.536432	126
344	2.536558	2.536685	2.536811	2.536937	2.537063	2.537189	2.537315	2.537441	2.537567	2.537693	126
345	2.537819	2.537945	2.538071	2.538197	2.538322	2.538448	2.538574	2.538699	2.538825	2.538951	126
346	2.539076	2.539202	2.539327	2.539452	2.539578	2.539704	2.539829	2.539954	2.540079	2.540204	125
347	2.540329	2.540455	2.540580	2.540705	2.540830	2.540955	2.541080	2.541205	2.541330	2.541454	125
348	2.541579	2.541704	2.541829	2.541953	2.542078	2.542203	2.542327	2 542452	2.542576	2.542701	125
349	2.542825	2.542950	2.543074	2.543199	2.543323	2.543447	2.543571	2 54369	2.543820	2.543944	124
350	2.544068	2.544192	2.544316	2.544440	2.544564	2.544688	2.544812	2.544936	2.545060	2.545183	124
351	2.545307	2.545431	2.545554	2.545678	2.545802	2.545925	2.546049	2.546172	2.546296	2.546419	124
352	2.546543	2.546666	2.546789	2.546913	2.547036	2.547159	2.547282	2.547405	2.547529	2.547652	123
353	2.547775	2.547898	2.548021	2.548144	2.548266	2.548389	2.548512	2.548635	2.548758	2.548881	123
354	2.549003	2.549126	2.549249	2.549371	2.549494	2.549616	2.549739	2.549861	2.549984	2.550106	123
355	2.550228	2.550351	2.550473	2.550595	2.550717	2.550840	2.550962	2.551084	2.551206	2.551328	122
356	2.551450	2.551572	2.551694	2.551816	2.551938	2.552059	2.552181	2.552303	2.552425	2.552546	122
357	2.552668	2.552790	2.552911	2.553033	2.553154	2.553276	2.553397	2.553519	2.553640	2.553762	121
358	2.553883	2.554004	2.554126	2.554247	2.554368	2.554489	2.554610	2.554731	2.554852	2.554973	121
359	2.555094	2.555215	2.555336	2.555457	2.555578	2.555699	2.555820	2.555940	2.556061	2.556182	121
360	2.556302	2.556423	2.556544	2.556664	2.556785	2.556905	2.557026	2.557146	2.557266	2.557387	120
361	2.557507	2.557627	2.557748	2.557868	2.557988	2.558108	2.558228	2.558348	2.558469	2.558589	120
362	2.558709	2.558828	2.558948	2.559068	2.559188	2.559308	2.559428	2.559548	2.559667	2.559787	120
363	2.559907	2.560026	2.560146	2.560265	2.560385	2.560504	2.560624	2.560743	2.560863	2.560982	119
364	2.561101	2.561221	2.561340	2.561459	2.561578	2.561697	2.561847	2.561936	2.562055	2.562174	119
365	2.562293	2.562412	2.562531	2.562650	2.562768	2.562887	2.563006	2.56 125	2.563237	2.563363	119
366	2.563481	2.563600	2.563718	2.563837	2.563955	2.564074	2.564192	2.564311	2.564429	2.564548	119
367	2.564666	2.564784	2.564903	2.565021	2.565139	2.565257	2.565375	2.565494	2.565612	2.565730	118
368	2.565848	2.565966	2.566084	2.566202	2.566320	2.566437	2.566555	2.566673	2.566791	2.566909	118
369	2.567026	2.567144	2.567262	2.567379	2.567497	2.567614	2 567732	2.567849	2.567967	2.568084	118

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
370	2.568202	2.568319	2.568436	2.568554	2.568671	2.568788	2.568905	2.569023	2.569140	2.569257	117
371	2.569374	2.569491	2.569608	2.569725	2.569842	2.569959	2.570076	2.570193	2.570309	2.570426	117
372	2.570543	2.570660	2.570776	2.570893	2.571010	2.571126	2.571243	2.571359	2.571476	2.571592	117
373	2.571709	2.571825	2.571942	2.572058	2.572174	2.572291	2.572407	2.572523	2.572639	2.572755	116
374	2.572872	2.572988	2.573104	2.573220	2.573336	2.573452	2.573568	2.573684	2.573800	2.573915	116
375	2.574031	2.574147	2.574263	2.574379	2.574494	2.574610	2.574726	2.574841	2.574957	2.575072	116
376	2.575188	2.575303	2.575419	2.575534	2.575650	2.575765	2.575880	2.575996	2.576111	2.576226	115
377	2.576341	2.576456	2.576572	2.576687	2.576802	2.576917	2.577032	2.577147	2.577262	2.577377	115
378	2.577492	2.577607	2.577721	2.577836	2.577951	2.578066	2.578181	2.578295	2.578410	2.578525	115
379	2.578639	2.578754	2.578868	2.578983	2.579097	2.579212	2.579326	2.579441	2.579555	2.579669	114
380	2.579784	2.579898	2.580012	2.580126	2.580240	2.580355	2.580469	2.580583	2.580697	2.580811	114
381	2.580925	2.581039	2.581153	2.581267	2.581381	2.581495	2.581608	2.581722	2.581836	2.581950	114
382	2.582063	2.582177	2.582291	2.582404	2.582518	2.582631	2.582745	2.582858	2.582972	2.583085	113
383	2.583199	2.583312	2.583425	2.583539	2.583652	2.583765	2.583879	2.583992	2.584105	2.584218	113
384	2.584331	2.584444	2.584557	2.584670	2.584785	2.584896	2.585009	2.585122	2.585235	2.585348	113
385	2.585461	2.585573	2.585686	2.585799	2.585912	2.586024	2.586137	2.586250	2.586362	2.586475	113
386	2.586587	2.586700	2.586812	2.586925	2.587037	2.587149	2.587262	2.587374	2.587486	2.587599	112
387	2.587711	2.587823	2.587935	2.588047	2.588160	2.588272	2.588384	2.588496	2.588608	2.588720	112
388	2.588832	2.588944	2.589055	2.589167	2.589279	2.589391	2.589503	2.589614	2.589726	2.589838	112
389	2.589950	2.590061	2.590173	2.590284	2.590396	2.590507	2.590619	2.590730	2.590842	2.590953	112
390	2.590953	2.591176	2.591827	2.591398	2.591510	2.591621	2.591732	2.591843	2.591955	2.592066	111
391	2.592177	2.592288	2.592399	2.592510	2.592621	2.592932	2.592843	2.592954	2.593064	2.593175	111
392	2.593286	2.593397	2.593508	2.593618	2.593729	2.593840	2.593950	2.594061	2.594171	2.594282	111
393	2.594392	2.594503	2.594613	2.594724	2.594834	2.594945	2.595055	2.595165	2.595276	2.595386	110
394	2.595496	2.595606	2.595717	2.595827	2.595937	2.596047	2.596157	2.596267	2.596377	2.596487	110
395	2.596597	2.596707	2.596817	2.596927	2.597037	2.597146	2.597256	2.597366	2.597476	2.597585	110
396	2.597695	2.597805	2.597914	2.598024	2.598134	2.598243	2.598353	2.598462	2.598572	2.598681	110
397	2.598790	2.598900	2.599009	2.599119	2.599228	2.599337	2.599446	2.599556	2.599665	2.599774	109
398	2.599883	2.599992	2.600101	2.600210	2.600319	2.600428	2.600537	2.600646	2.600755	2.600864	109
399	2.600973	2.601082	2.601190	2.601299	2.601408	2.601517	2.601625	2.601734	2.601843	2.601951	109
400	2.602060	2.602168	2.602277	2.602386	2.602494	2.602602	2.602711	2.602819	2.602928	2.603036	108
401	2.603144	2.603253	2.603361	2.603469	2.603577	2.603685	2.603794	2.603902	2.604010	2.604118	108
402	2.604226	2.604334	2.604442	2.604550	2.604658	2.604766	2.604874	2.604982	2.605089	2.605197	108
403	2.605305	2.605413	2.605520	2.605628	2.605736	2.605843	2.605951	2.606059	2.606166	2.606274	108
404	2.606381	2.606489	2.606596	2.606704	2.606811	2.606918	2.607026	2.607133	2.607240	2.607348	107
405	2.607455	2.607562	2.607669	2.607777	2.607884	2.607991	2.608098	2.608205	2.608312	2.608419	107
406	2.608526	2.608633	2.608740	2.608847	2.608954	2.609060	2.609167	2.609274	2.609381	2.609488	107
407	2.609594	2.609701	2.609808	2.609914	2.610021	2.610128	2.610234	2.610341	2.610447	2.610554	107
408	2.610660	2.610767	2.610873	2.610979	2.611086	2.611192	2.611298	2.611405	2.611511	2.611617	106
409	2.611723	2.611829	2.611936	2.612042	2.612148	2.612254	2.612360	2.612466	2.612572	2.612678	106
410	2.612784	2.612890	2.612996	2.613102	2.613207	2.613313	2.613419	2.613525	2.613630	2.613736	106
411	2.613842	2.613947	2.614053	2.614159	2.614264	2.614370	2.614475	2.614581	2.614686	2.614792	106
412	2.614897	2.615003	2.615108	2.615213	2.615319	2.615424	2.615529	2.615634	2.615740	2.615845	105
413	2.615950	2.616055	2.616160	2.616265	2.616370	2.616475	2.616580	2.616685	2.616790	2.616895	105
414	2.617000	2.617105	2.617210	2.617315	2.617420	2.617524	2.617629	2.617734	2.617839	2.617943	105
415	2.618048	2.618153	2.618257	2.618362	2.618466	2.618571	2.618675	2.618780	2.618884	2.618989	105
416	2.619093	2.619198	2.619302	2.619406	2.619511	2.619615	2.619719	2.619823	2.619928	2.620032	104
417	2.620136	2.620240	2.620344	2.620448	2.620552	2.620656	2.620760	2.620864	2.620968	2.621072	104
418	2.621176	2.621280	2.621384	2.621488	2.621592	2.621695	2.621799	2.621903	2.622007	2.622110	104
419	2.622214	2.622318	2.622421	2.622525	2.622628	2.622732	2.622835	2.622939	2.623042	2.623146	104
420	2.623249	2.623353	2.623456	2.623559	2.623663	2.623766	2.623869	2.623972	2.624076	2.624179	104
421	2.624282	2.624385	2.624488	2.624591	2.624694	2.624798	2.624901	2.625004	2.625107	2.625209	103
422	2.625312	2.625415	2.625518	2.625621	2.625724	2.625827	2.625929	2.626032	2.626135	2.626238	103
423	2.626340	2.626443	2.626546	2.626648	2.626751	2.626853	2.626956	2.627058	2.627161	2.627263	103
424	2.627366	2.627468	2.627571	2.627673	2.627775	2.627878	2.627980	2.628082	2.628184	2.628287	102
425	2.628389	2.628491	2.628593	2.628695	2.628797	2.628901	2.629002	2.629104	2.629206	2.629308	102
426	2.629410	2.629511	2.629613	2.629715	2.629817	2.629919	2.630021	2.630123	2.630224	2.630326	102
427	2.630428	2.630529	2.630631	2.630733	2.630834	2.630936	2.631038	2.631139	2.631241	2.631342	102
428	2.631444	2.631545	2.631647	2.631748	2.631849	2.631951	2.632052	2.63215	2.632255	2.632356	101
429	2.632457	2.632558	2.632660	2.632761	2.632862	2.632963	2.633064	2.633165	2.633266	2.633367	101
430	2.633468	2.633569	2.633670	2.633771	2.633872	2.633973	2.634074	2.634175	2.634276	2.634376	100
431	2.634477	2.634578	2.634679	2.634779	2.634880	2.634981	2.635081	2.635182	2.635283	2.635383	100
432	2.635484	2.635584	2.635685	2.635785	2.635886	2.635986	2.636086	2.636187	2.636287	2.636388	100
433	2.636488	2.636588	2.636688	2.636789	2.636889	2.636989	2.637089	2.637189	2.637289	2.637390	100
434	2.637490	2.637590	2.637690	2.637790	2.637890	2.637990	2.638090	2.638190	2.638289	2.638389	99
435	2.638489	2.638589	2.638689	2.638789	2.638888	2.638988	2.639088	2.639188	2.639287	2.639387	99
436	2.639486	2.639586	2.639686	2.639785	2.639885	2.639984	2.640084	2.640183	2.640283	2.640382	99
437	2.640481	2.640581	2.640680	2.640779	2.640879	2.640978	2.641077	2.641176	2.641276	2.641375	99
438	2.641474	2.641573	2.641672	2.641771	2.641870	2.641970	2.642069	2.642168	2.642267	2.642366	99
439	2.642464	2.642563	2.642662	2.642761	2.642860	2.642959	2.643058	2.643156	2.643255	2.643354	99
440	2.643453	2.643551	2.643650	2.643749	2.643847	2.643946	2.644044	2.644143	2.644242	2.644340	98
441	2.644439	2.644537	2.644635	2.644734	2.644832	2.644931	2.645029	2.645127	2.645226	2.645324	98
442	2.645422	2.645520	2.645619	2.645717	2.645815	2.645913	2.646011	2.646109	2.646208	2.646306	98
443	2.646404	2.646502	2.646600	2.646698	2.646796	2.646894	2.646991	2.647089	2.647187	2.647285	98
444	2.647383	2.647481	2.647578	2.647676	2.647774	2.647872	2.647969	2.648067	2.648165	2.648262	98
445	2.648360	2.648458	2.648555	2.648653	2.648750	2.648848	2.648945	2.649043	2.649140	2.649237	97
446	2.649335	2.649432	2.649530	2.649627	2.649724	2.649821	2.649919	2.650016	2.650113	2.650210	97
447	2.650307	2.650405	2.650502	2.650599	2.650696	2.650793	2.650890	2.650987	2.651084	2.651181	97
448	2.651278	2.651375	2.651472	2.651569	2.651666	2.651762	2.651859	2.651956	2.652053	2.652150	97
449	2.652246	2.652343	2.652440	2.652536	2.652633	2.652730	2.652826	2.652923	2.653019	2.653116	97
450	2.653212	2.653309	2.653405	2.653502	2.653598	2.653695	2.653791	2.653888	2.653984	2.654080	96
451	2.654176	2.654273	2.654369	2.654465	2.654562	2.654658	2.654574	2.654850	2.654946	2.655042	96

N°	0	1	2	3	4	5	6	7	8	9	Diff.
452	2.655138	2.655234	2.655331	2.655427	2.655523	2.655619	2.655714	2.655810	2.655906	2.656002	96
453	2.656098	2.656194	2.656290	2.656386	2.656481	2.656577	2.656673	2.656769	2.656864	2.656960	96
454	2.657056	2.657151	2.657247	2.657343	2.657438	2.657534	2.657629	2.657725	2.657820	2.657916	96
455	2.658011	2.658107	2.658202	2.658298	2.658393	2.658488	2.658584	2.658679	2.658774	2.658870	95
456	2.658965	2.659060	2.659155	2.659250	2.659346	2.659441	2.659536	2.659631	2.659726	2.659821	95
457	2.659916	2.660011	2.660106	2.660201	2.660296	2.660391	2.660486	2.660581	2.660676	2.660771	95
458	2.660865	2.660960	2.661055	2.661150	2.661245	2.661339	2.661434	2.661529	2.661623	2.661718	95
459	2.661813	2.661907	2.662002	2.662096	2.662191	2.662285	2.662380	2.662474	2.662569	2.662663	95
460	2.662758	2.662852	2.662947	2.663041	2.663135	2.663230	2.663324	2.663418	2.663512	2.663607	94
461	2.663701	2.663795	2.663889	2.663983	2.664078	2.664172	2.664266	2.664360	2.664454	2.664548	94
462	2.664642	2.664736	2.664830	2.664924	2.665018	2.665112	2.665206	2.665299	2.665393	2.665487	94
463	2.665581	2.665675	2.665768	2.665862	2.665956	2.666050	2.666143	2.666237	2.666331	2.666424	94
464	2.666518	2.666612	2.666705	2.666799	2.666892	2.666986	2.667079	2.667173	2.667266	2.667359	94
465	2.667453	2.667546	2.667640	2.667733	2.667826	2.667920	2.668013	2.668106	2.668199	2.668293	93
466	2.668386	2.668479	2.668572	2.668665	2.668758	2.668852	2.668945	2.669038	2.669131	2.669224	93
467	2.669317	2.669410	2.669503	2.669596	2.669689	2.669782	2.669874	2.669967	2.670060	2.670153	93
468	2.670246	2.670339	2.670431	2.670524	2.670617	2.670710	2.670802	2.670895	2.670988	2.671080	93
469	2.671173	2.671265	2.671358	2.671451	2.671543	2.671636	2.671728	2.671821	2.671913	2.672005	93
470	2.672098	2.672190	2.672283	2.672375	2.672467	2.672560	2.672652	2.672744	2.672836	2.672929	92
471	2.673021	2.673113	2.673205	2.673297	2.673390	2.673482	2.673574	2.673666	2.673738	2.673850	92
472	2.673942	2.674034	2.674126	2.674218	2.674315	2.674402	2.674494	2.674586	2.674677	2.674769	92
473	2,674861	2.674953	2.675045	2.675136	2.675228	2.675320	2.675412	2.675503	2.675595	2.675687	92
474	2.675778	2.675870	2.675961	2.676053	2.676145	2.676236	2.676328	2.676419	2.676511	2.676602	92
475	2.676694	2.676785	2.676876	2.676968	2.677059	2.677150	2.677242	2.677333	2.677424	2.677516	91
476	2.677607	2.677698	2.677789	2.677881	2.677972	2.678063	2.678154	2.678245	2.678336	2.678427	91
477	2.678518	2.678609	2.678700	2.678791	2.678882	2.678973	2.679064	2.679155	2.679246	2.679337	91
478	2.679428	2.679519	2.679610	2.679700	2.679791	2.679882	2.679973	2.680063	2.680154	2.680245	91
479	2.680335	2.680426	2.680517	2.680607	2.680698	2.680789	2.680879	2.680970	2.681060	2.681151	91
480	2.681241	2.681332	2.681422	2.681513	2.681603	2.681693	2.681784	2.681874	2.681964	2.682055	90
481	2.682145	2.682235	2.682326	2.682416	2.682506	2.682596	2.682686	2.682777	2.682867	2.682957	90
482	2.683047	2.683137	2.683227	2.683317	2.683407	2.683497	2.683587	2.683677	2.683767	2.683857	90
483	2.683947	2.684037	2.684127	2.684217	2.684307	2.684396	2.684486	2.684576	2.684666	2.684756	90
484	2.684845	2.684935	2.685025	2.685114	2.685204	2.685294	2.685383	2.685472	2.685563	2.685652	90
485	2.685742	2.685831	2.685921	2.686010	2.686100	2.686189	2.686279	2.686368	2.686457	2.686547	89
486	2.686636	2.686726	2.686815	2.686904	2.686994	2.687083	2.687172	2.687261	2.687351	2.687440	89
487	2.687529	2.687618	2.687707	2.687796	2.687885	2.687975	2.688064	2.688153	2.688242	2.688331	89
488	2.688420	2.688509	2.688598	2.688687	2.688776	2.688865	2.688953	2.689042	2.689131	2.689220	89
489	2.689309	2.689398	2.689486	2.689575	2.689664	2.689753	2.689841	2.689930	2.690019	2.690107	89
490	2.690196	2.690285	2.690373	2.690462	2.690550	2.690639	2.690727	2.690816	2.690905	2.690993	89
491	2.691081	2.691170	2.691258	2.691347	2.691435	2.691523	2.691612	2.691700	2.691788	2.691877	88
492	2.691965	2.692053	2.692142	2.692230	2.692318	2.692406	2.692494	2.692583	2.692671	2.692759	88
493	2.692847	2.692935	2.693023	2.693111	2.693199	2.693287	2.693375	2.693463	2.693551	2.693639	88
494	2.693727	2.693815	2.693903	2.693991	2.694078	2.694166	2.694254	2.694342	2.694430	.694517	88
495	2.694605	2.694693	2.694781	2.694868	2.694956	2.695044	2.695131	2.695219	2.695306	2.695394	88
496	2.695482	2.695569	2.695657	2.695744	2.695832	2.695919	2.696007	2.696094	2.696182	2.696269	87
497	2.696356	2.696444	2.696531	2.696618	2.696706	2.696793	2.696880	2.696968	2.697055	2.697142	87
498	2.697229	2.697316	2.697404	2.697491	2.697578	2.697665	2.697752	2.697839	2.697926	2.698013	87
499	2.698100	2.698188	2.698275	2.698362	2.698448	2.698535	2.698622	2.698709	2.698736	2.698883	87
500	2.698970	2.699057	2.699144	2.699230	2.699317	2.699404	2.699491	2.699578	2.699664	2.699751	87
501	2.699838	2.699924	2.700011	2.700098	2.700184	2.700271	2.700357	2.700444	2.700531	2.700617	87
502	2.700704	2.700790	2.700877	2.700963	2.701050	2.701136	2.701222	2.701309	2.701395	2.701482	86
503	2.701568	2.701654	2.701741	2.701827	2.701913	2.701999	2.702086	2.702172	2.702258	2.702344	86
504	2.702430	2.702517	2.702603	2.702689	2.702775	2.702861	2.702947	2.703033	2.703119	2.703205	86
505	2.703291	2.703377	2.703463	2.703549	2.703635	2.703721	2.703807	2.703893	2.703979	2.704065	86
506	2.704150	2.704236	2.704322	2.704408	2.704494	2.704579	2.704665	2.704751	2.704837	2.704922	86
507	2.705008	2.705094	2.705179	2.705265	2.705350	2.705436	2.705522	2.705607	2.705693	2.705778	86
508	2.705864	2.705949	2.706035	2.706120	2.706205	2.706291	2.706376	2.706462	2.706547	2.706632	85
509	2.706718	2.706803	2.706888	2.706974	2.707059	2.707144	2.707229	2.707315	2.707400	2.707485	85
510	2.707570	2.707655	2.707740	2.707826	2.707911	2.707996	2.708081	2.708166	2.708251	2.708336	85
511	2.708421	2.708506	2.708591	2.708676	2.708761	2.708846	2.708931	2.709015	2.709100	2.709185	85
512	2.709270	2.709355	2.709440	2.709524	2.709609	2.709694	2.709779	2.709863	2.709948	2.710033	85
513	2.710117	2.710202	2.710287	2.710371	2.710455	2.710540	2.710625	2.710710	2.710794	2.710879	85
514	2.710963	2.711048	2.711132	2.711216	2.711301	2.711385	2.711470	2.711554	2.711638	2.711723	84
515	2.711807	2.711891	2.711976	2.712060	2.712144	2.712229	2.712313	2.712397	2.712481	2.712565	84
516	2.712650	2.712734	2.712818	2.712902	2.712986	2.713070	2.713154	2.713238	2.713322	2.713406	84
517	2.713490	2.713574	2.713658	2.713742	2.713836	2.713910	2.713994	2.714078	2.714162	2.714246	84
518	2.714330	2.714414	2.714497	2.714581	2.714665	2.714749	2.714832	2.714916	2.715000	2.715084	84
519	2.715167	2.715251	2.715335	2.715418	2.715502	2.715586	2.715669	2 715753	2.715836	2.715920	84
520	2.716003	2.716087	2.716170	2.716254	2.716337	2.716421	2.716504	2.716588	2.716671	2.716754	83
521	2.716838	2.716921	2.717004	2.717088	2.717171	2.717254	2.717338	2.717421	2.717504	2.717587	83
522	2.717670	2.717754	2.717837	2.717920	2.718003	2.718086	2.718169	2.718253	2.718336	2.718419	83
523	2.718502	2.718585	2.718668	2.718571	2.718834	2.718917	2.719000	2.719083	2.719165	2.719248	83
524	2.719331	2.719414	2.719497	2.719580	2.719663	2.719745	2.719828	2.719911	2.719994	2.720077	83
525	2.720159	2.720242	2.720325	2.720407	2.720490	2.720573	2.720655	2.720738	2.720821	2.720903	83
526	2.720986	2.721068	2.721151	2.721233	2.721316	2.721398	2.721481	2.721563	2.721646	2.721728	82
527	2.721811	2.721893	2.721975	2.722058	2.722140	2.722222	2.722305	2.722387	2.722469	2.722552	82
528	2.722634	2.722716	2.722798	2.722881	2.722963	2.723045	2.723127	2.723209	2.723291	2.723374	82
529	2.723456	2.723538	2.723620	2.723702	2.723784	2.723866	2.723948	2.724030	2.724112	2.724194	82
530	2.724276	2.724358	2.724440	2.724522	2.724603	2.724685	2.724767	2.724849	2.724931	2.725013	82
531	2.725094	2.725176	2.725258	2.725340	2.725421	2.725503	2.725585	2.725667	2.725748	2.725830	82
532	2.725912	2.725993	2.726075	2.726156	2.726238	2.726320	2.726401	2.726483	2.726564	2.726646	82
533	2.726727	2.726809	2.726890	2.726972	2.724053	2.727134	2.727216	2.727297	2.727379	2.727420	81

N°	0	1	2	3	4	5	6	7	8	9	Diff.
534	2.727541	2.727623	2.727704	2.727785	2.727866	2.727948	2.728029	2.728110	2.728191	2.728273	81
535	2.728354	2.728435	2.728516	2.728597	2.728678	2.728759	2.728841	2.728922	2.729003	2.729084	81
536	2.729165	2.729246	2.729327	2.729408	2.729489	2.729570	2.729651	2.729732	2.729813	2.729893	81
537	2.729974	2.730055	2.730136	2.730217	2.730298	2.730378	2.730459	2.730540	2.730621	2.730702	81
538	2.730782	2.730863	2.730944	2.731024	2.731105	2.731186	2.731266	2.731347	2.731428	2.731508	81
539	2.731589	2.731669	2.731750	2.731830	2.731911	2.731991	2.732072	2.732152	2.732233	2.732313	81
540	2.732394	2.732474	2.732555	2.732635	2.732715	2.732796	2.732876	2.732956	2.733037	2.733177	80
541	2.733797	2.733277	2.733358	2.733438	2.733518	2.733598	2.733679	2.733759	2.733839	2.733919	80
542	2.733999	2.734079	2.734159	2.734240	2.734320	2.734400	2.734480	2.734560	2.734640	2.734720	80
543	2.734800	2.734880	2.734960	2.735040	2.735120	2.735200	2.735279	2.735359	2.735439	2.735519	80
544	2.735599	2.735679	2.735758	2.735838	2.735918	2.735998	2.736078	2.736157	2.736237	2.736317	80
545	2.736396	2.736476	2.736556	2.736635	2.736615	2.736795	2.736874	2.736954	2.737034	2.737113	80
546	2.737193	2.737272	2.737352	2.737431	2.737511	2.737590	2.737670	2.737749	2.737829	2.737908	79
547	2.737987	2.738067	2.738146	2.738225	2.738305	2.738384	2.738463	2.738543	2.738622	2.738701	79
548	2.738781	2.738860	2.738939	2.739018	2.739097	2.739177	2.739256	2.739335	2.739414	2.739493	79
549	2.739572	2.739651	2.739730	2.739810	2.739889	2.739968	2.740047	2.740126	2.740205	2.740284	79
550	2.740363	2.740442	2.740521	2.740599	2.740678	2.740757	2.740836	2.740915	2.740994	2.741073	79
551	2.741152	2.741230	2.741309	2.741388	2.741467	2.741546	2.741624	2.741703	2.741782	2.741860	79
552	2.741939	2.742018	2.742096	2.742175	2.742254	2.742332	2.742411	2.742489	2.742568	2.742647	79
553	2.742725	2.742804	2.742882	2.742961	2.743039	2.743118	2.743196	2.743275	2.743353	2.743431	78
554	2.743510	2.743588	2.745666	2.743745	2.743823	2.743902	2.743980	2.744058	2.744136	2.744215	78
555	2.744293	2.744371	2.744449	2.744528	2.744606	2.744684	2.744762	2.744840	2.744919	2.744997	78
556	2.745075	2.745153	2.745231	2.745309	2.745387	2.745465	2.745543	2.745621	2.745699	2.745777	78
557	2.745855	2.745933	2.746011	2.746089	2.746167	2.746245	2.746323	2.746401	2.747479	2.746556	78
558	2.746634	2.746712	2.746790	2.746868	2.746945	2.747023	2.747101	2.747179	2.747256	2.747334	78
559	2.747412	2.747489	2.747567	2.747645	2.747722	2.747800	2.747878	2.747955	2.748033	2.748110	78
560	2.748188	2.748266	2.748343	2.748421	2.738498	2.748576	2.748653	2.748731	2.748808	2.748885	77
561	2.748963	2.749040	2.749118	2.749195	2.749272	2.749350	.749427	2.749504	2.749582	2.749659	77
562	2.749736	2.749814	2.749891	2.749968	2.750045	2.750123	2.750200	2.750277	2.750354	2.750431	77
563	2.750508	2.750586	2.750663	2.750740	2.750817	2.750894	2.750971	2.751048	2.751125	2.751202	77
564	2.751279	2.751356	2.751433	2.751510	2.751587	2.751664	2.751741	2.751818	2.751895	2.751972	77
565	2.752048	2.752125	2.752202	2.752279	.752356	2.752433	2.752509	2.752586	2.752663	2.752740	77
566	2.752816	2.75289	2.752970	2.753047	2.753123	2.753200	2.753277	2.753354	2.753430	2.753506	77
567	2.753583	2.753660	2.753736	2.753813	2.753889	2.753966	2.754042	2.754119	2.754195	2.754272	77
568	2.754348	2.754425	2.754501	2.754578	2.754654	2.754730	2.754807	2.754883	2.754960	2.755035	76
569	2.755112	2.755189	2.755265	2.755341	2.755417	2.755494	2.755570	2.755646	2.755722	2.755799	76
570	2.755875	2.755951	2.756027	2.756103	2.756180	2.756256	2.756332	2.756408	2.756484	2.756560	76
571	2.756636	2.756712	2.756788	2.756878	2.756940	2.757016	2.757092	2.757168	2.757244	2.757320	76
572	2.757396	2.757472	2.757548	2.757624	2.757700	2.757773	2.757851	2.757927	2.758003	2.758079	76
573	2.758155	2.758230	2.758306	2.758382	2.758458	2.758539	2.758609	2.758685	2.758761	2.758836	76
574	2.758912	2.758988	2.759063	2.759139	2.759214	2.759290	2.759366	2.759441	2.759517	2.759592	76
575	2.756668	2.759743	2.759819	2.759894	2.759970	2.760045	2.760121	2.760196	2.760272	2.760347	75
576	2.760422	2.760498	2.760573	2.760649	2.760724	2.760799	2.760875	2.760950	2.761025	2.761101	75
577	2.761176	2.761251	2.761326	2.761402	2.761477	2.761552	2.761627	2.761702	2.761778	2.761853	75
578	2.761928	2.762003	2.762078	2.762153	2.762228	2.762303	2.762378	2.762453	2.762529	2.762604	75
579	2.762679	2.762754	2.762829	2.762904	2.762978	2.763053	2.763128	2.763203	2.763278	2.763353	75
580	2.763428	2.763503	2.763578	2.763653	2.763727	2.763802	2.763877	2.763952	2.764027	2.764101	75
581	2.764176	2.764251	2.764326	2.764400	2.764475	2.764550	2.764624	2.764699	2.764774	2.764848	75
582	2.764923	2.764998	2.765072	2.765147	2.765221	2.765296	2.765370	2.765445	2.765520	2.765594	75
583	2.765669	2.765743	2.765818	2.765892	2.765966	2.766041	2.766115	2.766190	2.766264	2.766338	74
584	2.766413	2.766487	2.766562	2.766636	2.766710	2.766785	2.766859	2.766933	2.767007	2.767082	74
585	2.767156	2.767230	2.767304	2.767379	2.767453	2.767525	2.767601	2.767675	2.767749	2.767823	74
586	2.767878	2.767972	2.768046	2.768120	2.768194	2.768268	2.768343	2.768416	2.768490	2.768564	74
587	2.768638	2.768711	2.768786	2.768860	2.768934	2.769008	2.769082	2.769156	2.769230	2.769303	74
588	2.769377	2.769451	2.769525	2.769599	2.769673	2.769746	2.769820	2.769894	2.769968	2.770042	74
589	2.770115	2.770189	2.770263	2.770336	2.770410	2.770484	2.770557	2.770631	2.770705	2.770778	74
590	2.770852	2.770926	2.770999	2.771073	2.771146	2.771220	2.771293	2.771367	2.771440	2.771514	74
591	2.771587	2.771661	2.771734	2.771808	2.771881	2.771955	2.772028	2.772102	2.772175	2.772248	73
592	2.772322	2.772395	2.772468	2.772542	2.772615	2.772688	2.772762	2.772835	2.772908	2.772981	73
593	2.773055	2.773128	2.773201	2.773274	2.773348	2.773421	2.773494	2.773567	2.773640	2.773713	73
594	2.773786	2.773860	2.773933	2.774006	2.774079	2.774152	2.774225	2.774298	2.774371	2.774444	73
595	2.774517	2.774590	2.774663	2.774736	2.774809	2.774882	2.774955	2.775028	2.775100	2.775173	73
596	2.775240	2.775319	2.775392	2.775465	2.775538	2.775610	2.775683	2.775756	2.775829	2.775902	73
597	2.775974	2.776047	2.776120	2.776193	2.776265	2.776338	2.776411	2.776483	2.776556	2.776629	73
598	2.776701	2.776774	2.776846	2.776919	2.776992	2.777064	2.777137	2.777209	2.777282	2.777354	73
599	2.777427	2.777499	2.777572	2.777644	2.777717	2.777789	2.777862	2.777934	2.778006	2.778079	72
600	2.778151	2.778224	2.778296	2.778368	2.778441	2.778513	2.778585	2.778658	2.778730	2.778802	72
601	2.778874	2.778947	2.779019	2.779091	2.779163	2.779236	2.779308	2.779380	2.779452	2.779524	72
602	2.779596	2.779669	2.779741	2.779813	2.779885	2.779957	2.780029	2.780101	2.780173	2.780245	72
603	2.780317	2.780389	2.780461	2.780533	2.780605	2.780677	2.780749	2.780821	2.780893	2.780965	72
604	2.781037	2.781109	2.781181	2.781253	2.781324	2.781396	2.781468	2.781540	2.781612	2.781684	72
605	2.781755	2.781827	2.781899	2.781971	2.782042	2.782114	2.782186	2.782258	2.782329	2.782401	72
606	2.782473	2.782544	2.782616	2.782688	2.782759	2.782831	2.782902	2.782974	2.783046	2.783117	71
607	2.783189	2.783260	2.783332	2.783403	2.783475	2.783546	2.783618	2.783689	2.783761	2.783832	71
608	2.783904	2.783975	2.784046	2.784118	2.784189	2.784261	2.784332	2.784403	2.784475	2.784546	71
609	2.784617	2.784689	2.784760	2.784831	2.784902	2.784974	2.785045	2.785116	2.785187	2.785259	71
610	2.785330	2.785401	2.785472	2.785543	2.785615	2.785686	2.785757	2.785828	2.785899	2.785970	71
611	2.786041	2.786112	2.786183	2.786254	2.786325	2.786396	2.786467	2.786538	2.786609	2.786680	71
612	2.786751	2.786822	2.786893	2.786964	2.787035	2.787106	2.787177	2.787248	2.787319	2.787390	71
613	2.787460	2.787531	2.787602	2.787673	2.787744	2.787815	2.787885	2.787956	2.788027	2.788098	71
614	2.788168	2.788239	2.788310	2.788381	2.788451	2.788522	2.788593	2.788663	2.788734	2.788804	71
615	2.788875	2.788946	2.789016	2.789087	2.789152	2.789228	2.789299	2.789369	2.789440	2.789510	71

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
616	2.789581	2.789651	2.789722	2.789792	2.789863	2.789933	2.790003	2.790074	2.790144	2.790215	70
617	2.790285	2.790356	2.790426	2.790496	2.790567	2.790637	2.790707	2.790778	2.790848	2.790918	70
618	2.790988	2.791059	2.791129	2.791199	2.791269	2.791340	2.791410	2.791480	2.791550	2.791620	70
619	2.791691	2.791761	2.791831	2.791901	2.791971	2.792041	2.792111	2.792181	2.792252	2.792322	70
620	2.792392	2.792462	2.792532	2.792602	2.792672	2.792742	2.792812	2.792882	2.792952	2.793022	70
621	2.793092	2.793162	2.793231	2.793301	2.793371	2.793441	2.793511	2.793581	2.793651	2.793721	70
622	2.793790	2.793860	2.793930	2.794000	2.794070	2.794139	2.794209	2.794279	2.794349	2.794418	70
623	2.794488	2.794558	2.794627	2.794697	2.794767	2.794836	2.794906	2.794970	2.795045	2.795115	70
624	2.795185	2.795254	2.795324	2.795393	2.795463	2.795532	2.795602	2.795671	2.795741	2.795810	70
625	2.795880	2.795949	2.796019	2.796088	2.796158	2.796227	2.796297	2.796366	2.796436	2.796505	69
626	2.796574	2.796644	2.796713	2.796782	2.796852	2.796921	2.796990	2.797060	2.797129	2.797198	69
627	2.797268	2.797337	2.797406	2.797475	2.797545	2.797614	2.797683	2.797752	2.797821	2.797890	69
628	2.797960	2.798029	2.798098	2.798167	2.798236	2.798305	2.798374	2.798443	2.798512	2.798582	69
629	2.798651	2.798720	2.798789	2.798858	2.798927	2.798996	2.799065	2.799134	2.799203	2.799272	69
630	2.799341	2.799409	2.799478	2.799547	2.799616	2.799685	2.799754	2.799823	2.799802	2.799960	69
631	2.800029	2.800098	2.800167	2.800236	2.800305	2.800373	2.800442	2.800511	2.800580	2.800648	69
632	2.800717	2.800789	2.800854	2.800923	2.800992	2.801060	2.801129	2.801198	2.801267	2.801335	69
633	2.801404	2.801472	2.801541	2.801609	2.801678	2.801747	2.801815	2.801884	2.801952	2.802021	69
634	2.802089	2.802158	2.802226	2.802295	2.802363	2.802432	2.802500	2.802568	2.802637	2.802705	68
635	2.802774	2.802842	2.802910	2.802979	2.803047	2.803116	2.803184	2.803252	2.803321	2.803389	68
636	2.803457	2.803525	2.803594	2.803662	2.803730	2.803798	2.803867	2.803935	2.804003	2.804071	68
637	2.804139	2.804208	2.804276	2.804344	2.804412	2.804480	2.804548	2.804616	2.804685	2.804753	68
638	2.804821	2.804889	2.804957	2.805025	2.805093	2.805161	2.805229	2.805297	2.805365	2.805433	68
639	2.805501	2.805569	2.805637	2.805705	2.805773	2.805840	2.805908	2.805976	2.806044	2.806112	68
640	2.806180	2.806248	2.806316	2.806384	2.806451	2.806519	2.806587	2.806655	2.806723	2.806790	68
641	2.806858	2.806926	2.806994	2.807061	2.807129	2.807197	2.807264	2.807332	2.807400	2.807467	68
642	2.807535	2.807603	2.807670	2.807738	2.807806	2.807873	2.807941	2.808008	2.808076	2.808143	68
643	2.808211	2.808279	2.808346	2.808414	2.808481	2.808548	2.808616	2.808683	2.808751	2.808818	68
644	2.808886	2.808953	2.809021	2.809088	2.809155	2.809223	2.809290	2.809358	2.809425	2.809492	67
645	2.809560	2.809627	2.809694	2.809762	2.809829	2.809896	2.809963	2.810031	2.810098	2.810165	67
646	2.810235	2.810300	2.810367	2.810434	2.810501	2.810568	2.810636	2.810703	2.810770	2.810837	67
647	2.810904	2.810971	2.811038	2.811106	2.811173	2.811240	2.811307	2.811374	2.811441	2.811508	67
648	2.811575	2.811642	2.811709	2.811776	2.811843	2.811910	2.811977	2.812044	2.812111	2.812178	67
649	2.812245	2.812312	2.812378	2.812445	2.812512	2.812579	2.812646	2.812713	2.812780	2.812846	67
650	2.812913	2.812980	2.813047	2.813114	2.813180	2.813247	2.813314	2.813381	2.813447	2.813514	67
651	2.813581	2.813648	2.813714	2.813781	2.813848	2.813914	2.813980	2.814048	2.814114	2.814181	67
652	2.814248	2.814314	2.814381	2.814447	2.814514	2.814580	2.814647	2.814714	2.814780	2.814847	67
653	2.814913	2.814980	2.815046	2.815112	2.815179	2.815246	2.815312	2.815378	2.815445	2.815511	66
654	2.815578	2.815644	2.815710	2.815777	2.815843	2.815910	2.815976	2.816042	2.816109	2.816175	66
655	2.816241	2.816308	2.816374	2.816440	2.816506	2.816573	2.816639	2.816705	2.816771	2.816838	66
656	2.816904	2.816970	2.817036	2.817102	2.817169	2.817235	2.817301	2.817367	2.817433	2.817499	66
657	2.817565	2.817631	2.817698	2.817764	2.817830	2.817896	2.817962	2.818028	2.818094	2.818100	66
658	2.818226	2.818292	2.818358	2.818424	2.818490	2.818556	2.818622	2.818668	2.818754	2.818819	66
659	2.818885	2.818951	2.819017	2.819083	2.819149	2.819215	2.819281	2.819346	2.819412	2.819478	66
660	2.819544	2.819610	2.819675	2.819741	2.819807	2.819873	2.819939	2.820004	2.820070	2.820136	66
661	2.820201	2.820267	2.820333	2.820398	2.820464	2.820536	2.820595	2.820661	2.820727	2.820792	66
662	2.820858	2.820924	2.820989	2.821055	2.821120	2.821186	2.821251	2.821317	2.821482	2.821448	66
663	2.821513	2.821579	2.821644	2.821710	2.821775	2.821841	2.821906	2.821972	2.822037	2.822103	65
664	2.822168	2.822233	2.822299	2.822364	2.822430	2.822495	2.822560	2.822626	2.822691	2.822756	65
665	2.822822	2.822887	2.822952	2.823017	2.823083	2.823148	2.823213	2.823279	2.823344	2.823409	65
666	2.823474	2.823539	2.823605	2.823670	2.823735	2.823800	2.823865	2.823930	2.823996	2.824061	65
667	2.824126	2.824191	2.824256	2.824321	2.824386	2.824451	2.824516	2.824581	2.824646	2.824711	65
668	2.824776	2.824841	2.824906	2.824971	2.825036	2.825101	2.825166	2.825231	2.825296	2.825361	65
669	2.825426	2.825401	2.825556	2.825620	2.825686	2.825751	2.825815	2.825880	2.825945	2.826010	65
670	2.826075	2.826140	2.826204	2.826269	2.826334	2.826399	2.826464	2.826528	2.826593	2.826658	65
671	2.826722	2.826787	2.826852	2.826917	2.826981	2.827046	2.827111	2.827175	2.827240	2.827305	65
672	2.827369	2.827434	2.827498	2.827563	2.827628	2.827692	2.827757	2.827821	2.827886	2.827950	65
673	2.828015	2.828080	2.828144	2.828209	2.828273	2.828338	2.820402	2.828466	2.828531	2.828595	64
674	2.828660	2.828724	2.828789	2.828853	2.828918	2.828982	2.829046	2.829111	2.829175	2.829239	64
675	2.829304	2.829368	2.829432	2.829497	2.829561	2.829625	2.829690	2.829754	2.829818	2.829882	64
676	2.829947	2.830011	2.830075	2.830139	2.830204	2.830268	2.830332	2.830396	2.830460	2.830524	64
677	2.830589	2.830653	2.830717	2.830781	2.830845	2.830909	2.830973	2.831037	2.831102	2.831166	64
678	2.831230	2.831294	2.831358	2.831422	2.831486	2.831550	2.831614	2.831678	2.831742	2.831806	64
679	2.831870	2.831934	2.831998	2.832062	2.832125	2.832189	2.832253	2.832317	2.832381	2.832445	64
680	2.832509	2.832573	2.832637	2.832700	2.832764	2.832828	2.832892	2.832956	2.833019	2.833083	64
681	2.833147	2.833211	2.833275	2.833338	2.833402	2.833466	2.833530	2.833593	2.833657	2.833721	64
682	2.833784	2.833848	2.833912	2.833975	2.834039	2.834103	2.834166	2.834230	2.834293	2.834357	64
683	2.834421	2.834484	2.834548	2.834611	2.834675	2.834738	2.834802	2.834866	2.834929	2.834993	64
684	2.835056	2.835120	2.835183	2.835246	2.835310	2.835373	2.835437	2.835500	2.835564	2.835627	63
685	2.835691	2.835754	2.835817	2.835881	2.835944	2.836007	2.836071	2.836134	2.836197	2.836261	63
686	2.836324	2.836387	2.836451	2.836514	2.836577	2.836640	2.836704	2.836767	2.836830	2.836893	63
687	2.836957	2.837020	2.837083	2.837116	2.837209	2.837273	2.837336	2.837399	2.837462	2.837525	63
688	2.837588	2.837652	2.837715	2.837778	2.837841	2.837904	2.837967	2.838030	2.838093	2.838156	63
689	2.838219	2.838282	2.838345	2.838408	2.838471	2.838534	2.838597	2.838660	2.838723	2.838786	63
690	2.838849	2.838912	2.838975	2.839038	2.839101	2.839164	2.839227	2.839289	2.839352	2.839415	63
691	2.839478	2.839541	2.839604	2.839667	2.839729	2.83979	2.839855	2.839918	2.839981	2.840043	63
692	2.840106	2.840169	2.840232	2.840294	2.840357	2.840420	2.840482	2.840545	2.840608	2.840671	63
693	2.840733	2.840796	2.840859	2.840921	2.840984	2.841046	2.841109	2.841172	2.841234	2.841297	63
694	2.841359	2.841422	2.841485	2.841547	2.841610	2.841672	2.841735	2.841797	2.841860	2.841922	63
695	2.841985	2.842047	2.842110	2.842172	2.842235	2.842297	2.842360	2.842422	2.842484	2.842543	62
696	2.842609	2.842672	2.842734	2.842796	2.842859	2.842921	2.842983	2.843046	2.843108	2.843170	62
697	2.843233	2.843295	2.843357	2.843420	2.843482	2.843544	2.843606	2.843669	2.843731	2.843793	62

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
698	2.843855	2.843918	2.843980	2.844042	2.844104	2.844166	2.844229	2.844291	2.844353	2.844415	62
699	2.844477	2.844539	2.844601	2.844663	2.844726	2.844788	2.844851	2.844912	2.844974	2.845036	62
700	2.845098	2.845160	2.845222	2.845284	2.845346	2.845408	2.845470	2.845532	2.845594	2.845656	62
701	2.845718	2.845780	2.845842	2.845902	2.845966	2.846028	2.846090	2.846151	2.846213	2.846275	62
702	2.846337	2.846399	2.846461	2.846523	2.846584	2.846646	2.846708	2.846770	2.846832	2.846893	62
703	2.846955	2.847017	2.847079	2.847141	2.847202	2.847264	2.847326	2.847388	2.847449	2.847511	62
704	2.847573	2.847634	2.847696	2.847758	2.847819	2.847881	2.847943	2.848004	2.848066	2.848127	62
705	2.848189	2.848251	2.848312	2.848374	2.848435	2.848497	2.848559	2.848620	2.848682	2.848743	62
706	2.848805	2.848866	2.848928	2.848989	2.849051	2.849112	2.849174	2.849235	2.849296	2.849358	61
707	2.849419	2.849481	2.849542	2.849604	2.849665	2.849726	2.849788	2.849849	2.849911	2.849972	61
708	2.850033	2.850095	2.850156	2.850217	2.850279	2.850340	2.850401	2.850462	2.850524	2.850585	61
709	2.850646	2.850707	2.850769	2.850830	2.850891	2.850952	2.851014	2.851075	2.851136	2.851197	61
710	2.851258	2.851319	2.851381	2.851442	2.851503	2.851564	2.851625	2.851686	2.851747	2.851808	61
711	2.851870	2.851931	2.851992	2.852053	2.852114	2.852175	2.852236	2.852297	2.852358	2.852419	61
712	2.852480	2.852541	2.852602	2.852663	2.852724	2.852785	2.852846	2.852907	2.852968	2.353029	61
713	2.853089	2.853150	2.853211	2.853272	2.853333	2.853394	2.853455	2.853516	2.853576	2.853637	61
714	2.853698	2.853759	2.853820	2.853881	2.853941	2.854002	2.854063	2.854124	2.854184	2.854245	61
715	2.854306	2.854367	2.854427	2.854488	2.854549	2.854610	2.854670	2.854731	2.854792	2.854852	61
716	2.854913	2.854974	2.855034	2.855095	2.855156	2.855216	2.855277	2.855337	2.855398	2.855459	61
717	2.855519	2.855580	2.855640	2.855701	2.855561	2.855822	2.855882	2.855943	2.856003	2.856064	61
718	2.856124	2.856185	2.856245	2.856306	2.856466	2.856427	2.856487	2.856548	2.856608	2.856668	60
719	2.856729	2.856789	2.856850	2.856910	2.856970	2.857031	2.857091	2.857151	2.857212	2.857272	60
720	2.857332	2.857393	2.857453	2.857513	2.857574	2.857634	2.857694	2.857754	2.857815	2.857875	60
721	2.857935	2.857995	2.858056	2.858116	2.858176	2.858236	2.858296	2.858357	2.858417	2.858477	60
722	2.858537	2.858597	2.858657	2.858718	2.858778	2.858838	2.858898	2.858958	2.859018	2.859078	60
723	2.859138	2.859198	2.859258	2.859318	2.859378	2.859438	2.859499	2.859559	2.859619	2.859679	60
724	2.859739	2.859798	2.859858	2.859918	2.859978	2.860038	2.860098	2.860158	2.860218	2.860278	60
725	2.860338	2.860398	2.860458	2.860518	2.860578	2.860637	2.860697	2.860757	2.860817	2.860877	90
726	2.860937	2.860996	2.861056	2.861116	2.861176	2.861236	2.861295	2.861355	2.861415	2.861475	60
727	2.861534	2.861594	2.861654	2.861714	2.861773	2.861833	2.861893	2.861952	2.862012	2.862072	60
728	2.862131	2.862191	2.862251	2.862310	2.862370	2.862430	2.862489	2.862549	2.862608	2.862668	60
729	2.862727	2.862787	2.862847	2.862906	2.862966	2.863025	2.863085	2.863144	2.863204	2.863263	60
730	2.863323	2.863382	2.863442	2.863501	2.863561	2.863620	2.863680	2.863739	2.863798	2.863858	59
731	2.863917	2.863977	2.864036	2.864096	2.864155	2.864214	2.864274	2.864333	2.864392	2 864452	39
732	2.864511	2.864570	2.864630	2.864689	2.864748	2.864808	2.864867	2.864926	2.864985	2.865045	59
733	2.865104	2.865163	2.865222	2.865282	2.865341	2.865400	2.865459	2.865518	2.865578	2.865637	59
734	2.865696	2.865755	2.865814	2.865873	2.865933	2.865992	2.866051	2.866110	2.866169	2.866228	59
735	2.866287	2.866346	2.866405	2.866465	2.866524	2.866583	2.866642	2.866701	2.866760	2.866819	59
736	2.866878	2.866937	2.866996	2.867055	2.867114	2.867173	2.867232	2.867291	2.867350	2.867409	59
737	2.867467	2.867526	2.867585	2.867644	2.867703	2.867762	2.867821	2 867880	2.867939	2.867997	59
738	2.868056	2.868115	2.868174	2.868233	2.868292	2.868350	2.868409	2.868468	2.868527	2.868586	59
739	2.868644	2.868703	2.868762	2.868821	2.868879	2.868938	2.868997	2.869056	2.869114	2.869173	59
740	2.869232	2.869290	2.869349	2.869408	2.869466	2.869525	2.869584	2.869642	2.869701	2.869760	59
741	2.869818	2.869877	2.869935	2.869994	2.870053	2.870111	2.870170	2.870228	2.870287	2.870345	59
742	2.870404	2.870462	2.870521	2.870579	2.870638	2.870696	2.870755	2.870813	2.870872	2.870930	58
743	2.870989	2.871047	2.871106	2.871164	2.871223	2.871281	2.871339	2.871398	2.871456	2.871515	58
744	2.871573	2.871631	2.871690	2.871748	2.871806	2.871865	2.871923	2.871981	2.872040	2.872098	58
745	2.872156	2.872215	2.872273	2.872331	2.872389	2.872448	2.872506	2.872564	2.872622	2.872681	58
746	2.872739	2.872797	2.872855	2.872913	2.872972	2.873030	2.873088	2.873146	2.873204	2.873262	58
747	2.873321	2.873379	2.873437	2.873495	2.873553	2.873611	2.873669	2.873727	2.873785	2.873843	58
748	2.873902	2.873960	2.874018	2.874076	2.874134	2.874192	2.874250	2.874308	2.874366	2.874424	58
749	2.874482	2 874540	2.874598	2.874656	2.874714	2.874772	2.874830	2.874887	2.874945	2.875003	58
750	2.875061	2.875119	2.875177	2.875235	2.875293	2.875351	2.875409	2.875466	2.875524	2.875582	58
751	2.875640	2.875698	2.875756	2.875813	2.875871	2.875929	2.875987	2.876044	2.876102	2.876160	58
752	2.876218	2.876276	2.876333	2.876391	2.876449	2.876506	2.876564	2.876622	2 876680	2.876737	58
753	2.876795	2.876853	2.876910	2.876968	2.877026	2.877083	2.877141	2.877198	2.877256	2.877314	58
754	2.877371	2.877429	2.877486	2.877544	2.877603	2.877659	2.877717	2.877774	2.877832	2.877889	58
755	2.877943	2.878004	2.878062	2.878119	2.878177	2.878234	2.878292	2.878349	2.878407	2.878494	57
756	2.878522	2.878579	2.878637	2.878694	2.878751	2.878809	2.878866	2.878922	2.878981	2.879038	57
757	2.879096	2.879153	2.879211	2.879268	2.879325	2.879383	2.879440	2.879497	2.879555	2.879612	57
758	2.879669	2.879726	2.879784	2.879841	2.879898	2.879956	2.880010	2.880070	2.880127	2.880185	57
759	2.880242	2.880299	2.880356	2.880413	2.880471	2.880528	2.880585	2.880642	2.880699	2.880756	57
760	2.880814	2.880871	2.880928	2.880985	2.881042	2.881099	2.881156	2.881213	2.881270	2.881328	57
761	2.881385	2.881442	2.881499	2.881556	2.881613	2.881670	2.881727	2.881784	2.881841	2.881898	57
762	2.881955	2.882012	2.882069	2.882126	2.882183	2.882240	2.882297	2.882354	2.882411	2.882408	57
763	2.882524	2.882581	2.882638	2.882695	2.882752	2.883809	2.882866	2.882923	2.882980	2.883036	57
764	2.883093	2.883150	2.883207	2.883264	2.883321	2.883377	2.883434	2.883491	2.883548	2.883605	57
765	2.883661	2.883718	2.883775	2.883832	2.883889	2.883945	2.884002	2.884059	2.884115	2.884172	57
766	2.884229	2.884285	2.884342	2.884399	2.884455	2.884514	2.884569	2.884625	2.884682	2.884739	57
767	2.884795	2.884852	2.884909	2.884965	2.885022	2.885078	2.885135	2.885191	2.885248	2.885305	57
768	2.885361	2.885418	2.885474	2.885531	2.885587	2.885644	2.885700	2.885757	2.885813	2.885870	57
769	2.885926	2.885983	2.886039	2.886096	2.886152	2.886209	2.886265	2.886321	2.886378	2.886434	56
770	2.886490	2.886547	2.886603	2.886660	2.886716	2.886773	2.886829	2.886885	2.886942	2.886998	56
771	2.887054	2.887111	2.887167	2.887223	2.887280	2.887336	2.887392	2.887448	2.887505	2.887561	56
772	2.887617	2.887673	2.887730	2.887786	2.887842	2.887898	2.887955	2.888011	2.888067	2.888123	56
773	2.888179	2.888236	2.888292	2.888348	2.888404	2.888460	2.888516	2.888573	2.888629	2.888685	56
774	2.888741	2.888797	2.888853	2.888909	2.888965	2.889021	2.889077	2.889133	2.889190	2.889249	56
775	2.889302	2.889358	2.889414	2.889470	2.889526	2.889582	2.889638	2.889694	2.889750	2.889806	56
776	2.889862	2.889918	2.889974	2.890030	2.890086	2.890141	2.890197	2.890253	2.890309	2.890365	56
777	2.890421	2.890477	2.890533	2.890589	2.890644	2.890700	2.890755	2.890812	2.890868	2.890924	56
778	2.890980	2.891035	2.891091	2.891147	2.891203	2.891259	2.891314	2.891370	2.891426	2.891482	56
779	2.891537	2.891593	2.891649	2.891705	2.891760	2.891816	2.891872	2.891927	2.891983	2.892039	56

N°	0	1	2	3	4	5	6	7	8	9	Diff.
780	2.892095	2.892150	2.892206	2.892262	2.892317	2.892373	2.892428	2.892484	2.892540	2.892395	56
781	2.892651	2.892707	2.892762	2.892818	2.892873	2.892929	2.892985	2.893040	2.893096	2.893151	56
782	2.893207	2.893262	2.893318	2.893373	2.893429	2.893484	2.893540	2.893595	2.893651	2.893706	56
783	2.893762	2.893717	2.893873	2.893928	2.893984	2.894039	2.894094	2.894150	2.894205	2.894261	55
784	2.894316	2.894371	2.894427	2.894482	2.894538	2.894593	2.894648	2.894704	2.894759	2.894814	55
785	2.894870	2.894925	2.894980	2.895036	2.895091	2.895146	2.895201	2.895257	2.895312	2.895367	55
786	2.895422	2.895478	2.895533	2.895588	2.895643	2.895699	2.895754	2.895809	2.895864	2.895919	55
787	2.895975	2.896030	2.896085	2.896140	2.896195	2.896251	2.896306	2.896361	2.896410	2.896471	55
788	2.896526	2.896581	2.896636	2.896691	2.896747	2.896802	2.896857	2.896912	2.896967	2.897022	55
789	2.897077	2.897132	2.897187	2.897242	2.897297	2.897352	2.897407	2.897462	2.897517	2.897572	55
790	2.897627	2.897682	2.897737	2.897792	2.897847	2.897902	2.897957	2.898012	2.898067	2.898122	55
791	2.898176	2.898231	2.898286	2.898341	2.898396	2.898451	2.898506	2.898561	2.898615	2.898670	55
792	2.898725	2.898780	2.898835	2.898890	2.898944	2.898999	2.899054	2.899109	2.899164	2.899218	55
793	2.899273	2.899328	2.899383	2.899437	2.899492	2.899547	2.899602	2.899656	2.899711	2.899766	55
794	2.899820	2.899875	2.899930	2.899985	2.900039	2.900094	2.900140	2.900203	2.900258	2.900312	55
795	2.900367	2.900422	2.900476	2.900531	2.900586	2.900640	2.900695	2.900749	2.900804	2.900858	55
796	2.900913	2.900968	2.901022	2.901077	2.901131	2.901186	2.901240	2.901295	2.901349	2.901404	55
797	2.901458	2.901513	2.901567	2.901622	2.901676	2.901731	2.901785	2.901840	2.901894	2.901948	54
798	2.902003	2.902057	2.902112	2.902166	2.902220	2.902275	2.902329	2.902384	2.902438	2.902492	54
799	2.902547	2.902601	2.902655	2.902710	2.902764	2.902818	2.902873	2.902927	2.902981	2.903036	54
800	2.903090	2.903144	2.903198	2.903253	2.903307	2.903361	2.903416	2.903470	2.903524	2.903578	54
801	2.903632	2.903687	2.903741	2.903795	2.903849	2.903903	2.903958	2.904012	2.904066	2.904120	54
802	2.904174	2.904228	2.904283	2.904337	2.904391	2.904445	2.904499	2.904553	2.904607	2.904661	54
803	2.904715	2.904770	2.904824	2.904878	2.904932	2.904986	2.905040	2.905094	2.905148	2.905202	54
804	2.905256	2.905310	2.905364	2.905418	2.905472	2.905526	2.905580	2.905634	2.905688	2.905742	54
805	2.905796	2.905850	2.905904	2.905958	2.906012	2.906065	2.906119	2.906173	2.906227	2.906281	54
806	2.906335	2.906389	2.906443	2.906497	2.906550	2.906604	2.906658	2.906712	2.906766	2.906820	54
807	2.906873	2.906927	2.906981	2.907035	2.907089	2.907142	2.907196	2.907250	2.907304	2.907358	54
808	2.907411	2.907465	2.907519	2.907573	2.907626	2.907680	2.907734	2.907787	2.907841	2.907895	54
809	2.907948	2.908002	2.908056	2.908109	2.908163	2.908217	2.908270	2 608324	2.908378	2.908431	54
810	2.908485	2.908539	2.908592	2.908646	2.908699	2.908753	2.908807	2.908860	2.908914	2.908967	54
811	2.909021	2.909074	2.909128	2.909181	2.909235	2.909288	2.909342	2.909395	2.909449	2.909502	54
812	2.909556	2.909609	2.909663	2.909716	2.909770	2.909823	2.909877	2.909930	2.909984	2.910037	53
813	2.910090	2.910144	2.910197	2.910251	2.910304	2.910358	2.910411	2.910460	2.910518	2.910571	53
814	2.910624	2.910678	2.910731	2.910784	2.910838	2.910891	2.910944	2.910998	2.911051	2.911104	53
815	2.911158	2.911211	2.911264	2.911317	2.911371	2.911024	2.911477	2.911530	2.911584	2.911637	53
816	2.911690	2.911743	2.911797	2.911850	2.911903	2.911956	2.912009	2.912063	2.912116	2.912169	53
817	2.912222	2.912275	2.912328	2.912381	2.912435	2.912488	2.912541	2.912594	2.912647	2.912700	53
818	2.912753	2.912806	2.912859	2.912912	2.912966	2.913019	2.913072	2.913125	2.913178	2.913231	53
819	2.913284	2.913337	2.913390	2.913443	2.913496	2.913549	2.913602	2.913655	2.913708	2.913761	53
820	2.913814	2.913867	2.913920	2.913973	2.914026	2.914079	2.914131	2.914184	2.914237	2.914290	53
821	2.914343	2.914396	2.914449	2.914502	2.914555	2.914608	2.914660	2.914713	2.914766	2.914819	53
822	2.914872	2.914925	2.914977	2.915030	2.915083	2.915136	2.915189	2.915241	2.915294	2.915347	53
823	2.915400	2.915453	2.915505	2.915558	2.915611	2.915664	2.915716	2.915769	2.915822	2.915874	53
824	2.915927	2.915980	2.916033	2.916085	2.916138	2.916191	2.916243	2.916296	2.916349	2.916401	53
825	2.916454	2.916507	2.916559	2.916612	2.916664	2.916717	2.916770	2.919822	2.916875	2.916927	53
826	2.916980	2.917033	2.917085	2.917138	2.917190	2.917243	2.917295	2.917345	2.917400	2.917453	53
827	2.917505	2.917558	2.917610	2.917663	2.917715	2.917768	2.917820	2.917873	2.917925	2.917978	52
828	2.918030	2.918083	2.918135	2.918188	2.918240	2.918292	2.918345	2.918397	2.918450	2.918502	52
829	2.918554	2.918607	2.918659	2.918712	2.918764	2.918816	2.918869	2.918921	2.918973	2.919026	52
830	2.919078	2.919130	2.919183	2.919235	2.919287	2.919340	2.919392	2.919444	2.919496	2.919549	52
831	2.919601	2.919653	2.919705	2.919758	2.919810	2.919862	2.919914	2.919967	2.920019	2.920071	52
832	2.920123	2.920175	2.920228	2.920280	2.920332	2.920384	2.920436	2.920489	2.920545	2.920593	52
833	2.920645	2.920697	2.920749	2.920801	2.920853	2.920906	2.920958	2.921010	2.921062	2.921114	52
834	2.921166	2.921218	2.921270	2.921322	2.921374	2.921426	2.921478	2.921530	2.921582	2.921634	52
835	2.921686	2.921738	2.921790	2.921842	2.921894	2.921946	2.921998	2.922050	2.922102	2.922154	52
836	2.922206	2.922258	2.922310	2.922362	2.922414	2.922466	2.922518	2.922570	2.922622	2.922674	52
837	2.922725	2.922777	2.922829	2.922881	2.922933	2.922985	2.923037	2.923088	2.923140	2.923192	52
838	2.923244	2.923296	2.923348	2.923399	2.923451	2.923503	2.923555	2.923607	2.923658	2.923710	52
839	2.923762	2.923814	2.923865	2.923917	2.923969	2.924021	2.924072	2.924124	2.924176	2.924228	52
840	2.924279	2.924331	2.924383	2.924434	2.924486	2.924538	2.924589	2.924641	2.924693	2.924744	52
841	2.924796	2.924848	2.924899	2.924951	2.925002	2.925054	2.925106	2.925157	2.925209	2.925260	52
842	2.925312	2.925364	2.925415	2.925467	2.925518	2.925570	2.925621	2.925673	2.925724	2.925776	52
843	2.925828	2.925879	2.925930	2.925982	2.926034	2.926085	2.926137	2.926188	2.926239	2.926291	51
844	2.926342	2.926394	2.926445	2.926497	2.926548	2.926600	2.926951	2.926702	2.926754	2.926805	51
845	2.926857	2.926908	2.926959	2.927011	2.927062	2.927114	2.927165	2.927216	2.927268	2.927319	51
846	2.927370	2.927422	2.927473	2.927524	2.927576	2.927627	2.927678	2.927730	2.927781	2.927832	51
847	2.927883	2.927935	2.927986	2.928037	2.928088	2.928140	2.928191	2.928242	2.928293	2.928345	51
848	2.928396	2.928447	2.928498	2.928549	2.928601	2.928652	2.928703	2.928754	2.928805	2.928856	51
849	2.928908	2.928959	2.929010	2.929061	2.929112	2.929163	2.929214	2.929269	2.929317	2.929368	51
850	2.929419	2.929470	2.929521	2.929572	2.929723	2.929674	2.929725	2.929776	2.929827	2.929878	51
851	2.929930	2.929981	2.930032	2.930083	2.930134	2.930185	2.930236	2.930287	2.930338	2.930389	51
852	2.930440	2.930491	2.930540	2.930592	2.930643	2.930694	2.930745	2.930796	2.930847	2.930898	51
853	2.930949	2.931000	2.931051	2.931102	2.931153	2.931205	2.931254	2.931305	2.931356	2.931407	51
854	2.931458	2.931509	2.931560	2.931610	2.931661	2.931712	2.931763	2.931814	2.931864	2.931915	51
855	2.931966	2.932017	2.932068	2.932118	2.932169	2.932220	2.932271	2.932321	2.932372	2.932423	51
856	2.932474	2.932524	2.932575	2.932626	2.932677	2.932727	2.932778	2.932829	2.932879	2.932930	51
857	2.932981	2.933033	2.933082	2.933133	2.933183	2.933234	2.933285	2.933335	2.933386	2.933437	51
858	2.933487	2.933538	2.933588	2.933639	2.933690	2.933740	2.933791	2.933841	2.933892	2.933943	51
859	2.933993	2.934044	2.934094	2.934145	2.934195	2.934246	2.934296	2.934347	2.934397	2.934448	51
860	2.934498	2.934549	2.934599	2.934650	2.934700	2.934751	2.934801	2.934852	2.934902	2.934953	50
861	2.935003	2.935054	2.935104	2.935154	2.935205	2.935255	2.975306	2.935356	2.935406	2.935457	50

N°	0	1	2	3	4	5	6	7	8	9	Diff.
862	2.935507	2.935558	2.935608	2.935668	2.935709	2.935759	2.935809	2.935860	2.935910	2.935962	50
863	2.936011	2.936061	2.936111	2.936162	2.936212	2.936262	2.936313	2.936363	2.936413	2.936463	50
864	2.936514	2.936564	2.936614	2.936664	2.936715	2.936765	2.936815	2.936865	2.936916	2.936969	50
865	2.937016	2.937066	2.937116	2.937167	2.937217	2.937267	2.937317	2.937362	2.937418	2.937468	50
866	2.937518	2.937568	2.937618	2.937668	2.937718	2.937769	2.937819	2.937869	2.937919	2.937969	50
867	2.938019	2.938069	2.938119	2.938169	2.938219	2.938269	2.938319	2.938370	2.938420	2.938470	50
868	2.938570	2.938570	2.938620	2.938670	2.938720	2.938770	2.938820	2.938870	2.938920	2.938970	50
869	2.939020	2.939070	2.939120	2.939170	2.939220	2.939270	2.939319	2.939369	2.939419	2.939469	50
870	2.939519	2.939569	2.939619	2.939669	2.939719	2.939769	2.939819	2.939869	2.939918	2.939968	50
871	2.940018	2.940068	2.940118	2.940168	2.940218	2.940267	2.940317	2.940366	2.940417	2.940467	50
872	2.940516	2.940566	2.940616	2.940666	2.940716	2.940765	2.940815	2.940865	2.940915	2.940964	50
873	2.941014	2.941064	2.941114	2.941163	2.941213	2.941263	2.941313	2.941362	2.941412	2.941462	50
874	2.941511	2.941561	2.941611	2.941660	2.941710	2.941760	2.941809	2.941859	2.941909	2.941958	50
875	2.942008	2.942058	2.942107	2.942157	2.942206	2.942256	2.942300	2.942355	2.942405	2.942454	50
876	2.942504	2.942554	2.942603	2.942653	2.942702	2.942752	2.942801	2.942851	2.942900	2.942950	50
877	2.943000	2.943049	2.943099	2.943148	2.943198	2.943247	2.942397	2.943346	2.943397	2.944445	49
878	2.943494	2.943544	2.943593	2.943643	2.943692	2.943742	2.943791	2.943841	2.943890	2.943939	49
879	2.943989	2.944038	2.944088	2.944137	2.944186	2.944236	2.944285	2.944335	2.944384	2.941433	49
880	2.944483	2.944532	2.944581	2.944631	2.944690	2.944729	2.944779	2.944828	2.944877	2.944927	49
881	2.944976	2.945025	2.945074	2.945124	2.945173	2.945222	2.945272	2.945321	2.945370	2.945419	49
882	2.945469	2.945518	2.945567	2.945616	2.945665	2.945715	2.945764	2.945813	2.945863	2.945911	49
883	2.945961	2.946010	2.946059	2.946108	2.946157	2.946207	2.946256	2.946305	2.946354	2.946403	49
884	2.945452	2.946501	2.946550	2.946600	2.946649	2.946698	2.946747	2.946796	2.946845	2.946892	49
885	2.946943	2.946992	2.947041	2.947090	2.947139	2.947189	2.947238	2.947287	2.947336	2.947385	49
886	2.947434	2.947483	2.947532	2.947581	2.947630	2.947679	2.947728	2.947777	2.947826	2.947875	49
887	2.947924	2.947973	2.948021	2.948070	2.948119	2.948168	2.948217	2.948267	2.948315	2.948364	49
888	2.948413	2.948462	2.948511	2.948560	2.948608	2.948657	2.948700	2.948755	2.948804	2.948853	49
889	2.948902	2.948951	2.948999	2.949048	2.949097	2.949146	2.949195	2.949244	2.949292	2.949341	49
890	2.949390	2.949439	2.949488	2.949539	2.949585	2.949633	2.949683	2.949731	2.949780	2.949829	49
891	2.949878	2.949926	2.949975	2.950023	2.950073	2.950121	2.950170	2.950219	2.950267	2.950316	49
892	2.950365	2.950413	2.950462	2.950511	2.950560	2.950608	2.950657	2.950705	2.950754	2.950803	49
893	2.950859	2.950900	2.950946	2.950997	2.951047	2.951095	2.951143	2.951192	2.951240	2.951289	49
894	2.951337	2.951386	2.951435	2.951483	2.951532	2.951580	2.951629	2.951677	2.951726	2.951774	49
895	2.951823	2.951872	2.951920	2.951969	2.952017	2.952066	2.952114	2.952163	2.952211	2.952259	48
896	2.952328	2.952356	2.952405	2.952453	2.952502	2.952550	2.952699	2.952647	2.952696	2.952744	48
897	2.952792	2.952841	2.952889	2.952938	2.952986	2.953034	2.953083	2.953131	2.953180	2.953228	48
898	2.953276	2.953325	2.953373	2.953421	2.953470	2.953518	2.953566	2.953615	2.953662	2.953711	48
899	2.953760	2.953808	2.953856	2.953905	2.953953	2.954001	2.954049	2.954098	2.954246	2.954191	48
900	2.954242	2.954291	2.954339	2.954387	2.954435	2.954484	2.954532	2.954580	2.954628	2.954677	48
901	2.954725	2.954773	2.954811	2.954869	2.954918	2.954966	2.955014	2.955062	2.955110	2.955185	48
902	2.955206	2.955255	2.955303	2.955351	2.955399	2.955447	2.955495	2.955543	2.955591	2.955640	48
903	2.955688	2.955736	2.955784	2.955832	2.955880	2.955928	2.955976	2.956024	2.956072	2.956120	48
904	2.956168	2.956216	2.956264	2.956312	2.956360	2.956409	2.956457	2.956505	2.956553	2.956601	48
905	2.956649	2.956697	2.956744	2.956792	2.956840	2.956888	2.956936	2.956984	2.957032	2.957080	48
906	2.957128	2.957176	2.957224	2.957272	2.957320	2.957368	2.957416	2.957464	2.957511	2.957559	48
907	2.957607	2.957655	2.957707	2.957751	2.957799	2.957847	2.957894	2.957942	2.957990	2.958038	48
908	2.958086	2.958134	2.958181	2.958229	2.958277	2.958325	2.958373	2.958420	2.958468	2.958516	48
909	2.958564	2.958612	2.958659	2.958707	2.958755	2.958803	2.958850	2.958898	2.958946	2.958994	48
910	2.959041	2.959089	2.959137	2.959184	2.959232	2.959280	2.959328	2.959375	2.959423	2.959471	48
911	2.959518	2.959566	2.959614	2.959661	2.959709	2.959757	2.959804	2.959852	2.959900	2.959947	48
912	2.959995	2.960042	2.960090	2.960138	2.960185	2.960233	2.960280	2.960328	2.960376	2.960423	48
913	2.960471	2.960518	2.960566	2.960613	2.960661	2.960708	2.960756	2.960804	2.960851	2.960899	48
914	2.960946	2.960994	2.961041	2.961089	2.961136	2.961184	2.961231	2.961279	2.961326	2.961374	47
915	2.961421	2.961468	2.961516	2.961563	2.961611	2.961658	2.961706	2.961753	2.961801	2.961848	47
916	2.961895	2.961943	2.961990	2.962038	2.962085	2.962132	2.962180	2.962227	2.962275	2.962322	47
917	2.962369	2.962417	2.962464	2.962511	2.962559	2.962606	2.962653	2.962701	2.962748	2.962795	47
918	2.962843	2.962890	2.962927	2.962985	2.963032	2.963079	2.963126	2.963174	2.963221	2.963268	47
919	2.963315	2.963363	2.963410	2.963457	2.963504	2.963552	2.963599	2.963646	2.963693	2.963741	47
920	2.963788	2.963835	2.963882	2.963929	2.963977	2.964024	2.964071	2.964118	2.964165	2.964212	47
921	2.964260	2.964307	2.964354	2.964401	2.964448	2.964495	2.964542	2.964590	2.964637	2.964684	47
922	2.964731	2.964778	2.964825	2.964872	2.964919	2.964966	2.965013	2.965060	2.965108	2.965155	47
923	2.965202	2.965249	2.965296	2.965343	2.965390	2.965437	2.995584	2.965531	2.965578	2.965625	47
924	2.965672	2.965719	2.965766	2.965813	2.965860	2.965907	2.965954	2.966001	2.966048	2.966095	47
925	2.966142	2.966189	2.966236	2.966283	2.966329	2.966376	2.966423	2.966470	2.966511	2.966564	47
926	2.966611	2.966658	2.966705	2.966752	2.966798	2.966845	2.966892	2.966939	2.966986	2.967033	47
927	2.967080	2.967127	2.967173	2.967220	2.967267	2.967314	2.967361	2.967408	2.967454	2.967501	47
928	2.967548	2.967595	2.967642	2.967688	2.967735	2.967782	2.967829	2.967875	2.967922	2.967969	47
929	2.968016	2.968062	2.968107	2.968156	2.968203	2.968249	2.968296	2.968343	2.968389	2.968436	47
930	2.968483	2.968530	2.968576	2.968623	2.968670	2.968716	2.968763	2.968810	2.968856	2.968903	47
931	2.968950	2.968996	2.969042	2.969090	2.969136	2.969183	2.969229	2.969276	2.969323	2.969369	47
932	2.069416	2.969462	2.969509	2.969556	2.969602	2.969649	2.969695	2.969742	2.969788	2.969835	47
933	2.969882	2,969928	2.969975	2.970031	2.970068	2.970114	2.970161	2.970207	2.970254	2.970300	47
934	2.970347	2.970393	2.970440	2.970486	2.970533	2.970579	2.970626	2.970672	2.970719	2.970765	46
935	2.970812	2.970858	2.970904	2.970951	2.970997	2.971044	2.971090	2.971137	2.971183	2.971224	46
936	2.971276	2.971322	2.971369	2.971415	2.971461	2.971508	2.971554	2.971600	2.971647	2.971693	46
937	2.971740	2.971786	2.971832	2.971879	2.971925	2.971971	2.972018	2.972064	2.972110	2.972156	46
938	2.972203	2.972249	2.972295	2.972342	2.972388	2.972434	2.972480	2.972527	2.972573	2.972619	46
939	2.972666	2.972712	2.972758	2.972804	2.972851	2.972897	2.972945	2.972989	2.973031	2.973082	46
940	2.973128	2.973174	2.973220	2.673260	2.973313	2.973359	2.973405	2.973451	2.973497	2.973543	46
941	2.973590	2.973636	2.973682	2.973728	2.973774	2.973820	2.973866	2.973913	2.973959	2.974005	46
942	2.975051	2.974097	2.974343	2.974189	2.974235	2.974281	2.974327	2.974373	2.974420	2.974466	46
943	2.974512	2.974558	2.974604	2.974650	2.974696	2.974742	2.974788	2.974834	2.974880	2.074926	46

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
944	2.974972	2.975018	2.975064	2.975110	2.975156	2.975202	2.975248	2.975294	2.975340	2.975386	46
945	2.975432	2.975478	2.975524	2.975570	2.975616	2.975661	2.975707	2.975753	2.975799	2.975845	46
946	2.975890	2.975937	2.975983	2.976029	2.976075	2.976121	2.970167	2.976212	2.976258	2.976304	46
947	2.976350	2.976396	2.976442	2.976487	2.976533	2.976579	2.976625	2.976671	2.976717	2.976762	46
948	2.976808	2.976854	2.976900	2.976940	2.976991	2.977037	2.977083	2.977129	2.977175	2.977220	46
949	2.977266	2.977312	2.977358	2.977403	2.977449	2.977495	2.977541	2.977586	2.977632	2.977678	46
950	2.977724	2.977796	2.977815	2.977861	2.977906	2.977952	2.977998	2.978043	2.978089	2.978135	46
951	2.978180	2.978226	2.978272	2.978317	2.978363	2.978409	2.978454	2.978500	2.978546	2.978591	46
952	2.978637	2.978683	2.678728	2.978774	2.978819	2.978865	2.978911	2.978956	2.979002	2.979047	46
953	2.979093	2.979138	2.979184	2.979230	2.979275	2.979321	2.979366	2.979412	2.979457	2.979503	46
954	2.979548	2.979594	2.979639	2.979685	2.979730	2.979776	2.979821	2.979867	2.979912	2.979958	46
955	2.980003	2.980049	2.980094	2.980140	2.980185	2.980231	2.980276	2.980322	2.980267	2.980412	45
956	2.980458	2.980503	2.980549	2.980594	2.980640	2.980685	2.980730	2.980776	2.980821	2.980867	45
957	2.980912	2.980957	2.981003	2.981048	2.981093	2.981139	2.981184	2.981229	2.981275	2.981320	45
958	2.981365	2.981411	2.981456	2.981501	2.981547	2.981592	2.981637	2.981683	2.981728	2.981773	45
959	2.981819	2.981864	2.981909	2.981954	2.982000	2.982045	2.982090	2.982135	2.982182	2.982226	45
961	2.982271	2.982316	2.982362	2.982407	2.982452	2.982497	2.982543	2.982588	2.982633	2 982678	45
962	2.982723	2.982769	2.982814	2.982859	2.982904	2.982949	2.982994	2.983040	2.983085	2.983130	45
963	2.983175	2.983220	2.983265	2.983310	2.983356	2.983401	2.983446	2.983491	2.983536	2.983581	45
964	2.983626	2.983671	2.983716	2.983762	2.983807	2.983852	2.983897	2.983942	2.983987	2.984032	45
964	2.984077	2.984122	2.984167	2.984212	2.984257	2.984302	2.984347	2.984392	2.984437	2.984482	45
965	2.984527	2.984572	2.984617	2.984662	2.984707	2.984752	2.984797	2.984842	2.984887	2.984932	45
966	2.984977	2.985022	2.985067	2.985112	2.985157	2.985202	2.985247	2.985292	2.985337	2.985382	45
967	2.985426	2.985471	2.985516	2.985561	2.985606	2.985651	2.985696	2.988741	2.985786	2.985830	45
968	2.985875	2.985920	2.985965	2.986010	2.986055	2.986100	2.986144	2.986187	2.986234	2.986279	45
969	2.986324	2.986369	2.986413	2.986458	2.986503	2.986548	2.986593	2.986637	2.986682	2.986727	45
970	2.986772	2.986816	2.986861	2.986906	2.986951	2.986995	2.987040	2.987085	2.987130	2.987074	45
971	2.987219	2.987264	2.987309	2.987353	2.987398	2.987443	2.987487	2.987532	2.987577	2.987622	45
972	2.987666	2.987711	2.987756	2.987800	2.987845	2.987890	2.987934	2.987979	2.988024	2.988068	45
973	2.988113	2.988157	2.988202	2.988247	2.988291	2.988336	2.988381	2.988425	2.988470	2.988314	45
974	2.988559	2.988603	2.988648	2.988693	2.988737	2.988782	2.988826	2.988871	2.988915	2.988960	45
975	2.989005	2.989049	2.989094	2.989138	2.989183	2.989227	2.989272	2.989361	2.989361	2.989405	45
976	2.989450	2.989494	2.989539	2.989583	2.989628	2.989672	2.989717	2.989762	2.989806	2.989850	44
977	2.989895	2.989939	2.989983	2.980028	2.990072	2.990117	2.990161	2.990206	2.990250	2.990294	44
978	2.990339	2.990384	2.990428	2.990472	2.990516	2.990561	2.990605	2.990650	2.990694	2.990738	44
979	2.990783	2.990827	2.990871	2.990916	2.990960	2.991004	2.991049	2.991093	2.991137	2.996182	44
980	2.991226	2.991270	2.991315	2.991359	2.991403	2.991448	2.991492	2.991536	2.991580	2.991625	44
981	2.991669	2.991713	2.991757	2.991802	2.991846	2.991890	2.991934	2.991979	2.992023	2.992067	44
982	2.992111	2.992156	2.992200	2.992244	2.992288	2.992333	2.992377	2.992421	2.992465	2.992509	44
983	2.992553	2.992598	2.992642	2.992686	2.992730	2.992774	2.992818	2.992863	2.992907	2.992951	44
984	2.992995	2.993039	2.993083	2.993127	2.993172	2.993216	2.993260	2.993304	2.993348	2.993392	44
985	2.993436	2.993480	2.993524	2.993568	2.993613	2.993657	2.993701	2.993745	2.993789	2.993835	44
986	2.993877	2.993921	2.993965	2.994009	2.994053	2.994097	2.994141	2.994185	2.994229	2.994273	44
989	2.994317	2.994361	2.994405	2.994449	2.994493	2.994537	2.994581	2.994625	2.994669	2.994713	44
988	2.994757	2.994801	2.994845	2.994889	2.994933	2.994977	2.995021	2.995064	2.995108	2.995152	44
989	2.995196	2.995240	2.995284	2.995328	2.995372	2.995416	2.995460	2.995504	2.995547	2.995591	44
990	2.995635	2.995679	2.995723	2.995767	2.995811	2.995854	2.995898	2.995942	2.995786	2.996030	44
991	2.996074	2.996117	2.996161	2.996205	2.996249	2.996293	2.996336	2.996380	2.996424	2.996468	44
992	2.996512	2.996555	2.996599	2.996643	2.996687	2.996730	2.996774	2.996818	2.996862	2.996905	44
993	2.996949	2.996993	2.997039	2.997080	2.997124	2.997168	2.997212	2.997255	2.997299	2.997343	44
994	2.997386	2.997430	2.997474	2.997517	2.997561	2.997605	2.997648	2.997692	2.997736	2.997779	44
995	2.997823	2.997867	2.997910	2.997954	2.997998	2.998041	2.998085	2.998128	2.998172	2.998216	44
996	2.998259	2.998303	2.998346	2.998390	2.998434	2.998477	2.998521	2.998564	2.998608	2.998652	44
997	2.998695	2.998736	2.998782	2.998826	2.998869	2.998913	2.998956	2.999000	2.999043	2.999087	44
998	2.999130	2.999174	2.999218	2.999261	2.999305	2.999348	2.999392	2.999435	2.999478	2.999520	44
999	2.999565	2.999609	2.999652	2.999696	2.999739	2 999783	2.999826	2.999870	2.999913	2.999957	43

Uſe of the preceding table.

To find the logarithm *of any number within the compaſs of the Table.*—If the number be under 100, it is eaſily found in the firſt diviſion at the head of the firſt page; if it be betwixt 100 and 1000, over againſt the number in the firſt column of the following pages, in the next column under 0 will be found the *logarithm* required. If the number be betwixt 1000 and 10000, the firſt three figures of the number are to be found in the column marked Nº and the fourth figure at the top, and in the column under it, lineally againſt the firſt three figures, will be found the *logarithm* required, changing the index 2 into 3. The column, marked Diff. and ſhewing the common difference by which each of theſe columns increaſes, ſerves to find the *logarithms* of numbers beyond 10000. Thus,

To find the logarithm *for a number greater than any in the common canon, but leſs than* 10000000. Cut off four figures on the left of the given number, and ſeek the *logarithm* in the table; and as many units to the index as there are figures remaining on the right; ſubtract the *logarithm* found from the next following it, in the table; then, as the difference of numbers in the canon is to the tabular diſtance of the *logarithms* anſwering to them, ſo are the remaining figures of the given number to the logarithmic difference; which, if it be added to the *logarithm* before found, the ſum will be the *logarithm* required. Suppoſe, v. gr. the *logarithm* of the number 92375 required. Cut off the four figures 9237, and to the characteriſtic of the *logarithm* correſponding to them, add an unit; then,

From the *logarith.* of the numb. 9238 = 3.965578
Subtract *logarith.* numb. —— 9237 = 3.965531
Remains tabular difference 47

Then 10 : 47 :: 5 : 23
Now to the *logarithm* ———————— 4.965531
Add the difference found ———————— 23
The ſum is the *logarithm* required — 4.965554

Or more briefly; find the *logarithm* of the firſt four figures as before; then multiply the common difference which ſtands againſt it by the remaining figures of the given number; from the product, cut off as many figures at the right hand as you multiplied by, and add the remainder to the *logarithm* before found, fitting it with a proper index. Thus 47 × 5 = 235; cut off 5 and add 23.

To find the logarithm *of a fraction.*—Subtract the *logarithm* of the numerator from that of the denominator, and to the remainder prefix the ſign of ſubtraction. Thus ſuppoſe it required to find the *logarithm* of the fraction $\frac{3}{7}$.

Logarithm of 7 = 0.845098
Logarithm of 3 = 0.477121
Logarithm of $\frac{3}{7}$ = −0.367977

The reaſon of the rule is, that a fraction being the quotient of the numerator divided by the denominator, its *logarithm* muſt be the difference of the *logarithms* of thoſe two; ſo that the numerator being ſubtracted from the denominator, the difference becomes negative. Stifelius obſerved, that the *logarithms* of a proper fraction muſt always be negative, if that of unity be 0; which is evident, a fraction being leſs than one,

Or, the *logarithm* of the denominator, though greater than that of the numerator, as in the caſe of a proper fraction, may be ſubtracted from it, regard being had to the ſign of the index, which alone in that caſe is negative. Thus,

Log. of 3 = 0.477121
Log. of 7 = 0.845098
Log. of $\frac{3}{7}$ = 1.632023 which produces the ſame

ſame effect in any operation, as that before found, viz. —0. 367977, this being to be ſubtracted, and the other to be added.

Or again, the fraction may be reduced to a decimal, and its *logarithm* found; which differs from that of a whole number only in the index, which is to be negative.

For an improper fraction v. gr. $\frac{9}{5}$, its numerator being greater than its denominator, its *logarithm* is had by ſubtracting the *logarithm* of the latter from that of the former.

The logarithm of $9=0.9542425$
Logarithm of $\underline{5=0.6989700}$
Logarithm $\frac{9}{5}=0.2552725$

In the ſame manner may a *logarithm* of a mixed number, as $3\frac{2}{7}$, be found, it being firſt reduced into an improper fraction $\frac{23}{7}$.

Or, this improper fraction may be reduced to a mixed number, whoſe *logarithm* muſt be found as if it were wholly integral, and its index taken according to the integral part. We ſhall here obſerve, that the *logarithms* of whoſe numbers are added, ſubtracted, &c. according to the rules of theſe operations in decimal arithmetic; but with regard to the management of *logarithms* with negative indices, the ſame rules are to be obſerved as thoſe given in Algebra for like and unlike ſigns.

In addition, all the figures, except the index, are reckoned poſitive, and therefore the figure to be carried to the index from the other part of the *logarithm*, takes away ſo much from the negative index. Thus $1.8683326+\bar{3}.698972=\bar{1}.562298$. In ſubtraction, if either one or both of the *logarithms* have negative indices, you muſt change the ſign of the index of the ſubtrahend, after you have carried to it what may ariſe from the decimal part, and then add the indices: thus $\bar{1}.562298-1.863326=\bar{3}.698972$. In multiplication, what is carried from the product of the other parts of the *logarithms* muſt be ſubtracted from the product of the indices: thus $\bar{2}.477121\times5=\bar{8}.385605$. In diviſion, if the diviſor will exactly meaſure the index, proceed as in common arithmetic; e. g. $\bar{4}.924782\div2=\bar{2}.462391$. But if the diviſor will not exactly meaſure the index, add units to the index, till you can exactly divide it, and carry theſe units to the next number: e. g. $\bar{8}.385605\div5=\bar{2}.477121$.

To find the number correſponding to any given logarithm. If the *logarithm* be within the limits of the table, i. e. if its index does not exceed 3, then, neglecting the index, look down in the column of *logarithms* under 0. for the two or three firſt figures of your given *logarithm*, and if you exactly find all the figures of the given *logarithm* in that column, you have the number correſponding at the left hand. But if you do not find your *logarithm* exactly in the column under 0, you muſt run through the other columns, till you find it exactly, or till you obtain the next leaſt *logarithm*; and in the column of numbers lineally againſt it, you have the firſt 3 figures of the number ſought, to which join the figure over the column, where your *logarithm* or its next leaſt was found, and you have the correſponding number. E. g. The number anſwering to the *logarithm* 3.544812 is 3506.

If the index of this *logarithm* had been 1, then the two laſt figures of the number would have been decimal; with the index 0, its correſponding number would have been 3.506; with $\bar{1}$, .3506; with $\bar{2}$, .03506, &c.

If the *logarithm* cannot be found exactly, take the next leaſt, and make the difference between the given *logarithm* and the next leaſt the numerator of a fraction, whoſe denominator ſhall be the common difference, and add the fraction to the nunber found in the table.

To find the number correſponding to a logarithm *greater than any in the table.*—Firſt, from the given *logarithm*, ſubſtract the *logarithm* of 10, or 100, or 1000, or 10000, till you have a *logarithm* that will come within the compaſs of the table; find the number correſponding to this, and multiply it by 10, or 100, or 1000, or 10000, the product is the number required.

Suppoſe, for inſtance, the number correſponding to the *logarithm* 7.7589982 be required; ſubſtract the *logarithm* of the number 10000, which is 4.0000000, from 7.589982; the remainder is 3.7589982, the number correſponding to which is 5741 $\frac{11}{100}$: this multiplied by 10000, the product is 57411100, the number required.

Otherwiſe ſeek the decimal member of the *logarithm* in the table, and if you can find it exactly, you have the four firſt figures of the number in the table, to which affix as many cyphers as the given index exceeds 3, and it is the number required. But if you cannot find the *logarithm* exactly, take the next leaſt, and find the four firſt figures of the correſponding number; then take the difference betwixt the given *logarithm* and the next leaſt, and annex to it as many cyphers as the index exceeds 3; then divide by the common difference, and affix the quotient to the 4 firſt figures, and you have the number required.

To find the number correſponding to a negative logarithm.—To the given negative *logarithm*, add the laſt *logarithm* of the table, or that of the number 10000; i. e. ſubtract the firſt from the ſecond, and find the number correſponding to the remainder; this will be the numerator of the fraction whoſe denominator will be 10000; v. gr. ſuppoſe it to be required to find the fraction correſponding to the negative *logarithm*——-——-——0.3679767, ſubtract this from
$\underline{4.0000000}$
The remainder is——-—3.6320233, the number correſponding to which is 4285 $\frac{71}{100}$, the fraction ſought therefore is $\frac{4285}{10000000}$.—The reaſon of the rule is, that as a fraction is the quotient, ariſing on the diviſion of the numerator by the denominator, unity will be to the fraction as the denominator to the numerator; but as unity is to the fraction correſponding to the given negative *logarithm*, ſo is 10000 to the number correſponding to the remainder: therefore, if 10000 be taken for the denominator, the number will be the numerator of the fraction required.

The negative *logarithm*—0.367977 is equal to the *logarithm* $\bar{1}.632023$, and the number anſwering to it found in the manner already directed, will be .4285 $\frac{721}{101}$.

To find a fourth proportional to three given numbers.—Add the *logarithm* of the ſecond to that of the third, and from the ſum ſubtract the *logarithm* of the firſt; the remainder is the *logarithm* of the fourth required. E. gr. let the given numbers be 4, 68, and 3.

Logarithm $68=1.832509$
Logarithm $\underline{3=0.477121}$
Sum $=2.309630$
Logarithm $\underline{4=0.602060}$
Logarithm required 1.707570

The number in the tables correſponding to which is 51.—Otherwiſe, againſt the firſt term, write the ARITHMETICAL *complement* of its *logarithms*, and againſt the ſecond and third terms write their *logarithm*; and the ſum of theſe three *logarithms*, abating 10 in the index, will be the *logarithm* of the fourth term. Thus

4 —9.397940
68 — 1.832509
$\underline{3\ —0.477121}$
51 — 1.707570 as before.

This problem is of the utmoſt uſe in trigonometry. See TRIANGLE and TRIGONOMETRY.

For the method of performing multiplication, diviſion, involution, and extraction of roots by *logarithms*, ſee the beginning of this article.

In the common tables of *logarithms* we find the *logarithm* correſponding to any given number within the limits of the table by inſpection; but it is of uſe alſo to have a table wherein the *logarithms* are placed in their natural order from 0 to 100000 for inſtance, and with the correſponding natural numbers; ſo that a *logarithm* being given we may find the correſponding number by inſpection only, which can ſeldom be done by the common tables; nor can the correſponding number to a *logarithm* not in the table be found without ſome trouble.

A table of this ſort is called by Dr. Wallis an *anti-logarithmic canon*; and by this canon a *logarithm* being given, its number may be found with the ſame facility that a *logarithm* of a given number may be found by the common canon.

Dr. Wallis tells us that a canon of this kind was formed many years ago. It was begun, perhaps, by Harriot, and it was finiſhed at leaſt, and prepared for the preſs, if not begun by Warner. This canon ſeems to have been loſt; but the loſs has been ſupplied by Mr. Dodſon. See the *Anti-logarithmic Canon* by James Dodſon, Lond. 1742. fol. where the author alſo ſhews the conſtruction and uſe of his Table at large: and in which he has computed the numbers correſponding to every *logarithm* from 1 to 100000, to 11 places of figures.

LOGARITHMS, *hyperbolic*, are the ſame as natural *logarithms* or thoſe of Napier's firſt ſcheme.

The reaſon of the appellation is the analogy *hyperbolic* ſpaces have to *logarithms*. Thus,

It is known, that if on the aſymptote OS of an hyperbola LMN, *Tab.* II. *Analyſis*, *fig.* 49. the abſciſſæ OA, OP, OG, OR, &c. be taken in geometric progreſſion, the correſponding ſectors LOM, LON, LOQ, &c. or the ſegments LAPM, LAGN, LARQ, &c. will be in arithmetical progreſſion. Hence the ſegments or ſectors will be the *logarithms* of their correſponding abſciſſæ, OP, OG, OR, &c. And the ſector LOM, or the ſegment LAPM meaſures the ratio OP to OA. The modulus of this ſyſtem of *logarithms* is the parallelogram OALB, which being ſuppoſed unity, theſe *logarithms* coincide with Napier's.

Hyperbolic ſectors meaſure ratios as circular ſectors or arches meaſure angles. See Maclaurin, l. c. Art. 177. L'Hopital Sect. Coniq. art. 221.

By means of the hyperbola having the *hyperbolic logarithm* of $1=0$, it is eaſy to find the hyperbolic *logarithm* of 10. Let EZ and ET (*Tab.* III. *Analyſis*, *fig.* 63.) be the aſymptotes of the rectangular hyperbola YAI, whoſe parameter is $AP=PE=1$. Then, the area of the ſpace PABC will be the *hyperbolic logarithm* of $\frac{EC}{EP}$, that is, of EC; the area of the ſpace PA bc will be the *hyperbolic logarithm* of $\frac{EP}{Ec}$, that is of $\frac{1}{Ec}$; and the area of the ſpace cb BC will be the *hyperbolic logarithm* of $\frac{EC}{Ec}$; the right lines or ordinates CB and cb being ſuppoſed parallel to the aſymptote EZ. Now, to find theſe areas.

1. Put $Pc=x$, and $cb=y$; then, by the known property of the curve, $y=\frac{1}{1-x}$; which, drawn into $\dot{x}$, is $y\dot{x}=\frac{\dot{x}}{1-x}=$ the fluxion of $Pb=$ (by throwing $\frac{\dot{x}}{1-x}$ into a ſeries) $\dot{x}+x\dot{x}+x^2\dot{x}+x^3\dot{x}+x^4\dot{x}+x^5\dot{x}+x^6\dot{x}+x^7\dot{x}+x^8\dot{x}+x^9\dot{x}+x^{10}\dot{x}+x^{11}\dot{x}$, &c. therefore the fluent of this ſeries, *viz.* $x+\frac{1}{2}x^2+\frac{1}{3}x^3+\frac{1}{4}x^4+\frac{1}{5}x^5+\frac{1}{6}x^6+\frac{1}{7}x^7+\frac{1}{8}x^8+\frac{1}{9}x^9+\frac{1}{10}x^{10}+\frac{1}{11}x^{11}+\frac{1}{12}x^{12}+$ &c. is $=Pb$.

2. Put $PC=x$, and $CB=y$; then $y=\frac{1}{1+x}$, and $y\dot{x}=\frac{\dot{x}}{1+x}$ = the fluxion of $PB=$ (by throwing $\frac{\dot{x}}{1+x}$ into a ſeries,) $\dot{x}-x\dot{x}+x^2\dot{x}-x^3\dot{x}+x^4\dot{x}-x^5\dot{x}+x^6\dot{x}-x^7\dot{x}+x^8\dot{x}-x^9\dot{x}+x^{10}\dot{x}-x^{11}\dot{x}+$ &c. therefore the fluent of this ſeries, viz. $x-\frac{1}{2}x^2+\frac{1}{3}x^3-\frac{1}{4}x^4+\frac{1}{5}x^5-\frac{1}{6}x^6+\frac{1}{7}x^7-\frac{1}{8}x^8+\frac{1}{9}x^9-\frac{1}{10}x^{10}+\frac{1}{11}x^{11}-\frac{1}{12}x^{12}+$ &c. is $=PB$.

Hence if $Pc=PC$, the area cbBC, viz. the ſum of Pb and PB will be $=2\times:x+\frac{1}{3}x^3+\frac{1}{5}x^5+\frac{1}{7}x^7+\frac{1}{9}x^9+\frac{1}{11}x^{11}+$ &c. And $Pb-PB$ will be $=x^2+\frac{1}{2}x^4+\frac{1}{3}x^6+\frac{1}{4}x^8+\frac{1}{5}x^{10}+\frac{1}{6}x^{12}+$, &c. That is, if $Ec=.9$, and $cP=PC=.1$; then by ſubſtituting .1 for x, we ſhall have $cB=.2006706954$, &c. and $Pb-Pb=.0100503358$, &c. half of which added to half cB is .1053605156, &c. $=Pb=$ the *hyperbolic logarithm* of $\frac{.1}{.9}$. And, if $Ec=.8$, and $cP=PC=x=.2$; then, by writing .2 for x, we have $cB=.4054651081$, &c. = the *hyperbolic logarithm* of $\frac{1.2}{.8}$; and $Pb-PB=.0408213945$, &c. half of which ſubtracted from half cB is .1823215567, &c. $P=B=$ the *hyperbolic logarithm* of $\frac{1.2}{1}$ or 1.2; and this ſubtracted from cB leaves .2231435513, &c. $=Pb=$ the *hyperbolic logarithm* of $\frac{1}{.8}$. Therefore, by the nature of *logarithms*, the *hyperbolic logarithm* of $\frac{1}{.9}\times\frac{1.2}{.8}\times 1.2$ *viz.* of 2, is $=.1053605156$, &c. $+.4054651081$, &c. $+.1823215567$, &c. $=.6931471805$, &c. and, the *hyperbolic logarithm* of 2^3, *viz.* of 8, is $=3\times.6931471805$, &c. $=2.0794415416$, &c. and, the *hyperbolic logarithm* of $8\times\frac{1}{.8}$, *viz.* of 10, is $=2.0794415416$, &c. $+.2231435513$, &c. $=.2.3025850929$, &c. Q. E. I. Rowe's Fluxions, p. 204, &c.

Logarithm, *imaginary*, is uſed for the *logarithm* of negative and imaginary quantities, ſuch as $a-\sqrt{-a}$, &c. Thus alſo the fluents of certain imaginary fluxionary expreſſions, ſuch as $\frac{\dot{x}}{x\sqrt{-1}}$, $\frac{a\dot{x}}{2bx\sqrt{-1}}$, &c. are *imaginary logarithms*. Euler Analyſ. Infin. vol. i. p. 72, 74.

The expreſſion $\frac{\dot{x}}{x}$ repreſents the fluxion of the *logarithm* of x, and the fluent therefore of $\frac{\dot{x}}{x}$ is the *logarithm* of x; but no *logarithm* can repreſent the fluent of $\frac{\dot{x}}{x\sqrt{-1}}$, which is therefore called an *imaginary logarithm*.

However, when theſe *imaginary logarithms* occur in the ſolutions of problems, they may be transformed into circular arcs or ſectors; that is, the *imaginary logarithm*, or imaginary hyperbolic ſector becomes a real circular ſector, See Bernoulii, Oper. tom. i. p. 400. and p. 512. Mac Laurin's Fluxions, art. 762, ſeq. Walmeſley, Anal. des Meſ. p. 63.

LOGARITHMIC *curve.* See Curve.

LOGGERHEAT, in the *Sea Language*, denotes a large round ball of iron, with a long handle, for heating pitch.

LOGIC, the art of thinking juſtly; or of making a right uſe of our rational faculties, in defining, dividing, and reaſoning: or, as it is defined by an excellent writer on this ſubject, *logic* is the art of uſing reaſon well in our enquiries after truth, and the communication of it to others. Watts.

The word is Greek, λογικη, derived from λογος, *ſermo*, *diſcourſe*; in regard thinking is only an inward, mental diſcourſe, wherein the mind converſes with itſelf.

Logic is alſo ſometimes called *dialectica*; and ſometimes the *canonical art*, as being a canon, or rule for directing us in our reaſonings.

As, in order to think aright, it is neceſſary that we apprehend, judge, diſcourſe, and diſpoſe, or methodize, rightly: hence perception or apprehenſions, judgment, diſcourſe or reaſoning, and diſpoſition, whence reſults method, become the four fundamental articles of this art, and it is from our reflections on thoſe operations of the mind that *logic* is, or ought to be, wholly drawn.

Lord Bacon divides *logic* into four branches, according to the ends propoſed in each: for a man reaſons, either to find what he ſeeks, or to judge of what he finds, or to retain what he judges, or to teach what he retains; whence ariſe ſo many arts of reaſoning; viz. the art of *inquiſition*, or invention; the art of *examining*, or judgment; the art of *preſerving*, or of memory; and the art of *elocution*, or delivery.

Logic, having being extremely abuſed, is now in ſome diſrepute. The ſchools have ſo clogged it with barbarous terms and phraſes, and have run it out ſo much into dry uſeleſs ſubtleties, that it ſeems rather intended to exerciſe the mind in wrangling and diſputation than to aſſiſt it in thinking juſtly. It is true, in its original, it was rather intended as the art of cavilling than of reaſoning; the Greeks, among whom it had its riſe, being a people who piqued themſelves mightily upon their being able to talk *ex tempore*; and to argue, by turns, on either ſide of the queſtion.—Hence their dialectici, to be always furniſhed with arms for ſuch rencounters, invented a ſet of words and terms, rather than rules and reaſons, fitted for the uſe of contention and diſpute.

Logic, then, was only an art of words, which frequently had no meaning, but ſerved well enough to hide ignorance inſtead of improving knowledge; to baffle reaſon inſtead of aſſiſting it, and to confound the truth inſtead of clearing it.—Much of that heap of words, and rules, which we have borrowed from the old *logic*, is of little uſe in life; and is ſo far out of the common uſage, that the mind does not attend to them without trouble; and finding nothing in them to reward its attention, it ſoon diſcharges itſelf, and loſes all ideas it had conceived of them.

But *logic*, diſengaged from the jargon of the ſchools, and reduced into a clear and intelligible method, is the art of conducting the underſtanding in the knowledge of things, and the diſcovery of truth.

From its proper uſe we gain ſeveral very conſiderable advantages: for, 1. The conſideration of rules incites the mind to a cloſer attention and application in thinking; ſo that we hereby become aſſured, that we make the beſt uſe of our faculties. 2. We hereby more eaſily and accurately diſcover and find out the errors and defects in our reaſoning; for the common light of reaſon, unaſſiſted by *logic*, frequently obſerves an argumentation to be faulty, without being able to determine wherein the preciſe failure conſiſts. 3. By theſe reflections on the order and manner of the operations of the mind, we are brought to a more juſt and complete knowledge of the nature of our own underſtanding. See Soul and Understanding.

LOGICAL *concrete.* See Concrete.

Logical *part.* See Part.

LOGISTA, the title of an officer at Athens, whoſe buſineſs was to receive and paſs the accounts of magiſtrates when they came out of their office.

The *logiſtæ* were in number ten; they were elected by lot, and had ten euthyni, or auditors of accounts, under them.

LOGISTIC, or *logarithmic line*, a curve ſo called, from its properties and uſes, in conſtructing and explaining the nature of logarithms.

If the right line AX (*Tab. Analyſis*, *fig.* 37.) be divided into any number of equal parts, and to the points of thoſe diviſions, A, P, p, &c. be drawn lines continually proportional, the points, N, M, m, &c. form the *logiſtic* or *logarithmic line* or *curve*.

Here the abſciſſes AP, Ap, &c. are the logarithms of the ſemiordinates PM, pm, &c.

Hence, if $AP=x$, $Ap=v$, $PM=y$, $pm=z$, and the logarithms of y and $z=ly$ and lz; x will be $=ly$, and $v=lz$; conſequently $x:v=ly:lz$; that is, the denominators of the ratios AN : PM, and AN : pm, are to one another as the abciſſes AP and Ap.

Hence it follows, that there may be infinite other *logiſtic* lines invented: provided $xm:vm::ly:lz$, that any of the roots, or powers, may be the *logarithms* of the ſemiordinates. The *logiſtic* will never concur with the axis, except at an infinite diſtance; ſo that AX is its aſymptote. See *Logarithmic* Curve.

Logistic, *quadrature of the*. See Quadrature.

Logistic, or *logarithmic ſpiral*, a line whoſe conſtruction is as follows:—Divide the quadrant of a circle into any number of equal parts, in the points N, *n*, *n*, &c. (*Tab. Analyſis*, *fig.* 22.) and from the radii C N, C*n*, C*n*, &c. cut off CM, C*m*, C*m*, &c. continually proportional, the points M, *m*, *m*, &c. form the *logiſtic ſpiral*.

The arches, therefore, AN, A*n*, &c. are the logarithms of the ordinates CM, C*m*, &c. whence alſo it follows, that there may be infinite *logiſtic ſpirals*.

LOGISTICA, or Logistical *arithmetic*, a denomination ſometimes given to the arithmetic of ſexageſimal fractions, uſed by aſtronomers in their calculations.

It was ſo called from a Greek Treatiſe of one Barlaamus Monachus, who wrote about ſexageſimal multiplication very accurately; and intitled his book Λογιστικη. This author Voſſius places about the year 1350, but he miſtakes the work for a treatiſe of algebra.

Shakerly, in his Tabulæ Britannicæ, has a table of logarithms adapted to the ſexageſimal fractions; which, therefore, he calls *logiſtical logarithms*; and the expeditious arithmetic of them, which is by this means obtained, and by which all the trouble of multiplication and diviſion is ſaved, he calls *logiſtical arithmetic*.

LOGOGRAPHI, Λογογραφοι, among the *Ancients*, were the ſecretaries of the logistæ, and kept an account of the public revenues.

LOGOGRIPHUS, from the Greek λογος, *diſcourſe*, and γριφος, or γριπος, *net*, a kind of ſymbol, or riddle, propoſed to ſtudents for their ſolution, in order to exerciſe and improve the mind.

The *logogriphus* uſually conſiſts in ſome equivocal alluſion, or mutilation of words; which, literally taken, ſignify ſomething different from the thing intended by it; ſo that it is a kind of medium between a rebus and proper ænigma.

According to Kircher, *logogriphi* are a kind of canting arms: thus a perſon called Leonard, who bore in his arms a lion and nard, or ſpikenard, according to that father, made a *logographe*. Oedip. Ægypt.

In another place, the ſame author defines *logogriphus* to be an ænigma; which, under one name or word will bear various meanings, by adding or retrenching ſome part of it.—This kind of ænigmas is well known to the Arabs; among whom are authors who treat expreſly of it.

LOGOTHETA, an officer under the emperors of the Eaſt, who kept an account of the various branches of public and private expence.

There were ſeveral kinds of them diſtinguiſhed by the particular branch they ſuperintended, as the *logotheta* τȣ δρομȣ, or *poſt-maſter general*; *logotheta* των οικειακων, or *maſter of the houſhold*, &c.

LOHOCH. See Loch.

LOINS, *lumbi*, in *Anatomy*, that part of the body about the reins, properly the lower part of the ſpine of the back, compoſed of five vertebræ, larger than thoſe of the back, and ſerving them as a baſe; having their articulations pretty looſe, that the motion of the *loins* may be more free. See *Tab. Anat.* (*Oſteol.*) *fig.* 3. *n.* 14. *fig.* 7. *n.* 16. *fig.* 9.* *fig.* 11. See alſo Spine, and Vertebra.

LOKE, in *Mythology*, the name of one of the deities of the northern nations, anſwering to the Arimanes among the Perſians, whom they repreſent as at enmity both with Gods and men, and the author of all the evils which deſolute the univerſe. *Loke* is deſcribed in the Edda as producing the great ſerpent which incircles the world; which ſeems to have been intended as an emblem of corruption or ſin: he alſo gives birth to Hela or death, the queen of the infernal regions; and alſo to the wolf Fenris, that monſter who is to encounter the Gods and deſtroy the world. North Ant. vol. ii. p. 85, &c.

LOLIUM, in *Botany*, *darnel*, or *rye-graſs*, a genus of the *triandria dyginia* claſs, with a ſingle-leaved, fixed, many-flowered empalement.

The ancients uſe the word *lolium* as the name of a diſeaſed ſtate of corn of any kind, and have given accounts of ſeveral ſorts of diſeaſed appearances, to all of which they indifferently gave this name. See Grass.

LOLLARDS, in *Eccleſiaſtical Hiſtory*, a religious ſect, differing in many religious points from the church of Rome, which aroſe in Germany about the beginning of the fourteenth century; ſo called, as many writers have erroneouſly imagined, from Walter Lollard, who began to dogmatize in 1315, and was burnt at Cologn: but it is evident that Lollard was no ſurname, but merely a term of reproach applied to all heretics who concealed the poiſon of error under the appearance of piety.

The monk of Canterbury derives the origin of the word *Lollard*, among us, from *lolium*, *a tare*; as if the *Lollards* were the tares ſown in Chriſt's vineyard. — Abelly ſays, that the word *Lollard* ſignifies *praiſing God*, from the German *loben*, *to praiſe*, and *herr*, *Lord*; becauſe the *Lollards* employed themſelves in travelling about from place to place, ſinging pſalms and hymns.

Others, much to the ſame purpoſe, derive *lollhard*, *lullhard*, or *lollert*, *lullert*, as it was written by the ancient Germans, from the old German word *lullen*, *lollen*, or *lallen*, and the termination *hard*, with which many of the High Dutch words end. *Lollen* ſignifies to ſing with a low voice, and, therefore, *Lollhard* is a ſinger, or one who frequently ſings; and in the vulgar tongue of the Germans, it denotes a perſon who is continually praiſing God with a ſong, or ſinging hymns to his honour. The Alexians or Cellites were called *Lollards*, becauſe they were public ſingers who made it their buſineſs to inter the bodies of thoſe who died of the plague, and ſang a dirge over them in a mournful and indiſtinct tone as they carried them to the grave. The name was afterwards aſſumed by perſons that diſhonoured it; for we find, among thoſe *Lollards* who made extraordinary pretences to piety and religion, and ſpent the greateſt part of their time in meditation, prayers, and ſuch acts of piety, there were many abominable hypocrites, who entertained the moſt ridiculous opinions, and concealed the moſt enormous vices under the ſpecious maſk of this extraordinary profeſſion. And many injurious aſperſions were propagated againſt thoſe who aſſumed this name, by the prieſts and monks; ſo that by degrees, any perſon who covered hereſies or crimes under the appearance of piety, was called a *Lollard*. Thus the name was not uſed to denote any one particular ſect, but was formerly common to all perſons and all ſects, who were ſuppoſed to be guilty of impiety towards God or the church, under an external profeſſion of extraordinary piety. However, many ſocieties, conſiſting both of men and women, under the name of *Lollards*, were formed in moſt parts of Germany and Flanders, and were ſupported partly by their manual labours, and partly by the charitable donations of pious perſons. The magiſtrates and inhabitants of the towns, where theſe brethren and ſiſters reſided, gave them particular marks of favour and protection, on account of their great uſefulneſs of the ſick and needy. They were thus ſupported againſt their malignant rivals, and obtained many papal conſtitutions, by which their inſtitute was confirmed, their perſons exempted from the cognizance of the inquiſitors, and ſubjected entirely to the juriſdiction of the biſhops; but as theſe meaſures were inſufficient to ſecure them from moleſtation, Charles, duke of Burgundy, in the year 1472, obtained a ſolemn bull from pope Sixtus IV. ordering that the Cellites, or *Lollards*, ſhould be ranked among the religious orders, and delivered from the juriſdiction of the biſhops; and pope Julius II. granted them yet greater privileges in the year 1506. Moſheim informs us that many ſocieties of this kind are ſtill ſubſiſting at Cologn, and in the cities of Flanders, though they have evidently departed from their ancient rules. Eccl. Hiſt. vol. iii. p. 188. 8vo.

Lollard and his followers rejected the ſacrifice of the maſs, extreme unction, and penances for ſin; arguing, that Chriſt's ſufferings were ſufficient. He is likewiſe ſaid to have ſet aſide baptiſm, as a thing of no effect; and repentance, as not abſolute neceſſary, &c.—In England, the followers of Wickliffe were called, by way of reproach, *Lollards*, from ſome affinity there was between ſome of their tenets; though others are of opinion, that the Engliſh *Lollards* came from Germany.

They were ſolemnly condemned by the archbiſhop of Canterbury and the council of Oxford.

LOMBAIRE *externe*, in *Anatomy*, a name given by Winſlow, and ſome other of the French writers, to a muſcle, called by the earlier authors the *primus dorſi*, and now generally known by the name *quadratus lumborum*. The French call this the external lumbal muſcle, in diſtinction from the *pſoas magnus*, which they call the *lombaire interne*.

Lombaire *interne*, in *Anatomy*, a name given by Winſlow, and ſome other French writers, to the muſcle generally called *pſoas magnus*.

LOMENTUM, a word uſed by the old writers on medicine to expreſs a meal made of beans, or bread made of this meal, and uſed as a waſh. See Detersorium.

Others have applied it to the French chalk, or morochthus, uſed by the ſcowerers of cloaths, which is brought over in large cakes, reſembling loaves or cakes of bread.

LOMWIA, in *Ornithology*, the name of a web-footed water-fowl common on the Engliſh ſhores, and called in different places the *guillem*, *guillemot*, *ſea-hen*, *kiddaw*, and *ſhout*: the laſt name, however, is ſomewhat equivocal, as the Scotch call the common *razor-bill* by this name.

The *lomwia*, or kiddaw, or colymbus *traile* of Linnæus, is much like the razor-bill, but it is larger, being of the full ſize of a common duck; its head, neck, wings, back, and tail, as alſo the upper part of its throat, are of a mixed colour, between brown, black, and grey; its breaſt, belly, and lower part of its throat are white, and its wings are variegated with a mixture of white; its bill is ſtrait, black, and ſharp, and is three fingers breadth long, and rounded; its legs are placed far behind, and it has no hinder toes. It is very plentiful on the high cliffs on ſeveral of our coaſts, and builds on the naked rocks there. It is a very ſimple bird, for when it is ſhot at and ſees ſome of its companions killed by it; it will not quit the rock. Ray's Ornithol. p. 244.

There is a leſſer variety of this bird, which frequents the Welch coaſts in winter; and which haunt the frith of Forth in purſuit of ſprats, where they are called *morrots*; but they all retire before ſpring.

LONCHITIS, in *Botany*. See SPLEENWORT.

LONCHOTON, a word uſed by ſome chemical writers to expreſs the beſt and pureſt kinds of native vitriol, of the green or bluiſh green kinds.

LONDON *pride*, in *Botany*. See SAXIFRAGE.

LONG *accent*, in *Grammar*. See ACCENT.

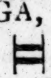
LONG *hand*. See *Long* HAND.

LONG *meaſure*, See MEASURE.

LONG *muſcles*, in *Anatomy*. See LONGUS.

LONG-*jointed*, in the *Manege*. A horſe is ſaid to be *long-jointed*, whoſe paſtern is ſlender and pliant. *Long-jointed* horſes are wont to have wind-galls.

LONG-*legs*, in *Natural Hiſtory*. See TIPULA.

LONGA, *long*, in the *Italian Muſic*, is a character marked thus , containing four ſemi-breves, in common tune, and conſequently eight minims, unleſs tied to a breve; for its content in ſuch caſe, ſee LIGATURE.

LONGANON, a name given by ſome authors to the inteſtinum rectum.

LONGEVITY, length of life. See LIFE and AGE.

From the different *longevities* of men in the beginning of the world, after the flood, and in theſe ages, Dr. Derham draws a good argument from the interpoſition of a Divine Providence.

Immediately after the creation, when the world was to be peopled by one man and woman, the ordinary age was 900 years and upwards.—Immediately, after the flood, when there were three perſons to ſtock the world, their age was cut ſhorter; and none of thoſe patriarchs, but Shem, arrived at 500. In the ſecond century we find none that reached 240; in the third, none, but Terah, that came to 200 years; the world, at leaſt a part of it, by that time being ſo well peopled, that they had built cities, and were cantoned out into diſtant nations. By degrees, as the number of people increaſed, their *longevity* decreaſed, till it came down at length, to 70 or 80 years; and there it ſtood, and has continued to ſtand, ever ſince the time of Moſes. This is found a good medium, and, by means hereof, the world is neither overſtocked, nor kept too thin; but life and death keep a pretty equal pace.

That the common duration of man's life has been the ſame in all ages ſince the world was peopled, is plain, both from ſacred and profane hiſtory. To paſs by others, Plato lived to 81, and was accounted an old man: and the inſtance of *longevity* produced by Pliny, lib. vii. cap. 48. as very extraordinary, may moſt of them be paralleled in modern hiſtories, particularly in Dr. Plott's Nat. Hiſt. of Ox. and Staff.—Among others, he tells us of twelve tenants to the ſame perſon, who made up 1000 years; to ſay nothing of old Parr, who lived 152 years 9 months; nor of H. Jenkins, of Yorkſhire, who lived 169 years; or of the counteſs of Deſmond, or Mr. Eckleſton, both of Ireland, who each exceeded 140 years.

LONGIMETRY, the art of meaſuring lengths, both acceſſible as roads, &c. and inacceſſible, as arms of the ſea, &c.

Longimetry is a part of trigonometry, and a dependent on geometry, in the ſame manner as altimetry, planimetry, ſtereometry, &c.

The art of *longimetry* ſee under the names of the inſtruments uſed in it, particularly THEODOLITE, CHAIN, DISTANCE, &c.

LONGISSIMUS *dorſi*. See DORSI.

In conjunction with ſome others, this helps to keep the body erect.

LONGISSIMUS *Oculi*. See OBLIQUUS *ſuperior*.

LONGITUDE *of the earth*, is ſometimes uſed to denote its extent from weſt to eaſt, according to the direction of the equator.

By which it ſtands contradiſtinguiſhed from the *latitude of the earth*, which denotes its extent from one pole to the other.

LONGITUDE *of a ſtar*, in *Aſtronomy*, is an arch of the ecliptic, counted from the beginning of Aries, to the place where a ſtar's circle of *longitude* cuts the ecliptic.

The *longitude* of a ſtar, as *S* (*Tab. Aſtronomy, fig.* 14. n. 2.) is an arch of the ecliptic E L, comprehended between the beginning of Aries, and the circle of *longitude* T M, drawn through the centre of the ſtar *S*.

Longitude ſtands in the ſame relation to the ecliptic that *right aſcenſion* does to the equator.

In which ſenſe, the longitude of a ſtar amounts to much the ſame as the ſtar's place in the ecliptic, reckoned from the beginning of Aries; which to find, ſee PLACE *of the ſun, or ſtar*.

LONGITUDE *of the ſun*, or *a ſtar*, from the next equinoctial point, is the number of degrees, and minutes they are from the beginning of Aries, or Libra, either before or after them; which can never be more than 180 degrees.

LONGITUDE, *geocentric*, *of a planet*. See GEOCENTRIC.

LONGITUDE *of a place*, in *Geography*, is its diſtance from ſome firſt meridian; or an arch of the equator, intercepted between the meridian of the place, and the *firſt* MERIDIAN. See a table exhibiting the quantity of each degree of *longitude* in each parallel of latitude, under DEGREE.

LONGITUDE, in *Navigation*, is the diſtance of a ſhip, or place, eaſt or weſt, from another, counted in degrees of the equator. If this diſtance be counted in leagues, or miles, or in degrees of the meridian, and not in thoſe proper to the parallel of latitude, it is uſually called DEPARTURE.

To diſcover an exact method of finding the *longitude* at ſea, is a problem that has extremely perplexed the mathematicians of theſe two laſt ages; and for the ſolution whereof, great rewards have been publicly offered by the Engliſh, French, Dutch, and other nations; this being the only thing wanting to render navigation perfect.

In the year 1598, Philip the Third, king of Spain, offered a reward of 1000 crowns for the ſolution of this problem; this noble example was followed by the States General, who offered 10,000 florins; and, in 1635, John Morin, profeſſor of mathematics at Paris, propoſed a method of reſolving it to cardinal Richlieu; though the commiſſioners, who were appointed to examine this method, judged it inſufficient, on account of the imperfection of the lunar tables, cardinal Mazarin, in 1645, procured for him a penſion of 2000 livres. In 1714, an act was paſſed in the Britiſh parliament, appointing and impowering certain commiſſioners to make out a bill for a ſum not exceeding 2000*l.* towards making neceſſary experiments; and alſo granting a reward to the perſon who ſhould diſcover the *longitude* at ſea, proportioned to the degree of accuracy that might be attained by ſuch method; viz. a reward of 10,000*l.* if it determines the ſame *longitude* to one degree of a great circle, or ſixty geographical miles; 15,000*l.* if it determines the ſame to two-thirds of that diſtance; and 20,000*l.* if it determines it to half that diſtance. It is added, that one moiety or half part of ſuch rewards or ſum, ſhall be due and paid when the ſaid commiſſioners, or the major part of them, do agree, that any ſuch method extends to the ſecurity of ſhips, within eighty geographical miles from the ſhores, which are places of the greateſt danger; and the other moiety or half part, when a ſhip, by the appointment of the ſaid commiſſioners, or the major part of them, ſhall thereby actually ſail over the ocean, from Great Britain to any ſuch port in the Weſt Indies as thoſe commiſſioners, or the major part of them, ſhall chuſe, or nominate for the experiment, without loſing her *longitude* beyond the limits above mentioned. 12 Ann. cap. 15. See alſo ſtat. 14 Geo. II. cap. 39. 26 Geo. II. cap. 25. By ſtat. 14 Geo. III. all former acts concerning the *longitude* at ſea are repealed, except ſo much of tham as relates to the appointment and authority of the commiſſioners thereby conſtituted, and alſo ſuch clauſes as relate to the conſtructing, printing, publiſhing, &c. of nautical almanacs, and other uſeful tables; and it is enacted, that any perſon, who ſhall diſcover any method for finding the *longitude* by means of a time-keeper, the principles of which have not hitherto been made public, ſhall be intitled to the reward of 5000*l.* if, after certain trials preſcribed by the commiſſioners, ſuch method ſhall enable the ſhip to keep her *longitude*, during a voyage of ſix months: within ſixty geographical miles, or a degree of a great circle; to 7500*l.* if it ſerves to keep her *longitude* for the ſame time, within forty geographical miles, or two-thirds of a degree of a great circle; or to a reward of 10,000*l.* if, for that time, it enables her to keep her *longitude* within thirty geographical miles, or half a degree of a great circle. If the method propoſed ſhall be by means of improved ſolar and lunar tables, the author of ſuch tables ſhall be intitled to a reward of 5000*l.* when they ſhew the diſtance of the moon from the ſun and ſtars within 15″ of a degree, anſwering to about 7′ of *longitude*, after making an allowance of half a degree for the errors of obſervation, and under certain reſtrictions, and after compariſon with aſtronomical obſervations for a period of 18⅔ years, which is deemed the period of the irregularities of the lunar motions. In caſe any other method ſhall be propoſed for finding the *longitude* at ſea, beſide theſe already mentioned, the author ſhall be intitled to 5000*l*. if it ſhall determine the ſaid *longitude* within one degree of a great circle, or ſixty geographical miles; to 7500*l*. if it ſhall determine the ſame to two-thirds of that diſtance; and to 10,000*l*. if it ſhall determine the ſame to one half of that diſtance. The commiſſioners are impowered by this act to make out bills upon the treaſurer of the navy for any ſums of money, which they ſhall think neceſſary for making experiments with relation to any probable diſcovery or improvement. It is obſervable, that there is an ambiguity in the limits preſcribed by this and other acts, relating to the *longitude*, which may poſſibly be the occaſion of diſputes; for ſixty geographical miles ro one degree of a great circle may make either one or one hundred and eighty degrees of *longitude*; and, therefore, the determination ought to have been expreſſed in minutes of the equator.

Various are the attempts that authors have made for this purpoſe, and various the methods they have propoſed which have been attended with different degrees of ſucceſs. What moſt of them aim at is, a method of determining the difference of time between any two points on the earth; for the *longitude* of any place is an arc of the equator intercepted between the ſaid meridian and the meridian of that place, and this arc is proportional to the quantity of time which the ſun requires to move from the one meridian to the other; and every fifteen degrees of the equator anſwering to an hour, i. e. one degree to 4 minutes of time, and one minute of a degree to 15 ſeconds of time; the difference of time being known, and turned into degrees, will give the *longitude*, and *vice verſa*. This ſome have attempted to effect by clocks, watches, and other automata: for, if a clock or watch was ſo contrived, as in all ſeaſons and in all places to go uniformerly; ſuch a watch being regulated to London or Greenwich time, would always ſhew the time of the day at London or Greenwich, then the time of the day under any other meridian being found, the difference between that time and the London or Greenwich time correſponding, would give the difference of *longitude*.

Gemma Friſius, in a tract intitled De Principiis Aſtronomiæ et Geographiæ, printed at Antwerp in 1530, ſeems to have been the firſt who ſuggeſted the method of finding the *longitude* at ſea by means of watches, or time-keepers; which machines were then, as he ſays, but lately invented. After him, Metius, about 1631, and ſome others attempted it; but the ſtate of watch-making was then too imperfect for this purpoſe. Dr. Hook and Mr. Huygens, about the ſame time, viz. about the year 1664, applied the invention of the pendulum-ſpring to watches; and employed it for the purpoſe of diſcovering the *longitude* at ſea. Some diſputes, however, between the former of thoſe gentlemen and the Engliſh miniſtry, prevented any experiments being made with watches conſtructed by him; but many experiments were made with watches conſtructed by Mr. Huygens. Major Holmes, in a voyage from the coaſt of Guinea in 1665, predicted with one of his watches, the *longitude* of the iſland of Fuego to a very great degree of accuracy: this ſucceſs encouraged Huygens to improve the ſtructure of his watches, ſee Phil. Tranſ. Nº 47. for May, 1669), but experience ſoon convinced him, that unleſs methods could be diſcovered for preſerving the regular motion of ſuch machines, and preventing the effects of heat and cold, and other diſturbing cauſes, they could never anſwer the intention of diſcovering the *longitude*; and on this account his attempts failed. The firſt perſon who turned his thoughts this way, after the public encouragement held out by the act of 1714, was Henry Sully, an Engliſhman; who, in 1714, printed at Vienna a ſmall tract on the ſubject of watch-making, and afterwards removing to Paris, employed himſelf in improving time-keepers for the diſcovery of the *longitude*. He is ſaid to have greatly diminiſhed the friction, and to have rendered that which remained uniform. The greater part of what is yet known of watch-making in France, is principally to be attributed to him; for the famous Julien le Roy was his pupil, and owed moſt of his inventions to him, which he afterwards perfected and excuted; and this gentleman, his ſon, and M. Berthoud are the only perſons in France, who have turned their thoughts this way ſince the time of Sully. Several watches, made by the two latter artiſts, have been tried at ſea, at the expence of the king of France, and voluminous accounts have been publiſhed of theſe trials; but it does not appear that they afford any conſiderable advantage with regard to the main object. In the year 1726, our own countryman, Mr. John Harriſon, produced a time-keeper of his own conſtruction, which was found to keep time ſo exactly with the heavens, as not to err above one ſecond in a month, for ten years together; and in the year 1736, this machine was tried, on board one of his majeſty's ſhips, in a voyage to and from Liſbon; and by its exact meaſure of time, in the ſhip's return from Liſbon, corrected an error of almoſt a degree and a half, in the computation of the ſhip's reckoning. Mr. Harriſon, in conſequence of this ſucceſs, received public encouragement to proceed; and he made three other time-keepers, every one of which was more accurate, and better adapted to the purpoſe of meaſuring time truly at ſea, than the former. The ſecond of his machines was finiſhed in 1739; the third in 1758; and the fourth in 1761: this laſt proved ſo much to Mr. Harriſon's ſatisfaction, that he applied to the commiſſioners of the board of *longitude* for orders to make a trial of this inſtrument in a voyage to ſome port of the Weſt Indies, according to the directions of the ſtatute of 12 of Anne above cited. Accordingly Mr. William Harriſon, ſon of the inventor, embarked on board his majeſty's ſhip Deptford, in November, 1761, with this fourth time-keeper, on a voyage for Jamaica: and the *longitude* of the iſland, as ſhewn by the time-keeper, on his arrival there, differed but one minute and a quarter of the equator from the true *longitude*, deduced from aſtronomical obſervations. The time-keeper alſo pointed out the *longitudes* of the ſeveral places, which they ſaw in the courſe of the voyage, in a very exact manner. Mr. Harriſon, junior, returned to England, with the time-keeper, in the latter end of March, 1762; and found that it had erred, in the whole, from its ſetting out to its return to England, no more than $1' 54''\frac{1}{2}$ in time, or 28⅝ minutes of *longitude*; whereas the act require no greater exactneſs than thirty minutes, in a voyage to the Weſt Indies. Mr. Harriſon now claimed the whole reward of 20,000*l*. offered by the ſaid act; but ſome doubts ariſing in the minds of the commiſſioners concerning the true ſituation of the iſland of Jamaica, and the manner in which the time at that place had been found, as well as at Portſmouth; and it being farther ſuggeſted by ſome, that although the time-keeper happened to be right at Jamaica and after its return to England, it was by no means a proof that it had been always ſo in the intermediate times, another trial was propoſed in a voyage to the iſland of Barbadoes, in which precautions were taken to obviate as many of theſe objections as poſſible. Accordingly, the commiſſioners proviouſly ſent out proper perſons to make aſtronomical obſervaons at that iſland, which, when compared with other correſponding ones made in England, would determine, beyond a doubt, its true ſituation. Mr. William Harriſon again ſet out with his father's time-keeper, in March 1764, the watch having been compared with equal altitudes, before he ſet out, at Portſmouth, and arrived at Barbadoes about the middle of May; where, on comparing it again with equal altitudes of the ſun, it was found to ſhew the difference of *longitude* between Portſmouth and Barbadoes, $3^h 55' 3''$; the true difference of *longitude* between theſe places, reſulting from aſtronomical obſervations, being $3^h 54' 20''$, ſo that the error of the watch was $43'$, or $10' 45''$ of *longitude*. The watch gained at the rate of 2′,58 a day, on mean time, from February 29th to March 21ſt, at Portſmouth, and loſt at the rate of 2″,8 a day, from May 14th to May 17th, at Barbadoes: and from its departure from Surry-ſtreet in the Strand, where it had been compared with Mr. Short's regulator, till it arrival there again, after one hundred and fifty-ſix days, it had gained fifty-four ſeconds. In conſequence of this and the former trials, Mr. Harriſon received a moiety of the reward offered by the 12th of Queen Anne, on his explaining the principles by which his time-keeper was conſtructed, and delivering this as well as the former three, to the commiſſioners of the *longitude*, for the uſe of the public. He was alſo promiſed the other moiety of the reward, when other time-keepers were made, on the ſame principles, either by himſelf or others, which performed equally well with that which he had laſt made. This laſt time-keeper was alſo ſent down to the royal obſervatory at Greenwich, to be tried there, under the direction of the Rev. Mr. Maſkelyne, his majeſty's aſtronomer royal. It did not appear, however, that during the time of this trial, the watch went with the regularity that was expected, which gave reaſons for apprehending that the performance even of the ſame watch, was not at all times equal; and conſequently that little certainty could be expected in the performance of different ones. Moreover, the watch was now found to go faſter than it did during its voyage to and from Barbadoes, by about eighteen or nineteen ſeconds in twenty-four hours; but this circumſtance was accounted for by Mr. Harriſon; who informs us, that he had altered the rate of its going by trying ſome experiments, which he had not time to finiſh before he was ordered to deliver up the watch to the board. Soon after this trial, the commiſſioners of *longitude* agreed with Mr. Kendall, one of the watchmakers appointed by them to receive Mr. Harriſon's diſcoveries, to make another watch on the ſame conſtruction with this, in order to determine whether other watchmakers could make them from the account which Mr. Harriſon had given, as well as himſelf. The event proved the affirmative; for the watch produced by Mr. Kendall, in conſequence of this agreement, went conſiderably better than that which had been made by Mr. Harriſon himſelf. This watch was ſent out with Capt. Cook in his ſecond voyage towards the ſouth pole and round the world, in 1772, 1773, 1774, and 1775, to be tried under the care of Mr. Wales, employed by the board of *longitude* for that purpoſe. The only defect which appears to have been in this watch is, that its rate of going was continually accelerated; but in the 3½ years, during this trial, it never amounted to 14′½ a day. In conſequence of the going of this watch, the houſe of commons were pleaſed, in 1774, to order the other moiety of the reward, offered by the act of the 12th of queen Anne, to be given to Mr. Harriſon, and to paſs the act above recited. Mr. Arnold has lately conſtructed a watch, which ſeems to be more accurate than any of the former, though it has not yet been tried at ſea. During thirteen months of trial from, February 1779, to February 1780, the greateſt difference between the rates on which the watch went on any two days, was 6″,69: the greateſt difference between its rates of going on any day and the next to it, was 4″,11; ſo that the greateſt error it would have committed on the difference of *longitude*, on any one day, would have been very little more than one minute; which, as Mr. Arnold obſerves, is determining the *longitude* daily, to as great preciſion as the latitude can, in general, be determined. If the mean rate at which it went during the month of February 1779, be taken as a ſtandard rate with which we may compare its going for the following twelve months, the greateſt error which it would have commited in the *longitude* ſhewn by it; would have been 2′,33″,2, or 38′ 18″ in *longitude*: the parts of this machine, which are to counteract the effects of heat and cold, ſeem to be moſt exactly adjuſted; and the balance is ſo adjuſted likewiſe, that it is capable of going alike in the different poſitions into which the watch may be placed. Account kept during thirteen Months in the Royal Obſervatory at Greenwich, of the going of a Pocket Chronometer, made on a new Conſtruction, by John Arnold, &c. 4to. 1780. See TIME-*keeper* and PENDULUM.

Others have propoſed various aſtronomical methods for finding the *longitude* in the heavens; for, if the exact times of any celeſtial appearance be known for two places, the difference of thoſe times gives that of the *longitude* of thoſe places. Theſe methods chiefly depend on having an ephemeris or almanac, ſuited to the meridian of ſome place, ſuppoſe Greenwich, for which the *Nautical* ALMANAC is fitted, which emphemeris ſhall contain for every day of the year the ſun's place, right aſcenſion, declination, the times of the planets paſſing the meridian, as alſo their riſing and ſetting, the times of the eclipſes of the ſun and moon, together with thoſe of Jupiter's ſatellites, the diſtance of the moon from the ſun, and ſome zodiacal ſtars at certain times; and, in general, the time when any other remarkable celeſtial appearances may be ſeen at the place for which the ephemeris is calculated: therefore, if the hour and minute be known, wherein any of the ſame phenomena are obſerved in any unknown place, the difference between the hour and minute of that place, and that other to which the tables are calculated, and conſequently the difference of their meridians, and their *longitude*, from each other, are known alſo.

Now the difficulty here does not conſiſt in the exact finding of the time, which is eaſily had, from the ſun's altitude, or azimuth, but the defect lies in the paucity of proper appearances, capable of being thus obſerved; for all ſlow motions (v. gr. that of Saturn) are at once excluded, as ſhewing but little difference in a conſiderable ſpace of time; and it being here required, that the phenomenon be ſenſibly varied in two minutes time, an error of two minutes in time produces another of thirty miles in *longitude*.—Now there are no phenomena in the heavens that have theſe requiſites, excepting the ſeveral ſtages of an eclipſe of the moon: her *longitude*, or place in the zodiac; her diſtance from the fixed ſtars, or appulſe to them; her ingreſs into the ecliptic; or the points of her orbit, where that cuts the ecliptic, and the conjunction, diſtances, and eclipſes of Jupiter's ſatellites.—Of each of which in their order.

1. The method, by the eclipſes of the moon, is very eaſy, and ſufficiently accurate, if there were but eclipſes every night.—At the moment wherein we ſee the beginning, or middle, or end of a lunar eclipſe by a teleſcope, we have nothing to do but take the altitude, or azimuth, of ſome fixed ſtar, from which the hour and minute are eaſily found; or without the altitude, if the ſtar be in the meridian.—This hour and minute, therefore, thus found, and compared with that expreſſed in the tables, gives the *longitude*.

But as the beginning or end of an eclipſe of the moon cannot be generally obſerved nearer than one minute, ſometimes two or three minutes of time, the *longitudes* of places cannot be certainly determined by this method from a ſingle obſervation of the beginning or end, nearer than a degree. However, if both the beginning and end of the eclipſe be obſerved, a conſiderably greater degree of exactneſs will be attained.

2. The moon's place in the zodiac is a phenomenon more frequent than that of her eclipſes; but then the obſervation thereof is difficult, and the calculus intricate and perplexed, by reaſon of two parallaxes; ſo that it is ſcarce practicable, to any tolerable degree of accuracy. Indeed, by waiting till the moon comes into the meridian of the place, and then taking the altitude of ſome remarkable ſtar (the altitude being ſuppoſed to be firſt known), from this altitude, and the latitude, we ſhall be able to find the time pretty accurately; though it will be better to do it by ſome ſtar in the meridian. Now the time being found, it will be eaſy to find what point of the ecliptic is then in the meridian, or mid-heaven. Thus we ſhall have the moon's place in the zodiac, correſponding to the time of our place. Then in the ephemeris we find what hour it is in the meridian of the ephemeris, when the moon is in that part of the zodiac: thus we ſhall have the hour and minute of the two places for the ſame time; the difference of which will give the difference of *longitude*.

3. In regard there are many times when the moon cannot be obſerved in the meridian, there is, therefore, another ſtill more frequent phenomenon, from which the *longitude* is ſought; viz. the moon's appulſe and receſs from the fixed ſtars; for from thence the moon's true place may be veſtigated for the given time of obſervation.

The firſt perſon who recommended the inveſtigation of the *longitude* from obſerving the diſtance between the moon and ſome ſtar, is ſaid to have been John Werner, of Nuremberg, who printed his annotations on the firſt book of Ptolemy's Geography, in 1514: Peter Apian, profeſſor of mathematics at Ingolſtadt, in 1524; Oronce Finè, of Briançon, about 1530: Gemma Friſius, at Antwerp, in 1530; Nonius or Pedro Nunez, in 1560; and Kepler, in 1630, all ſuggeſt and recommend the ſame method. In 1665, king Charles II. erected the obſervatory at Greenwich, and appointed Mr. Flamſteed his aſtronomical obſerver, with this expreſs command, that he ſhould apply himſelf with the utmoſt care and diligence to the rectifying the table of the motions of the heavens, and the place of the fixed ſtars, in order to find out the ſo ſuch deſired *longitude* at ſea, for perfecting the art of navigation. To the fidelity and induſtry with which Mr. Flamſteed executed his commiſſion, we are in a great meaſure indebted for that curious theory of the moon, which was afterwards formed by the immortal Newton. This incomparable philoſopher made the beſt uſe which human ſagacity could make of the obſervations with which he was furniſhed; but, as theſe were interrupted and imperfect, the difference of ſir Iſaac's theory from the heavens would ſometimes amount at leaſt to five minutes. Dr. Halley employed much time on this ſubject; and a ſtarry zodiac was publiſhed under his direction, containing all the ſtars to which the moon's appulſe can be obſerved: but for want of proper inſtruments and correct tables, he could not proceed in making the neceſſary obſervations: in a paper on this ſubject he expreſſes his hope, that the inſtrument juſt invented by Mr. Hadley, might be applied to taking angles at ſea with the deſired accuracy. See Phil. Tranſ. N°421. This great aſtronomer, and after him the abbé de la Caille, and others, have reckoned the beſt aſtronomical method of finding the *longitude* at ſea, to be that wherein the diſtance of the moon from the ſun, or from a ſtar is uſed; for the moon's daily mean motion being about thirteen degrees, her hourly mean motion is about half a degree, or one minute of a degree in two minutes of time; and ſo an error of one minute of a degree in poſition will produce an error of two minutes in time, or half a degree in *longitude*: and if by obſervation it is determined what part of her daily motion the moon has run through during the interval between a certain point of time under a known meridian, and the inſtant of time when the obſervations are made on her, under an unknown meridian, then her daily motion at that time will have, to the part thereof determined by obſervation, the ſame ratio which twenty-four hours has to the interval of time taken to deſcribe that arc. From the very conſiderable improvements mady by ſir Iſaac Newton in the theory of the moon, and more lately by Mr. Euler, and others on his principles, M. Tobias Mayer, profeſſor, of Gottingen, was enabled to calculate lunar tables more correct than any that were before publiſhed, and he has ſucceeded ſo far as to give the moon's place within one minute of the truth. This has been proved by a compariſon of the tables with the obſervations made at the Greenwich obſervatory by the late Dr Bradley, and by the preſent aſtronomer royal. Theſe tables, for which the widow of Mr. Mayer was rewarded by the Britiſh parliament, were publiſhed in 1770, by Mr. Maſkelyne, by order of the commiſſioners of *longitude*. Mr. Maſkelyne, in his voyage to St. Helena, in 1761, made uſe of theſe tables, and found them to anſwer for the diſcovery of the *longitude*, within a degree; and in order to facilitate the general uſe of them, he propoſed a nautical ephemeris, the ſcheme of which was adopted by the commiſſioners of *longitude*, and firſt executed in the year 1767: and the publication has been regularly continued ever ſince. But as the rules that were given in the appendix to one of thoſe publications, for correcting the effects of refraction and parallax were deemed too difficult for general uſe, they were reduced to tables; ſo that by the help of the ephemeris, theſe tables, and others that are provided, the calculation relating to the *longitude*, which could not be performed by the moſt expert mathematician in leſs than four hours, may now be completed with greater eaſe and accuracy in half an hour. Mr. Maſkelyne obſerved, that the error of M. Mayer's laſt lunar tables ſcarce ever exceeds $1'$ at the moſt, and ſeldom amounts to $20''$; and, therefore, the uncertainty hence ariſing in the determination of the *longitude*, can ſcarcely exceed half a degree, and generally will not exceed ten miles. As this method of determining the *longitude* depends on the uſe of the tables, annually publiſhed for this purpoſe, we ſhall refer thoſe who wiſh for farther information, to the inſtructions that accompany them, and particularly to thoſe that are annexed to the tables requiſite to be uſed with the aſtronomical and nautical Ephemeris, 1766, p. 141, &c.

4. To find the *longitude* by the moon's ingreſs into the ecliptic, obſere the moment of that ingreſs: then, in the ephemeris, ſee what hour it is in the meridian of the ephemeris, when that ingreſs happens. The difference between theſe times gives the difference of *longitude*. See MOON.

5. The phenomena of Jupiter's ſatellites have been generally preferred to thoſe of the moon, for finding the *longitude*; becauſe the former are leſs liable to parallaxes; and do, farther, afford a very commodious obſervation, in every ſituation of that planet above the horizon. Their motion is very ſwift, and muſt be calculated for every hour; and, for that reaſon, they are not found in the common ephemerides, but are had elſewhere; particularly in the Nautical Ephemeris. Theſe ſatellites of Jupiter was no ſooner diſcovered by Galileo, in his Sydereus Nuncius, firſt printed at Venice, in 1610, than the frequency of their eclipſes recommended them for this purpoſe; and among thoſe who attempted this ſubject, none were more ſucceſsful than Caſſini. This great aſtronomer, in 1688, publiſhed at Bologna tables for calculating the appearances of their eclipſes, with directions for finding thence the *longitude*, of places; and being invited to France by Lewis XIV. he there publiſhed correcter tables in 1693. But the mutual attractions of the ſatellites rendering their motions very irregular, the tables ſoon became uſeleſs; inſomuch that they require to be renewed from time to time, which has been performed by ingenious perſons, as Dr. James Pound, Dr. James Bradley, M. Caſſini the ſon, and M. Peter Wargentin. Wargentin's tables are much eſteemed; they were firſt publiſhed at Stockolm, in the Acta Societatis Regia Scientiarum Upſalenſis, for the year 1741; and ſince more correctly from a new copy of the author's at Paris, in 1759, by M. de la Lande. They are alſo publiſhed in the Nautical Almanac for 1771 and 1779, &c.

Now, to find the *longitude* by theſe ſatellites, with a good teleſcope obſerve a conjunction of two of them, or of one of them with Jupiter, or any other the like appearance; and, at the ſame time, find the hour and minute from the meridian altitude of ſome ſtar, or by means of a clock or watch, previouſly regulated for the place of obſervation; then, conſulting tables of the ſatellites, obſerve the hour and minute wherein ſuch appearance happens in the meridian of the place to which the tables are calculated. The difference of time, as before, will give the *longitude*.

The eclipſes of the firſt and ſecond of Jupiter's ſatellites are the moſt proper for this purpoſe: and the beſt teleſcopes for obſerving them are common refracting teleſcopes, from fifteen to twenty feet, reflecting teleſcopes of eighteen inches or two feet, and teleſcopes of Mr. Dolland's conſtruction, with two object-glaſſes, from five to ten feet; or, which are ſtill more convenient, thoſe of three feet and a half, conſtructed with three object-glaſſes, which are as manageable as reflecting teleſcopes, and perform as much as thoſe of ten feet, with two object-glaſſes. As theſe eclipſes happen almoſt daily, they afford the moſt ready means of determining the *longitude* of places at land, and have very much contributed to the modern improvements, in geography. If it were poſſible to obſerve them with ſufficient accuracy in a ſhip under ſail, they would be of great ſervice in aſcertaining its *longitude* from time to time. In order to remedy the inconvenience to which theſe obſervations are liable from the agitation of the ſhip, Mr. Chriſtopher Irwin invented what he calls a marine chair. This chair was tried by Mr. Maſkelyne, in his voyage to Barbadoes, who found it totally impracticable to derive any advantage from the uſe of it: and indeed, conſidering the great power requiſite in a teleſcope for making theſe obſervations well, and the violence, as well as irregularities of the motion of a ſhip, there is reaſon to fear that the complete management of a teleſcope on ſhip-board will always remain among the deſiderata in this part of nautical ſcience. Since all methods which depend on the phenomena of the heavens have alſo this other defect, that they cannot be obſerved all times; the improvement of time-keepers is an object of very great importance.

Mr. Whiſton and Mr. Ditton have propoſed a method of determing the *longitude*, by the flaſh and report of great guns. Sounds, it is known, move pretty equably in all their ſtages, whatever the ſonorous body be that occaſions them, or whatever the medium that conveys them. If, then, a mortar, or great gun, be exploded, at a place whoſe *longitude* is known, the difference between the time wherein the flaſh (which moves, as it were inſtantaneouſly) is ſeen, and the ſound, which moves at the rate of a mile in four ſeconds, is heard, will give the diſtance of thoſe places from each other; whence if their latitudes be known, the difference of *longitude* will be likewiſe known.

Again, if the hour and minute of the exploſion be known (for the place where it is made), by obſerving the hour and minute from the ſun or ſtars, at the place whoſe *longitude* is required; the difference between thoſe times will give the difference of *longitude*.

Again, if the ſaid mortar be loaded with an iron ſhell, full of combuſtible matter, and poſited perpendicularly, it will carry the ſame a mile high, which will be ſeen near a hundred miles: if therefore, neither the ſound ſhall be heard, nor the flaſh ſeen, the diſtance of any remote place from the place of the mortar, may be determined from the altitude of the ſhell above the horizon of the place unknown: and the diſtance and latitudes known, the *longitude* is eaſily found. According to this ſcheme, it was propoſed to have ſuch mortars fixed at proper diſtances, and at known ſtations, on all the frequented coaſts, iſlands, capes, &c. and to be exploded at certain hours, for the obſervation of mariners.

This method, though good in the theory, yet is found uſeleſs in the practice; as being extremely troubleſome, and yet precarious. It ſuppoſes that ſounds may be heard forty, fifty, or ſixty miles; of which, it is true, we have inſtances, but they are very rare; and, ordinarily, the report of a cannon is not heard above half ſo far, and ſometimes much leſs. It ſuppoſes, again ſound to move always with equal velocity; whereas, in fact, its velocity is increaſed or diminiſhed as it moves with or againſt the wind. It ſuppoſes, again, the ſtrength of powder uniform; and that the ſame quantity carries the ſame range; the contrary whereof is known to every gunner. We ſay nothing of thick cloudy nights, when no lights can be ſeen; nor of ſtormy nights, when no ſound can be heard; even at inconſiderable diſtances.

We have another method of finding the *longitude*, propoſed by the ſame Mr. Whiſton, viz. by the inclinatory, or DIPPING-*needle*.

LONGITUDE, *angle of*. See ANGLE.

LONGITUDE, *argument of*. See ARGUMENT.

LONGITUDE, *circle of*. See CIRCLE.

LONGITUDE, *degrees of*. See DEGREE.

LONGITUDE, *parallax of*. See PARALLAX.

LONGITUDES *refraction of*. See REFRACTION.

LONGITUDE *of motion*, is uſed by Dr. Wallis for the meaſure of motion, eſtimated according to the line of direction; on which principle, *longitude* of motion is the diſtance, or length, which the centre of any moving body runs through, as it moves on in a right line.

The ſame author calls the meaſure of any motion, eſtimated according to the line of direction of the vis motrix, the *altitude* of it.

Bellini alſo uſes the terms *longitude* and *altitude* in the ſame ſenſe, in many places of his writings, which an ordinary reader finds hard to underſtand, for want of this interpretation. By *altitude* alſo in his nineteenth propoſition *de febribus*, he makes the thickneſs of the viſcid matter in the blood-veſſels; or the greateſt length a viſcid particle is extended into, from the ſide of a canal to its axis.

LONGITUDINAL, in *Anatomy*, is uſed to ſignify ſome part, or member, extended in length, or poſited lengthwiſe.

The membranes which compoſe the veſſels, are woven out of two kinds of fibres, the one *longitudinal*, the other *circular*, cutting the *longitudinal* at right angles.

The *longitudinal* fibres are tendinous and elaſtic; the *circular*, muſculous, and motrices, like ſphincters.

LONGUS, Long, an epithet given by *Anatomiſts*, to a great number of muſcles, hereby contradiſtinguiſhed from BREVIS.

The ſecond extenſor of the carpus is called *longus*, in compariſon of the third extenſor, which is called *brevis*, *ſhort*. The *longus* has its origin in the bottom of the humerus, and, lying along the radius, paſſes underneath the ligamentum annulare, and is inſerted into the carpus.

The ſecond of the flexors of the neck is alſo called the *longus* or *longus colli*; and ſometimes *rectus*. It has its origin in the lateral part of the body of the four upper vertebræ of the back; and is inſerted into the body of the four vetrebræ of the neck, and ſometimes into the occiput: this, with conjunction with the ſcalenum, bends the neck.

The third of the ſix muſcles of the elbow, or arm, which is the firſt of its extenſors, is alſo called *longus*, as being the longeſt of the extenſors. It has its origin on the upper ſide of the omoplate, near the neck, and deſcending by the hind part of the arm, is inſerted into the olecranum by a ſtrong aponeuroſis, which is common to it and the ſecond and third extenſor of the arm.

The ſecond muſcle of the thumb, which is the firſt of its extenſors, is alſo called *longus*, as being longer than another extenſor of the ſame thumb, called *brevis*. The *longus* proceeds from the upper and external part of the bone of the elbow; and, riſing over the radius, is inſerted by a forked tendon, into the ſecond bone of the thumb, which it extends. One of the four muſcles of the radius is alſo called the *longus*; this is the firſt of the two ſupinators, and has its origin three or four fingers breadth above the outer apophyſis of the humerus, whence running along the radius, it is inſerted into the inner parts of its lower apophyſis. It is called *longus* with regard to the other ſupinator, which is called *brevis*. Theſe two muſcles ſerve to turn the radius, ſo that the palm of the hand looks upward; which makes the ſupination.

The firſt of the abductors of the leg is alſo called the *longus*, or *longus tibiæ*; and bears this title more juſtly than any of the others, as being the longeſt muſcle in the whole body. It is alſo denominated *faſcialis*, on account of its bearing ſome reſemblance to a *(faſcia)* ſwathe; and *ſartorius*, or taylor's muſcle, becauſe it ſerves to bend the legs inward, as the taylors uſe to have them when at work. See *Tab. Anat. (Myol.) fig.* 1. *n.* 40. *fig.* 2. *n.* 38.

Longus *cubiti*, is a muſcle, which, with others, extends the cubitus. It ariſes from the inferior coſta of the ſcapula nigh its neck; and, paſſing between the two round muſcles, deſcends on the back ſide of the humerus; where it joins with the brevis and brachiæus externus.

LONICERA. See *Upright* Honeysuckle.

LOOF, or, as it is uſually pronounced, Luff, a term uſed in conding of a ſhip. Thus,

Loof *up*, is to bid the ſteerſman keeper nearer to the wind,

Loof *into a harbour*, is to ſail into it cloſe by the wind.

Loof, *to ſpring the*, or *luff*, is when a ſhip that was going large before the wind is brought cloſe by the wind.

When a ſhip ſails on a wind, that is, on a quarter-wind, they ſay to the ſteerſman, *keep your luff! veer no more! keep her to! touch the wind! have a care of the lee-latch!* All which words ſignify much the ſame thing, and bid the man at the helm to keep the ſhip near the wind.

Loof *of a ſhip*, denotes the after part of a ſhip's bow; or that part of her ſide forward where the planks begin to be incurvated into an arch, as they approach the ſtem. Hence, the guns which lie here are called *loof-pieces*.

Loof-*hook*, in a *ſhip*, a tackle with two hooks to it, one of which is to hitch into the crengle of the main and foreſail, and the other is to hitch into a certain ſtrap, which is ſpliced into the cheſs-tree, and ſo down the ſail. Its uſe is to ſuccour the tackles in a large ſail, that all the ſtreſs may not bear upon the tack. Sometimes alſo it is uſed when the tack is to be ſeized the furer.

Loof-*tackle*, or Luff-*tackle*, in a *ſhip*, a large *tackle*, large than the jigger-tackle, but ſmaller than thoſe which hoiſt the heavier materials into and out of the veſſel, ſuch as the main and fore tackles, the ſtay and quarter tackles, &c. ſerving to lift all the ſmall weights in or out of the ſhip, and otherwiſe variouſly employed as occaſion requires.

LOOK-OUT, in *Sea Language*, denotes a watchful attention to ſome important object, or event, which is expected to ariſe from the preſent ſituation of a ſhip, &c. It is principally uſed when there is a probability of danger from the real or propoſed proximity of land, rocks, enemies, &c. There is always a *look-out* kept on a ſhip's forecaſtle at ſea, to watch for any dangerous objects lying near her track; the mate of the watch accordingly calls often from the quarter deck, *look out afore there!* to the perſons appointed to this ſervice. Falconer.

LOOKING-*glaſs*, a plain glaſs ſpeculum, or mirror, which being impervious to the light, reflects its rays, and ſo exhibits the images of objects placed before it.

The theory of *looking-glaſſes*, and the laws whereby they give the appearance of bodies, ſee under Mirror.

Looking-*glaſſes*, *the manner of grinding and preparing*, is as follows:—A plate of glaſs is fixed to a horizonal table, and to another leſſer table is fixed another plate, over the hind part of which is added a box loaded with ſtones, and other weights. Over the firſt plate is ſprinkled fine ſand and water, in a ſufficient quantity for the grinding, and the ſecond or leſs plate is laid on it; and thus worked this way and that way, till each has planed the other's ſurface. As they begin to grow ſmoother, finer ſand is uſed, and at laſt powder of ſmalt. Being thus fitted for poliſhing, a wooden parallelopided, lined with Tripoli earth, or burnt tin, tempered with water, is laid on the plate, and worked to and again, till the glaſs hath got a perfect politure.

It is found extremely difficult to bring a glaſs to an exact planeneſs. Hevelius judges more art required to bring glaſs to a perfect plane than to a ſphere. For poliſhing large plates of glaſs, they have a machine for the purpoſe. See Glass.

The plates being poliſhed, a thin blotting paper is ſpread on a table or marble ſlab; and ſprinkled with fine powdered chalk; and this done, over the paper is laid a thin lamina or leaf of tin, on which is poured mercury, which is to be equally diſtributed over the leaf, with a hare's foot or cotton. Over the leaf is laid a very thin ſmooth paper, of which the kind called fan-paper is beſt, and over that the glaſs plate. With the left hand the glaſs-plate is preſſed down, and with the right the paper is gently drawn out; which done, the plate is covered with a thicker paper, and loaden with greater weight, that the ſuperfluous mercury may be driven out, and the tin adhere more cloſely to the glaſs. When it is dried, the weight is removed, and the *looking-glaſs* is complete.

Some uſe an ounce of mercury with half an ounce of marcaſite or biſmuth, melted by the fire; and leſt the mercury evaporate in ſmoke, pour it into cold water; and when cold, ſqueeze it through a cloth or leather. Some alſo add a quarter of an ounce of lead and tin to the marcaſite, that the glaſs may dry the ſooner. See Foliating.

Looking-*glaſs*, *Venus's*, in *Botany*. See Campanula.

LOOL, in *Metallurgy*, a veſſel made to receive the waſhings of ores of metals. The heavier or more metalline part of the ores remain in the trough to which they are waſhed; the lighter, and more earthy, run off with the water, but ſettle in the *lool*.

LOOM, the weaver's frame; a machine whereby ſeveral diſtinct threads are woven into one piece.

Looms are of various ſtructures, accommodated to the various kinds of materials to be woven, and the various manner of weaving them; viz. for woollens, ſilks, linens, cottons, cloths of gold; and other works, as tapeſtry, ribbands, ſtockings, &c. divers of which will be found under their proper heads. See Weaving.

The weaver's *loom*-engine, otherwiſe called the Dutch *loom*-engine, was brought into uſe from Holland to London, in or about the year 1676.

Loom, *heir*, in *Law*. See Heir-*loom*.

Loom, at *Sea*. If a ſhip appears big, when at a diſtance, they ſay ſhe *looms*, or appears a great ſail: the term is alſo uſed to denote the indiſtinct appearance of any other diſtant object.

Loom-*gale*, at *Sea*, a gentle, eaſy gale of wind, in which a ſhip can carry her top-ſails *a*-Trip.

LOON, in *Ornithology*, a name given to the *columbus major*, or great diver, and alſo to the *columbus minor*. See *Tippet*-Grebe and Dob chick.

LOOP, in the *Iron Works*, is a part of a ſow or block of caſt iron broken or melted off from the reſt, and prepared for the forge or hammer. The uſual method is, to break off the *loop* of about three quarters of a hundred weight. This *loop* they take up with their ſlinging-tongs, and beat it with iron ſledges upon an iron-plate near the fire, that ſo it may not fall to pieces, but be in a condition to be carried under the hammer. It is then placed under the hammer, and a little water being drawn to make the hammer move but ſoftly, it is beat very gently, and by this means the droſs and foulneſs are forced off, and after this they draw more and more water by degrees, and beat it more and more till they bring it to a four-ſquare maſs, of about two feet long, which they call a bloom.

LOOP-*Holes*, in the *Sea-Language*, are holes made in the coamings of the hatches of a ſhip, to fire muſquets through in a cloſe fight.

LOOPING, in *Metallurgy*, a word uſed by the miners of ſome counties of England, to expreſs the running together of the matter of an ore into a maſs, in the roaſting or firſt burning, intended only to calcine it ſo far as to make it fit for powdering. This accident which gives the miners ſome trouble, is generally owing to the continuing the fire too long in this proceſs.

To LOOSE, in *Sea-Language*, is to unfurl or caſt *looſe* any ſail, in order to be ſet, or dried after rainy weather.

LOOSE-*Strife*, *Liſimachia*, in *Botany*, a genus of the *pentandria monogynia* claſs; the characters of which are theſe: the empalement of the flower is permanent, and cut into five acute ſegments that are erect; the flower is of one petal, cut into five oblong oval ſegments to the bottom, which ſpread open flat; it hath five awl-ſhaped ſtamina about half the length of the petal, terminated by acute-pointed ſummits; in the centre is ſituated a roundiſh germen, ſupporting a ſlender ſtyle of the length of the ſtamina, crowned by an obtuſe ſtigma; the germen afterwards turns to a globular capſule, with one cell opening with ten valves, and filled with ſmall angular ſeeds. Miller enumerates ten, and Linnæus eleven ſpecies. See MONEY-*wort*.

Podded LOOSE-*ſtrife*, in *Botany*. See WILLOW-*herb*.

Purple and *ſpiked* LOOSE-*ſtrife*, *lythrum*, in *Botany*, a genus of the *dodecandria monogynia* claſs: the characters are, that the flower hath a cylindrical ſtriated empalement of one leaf, indented at the brim in twelve parts, which are alternately ſmaller; it has ſix oblong blunt petals, inſerted in the indentures of the empalement, and ten ſlender ſtamina of the length of the empalement, the upper being ſhorter than the lower, terminated by ſingle riſing ſummits; in the centre is ſituated an oblong germen, which turns to an oblong acute capſule, with two cells filled with ſmall ſeeds. Miller reckons ten and Linnæus nine ſpecies.

Virginian LOOS-*ſtrife*. See GAURA.

LOOSE *Style*. See STYLE.

LOOSENED. See HOOF-*looſened*.

LOPHIA, in *Anatomy*, a term for the upper part of the *cervix*, or back part of the human neck.

LOPHIUS, in *Ichthyology*, a genus of the *amphibia nantes* in the Linnæan ſyſtem; having ſolitary ſpiracles near the branchia; many ſmall teeth, pectoral fins, incident in the branchiæ; and only three branchiæ. The ſpecies are the GUAPERVA, the GUACUIA, and RANA *piſcatrix*.

LOPPA, a word uſed by the chemical writers to expreſs the metallic maſs, which reſults from a cementatory calcination, either with or without regulus.

LOPPING, among *Gardeners*, the cutting in a proper and artful manner, the branches of trees, ſo as to make them grow more beautiful or more durable.

It is obſervable, that moſt old trees are hollow within, and this is in general owing to their wrong management, the tops being ſuffered to grow too large before they are lopped. This is a very common error in regard to the aſh, elm, hornbeam, &c. and is owing to people perſuading themſelves, that by this means they ſhall have more great wood; but they do not conſider, that the cutting off large tops deſtroys or decays the tree, ſo that it decays more in the body than it grows in the head. And though the hornbeams and elms will bear large tops when the outſide is little more than a ſhell, yet this is not at all the caſe with the aſh, which ſhould therefore always be cut down as ſoon as it begins to decay. See HOLLOWNESS *of trees*.

The *lopping* of young trees, that is of ſuch as are ten or twelve years old, will preſerve them much longer, and will occaſion the ſhoots to grow more into the wood in one year, than they do in old tops in two or three. The taking off of large boughs in a careleſs manner deſtroys many a tree; they ſhould therefore always be lopped cloſe and ſmooth, and not parallel to the horizon, and the wound covered with ſome loam to keep it from rotting, and preventing the wet from entering and getting into the body of the tree.

All ſort of reſinous trees, or ſuch as abound with a milky juice, ſhould be lopped but very ſparingly, for they are very ſubject to decay when cut. The beſt ſeaſon for the *lopping* theſe is the end of Auguſt, when they will not bleed very much, and the wounds will heal before the hard weather. Miller.

Whatever ſhape a tree is intended to be of, it muſt be thrown into it by *lopping* while young, for the branches being then ſmall, full of juice, heal eaſily and never endanger the tree. When a tree is intended for timber, it muſt be left to grow to its own height, and its top is never to be cut off on any account. Thoſe trees which have large piths, as the aſh, elm, willow, and poplar, and the like, muſt never have their heads cut off, if intended to ſtand long, for the wet gets into the ſoft part of the tree, and begins to hollow, and rot it where cut off, and ſoon ſpreads to the very root, ſo that the whole is but a ſhell or caſe of a tree. If a tree grow top heavy, and be in danger of breaking down, then ſome think it neceſſary to take off the top to preſerve it; but this may be much better done only by thinning the top, that is cutting off the ſmall branches that grow from the main boughs of the head, and leaving them bare, ſo as to let the wind have a free paſſage through them. This is a very good practice for young trees, which are intended to be ſpreading ones; and if they are intended to be tall and ſlender ones, the beſt method to be taken with them, while young, is rubbing off the buds as faſt as they appear in the ſpring, and taking off the ſide-ſhoots as they grow, leaving only here and there one; when any new ſhoots break out, ſome of them may be ſaved, and the others cut off in their place, always obſerving to cut off the largeſt, and leave the youngeſt; the whole intent being to leave ſome check there for the ſap, to prevent its all running up to the head, which would endanger the breaking of the body in ſome weak place. When the trunk ſeems ſtrong and robuſt, the fewer of theſe ſhoots need be left: the great care, in this caſe, is to be employed about the head. The leading ſtalk, or branch, muſt be carried up all the way ſtraight and ſingle, and not ſuffered to fork or ſplit till it come to the head, and the quantity of boughs left there muſt be ſuch as will not leave the whole top-heavy. When the tree is grown to its proper height, the head is to be ſuffered to break out in its natural way, and the ſide branches are to be kept cut off as they ſhoot, or at any proper diſtances of time.

If the ſide-boughs are found ſtill breaking out, and the top is able to ſuſtain itſelf, the boughs that put out in ſpring ſhould be lopped very cloſe in ſummer, a little after midſummer; this will cauſe the bark to ſhoot over them, and they will not be liable to grow again. This is the only method of making a tree grow with a fine ſtraight and handſome body.

The generality of the world are againſt pruning timber-trees at all, and where they naturally grow ſtraight and regular, it is much better let alone. But all the common faults in ſhape may be regulated by this *lopping* them while young, and it can be attended with no ill conſequence to the timber; for the cut not lying near the timber pith, cannot effect it when grown up, and ſquared in the working for beams or other uſes, or to be quartered, for all the defects, occaſioned by ſuch wounds, are in the ſuperficial parts, and all the four quarters are perfectly ſound within.

As to the large foreſt-trees they ſhould not be lopped at all, except in caſes of great neceſſity, and then the large boughs muſt not be cut, but only the ſide branches, and even theſe muſt be cut off cloſe, that the bark may ſoon cover the wound, and yet a little ſlanting, that the water may run off, and not lodge upon the cut part.

If there is a neceſſity of cutting off a large bough, as by its being broken or cankered, let it be cut off ſlanting at about four feet diſtance from the body of the tree, and that if poſſible near ſome place where there is a young ſhoot from it, which may receive the ſap and grow up in its place. No ſtump muſt be left ſtanding out farther than this, becauſe they are wounded parts which never can heal, and which will always be letting in the water, and will ſerve as pipes to convey that water to the heart of the body of the tree, and by degrees will utterly ſpoil it. All that grow upright, whether they be large or ſmall branches, muſt in cutting be taken off ſlanting, never evenly, for the ſame reaſon; thoſe boughs that bear from the head are to be cut with the ſlope on the lower ſide; and on any occaſion that great wounds are given to a tree, they ſhould be covered with a mixture of clay and horſe-dung, which will make them heal much ſooner than they otherwiſe would do. Mortimer. See FOREST-*Trees*.

LORANTHUS, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flower is tubulous, and cut into ſix narrow ſegments, almoſt to the bottom, which are reflexed; the germen is ſituated below the empalement, and becomes a berry containing one ſeed. Linnæus enumerates nine ſpecies.

LORARII, among the *Romans*, officers whoſe buſineſs it was, with whips and ſcourges, to compel the gladiators to engage. The *lorarii* alſo puniſhed ſlaves who diſobeyed their maſters.

LORD, a title of honour attributed to thoſe who are noble, either by birth, or creation; and veſted with the dignity of a baron.

The word is of Saxon origin, and primarily denotes a bread-giver, alluding to the hoſpitality of our ancient nobles: it is formed, according to Camden, from *hlaford*, afterwards written *loford*; a compound of *hlaf*, *bread*, and *ford*, *to ſupply*, *afford*.

In this ſenſe, *lord* amounts to the ſame with *peer* of the realm, *lord* of parliament.

Lord is alſo applied to thoſe ſo called by the courteſy of England; as all ſons of a duke or marquis, and the eldeſt ſon of an earl.

Lord is alſo an appellation given to divers perſons honourable by office; as *lord* chief juſtice, *lord* chancellor, *lord* of the treaſury, admiralty, &c.

Lord is alſo a title ſometimes given to an inferior perſon who has a fee, and conſequently the homage of tenants within his manor.

For by his tenants he is called *lord*, and in ſome places, for diſtinction ſake, *land-lord*.

It is in this laſt ſignification that the word *lord* is principally uſed in our law-books, where it is divided into *lord paramount*, and *lord meſne*.

Lord *meſne*, is he that is owner of a manor, and by virtue thereof hath tenants holding of him in fee, and by copy of court-roll; and yet holds himſelf of a ſuperior *lord* called *lord paramount*.

We alſo read of *very lord*, and *very tenant*.

Lord *in groſs*, he who is *lord*, not by reaſon of any manor, as the king in reſpect of his crown, &c.

Very **Lord**, is he who is immediate *lord* to his tenant; and *very tenant*, he who holds immediately of that *lord*. So that where there is *lord* paramount, *lord* meſne, and tenant; the *lord* paramount is not very *lord* to the tenant.

Lord *high-admiral* of England, is one of the great officers of the crown, whoſe truſt and honour is ſo great, that it was formerly ſeldom given, except to ſome of the king's youngeſt ſons, or near kinſmen.

To him is, by the king, intruſted the management of all maritime affairs, as well in reſpect to juriſdiction as protection; with the government of the Britiſh navy; and a power to decide all controverſies and cauſes maritime, as well civil as criminal; ſuch as happen either on our coaſts, or beyond ſea, among his majeſty's ſubjects.

To him alſo belong ſuch wrecks and prizes, as are called LAGON, JETSON, and FLOTSON; that is, goods lying in the ſea floating, or caſt on ſhore, excepting in ſuch royalties as are granted to other *lords* of manors, &c. with all great fiſhes, calle *royal* FISH, except whales and ſturgeon; a ſhare of prizes in time of war, and the goods of pirates and felons condemned.

The *lord high-admiral* has under him many officers of high and low condition; ſome at ſea, others at land; ſome of a military, others of a civil capacity; ſome judicial others miniſterial. See ADMIRAL.

This great office is now uſually executed by ſeven commiſſioners, who are ſtyled *lords of the admiralty*: one is called the firſt *lord*, with a ſalary of 3000*l*. a year, the others have 1000*l*. a year each. Under theſe there are a ſecretary and deputy-ſecretary, and ſeveral inferior clerks.

In this court called the *court of admiralty*, all proceſſes iſſue in his name not the king's, as they do in all other courts; ſo that the dominion and juriſdiction of the ſea may juſtly be ſtyled another commonwealth or kingdom apart, and the *lord high admiral*, the viceroy of the maritime kingdom.

He hath under him a lieutenant, or deputy, who is judge of the admiralty, commonly a doctor of the civil law. See COURT *of admiralty*.

Lord *privy-ſeal*, has his office by patent: before the thirtieth of Henry VIII. he was generally an eccleſiaſtic; ſince which, the office has been uſually conferred on temporal peers, above the degree of barons.

The *lord privy-ſeal*, receiving a warrant from the ſignet-office, iſſues the privy-ſeal, which is an authority to the lord chancellor to paſs the great-ſeal, where the nature of the grant requires the SEAL.—But privy-ſeals for money begin in the treaſury, from whence the firſt warrant iſſues, counterſigned by the lord treaſurer.—On the *lord privy ſeal* are attendant four clerks, who have two deputies to act for them.

Lord *ſteward of the king's houſhold*, is the principal officer for the civil government of the king's ſervants below-ſtairs; over the officers of which he has juriſdiction. See HOUSHOLD.

He is conſtituted by the delivery of the white ſtaff, which is eſteemed his commiſſion.—By virtue of his office, without any other commiſſion, he judges of all offences committed within the court, or the verge thereof; and gives judgment according to their ſeveral deſerts.

At the death of the ſovereign he breaks his ſtaff over the grave in which the royal corpſe is depoſited, and thereby diſcharges all the officers under his power.

Lord *advocate*. See ADVOCATE.

Lord *high-treaſurer*. See TREASURER.

Lord *chamberlain of the houſhold*. } See CHAMBERLAIN.
Lord *great chamberlain of England*. }

Lord *high-chancellor of England*. See CHANCELLOR.

Lords *of the bed-chamber* are fourteen in number under the *Lord* Chamberlain. See BED-CHAMBER.

Lords *of ſeſſion*. See SESSION.

Lords, *houſe of*. See PEERS.

Lords *of the treaſury*. See TREASURY.

Lords *lieutenants of counties*, are officers of great diſtinction, appointed by the king for the managing the ſtanding militia of the county, and all military matters therein.

They are ſuppoſed to have been introduced about the reign of king Henry VIII. for they are mentioned as known officers in the ſtatute 4 and 5 Ph. and M. c. 3 though they had not been then long in uſe; for Camden ſpeaks of them, in the time of queen Elizabeth, as extraordinary magiſtrates conſtituted only in times of difficulty and danger.

They are generally of the principal nobility, and of the beſt intereſt in the county: they are to form the militia in caſe of a rebellion, &c. and march at the head of them, as the king ſhall direct.

They have the power of commiſſioning colonels, majors, captains, and ſubaltern officers; alſo to preſent the king with the names of deputy-lieutenants, who are to be ſelected from the beſt gentry in the county, and act in the abſence of the *lords-lieutenants*.

Subſervient to the *lords-lieutenants*, and deputy-lieutenants, are the juſtices of peace; who according to the order they receive from them, are to iſſue out warrants to the high and petty-conſtables, &c. for military ſervice, &c.

Lord's *Day*. See SUNDAY.

LORDOSIS, of λορδος, *bent inwards*, in the *Medical Writings*, a name given to the diſtempered ſtate of the ſpine, in which it is bent inwards, or toward the anterior parts. It is uſed in oppoſition to gibbous, or hump-backed.

LORICATION, or COATING, in *Chemiſtry*, is the covering a glaſs or earthen veſſel with a coat or cruſt of a matter able to reſiſt the fire, to prevent its breaking in the performing an operation that requires great violence of fire.

When veſſels are expoſed to a fire too ſtrong for their ſtructure, or to the corroſive quality contained in them, or on the throwing on of freſh cold fuel into the fire where they ſtand, it frequently happens that they crack and burſt; for the preventing of which, the operator has recourſe to this method of *coating* or *loricating* his veſſels. It is performed in the following manner: take a quantity of waſhed clay, with an admixture of pure ſand, powder of calcined flints, or broken crucibles; and inſtead of pure water moiſten it with freſh blood that has not yet been coagulated, diluted with twice or three times its quantity of water; make the clay with this into a thin paſte, and work it into ſome cow's hair, or other hair not too long nor too ſtiff, and a little powdered and ſifted glaſs, if you have it at hand; ſmear over the veſſel intended to be uſed with this paſte, by means of a pencil, and ſet it to dry; when dry, beſmear it again, and repeat the operation till the veſſel have a cruſt of a third, or a quarter of an inch, at leaſt, thick of this matter, and let it be thoroughly dry before it is uſed.

To keep blood in a proper ſtate for this uſe, it muſt, when juſt let out from the animal, be well ſtirred about with a ſtick for ſome time, at leaſt till it is quite cold; and being thus prepared, it will keep for ſome days without coagulating, and fit for uſe.

This compoſition, with an admixture of bole, worked into a paſte with the whites of eggs, diluted with water, makes alſo the proper LUTE for cloſing the junctures of other chemical veſſels, in the diſtilling ſtrong ſpirits.

LORIMERS, one of the COMPANIES of London, that make bits for bridles, ſpurs, and ſuch like ſmall iron ware. They are mentioned ſtat. 1 Rich. II. cap. 12.

The word ſeems derived from the Latin, *lorum*, a thong.

LORIPES, in *Ornithology*, the name uſed by ſome authors for the HIMANTOPUS, a bird of the water-kind, remarkable for the length and weakneſs of its legs.

LORIS, in *Zoology*, a ſpecies of LEMUR in the Linnæan ſyſtem, being the *lemur tardigradus* of Buffon, deſcribed by Buffon, Nat. Hiſt. vol. xxvi. p. 277. *Tab.* III. *Quadrupeds*, Nº 29. See MAUCAUCO.

LORUS, a name by which ſome of the chemical writers have called mercury.

LOT in a legal ſenſe. See Scot.

Lot, or **Loth**, in *Mining*, is the thirteenth diſh, meaſure, or part of the miner's ore which the bar-maſter takes up for the king, or the farmer.

LOTA, in *Zoology*, the name of a ſpecies of the *muſtela fluviatilis*, or eel-*pout*, differing from the ordinary kind, in that it has no hairs or excreſcences on the upper jaw; the tail is flat and like the point of a broad ſword, whereas that of the common kind is more rounded; and that it is covered with eaſily diſtinguiſhable ſcales.

LOTE-tree, in *Botany*. See Nettle-*tree*.

LOTION, **Lotio**, popularly called *waſh*, denotes a form of medicine made up of liquid matters, chiefly uſed for beautifying the ſkin, and cleanſing it from thoſe deformities which a diſtempered blood ſometimes throws on it; or rather, which are occaſioned by a preternatural ſecretion. For generally ſpeaking, thoſe diſtempers of the ſkin, which are accounted ſigns of a foul blood, proceed from the natural ſalts thrown off by the cutaneous glands, which ought to be waſhed away through the kidneys; ſo that inſtead of ſweetners, which are uſually preſcribed on thoſe occaſions, Dr. Quincy thinks the urinary diſcharge ſhould be promoted or that of the ſkin rectified by proper *lotions*, or ointments and frictions.

Lotion alſo denotes a remedy, poſſeſſing a medium between a fomentation and a bath.

There are refreſhing and ſomniferous *lotions* for feveriſh perſons, made of leaves, flowers, and roots boiled, wherewith the feet and hands of the patient are waſhed; and after waſhing, wrapped up in linen, ſteeped in the ſame decoction, till dry.

There are *lotions* alſo for the head and hair, made of the aſhes of vine-twigs.

Lotion *of the philoſophers*, in *Chemiſtry*, is a cohobation which nature makes of what is raiſed up, and afterwards falls back again to the bottom of the veſſel.

Lotion, in *Pharmacy*, denotes a preparation of medicines, by waſhing them in ſome liquid, either made very light, ſo as to take away only the dregs; or ſharp, ſo as to penetrate them, in order to clear them of ſome ſalt, or corroſive ſpirit, as is done to antimony, precipitates, magiſteries, &c. or intended to take away ſome foulneſs, or ill quality; or to communicate ſome good one.

Lotio *ſaponacea*, the *ſaponaceous lotion*, the name of a form of medicine preſcribed in the late London Pharmacopœa, being properly ſoap in a liquid form. It is ordered to be made thus; take damaſk roſe-water three quarters of a pint; oil of olives, a quarter of a pint; ley of tartar half an ounce in meaſure: rub the ley and oil together till they are mixed, and then gradually add the water.

LOTOMETRA, in *Botany*, a name given by many of the ancients to the *nymphæa Indica*, or *Ægyptiaca*, called alſo the *faba Ægyptiaca*, and originally the *nilufar*, an abbreviation of *nilnufar*; *nufar* ſignifying a water-lily, and the prefix *nil* expreſſing its growing particularly in the river Nile.

Neophytus tells us, that this *lotometra* has leaves of a middle from between thoſe of the common *nymphæa*, which are roundiſh, and thoſe of the *arum*, which are oblong and pointed, and are cordated at the baſe; and this is the very figure of the leaves of the *faba Ægyptiaca*, as we ſee it in all paintings, &c.

LOTTERY, a kind of game at hazard, wherein ſeveral lots of merchandize, or ſums of money, are depoſited as prizes, for the benefit of the fortunate.

The deſign of *lotteries*, and the manner of drawing them, are too well known among us to need a deſcription: they are very frequent in England and Holland, where they cannot be ſet on foot without the permiſſion of the magiſtrate.—In France too, there have been ſeveral *lotteries* in favour of their hoſpitals.

M. le Clerc has compoſed a treatiſe of *lotteries*, wherein is ſhewn what is laudable, and what blameable in them.—Gregorio Leti has alſo a book on the ſubject of *lotteries*. Father Meneſtrier has a treatiſe on the ſame, publiſhed in 1700, where he ſhews their origin, and uſe among the Romans. He diſtinguiſhes ſeveral kinds of *lotteries*, and takes occaſion to ſpeak of chances, and reſolves ſeveral caſes of conſcience relating thereto.

The firſt *lottery* in England of which we have any account, was drawn at the weſt door of St. Paul's cathedral, in the year 1569, and conſiſted of 40,000 lots at ten ſhillings each lot; the prizes were plate; and the profits were to be applied towards reparing the havens of this kingdom. At this time there were only three *lottery* offices in London.

In 1612, king James, for the plantation of Engliſh colonies in Virginia, appointed a *lottery*, to be held at the Weſt end of St. Paul's; the chief prize of which was 4000 crowns, in fair plate. But by 10 and 11 W. c. 17. all *lotteries* are declared to be public nuſances, and all grants, patents and licences, for ſuch *lotteries*, to be againſt law. They are farther prohibited under penalties by 9 Ann. c. 6.

By the 8 Geo. I. c. 2. for ſuppreſſion of private *lotteries*, no perſon ſhall ſet up or keep any office, of ſales of houſes or lands, plate, goods &c. for improvement of ſmall ſums of money, or expoſe to ſale any houſes or goods by way of *lottery*, lots, tickets, or numbers, or publiſh propoſals relating to the ſame, &c. on pain of forfeiting 500*l*. And adventures in ſuch ſales ſhall forfeit double the ſum contributed. See 9 Geo. I.

No perſon ſhall ſell the chance of any ticket in a public *lottery* for leſs than the whole time of drawing; nor any ſhares therein, or receive money on conſideration of repayment, if tickets prove unfortunate, on forfeiture of treble the ſum received: to be recovered in the courts of Weſtminſter, &c. Stat. 6 Geo II.

See other ſtatutes relating to *lotteries* under the article Gaming. The act paſſed in 1778, for regulating the conduct of the *lottery* reſtrains any perſon from keeping an office for the ſale of tickets, ſhares, or chances, or for buying, ſelling, inſuring or regiſtering, without a licence; for which licence each office-keeper muſt pay 50*l*. to continue in force for one year, and the produce to be applied towards defraying the expences of the *lottery*. And no perſon is allowed to ſell any ſhare or chance leſs than a ſixteenth on the penalty of 50*l*. All tickets divided into ſhares or chances are to be depoſited in an office, to be eſtabliſhed in London by the commiſſioners of the Treaſury, who are to appoint a perſon to conduct the buſineſs thereof; and all ſhares are to be ſtamped by the ſaid officer, who is to give a receipt for every ticket depoſited with him. The numbers of all tickets ſo depoſited are to be entered in a book, with the names of the owners, and the number of ſhares into which they are divided; and two pence for each ſhare is to be paid to the officer on depoſiting ſuch tickets, who is therewith to pay all expences incident to the office. All tickets depoſited in the office are to remain there three days after the drawing. And any perſon keeping an office, or ſelling ſhares, or who ſhall publiſh any ſcheme for receiving moneys in conſideration of any intereſt to be granted in any ticket in the ſaid *lottery*, &c. without being in poſſeſſion of ſuch ticket, ſhall forfeit 500*l*. and ſuffer three months impriſonment. And no buſineſs is to be tranſacted at any of the offices after eight in the evening, except on the evening of the Saturday preceding the drawing. No perſon is to keep any office for the ſale of tickets, &c. in Oxford or Cambridge, on penalty of 20*l*. Before this regulating ſtatute took place, there were upwards of 400 *lottery* offices in and about London only; but the whole number afterwards, for all England, as appeared by the liſt publiſhed by authority, amounted to no more than 51.

The various calculations, relating to *lotteries*, depend on an acquaintance with the doctrine of chances, a ſummary of which the reader will find under the article of Gaming. Thus by Prob. II. under that article, it is eaſy to find how many tickets one muſt take in a *lottery* whereof the number of blanks is to the number of prizes as 39 to 1, in order to make it an equal chance for one or more prizes. Multiply 39 by 0.7, and the product 27.3 ſhews that the number of tickets for this purpoſe will be 27 or 28 at moſt. In a *lottery* likewiſe, wherefore the number of blanks is to the number of prizes as 5 to 1, multiply 5 by 0.7. and the product 3.5 ſhews, that there is more than an equality of chance in four tickets for one or more prizes, but leſs than an equality in three. But if in a *lottery* having the blanks to the prizes as 39 to 1, the whole number of tickets were only 40, the above proportion would be altered; for 20 tickets would be a ſufficient number for the juſt expectation of the ſingle prize; becauſe it is evident, that the prize may be as well among the tickets which are taken, as among thoſe that are left behind. Moreover, if the number of tickets were 80, and the ſame proportion of blanks to prizes preſerved, the proportion would ſtill be altered; for by the doctrine of combination it appears, that the probability of taking one prize, or both in 20 tickets would be but $\frac{139}{316}$, and the probability of taking none would be $\frac{177}{316}$; wherefore the odds againſt taking any prize would be as 177 to 139, or nearly as 9 to 7. By the ſame doctrine of combination it alſo appears, that 23 tickets would not be quite ſufficient for the expectation of a prize in this *lottery*; but that 24 would rather be too many: ſo that one might with advantage lay an even wager of taking a prize in 24 tickets.

If the proportion of 39 to 1 be oftener repeated, the number of tickets requiſite for the equal chance of a prize, will ſtill increaſe with that repetition; yet let the proportion of 39 to 1 be repeated ever ſo many times, nay, an infinite number of times, the number of tickets requiſite for the equal chance of a prize would never exceed $\frac{7}{10}$ of 39, that is about 27 or 28. Wherefore, if the proportion of the blanks to the prizes be often repeated, as it uſually is in *lotteries*, the number of tickets requiſite for a prize will always be found by taking $\frac{7}{10}$ of the proportion of the blanks to the prizes. Again, by Prob. IV. under GAMING, it may be found how many tickets muſt be taken, in a *lottery* whoſe number of blanks is to that of the prizes, as 39 to 1, in order to make it as probable that 2 or more benefits will be taken as not: multiply 39 by 1. 678, and the product 65.4 will ſhew, that no leſs than 65 tickets will be requiſite to that effect.

Farther, by Prob. IX. under GAMING, we may find, in a *lottery* conſiſting of 40000 tickets, among which are three particular benefits, what is the probability that taking 8000 of them, one or more of the particular benefits ſhall be among them. Subſtitute 8000, 40000, 32000, 3, and 1 reſpectively for c, n, d, a, and p, in that problem: and the probability of taking preciſely one of the three particular benefits will appear to be $\frac{8000 \times 32000 \times 31999 \times 3}{40000 \times 39999 \times 39998} = \frac{48}{125}$ nearly. If $p=2$, the probability of taking preciſely 2 of the particular benefits will be $\frac{8000 \times 7999 \times 32000 \times 3}{40000 \times 39999 \times 39998} = \frac{12}{125}$ nearly. If $p=3$, the probability of taking all the 3 particular benefits, will be $\frac{8000 \times 7999 \times 7998}{40000 \times 39999 \times 39998} = \frac{1}{125}$. And the probability of taking one or more of the three particular benefits will be $\frac{48+12+1}{125} = \frac{61}{125}$ very nearly. Theſe three operations might have been contracted into one by inquiring the probability of not taking any of the three particular benefits, which will be found to be $\frac{32000 \times 31999 \times 31998}{40000 \times 39999 \times 39998} = \frac{64}{125}$ nearly, which being ſubtracted from unity, gives a remainder, $1 - \frac{64}{125} = \frac{61}{125}$, ſhewing the probability required; and therefore the odds againſt taking any of three particular benefits will be 64 to 61 nearly.

2. To find by the ſame problem how many tickets ought to be taken in a *lottery* conſiſting of 40000, among which are three particular benefits, to make it as probable that one or more of theſe three may be taken as not. Let the number of tickets requiſite to be taken be $=x$, and the probability of not taking any of the particular benefits will be $\frac{n-x}{n} \times \frac{n-x-1}{n-1} \times \frac{n-x-2}{n-2}$; but this probability is equal to $\frac{1}{2}$, ſince by hypotheſis, the probability of taking one or more of them is equal to $\frac{1}{2}$; whence we ſhall have the equation $\frac{n-x}{n} \times \frac{n-x-1}{n-1} \times \frac{n-x-2}{n-2} = \frac{1}{2}$, from the ſolution of which x will be found nearly equal to 8252. The terms of this equation, Mr. De Moivre obſerves, may be conſidered as being in geometric progreſſion: ſince the factors both of the numerator and denominator are few and in arithmetic progreſſion, and their difference very ſmall in reſpect of n: and, therefore, the cube of the middle term may be ſuppoſed equal to the product of the multiplication of theſe terms; whence will ariſe the equation, $\left.\overline{\frac{n-x-1}{n-1}}\right|^3 = \frac{1}{2}$; or, neglecting unit both in the numerator and *denominator*, $\left.\overline{\frac{n-x}{n}}\right|^3 = \frac{1}{2}$ and x, conſequently, $= n \times \overline{1 - \sqrt{\tfrac{1}{2}}}$, or $n \times \overline{1 - \tfrac{1}{2}\sqrt[3]{4}}$: but $n = 40000$, and $1 - \frac{1}{2}\sqrt[3]{4} = 0.2063$; therefore $x = 8252$.

3. To determine accurately, in a *lottery* of 100000 tickets, whereof 90000 are blanks, and 10000 are benefits, what the odds are of taking or not taking a benefit, in any number of tickets aſſigned. Let the number be 6; and it will appear, by the above cited problem, that the number of chances for taking no prize in 6 tickets, making $a = 10000$, $b = 90000$, $c = 6$, $p = 0$, $n = 100000$, will be $\frac{90000}{1} \times \frac{89999}{2} \times \frac{89998}{3} \times \frac{89997}{4} \times \frac{89996}{5} \times \frac{89995}{6}$; and that the whole number of chances will be $\frac{100000}{1} \times \frac{99999}{2} \times \frac{99998}{3} \times \frac{99997}{4} \times \frac{99996}{5} \times \frac{99995}{6}$; then dividing the firſt number of chances by the ſecond, by means of LOGARITHMS, the quotient will be 0.53143, the probability required: this decimal fraction being ſubtracted from unity, the remainder 0.46857 ſhews the probability of taking one prize or more in 6 tickets; wherefore the odds againſt taking any prize in 6 tickets will be 53143 to 46857. If the number of tickets be 7, then carrying each number of chances above written one ſtep farther, we ſhall find that the probability of taking no prize in 7 tickets is 0.47828, which ſubtracted from unit leaves a remainder 0.52172, which ſhews the odds of taking one prize or more in 7 tickets to be 52172 to 47828.

4. By the ſame problem, to find the value of the chance of a prize, ſuppoſing each ticket to be 10*l.* and that after the *lottery* is drawn, 7*l.* 10*s.* be returned to the blanks. There being 90000 blanks, to each of which is returned 7*l.* 10*s.* the total value of the blanks is 675000*l.* and conſequently the total value of the benefits is 325000*l.* which being divided by 10000, the number of benefits, gives a quotient 32*l.* 10*s.* and, therefore, one might for the ſum of 32*l.* 10*s.* be entiteled to have a benefit certain taken at random out of the whole number of benefits: the purchaſer of a chance has, therefore, one chance in ten for the ſum of 32*l.* 10*s.* and nine chances in ten for loſing his money; from whence it follows, that the value of his chance is the 10th part of 32*l.* 10*s.* i. e. 3*l.* 5*s.* And conſequently the purchaſer of a chance by giving the ſeller 3*l.* 5*s.* is intitled to the chance of a benefit, and ought not to return any thing to the ſeller, although he ſhould have a prize; for the ſeller having 3*l.* 5*s.* ſure, and nine chances in ten for 7*l.* 10*s.* the value of which chance is 6*l.* 15*s.* it follows that he has his 10*l.* 5*s.*

In the ſame kind of *lottery*, let A engage to furniſh B with a chance, that on condition whenever the ticket on which the chance depends, ſhall happen to be drawn, whether it proves a blank or prize, A ſhall furniſh B with a new chance, and ſo on, as often as there is occaſion till the whole *lottery* is drawn; it is propoſed to find what conſideration B ought to give A before the *lottery* begins to be drawn, for the chance or chances of one or more prizes, admitting that the *lottery* will be 40 days in drawing.

Let the abſolute value of a chance, or 3*l.* 5*s.* be called s. Firſt A who is the ſeller ought to conſider, that on the firſt day he furniſhes neceſſarily a chance whoſe value is s.

2dly, That on the ſecond day, he does not neceſſarily furniſh a chance, but conditionally, *viz.* if it ſo happen that the ticket on which the chance depends, ſhould be drawn on the firſt day; but the probability of its being drawn on the firſt day is $\frac{1}{40}$; and therefore, he ought to take $\frac{1}{40}s$. for the conſideration of the ſecond day.

3dly, That in the ſame manner he does not neceſſarily furniſh a chance on the third day, but conditionally, in caſe the only ticket depending (for there can be but one) ſhould happen to be drawn on the ſecond day; of which the probability being $\frac{1}{39}$, by reaſon of the remaining 39 days from the ſecond incluſive to the laſt, it follows, that the value of that chance is $\frac{1}{39}s$.

4thly, And for the ſame reaſon the value of the next is $\frac{1}{38}s$. &c. the purchaſer ought, therefore, to give the ſeller $\overline{1 + \frac{1}{40} + \frac{1}{39} + \frac{1}{38} + \frac{1}{37} \text{-------} + \frac{1}{2}} \times s$, or $\overline{1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} \text{-------} + \frac{1}{40}} \times s$: The ſum of theſe 40 terms, being 4.2785 nearly, multiplied by s or 3.25, will give a product 13.9, ſhewing that the purchaſer ought to give the ſeller about 13*l.* 18*s.*

From what has been ſaid it appears, that the value of the chance s for one ſingle day that ſhall be fixed upon is the value of that chance divided by the number of days intercepted between that day incluſive and the number of days remaining to the end of the *lottery*; which, however, muſt be underſtood with this reſtriction, that the day fixed upon muſt be choſen before the *lottery* begins; or if it be done on any other day, the ſtate of the *lottery* muſt be known, and a new calculation made accordingly for the value of s. De Moivre's Doctrine of Chances, 1756.

LOTTERY is alſo the name of a well known game at cards.

LOTUS, in *Botany*, ſee *Bird's Foot* TREFOIL.

LOTUS *Africanus*. See *Indian Date* PLUM.

Bladder LOTUS, a name ſometimes given to a ſpecies of *vulneraria*, or *anthyllis*. See LADY's *Finger*.

LOTUS, *glycicalamus*, a name given by the ancient Greeks to an Egyptian plant according to ſome, and according to others, to a rare plant, found only in few places, and only met with by accident, by the people who made long and uncommon voyages. The whole account given of it, by the earlieſt writers, is no more than that it was of a very ſweet and pleaſant taſte. Myrepſus uſes the term frequently, and his interpreters underſtand him to mean the *caſſia fiſtula* by it. But we have accounts from Homer, that the followers of Ulyſſes were detained by eating the *lotus glycycalamus*; and it is not at all probable, that the *caſſia fiſtula* could be the thing meant by the word in this place; neither will the words of the author allow it to be any thing of this kind. The *caſſia fiſtula* is the fruit of a tree: but this *glycycalamus* we find in Homer himſelf was an herbaceous plant. Quintilian calls it expreſly a kind of graſs, *gramen*; and from the other accounts of its growing in form of reeds, and in wet places; it ſeems very probable, that it was the ſugar-cane that they called by this name. See *Indian Date* PLUM.

LOVAGE, *liguſticum*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: it has an umbellated flower. the general umbel compoſed of ſeveral ſmaller; this umbel has an involucrum of ſeven unequal leaves; the perianthium of the flower is indented in five parts, and the flower has five equal petals, which are inflexed at their points, and five hairy ſtamina; the germen, which is ſituated under the flower, turns to an oblong fruit, divided into two parts; it is angular and channelled, containing two oblong ſmooth ſeeds. Miller reckons five, and Linnæus ſix ſpecies.

The root, leaves, and ſeeds of the common *lovage* with many leaves, whoſe lobes are cut toward the tops, are of the aromatic kind, they warm and comfort the ſtomach, expel wind, and provoke urine. They have been ſuppoſed particularly uſeful in female diſorders.

LOVE, in *Ethics*, is one of the primitive paſſions; and may be generally defined to be the gravitation or tendency of the ſoul toward good. If this affection be conceived ſeparate from any alteration in the body, it is called intellectual or rational *love*; if it be attended with an agitation of blood and ſpirits, it is called ſenſative or paſſionate *love*. It is obſerved by moral writers, that thoſe paſſions in which *love* predominates are more agreeable to the original intention of nature than thoſe which are ranged under hatred; becauſe they are found to have a more friendly influence upon the body, and tend, within proper bounds, to the preſervation and happineſs of life, which the others do not. See Cumberland de Leg. Nat. c. 2. § 19. *Love* regarding its object as abſent, begets deſire; as preſent, either immediately or in proſpect, joy and hope. *Love* of deſire, abſtractedly conſidered, is a ſimple tendency towards good; when conſidered as wiſhing the good deſired to ſome being or other, it is called BENEVOLENCE, and SELF-*love*. See PLEASURE, and PAIN.

LOVE, *family of*. See FAMILY.

LOVE, *Platonic*. See PLATONIC.

LOVE-*apple* is the Engliſh name for the fruit of the LYCOPERSICON, a plant cultivated in gardens with us, for the ſingularity of its appearance. The Portugueſe call it *tomato*, and eat the fruit, either raw or ſtewed; as do the Jew families in England.

LOVE-*graſs*. See GRASS.

LOVE *in a miſt*. See PASSION *Flower*.

LOVE *lies a bleeding*. See AMARANTH.

Tree of LOVE. See JUDAS *Tree*.

LOUIS, LEWIS, LOUIS D'OR, or LEWIDORE, a French coin, firſt ſtruck in 1641, under the reign of Louis XIII. and which has now a conſiderable currency.

Louis d'ors, at firſt, were valued at ten livres, afterwards at eleven, and at length at twelve and fourteen. In the latter end of the reign of Louis XIV. they were riſen to twenty, and in the beginning of that of Louis XV. to thirty and thirty-ſix, nay, forty and upwards; with this difference, however, that in the laſt coinings the weight was augmented in ſome proportion in the price, which in the former reign, was never regarded.

On one ſide of the coin is the king's head ſeen, with his name; and on the other, a croſs compoſed of eight L's cantoned with crowns. The legend is, *Chriſtus regnat, vincit, imperat.*—The reverſe has been frequently changed; at preſent, it bears a hand of juſtice croſſed in a ſaltier, with a ſceptre.

There are alſo white LOUISES, or LOUIS *d'argent*, ſome of 120, others of 60 ſols a-piece, called alſo *ecus*; and among us *French crowns*, *half-crowns*, &c.

On the one ſide of theſe is the king's head, and on the other the French arms, with this legend, *Sit nomen Domini benedictum.*

Knights of ST. LOUIS, is the name of a military order, inſtituted by Louis XIV. in 1693.

Their collar is of a flame-colour, and paſſes from left to right. The king is their grand-maſter. There are in it eight great croſſes, and twenty-four commanders. The number of knights is not limited. At the time of their inſtitution, the king charged his revenue with a fund of three hundred thouſand livres, for the penſions of the commanders and knights.

LOUS, Λȣς, in *Chronology*, the Macedonian name for the Athenian month ECATOMBÆON, which was the firſt of their year and anſwered to the latter part of our June and the beginning of July.

LOUSE, *pediculus*, in *Zoology*, a genus of inſects of the *aptera* order, the body of which is lobated at the ſides; the abdomen depreſſed; the legs are ſix, ſerving only for walking; the eyes are two, and are ſimple; the mouth is capable of putting out a ſmall ſting; and the antennæ are of the length of the thorax.

Moſt animals are infeſted with *lice*, or inſects, which feed upon them: thus ſheep have one ſpecies, oxen another, &c. and mankind are not free from them. For beſide the common kind, whoſe natural habitation is in the heads of children, there is another kind called the *crab-louſe*, whoſe reſidence is about the pubes. Linnæus enumerates no leſs than forty different ſpecies, diſtinguiſhing them by the ſeveral animals to which they belong.

The *louſe* affords to the microſcopic obſerver of the works of the creation, a very delicate and beautiful ſtructure of parts. See *Tab. of Microſcopical Objects*, *Claſs* 1.

This creature has ſo tranſparent a ſhell, or ſkin, that we are able to diſcover more of what paſſes within its body, than in moſt other living creatures. It has naturally three diviſions, the head, the breaſt, and the tail part. In the head appear two fine black eyes, with a horn that has five joints, and is ſurrounded with hair ſtanding before each eye; and from the end of the noſe, or ſnout, there is a pointed projecting part, which ſerves as a ſheath or caſe to a piercer, or ſucker, which the creature thruſts into the ſkin, to draw out the blood and humours, which are its deſtined food, for it has no mouth that opens in the common way. This piercer, or ſucker, is judged to be ſeven hundred times ſmaller than a hair, and is contained in another caſe within the firſt, and can be thruſt out or drawn in at pleaſure. Baker's Microſcope, p. 177.

The breaſt is very beautifully marked in the middle, the ſkin is tranſparent, and full of little pits, and from the under part of it proceed ſix legs, each having five joints, and their ſkin all the way reſembling ſhagreen, except at the ends, where it is ſmoother. Each leg is terminated by two claws, which are hooked, and are of an unequal length and ſize; theſe it uſes as we would a thumb and a middle finger, and there are hairs between theſe claws as well as all over the legs. Lewenhoeck's Arcan. Nat. tom. ii. p. 74.

On the back of the tail part there may be diſcovered ſome ring-like diviſions, abundance of hairs, and a ſort of marks, which look like the ſtrokes of a rod on a child that has been whipped; the ſkin of the belly ſeems like ſhagreen, and towards the lower end is very clear, and full of pits: at the extremity of the tail there are two ſemicircular parts, covered all over with hairs, which ſerve to conceal the anus.

When the *louſe* moves its legs, the motion of the muſcles, which all unite in an oblong dark ſpot in the middle of the breaſt, may be diſtinguiſhed perfectly, and ſo may the motion of the muſcles of the head when it moves its horns. We may likewiſe ſee the various ramifications of the veins and arteries, which are white, with the pulſe regularly beating in the arteries. But the moſt ſurpriſing of all the ſights, is the periſtaltic motion of the guts, which is continued from the ſtomach down to the anus. Philoſ. Tranſ. N° 102.

If one of theſe creatures, when hungry, be placed on the back of the hand, it will thruſt its ſucker into the ſkin, and the blood it ſucks may be ſeen paſſing in a fine ſtream to the fore-part of the head; where falling into a roundiſh cavity, it paſſes again in a fine ſtream to another circular receptable in the midle of the head; from thence it runs through a ſmaller veſſel to the breaſt, and then to a gut which reaches to the hinder part of the body, where in a curve it turns again a little upward. In the breaſt and the gut the blood is moved without intermiſſion with a great force, eſpecially in the gut; and that with ſo ſtrong a propulſion downward, and ſuch a contraction of the gut as is very ſurpriſing. Power's Mic. Obſ. 9.

In the upper part of the crooked aſcending gut before mentioned the propelled blood ſtands ſtill, and ſeems to undergo a ſeparation; ſome of it becoming clear and wateriſh, while other little black particles paſs downward to the anus.

If a *louſe* be placed on its back, two bloody darkiſh ſpots appear; the larger in the middle of the body, the leſſer toward the tail. In the larger ſpot, a white film or bladder contracts and dilates upwards and downwards from the head toward the tail, the motions of which are followed by a pulſation of the dark bloody ſpot, in or over which the white bladder ſeems to lie. This motion of the ſyſtole and diaſtole is beſt ſeen when the creature begins to grow weak; and on pricking the white bladder, which ſeems to be the heart, the creature always inſtantly dies. The lower dark ſpot is ſuppoſed to be the excrements in the guts.

Lice have been ſuppoſed to be hermaphrodites, but this is erroneous; for Mr. Lewenhoeck diſcovered that the males have ſtings in their tails, which the females have not. And he ſuppoſes the ſmarting pain theſe creatures ſometimes give to be owing to their ſtinging with theſe ſtings, when made uneaſy by preſſure or otherwiſe. And this accurate obſerver ſays, that he felt little or no pain from their ſuckers, though ſix of them were feeding on his hand at once.

The ſame accurate obſerver determining to know their true hiſtory and manner of breeding, put two females into a black ſtocking, which he wore night and day. He found, on examination, that in ſix days one of them had laid above fifty eggs; and upon diſſecting it, he found as many yet remaining in the ovary; whence he concludes, that in twelve days it would have laid a hundred eggs. Theſe eggs naturally hatch in ſix days, and would then probably have produced fifty males and as many females; and theſe females coming to their full growth in eighteen days, might each of them be ſuppoſed after twelve days more to lay a hundred eggs; which eggs, in ſix days more, might produce a young brood of five thouſand; ſo that in eight weeks one *louſe* may ſee five thouſand of its own deſcendants. A *louſe* may be eaſily diſſected in a ſmall drop of water upon a ſlip of glaſs; and thus placed before the microſcope, it is common to find five or ſix eggs of a ſize ready to be laid, and ſixty or ſeventy others of different bigneſs. In the male the penis is very remarkably diſtinct, as are alſo the teſtes, of which he ſeems to have a double pair, as is alſo the ſting, the ſtructure of which merits a peculiar attention. Lewenhoeck's Arcan. Natur. tom. ii. p. 78.

Many animals, both of the quadruped and flying kinds, are ſubject to *lice*: but theſe are of peculiar ſpecies on each animal, and are not at all like thoſe which infeſt the human body. Nay, even inſects are infeſted with vermin, which feed on them and torment them. Several kinds of beetles are very ſubject to *lice*; but particularly that kind called thence the *louſy beetle*. The *lice* on this are very numerous, but will not be ſhook off. The earwig is often infeſted with *lice* juſt at the ſetting on of its head: theſe are white, and ſhining like mites, but they are much ſmaller; they are round-backed, flat-bellied, and have long legs, particularly the foremoſt pair. Snails of all kinds, but eſpecially the large naked kinds, are very ſubject to *lice*, which are continually ſeen running about them, and devouring them. Numbers of little red *lice* with a very ſmall head, and in ſhape reſembling a tortoiſe, are often ſeen about the legs of ſpiders, and they never leave the ſpider while he lives, but if he be killed, they almoſt inſtantly forſake him. A ſort of whitiſh *lice* are very common on humble-bees; they are alſo found on ants; and many ſorts of fiſhes are not leſs ſubject to them than the land animals. Kircher ſays, that he has found *lice* alſo on flies. Baker's Microſcope, p. 182.

Signior Redi, who has more accurately examined theſe creatures than any other author, has engraved ſeveral ſpecies found on different animals. He calls thoſe found on beaſts *lice*, and thoſe found on birds fleas. He is of opinion, that every ſpecies of birds has its peculiar ſort of flea, different from thoſe of other birds; and has obſerved that they are hatched white, but that they gradually acquire a colour like that of the feathers they live among; yet they uſually remain tranſparent enough for a good microſcope to diſcover the motion of their inteſtines. The kinds he has obſerved are theſe: on the hawk three different ſorts; on the large pigeon, the turtle-dove, the hen, the ſtarling, the crane, the magpye, the heron, the leſſer heron, the ſwan, the turkey, the duck, the ſeamew, the ſmall ſwan, the teal, the caſtrel, the peacock, the capon, and the crow, on each one ſort; on the moorhen three ſorts; on the wild gooſe two ſorts; and on the crane, beſide the common one, a white ſort, marked, as it were with Arabic characters. Men, he obſerves, are ſubject to two kinds, the common *louſe*, and that called the *crab-louſe*. He alſo found peculiar ſorts on the goat, the camel, the aſs, the African ram, the ſtag, which has, like many of the birds, two kinds, and on the lion and the tyger. The ſame author has obſerved, that the ſize of theſe creatures is not at all proportioned to that of the animal they are to inhabit, for the ſtarling has them as large as the ſwan. Redi, Gen. Inſ. p. 312.

It is obſervable, that ſome ſort of conſtitutions are more apt to breed *lice* than others; and that in certain places of different degrees of heat, they are very certain to be deſtroyed upon people, who in other climates are overrun with them. It is an obſervation of Oviedo, that the Spaniſh ſailors who are generally much afflicted with *lice*, always loſe them in a certain degree in their voyage to the Indies, and have them again on their coming to the ſame degree at their return: this is not only true of the Spaniards, but of all other people who make the ſame voyage; for though they ſet out ever ſo *louſy*, they have not one of theſe creatures to be found after they come to the tropic. And in the Indies there is no ſuch thing as a *louſe* about the body, though the people be ever ſo naſty. The ſailors continue free from theſe creatures till their return; but in going back they uſually begin to be *louſy*, after they come to about the latitude of Madeira. The extreme ſweats which the working people naturally fall into between this latitude and the Indies, drown and deſtroy the *lice*, and are of the ſame effect as the rubbing over the *louſy* heads of children with butter and oil. The ſweat in and about the Indies is not rank as in Europe, and therefore it is not apt to breed *lice*; but when the people return into latitudes where they ſweat rank again, their naſtineſs ſubjects them to the ſame viſitations of theſe vermin which it uſed to have.

The people in general, in the Indies, are very ſubject to *lice* in their heads, though free from them in their bodies. The reaſon of this is, that their heads ſweat leſs than their body, and they take no care to comb and clean them. The Spaniſh negroes waſh their heads thoroughly once every week with ſoap, to prevent their being *louſy*. This makes them eſcape much better than the other negroes who are ſlaves there, for the *lice* grow ſo numerous in their heads, that they often eat large holes in this part.

Mr. de la Hire has given a curious account of the creature which he found on the common fly. Having occaſion to view a living fly by the microſcope, he obſerved on its head, back, and ſhoulders, a great number of ſmall animals, crawling very nimbly about, and often climbing up the hairs, which grow at the origin of the fly's legs. He, with a fine needle, took up one of theſe, and placed it before the microſcope, uſed to view the animalcules in fluids. It had eight legs, four on each ſide; they were not placed very diſtant from one another, but the four toward the head were ſeparated by a ſmall ſpace from the four toward the tail. The feet were of a particular ſtructure, being compoſed of ſeveral fingers, as it were, and fitted for taking faſt hold of any thing; the two neareſt the head were alſo more remarkable in this particular than thoſe near the tail; the extremities of the legs, for a little way above the feet, were dry and void of fleſh, like the legs of birds, but above this part they appeared plump and fleſhy. It had two ſmall horns upon its head, formed of ſeveral hairs arranged cloſe together; and there were ſome other cluſters of hairs by the ſide of theſe horns, but they had not the ſame figure; and toward the origin of the hinder legs there were two other ſuch cluſters of hairs, which took their origin at the middle of the back. The whole creature was of a bright yellowiſh red; and the legs, and all the body, except a large ſpot in the centre, were perfectly tranſparent. In ſize, the author believes it was about $\frac{1}{4000}$th part of the bigneſs of the head of the fly; he obſerves, that it is rarely that flies are found infeſted with them. Mem. Acad. Par. 1693.

Louse, *tree*. See Aphis.

Louse, *wood*. See Millepedes.

Louse-*wort*, *pedicularis*, in *Botany*, the name of a genus of plants, of the *didynamia angioſpermia* claſs; the characters of which are theſe: the flower conſiſts of one leaf, and is of a perſonated or maſked form, and divided into two lips, the upper one hooded, the lower one divided into three ſegments; the piſtil ariſes from the cup, and is fixed in manner of a nail to the hinder part of a flower; this afterwards ripens into a capſule, divided into two cells, and containing oblong, flatted, and marginated ſeeds. Linnæus enumerates fifteen ſpecies of this plant. The common ſpecies are very troubleſome weeds in paſtures.

Louse-*wort*, *yellow*, *rhinanthus*, in *Botany*, a genus of the *didynimia angioſpermia* claſs; the characters are, that the flower hath a permanent empalement of one leaf, which is roundiſh, compreſſed, and blown up; it hath one ringent petal, with a cylindrical tube of the length of the empalement, compreſſed at the baſe, but opening at the top; the upper lip is hooded, compreſſed, and indented at the point; the lower lip is plain, ſpreading, and cut into three obtuſe parts at the point; it has four ſtamina ſhut up in the upper lip, and an oval compreſſed germen, which becomes a capſule of the ſame form, with two cells, opening on the ſide and filled with compreſſed ſeeds. Miller enumerates three and Linnæus ſeven ſpecies.

The Dutch carry on a trade with the ſeeds and ſeedveſſels of a ſpecies of this plant, reſembling the common yellow meadow *louſe-wort*, to Germany, and call it *ſemen ſaradillos*; they uſe it for deſtroying bugs; for this purpoſe, they boil a quantity of the ſeeds and capſules in common water, with which they waſh their wainſcots, bedſteads, &c. where theſe inſects are lodged, and thus they are effectually deſtroyed. Miller.

LOUVRE, in *Muſic*, a well known dance-tune.

LOUVRE is alſo the name of the royal palace at Paris.

LOUVRE, *honours of the*. See HONOURS.

LOW *airs*, in *Horſemanſhip*. See AIRS.

LOW *flank*, *hemiſphere*, *maſs*, *ſtyle*. See the ſubſtantives.

LOW-*bell*, in *Birding*, a name given to a *bell*, by means of which they take birds in the night in open champaign countries, and among ſtubble in October. The method is to go out about nine o'clock in a ſtill evening, when the air is mild and the moon does not ſhine.

The *low-bell* is to be of a deep and hollow ſound, and of ſuch a ſize, that a man may conveniently carry it in one hand. The perſon who carries it is to make it toll all the way he goes, as nearly as may be, in that manner in which the *bell* on the neck of a ſheep tolls, as it goes on while it feeds. There muſt alſo be a box made like a large lanthorn, about a foot ſquare, and lined with tin, but with one ſide open. Two or three great lights are to be ſet in this, and the box is to be fixed to the perſon's breaſt, with the open ſide forwards, ſo that the light may be caſt forward to a great diſtance; it will ſpread as it goes out of the box, and will diſtinctly ſhew the perſon who carries it whatever there is in a large ſpace of ground which it extends over, and conſequently all the birds that rooſt upon the ground. Two perſons muſt follow him who carries the box and *bell*, one on each ſide, ſo as not to be within the reach of the light to ſhew themſelves. Each of theſe is to have a hand-net of about three or four feet ſquare, faſtened to a long ſtick or pole; and on which ever ſide any bird is ſeen at rooſt, the perſon who is neareſt is to lay his net over it, and take it with as little noiſe as poſſible. When the net is over the bird, the perſon who laid it is not to be in a hurry to take the bird, but muſt ſtay till he who carries the light is got beyond it, that the motions may not be diſcovered. The blaze of the light, and the noiſe of the *bell*, terrify and amaze the birds, in ſuch a manner, that they remain ſtill to be taken; but the people who are about the work muſt keep the ſtricteſt quiet and ſtillneſs that may be.

Some people are fond of going on this ſcheme alone. The perſon then fixes the light-box to his breaſt, and carries the *bell* in one hand and the net in the other; the net, in this caſe, may be ſomewhat ſmaller, and the handle ſhorter. When more than one are out at a time, it is always proper to carry a gun. It is no uncommon thing to eſpy a hare when on this expedition; and, in that caſe, it is better to ſhoot her, than to truſt to the taking her in the net, for ſhe will very eaſily eſcape from that. Some tie the *bell* to their girdle, and carry the light in their left hand and the net in their right; the light is not to be ſo large in this caſe, and the other way is therefore rather the better.

LOW-*bellers*, in our *Statute-Books*, are perſons who go in the night-time with a light and bell: by the ſight and noiſe whereof, birds ſitting on the ground become ſtupefied, and ſo are covered with a net, and taken.

LOW, in the *Manege*—To *carry* LOW. See CARRYING.

LOW-*water*. See WATER.

LOW-*wines*. See *Low*-WINES.

To **LOWER**, in *Sea-Language*, is to eaſe down gradually, expreſſed of ſome weighty body, which is ſuſpended by tackles or other ropes, which being ſlackened, ſuffer the body to deſcend as ſlowly or expeditiouſly as the occaſion requires. Hence *lower handſomely*, and *lower cheerly*, are oppoſed to one another; the former being the order to *lower* gradually, and the latter to *lower* expeditiouſly.

LOWERING, in the *Diſtillery*, a term uſed to expreſs the debaſing the ſtrength of any ſpirituous liquor by mixing water with it. The ſtandard and marketable price of theſe liquors are fixed, in regard to a certain ſtrength in them called PROOF; this is that ſtrength, which makes them, when ſhook in a phial, or poured from on high into a glaſs, retain a froth or crown of bubbles for ſome time. In this ſtate ſpirits conſiſt of about half pure, or totally inflammable ſpirit and half water; and if any foreign or home ſpirit is to be expoſed to ſale, and is found to have that proof wanting, ſcarce any one will buy it, till it has been diſtilled again and brought to that ſtrength; and if it is above that ſtrength the proprietor uſually adds water to it to bring it down to that ſtandard. This addition of water, to debaſe the ſtrength, is what is called *lowering* it. People well acquainted with the goods, will indeed buy ſpirits at any ſtrength, only *lowering* a ſample to the proof ſtrength, and by that judging of the ſtrength of the whole; but the generality of buyers will not enter into this, but have it all *lowered* for them.

There is another kind of *lowering* in practice among the retailers of ſpirituous liquors to the vulgar, this is the reducing it under the ſtandard of proof. They buy it proof, and afterwards increaſe their profit upon it, by *lowering* it with water one eighth part. The quantity of ſpirit is what they generally allow themſelves for the addition of water; and whoever has the art of doing this, without deſtroying the bubble proof, as this is eaſily done by means of ſome addition, that gives a greater tenacity to the parts of the ſpirit, will deceive all that judge by this proof alone; that is, very nearly all who are concerned in the ſpirit trade. Such an additional quantity of water as one eighth, makes the ſpirit taſte ſofter and cooler, and will make many prefer it to the ſtronger ſpirit, which is hotter and more fiery; but unleſs the ſpirit, thus *lowered*, were tolerably clean, or the proof be ſome other way preſerved, the addition of the water lets looſe ſome of the coarſe oil, which makes the liquor milky, and leaves a very nauſeous taſte in the mouth. Shaw's Eſſay on Diſtillery.

The way to judge of ſpirits not being thus *lowered*, or debaſed in ſtrength, is to examine them by the eye and tongue; and in buying a quantity of proof goods, ſuch ſhould always be choſen as are clean, thin, and light, and have a good crown of froth, which goes off in large bubbles, ſuch as taſte ſoft and uniform, and are not high flavoured, of an alkaline guſt, nor acrid and fiery, but ſoon quit the tongue.

LOWERING *the flag*. See FLAG.

LOWEST *region*. See REGION.

LOXIA, in *Ornithology*. See CROSS *bill*. See alſo BULL-*finch*, COCOTHRASTES, GEEEN-*finch*, &c.

LOXODROMIC *table*. See TABLE.

LOXODROMICS, the art or method of oblique SAILING, by the the loxodromy, or RHUMB.

LOXODROMY, LOXODROMIA, formed of λοξος, *oblique*, and δρομος, *courſe*, the line which a ſhip deſcribes in ſailing on the ſame collateral RHUMB.

The *loxodromy*, called alſo the *loxodromic line*, cuts all the meridians in the ſame angle, called the *loxodromic angle*. This line is a ſpecies of the logarithmic SPIRAL, deſcribed on the ſurface of the ſphere, having the meridians for its radii.

LOYAL, in the *Manege*. A horſe is ſaid to be *loyal*, that freely bends all his force in obeying and performing any manege he is put to; and does not defend himſelf, or reſiſt, notwithſtanding his being ill treated.

A *loyal* mouth is an excellent mouth, of the nature of ſuch as we call mouths with a full reſt upon the hand.

LOZENGE, or LOZANGE, in *Geometry*, a kind of parallelogram, or quadrilateral figure, conſiſting of four equal and parallel lines, or ſides, whoſe angles are not right, but whereof two oppoſite ones are acute, and the other two obtuſe; the diſtance between the two obtuſe ones being always equal to the length of one ſide.

Scaliger derives the word *lozenge* from *laurengia*; this figure reſembling, in ſome reſpects, that of a laurel leaf. In geometry, it is ordinarily called RHOMBUS; and, when the ſides are unequal RHOMBOIDES.

LOZENGE, in *Heraldry*, is a rhombus, or figure of equal ſides, but unequal angles; reſembling a quarry of glaſs in our old windows; placed erect, point-ways. See *Tab.* II. *Heraldry*, *fig.* 71. It is in this figure that all unmarried gentlewomen and widows bear their coats of arms; becauſe, as ſome ſay, it was the figure of the Amazonian ſhield: or, as others, becauſe it is the ancient figure of the ſpindle.

The *lozenge* differs from the *fuſil*, in that the latter is narrower in the middle, and not ſo ſharp at the ends.

LOZENGES, among *Jewellers*, are common to brilliant and roſe diamonds. In the former they are formed by the meeting of the ſkill and ſtar-facets on the bezil; in the latter, by the meeting of the FACETS in the horizontal ribs of the crown.

LOZENGE is alſo a form of medicine, made into ſmall pieces, to be held or chewed in the mouth till they are melted there: the ſame with what are otherwiſe called *trochiſci*, *troches*.

LUA, in *Mythology*, a Roman divinity mentioned by Livy, lib. viii. and invoked in war. The name is ſuppoſed to be derived from *luere*, *to expiate*.

LUBI, in *Botany*, a name by which many authors have called the *cocoa nut-tree*, or *palma nucifera medica* of other writers.

LUCAR, among the Romans, an appellation given to the money expended upon plays and public ſhews.

LUCARIA, an ancient feaſt celebrated by the Romans. Sext. Pompeius obſerves, that the *Lucaria* were ſolemnized in the woods, where the Romans, defeated and purſued by the Gauls, retired, and concealed themſelves. The word, according to Feſtus, and Sext. Pompeius, comes from *lucus*, *a grove*, or *wood*. Varro derives it from *luce*, the ablative of the word *lux*, *light* and *liberty*. But the former etymology ſeems the more natural.

It was held in the month of July, in memory of the aſylum they found in the wood, which was between the Tyber and the road called Via Salaria.

LUCE, *eau de*. See Eau *de luce*.

LUCERIUS, in *Mythology*, a name given to Jupiter, as *Luceria* was given to Juno, as the deities which gave light to the world.

LUCERNA, in *Ichthyology*, the name of a fiſh caught in the Mediterranean and ſome other ſeas, of the cuculus kind, and very nearly approaching to the ſhape and figure of the HIRUNDO. Its tail is but ſlightly forked, and what diſtinguiſhes it principally from the hirundo, is, that its ſide-lines, near the tail divide into two, whereas in that fiſh they continue ſingle; its ſcales are very ſmall, and it has a furrow on the back, edged by twenty-five ſpines on each ſide; the gill-fins are of a remarkable ſize, and look like wings; it feeds on ſhrimps and other ſmall animals. See *Tab.* II. *of Fiſhes*, N° 20.

LUCERNE, *medica*, in *Botany*. The flower, which hath a bell-ſhaped empalement of one leaf, cut into five equal acute points, is of the butterfly kind; the ſtandard oval and entire; the border reflexed; the two wings are oblong, oval, and fixed by an appendix to the keel, which is oblong, bifid, and reflexed toward the ſtandard; it has ten ſtamina, nine of which are joined almoſt to their tops, the other is ſingle, terminated by ſmall ſummits; it has an oblong compreſſed germen, which is incurved, ſitting in a ſhort ſtyle: this and the ſtamina are involved by the keel and ſtandard; the germen afterward turns to a compreſſed moon-ſhaped pod, incloſing ſeveral kidney-ſhaped ſeeds. Miller enumerates eight ſpecies. Linnæus joins this genus to the medicago or *Snail* TREFOIL.

Lucerne, which is the greater upright *medica*, with purpliſh flowers, called alſo Burgundy hay, is frequently cultivated by our farmers in the manner of clover. It is the ſame plant which the ancients were ſo fond of under the name of *medica*, ſo called becauſe it came originally from Media, and on the culture of which they beſtowed ſuch great care and pains.

Its leaves grow three at a joint, like thoſe of the clover; its flowers, which appear in June, are purple, and its pods of a ſcrew-like ſhape, containing ſeeds, which ripen in September, like thoſe of the broad-clover, but larger and more kidney-ſhaped.

The ſtalks grow erect, and after mowing, they immediately grow up again from the parts where they were cut off. The roots are longer than thoſe of the ſaint-foin, and are not ſingle, but ſometimes they run perpendicular in three or four places from the crown. Miller reckons four varieties of this ſpecies, the beſt of which is that with the purple flower.

This is the only plant in the world, whoſe hay is preferable to the ſaint-foin for the fattening of cattle; but its virtues, in that reſpect are ſo great, that they are not to be credited by any that have not tried the plant. It is the ſweeteſt graſs in the world, but muſt be given to cattle with caution, and in ſmall quantities, otherwiſe they will ſwell and incur diſeaſes from it.

The ancients were at the greateſt pains to plant this properly: they choſe the fatteſt and beſt land they had for it, and this they dunged and laid out in beds as we do for the choiceſt garden plants. They ſowed it in the end of April, firſt carefully preparing the ground by breaking the clods, then they raked the earth over the ſeeds to cover them lightly, and when it was come up, they carefully kept the beds clear of weeds. They ſowed it very thick, and let the firſt crop of it ſtand till the ſeed was in part ſhattered out, that they might be ſure of more plants in the beds; after this, they cut it as young as they pleaſed, and it uſually yielded them four or five crops or more in a year. A land well planted with it, would with proper management, laſt ten years, and produce largely all the time. It is computed that Engliſh gardeners make forty pounds of an acre of aſparagus, or many other garden plants, with half the labour and expence that was beſtowed upon an acre of the Roman *medica*. This was a piece of huſbandry only practiſed while that great empire was in its glory; at preſent they have very little *medica* or *lucerne* in Italy, and what they have is manured in a leſs troubleſome manner.

In the ſouth of France there is annually a great quantity of it raiſed. They ſow it alone in March, or in the end of September, chooſing for this purpoſe dry and ſandy lands, but ſuch as lie low.

They prepare theſe by ploughing and harrowing them very fine, and the ſpring and autumn being rainy, they have no occaſion to water the plants, while young, as the Romans did. The ſummers in that part of the world are much drier than in Italy, and by that means the graſs is burnt up, and other weeds much deſtroyed, ſo that the crop does not want that vaſt expence in weeding that the Roman *medica* did: by this means the expence alſo is greatly abated.

On the banks of the Rhine, *lucerne* is produced in great abundance, and may be mowed five or ſix times in a year. In Switzerland alſo this plant is cultivated with great advantage: but it has not found ſo good a reception in England as it juſtly deſerves; though there is reaſon to believe that it will ſucceed as well in this country as in France or Switzerland, ſince it is extremely hardy, and capable of reſiſting the ſevereſt cold of our climate. The culture of *lucerne* was attempted in this country about the year 1650, and afterwards diſcontinued, through failure of ſucceſs, for many years; but ſince the diſcovery and practice of the new method of huſbandry, it has been revived with conſiderable advantage. However writers on agriculture are not agreed as to the beſt method of cultivating this plant. Mr. Tull obſerves, that though all our land ſeems to be either too rich, too poor, or too cold, for raiſing this valuable plant in the way of the common huſbandry, yet he is convinced, that in the new methods, many thouſand acres of Engliſh land is capable of producing fine crops of it, even for an age together.

The greater degree of moiſture, and leſs heat of this climate, are all of the utmoſt advantage to this plant when horſe-hoed, as that ſufficiently prevents the growth of the turf which would deſtroy it.

In the drier ſummers in Italy and in the ſouth of France, the *lucerne* yields only four or five crops inſtead of ſix or ſeven; but in the drier ſummers in England, it would ſucceed the beſt of all, and give the moſt numerous crops. The horſe-hoing prevents the turf, and makes the land imbibe the dews, and retain them for the nouriſhment of the plants; and *lucerne*, in ſheltering places, will grow by this means, even in our winter, plants of it having been ſeen at Chriſtmas of fourteen inches high. Our winters need not be feared in regard to the *lucerne*, for at Neufchatel it is found to ſtand all the winters very well; yet there the roſemary plants all die if left out in the winter. This is a proof that the winters are more ſevere than our's, for it is not one winter in forty that hurts this ſhrub with us.

In the year 1708, the *lucerne* in Languedoc ſuffered by the ſeverity of the winter, but this was ſo ſharp, that the olive-trees, and even the walnut-trees, were alſo killed by it: as no ſuch froſts come among us to kill our walnut-trees, we need not fear a crop of this plant, for much of it ſurvived even there when thoſe trees periſhed. In Languedoc the *lucerne* never arrives at any great height, except where it has the advantage of the plough; and in Wiltſhire there have been lands ſown with it, where it grew but poorly and low; but after the ſame grounds had been ploughed, and after corn laid down with ſaint-foin, the *lucerne* plants that were left grew up to a vaſt height, and were very vigorous, which ſhews the advantage of the plough; and all this advantage will be regularly given by horſe-hoeing, without the deſtruction of any of the plants. Though the common method of huſbandry will not raiſe *lucerne* to advantage, yet the horſe-hoeing huſbandry will raiſe it annually, increaſing in value to the owner, and make one of the moſt profitable articles of it. The ſoil to plant it on muſt be either a hot gravel, or a very rich dry ſand, or ſome other rich warm land that has not an under ſtratum of clay, and is not too near ſprings of water. The natural poorneſs of gravel may be made up by dung and the benefit of the hoe, and the natural richneſs of the other lands being increaſed by hoeing and cleanſing them from graſs, the *lucerne* will thrive with leſs heat; for what it wanted in one of theſe qualities muſt be made up in the other. The beſt ſeaſon for planting it in England according to Mr. Tull, is about the middle of April after the danger of froſt is paſt; for a ſmall froſt will deſtroy the whole crop, when the plants firſt appear, and too much wet, with cold weather, will rot the ſeeds in the ground.

The number of *lucerne* plants ſhould be leſs than thoſe of ſaint-foin to an acre, becauſe they grow much larger in this way of management, and each occupies a great ſpace of ground, and produces a larger quantity of hay. The quick growth of this plant requires that it ſhould have large ſupplies of nouriſhment, and good room to grow in, and it is better in all things of this kind to err in ſetting the plants too far diſtant than in ſetting them too near.

The moſt fatal diſeaſe incident to *lucerne* is ſtarving; for this reaſon good culture is neceſſary to it, and the often turning the earth with the hoe all about it. By this means, a plant, that in the common way of ſowing, would not have been more than four or five inches high, will be three feet, and will ſpread every way, ſo as to produce a quantity of hay, more like the cutting of a ſhrub than a plant. The plants ſhould ſtand at five inches diſtance in ſingle rows, and the intervals between theſe rows muſt be left wide enough for the uſe of the hoe-plough.

The rows of *lucerne* plants muſt not be thinned till they are grown up to ſome height; for while young they are ſubject to be eaten by the fly, like turneps; and if this deſtroyer ſhould ſeize them, after they are reduced to only a competent number, the crop would be rendered much too thin. The hoe-plough is the only inſtrument that can bring this plant to perfection, and it muſt be frequently had in proportion to the number of crops it produces; but then it muſt be ſtill ſome years, leſt the ploughed ground injure the hay that is made upon it; and when it is come to a turf, and the *lucerne* wants renewing, the four-coultered plough is the only inſtrument that can prepare the turf to be killed, and cure the *lucerne*. This plough muſt be uſed in the following manner: turn its furrows toward one row, and from the next; that is, plough round one row, and that will finiſh two intervals; and ſo of the reſt. The next ploughing muſt be towards thoſe rows from which they were turned the firſt time, and care muſt be taken that the firſt furrows do not lie long enough on the rows to kill the plants, which will be much longer in winter than in ſummer.

Lucerne can never be expected to ſucceed well any where, let the ſoil be ever ſo good, unleſs it be kept clean from natural graſs. Tull's Horſe-Hoeing Huſbandry, chap. 13.

Mr. Miller, in his directions for the culture of *lucerne*, recommends a light, dry, looſe, ſandy land, which ſhould be well ploughed and dreſſed, and cleared of weeds. The beſt time for ſowing the ſeed, which ſhould not be mixed with oats or barley, as is ſometimes the practice, is in the middle of April, and in a dry ſeaſon. After having well ploughed and harrowed the land very fine, he adviſes to make a drill quite acroſs the ground, almoſt half an inch deep, into which the ſeeds ſhould be ſcattered very thin, and to cover them over with earth ſomewhat more than a quarter of an inch thick. Another drill ſhould then be made about a foot and a half from the former, ſowing the ſeeds in the ſame manner as before, and thus proceeding through the whole ground. In this way, an acre of land will require about ſix pounds of ſeeds. If this crop be well cultivated, it will continue many years, and be as good as when firſt ſown. By ſowing the ſeed in rows, the plants will have room to grow, and the ſoil between them may be ſtirred more eaſily with a hoe, in order to deſtroy the weeds and encourage the growth of the plants. This hoeing ſhould be repeated in dry weather two or three times, while the plants are young, for more effectually deſtroying the weeds. In the beginning of Auguſt the plants will have grown to the height of two feet or more, and the flowers will begin to appear: they ſhould then be cut in a dry ſeaſon; and when they are made into hay, often turned that they may ſoon dry and be carried off the ground; for if they lie long upon the roots, they will prevent their ſhooting. Mr. Tull recommends to cut the *lucerne* before it begins to flower: the richeſt *lucerne* hay, he ſays, is cut while the ſtalks are ſingle, without any collateral branches, and in this caſe there is not uſually ſo much as the bud of a flower to be ſeen on the plants. After the crop is taken off, the ground ſhould be ſtirred between the rows with a hoe, to kill the weeds and looſen the ſurface; and thus in the beginning of September, there will be ſhoots four or five inches high, which may be fed down with ſheep until November. In the beginning of February, the ground between the rows ſhould again be ſtirred with the hoe, without injuring the crown of the roots. By this management, in a warm ſoil, the ſhoots will be five or ſix inches high in the middle of March; and they may be fed down, if fodder be wanted, till a week in April; after which it ſhould be left to grow for a crop, which will be fit to cut in the beginning of June; and when the ground is cleared, let it be ſtirred again with a Dutch hoe, and thus there will be another crop fit to cut in the middle or latter end of July: after which it ſhould be fed down again in autumn with larger cattle, obſerving not to let them remain after the roots have done ſhooting, leſt they eat down the crown of the roots below the buds, which would conſiderably damage, if not deſtroy them. In this way you may continue conſtantly to have two crops to cut, and two feedings upon this plant, and in good ſeaſons there may be three crops cut and two feedings; which will be a great improvement, eſpecially as this plant will grow upon dry barren ſoils, and be of great uſe in dry ſummers, when graſs is often burnt up. And as it is an early plant in the ſpring, it will be of great ſervice when fodder is ſcarce, becauſe it will be fit to feed at leaſt a month before graſs or clover. The beſt ſeed is procured from Switzerland and the northern parts of France; but the ſeed may be ſowed in England, by ſuffering ſome of the plants to grow uncut till the ſeeds are ripe, and then cutting them and laying them to dry in an open barn, expoſed to the air, but defended from the wet. When they are quite dry, the ſeed may be threſhed out, cleanſed from the huſk, and preſerved in a dry place. This ſeed, ſays Mr. Miller, is preferable to any brought from abroad. This writer lays great ſtreſs on *lucerne* being ſown by itſelf, unmixed with any other ſeed. When the *lucerne* is made into hay, it muſt be often turned, and expoſed a fortnight before it can be houſed; and ſhould then be kept in cloſe barns, where it will remain good for three years. An acre of this fodder has been reckoned ſufficient to keep three horſes for a whole year: and three acres of it have fed ten cart-horſes, from the end of April to the beginning of October, without any other food, though they have been conſtantly worked. *Lucerne* is beſt uſed green, and will ſerve the purpoſe both of hay and corn. Miller's Gard. Dict.

Mr. Rocque, a late writer on the culture of *lucerne*, advances a different opinion from that of moſt others on this ſubject. He recommends the ſtrongeſt land, which ſhould be prepared in the ſame manner as for barley, being ploughed, harrowed, and cleaned from weeds: he adviſes before the laſt ploughing, to manure the land with freſh ſtable-dung, which ſhould be laid on in a ſtate of full fermentation, and ploughed in as ſoon as poſſible: after which the land muſt be harrowed, and the *lucerne*-ſeed ſown broad-caſt, not in drills, in fine weather, after the rate of about fourteen pounds to an acre; afterwards it ſhould be harrowed again with a light or buſh-harrow, and, laſtly, rolled to ſettle the ground and break the clods. The quantity of tillage and time of ſowing muſt be regulated by the nature of the ſoil. Heavy ſtrong land will require more ploughings and harrowings, and to be later ſown than light land; and, for the firſt time, a trench-ploughing would be of great advantage. *Lucerne*, he ſays, may be ſown from the beginning of March to the end of May, but April, in dry weather, is the beſt time. Barley or oats may be ſown with the *lucerne*, in the proportion of a buſhel of either of the former, which ſhould be ſown firſt on an acre, to fourteen pounds of the *lucerne*. When the plants are one year old, Mr. Rocque adviſes, to go over the land, early in the ſpring, and in dry weather, with a large harrow, as often as is ſufficient to root up annual weeds and graſs; to add a dreſſing of rotten dung; and in the ſecond ſpring, after ſowing, to plough the ground with a drill plough, having a round ſhare, without a fin or feather, and without a coulter, which ploughing ſhould be annually repeated: after lying for a few days to dry and mellow, it ſhould be harrowed down. This writer ſays, that he has ſeen *lucerne* mowed five times in a ſeaſon, yielding, at the five mowings, nearly eight loads of hay per acre. Mr. Rocque is of opinion, that it is by no means adviſeable to ſave the ſeed in England, ſince it may be imported ſo cheap, that the ſeedſman can afford to retail it at 9*d.* a pound.

Others have recommended the method of ſowing the *lucerne* ſeed in a nurſery, and afterwards removing the young plants, with their ſtalks and tap-roots cut off, and tranſplanting them in the field where the crop is to be produced. The plants in this way of management are tranſplanted into holes filled with water, in rows three feet four inches diſtant from each other, and about a foot from each other in the rows. An acre of tranſplanted *lucerne*, it is ſaid, will bring in 5*l.* a year, clear of all expences, for a conſiderable time. M. de Chateauvieux has made many experiments on the method of cultivating *lucerne* on beds and ridges, which are to be a little more than three feet broad, and tranſplanting his plants in a ſingle row upon each ridge, at the diſtance of about ſix inches. In this way he obtained above five tons of *lucerne* hay per Engliſh acre, reckoning his crops at an average of four years; and it is obſervable, that his crops were improving, though they had no manure, and were only hoed with his cultivation. This method of planting on ridges ſeems to be the beſt method, with regard to produce, of any that has been yet practiſed; but it might be moſt adviſeable, to ſet the plants at nine inches diſtance in the rows, and to make the ridges four one-half, or five inches broad, for the convenience of hoeing them. Good crops of green *lucerne* may be reckoned from twenty to forty tons, and the average about twenty-five tons per acre, when drilled on the level; but conſiderably more, if upon ridges and horſe-hoed. Farmer's Diction. art. *Lucerne*,

Lucerne, in *Ichthyology*, a name given by the Venetians to the fiſh commonly called the URANOSCOPE. It is a ſpecies of trachinus, with many beards on the lower jaw.

LUCIANISTS, or **Lucanists**, a religious ſect, ſo called from Lucianus, or Lucanus, a heretic of the ſecond century, being a diſciple of Marcion, whoſe errors he followed, adding ſome new ones to them.

Epiphanius ſays, he abandoned Marcion; teaching, that people ought not to marry for fear of enriching the Creator: and yet other authors maintain, that he held this error in common with Marcion, and other Gnoſtics. He denied the immortality of the ſoul; aſſerting it to be material.

There was another ſect of *Lucianiſts*, who appeared ſome time after the Arians. They taught that the Father had been a Father always, and that he had the name even before he begot the Son; as having in him the power, or faculty, of generation: and in this manner they accounted for the eternity of the Son.

LUCID *intervals*, the fits of lunatics, or maniacs, wherein the phrenzy leaves them in poſſeſſion of their reaſon.

It is ſaid, lunatics are capable of making a will in their *lucid intervals*.

LUCIDA *coronæ*, a fixed ſtar of the ſecond magnitude, in the northern crown. See CORONA *borealis*.

LUCIDA *hydræ*, in *Aſtronomy*. See COR *hydræ*.

LUCIDA *lyræ*, a bright ſtar of the firſt magnitude, in the conſtellation LYRA.

LUCIDUM *ſeptum*. See SEPTUM.

LUCIFER, in *Aſtronomy* and *Mythology*, a name given to the planet Venus, when ſhe appears in the morning before ſun-riſe.

LUCIFERA, in *Mythology*, a ſurname given to Diana, under which title ſhe was invoked by the Greeks in childbed. She was repreſented as covered with a large veil, interſperſed with ſtars, bearing a creſcent on her head, and holding in her hand a lighted flambeau.

LUCIFERIANS, a religious ſect, who adhered to the ſchiſm of Lucifer, biſhop of Cagliari, in the fourth century, who was baniſhed by the emperor Conſtantius, for having defended the Nicene doctrine concerning the three perſons in the Godhead.

St. Auguſtine ſeems to intimate, that they believed the ſoul, which they conſidered as of a carnal nature, to be tranſmitted to the children from their fathers. Theodoret ſays, that Lucifer was the author of a new error. The *Luciferians* increaſed mightily in Gaul, Spain, Egypt, &c. The occaſion of the ſchiſm was, that *Lucifer* would not allow any acts he had done to be aboliſhed. There were but two *Luciferian* biſhops, but a great number of prieſts and deacons. The *Luciferians* bore a peculiar averſion to the Arians.

LUCINA, of *lux*, *light*, in *Mythology*, a deity who preſided over the labour of women and the birth of children. This title is ſometimes given to Diana, but moſt commonly to Juno.

LUCIOLA, in *Botany*, a name uſed by ſome authors for the ophiogloſſum, or adders tongue.

LUCIOPERCA, the *pike-perch*, a fiſh caught in the Danube, and other large rivers, and in the lakes of Germany, and eſteemed a very good one for the table. Others have called it by the names *ſchilus* and *nagumulus*. It is a fiſh that grows to a very conſiderable ſize, being frequently caught from two feet to three or four in length; it is of a longer ſhape than the river-perch, and grows narrower toward the tail; its ſnout is alſo more pointed and longer, and its back much leſs prominent than that of the common perch; its figure, upon the whole, more approaches to that of the pike than of the perch; its belly is however broad and flat; and on the anterior part of the back toward the heart, there is a furrow in the middle. The ſcales are ranged very cloſe together, and are fimbriated round their edges; the breaſt has no ſcales; the ſides are of the ſame colour with thoſe of the common perch, a yellowiſh brown, and its belly and fins are red, but leſs ſo than in the common perch.

LUCIUS, in *Ichthyology*. See PIKE.

LUCIUS *marinus*, the *ſea-pike*, a name given by ſome authors to the fiſh more uſually called the MERLUCIUS, and in Engliſh the HAKE.

LUCIUS *marinus*, is alſo uſed by many authors for the SUDIS, called alſo by ſome *ſphyræna*.

LUCIUS *terreſtris*, the *land-pike*, in *Zoology*, the name of a very ſingular ſpecies of American lizard, which has the ſhape, ſcales, &c. of the pike-fiſh; in the place of the fins of that fiſh, it has four legs, but theſe are ſo weak and ſlender, that it makes no uſe of them in walking, but crawls along upon the ground in the manner of a ſnake, and draws its legs after it; it grows to about fifteen inches long, with a proportionable thickneſs; it is all over covered with ſmall, ſtrong, and gloſſy ſcales, of a ſilvery grey. In the night they retire into holes and caverns, and make a very diſagreeable and loud noiſe, much louder than the croaking of frogs. They ſeldom ſtir out of their holes, unleſs in the duſk of the evening; and if they are ever met with in the day-time, their ſtrange motion ſurpriſes all who ſee them.

LUCULLEUM *marmor*, in the *Natural Hiſtory of the Ancients*, the name of a hard ſtony kind of marble, of a good fine black, and capable of an elegant poliſh, but little regarded from its want of variegations. When freſh broken, it is ſeen to be full of ſmall, but very bright ſhining particles, appearing like ſo many ſmall ſpangles of talc. It had its name from the Roman conſul Lucullus, who firſt brought it into uſe in that city. It is common in Italy, Germany, and France. We have much of it imported, and our artificers call it the *Namur* marble, the Spaniards call it marble of *Buga*. Hill's Hiſt. of Foſſ. p. 466.

LUCULLIAN *games*, in *Antiquity*, were annual games decreed by the province of Aſia, about the year 70 before Chriſt, in honour of the exploits of Lucullus.

LUDI *Circenſes*. See CIRCENSES.

LUDI *Cereales*. See CEREALES.

LUDI *florales*. See FLORALES.

LUDI *juveniles*. See DECEMBER.

LUDI *Trojani*. See TROIA.

LUDICROUS *games*. See GAMES.

LUDUS *Helmontii*, ſo called from Van Helmont, who extolled its medicinal virtues, in *Natural Hiſtory*, an opake foſſil of an irregular ſhape, but of a very regular and ſingular internal ſtructure. It is of an earthy hue, and always divided into ſeparate maſſes, by a number of veins of a different colour, and purer matter than the reſt. Theſe maſſes, into which it is divided, are ſometimes ſmall and pretty regularly figured; in which caſe, they are called *tali* or *ludi*, *dice*; but they are more frequently of no regular ſhape at all. There are others of them cruſtated, or compoſed of many coats, diſpoſed one over another about a central nucleus. In theſe the *ſepta*, or dividing veins, are very thin and fine, in the others thicker.

It is only theſe *ſepta* that are uſed in medicine, being given in nephritic complaints with ſucceſs. The doſe is from a ſcruple to a drachm.

LUDWIGIA, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe: the flower whoſe empalement is compoſed of one leaf, cut into ſegments at the top, conſiſts of four ſpear-ſhaped petals, which are equal and ſpread open; in the centre of the flower is ſituated the four-cornered petal, attended with four ſtamina; the germen which ſits under the flower, become, a four-cornered fruit, crowned with the empalement, and has four cells, which are filled with ſmall ſeeds. Miller mentions only one ſpecies of this plant, which grows naturally in South America; Linnæus reckons three ſpecies.

LUES, in a general ſenſe, is uſed for a diſeaſe of any kind.

LUES, in a more particular ſenſe, is reſtrained to contagious and peſtilential diſeaſes.

LUES, in the common and modern uſe of the word, eſpecially when joined with *Gallica*, or *venerea*, is reſtrained only to the French pox. See VENEREAL *diſeaſe*.

LUFF, a ſea term, the ſame with LOOF.

LUFFA, *Egyptian cucumber*, in *Botany*, is a ſpecies of the *momordica* in the Linnæan ſyſtem. See *Male* BALSAM *apple*.

LUG-*a-leaf*, a name uſed in ſome parts of England for a ſmall fiſh of the turbot kind, or rather a middle kind between that and the plaiſe. It is the ſame with the *ſoaggio*.

It is the *rhomboides* of Rondeletius, and the *rhombus non aculeatus ſquamoſus* of Willughby.

We have it on our own ſhores; and the Corniſh people, who frequently catch it, call it the *lug-a-leaf*. It has no rough lines at the roots of its fins. Its eyes are large, and ſet at a conſiderable diſtance, and it is covered with extremely minute ſcales. It is very flat and thin, and of an aſh-colour.

It is a very ſingular ſpecies of fiſh, differing, in ſome particulars, from both thoſe genera to which it ſeems allied. It differs from the plaiſe kind, in than it has the eyes, fins, &c. of the turbot, or rhombus; and from that fiſh, in that it is ſcaly, as the plaiſe, and the other fiſh of that genus.

LUG-*ſail*, in *Sea Language*, is a ſquare ſail, hoiſted occaſionally on the maſt of a boat or ſmall veſſel, upon a yard which hangs nearly at a right-angle with the maſt. Theſe are chiefly uſed in the *barca longas*, navigated by the Spaniards in the Mediterranean.

LUGGS, the Engliſh name for a peculiar ſpecies of inſect, found in great plenty on the ſhores of Cornwall. It is of the nature of the *ſcolopendra*, and is called by Mr. Ray *vermis ſcolopendroides*. It grows to twelve inches long, and has inſtead of legs nineteen pair of ſtiff briſtles, all which ſtand toward the head part of the creature. The tail is at leaſt five inches long, when full grown, and has no mark of them. Its body is rounded, and much reſembles the body of the common earth-worm, and is of a fleſh-colour, or pale red. It has no forceps.

LUGMON, in *Natural Hiſtory*, a name given by the people of the Philippine Iſlands to a ſpecies of turtle, the female of which has a tuft of red feathers, of a pale blood-colour, on her breaſt, which have greatly the appearance of a wound, ſo much that any body would really be deceived.

LUJULA, *wood-ſorrel*, in *Medicine*. See SORREL.

LUKE, or *Goſpel of St. Luke*, a canonical book of the New Teſtament, written by *Luke* the Evangeliſt, who was probably, an early Jewiſh believer, ſoon after the aſcenſion of Chriſt; if not a hearer of Chriſt, and one of the ſeventy diſciples. *Luke* was by profeſſion a phyſician; and is ſuppoſed to have died a natural death in the eightieth or eighty-fourth year of his age, about the year of Chriſt 70.

Some think it was properly St. Paul's goſpel, and that when that apoſtle ſpeaks of his goſpel, he means what is called *St. Luke's*. Irenæus ſays, that *St. Luke* digeſted into writing what St. Paul preached to the Gentiles; and Gregory Nazianzen tells us, that *St. Luke* wrote with the aſſiſtance of St. Paul. This Goſpel, as well as the Acts of the Apoſtles, written by this evangeliſt, are ſuppoſed to have been two parts of the ſame volume, and to have been publiſhed in the year of Chriſt 63 or 64, as ſome ſay, in Alexandria, but according to others in Greece.

St. Luke, ſays a modern writer, is pure, copious, and flowing in his language, and has a wonderful and entertaining variety of ſelect circumſtances in his narration of our Saviour's divine actions. He acquaints us with numerous paſſages of the evangelical hiſtory, not related by any other evangeliſt: both in this goſpel and Apoſtolical Acts, he is accurate and neat, clear and flowing with a natural and eaſy grace: his ſtyle is admirably accommodated to the deſign of hiſtory; it had a very conſiderable reſemblance to that of his great maſter St. Paul; and, like him, he had a learned and liberal education, and appears to have been very converſant with the beſt claſſics; for many of his words and expreſſions are exactly parallel to theirs. Blackwall's Sacred Claſſics.

St. LUKE's *day* is a feſtival obſerved on the 18th of October.

St. LUKE's *hoſpital*. See HOSPITAL.

LULANIS, in *Botany*, a name given by ſome of the ancient Greeks to a plant, uſed very frequently for a yellow colour in dying, and by the ladies for tinging their hair yellow, the favourite colour of thoſe times. Neophytus explaining this word, ſays, that it ſignified the ſame with iſatis, glaſtum, or woad; and ſeveral others have been of that opinion, though very abſurdly, ſince the glaſtum or woad dies a blue colour, not a yellow; and by no means anſwers the deſcription of the *lulanis*, which is the ſame with the LUTUM, or *lutea herba* of the Romans, and with the *geniſtella tinctoria*, or DYERS-*weed* of theſe times.

LULLY's *art*. See ART.

LUMBAGO, pains about the loins, and the ſmall of the back; ſuch as precede ague-fits, and fevers.

They riſe commonly from fulneſs, and acrimony; in common with a diſpoſition to yawning, ſhuddering, and erratic pains in other parts; and go off with evacuation, generally by ſweat, and other critical diſcharges of fevers. This diſorder is a kind of RHEUMATISM in the loins.

LUMBAL *glands*. See GLAND.

LUMBAL *nerves*. See NERVE.

LUMBARIS, an epithet given to thoſe branches of the aorta which carry the blood to the muſcles of the loins.

LUMBARIS is alſo applied to certain veins which bring back the blood from the loins into the trunk of the vena cava.

There is alſo a muſcle of the thigh which bears this name. See PSOAS.

LUMBRICAL, LUMBRICALIS, an appellation given to four muſcles of the hand, and as many of the foot, which act as adducents of the fingers and toes.

The word is formed from *lumbricus*, *worm*, on account of their figure, and ſmallneſs, which give them a reſemblance to worms: on which account they are called *vermiculares*.

LUMBRICALES *manus* are muſcles of the hands, commonly ſuppoſed to be nothing but branches of the tendons of the perforans, which go to the inſide of the firſt bone on each finger, and are ſuppoſed to contribute to the variety of motions with the fingers, by giving a diverſion to the direct actions of the other muſcles; but, ſimply, they only ſerve to draw the fingers towards the thumb. Though Mr. Cowper obſerves that ſome of them have diſtinct origins; and ſuſpects that the reſt may have ſo too, and therefore makes them diſtinct muſcles.

LUMBRICALES *pedes*, are muſcles of the foot, which ariſe, as in the hand, one from each tendon of the perforans, or profundus: and go to the inſide of each of the leſſer toes.

LUMBRICUS, in *Zoology*. See EARTH-*worm*.

LUMELLA, in the *Glaſs-trade*, the round hole in the floor of the tower of the leer, which is directly over the working ſurface, and by which the flame is let into the tower.

LUMINOSA *ſemita*. See SEMITA.

LUMINOUS *column*, and *fire*. See the ſubſtantives.

LUMINOUS, *emanations*, have been obſerved from human bodies, as alſo from thoſe of brutes. The light ariſing from currying a horſe, or from rubbing a cat's back, are known to moſt. Inſtances of a like kind have been known on combing a woman's head. Bartholin gives us an account, which he entitles *mulier ſplendens*, of a lady in Italy, whoſe body would ſhine, whenever ſlightly touched with a piece of linen. Theſe effluvia of animal bodies have many properties in common with thoſe produced in glaſs; ſuch as their being lucid, their ſnapping, and their not being excited without ſome degree of friction; and are undoubtedly electrical, as a cat's back has been found ſtrongly electrical when ſtroaked. See ELECTRICITY, and LIGHT.

Human bodies not only appear *luminous*, but even the exhalations from them adhering to their clothing will cauſe it to ſhine likewiſe.

LUMINOUSNESS *of the ſea*. See SEA and FIRE.

LUMME, in *Ornithology*, the name of a water-fowl of the colymbus kind, called by authors *colymbus arcticus*, common about Iceland and ſome parts of Norway, and ſcarce known in other parts of the world.

It is a beautiful bird, of the ſize of a duck; it has a black and ſharp beak, of two inches long, and its head and neck are covered with grey feathers, running each way to a ſharp edge, and making the appearance of a hood, or friar's cowl, its back and wings are black, variegated with ſquare ſpecks of white, and juſt under the neck there is a large black ſquare ſpot. This runs down the back alſo to five inches in length, and is about two inches broad, and beautifully variegated with black, white, and grey. Its belly is white, its legs are ſhort, and its feet webbed. The people, where it is common, hold it as ſacred, in ſome meaſure, and are afraid of killing it in ſome places: but the Icelanders make it their principal food, and are very dextrous in catching it with ſnares. Ray.

LUMP-*fiſh*, the *cyclopterus lumpus*, in the Linnæan ſyſtem, in *Ichthyology*, a thick and ſhort ſea-fiſh, called the *ſucker*, alſo the *ſea-owl*, and by the Scotch the *cock-paddle*.

It is a thick and very ill-ſhaped fiſh. Its belly is broad and flat, and its back riſes to a ridge: its colour is a mixture of blackiſh and red; its belly is red: it has no ſcales, but is covered with a rough ſkin, which is full of ſharp tubercles; and on each ſide it has three rows of prickles or crooked thorns; it has two fins on the back, the firſt thick, cartilaginous, or rather fleſhy, and having no rays or nerves, and another below is ſupported by nine rays; its mouth is large, and its jaws are furniſhed with vaſt numbers of ſmall teeth; beneath the pectoral fins is the part by which it adheres to the rocks, &c. conſiſting of an oval aperture, ſurrounded with a fleſhy, muſcular, and obtuſe ſoft ſubſtance, edged with ſmaller threaded appendages, which concur in ſo many claſpers.

It is caught in many parts of the Engliſh ſeas, and is common in the fiſhmongers ſhops in London, but it is not much eſteemed, being both flabby and inſipid. On the coaſt of Sutherland it abounds in the ſpring, and is devoured by the ſeals, which may be known by the ſmoothneſs of the water above the ſpot; the oil ſerving to ſtill the agitation of the waves. The roe of this fiſh is remarkably large, and is boiled to a pulp, and eaten by the Greenlanders. See *Tab.* II. *of Fiſh*, N° 21.

LUMP *of fleſh*, in the *Manege*. See BOUILLON

LUMPEN, in *Ichthyology*, the name of a long-bodied fiſh, of the muſtela kind, common in the markets at Antwerp.

It is of a long and round body, growing gradually ſlenderer to the tail. Its colour is a greeniſh yellow, with black broad lines on the back, placed tranſverſely; and it has a little redneſs at the end of its tail.

The *lumpen* is the *galea piſcis*, or *muſtela altera* of Geſner, and others. It is a ſpecies of the *blenni*, diſtinguiſhed by Artedi by the name of the *blennus* with fins like cirri under its neck, and tranſverſe ſtreaks on the back. The cirri are bifid.

LUNA, in *Aſtronomy*. See MOON.

LUNA, in the jargon of the *Chemiſts*, ſignifies SILVER; ſo called from the ſuppoſed influence of the moon thereupon.

The medicinal virtues of this metal, Dr. Quincy ſays, are none at all, until it has undergone very elaborate preparations.

LUNA *cornea*, in *Chemiſtry*, is the combination of marine acid with ſilver. To make this combination, the ſilver is firſt diſſolved in nitrous acid; to this ſolution marine acid, or more uſually common ſalt diſſolved in water, is added. The mixture ſoon becomes turbid, and a copious precipitate is formed in it, which has always the appearance of curd. The ſolution of ſalt is added, till no more precipitate is formed. The precipitate, when ſeparated from the liquor that ſwims over it, is called *luna cornea*; becauſe if this matter be expoſed alone to fire, the acid carries off with it a portion of the ſilver, and the remaining matter melts, aſſuming the form of a horny ſubſtance.

The beſt method of reducing *luna cornea*, or of ſeparating ſilver from marine acid, according to Marcgraaf is to diſſolve half an ounce of fine ſilver in aqua fortis, to precipitate it by a ſea-ſalt, and edulcorate the precipitate, which will then weigh five drams ſixteen grains. For the reduction of this precipitate, mix it with an ounce and a half of dry volatile ſal ammoniac, triturate them well together with a little water during a quarter of an hour; then add three ounces of mercury obtained from cinnabar by means of quick-lime, and continue to triturate during ſome hours with a little more water. Thus an amalgam will be formed, which being waſhed from a white powder and dried, will weigh three ounces and half a dram. By diſtillation of this amalgam, a reſiduum of ſilver, four grains leſs than the original half ounce, will be obtained. By ſubliming the white powder, which weighs five drams, three grains of ſilver will be obtained; but if the amalgam and white powder be diſtilled together, the operation will fail, and the *luna cornea* be recompoſed. Berlin Mem. 1749. M. Beaumé ſays, that *luna cornea* may be reduced without loſs by fuſion with four times its weight of fixed alkali.

Luna cornea mixed with ſea-ſalt and tartar rubbed on braſs gives a ſilver-like appearance; and is the ſubſtance employed for the ſilvering of the dial-plates for clocks. A more ſubſtantial ſilvering may be given by the above mixture, if the piece of braſs to be ſilvered be previouſly heated conſiderably, and cleaned with a ſcratch bruſh, and if the operation be repeated, till the ſilver ſeems to be ſufficiently thick. The braſs having a ſtronger diſpoſition to unite with the marine acid than the ſilver has, ſeparates this acid from the ſilver, which is then precipitated upon the ſurface of the braſs plate. The *luna cornea* will alſo ſerve in examination of mineral waters or of any other liquor, to diſſolve if they contain marine acid in whatever baſe it be engaged, except metallic baſes; for if theſe waters contain the ſmalleſt quantity of marine acid, a *luna cornea* will be precipitated by them from a ſolution of ſilver in nitrous acid, and this *luna cornea* is known by its acid-like appearance. Dict. Chem. Eng. edit.

LUNA, *Cryſtals of*. See CRYSTAL.

LUNA, *Vitriol of*. See VITRIOL.

LUNA *marina*, in *Ichthyology*, a name by which Geſner has called a peculiar ſpecies of *ſtar-fiſh*, called alſo the *ſea-ſun*. See SOLEIL *de Mer*.

LUNA *piſcis*, in *Ichthyology*, a name by which ſome have called the mola, which we uſually call in Engliſh the SUN-*fiſh*.

LUNÆ, *Lac*. See LAC *lunæ*.

LUNÆTRIA, a term invented by ſome affected writers on medicine for a fever, which they ſay is curable in one period of the moon.

LUNALE *bezoardicum*. See BEZOARDICUM.

LUNAR, ſomething relating to the MOON.

LUNAR *cycle*. See CYCLE.

LUNAR *month*. See MONTH.

LUNAR *year*, conſiſts of three hundred and fifty-four days, or twelve ſynodical months. See YEAR.

In the firſt ages, the year uſed by all nations was *lunar*; the variety of courſe being more frequent in this planet, and, of conſequence more conſpicuous, and better known to men, than thoſe of any other. The Romans regulated their year, in part, by the moon, even till the time of Julius Cæſar: the Jews too had their *lunar* months. Some rabbins pretend, that the *lunar* month did not commence till the moment the moon began to appear; and that there was a law, which obliged the perſon who diſcovered her firſt, to go and inform the ſanhedrin thereof. Upon which the preſident ſolemnly pronounced the month begun, and notice was given of it to the people by fires lighted on the tops of mountains. But this appears ſomewhat chimerical.

LUNAR *dial*, *eclipſe*, *horoſcope*, and *rainbow*. See the ſeveral ſubſtantives.

LUNARE, *os*, in *Anatomy*, is the ſecond bone in the firſt row of the carpus. It has its name from the Latin, *luna*, the moon, becauſe one of its ſides is in form of a creſcent.

The articular ſides in this bone are four in number. One convex, for the baſis of the radius; one ſemi-lunar, for the os ſcaphoides; one almoſt triangular, for the os cuneiforme; and one hollow, which, with the hollow ſide of the os ſcaphoides, forms a cotyloide cavity for the head of the os magnum. The convex ſide, together with that of the os ſcaphoides, forms an oblong convexity, anſwering to the oblong concavity in the baſis of the radius. The outer and inner ſurface are ſmall and rough. This bone would ſomewhat more properly be named *os ſemi-lunare*, than *lunare*, &c. See Winſlow.

LUNARIA, in *Botany*. See HONESTY.

LUNARIA, in *Natural Hiſtory*, is alſo uſed by ſome authors for the SELENITES.

LUNARIS *cochlea*, in *Natural Hiſtory*, the name of a genus of ſhells of the ſnail-kind, the diſtinguiſhing character of which is their having a perfectly round mouth. Theſe are univalve, umbilicated ſhells, with a depreſſed clavicle, and a ſurface ſometimes ſmooth, but more frequently ſtraited, furrowed, laciniated, or covered with tubercles. See COCHLEA.

It is ſaid, that Archimedes took the invention of the ſcrew, ſo famous ever ſince his time, and ſtill called after his name, from the form of this ſhell; and it is generally allowed, that architects have taken the hint of their winding flights of ſtairs from it.

The ſmall ſpecies of crab, called *Bernard the hermit*, often lodges itſelf in a ſhell of one of theſe animals, after the creature to whom it belonged is dead. One ſpecies of this genus is called the *rotunda*, from its round ſhape. This is ſo large as to contain two quarts of water; and from an old practice of uſing this ſpecies by way of an oil jar in families, it obtained the name of *olearia*. There is a peculiar ſpecies, called the *dauphin-ſnail*, which is elegantly furniſhed with rows of points of a jagged form on all its ſpires; and the ſhell, called the *eperon*, is another ſpecies of this genus, the volutæ of which are in the ſame manner furniſhed with points; but in this ſpecies they are ſmoother and ſharper than in the dauphin-ſnail. Rondeletius has given the name *echinophora* to one, which is all over covered with rough tubercles. And there is one ſpecies of this ſhell brought from America, which is very large, and of a fine pearly coat within. The workmen in toys take much of what they uſe from it; and what we imagine the inſide of the nacre, or mother of pearl, is often no other than the inner coat of this ſnail. Of this genus there are enumerated twenty-one different ſpecies. Hiſt. Nat. Eclar. par. ii. p. 251.

LUNATIC, LUNATICUS, a perſon affected, or governed by the moon. Hence, epileptics were anciently called *lunatici*, becauſe the paroxyſms of that diſeaſe ſeem to be regulated by the changes of the moon. Thus Galen, De Diebus criticis, lib. iii. ſays, the moon governs the periods of epileptic caſes; and others referred the diſeaſe entirely to this planet. Aretæus de Diuturnis Morbis, lib. i. cap. 4. See Mead's Treatiſe concerning the Influence of the Sun and Moon upon the Human Bodies, p. 38. 46, &c.

Mad people are ſtill called *lunatics*, from an ancient but now almoſt exploded opinion, that they are much influenced by that planet. A much ſounder philoſophy hath taught us, that if there be any thing in it, it muſt be accounted for, not in the manner the ancients imagined, nor otherwiſe than what the moon has in common with other heavenly bodies, occaſioning various alterations in the gravity of our atmoſphere, and thereby affecting human bodies. However, there is conſiderable reaſon to doubt the fact; and it is certain that the moon has no perceivable influence on our moſt accurate barometers.

The ſtat. 17 Ed. II. cap. 10. ordains that the king is to provide that the lands of *lunatics* be ſafely kept, and they and their families maintained by the profits; and the reſidue ſhall be kept for their uſe, and be delivered to them when they come to their right mind; the king taking nothing to his own uſe; and if the parties die in ſuch ſtate, the reſidue ſhall go to their executors or adminiſtrators. A warrant is now iſſued by the king under his royal ſign manual, to the chancellor or keeper of his ſeal, to perform this office for him.

Lunatics are not legally accountable for any crimes they commit in this ſtate. And alſo, if a man in his ſound memory commits a capital offence, and before arraignment for it, he becomes mad, he ought not to be arraigned for it; and if after he has pleaded, the priſoner becomes mad, he ſhall not be tried: if after he be tried and found guilty, he loſes his ſenſes before judgment, judgment ſhall not be pronounced: and, if after judgment, he becomes of non-ſane memory, execution ſhall be ſtayed.

For the marriage of *lunatics*. See MARRIAGE.

LUNATION, the period, or ſpace of time, between one new moon and another; alſo called *ſynodical month*. See CYCLE and EPACT.

LUNDA, in *Ornithology*, a name by which Wormius, Hoier, and ſome others, have called the bird commonly known by the name of the *anas arctica Cluſii*. See DUCK.

LUNDRESS, in our *Old Writers*, a ſterling ſilver penny; which had its name from being coined only in London, and not at the country mints.

LUNE, LUNULA, in *Geometry*, a plane in form of a creſcent or half-moon, terminated by the circumference of two circles, that interſect each other within.

Though the quadrature of the entire circle was never yet effected, yet geometricians have found out the ſquares of many of its parts. The firſt partial quadrature was that of the *lunula* given by Hippocrates of Scio, or Chios; who, from being a ſhipwrecked merchant, commenced geometrician. See CIRCLE and QUADRATURE.

Let A E B (*Tab.* III. *Geometry*, *fig.* 59.) be a ſemicircle, and $GC = GB$; with the radius B C deſcribe a quadrant A F B, then will A E B F A be Hippocrates's *lune*.

And ſince $BC^2 = 2GB^2$, the quadrant A F B C will be equal to the ſemicircle A E B: taking away, therefore, from each the common ſegment A F B G A; A E B F A = to the triangle $ACB = GB^2$.

The quadrature of the *lunula* is generally aſcribed to Hippocrates of Chios; but Proclus tells us expreſsly, that it was found by Œnopidas of Chios. See Mr. Heinius in Mem. de l'Acad de Berlin, tom. ii. p. 410. who has given us a diſſertation on the Œnopidas.

LUNE, in *Fortification*. See DEMI-*lune*.

LUNENSE *marmor*, in the *Natural Hiſtory of the Ancients*, the name of that ſpecies of white marble, now known among us by the name of the *Carara marble*, and diſtinguiſhed from the ſtatuary kind by its greater hardneſs and leſs ſplendor. It was ever greatly eſteemed in building and ornamental works, and is ſo ſtill. It is of a very cloſe and fine texture, of a very pure white, and much more tranſparent than any other of the white marbles. It has always been found in great quanties in Italy, and is ſo to this day.

LUNES, or LOWINGS, in *Falconry*, leaſhes or longlaſhes to call in hawks.

LUNETTE, in *Fortification*, an inveloped counterguard, or elevation of earth, made beyond the ſecond ditch, oppoſite to the places of arms; differing from the ravelins only in their ſituation.

Lunettes are uſually made in ditches full of water, and ſerve to the ſame purpoſe as fauſſebrays, to diſpute the paſſage of the ditch.

Lunettes are placed on both ſides of the ravelin, as B, B, *Tab.* VIII. *Fortification fig.* 47. to increaſe the ſtrength of a place: they are conſtructed by biſecting the faces of the ravelin with the perpendicular L N, on which are ſet off 30 toiſes from the counterſcarp of the ditch, for one of its faces; the other face P N is found by making the ſemigorge T P of 25 toiſes; the ditch before the *lunettes* is 12 toiſes, the parapet 3, and the rampart 8. There is ſometimes another work made to cover the ſaliant angle of the ravelin, ſuch as A, called BONNET, whoſe faces are parallel to thoſe of the ravelin, and when produced biſect thoſe of the *lunettes*; the ditch before it being 10 toiſes. There are likewiſe ſome *lunettes*, whoſe faces are drawn perpendicular to thoſe of the ravelin, within a third part from the ſaliant angle, and their ſemigorges are only 20 toiſes. Mr. Muller recommends the face P N to be perpendicular to that of the baſtion, which would then defend it in a direct manner; and if the ſemigorges of the bonnet A were only 7 or 8 toiſes, it would be leſs expenſive, and its ditch and the covert-way before it would be better defended by the *lunettes*. Elem. of Fortif. p. 36.

LUNETTE, in the *Manege*, is a half horſe-ſhoe, or ſuch a ſhoe as wants the ſpunge, i. e. that part of the branch which runs towards the quarters of the foot.

LUNETTE is alſo the name of two ſmall pieces of felt, made round and hollow, to clap upon the eyes of a vicious horſe that is apt to bite, and ſtrike with his fore feet, or that will not ſuffer his rider to mount him.

LUNGS, in *Anatomy*, a part of the human body, compoſed of veſſels, and membranous veſicles; ſerving for reſpiration. See BLOOD.

The lungs are connected, above to the fauces, by means of the trachea; and below, to the vertebræ of the thorax; and to the ſternum and diaphragma, by means of the pleura. They are divided into two great lobes, of a reddiſh colour in children, greyiſh in adults, and bluiſh in old age, by the mediaſtinum and heart, and thoſe again into others leſſer; the right ſometimes into three, by means of ſome fiſſures running from the fore to the back edge. At the lower edge of the left lung, there is an indented notch or ſinus oppoſite to the apex of the heart, which is, therefore, never covered by that lung even in the the ſtrongeſt expirations, and conſequently the apex of the heart and pericardium may always ſtrike againſt the ribs. The great lobes, when inflated, reſemble each of them a horſe's hoof in figure, but together they are more like an ox's inverted, convex next the ribs, concave next the diaphragm, and irregularly depreſſed next the mediaſtinum and heart. See *Tab. Anat.* (*Splanch.*) *fig.* 12. *lit. t t*, *fig.* 14.

The ſubſtance of the *lungs* is membranous; conſiſting chiefly of innumerable cells, or veſſels, which ſeem to be nothing but expanſions of the membranes of the BRONCHIA, to which they hang like grapes in cluſters; ſo that by blowing into one of the branches of the bronchia, thoſe cells, or veſſels beloning to it, are blown up; the reſt, which do not, remaining ſtill flaccid and unaltered.

Theſe cluſters of veſicles, or cells, are called the *internal lobules*; by which name they are diſtinguiſhed from the leſſer lobes ſpoken of. They are ſeparated from one another by interſtices, which receive the veſſels, and are filled up with membranes propagated from the lobules, and lying parallel, ſome angular. Theſe lobules diſcover and diſplay themſelves very exactly if the larger trunks of the bronchia be laid open, and the leſſer blown into; by which means, every lobule belonging to that branch will be inflated, and riſe very diſtinctly, and ſhew its extent.

The whole ſubſtance of the *lungs* is covered with a common membrane, continued from each pleura, which is diviſible into two coats; the outer thin, ſmooth, and nervous; the inner ſomewhat thicker and rougher, conſiſting moſtly of the extremities of veſſels and veſicles, through the impreſſion of which it is pitted, and reſembles, in ſome meaſure, a honey-comb. Some affirm, that in this coat are abundance of perforations, or pores, ſo diſpoſed, that they readily imbibe any humidity from the cavity of the thorax, but ſuffer nothing to eſcape into it: but this ſeems little more than fancy.

The veſſels of the *lungs* are, the bronchia, the pulmonary and bronchial arteries and veins, nerves, and lymphatics. Of theſe veſſels, ſome are *proper*, and ſome *common*, in reſpect of the ſervice they are of to the reſt of the body. The *common* are, the bronchia, the pulmonary artery and vein, the nerves and lymphatics; the *proper* are, the bronchial artery and vein.

Dr. Willis, contrary to the common opinion, aſcribes to the *lungs* a great number of nerves, which come from the trunk of the par vagum: and which being diſtributed through the ſubſtance of the *lungs*, embrace the aerious and ſanguiferous veſſels. He alſo aſſerts, that the veſiculæ have muſculous fibres, to enable them to exert a greater contractive force in expiration; though others deny any ſuch fibres. Diemerbroeck obſerves, that the veſicles admit not only of air, but alſo of other groſſer matter; and inſtances two aſthmatic perſons which he opened; the one a ſtone-cutter, the veſiculæ of whoſe *lungs* were ſo ſtuffed with duſt, that, in cutting, his knife went as if through a heap of ſand; and the other a feather-driver, in whom the veſicles were full of the fine duſt, or down of feathers. See ASTHMA.

From the experiments made on living animals by Dr. Houſton, Dr. Hoadley, and Mr. Bremond, the *lungs* ſeem to act independent of the thorax, continuing to be dilated and contracted after they are expoſed to the air. Phil. Tranſ. Nº 441. ſect. 4. Lectures on Reſpiration. Mem. de l'Acad. des Sciences, 1739.

An artificial inflation of the *lungs* of a dead or dying animal will put the heart in motion, and continue it ſo for ſome time. And we have an inſtance of the ſucceſsful application of this experiment to the reſcuing the life of a perſon ſuffocated by the means of a coal-pit. See Medic. Eſſ. Edinb. vol. v. And Phil. Tranſ. Nº 475. ſect. 11.

In the Medical Eſſays of Edinb. we read of an ulcer in the *lungs* piercing through the diaphragm into the liver. See vol. i. art. 26.

Dropſy of the LUNGS. See DROPSY.

Polypus of the LUNGS. See POLYPUS.

LUNGS *wounded*. There is always reaſon to apprehend that the *lungs* are wounded, when the patient voids a great quantity of frothy blood by the mouth, accompanied with a cough, after receiving a wound in the thorax, eſpecially when the blood that is voided at the wound is very florid, and the patient makes a particular noiſe when he draws his breath. The office of the ſurgeon, in this caſe, is to clear the cavity of the thorax from extravaſated blood, and to heal the external wound, when that may be done with ſafety: but as no application can be made to the internal wound, that muſt be left to nature. Whenever the divided veſſels contract themſelves, and the blood ſtops of itſelf, the patient will recover. The perſons who have recovered from theſe wounds, are afterwards ſubject to conſumptions, and ulcers of the *lungs*. Sometimes, in caſes of this kind, the wounded part of the *lungs* puſhes itſelf forward, and ſticks pretty firmly in the orifice of the external wound. In this caſe, if it is forced back again, it will diſcharge a great quantity of blood into the cavity of the thorax: therefore it is better to let it remain in the ſituation nature has thrown it into; for by this means it will admit of the immediate application of proper dreſſings, and you may ſafely encourage it to adhere to the lips of the external wound: but if a wounded portion of the *lungs* ſhould be puſhed out of the thorax, beyond the limits of the external wound, a fine piece of linen is to be wrapped round this part, and a ligature muſt then be made above the linen, and all that is below the ligature taken off with a fine knife, and the ſound part of the *lungs* muſt then be returned into the body, keeping one end of the ligature conſtantly hanging out at the external wound; the wound is then to be kept open with a tent, and the ligature at length may be ſafely drawn out. The wound is then to be healed in the ordinary way. And during the courſe of the cure the patient muſt take internally vulnerary decoctions, and Lucatellus's balſam. By this treatment, wounds of this dangerous kind are ſometimes cured; but when they are not, it is a ſatisfaction to know that all has been done, that could be done in ſo deſperate a caſe. Heiſter's Surgery, p. 73.

Lungs, *Inflammation of the*. See Peripneumony.

Lungs *of inſects*. In the fly claſs the ſtigmata are extremely numerous, and the tracheæ which they terminate, are branched and divaricated all over the body in an amazing manner, as if every part and particle of the bodies of theſe little animals had occaſion for its particular air-veſſels; beſides theſe, however, flies are provided with proper *lungs*. They have two, and thoſe ſo very large, that they frequently take up half, and ſometimes two thirds of the body of the animal.

Theſe are two bladders placed ſideways one by the other, alike in ſhape and ſize, and having their origin at the junction of the corcelet and body; and in many flies, whoſe bodies are compoſed of five rings, extending to the third, and ſometimes reaching the fourth. The ſize and figure of each of theſe bladders are ſuch as is neceſſary to fill almoſt entirely that cavity of the body in which it is lodged. They each of them touch the ſides of this cavity; the part when they join one another is flat, and this commiſſure forms a line running ſtraight down the body; they are, however, in this part, though ſo cloſely in contact, yet not at all joined to one another: this commiſſure, however, does not reach quite up to the back, or quite down to the belly; there is a ſmall cavity left between each, which was very neceſſary in both places; the one to give paſſage to the great artery, the other to the excrements. Reaumur's Hiſt. Inſ. vol. iv. p. 267, &c.

Lungs, *Sea*, in *Zoology*. See Medusa.

Lungs, *Ships*. See Ventilator.

Lung-*wort*, *pulmonaria*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower has a cylindrical, five-cornered, permanent empalement, cut into five parts at the top; the flower is of one petal, having a cylindrical tube, of the length of the empalement, cut at the top into five parts, which ſpread open, but the chaps are pervious; it has five ſhort ſtamina, terminated by erect ſummits, which cloſe together; and four germina ſupporting a ſhort ſtyle, crowned by an obtuſe indented ſtigma; the germina turn to four roundiſh ſeeds ſitting in the bottom of the empalement. There are ſix ſpecies.

The figure of the flower-cup is what principally diſtinguiſhes the *pulmonaria* from the bugloſs, &c. and the plants of it may be uſually known when not in flower, by their long, rough, and not divided leaves, which in almoſt all the ſpecies are ſpotted, ſo as to reſemble the tabid *lungs* of an animal, whence it had its name. Tourn. Inſt. p. 137.

The leaves of the common ſpotted *pulmonaria*, or, as we vulgarly call it, *ſage of Jeruſalem*, or Jeruſalem cowſlip, which grows wild in many parts of Europe, and flowers in our gardens in April and May, have been eſteemed an excellent medicine in many of the diſorders of the *lungs*; and have been ſaid to do great ſervice in ſpitting of blood, though Dr. Lewis ſays, that they appear to have little medicinal virtue; and they ſtand greatly recommended, externally uſed as a conſolidator and healer of old ulcers as well as freſh wounds.

Lung-*wort*, *cow's*. See Mullein.

Lung-*wort*, *golden*. See Hawkweed.

LUNISOLAR, in *Aſtronomy* and *Chronology*, denotes ſomething compoſed of the revolution of the ſun, and of that of the moon.

Lunisolar *year* is a period of years made by multiplying the cycle of the moon, which is nineteen, by that of the ſun, which is twenty-eight; the product of which is five hundred and thirty-two; in which ſpace of time thoſe two luminaries return to the ſame points.

LUNULA, in *Geometry*. See Lune.

Lunula, the *half moon*, among the Romans, an ornament the patricians wore on their ſhoes.

Lunula was alſo an ornament in form of a moon, worn by the ladies.

LUNULAR *angles*. See Angle.

LUNULARIA, in *Botany*, a name given by Micheli to certain ſpecies of the marchantia, a kind of Lichen. Theſe have the male cup divided into four ſegments, and thoſe turning their edges over the flower; whereas the marchantia, as he calls them, have eight or ten ſegments, and thoſe plain.

LUNULATED *leaf*, among *Botaniſts*. See Leaf.

LUPERCALIA, feaſts inſtituted, in ancient Rome, in honour of the god Pan.

The word comes from *Lupercal*, the name of a place under the Palatine mountain, were the ſacrifices were performed.

The *Lupercalia*, were celebrated on the fifteenth of the calends of March, that is on the fifteenth of Februrary; or as Ovid obſerves, on the third day after the ides. They are ſuppoſed to have been eſtabliſhed by Evander.

On the morning of the feaſt, the Luperci, or prieſts of Pan, ran naked through the ſtreets of Rome, ſtriking the married women they met on the hands and belly, with a thong, or ſtrap, of goat's leather; which was held an omen promiſing them fecundity and happy deliveries.

The reaſon of this indecent cuſtom, in celebrating the *Lupercalia*, tooks its riſe from Romulus and Remus: for while they were aſſiſting at this feaſt, a body of robbers taking hold of the occaſion, plundered them of their flocks. Upon this, the two brothers, and all the youth that were with them, throwing off their cloaths, to be the more expedite, purſued the thieves and recovered their prey. This ſucceeded ſo well, that, henceforward this ceremony became a part of the *Lupercalia*.

This feaſt was aboliſhed in the time of Auguſtus; but it was afterwards reſtored, and continued to the time of the emperor Anaſtaſius. Baronius ſays, it was aboliſhed by pope Gelaſius, in 496.

LUPERCI, a name given to the prieſts of the god Pan.

The *Luperci* were the moſt ancient order of prieſts in Rome; they were divided into two colleges, or companies; the one called *Fabii*, and the other *Quintilii*: to theſe Cæſar added a third, which he called *Julii*.

Suetonius mentions the inſtitution of this new college of *Luperci* as a thing that rendered Cæſar more odious than he was: however, it appears, from the ſame paſſage of Suetonius, that this new company was not inſtituted by Cæſar, nor in honour of Pan, but by ſome friends of Cæſar, and in honour of himſelf.

LUPI *crepitus*. See Crepitus.

LUPIA, in *Surgery*, a name given by ſome authors to that ſort of ſwelling, called by others *talpa* and *teſtudo*. This is an encyſted tumor, more diſtinguiſhed by its ſituation than by its nature, ſince of whatever kind it be, whether aſteatomatous, or atheromatous, &c. if ſituated under the ſcalp, it is called by theſe names. Heiſter's Surgery, p. 51.

LUPINASTER, in *Botany*, the name given by Buxbaum to a new genus of plants, from their near approach to the characters of the lupine; the flowers are like thoſe of the other papilionaceous plants; the leaves are digitated as in the lupines; the flowers are collected into a head, ſuſtained on a long pedicle, iſſuing from the alæ of the leaves; the pods are flat, and the ſeeds kidney-ſhaped; the ſtalks are ſix or eight inches high; the leaves long, of a bluiſh green, ſharply ſerrated, and elegantly ſtriated; they grow ſix, ſeven, or eight on a pedicle, which comes out of a yellowiſh membrane ſurrounding the ſtalk; the flowers are of a bluiſh purple, and ariſe out of cups, divided into ſeveral ſegments; the pods are long and depreſſed, and the ſeeds black and kidney-ſhaped. It grows in great plenty about the banks of the Volga. Act. Petrop. vol. ii. p. 346.

LUPINE, *lupinus*, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are theſe: the empalement is bifid and of one leaf; the flower is of the butterfly kind; the ſtandard roundiſh, heart-ſhaped, indented at the top, and the ſides reflexed and compreſſed; the wings are nearly oval, and cloſe at their baſe, the keel narrow, falcated, and ending in a point; it has ten ſtamina joined at their baſe in two bodies, but diſtinct above; in the centre is ſituated a hairy compreſſed germen, which becomes an oblong, large, thick-ſhelled pod with one cell, ending with an acute point, including ſeveral roundiſh compreſſed ſeeds. There are ſix ſpecies of this plant, propagated in gardens, where they make a very agreeable appearance. But the kind moſt frequent with us is the leſſer purple or blue-flowered kind. This is propagated by ſowing the ſeeds in a common flower border, where they require no care, but will come up and thrive of themſelves; they ſhould be ſown in April, in the places where they are to remain, for it gives leſs trouble, and they are plants which but very badly bear tranſplanting. This ſort flowers in June and July, and the ſeeds ripen in autumn. The common yellow *lupine* is cultivated for the ſweetneſs of its flowers, though they are of ſhort duration, eſpecially in warm weather. The ſeeds ſhould therefore be ſown at different times, viz. in April, May, and June, that there may be a ſucceſſion of flowers through the ſeaſon. If ſome of theſe ſeeds are ſown in autumn on a warm border, the plants will often live through the winter, and flower early in the ſpring. The ſeeds of the manured *lupine*, with a white flower, being of a bitter taſte, are ſometimes uſed in medicine, to open, digeſt, diſſolve, and cleanſe. The flower of the ſeed has been occaſionally mixed with the juice of lemon, and a little alumen ſaccharinum, and made up in the form of ſoft ointment, to make the face ſmooth. Miller.

LUPULUS, *hop*, in *Botany*. See HOP.

LUPUS, *Wolf*, in *Aſtronomy*, a ſouthern conſtellation, joined to the CENTAUR, whoſe ſtars in Ptolemy's Catalogue are nineteen; in the Britannic Catalogue with Sharp's Appendix, twenty-four: the order, names, longitudes, latitudes, magnitudes, &c. are as follow:

	Bayer's Charact.	Signs.	Longit.			Latitude.			Magnitude.
			°	′	″	°	′	″	
Southern in the fore foot		♏	20	21	0	12	58	21	5
Northern	δ		20	39	24	11	28	12	5 . 6
Preced. of the two in the noſe	γ		26	20	43	14	25	44	5 . 6
			27	2	28	14	34	6	5 . 6
Second	λ		28	29	40	13	7	48	5
5.									
In the foot at the hand of the Centaur	ο		21	12	23	24	59	20	3
In the ham	α		19	41	13	29	57	42	3
Northern of the two ſouthern			19	51	28	32	4	49	5
Southern			19	22	26	33	21	50	5
Contiguous to the firſt of the *wolf*			20	1	0	25	49	40	5
10.									
Preced. of two in the ſhoulder			24	50	19	21	21	5	4
Subſequent			27	38	43	21	11	16	4
In the middle of the body			26	18	5	25	11	14	4
In the belly			23	54	38	26	27	47	5
In the thigh			23	51	58	78	20	23	5
15.									
Northern in the thigh			26	34	26	28	26	38	5
Southern			25	40	18	29	35	56	5
In the loins			26	53	19	32	45	56	5
South. in the extrem. of tail			15	0	7	30	8	50	5
Northern			15	50	19	28	56	18	5
20.									
Before the neck			23	41	8	17	6	47	5
Subſequent			24	6	49	17	37	47	6
Southern of two in the throat		♐	1	43	50	17	21	0	5
Northern			2	44	50	15	30	0	5

LUPUS, in *Botany*, a name ſaid to be given by Pliny to the common hop: this is, however, an error, for though the word ſtands in moſt of the copies of that author *lupus*, the true meaning is doubtleſs *lupulus*, *the hop*. Pliny has coupled it with a word that expreſſes its climbing upon willows, calling it *lupus ſalictarius*. We find in all the old writers the *upulus*, which is the proper name of the hop before the initial, *l*, was added, joined with the word *ſalictarius*, but no where mention of *lupus ſalictarius*, unleſs in Pliny.

LUPUS, in *Ornithology*, a name given by ſome authors to the *monedula* or JACKDAW, from his voracious appetite and habit of ſtealing.

LUPUS, in *Zoology*. See WOLF.

LUPUS *aureus*, the *gold coloured wolf*, in *Zoology*, the name by which Latin authors call the creature known in Engliſh by the name of the JACKALL.

LUPUS *cervarius*, in *Zoology*, a name by which many authors have called the LYNX, from its feeding on deer.

LUPUS *marinus*, the *ſea-wolf*, the *anarhicas lupus* of Linnæus, in *Ichthyology*, a fierce and voracious ſea-fiſh, confined to the northern ſeas of our globe. It is found in thoſe of Greenland, Iceland, and Norway, on the coaſts of Scotland, and of Yorkſhire, and in that part of the German ocean which waſhes the ſhores of Holland. Its head is larger in proportion to its ſize than that of the ſhark, and rounder, a little flatted on the top; the noſe blunt; the noſtrils very ſmall; the eyes ſmall, and placed near the end of the noſe; the body is long, and a little compreſſed ſideways; the back, ſides, and fins, are all of a livid lead colour; the two firſt marked downwards with irregular, obſcure, duſky lines, which in different fiſh have different appearances. The young are of a greeniſh caſt; the belly is white; the ſkin is ſmooth and ſoft, but his teeth ſo remarkably hard and ſtrong, that if he bites againſt an anchor of a ſhip, or other iron ſubſtance, he makes a loud noiſe, and leaves his marks in the iron; the fore-teeth are ſtrong, conical, diverging a little from each other, ſtand far out of the jaws, and are commonly ſix above and ſix below, though ſometimes there are only five in each jaw: theſe are ſupported within ſide by a row of leſſer teeth, which make the number in the upper jaw ſeventeen or eighteen, and in the lower eleven or twelve. The ſides of the lower jaw are convex inwards, and the grinding teeth of this jaw are higher on the outer than the inner edges, and join to the canine teeth, but in the upper are ſeparated from them; in the centre are two rows of flat ſtrong teeth, fixed on an oblong baſis upon the bones of the palate and noſe: theſe and the other grinding teeth are often found foſſil, and called BUFONITES, or toad-ſtones. The two bones that form the under jaw are united before by a looſe cartilage, ſerving by a free motion to the purpoſe of breaking, grinding, and comminuting its teſtaceous and cruſtaceous food, as crabs, lobſters, prawns, muſcles, &c. At the entrance of the gullet, above, and below, are two very ſmall echinated bones. It has two fins like wings, ſituated juſt under the gills; and one long dorſal fin running from the head to the tail: and another reaching from the anus to the tail; the tail is round at its end, and conſiſts of thirteen rays. This fiſh grows to a large ſize, being ſometimes found on the Yorkſhire coaſt of the length of four feet, and near Shetland more than ſeven feet. Pennant. See *Tab.* III. *Fiſh*, N° 22.

To LURCH, in *Fencing*, is to make an opening in order to invite your adverſary to thruſt at you, when you, being ready, may find a favourable repoſt at him.

LURCHER, among *Sportſmen*, a kind of hunting DOG, like a mongrel greyhound, with pricked ears, a ſhaggy coat, and generally of a yellowiſh white colour.

LURE, in *Falconry*, a piece of red leather cut in form of a bird, with two wings ſtuck with feathers, and ſometimes baited with a piece of fleſh: wherewith to reclaim, or call back the hawk.

The word comes from the French *leurre*, which ſignifies the ſame; formed, according to Skinner, from the Anglo-Saxon, *læura*, *traitor*; or, according to Tripaud, from *leora*, *craftineſs*. See FALCON and HAWKING.

LUSCINIA, the *nightingale*. See NIGHTINGALE.

LUSHBURGHS, or LUXENBURGHS, in our *Old Writers*, a baſe ſort of foreign coin, made of the likeneſs of Engliſh money, and brought into England in the time of Edw. III. to deceive the king and his people: on account of which it was made treaſon, for any one willingly to bring any ſuch money into the realm, as knowing it to be falſe. Stat. 23 Edw. III. 3 Inſt. 1.

LUSITANICA *rubra bolus*, is an impure earth, of a florid red colour, compact texture, and heavy: it colours the hands, and is very friable, readily diſſoluble in water, and raiſes with it a ſtrong ebullition: it melts readily in the mouth, has a ſtrong aſtringent taſte, is gritty, and adheres firmly to the tongue. It acquires hardneſs and a brighter colour by burning; it is of an alkaline quality; it is dug in the kingdoms of Portugal and Spain; it is alſo found near the Havannah and La Vera Cruz in New Spain. It is eſteemed a very valuable aſtringent, and an effectual remedy for fluxes and other diſtempers of that kind. It is alſo accounted alexipharmic by the Spaniards and Portugueſe. They made an earthen ware of this *bole*, which they call *bucaros*: the ware is of a fine red colour, ſmooth and poliſhed, though it is merely dried and not glazed. They uſe it to filtre, cleanſe, and cool the water. Veſſels of the ſame kind are alſo brought from the Havannah and Vera Cruz.

LUST, at *Sea*. If a ſhip *heel* either to the ſtar-board or port, the ſeamen ſay ſhe hath a *luſt* that way; and they ſay ſo though it be occaſioned only by the ſhooting of her ballaſt, or by the unequal ſtowing of things in the hold; though it is more properly ſaid of a ſhip, when ſhe is inclined to heel any way upon account of her mold or make.

LUST-*wort*, in *Botany*. See SUN-*dew*.

LUSTER, or LUSTRE, gloſs, or brightneſs appearing on any thing; particularly on manufactures of ſilk, wool, or ſtuff.

LUSTRE is alſo uſed for a certain compoſition, or manner of giving that gloſs or brilliance.

The *luſtre* of ſilks, in which their chief beauty conſiſts, is given them by waſhing in ſoap, then clear water, and dipping them in alum-water cold.

The *luſtre* of black taffety is given by double-brewed beer, boiled with orange or lemon-juice; that of coloured taffetas with water of gourds, diſtilled in an alembic. Curriers give a *luſtre*, or gloſs to the leather ſeveral ways, according to the colour to be illuſtrated. For blacks, the firſt *luſture* is with juice of barberries; the ſecond with gum arabic, ale, vinegar, and Flanders glue, boiled together: for coloured leathers they uſe the white of an egg beaten in water: moroccos have their *luſtre* from juice of barberries, and lemon or orange.

For hats, the *luſtre* is frequently given with common water; ſometimes a little black dye is added. The ſame *luſtre* ſerves ſkinners, except that in white furs they never uſe any black dye. For very black furs they ſometimes prepare a *luſtre* of galls, copperas, Roman alum, ox's marrow, and other ingredients.

The *luſtre* is given to cloths and mohairs, by PRESSING them under the CALENDER.

LUSTRE, an appellation given to a branched candleſtick, when made of glaſs. See BRANCH and JESSE.

LUSTRAL, an epithet given by the ancients, to the water uſed in their ceremonies, to ſprinkle and purify the people. From hence the Romaniſts have borrowed the holy water uſed in their churches.

LUSTRAL *day*, *dies* LUSTRICUS, that whereon the luſtrations were performed for a child, and its name given; which was uſually the ninth day from the birth of a boy, and the eighth from that of a girl. Though others performed the ceremony on the laſt day of that week wherein the child was born, and others on the fifth day from its birth.

Over this feaſt day the goddeſs Nundina was ſuppoſed to preſide; the midwives, nurſes, and domeſtics, handed the child backwards and forwards, around a fire burning on the altars of the gods, after which they ſprinkled it with water; hence this feaſt had the name of AMPHIDROMIA. The old women mixed ſaliva and duſt with the water. The whole ended with a ſumptuous entertainment. The parents received gifts from their friends on this occaſion. If this child was a male, their door was decked with an olive-garland; if a female with wool, denoting the work about which they were to be employed. Potter.

LUSTRATION, *expiation*, in *Antiquity*, ſacrifices or ceremonies, by which the Romans purified their cities, fields, armies, or people defiled by any crime, or impurity. Some of the *luſtrations* were public, othere private.

There were three ſpecies, or manners of performing *luſtration*; viz. by fire and ſulphur; by water; and by air; which laſt was done by fanning and agitating the air round the thing to be purified.

There was alſo a peculiar kind of *luſtration* for young children.

Lomier has a volume expreſs on the *luſtrations* of the ancients: Joh. Lomieri Zutphanenſis Epimenedes, ſive de veterum Gentilium *Luſtrationibus*; firſt printed at Utrecht in 1681, and ſince, with additions, in 1702, 4to.

All perſons, ſlaves only excepted, he ſhews, were miniſters of ſome ſort of *luſtration*. When any one died, the houſe was to be ſwept after a particular manner, by way of purification: the prieſt threw water on new married people, with the like intention. To purify themſelves, people would even ſometimes run naked through the ſtreets; ſuch was their extravagance. And, as if fancy was not fertile enough in inventing modes of *luſtration*, they even uſed inchantments to raiſe the dead, in order to get inſtructions what they muſt do to purge themſelves of their ſins. Add, that they frequently raiſed the opinion of the ſanctity of their expiations by fictitious miracles.

It was common, on theſe occaſions to ſhed human blood: the prieſts of Cybele, Bellona, and Baal, made cruel inciſions on themſelves. Erectheus, king of Attica, ſacrificed his daughter to Proſerpina. Several had their throats cut at Rome, to obtain the emperor's health from the gods. Thoſe who commanded armies offered one of their ſoldiers to appeaſe the anger of the gods; that he alone might ſuffer all the wrath the army deſerved.

All ſorts of perfumes, and odoriferous herbs, had place in *luſtration*. The egg was much uſed among them, as being the ſymbol of the four elements; its ſhell, they ſay, repreſents the earth; the yolk, a globe of fire; the white, reſembles the water; and beſides it has a ſpirit, they ſay, which repreſents the air. For this reaſon it is, that the bonzes, or Indian prieſts, believe to this day that the world came out of an egg. There is ſcarce any pot-herb, pulſe, tree, mineral, or metal, which they did not offer the gods by way of expiation: nor did they forget milk, bread, wine, or honey: what is more, they made uſe of the very ſpittle, and urine.

The poets had feigned, that the gods purified themſelves, and they did not omit to purify their ſtatues. They made *luſtration* for children the eighth day after their birth. When a man who had been falſely reputed dead, returned home, he was not to enter his houſe by the door. It was a ſettled cuſtom to offer no expiation for thoſe who were hanged by order of juſtice; or that were killed by thunder. Neither did they offer any for thoſe who were drowned in the ſea; it being the common opinion, that their ſouls periſhed with their bodies. And hence it was, that perſons in danger of ſhipwreck, ſometimes thruſt their ſwords through their bodies, that they might not die in the ſea; where they thought their ſoul which they ſuppoſed to be a flame, would be totally extinguiſhed. The moſt celebrated expiatory ſacrifice was the hecatomb, when they offered a hundred beaſts; though they commonly did not offer ſo many, but contented themſelves with killing twenty-five; but thoſe being quadrupeds, their feet came to an hundred.

The manner of the Macedonians purifying their army by *luſtration* was this; at the time of their feſtival Xanthica, they divided a bitch into two halves, one of which, together with the entrails, was placed upon the right hand, the other upon the left; between theſe the army marched in this order: after the arms of the Macedonian kings, came the firſt line of the army, conſiſting of horſe; theſe were followed by the king, and his children, after whom went the life guards; then followed the reſt of the army: this done, the army was divided into two parts, one of which being ſet in array againſt the other, there followed a ſhort encounter in imitation of a fight. Potter, Archæol. Græc. lib. ii. c. 20. tom. i. p. 417.

Luſtrations, and luſtratory ſacrifices, were not only performed for men, but alſo for temples, altars, theatres, trees, fountains, rivers, ſheep, fields, and villages. When the Arval brothers offer a victim for the fields, their ſacrifice was called *ambarvalia*.

Cities were alſo to be purified, from time to time: ſome made the victim walk round their walls, and then ſlew him. The Athenians ſacrificed two men, one for the men of their city, and the other for the women. The Corinthians ſacrificed the children of Medea ſo: though the poets ſay, Medea killed them herſelf. The Romans performed the ceremony of purifying their city every fifth year; whence the name of *luſtrum* was given to the ſpace of five years.

Divers of the expiations were auſtere: ſome faſted; others abſtained from all ſenſual pleaſures; ſome, as the prieſts of Cybele, caſtrated themſelves; others, that they might live chaſte, eat rue, or lay under the branches of a ſhrub called AGNUS *caſtus*.

They caſt into the river, or at leaſt out of the city, the animals or other things that had ſerved for a *luſtration*, or ſacrifice of atonement; and thought themſelves threatened with ſome great misfortune, when by chance they trod upon them. At Marſeilles, they took care to feed a poor man for ſome time; after which, they charged him with all the ſins of the country, and drove him away: thoſe of Leucade faſtened a number of birds to a man charged with their ſins, and in that condition caſt him headlong from a high tower; and if the birds hindered his being killed, they drove him out of the country.

Some of theſe ceremonies were aboliſhed by the emperor Conſtantine, and his ſucceſſors; the reſt ſubſiſted till the Gothic kings were maſters of Rome, under whom they expired; except that ſeveral of them were adopted by the popes, and brought into the church, where they make a figure to this day: witneſs the numerous conſecrations, benedictions, exorciſms, ablutions, ſprinklings, proceſſions, feaſts, &c. ſtill in uſe in the Roman church.

LUSTRINGS. A company was incorporated for making, dreſſing, and luſtrating alamodes and *luſtrings* in England, who were to have the ſole benefit thereof, by ſtat. 4 and 5 W. and M. And no foreign ſilks known by the name of *luſtrings* or alamodes are to be imported, but at the port of London, &c. Stat. 9 and 10 W. III. c. 43. See SILK.

LUSTRUM, a term uſed by the Romans, to ſignify a ſpace of five years.

Varro derives the word from *luo*, *to pay*; becauſe at the beginning of every fifth year they paid the cenſus, or tribute impoſed by the cenſors; whoſe authority, at their firſt inſtitution was continued them for five years; though afterwards it was abridged to one. Others rather derive the word from *luſtrare*, *to make a review*; becauſe once in five years the cenſors reviewed the army.

LUSTRUM was alſo a ceremony, or ſacrifice uſed by the Romans, after numbering their people, once in five years. See LUSTRATION.

The *cenſus* was accompanied always by a *luſtration* of the people, ſo the word *luſtrum*, has conſtantly been taken by the ancients and moderns for a term of five years: yet, if we enquire into the real ſtate of the caſe, we ſhall find no good ground for fixing ſo preciſe a ſignification to it ; but, on the contrary, that the CENSUS and *luſtrum* were, for the moſt part, held irregularly and uncertainly, at very different and various intervals of time, as the particular exigencies of the ſtate required. Middlet. of Rom. Sen. p. 107.

LUTATION, in *Chemiſtry*, is uſed for the cementing of chemical veſſels cloſe together.

LUTE, **Lutum**, in *Chemiſtry*, a compoſition of certain tenaceous ſubſtances, wherewith to cloſe the apertures and junctures of veſſels in diſtillation, &c.

Under *lute* is comprehended any ſort of cement, or plaſter, uſed either in the conſtruction of furnaces, or in fitting to them veſſels of glaſs or earth, that are to reſiſt a very violent fire. Some *lutes* are made of flour and water ; others of quick-lime and whites of eggs ; others, of iron-filings, brick-duſt, and linſeed-oil ; others, of potter's-earth, river-ſand, horſe-dung, powder of broken pots, caput mortuum of vitriol, droſs of iron, beaten glaſs, flocks of wool, mixed with ſalt water or bullock's blood. The *lute* uſed by Lemery was only two parts of ſand, and one of clay, tempered together in water ; which does very well for joining the noſes of retorts and their receivers in diſtilling of volatile ſpirits, &c.

Others have recommended for covering the inſide of FURNACES, a maſs of clay mixed with ſand, and moiſtened with three or four times as much ox-blood diluted with water. The beſt *lute*, and eaſieſt to be had at London, is a ſort of clay called Windſor loam, which muſt be mixed pretty ſtiff, and preſſed into the inſide of the furnace, firſt wetted with water ; and when the clay begins to dry, it muſt be beat down cloſe to the ſides with a wooden mallet ; then the unevenneſs and cracks filled up with freſh clay ſomewhat moiſter, ſo as to be made ſmooth and even with a trowel, and then left to dry gently ; and if any cracks happen, they muſt again be filled up.

Dr. Shaw recommends the following mixture : take a buſhel of Windſor loam, four quarts of brick-duſt, two quarts of powdered green glaſs, two quarts of iron filings, four handfuls of cow-hair, and eight handfuls of horſe-dung ; beat theſe all together, and add a ſufficient quantity of bullock's blood to make a ſtiff and uniform paſte

In diſtilling by the alembic, or veſica, or copper body, with its head or ſerpentine, a wet bladder ſerves very well to *lute* the junctures of the veſſels ; ſlips of paper or linen, covered with flour paſte, will alſo anſwer this purpoſe : when more penetrating and diſſolving vapours are contained in the veſſels, it will be neceſſary to uſe a *lute* formed of quick-lime ſlaked in the air, and beat into a liquid paſte, with whites of eggs, which ſhould be ſpread upon ſlips of linen, and applied exactly to the juncture of the veſſels : but for the diſtillation of corroſive ſpirits, as alſo to ſtop the cracks of glaſſes, &c. the following compoſition is recommended ; viz ſtarch boiled, or fiſh-glue diſſolved in ſpirit of wine, with flour of ſulphur, maſtic, and lime ſlaked with milk.

For this purpoſe recourſe muſt be had to what is called the fat *lute* ; made by forming into a paſte ſome dried clay, finely powdered, ſifted through a ſilken ſearce, and moiſtened with water, and then by beating this paſte in a mortar, with boiled linſeed oil, that is oil which has been rendered drying by litharge diſſolved in it, and fit for the uſe of painters. This *lute* may be made up in a cylindric form, and ſhould be applied by flattening it to the joinings of the veſſels, previouſly well dried, and the whole covered with ſlips of linen, ſpread with *lute* of lime and whites of eggs : theſe ſlips muſt be faſtened with packthread. See CÆMENT, and MORTAR.

Lute, a muſical inſtrument of the ſtring kind ; which had anciently but five rows of ſtrings ; though in courſe of time, four, five, or ſix more have been added.

Some derive the word from the German *laute*, which ſignifies the ſame ; or from *lauten*, *ſonare*. Scaliger and Bochart derive it from the Arabic, *allaud*.

The *lute* conſiſts of four principal parts : the table, the body or belly, which has nine or ten ſides ; the neck, which has nine or ten ſtops or diviſions, marked with ſtrings ; and the head or croſs, wherein are ſcrews, for raiſing or lowering the ſtrings to the proper tone. In the middle of the table is a roſe, or paſſage for the ſound. There is alſo a bridge that the ſtrings are faſtened to, and a piece of ivory between the head and the neck, to which the other extremity of the ſtrings is fitted. In playing the ſtrings are ſtruck with the right hand, and with the left the ſtops are preſſed.

The *lutes* of Bologna are eſteemed the beſt ; on account of the wood, which is ſaid to have an uncommon diſpoſition for producing a ſweet ſound. The theorbo is an improvement on the common *lute*.

Lute, *temperament of the*, denotes the alteration requiſite to be made in the intervals, both with regard to concords, and diſcords, in order to render them more juſt on that inſtrument.

Lute, *archi.* See ARCILUTO.

Lute, *theorbo.* See THEORBO.

LUTEA, in *Natural Hiſtory*, the name of a ſpecies of fly found frequently near waters after rain ; it is of a dunniſh yellow colour, the wings are long, and the eyes large and prominent ; the tail is thick, and has two hairs of a conſiderable length, growing at the head, ſo that it is of the biſetæ kind.

Lutea is alſo a name by which ſome authors have called the YELLOW *hammer*.

LUTEOLA, in *Botany*. See DYER's *weed*.

Luteola, in *Ornithology*, a name given by many to a ſmall bird, the *motacilla trochilus* of Linnæus, called by others *aſilus*, and by others *regulus non criſtatus* ; but this laſt is a name that has occaſioned ſome confuſion, as many have erroneouſly called our common wren the *regulus*, and as it has no creſt, imagined it to be the bird meant by this name.

It is, excepting the creſted wren, the ſmalleſt of all European birds, and it very little exceeds that in ſize ; its head, neck, and back are of a greeniſh brown ; the rump is greener than the reſt ; it has a yellow line on each ſide, extended from the noſtrils, beyond the eyes, to the hinder part of the head ; the breaſt, throat, and belly are yellow, with a very faint caſt of green ; the wings and tail are brown, and all their feathers are tipped with green at their ends ; the under part of the wings has much of a very fine green ; the beak is extremely ſlender and half an inch long ; the mouth is yellow within ; it makes a loud noiſe, like that of a graſshopper, and is principally found among willows ; it is continually creeping and ſinging among the branches of trees ; it builds with ſtraw and feathers, and lays five eggs, which are white and ſpotted with red : there is a conſiderable variation in the colours of theſe birds ; ſome of them being much greener on the back, and much whiter on the belly, than others.

LUTHERANISM, in *Eccleſiaſtical Hiſtory*, the ſentiments of Dr. Martin Luther, and his followers, with regard to religion.

Lutheraniſm had its riſe in the 16th century ; its author was born at Eiſleben in Thuringia, in 1483 After his ſtudies he entered himſelf among the Auguſtines, and having found a copy of the Bible, which lay neglected in the library of his monaſtery, he devoted himſelf with ſurpriſing aſſiduity to the ſtudy of the ſcriptures ; and in 1512, took the cap of a doctor in theology, in the univerſity of Wittemberg. In 1516, he attacked the ſchool-divinity in ſeveral theſes. In 1517, Leo X. ordered indulgences to be diſpenſed to thoſe who ſhould contribute towards the building of St. Peter's church at Rome, comprehending all ſins paſt, preſent, and future : Albert, archbiſhop of Mentz and Magdeburgh, appointed John Tetzel, a monk of the Dominican order, notorious for his profligacy, barbarity, and extortion, to preach and proclaim theſe indulgences in Germany. The inſolence and indecency with which Tetzel executed his commiſſion, rouzed the indignation of Luther, who, in ninety-five propoſitions, maintained publicly at Wittemberg, on the 30th of September, 1517, cenſured the extravagant extortion of theſe queſtors, and plainly pointed out the Roman pontiff as a partaker of their guilt ; ſince he ſuffered the people to be ſeduced by ſuch deluſions from placing their principal confidence in Chriſt, the only proper object of their truſt.

He alſo wrote to Albert, warmly remonſtrating againſt the falſe opinions and wicked lives of the preachers of indulgences ; and in order to gain the ſuffrage of men of learning, he publiſhed his ninety-five theſes ; appointing a day on which the learned were invited to impugn them either in perſon, or by writing, and ſubjoining to the whole, ſolemn proteſtations of his high reſpect for the apoſtolic ſee, and of his implicit ſubmiſſion to its authority. No opponent appeared at the time appointed ; the theſes ſpread over Germany with aſtoniſhing rapidity ; they were much read and approved : at the ſame time the boldneſs and novelty of his opinions drew great attention from his hearers, and being recommended by the authority of Luther's perſonal character, and by a popular and perſuaſive eloquence, made a deep impreſſion. Luther was alſo an Auguſtinian, and Tetzel a Dominican ; and, therefore, he was more encouraged than oppoſed by the friars of his own order, who hoped to ſee the Dominicans expoſed to the hatred and ſcorn of the people. He was alſo ſecretly ſupported by his ſovereign, the elector of Saxony, who wiſhed to ſee the exactions of the court of Rome reſtrained. This was the commencement and foundation of that memorable rupture and revolution in the church, which humbled the grandeur of the lordly pontiffs, and eclipſed ſo great a part of their glory. See REFORMATION.

It has been ſaid indeed by F. Paul, in his Hiſtory of the Council of Trent, p. 5. and after him by Mr. Hume, in his Hiſtory of England, vol. i. p. 119. as well as by others, that the Auſtin friars had been uſually employed in preaching indulgences in Saxony; but that Arcemboldo, a Genoeſe merchant, who was employed by Magdalen, the ſiſter of Leo, to whom he had granted the profits ariſing from the ſale of indulgences in Saxony, to collect the money that ſhould be raiſed, and his deputies, hoping to gain more by committing this truſt to the Dominicans, had bargained with Tetzel; and that Luther was prompted at firſt to oppoſe Tetzel and his aſſociates, and to deny indulgences, by a deſire of taking revenge for this injury offered to his order. Mr. Chambers, in the former edition of this work, followed the Diction. de Trevoux, as that Dictionary ſeems to have adopted the repreſentation of Boſſuet; and, more lately, the editors of the Encyclopedie have ſtated the firſt riſe of *Lutheraniſm* in a manner that favours the opinion juſt mentioned: it is proper, therefore, to obſerve, that the profits ariſing from indulgences in Saxony and the adjacent countries, were granted, not to Magdalen, the ſiſter of Leo, but to Albert, archbiſhop of Mentz, who had the ſole right of nominating thoſe who publiſhed them: moreover, Arcemboldo never had any concern in the publication of indulgences in Saxony; becauſe his diſtrict was Flanders and the Upper and Lower Rhine. Beſides, the publication of indulgences in Germany was not uſually committed to the Auguſtinians: from the year 1229, that lucrative commiſſion was principally intruſted with the Dominicans; and they had been employed in the ſame office a ſhort time before the preſent period: the promulgation of them, at three different periods under Julius II. was granted to the Franciſcans, and the guardian of the Franciſcans was joined in the truſt with Albert on this occaſion, though he refuſed to accept it: and it is remarkable, that for half a century before Luther, viz. from 1450 to 1517, the name of an Auſtin friar employed in this ſervice, occurs but once. To theſe facts it may be added, that it is far from being probable, that Luther would have been ſolicitous about obtaining for himſelf or his order, a commiſſion of this kind, at a time when the preaching of indulgences was become very unpopular; inſomuch that all the princes of Europe, and many biſhops, as well as other learned men, abhorred the traffic; and even the Franciſcans and Dominicans, towards the concluſion of the fifteenth century, oppoſed it publicly, both in their diſcourſes and writings: nor was this commiſſion given to the Dominicans in general, but ſolely to Tetzel. Finally, Luther was never accuſed of oppoſing the publication of indulgences from reſentment or envy, either in the edicts of the pontiffs of his time, or in the reproaches of his contemporary writers, who defended the cauſe of Rome from the year 1517 to 1546, and who were far from being ſparing of their invectives and calumnies. The reader may find this matter fully ſtated by Dr. Maclean, the tranſlator of Moſheim's Eccleſiaſtical Hiſtory, in vol. iii. p. 304. note (p) 8vo. ed. and by Dr Robertſon in his Hiſt. of Ch. V. vol. ii. p. 125. note *, 8vo. edit.

But to return from a digreſſion, which, it is hoped, will not be unacceptable to the readers of a work of this kind: the ſentiments of Luther were received with applauſe by the greateſt part of Germany; and the alarm of controverſy being ſounded, Tetzel publiſhed counter-theſes in oppoſition to thoſe of Luther, and was ſupported by Priario, Eckius, and others. Leo, however, treated the diſpute at firſt with indifference and contempt; till being rouſed by Luther's adverſaries, he ſummoned him to appear at Rome: but partly by Luther's own application to the pontiff, and partly by the interference of Frederic the Wiſe, elector of Saxony, cardinal Cajetan, a Dominican, the pope's legate in Germany, was appointed to hear and determine the cauſe. The cardinal, in an arrogant and overbearing manner, inſiſted on Luther's renouncing his opinions, and ſubmitting reſpectfully to the judgment of the Roman pontif. The intrepid reformer was not to be awed into compliance; and leaving Augſburgh, the place of conference, returned into his own country. But before his departure, he prepared a ſolemn appeal from the pope ill informed at that time concerning his cauſe, to the pope when he ſhould receive more full information concerning it. Leo, enraged at the obſtinacy of Luther, publiſhed an edict in 1518, commanding his ſpiritual ſubjects to acknowledge his power of delivering from all the puniſhments due to ſin and tranſgreſſion of every kind: upon this meaſure, Luther appealed from the pontif to a general council. The pope, repenting of his precipitance, and deſirous of bringing the diſpute to an amicable concluſion, employed Miltitz, a Saxon knight, to negociate with Luther: but, though there ſeemed at firſt to be ſome hopes of a reconciliation, the violence of the enemies of Luther blaſted theſe agreeable expectations, and kindled anew the flames of diſcord. At length Leo X. iſſued out a bull againſt Luther, dated the 15th of June, 1520, condemning forty-one heretical propoſitions ſelected from his writings, ordering his works to be burnt, and prohibiting their being read; and ſummoning Luther himſelf, on pain of excommunication, to acknowledge and retract his errors In conſequence of this raſh and furious ſentence, Luther withdrew himſelf in the moſt public manner from the communion of the church of Rome; commiting to the flames at Wittemberg, before a vaſt multitude of ſpectators, the pope's bull of excommunication, and all the decretals and canons relating to the pope's ſupreme juriſdiction. Soon after this a ſecond bull was iſſued againſt him on the 6th of January, 1521, by which he was expelled from the communion of the church, for having inſulted the majeſty and diſowned the ſupremacy of the Roman pontif. Theſe violent meaſures led this bold reformer to form the project of founding a church, upon principles entirely oppoſite to thoſe of Rome, and to eſtabliſh in it a ſyſtem of doctrine and eccleſiaſtical diſcipline, agreeable to the ſpirit and precepts of the goſpel of truth: in this noble undertaking he was encouraged by many learned and pious men in various parts of Europe, and eſpecially by the celebrated Melancthon. In 1521, Charles V. ſummoned Luther to appear before the diet at Worms, where he behaved with great decency and equal firmneſs; he acknowleged an exceſs of vehemence and acrimony in his controverſial writings, but refuſed to retract his opinions unleſs he were convinced of their falſhood, or to conſent to their being tried by any other rule than the word of God. However, after his departure, when it was found that neither intreaties nor threats could be of any avail, he was condemned by the unanimous ſuffrages both of the emperor and the princes, and declared an enemy to the whole Roman empire. Frederic, the elector of Saxony, contrived to preſerve him from the violence of his enemies, by ſeizing him on his return, and carrying him to the caſtle of Wartburgh, as a place of ſafety: in this retreat, which he called his Patmos, Luther was concealed for the ſpace of ten months, where he employed himſelf in preparing ſeveral uſeful compoſitions. During his confinement his opinions gained ground; and the Auguſtinians of Wittemberg, with the approbation of the univerſity and the connivance of the elector, aboliſhed the celebration of private maſſes, and gave the cup as well as the bread to the laity, in the adminiſtration of the Lord's ſupper. Neverthleſs, at this time, his opinions were ſolemnly condemned by a decree of the univerſity of Paris, and in a Treatiſe on the ſeven Sacraments, publiſhed by Henry VIII. of England. Luther ſoon publiſhed his animadverſions both on the decree of of the univerſity and the work of the Engliſh monarch. In the month of March, 1522, he quitted his retreat, and returned to Wittemberg, in order to check the furious zeal of Caroloſtadt and his fanatical followers, who had begun to excite tumults in Saxony; and his appearance alone ſuppreſſed that ſpirit of extravagance which began to ſeize his party. Whilſt Luther was in confinement, he had begun to tranſlate the Bible into the German tongue, and in 1524, by his own diligent application, and the aſſiſtance of Melancthon and ſeveral other of his diſciples, he finiſhed part of the New Teſtament; and the publication of it proved more fatal to the church of Rome than that of all his own works. The advocates for reformation in the other countries of Europe, were thus encouraged to publiſh verſions of the ſcriptures in their own languages: and ſeveral cities and princes of Germany embraced the reformed religion, and patronized Luther's opinions: and though the ſucceeding popes Adrian VI. and Clement VII. exerted their utmoſt efforts to prevent their ſpreading, they proved altogether ineffectual. In a word, the character of the man, the ſtrength of his arguments, and the weakneſs of his adverſaries cauſe, procured him an increaſing number of followers. And thus it was that *Lutheraniſm* was formed; the adherents whereto were called *Lutherans*, from *Lutherus*, a name which has a Greek turn, and which he aſſumed in lieu of his family name, *Lotter*, or *Lauther*; it being the cuſtom of thoſe days, for men of learning to give themſelves Greek names; witneſs Eraſmus, Melancthon, Bucer, &c.

In 1523, Luther quitted the habit of a religious, and in 1526, married Catharine à Boria, a nun of a noble family, who, having thrown off the veil, had fled from the cloiſters; and after having been an happy inſtrument of reforming a great part of Germany, under the protection of Frederic and John, electors of Saxony, he died at his native place in 1546.

For a full and accurate account of the riſe and progreſs of *Lutheraniſm*, the reader may conſult Moſheim and Robertſon, ubi ſupra. See PROTESTANTS and REFORMATION.

Lutheraniſm, has undergone ſome alterations ſince the time of its founder. Luther rejected the epiſtle of St. James, as inconſiſtent with the doctrine of St. Paul, in relation to juſtification; he alſo ſet aſide the Apocalypſe;

both which are now received as canonical in the Lutheran church.

Luther reduced the number of ſacraments to two, viz. baptiſm, and the euchariſt; but he believed the impanation, or CONSUBSTANTIATION: that is, that the matter of the bread and wine remain with the body and blood of Chriſt; and it is in this article, that the main difference between the Lutheran and Engliſh churches conſiſts.

Luther maintained the maſs to be no ſacrifice; he exploded the adoration of the hoſt, auricular confeſſion, meritorious works, indulgences, purgatories, the worſhip of images, &c. which had been introduced in the corrupt times of the Romiſh church. He alſo oppoſed the doctrine of free-will; maintained predeſtination: aſſerted that we are neceſſitated in all we do; that all our actions done in a ſtate of ſin, and even the virtues themſelves of heathens, are crimes; that we are only juſtified by the imputation of the merits and ſatisfaction of Chriſt. He alſo oppoſed the faſtings in the Romiſh church, monaſtical vows, the celibacy of the clergy, &c.

Some authors reckon thirty-nine different ſects, which at different times have ſprung up among the Lutherans.

LUTHERANS, a ſect of Proteſtants who profeſs Lutheraniſm, or adhere to the doctrine and tenets of Luther.

The *Lutherans*, of all Proteſtants, are thoſe who differ leaſt from the Romiſh church; as they affirm, that the body and blood of Chriſt are materially preſent in the ſacrament of the Lord's ſupper, though in an incomprehenſible manner; and likewiſe repreſent ſome religious rites and inſtitutions, as the uſe of images in churches, the diſtinguiſhing veſtments of the clergy, the private confeſſion of ſins, the uſe of wafers in the adminiſtration of the Lord's ſupper, the form of exorciſm in the celebration of baptiſm, and other ceremonies of the like nature, as tolerable, and ſome of them as uſeful. The *Lutherans* maintain, with regard to the divine decrees, that they reſpect the ſalvation or miſery of men, in conſequence of a previous knowledge of their ſentiments and characters, and not as free and unconditional, and as founded on the mere will of God. Towards the cloſe of the laſt century, the *Lutherans* began to entertain a greater liberality of ſentiment than they had before adopted; though in many places they perſevered longer in ſevere and deſpotic principles than other proteſtant churches. Their public teachers now enjoy an unbounded liberty of diſſenting from the deciſions of thoſe ſymbols or creeds, which were once deemed almoſt infallable rules of faith and practice, and of declaring their diſſent in the manner they judge the moſt expedient. Moſheim attributes this change in their ſentiments to the maxim, which they generally adopted, that Chriſtians were accountable to God alone for their religious opinions; and that no individual could be juſtly puniſhed by the magiſtrate for his erroneous opinions, while he conducted himſelf like a virtuous and obedient ſubject, and made no attempts to diſturb the peace and order of civil ſociety. Eccl. Hiſt. vol. iv. p. 440. Eng. ed. 8vo.

LUTHERN, from the French *lucarne*, of the Latin *lucerna*, *light*, or *lantern*, a kind of window over the cornice, in the roof of a building; ſtanding perpendicularly over the naked of the wall; and ſerving to illuminate the upper ſtory.

The French architects diſtinguiſh theſe into various kinds, according to their various forms; as *ſquare*, *ſemicircular*, *bulls eyes*, *flat arches*, *Flemiſh lutherns*, &c.

LUTRA, in *Zoology*. See OTTER.

LUTUM, in *Botany*, a name given by the ancient Roman authors to a plant ſince called *luteola*, or DYER's *weed*, and by authors of later date *carniola*, and *cymene*. It is uſed at this time to dye things yellow, and was ſo by the ancient Greeks, who expreſly mention the dying woollen cloth with it. The Roman courtezans had alſo a way of dying their hair yellow with it.

LUTUM *ſapientiæ* is the hermetical ſeal; made by melting the end of a glaſs veſſel by a lamp, and twiſting it up with a pair of pliers.

LUXATION, LUXATIO, formed from *luxare*, *to looſen*, in *Medicine* and *Surgery*, the ſlipping of the head of a bone from its proper receptacle into another place, whereby the natural motion of the joint is deſtroyed.

Luxation is the ſame with what is otherwiſe called DISLOCATION; being the diſplacing of a bone, or rather the disjointing of two bones, articulated together for the motion of the part.

Luxations are either violent, proceeding from ſome external cauſe; as falls, ſtrains, blows, leaps, extenſions, &c. Or *gentle*, ariſing from internal cauſes; as a natural laxity of the ligaments, a fluxion of humours, or gradual collection thereof between the joints, &c.

Luxation, properly, has place only amongſt bones whoſe ſtructure determines them to a manifeſt motion: ſuch are all thoſe united by DIARTHROSIS: thoſe articulated by SYNARTHROSIS, where there is no manifeſt motion, are indeed ſubject to fracture, caries, exoſtoſis, &c. but not to *luxation*.

Luxations, again, are either *perfect*, or *imperfect*.

LUXATION, *perfect*, or *complete*, εξαρθρημα, is that where the head of a bone is actually ſtarted out of the cavity of another. This is known by a tumor or protuberance, formed by the head of the ſeparate bone, which raiſes up the ſkin and muſcular fleſh above its natural level in the part not deſtined to receive it; and an hollowneſs or ſinking in the place from whence it is ſtarted, perceivable by the touch. It is alſo attended with great pain, a total abolition of motion, and a ſhortening of the limb.

LUXATION, *imperfect*, *or partial*, παραρθρημα, called alſo *ſublaxation*, is where the motion is only much impaired, the joint weakened, and a deformity perceivable in it, when compared with the oppoſite part, which is ſound. This is otherwiſe called a *ſtrain*, when it proceeds from an external cauſe; or, ſimply, a *relaxation*, when from an internal one.

A *luxation* is ſaid to be *ſimple*, when it has no other accident or injury accompanying it—*complicated*, when it is attended with a wound, inflammation, fracture, or the like.

The cure of a *luxation* is by a ſpeedy reduction of the diſlocated member to its natural place. To this are neceſſary: 1. *Extenſion*, which a luxated as well as fractured member requires; as well on account of the contraction of the tendons, as that the head of the bone may more directly be intruded into its ſeat. This extenſion is made either by the hands alone, which is called *modus palaſtricus*, becauſe among wreſtlers, diſlocated members uſed to be reduced after this manner; or by ligatures or towels; or by inſtruments, or great machines, when the *luxation* is difficult and inveterate.

2. After extenſion follows the intruding of the joint into the natural cavity; which, likewiſe, may either be effected by the hands only, or by the heel (as when the head of the os humeri is fallen into the arm-pit), or by means of ladders, doors, peſtles, or Hippocrates's inſtruments, called *ambe*. This way is termed *methodical*, by way of diſtinction from the third, which is called *organical*, becauſe performed by large inſtruments, and machines, but now altogether out of uſe. Gourmelinus to theſe adds αποθεσις, the very act of reducing the member into its own place, which is to be known by the ſound uſually heard, and from the uſe and motion of the reduced joint. Laſtly, becauſe, on account of the laxity of the tendons &c. the reduced bone cannot remain in its natural poſition, it is neceſſary yet farther to apply compreſſes and bandage; by whoſe means the articulation is preſerved ſafe till the ligaments may acquire their uſual ſtrength of elaſticity and aſtriction.

A recent *luxation* or diſlocation may generally be reduced by extenſion alone, which muſt always be greater or leſs, according to the ſtrength of the muſcles which move the joint, the uſe, robuſtneſs, and other circumſtances of the patient. When the bone has been out of its place for any conſiderable time, and a ſwelling or inflammation has come on, it will be neceſſary to bleed the patient, and, after fomenting the part, to apply ſoft poultices, with vinegar, to it for ſome time before the reduction be attempted. After the reduction, it is only neceſſary to apply cloths dipped in vinegar, or camphorated ſpirits of wine to the part, and to keep it perfectly eaſy.

LUXATION *of the ancle*, *clavicle*, *os coccygis*, *cubitus*, *fibula*, *fingers*, *hand*, *humerus*, *jaw*, *knee*, *neck*, *noſe*, *os calcis*, *ribs*, *thigh*, and *vertebræ*. See ANCLE, CLAVICLE, *Os* COCCYGIS, &c.

LUXURY, denotes an addictedneſs to ſenſual pleaſure. Exceſs of diet, which is one ſpecies of *luxury*, is prohibited by 10 Edw. III. ſtat. 3. which ordains that no man ſhall be ſerved at dinner or ſupper with more than two courſes; except upon ſome great holiday there ſpecified, in which he may be ſerved with three.

LUZZO *marino*, in *Ichthyology*, a name given by the Italians to the fiſh called by the ancient Greek writers, and many of the modern Latin authors, SPHYRÆNA; and by Pliny, Varro, and ſome other of the old Roman authors, SUDIS. Gaza has called it the *malleolus*, and the French at this time, call it *ſpet*. It ſeems to belong to the genus of the *ſcombri*. Salvian has given the figure of it, but it is an imperfect one; for he has omitted the firſt fin of the back.

LYCÆA, Λυκαια, in *Antiquity*, an Arcadian feſtival reſembling the Roman LUPERCALIA, in which the conqueror was rewarded with a ſuit of brazen armour.

LYCANTHROPY, Λυκανθρωπια, formed of λυκος, *wolf*, and ανθρωπος, *man*, q. d. *man-wolf*, a ſpecies of madneſs, wherein thoſe affected run in the night-time, howling, about the fields like wolves; and ſometimes bite and ſnarl like dogs: whence the diſeaſe is alſo called by the ancients *cynanthropy*.

Lycanthropy is alſo uſed by ſome to expreſs an imaginary metamorphoſis of a man into a wolf, by magic powers; wherein the perſons affected ſeem not only to themſelves in the form of wolves, but to others. See MADNESS.

LYCEUM, Λυκειον, in *Antiquity*, the name of a celebrated ſchool, or academy at Athens, where Ariſtotle explained his philoſophy.

The place was compoſed of porticoes, and trees planted in the quincunx form, where the philoſophers diſputed walking. Hence *philoſophy of the Lyceum* is uſed to ſignify the philoſophy of Ariſtotle, or the Peripatetic philoſophy. Suidas obſerves, that the *Lyceum* took its name from its having been originally a temple of Apollo *Lyceus*; or rather, a portico or gallery built by Lyceus, ſon of Apollo: but others mention it to have been built by Piſiſtratus, or Pericles.

LYCHNIDEA, in *Botany*. See PHLOX.

LYCHNIS, in *Botany*. See CAMPION.

LYCHNITES *marmor*. See MARBLE.

LYCIUM, in the *Materia Medica*, the name of a fruit called by the French *baye d'Avignon*, the AVIGNON *berry*, and by many authors the *pyxacantha*. The ſhrub which produces it is the *lycium ſive pyracantha* of Gerrard. See *Box* THORN. The fruit is about the ſize of a grain of wheat, and is not round, but of an angular form when dried, ſometimes of three, ſometimes of four angles, and ſometimes dented in at one end like a heart. It is of a yellowiſh green colour, and of a bitter and aſtringent taſte. It ſhould be choſen freſh dried, and large. There was formerly a rob, or inſpiſſated juice made from theſe berries, much in uſe in medicine; but this was generally adulterated with a rob made of the berries of the woodbine, privet, ſloe, or other ſhrub, and is now quite out of uſe. The dyers in France and Holland uſe it for a yellow; and the Dutch have another uſe for it, which is, that they boil it in alum-water, and mixing it in whiting, form it into twiſted ſticks, which they ſell to the painters in water-colours, under the name of *ſtil de grain*.

LYCOCTONON. See ACONITE.

LYCODONTES. See BUFONITÆ.

LYCOGALA, in *Botany*, a name by which Micheli has called ſeveral of the ſpecies of MUCOR.

LYCOIDES, a term uſed by medical writers to expreſs the diſorders which ariſe in the human body by a along retention of the ſeed. Theſe are ſometimes madneſs, and very often dangerous quinſies and ſwellings, and inflammations about the neck and throat. If we conſider the natural tendency of the diſorders of this kind to affect the neck, and the remarkable ſwelling of the necks of bucks, and ſome other animals at rutting time, it may give ſome rational hints towards underſtanding the alteration of the voice in boys who arrive at puberty.

Blancard derives the word *lycoides*, from λυκος, *lupus*, and ειδος, *forma*, from a ſuppoſition that wolves are ſubject to this diſorder.

LYCOPERDON, in *Botany*. See PUFF-*ball*.

LYCOPERSICON, in *Botany*; *love-apple*, *wolf's peach*, or *tomatas*. Its characters are theſe: the flower which has a permanent empalement of one leaf cut into five acute ſegments at the top, has one wheel-ſhaped petal, with a very ſhort tube, and a large five-cornered brim, which ſpreads open and is plaited; it has five ſmall awl-ſhaped ſtamina which cloſe together; it has a roundiſh germen, which becomes a roundiſh fleſhy fruit or berry, divided into ſeveral cells, incloſing many flat ſeeds. There are ſeven ſpecies, one of which is the common POTATOE. Miller.

Linnæus has joined this genus and the melongena of Tournefort to the ſolanum, or NIGHTSHADE.

That ſpecies called tomatas is cultivated in many of our gardens, and its fruit eaten by the Spaniards and Italians, and by the Jew families in England, as we do cucumbers, with oil and vinegar, or elſe ſtewed in ſoups.

The plants are propagated by ſowing their ſeeds in March on a moderate hot-bed. When they are come up two inches high they are to be tranſplanted into another hot-bed of about the ſame temperature, where they are to be ſet at four inches diſtance. In this place they muſt be watered and ſhaded, and muſt have as much freſh air as may be; and in May they are to be tranſplanted into pots, or borders, and the branches, when they grow long, muſt be ſupported with ſticks, otherwiſe the fruit when it grows large, will break them. They require frequent watering, and in Auguſt ripen their fruit, which grows to a large ſize, and makes a very pretty figure. But they ſhould not be planted near habitations, for the leaves and ſtalks, when rubbed by the cloaths in people's paſſing by, yield a very ſtrong and very offenſive ſmell. Miller.

LYCOPHTHALMUS, *the wolf's eye ſtone*, a name given by ſome authors to ſuch pieces of agate or any other ſemi-pellucid ſtone, as chance to have circular ſpots in them, reſembling in colour the eye of that animal.

LYCOPODIOIDES, in *Botany*, the name of a genus of moſſes, the characters of which are theſe: it produces its ſeeds in ſpikes, in the manner of the *lycopodium*, or wolf's claw moſs, but that in two ways; for ſome of the capſules incloſe a powder, which ſeems only a farina; others ſeem to contain true ſeeds; theſe always ſtand to the number of three in each capſule. It differs from the *lycopodium* alſo in its general appearance and manner of growth, the leaves being all placed in the ſame plane, and expanded in the manner of fins, with an intermediate ſeries of ſmall leaves, which cover the upper ſide of the middle rib, or ſtalk. Of theſe moſſes there are two orders; the firſt comprehends ſuch as are creeping, or procumbent.

The ſecond order of the *lycopodioides* comprehends thoſe which are erect, or have ſome erect, and ſome procumbent or creeping branches, with erect ſhoots riſing from them. Dillen. Hiſt. Muſc. p. 465, &c. See *Tab.* XV. *of Botany*, Nº 15.

LYCOPODIUM, in *Botany*, the name of a genus of moſſes, the characters of which are theſe: it produces capſules in the alæ of certain leaves, which are very unlike the capſules of the other moſſes, having neither calyptra, operculum, nor pedicle; theſe do not ſtand as thoſe of the *ſelago*, in all the alæ of the leaves, but are collected together into a ſort of ſpike of a ſcaly ſtructure, and one capſule ſtands under every ſcale, or leaf; theſe capſules are of the ſhape of a kidney, and when ripe they ſeparate longitudinally into two parts, and throw out a powder, conſiſting of round globules. It has been ſuppoſed by many, that this powder is the farina of the flower; but as there are no ſeeds found in any other part of the plant for it to impregnate, it ſeems a much more probable opinion, that this powder, as well as that of the capſules of all the other moſſes, is the true and genuine ſeed of the plant. In moſt of the ſpecies of this plant, the ſpikes are compoſed of leaves of a different figure from thoſe of the reſt of the plant, and are therefore called ſcales; but in ſome they are made of leaves of the ſame figure with thoſe of the other parts of the moſs. See *Tab.* X. *of Botany*, Nº 14.

The firſt order of the *lycopodia*, according to Dillenius, conſiſts of thoſe which have their ſpikes ſupported on pedicles; and of theſe the firſt ſeries are diſtinguiſhed by the appellation of *juliferæ*, from their ſpikes reſembling the juli or catkins of ſome trees, and being not of the ſame leaves with the reſt of the plant.

The ſecond ſeries of the *lycopodia*, comprehends thoſe whoſe ſpikes conſiſt of leaves, the ſame with thoſe of the other part of the plant.

The ſecond order of the *lycopodia* comprehends thoſe which have ſpikes not placed on pedicles. Linnæus enumerates twenty-four ſpecies of this genus, the characters of which are, that it has a bivalve ſeſſile anthera and no calyptra.

LYCOPSIS, in *Botany*, the name of a genus of plants, the characters of which are theſe: the cup is a perianthium, divided into five broad, oblong, acute, and open ſegments, and remaining after the flower is fallen; the flower conſiſts of a ſingle petal, in form of a cylindric and crooked tube, the rim of which is ſlightly divided into five ſegments, and is obtuſe; the opening is covered with five convex and prominent ſcales, converging one towards another; the ſtamina are five extremely ſmall filaments, placed at the bending of the tube of the flower; the antheræ are ſmall and covered: the piſtil has four germina; and the ſtyle is ſlender, and of the length of the ſtamina; and the ſtigma is obtuſe and bifid; the cup is very large, and contains four oblong ſeeds.

LYCOPUS, in *Botany*. See *Water* HOREHOUND.

LYCOSTAPHYLÆ, *wolf's grapes*, in *Botany*, a name given by ſome of the Greek writers to the *pomum amoris*, a kind of eſculent nightſhade, which we have much more properly called *lycoperſicon*, the *wolf's peach*; its fruit being as large as a peach and in nothing reſembling a grape. Some of the Latin authors we find have called this *morella*; and ſome, who have not underſtood this ſynonymous uſe of the word, have miſtaken the writers to have meant the muſhroom we call morel, when they preſcribe this plant in fevers. The ſeeds of this plant are, however, what are uſually preſcribed in this caſe, and there is no danger therefore of their ſubſtituting the morel muſhroom for it, if they will ſtick to the letter of the text; the ſeeds of that morel being too ſmall to be gathered in ſuch quantities as are preſcribed.

Æmilius Macer tells, that the nightſhades, in general, were called by the name *morella* in his time: his words are, *herbam quam Græci ſtrychnum dixere, Latini morel-*

rellam dicunt. The name *morella* ſeems to be formed upon the word *morion*, a name given both by the Greeks and Latins to one of the ſleepy nightſhades, and to the male mandrake of Dioſcorides, which the ſhepherds were fond of eating; but which brought on ſleepy diſorders, if taken too largely.

LYCOSTOMUS, in *Ichthyology*, the name of a fiſh caught in the Baltic, but not very frequently, and approaching ſomewhat to the nature of the herring or pilchard. It is uſually of five or ſix inches long, and ſo fat and fleſhy, that its body is not flat, as all the herring kind have their's, but rounded; its ſcales are very ſmall and looſe, eaſily falling off on rubbing.

The name *lycoſtomus* is given by Ælian, and many other of the Greek authors, to the ANCHOVY, called by others the *encraulus* and *encrauſicholus*, and by the late writers *encraſicolus*. Artedi proves it to be only a ſpecies of the herring or clupea, and diſtinguiſhes it from the reſt by the name of the *clupea* with the upper jaw longeſt.

LYCURGIA, λυκουργεια, in *Antiquity*, a feſtival celebrated by the Spartans in memory of Lycurgus, whom they honoured with a temple, and an anniverſary ſacrifice.

LYDIAN, in *Ancient Muſic*, the ſecond ſpecies of the diapaſon.

LYDIAN *mode*. See MODE.

LYDIUM *marmor*. See MARBLE.

LYDIUS *lapis*, in the *Natural Hiſtory of the Ancients*, the name of the ſtone uſed by way of touch-ſtone for the trial of gold and ſilver, and called alſo by ſome *heraclius lapis*, both which names are alſo applied by the ancients to the load-ſtone, and hence have ariſen no ſmall miſunderſtandings of their works.

The true *lapis lydius*, or touch-ſtone, was anciently found only in the river Tmolus, but afterwards it was diſcovered in many other places, and is now very common in many of the rivers of Germany. The ancients give us very remarkable and circumſtantial accounts of the uſes they made of it, and it is plain they were able to diſcern the alloys in gold, by means of it with very great exactneſs. We at preſent uſe ſeveral different ſtones under this name, and for the ſame purpoſe; in Italy a green marble, called *verdello*, is what is moſt frequently uſed; and with us, very frequently, ſmall pieces of the BASALTES, the ſame with that vaſt maſs of black marble called the GIANT'S *Cauſeway* in Ireland.

LYEMMER. See LEVINER.

LYGDINUM *marmor*. See MARBLE.

LYGDUS *lapis*, in *Natural Hiſtory*, a name given by ſome of the ancients to the ſpecies of alabaſter, which others of them called *marmor lygdinum*, by which name there is only one ſpecies.

LYGEUM, *hooded matweed*, in *Botany*, a genus of the *triandria monogynia* claſs: the characters of which are, that it has a ſingle-leaved ſpatha, two corollæ over the ſame germen, and that the fruit is a bilocular nut; it was moſt uſually known. See MARBLE.

LYGMOS. See HICKUP.

LYGON and LYCUS, in *Botany*, are uſed for AGNUS *caſtus*.

LYING-*in-women*. The diſorders that attend *lying-in-women* are principally theſe: the ſuppreſſion, or immoderate flux of the lochia; the manner of curing which, ſee under LOCHIA. Inflammatory fevers are too common in theſe caſes, and uſually ariſe either from a retention of part of the ſecundines, a ſuppreſſion of the lochia, or taking cold; or, finally, from violent paſſions of the mind, ſuch as anger, fear, joy, or the like. Theſe fevers very often prove fatal, if not carefully treated. The beſt method in them, is to give the ſaline medicines joined to the abſorbents, partly ſaturated with acids, and the uſual attemperating powders of nitre, and the like. The diſcuſſion of the cauſe is at the ſame time to be attempted by the mild alexipharmics, among which the cortex elutherii holds a principal place, and with the uſe of theſe the patient is to be kept in a gentle breathing ſweat, during the courſe of the cure; the bowels muſt alſo be kept gently open, by means of mild ſuppoſitories, emollient glyſters, or the gentle laxative medicines in ſmall doſes. The miliary fever often alſo attends *lying-in-women*, the method of cure in which ſee under *Puerperal* FEVER, and not unfrequently they fall into the *febris popularis*, diſtinguiſhed from the other by the broadneſs of the ſpots. This uſually goes off by the uſe of attemperating and abſorbent medicines, and a gentle diaphoretic regimen; and finally, after about fourteen days, it is proper to carry off the remaining ſordes by ſome gentle doſes of rhubarb.

A bilious diarrhœa is often alſo a complaint at theſe times. This is eaſily brought on by violent paſſions, or by drinking cold liquors, or ſuch as are fæculent and fermenting; and ſometimes it ſucceeds a natural ſuppreſſion of a flux of blood. This often proves a very terrible and fatal ſymptom, being attended with violent pains, and an inflammation of the inteſtines, accompanied with an inflammatory fever, eſpecially when it continues longer than three or four days. In caſe of this ſymptom the method is to give abſorbent powders, ſuch as mother of pearl and the like; and after the matter has been corrected by this, and the other teſtaceous powders, as coral and crab's-eyes, the bitter extracts of gentian, &c. are to be given to ſtrengthen the parts, and in the intermediate days ſmall doſes of rhubarb, and, if it be neceſſary, of opiates, or other anodynes carefully corrected. Aſtringents and an improper uſe of opium are very dangerous; and it is always proper to drink a large quantity of warm diluting liquors; if it be found neceſſary to give nitre, it muſt be mixed in ſmall quantities with theſe liquors. See *Puerperal* FEVER.

Flatulencies are alſo very common to women in child-bed, from improper diſcharges of the *lochia*; theſe are cured by giving internally the common abſorbents with calx of antimony, oil of ſweet almonds, aniſated ſpirit of ſal ammoniac, eſſence of orange-peel; and, in people of hot habits, nitrous medicines, and the *ſpiritus nitri dulcis*, with carminative broths, with a ſmall quantity of ſaffron boiled in them.

After-pains are the greateſt of all the complaints of *lying-in-women*, and withal the moſt common; theſe ſometimes ariſe from difficult labour; ſometimes from ſome part of the ſecundines being left, or from blood coagulated in the uterus; they alſo frequently ariſe from the improper evacuation of the lochia, whether they be too much, or too little in the quantity; alſo from cold; from neglecting the proper binding or ligature of the abdomen after delivery; and finally, from the infant's ſucking too violently while the mother is weak.

Theſe pains are greatly mitigated by the carminative, aromatic, and nervous medicines; ſuch is the tincture of orange-peels, zedoary, angelica-root, and camomile-flowers. Caſtor is to be particularly avoided in this caſe. Candied nutmegs are a very good medicine in it, and carminative broths; with the diſtilled waters of penny-royal, baum, cinnamon, and the like. External fomentations may be uſed at the ſame time, made of decoctions of roſemary, mint, elder-flowers, and bay-berries: and the common carminative clyſters are often of the utmoſt ſervice; and finally, the carminative oils, as that of carraway, and the like, may be rubbed on the pit of the ſtomach.

Theſe pains ſeldom happen to women in their firſt *lying-in*; but they are not wholly exempt from them, for ſingular inſtances happen of their violence in thoſe caſes.

Swelling of the belly. This is another very common complaint with women after their *lying-in*; and uſually is owing to the neglecting the proper ligatures about the abdomen after delivery. The cure for this is to be found in carminatives and reſolvents, which firſt of all cleanſe the womb from all its foulneſſes, and afterwards reſtore it to its due tone. Bryony and hellebore roots in various forms, as alſo the leaves of betony, origanum and chervil ſerve to this purpoſe; and Stahl's or Becker's pills are of the moſt ſingular ſervice, but all theſe things are to be uſed for ſome time.

Swelling of the pudenda. This is a ſymptom that uſually takes its riſe from difficult delivery; and beſides the pain and other inconveniencies attending it, uſually brings on a dyſury. The proper remedies are ointments of elder, and marſhmallows, with the camphorated white ointment, commonly called by the good women ſimply unguentum. Bags of camomile flowers, with linſeed, and a little camphor, boiled in milk, and then lightly ſqueezed, are alſo of great ſervice. When the dyſury continues after the ſwelling is taken down, it is then to be treated in the common way. When there is any actual wound in the parts, the liquor of myrrh, or oil of eggs, and other balſams are to be uſed, but all fatty ſubſtances are to be carefully avoided, as they uſually occaſion tumors.

Proper treatment of lying-in-women. As ſoon as ever they are delivered, they are to be put immediately into a warm bed, and the belly wound round with a broad ſwathe or roller; they are then to be kept with the utmoſt care from external cold; for the ſweats, on the one hand, and the lochia on the other, make them extremely ſuſceptible of miſchief that way; and the conſequence is a ſuppreſſion of the lochia, with fevers of a very dangerous kind, tumors of the abdomen, and many other terrible complaints. They are then to be kept extremely quiet, and if they are not in danger of fainting, they are to be ſuffered to ſleep as ſoon as poſſible; but if there be any ſuſpicion of fainting, they muſt be kept awake three or four hours after delivery. Their ſtrength is then to be reſtored by broths of tender meats, as chicken, or the like, and by caudles. And the uſe of jellies, as of hartſhorn, and the like, is to be freely indulged. After the fourth day, when the painful buſineſs of the MILK is over, they may be indulged with good wine, drank alone, in moderate quantities. The heat of the room is to be all the time preſerved as equally as may be; and they are to be allowed to drink as much warm liquors as they pleaſe, but they muſt not touch any cold ones. The ſeveral excretions are carefully to be regarded, eſpecially the lochia. Great care muſt be taken that this diſcharge is not rendered too great by means of hot medicines, or a too hot regimen, nor ſuppreſſed by a cold regimen, or by the cold air. A gentle ſweating is to be encouraged, and promoted during the whole time; and even, if this become very conſiderable, in people of corpulent habits, it is not to be checked. Coſtiveneſs, during the two or three firſt days, is not to be regarded, for the vital principle is at that time ſo much engaged in the ſecretions of the lochia and milk, that it is no wonder if the bowels are leſs ſtimulated. No means are to be uſed to irritate the bowels in this time, nor ſhould the ſtomach be loaded with ſolid foods. After theſe firſt days are over, if the coſtiveneſs remains, it is proper to give glyſters at times, to make the patient take lubricating foods, and now and then ſwallow a little oil of ſweet almonds.

All paſſions of the mind are to be avoided in the moſt careful manner, and all occaſions of them kept from the patient. Fear is often known to ſtop the lochia, and anger to bring on hæmorrhages of a dangerous kind, and ſometimes fevers and bilious diarrhœas, and both often throw the patient into faintings. The light is to be kept out of the room in a great meaſure; for it often happens that the ſight is much impaired, and the eyes weakened in tender perſons; and ſometimes noiſes and ringing in the ears, ſometimes deafneſs is brought on.

Talking much is very improper in theſe caſes, as it eaſily throws the blood into commotions; and it is to be carefully obſerved that when the exceſſive flux of the lochia has rendered the patients very weak, and often ſubject to faintings, they are by no means to be indulged in that ſleepineſs which uſually grows upon them; for they ſometimes die in ſuch ſleeps. Bags of carminative ingredients are very properly applied to the abdomen, during the firſt days of *lying-in*, for they greatly prevent flatulencies; and it is a very good cuſtom, of ſome people, to apply cloths wetted in wine to the pudenda, when ſwelled, or otherwiſe injured in delivery. In young people, eſpecially thoſe of plethoric habits, all hot things are to be avoided, and wine is to be uſed with great caution and circumſpection. If the blood is on any occaſion thrown into commotion, abſorbents and nitrous medicines are proper: when the perſon is of a weak conſtitution, ſhe is not to be ſuffered to get out of bed until the firſt nine days are over, and not to leave her room until a month, or until five or ſix weeks are over, and then it is proper to give a doſe or two of ſome gentle purge. See DELIVERY, LOCHIA, MILK, and MOLA.

LYING *under the ſea*, in *Sea-language*, is when, in a ſtorm, the ſhip is a-hull, and the helm ſo faſtened a-lee, that the ſea breaks upon her bow, or broadſide.

LYING *along* denotes the ſtate of a ſhip, when preſſed down ſideways by a weight of ſail in a freſh wind that croſſes the ſhip's courſe either directly or obliquely.

LYING-*to*, or **LYING-*by***, denotes the ſituation of a ſhip when ſhe is retarded in her courſe, by arranging the ſails in ſuch a manner as to counteract each other with nearly an equal effort, and render the ſhip almoſt immoveable, with reſpect to her progreſſive motion, or head-way. A ſhip is uſually *brought-to* by the main or fore-top-ſails, one of which is laid a-back, whilſt the other is full; ſo that the latter puſhes the ſhip forward, whilſt the former reſiſts the impulſe, by forcing her a-ſtern. This is particularly practiſed in a general engagement, when the hoſtile fleets are drawn up in two lines of battle oppoſite to each other; it is alſo uſed to wait for ſome other ſhip, either approaching or expected; or to avoid purſuing a dangerous courſe, eſpecially in dark or foggy weather, &c. Falconer.

LYING-*to in a ſtorm*. See TRYING.

LYLAC, in *Botany*. See LILAC.

LYMPHÆ, among the *Romans*, a kind of grottoes, or artificial caves, ſo called from *lympha*, *water*; becauſe they were furniſhed with a great many tubes, canals, and ſecret paſſages, through which the water ſuddenly guſhed upon the ſpectators, while buſy in admiring the great variety and beautiful arrangement of ſhells, with which the grotto was adorned.

LYMPH, LYMPHIA, in *Anatomy*, a thin tranſparent humour, ſomething like water, ſecreted from the ſerum of the blood in all parts of the body, and returned to the blood again, by proper ducts of its own, called *lymphatics*, and ſuppoſed, by ſome, to be the immediate matter of nutrition.

If the *lymph* be chemically examined, it will be found to contain a great deal of volatile, but no fixed ſalt, ſome phlegm, ſome ſulphur, and a little earth.

The uſe of the *lymph* may be gathered from the conſideration of the parts into which it diſcharges itſelf. That which comes from the head, neck and arms, is thrown into the jugular and ſubclavian veins. All the lymphatics, which the parts in the cavity of the thorax ſend out, empty themſelves into the thoracic duct; and the *lympha*, from all the reſt of the body, flows to the common receptacle: ſo that there can be no doubt, but that its chief uſe is to dilute and perfect the chyle, before it mixes with the blood.

The late ingenious Mr. Hewſon uſes the term *lymph* to denote that part of the blood which jellies, or becomes ſolid ſpontaneouſly, when blood is received into a baſon, and, therefore, this coagulable *lymph*, which ſome have called the fibrous part of the blood or the gluten, and which, by becoming ſolid, gives firmneſs to the CRASSAMENTUM, ought not to be confounded with the SERUM of the blood, which alſo contains a ſubſtance that coagulates, when expoſed to heat, or when mixed with ardent ſpirits, or ſome other chemical ſubſtances; though it remains fluid when merely expoſed to the air. That the coagulable *lymph* gives firmneſs to the craſſamentum, whilſt the red particles of which it conſiſts give the red colour to the blood, is proved by agitating freſh blood with a ſtick, ſo as to collect this *lymph* on the ſtick, in which caſe the reſt of the blood remains fluid; and theſe two parts may be ſeparated by waſhing the craſſamentum in water, the red particles diſſolving in the water, whilſt the coagulable *lymph* remains ſolid. Mr. Hewſon, in the courſe of his experiments on this ſubject, has found, that neutral ſalts mixed with the blood, when juſt received from the vein, prevents its coagulation, or keep it fluid; but upon adding water to the mixture, it then jellies or coagulates; and on ſhaking the jelly, the coagulum will be broken, and the part ſo coagulated can be now ſeparated as it falls to the bottom, and proves to be the *lymph*. Moreover the blood, thus kept fluid by neutral ſalts, ſtill retains its property of being coagulable by heat, and by other ſubſtances as before, air excepted.

The coagulable *lymph* from various cauſes becomes ſolid in the body, and occaſions various obſtructions and inflammations: it appears therefore, to be a deſideratum of conſiderable importance, to aſcertain the cauſe of that coagulation which it always, and generally very ſoon undergoes, when it is out of the body. With this view Mr. Hewſon conſiders the particular circumſtances, in which blood, received into a baſon and there coagulating, differs from that flowing in the veſſels of a living animal. The moſt obvious and material differences are, that, in the firſt caſe, it is expoſed to the action of the air, and to that of cold, and that it is at reſt. In the laſt caſe, all theſe circumſtances are wanting. From the whole of his experiments, it appears, that the blood, when out of the body, coagulates as ſoon, when agitated and kept warm, as it does when ſuffered to reſt and to cool; and, from a compariſon of the whole, there is reaſon to conclude, that the air is a ſtrong coagulent of the blood; and that the change which this fluid ſoon undergoes in its conſiſtency, when taken from the veins, is chiefly owing to the action of that element, and not to cold, or want of motion. His experiments likewiſe tend to prove, that the inflammatory cruſt, SIZE, or BUFF, which often appears on the blood in inflammatory diſorders, is not forced from the ſerum, but from the fixation of the coagulable *lymph*, after the red particles have ſubſided. It appears alſo from his experiments and obſervations, that ſizy blood coagulates much more ſlowly than other blood; that inflammation actually leſſens the diſpoſition of that fluid to coagulate; and, that in inflammatory diſorders, where this whitiſh cruſt or ſize appears, the blood, or at leaſt the coagulable *lymph*, which conſtitutes this inflammatory ſize, is nearly attenuated. It appears farther, that the common opinion, that cold coagulates blood, is ſo far from being true, that the *lymph*, on being cooled, is deprived of its power of coagulation, when expoſed to the air. He alſo concludes, that bleeding alters the nature of the blood, not by removing the vitiated part, and given room for new blood to be formed, as has been ſuppoſed, but probably by changing that ſtate of the blood-veſſels, on which the thinneſs of the *lymph*, and the leſſening of its tendency to coagulate, depend. And although bleeding does in general weaken the action of the veſſels, increaſe the diſpoſition of the blood to coagulate and even thicken the *lymph*, yet it may happen, that the taking away blood in the ordinary quantity, may produce none of theſe effects. Phil. Tranſ. vol. lx. art. 32, 33, 34. See BLOOD, HÆMORRHAGE, HEAT, INFLAMMATION, and LYMPHATICS.

LYMPHATI or **Lymphatici**, in *Antiquity*, a name given by the Latins to poſſeſſed or mad perſons, becauſe they were thought to be gifted with divination. Plin. Nat. Hiſt. lib. xxv. cap. 5. p. 386. edit. Hard.

Theſe anſwer to the νυμφοληπτοι of the Greeks: the ancient Greeks called water *nympha*, which the Latins changed into *lympha*. The term *omphi*, ſays Mr. Bryant, is of great antiquity, and denotes an oracular influence by which people obtained an inſight into the ſecrets of futurity: it was written *omphi* or *amphi*, and ſignified the oracle of Ham, who, according to the Egyptian theology, was the ſame as the ſun, or Oſiris: and as fountains were deemed ſacred, theſe were ſtyled by the Amonians *Ain Omphe*, or the fountains of the oracle, from the divine influence with which they were ſuppoſed to abound, which terms were afterwards contracted by the Greeks into νυμφη, *a nymph*, who ſuppoſed ſuch a perſon to be an inferior goddeſs who preſided over waters. In the ſame manner from *al omphia* was derived *lympha*, which differed from aqua or common water, becauſe it was of a ſacred or prophetic nature. Analyſis of Ant. Myth. vol. i. p. 280.

LYMPHATICS, or **Lympheducts**, a ſort of fine, ſmall, tranſparent veſſels, generally ariſing from the glands, and conveying back to the blood a tranſparent liquor, called *lymph* or *lympha*.

Theſe, though not ſo viſible as the other veſſels, becauſe of their minuteneſs and tranſparency, are, however, exiſtent in all parts of the body; but the difficulty of finding them has prevented their being deſcribed in many parts. The *lymphatics* are contracted at ſmall and unequal diſtances by two oppoſite ſemilunar valves, which permit the lymph to paſs through them towards the heart; but ſhut, like flood-gates, upon its returning.

They ariſe in all parts of the body, but after what manner, needs no great diſpute; for, without doubt, all the liquors in the body, excepting the chyle, are ſeparated from the blood in the fine capillary veſſels, by a different pipe from the common channel, in which the reſt of the blood moves: but whether this pipe be long or ſhort, whether it be viſible or inviſible, it is ſtill a gland, whilſt it ſuffers ſome part of the blood to paſs through it; denying a paſſage to the reſt.

Now, the glands which ſeparate the lymph muſt be of the ſmalleſt kind, for they are inviſible to the fineſt microſcope: but their excretory ducts, the *lymphatic* veſſels, unite with one another, and grow larger, as they approach the heart: yet they do not open in one common channel, as the veins do; for ſometimes we find two, or three, or more *lymphatics*, running by one another; which only communicate by ſhort intermediate ducts, and which unite and immediately divide again. In their progreſs, they always touch at one or two conglobate or veſicular glands, into which they diſcharge themſelves of their *lympha*. Sometimes the whole *lymphatic* opens at ſeveral places into the gland; and ſometimes it ſends in only two or three branches, whilſt the main trunk paſſes over and joins the *lymphatics* which ariſe from the oppoſite ſides of the gland, exporting again their lympha to their common receptacle.

The glands of the abdomen, which receive the *lymphatics* from all its parts, as likewiſe from the lower extremities, are the glandulæ inguinales, ſacræ, iliacæ, lumbares, meſentericæ, and hepaticæ; all which ſend out new *lymphatics*, which pour their contents into the receptaculum chyli; as thoſe of the cheſt, head, and arms, do into the ductus thoracicus, jugular, and ſubclavian veins.

Theſe glands are round and ſmooth bodies, about the bigneſs of a hazle-nut, bigger or leſſer, according to the number of *lymphatics* they receive. Their ſubſtance is membranous, and their whole bulk divided into little cells, which receive the lymph from the *lymphatics*; and are therefore improperly called *glands*, becauſe they ſeparate no liquor from the blood. It is true, that their exporting *lymphatics*, communicating with their arteries, do receive a lymph from them; but this is done without the help of congloberate glands; as the lacteal veins do with the capillary arteries of the guts: the chief uſe of theſe veſicular bodies ſeems to be, that the ſlow-moving lympha may receive a greater velocity from the elaſtic contraction of their membranous cells, as well as from the new lymph immediately derived from the arteries. See Gland.

Dr. Akenſide, in his account of the origin and uſe of the *lymphatic* veſſels of animals, concludes, that they have their origin, in general, among the little cavities of the cellular ſubſtance of the muſcles, among the mucous folliculi of the tendons, or the membranous receptacles and ducts of the larger glands; that their extremities or roots do, from theſe cavities, imbibe the moiſture exhaled there from the ultimate arterial tubes, juſt as the lacteals (the *lymphatics* of the meſentery) do on the concave ſurface of the inteſtines: and that the minute imbibing veſſels, by gradually opening into one another, form at length a *lymphatic* trunk, furniſhed with valves to prevent the return of its fluid, and tending uniformly, from the extremities, and from the viſcera, to re-convey to the blood that lymph with which they are kept in perpetual moiſture; which is indiſpenſibly neceſſary to life and motion; while, at the ſame, the continual reabſorptions of that moiſture by the *lymphatics* is no leſs neceſſary, in order to preſerve the blood properly fluid, and to prevent the putrefaction which would inevitably follow, if this animal vapour be ſuffered to ſtagnate in the cavities where it is diſcharged. Phil. Tranſ. vol. l. p. 328.

Mr. Hewſon's doctrine on this ſubject is, that the *lymphatic* ſyſtem and its appendages, in which he includes the *lymphatic* veſſels, the *lymphatic* glands, the THYMUS, and the SPLEEN, are the elaboratory which nature uſes, or the organs which ſhe employs in fabricating the particles of the BLOOD, which he deſcribes as round, flat, red veſicles containing ſmall and ſolid particles in their centres. He ſhews, that the *lymphatic* glands ſecrete a fluid, in which may be ſeen, by means of the microſcope, numberleſs ſmall ſolid particles, exactly reſembling, in ſize and ſhape, the central particles contained in the middle of the veſicles. He obſerves farther that, after a *lymphatic* veſſel has emerged from a *lymphatic* gland, central particles are found to have acquired their veſicular portions, and that they are now become real particles of red blood completely formed. He conjectures, that this newly acquired veſicle may either be a ſecretion from the internal coat of the *lymphatic* veſſel; or, that this veſſel has a plaſtic power over its contained fluid, ſo as not only to form a veſicle round the central particle, but alſo to give its red colour; for, till the red veſicle is formed, the central particle is evidently white. See Experimental Inquiries, part the 3d, &c. &c. being the remaining part of the Obſervations and Experiments of the late Mr. W. Hewſon, F. R. S. By Magnus Falconer, 1777.

The *lymphatic* ſyſtem is not confined to the human ſpecies: Mr. Hewſon diſcovered it in birds, fiſh, and amphibious animals. See Lacteals.

LYNCHET, among *Farmers*, a line of green ſward, ſerving as a boundary to ſeparate ploughed land, in common fields. See Balks.

LYNCIS *lapis*, in *Natural Hiſtory*, the name given by moſt of the writers of the middle age to the BELEMNITES.

LYNCURIUS *lapis*, in the *Natural Hiſtory of the Ancients*, the name of a ſtone about which there have been various diſputes among the later writers. Theophraſtus has left us this account of it; that it was hard, and uſed for engraving ſeals on, and was of a very ſolid texture like the gems; that it had an attractive power like amber, and was pellucid, and of a flame-colour.

Dr. Woodward believed this ſtone to be a ſpecies of the BELEMNITES, to which it is objected, that this is neither pellucid nor fit for engraving ſeals upon, neither can it by any management be made to attract ſtraws and other light bodies.

M. Geoffroy conſiders it as AMBER; but this ſubſtance, though it has the attractive power mentioned by Theophraſtus, has not the firm texture requiſite to have ſeals engraved upon it, neither is it ſo very hard, as is expreſly ſaid by this author concerning the *lyncurium*, as to require great labour in poliſhing it.

All that the ancients have ſaid about it, determines that it was really one of the gems, and that it was of a flame-colour; and this deſcription agrees perfectly, ſays Dr. Hill, with the gem we call the HYACINTH, and this doubtleſs was the ſtone they knew by that name; ſince it is plain by the antique heads we ſee cut in it, that it was in common uſe among them; and it is plain from all their writings, that they did not know it by any other name: what they called the hyacinth being a very different ſtone, and one to which that name much more properly belonged, being a bluer amethyſt than the common kind, and ſomewhat reſembling the colour of the hyacinth flower. The ancients have ſpoken of three or four kinds of it, that is, three or four varieties in degree of colour; and we alſo, at this time, are acquainted with the very ſame varieties. What they called the male and female *lyncurius*, were plainly our deeper and paler hyacinth; and the fine *lyncurius*, deſcribed by Pliny, our hyacinth a la bella. Hill's Theophraſt. p. 75.

Dr. Watſon, in his obſervations relating to the *lyncurium* of the ancients makes it extremely probable, that the *lyncurium* of Theophraſtus is the TOURMALIN which agrees with his deſcription in all its ſenſible qualities; viz. that it is a very hard pellucid ſtone, of a deep red colour; that it is very proper to engrave ſeals upon; that it attracts like amber, not only ſtraws and light pieces of wood, but filings of iron and braſs. Phil. Tranſ. vol. II. art. 37. p. 394.

LYNX, in *Zoology*, the name of a very fierce beaſt of prey, called in Engliſh the *ounce*, and by many Latin authors the *lupus cervarius*, or deer-wolf, from its loving to feed on deer. This animal, in the Linnæan ſyſtem, is a ſpecies of *felis* or cat, with a ſhort tail, black at the end, and ears tufted with black long hairs. See *Tab.* III. *of Quadrupeds*, N° 30.

Pliny ſeems to diſtinguiſh the *lynx* from the *lupus cervarius*, but there ſeems not the leaſt reaſon for it. The principal colours of this creature are a whitiſh and a purpliſh yellow, variegated with numerous very beautiful round ſpots like eyes, in the manner of the *leopard*; theſe are uſually black. Sometimes it is ſeen alſo of a plain fox-colour on the back, and full of black ſpots, and grey on the belly, and inner part of the legs, with the like ſpots as on the back and ſides, but larger, of a ſomewhat paler colour, and fewer in number.

The hairs of this creature, as well ſuch as appeared reddiſh, as thoſe which were grey, when nicely examined, are all found to be truly of three colours in each ſingle hair; the middle part being of a reddiſh tawney, the bottom grey, and the top white; but thoſe which compoſe the black ſpots are only of two colours, there being no white at their ends.

This creature's eyes are extremely bright and vivid, and ſhew plainly that it has a very piercing ſight. Its ears are like thoſe of a cat, but have this peculiarity, which diſtinguiſhes the creature from all the animals of the ſame claſs, that they have a fine pencil of black hairs growing out at their extremities, very ſmooth, and of a deep black like velvet, and two fingers long. Its tongue is rough like that of the lion. The *lynx* is found wild in Italy and Germany, but the greater number are in Aſia, and theſe are much finer coloured than the European. They all differ conſiderably from one another, at times, in the number and diſpoſition of their ſpots. The greater number is found in the north of Europe, Aſia, and America, whence the furs, which are valuable for their ſoftneſs and warmth, are annually imported.

There are ſeveral varieties differing in ſize and colour. Pennant mentions a diſtinct ſpecies, under the name of the *bay lynx*, inhabiting the inner parts of the province of New York; and the Pruſſian *lynx*, for which ſee SIGAHGUSH. Ray and Pennant.

LYNX, in *Mythology*, was a fabulous animal conſecrated to Bacchus.

LYNX, in *Aſtronomy*, is a conſtellation of the northern hemiſphere, made by Hevelius out of unformed ſtars: the number of ſtars in Hevelius's catalogue is nineteen, and in the Britannic is forty-four, their names, places, longitudes, latitudes, and magnitudes are as follow:

Situation of ſtars.	Signs.	Longit. °	′	″	Latitude N. °	′	″	Magnitude.
In the right knee at the eye	♊	28	24	42	38	4	30	5.6
1. In the noſtrils		28	47	55	35	34	30	4
		29	3	18	38	20	52	6
		29	10	22	35	57	34	6
2. In the noſtrils		29	58	24	35	2	30	6.7
5.								
	♋	0	37	45	34	50	36	6.7
		1	25	52	33	3	0	6.7
		1	24	30	38	12	30	6.7
		1	37	18	33	6	10	6
10.		1	31	20	38	12	12	6.7
		1	50	38	33	34	55	6
		2	56	58	36	15	28	7
		3	26	57	34	0	20	6
Lower in the neck		4	2	5	36	21	20	5
Upper in the neck		4	49	56	35	24	30	5
15.								
At the left ſhoulder		6	37	22	22	9	14	6
		6	23	27	37	57	30	7
At the left ear		7	35	2	36	57	17	6
In the neck		9	36	55	32	48	19	5
		10	25	2	27	44	14	6
20.								
In the ſide		11	23	13	26	53	58	5
		11	22	9	27	26	35	6
		12	3	49	35	1	27	7
Above the nape of the neck		12	1	48	36	41	0	5
		16	49	43	25	58	55	6
25.								
		16	49	39	26	10	40	5
In the back		18	18	4	30	31	26	5
		20	25	38	22	30	3	7
		17	14	0	38	38	50	5
30.		18	15	52	36	56	50	6

Situations of ſtars.	Signs.	Long't. °	′	″	Latitude N. °	′	″	Magnitude.
In the belly		23	13	38	23	4	21	5
		27	10	49	17	3	25	7
At the left knee		27	25	26	17	6	24	6
1. In the root of the tail		25	53	57	26	29	5	6
2. In ditto		28	37	20	25	1	55	6
35.								
	♌	2	58	45	25	49	30	5.6
		1	1	10	33	45	11	6
In the middle of the tail		6	13	10	20	4	20	4
		2	4	45	32	16	16	6
Laſt in the tail		7	31	10	17	56	0	4
40.								
		4	51	59	28	58	40	6
		8	52	0	24	35	43	6
		9	45	50	24	24	30	7.6
		2	22	7	40	39	30	5.6

LYRA, in *Aſtronomy*, a conſtellation in the northern hemiſphere.

The number of its ſtars, in Ptolemy's catalogue is ten, in Tycho's eleven; in Hevelius's ſeventeen; and in the Britannic catalogue twenty-one; the names, places, longitudes, latitudes, and magnitudes whereof are as follow:

Stars in the conſtellation *Lyra*, or *Vulture Cadens*.

Names and ſituation of the ſtars.	Bayer's Cha	Signs.	Longit. °	′	″	Latitude N. °	′	″	Magnitude.
South. in the preced. wing of the Vult.	κ	♑	3	35	39	59	24	42	5
North of the ſame	μ		5	55	19	62	46	40	6
Lucida in the ſhell called *lyra*	α		10	57	18	61	45	31	1
Bright ſtar the moſt nor. of the adjacent	ε		14	17	42	62	26	05	5
Another contiguous			14	17	17	62	22	31	6
5.									
South of theſe	ζ		13	46	55	60	23	13	5
Contiguous alſo to this			13	47	29	60	22	16	5
Sou. of the preced. in the jugum of the lyre	ν		14	19	42	55	29	48	6
	ν		14	17	58	55	13	58	6
North. of the preced. in the jugum	β		14	35	30	56	1	48	3
10.									
Preced. in the root of either horn	δ		17	3	51	59	26	39	4.5
Subſeq. of the ſame	δ		17	21	39	59	21	54	4
	ϖ		20	54	46	66	13	6	3
Nor. of thoſe that fol. in the jugum			17	37	00	55	3	28	3
South of the ſame			17	50	36	54	28	15	6
15.									
			21	10	46	60	2	21	6
			20	35	18	54	33	2	6
In the middle of the body	γ		21	54	8	58	3	44	5
			24	33	11	61	0	13	6
In the eaſtern part of the ſhell	η		25	46	19	60	42	55	6
South. of the ſame	θ	♑	26	14	11	59	36	20	6

LYRA, in *Ichthyology*, the name of a fiſh of the *trigla* kind, of which there are two varieties, reckoned by Artedi and Linnæus two different ſpecies. The one the *piper* or TIBICEN. The other the *lyra cornuta*, or horned harpfiſh. This laſt is a fiſh of an octangular form, covered all over with bony ſcales: theſe are of a rhomboidal figure, and each has in its middle a ſharp and ſtrong prickle bending backwards; it is of a red colour, and its head is very large; its ſnout divides towards the extremity into two long horns, on which are placed two perpendicular ſpines, and a third above makes an acute angle with theſe; it has one very long fin on the back, and another anſwering to it behind the anus: alſo two large ones at the gills, and two ſmaller on the belly; it has only two filaments, called fingers, behind its gillfins; its mouth is large, but has no teeth, and there are ſeveral beards on its under jaw; two of which are longer than the reſt, and are branched: it is caught in the Mediterranean, and brought to market at Rome; it is a ſcarce fiſh in other places, and at Montpellier was once ſhewn to Mr. Ray for the *remora*. See *Tab.* III. *of Fiſh*, N° 23.

LYRA is alſo the name of a beautiful ſea-ſhell of the genus of the *concha globoſa*, or dolium. There are three ſpecies of the *lyra*, or harp-ſhell. 1. The common *lyra*, which has thirteen roſe-coloured ribs running along its body. 2. The eleven-ribbed *lyra*; and 3. The noble harp, or *lyra nobilis*. This is a moſt elegantly variegated ſhell; its ground colour is a deep brown, and its variegations very elegant and black.

LYRÆ *lucida*. See LUCIDA.

LYRATUM *folium*, among *Botaniſts*. See LEAF.

LYRE, LYRA, a ſtringed inſtrument much uſed among the ancients; ſaid to be invented by Mercury, about the year of the world 2000, on occaſion of his finding a dead ſhell-fiſh, called by the Greeks, *chelone*, and Latins *teſtudo*, left on an inundation of the Nile; of the ſhell whereof he formed his *lyre*; mounting it with ſeven ſtrings, according to Lucian, and adding a kind of jugum to it, to ſtretch or looſen the ſtrings.

Boetius relates the opinion of ſome, who ſay, that Mercury's *lyre* had but four ſtrings, in imitation of the mundane muſic of the four elements. Diodorus Siculus ſays it had but three ſtrings, in imitation of the three ſeaſons of the year; which were all the Greeks counted, viz. ſpring, ſummer, and winter. Nicomachus, Horace, Lucian, and others, make it have ſeven ſtrings, in imitation of the ſeven planets.

This three, four, or ſeven-ſtringed inſtrument, they ſay, Mercury gave to Orpheus; who being torn to pieces by the Bacchantes, the *lyre* was hung up by the Leſbians in Apollo's temple. Others ſay, Pythagoras found it in ſome temple in Egypt, and added an eighth ſtring. Nicomachus ſays, that when Orpheus was killed, this *lyre* was caſt into the ſea, and thrown up at Antiſſa, a city of Leſbos; where the fiſhermen finding it, gave it to Terpander, who carried it into Egypt, and called himſelf the inventor. The ſeven ſtrings were diatonically diſpoſed, by tones and ſemitones; and Pythagoras's eighth ſtring made up the octave.

Mr. Barnes, in the prolegomena to his edition of Anacreon, has an inquiry into the antiquity and ſtructure of the *lyre*; of which he makes Jubal the firſt inventor. For the ſeveral changes this inſtrument underwent, by the addition of new ſtrings, he obſerves, that, according to Diodorus, it had originally only three; whence it was called τριχορδος. Afterwards it had ſeven ſtrings; as appears from Homer, Pindar, Horace, Virgil, &c. Feſtus Avienus gives the *lyre* of Orpheus nine ſtrings. David mentions an inſtrument of that ſort ſtrung with ten, *in ſalterio decachordo*. Timotheus of Miletus added four to the old ſeven, which made eleven. Joſephus, in his Jewiſh Antiquities, makes mention of one with twelve ſtrings; to which were afterwards added ſix others, which made eighteen in all. Anacreon himſelf ſays, p. 253. of Mr. Barnes's edition, *canto viginti totis chordis*. As for the modern *lyre*, or Welſh HARP, it is ſufficiently known.

From the *lyre*, which all agree to be the firſt inſtrument of the ſtringed kind in Greece, there aroſe an infinite number of others, different in ſhape, and number of ſtrings: as the pſalterium, trigon, ſambucus, pectis, magadis, barbiton, teſtudo (the two laſt uſed promiſcuouſly, by Horace, with the *lyre* and *cithara)*, epigonium, ſimmicium, and pandura; which were all ſtruck with the hand, or a plectrum. See PSALTERY, SAMBUCA, MAGADIS, BARBITON, and CITHARA.

LYRE, among painters, ſtatuaries, &c. is an ATTRIBUTE of Apollo and the Muſes.

LYRIC, ſomething ſung or played, on the LYRE or HARP.

LYRIC is more particularly applied to the ancient odes, and ſtanzas; which anſwer to our *airs*, or *ſongs*, and may be played on inſtruments.

The ancients were great admirers of *lyric verſes*; which name, Mr. Barnes obſerves, they gave to ſuch verſes as were ſung to the lyre.

This ſpecies of poetry was originally employed in celebrating the praiſes of gods and heroes; though it was afterward introduced into feaſts, and public diverſions: it is a miſtake to imagine Anacreon, as the Greeks do, the author of it; ſince it appears from Scripture to have been in uſe above a thouſand years before that poet. Mr. Barnes ſhews how unjuſt it is to exclude heroic ſubjects and actions from this ſort of verſe, *lyric poetry* being capable of all the elevation and ſublimity ſuch ſubjects require; which he confirms by the example of Alcæus, Steſichorus, Anacreon, and Horace, and by his own eſſay, a triumphal Ode inſcribed to the Duke of Marlborough, at the head of this edition: he concludes with the hiſtory of *lyric poetry*, and of thoſe ancients who excelled in it.

The characteriſtic of *lyric poetry*, which diſtinguiſhes it from all others, is *dignity* and *ſweetneſs*. As *gravity* rules in heroic verſe; *ſimplicity*, in paſtoral; *tenderneſs* and *ſoftneſs*, in elegy; *ſharpneſs* and *poignancy*, in ſatire; *mirth*, in comedy; the *pathetic*, in tragedy; and the *point*, in epigram; ſo in the *lyric*, the poet applies himſelf wholly to ſooth the minds of men, by the ſweetneſs and variety of the verſe, and the delicacy and elevation of the words and thoughts; the agreeableneſs of the numbers, and the deſcription of things moſt pleaſing in their own nature.

LYRODI, among the *Ancients*, a kind of muſicians who played on the LYRE, and ſung at the ſame time.

LYRODI was alſo an appellation given to ſuch as made it their employment to ſing lyric poems, compoſed by others.

LYSANDRIA, Λυσανδρια, in *Antiquity*, a Samian feſtival celebrated with ſacrifices and games, in honour of Lyſander the Lacedæmonian admiral. It was anciently called *herea*, which name was aboliſhed by a decree of the Samians.

LYSIARCHA, an ancient kind of magiſtrate, being the pontiff of Lycia, or ſuperintendant of the ſacred games of that province.

Strabo obſerves, that the *lyſiarcha* was created in a council conſiſting of the deputies of twenty-three cities; that is, of all the cities in the province; ſome of which cities had three voices, others two, and others but one.

Cardinal Norris ſays, that the *lyſiarcha* preſided in matters of religion; in effect, the *lyſiarcha* was nearly the ſame with the *aſiarcha*, and *ſyriarcha*; who, though they were all the heads of the councils, or ſtates of thoſe provinces, yet were they eſtabliſhed principally to take care of the games and feaſts celebrated in honour of the gods, whoſe prieſts they were inaugurated, at the ſame time that they were created *lyſiarcha*, *ſyriarcha*, or *aſiarcha*.

LYSIMACHIA. See LOOSE-*ſtrife*.

LYSIMACHIA-*worm*, in *Natural Hiſtory*, a name given to an inſect found very frequently feeding on the leaves of the *lyſimachia*, or willow-herb. It has uſually been eſteemed a caterpillar, but is properly one of the FAUSSE *chenilles*, having a rounded head, and twenty-two legs; this creature changes its ſkin ſeveral times, and finally changes its colour with it; it is at firſt of a bluiſh grey, but on its laſt change in the worm-ſtate it becomes of a yellowiſh green; when it has lived a week or thereabout, after this laſt change, it becomes a chryſalis, from which there afterwards comes out a four-winged fly.

LYSSA, λυσσα, a word uſed by medical authors to expreſs that ſpecies of madneſs which is peculiar to dogs and wolves, but is communicated by their bite to man and other animals. Hence perſons labouring under the diſmal effects of ſuch a bite, are called alſo *lyſſodecti*.

LYTHRUM, in *Botany*, a name by which Linnæus calls a genus of plants, named by Tournefort, and other authors, *ſalicaria*. See *Purple* LOOSE-*ſtrife*.

M.

M, A liquid conſonant, and the twelfth letter in the alphabet.

It has one unvaried ſound, and is pronounced by ſtriking the upper lip againſt the lower; in which the pronunciation of this letter agrees with that of *b*; the only difference between the two conſiſting in a little motion made in the noſe in pronouncing *M*, and not in *b*: whence it happens, that thoſe who have taken cold, for *M* ordinarily pronounce *b*; the noſe, in that caſe, being diſabled from making the neceſſary motion.

All conſonants are formed with the aid of vowels; in *em* the vowel precedes, in *be* it follows: and *M* is never mute.

Quintilian obſerves, that the *M* ſometimes ends Latin words, but never Greek ones; the Greeks always changing it in that caſe into *n*, for the ſake of the better ſound.

M is alſo a numeral letter, and among the ancients was uſed for a thouſand; according to the verſe,

M *caput eſt numeri, quem ſcimus mille teneri.*

When a daſh is added at the top of it, as $\overline{\text{M}}$; it ſignifies a thouſand times a thouſand.

M as an abbreviature, ſtands for Manlius, Marcus, Martius, and Mucius: *M. A.* ſignifies *magiſter artium*, or maſter of arts; *MS.* manuſcript, and *MSS.* manuſcripts.

M. in *Aſtronomical Tables*, and other things of that kind, is uſed for *Meridional* or ſouthern; and ſometimes for *Meridian*, or mid-day.

M. in *Medicinal Preſcription*, is frequently uſed to ſignify a maniple, or handful: and it is ſometimes alſo put at the end of a recipe, for *miſce, mingle*; or for *mixtura, a mixture.* Thus, *m. f. julapium*, ſignifies *mix*, and *make a julep.*

M. in *Law*, the brand or ſtigma of a perſon convicted of man-ſlaughter, and admitted to the benefit of his clergy. It is to be burnt on the brawn of the left thumb.

MABBY, a kind of wine made from potatoes. It is ſaid to be uſed in Barbadoes.

MABOUJAS, the *devil-lizard*, in *Zoology*, a ſpecies of American lizard, ſo called from its uglineſs and diſagreeable aſpect. It grows to ſix or ſeven inches long, and to the thickneſs of a thumb. and is found in the trunks of rotten trees, and in marſhy places, where the ſun-beams ſeldom reach; it is all over of a gloſſy black colour, and looks as if ſmeared over with oil.

MAC, an Iriſh word ſignifying *ſon*; frequently prefixed to ſurnames: as *Mac*donald for Donald's ſon, *Mac*laurin for Laurence's ſon, &c.

MACAM, *Indian apple*, in *Natural Hiſtory*, the name of a common Eaſt Indian fruit: it is of a round ſhape, and about the ſize of our common wild crabs which grow in the hedges; inſtead of the ſeveral ſmall ſeeds, which our crabs and apples contain, this fruit has only one hard kernel; it is of an acid taſte, and of a raw and not very agreeable ſmell; the tree which produces this fruit, does not grow to any great height; it reſembles the quince-tree in its leaves, except that they have a yellowiſh caſt. Mem. Acad. Par. 1699.

MACAO, in *Zoology.* See MACAW.

MACAQUO, in *Zoology*, the name of a large ſpecies of monkey, called by Mr. Ray *cercopithecus Angolenſis major*, the great Angola monkey. Its hair is ſometimes of the colour of that of a wolf, but that of others is brown, tinged with yellow or olive; its noſtrils are elate, and divided like thoſe of a hare; its head like a bear's; its eyes ſmall; its buttocks are bald; on theſe he frequently ſits upright: he always carries his tail bent into a ſort of arch: his length, from the head to the inſertion of the tail, is more than a foot; his tail is rather ſhorter than his body; his legs are conſiderably long, and his body remarkably fat and bulky; his teeth are extremely white; and his penis very much reſembles that of a man: it is an extremely lively animal, and continually plays a number of antic tricks; its voice is ſhrill, and its only note hah! hah! See CERCOPITHECUS.

They have another ſpecies of this kind alſo about Angola, which may be called the black *macaquo.* Its only colour is black; but on many parts of the back and ſides, there is a greyiſh caſt among it: this has a tail of remarkable length, being more than two feet long.

MACARIANS, in *Eccleſiaſtical Hiſtory*, the followers of Macarius, an Egyptian monk, who was diſtinguiſhed towards the cloſe of the fourth century for his ſanctity and virtue. In his writings there are ſome ſuperſtitious tenets, and alſo certain opinions that ſeem tainted with Origeniſm. The name has been alſo applied to thoſe who adopted the ſentiments of Macarius, a native of Ireland, who, about the cloſe of the ninth century, propagated in France the error afterwards maintained by Averrhoes, that one individual intelligence or ſoul performed the ſpiritual and rational functions in all the human race.

MACARON, the name of a ſort of vermicelli, a paſte made of flour and water, and formed in the ſhape of the barrel of a large quill, or the guts of ſmall fowls.

MACARONIC, or MACARONIAN, a kind of burleſque poetry; conſiſting of a jumble of words of different languages, with words of the vulgar tongue latinized, and Latin words modernized.

Macarone, among the Italians, as has been obſerved by Cælius Rhodiginus, ſignifies a coarſe clowniſh man; and becauſe this kind of poetry, being patched out of ſeveral languages, and full of extravagant words, is not ſo polite and ſmooth as thoſe of Virgil, &c. the Italians, among whom it had its riſe, gave it the name of *Macaronian* or *Macaronic* poetry. Others chooſe to derive it *a Macaronibus*, from *Macaroons*, a kind of confection made of meal not boulted, ſweet almonds, ſugar, and the whites of eggs; accounted a great dainty among the country people in Italy; which from their being compoſed of various ingredients occaſioned this kind of poetry, which conſiſts of Latin, Italian, Spaniſh, French, Engliſh, &c. to be called by their name.

Theoph. Folingius, a Benedictine monk of Mantua, was the firſt who invented, or at leaſt cultivated, this kind of verſe: for though we have a *Macaronea* Ariminenſis in a very old letter, beginning, "Eſt author Typhis Leonicus atque Paranſus;" yet it ſeems to have been the work of Guarinus Capellus Sarſinas, who in the year 1256, printed ſix books of *Macaronic* poetry, in Cabrinum Gagamonæ Regem: but as both theſe came out after the firſt edition of Folingius, which was publiſhed under the name of Merlinus Coccajus in 1520, ſo they were likewiſe much inferior to his both in the ſtyle, invention, and epiſodes, wherewith he has enriched the hiſtory of Baldus; which makes the ſubject of his poem. The famous Rabelais firſt transferred the *Macaronic* ſtyle out of the Italian verſe into French proſe, and on the model thereof formed ſome of the beſt things in his Pantagruel.

We have ſcarce any thing in Engliſh in the *Macaronian* way, except ſome little looſe pieces collected in Camden's Remains: which is no diſcredit to our authors: for one may ſay of ſuch pieces in general,

Turpe eſt difficiles habere nugas,
Et ſtultus labir eſt ineptiarum.

But the Germans and Netherlanders have had their *Macoronic* poets; witneſs the Certamen Catholicum cum Calviniſtis, of one Martinius Hamconius Friſius, which contains about twelve hundred verſes, all the words whereof begin with the letter *C.*

MACAROON. See MACARONIC.

MACASSAR *poiſon*, in *Natural Hiſtory*, called *ippo*, in the Macaſſar and Malayan tongue, is the gum of a certain tree, ſhining, brittle, black, and every way like ſtone-pitch, growing in the iſland Celebes, in the South Seas; with which all the natives arm themſelves in travel, having a long hollow trunk of a hard red-wood like braſil, accurately bored, and at one end is fixed a large lance-blade of iron. Then they make a ſmall arrow very ſtraight, and ſomewhat bigger than a large wheaten ſtraw: at one end they fix it into a round piece of white, light, ſoft wood, like cork, about the length of the little finger, juſt fit for the bore of the trunk, to paſs clear by the force of one's breath, and to fill it ſo exactly, that the air may not paſs by, but againſt it, in order to carry it with the greater force. At the other end they fix it either in a ſmall fiſh-tooth for that purpoſe, or make a blade of wood of the bigneſs of the point of a lancet, about three-quarters of an inch long, and making a little notch at the end of the arrow, they ſtrike it firm therein, which they anoint with poiſon. The poiſonous gum, when gathered, is put into hollow bamboos or canes, ſtopped up very cloſe, and thus brought to *Macaſſar*. When they fit it for uſe, they take a piece of ſmooth turtle ſhell, and a ſtick cut flat and ſmooth at the end: then they take green galangal root, grate it, and with the addition of a little fair water, preſs the juice into a clean china diſh: then with a knife, ſcraping a little of the poiſon upon the ſhell, dip the end of the ſtick in the forementioned liquor, and with this diſſolve the poiſon, to the conſiſtence of a ſyrup: when this is done, they anoint the fiſh tooth or wooden-blade with the ſame ſtick and lay them in the ſun, ſo that it may be baked hard. The pointed arrows thus prepared are put in hollow bamboos, cloſe ſhut, and in this ſtate they retain their virtue for a month. Birch's Hiſt. of the Royal Society, vol. ii. p. 44.

MACAW, MACCAW, or MACAO, in *Ornithology*, the name of a large ſpecies of parrot, diſtinguiſhed alſo by the length of its tail. There are three different ſpecies of this bird brought over into Europe, which not only differ in ſize and other particulars, but alſo in colour. The firſt is the largeſt, and is finely variegated with blue and yellow; the ſecond is ſomewhat ſmaller than this, and is principally red and yellow; and the third is red and blue. It is not uncommon alſo to ſee the *macaw* perfectly white, and it is to that particular colour we give the name of *cockatoon*; though with ſome it is made the ſynonymous name of all the *macaw* tribe.

MACAW-*tree* See PALM-*tree*.

MACCABEES, two apocryphal books of Scripture, containing the hiſtory of Judas and his brothers, and their wars againſt the Syrian kings in defence of their religion and liberties, ſo called from Judas Mattathias, ſurnamed *Maccabeus*, as ſome ſay from the word מכבי, formed of the initials of מי כמבה באלם יהוה, q. d. *Who is like unto thee, O Lord, among the Gods*; which was the motto of his ſtandard; whence thoſe who fought under his ſtandard were called *Maccabees*, and the name was generally applied to all who ſuffered in the cauſe of the true religion, under the Egyptian or Syrian kings. The firſt book of the *Maccabees* is an excellent hiſtory, and comes neareſt to the ſtyle and manner of the ſacred hiſtorians of any extant. It was written originally in the Chaldee language, of the Jeruſalem dialect, and was extant in this language in the time of Jerom. From the Chaldee it was tranſlated into Greek, from the Greek into Latin. It is ſuppoſed to have been written by John Hyrcanus, the ſon of Simon, who was prince and high prieſt of the Jews near thirty years, and began his government at the time where this hiſtory ends. It contains the hiſtory of forty years, from the reign of Antiochus Epiphanes, to the death of Simon the high prieſt; that is, from the year of the world 3829 to the year 3869; 131 years before Chriſt. The ſecond book of the *Maccabees* begins with two epiſtles ſent from the Jews of Jeruſalem, to the Jews of Egypt and Alexandria; to exhort them to obſerve the feaſt of the dedication of the new altar erected by Judas, on his purifying the temple. The firſt was written in the 169th year of the æra of the Seleucidæ, i. e. before Chriſt 144; and the ſecond in the 188th year of the ſame æra, or 125 before Chriſt; and both appear to be ſpurious. After theſe epiſtles follows the preface of the author to his hiſtory, which is an abridgment of a larger work, compoſed by one Jaſon, a Jew of Cirene, who wrote in Greek the hiſtory of Judas *Maccabeus*, and his brethren, and the wars againſt Antiochus Epiphanes, and Eupator his ſon. This ſecond book does not, by any means, equal the accuracy and excellence of the firſt. It contains an hiſtory of about fifteen years, from the execution of Heliodorus's commiſſion, who was ſent by Seleucus, to fetch away the treaſures of the temple, to the victory obtained by Judas *Maccabeus* over Nicanor; that is from the year of the world 3828 to the year 3843, 147 years before Chriſt. There are in the Polyglot Bibles, both of Paris and London, Syriac verſions of both theſe books; but they, as well as the Engliſh verſions which we have among the apocryphal writers in our Bibles, are derived from the Greek. There is alſo a third book of the *Maccabees*, containing the hiſtory of the perſecution of Ptolemy Philopater againſt the Jews in Egypt, and their ſufferings under it; and ſeems to have been written by ſome Alexandrian Jew in the Greek language, not long after the time of Siracides. It is in moſt of the ancient manuſcript copies of the Greek Septuagint, particularly in the Alexandrian and Vatican, but was never inſerted into the vulgar Latin verſion of the Bible, nor conſequently into any of our Engliſh copies. Moreover Joſephus's hiſtory of the martyrs that ſuffered under Antiochus Epiphanes, is found in ſome manuſcript Greek Bibles, under the name of the fourth book of the *Maccabees*.

MACE, *macis*, is a pretty thick, tough, unctuous membrane, reticular or variouſly chapt, of a lively reddiſh yellow colour, approaching to that of ſaffron, enveloping the ſhell of the fruit, whoſe kernel is the NUTMEG. The *mace*, when freſh, is of a blood-red colour and acquires its yellow hue in drying. It is dried in the ſun, upon hurdles fixed above one another, and then, as it is ſaid, ſprinkled with ſea-water, to prevent its crumbling in carriage.

Mace has a pleaſant aromatic ſmell, and a warm, bitteriſh, moderately pungent taſte; it is a thin and flat membranacious ſubſtance, of an oleaginous nature, and of a yellowiſh colour. We meet with it in flakes of an inch or more in length, which are divided into a multitude of irregular ramifications: it is of an extremely ſmooth ſurface, and of a tolerably cloſe texture, yet friable, and very eaſily cut to pieces. It is of an extremely fragrant, aromatic, and agreeable ſmell, and of a pleaſant, but acrid and oleaginous taſte; it is to be choſen new, not dry, and of a fragrant ſmell, tough, oleaginous, and of a good yellow. The people who collect the nutmeg fruit cut it open, and throw away the pulpy ſubſtance, or external coat; they then ſee the *mace* covering the nutmeg, wrapping itſelf every where round its outer woody ſhell. The *mace* is at this time of a red colour; they take it carefully off from the nutmeg, and lay it in the ſun for the whole day. In this time its colour, from a ſtrong blood-red, becomes duſky; it is after this carried to another place, where the ſun has leſs power, and there expoſed again to its rays, the few hours they reach thither. By this means it dries gently, and remains tough, and retains its fragrancy and colour in a great degree: if it were dried more haſtily, it would be whitiſh, brittle, and would loſe much of its ſmell: after this it is ſlightly ſprinkled over with ſea-water, and then put up into bales in which it is preſſed down firm andc loſe, by way of preſerving its fragrance and conſiſtence.

It is of an aſtringent and drying nature, and is uſed as a corrector in cardiac and cathartic compoſitions. In its general quality it is nearly ſimilar to the nutmeg; the principal difference conſiſts in the *mace* being much warmer, more bitteriſh, leſs unctuous, and ſitting eaſier on weak ſtomachs; in its yielding by expreſſion a more fluid oil, and in diſtillation by water a more ſubtile volatile one. Lewis's Mat. Med.

MACE, *oil of*, is a kind of ſebaceous matter, ſaid to be expreſſed from the nutmeg, and appearing to be a mixture of the groſs ſebacious matter of the nutmeg, with a little of the eſſential or aromatic oil; both which may be perfectly ſeparated from one another by maceration or digeſtion in rectified ſpirit, or by diſtillation with water. The beſt ſort of this oil is brought from the Eaſt Indies in ſtone jars, and is ſomewhat ſoft, of a yellow colour, and of a ſtrong agreeable ſmell, much reſembling that of the nutmeg itſelf. There is another ſort brought from Holland in ſolid maſſes, generally flat, and of a ſquare figure, of a paler colour, and much weaker ſmell. Lewis.

MACE, *reed*, in *Botany*. See TYPHA.

MACEDONIAN *kingdom*, in *Ancient Hiſtory*, one of the four kingdoms into which the EMPIRE of Alexander was divided after his death. This kingdom, under Perſeus, who was overcome, and taken by Æmilius, and carried in triumph to Rome, where he died in priſon, was reduced to the form of a Roman province. The other three, viz. the Aſiatic, Syrian, and Egyptian kingdoms, flouriſhed for a conſiderable time under their own kings, but were at laſt compelled to receive the Roman yoke.

MACEDONIAN *year*. See YEAR.

MACEDONIANS, in *Eccleſiaſtical Hiſtory*, the followers of Macedonius, biſhop of Conſtantinople, who, through the influence of the Eunomians, was depoſed by the council of Conſtantinople in 360, and ſent into exile. He conſidered the Holy Ghoſt as a divine energy diffuſed throughout the univerſe, and not as a perſon diſtinct from the Father and the Son. The ſect of *Macedonians* was cruſhed before it had arrived at its full maturity, by the council aſſembled by Theodoſius in 381, at Conſtantinople. See SEMI-ARIANS.

MACER. The Grecian *macer* is brought from Barbary; and the part in uſe is the thick yellow bark, which has a very aſtringent taſte, and is ſaid by Dioſcorides to be good againſt ſpitting of blood, the dyſentery, and fluxes. See SIMAROUBA.

MACERATION, in *Pharmacy*, the operation of diſſolving a ſolid body by means of water, or ſome other liquor.

In this ſenſe, the word amounts to much the ſame with LIQUEFACTION, or liquation.

MACERATION is alſo uſed for the infuſing a body in any menſtruous fluid, in order to a ſolution of its principles, whether with or without fire.

In which ſenſe, *maceration* amounts to much the ſame with DIGESTION.

Others reſtrain *maceration* to that particular kind of digeſtion, which is performed in thick ſubſtances, as when having mixed roſes with fat to make *unguent. roſatum*, the mixture is expoſed for ſome days to the ſun, that the virtue of the roſes may be the better communicated to the fat.

MACERONE, in *Botany*, a name given by ſome authors to the great *hippoſelinum*, or herb alexanders, or ALISANDERS.

MACHA *mona*, a kind of African CALABASH. It is the fruit of a very large tree which grows in Africa, and the American iſlands. When this fruit is ripe, the pulp has a ſouriſh taſte, with a little aſtringency: it is delicious in hot countries; and they prepare a liquor of it, which they uſe inſtead of lemonade, to cool and refreſh themſelves, and give it to ſick perſons under a looſeneſs. The pulp, dried, taſtes as well as the ſpiced bread of Rheims. The ſlaves make a kind of thick gruel with this pulp and water; it is of an abſorbent quality. The African women uſe the pulp inſtead of rennet, for curdling their milk.

The ſeeds of this fruit are as big as ſmall pine-apple kernels, kidney-ſhaped, of a cheſnut-colour, and incloſing an almond far more delicious than our ſweet almonds.

MACHÆRION, a word uſed by chirurgical writers, as the name of an inſtrument of the nature of the inciſion knife. It is alſo ſometimes uſed to expreſs an inciſion; and by the aruſpices of old it was applied to ſome particular part of the liver of animals, from which they preſaged events.

MACHERA *lapis*, in *Natural Hiſtory*, the name of a ſtone of a ferrugineous colour, frequent on mount Berecynthus in Phrygia. Plutarch, and many other grave writers, relate, that if any perſon found this ſtone, and took it up at the time of the celebration of the feaſts of Cybele, he inſtantly was ſeized with madneſs.

MACHIAVELISM, in *Literary Hiſtory*, is a ſpecies of deteſtable politics, which may be defined in few words, the art of reigning tyrannically, the principles of which are inculcated in the works of Machiavel, a native of Florence, and particularly in his treatiſe, entitled the Prince. M. de Wicquefort obſerves, concerning the character of this writer: Machiavel ſays almoſt every where what princes do, and not what they ought to do. To the ſame purpoſe the chancellor Bacon remarks: *Eſt quod gratias agamus* Machiavello *et hujus modi ſcriptoribus qui apertè & indiſſimulanter proferunt quid homines facere ſoleant non quid debeant.* Machiaval was ſecretary, and afterwards hiſtoriographer to the republic of Florence. He was put to the rack upon the ſuſpicion of being concerned in a confederacy againſt the houſe of Medicis; but he endured the torments of it, without making any confeſſion. He was as much an enemy to religion as to ſound politics; and is ſaid to have died in the year 1530, uttering profane jeſts and blaſphemies. Bayle.

MACHINE, *machina*, in general, ſignifies any thing that ſerves to augment, or to regulate moving powers: or it is any body deſtined to produce motion, ſo as to ſave either time or force.

The word comes from the Greek *μηχανη*, *machine*, *invention*, *art*. And hence, in ſtrictneſs, a *machine* is ſomething that conſiſts more in art and invention than in the ſtrength and ſolidity of the materials; and for this reaſon it is that the inventors of *machines* are called *ingenieurs*.

MACHINES, *ſimple*, are thoſe otherwiſe called MECHANICAL *powers*. There are ſix ſimple *machines*, to which all others may be reduced; viz. the BALANCE, LEVER, WHEEL, PULLEY, WEDGE, and SCREW.

The ſimple *machines*, or mechanical powers, according to their different ſtructure, ſerve for different purpoſes; and it is the buſineſs of the ſkilful mechaniſt to chooſe them, or combine them, in the manner that may be beſt adapted, to produce the effect required, by the power which he is poſſeſſed of, and at the leaſt expence. The lever can be employed to raiſe weights a little way only, unleſs the engine itſelf be moved; as, for inſtance, to raiſe ſtones out of their beds in quarries. But the axis and wheel may ſerve for raiſing weights from the greateſt depths. Pulleys being eaſily carried, are therefore much employed in ſhips. The wedge is excellent for ſeparating the parts of bodies; and the ſcrew for compreſſing or ſqueezing them together; and its great friction is even ſometimes of uſe, to preſerve the effect already produced by it. The ſtrength of the *machine*, and of its parts, muſt be proportioned to the effects which are to be produced by it. Thus, when the centre of motion is placed between the power and the weight, it muſt ſuſtain the ſum of their efforts; a ſmall balance, therefore, ought not to be employed in weighing great weights; for theſe diſorder its ſtructure, and render it unfit for ſerving that purpoſe with accuracy. Neither are great *machines* proper for producing ſmall effects. It were to be wiſhed, that we had a detail of all theſe things drawn up by ſome ſkilful and experienced mechaniſt.

From theſe ſimple *machines*, compounded ones are formed by various combinations, and ſerve for different purpoſes; in all which the ſame general laws take place; and particularly this, that the power and weight ſuſtain each other, when they are in the inverſe proportion of the velocities which they would have in the directions wherein they act, if they were put in motion.

But in practice the friction of *machines* is to be conſidered, without allowing for which we ſhall often find ourſelves at a loſs. See FRICTION.

Accurate deſcriptions and draughts of *machines* would be a very curious and uſeful work. But to make a collection of this kind as advantageous as poſſible, it ſhould, beſides the deſcriptions of *machines*, contain an analyſis of them; pointing out their advantages and diſadvantages; the reaſons of the conſtructions; and the general problems, implied in theſe conſtructions, with their ſolutions, ſhould be extracted. None of theſe things have as yet been done, in a complete and ſatisfactory manner in any treatiſe of this kind. However, many curious particulars may be gathered from Strada, Beſſon, Beroaldus, Auguſtinus de Ramellis, Bockler, Leupold, Beyer, Limpergh, Van Zyl, Perault, and others; a ſhort account of whoſe works we find in Wolfii Commentario de præcipuis ſcriptis Mathematicis. Elem. Matheſ. Univ. tom. v. p. 84, ſeq. To theſe muſt be added, monſieur Bellidor's Architecture Hydraulique, and Dr. Deſagulier's Courſe of Experimental Philoſophy. The Royal Academy of Sciences at Paris have alſo given us a collection of *machines* and inventions approved of by them. This work, publiſhed by monſieur Gallon, conſiſts of ſix volumes in quarto, containing engraved draughts of the *machines*, with their deſcriptions annexed. But a complete inſtitution of practical mechanics is ſtill wanting.

MACHINE, *compound*, is that which is compoſed of ſeveral ſimple ones combined together.

The number of compound *machines* is now almoſt infinite; and yet the ancients ſeem to have outdone the moderns in this reſpect; their *machines* of war, architecture, &c. being deſcribed as vaſtly ſuperior to our's.

MACHINE, *architectonical*, is an aſſemblage of pieces of wood ſo diſpoſed, as that, by means of ropes and pulleys, a ſmall number of men may raiſe vaſt loads, and lay them in their places. Such are cranes, &c.

It is hard to conceive what ſort of *machines* the ancients muſt have uſed to raiſe thoſe immenſe ſtones found in ſome of the antique buildings.

MACHINES, *blowing*. See BELLOWS.

MACHINES, *electrical*. See ELECTRICAL *machine*.

MACHINE, *wind*. See ANEMOMETER, and WIND *machine*.

MACHINE, *water*, or *hydraulic*, is either uſed to ſignify a ſimple *machine*, ſerving to conduct or raiſe water; as a ſluice, pump, &c. or ſeveral of theſe acting together, to produce ſome extraordinary effect; as the

MACHINE *of Marli*. See MARLI. See alſo FIRE-*engine*. and STEEM-*engine*, and WATER-*works*.

MACHINES, *military*, among the *Ancients*, were of three kinds: the firſt ſerving to launch arrows, as the ſcorpion; or javelins, as the catapulta; or ſtones, as the baliſta; or fiery darts, as the pyrabolus: the ſecond ſerving to beat down walls, as the battering ram and terebra: and the third to ſhelter thoſe who approach the enemy's wall; as the tortoiſe or teſtudo, the vinea, and the towers of wood. See SCORPION, ARIES, &c.

The *machines of war* now in uſe, conſiſt in artillery, bombs, petards, &c.

MACHINE, in *Dramatic Poetry*, is when the poet brings ſome divinity or ſupernatural being upon the ſtage; to perform ſome exploit, or ſolve ſome difficulty, out of the reach of human power.

The *machines* of the drama are gods, angels, ghoſts, &c. They are ſo called from the *machines* or contrivances by which they are repreſented upon the ſtage, and afterwards removed again.

Hence the uſe of the word *machine* has alſo paſſed into epic poem; though the reaſon of its name be there wanting. It denotes, in both caſes, the intervention or miniſtry of ſome divinity: but as the occaſion of *machines* in the one and the other is ſomewhat different, the rules and laws of managing them are different likewiſe.

The ancient dramatic poets never brought any *machine* on the ſtage, but where there was an abſolute neceſſity for the preſence of a god; and they were generally laughed at for ſuffering themſelves to be reduced to ſuch a neceſſity. Accordingly, Ariſtotle lays it down as an expreſs law, that the unravelling of the piece ſhould ariſe from the fable itſelf, and not from any foreign *machine*, as in the Medea. Horace is ſomething leſs ſevere, and contents himſelf with ſaying, that the gods ſhould never appear, unleſs where the *nodus*, or knot, is worthy of their preſence; *Nec deus interſit, niſi dignus vindice nodus—inciderit.* But it is quite otherwiſe with the epopea; in that there muſt be *machines* every where, and in every part. Homer and Virgil do nothing without them. Petronius, with his uſual fire, maintains, that the poet ſhould deal more with the gods than with men; that he ſhould every-where leave marks of this prophetic raptures, and of the divine fury that poſſeſſes him; that his thoughts ſhould be all full of fables, that is of allegories and figures: in fine, he will have a poem diſtinguiſhed from a hiſtory in all its parts; not ſo much by the verſes, as by that poetical fury, which expreſſes itſelf wholly by allegories; and does nothing but by *machines*, or the miniſtry of the gods. A poet, therefore, muſt leave it to the hiſtorian to ſay, that a fleet was diſperſed by a ſtorm, and driven to foreign ſhores; and muſt himſelf ſay, with Virgil, that Juno went to ſeek Æolus; and that this god, at her requeſt, turned the winds looſe againſt the Trojans: he muſt leave the hiſtorian to write, that a young prince behaved himſelf with a great deal of prudence and diſcretion on all occaſions; and muſt ſay, with Homer, that Minerva led him by the hand in all his enterprizes: let an hiſtorian ſay, that Agamemnon, quarelling with Achilles, hath a mind to ſhew him, though miſtakenly, that he can take Troy without his aſſiſtance; the poet muſt ſay, that Thetis, piqued at the affront her ſon had received, flies up to heaven, there to demand vengeance of Jupiter: and that this god, to ſatisfy her, ſends the god Somnus, or Sleep, to Agamemnon, to deceive him, and make him believe that he ſhall take Troy that day.

It is thus that the epic poets uſed *machines* in all parts of their works; in the Iliad, Odyſſey, and Æneid, the propoſition mentions them; the invocation is addreſſed to them; and the narration is full of them: they are the cauſes of actions; they make the knots, and at laſt they unravel them. This laſt circumſtance is what Ariſtotle forbids in the drama; but it is what Homer and Virgil have both practiſed in the epopea. Thus Minerva fights for Ulyſſes againſt Penelope's lovers, helps him to deſtroy them; and, the next day, herſelf makes the peace between Ulyſſes and the Ithacans; which cloſes the Odyſſey.

The uſe of *machines*, in the epic poem is, in ſome accounts, entirely oppoſite to what Horace preſcribes for the theatre. In tragedy, that critic will never have them uſed without an abſolute neceſſity; whereas, in the epopea, they ſhould never be uſed, but where they may be as well let alone; and where the action appears as if it did not neceſſarily require them. How many gods and *machines* does Virgil implore to raiſe the ſtorm that derives Æneas into Carthage; which yet might eaſily have happened in the ordinary courſe of nature.

In Milton's Paradiſe Loſt, moſt of the actors are ſupernatural perſonages; and in voltaire's Henriade, the poet has made excellent uſe of St. Louis.

Machines, in the epic poem, therefore, are not contrivances of the poet, to recover himſelf after he has made a falſe ſtep, nor to ſolve any difficulty peculiar to ſome part of the poem; but it is the preſence of a divinity, and ſome ſupernatural and extraordinary action, which the poet inſerts in moſt of the incidents of his work, to render it more majeſtic and admirable, and to train up his readers to piety and virtue. This mixture ſhould always be ſo managed, as that the *machines* may be retrenched, without retrenching any thing from the action.

As to the manner in which the *machines* are to act; it may be obſerved, that in the old mythology, there are gods both good, bad, and indifferent; and that our paſſions may be converted into ſo many allegorial divinities: ſo that every thing, both good and bad in a poem, may be attributed to theſe *machines*, and may be tranſacted by them. They do not, however, always act in the ſame manner; ſometimes they act without appearing, and by ſimple inſpirations, which have nothing in them extraordinary or miraculous; as when we ſay, the devil ſuggeſted ſuch a thought, &c. The ſecond manner of acting is entirely miraculous; as when a divinity preſents itſelf viſible before men, ſo as to be known by them; or when they diſguiſe themſelves under ſome human form without diſcovering themſelves. The third manner partakes of each of the two, and conſiſts in oracles, dreams, and extraordinary inſpirations: all which Boſſu calls *demi-machines*.

All theſe manners ought to be ſo managed, as to carry a veriſimilitude: and though veriſimilitude be of a vaſt extent in *machines*, as being founded on the divine power, yet it has its bounds.

MACHUL, an inſtrument of muſic among the Hebrews: Kircher apprehends that the name was given to two kinds of inſtruments, one of the ſtringed and the other of the pulſatile kind. That of the former ſort hath ſix chords, and is repreſented *Tab. Muſic, fig.* 4. Though there is great reaſon to doubt whether an inſtrument requiring the aid of the hair-bow, and ſo much reſembling the viol, be ſo ancient. The ſecond kind was of a circular form, (ſee *fig* 5.) made of metal, and either hung round with little bells, or furniſhed with iron rigns, ſuſpended on a rod or bar that paſſed acroſs the circle. Kircher ſuppoſes that it was moved to and fro by a handle fixed to it, and thus emitted a melancholy kind of murmur.

MACHLIS, in *Natural Hiſtory*, a name uſed by Pliny and ſome of the old authors, for the ELK, and alſo for the *rein*-DEER.

MACKREL, *ſcomber*, in *Ichthyology*, a well known ſea-fiſh of the ſcomber kind: the noſe is taper and ſharp-pointed; the eyes large; the jaws of an equal length; and the teeth ſmall, but numerous; the body is a little compreſſed on the ſides; towards the tail it grows very ſlender; and a little angular; the firſt dorſal fin is placed a little behind the pectoral fin, is triangular, and conſiſts of nine or ten ſtiff rays; the ſecond lies at a diſtance from the other, and has twelve ſoft rays; the pectoral, twenty; the ventral, ſix; and at the baſe of the anal fin is a ſtrong ſpine; between the laſt dorſal fin and the tail are five ſmall fins, and the ſame number between the anal fin and the tail; the tail is broad and ſemilunar; the colour of the back and ſides above the lateral line is a fine green, varied with blue, marked with black lines, pointing downwards; beneath the line, the ſides and belly are of a ſilvery colour. In the ſpring, the eyes of the *mackrel* are almoſt covered with a white film, which grows in winter; during which period they are half blind, and is caſt in the beginning of ſummer. This fiſh was in high eſteem among the Romans, becauſe it furniſhed the precious GARUM. The beſt time of taking *mackrel* is during a freſh gale of wind which is thence called the *mackrel* gale. See *Mackrel* FISHERY. Pennant.

MACKREL, *horſe*, *ſcomber trachurus*, of Linnæus, in *Ichthyology*, a name given by us to a peculiar ſpecies of *mackrel*, called alſo in Cornwall a ſcad. It is the *trachurus* of authors in general. Bellonius calls it the *lacertus*, and the old Greeks writers, as Ariſtotle and the reſt, the *ſaurus*. Artedi diſtinguiſhes it by the name of the *ſcomber*, or *mackrel*, with the lateral lines aculeated, and with thrity rays in the pinna ani. This fiſh is firm and well taſted, and has the flavour of *mackrel*.

MACROCEPHALUS, Μακροκεφαλος, compounded of μακρος, *great*, and κεφαλη, *head*, denotes a perſon with a head larger or longer than the common ſize.

Macrocephali, or *long-heads*, is a name given to a certain people, who, according to the account of authors, were famous for the unſeemly length of their heads; yet cuſtom ſo far habituated them to it, that inſtead of looking on it as a deformity, they eſteemed it a beauty, and as ſoon as the child was born, moulded and faſhioned its head in their hands to as great a length as poſſible, and afterwards uſed all ſuch rollers and bandages as might ſeem moſt likely to determine its growing long.

MACROCERCI, the name eſtabliſhed by Dr. Hill for a large genus of animalcules, diſtinguiſhed from all others by having tails longer than their bodies. See ANIMALCULE.

MACROCNEMUM, in *Botany*, a genus of the *pentandria monogynia* claſs: the characters are, that the flower is bell-ſhaped, the fruit is a double-celled capſule, and the ſeed imbricated. There is only one ſpecies.

MACROCOLUM, or MACROCOLLUM formed of μακρος, *large*, and κολλαω, *I join*, among the Romans, the largeſt kind of paper then in uſe. It meaſured ſixteen inches, and frequently two feet.

MACROCOSM, Μακροκοσμος, compounded of μακρος, *long*, *large*, and κοσμος, *world*, denotes the great world, that is, the univerſe.

In which ſenſe it ſtands contradiſtinguiſhed from MICROCOSM, a term uſed to expreſs man.

MACROLOGY, Μακρολογια, formed of μακρος, *long*, and λογος, *diſcourſe*, in *Rhetoric*, a redundant, or too copious ſtyle; an example of which we have in Livy, lib. viii. *Legati non impetrata pace, retro domum, unde venerant abierunt.*

The too copious is equally ſubject to obſcurity with the too conciſe ſtyle, and conſequently ought to be avoided. See BRACHYLOGY, DICTION, and STYLE.

MACROPEDIUM, the *long-legs*, a name given by ſome writers in natural hiſtory, to the common TIPULA.

MACROPIPER, a name given by authors to the *piper longum*, or long pepper.

MACROPNUS, formed of *μακρος*, *long*, and *πνοη*, *breath*, a word uſed by Hippocrates, and other old writers in medicine, to ſignify a perſon who fetches his breath at long intervals. It is uſed in oppoſition to *brachipnus*, or ſhort breathed.

MACROPTERA, derived from *μακρος*, *long*, and *πτερον*, *a wing*. The hawks of this genus have their wings ſo long, that when cloſed they reach to the end of the tail, or nearly ſo. Of this genus are the bald-buzzard, the kite, the hen-harrier, the honey-buzzard, and the common buzzard, the ſacre, the jer-falcon, &c.

MACRORYNCHÆ, *long-beaked*, derived from *μακρος*, *long*, and *ρυγχος*, *a beak*, in *Ichthyology*, the character of a large order of the bird kind.

The birds of this order have all of them beaks many times longer than their heads, with oblong noſtrils, and a furrow running from them towards the apex of the beak.

MACROTELOSTYLA, in *Natural Hiſtory*, the name of a genus of cryſtals, which are compoſed of two pyramids joined to the end of a column; both the pyramids, as alſo the column, being hexangular, and the whole body conſequently compoſed of eighteen planes.

The word is derived from the Greek *μακρος*, *long*, *τελειος*, *perfect*, and *ςυλος*, *a column*; expreſſing a perfect cryſtal with a long column. See *Tab. of Foſſils*, *Claſs* 3.

There are only three known ſpecies of this genus. Either of the ſorts found with us, are called by the common name of *Corniſh diamonds*. Hill's Hiſt. of Foſſ.

MACROULE, in *Ornithology*, the name given by many to the largeſt ſpecies of coot. It is of a deeper black than the common kind, and has a large bald ſpot on its head. It is alſo called by ſome *diable de mer*. It is found in Lancaſhire and Scotland. See COOT.

MACUCAQUA, in *Ornithology*, the name of a Braſilian bird of the gallinaceous kind, called alſo by ſome the *gallina ſylveſtris*, or wild hen. It has no tail: but is a very well taſted fowl, and has twice as much fleſh as the European hen; its eggs are ſomewhat larger than the common hen eggs, and of a bluiſh green colour; it feeds on fruit that fall off the trees, &c. and runs well, but cannot fly high or far, and never is ſeen in the trees. Marcgrave.

MACULÆ, in *Aſtronomy*, dark ſpots appearing on the luminary faces of the ſun, moon, and even ſome of the planets.

In which ſenſe *maculæ* ſtand contradiſtinguiſhed from FACULÆ.

MACULÆ, *ſolar*, are dark ſpots of an irregular, changeable, figure, obſerved in the face of the ſun, firſt taken notice of by Galileo, 1610, ſoon after he had finiſhed his teleſcope, and afterwards accurately obſerved by Scheiner, Hevelius, Mr. Flamſteed, Caſſini, Kirch, &c. Phil. Tranſ. vol. i. p. 274. vol. lxiv. p. i. p. 194.

Many of theſe *maculæ* appear to conſiſt of heterogeneous parts; whereof the darker and more denſe are called by Hevelius, nuclei, and are encompaſſed, as it were, with atmoſpheres, ſomewhat rarer, and leſs obſcure; but the figure both of the nuclei and entire *maculæ* is variable. In 1644, Hevelius obſerved a ſmall thin *macula*, which, in two days time, grew to ten times its bulk; appearing withal much darker, and with a larger nucleus; and ſuch ſudden mutations are frequent. The nucleus, he obſerved, began to fail ſenſibly before the ſpot diſappeared; and that, before it quite vaniſhed, it broke into four, which, in two days, again reunited. Some *maculæ* have laſted two, three, ten, fifteen, twenty, thirty, but ſeldom forty days; though Kirchius obſerved one in 1681, which remained from April 26th to the 17th of July. The ſpots move over the ſun's diſk with a motion ſomewhat ſlacker near the limb than the centre: that obſerved by Kirchius was twelve days viſible on the ſun's diſk; for fifteen days more it lay behind it, it being the uſual rule to return to the limb whence they departed in twenty-ſeven, ſometimes in twenty eight days.

Laſtly, it muſt be obſerved, that the *maculæ* contract themſelves nearer the limb, and in the middle of the diſk appear much larger; thoſe often running into one in the diſk, which, in the limb, were ſeparate: that many of them ariſe in the middle of the diſk, and many diſappear in the ſame: and that none of them are obſerved to deviate from their path near the horizon; whereas Hevelius, obſerving Mercury in the ſun near the horizon, found him too low, being thruſt twenty-ſeven ſeconds beneath his former path.

From theſe phenomena we collect, 1. That ſince Mercury's depreſſion below his path ariſes from his parallax, the *maculæ*, having no parallax from the ſun, are nearer him than that planet.

2. That, ſince they ariſe and diſappear in the middle of the ſun's diſk, and undergo various alterations with regard both to bulk, figure, and denſity, they muſt be formed *de novo*, and again diſſolved about the ſun; and hence ſome have inferred, that they are a kind of ſolar clouds, formed out of its exhalations.

3. If they are of this nature, as they riſe over his body, and are ſuſpended at a certain height from it, it appears, from the laws of hydroſtatics, that the ſun muſt be encompaſſed with ſome fluid to drive thoſe exhalations upwards; which fluid muſt be denſer as it is lower, and rarer as higher, like our atmoſphere: and, ſince the *maculæ* diſſolve and diſappear in the very middle of the ſun's diſk, the matter thereof, ſuppoſing them to be ſolar exhalations, muſt fall back again to the ſun; whence there muſt ariſe changes in the ſun's atmoſphere; and, conſequently, in the ſun itſelf.

4. Since the revolution of the *maculæ* round the ſun is very regular, and ſince their diſtance from the ſun is very ſmall, it is not properly the *maculæ* that move round the ſun, but it is himſelf, together with his atmoſphere, wherein the *maculæ* ſwim, that in the ſpace of twenty-ſeven days, twelve hours, twenty minutes, moves round his own axis; and to the ſame fixed ſtar in twenty-five days, fifteen hours, ſixteen minutes (ſee SUN); and hence it is, that the *maculæ*, being viewed obliquely near the limb, appear narrow and oblong.

5. Since the ſun appears with a circular diſk in every ſituation, his figure, as to ſenſe, muſt be ſpherical.

The magnitude of the ſurface of a ſpot may be eſtimated by the time of its tranſit over a hair in a fixed teleſcope. Galileo reckons ſome ſpots to be larger than all Aſia and Africa put together: but if he had known the ſun's parallax and diſtance as exactly as we do, he would have found them much larger than the whole ſurface of the earth. For, in 1612, he obſerved a ſpot ſo large as to be plainly viſible to the naked eye; it, therefore, ſubtended an angle at the eye of about a minute. The diameter of the earth, if removed to the ſun, would ſubtend an angle of but about ſeventeen ſeconds. Therefore the diameter of the ſpot was to the diameter of the earth, as ſixty to ſeventeen, or three one-half to one nearly; and conſequently, the ſurface of the ſpot, if circular, to a great circle of the earth, as twelve one-fourth to one, and to the whole ſurface of the earth, as twelve one-fourth to four, or nearly three to one. Gaſſendus obſerved a ſpot whoſe diameter was $\frac{1}{20}$ of the ſun's, and, therefore, ſubtended an angle at the eye of above a minute and a half. Its ſurface was, therefore, above ſix times larger than the whole ſurface of the earth. He tells us, that he ſaw above forty ſpots at once, but did not perceive that the light of the ſun was ſenſibly diminiſhed: nevertheleſs, the paleneſs of the ſun mentioned by hiſtorians, after the death of Julius Cæſar, might have been cauſed in this manner, if we admit the fact.

The opinions that have been formed concerning the nature, origin, and ſituation of the ſolar ſpots, have been various: Dr. Wilſon, profeſſor of practical aſtronomy in the univerſity of Glaſgow, by attending particularly to the different phaſes preſented by the umbra, or ſhady zone, of a ſpot of an extraordinary ſize that appeared upon the ſun, in the month of November, 1769, during its progreſs over the ſolar diſc, was led to form a new and ſingular conjecture concerning the nature of theſe appearances; which he ſeems to have afterwards confirmed by repeated obſervations. The reſults of theſe obſervations are, that the ſolar *maculæ* are cavities in the body of the ſun; that the nucleus, as the middle or dark part has been uſually called, is the bottom of the excavation; and that the umbra, or ſhady zone uſually ſurrounding it, is the ſhelving ſides of the cavity. Dr. Wilſon appears not only to have very ſatisfactorily aſcertained the reality of theſe immenſe excavations in the ſun's body, but has pointed out a method of meaſuring the depth of them. He eſtimates, in particular, that the nucleus, or bottom of the large ſpot above mentioned, was not leſs than a ſemidiameter of the earth, or about four thouſand miles, below the level of the ſun's ſurface; while its other dimenſions were of a much larger extent. He obſerved, that when a ſpot, in the middle of the ſun's diſc, where it is ſurrounded equally on all ſides with its umbra, comes near the weſtern limb of the ſun; that part of the umbra, which is next to the ſun's centre gradually diminiſhes in breadth, and at length, when the ſpot reaches within about a minute of the limb, totally diſappears; while the umbra, on the other ſide of it, continues nearly of its former dimenſions. If, after the period of half a revolution, the ſpot appears again on the oppoſite ſide of the diſc, that part of the umbra, which had before diſappeared, and which is now on the left hand ſide of the nucleus, is now plainly to be ſeen: but the umbra on the other ſide of the ſpot, or that which is next to the ſun's centre, ſeems to have vaniſhed in its turn; being hid from the view by the upper edge of the excavation, or by the oblique poſition of its ſloping ſides with reſpect to the eye. As the ſpot, however, advances on the ſun's ſurface, this umbra, or ſide of the cavity, comes in ſight;

at firſt appearing narrow, but afterwards gradually increaſing in breadth, in proportion as the ſpot moves toward the middle of the diſc. Theſe appearances, in particular the gradual diminution and diſappearance, as well as the re-appearance and gradual enlargement of the umbra, on the one ſide or the other of a ſpot, according as it advances near the weſtern limb, or proceeds onwards from the eaſtern edge of the ſun, are naturally accounted for by Dr. Wilſon's ſuppoſition, that the umbræ are the ſloping ſides of a cavity, which will appear under different angles, or of different breadths, or totally diſappear, according to their poſition with reſpect to the eye of the ſpectator. Theſe appearances, at leaſt, perfectly reſemble the phaſes that would be exhibited by an excavation in a ſpherical body, made to revolve on its axis; the bottom of the cavity being painted black, and the ſides lightly ſhaded. From theſe and other obſervations it may be inferred, that the body of the ſun, at the depth of the nucleus, either emits no light, or emits ſo little as to appear dark, when ſeen at the ſame time, and compared, with that reſplendent, and probably, in ſome degree, fluid ſubſtance that covers his ſurface. This manner of conſidering theſe phenomena naturally gives riſe to many curious ſpeculations and inquiries. It is natural, for inſtance, to inquire by what great commotion this refulgent matter is thrown up on all ſides, ſo as to expoſe to our view the darker part of the ſun's body, which was before covered by it? What is the nature of the ſhining matter? and why, when an excavation is formed in it, is the luſtre of this ſhining ſubſtance, which forms the ſhelving ſides of the cavity, ſo far diminiſhed as to give the whole the appearance of the ſhady zone, or darkiſh atmoſphere, ſurrounding the denuded part of the ſun's body. On theſe and many other ſubjects, Doctor Wilſon has advanced ſome ingenious conjectures; for which we muſt refer the curious to the Phil. Tranſ. vol. lxiv. part i. art. 1. See alſo ſome remarks on Dr. Wilſon's Theory, by Mr. Woolaſton, in the Phil. Tranſ. vol. lxiv. part. ii. art. 1. p. 337, &c.

M. de La Lande, in the Memoirs of the French Academy for 1776, contends, that the ſpots of the ſun are owing to dark bodies like rocks, which by an alternate flux and reflux of the liquid igneous matter of the ſun, ſometimes raiſe their heads above the general ſurface: and that that part of the opake rock, which at any time thus ſtands above, gives the appearance of the nucleus, while thoſe parts which in each lie only a little under the igneous matter appear to us as the ſurrounding umbra. See this opinion examined, and Dr. Wilſon's vindicated by himſelf, in Phil. Tranſ. vol. lxxii. p. i. art. 10.

Maculæ, in the *Writers of Medicine*, is uſed to expreſs all kinds of ſpots and efflorefcences on the ſkin, with different epithets. Thus, *maculæ peſtilentiales*, are the ſpots or efflorefcences, which appear upon the ſkin in peſtilential diſeaſes. *Maculæ hepaticæ* are ſpots of a browniſh red colour, appearing on the ſkin in many places, from an *ichoreſcence* of the blood, attended with a ſort of coagulation. *Maculæ volaticæ*, or vaniſhing ſpots, are very common to children, appearing in ſeveral parts of their bodies, and very ſoon diſappearing again. *Maculæ maternæ* are the ſpots or blemiſhes on children, called *nævi*, and marks from the mother's longing; and *maculæ albæ* are white ſpots which appear in the cornea of the eye, called by other names, albugo, leucoma, nebula, and nubecula.

Macula *oculi*, a word uſed by many authors to ſignify a cataract or ſuffuſion.

MAD-*dog*. See Madness.

Mad-*apple*, or, as called by ſome, the EGG *plant*, *melongena*, in *Botany*. Its characters are theſe: the flower, which has a permanent empalement of one leaf, deeply cut into five acute ſegments, has but one petal, which is cut into five parts, and reflexed; it has five awl-ſhaped ſtamina; and in the centre is ſituated an oblong germen, which becomes an oval or oblong fruit; with one cell, with a fleſhy pulp, filled with compreſſed roundiſh ſeeds. There are four ſpecies. Miller.

Linnæus has joined this ſpecies, and the LYCOPERSICON of Tournefort, to the *ſolanum*, or NIGHTSHADE, making them only ſpecies of that genus.

This plant is propagated in the gardens of the curious with us; and in Spain, Italy, and Barbary, common in the kitchen-gardens, the fruit of them being frequently eaten there, boiled with fat fleſh, putting thereto ſome ſcraped cheeſe, and preſerving it through the winter with vinegar, honey, or ſalt pickle. This they eſteem of great efficacy to provoke venery. In ſummer alſo, when the fruit is juſt ripe, they eat it freſh dreſſed, with ſpices, and other ingredients.

The manner of propagating them with us, is to ſow the ſeeds in March, upon a moderate hot-bed; and when the plants are come up, they are to be thinned by planting them in another hot-bed at about four inches aſunder, watering and ſhading them till they have taken root. They muſt afterwards have as much air as the ſeaſon will allow; and in May they muſt be tranſplanted into a warm border, ſetting them at two feet diſtance every way. About the middle of July the fruit will appear; and if the weather be dry at this time, they muſt be often watered, which will make the fruit grow large. The fruit ripens in the end of Auguſt. Miller.

The apples being much like thoſe of the mandrake, have induced ſome moderns to ſuſpect this plant to be the male mandrake of Theophraſtus: and ſuppoſing them to be deadly, to call them *mad-apples*; whereas in reality they excite no ſymptoms of madneſs, but are uſed by the Italians and Spaniards in their ſauces and ſweetmeats. They have the taſte of the citron.

Mad-*water*, among *Miners*, is water that has been drawn from a ſhaft, or any part of the mine, and returns back again to the ſame place from whence it was drawn.

Mad-*wort*, *alyſſum*, in *Botany*, a genus of the *tetradynamia ſiliculoſa* claſs. Its characters are theſe: the flower, which has an oblong four-leaved empalement, that falls away, has four petals in form of a croſs, and ſix ſtamina, two of which are ſhorter than the other four, crowned with broad ſummits; in the centre of the flower is ſituated the oval germen, which becomes a globular, or compreſſed ſeed-veſſel, containing ſeveral compreſſed ſeeds. Miller enumerates eight, and Linnæus ſeventeen ſpecies. This plant is ſaid to be aperitive, and good againſt the bite of a mad dog; being of a very penetrating and diaphoretic nature, and agreeing in other reſpects with the ſcurvy-graſs.

Mad-*wort*, *German*. See Asperugo.

MADDER, *rubia*, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe: the empalement of the flower is ſmall, cut into four ſegments, and ſits upon the germen; the flower has one bell-ſhaped petal, having no tube, but is divided into four parts; it has four awl-ſhaped ſtamina, which are ſhorter than the petals, terminated by ſingle ſummits, and a twin germen under the flower, ſupporting a ſlender ſtyle, divided into two parts upward, and crowned by two-headed ſtigmas; the germen afterwards becomes two ſmooth berries, joined together, each having one roundiſh ſeed, with a navel. There are three ſpecies.

The culture of that ſpecies of *madder*, which is uſed by the dyers and callico printers, and which grows naturally in the Levant, is an article of conſiderable advantage to the Dutch, inſomuch that at an average of ſeveral years paſt they have received from us more than 180,000*l.* per annum, and might be proſecuted here with equal ſucceſs.

The method of cultivating it in Holland is this: in autumn they new plough the land, where the *madder* is to be planted, if it is ſtrong and heavy, laying it up in high ridges that it may be mellowed by the winter's froſts. In March they plough it again, working it very deep, and laying it in ridges at eighteen inches aſunder, and about a foot deep. Then, in the beginning of April, when the *madder* begins to ſhoot out of the ground, they open the earth about the old roots, and take off all the ſide ſhoots, which extend themſelves horizontally juſt under the ſurface of the ground, preſerving as much of the root as may be with them. Theſe they plant immediately on the tops of the new ridges, at about a foot diſtance from each other; and this they uſually do in ſhowery weather, when the plants immediately take root, and require no more water. In theſe ridges they let the plants remain two ſeaſons, keeping them clear of weeds; and at Michaelmas time, when the leaves are fallen off, they take up the roots, and dry them for the market.

The beſt land for the culture of *madder* in England is a ſoft ſandy loam, which has been for ſome years in tillage, with a depth of two and a half or three feet of good earth, free from all weeds. The ground ſhould be ploughed deep before winter, and laid in ridges to mellow; and if it be not too ſtrong, there will be no neceſſity for ploughing it again, till juſt before the time of planting the *madder*, when it ſhould be ploughed as deep as poſſible; and there ſhould be men following the plough in the furrows, who ſhould dig a full ſpit below the bottom of the furrow, and turn it upon the top. The beſt time for planting the *madder* in the ground, thus prepared and made level, is about the middle or latter end of April; the young ſhoots being about two inches above the ground. The ſhoots ſhould be taken up carefully, ſo that the roots may be large and unbroken; and if they are in any degree withered by lying out of the ground, they ſhould be ſet upright in water for a few hours, before they are planted. In planting of *madder*, if the roots have been left three years in the ground, the beſt diſtance of the rows is three feet; but if they are taken up in two years, they may be two feet aſunder; and the diſtance of the plants in the rows ſhould be one foot, if they are to ſtand two years, or a foot and a half, if they are to ſtand three years. When there is no danger of too much wet in winter, the plants may be ſet upon the level ground; otherwiſe they would be planted in ridges, that the wet may drain off. The method of planting is as follows: when the ground is made ſmooth, a line is drawn acroſs, to mark out the rows; then, with an iron-ſhod dibble, holes are made at the proper diſtances; the depth of theſe holes ſhould be equal to the length of the roots; and when the plants are put into the holes, the earth ſhould be preſſed cloſe to them, in order to ſecure them from being deſtroyed by birds. It is moſt adviſeable in planting *madder*, never to ſow or plant any thing between the rows, but to keep the *madder* quite clean from weeds, or any other kind of vegetable. Some ſhowers of rain in a day or two after the planting will be of conſiderable ſervice. During the firſt ſummer, the only culture which the *madder* requires is that of keeping it clean, by ſcuffling it over with a Dutch hoe, as ſoon as the weeds appear; and when the ſhoots or haulm of the plants decay in autumn, they ſhould be raked off the ground; and the intervals between the rows ſhould be either dug with a ſpade or ploughed with a hoeing plough, laying up the earth over the heads of the plants in a roundiſh ridge. Some have covered the haulm of their *madder* with the earth, to keep the froſt out of the ground, in the manner of the Dutch: but this practice is not abſolutely neceſſary in England. In the following ſpring, before the *madder* begins to ſhoot, the ground ſhould be raked very ſmooth, and the weeds deſtroyed; and in the enſuing ſummer, care muſt be taken to keep it clear from weeds; and if it is performed by the hoe-plough, the earth of the intervals ſhould be thrown up againſt one ſide of the ridges, which will earth up the roots, and greatly increaſe their ſtrength; but before the ground of one interval is ſo hoed, the haulm of the plants ſhould be turned over to the next adjoining interval, and ſuffered to lie in this manner for two or three weeks, and then turned back again on thoſe intervals which were hoed, obſerving firſt to ſcuffle the ground, then the alternate intervals ſhould be ploughed in like manner, turning the earth up againſt the oppoſite ſides of the roots. By this method the intervals will be alternately ploughed, and the plants earthed up, whereby the ground will be kept clean and ſtirred, which will greatly promote the growth of the roots; and thus the ſuperficial ſhoots will be ſubdued, and the principal roots greatly ſtrengthened. In the following autumn the ground ſhould be cleared of the haulm and weeds, and the earth raiſed in ridges over the roots, as in the preceding year. In the third ſpring the roots will furniſh a great ſupply of young plants; but, before they appear, the ground ſhould be cleaned and raked ſmooth; and when the young plants are fit to take off, this ſhould be carefully done, always taking off thoſe which are produced at the greateſt diſtance from the crown of the mother plants. The culture of the *madder* in the third ſummer muſt be the ſame as in the ſecond; but as the roots will be then much ſtronger, the earth ſhould be laid up a little higher to them at the times when the ground is cleaned and ploughed; and it will be of ſervice to hoe or plough off the diſtant ſuperficial roots, when come up in the intervals, in order to ſtrengthen the larger downright roots; and as the haulm will be now very ſtrong and thick, the frequent turning it over from one interval to another will prevent its rotting, and the ſun is alternately admitted to each ſide of the roots, which will much contribute to the growth of the *madder*. As ſoon as the haulm of the *madder* begins to decay in autumn, the roots may be taken up for uſe, becauſe the roots have then done growing for that ſeaſon, and will be leſs liable to ſhrink, than if they are dug up when the plants are growing. When the ſeaſon for digging up the *madder* roots is come, it ſhould be done in the following manner: a deep trench ſhould be dug at one ſide of the ground next to the firſt row of *madder*, in order to make a ſufficient opening to receive the earth, which muſt be laid therein in digging up the row of roots; ſo that it ſhould be at leaſt two feet broad, and two ſpits and two ſhovellings deep, and as cloſe as poſſible to the roots, ſo that they are not cut or broke; then the rows of roots muſt be carefully dug up, turning the earth into the forementioned trench. After the principal roots are taken up, there will be many of the long fibres remaining below: and, therefore, in order to get the roots as clean as poſſible, the whole ſpot of ground ſhould be dug to the ſame depth as the firſt trench; and thoſe who are employed in picking up the roots muſt follow the diggers, to get them all out to the bottom. This digging will be an excellent preparation of the ground for any ſucceeding crop. After the roots are taken up, the ſooner they are carried to the place of drying, the finer will be their colour; and therefore no more roots ſhould be taken up than can be carried under ſhelter in the ſame day; for by lying in heaps, they will heat, and much wet will likewiſe tend to diſcolour them. The firſt place, where the roots ſhould be laid to dry, muſt be open to admit the air, but covered on the top to keep out the wet: a building like that in which tanners dry their ſkins, will be very proper for this purpoſe. They may remain in this ſituation for three or four days, but the roots ſhould be turned over once or twice, that every part may dry equally; and that the earth which adhered to them may be rubbed off. They ſhould then be carried to the kilns to be farther dried; and as there are in moſt parts of England, kilns already erected for drying of malt and hops, they may be uſed for drying of *madder*: but if there were VENTILATORS fixed to theſe kilns, for blowing a ſufficient quantity of air through the rooms, where the *madder* roots are drying, in the manner directed by Dr. Hales, for drying of malt and hops, it would be found a much better method than that which is practiced by the Dutch, and ſave a great expence of fuel. When the outſide of the roots has been ſufficiently dried in this cold ſtove or kiln, they ſhould be removed to the threſhing floor, which may be the ſame as in a common barn where corn is thraſhed. On this floor, made as clean as poſſible, the roots ſhould be threſhed, in order to beat off their ſkins or outſide covering: this ſkin, called *mull*, is the worſt ſort of *madder*, and ſold at a very low price: when it is ſeparated from the roots, it is pounded by itſelf, and afterwards packed up in ſeparate caſks, and ſold under the name of *mull*. This, however, may be ſometimes ſold at a price, which will defray the whole expence of drying the crop. After the *mull* is ſeparated from the roots, they muſt then be removed to the kiln again, and there carefully dried in a greater heat than before: and that the heat may not be too great, the roots ſhould be frequently turned in this ſtove, the fires properly regulated, and a ſufficient quantity of freſh air blown through the kiln, which will ſerve to drive out the foul air occaſioned by the reſpiration of the roots, and thus be uſeful in preſerving their colour. It will be always better to have the heat rather leſs than too violent; for though the roots may require a longer time to dry with a ſlow heat, yet the colour will be better. When the roots are properly dried in this ſtove, they muſt be carried to the pounding-houſe, where they muſt be reduced to powder. Any common building will ſerve for this purpoſe, provided there be room in it for fixing the requiſite apparatus: the back for this purpoſe ſhould be like thoſe uſed in Holland, and alſo the ſtampers, which are bound round at bottom with thick iron bands, framed like the points of a ſtar; for if the ſurface of the ſtampers be ſmooth and even, the *madder* will adhere to them ſo cloſely as to render it impoſſible to pulverize the roots properly. The ſtampers may be ſo contrived as to be worked by water, where there is convenience, or perhaps by wind; but in Holland it is done by horſes. Miller.

It appears from the calculations of another writer, that, ſuppoſing the land to be worth 40*s*. per acre, and excluding the original price of the plants, the whole expence of cultivating it with *madder*, is 15*l*. 18*s*. 2*d*. and that the produce of it is 52*l*. 12*s*. 2*d*. ſo that the clear profit is 36*l*. 14*s*.

Perſons ſtealing or deſtroying *madder* roots are liable to ſatisfaction for damages, at the diſcretion of the juſtice, for the firſt offence, or commitment to the houſe of correction for one month, or whipping; and for the ſecond offence, commitment to the houſe of correction for three months: provided that the proſecution be commenced within thirty days. 31 Geo. II. c. 35.

The root of the common *madder* cultivated for the uſe of the dyers, is an excellent aperient and diuretic. When taken internally it tinges the urine red. It is preſcribed with great ſucceſs in obſtructions of the liver and ſpleen, in ſuppreſſions of the menſes and urine, and in dropſies, jaundices, and cachexies. It is alſo recommended as a vulnerary, and ſaid to be peculiarly excellent in the diſſolving coagulated blood. The college of Edinburgh makes it an ingredient in the icteric decoction, which is prepared by boiling an ounce of *madder*, the ſame quantity of turmeric, and the ſame quantity of the roots and leaves of celandine, in three pints of water to a quart, to which, then ſtrained and cooled, the juice of two hundred millepedes is added: a quarter of a pint of this liquor is taken twice a day, or oftener. The dyers prepare a red colour with it, and uſe it alſo as a firſt tint for ſeveral others.

It impregnates water with a dull red colour, and ſpirit of wine with a deep bright red. Wool, previouſly boiled in a ſolution of alum and tartar, receives from a hot decoction of *madder* and tartar, a very durable, but not a very beautiful red colour. M. Margraaf (Berlin Mem. 1771) ſhews how a very durable lake, of a fine red colour, fit for the purpoſes of painting, may be obtained, from *madder*. The proceſs is as follows: take two ounces of the pureſt Roman alum, and diſſolve it in three (French) quarts of diſtilled water that has boiled, and in a clean glazed pot. Set the pot on the fire, and when the water begins to boil, withdraw it, and add to it two ounces of the beſt Dutch *madder*. Boil the mixture once or twice; then remove it from the fire, and filtrate it through a double filtre of paper not coloured. Let the filtrated liquor ſtand for a night to ſettle; and pour off the clear liquor into the glazed pot, well cleaned. Make the liquor hot, and add to it gradually a clear ſolution of ſalt of tartar in water, till all the *madder* is precipitated; filtrate the mixture, and upon the red precipitate which remains upon the filtre, pour boiling diſtilled water, till the water no longer acquires a ſaline taſte; the red lake is then to be gently dried. The colour of this precipitate is deep; but if two parts of *madder* be uſed to one part of alum, the colour will be ſtill deeper: one part of *madder* and four parts of alum produce a beautiful roſe-colour. Mr. John Belchier ſhewed to the Royal Society the bones of hogs which were become red, by their feeding on bran that had been boiled with printed calicoes, which had been ſtained with preparations of iron, alum, ſugar of lead, and had had an infuſion of *madder-root*, to fix the colours. By feeding a cock ſixteen days on fig-duſt, with a little *madder-root*, all his bones became alſo red. Phil. Tranſ. Nº 457.

M. Hamel du Monçeau verified Mr. Belchier's experiments, and obſerved, that except the villous coat of the ſtomach and inteſtines, the capſula of the cryſtalline and vitreous humours of the eyes, and ſome very hard bony tendons, and the bones; no other part had any tincture of the *madder*. The moſt ſolid bones were moſt tinged, and all the red ones were larger, more ſpungy, and eaſily broken; nor did they unite ſo well, when broken, as white bones. Some young animals had their bones tinged in three days. The red colour went gradually off, when the cretures forebore to take the *madder* for food, which proved unhealthy, for they began to languiſh ſoon, and died with it. Vegetables did not take the red colour when they were planted in *madder*; and none of the other dyes, with which he fed animals, had any ſuch effect of tinging their bones, as the *madder* had. Mr. Du Hamel having mixed *madder* with the food of a pig for ſome time, and then kept away the *madder* an equal time, found, upon ſawing the bones through, that their interior laminæ were red, while the exterior were white: and having fed another pig ſix weeks with *madder*, then kept it out of its food as long, and then mixed it other ſix weeks; upon ſawing the bones, they were compoſed of three layers, whereof the external and internal were red, the middle one was white. Mem. de l'Acad. des Scienc. 1739. & Phil. Tranſ. Nº 457. § 4. Med. Eſſ. Edinb. Abr. vol. ii. p. 477.

MADDER, *little field, Sherardia*, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe: the flower has a ſmall permanent empalement ſitting upon the germen; it has one long tubulous petal, cut into four plain acute parts at the brim; it has four ſtamina, ſituated on the top of the tube; terminated by ſingle ſummits, and an oblong twin germen below the flower, ſupporting a ſlender bifid ſtyle, crowned by two headed ſtigmas; the germen afterwards becomes an oblong fruit, containing two oblong ſeeds; which are ſeparated. Miller reckons two and Linnæus three ſpecies.

MADDER, *petty*, in *Botany*. See CRUCIANELLA.

MADERAM-*pulli*, in *Botany*, a name uſed by ſome authors for the tree whoſe fruit is the tamarind of the ſhops.

MADIC, a word uſed by ſome medical writers for buttermilk.

MADISTERIUM, Μαδιςηριον, a name given by the Greeks to an inſtrument intended to keep the ſkin ſmooth, by eradicating the hairs.

MAD-HOUSE. By 14 Geo. III. c. 49. enacted to be in force for five years, and by 19 Geo. III. c. 15. which continues it for ſeven years farther, no perſon, on pain of 500*l.* ſhall entertain or confine, in any houſe kept for the reception of LUNATICS, more than one lunatic at a time, without a licence to be granted yearly by five commiſſioners annually elected by the college of phyſicians, within London and Weſtminſter, and ſeven miles thereof, and within the county of Middleſex, and elſewhere by the juſtices in ſeſſions. The licences are to be ſtamped with a 5*s.* ſtamp: every one who keeps a number or lunatics, not exceeding ten, ſhall pay the ſum of 10*l.* and above ten the ſum of 15*l.* and 6*s.* 8*d.* on every licence, as a fee to the ſecretary of the commiſſioners. No licence can authoriſe any perſon to keep more than one houſe. The commiſſioners are required annually to viſit licenſed houſes, and inſpect their ſtate: on application to the commiſſioners for information concerning any confined perſon, the ſecretary is to ſearch his books, and acquaint the perſons applying with the name of the keepers in whoſe houſe the lunatic is confined. The keeper is required to give notice to the ſecretary, within three days after receiving a patient, who is to file ſuch notice; and every keeper admitting a perſon as lunatic, without an order under the hand of ſome phyſician or ſurgeon, that ſuch perſon is proper to be received, ſhall pay the ſum of 100*l.*

MADNESS, *mania*, in *Medicine*. See MANIA.

MADNESS, *from the bite of enraged animals, rabies canina.* The bites of enraged animals, though they were not *mad* at the time they inflicted them, are uſually attended with very grievous conſequences. If the wound is ſlight, the diſcharge of blood from the part is to be encouraged by preſſing it with the fingers, ſucking it in the mouth, or by the application of cupping-glaſſes, or enlarging it with a lancet. It is afterwards to be waſhed with warm ſpirit of wine, and bolſters dipped in the ſame liquor are to be applied to it, repeating the application every three or four hours, till all danger of inflammation is gone off If the wound be conſiderably deep, it is always neceſſary to enlarge it with the knife, unleſs it have already a very large opening, and, after applying ſpirit of wine for the firſt days, to prevent the bad ſymptoms, it may be eaſily healed with honey or ſome digeſtive ointment, and afterwards with a vulnerary balſam, as uſed in other wounds. To know whether a dog which has bitten a perſon be or be not *mad*, it is neceſſary to know the marks by which a dog, in that condition, is to be diſtinguiſhed from others. See HYDROPHOBIA.

Perſons bit by a *mad* dog are uſually afflicted with very violent diſorders, ſometimes ſooner, ſometimes later, according to the malignity of the poiſon imbibed by the wound, and other accidents. Many means have been recommended by different perſons, as preſervatives or as remedies in theſe diſorders: the principal of which we ſhall recount in the ſequel of this article.

Dr. de Sault argues for the *rabies canina*, depending on ſmall worms, of which, he ſays, there are a great number found in the heads of thoſe who die of this diſeaſe. From the analogy of this terrible diſeaſe with others, ſuch as the itch, lues venerea, &c. which, in his opinion, are alſo contagious, by worms communicating from one perſon to another, he was led to think that the cure of the *rabies* was only to be performed by mercury, and the ſucceſs confirmed his theory; for of four men who had all been bit at the ſame time by the ſame wolf, two were treated by the common ſpecifics of plunging in the ſea, &c. and died ſome days after of the *rabies*. The other two, having all the ſigns of an approaching *rabies*, were cured by Dr. de Sault's method, which is this: if he is conſulted immediately after the perſon is bit, he orders him to be bathed in the ſea, that the common confidence in this method may calm his mind. As ſoon as the patient returns, he puts him on the uſe of Palmarius's powder, compoſed of equal parts of the leaves of rue, vervain, ſage, plantain, polypody, common wormwood, mint, mugwort, baſtard baum, betony, St. John's wort, and leſſer centaury, dried and powdered, with ſome coralline. A dram of this powder is to be taken every morning, in a glaſs of white wine or warm water. This he gives for twenty or thirty days, as there is more or leſs preſumption of the poiſon having entered the blood. From the firſt day of taking the powder, he rubs a dram or two of ung. Neapolit. upon the wound, and ſkin round it, every other day. After doing this thrice, he applies the ointment every third day; and afterwards every fourth day, till he has made uſe of two or three ounces of the ointment. If the patient has delayed ſeveral days to take his advice, he uſes the mercurial friction three or four times a day, for four days, and increaſes the doſe of Palmarius's powder; then forbears the inunction two days, leſt a ſalivation ſhould be brought on. Our author likewiſe recommends muſic as of uſe to calm the mind, and divert the fear which people, in danger of this diſeaſe, generally have. Med. Eſſ. Edinb. vol. vi. p. 457. Boerhaave, in order to prevent the effects of a bite inflicted by a *mad* dog, recommends deep ſcarifications in the parts immediately affected and thoſe adjacent to it; the application of large cupping-glaſſes or actual cauteries; and an uninterrupted fomentation, with a brine or pickle made of ſea-ſalt and vinegar: and this treatment is to be continued for ſix months. The patient is alſo to be occaſionally thrown headlong into water, with the moſt terrifying circumſtances; becauſe he apprehends that the advantage of bathing ariſes from the terror. He adviſes likewiſe frequent purges with rhubarb, agaric, and the juice of elder-bark; and gentle ſweats every morning by taking a mixture of aromatic vinegar, ſea-ſalt, and warm water. The patient ſhould foment his head, hands, and feet in a bath of water, and drink cold water till he throws it up, by vomit: his diet ſhould be light and laxative. When ſigns of approaching *madneſs* are diſcovered, a large quantity of blood ſhould be taken away, till the patient faints; and the following clyſters mixed with a little vinegar ſhould be injected: viz. ten ounces of barley water, two drams of nitre, and elder vinegar and honey of roſes, of each an ounce: or, ten ounces of rue, two drams of ſea ſalt, ſix drams of vinegar impregnated with marigold-flowers, and an ounce of honey. Theſe ſhould be often repeated, and the patient be often thrown into cold water or waſhed with it. See HYDROPHOBIA.

Dr. James relates the cure he made of dogs that were *mad*, and how he preſerved others from the *rabies*, who had been bit by *mad* dogs, by giving doſes of turbith mineral every day, or every other day. The other dogs of the pack that had been bit, died, notwithſtanding the famous pewter medicine, dipping in the ſea, and the other common ſpecifics. The doctor likewiſe mentions three people who were bit by *mad* dogs, and eſcaped the *rabies* by the uſe of the turbith. Phil. Tranſ. Nº 441. § 8.

He directs to rub into the part where the wound was received, a dram or more of mercurial ointment, formed of equal parts of hog's lard and crude quickſilver, as ſoon as poſſible after the bite: this ſhould be repeated every day for a week: and in the evening, the patient ſhould take from three to eight grains of turbith mineral, according to his ſtrength and the degree of infection, with an equal quantity of camphor made into a bolus with any conſerve. The doſe ſhould be repeated every other evening; but ſalivation muſt be avoided. About two or three days after the laſt doſe, the patient ſhould bathe his head in cold water every day, till, as he ſays, the day before the next full or new moon; and then repeat the doſe of turbith mineral three times, as before; and after the third doſe, bathe again: and let this method be repeated for three or four ſucceſſive periods of the moon. He abſolutely forbids all nervous and heating medicines. James on Canine Madneſs.

Mr. Fuller relates the good effects of the PULVIS *antilyſſus*, compoſed of lichen. ciner. terreſt. and piper. ingr. in preventing the *rabies*. Phil. Tranſ. Nº 448. § 5.

This is much recommended as a preventive medicine by Dr. Mead, who ſays, that in the ſpace of thirty years, he uſed it a thouſand times and never knew it fail.

A perſon who had been bit by a *mad* dog, and began to have ſymptoms of the *rabies*, was ſaved by having one hundred and twenty ounces of blood taken in a week, and being bathed in cold water. Phil. Tranſ. ibid. § 6.

Mr. Nourſe relates the hiſtory of a lad bit in the thumb by a *mad* dog; he took morning and evening a dram of the *pulvis antilyſſus* forty days, and bathed in the ſea ten days; he was cut for the ſtone ſoon after, and recovered very well; nineteen months after which he died, with all the ſymptoms of the hydrophobia. Phil. Tranſ. Nº 445.

The Tonquineſe pretend to an infallible remedy for the bite of the *mad* dog. Their method is to take about ſixteen grains of the beſt muſk; of the pureſt native cinnabar, and fineſt vermillion, each about twenty-four grains; and having reduced them ſeparately to impalpable powders, they mix and adminiſter them in about a gill of arrack. This, in two or three hours, generally throws the patient into a ſound ſleep, and perſpiration: if not, they repeat the doſe, and think the cure certain. See Phil. Tranſ. vol. xliii. Nº 474. p. 225. where Mr. Reid, to whom we are obliged for this receipt, obſerves, as to the vermillion, that though it be a preparation of cinnabar, yet, as the Tonquineſe ſeem to think its virtue different, it were to be wiſhed that we knew their method of preparing it, in which they certainly excel.

This compoſition of muſk and cinnabar has been applied with ſucceſs to other diſtempers, as an antiſpaſmodic; but as Tonquin vermillion is not eaſy to be had, Mr. Reid ſubſtituted an equal quantity of factitious cinnabar in its ſtead, and ſometimes adminiſtered it in rum or brandy inſtead of arrack. See MUSK.

The Tonquineſe medicine is ſometimes called Cobb's powder, becauſe it was brought over from Tonquin by a Mr. Cobb, formerly in the ſervice of the Eaſt India Company.

A good antiſpaſmodic medicine may be prepared by mixing half a dram of Virginian ſnake-root in powder, with twelve grains of gum aſſafœtida, and ſeven grains of gum camphor, into a bolus, with ſyrup of ſaffron. Or, one dram of camphor, half an ounce of purified nitre, two drams of powdered Virginian ſnake-root may be rubbed together in a mortar, and the whole divided into ten doſes. Mercury is alſo a medicine of conſiderable efficacy, in the prevention and cure of this kind of *madneſs*. When uſed as a preventive, it will be ſufficient to rub daily a dram of the ointment into the parts about the wound. Vinegar taken freely in the patient's drink and food, is of conſiderable ſervice. But theſe or any other medicines muſt be uſed for a ſufficient length of time.

The following receipt was taken from the church of Cathorp, in Lincolnſhire, where almoſt the whole pariſh were bit by a *mad* dog, and thoſe who uſed it recovered, but they who did not, died: take the leaves of rue picked from the ſtalks and bruiſed, ſix ounces; garlick picked from the ſtalks and bruiſed, Venice treacle, and mithridate, and the ſcrapings of pewter, of each four ounces; boil all theſe over a ſlow fire in two quarts of ſtrong ale, till one pint be conſumed; then keep it in a bottle cloſe ſtopped, and give nine ſpoonfuls of it warm to a man or woman, for ſeven mornings together faſting; and ſix ſpoonfuls to a dog. It is confidently ſaid, that this will not fail, if it be uſed within nine days after the biting of the dog. Some of the ingredients from which the liquor was ſtrained, ſhould be applied to the wounded part. Dr. Parſons adviſes to rub into the wound, as ſoon as a perſon receives the bite, a ſpoonful or two of common ſalt, moiſtened with water, and to repeat it three or four times a day, for a week or ten days; and then to lay on a compreſs with the ſame ſaline preparation. If the wound is very ſmall, it ought to be dilated, that enough of the ſalt may be the ſooner introduced. The inhabitants of Connecticut in New England have long practiſed this method with ſucceſs, as an antidote againſt the bites of *mad* dogs and venomous animals in general.

The moſt proper thing the ſurgeon can do on this occaſion, is to enlarge the wound with the knife, and promote the flowing out of the blood; then to waſh it with ſalt-water, or with Venice treacle diſſolved in vinegar; and when the texture of the part will permit, that is, when only the common integuments, or fleſhy parts are wounded, to apply the actual cautery to the wound, and afterwards dreſs it as other burns. Another method much practiſed, is to make a tight ligature above the wound, to prevent, as much as may be, the return of the blood by the veins from that part; then to enlarge the wound with a knife, and waſh it as before directed; then cauterize it, if the part will admit that operation, if not, cleanſe the wound, if deep, by means of a ſyringe, and apply over it a plaſter of the mercurial kind; and if the perſon be plethoric, to open a vein. After the Venice treacle has been uſed for a day or two in theſe caſes, the wound is to be dreſſed with honey, or with the common digeſtive ointment, mixed with the Ægyptian ointment, or with red precipitate, and be kept open by means of theſe dreſſings for ſome weeks; for wounds of this kind muſt never be healed too ſoon, eſpecially when they have not been cauterized. Heiſter's Surg. p. 99.

The patient ſhould alſo begin to uſe either Dr. Mead's PULVIS *antilyſſus*, or ſome of the others already mentioned. He muſt alſo rub into the parts about the wound, daily, one dram of the mercurial ointment; which may be continued for ten or twelve days. Afterwards he may take a purge or two; and then begin to uſe the cold or rather a warm bath; which he may perſiſt in every morning for five or ſix weeks. In the mean time he may take either one of the boluſes of ſnake-root, aſſafœtida and camphor, or one of the powders of nitre, camphor, and ſnake-root, twice a day. He ſhould carefully abſtain from fleſh, and all ſalted and high ſeaſoned proviſions. He muſt alſo avoid ſtrong liquors and turbulent paſſions, and live moſtly on a light and ſpare diet, and be kept as eaſy and chearful as poſſible. Dr. Buchan obſerves, that he has never ſeen this courſe of medicine, with proper regimen, fail in preventing the HYDROPHOBIA. Dom. Med. p. 525. ed. 1776.

Dr. Tiſſot ſays, that this diſeaſe may be cured in the following manner: let the patient loſe a conſiderable quantity of blood; and let bleeding be repeated twice, thrice, or even a fourth time, if circumſtances require it: the patient ſhould be put, if poſſible, into a warm bath twice a day; and every day receive two or three emollient clyſters: the wound and adjacent parts ſhould be rubbed with the mercurial ointment twice a day; and the whole limb, in which the wound lies, be rubbed with oil, and wrapped up in an oily flannel: a doſe of Cobb's powder ſhould be taken every three hours in a cup of the infuſion of lime-tree and elder flowers: and a bolus, made by mixing one dram of powdered Virginia ſnake-root, one grain of opium, and of camphor and aſſafœtida ten grains each, with a ſufficient quantity of conſerve or rob of elder, ſhould be given every night, and repeated in the morning, if the patient is not eaſy, waſhing it down with the above mentioned infuſion. When there is a great nauſea at the ſtomach, and a bitterneſs in the mouth, thirty-five or forty grains of ipecacuanha, in the powder, may be taken for a vomit. The patient's food muſt be light, as panada, ſoups made of mealy vegetables, &c. and if he ſhould long continue weak and ſubject to terrors, he may take half a dram of the Peruvian bark thrice a day. Tiſſot's Advice, &c. p. 203. ed. 1766.

In a caſe, with reſpect to which Dr. Fothergill and Dr. Watſon held a conſultation, they agreed on the following method of treatment, though unattended with ſucceſs. They ordered the patient to be blooded ſtanding, according as his ſtrength would bear; that he ſhould be conveyed to the warm bath, and remain in it as long as it was agreeable: at his return from the bath, a clyſter of milk and water was injected with a dram of Dover's powder, and half an ounce of mercurial unction was rubbed on his legs and thighs; one ſcruple of thebaic extract was ordered to be made into twenty pills, three of which were to be taken when he came out of the bath, and two every hour till he ſeemed diſpoſed to ſleep. The Ormſkirk remedy, which has been extolled as an infallible preſervative in this diſorder, had been previouſly tried without any beneficial effect.

The method of bathing in freſh or ſalt water, with the terrifying circumſtances that attend it, founded indeed on the authority of Celſus, lib. v. cap. 27. and generally recurred to in this diſorder, has alſo been found ineffectual. Mercurials, however commonly recommended, are no ſufficient preſervatives; nor can we rely on the *pulvis antilyſſus* extolled by Mead, nor on the Tonquin medicine. The only method that promiſed much ſecurity, and that is recommended by long and extenſive experience is that, adviſed alſo by Celſus, of burning the wounded part, and promoting a diſcharge from the wound as long and as copiouſly as poſſible. A ſufficient opening for this purpoſe may me made either by the knife or by actual cautery. In the Highlands it is common, when a perſon is bit by a mad dog, to cut out the fleſh of the wounded part with a razor, to ſuck the blood in plenty, and to cover the wound with a handful of cobwebs; and in ſome parts of Europe, they fill the wound with gun-powder as ſpeedily as poſſible and ſet fire to it; or if there be no conſiderable wound, make an inciſion near it quickly, put gun-powder into it, and then ſet it on fire; and thus, the exploſion both enlarges the wound and prevents its ſpeedy healing. Lond. Med. Obſ. vol. v. art. 19. and art. 26.

MADNING-*Money*, old Roman coins, found about Dunſtable, are ſo called by the country people; and have their name from *magintum*, uſed by the emperor Antoninus in his Itinerary, for Dunſtable.

MADON, in *Botany*, a name by which Pliny, and ſome other authors, have called the white bryony.

MADOR, a word uſed by ſome authors to expreſs the ſweat which ariſes under ſyncope or fainting, whether it be cold or hot, or in larger or ſmaller quantities.

MADREPORA, in *Natural Hiſtory*, the name of a genus of ſubmarine ſubſtances, the characters of which are, that they are almoſt of a ſtony hardneſs, reſembling the corals, and are uſually divided into branches, and pervious by many holes or cavities, which are frequently of a ſtellar figure.

In the Linnæan ſyſtem, this is a genus of LITHOPHYTA: The animal that inhabits it is the meduſa: it comprehends thirty-nine ſpecies. According to Donati, the *madrepora* is like the choral as to its hardneſs, which is equal to bone or marble; the colour is white when poliſhed; its ſurface is lightly wrinkled, and the wrinkles run lengthwiſe of the branches; in the centre there is a ſort of cylinder, which is often pierced through its whole length by two or three holes. From this cylinder are detached about ſeventeen laminæ, which run to the circumference in ſtrait lines; and are tranſverſely interſected by other laminæ, forming many irregular cavities; the cellules, which are compoſed of theſe laminæ ranged into a circle, are the habitations of little polypes, which are extremely tender animals, generally tranſparent, and variegated with beautiful colours. M. de Peyſſonel obſerves, that thoſe writers who only conſidered the figures of ſubmarine ſubſtances, denominated that claſs of them, which ſeemed pierced with holes, *pora*; and thoſe the holes of which were large, they called *madrepora*. He defines them to be all thoſe marine bodies, which are of a ſtony ſubſtance, without either bark or cruſt, and which have but one apparent opening at each extremity, furniſhed with rays that proceed from the centre to the circumference. He obſerves that the body of the animal of the *madrepora*, whoſe fleſh is ſo ſoft, that it divides upon the gentleſt touch, fills the centre; the head is placed in the middle, and ſurrounded by ſeveral feet or claws, which fill the intervals of the partitions obſerved in this ſubſtance, and are at pleaſure brought to its head, and are furniſhed with yellow papillæ. He diſcovered, that its head or centre was lifted up occaſionally above the ſurface, and often contracted and dilated itſelf like the pupil of the eye: he ſaw all its claws moved, as well as its head or centre. When the animals of the *madrepora* are deſtroyed, its extremities become white. In the *madrepora*, he ſays, the animal occupies the extremity; and the ſubſtance is of a ſtony, but more looſe texture than the coral. This is formed, like other ſubſtances of the ſame nature, of a liquor which the animal diſcharges; and he farther adds, that there are ſome ſpecies of the polype of the *madrepora*, which are produced ſingly, and others in cluſters. Phil. Tranſ. vol. xlvii. p. 105. 461, &c. See CORAL.

MADRIER, in the *Military Art*, a thick plank, ſometimes armed with iron plates, having a cavity ſufficient to receive the mouth of a petard when charged; with which it is applied againſt a gate, or other body deſigned to be broken down. See PETARD.

MADRIER alſo denotes a long and broad plank, uſed for ſupporting the earth in mining, carrying on ſaps, making caponiers, galleries and the like.

There are alſo *madriers* lined with tin, and covered with earth; ſerving as defences againſt artificial fires, in lodgments, &c. where there is need of being covered over head.

MADRIGAL, in the modern Italian, Spaniſh, and French poetry, denotes a little amorous piece, containing a certain number of free unequal verſes, not tied either to the ſcrupulous regularity of a ſonnet, or the ſubtlety of an epigram, but conſiſting of ſome tender and delicate, yet ſimple thought, ſuitably expreſſed.

Menage derives the word from *mandra*, which, in Latin and Greek, ſignifies a ſheepfold; imagining it to have been originally a kind of paſtoral or ſhepherd's ſong; whence the Italians formed their *madrigale*, and we *madrigal*. Others rather chooſe to derive the word from *madrugar*; which, in the Spaniſh, ſignifies to riſe in the morning; the *madrigals* being formerly ſung early in the morning, by thoſe who had a mind to ſerenade their miſtreſſes.

Huet ſuppoſes it to be a corruption of *martegeaux*, a name given to the inhabitants of a diſtrict of Provence, who either invented or excelled in this ſpecies of compoſition. If the origin is deduced from the Spaniards, it may have taken its name from a town in Spain, called *Madrigal*. Others ſuppoſing that its firſt application was to religious poems, addreſſed to the Virgin, *alla Madre*, derive from thence *madrialle*, and *madrigale*.

The *madrigal*, according to M. le Brun, is an epigram without any thing very briſk and ſprightly in its fall, or cloſe: ſomething very tender and gallant is uſually the ſubject of it; and a certain beautiful, noble, yet chaſte ſimplicity forms its character.

The *madrigal* is uſually looked on as the ſhorteſt of all the leſſer kinds of poems, except the epigram: it may conſiſt of fewer verſes than either the ſonnet, or roundelay. There is no other rule regarded in mingling the rhymes and verſes of different kinds, but the fancy and convenience of the author. This poem, however, really allows of leſs licence than many others; whether we regard the rhyme, meaſures, or the purity of expreſſion.

The term is alſo applied to a muſical compoſition of three or more parts for different voices, adapted to the words of ſuch poems.

MAEL *Coronde*, in the *Language of the Celoneſe*, the flowering cinnamon-tree. This is a name given to a peculiar ſpecies of the cinnamon-tree, which is all the year round found full of flowers. The flowers are not eaſily to be diſtinguiſhed from the very fineſt cinnamon-flowers, but they produce no fruit, which the flowers of the fine cinnamon always do. The bark is much like that of the beſt cinnamon, in external appearance; but it has very little taſte or ſmell. The tree grows very large, and the inhabitants ſometimes tap it, by boring a hole into the trunk, at which it bleeds a thin watery juice, in the manner of our birch-tree.

MÆMACTERION, Μαιμακτηριων, in *Chronology*, the fourth month of the Athenian year. It contained twenty-nine days, and anſwered to the latter part of our September and beginning of October. The Bœotians call it *alalcomenius*.

It took its name from the feſtival *Memacteria*, ſacred to Jupiter, kept at this time.

MÆMACYLON, in the *Materia Medica*, a name given by Dioſcorides, and the ancients in general, to the fruit of the *arbutus*, or ſtrawberry-tree.

MÆNA, in *Ichthyology*, the name of a ſmall fiſh caught in vaſt abundance about the ſhores of the Mediterranean, and common in the markets of Italy, where they are accounted but a poor ſort of fiſh, and ſold at a very cheap rate. It is ſomewhat of the figure of the pearch, but broader and thinner, and is ſeldom above four or five inches in length.

MÆNA *candida*, in *Ichthyology*, a name given by many authors to the ſmaris. It is not very improper, for they are both of the ſame genus of the SPARUS, and are very nearly allied to one another; the principal difference conſiſting in the tail and belly fins of the ſmaris being red.

MAESTOSO, or MAESTUOSO, in the *Italian Muſic*, ſignifies to play with grandeur, and conſequently ſlow, but yet with ſtrength and firmneſs.

MAFORTIUM, among the *Romans*, a veil, or head-dreſs, worn by the married women.

MAGADA, in *Mythology*, a title under which Venus was known and worſhipped in Lower Saxony; where this goddeſs had a famous temple, which was treated with reſpect even by the Huns and Vandals, when they ravaged the country. It is ſaid to have been deſtroyed by Charlemagne.

MAGAS, **Magadis**, from μαγαδιζειν, *to ſing*, or *play in uniſon* or *octave*, the name of a muſical inſtrument, in uſe among the ancients.

There were two kinds of *magades*, the one a ſtring inſtrument, formed of twenty chords, arranged in pairs, and tuned to uniſon or octave, ſo that they yielded ten ſounds; the invention whereof is aſcribed, by ſome to Sappho; by others, to the Lydians; and by ſome to Timotheus of Miletus.

The other was a kind of flute, which, at the ſame time, yielded very high and very low notes. The former kind was, at leaſt much improved by Timotheus of Miletus, who is ſaid to have been impeached of a crime; becauſe by increaſing the number of chords, he ſpoiled and diſcredited the ancient muſic.

Magas, in the *Ancient Muſic*, is alſo uſed to denote the bridge of any inſtrument.

MAGAURI, in *Ornithology*, the name of a Braſilian bird, a ſpecies of STORK: it is of the ſize of the common white ſtork; its neck is a foot long, and its beak ſtrait and pointed, and nine fingers breadth in length; its legs long and naked; its tail is ſhort; its head, neck, and body, are covered with ſnow-white feathers; on the throat theſe are very long, very white, and valuable; its wings and tail have their long feathers black; its legs are red; and its fleſh eatable.

MAGAZINE, in the *Military Art*, a place in fortified towns, where all ſorts of ſtores are kept; and where carpenters, wheelwrights, ſmiths, &c. are employed in making things needful to furniſh out the train of artillery.

Magazine, *powder*, is a building conſtructed for keeping large quantities of powder. Theſe *magazines* were formerly towers erected in the town walls; but many inconveniencies attending this ſituation of them, they are now placed in different parts of the town. They were at firſt conſtructed with Gothic arches; but M. Vauban, finding theſe too weak, conſtructed them in a ſemicircular form of the following dimenſions, viz. ſixty feet long within, and twenty-five broad; the foundations eight or nine feet thick; and eight feet high from the foundation to the ſpring of the arch; the floor about two feet from the ground to prevent damp; and conſequently ſix feet for the height of the ſtory.

The thinneſt part or hanches of the arch is three feet thick, and the arch made of four leſſer ones, one over the other, and the outſide of the whole terminated in a ſlope to form the roof; from the higheſt part of the arch to the ridges is eight feet, which makes the angle ſomewhat greater than ninety degrees; the two wings or gable ends, are four feet thick, raiſed ſomewhat higher than the roof, as is cuſtomory in other buildings; as to their foundations they are five feet thick, and as deep as the nature of the ground required.

The piers or long ſides are ſupported by four counterforts, each of ſix feet broad, and four feet long, and their interval twelve feet; between the intervals of the counterforts, are air-holes, in order to keep the *magazine* dry and free from dampneſs; the dices of theſe air-holes are commonly a foot and a half every way, and the vacant ſpace round them three inches, made ſo, as the in and outſides be in the ſame direction. The dices ſerve to prevent an enemy from throwing fire in, to burn the *magazine*, and for a farther precaution, it is neceſſary to ſtop theſe holes with ſeveral iron plates, that have ſmall holes in them like a ſkimmer, otherwiſe fire might be tied to the tail of ſome ſmall animal, and ſo drive it in that way; this would be no hard matter to do, ſince where this precaution had been neglected, egg-ſhells have been found within, that have been carried there by weaſles.

To keep the floor from dampneſs, beams are laid long ways, and to prevent theſe beams from being ſoon rotten, large ſtones are laid under them; theſe beams are eight or nine inches ſquare, or rather ten high and eight broad, which is better, and eighteen inches diſtant from each other; their interval is filled with dry ſea coals, or chips of dry ſtones, then over theſe beams are others laid croſs-ways, of four inches broad, and five high, which are covered with two inch planks.

Mr. Belidor would have brick walls made under the floor, inſtead of beams, and a double floor laid on the croſs-beams; which does not appear to be ſo well as the manner propoſed here; the reader is, however, at liberty to chooſe the method he likes beſt.

To give light to the *magazine*, a window is made in each wing, which are ſhut up by two ſhutters of two or three inches thick, one within and the other without; that which is on the outſide is covered with an iron plate, and is faſtened with bolts, as well as that on the inſide. Theſe windows are made very high, for fear of accidents, and are opened by means of a ladder, to give air to the *magazine* in fine dry weather.

There is likewiſe a double door made of ſtrong planks, the one opens on the outſide, and the other within; the outſide one is alſo covered with an iron plate, and both are locked by a ſtrong double lock; the ſtore-keeper has the key of the outſide, and the governor that of the inſide: the door ought to face the ſouth nearly, if poſſible; in order to render the *magazine* as light as can be, and that the wind blowing in may be dry and warm. Sometimes a wall of ten feet high is built round the *magazine* about twelve diſtant from it, to prevent any thing from approaching it without being ſeen. Mr. Muller has propoſed ſome alterations by way of improvement, in M. Vauban's conſtruction, for which ſee his Practical Fortification, p. 219, &c.

If large *magazines* are required, the piers or ſide walls which ſupport the arch, ſhould be ten feet thick, ſeventy-two feet long, and twenty-five feet high; the middle wall, which ſupports the two ſmall arches of the ground floor, eight feet high, and eighteen inches thick, and likewiſe the arches: the thickneſs of the great arch ſhould be three feet ſix inches, and the counterforts, as well as the air-holes, the ſame as before. *Magazines* of this kind ſhould not be erected in fortified towns, but in ſome inland part of the country near the capital, where no enemy is expected. It has been obſerved, that after the centres of ſemicircular arches are ſtruck, they ſettle at the crown and riſe up at the hanches; now as this ſhrinking of the arches muſt be attended with ill conſequences, by breaking the texture of the cement after it has been partly dried, and alſo by opening the joints of the vouſſoirs at one end, Dr. Hutton, in his Treatiſe on Bridges, has propoſed to remedy this inconvenience, with regard to bridges, by the arch of equilibration: and as the ill effect is much greater in powder *magazines*, he has alſo propoſed to find an arch of equilibration for them alſo; and to conſtruct it when the ſpan is twenty feet, the pitch or height ten, which are the ſame dimenſions as thoſe of the ſemicircle, the inclined exterior walls, at top, forming an angle of 113°, and the height of their angular point above the top of the arch equal to ſeven feet: this curious queſtion was anſwered in 1775, by the Rev. Mr. Wilbore, and the ſolution of it may be found in Hutton's Miſcellanea Mathematica.

Magazine, *artillery*, or the *magazine* to a field battery, is uſually made about fifty or ſixty yards behind the platform. This is a cavity dug in the ground about four feet deep, and the earth thrown between the pit and the platform; the ſides of the pit are ſometimes planked round to keep it dry and to prevent the earth from crumbling in; and the powder-barrels placed here are covered with hurdles and earth, or tanned hides, to preſerve the powder from wet or fire. The communication to the *magazine* is by a ſloping trench beginning to deſcend about five or ſix yards behind the platform; and the earth is thrown on that ſide where it will moſt conveniently cover the perſons who remove the barrels of powder from the great *magazine* to the *battery* or ſmall *magazine*. When there are many cannons in the battery, and the ſervice is quick, it is cuſtomary to have, for every two pieces, a ſmall *magazine* to hold twenty or thirty barrels of powder; this is placed about fifteen or twenty yards behind the platform, and againſt the merlon between the cannon; and as theſe barrels are uſed, they are replaced by others from the great *magazine*. At each *magazine* a centinel is placed to prevent accidents; and in order to prevent perſons from coming into the battery and *magazines* who have no buſineſs there, a trench is ſometimes dug behind the *magazine* and carried into the trenches which communicate between the *magazine* and battery.

Magazine, or **Powder-Room**, in a ſhip, a cloſe room or ſtore-houſe built in the fore, or afterpart of a ſhip's hold, to contain the gunpowder uſed in battle, &c. This apartment is ſtrongly ſecured againſt fire, and no perſon is ſuffered to enter it with a lamp or candle; it is therefore lighted, as occaſion requires, by means of the candles or lamps which are fixed in the LIGHT-*room* contiguous to it.

MAGBOTE, or **Mægbote**, formed of the Saxon *mæg*, i. e. *cognatus*, and *bote*, *compenſatio*, in our *Old Writers*, a compenſation for the ſlaying or murder of one's kinſman, in ancient times, when corporal puniſhments for murder, &c. were ſometimes commuted into pecuniary fines, if the friends and relations of the party were ſo ſatisfied.

MAGDALEN. *Religious of St.* Magdalen, is a denomination given to divers communities of nuns, conſiſting, generally, of penitent courtezans; ſometimes alſo called *Magdalanettes*.

Such are thoſe at Metz, eſtabliſhed in 1452; thoſe at Paris, in 1492; thoſe at Naples firſt eſtabliſhed in 1324, and endowed by queen Sancha, to ſerve as a retreat for public courtezans, who ſhould betake themſelves to repentance; and thoſe of Rouen and Bourdeaux, which had their original among thoſe of Paris in 1618.

In each of theſe monaſteries there are three kinds of perſons and congregations; the firſt conſiſt of thoſe who are admitted to make vows, and theſe bear the name of *St. Magdalen*; the congregation of St. Martha is the ſecond, and is compoſed of thoſe who it is not judged proper to admit to vows; finally the congregation of St. Lazarus is compoſed of ſuch as are detained there by force.

The religious of *St. Magdalen* at Rome were eſtabliſhed by pope Leo X. Clement VIII. ſettled a revenue on them, and farther appointed that the effects of all public proſtitutes, dying inteſtate, ſhould fall to them; and that the teſtament of the reſt ſhould be invalid, unleſs they bequeath a portion of their effects, which was to be at leaſt a fifth part, to them.

Magdalen *hoſpital*. See Hospital.

MAGDALEO, a word uſed by diſpenſatory writers, to expreſs any thing made up into a cylindrical form. The common rolls of plaſters which the apothecaries make up to be ready for ſpreading upon occaſion, are thus called, as alſo the rolls of ſulphur or common brimſtone.

MAGDALIÆ, or **Magdalides**, the ſame as Magdallones, rolls of ſulphur, plaſter, &c.

MAGELLANIC *clouds*, whitiſh appearances like clouds, ſeen in the heavens towards the ſouth pole, and having the ſame apparent motion of the ſtars.

They are three in number, two of them near each other. The largeſt lies far from the ſouth pole, but the other two are not many degrees more remote from it than the neareſt conſpicuous ſtar, that is, about eleven degrees. Mr. Boyle conjectures, that if theſe clouds were ſeen through a good teleſcope, they would appear to be multitudes of ſmall ſtars, like the milky way. Boyle's Works abr. vol. i. p. 295.

Magellanic *gooſe*, *anſer magellanicus*, in *Ornithology*. See Goose.

MAGGOT, the common name of the fly-worm, bred in fleſh, from the egg of the great blue fleſh-fly. Notwithſtanding the diſtaſte for this animal, its figure and ſtructure of parts are greatly worth attending to, and may ſerve as a general hiſtory of the claſs of worms produced from the eggs of flies.

This animal is white and fleſhy; its body is compoſed of a number of rings, like the bodies of caterpillars, and other the like inſects, and is capable at the pleaſure of the animal of aſſuming different figures, being, at times, more or leſs extended in length, and conſequently more or leſs thick.

Notwithſtanding that this creature has no legs, it is able to move itſelf very ſwiftly, and, in its firſt attempt to move its body, is extended to its greateſt length, and aſſumes ſomething of the figure of a pointed cone. The pointed part of this cone is the head of the animal, and is not ſeparated from the next ring by any deeper furrow than the reſt of the rings are from one another. In ſome ſtates of the animal one may ſee two ſhort horns thruſt out from the head; but what are more conſtantly obſervable, are two brown ſcaly hooks; theſe, are however, ſometimes hid, and have each of them a ſheath, or caſe, into which the animal can retract them at pleaſure.

Theſe hooks are bent into an arch, the concavity of which is toward the place on which the creature is placed, and they are thickeſt at their inſertion in the head, and thence diminiſh gradually, till they terminate in a fine ſharp point.

Theſe two hooks are placed in a parallel direction, and can never come together, and therefore cannot ſerve in the place of teeth to grind the food between, but merely to pull and ſever it to pieces, that it may be of a proper ſize for the mouth of the creature.

The creature has beſides theſe two hooks a kind of dart, which is of about a third part of their length, and is placed an an equal diſtance between them. This alſo is brown like them, and ſcaly; it is quite ſtrait, and terminates in a fine point. The hooks have, as it were, two ſcaly thorns at their points, and this dart ſeems intended, by reiterated ſtrokes, to divide and break the pieces of fleſh theſe have ſeparated from the reſt, into ſmaller parts.

Immediately below the apertures for the egreſs of the hooks, is placed the mouth of the animal; the creature does not ſhew this little opening unleſs preſſed; but if the preſſure be properly managed, it will ſufficiently open it, and there may be diſcovered within it a ſmall protuberance which may very naturally be ſuppoſed either the tongue, or the ſucker of the animal. The hooks in this creature not only ſupply the place of teeth but alſo of legs; ſince it is by faſtening theſe hooks into the ſubſtance it is placed on, and then drawing up its body to it, that it pulls itſelf along.

The back of the creature lowers itſelf by degrees as it approaches the extremity of the belly, and near the place where the back begins to lower itſelf, are placed the creature's two principal organs of reſpiration. One may perceive there two ſmall roundiſh brown ſpots; theſe are very eaſily diſtinguiſhable by the naked eye; becauſe the reſt of the body of the creature is white; but if we take in the aſſiſtance of glaſſes, each of theſe ſpots appears to be a brown circular eminence raiſed a little above the reſt of the body. On each of theſe ſpots one may alſo diſcover three oblong oval cavities, ſomething in the ſhape of button-holes; theſe are ſituated in a parallel direction to one another, and their length nearly in a perpendicular direction to that of the body of the animal.

Theſe apertures are ſo many ſtigmata or air-holes, openings deſtined to admit the air neceſſary to the life of the animal. The creature has ſix of theſe ſtigmata, three in each ſide of its body.

The great tranſparence of the body of this inſect, gives us an opportunity alſo to diſtinguiſh that it has on each ſide a large white veſſel running the whole length of the body. It is eaſy to follow the courſe of theſe veſſels through their whole length, but they are moſt diſtinct of all toward its hinder part, and they are always ſeen to terminate each in the brown ſpot before deſcribed; this leaves us no room to doubt but that they are the two principal tracheæ.

Theſe poſterior tracheæ have been well known to the later naturaliſts; but there are two others beſides theſe which they ſeem not to have diſtinguiſhed. Theſe are ſituated in the anterior part of the animal, and are eaſily diſcovered by following the courſe of the tracheæ on each ſide; for though theſe all the way diminiſh in their diameters as they approach the head of the animal, yet it may be eaſily enough ſeen where they terminate, which is (taking the head for one ring) in the junction of the ſecond and third ring. In this place the naked eye eaſily diſcovers a ſmall ſpot at the extremity of each, which viewed with a good microſcope appears to be a plain ſtigma, of the figure of a funnel with half of it cut off, and very elegantly indented, and as it were fringed at the edges.

Theſe ſtigmata in the anterior part of the body, are as conſtant in this creature as the poſterior ones, but it ſeems to have none of thoſe which the caterpillar claſs are furniſhed with along their ſides; though it ſeems from the ſtructure of the fly it afterwards transforms itſelf into, that it ought to have them, ſince that has ſtigmata in their places.

The ramifications of the two great tracheæ are very beautifully ſeen in this creature, eſpecially on his belly; and it is remarkable that no veſſel analogous to the great artery in the caterpillar claſs can be diſcovered in theſe; though, if there were any ſuch, their great tranſparence muſt needs make them very eaſily diſtinguiſhable; nor could its dilatations and contractions, if ſo conſiderable as in that claſs of animals, be leſs ſo. See Caterpillar.

Malpighi imagined that artery, in the caterpillar-claſs, a ſeries of hearts; in its place, however, there may be ſeen in theſe animals a true heart. It is eaſy to obſerve in theſe creatures about the fourth ring of the body, a ſmall fleſhy part, which has alternate contractions and dilatations, and is not only diſcoverable in the body by means of the creature's tranſparence; but, on making a proper ſection of them in the ſecond, third, and fourth rings, will be thrown out of the body of the creature, and will afterwards continue its beats for ſome minutes. Reaumur's Hiſt. of Inſect. vol. iv. p. 166, ſeq.

MAGI, or **Magians**, a title which the ancient Perſians gave to their wiſe men or philoſophers.

The learned are in great perplexity about the original of the word *magus*, *μαγος*. Plato, Xenophon, Herodotus, Strabo, &c. derived it from the Perſian language, in which it ſignified *a prieſt*, or perſon appointed to officiate in holy things; as *Druid*, amoeg the Gauls; *Gymnoſophiſt*, among the Indians; and *Levite*, among the Hebrews. Others derive it from the Greek *μεγας*, *great*; which they ſay, being borrowed of the Greeks by the Perſians, was returned in the form of *μαγος*; but Voſſius with more probability, brings it from the Hebrew חגה *haga*, *to meditate*; whence, מחגים *maaghim*, in Latin *meditabundi*, q. d. people addicted to meditation. See the ſequel of this article.

Magi, among the Perſians, anſwers to *σοφοι*, or *φιλοσοφοι*, among the Greeks; *ſapientes*, among the Latins; *Druids*, among the Gauls; *Gymnoſophiſts*, among the Indians; and *prophets*, or *prieſts*, among the Egyptians.

The ancient *Magi*, according to Ariſtotle and Laertius, were the ſole authors and conſervators of the Perſian philoſophy; and the philoſophy principally cultivated among them was theology and politics; they being always eſteemed as the interpreters of all law, both divine and human; on which account they were wonderfully revered by the people. Hence, Cicero obſerves, that none were admitted to the crown of Perſia, but ſuch as were well inſtructed in the diſcipline of the *magi*; who taught τα βασιλικα, and ſhewed princes how to govern.

Plato, Apulius, Laertius, and others, agree, that the philoſophy of the *magi* related principally to the worſhip of the gods: they were the perſons who were to offer prayers, ſupplications, and ſacrifices, as if the gods would be heard by them alone.

But, according to Lucian, Suidas, &c. this theology, or worſhip of the gods, as it is called, about which the *Magi* were employed, was little more than the diabolical art of divination; ſo that μαγεια, ſtrictly taken, was the art of divination. Theſe people were held in ſuch veneration among the Perſians, that Darius, the ſon of Hyſtaſpes, among other things, had it engraven on his monument, that he was the maſter of the *Magi*.

Philo Judæus deſcribes the *Magi* to be diligent inquirers into nature, out of the love they bear to truth; and who, ſetting themſelves apart from other things, contemplate the divine virtues the more clearly, and initiate others in the ſame myſteries.

The *Magi*, or *Magians*, formed one of the two grand ſects into which the idolatry of the world was divided between five and ſix hundred years before Chriſt. Theſe abominated all thoſe images which were worſhipped by the other ſect, denominated SABIANS, and paid their worſhip to the Deity under the emblem of fire. Their chief doctrine was, that there were two principles, one of which was the cauſe of all good, and the other the cauſe of all evil. The former was repreſented by light, and the latter by darkneſs, as their trueſt ſymbols; and of the compoſition of theſe two they ſuppoſed that all things in the world were made. The good god they called Yazdan, denominated by the Greeks Oroſmades; and the evil god Abraman, whom the Greeks called Arimanius. Concerning theſe two gods, there was this difference of opinion among them; that whereas ſome held both of them to have been from all eternity, there were others who contended that the good God only was eternal, and that the other was created. But they both agreed in this, that there will be a continual oppoſition between theſe two, till the end of the world; when the former ſhall overcome the latter; and that from thenceforth each of them ſhall have his world to himſelf; that is, the good God ſhall have his world with all good men with him, and the evil god his world with all evil men with him. The good God they always worſhipped before fire, as being the cauſe of light, and eſpecially before the ſun, as being, in their opinion, the moſt perfect fire, and cauſing the moſt perfect light: and, for this reaſon, they had, in all their temples, fire continually burning on altars, erected in them for that purpoſe. Before theſe ſacred fires they performed all their public acts of devotion, as they likewiſe practiſed their private devotions before their private fires in their own houſes. Such were the tenets of this ſect, when Smerdis, who was the principal leader of it, having uſurped the crown after the death of Cambyſes, was ſlain by ſeven princes of Perſia; and many of the *Magians* who adhered to him ſhared likewiſe the ſame fate. In conſequence of this event, thoſe who adopted the ſentiment of this ſect were called, by way of deriſion, *Magians*, from *mige-guſh*, which ſignified, in the language of the country then in uſe, *one that had his ears cropped*. The whole ſect of the *Magians* would ſoon have ſunk into utter extinction, if it had not, in a few years after this period, been revived and reformed by Zoroaſter. This celebrated philoſopher, called by the Perſians Zerduſht or Zaratuſh, began, about the thirty-ſixth year of the reign of Darius, to reſtore and reform the *Magian* ſyſtem of religion. He was not only excellently ſkilled in all the learning of the Eaſt, that prevailed in his time; but likewiſe thoroughly verſed in the Jewiſh religion, and in all the ſacred writings of the Old Teſtament that were then extant, whence ſome have inferred that he was a native Jew both by birth and profeſſion; and that he had been ſervant to one of the prophets, probably to Ezekiel or Daniel. He made his firſt appearance in Media, in the city of Xiz, now called Aderbijan, as ſome ſay; or, according to others, in Ecbatana, now called Tauris. Inſtead of admitting the exiſtence of two firſt cauſes, with the *Magians*, he introduced a principle ſuperior to them both, one ſupreme God, who created both theſe, and out of theſe two produced, according to his ſovereign pleaſure, every thing elſe. See Iſaiah v. 5, 6, 7.

In order to avoid making God the author of all evil, he taught, that God originally created only light or good, and that darkneſs or evil followed it by conſequence, as the ſhadow doth the perſon. According to his doctrine there was one ſupreme Being independently, and ſelf-exiſting from all eternity: under him there were two angels, one the angel of light, the author and director of all good: and the other the angel of darkneſs, who is the author and director of all evil: theſe two, out of the mixture of light and darkneſs made all things that are; and they are in a ſtate of perpetual conflict; ſo that where the angel of light prevails, there the moſt is good, and where the angel of darkneſs prevails, there the moſt is evil: this ſtruggle ſhall continue to the end of the world; and then there ſhall be a general reſurrection, and a day of judgment; after which the angel of darkneſs and his diſciples ſhall go into a world of their own, where they ſhall ſuffer in everlaſting darkneſs the puniſhment of their evil deeds; and the angel of light and his diſciples ſhall go into a world of their own, where they ſhall receive, in everlaſting light, the reward due unto their good deeds: and henceforward they ſhall for ever remain ſeparate. Thoſe who remain of this ſect in Perſia and India, in the preſent day, retain the ſame doctrines. Zoroaſter alſo cauſed fire-temples to be erected wherever he came: for having feigned that he was taken up into heaven, and there inſtructed in the doctrines he taught by God himſelf, out of the midſt of a great and moſt bright flame of fire, he taught his followers, that fire was the trueſt ſhechinah of the divine preſence; that the ſun being the moſt perfect fire, God had there the throne of his glory, and the reſidence of his divine preſence in a peculiar manner; and next to this in our elementary fire: and, therefore, he ordered them to direct all their worſhip to God, firſt towards the ſun, which they called Mithra, and next toward their ſacred fires: and when they came before theſe fires to worſhip, they always approached them on the weſt ſide, that having their faces towards them, and always towards the riſing ſun at the ſame time, they might direct their worſhip towards both. And in this poſture they always performed every act of their worſhip. Zoroaſter alſo pretended, that he brought ſome of the heavenly fire with him on his return, and placed it on the altar of the firſt fire-temple, which he erected at Xiz, in Media, whence it was propagated to all the reſt. And on this account, their prieſts carefully watch it, and never ſuffer it to be extinguiſhed.

Zoroaſter, having aſſumed the character of a divine prophet and reformer of religion, retired into a cave, devoting himſelf to prayer and meditation, where he compoſed the book called the ZEND, in which his pretended revelations were contained. From Media he removed into Bactria; and he went alſo into India among the Brachmans, and having acquired all their knowledge in mathematics, philoſophy, and aſtronomy, returned and communicated the knowledge he had acquired to his *Magians*: and thus they became famous for their ſkill in theſe ſciences; ſo that a learned man and a *Magian* were equivalent terms. The vulgar conceived of them as perſons actuated and inſpired by ſupernatural powers: and hence thoſe who pretended to wicked and diabolical acts aſſumed the name of *Magians*; and the term magician acquired its evil meaning. However this diſtinguiſhed knowledge was confined to thoſe who were by way of eminence the *Magi*, or the prieſts; who, like thoſe of the Jews, being of the ſame tribe, appropriated their learning to their own families. Theſe prieſts were diſtributed into three orders, viz, the inferior clergy, the ſuperintendants who governed them, and the archimagus, or high-prieſt: and their churches or temples were alſo of three ſorts, parochial or oratories; fire temples, in which fire was kept continually burning on a ſacred altar; and the fire-temple in which the archimagus reſided. Zoroaſter at length carried his religious ſyſtem to the royal court of Suſa, and made Darius a proſelyte, together with moſt of the great men of the kingdom. Darius was ſo attached to the *Magian* ſyſtem, that he became an archimagus, and ordered, that among other titles, it ſhould be engraved on his monument, that he was *maſter of the Magians*. Hence the kings of Perſia were conſidered as pertaining to the ſacerdotal tribe, and were always initiated in the ſacred order of the *Magians*, before they took on them the crown, or were inaugurated into the kingdom.

Zoroaſter, after this ſucceſs, returned to Balch in Bactria, where, according to his own inſtitution, he was obliged to reſide, as archimagus or head of the ſect, and there he reigned in ſpirituals with the ſame authority, over the whole empire, as the king did in temporals: and from hence probably aroſe the miſtake of making him king of Bactria. Zoroaſter, at length fell a ſacrifice to his zeal; for having concerted an enterprize againſt Argaſp, king of the oriental Scythians, who was a zealous Sabian, to draw him over to his religion; the Scythian prince invaded Bactria with an army, and ſlew Zoroaſter, with all the prieſts of this patriarchal church, to the number of eighty perſons, and demoliſhed all the fire-temples in that province. This is ſaid to have happened in the 35th year of Darius. Pythagoras derived a great part of his knowledge from Zoroaſter, and his diſciples the *Magians*. Prideaux's Conn. vol. i.

Their deſcendants, the modern *Magi*, or fire-worſhippers, are divided into three claſſes; whereof the firſt and moſt learned, neither eat nor kill animals; but adhere to the old inſtitution of abſtaining from living creatures. The *Magi* of the ſecond claſs refrain only from tame animals; nor do the laſt kill all indifferently, it being the firm and diſtinguiſhing ſettled notion of them all, *την μετεμψυχωσιν ειναι, that there is a tranſmigration of ſouls.* See METEMPSYCHOSIS and GABRES.

MAGIC, MAGIA, Μαγεια, in its ancient ſenſe, the ſcience, or diſcipline and doctrine, of the *Magi*, or wiſe-men of Perſia. See the preceding article.

MAGIC, in a more modern ſenſe, is a ſcience which teaches to perform wonderful and ſurpriſing effects.

The word *magic* originally carried with it a very innocent, nay, a very laudable, meaning; being uſed purely to ſignify the ſtudy of wiſdom, and the more ſublime parts of knowledge; but in regard the ancient *Magi* engaged themſelves in aſtrology, divination, ſorcery, &c. the term *Magic*, in time, became odious, and was only uſed to ſignify an unlawful and diabolical kind of ſcience depending, as it was pretended, on the aſſiſtance of the devil, and departed ſouls.

If any wonder how ſo vain and deceitful a ſcience ſhould gain ſo much credit and authority over men's minds, Pliny gives the reaſon of it. It is, ſays he, becauſe it has poſſeſſed itſelf of three ſciences of the moſt eſteem among men, taking from each all that is great and marvellous in it. Nobody doubts but it had its origin in medicine, and that it inſinuated itſelf into the minds of the people under pretence of affording extraordinary remedies. To theſe fine promiſes is added every thing in religion that is pompous and ſplendid, and that appears calculated to blind and captivate mankind. And, laſtly, it mingled judiciary aſtrology with the reſt, perſuading people, curious of futurity, that it ſaw every thing to come in the heavens. Agrippa divides *magic* into three kinds, *natural*, *celeſtial*, and *ceremonial* or *ſuperſtitious*.

MAGIC *natural* is no more than the application of natural active cauſes to paſſive things or ſubjects; by means whereof many ſurpriſing, but yet natural, effects are produced.

MAGIC *celeſtial* borders nearly on judiciary aſtrology; it attributes to ſpirits a kind of rule, or dominion, over the planets; and to the planets a dominion over men; and on thoſe principles, builds a ridiculous kind of ſyſtem.

MAGIC *ſuperſtitious*, or *geotic*, conſiſts in the invocation of devils: its effects are uſually evil and wicked, though very ſtrange, and ſeemingly ſurpaſſing the powers of nature: they are ſuppoſed to be produced by virtue of ſome compact, either tacit or expreſs, with evil ſpirits; but the truth is, theſe ſuppoſed compacts have not the power that is uſually imagined; nor do they produce half thoſe effects ordinarily aſcribed to them.

MAGIC *lantern*, an optic machine contrived by Kircher, (ſee his Ars Magna Lucis et Umbræ, p. 768, 769), by means whereof little painted images are repreſented on an oppoſite wall of a dark room, magnified to any bigneſs at pleaſure.

MAGIC *lantern, conſtruction of the.* Suppoſe A B C D (*Tab. Optics, fig.* 10.) a common tin lantern, to which is added a tube to draw out F G. In H is fixed a metallic concave ſpeculum, of a foot diameter at moſt, or four inches at leaſt: or in lieu thereof, near the extremity of the tube, there muſt be placed a convex lens, conſiſting of a ſegment of a ſmall ſphere, its diameter not exceeding a few inches. The uſe of this lens is to throw a ſtrong light upon the image; and ſometimes a concave ſpeculum is uſed with the lens, in order to make the image ſtill more vivid. In the focus of the concave ſpeculum, or lens, is placed a lamp L; within the tube where it is ſoldered to the ſide of the lantern, is placed a ſmall lens, convex on both ſides, being a portion of a ſmall ſphere, having its focus about the diſtance of three inches. The extreme part of the tube F M, is ſquare, and has an aperture quite through, ſo as to receive an oblong frame N O, paſſed into it; in this frame are round holes, an inch or two in diameter. According to the bigneſs of theſe holes are drawn circles on a plain thin glaſs; and in theſe circles are painted any figures or images, at pleaſure, with tranſparent water colours. Theſe images fitted into the frame, and placed invertedly, at a little diſtance from the focus of the lens I, will be projected on an oppoſite white wall of a dark room, prodigiouſly magnified in all their colours, and in an erect ſituation. By having the inſtrument ſo contrived, as that the lens I may move in a ſlide, the focus may be made, and conſequently the image appear diſtinct at almoſt any diſtance.

Or thus:—Every thing being managed as in the former, into the ſliding tube F G, inſert another convex lens K, the ſegment of a ſphere ſomewhat larger than I. Now, if the picture be brought nearer to I than the diſtance of the focus, diverging rays will be propagated, as if they proceeded from the object; wherefore, if the lens K be ſo placed, as that the object is very near its focus, the image will be exhibited on the wall, exceedingly magnified.

MAGIC *lantern, theory of the.* The lamp being placed in the focus of the concave ſpeculum, or any convex glaſs, the rays will be propagated parallel to each other, and the image will be ſtrongly illumined, and will therefore emit a great number of rays upon the lens I. But, being ſuppoſed to be placed near the lens I, the inverted image of the picture inverted muſt be formed on the oppoſite wall, exceedingly magnified, after its refraction through the lens; and it will be ſtill the more magnified, as the lens is a ſegment of a leſs ſphere, and as the picture is placed nearer the focus of the lens: in a dark place, therefore, the picture will be repreſented prodigiouſly large and extremely vivid.

To heighten the light, ſpecula are preferred to lenſes; the focus of a ſpeculum being nearer than that of a lens. De Chales orders the diameter of the lens I to be two, four, or five digits, and in a ſubduple proportion to the other K; i. e. if I be five digits, K muſt be ten; and the diameter of the ſpeculum, according to the ſame, is to be two digits. Zahnius chooſes to have the diameter of I $\frac{9}{10}$ of a foot; and that of K one foot and a half, &c.

Little animals being included in the *magic lantern*, in the manner obſerved in ſpeaking of the microſcope, or any little tranſparent objects faſtened to a ſlice of talc or glaſs, and ſubſtituted inſtead of images, the *magic lantern* will become a microſcope.

A view of the inſtrument itſelf may be ſeen in *fig.* 10, N° 2. in which *b b c* is the lens that throws the light of the candle or lamp *a* on the object *d e*, and *k l* is the lens that magnifies the image *f g* on the white wall F H in a dark room. It is plain, that if the tube *b n k l m c* be contracted, and the glaſs *k l* be brought nearer the object *d e*, the image *f g* will be enlarged; and hence this *lantern* has been called the *lanterna megalographica.* On the contrary, if the tube be protracted, the image of the object will be diminiſhed.

Mr. Euler propoſed a ſcheme to introduce viſion by reflected light into the *magic lantern*, as well as the *ſolar* MICROSCOPE, by which many inconvenieces to which thoſe inſtruments are ſubject, might be avoided. For this purpoſe, he ſays, that nothing is neceſſary but a large concave mirror, perforated as for a teleſcope, and that the light be ſo ſituated, that none of it may paſs directly through the perforation, ſo as to fall on the images of the objects upon the ſcreen. He propoſes to have four different machines for objects of different ſizes; the firſt for thoſe of ſix feet long, the ſecond for thoſe of one foot, the third for thoſe of two inches, and the fourth for thoſe of two lines. An idea of this contrivance is given in *Tab.* III. *Optics, fig.* 42. in which O D repreſents the concave mirror, E the object, *l*, *l*, the lights, and A the lens, through which the rays are tranſmitted to the ſcreen. Nov. Com. Petrop. vol. iii. p. 363.

MAGIC *ſquare*, a ſquare figure, formed of a ſeries of numbers, in mathematical proportion; ſo diſpoſed in parallel and equal ranks, as that the ſums of each row, taken either perpendicularly, horizontally, or diagonally, are equal.

The ſeveral numbers which compoſe any ſquare number (for inſtance, 1, 2, 3, 4, 5, &c. to 25 incluſive, which compoſe the ſquare number 25) being diſpoſed after each other, in a ſquare figure of 25 cells, each in its cell; if then you change the order of theſe numbers and diſpoſe them in the cells in ſuch manner, as that the five numbers which fill an horizontal rank of cells, being added together, ſhall make the ſame ſum with the five numbers in any other rank of cells, whether horizontal, or vertical, and even the ſame number with the five in each of the two diagonal ranks; this diſpoſition of numbers is called a *magic ſquare*; in oppoſition to the former diſpoſition, which is called a *natural ſquare*. See the figures following:

Natural ſquare.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	18	20
21	22	23	24	25

Magic ſquare.

16	14	8	2	25
3	22	20	11	9
15	6	4	23	17
24	18	12	10	1
7	5	21	19	13

One would imagine, that theſe *magic ſquares* had that name given them, in regard this property of all their ranks, which, taken any way, make always the ſame ſum, appeared extremely ſurpriſing, eſpecially in certain ignorant ages, when mathematics paſſed for *magic*; but there is a great deal of reaſon to ſuſpect, that theſe ſquares merited their name ſtill farther, by the ſuperſtitious operations they were employed in, as the conſtruction of taliſmans, &c. for, according to the childiſh philoſophy of thoſe days, which attributed virtues to numbers, what virtues might not be expected from numbers ſo wonderful?

However, what was at firſt the vain practice of makers of taliſmans and conjurers, has ſince become the ſubject of a ſerious reſearch among the mathematicians; not that they imagine it will lead them to any thing of ſolid uſe or advantage. *Magic ſquares* favour too much of their original to be of much uſe; but only as it is a kind of play, where the difficulty makes the merit, and it may chance to produce ſome new views of numbers, which mathematicians will not loſe the occaſion of.

Eman. Moſchopulus, a Greek author of no great antiquity, is the firſt that appears to have ſpoken of *magic ſquares*: and, by the age wherein he lived, there is reaſon to believe he did not look on them merely as a mathematician. However he has left us ſome rules for their conſtruction. In the treatiſe of Cor. Agrippa, ſo much accuſed of *magic*, we find the ſquares of ſeven numbers, viz. from three to nine incluſive, diſpoſed *magically*; and it muſt not be ſuppoſed, that thoſe ſeven numbers were preferred to all the other without ſome very good reaſon: in effect, it is becauſe their ſquares, according to the ſyſtem of Agrippa, and his followers, are planetary. The ſquare of 3, for inſtance, belongs to Saturn; that of 4 to Jupiter; that of 5 to Mars; that of 6 to the Sun; that of 7 to Venus; that of 8 to Mercury; and that of 9 to the Moon. M. Bachet applied himſelf to the ſtudy of *magic ſquares*, on the hint he had taken from the planetary ſquares of Agrippa, as being unacquainted with the work of Moſchopulus, which is only in manuſcript in the French king's library; and, without the aſſiſtance of any author, he found out a new method for thoſe ſquares whoſe root is uneven, for inſtance, 25, 49, &c. but he could not make any thing of thoſe whoſe root is even.

After him came M. Frenicle, who took the ſame ſubject in hand. A certain great algebraiſt was of opinion, that whereas the ſixteen numbers which compoſe the ſquare, might be diſpoſed 20922789888000 different ways in a natural ſquare (as from the rules of combination it is certain they may) they could not be diſpoſed in a *magic ſquare* above ſixteen different ways; but M. Frenicle ſhewed, that they might be thus diſpoſed 878 different ways: whence it appears how much his method exceeds the former, which only yielded the 55th part of *magic ſquares* of that of M. Frenicle.

To this inquiry he thought fit to add a difficulty that had not yet been conſidered: the *magic ſquare* of 7, for inſtance, being conſtructed, and its 49 cells filled, if the two horizontal ranks of cells, and, at the ſame time, the two vertical ones, the moſt remote from the middle, be retrenched, that is, if the whole border or circumference of the ſquare be taken away, there will remain a ſquare, whoſe root will be 5, and which will only conſiſt of twenty-five cells. Now, it is not at all ſurpriſing, that the ſquare ſhould be no longer *magical*, becauſe the ranks of the large ones were not intended to make the ſame ſum, excepting when taken entire with all the ſeven numbers that fill their ſeven cells; ſo that being mutilated each of two cells, and having loſt two of their numbers, it may be well expected, that their remainders will not any longer make the ſame ſum. But M. Frenicle would not be ſatiſfied, unleſs when the circumference or border of the *magic ſquare* was taken away, and even any circumference at pleaſure, or, in fine, ſeveral circumferences at once, the remaining ſquares were ſtill *magical*: which laſt condition, no doubt, made theſe *ſquares* vaſtly more *magical* than ever.

Again, he inverted that condition, and required that any circumference taken at pleaſure, or even ſeveral circumferences, ſhould be inſeparable from the ſquare; that is, that it ſhould ceaſe to be *magical* when they were removed, and yet continue *magical* after the removal of any of the reſt. M. Frenicle, however, gives no general demonſtration of his methods, and frequently ſeems to have no other guide but chance. It is true, his book was not publiſhed by himſelf, nor did it appear till after his death, viz. in 1693.

In 1703, M. Poignard, canon of Bruſſels, publiſhed a treatiſe of ſublime *magic ſquares*. Before him there had been no *magic ſquares* made but for ſerieſes of natural numbers that formed a ſquare; but M. Poignard made two very conſiderable improvements. 1°, Inſtead of taking all the numbers that fill a ſquare, for inſtance, the thirty-ſix ſucceſſive numbers, which would fill all the cells of a natural ſquare, whoſe ſide is 6, he only takes as many ſucceſſive numbers as there are units in the ſide of the ſquare, which, in this caſe, are ſix; and theſe ſix numbers alone he diſpoſes in ſuch manner in the thirty-ſix cells, that none of them are repeated twice in the ſame rank, whether it be horizontal, vertical, or diagonal; whence it follows, that all the ranks, taken all the ways poſſible, muſt always make the ſame ſum, which M. Poignard calls repeated progreſſion. 2°, Inſtead of being confined to take theſe numbers according to the ſeries and ſucceſſion of the natural numbers, that is, in an arithmetical progreſſion, he takes them likewiſe in a geometrical progreſſion, and even in an harmonical progreſſion. But with theſe two laſt progreſſions the *magic* muſt neceſſarily be different to what it was: in the ſquares filled with numbers in geometrical progreſſion, it conſiſts in this, that the products of all the ranks are equal; and, in the harmonical progreſſion, the numbers of all the ranks continually follow that progreſſion; he makes ſquares of each of theſe three progreſſions repeated.

This book of M. Poignard gave occaſion to M. De la Hire to turn his thoughts the ſame way, which he did with ſuch ſucceſs, that he ſeems to have well-nigh completed the theory of *magic ſquares*. He firſt conſiders uneven *ſquares*: all his predeceſſors on the ſubject having found the conſtruction of even ones by much the moſt difficult; for which reaſon M. De la Hire reſerves thoſe for the laſt. This exceſs of difficulty may ariſe partly from hence, that the numbers are taken in arithmetical progreſſion. Now in that progreſſion, if the number of terms be uneven, that in the middle has ſome properties, which may be of ſervice; for inſtance, being multiplied by the number of terms in the progreſſion, the product is equal to the ſum of all the terms.

M. De la Hire propoſes a general method for uneven ſquares, which has ſome ſimilitude with the theory of compound motions, ſo uſeful and fertile in mechanics. As that conſiſts in decompounding motions, the reſolving them into others more ſimple; ſo does M. De la Hire's method conſiſt in reſolving the ſquare that is to be conſtructed into two ſimple and primitive ſquares. It muſt be owned, however, it is not quite ſo eaſy to conceive thoſe two ſimple and primitive ſquares in the compound or perfect ſquare, as in oblique motion to imagine a parallel and perpendicular one.

Suppoſe a ſquare of cells, whoſe root is uneven, for inſtance 7; and that its forty-nine cells are to be filled magically with numbers, for inſtance, the firſt 7. M. De la Hire, on the one ſide, takes the firſt ſeven numbers beginning with unity, and ending with the root 7; and on the other 7, and all its multiples to 49, excluſively; and as theſe only make ſix numbers, he adds 0, which makes this an arithmetical progreſſion of ſeven terms, as well as the other; 0. 7. 14. 21. 28. 35. 42. This done, with the firſt progreſſion repeated, he fills the ſquare of the root 7 magically; in order to this, he writes in the firſt ſeven cells of the firſt horizontal rank, the ſeven numbers propoſed, in what order he pleaſes, for that is abſolutely indifferent; and it is proper to obſerve here that thoſe ſeven numbers may be ranged in 5040 different manners in the ſame rank. The order in which they are placed in the firſt horizontal rank, be it what it will, is that which determines their order in all the reſt. For the ſecond horizontal rank, he places in its firſt cell, either the third, the fourth, the fifth, or the ſixth number, from the firſt number of the firſt rank; and after that writes the ſix others in order as they follow. For the third horizontal rank, he obſerves the ſame method with regard to the ſecond, that he obſerved in the ſecond with regard to the firſt, and ſo of the reſt. For inſtance, ſuppoſe the firſt horizontal rank filled with the ſeven numbers in their natural order, 1, 2, 3, 4, 5, 6, 7; the ſecond horizontal rank may either commence with 3, with 4, with 5, or with 6: but in this inſtance it commences with 3; the third rank therefore muſt commence with 5, the fourth with 7, the fifth with 2, the ſixth with 4, and the ſeventh with 6. The commencement of the ranks which follow the firſt being thus determined, the other numbers as we have already obſerved, muſt be written down in the order wherein they ſtood in the firſt, going on to 5, 6, and 7, and returning to 1, 2, &c. till every number in the firſt rank be found in every rank underneath, according to the order arbitrarily pitched upon at firſt. By this means it is evident that no number whatever can be repeated twice in the ſame rank; and by conſequence, that the

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	7	1	2	3	4	5

ſeven numbers 1, 2, 3, 4, 5, 6, 7, being in each rank, muſt of neceſſity make the ſame ſum.

It appears, from this example, that the arrangement of the numbers in the firſt rank being choſen at pleaſure, the other ranks may be continued in four different manners: and ſince the firſt rank may have 5040 different arrangements, there are no leſs than 20160 different manners of conſtructing the *magic ſquare* of ſeven numbers repeated.

1	2	3	4	5	6	7
2	3	4	5	6	7	1
3	4	5	6	7	1	2
4	5	6	7	1	2	3
5	6	7	1	2	3	4
6	7	1	2	3	4	5
7	1	2	3	4	5	6

1	2	3	4	5	6	7
7	1	2	3	4	5	6
6	7	1	2	3	4	5
5	6	7	1	2	3	4
4	5	6	7	1	2	3
3	4	5	6	7	1	2
2	3	4	5	6	7	1

The order of the numbers in the firſt rank being determined; if in beginning with the ſecond rank, the ſecond number 2, or the laſt number 7, ſhould be pitched upon, in one of thoſe caſes and repeated; and, in the other caſe, the other diagonal would be falſe, unleſs the number repeated ſeven times ſhould happen to be 4; for four times ſeven is equal to the ſum of 1, 2, 3, 4, 5, 6, 7: and, in general, in every ſquare conſiſting of an unequal number of terms, in arithmetical progreſſion, one of the diagonals would be falſe according to thoſe two conſtructions, unleſs the term always repeated in that diagonal, were the middle term of the progreſſion.

It is not, however, at all neceſſary to take the terms in an arithmetical progreſſion; for, according to this method, one may conſtruct a *magic ſquare* of any numbers at pleaſure, whether they be according to any certain progreſſion, or not. If they be in an arithmetical progreſſion, it will be proper, out of the general method, to except thoſe two conſtructions, which produce a continual repetition of the ſame term, in one of the two diagonals; and only to take in the caſe, wherein that repetition would prevent the diagonal from being juſt: which caſe being abſolutely diſregarded, when we computed that the ſquare of 7 might have 20160 different conſtructions; it is evident, that by taking that caſe in, it muſt have vaſtly more.

To begin the ſecond rank with any other number beſides the ſecond and the laſt, muſt not, however, be looked on as an univerſal rule; it holds good for the ſquare of 7; but if the ſquare of 9 for inſtance, were to be conſtructed and the fourth figure of the firſt horizontal rank were pitched on for the firſt of the ſecond, the conſequence would be, that the fifth and eighth horizontal ranks would likewiſe commence with the ſame number, which would therefore be repeated three times in the ſame vertical rank, and occaſion other repetitions in all the reſt. The general rule, therefore, muſt be conceived thus: let the number in the firſt rank pitched on, for the commencement of the ſecond, have ſuch an exponent of its quota, that is, let the order of its place be ſuch, as that if an unit be taken from it, the remainder will not be any juſt quota part of the root of the ſquare; that is, cannot divide it equally. If for example, in the ſquare of 7, the third number of the firſt horizontal rank be pitched on for the firſt of the ſecond, ſuch conſtruction will be juſt: becauſe the exponent of the place of that number, viz. 3, ſubtracting 1, that is, 2 cannot divide 7. Thus alſo might the fourth number of the ſame firſt rank be choſen, becauſe 4—1, viz. 3, cannot divide 7, and, for the ſame reaſon the fifth or ſixth number might be taken: but in the ſquare of 9, the fourth number of the firſt rank muſt not be taken, becauſe 4—1, viz. 3, does divide 9. The reaſon of this rule will appear very evidently, by conſidering in what manner the returns of the ſame numbers do or do not happen, taking them always in the ſame manner in any given ſeries. And hence it follows, that the fewer diviſions the root of any ſquare to be conſtructed has, the more different manners of conſtructing it there are; and that the prime numbers, i. e. thoſe which have no diviſions, as 5, 7, 11, 13, &c. are thoſe whoſe ſquares will admit of the moſt variations in proportion to their quantities.

The ſquares conſtructed, according to this method, have ſome particular properties not required in the problem; for the numbers that compoſe any rank parallel to one of the two diagonals, are ranged in the ſame order with the numbers that compoſe the diagonal, to which they are parellel. And as any rank parallel to a diagonal, muſt neceſſarily be ſhorter, and have fewer cells, than the diagonal itſelf, by adding it to the correſpondent parallel, which has the number of cells by which the other falls ſhort of the diagonal, the numbers of thoſe two parallels, placed, as it were, end to end, ſtill follow the ſame order with thoſe of the diagonal: beſides, that their ſums are likewiſe equal; ſo that they are magical on another account. Inſtead of the ſquares, which we have hitherto formed by horizontal ranks, one might alſo form them by vertical ones; the caſe is the ſame in both.

First Primitive.

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	7	1	2	3	4	5

All we have hitherto ſaid regards only the firſt primitive ſquare, whoſe numbers, in the propoſed example, were 1, 2, 3, 4, 5, 6, 7; here ſtill remains the ſecond primitive, whoſe numbers are 0, 7, 14, 21, 28, 35, 42. M. de la Hire proceeds in the ſame manner here as in the former; and this may likewiſe be conſtructed in 20160 different manners, as containing the ſame number of terms with the firſt. Its conſtruction being made and of conſequence all its ranks making the ſame ſum, it is evident, that if we bring the two into one, by adding together the numbers of the two correſponding cells of the two ſquares, that is, the two numbers of the firſt of each, the two numbers of the ſecond, of the third, &c and diſpoſe them in the forty-nine correſponding cells of a third ſquare; it will likewiſe be *magical*, in regard to its rank, formed by the addition of equal ſums to equal ſums, which muſt of neceſſity be equal among themſelves. All that remains in doubt is, whether or no, by the addition of the correſponding cell of the two firſt ſquares, all the cells of the third will be filled in ſuch manner, as that each not only contains one of the numbers of the progreſſion from 1 to 49, but alſo that this number be different from any of the reſt, which is the end and deſign of the whole operation.

Second Primitive.

0	7	14	21	28	35	42
21	28	35	42	0	7	14
42	0	7	14	21	28	35
14	21	28	35	42	0	7
35	42	0	7	14	21	28
7	14	21	28	35	42	0
28	35	42	0	7	14	21

As to this it muſt be obſerved, that if in the conſtruction of the ſecond *primitive ſquare*, care has been taken in the commencement of the ſecond horizontal rank, to obſerve an order with regard to the firſt, different from what was obſerved in the conſtruction of the firſt ſquare; for inſtance, if the ſecond rank of the firſt ſquare began with the third term of the firſt rank, and the ſecond rank of the ſecond ſquare commence with the fourth of the firſt rank, as in the example it actually does; each number of the firſt ſquare may be combined once, and only once, by addition with all the numbers of the ſecond. And as the numbers of the firſt are here 1, 2, 3, 4, 5, 6, 7, and thoſe of the ſecond 0, 7, 14, 21, 28, 35, 42, by combining them in this manner, we have all the numbers in the progreſſion from 1 to 49, without having any of them repeated; which is the *perfect and magic ſquare* propoſed.

Perfect Square.

1	9	17	25	33	41	49
24	32	40	48	7	8	16
47	6	14	15	24	31	39
21	22	31	38	46	5	13
37	47	4	12	20	28	29
11	19	27	35	36	46	3
34	42	43	2	10	18	26

The neceſſity of conſtructing the two *primitive ſquares* in a different manner, does not at all hinder but that each of the 20160 conſtructions of the one may be combined with all the 20160 conſtructions of the other: of conſequence, therefore 20160 multiplied by itſelf, which makes 406425600, is the number of different conſtructions that may be made of the *perfect ſquare*, which here conſiſts of the 49 numbers of the natural progreſſion. But as we have already obſerved, that a *primitive ſquare* of ſeven numbers repeated may have above 20160 ſeveral conſtructions, the number 406425600 muſt come vaſtly ſhort of expreſſing all the poſſible conſtructions of a perfect *magic ſquare* of the 49 firſt numbers.

As to the *even ſquares*, he conſtructs them like the *uneven* ones, by two *primitive ſquares*; but the conſtruction of *primitives* is different in general; and may be ſo a great number of ways: and thoſe general differences admit of a great number of particular variations, which give as many different conſtructions of the ſame even ſquare. It ſcarce ſeems poſſible to determine exactly, either how many general differences there may be between the conſtruction of the primitive ſquares of an even ſquare and an uneven one; nor how many particular variations each general difference may admit of; and, of conſequence, we are ſtill far from being able to determine the number of different conſtructions of all thoſe that may be made by the primitive ſquares.

See the Memoirs of the Royal Academy of Sciences, for 1705 and 1710, where this ſubject is almoſt exhauſted by M. de la Hire and M. Sauveur. See alſo Saunderſon's Algebra, vol. i. p. 354, &c.

The ingenious Dr. Franklin ſeems to have carried this curious ſpeculation farther than any of his predeceſſors in the ſame way. He has conſtructed not only a *magic* ſquare of ſquares, but likewiſe a *magic* circle of circles, of which we ſhall give ſome account for the amuſement of our readers. The *magic ſquare* of ſquares is formed by dividing the great ſquare, as *Tab*. III. *Analyſis*, *fig*. 64. The great ſquare is divided into 256 ſmall ſquares, in which all the numbers from one to 256 are placed, in 16 columns, which may be taken either horizontally or vertically. The properties are as follow:

1. The ſum of the fixteen numbers in each column, vertical and horizontal, is 2056.

2. Every half column, vertical and horizontal, makes 1028, or half of 2056.

3. Half a diagonal aſcending, added to half a diagonal deſcending, makes 2056; taking theſe half diagonals from the ends of any ſide of the ſquare to the middle thereof; and ſo reckoning them either upward, or downward; or ſidewiſe from left to right hand, or from right to left.

4. The ſame with all the parallels to the half diagonals, as many as can be drawn in the great ſquare: for any two of them being directed upward and downward, from the place where they begin to that where they end, their ſums will make 2056. The ſame downward and upward in like manner: or all the ſame if taken ſideways to the middle, and back to the ſame ſide again. N. B. One ſet of theſe half diagonals and their parallels is drawn in the ſame ſquare upward and downward. Another ſuch ſet may be drawn from any of the other three ſides.

5. The four corner numbers in the great ſquare added to the four central numbers therein, make 1028; equal to the half ſum of any vertical or horizontal column, which contains 16 numbers; and equal to half a diagonal or its parallel.

6. If a ſquare hole (equal in breadth to four of the little ſquares) be cut in a paper, through which any of the ſixteen little ſquares in the great ſquare may be ſeen, and the paper be laid on the great ſquare; the ſum of all the 16 numbers, ſeen through the hole, is equal to the ſum of the ſixteen numbers in any horizontal or vertical column, viz. to 2056.

The *magic* circle of circles, *fig*. 65. is compoſed of a ſeries of numbers, from 12 to 75 incluſive, divided into eight concentric circular ſpaces, and ranged in eight radii of numbers, with the number 12 in the centre; which number, like the centre, is common to all theſe circular ſpaces, and to all the radii.

The numbers are ſo placed, that the ſum of all thoſe in either of the concentric circular ſpaces above mentioned, together with the central number 12, make 360; equal to the number of degrees in a circle.

The numbers in each radius alſo, together with the central number 12, make juſt 360.

The numbers in half of any of the above circular ſpaces, taken either above or below the double horizontal line, with half the central number 12, make 180; equal to the number of degrees in a ſemicircle.

If any four adjoining numbers be taken, as if in a ſquare, in the radial diviſions of theſe circular ſpaces; the ſum of theſe, with half the central number, make 180.

There are, moreover, included four ſets of other circular ſpaces, bounded by circles which are excentric with reſpect to the common centre; each of theſe ſets containing five ſpaces. The centres of the circles which bound them are at A, B, C, and D. The ſet whoſe centre is at A is bounded by dotted lines; the ſet whoſe centre is at C is bounded by lines of ſhort unconnected ſtrokes, and the ſet round D is bounded by lines of unconnected longer ſtrokes, to diſtinguiſh them from one another. In drawing this figure by hand, the ſet of concentric circles ſhould be drawn with black ink; and the four different ſets of excentric circles with four kinds of ink of different colours; as blue, red, yellow, and green, for diſtinguiſhing them readily from one another.

Theſe ſets of excentric circular ſpaces interſect thoſe of the concentric, and each other: and yet, the numbers contained in each of the excentric ſpaces, taken all around through any of the 20, which are excentric, make the ſame ſum as thoſe of the concentric; namely, 360, when the central number 12 is added. Their halves alſo, taken above or below the double horizontal line, with half the central number, make 180.

Obſerve, that there is not one of the numbers but what belongs at leaſt to two of the circular ſpaces; ſome to three, ſome to four, ſome to five: and yet they are all ſo placed, as never to break the required number 360, in any of the 28 circular ſpaces within the primitive circle.

To bring theſe matters in view, all the numbers as above mentioned are taken out: and placed in ſeparate columns, as they ſtand around both the concentric and excentric circular ſpaces, always beginning with the outermoſt and ending with the innermoſt of each ſet; and alſo the numbers as they ſtand in the eight radii, from the circumference to the centre; the common central number 12 being placed the loweſt in each column.

1. In the eight concentric circular ſpaces.

14	72	23	65	21	67	12	74
25	63	16	70	18	68	27	61
30	56	39	49	37	51	28	58
41	47	32	54	34	52	43	45
46	40	55	33	53	35	44	42
57	31	48	38	50	36	69	29
62	24	71	17	69	19	50	26
73	15	64	22	66	20	75	13
12	12	12	12	12	12	12	12
360	360	360	360	360	360	360	360

2. In the eight radii.

14	25	30	41	46	57	62	73
72	63	56	47	40	31	24	15
23	16	39	32	55	48	71	64
65	70	49	54	33	38	17	22
31	18	37	34	53	50	69	66
67	68	51	52	35	36	19	20
12	27	28	43	44	59	60	75
74	61	58	45	42	29	26	13
12	12	12	12	12	12	12	12
360	360	360	360	360	36	360	360

3. In the five excentric circular ſpaces whoſe centre is at A.

14	72	23	65	21
63	16	70	18	68
39	49	37	51	28
54	34	52	43	45
33	53	35	44	42
48	38	50	36	59
24	71	17	69	19
73	15	64	22	66
12	12	12	12	12
360	360	360	360	360

4. In the five excentric circular ſpaces whoſe centre is at B.

30	56	39	49	37
47	32	54	34	52
55	33	53	35	44
38	50	36	59	29
17	69	19	60	26
64	22	66	20	75
72	23	65	21	67
25	63	16	70	18
12	12	12	12	12
360	360	360	360	360

5. In the five excentric circular ſpaces whoſe centre is at C.

46	40	55	33	53
31	48	38	50	36
71	17	69	19	60
22	66	20	75	13
65	21	67	12	74
16	70	18	68	27
56	39	49	37	51
41	47	32	54	34
12	12	12	12	12
360	360	360	360	360

6. In the five excentric circular ſpaces whoſe centre is at D.

62	24	71	17	69
15	64	22	66	20
23	65	21	67	12
70	18	68	27	61
49	37	51	28	58
32	54	34	52	43
40	55	33	53	35
57	31	48	38	50
12	12	12	12	12
360	360	360	360	360

If now, we take any four numbers, as in a ſquare form, either from N° 1. N° 2. (as ſuppoſe from N° 1.) as in the margin; and add half the central number 12 to them, the ſum will be 180; equal to half the numbers in any circular ſpace, taken above or below the double horizontal line: and equal to the number of degrees in a ſemicircle. Thus, 14, 72, 25, 63, and 6, make 180. See Franklin's Exp. and Obſ. p. 350, &c. edit. 4to. 1769; or Ferguſon's Tables and Tracts, 1771, p. 318, &c.

14 72
25 63
6

MAGICAL *picture*, in *Electricity*, was firſt contrived by Mr. Kinnerſley, and is thus made: having a large metzotinto with a frame and glaſs, e. gr. of the king, take out the print, and cut a pannel out of it, near two inches diſtant from the frame all round; with thin paſte or gum-water, fix the border that is cut off on the inſide of the glaſs, preſſing it ſmooth and cloſe: then fill up the vacancy by gilding the glaſs well with leaf gold, or braſs. Gild likewiſe the inner edge of the back of the frame all round, except the top part, and form a communication between that gilding and the gilding behind the glaſs; then put in the boards, and that ſide is finiſhed. Turn up the glaſs, and gild the foreſide exactly over the back gilding, and when it is dry, cover it, by paſting on the pannel of the picture that hath been cut out, obſerving to bring the correſpondent parts of the border and picture together, by which means the picture will appear of a piece, as at firſt, only part behind the glaſs and part before. Hold the picture horizontally by the top, and place a little moveable gilt crown on the king's head. If now the picture be moderately electrified, and another perſon takes old of the frame with one hand, ſo that his fingers touch its inſide gilding, and with the other hand endeavour to take off the crown, he will receive a terrible blow, and fail in the attempt. If the picture were highly charged, the conſequence might be as fatal as that of high treaſon. The operator, who holds the picture by the upper end, where the inſide of the frame is not gilt, to prevent its falling, feels nothing of the ſhock, and may touch the face of the picture without danger. If a ring of perſons take the ſhock among them, the experiment is called the conſpirators. Franklin's Exp. and Obſ. p. 30.

MAGICIAN, is one who practiſes the art of MAGIC. See DIVINATION and SORCERY.

The ancient *magicians* pretended to extraordinary powers of interpreting dreams, foretelling future events, and accompliſhing many wonderful things, by their ſuperior knowledge of the ſecret powers of nature, of the virtues of plants and minerals, and the motions and influences of the ſtars. And as the art of magic among the pagan nations was founded in this ſyſtem of theology, and the *magi* who firſt exerciſed it were the prieſts of the gods, they pretend to derive theſe extraordinary powers from the aſſiſtance of the gods; which aſſiſtance they ſought by a great variety of rites and ſacrifices, adapted to their reſpective natures, by the uſe of charms and ſuperſtitious words, and alſo by ceremonies and ſupplications: they pretended likewiſe, in the proper uſe of their art, to a power of compelling the gods to execute their deſires and commands. A late excellent writer has ſhewn, that the ſcripture brands all theſe powers as a ſhameleſs impoſture, and reproaches thoſe who aſſumed them with an utter inability of diſcovering or accompliſhing any thing ſupernatural. See Iſaiah xlvii. 11, 12, 13. chap. viii. 18, 19. ch. xli. 23, 24. chap. xliv. 25. Jerem. x. 2, 3, 8, 14. chap. xiv. 14. chap. xxvii. 9, 10 chap. l. 36. Pſ. xxi. 6. Jonah ii. 8. Nevertheleſs many of the Chriſtian fathers, as well as ſome of the heathen philoſophers, aſcribe the efficacy of *magic* to evil DEMONS: and it was a very prevailing opinion in the primitive church, that *magicians* and necromancers, both among the Gentiles and heretical Chriſtians, had each their particular demon, perpetually attending on their perſons, and obſequious to their commands, by whoſe help they could call up the ſouls of the dead, foretell future events, and perform miracles. In ſupport of this opinion, it has been alledged, that the names by which the ſeveral ſorts of diviners are deſcribed in ſcripture, imply a communication with ſpiritual beings; that the laws of Moſes (Exod. xxii. 18. Lev. xix. 26, 31. chap. xx. 27. Deut. xviii. 10, 11.) againſt divination and witchcraft, prove the efficacy of theſe arts, though in reality they prove nothing more than their execrable wickedneſs and impiety; and that pretenſions to divination could not have ſupported their credit in all the heathen nations and through all ages, if ſome inſtances of true divination had not occurred. But the ſtrongeſt argument is derived from the ſcripture hiſtory of the *Egyptian Magicians* who oppoſed Moſes. With regard to the works performed by theſe *magicians*, ſome have ſuppoſed that God himſelf empowered them to perform true miracles, and gave them an unexpected ſucceſs; but the hiſtory expreſsly aſcribes the effects they produced, not to God, but to their own enchantments. Others imagine, that the devil aſſiſted the *magicians* not in performing true miracles, but in deceiving the ſenſes of the ſpectators, or in preſenting before them deluſive appearances of true miracles; againſt which opinion it has been urged that it tends to diſparage the credit of the works of Moſes. The moſt common opinion ſince the time of St. Auſtin, has been, that they were not only performed by the power of the devil, but were genuine miracles, and real imitations of thoſe of Moſes. In a late elaborate enquiry into the true ſenſe and deſign of this part of ſcripture hiſtory, it has been ſhewn, that the names given to the *magicians*, ſeem to expreſs their profeſſion, their affectation of ſuperior knowledge, and their pretences both to explain and effect ſigns and wonders, by obſerving the rules of their art; and therefore, that they are the perſons, whoſe ability of diſcovering or effecting any thing ſupernatural the ſcripture expreſly denies. The learned author farther inveſtigates the deſign, for which Pharaoh employed them on this occaſion; which he apprehends, was to learn from them, whether the ſign given by Moſes was truly ſupernatural, or only ſuch as their art was able to accompliſh. Accordingly it is obſerved, that they did not undertake to outdo Moſes or to control him, by ſuperior or oppoſite arts of power, but merely to imitate him, or to do the ſame works with his, with a view of invalidating the argument which he drew from his miracles, in ſupport of the ſole divinity of Jehovah, and of his own emiſſion. The queſtion on this occaſion was not, are the gods of Egypt ſuperior to the God of Iſrael, or can any evil ſpirits perform greater miracles than thoſe which Moſes performed by the aſſiſtance of Jehovah? but the queſtion was, are the works of Moſes proper proofs that the God of Iſrael is Jehovah, the only ſovereign of nature, and conſequently that Moſes acts by his commiſſion; or, are they merely the wonders of nature, and the effects of magic? In this light Philo, de Vita Moſis, lib i. p. 616. and Joſephus, Antiq. Jud. lib. ii. cap. 13. place the ſubject. Moreover, it appears from the principles and conduct of Moſes, that he could not allow the *magicians* to have performed real miracles: becauſe the ſcripture repreſents the whole body of *magicians* as impoſtures; the ſacred writers, Moſes in particular, deſcribe all the heathen deities, in the belief of whoſe exiſtence and influence the magic art was founded, as unſupported by any viſible ſpirits, and utterly impotent and ſenſeleſs: the religion of Moſes was built on the unity and ſole dominion of God, and the ſole divinity of Jehovah was the point which Moſes was now about to eſtabliſh, in direct oppoſition to the principles of idolatry; ſo that if he had allowed that the heathen idols, or any evil ſpirits ſupporting their cauſe, enabled the *magicians* to turn rods into ſerpents, and water into blood, and to create frogs, he would have contradicted the great deſign of his miſſion, and overthrown the whole fabric of his religion: beſides, Moſes appropriates all miracles to God, and urges his own, both in general and ſeparately, as an abſolute and authentic proof, both of the ſole divinity of Jehovah, and of his own miſſion; which he could not juſtly have done, if his oppoſers performed miracles, and even the ſame with his. On the other hand, it has been urged, that Moſes deſcribes the works of the *magicians* in the very ſame language he does his own. Exod. vii. 11, 12. chap. v. 22. chap. viii. 7. and hence it is concluded, that they were equally miraculous. To this objection it is replied, that it is common to ſpeak of profeſſed jugglers, as doing what they pretend and appear to do; but that Moſes does not affirm, that there was a perfect conformity between his works and thoſe of the *magicians*, but they did *ſo*, or in like manner, uſing a word which expreſſes merely a general ſimilitude; and he expreſly refers all they did, or attempted in imitation of himſelf, not to the invocation or power of demons, or of any ſuperior beings, but to human artifice and impoſture. The original words tranſlated *inchantments*, Exod. vii. 11. 22. and chap. viii. 7. 18. import deception and concealment, and ought to have been rendered, *ſecret ſlights* or *jugglings*. Our learned writer farther ſhews, that the works performed by the *magicians* did not exceed the cauſe, or human artifice, to which they are aſcribed. Farmer's Diſſ. on Miracles, 1771, chap. 3. § 3. chap. 4. § 1.

MAGISTER, MASTER, a title frequently found in old writing; noting the perſon who bore it to have attained ſome degree of eminence *in ſcientia aliqua, præſertim in literaria.*

In old times, thoſe we now call *doctors*, were called *magiſtri*, or *maſters*.

MAGISTERY, MAGISTERIUM, in *Chemiſtry*, is a name given to almoſt all precipitates; ſo that *magiſtery* and precipitate are almoſt ſynonymous: but the term has been lately applied to ſome particular precipitates, which are uſed in medicine and the arts. Such are the *magiſteries* of biſmuth, coral, crabs-eyes, ſulphur, &c.

MAGISTERY *of biſmuth*, is a fine powder made by diſſolving biſmuth in ſpirit of nitre, and pouring on it a large quantity of clear water, which precipitates the *magiſtery* to the bottom.

This is chiefly uſed in the compoſition of white paint for the ladies: it is preferred to all other whites on account of its ſuperior beauty, luſtre, and almoſt inſenſible tint of carnation, which renders it more ſimilar to the fineſt and whiteſt ſkin; but the ſkin will be conſiderably injured by a continued uſe of it. See BISMUTH.

MAGISTERY *of coral*, &c. Coral, crabs-eyes, pearl, ſhells, chalk, and other ſubſtances of that kind, are all abſorbent and calcareous earths, eaſily ſoluble in nitrous acid. If the ſolutions of theſe matters are precipitated by a fixed alkali, and afterwards well waſhed, they acquire the name of *magiſtery*, together with that of the ſubſtance which has been diſſolved and precipitated.

MAGISTERY *of lead*. See LEAD.

MAGISTERY is alſo uſed in ſpeaking of reſins, or the reſinous extracts of ſcammony, jalap, turbith, &c. which are made by drawing a tincture from the matter in ſpirit of wine, and precipitating it with water.

Mr. Boyle takes the proper notion of a *magiſtery* to conſiſt in a preparation of a body, whereby it is wholly, or at leaſt in great meaſure, by means of ſome extraneous additament, converted into a body of a different kind: as when iron or copper is turned into cryſtals of Mars and Venus.

MAGISTRATE, is the name of any public officer or ruler, to whom the executive power of the law is committed, either wholly or in part. Of *magiſtrates*, ſome are ſupreme, in whom the ſovereign power of the ſtate reſides; others are ſubordinate, deriving all their authority from the ſupreme *magiſtrate*, accountable to him for their conduct, and acting in an inferior ſecondary ſphere. See King, Sheriff, Justice, &c.

MAGMA, *Μαγμα*, among *Chemiſts*, &c. the dregs or recrements of a compoſition, remaining after all the more fluid parts are expreſſed.

It is a word uſed by medical writters on many occaſions, ſometimes in a very lax, and ſometimes in a more appropriated ſenſe. Some writers uſe it to expreſs a maſs of any thing; others for a thick ointment made up with very little fluid matter to prevent its running; and others for the remains of an ointment after expreſſion from its ingredients. Galen reſtrains the word *magma* to expreſs only the fæces of mirobalans.

MAGNA *arteria*. See Aorta.

Magna *aſſiza eligenda*, a writ directed to the ſheriff to ſummon four lawful knights before the juſtice of aſſize, there, upon their oaths, to chooſe twelve knights of the vicinage, &c. to paſs upon the *great aſſize* between A. B. plaintiff, and C. D. defendant, &c. See Assizes.

Magna *Charta*, the *great charter* of liberties of England, granted in the ninth year of Henry the Third, and confirmed by Edward the Firſt.

The reaſon of its being termed *Magna*, or *great*, is either becauſe of the excellency of the laws and liberties therein contained; or becauſe there was another charter, called *Charta de Foreſta*, eſtabliſhed with it, which was the leſſer of the two; or elſe becauſe it contained more than any other charters; or in regard of the wars and troubles in the obtaining of it; or of a great and remarkable ſolemnity in the denouncing excommunications againſt the infringers of it.

Magna Charta may be ſaid to derive its origin from king Edward the Confeſſor, who granted divers liberties and privileges, both civil and eccleſiaſtical, by charter: the ſame with ſome others, were alſo granted and confirmed by king Henry I. by a celebrated great charter, now loſt. His ſucceſſors king Stephen, king Henry II. and king John, confirmed or re-enacted the ſame; but the laſt prince violating his charter, the barons took up arms, and his reign ended in blood. Henry III. who ſucceeded him, after having procured an inquiſition to be made by twelve men in each county, what the liberties of England were in the time of Henry I. confirmed, with ſome alterations, the charter, obtained ſword in hand from king John, in 1215, being the preſent *Magna Charta*; which he ſeveral times confirmed and as often broke again; till, in the thirty-ſeventh year of his reign, he came to Weſtminſter-hall, where, in the preſence of the nobility and biſhops, with lighted candles in their hands, *Magna Charta* was read, the king all the while laying his hand on his breaſt, and at laſt ſolemnly ſwearing faithfully and inviolably to obſerve all the things therein contained, as he was a man, a Chriſtan, a ſoldier, and a king. Then the biſhops extinguiſhed their candles, throwing them on the ground, crying, Thus let him be extinguiſhed and ſtink in hell who violates this charter.

Nevertheleſs, king Henry in the next year invaded the rights of his people, till the barons levied war againſt him; and, after various ſucceſs, he confirmed this charter and the charter of the foreſt, in the parliament of Marlbridge, and in the fifty-ſecond year of his reign. Afterwards, by the ſtatute 25 Edw. I. called *confirmatio chartarum*, whereby the great charter is directed to be allowed as the common law, all judgments contrary to it are declared void; copies of it are ordered to be ſent to all cathedral churches, and read twice a year to the people; and ſentence of excommunication is directed to be as conſtantly denounced againſt all thoſe that, by word, deed or counſel, act contrary thereto, or in any degree infringe it. Sir Edward Coke obſerves, that it was confirmed no leſs than thirty two times, from the firſt Edward to Henry IV. Then, after a long interval, by the *petition* of right, by many ſalutary laws, particularly the habeas *corpus* act of Charles II. by the *bill* of rights, and laſtly by the *act* of settlement.

The *Magna Charta* is the baſis of the Engliſh laws and liberties: beſides thoſe proviſions, which redreſſed many grievances incident to feodal tenures, care was alſo taken therein to protect the ſubject againſt other oppreſſions, frequently ariſing from unreaſonable amercements, from illegal diſtreſs or other proceſs for debts or ſervices due to the crown, and from the tyrannical abuſe of the prerogative of purveyance, and pre-emption. It fixed the forfetiure of lands for felony in the ſame manner as it ſtill remains; prohibited for the future the grants of excluſive fiſheries, and the erection of new bridges ſo as to oppreſs the neighbourhood. With reſpect to private rights, it eſtabliſhed the teſtamentary power of the ſubject over part of his perſonal eſtate, the reſt being diſtributed among his wife and children; it laid down the law of dower, as it hath continued ever ſince; and prohibited the appeals of women, unleſs for the death of their huſbands. In matters of public police and national concern: it enjoined an uniformity of weights and meaſures; gave new encouragement to commerce, by the protection of merchant-ſtrangers; and forbad the alienation of lands in mortmain. With regard to the adminiſtration of juſtice: beſides prohibiting all denials or delays of it, it fixed the court of common pleas at Weſtminſter that the ſuitors might no longer be haraſſed with following the king's perſon in all his progreſſes; and at the ſame time brought the trials of iſſues home to the very doors of the freeholders, by directing aſſizes to be taken in the proper counties, and eſtabliſhing annual circuits; it alſo corrected ſome abuſes then incident to the trials by wager of law and of battle; directed the regular awarding of inqueſt for life or member; prohibited the king's inferior miniſters from holding pleas of the crown, or trying any criminal charge, whereby many forfeitures might otherwiſe have unjuſtly accrued to the exchequer; and regulated the time and place of holding the inferior tribunals of juſtice, the county-court, ſheriff's turn and court-leet. It confirmed and eſtabliſhed the liberties of the city of London, and all other cities, boroughs, towns, and ports of the kingdom. And, laſtly, (which alone would have merited the title that it bears of the *Great Charter)* it protected every individual of the nation in the free enjoyment of his life, his liberty, and his property, unleſs declared to be forfeited by the judgment of his peers or the law of the land. Blackſt. Com. vol. iv. p. 417.

MAGNANINE, in *Ornithology*, the name of a ſmall bird deſcribed by Aldrovand, Geſner, and ſome other authors, and ſeeming to be the ſame with our *hedge*-sparrow, commonly known among authors by the name *curruca*.

MAGNES *carneus*, in *Natural Hiſtory*, a name given by Cardan and ſome other authors, to a white earth dug in Italy and ſome other places, and called alſo by many calamita *alba*. It is an indurated earthy ſubſtance of the hardneſs of oſteocolla, and is of a white colour variegated with black lines. It adheres very firmly to the tongue, and is hence ſaid to attract fleſh in the ſame manner as the magnet does iron. It is even pretended, that if an iron ſtylus be rubbed over with this ſtony earth, and then plunged into the fleſh, the virtue of the earth will heal the wound as ſoon as made, and when the weapon is taken forth, there will remain no appearance of hurt. Cardan affirms that he ſaw this tried with ſucceſs, but ſuſpects witchcraft in the caſe!

MAGNESIA *alba*, in *Chemiſtry* and *Medicine*, a fine white earth, which has not hitherto been found naturally pure or in a ſeparate ſtate. At Rome it bore the name of the Count of Palma, though many are of an opion, that the preparation was carried from Germany into Italy. It was, however, for ſeveral years, a celebrated ſecret, in poſſeſſion of ſome particular perſons, till the method of preparing it was made public by Lanciſi, in the year 1717, and afterwards by Hoffman in 1722. It was then extracted from the mother-ley, or the liquor which remains after the cryſtallization of rough nitre; either by precipitation with a ſolution of fixed alkaline ſalt; or by evaporating the liquor, and calcining the dry reſiduum, ſo as to diſſipate the acids by which the earth had been made diſſoluble. The *magneſia*, in this mother-ley, proceeds from the vegetable aſhes contained in it; but as quick-lime is commonly much employed in moſt of the German, French, and other European nitre-works, the ſubſtance obtained from the mother-leys of thoſe works is rather a calcareous earth than *magneſia*, and appears to be ſuch by its burning into quick-lime, and forming a ſelenites with the vitriolic acid. *Magneſia* is called the *miraculum chemicum*, becauſe from two pellucid liquors a coagulum is formed, which contains this ſubſtance.

From the experiments of Dr. Black, related in the Edinburgh Phyſ. & Lit. Eſſ. vol. ii. art. 8. we learn, that *magneſia* is ſoluble, with efferveſcenſe, in vitriolic, nitrous, marine, and acetous acids; forming with the vitriolic, acid, cryſtals ſimilar to thoſe of the Epſom ſalt, and with the nitrous acids, cryſtals which deliquated in a moiſt air: with marine acid it formed no cryſtals; but the ſaline matter being evaporated to dryneſs, ſoon deliquated by expoſure to air: with diſtilled vinegar it formed no cryſtals by evaporation, but a ſaline maſs, viſcid when warm, reſembling glue in colour and conſiſtence, and brittle when cold. *Magneſia* was found to loſe, by calcination, ſeven-twelfths of its weight, and was thus deprived of the power of effervescing with acids; whence the ſubſtance loſt by calcination was GAS, or *fixable* AIR: nevertheleſs this gas, and almoſt the whole weight loſt by calcination, were reſtored to it by ſolution in vitriolic acid, and precipitation from them by a mild fixed alkali, the gas of which is abſorbed: in this laſt reſpect it ſeemed analogous to the calcareous earths, but differed from them in other properties; particularly in theſe, that when calcined, it was not ſoluble in water, nor communicated any ſenſible impregnation to it, and that it did not, like them, when calcined, become cauſtic or acrid.

Dr. Black alſo found, that *magneſia* was precipitated from acids by volatile alkali; that, when uncalcined, it precipitated calcareous earth from acids; but when calcined, or in any other way deprived of its gas, it did not precipitate theſe earths: when uncalcined or united with gas, it precipitated lime from lime-water; which ſhews that the calcareous earth had a ſtronger power to combine with the gas, than the *magneſia* had, ſince the former earth took this gas from the latter; by which means the former was rendered mild and unſoluble in water, and therefore was precipitated. This property ſuggeſted to Dr. Alſton a method of procuring ſweet water at ſea, by adding *magneſia* to water, the putrefaction of which has been prevented by the previous addition of quick-lime. M. Monnet obſerves, that *magneſia* combined with ſulphur, generally invelops ſtrata of coal: M. Margraaf has diſcovered that the ſerpentine earths in Saxony, contain *magneſia*: and M. Monnet adds, that the marly and alſo the alum earths contain it. Mr. Henry, an ingenious apothecary at Mancheſter, has communicated the following proceſs for making the *magneſia*. Diſſolve any quantity of ſal catharticus amarus in its own weight of water; filter and add to it by degrees a filtered ſolution of pearl or pot-aſhes, in an equal quantity of water, ſtirring them gently, until the mixed liquors have acquired the appearance of a complete coagulum; then deſiſt from adding any more of the alkaline lixivium, and immediately throw the mixture into a large veſſel of boiling water; keep it boiling for a quarter of an hour, then take it out, and put it into glazed earthen veſſels; as ſoon as the powder hath ſubſided, and before the water is quite cold, pour it off, and add a freſh quantity of boiling water; repeat theſe ablutions with hot water ſeveral times, till the liquor hath entirely loſt its ſaline taſte: then let it be ſo agitated as to ſuſpend the finer parts of the powder, in which ſtate decant it into other veſſels, and having ſeparated the water from the *magneſia*, by inclination, put it on large chalk-ſtones, till a conſiderable part of the humidity is abſorbed; then wrap it up in ſheets of white-paper, and dry it before the fire. Pour hot water upon the remaining powder, ſtir and decant it in its turbid ſtate, and ſeparate the *magneſia* from the water as before; thus the whole, or moſt of it, will be reduced to an equal degree of fineneſs. The larger the quantity of water into which the precipitated powder is caſt, the more ſpeedily and perfectly will the vitriolated tartar, which is formed by the union of the alkali with the acid of the ſal cath. be waſhed off. The neutral ſalt ſhould be waſhed off as quick as poſſible; otherwiſe, by allowing the mixture to ſtand for ſome time, the powder concretes into minute grains, which, when viewed with a microſcope, appear to be aſſemblages of needles diverging from a point. Theſe concretions cannot be re-diſſolved by any waſhing, however long continued. Dr. Black orders four times the quantity of water to that of the ſolution for throwing the coagulum into, but Mr. Henry obſerves, that this quantity is much too little. The water ſhould be pure, and diſtilled water is the beſt, provided it be kept till its empyreuma is gone off. Hard or impure water makes *magneſia* coarſe and diſagreeable. The chalk-ſtones on which the *magneſia* is dried ſhould be expoſed to a moderate heat, that the moiſture may evaporate quickly: and cleanlineſs ſhould be particularly attended to through the whole proceſs.

The *magneſia* is recommended by Hoffman, as an uſeful antacid, a ſafe and inoffenſive laxative in doſes of a dram or two, and a diaphoretic and diuretic, when given in ſmaller doſes of fifteen or twenty grains. It is now much in uſe, particularly in heart-burns, for correcting acidities in the primæ viæ, and for preventing or removing the many diſorders to which children are ſubject on this account. It is preferred to all common abſorbents, on account of its laxative qualitity, which it manifeſts when it meets with an acid in the ſtomach and bowels. If it is mixed with rhubarb, it prevents the rhubarb from leaving a coſtiveneſs behind. If the *magneſia* is neither accompanied, nor met with by an acid, it is not purgative, but ſimply abſorbent.

Objection has been made to the uſe of *magneſia* by Hoffman and others, that it frequently produced flatulencies, gripings, and other uneaſy ſenſations, particularly in weak bowels. It is now well known, that theſe ſymptoms muſt have been produced by the great quantity of fixed air contained in it, and diſcharged from it in conſequence of its meeting and effervescing with an acid in the ſtomach or inteſtines. Dr. Percival, therefore, ſuggeſted to Mr. Henry the idea of depriving it of its air, with a view of obviating theſe troubleſome ſymptoms occaſionally attending the uſe of it. For this purpoſe the *magneſia* ſhould be calcined by putting it in a common crucible, placing it in a glowing fire and keeping it red-hot for the ſpace of two hours. The *magneſia* thus treated was found to be equally purgative, when given in half its former doſe, and is deprived, by this proceſs, of the diſagreeable qualities above mentioned, and acquires likewiſe new properties, which render it likely to anſwer ſome other important practical purpoſe. By calcination it is not only rendered incapable of generating air in the ſtomach and bowels, but it is qualified to abſorb, or render fixed, that which it finds there, and which is produced, ſometimes in too great quantities, in the proceſs of digeſtion; and it is conſequently adapted to relieve thoſe colics or other diſorders, which are commonly called flatulent. In this reſpect it promiſes, as Mr. Henry obſerves, to be much more efficacious than the whole tribe of carminatives, from which it eſſentially differs with regard to its mode of operation and effects. It appears likewiſe to be the moſt proper cathartic for patients afflicted with the ſtone, who are under a courſe of the ſoap-ley; as it cannot, like the vegetable purgatives, counteract the lixivium, by throwing air into it; but, on the contrary, muſt abſorb a part of that air, which is already in the *primæ viæ*, and which would otherwiſe be attracted by the cauſtic alkali and render it leſs capable of acting on the calculus. In order to produce theſe effects, it is of great importance, that the *magneſia* intended for calcination, ſhould be perfectly free from any admixture of calcareous earth; as in that proceſs, this laſt mentioned ſubſtance muſt neceſſarily be deprived of its air, or rendered cauſtic; and the *magneſia* which contains it will accordingly impregnate the water in which it is infuſed with the taſte and qualities of lime-water. Mr. Glaſs's *magneſia*, which has been ſo highly extolled, appeared by Mr. Henry's experiments, to contain no inconſiderable portion of calareous earth. Lond. Med. Tranſ. vol. ii. art. 16. Henry's Exp. and Obſ. 1773.

MAGNESIA *nigra*, or MANGANESE, is a native mineral found in iron mines, and in the lead-mines of Mendip-hills, in Somerſetſhire, commonly conſidered as an ore of iron, though the experiments of Mr. Pott and Mr. Cronſtedt ſhew, that it contains little or no iron; and therefore, the latter author has made a diſtinct order of this earth, which he calls *terræ magneſiæ*. From ſome experiments of the former writer, it may be preſumed that this mineral conſiſts in great part of an earth, analogous to that of alum, which, in combination with acids, makes one of the ſtrongeſt ſtyptics.

It is a denſe ponderous ſubſtance, in its fineſt and pureſt pieces, approaching greatly to the texture of the *lapis hæmatites*, being compoſed of regular parallel ſtriæ, diverging from a centre to the circumference. This kind, however, is rare; beſides which there is another ſomewhat leſs pure kind, of an iron-grey colour, and irregularly ſtreaked like the ſteel-grained lead-ores. But the common *mangane ſe*, is of a perfectly irregular ſtructure. It is very heavy, moderately hard, and of a deep duſky grey, approaching to black, though ſometimes of a ferruginous brown. It is found in large maſſes of no determinate ſhape, and of a rude, rugged, and unequal ſurface. *Manganeſe* gives fire but difficultly with ſteel, and makes no effervescence with acids; though they diſſolve ſome part of it, eſpecially when it is calcined. Spirit of vitriol acquires from it a roſe colour; and aqua regia, alſo acquires colour, eſpecially from the black kind. From theſe ſolutions, fixed alkali precipitate a white earth. It is remarkable for communicating to a large proportion of glaſs in fuſion, a purpliſh or red tinge, which diſappears on a continuance of the fire; at the ſame time deſtroying the efforts of many other colouring matters and rendering a foul or coloured glaſs clear. When fuſed with nitre or with fixed alkali, it gives to warm water various colours, green, purple, red, or blue, which change by agitating the water. Cronſtedt ſays, that he has ſometimes extracted a ſmall portion of tin from *magneſia*; and that the colours given by it to glaſs, are eaſily deſtroyed by calces of arſenic or of tin.

Dr. Prieſtley, on putting an ounce of this ſubſtance finely powdered into a ſmall retort with a very long narrow neck, and expoſing it to a red-ſand heat, found, that forty ounce-meaſures of air were expelled from it in different portions. Part of this air in every portion, was fixed air, and at firſt almoſt wholly ſo; but four-fifths of the laſt produce was the pureſt dephlogiſticated air. Imagining that the nitrous acid, or at leaſt the influence of the atmoſphere, was neceſſary to the production of this latter kind of air, he was ſurpriſed at this reſult, from examining a ſubſtance, without the uſe of any nitrous acid, which, till it was dug out of the bowels of the earth, had not been expoſed to the influence of the external air; unleſs, as an ingenious writer ſuggeſts, we recur to ſome unknown or very diſtant æra, in which it may poſſibly have had a communication with the atmoſphere, and have acquired its dephlogiſticated air in a manner ſimilar to that in which the precipitate per ſe and red lead, at preſent acquire their pure air, during the act of calcination, in our laboratories. According to this idea, we may ſay that *manganeſe*, whoſe nature is little known, may probably be a metallic calx, which has undergone a calcination in volcanos, long ſince extinct; but which may formerly have had a communication with the atmoſphere. Prieſtley's Exp. and Obſ. relating to various Branches of Natural Philoſophy, 1779, p. 203, &c.

From ſome experiments of M. Sage, related in his Elemens de Mineralogie Docimaſtique, &c. Paris, 1777, he is led to infer, that *manganeſe* is compoſed of zinc and cobalt mineraliſed by the marine acid; and he obſerves, that the lead, copper, or iron, which are ſometimes found in it, are accidental additions. He accounts for the quality which this ſubſtance poſſeſſes of deſtroying the bluiſh or green tinge which glaſs may have received, and rendering it colourleſs, by obſerving, that the depuration of the glaſs is probably produced by the calx of the zinc contained in the *manganeſe*: this calx, he ſuppoſes, lays hold of the phlogiſton to which the glaſs owed its green colour. The zinc is thereby reduced, and diſſipated in the atmoſphere, while the ſmall portion of cobalt contained in the *manganeſe* gives the glaſs a ſlight bluiſh tinge, which contributes to its tranſparency. See *Regulus* of MANGANESE.

This ſubſtance is of vaſt uſe in the glaſs-trade, but neither the induſtrious Neri, nor any others who have written of the art, can ever deliver the true proportions in which it is to be mixed with the glaſs-metal on the ſeveral occaſions. The ſame thing is alſo to be obſerved in regard to zaffer, another ſubſtance in continual uſe with them. And the reaſon of this is, that there is vaſt difference in the quality of theſe bodies, ſome of which are ſold, being very pure and rich, others good for almoſt nothing, and much of middle degrees of purity between theſe. For this reaſon there is no determining how much of each is to be added to the glaſs, but the conciliator adds them at ſeveral times, and in ſmall quantities, and takes frequent proofs by his eye, till he knows they are properly proportioned. See GLASS.

It is alſo uſed to give a GLAZING to pottery, and recommended medicinally, when calcined by a ſtrong fire, as an aſtringent.

MAGNESIA, *opalina*, *opalin*, or ruby-coloured *magneſia* of antimony, is made, according to the directious of Lemery, of equal parts of antimony, nitre, and decrepitated ſea-ſalt. It is a much weaker emetic than the liver of *antimony*.

MAGNET, MAGNES, the *loadſtone*; a ſort of ferruginous ſtone, in weight and colour reſembling iron ore, and very hard and heavy; endued with divers extraordinary properties, attractive, directive, inclinatory, &c.

The *magnet* is alſo called *lapis Heracleus*, from Heraclea, a city of Magneſia, a port of the ancient Lydia, where it is ſaid to have been firſt found, and from which it is uſually ſuppoſed to have taken its name. Though others derive the word from a ſhepherd named *Magnes*, who firſt diſcovered it with the iron of his crook on mount Ida. It is alſo called *lapis nauticus*, by reaſon of its uſe in navigation; and *ſiderites*, from its attracting iron, which the Greeks called σιδερος.

The *magnet* is indeed a true iron ore, from which a conſiderable portion of iron may be extracted, and is uſually found in iron mines, and ſometimes in very large pieces, half magnet half common ore. Its colour is different, white, blue, red, black, but moſtly ferruginous, according to the different countries it is brought from. Norman obſerves, that the beſt are thoſe brought from China and Bengal, which are of an irony or ſanguine colour; thoſe of Arabia are reddiſh; thoſe of Macedonia blackiſh; and thoſe of Hungary, Germany, England, &c. of the colour of unwrought iron. Neither its figure nor bulk are determined, but it is found of all forms and ſizes.

The ancients reckoned five kinds of magnets, different in colour and virtue; the Ethiopic, Magneſian, Bœotic, Alexandrian, and Natolian. They alſo took it to be of two kinds, male and female; but the chief uſe they made of it was in medicine; eſpecially for the cure of burns, and defluxions on the eyes. The moderns, more happy, take it to conduct them in their voyages.

The moſt diſtinguiſhing properties of the *magnet* are, that it attracts iron, thus ſerving the purpoſes of the chemiſt in diſcovering or ſeparating ſmall particles of iron, mixed with other matters, and that it points to the poles of the world; and in other circumſtances, alſo dips or inclines to a point beneath the horizon, directly under the pole; and that it communicates theſe properties, by touch, to iron. On which foundation are formed the mariners needles; both the horizontal, and the inclinatory, or dipping-needles. See NEEDLE, DIPPING, &c.

MAGNET, *the attractive power of the*, was known to the ancients, and is mentioned even by Plato and Euripides, who call it the *Herculean ſtone*; becauſe it commands iron, which ſubdues every thing elſe. This property is finely deſcribed by Pliny: *Quid lapidis rigore pigrius? Ecce ſenſus manuſque tribuit illi natura. Quid ferri duritie pugnacius? Sed cedit & patitur* mores: *trahitur namquea* magnete *lapide, domitrixque illa rerum omnium materia ad inane neſcito quid curret, atque ut proprius venit, aſſiſtit teneturque, & complexu hæret.* lib. xxxvi. cap. 16.

The ancients ſeem alſo to have been acquainted with the communicative virtue of the *magnet*. Plato has deſcribed a chain of iron rings ſuſpended by one another, the firſt of which is ſuſtained by the load-ſtone: Lucretius, Philo, Pliny, Galen, and Nemeſius have likewiſe deſcribed the ſame phenomenon: but the knowledge of its directive power, whereby it diſpoſes its poles along the meridian of every place, and occaſions needles, pieces of iron, &c. touched with it, to point nearly north and ſouth, is of a much later date; though the exact time of its diſcovery, and the diſcoverer himſelf, are yet in the dark. The firſt tidings we hear of it, are in 1260, when Marco Polo, the Venetian, is ſaid, by ſome, to have introduced the mariner's compaſs; though not as an invention of his own; but as derived from the Chineſe, who are ſaid to have had the uſe of it long before; though ſome imagine that the Chineſe before that had borrowed it from the Europeans. Flavio de Gioia, a Neapolitan, and a citizen of Amalfi, is the perſon uſually ſuppoſed to have the beſt title to the diſcovery, about the year 1302: and yet ſir G. Wheeler mentions, that he had ſeen a book of aſtronomy much older, which ſpoke of the uſe of the needle: though not as applied to the uſes of navigation, but of aſtronomy. And in Guyot de Provins, an old French poet, who wrote about the year 1180, there is expreſs mention made of the *loadſtone*, and the compaſs; and their uſe in navigation is obliquely hinted at.

MAGNET, *the variation of the*, or its declination from the pole, was firſt diſcovered by Seb. Cabot, a Venetian, in 1500, who firſt ſerved our king Henry VII. then the king of Spain, and laſtly returning to England, was conſtituted grand pilot by king Edw. VI. with an annual ſalary of above 160*l.* though Ferdinand, the ſon of Columbus, aſſerts, that his father obſerved it on the 14th of September, 1492: and the variation of that variation by Mr. Gellibrand, an Engliſhman, who publiſhed his diſcovery in a ſmall quarto pamphlet, intitled A Diſcourſe Mathematical on the Variation of the Magnetic Needle, printed in 1635.

Laſtly, the dip or inclination of the needle, when at liberty to play vertically, to a point beneath the horizon, was firſt diſcovered by another of our countrymen, Mr. R. Norman, who in 1581, publiſhed the diſcovery he had long before made, in a ſmall pamphlet, called the *Nerve Attractive*, where he ſhews how to determine its quantity. See DIPPING-*needle*.

MAGNET, *phenomena of the*. 1. In every *magnet* there are two poles, one whereof points northward, the other ſouthward; one of theſe is called the north-pole, and the other the ſouth; and that is generally, and moſt properly called the ſouth-pole, which, if the *magnet* was put into a little boat of wood, or other materials, large enough to ſupport it, and ſet afloat in water, would turn itſelf towards the north; and that is more properly called the north-pole, which would turn towards the ſouth. The reaſon of calling them thus is, that the pole of the *magnet* which turns towards the ſouth, is of the ſame kind with the northern magnetic pole or poles of the earth, and contrarywiſe. The north pole of one *magnet* always attracts the ſouth-pole, and repels the north-pole of another, and *vice verſâ*. It is obſerved that the poles of *magnets* are not at their extremities but at a little diſtance from thence: and if the *magnet* be divided into ever ſo many pieces, the two poles will be found in each piece: we may add, that in ſome natural *magnets* there are more than two poles, inſtances having occurred of ſome in which there are eight, nine, and even ten. M. Muſchenbroeck ſays that he has ſeen a cube, each ſide of which was polar. The axis of a *magnet* is a right line which paſſes from one pole to another, and the equator is formed by a plane biſecting it in a direction perpendicular to the axis. By the following method, the ſituation of the poles, and the direction of the *magnetic* effluvia in paſſing out of the ſtone, may be exhibited to the ſight: let A B, C D, *Tab. Magnetiſm, fig.* 1. be the poles of the ſtone; about every ſide gently ſtrew ſome ſteel-filings on a ſheet of white paper; theſe ſmall particles will be affected by the effluvia of the ſtone, and ſo diſpoſed as to ſhew the courſe and direction of the *magnetic* particles in every part. Thus in the middle of each pole, between A B, and D C, it appears to go nearly ſtrait on; towards the ſides it proceeds in lines more and more curved, till at laſt the curve lines from both poles exactly meeting and coinciding from numberleſs curves on each ſide, nearly of a circular figure, as repreſented in the diagram. This ſeems to ſhew, that the magnetic virtue emitted from one pole circulates to and enters the other. The ſituation of the poles may be alſo determined by placing over the *magnet* a very fine needle, which will ſtand perpendicular over each pole, being more ſtrongly attracted by it, and no where elſe. 2. Theſe poles, in different parts of the globe, are differently inclined towards a point under the horizon. 3. Theſe poles, though contrary to one another, do help mutually towards the *magnet's* attraction and ſuſpenſion of iron. 4. If two *magnets* be ſpherical, one will turn or conform itſelf to the other, ſo as either of them would do to the earth; and after they have ſo conformed or turned themſelves, they will endeavour to approach or join each other; but if placed in a contrary poſition, they will avoid each other. This property may be illuſtrated by placing two *magnets* on ſmall pieces of wood, formed in the ſhape of boats, and ſwimming freely on ſtagnated water, undiſturbed by wind, and at ſuch a diſtance as to be within the ſphere of each other's activity: both the boats will ſwim towards each other with an accelerated motion, and meet exactly in the middle of the diſtance between them, provided that the boats and magnets were exactly of the ſame weight and bulk: but if either boat be turned, ſo that its *magnet* may preſent a contrary end to that by which it was attracted by the other *magnet*, they will both recede from each other with an equal velocity. The ſame phenomenon may likewiſe be exhibited by ſuſpending a *magnet* C, from the end B of a balance, *Tab. Magnetiſm, fig.* 2. and forming an equilibrium with a weight in the ſcale A, place another *magnet* D under C, and C will be found to ruſh towards D and to lift the weight in the ſcale A; but if the oppoſite end of D be preſented to C, C will be repelled by it, aſcend, and the ſcale A will deſcend: if D be placed above C, as in E, the effects will be juſt the contrary.

M. Muſchenbroek has found by a variety of experiments, that two *magnets* attract one another with different forces at different diſtances; that they act moſt ſtrongly in mutual contact, in which caſe their force has been equal to the weight of three hundred and forty grains, but at the diſtance of twelve inches, equal only to twenty-three grains; nevertheleſs they obſerve no regular proportion in their decreaſe, but the ratio is leſs than the inverſe of their diſtances; and different in different *magnets* and at different times. There are ſome whoſe ſphere of activity reaches even to fourteen feet, and others in which it is not ſenſible at the diſtance of eight or nine inches. He has alſo found, that the ſphere of repulſion varies in different *magnets*, and at different diſtances; and that the repulſive force is much leſs than that of attraction; the latter in contact being equal to three hundred and forty grains, whereas the former is equal only to forty-four grains. It appears alſo from another experiment of the ſame author, that the repelling forces of both poles of the ſame *magnet*, are very conſiderable at the diſtance of twelve lines, being equal to thirty grains, that they increaſe to the diſtance only of ſeven lines, where they are equal to thirty-ſix, but that in immediate contact they are equal only to thirteen grains. Mr. Michell, however, differs much in his deductions from thoſe above mentioned: he maintains, that each pole acts, attracts, or repels exactly equally, at equal diſtances in every direction: and that the magnetical attraction and repulſion are exactly equal to each other. He adds, that the miſtake of thoſe who think otherwiſe, aroſe from their not attending to the different degrees of ſtrength, which *magnets* have in different circumſtances: for two *magnets* that are placed with their attracting poles towards each other, will have their power, by that means, increaſed: and, on the contrary, if their repelling poles be placed towards each other, their power will thereby be diminiſhed: and this increaſe or diminution of power will be in a greater or leſs degree, according as the *magnets* are nearer to, or farther from each other; whence in all the experiments made on this ſubject, the attraction and repulſion come perpetually nearer to an equality, the greater the diſtance of the two *magnets* is, with which the experiments are made, and *vice verſa.* And ſo great is the effect of *magnets* on each other, that when the repellent poles of a large *magnet* and a ſmall one are brought into contact, the ſmall one ſhall ſometimes have its repellency changed into attraction. Mr. Michell alſo infers from other experiments, that the attraction and repulſion of *magnets* decreaſe as the ſquares of the diſtances from the reſpective poles increaſe. The differences of opinion in this reſpect are aſcribed by him to the want of making proper allowances for that property of *magnets*, in conſequence of which they attract or repel equally at equal diſtances, together with the increaſe and diminution of power in the *magnets* with which the experiments were tried. See *Laws of* MAGNETISM.

5. If a *magnet* be cut through the axis, the parts or ſegments of the ſtone, which before were joined, will now avoid and fly each other. 6. If the *magnet* be cut by a ſection perpendicular to its axis, the two points which before were conjoined, will become contrary poles; one in one, the other in the other ſegment. 7. Iron is not only attracted by a *magnet*, even more than another *magnet*, and equally attracts it, but alſo receives virtue from the *magnet* by application to it, or barely from an approach near it, though it do not touch it; and the iron receives this virtue variouſly, according to the parts of the ſtone it is made to touch, or even but to approach to. In order to communicate the magnetic virtue more effectually, the following methods are made uſe of: viz. it has been diſcovered, that iron rubbed upon one of the poles of the *magnet* acquires much greater virtue than from any other part of it, and this is more conſiderable from an armed *magnet*, than from a naked one. Farther the more gently the iron is preſſed, and the more it is preſſed againſt the pole, the more magnetical it becomes. Again it is more convenient to impregnate iron on one pole, than on both ſides ſucceſſively; becauſe the iron receives magnetic virtue from each pole, in contrary directions, which deſtroy each other's effects. Moreover, the iron is much better impregnated by preſſing it uniformly and in the ſame direction, according to its length, than by rubbing it by the middle; and the extremity which touches the pole laſt, retains the greateſt virtue; it is alſo of importance that the length of the iron be conſiderable. Beſides, a piece of poliſhed ſteel, or of pointed iron, receives more virtue than mere iron, or iron of the ſame figure; and, *cæteris paribus*, a piece of iron that is long, ſmall, and pointed, is more ſtrongly impregnated than that of any other form. 8. If an oblong piece of iron be any way applied to the ſtone, it receives virtue from it, only as to its length. 9. The *magnet* loſes none of its own virtue by communicating any to the iron; though this is doubted by Mr. Savery; and this virtue it can communicate to the iron very ſpeedily: though the longer the iron touches or joins the ſtone, the longer will its communicated virtue remain in it; and a better *magnet* will communicate more of it, and ſooner, than one not ſo good. The late Dr. Gowin Knight, practiſed a method, which he never publiſhed, of communicating to iron a very conſiderable magnetic virtue, and alſo of increaſing that of feeble *magnets*. From a report delivered to the Royal Society, in 1744, it appears that he had prepared a ſmall eight-cornered bar of ſteel, three inches and almoſt $\frac{7}{10}$ long, and about half an ounce Troy in weight, which lifted by one of its ends about eleven of the ſame ounces: that another plain bar of ſteel of a parallelopiped form, $5\frac{9}{10}$ inches long, $\frac{4}{10}$ inch broad, and $\frac{3}{10}$ inch thick, weighing two ounces $8\frac{1}{2}$ penny-weights, lifted, in like manner, by one of its ends, twenty Troy ounces: that a ſteel bar, almoſt of the ſame form as the laſt, but only four inches in length, capped or armed with iron at each end, cramped with ſilver, and weighing all together one ounce fourteen penny-weights, lifted by the feet of the armour full four pounds Troy; and that a ſingle block of ſteel, of a parallelopiped form, almoſt four inches long, $1\frac{2}{10}$ high, and $\frac{4}{10}$ inch thick, armed with iron cramped with braſs, and ſuſpended by a ring of the ſame, and weighing all together fourteen ounces one penny-weight, lifted by the feet of the armour, fourteen pounds $2\frac{1}{2}$ ounces, Troy weight. He alſo exhibited a compound artificial *magnet*, conſiſting of twelve bars of ſteel armed, which lifted by the feet of the armour as the laſt, twenty-three Troy pounds $2\frac{1}{2}$ ounces. At the ſame time he preſented before the ſociety, a ſmall armed loadſtone, which, with its armour, weighed ſeven penny-weights fourteen grains, and which could ſcarce lift two ounces; but improved by his method, it ſuſtained ſix ounces eighteen penny-weights and three grains. See *Armed* MAGNET, and *Artificial* MAGNET.

10. Iron will receive magnetiſm more eaſily than ſteel; the ſoft ſteel receives it much more eaſily than the ſprings tempered, and the ſpring-tempered much more eaſily than

the hard: but a piece of ſpring-tempered ſteel will not return near ſo much magnetiſm, and is therefore incapable of being excited to the ſame degree, as hard ſteel; ſoft ſteel will retain it ſtill leſs; and iron, which is the ſofteſt of all, ſcarce retains any. Mr. Michel has evinced the truth of theſe obſervations both by reaſoning and experiment. There are other bodies, beſides iron and ſteel, which are ſuſceptible of magnetiſm; theſe are probably no other than iron in ſome ſhape or other, or bodies that have a mixture of them: ſuch are all ſorts of iron ore after ignition, and ſome before. It is obſervable, that ſeveral of the hard ores of iron, which are not affected in the leaſt by the *magnet* in their natural ſtate, are vigorouſly attracted by it, when moderately roaſted; that the calces of iron, by ſlight roaſting with inflammable additions, are made to obey the *loadſtone*, and revived into their metallic form, each particle appearing now to be perfect iron; whilſt the calces of other metals are in no degree revived, without being brought into fuſion. There are alſo ſeveral ſorts of heavy, ſhining, opake, black, or dark chocolate-coloured ſand, moſt of which, if not all, are iron ores, which are ſuſceptible of magnetiſm. Of this kind is the dark-brown ſand in EMERY: we may alſo refer to this claſs moſt braſs, and ſeveral other metals; and bricks that have been much burnt in the fire. The magnetiſm of theſe is probably owing to a ſmall quantity of iron mixed with them. What is in the braſs, Mr. Michell conjectures, may come from the lapis calaminaris, which is ſaid to have often a ſmall mixture of iron in it: but Mr. Arderon, who has ſucceeded in giving magnetiſm and polarity to braſs, has doubts as to the mixture of iron with braſs: particularly, becauſe braſs fluxes with a much leſs degree of heat than iron, and iron naturally ſwims in fluid braſs. Phil. Tranſ. vol. l. p. 774.

11. A needle touched by a *magnet* will turn its ends the ſame way towards the poles of the world, as the *magnet* itſelf does. 12. Neither *loadſtone* nor needles touched by it do conform their poles exactly to thoſe of the world, but have uſually ſome variation from them; and this VARIATION is different in divers places, and at divers times in the ſame place. 13. A *loadſtone* will take up much more iron when armed or capped, than it can when naked. And though an iron ring or key be ſuſpended by the *loadſtone*, yet the magnetical particles do not hinder that ring or key from turning round any way, either to the right or left. See ARMS and *Armed* MAGNET.

14. The force of a *loadſtone* may be variouſly increaſed or leſſened by the various application of iron, or another *loadſtone*, to it. 15. A ſtrong *magnet*, at the leaſt diſtance from a leſſer, or a weaker, cannot draw to it a piece of iron adhering actually to ſuch leſſer or weaker ſtone; but if it come to touch it, it can draw it from the other: but a weaker *magnet*, or even a little piece of iron, can draw away or ſeparate a piece of iron contiguous to a greater or ſtronger *loadſtone*. 16. In theſe northern parts of the world, the ſouth pole of a *loadſtone* will raiſe up more iron than the north pole. 17. A plate of iron only, but no other body interpoſed, can impede the operation of the *loadſtone*, either as to its attractive or directive quality. Mr. Boyle found this true in glaſſes ſealed hermetically; and glaſs is a body as impervious, as moſt are, to any effluvia. The magnetic virtue is ſenſibly continued through the ſubſtance of ſeveral contiguous bodies or pieces of iron, as keys, &c. It pervades the pores of the hardeſt bodies; and equally attracts the iron in vacuo, as in open air. 18. The power or virtue of a *loadſtone*, and of iron or ſteel impregnated with the magnetic virtue, may be impaired by long lying in a wrong poſition, by an electrical ſtroke, as alſo by ruſt, wet, &c. and it may be quite deſtroyed by fire, and by LIGHTNING. 19. A piece of iron wire, well touched, will, upon being bent round in a ring, or coiled round on a ſtick, &c. generally, quite loſe its directive virtue; but it will always have it much diminiſhed: and yet if the whole length of the wire was not entirely bent, ſo that the ends of it, though but for the length of one tenth of an inch, were left ſtrait, the virtue will not be deſtroyed in thoſe parts: though it will in all the reſt. This was firſt obſerved by Meſſ. Grimaldi, and de la Hire; and is confirmed by the experiments of Dr. Derham; who adds farther, that through coiling or bending the wire as above would always deſtroy its virtue by day, yet it would not do it in the evening. 20. The ſphere of the activity of *magnets* is greater and leſs at different times: in particular that reſerved in the repoſitory of the Royal Society will keep a key or other body ſuſpended to another, ſometimes at the height of eight or ten feet; and at others, not above four feet. See 4. above. To which we may add, that the variation of the *magnetical* needle from the meridian varies at various times of the day; as appears from ſome experiments of Mr. Graham. See VARIATION.

21. By twiſting a piece of wire touched with a *magnet*, its virtue is exceedingly diminiſhed, and ſometimes ſo diſordered and confuſed, that in ſome parts it will attract, and in others repel; and even in ſome places, one ſide of the wire ſeems to be attracted, and the other ſide repelled, by one and the ſame pole of the ſtone.

22. A piece of wire that has been touched, being ſplit or cleft in two, the poles are ſometimes changed, as in a cleft *magnet*; the north becoming the ſouth, and the ſouth the north: and yet ſometimes one half of the wire will retain its former poles, and the other half will have them changed. To which it may be added, that laying one or other ſide of the half uppermoſt, cauſes a great alteration in its tendency or averſion to the poles of the *magnet*.

23. A wire being touched from end to end with the ſame pole of the *magnet*, the end whereat you begin will always turn contrary to the pole which touched it: if it be again touched the ſame way with the other pole of the *magnet*, it will then be turned the contrary way. 24. If a piece of wire be touched in the middle with only one pole of the *magnet*, without moving it backwards or forwards; in that place will be the pole of the wire, and the two ends will be the other pole. 25. If a *magnet* be heated red-hot, and again cooled either with its ſouth pole towards the north in a horizontal poſition, or with its ſouth pole downwards in a perpendicular poſition, its poles will be changed. 26. Mr. Boyle (to whom we are indebted for the following *magnetical* phenomena) found he could preſently change the poles of a ſmall fragment of a *loadſtone*, by applying them to the oppoſite vigorous ones of a large *magnet*. Dr. Knight diſcovered a method of changing the direction of the poles in natural *magnets*, multiplying and variouſly placing them at pleaſure. In the firſt inſtance, recorded in the Philoſophical Tranſactions, he inverted the poles of a *magnet* by a proceſs, which required only a minute's time; ſo that the ſame end, which before attracted the ſouth end of the needle, now attracted the north and repelled the ſouth, and *vice verſâ*: in the ſame time he again turned the direction of the polarity of the ſtone at right angles, to its former direction; and afterwards inverted this laſt direction of the poles. In the ſecond ſeries of experiments, he cut a piece of natural *loadſtone* into the ſhape of parallelopiped $1\frac{3}{10}$ inch long, $\frac{4}{10}$ inch broad, and $\frac{}{10}$ in thickneſs: its weight was three drams and ten grains. In this ſtone he placed the magnetical virtue in ſuch a manner, that the two oppoſite ends became, both of them, ſouth poles, and the middle was quite round a north pole. The two oppoſite ends of another ſtone were made both north poles, and the two oppoſite ſides ſouth poles. At one end of another ſtone, he placed a north pole ſurrounded by a ſouth; and at the other end a ſouth ſurrounded by a north pole; ſo that the edges of each ſurface had a pole of a different denomination from that which occupied the middle. On another occaſion, he inverted the poles at the ends of a piece of *magnet*, and then transferred them to the ſides of the ſtone. All theſe changes of the poles are eaſily produced by ſteel bars A B, C D, *Tab. Magnetiſm*, *fig.* 3. impregnated with a ſtrong magnetic virtue, by which the piece of *magnet* E F, placed between them is ſo affected, that the poles may be changed at pleaſure, and excited in places that are touched by the ends of the bars. Mr. Michell has ſhewn the method of doing this both in ſmall and large *magnets*. If a ſmall and ſhort *magnet* is to have its poles changed, lay the ſupporters deſcribed under *Armed* MAGNETS ſo, that the centre of their force ſhall, at each end, lie at the end of the line deſigned to be the axis of the *magnet*, and touch it double in the manner explained under *Artificial* MAGNET, as near as may be in that direction. If the poles are to be converted, and the *magnet* be long enough, touch it double according to the directions for converting the poles of an artificial *magnet*; then ſupport it, and touch it over again with freſh touches: or if the *magnet* is ſhort, apply bars as ſupporters only, and change them two or three times: or elſe make uſe of the following method, applicable to large *magnets*. If the poles of ſuch are to be changed, the middle of the end of the piece of iron placed at each end of the *magnet* (ſee *Armed* MAGNET) is to be placed againſt the end of the line deſigned to be the axis. If the poles are to be converted, it ſhould be done firſt by touching double, if a ſufficient force of magnetical bars can be applied for this purpoſe: but if by touching double, the poles will not be converted, place the *magnet* between two pieces of iron, then keeping them ſteady at their diſtance, remove the *magnet*, and connecting the pieces of iron by wedges of iron, that may not ſtand in the way of it, when it is to be put in its place again, apply the ſupporters as before, and putting the *magnet* in its place, take off the iron wedges. This may be done two or three times, if it be found neceſſary, retouching the ſupporters every time. See *Artificial* MAGNET. It is well known, that LIGHTNING not only deſtroys, but reverſes in ſome caſes, the poles of

magnetic needles. 27. Hard iron tools well tempered, when heated by a briſk attrition, as filing, turning, &c. will, while warm, attract thin filings or chips of iron, ſteel, &c. though not when cold; though there are not wanting ſome inſtances of their retaining the virtue when quite cold. 28. The iron bars of windows, &c. which have a long time ſtood in an erect poſition, grow permanently *magnetical*; the lower end of ſuch bars being the north pole, and the upper end the ſouthern. 29. A bar of iron that has not ſtood long in an erect poſture, if it be only held perpendicular, will become *magnetical*; and its lower end the north pole; as appears from its attracting the ſouth pole of a needle; but then this virtue is tranſient, and, by inverting the bar, the poles will ſhift their places. In order therefore to render the quality permanent in an iron bar, it muſt continue a long time in a proper poſition. But the fire will produce the effect in a ſhort time: but as it will immediately deprive a *loadſtone* of its attracting virtue, ſo it ſoon gives a verticity to a bar of iron, if, being heated red-hot, it be cooled in an erect poſture, or directly north and ſouth. Nay, tongs and pokers, by being often heated and ſet to cool again in a poſture nearly erect, have frequently gained this *magnetical* property. The *magnetic* virtue may be excited in iron and ſteel by electricity and lightning. 30. Mr. Boyle found, that by heating a piece of Engliſh oaker red-hot, and placing it to cool in a proper poſture, it manifeſtly acquired a *magnetic* virtue. And an excellent *magnet* of the ſame ingenious gentleman's having lain near a year in an inconvenient poſture, had its virtue ſurpriſingly impaired; as if it had been injured by fire. 31. A needle well touched, it is well known, will point north and ſouth: if it have one contrary touch of the ſame ſtone, it will be deprived of its faculty; and by another ſuch touch it will have its poles quite changed. 32. If a bar of iron have gained a verticity by being heated red-hot, and cooled again, north and ſouth, and then hammered at the two ends; its virtues will be deſtroyed by two or three ſmart blows on the middle. M. Martin ſays, that by a ſmart ſtroke of a hammer on the untouched end of the dipping-needle, he has often cauſed the whole *magnetic* virtue to come to that end from the other, ſo as to make it dip on that ſide as much as it did on the other before: on the contrary, by ſuch a ſtroke he has ſometimes made it dip much more on the touched end than before. Sometimes, by ſtriking it, the needle, which dipped before, will be reſtored to its equilibrium, as if the virtue had made its eſcape, or were uniformly diffuſed all over the needle. 33. By drawing the back of a knife, or long piece of ſteel wire, &c. leiſurely over the pole of a *loadſtone*, carrying the motion from the middle of the ſtone to the pole; the knife or wire will accordingly attract one end of a needle: but if the knife or wire be paſſed from the ſaid pole to the middle of the ſtone, it will repel that end of the needle which in the other caſe it attracts. 34. Either a *magnet* or a piece of iron being laid on a piece of cork, ſo as to ſwim freely in water; it will be found, that whichſoever of the two is held in the hand, the other will be drawn to it: ſo that iron attracts the *magnet* as much as it is attracted by it; action and reaction being always equal. In this experiment, if the *magnet* be ſet afloat, it will direct its two poles to the poles of the world. 35. A knife, &c. touched with the *magnet*, acquires a greater or leſs degree of virtue, according to the part it is touched on. It receives the ſtrongeſt touch, when it is drawn leiſurely from the handle towards the point over one of the poles: and if the ſame knife thus touched, and thus in poſſeſſion of a ſtrong attractive power, be retouched in a contrary direction, viz. by drawing it from the point towards the handle over the ſame pole, it immediately loſes all its virtue. Laſtly. It is obſerved by ſome writers, that the power or force of *magnets* is generally greater in ſmall than in large ones, in proportion to their bulk. It is very rare that very large ones will take up more than three or four times their own weight, but a ſmall one, that is only tolerably good, will take up eight, ten, or twelve times its weight. Mr. Martin mentions one, whoſe weight with the armature is only forty-three grains, that will take up twenty-four times its own weight, or one thouſand and thirty-two grains; and another wore in a ring, weighing ſcarce three grains, that will take up ſeven hundred and forty-ſix grains, or two hundred and fifty times its own weight.

Magnet, in *Medicine*. Some writers of the middle ages have, from a miſtaken tranſlation of Theophraſtus, been induced to account the *loadſtone* poiſonous, which the ancients were ſo far from doing, that they gave it inwardly. Galen aſcribes a purgative quality to it, and recommends it in dropſies; and Dioſcorides preſcribes it as a good medicine to evacuate groſs melancholic humours. It is doubtleſs poſſeſſed of the ſame virtues with the other ores of iron, though of late never uſed inwardly, being only made an ingredient in ſome plaſters.

It has been ſaid, that the application of the artificial *magnet*, or of a *magnetical* bar to the teeth, will effectually cure the tooth-ach.

Magnet, in *Metallurgy* and *Chemiſtry*. Iron ores may generally be diſcovered to be ſuch by the *magnet*; for almoſt all of them will be attracted by it either before or after ignition. A ſtrong *artificial* MAGNET, well hung, and uſed as a needle, will beſt ſerve for this purpoſe. It will alſo readily find, and ſeparate any little bits of iron or ſteel from other things, and particularly iron or ſteel from thoſe of other metals. It will likewiſe diſcover whether tools, &c. are made of ſteel, or whether they are iron caſe-hardened; for the ſteel will receive a ſtrong touch, when the other will hardly receive any. For the uſe of the *magnetic* needle, in *Mining*, ſee NEEDLE. According to Neumann, the magnet is almoſt totally ſoluble in ſpirit of nitre, and partially in the vitriolic and marine acids.

Magnet, *armed*, denotes one that is capped, caſed, or ſet in iron or ſteel, in order to make it take up the greater weight, and alſo more readily to diſtinguiſh its poles. For the method of arming the natural *magnet* ſee ARM. Mr Mitchell directs to increaſe the power of a natural *magnet*, if it be ſmall and ſhort, by laying a great number of iron bars at its end, after the manner of ſupporters, care being taken to apply the proper poles; if it be pretty long, ſo as to allow room for it, by touching it alſo double with ſeveral bars, according to its bulk, applying them to all ſides at once. To increaſe the power of a large *magnet*, inſtead of placing ſupporters, he adviſes to put a large piece of iron, of the thickneſs and breadth of the *magnet* at each end of it. This piece of iron ſhould be either three or four times as long as it is thick, or elſe ſhort, and three or four times as large at the end not touching the *magnet*, as at the other: in the former of theſe ways, there are to be placed on one ſide, in the other caſe at the broad end, as many ſupporters as can conveniently ſtand there. This, if the *magnet* be very ſhort, may be ſufficient; if it be long, it ſhould beſides be touched double. If the *magnets* to be thus improved be very ſuſceptible of magnetiſm, they ſhould have much thicker armour than is generally uſed, becauſe they will thus retain more magnetiſm; and the armour ſhould be ſo faſtened, that the hoops, &c. uſed for that purpoſe may not ſtand in the way of applying any thing to the ends, or the ſides; for it is much the beſt way to make any ſhort *magnets* magnetical in their armour, becauſe they will retain more power by this means. But Mr. Michell apprehends, that the beſt way of managing very large *magnets*, would be to ſlit them in a direction parallel to the axis, into ſeveral long bars of the length of the ſtone, and having made them magnetical ſingly, to put them into their armour, in the manner directed for compound artificial *magnets*. The ſteel bars uſed for artificial magnets, may be armed and made magnetical, like the natural *magnets*. Armed compound artificial *magnets* may be made of ſeveral bars exactly of a length, with armour nicely fitted to them. The bars ſhould have the ſame proportions as thoſe of ſingle unarmed *magnets*; they ſhould be touched ſingly, and put into their armour, as they are touched, with the poles of the ſame denomination the ſame way. The armour ſhould be pretty thick, and ſhould have a wedge of iron applied to it, whilſt the bars are putting in, and till the whole is bound together and finiſhed; for which reaſon the caſe, that keeps the armour together at bottom, ſhould be put on before any of the bars are put in. The iron wedge ſhould always continue applied to the *magnet*, but when it is uſed; for this will be a great preſervation to it; though with all this precaution, it will loſe a great deal of its firſt ſtrength in a very little time. Mr. Mitchell directs an occaſional *magnet* of this kind to be made in the following manner: let there be a ſmall box, about an inch deep, ſix inches long, and three or four wide; in the bottom of this box fix two bars of iron, at each end one, about $\frac{3}{8}$ inch ſquare, reaching quite acroſs the ends and through holes in one ſide, and projecting a little way beyond; theſe projecting ends ſerve as feet to lift with like thoſe of the common armed natural *magnet*: the faces of theſe feet ſhould lie in the ſame plane with each other; and they may be reduced, by taking off the edges, to about half the breadth of the bar, in the flat way of the box. When the *magnet* is wanted, apply a wedge of iron to the two feet, that come through the ſide of the box; and having made any number of the ſix-inch bars as magnetical as may be, place them one by one with their edges againſt the two iron bars in the box, and with their poles of the ſame denomination the ſame way, puſhing them cloſe againſt the ſide of the box, which will keep them from turning over and lying flat-ways. Having placed as many of the ſix-inch bars as are required, in this manner, lay two or three doubles of flannel, or ſomething elſe that is ſoft and ſpungy, over them, and preſs them againſt the two iron bars with the lid of the box, and faſten it down. Such a *magnet* as this may be eaſily taken to pieces and retouched, and ſet together again, as occaſion ſhall ſerve. A *magnet* of this kind, conſiſting of three dozen of ſix-inch bars, will liſt fifty pounds avoirdupois.

MAGNET, *arſenical*, in *Chemiſtry*, MAGNES *arſenicalis*, denotes a mixture of equal parts of arſenic, ſulphur, and antimony melted together over the fire, and condenſed in manner of a ſtone.

It is a very gentle cauſtic, and was firſt invented by Angelus Sala. It ſucceeds very well in taking down fungous fleſh in wounds. It has its name *magnet*, becauſe, being worn during malignant diſeaſes, it is ſuppoſed to preſerve the wearer from infection, by a *magnetical* power.

MAGNET, *artificial*, is a ſteel or iron bar, impregnated with the magnetic virtue, ſo as poſſeſs all the properties, and be uſed inſtead of the natural *loadſtone*. The method of making *magnets* of this kind, by means of a natural *magnet*, and even without the aſſiſtance of any *magnet*, was ſuggeſted many years ago by Mr. Servington Savery, and particularly deſcribed in the Phil. Tranſ. N° 414. See alſo Abridgement, vol. vi. part ii. p. 260, &c. But as his method was tedious and operoſe, though capable of communicating a very conſiderable virtue, it was little practiſed. Dr. Gowing Knight was the firſt who brought this kind of *magnets* to their preſent ſtate of perfection, ſo as to be of much greater efficacy than the natural ones. The reſult of his method, though the proceſs itſelf was kept ſecret, was firſt publiſhed in the Phil. Tranſ. for 1744. vol. xliii. art. 8 and Phil. Tranſ. for 1745. art. 3. See alſo vol. xliv. for 1747. art. 2. Mr. Wilſon has lately communicated to the public Dr. Knight's method; who informs us, that having provided himſelf with a large quantity of clean filings of iron, he put them into a large tub, that was more than one-third filled with clean water; he then, with great labour, worked the tub to and fro for many hours together, that the friction between the grains of iron by this treatment, might break off ſuch ſmaller parts as would remain ſuſpended in the water for ſome time. The obtaining of theſe very ſmall particles in ſufficient quantity, ſeemed to him, to be one of the principal deſiderata in the experiment. The water being thus rendered very muddy, he poured the ſame into a clean earthen veſſel, leaving the filings behind; and when the water had ſtood long enough to become clear, he poured it out carefully, without diſturbing ſuch of the iron ſediment as ſtill remained, which now appeared reduced almoſt to impalpable powder. This powder was afterwards removed, into another veſſel, in order to dry it: and this proceſs was ſeveral times repeated. When a ſufficient quantity of this fine powder was procured, he made a paſte of it with linſeed oil; preferring this vehicle, becauſe it contained a conſiderable quantity of the phlogiſtic principle. With theſe two ingredients he made a ſtiff paſte, which he well kneaded, before he formed it into convenient ſhapes, and then put upon wood, and ſometimes on tiles, in order to bake or dry it before a moderate fire, at about a foot diſtance from it. In about five or ſix hours it generally attained a ſufficient degree of hardneſs. When theſe baked pieces were become cold, he gave them their magnetic virtue in any direction he pleaſed, by placing them between the extreme ends of his large magazine of artificial *magnets* for a few ſeconds or more, as he ſaw occaſion. By this method, the virtue they acquired was ſuch, that when any one of thoſe pieces was held between two of his beſt ten-guinea bars, with its poles purpoſely inverted, it immediately of itſelf turned about to recover its natural direction, which the force of thoſe very powerful bars was not ſufficient to counteract. Phil. Tranſ. vol. lxix. part i. for 1779. art. 5. However, the method of making artificial *magnets* was diſcovered and publiſhed by Mr. John Mitchell, in a Treatiſe of Artificial *Magnets*, printed in 1750.. and by Mr. John Canton, in the Phil. Tranſ. for 1751. vol. xlvii. art. 6. p. 31. The proceſs for this purpoſe was alſo found out by others, particularly by Marul Uitgeleeze Natuurkund. Verhand. tom. ii. p. 261. and Du Hamel, Hiſt. Acad. Roy. 1745 and 1750.

Mr. Michell's method of making *magnets* is as follows: prepare a dozen bars of ſteel, of about 1¾ ounce weight each, ſix inches long, and half an inch broad: let theſe be hardened with a full, but not too great heat: let one end be nicked all round with a chiſſel, to diſtinguiſh it from the other; and the ends of the bars ſhould be cleaned after hardening, either upon a ſmooth ſtone, or razor-grinder's wheel: the ſize and ſhape of the bars may be varied at pleaſure, provided that the length be proportioned to the thickneſs. The beſt ſort of ſteel is that which has no veins of iron in it, and Mr. Michell has found the common bliſtered ſteel at leaſt equal to any other. When any *magnet* does not anſwer expectation, it will be proper to harden it over again, with a greater or leſs degree of heat, till it proves better. In order to preſerve theſe bars, contrive a box, that ſhall have two pieces of iron, about an inch long each, fixed upright in the middle of each end, over againſt each other, at the diſtance of ſix inches from outſide to outſide. Theſe pieces of iron, may be about ¼ inch ſquare, and ſhould be filed pretty ſmooth on the ſides. Againſt theſe are to be placed, with their edges towards them, the twelve magnetical bars, ſix on one ſide, with their ſouth, or north poles one way, and ſix on the other ſide with the ſame poles the contrary way. It is neceſſary to obſerve that theſe bars muſt neither be taken out, nor put in, all, or too many on a ſide at once; for if two only be left, with their poles of the ſame denomination the ſame way, without one or more on the other ſide to counterbalance their effects, they will damage each other: and if two of the ſame ſide be taken out together, or laid with their poles of the ſame denomination together, after they are taken out they will alſo damage one another: and if this be the caſe, it will be proper to reſtore them, before they are uſed, after the manner preſcribed for making of *magnets*. In order to make the marked ends of theſe bars ſouth poles, and the other ends north poles, place ſix of them in a line north and ſouth, bringing the unmarked end of one, to touch the marked end of the next throughout; the marked ends lying towards the north, which will be ſome advantage to them. Then take an armed *magnet*, and placing it with both poles upon one of the bars, the north pole towards the marked end, which is to be a ſouth pole, and the ſouth pole towards the unmarked end, which is to be a north pole, ſlide it backwards and forwards from end to end of the whole line of bars three or four times, taking care that they all touch. Then taking it off, remove the two endmoſt bars into the middle, and paſs over them again three or four times. Having thus touched the bars, it will not be improper to turn them with the other ſide uppermoſt, and to touch them over again on that ſide as before, omitting the endmoſt bars, till they are removed into the middle, where they alſo are to be touched.

If an unarmed *magnet*, either natural or artificial be uſed, lay the bars in a line as before; place the ſouth pole of the *magnet* upon the marked end of the endmoſt bar, and ſlide it over the whole line to the end: then taking that pole off, place the north pole upon the ſame bar in its room, not at the extremity of the bar, but towards the middle, and ſlide it back again; then, change the poles again, obſerving to ſet the *magnet* on at the middle of the bar, and ſlide it to the other end, as at firſt. Having done this four or five times, remove the two endmoſt bars into the middle, and placing the ſouth pole of the *magnet* upon the marked end of them, ſlide it to the unmarked end; and then placing the north pole upon the unmarked end, ſlide it to the marked end. Let this be repeated three or four times; and turning the bars with the other ſide upward, repeat the ſame proceſs again. When the *magnets* are weak, it may be neceſſary to touch the bars, according to the preceding directions, before they are hardened, when they will receive the magnetic virtue more eaſily; then, making the whole dozen magnetical, in the manner hereafter preſcribed, till they are as ſtrongly ſo as they will be in their ſoft ſtate, harden one half; and having made theſe again magnetical with the remaining half that are ſoft, harden thoſe alſo, and proceed. But if the *magnets* are too weak to perform properly, even in this caſe, recourſe muſt be had to ſmaller bars of ſteel, which ſhould alſo be ſoft; and if theſe fail, bars of iron muſt be uſed. Having communicated a ſmall degree of magnetiſm to ſix of the bars, let the other ſix, which are unmagnetical, be laid in a line, in the ſame manner as the former: and let A B. *Tab. Magnetiſm*, *fig.* 4. repreſent this line, conſiſting of ſix bars, though three only are delineated. The line drawn acroſs at the end of each bar, repreſents the mark diſtinguiſhing that end which is to be made the ſouth pole, from the other. Let C D, E F repreſent the ſix bars already made magnetical: theſe lean againſt each other at the top, and are ſeparated by a piece of wood, or other matter except iron, about a tenth of an inch at the bottom. The three *magnets* in C D, have all their ſouth poles downwards, and are placed towards the unmarked ends of the bars in the line, which are to be north poles; and the three *magnets* in E F, have all their north poles downward, and are placed towards the marked ends of the bars, which are to be ſouth poles. Slide theſe ſix magnetical bars thus placed, backward and forward three or four times, over the whole length of the line. Then taking them off, having firſt brought them to touch at the bottom, remove the two endmoſt bars of the line into the middle, and replacing the magnetical bars upon them, as before, paſs over thoſe again. Then taking them off, and turning the bars in the line with the other ſide upward, go over them again in the ſame manner, excepting the endmoſt bars; which, when thoſe in the middle are touched, are to be removed thither, to be touched in their turn. Thus the bars in the line will give a ſtronger power to that of the other ſix, by which they were touched: and, therefore, theſe latter may now be laid down in a line, and retouched, after the ſame manner, with the latter: when this is done, lay thoſe down again, and retouch them with the others: repeat this operation a few times, firſt touching one ſet, and then the other, till they have acquired as much magnetiſm as they will retain, or till they will receive no additional force, by any farther repetition. The ſix-inch bars, made magnetical after this manner, when properly hardened, will ſingly lift by one pole, a piece of iron, weighing a pound or better, if it be of a proper form; and ſix ſuch bars will touch a line of freſh bars of the ſame ſize, to their full perfection, by three or four times ſliding over them; except the endmoſt, which muſt always be removed into the middle. As ſeveral *magnets* laid together with their poles of the ſame denomination the ſame way, will greatly injure one another, unleſs they have ſomething to counteract them, it is abſolutely neceſſary, not to place two of them, of a ſide, on together; but ſingly, one on one ſide, and one on the other, making them to lean together, that they may reſt againſt one another at the top: at the bottom they are preſerved from injuring one another, by being placed upon the bar which is to be made magnetical. In like manner, they muſt not be taken off two of a ſide together, but ſingly, firſt on one ſide, and then on the other. But the readieſt way of taking them off is firſt to bring them to touch one another at the bottom, in the ſame manner as they do at the top, and then they may be removed at once, and upon occaſion ſet on again; only obſerving not to ſeparate them again at the bottom, till they are placed upon the bar, which they are to touch. The reaſon of removing the two bars at the ends of the line, in order to their receiving a greater virtue, ſeems to be, that the ſix *magnets*, employed in touching, are endeavouring to make that part of the bar which is not included between them magnetical, in a contrary direction from that which is included between them. As this laſt is the direction of magnetiſm deſigned, the former endeavour would be injurious; and it is prevented by two cauſes: one of which is the power, whereby the ſteel reſiſts in a degree every endeavour, either to make it magnetical, or to deſtroy its magnetiſm; and the other is the power of the bars already in ſome meaſure magnetical, which lie at both ends of the bar that is touched. Now this laſt power is wanting at one extremity of thoſe bars, that are placed at the ends; and conſequently not having a ſufficient force fully to reſiſt the contrary endeavour of the *magnets* employed in touching them, they become leſs magnetical than the others, which have a ſufficient force. Though in the line of bars, when making magnetical, each bar has only one at each end to ſupport it (thoſe *magnets* that are placed at the ends of the others to preſerve them being called *ſupporters*) againſt the contrary endeavour of the ſix, made uſe of to touch it; and this does very well: yet ſome will receive an additional force by being ſupported with larger *magnets*; or inſtead of theſe, two or three of their own ſize, at each end; thoſe at the marked end all with their north poles touching it, and thoſe at the unmarked end all with their ſouth poles touching it. And becauſe there will be two or three north poles, and as many ſouth poles together amongſt the ſupporters, at the other end from the bar to be touched, that have nothing to counteract them, it will be proper to place the ſouth pole of another *magnet* among the north poles, and the north pole of another among the ſouth poles, that they may not hurt one another, which they otherwiſe will do.

The manner above deſcribed is called the *double touch*: and Mr. Michell obſerves, that two *magnets* will give more ſtrength to a bar of their own ſize, when uſed after this manner, than a ſingle *magnet* equal to five of the former in ſtrength, when applied after the manner of the ſingle touch. This ingenious writer has deſcribed a frame, contrived for holding ſeveral of the ſix inch bars, when they are uſed in touching large bars, and when they cannot be conveniently held in the hand; for an account of which we muſt refer to his excellent pamphlet, already cited, p. 45, &c. ed. 2.

He obſerves, that the form of *magnets* is of very little conſequence, with regard to their receiving the magnetic virtue, provided that they have a ſufficient length in proportion to their bulk. The ſtrait bars may be made ſquare, round, or flat; though the flat are moſt convenient for touching, and probably ſomewhat ſtronger These may alſo be pointed at the ends, as in *fig.* 5. in order to render them lighter and to increaſe their power of lifting; though pointed bars are not ſo proper for touching. The *magnet* may be made in the form of a horſe-ſhoe, as in *fig.* 6. where a wedge of iron is ſuppoſed to be applied to the poles of it; and it will thus lie in a narrower compaſs, a wedge of iron may be applied to its two poles, and it will lift by both poles at once. The *magnet* may be alſo made annular, which is a plain flat bar, bent flatways inſtead of edgeways; and a ſemicircular *magnet* may be bent flatways like the annular, or edgeways like the horſe-ſhoe; and two *magnets* of this kind may be conveniently placed together, in order to preſerve each other.

The poles of a *magnet* may be converted by placing the bars which are to retouch it, with their north poles towards its north pole, and the ſouth poles towards its ſouth pole. In doing this, they ſhould be placed on at the middle, and ſlid once or twice backwards and forwards, before it is ſupported; and then, that which was the north pole muſt be ſupported as a ſouth pole, by north poles; and that, which was the ſouth pole, as a north pole, by ſouth poles. In order to make a bar magnetical, ſo that it ſhall have ſeveral poles, ſupport it at the places where the poles are deſigned to be, with poles of a contrary denomination from thoſe deſigned; and if any place is ſupported with ſouth poles, the next places on either ſide muſt be ſupported with north poles, and *vice verſâ*. Having done this, conſider each piece included between any two ſets of ſupporters, as a ſeparate bar, to be made magnetical, with its ſouth pole towards the north ſet of ſupporters, and its north pole toward the ſouth ſet, and touch it accordingly. *Magnets* of this ſort will not do well, unleſs they are very long; and at beſt they are always weak, and will very ſoon be injured; ſo that they ſhould only be made occaſionally.

Mr. Michell has alſo publiſhed a method of obtaining magnetiſm by means of three iron bars, without the aſſiſtance of a natural loadſtone, for which we ſhall refer to his pamphlet, p. 60, &c. and proceed to deſcribe the method deſcribed by the ingenious Mr. Canton, the remembrance of whoſe knowledge and communicative diſpoſition has led the editor often to lament his death in the courſe of this work; and whoſe friendſhip demands this tribute of reſpect. This gentleman has ſucceeded ſo well in his attempts to convey a conſiderable magnetic virtue to bars of hardened ſteel, as to be able to impregnate ſuch bars with this virtue to as high a degree, at leaſt, as any bars of the ſame weight and dimenſions, which he had ſeen or heard of; and to as high a degree, as he apprehends, the ſame bars, in their preſent ſtate, are capable of being impregnated. Mr. Canton was able, in about half an hour's time, to communicate to ſix bars of hardened ſteel, at firſt entirely deſtitute of any magnetic virtue, the utmoſt virtue they were capable of receiving; and that without the mediation or aſſiſtance of any natural *loadſtone*, or of any artificial *magnet*. Mr. Canton has publiſhed the deſcription of his proceſs with ſuch directions, that any perſon may readily perform the ſame. For this purpoſe procure a dozen bars; ſix of ſoft ſteel, each three inches long, $\frac{1}{4}$ inch broad, and $\frac{1}{20}$ inch thick, with two pieces of iron, each half the length of one of the bars, but of the ſame breadth and thickneſs; and ſix of hard ſteel, each $5\frac{1}{2}$ inches long, half an inch broad, and $\frac{3}{20}$ of an inch thick, with two pieces of iron of half the length, but the whole breadth and thickneſs of one of the hard bars: and let all the bars be marked with a line quite round them at one end. Then take an iron poker and tongs, (or two bars of iron) *Tab. Magnetiſm*, *fig.* 7. the larger they are, and the longer they have been uſed, the better: and fixing the poker upright between the knees, hold to it near the top one of the ſoft bars, having its marked end downward, by a piece of ſewing ſilk, which muſt be pulled tight with the left hand, that the bar may not ſlide; then graſping the tongs with the right hand a little below the middle, and holding them nearly in a vertical poſition, let the bar be ſtroked by the lower end, from the bottom to the top, about ten times on each ſide, which will give it a magnetic power ſufficient to lift a ſmall key at the marked end; which end, if the bar was ſuſpended on a point, would turn towards the north, and is, therefore, called the north pole, and the unmarked end is, for the ſame reaſon, called the ſouth pole of the bar. Four of the ſoft bars being impregnated after this manner, lay the other two, *fig.* 8. parallel to each other, at the diſtance of about one-fourth of an inch, between the two pieces of iron belonging to them, with a north and a ſouth pole againſt each piece of iron; then take two of the four bars already made magnetical, and place them together, ſo as to make a double bar in thickneſs, the north pole of one being even with the ſouth pole of the other; and the remaining two being put to theſe, one on each ſide, ſo as to have two north and two ſouth poles together, ſeparate the north from the ſouth poles at one end by a large pin, and place them perpendicularly with that end downward, on the middle of one of the parallel bars, the two north poles towards its ſouth, and the two ſouth poles towards its north end: ſlide them backward and forward three or four times over the whole length of the bar, and removing them from the middle of this, place them on the middle of the other bar as before directed, and go over that in the ſame manner; then turn both the bars with the other ſide upward, and repeat the former operation: this being done, take the two from between the pieces of iron, and placing the two outermoſt of the touching bars in their room, let the other two be the outermoſt of the four to touch theſe with; and this proceſs being repeated till each pair of bars has been touched three or four times over, which will give them a conſiderable magnetic power, put the half dozen together after the manner of the four, *fig.* 9. and touch with them two pair of the hard bars, placed between the irons at the diſtance of about half an inch from each other; then lay the ſoft bars aſide; and with the four hard ones let the other two be impregnated, *fig.* 10. holding the touching bars apart at the lower end near two tenths of an inch, to which diſtance let them be ſeparated after they are ſet on the parallel bar, and brought together again after they are taken off; this being obſerved, proceed according to the method already deſcribed, till each pair has been touched two or three times over. But as this vertical way of touching a bar will not give it quite ſo much of the magnetic virtue as it will receive, let each pair be now touched once or twice over, in their parallel poſition between the irons, *fig.* 11. with two of the bars held horizontally, or nearly ſo, by drawing at the ſame time the north of one from the middle over the ſouth end, and the ſouth of the other from the middle over the north end of a parallel bar: then bringing them to the middle again without touching the parallel bar, give three or four of theſe horizontal ſtrokes to each ſide. The horizontal touch, after the vertical, will make the bars as ſtrong as they can poſſibly be made; as appears by their not receiving any additional ſtrength, when the vertical touch is given by a greater number of bars, and the horizontal by thoſe of a ſuperior magnetic power. This whole proceſs may be gone through in about half an hour, and each of the larger bars, if well hardened, may be made to lift twenty-eight Troy ounces, and ſometimes more. And when theſe bars are thus impregnated, they will give to a hard bar of the ſame ſize its full virtue in leſs than two minutes; and will, therefore, anſwer all the purpoſes of magnetiſm in navigation and experimental philoſophy, much better than the *loadſtone,* which is well known not to have ſufficient power to impregnate hard bars. The half dozen being put into a caſe, *fig.* 12. in ſuch a manner as that two poles of the ſame denomination may not be together, and their irons with them as one bar, they will retain the virtue they have received; but if their power ſhould, by making experiments, be ever ſo far impaired, it may be reſtored without any foreign aſſiſtance in a few minutes. And if, out of curioſity, a much larger ſet of bars ſhould be required, theſe will communicate to them a ſufficient power to proceed with, and they may in a ſhort time, by the ſame method, be brought to their full ſtrength. Mr. Canton, by the ſame proceſs, communicated magnetic virtue to two larger bars, each half an inch ſquare, $10\frac{1}{2}$ inches in length, and weighing nearly ten ounces and twelve penny weights, to ſuch a degree, that one of them lifted, by one of its ends, ſeventy-nine ounces and nine pennyweights: and a flat ſemicircular ſteel *magnet,* weighing an ounce and thirteen pennyweights, was made to lift, by applying its two ends together to an iron wedge, ninety Troy ounces. The ſame ingenious gentleman could alſo readily deprive his bars of their virtue; and change the poles of a natural loadſtone, by placing it in an inverted direction, between the contrary poles of his larger bars, laid down at ſome diſtance from each other, in the ſame ſtraight line continued at the diſtance of about a quarter of an inch from either of the poles, without touching the ſtone with either of the bars.

The method in which the ſteel he made uſe of was hardened is as follows: having cut a ſufficient quantity of the leather of old ſhoes into very ſmall pieces, an iron pan is provided, which a little exceeds the length of a bar, is wide enough to admit of two bars ſide by ſide without touching each other on the pan, and at leaſt an inch deep. This pan is nearly half filled with the bits of leather, upon which are laid the two bars, having faſtened to the end of each a ſmall wire for taking them out: the pan is then quite filled with the leather, and placed on a gentle flat fire, being covered and ſurrounded with charcoal. The pan being brought to ſomewhat more than a red heat, is kept about half an hour, and the bars are ſuddenly quenched in a large quantity of cold water. Mr. Horne, in his Eſſays on Iron and Steel, p. 147. claims the merit of directing this proceſs for hardening Mr. Canton's bars. Artificial *magnets* are preferable to the natural ones in a variety of reſpects. Mr. Michell mentions particularly, that they may be had at much leſs expence and trouble, and in greater plenty; that they are much ſuperior to natural *magnets* in ſtrength, and better able to communicate the magnetic virtue in proportion to their ſtrength; that they are more eaſily reſtored to their former ſtrength when they are at any time damaged; that they furniſh ſeveral poles; and that they may be had in every form.

MAGNETICAL *amplitude* and *azimuth.* See AMPLITUDE and AZIMUTH.

MAGNETICAL *line,* is that line in which a needle would place itſelf, if left at entire liberty to turn itſelf as well vertically, as horizontally.

MAGNETICAL *meridian,* in *Navigation.* See MERIDIAN.

MAGNETICAL *needle,* in *Navigation,* &c. See NEEDLE.

MAGNETIS *lapis,* in the *Natural Hiſtory of the Ancients,* the name given in different ages to two very different ſubſtances. The earlieſt Greek authors expreſſed by it the loadſtone, which became afterwards called *Heraclius lapis*; and then the word *magnes* was applied to a very different ſtone brought from the ſame place, the neighbourhood of Magneſia in Lydia.

This was a fine beautiful and bright ſubſtance, of a pure white, and ſo very bright and gloſſy, as to bear a reſemblance to poliſhed ſilver. It was dug in large maſſes, and was of a texture capable of being wrought into any figure. Accordingly it was in great eſteem among the ancients, who had it wrought into veſſels for the uſe of the table.

It ſeems to be wholly unknown at preſent among the nations we have commerce with. Hill's Theophraſt. p. 79.

MAGNETISM, MAGNETISMUS, that quality or conſtitution of a body, and its pores, whereby it is rendered *magnetical,* or a *magnet.*

Magnetiſm is found to be a tranſient power, capable of being produced and deſtroyed again.

MAGNETISM, *the laws of,* are laid down by Mr. Whiſton in the following propoſitions.—1. The *loadſtone* has both an attractive and a directive power united together: whereas iron touched by it has only the former; i. e. the *magnet* not only attracts needles, or filings of ſteel, but directs them to certain different angles, with reſpect to its own ſurface and axis: whereas iron, touched with it, does little or nothing more than attract them; ſtill ſuffering them to lie along or ſtand perpendicular to its ſurface and edges in all places; without any ſuch ſpecial direction.

2. Neither the ſtrongeſt nor the largeſt *magnets* give a better directive touch to the needles than thoſe of a leſs ſize or virtue: to which it may be added, that whereas there are two qualities in all *magnets,* an attractive and a directive one, neither of them depend on, or are any argument of the ſtrength of the other.

3. The attractive powers of *magnets,* and of iron, will greatly increaſe or diminiſh the weight of needles on the balance; nay, it will overcome that weight, and ſuſtain other additional weights too: while the directive power has a much ſmaller effect. Gaſſendus, indeed, as well as Marſennus and Dr. Gilbert, maintain, it has none at all: but by miſtake; for Mr. Whiſton found, from repeated trials on large needles, that after the touch they weighed leſs than before. One of $4584\frac{1}{8}$ grains, loſt $2\frac{5}{8}$ grains by the touch; and another of 65726 grains weight, no leſs than 14 grains.

4. It is probable, that iron conſiſts almoſt wholly of the attractive particles; and the *magnet* of the attractive and directive together; mixed, probably, with other heterogeneous matter; as having never been purged by the fire, which iron has; and hence may ariſe the reaſon why iron, after it has been touched, will lift up much greater weight than the *loadſtone* that touched it.

5. The quantity and direction of *magnetic* powers, communicated to needles, is not properly, after ſuch communication, owing to the *magnet* which gave the touch, but to the goodneſs of the ſteel that receives it, and to the ſtrength and poſition of the terreſtrial *loadſtone* whoſe influence alone thoſe needles are afterwards ſubject to, and directed by; ſo that all ſuch needles, if good, move with the ſame ſtrength, and point to the ſame angles, what *loadſtone* ſoever (provided it be good) they have been excited by. Nor does the touch ſeem to do much more in *magnetical* than attrition does in electrical caſes; i. e. it ſerves to rub off ſome obſtructing particles, that adhere to the ſurface of the ſteel, and open the pores of the body touched, and ſo make for the entrance and exit of ſuch effluvia as occaſion or aſſiſt the powers we are

ſpeaking of. Hence Mr. Whiſton takes occaſion to obſerve, that the directive power of the *loadſtone* ſeems to be mechanical; and to be derived from *magnetic* effluvia, circulating continually round it.

6. The abſolute attractive power of different armed *loadſtones* is, *cæteris paribus*, according to the quantity, not of their diameters or ſolidities, but of the ſurfaces of the *loadſtones*; or in a duplicate proportion of their diameters.

7. The power of good *magnets* unarmed, not ſenſibly different in ſtrength, ſimilar in figure and poſition, but unequal in magnitude, is ſometimes a little greater, ſometimes a little leſs, than in the proportion of their ſimilar diameters.

8. The *loadſtone* attracts needles that have been touched, and others that have not been touched, with equal force at diſtances unequal; viz. where the diſtances are to one another as 5 to 2.

9. Both poles of a *loadſtone* equally attract needles, till they be, though roughly, touched; then it is, and then only, that one pole begins to attract one end, and repel the other: though the repelling pole will ſtill attract upon contact, nay, at very ſmall diſtances, notwithſtanding.

10. The attractive power of *loadſtones*, in their ſimilar poſition to, but different diſtances from, *magnetic* needles, is in the ſeſquiduplicate proportion of the diſtances of their ſurfaces from their needles reciprocally; or as the mean proportionals between the ſquares and the cubes of thoſe diſtances reciprocally; or as the ſquare roots of the fifth powers of thoſe diſtances reciprocally. Thus the *magnetic* power of attraction, at twice the diſtance from the ſurface of the *loadſtone*, is between a fifth and ſixth part of that power at the firſt diſtance; at thrice the diſtance, the power is between the fifteenth and ſixteenth part; at four times the diſtance, the power is thirty-two times as ſmall; and at ſix times the diſtance, eighty-eight times as ſmall. Where it is to be noted, that the diſtances are not taken as in the laws of gravity, from the centre; but from the ſurface: all experience aſſuring us, that the *magnetic* power reſides chiefly, if not wholly, in the ſurfaces of the *loadſtones* and iron; without any particular relation to any centre at all. The proportion here laid down was determined by Mr. Whiſton, from a great number of experiments of Mr. Hauſkbee. Dr. Brook Taylor, and himſelf. The force they meaſured by the chords of thoſe arcs, by which the *magnet*, at ſeveral diſtances, draws the needle out of its natural direction, to which chords (as he has demonſtrated) it is ever proportional. The numbers in ſome of their moſt accurate trials he gives us in the following table; ſetting down half the chords, or the ſines of half thoſe arcs of declination, as the true meaſures of the power of *magnetiſm*.

Diſtance in inches.	*Degrees of inclination.*	*Sines of ½ arcs.*	*Rat. ſeſquidupl.*
20	2	175	466
$14\frac{8}{9}$	4	349	216
$13\frac{5}{8}$	6	523	170
$12\frac{3}{8}$	8	697	138
$11\frac{1}{8}$	10	871	105
$10\frac{1}{4}$	12	1045	87
$9\frac{1}{4}$	14	1219	70

Sir Iſaac Newton, ſuppoſes magnetic attraction to decreaſe nearly in the triplicate ratio of the diſtance: Mr. Martin obſerves, that the power of his loadſtone decreaſes in the ſeſquiduplicate ratio of the diſtances inverſely. Dr. Helſham found it to be as the ſquares of the diſtances inverſely, which ratio agrees with that of the ingenious Mr. Michell: others, as Dr. Brook Taylor and Mr. Muſchenbroek, are of opinion, that this power follows no certain ratio at all, but that it is much quicker at greater diſtances than at ſmall ones, and that it is different in different ſtones. See *Phenomena of the* MAGNET, Nº 4.

11. An inclinatory, or dipping-needle, of ſix inches radius, and of a priſmatic, or cylindric figure, when it oſcillates along the *magnetic* meridian, performs there every mean vibration in about $6''$ or $360'''$; and every ſmall oſcillation in about $5\frac{1}{2}''$, or $330'''$; and the ſame kind of needle, four feet long, makes every mean oſcillation in about $24''$, and every ſmall one about $22''$.

12 The entire power of *magnetiſm* in this country, as it affects needles a foot long, is to that of gravity nearly as 1 to 300; and as it affects needles four feet long, as 1 to 600.

13. The quantity of *magnetic* power accelerating the ſame dipping needle, as it oſcillates in different vertical planes, is ever as the co-ſines of the angles made by thoſe planes, and the magnetic meridian, taken on the horizon.

Thus if we would eſtimate the quantity of forces in the horizontal and vertical ſituations of needles at London, we ſhall find, that the latter, in needles a foot long, is, to the entire force along the *magnetic* meridian, as 96 to 100; and in needles four feet long, as 9667 to 10000: whereas in the former, the entire force in needles a foot long, is as 28 to 100; and in thoſe four feet long, as 2569 to 10000.

Whence it follows, that the power by which horizontal needles are governed in theſe parts of the world, is but one quarter of the power by which the dipping needle is moved.

Hence, alſo, ſince the horizontal needle is moved only by a part of the power which moves the dipping-needle; and that it only points to a certain place in the horizon, becauſe that place is the neareſt its original tendency of any its ſituation will allow it to tend to; whenever the dipping needle ſtands exactly perpendicular to the horizon, the horizontal needle will not reſpect one point of the compaſs more than another, but will wheel about every way uncertainly.

14. The time of oſcillation and vibration, both in dipping and horizontal needles equally good, is as their length directly; and the actual velocity of their points along their arcs is always equal.

Hence *magnetic* needles are, *cæteris paribus*, ſtill better, the longer they are; and that in the ſame proportion with their length.

15. The earth on which we live, includes within it a vaſt ſpherical *magnet*, concentrical thereto, having its own poles, meridians, equator, and parallels; and all much of the ſame general nature of thoſe with ſmall *terrellæ* or ſpherical *loadſtones*, in the poſſeſſion of the curious among us.

16. The power of a good *terrella*, or a ſpherical *loadſtone*, as it affects a needle a foot long, is equal to the *magnetic* power of that internal *loadſtone* about two and a half, or three diameters of ſuch *loadſtone*. From which conſideration, the quantity of *magnetic* attraction, at all diſtances from the internal *loadſtone*, for needles a foot long, may be determined; and from the ſame conſideration it appears, that the diameter of this internal *loadſtone* is about eleven hundred and fifty miles. To which we add, that, in regard ſir Iſaac Newton has demonſtrated, that the power of gravity diminiſhes within the earth, and is leſs there than at its ſurface, nearly in the proportion of its greater nearneſs to the centre, the *magnetic* power, at two thouſand nine hundred miles diſtance from us, and nearly one thouſand and ſixty from the earth's centre, which is $\frac{10}{24}$ of the power of gravity here, will be ſomewhat greater than the power of gravity there: which limit is worthy our attention, gravity being ſtronger than *magnetiſm* on the one ſide of it, and weaker on the other; we mean, as it affects needles of one foot diameter. At that limit, therefore, at leaſt near the *magnetic* poles, iron a foot long will be twice as heavy, and fall twice as faſt, as any other natural body, viz. by the union of thoſe two equal powers, gravity and *magnetiſm*; and of conſequence, above that limit, ſuch an iron will be leſs than twice as heavy, below it more than twice as heavy, as any other natural body.

17. The earth's internal *loadſtone* is not fixed to our upper parts, but is moveable with reſpect to them, and actually revolves on the earth's axis, from eaſt to weſt, in a certain long period of time; as appears beyond contradiction, from the conſtant variation of the horizontal needle weſtward; as well as the regular increaſe of inclination of the dipping needle.

The only way to render this motion, i. e. the variation, poſſible and intelligible (to uſe Dr. Halley's words), is to ſuppoſe it to turn about the centre of a globe, having its centre of gravity fixed and immoveable in the ſame common centre of the earth. This moveable internal ſurface muſt likewiſe be looſe, and detached from the external part of the globe, which may be reckoned the ſhell, and the other the nucleus, or inner globe, included within it, with a fluid medium between. Now, from the variation's moving weſtward, it is plain, that the foreſaid nucleus has not preciſely attained the ſame degree of velocity with the exterior parts in their diurnal revolution: but ſo nearly equals it, that in three hundred and ſixty-five revolutions, the difference is ſcarce ſenſible; and muſt probably have ariſen from hence, that the impulſe, whereby the diurnal motion was impreſſed on the earth, was given to the external parts, and thence communicated to the internal.

18. This internal *magnet* has one central pole northward, in the nature of the poles of our common *loadſtones*; but its ſouthern pole appears not to be central, but rather circular, and that at a great diſtance from the ſouthern pole of the earth.

19. The northern *magnetic* pole is now ſituate, ſays Mr. Whiſton, about the latitude of 76 degrees ½; i. e. thirteen degrees ½ from the north pole of the earth, and about 30 degrees eaſtward from the meridian of London.

20. The ſouthern *magnetic* circular pole has its centre, or central pole, nearly in the parallel of 60 degrees; and, in a meridian paſſing along the eaſt coaſt of Borneo, about 117 degrees eaſtward of London. Its radius is alſo an arc of a great circle of about 44 degrees.

21. The reſpective motion of the internal *magnet*, or the velocity, v. g. of its north pole, appears to be 27 deg. 0 min. in 144 years, *i. e.* upwards of one degree in five years; ſo that it makes an entire revolution in 1920 years.

Hence, as the number of degrees in the upper earth's diurnal revolution is to the number of days in the revolution of the internal *magnet*, i. e. as 1 is to 700000, ſo is the reſpective motion of this *magnet* from eaſt to weſt; to the real motion of the upper earth from weſt to eaſt; or, to ſpeak ſtrictly, ſo is the difference of their motions from weſt to eaſt to the entire motion of the upper earth the ſame way. This external fixed earth has therefore communicated almoſt all its motion already to the internal *magnet*; and can communicate no more than this difference of their motion, and that only in an infinite term of years; or, in other words, this real internal motion can never be the ſeven hundred thouſandth part ſwifter than it is at preſent. This internal motion, therefore, began with the commencement of the diurnal motion of the upper earth; and has gone on ſtill faſter and faſter by the communication of that motion through the intermediate fluid. Since, therefore, action and re-action are equal, and tend to contrary parts, this internal *loadſtone*, thus accelerated by the upper part, muſt have all along retarded that upper earth, and made the diurnal rotation ſtill ſlower and ſlower. This acceleration on one ſide, and retardation on the other, muſt have been very great at the firſt beginning of the diurnal motion, when the difference of their motion was equal to the entire motion itſelf, and muſt have been diminiſhing ever ſince. To which cauſe is probably owing that acceleration of the moon's motion with reſpect to that of the earth, ſince the time of the old aſtronomers, firſt taken notice of by Dr. Halley, and embraced by ſir Iſaac Newton. And the ſame conſideration ſeems to ſuggeſt a method for determining the age of the world; for, were the proportions of the quantity of matter in the upper earth to the internal *magnet*, with the tenacity of the intermediate fluid, &c. known, one might go back from the known difference of their velocity now, and find thoſe differences and quantities of motion themſelves, *à priori*, in all paſt ages; or, were the velocity of the firſt diurnal rotation of the upper earth known, we might geometrically determine, *à priori*, how long ago that rotation began, or how ancient our earth is.

22. The variation of *magnetic* needles from the azimuth of the meridians of the internal *magnet* is derived from the difference of the ſtrength of the ſeveral parts of the internal magnet's ſurface; which as it is only to be known by experience, that variation cannot be determined beforehand, unleſs where there are good accounts how much it had formerly been; it being probable, that it returns round, and will be the ſame in any year of the next revolution of the internal *magnet*, that it has been in the like year of any former revolution, or will itſelf have a revolution in about 1920 years.

23. The two fixed *magnetic* poles in our upper earth firſt introduced by Dr. Halley, as neceſſary to ſolve the irregularity of the variation of the horizontal needle from the meridians of the moveable internal *magnet*, ſeem not to have any juſt foundation in nature, the like irregularities being found in the common *terrellæ*, or ſpherical *loadſtones*, and being beſt accounted for from the compoſition of the *magnets*, which are found to have parts of different degrees of purity, ſtrength and perfection; ſo that where the parts are weaker than ordinary, the ſtronger neighbouring parts prevail, and draw the needle that way: not but Dr. Gilbert's notion of prominent and depreſſed parts on *magnets* may have ſome room, and be allowed to contribute ſomewhat to ſuch variations. See VARIATION.

MAGNETISM, *for the cauſe of*, or the manner in which theſe phenomena of the *magnet* are produced, we have yet no hypotheſis that will ſatisfactorily account for them. Plutarch tells us, the *magnet* attracts iron, by emitting ſome ſpiritual effluvia, whereby the contiguous air being opened and driven on either ſide, does again drive that contiguous to it; and thus the action being communicated round, the iron is thereby protruded; but this is contradicted by the equally vigorous action of the *loadſtone* in vacuo, and in the open air. Others of the ancients aſcribe the action of a *magnet* to a ſoul that animates it; and others to an unknown ſympathy between the effluvia of the iron and thoſe of the *magnet*.

An opinion that has much prevailed among the moderns is that of Des Cartes, maintained by Malebranche, Rohault, Regis, &c. and even admitted and confirmed by Mr. Boyle, &c. In this it is ſuppoſed, that there is continually flowing, from the poles of the world, a ſubtile, impalpable, and inviſible matter, channelled or ſtriated: which matter, circulating round the earth, in the planes of the meridians, re-enters at the pole, oppoſite to that from which it iſſued, and paſſes again through the poles parallel to its axis: that the *magnet* has two poles anſwerable to thoſe of the earth; and that out of theſe there iſſues a matter like that juſt mentioned; and that this matter, entering at one of the poles, gives the impulſe whereby iron tends to the *magnet*, and produces what we call *attraction*. Now, beſides the *magnetical* matter re-entering the poles of the *magnet*, there is always a certain quantity thereof circulating round the *magnet*, compoſing a kind of vortex about it. The ſpace wherein this matter moves, is the ſphere of activity of the *magnet*, within which its attractive faculty is confined.

Dr. Gilbert, in his work De Magnete, folio, printed 1600, concludes, from ſome experiments which he made, that the needle is not attracted by the *magnet*, but turned into its poſition, by what he calls a diſponent virtue; which he ſuppoſed to ſurround the ſtone, ſomewhat in form of an atmoſphere.

As to its directive faculty, or the inclination of a needle touched with it to the poles of the world, and its dip to a point beneath the horizon, they follow from the ſame principle; ſince were the *magnet* or needle to have any other ſituation, the *magnetic* matter will ſtrike on its other ſurface in vain; and, not being able to get admiſſion, would, by degrees, change its ſituation, till ſuch time as its pores correſponded to the courſe of the *magnetical* matter; which ſituation having once acquired, it would ceaſe to move, the *magnetical* matter then ceaſing to diſturb it.

The form or eſſence of a *magnet* therefore is ſuppoſed to conſiſt in its being perforated by an infinite number of parallel pores; ſome whereof are diſpoſed to admit the ſtriated matter from the north pole of the world, others that of the ſouth: hence the north and ſouth poles of the *magnet*.

Mr. Hartſoeker maintains, that the *magnet* is no more than a common ſtone, full of an infinite number of hollow priſms; which by the diurnal motion of the earth, are ranged parallel to each other, and nearly parallel to the axis of the earth. Theſe priſms have their cavities filled with an extremely ſubtile matter, which, by the diurnal motion of the earth, is paſſed from priſm to priſm; thus making a circulation, and returning into the priſms where it firſt began. From theſe principles he deduces all the phenomena of the *magnet*; and M. Andry does the ſame, from the doctrine of alkali and acid.

For the directive power of the *magnet*, Mr. Whiſton, from the firſt, ſecond, third, &c. laws of *magnetiſm*, inclines to think it mechanical; and aſcribes it to *magnetic* effluvia circulating continually round the *loadſtone*; of which circulations, he thinks, there are evident indications in *magnetic* experiments; as Mr. Boyle thinks there are of the *magnetiſm*, or *magnetic* effluvia of the earth; tho' theſe effluvia are never yet rendered ſenſible, as electric effluvia began to be in his time. But the attractive power Mr. Whiſton thinks entirely immechanical, as the power of gravity is; not being able to deviſe any ſuch motion of a ſubtile fluid belonging to the *loadſtone*, as will account for the attractive power in the ſeſquiduplicate proportion of the diſtances reciprocally; though if he could, yet would that be no more than to remove the immediate power of the Supreme Being one ſtep farther; the laſt reſort of all mechanical principles whatever being in the immechanical power and efficacy of the Deity.

Dr. Knight deduces from ſeveral experiments the following propoſitions, which he offers not ſo much to explain the nature of the cauſe of *magnetiſm*, as the manner in which it acts; the *magnetic* matter of a *loadſtone*, he ſays, moves in a ſtrain from one pole to the other internally, and is then carried back in a curve line externally, till it arrive again at the pole where it firſt entered, to be again admitted: the immediate cauſe why two or more *magnetical* bodies attract each other, is the flux of one and the ſame ſtream of *magnetical* matter thro' them: and the immediate cauſe of *magnetic* repulſion is the conflux and accumulation of the magnetic matter. Phil. Tranſ. vol. xliv. p. 665, &c. Mr. Michell rejects the notion of a ſubtle fluid, but though he propoſed to publiſh a theory of *magnetiſm* eſtabliſhed by experiments, no ſuch theory has appeared. Signior Beccaria, from obſerving that a ſudden ſtroke of LIGHTNING gives polarity to *magnets*, conjectures, that a regular and conſtant circulation of the whole maſs of the electric fluid from north to ſouth may be the original cauſe of *magnetiſm* in general. This current he would not ſuppoſe to ariſe from one ſource, but from ſeveral, in the northern hemiſphere of the earth: the aberration of the common centre of all the currents from the north point, may be the cauſe of the *variation* of the needle, the period of this declination of the centre of the currents may be the period of the variation, and the obliquity with which the currents ſtrike into the earth may be the cauſe of the dipping of the needle, and alſo why bars of iron more eaſily receive the *magnetic* virtue in one particular direction. Lettre dell' Elettriciſmo, p. 269. or Prieſtley's Hiſt. Elec. vol. i. p. 409, &c. For the principal properties, with reſpect to which *magnetiſm* and electricity differ from or reſemble each other, ſee ELECTRICITY.

MAGNETISM is alſo uſed, by ſome *Chemiſts*, to ſignify a certain virtue, whereby one thing becomes affected at the ſame time with another, either in the ſame, or in a different manner. This amounts to the ſame with what they otherwiſe call SYMPATHY.

MAGNIFYING, among *Philoſophers*, is chiefly uſed in ſpeaking of microſcopes, which are ſaid to *magnify* objects, that is, to make them appear bigger than they really are, though, in reality, they do not, nor can, *magnify* any object, but only ſhew it nearer, and diſcover more of its parts, than before were taken notice of.

The *magnifying* power of denſe mediums of certain figures was known to the ancients, though they were far from underſtanding the cauſe of this effect. Seneca ſays, that ſmall and obſcure letters appear larger and brighter through a glaſs globe filled with water; and he abſurdly accounts for it by ſaying, that the eye ſlides in the water, and cannot lay hold of its object. Nat. Queſt. lib. i. c. 6.

Alexander Aphrodiſienſis, the great commentator upon Ariſtotle, who flouriſhed near two centuries after Seneca, ſays, that the reaſon why apples appear large when they are immerſed in water is, that the water which is contiguous to any body is affected with the ſame quality and colour; ſo that the eye is deceived in imagining the body itſelf to be larger. But the firſt diſtinct account we have of the *magnifying* power of glaſſes is in the writings of Alhazen, who flouriſhed in the twelfth century; and he was preceded by our own countryman Roger Bacon, who, in his Opus Majus, demonſtrates, that if a tranſparent body interpoſed between the eye and an object be convex towards the eye, the object will appear magnified; nor is it improbable that from the obſervations of Alhazen and Bacon, the conſtruction of SPECTACLES was derived.

MAGNIFYING *glaſs*, in *Optics*, denotes a little ſpherical convex lens; which, in tranſmitting the rays of light, inflects them, ſo, as that the parallel ones become converging, and thoſe which were diverging become parallel; by means whereof, objects viewed through them appear larger than when viewed by the naked eye. See MICROSCOPE.

MAGNISSA, in *Mineralogy*, a name given by ſome of the ancients to the white pyrites, called by others *leucolithos* and *argytholithos*. See MARCASITE.

MAGNITUDE, any thing that has parts without (or *extra* to) parts connected together by ſome common term.

Magnitude is any thing locally extended, or continued; or that has ſeveral dimenſions.

The origin of all *magnitude* is a point, which, though void of parts itſelf, yet its flux forms a line, the flux of that a ſurface, and of that a body.

Magnitude amounts to much the ſame with what is otherwiſe called *quantity*.

MAGNITUDE, *geometrical*, may be uſefully conſidered as generated or produced by motion. Thus lines may be conceived as generated by the motion of points; ſurfaces, by the motion of lines; ſolids, by the motion of ſurfaces; angles may be ſuppoſed to be generated by the rotation of their ſides.

Geometrical magnitude is always underſtood to conſiſt of parts; and to have no parts, or to have no *magnitude*, are conſidered as equivalent in this ſcience. There is, however, no neceſſity for conſidering *magnitude* as made up of an infinite number of ſmall parts; it is ſufficient that no quantity can be ſuppoſed to be ſo ſmall, but it may be conceived to be farther diminiſhed; and it is obvious, that we are not to eſtimate the number of parts that may be conceived in a given *magnitude*, by thoſe which in particular determinate circumſtances may be actually perceived in it by ſenſe, ſince a greater number of parts become ſenſible, by varying the circuſtances in which it is perceived. See Mac-Laurin's Fluxions, art. 290, &c.

Many of late have ſuppoſed geometrical *magnitude* to be compoſed of infinitely ſmall parts, aindnfinite in number; and hence have raiſed many paradoxes and myſteries in a ſcience wherein there ought to be none. Nay, infinitely ſmall parts of infinitely ſmall parts, &c. *ad infinitum*, have been introduced without the leaſt neceſſity. See Mac-Laurin's Fluxions, in the Introduction, where he makes ſeveral remarks on Monſieur de Fontenelle's *Geometrie de l'Infini*. See EXTENSION.

MAGNITUDE, *literal*, denotes a *magnitude* expreſſed by letters.

MAGNITUDE, *numerical*, is that expreſſed by numbers.

MAGNITUDE, *broken*, denotes a fraction.

MAGNITUDE, *complex*, is that formed by multiplication.

MAGNITUDE, *incommenſurable*, is that which has no proportion to unity.

MAGNITUDE, *apparent*, of a body, in *Optics*, is that meaſured by the optic or viſual angle, intercepted between rays drawn from its extremes to the centre of the pupil of the eye. It is one of the fundamental maxims in this ſcience, that whatever things are ſeen under the ſame or equal angles, appear equal; and *vice verſa*.

The *apparent magnitudes* of an object at different diſtances, are in a ratio leſs than that of their diſtances reciprocally.

The *apparent magnitudes* of the two great luminaries the ſun and moon, at riſing and ſetting, are a phenomenon that has extremely embarraſſed the modern philoſophers. According to the ordinary laws of viſion, they ſhould appear the leaſt when neareſt the horizon, as being then fartheſt diſtant from the eye; and yet we find the contrary to be true in fact.

Thus, it is well known, that the mean *apparent magnitude* of the moon is 30′ 30″, in round numbers 30′, at a full moon in the midſt of winter, and when ſhe is in the meridian, and at her greateſt northern latitude, and conſequently at her utmoſt elevation above our horizon: it is alſo as well known, that when ſhe is in this ſituation, being looked upon by the naked eye, ſhe appears to be accommodating her *magnitude* to our ſenſible meaſures, about a foot broad. But when ſhe is looked upon as ſhe ariſes, ſhe appears to be three or four foot broad, and yet if we take her diameter with an inſtrument, both in the one ſituation and the other, we ſhall find that ſhe is only 30′.

Ptolemy, in his Almageſt, lib. i. cap. 3, has aſcribed this appearance to a refraction of the rays by vapours, which actually enlarge the angle under which the moon appears; juſt as the angle is enlarged by which an object is ſeen from under water; and his commentator Theon explains diſtinctly how the dilatation of the angle in the object immerſed in water is cauſed. But it was afterwards diſcovered, that there is no alteration in the angle: upon which another ſolution was ſtarted by the Arab Alhazen; and followed and improved by Vitellio, Kepler, Peckham, Rog. Bacon, and others. According to Alhazen, the ſight apprehends the ſurface of the heavens as flat, and judges of the ſtars as it would of ordinary viſible objects extended upon a wide plain; the eye ſees them under equal angles, but withal perceives a difference in their diſtances, and (on account of the ſemidiameter of the earth, which is interpoſed in one caſe, and not in the other) that it is hence induced to judge thoſe which appear more remote to be greater. Some farther improvement was made in this explanation by Mr. Hobbes, though he fell into ſome miſtakes in his application of geometry to this ſubject. For he obſerves, that this deception operates gradually from the zenith to the horizon; and that if the apparent arch of the ſky be divided into any number of equal parts, thoſe parts, in deſcending towards the horizon will gradually ſubtend a leſs and leſs angle; and he was the firſt who expreſsly conſidered the vaulted appearance of the ſky as a real portion of a circle. Des Cartes, and from him Dr. Wallis, and moſt other authors, account for the appearance of a different diſtance under the ſame angle, from the long ſeries of objects interpoſed between the eye and the extremity of the ſenſible horizon; which makes us imagine it more remote than when in the meridian, where the eye ſees nothing in the way between the object and itſelf. This idea of a great diſtance makes us imagine the luminary the bigger; for any object being ſeen under any certain angle, and believed at the ſame time very remote, we naturally judge it muſt be very large, to appear under ſuch an angle, at ſuch a diſtance. And thus a pure judgment of the mind makes us ſee the ſun, or the moon, bigger in the horizon than in the meridian; notwithſtanding their images painted on the retina are really leſs in the former ſituation than the latter.

James Gregory, Geom. Par. Univerſ. p. 141. ſubſcribes to this opinion: Father Malebranche alſo, in the firſt book of his Recherche de la Verité, printed in 1673, has explained this phenomenon almoſt in the expreſſion of Des Cartes: and Huygens, in his Treatiſe on the Parhelia, tranſlated by Dr. Smith, Optics, art. 536, has approved, and very clearly illuſtrated the received opinion. The cauſe of this fallacy, ſays he, in ſhort, is this; that we think the ſun, or any thing elſe in the heavens, to be remoter from us, when it is near the horizon, than when it approaches towards the vertex, becauſe we imagine every thing in the air that appears near the vertex to be no farther from us than the clouds that fly over our heads; whereas, on the other hand, we are uſed to obſerve a large extent of land lying between us and the objects near the horizon, at the far end of which the convexity of the ſky begins to appear; which, therefore, with the objects that appear in it, is uſually imagined to be much farther from us. Now when two objects of equal magnitudes appear under the ſame angle, we always judge that object to be larger which we think is remoter. And this is the true cauſe of the deception we have been ſpeaking of. It is a wonder that an hypotheſis ſo rational as this ſhould ever loſe its credit, after having been maintained by writers of reputation, and for a great number of years. But it was generally imagined, that the actual perception of thoſe objects which divide the ſpace that is intercepted betwixt the eye and the horizon was neceſſary, in order to its ſuggeſting the idea of its extraordinary diſtance: and thus philoſophers were led to form much more objectionable ſolutions of the phenomenon. Accordingly Gaſſendus was of opinion, that the pupil of the eye, which is always more open as the place is more dark; being more ſo in the morning and evening than at other times, by reaſon the earth is covered with groſs vapours; and beſides, being obliged to paſs through a longer column or ſeries of vapours to reach the horizon; the image of the luminary enters the eye at a greater angle, and is really painted there larger at the former times than the latter. In anſwer to which it may be ſaid, that, notwithſtanding this dilatation of the pupil, occaſioned by the obſcurity, if the moon be viewed through a little pin-hole made in a paper, ſhe appears leſs when in the horizon than in the meridian. Nor can any thing be more abſurd than the poſition of Gaſſendus, who aſſerts, that a dilated pupil magnifies an object for the ſame reaſon as a convex glaſs does.

F. Gouye advances another hypotheſis, which is, that when the luminaries are in the horizon, the neighbourhood of the earth, and the groſs vapours wherewith they then appear enveloped, have the ſame effect with regard to us, as a wall, or other denſe body, placed behind a column; which, in that caſe, appears bigger than when inſulate, and encompaſſed on all ſides with an illumined air. Farther, it is obſerved, that a column, when fluted, appears bigger than before, when it was plain; the flutes being ſo many particular objects, which, by their multitude, occaſion the mind to imagine the whole object, whereof they are compoſed, of a larger extent. The ſame thing may be ſaid of the ſeveral objects ſeen towards the horizon, to which the ſun or moon correſpond at their riſing and ſetting. And hence it is, that they appear larger ſtill, when they riſe or ſet between trees; the narrow, yet diſtinct, intervals whereof have the ſame effect with regard to the apparent diameter of the luminary, as a greater number of flutes with regard to the ſhaft of a column.

Biſhop Berkeley ſuppoſed, that the moon appears larger near the horizon, becauſe her appearance is then fainter, and her beams affect the eye leſs; but this hypotheſis is refuted by Dr. Smith. Mr. Robins has recited ſome other opinions on this ſubject, Math. Tracts, vol. ii. p. 242. The commonly received opinion has been diſputed not only by F. Gouye, who obſerves, Acad. Par. 1700, p. 11, that the horizontal moon appears equally large acroſs the ſea, where there are no objects to produce the effect aſcribed to them; but alſo by Mr. Molyneux, who ſays, Phil. Tranſ. abr. vol. i. p. 221. that if this hypotheſis be true, we may at any time increaſe the apparent magnitude of the moon, even in the meridian; for, in order to divide the ſpace between it and the eye, we need only to look at it behind a cluſter of chimnies, the ridge of a hill, or the top of a houſe. He alſo makes the ſame obſervation with F. Gouye above mentioned, and farther obſerves, that when the height of all the intermediate objects is cut off, by looking through a tube, the imagination is not helped, the moon being ſtill conceived to be as large as before. However, Mr. Molyneux advances no hypotheſis of his own. Dr. Deſaguliers has well illuſtrated the doctrine of the horizontal moon, Phil. Tranſ. abr. vol. viii. p. 130, upon the ſuppoſition of our imagining the viſible heavens to be only a ſmall portion of a ſpherical ſurface, and conſequently ſuppoſing the moon to be farther from us in the horizon than near the zenith, and by ſeveral ingenious contrivances he demonſtrated how liable we are to ſuch deceptions. But the moſt complete illuſtration of this curious ſubject is given us by Dr. Smith. The cavity of the heavens, he ſays, appears to the eye, which is the only judge of an apparent figure, to a leſs portion of a ſpherical ſurface than a hemiſphere. In other words, the centre of the concavity is much below the eye, and by taking a medium among ſeveral obſervations, he found that the apparent diſtance of its parts at the horizon was generally between three or four times greater than the apparent diſtance of its parts over head. This he determined by meaſuring the actual height of ſome of the heavenly bodies, when, to his eye, they ſeemed to be half way between the horizon and the zenith. In this caſe their real altitude was only twenty-three degrees. When the ſun was but 30° high, the upper arch always appeared leſs than the under, and he thought that it was always greater when the ſun was about 18° or 20° high. Mr. Robins, in his Tracts, vol. ii. p. 245. ſhews how to determine the apparent concavity of the ſky in a more accurate and geometrical manner; by which it appears, that if the altitude of any of the heavenly bodies be 20° at the time when it ſeems to be half way between the horizon and the zenith, the horizontal diſtance will be hardly leſs than four times the perpendicular diſtance; but if that altitude be 28°, it will be little more than two and a half. Dr. Smith having determined the apparent figure of the ſky, is able to give a ſatisfactory explanation of the phenomenon of the horizontal moon, and other ſimilar appearances in the heavens. For ſuppoſing the arc A B C, *Tab.* III. *Optics, fig.* 43, to repreſent that apparent concavity, he found that the diameter of the ſun and moon would ſeem to be greater in the horizon than at any propoſed altitude, meaſured by the angle A O B, in the proportion of its apparent diſtances O A, O B. The numbers that expreſs theſe proportions he reduced into the following table, anſwering to the correſponding altitudes of the ſun or moon, which are alſo exactly repreſented to the eye in the figure, in which the moon, placed in the quadrantal arc F G, deſcribed about the centre O, are all equal to each other, and repreſent the body of the moon in the heights there noted, and the unequal moons in the concavity A B C are terminated by the viſual rays that come from the circumference of the real moon, at thoſe heights to the eye, at O. The diameters of theſe unequal moons at A and B do, therefore, bear the ſame proportion to each other, as their apparent diſtances O A, O B; and they muſt appear in the ſame proportion that they really have in this concave, becauſe we judge all objects in the heavens to be in this ſurface: ſo that the appearance to the eye is exactly the ſame, as if ſeveral moons were painted upon a real ſurface A B C in the proportions here aſſigned; in which caſe we ſhould certainly judge the real magnitudes of the larger paintings of the lower moon to be really larger, though the viſible *magnitudes* of them all, anſwering to their equal images upon the retina, were exactly equal. For the ſame reaſon Dr. Smith obſerves, that all the objects and diſtances of ſtars in the heavens, as well as the ſun and moon, muſt ſeem to be greater in the horizon than in higher ſituations; which is known to be the caſe. He alſo obſerves, that the apparent concave of the ſky being leſs than an hemiſphere, is the cauſe that the breadths of the colours in the inward and outward rainbows, and the interval between the bows appear leaſt at the top, and greater at the bottom; and by an eſtimate of the apparent breadths of the inward rainbow, at two different heights, made by a friend, he determined the apparent concavity of the ſky to be much the ſame as by the former methods. See HALO. This theory of the horizontal moon is alſo confirmed by the appearances of the tails of comets, which, whatever be their real figure, *magnitude*, and ſituation in abſolute ſpace, do always appear to be an arc of the concave ſky; and in farther confirmation of it, he gives us Mr. Cotes's explanation of the optical appearance of a remarkable meteor ſeen in the year 1716. Beſides the general cauſe above ſtated of the appearance of the horizontal moon, Dr. Smith acknowledges, that, at different times, the moon appears of different magnitudes even in the ſame horizon, and occaſionally of an extraordinary large ſize. This, he is inclined to believe, is chiefly owing to an extraordinary largeneſs of her picture upon the retina, which, in the preceding general theory, was ſuppoſed to be invariable. This, he ſays, might beſt be examined by taking the diameter of the moon with a micrometer, or by noting the year and day of the month, together with the heights of the barometer and thermometer. For if it ſhould appear, by many ſuch obſervations, that the largeſt horizontal moons generally happen at her perigee, in the warmeſt ſummer evenings, the barometer being low, and the thermometer high; ſince theſe cauſes are independent of one another, and all conſpire to enlarge the picture of the moon, we may reaſonably conclude that theſe extraordinary moons are chiefly owing to the concurrence of

The ſun or moon's altitude in degrees.	Apparent diameter or diſtances.
00	100
15	68
30	50
45	40
60	34
75	31
90	30

of theſe circumſtances. But ſince the difference in the apparent magnitude of the moon is not increaſed $\frac{1}{10}$th part of the whole in conſequence of her being in her perigee, and the enlargement of the image in all the other caſes here mentioned is very inconſiderable, it is probable that when the moon is imagined to be ſo much larger than uſual, the imagination is farther impoſed upon by ſome circumſtances which have not been attended to. Smith's Optics, vol. i. p. 63, &c. Remarks, p. 53.

MAGNOLIA, in *Botany*. See *Laurel-leaved* Tulip-*tree*.

MAGNUM *os carpi*. This is the third bone of the ſecond row in the carpus, and is the largeſt of all the bones of that part. It is of a conſiderable length, and has a kind of articular round head, which is received into the cotyloid cavity formed by the two firſt bones of the firſt row; and this articulation is capable of a ſmall degree of flexion and extenſion. The digital ſide is a cartilaginous baſis unequally and obliquely triangular, the apex being turned inward. It is articulated with the ſecond metacarpal bone, and is alſo a little notched on the radial edge for its articulation with the ſmall edge of the metacarpal bone. The radial ſide is very ſmall, and near the baſis, being articulated with the os pyramidale; the reſt of this ſurface is without cartilage; the cubital ſide is double, anſwering to a like ſide in the os unciforme with which it is articulated. The outer ſurface, which forms a part of the outer ſurface of the carpus, is broad, rough, and uneven, for the inſertion of ligaments; the inner ſurface is likewiſe rough, but narrower, and round both ſurfaces are ſeveral depreſſions, which, while the bone is in the body, are filled with ſmall glands, ligaments, &c. Winſlow's Anatomy, p. 84.

• MAGODUS, among the Romans, a name given to thoſe players who ſometimes acted the part of men, and ſometimes of women: the word is derived from μαγος, *magic*, and ωδος, *ſinger*, and properly denotes thoſe players who performed extraordinary feats and geſtures.

MAGOPHONIA, formed from μαγος, *magus*, and φονος, *ſlaughter*, the name of a feaſt among the ancient Perſians, held in memory of the expulſion of the Magians.

The Magus Smerdis having uſurped the throne of Perſia, upon the death of Cambyſes, 521 years before Jeſus Chriſt, ſeven of the principal lords of the court conſpired to drive him out of it. Their deſign was executed with good ſucceſs: Smerdis, and his brother, another Magus, called Patizithes, were killed. Upon which the people alſo roſe, and put all the Magi to the ſword; inſomuch that there would not one have eſcaped, had not night come upon them. Darius, ſon of Hyſtaſpes, was then elected king: and, in memory of this maſſacre of the Magi, a feaſt was inſtituted, ſays Herodotus, called *Magophonia*. See Magi.

MAGPYE, in *Ornithology*, a well known ſpecies of the Corvus, or the *corvus pica*, in the Linnæan ſyſtem. The colours of this bird are remarkable: its beak, white, green, and purple, and the rich and gilded combination of the gloſſes on the tail are at leaſt equal to thoſe that adorn the plumage of any other: it feeds on worms, inſects, and ſmall birds, and will deſtroy young chickens; it is a crafty, reſtleſs, noiſy bird, called by Ovid *nemorum convicia pica*. This bird is eaſily tamed, and may be taught to imitate the human voice; its neſt is entirely covered with thorns, exept one ſmall hole for admittance; it lays ſix or ſeven eggs, of a pale green colour ſpotted with brown. Pennant.

MAGRA, a word uſed by ſome writers for a ſort of red earth, and by others for the cornelian, the red jaſper, or any other ſtone of a red colour.

MAGUDARIS, a name by which Dioſcorides calls the SILPHIUM.

MAGYDARIS, in *Botany*, a name uſed by Theophraſtus, and other of the old authors, for the laſerpitium or LASERWORT.

MAHALEB, in the *Materia Medica*, the name of the fruit of a ſort of wild CHERRY called *ceraſus ſylveſtis amara*, or the wild bitter cherry, by Bauhine. The wood of the tree is of a greyiſh caſt, and fine grain, with a mixture of red in the veins, and is very firm, and of a ſweet ſmell, and uſed by the French in making cabinets; the leaves and flower carry a rude reſemblance of thoſe of the common cherry; the fruit is round, black, and reſembles a cherry, having the ſame ſort of ſtone in it, the kernel of which is like the bitter almond in taſte. It is commended in external applications, and the perfumers of France uſe it in their waſhballs. It is to be choſen freſh and ſweet, for it very often has an intolerable ſtinking ſmell, like that of bugs.

MAHERNIA, in *Botany*, a genus of the *pentandria pentagynia* claſs: the characters of which are, that the calyx is dentated into five horizontal points, that it has five petals, and five heart-ſhaped nectaria, and the fruit is a capſule with five cells. There are two ſpecies.

MAHIE, the name given by the inhabitants of Otaheite, or George's iſland, to their BREAD-FRUIT when made into a kind of four paſte, which, in conſequence of having undergone a fermentation, will keep a conſiderable time, and ſupply them with food when no ripe fruit is to be had. When therefore they ſee a great ſhew of new fruit on the trees, they ſtrip them all at once of their former crop, of which they make *mahie*. This *ſuccedaneum* for ripe bread-fruit is thus made. They gather the fruit before it be perfectly ripe, and laying it in heaps cover it cloſely with leaves. In this ſtate it ferments, and becomes diſagreeably ſweet; the core is then taken out entire, and the reſt of the fruit thrown into a hole in their houſes, dug on purpoſe, and neatly lined in the bottom and ſides with graſs. The whole is then covered with leaves, and heavy ſtones are laid upon them. In this ſtate it undergoes a ſecond fermentation, and becomes four, after which it will ſuffer no change for many months. It is taken out of this hole, as it is wanted for uſe, and being made into balls, it is wrapped up in leaves and baked, and thus dreſſed it will keep for five or ſix weeks. It is eaten, both cold and hot, and the natives of thoſe countries ſeldom make a meal without it; but to captain Cook and his company the taſte was as diſagreeable, as that of a pickled olive generally is, the firſt time it is eaten. Hawkeſworth's Account, &c. vol. ii. p. 145, 193.

MAHIM, Mahem, Maihem, or Mayhem, in *Law*, a *maim*, or corporal hurt, whereby a man loſeth the uſe of any member, that is, or may be, of defence to him in battle; as the eye, hand, foot, ſcalp of the head, fore-tooth; or, as ſome ſay, a finger, or toe: but the cutting off his ear or noſe are not held to be *mayhems* at common law, becauſe they do not weaken but only diſfigure him. The word comes from the French *mehain*, or *mehaigner*, *to mutilate*: the canoniſts call it *membri mutilatio*; and all agree, it conſiſts in the loſs of a member, or of the uſe thereof.

By the ancient law of England he that *maimed* any man was ſentenced to loſe the like part, which is ſtill the law in Sweden: but this was diſuſed, and *mayhem*, by the common law, was only puniſhable by fine and impriſonment; unleſs perhaps the offence of *mayhem* by caſtration, which all our old writers held to be felony. But by ſubſequent ſtatutes the crime and puniſhment of *mayhem* were put more out of doubt. 5 Hen. IV. cap. 5. 37 Hen. VIII. cap. 6. and by 22 and 23 Car. II. cap. 1. called the Coventry Act, it is enacted, that if any one ſhall, of malice aforethought, or by lying in wait, cut or diſable the tongue, put out an eye, ſlit the noſe, cut off the noſe or lip, or cut or diſable any limb or member of another perſon, with intention in ſo doing to *maim* or diſfigure him, it is felony without benefit of clergy; and, when the caſe is difficult to judge whether it be a *mahim*, or not, the judges commonly view the party wounded, and ſometimes take the opinion of the ſurgeons.

A perſon who *maims* himſelf, for the purpoſe of begging, and alſo a perſon who diſables himſelf, that he may not be impreſſed for a ſoldier, may be indicted and fined.

The offence of wilſully and maliciouſly ſhooting at any perſon which may endanger either killing or *maiming* him, though no ſuch evil conſequence enſues, is made felony without benefit of clergy, by 9 Geo. I. c. 22.

Malicious *maiming* of cattle in the night time incurs a forfeiture of treble damages, by action of treſpaſs, or upon the caſe, 22 and 23 Car. II. c. 7.

Mayhem, *appeal of*. See Appeal.

MAHO *Tree*. See *Syrian* Mallow.

MAHOGANY. See Cedar.

MAHOMET *Pigeon*, the common Engliſh name of a ſpecies of pigeon, called by Moore the *columba Numidica alba*. It is of the ſame ſhape and ſize with the Barbary pigeon, and has all the characters of that ſpecies, but is always perfectly white, which gives the red circle about the eyes a more lively look.

MAHOMETANISM, Mahometism, or Mohammedism; the ſyſtem of religion broached by *Mahomet*, and ſtill adhered to by his followers.

Mahomet was born at Mecca in Arabia, in the year of Chriſt 571 or 572 according to the moſt probable opinion: in the thirty-eighth year of his age he began to withdraw himſelf into a ſolitary cave near Mecca, called the cave of Hira, for the purpoſe of forming his ſyſtem of impoſture; the propagation of which he commenced in the fortieth year of his age, when he aſſumed the title of the apoſtle of God: and having gained nine diſciples, ſome of whom were the principal men of the city, in the forty-fourth year of his age he openly publiſhed his impoſture to the people of

Mecca, and declared himſelf a prophet ſent by God to recover them from Paganiſm, and to teach them the true religion. However, he was obliged to abandon Mecca, and to ſettle at Medina, on the 16th of July, A. D. 622, the year of the hegira or *Mahometan* epocha: here his party conſiderably increaſed, and having made ſeveral ſucceſsful excurſions againſt the Arab tribes, and conſtrained them by force to embrace his religion, his ſovereignty was eſtabliſhed in 628, and he united in himſelf the ſacred character of chief pontiff of his religion, as well as the royal; both which characters he tranſmitted to all his ſucceſſors, who, by the title of caliphs, reigned after him. But they were afterwards deprived of the regal authority, firſt by the governors of the provinces, who, about the year of hegira 325, aſſumed it to themſelves, and made themſelves kings in their reſpective governments; and then by others who aroſe on this diſtraction of the empire to uſurp upon them, till at laſt they had nothing left but the name and ſhadow of what they had once been. In the year of Chriſt 629 *Mahomet*, at the head of an army of ten thouſand men, reduced Mecca, and extended his conqueſts, with his religion, through moſt parts of Arabia: and the remaining Arabs ſubmitted and embraced his impoſture in 631. In the next year he died at Medina, being, according to ſome hiſtorians, ſixty-three years of age. It has been ſaid by many, that *Mahomet's* tomb, being of iron, under a vault of loadſtones, hangs in the air, and that this paſſes for a great miracle in the opinion of his followers. But this is a mere fable. Pliny informs us, lib. xxxiv. cap. 14. that Dinocrates the architect, had begun to roof the temple of Arſinoe at Alexandria with loadſtone, that her image, made of iron, might ſeem to hang there in the air; but the deſign was interrupted by his own death, and that of Ptolemy, who had ordered it to be done in honour of his ſiſter.

Mahometaniſm is embraced by the Turks, Perſians, and ſeveral nations among the Africans, and many among the Eaſt Indians.

Brerewood ſays, that if we divide the known countries of the earth into thirty equal parts, five of them are Chriſtians, ſix *Mahometan*, and nineteen Pagan.

The ſyſtem of *Mahometaniſm* is contained in the Koran, commonly called the Alcoran.

The firſt and chief article of the *Mahometan* creed is, that *there is no other god but one God*; which they have from the Koran, where theſe words are repeated inceſſantly: *there is no other God but he. Your God is the only God. I am God, and there is no other God but I.* This grand axiom of their theology ſeems to have been taken from the Jews, who were continually rehearſing thoſe words of Deuteronomy, *Hear, O Iſrael; the Lord our God is One.*

For this reaſon, the *Mahometan* account all ſuch as own any thing of number in the divinity, to be infidels or idolaters. And accordingly, one of the firſt leſſons they teach their children is, that God is neither male nor female, and conſequently can have no children.

The ſecond article of *Mahometaniſm* conſiſts in this, *that Mahomet was ſent from God*. By which they exclude all other religions: under pretence that their prophet was the laſt and greateſt of all the prophets that God would ever ſend, and that as the Jewiſh religion ceaſed with the coming of the Meſſiah, ſo likewiſe the Chriſtian religion was to be abrogated with the coming of *Mahomet*. Not but they own Moſes and Jeſus Chriſt to have been great prophets; but *Mahomet* they hold to be *The Prophet*, by way of excellence, commiſſioned to purge the holy ſcriptures of the Old and New Teſtament, which they allow, from the corruption introduced in them by Jews and Chriſtians, and to reſtore the law of God to its original purity; and the paraclete or comforter promiſed in the ſcriptures.

The *Mahometans* call their religion *Iſlam*, denoting as ſome ſay, *reſignation* or *ſubmiſſion* to the ſervice and commands of God, but according to others, formed from the root *ſalama*, ſignifying to *be ſaved*, and therefore the ſame with *the religion* or *ſtate of ſalvation*; and they divide it into two diſtinct parts, viz. *iman*, i. e. *faith* or *theory*; and *din*, i. e. *religion* or *practice*: and teach, that it is built on five fundamental points, one belonging to faith, and the other four to practice.

Under the confeſſion of faith already recited, they comprehend ſix diſtinct branches, viz. belief in God; in his angels; in his ſcriptures; in his prophets: in the reſurrection and day of judgment; and in God's abſolute decree and predeſtination both of good and evil. The four points relating to practice, are prayer, under which are comprehended thoſe waſhings or purifications which are neceſſary preparations required before prayer; alms; faſting; and the pilgrimage to Mecca. Their faith in God has been already mentioned: with reſpect to their opinion of angels, they believe them to have pure and ſubtil bodies, created of fire, and that they are differently employed, in writing down the actions of men, or in carrying the throne of God, and other ſervices. The four angels whom they regard as moſt diſtinguiſhed by God's favour, and on account of the offices aſſigned them, are Gabriel, Michael, Azrael the angel of death, who ſeparates men's ſouls from their bodies, and Iſraſil, whoſe office it will be to ſound the trumpet at the reſurrection. They alſo believe that two guardian angels, changed every day, attend on every man, to obſerve and write down his actions. Their whole doctrine concerning angels they have borrowed from the Jews, who learned the names and offices of thoſe beings from the Perſians. The devil, called by *Mahomet Eblis* from his deſpair, was one of thoſe angels who are neareſt to God's preſence, called Azazil, and fell according to the doctrine of the Koran, for refuſing to pay homage to Adam at the command of God. They alſo admit an intermediate order of beings, called genii, ſome of which are good and others bad.

As to the ſcriptures, the *Mahometans* are taught by the Koran, that God, in divers ages of the world, gave revelations of his will in writing to ſeveral prophets, the whole, and every word of which, it is abſolutely neceſſary for every good Moſlem to believe. *Mahomet* acknowledges the divine authority of the Pentateuch, Pſalms, and Goſpel, and often appeals to the conſonancy of the Koran with thoſe writings, and to the prophecies which he pretended were contained concerning himſelf, which the Jews and Chriſtians have ſuppreſſed.

At death, they maintain, that the bodies of thoſe who believe the unity of God, and the miſſion of *Mahomet*, reſt in peace, and are refreſhed with the air of paradiſe: otherwiſe they are grievouſly tormented. The ſouls of the former are conveyed to heaven, where a place is aſſigned them according to their merit and degree; thoſe of the wicked are tormented, till they are rejoined to their bodies at the reſurrection; the approach of which will be known by certain ſigns that precede it: theſe are the leſſer and the greater ſigns: the latter of which are the ſun's riſing in the weſt; the appearance of a monſtrous beaſt, which ſhall riſe out of the earth in the temple of Mecca; war with the Greeks and the taking of Conſtantinople; the coming of Anti-Chriſt; the deſcent of Jeſus on earth; war with the Jews; the eruption of Gog and Magog; a ſmoke which ſhall fill the whole earth; an eclipſe of the moon; the return of the Arabs to the worſhip of their ancient idols: the diſcovery of a vaſt heap of gold and ſilver by the retreat of the Euphrates; the demolition of the temple of Mecca by the Ethiopians; the ſpeaking of beaſts and inanimate things; the breaking out of fire; the appearance of a man, who ſhall drive men before him with his ſtaff; the advent of the Mhodi, or director, a perſon of the family of *Mahomet*, to govern the Arabians, and fill the world with righteouſneſs; and a wind that ſhall ſweep away the ſouls of all who have but a grain of faith in their hearts. But the immediate ſign of the reſurrection will be the firſt blaſt of the trumpet, which will be ſounded three times. The day of judgment will continue, as the Koran ſays in one place, one thouſand years, but according to another paſſage, fifty thouſand years: the reſurrection, ſay they, will be general, extended to all creatures, angels, genii, men, and animals; who will be aſſembled on the earth, give an account of their actions, and receive retribution. On this occaſion each perſon will have the book wherein all the actions of his life are written delivered to him, and their works will be weighed in a balance, which they minutely deſcribe. When the examination is finiſhed mutual retaliation will follow; which will be executed by taking away a proportionable part of the good works of him who offered injury to another, and adding it to him who ſuffered it. Brutes will be changed into duſt; and the believing genii be aſſigned a place near the confines of paradiſe, and the unbelieving puniſhed eternally and caſt into hell, with the infidels of mortal race. After this proceſs, the good and wicked are conducted to a bridge, called ALSIRAT; over which the former ſhall ſafely paſs, while *Mahomet* and his Moſlems lead the way, but the latter will fall down headlong into hell: where there are ſeven different apartments, adapted to as many diſtinct claſſes of the damned, who will ſuffer both from intenſe heat and exceſſive cold. In this ſtate infidels only will be liable to eternal puniſhment; but the Moſlems or believers will be delivered thence, after they have expiated their crimes by their ſufferings. This place of puniſhment is ſeparated from paradiſe by a wall, ſo ſmall in breadth as to admit the bleſſed and damned to converſe together. The righteous, after having paſſed the bridge above mentioned, will be refreſhed by drinking at the pond of their prophet, and then admitted into paradiſe, ſituated in the ſeventh heaven, and next to the throne of God; where they will feed on the moſt delicious fruits; be clothed in the moſt ſplendid ſilken garments, refreſhed with rivers of water, wine, milk, and honey, and entertained with the moſt delightful muſic, and the raviſhing girls of paradiſe with black eyes, the enjoyment of whoſe company will be a principal felicity of the faithful.

It appears from the Koran, that women as well as men will not only be puniſhed for their evil actions, but alſo receive the reward of their good deeds, and that both will enjoy a perpetual youth.

Farther, the orthodox doctrine with reſpect to predeſtination is, that every thing which happens in this world proceedeth entirely from the divine will, and is irrevocably fixed from all eternity in the preſerved table; God having ſecretly predeſtinated not only the adverſe and proſperous fortune of every perſon in this world, in the moſt minute particulars, but alſo his faith and infidelity, his obedience or diſobedience, and conſequently his ever laſting happineſs or miſery after death; which fate or predeſtination it is not poſſible for any foreſight or wiſdom to avoid.

In regard to the four fundamental points of religious practice; *Mahomet* is ſaid to have declared, that the practice of religion is founded on cleanlineſs, which is one half of the faith, and the key of prayer, without which it will not be heard by God. Such is the opinion which the *Mahometans* entertain of cleanlineſs, that it is purely on this account they ſeem to have adopted circumciſion, though it be not mentioned in the Koran. *Mahomet* has obliged his followers to pray five times every twenty-four hours, at cetain ſtated times, turning their faces towards the temple of Mecca, which is pointed to by a niche in their moſques: the life and ſpirit of prayer, they hold, as the inward diſpoſing of the heart; nor do they ever perform this duty in ſumptuous apparel, nor ſuffer their women to attend them on theſe occaſions.

Alms, among the *Mahometans*, are legal and voluntary; the giving of which is frequently inculcated in the Koran. Faſting is called by *Mahomet*, the gate of religion; and his followers are expreſly required to faſt during the month of Ramadan; which they obſerve by abſtaining from meat, drink, and women, from day-break till ſunſet. Beſides this, they have ſeveral other voluntary faſts. The pilgrimage to Mecca is ſo neceſſary a point of practice, that, according to a tradition of *Mahomet*, he who dies without performing it may as well die a Jew or a Chriſtian; and it is expreſly commanded in the Koran. The various ceremonies preſcribed to thoſe who perform this pilgrimage are extremely abſurd and ridiculous, and appear to be relicks of idolatrous ſuperſtition.

Beſides the fundamental points of faith and practice above recited, the *Mahometans* are required by the Koran, to abſtain from wine, gaming, uſury, divining by arrows, the eating of blood and ſwine's fleſh, and whatever dies of itſelf, or is ſlain in honour of any idol, or ſtrangled, or killed by accident, or by any other beaſt. The Koran allows polygamy within certain limits; forbidding any man to have more than four, whether wives or concubines: but *Mahomet* had the privilege of marrying as many wives, and keeping as many concubines as he pleaſed. It allows alſo of divorce; but ſeverely puniſhes fornication and adultery. The day of the week which *Mahomet* has ſet apart for public worſhip is Friday; beſides which they have two annual feaſts called BEIRAM.

After the death of *Mahomet*, a ſchiſm aroſe among his followers, which divided them into two great factions, whoſe ſeparation not only gave riſe to a variety of opinions and rites, but alſo excited the moſt implacable hatred, and the moſt deadly animoſities. Of theſe factions, the one acknowledged Abubeker, the father-in-law of *Mahomet*, as his ſucceſſor, or the true caliph, and its members were diſtinguiſhed by the name of SONNITES; while the other adhered to Ali, his ſon-in-law, and were known by the title of SCHIITES. Both, however, adhered to the Koran as a divine law, and the rule of faith and manners; to which indeed the former added, by way of interpretation, the Sonna, i. e. a certain law, which they looked upon as deſcended from *Mahomet* by oral tradition, and which the Schiites refuſed to admit. Among the Sonnites we are to reckon the Turks, Tartars, Arabians, Africans, and the greateſt part of the Indian *Mahometans*; whereas the Perſians, and the ſubjects of the grand mogul are generally conſidered as the followers of Ali, though the latter indeed ſeem rather to obſerve a ſtrict neutrality in this conteſt. Beſides theſe two grand factions, there are other ſubordinate ſects among the *Mahometans*, which diſpute with warmth concerning ſeveral points of religion, though without violating the rules of mutual toleration. Of theſe ſects there are four, which far ſurpaſs the reſt in point of reputation and importance, viz. the Haneſites, the ſect of Malee, the ſect of Al Shafei, and that of Ebn Hanbal, which are called the orthodox *Mahometans*. Sale's Preliminary Diſcourſe. See ALKORAN.

The rapid ſucceſs, which attended the propagation of this new religion, was owing to cauſes that are plain and evident, and muſt remove, or rather prevent, our ſurprize, when they are attentively conſidered. The terror of *Mahomet's* arms, and the repeated victories which were gained by him and his ſucceſſors, were, no doubt, the irreſiſtible arguments that perſuaded ſuch multitudes to embrace his religion, and ſubmit to his dominion. Beſides his law was artfully and marvellouſly adapted to the corrupt nature of man; and, in a more particular manner, to the manners and opinions of the eaſtern nations, and the vices to which they were naturally addicted: for the articles of faith which it propoſed were few in number, and extremely ſimple; and the duties it required were neither many nor difficult, nor ſuch as were incompatible with the empire of appetites and paſſions. It is to be obſerved farther, that the groſs ignorance under which the Arabians, Syrians, Perſians, and the greateſt part of the eaſtern nations, laboured at this time, rendered many an eaſy prey to the artifice and eloquence of this bold adventurer. To theſe cauſes of the progreſs of *Mahometaniſm*, we may add the bitter diſſenſions and cruel animoſities that reigned among the Chriſtian ſects, particularly the Greeks, Neſtorians, Eutychians, and Monophyſites; diſſentions that filled a great part of the Eaſt with carnage, aſſaſſinations, and ſuch deteſtable enormities, as rendered the very name of Chriſtianity odious to many. We might add here that the Monophyſites and Neſtorians, full of reſentment againſt the Greeks, from whom they had ſuffered the bittereſt and moſt injurious treatment, aſſiſted the Arabians in the conqueſt of ſeveral provinces, into which, of conſequence, the religion of *Mahomet* was afterwards introduced. Other cauſes of the ſudden progreſs of that religion would naturally occur to ſuch as conſider attentively its ſpirit and genius and the ſtate of the world at this time. Moſheim's Eccl. Hiſt. vol. ii. p. 9. ed. 8vo.

MAJA, in *Ornithology*, the name of a bird deſcribed by Niremberg as very common in the iſland of Cuba, and frequenting the fields of rice in large flocks. It is deſcribed to be a ſmall bird of a yellowiſh colour, very delicate, and well taſted, and remarkable for having a ſtomach on the back or outſide of the neck.

MAIAGUE, in *Ornithology*, the name of a Braſilian bird of the web-footed kind, but having its hinder toe looſe. It is of the ſize of the common gooſe; its head is large and round; its neck long, and it always carries it crooked like a ſwan: its beak is ſtrong and hooked at the end; it is all over of a browniſh black in colour, except that its throat is yellow. It is found about the mouths of rivers, and feeds on fiſh; it builds on the ground; it is very nimble in running, flying, and diving, and is not eaſily taken, but is a very well taſted fowl.

MAIDEN, an edged inſtrument uſed in ſome countries, particularly Scotland, for the beheading of criminals.

The *maiden* is a broad piece of iron, of a foot ſquare, ſharp on the lower part, and loaded above with lead, ſo as ſcarce to be lifted: at the time of execution, it is pulled up to the top of a narrow wooden frame ten feet high, with a groove on each ſide for the *maiden* to ſlide in. The priſoner's neck being faſtened to a bar underneath, on a ſigng iven, the *maiden* is let looſe, and the head in an inſtant ſeparated from the body.

MAIDEN is alſo the name of a machine firſt uſed in Yorkſhire, and ſince introduced into other places, for waſhing of linen; conſiſting of a tub nineteen inches high, and twenty-ſeven in diameter at the top, in which the linen is put, with hot water and ſoap, to which is adapted a cover, fitting it very cloſely, and faſtened to the tub by two wedges; through a hole in the middle of the cover paſſes an upright piece of wood, kept at a proper height by a peg above, and furniſhed with two handles, by which it is turned backward and forward: to the lower end of this upright piece is faſtened a round piece of wood, in which are fixed ſeveral pieces, like cogs of a wheeel. The operation of this machine is to make the linen paſs and repaſs quick through the water. Gent. Mag. vol. xxii. p. 32.

MAIDEN-*aſſizes*, are thoſe where no perſon is condemned to die.

MAIDEN-*hair*, *adiantum*, in *Botany* and *Medicine*. See ADIANTUM.

MAIDEN-*hair*, *black*, a name ſometimes given to the *dwarf*-FERN. See MILTWASTE.

MAIDEN-*hair*, *Engliſh*. See TRICHOMANES.

MAIDEN-*hair*, *white*. See *Wall*-RUE.

MAIDEN-*plum*. See *American* PLUM.

Mecca, and declared himſelf a prophet ſent by God to recover them from Paganiſm, and to teach them the true religion. However, he was obliged to abandon Mecca, and to ſettle at Medina, on the 16th of July, A. D. 622, the year of the hegira or *Mahometan* epocha: here his party conſiderably increaſed, and having made ſeveral ſucceſsful excurſions againſt the Arab tribes, and conſtrained them by force to embrace his religion, his ſovereignty was eſtabliſhed in 628, and he united in himſelf the ſacred character of chief pontiff of his religion, as well as the royal; both which characters he tranſmitted to all his ſucceſſors, who, by the title of caliphs, reigned after him. But they were afterwards deprived of the regal authority, firſt by the governors of the provinces, who, about the year of hegira 325, aſſumed it to themſelves, and made themſelves kings in their reſpective governments; and then by others who aroſe on this diſtraction of the empire to uſurp upon them, till at laſt they had nothing left but the name and ſhadow of what they had once been. In the year of Chriſt 629 *Mahomet*, at the head of an army of ten thouſand men, reduced Mecca, and extended his conqueſts, with his religion, through moſt parts of Arabia: and the remaining Arabs ſubmitted and embraced his impoſture in 631. In the next year he died at Medina, being, according to ſome hiſtorians, ſixty-three years of age. It has been ſaid by many, that *Mahomet's* tomb, being of iron, under a vault of loadſtones, hangs in the air, and that this paſſes for a great miracle in the opinion of his followers. But this is a mere fable. Pliny informs us, lib. xxxiv. cap. 14. that Dinocrates the architect, had begun to roof the temple of Arſince at Alexandria with loadſtone, that her image, made of iron, might ſeem to hang there in the air; but the deſign was interrupted by his own death, and that of Ptolemy, who had ordered it to be done in honour of his ſiſter.

Mahometaniſm is embraced by the Turks, Perſians, and ſeveral nations among the Africans, and many among the Eaſt Indians.

Brerewood ſays, that if we divide the known countries of the earth into thirty equal parts, five of them are Chriſtians, ſix *Mahometan*, and nineteen Pagan.

The ſyſtem of *Mahometaniſm* is contained in the Koran, commonly called the Alcoran.

The firſt and chief article of the *Mahometan* creed is, that *there is no other god but one God*; which they have from the Koran, where theſe words are repeated inceſſantly: *there is no other God but he. Your God is the only God. I am God, and there is no other God but I.* This grand axiom of their theology ſeems to have been taken from the Jews, who were continually rehearſing thoſe words of Deuteronomy, *Hear, O Iſrael; the Lord our God is One.*

For this reaſon, the *Mahometan* account all ſuch as own any thing of number in the divinity, to be infidels or idolaters. And accordingly, one of the firſt leſſons they teach their children is, that God is neither male nor female, and conſequently can have no children.

The ſecond article of *Mahometaniſm* conſiſts in this, *that Mahomet was ſent from God.* By which they exclude all other religions: under pretence that their prophet was the laſt and greateſt of all the prophets that God would ever ſend, and that as the Jewiſh religion ceaſed with the coming of the Meſſiah, ſo likewiſe the Chriſtian religion was to be abrogated with the coming of *Mahomet.* Not but they own Moſes and Jeſus Chriſt to have been great prophets; but *Mahomet* they hold to be *The Prophet*, by way of excellence, commiſſioned to purge the holy ſcriptures of the Old and New Teſtament, which they allow, from the corruption introduced in them by Jews and Chriſtians, and to reſtore the law of God to its original purity; and the paraclete or comforter promiſed in the ſcriptures.

The *Mahometans* call their religion *Iſlam*, denoting as ſome ſay, *reſignation* or *ſubmiſſion* to the ſervice and commands of God, but according to others, formed from the root *ſalama*, ſignifying to *be ſaved*, and therefore the ſame with *the religion* or *ſtate of ſalvation*; and they divide it into two diſtinct parts, viz. *iman*, i. e. *faith* or *theory*; and *din*, i. e. *religion* or *practice*: and teach, that it is built on five fundamental points, one belonging to faith, and the other four to practice.

Under the confeſſion of faith already recited, they comprehend ſix diſtinct branches, viz. belief in God; in his angels; in his ſcriptures; in his prophets: in the reſurrection and day of judgment; and in God's abſolute decree and predeſtination both of good and evil. The four points relating to practice, are prayer, under which are comprehended thoſe waſhings or purifications which are neceſſary preparations required before prayer; alms; faſting; and the pilgrimage to Mecca. Their faith in God has been already mentioned: with reſpect to their opinion of angels, they believe them to have pure and ſubtil bodies, created of fire, and that they are differently employed, in writing down the actions of men, or in carrying the throne of God, and other ſervices. The four angels whom they regard as moſt diſtinguiſhed by God's favour, and on account of the offices aſſigned them, are Gabriel, Michael, Azrael the angel of death, who ſeparates men's ſouls from their bodies, and Iſrafil, whoſe office it will be to ſound the trumpet at the reſurrection. They alſo believe that two guardian angels, changed every day, attend on every man, to obſerve and write down his actions. Their whole doctrine concerning angels they have borrowed from the Jews, who learned the names and offices of thoſe beings from the Perſians. The devil, called by *Mahomet Eblis* from his deſpair, was one of thoſe angels who are neareſt to God's preſence, called Azazil, and fell according to the doctrine of the Koran, for refuſing to pay homage to Adam at the command of God. They alſo admit an intermediate order of beings, called genii, ſome of which are good and others bad.

As to the ſcriptures, the *Mahometans* are taught by the Koran, that God, in divers ages of the world, gave revelations of his will in writing to ſeveral prophets, the whole, and every word of which, it is abſolutely neceſſary for every good Moſlem to believe. *Mahomet* acknowledges the divine authority of the Pentateuch, Pſalms, and Goſpel, and often appeals to the conſonancy of the Koran with thoſe writings, and to the prophecies which he pretended were contained concerning himſelf, which the Jews and Chriſtians have ſuppreſſed.

At death, they maintain, that the bodies of thoſe who believe the unity of God, and the miſſion of *Mahomet*, reſt in peace, and are refreſhed with the air of paradiſe: otherwiſe they are grievouſly tormented. The ſouls of the former are conveyed to heaven, where a place is aſſigned them according to their merit and degree; thoſe of the wicked are tormented, till they are rejoined to their bodies at the reſurrection; the approach of which will be known by certain ſigns that precede it: theſe are the leſſer and the greater ſigns: the latter of which are the ſun's riſing in the weſt; the appearance of a monſtrous beaſt, which ſhall riſe out of the earth in the temple of Mecca; war with the Greeks and the taking of Conſtantinople; the coming of Anti-Chriſt; the deſcent of Jeſus on earth; war with the Jews; the eruption of Gog and Magog; a ſmoke which ſhall fill the whole earth; an eclipſe of the moon; the return of the Arabs to the worſhip of their ancient idols: the diſcovery of a vaſt heap of gold and ſilver by the retreat of the Euphrates; the demolition of the temple of Mecca by the Ethiopians; the ſpeaking of beaſts and inanimate things; the breaking out of fire; the appearance of a man, who ſhall drive men before him with his ſtaff; the advent of the Mhodi, or director, a perſon of the family of *Mahomet*, to govern the Arabians, and fill the world with righteouſneſs; and a wind that ſhall ſweep away the ſouls of all who have but a grain of faith in their hearts. But the immediate ſign of the reſurrection will be the firſt blaſt of the trumpet, which will be ſounded three times. The day of judgment will continue, as the Koran ſays in one place, one thouſand years, but according to another paſſage, fifty thouſand years: the reſurrection, ſay they, will be general, extended to all creatures, angels, genii, men, and animals; who will be aſſembled on the earth, give an account of their actions, and receive retribution. On this occaſion each perſon will have the book wherein all the actions of his life are written delivered to him, and their works will be weighed in a balance, which they minutely deſcribe. When the examination is finiſhed mutual retaliation will follow; which will be executed by taking away a proportionable part of the good works of him who offered injury to another, and adding it to him who ſuffered it. Brutes will be changed into duſt; and the believing genii be aſſigned a place near the confines of paradiſe, and the unbelieving puniſhed eternally and caſt into hell, with the infidels of mortal race. After this proceſs, the good and wicked are conducted to a bridge, called ALSIRAT; over which the former ſhall ſafely paſs, while *Mahomet* and his Moſlems lead the way, but the latter will fall down headlong into hell: where there are ſeven different apartments, adapted to as many diſtinct claſſes of the damned, who will ſuffer both from intenſe heat and exceſſive cold. In this ſtate infidels only will be liable to eternal puniſhment; but the Moſlems or believers will be delivered thence, after they have expiated their crimes by their ſufferings. This place of puniſhment is ſeparated from paradiſe by a wall, ſo ſmall in breadth as to admit the bleſſed and damned to converſe together. The righteous, after having paſſed the bridge above mentioned, will be refreſhed by drinking at the pond of their prophet, and then admitted into paradiſe, ſituated in the ſeventh heaven, and next to the throne of God; where they will feed on the moſt delicious fruits; be clothed in the moſt ſplendid ſilken garments, refreſhed with rivers of water, wine, milk, and honey, and entertained with the moſt delightful muſic, and the raviſhing girls of paradiſe with black eyes, the enjoyment of whoſe company will be a principal felicity of the faithful.

It appears from the Koran, that women as well as men will not only be puniſhed for their evil actions, but alſo receive the reward of their good deeds, and that both will enjoy a perpetual youth.

Farther, the orthodox doctrine with reſpect to predeſtination is, that every thing which happens in this world proceedeth entirely from the divine will, and is irrevocably fixed from all eternity in the preſerved table; God having ſecretly predeſtinated not only the adverſe and proſperous fortune of every perſon in this world, in the moſt minute particulars, but alſo his faith and infidelity, his obedience or diſobedience, and conſequently his ever laſting happineſs or miſery after death; which fate or predeſtination it is not poſſible for any foreſight or wiſdom to avoid.

In regard to the four fundamental points of religious practice; *Mahomet* is ſaid to have declared, that the practice of religion is founded on cleanlineſs, which is one half of the faith, and the key of prayer, without which it will not be heard by God. Such is the opinion which the *Mahometans* entertain of cleanlineſs, that it is purely on this account they ſeem to have adopted circumciſion, though it be not mentioned in the Koran. *Mahomet* has obliged his followers to pray five times every twenty-four hours, at cetain ſtated times, turning their faces towards the temple of Mecca, which is pointed to by a niche in their moſques: the life and ſpirit of prayer, they hold, as the inward diſpoſing of the heart; nor do they ever perform this duty in ſumptuous apparel, nor ſuffer their women to attend them on theſe occaſions.

Alms, among the *Mahometans*, are legal and voluntary; the giving of which is frequently inculcated in the Koran. Faſting is called by *Mahomet*, the gate of religion; and his followers are expreſly required to faſt during the month of Ramadan; which they obſerve by abſtaining from meat, drink, and women, from day-break till ſunſet. Beſides this, they have ſeveral other voluntary faſts. The pilgrimage to Mecca is ſo neceſſary a point of practice, that, according to a tradition of *Mahomet*, he who dies without performing it may as well die a Jew or a Chriſtian; and it is expreſly commanded in the Koran. The various ceremonies preſcribed to thoſe who perform this pilgrimage are extremely abſurd and ridiculous, and appear to be relicks of idolatrous ſuperſtition.

Beſides the fundamental points of faith and practice above recited, the *Mahometans* are required by the Koran, to abſtain from wine, gaming, uſury, divining by arrows, the eating of blood and ſwine's fleſh, and whatever dies of itſelf, or is ſlain in honour of any idol, or ſtrangled, or killed by accident, or by any other beaſt. The Koran allows polygamy within certain limits; forbidding any man to have more than four, whether wives or concubines: but *Mahomet* had the privilege of marrying as many wives, and keeping as many concubines as he pleaſed. It allows alſo of divorce; but ſeverely puniſhes fornication and adultery. The day of the week which *Mahomet* has ſet apart for public worſhip is Friday; beſides which they have two annual feaſts called BEIRAM.

After the death of *Mahomet*, a ſchiſm aroſe among his followers, which divided them into two great factions, whoſe ſeparation not only gave riſe to a variety of opinions and rites, but alſo excited the moſt implacable hatred, and the moſt deadly animoſities. Of theſe factions, the one acknowledged Abubeker, the father-in-law of *Mahomet*, as his ſucceſſor, or the true caliph, and its members were diſtinguiſhed by the name of SONNITES; while the other adhered to Ali, his ſon-in-law, and were known by the title of SCHIITES. Both, however, adhered to the Koran as a divine law, and the rule of faith and manners; to which indeed the former added, by way of interpretation, the Sonna, i. e. a certain law, which they looked upon as deſcended from *Mahomet* by oral tradition, and which the Schiites refuſed to admit. Among the Sonnites we are to reckon the Turks, Tartars, Arabians, Africans, and the greateſt part of the Indian *Mahometans*; whereas the Perſians, and the ſubjects of the grand mogul are generally conſidered as the followers of Ali, though the latter indeed ſeem rather to obſerve a ſtrict neutrality in this conteſt. Beſides theſe two grand factions, there are other ſubordinate ſects among the *Mahometans*, which diſpute with warmth concerning ſeveral points of religion, though without violating the rules of mutual toleration. Of theſe ſects there are four, which far ſurpaſs the reſt in point of reputation and importance, viz. the Haneſites, the ſect of Malee, the ſect of Al Shafei, and that of Ebn Hanbal, which are called the orthodox *Mahometans*. Sale's Preliminary Diſcourſe. See ALKORAN.

The rapid ſucceſs, which attended the propagation of this new religion, was owing to cauſes that are plain and evident, and muſt remove, or rather prevent, our ſurprize, when they are attentively conſidered. The terror of *Mahomet's* arms, and the repeated victories which were gained by him and his ſucceſſors, were, no doubt, the irreſiſtible arguments that perſuaded ſuch multitudes to embrace his religion, and ſubmit to his dominion. Beſides his law was artfully and marvellouſly adapted to the corrupt nature of man; and, in a more particular manner, to the manners and opinions of the eaſtern nations, and the vices to which they were naturally addicted: for the articles of faith which it propoſed were few in number, and extremely ſimple; and the duties it required were neither many nor difficult, nor ſuch as were incompatible with the empire of appetites and paſſions. It is to be obſerved farther, that the groſs ignorance under which the Arabians, Syrians, Perſians, and the greateſt part of the eaſtern nations, laboured at this time, rendered many an eaſy prey to the artifice and eloquence of this bold adventurer. To theſe cauſes of the progreſs of *Mahometaniſm*, we may add the bitter diſſenſions and cruel animoſities that reigned among the Chriſtian ſects, particularly the Greeks, Neſtorians, Eutychians, and Monophyſites; diſſentions that filled a great part of the Eaſt with carnage, aſſaſſinations, and ſuch deteſtable enormities, as rendered the very name of Chriſtianity odious to many. We might add here that the Monophyſites and Neſtorians, full of reſentment againſt the Greeks, from whom they had ſuffered the bittereſt and moſt injurious treatment, aſſiſted the Arabians in the conqueſt of ſeveral provinces, into which, of conſequence, the religion of *Mahomet* was afterwards introduced. Other cauſes of the ſudden progreſs of that religion would naturally occur to ſuch as conſider attentively its ſpirit and genius and the ſtate of the world at this time. Moſheim's Eccl. Hiſt. vol. ii. p. 9. ed. 8vo.

MAJA, in *Ornithology*, the name of a bird deſcribed by Niremberg as very common in the iſland of Cuba, and frequenting the fields of rice in large flocks. It is deſcribed to be a ſmall bird of a yellowiſh colour, very delicate, and well taſted, and remarkable for having a ſtomach on the back or outſide of the neck.

MAIAGUE, in *Ornithology*, the name of a Braſilian bird of the web-footed kind, but having its hinder toe looſe. It is of the ſize of the common gooſe; its head is large and round; its neck long, and it always carries it crooked like a ſwan: its beak is ſtrong and hooked at the end; it is all over of a browniſh black in colour, except that its throat is yellow. It is found about the mouths of rivers, and feeds on fiſh; it builds on the ground; it is very nimble in running, flying, and diving, and is not eaſily taken, but is a very well taſted fowl.

MAIDEN, an edged inſtrument uſed in ſome countries, particularly Scotland, for the beheading of criminals.

The *maiden* is a broad piece of iron, of a foot ſquare, ſharp on the lower part, and loaded above with lead, ſo as ſcarce to be lifted: at the time of execution, it is pulled up to the top of a narrow wooden frame ten feet high, with a groove on each ſide for the *maiden* to ſlide in. The priſoner's neck being faſtened to a bar underneath, on a ſigng iven, the *maiden* is let looſe, and the head in an inſtant ſeparated from the body.

MAIDEN is alſo the name of a machine firſt uſed in Yorkſhire, and ſince introduced into other places, for waſhing of linen; conſiſting of a tub nineteen inches high, and twenty-ſeven in diameter at the top, in which the linen is put, with hot water and ſoap, to which is adapted a cover, fitting it very cloſely, and faſtened to the tub by two wedges; through a hole in the middle of the cover paſſes an upright piece of wood, kept at a proper height by a peg above, and furniſhed with two handles, by which it is turned backward and forward: to the lower end of this upright piece is faſtened a round piece of wood, in which are fixed ſeveral pieces, like cogs of a wheeel. The operation of this machine is to make the linen paſs and repaſs quick through the water. Gent. Mag. vol. xxii. p. 32.

MAIDEN-*aſſizes*, are thoſe where no perſon is condemned to die.

MAIDEN-*hair*, *adiantum*, in *Botany* and *Medicine*. See ADIANTUM.

MAIDEN-*hair*, *black*, a name ſometimes given to the *dwarf*-FERN. See MILTWASTE.

MAIDEN-*hair*, *Engliſh*. See TRICHOMANES.

MAIDEN-*hair*, *white*. See *Wall*-RUE.

MAIDEN-*plum*. See *American* PLUM.

MAIDEN-*rents*, in our *Old Writers*, a noble paid by the tenants of ſome manors on their marriage. This was ſaid to be given to the lord, for his omitting the cuſtom of marcheta, whereby he was to have the firſt night's lodging with his tenant's wife; but it ſeems more probably to have been a fine for a licence to marry a daughter.

MAJESTY, *majeſtas*, a title or quality given to kings; and which frequently ſerves as an appellation to diſtinguiſh them by.

The word ſeems compoſed of the two Latin words, *major*, *greater*, and *ſtatus*, *ſtate*.

The emperor is called, his Cæſarian or imperial *majeſty*; the king of Spain, his Catholic *majeſty*; the king of France, his moſt Chriſtian *majeſty*; the king of Great Britain, his Britannic *majeſty*, &c. Some have alſo extended this title to the popes.

Paſquier obſerves, that our forefathers uſed this quality very ſparingly; and that the frequent uſe of the word, which now obtains, had not its beginning before the reign of their Henry II. He inſtances ſeveral letters of St. Gregory, who, writing to king Theodoret and Theodoric, only compliments them with EXCELLENCY.

Till the time of Charles V. the king of Spain had no title but that of highneſs; Louis XI. was the firſt in France who aſſumed this title; and before our king Henry VIII. the kings of England were only addreſſed under the titles of grace, which began in the time of Henry IV. and excellent grace, under Henry VI. and HIGHNESS. See KING.

At the peace of Munſter, there was a great conteſt between the miniſters of the emperor and thoſe of France: the firſt would not allow the title of ſerenity to the king of France, and the latter would not give that of *majeſty* to the emperor. At laſt it was agreed, that, whenever the French king ſhould write with his own hand to the emperor, he ſhould give him the title of imperial *majeſty*; and reciprocally, when the emperor ſhould write to the king, he ſhould give him that of royal *majeſty*.

Under the Roman republic, the title *majeſty*, *majeſtas*, belonged to the whole body of the people, and to the principal magiſtrates; ſo that to diminiſh or wound the *majeſty* of the commonwealth, was to be wanting in reſpect to the ſtate, or to its miniſters. But the power afterwards paſſing into the hands of a ſingle perſon, the appellation of *majeſty* was transferred to the emperor, and the imperial family. Pliny compliments Trajan on his being contented with the title of greatneſs; and ſpeaks very invidiouſly of thoſe who affected that of *majeſty*. And yet *majeſty* ſeems to be the moſt modeſt and juſt title that can be attributed to ſovereigns, ſince it ſignifies no more than the royalty, or ſovereign power.

St. **MAIEUL**, *regular clerks of*. See FATHERS *of Somaſquo*.

MAIL, *maille*, is primarily applied to the maſhes or holes in net-work.

MAIL, *coat of*. See COAT *of mail*.

It is called alſo a HABERGEON.

Anciently they alſo wore ſhirts of *mail* under the waiſtcoat, ſo ſerve as a defence againſt ſwords and poniards. We alſo read of gloves of *mail*.

MAIL, or **MALL**, alſo ſignifies a round ring of iron; whence the play of pall-mall, from *palla*, a *ball*, and *maille*, the round ring through which it is to paſs

MAILLE, in our *Old Writers*, a ſmall kind of money. Silver half-pence were likewiſe termed *mailles*, 9 Hen. V. By indenture in the mint, a pound weight of old ſterling ſilver was to be coined into three hundred and ſixty ſterlings, or pennies, or ſeven hundred and twenty *mailles*, or half-pennies, or one thouſand four hundred and forty farthings. Hence the word *mail* was derived, which is now vulgarly uſed in Scotland to ſignify an annual rent. See GOLD-*coin*.

MAILLS, on *Ship-board*, are ſquare machines, compoſed of a number of rings interwoven net-wiſe, and uſed for rubbing off the looſe hemp which remains on lines or white cordage, after it is made.

MAILED implies a thing ſpeckled, or full of ſpecks; as the feathers of hawks, partridges, &c. or the furs of ſome wild beaſts.

MAIN, a term applied to ſeveral parts of a ſhip, as the *main-capſtan*, *main-maſt*, *main-top-maſt*, *main-ſail*, &c. and ſignifying the chief or largeſt of the kind. See CAPSTAN, MAST, SAIL, &c.

MAIN-*body of an army*, is the body of troops that marches between the advance and the rear guard. In a camp it is that part of an army which is encamped betwixt the right and left wings.

MAIN-*guard*. See GUARD.

MAIN-MORTE, a term in ſome ancient cuſtoms, ſtill obtaining in Burgundy, ſignifying a right which the lord has, on the death of the chief of a family that is *mainmortable*, of taking the beſt moveable in the houſe; or, in default of that, the right hand of the deceaſed was offered him, in token that he could ſerve him no longer. See MORT-MAIN.

MAINIS, in *Ichthyology*, a name uſed by Ariſtotle, Athenæus, and others of the old Greek writers, for the fiſh now called the *mena*, *menerela*, and *menola*. It is a ſpecies of the SPARUS, and is diſtinguiſhed from all the other ſpecies of that genus, by having four large teeth; and a variegated body, ornamented with a black ſpot in the middle of the ſides. This is the fiſh the Narbons call *jaſcele*.

MAINOUR, **MANOUR**, or **MEINOR**, in *Law*, ſignifies the thing that a thief takes away, or ſteals.

Thus, to be taken with *mainour*, is to be taken with the thing ſtolen about him. If the defendant were taken with the *mainour*, and ſo carried to court in ancient times they would arraign him on the *mainour*, without any appeal or indictment.

MAINPERNORS. See MAINPRISE.

MAINPRISE, compounded of the French *main*, *hand*, and *pris*, or *prins*, *taken*, in *Law*, the taking or receiving a man into friendly cuſtody, who otherwiſe might be committed to priſon; upon ſecurity given for his forthcoming at a day aſſigned.

They who thus undertake for any one, are called *mainpernors*, becauſe they receive the perſon into their hands; whence alſo comes the word *mainpernable*, denoting the perſon who may be thus bailed. See BAIL.

The writ of *mainpriſe* is a writ directed to the ſheriff, (either generally, when any man is impriſoned for a bailable offence, and bail hath been refuſed; or, ſpecially, when the offence or cauſe of commitment is not properly bailable below), commanding him to take ſureties for the priſoner's appearance, and to ſet him at large. Mainpernors differ from bail, in that a man's bail may impriſon or ſurrender him up before the ſtipulated day of appearance. Mainpernors can do neither, but are barely ſureties for his appearance at the day: bail are only ſureties, that the party be anſwerable for the ſpecial matter which they ſtipulate: mainpernors are bound to produce him to anſwer all charges whatſoever.

MAINTAINERS, are thoſe that maintain or ſecond a cauſe depending between others, by diſburſing money, or making friends for either party, &c. not being intereſted in the ſuit, or attornies employed therein. Stat. 19. Hen. VII. cap. 14. See MAINTENANCE.

MAINTENANCE, *manutenentia*, in *Law* an unlawful maintaining, or officious intermeddling in a ſuit between others, by aſſiſting either party with money or otherwiſe, to proſecute or defend it.

The word is metaphorically taken from the ſuccouring a young child, that learns to go by one's hand; but it is uſed in the bad ſenſe in ſome of our ſtatutes.

By the Roman law, it was a ſpecies of the *crimen falſi* to enter into any confederacy, or do any act, to ſupport another's law-ſuit, by money, witneſſes, or patronage.

A man may, however, maintain the ſuit of his near kinſman, ſervant, or poor neighbour out of charity and compaſſion, with impunity: otherwiſe the puniſhment by common law is fine and impriſonment; and by ſtat. 32 Hen. VIII. cap. 9. a forfeiture of 10*l*. The puniſhment of BARATRY, or *barretry*, in a common priſon, is alſo fine and impriſonment; but if the offender belongs to the profeſſion of the law, a barretor ought to be diſabled from practiſing for the future.

There lies a writ againſt a *maintainer*, called a writ of *maintenance*.

MAJOR, in *Logic*, is underſtood of the firſt propoſition of a regular ſyllogiſm.

It is called *major*, becauſe it has a more extenſive ſenſe than the *minor* PROPOSITION, as containing the principal term.

MAJOR *and minor*, in *Muſic*, are applied to concords which differ from each other by a ſemi-tone.

There are *major* and *minor* thirds, &c.

Major tone is the diifference between the fifth and fourth; the *major* ſemi tone the difference between the *major* fourth and the third. The *major* tone ſurpaſſes the *minor* by a comma. See TONE.

MAJOR, in *Law*, a perſon who is of age to manage his own affairs. See AGE.

By the civil law, a man is not a *major* till the age of twenty-five years; in England, he is a *major* at twenty-one, and in Normandy at twenty.

MAJOR, in the *Art of War*, a name given to ſeveral officers of different qualities and functions. Thus,

MAJOR-*general* is a general officer, who receives the general's orders, and delivers them out to the *majors* of brigades, with whom he concerts what troops are to mount the guard, what to go on parties, and what to form detachments, or to be ſent on convoys, &c.

It is his buſineſs alſo to view the ground to encamp on, and do other ſervices, he is ſubordinate to the general and lieutenant-general; and the next commanding officer to them.

MAJOR *of a brigade*, either of horſe or foot, is he who receives orders, and the word, from the major-general; and gives them to the particular *majors* of each regiment. See BRIGADE-*major*.

MAJOR *of a regiment* is an officer, whoſe buſineſs is to convey all orders to a regiment, to draw it up, and exerciſe it, to ſee it march in good order, to look to its quarters, and to rally it, if it happen to be broken in an engagement, &c.

The *major* is next in ſubordination to the lieutenant colonel, and generally promoted from the eldeſt captain. He is the only officer of a regiment of foot, who is allowed to be on horſeback in time of ſervice; but he always rides, that he may ſpeedily get from place to place, as occaſion requires.

MAJOR *of a regiment of horſe* is the firſt captain of the regiment; and commands in the abſence of the colonel.

MAJOR *of artillery* is the next officer to the lieutenant-colonel. In the field he receives daily orders from the brigade-*major*, and communicates them, with the parole, to his ſuperiors, and then dictates them to the adjutant.

MAJOR *of engineers*. See ENGINEER.

MAJOR, *ſerjeant*, is a non-commiſſioned officer, ſubordinate to the adjutant, as he is to the *major*.

MAJOR, *town*, is the third officer in order in a garriſon, being next to the deputy-governor.

He ought to underſtand fortification, and hath charge of the guards, rounds, patrols, and centinels.

There are alſo *aids-major*, *drums-major*, and other officers; ſo called, on account of ſome ſeniority or prerogative that they have over the reſt. See AID-*major*, and DRUM-*major*.

MAJOR, *fiſe*, has the ſame authority over the fifers as the *drum-major* has over the drummers. He teaches them their duty, appoints them for guards, &c.

MAJOR *helicis*, in *Anatomy*, a name given by Albinus to one of the muſcles of the eye, called by Santorini and others, *helicis muſculus*. This author diſtinguiſhes it under the name *major*, from another muſcle which he calls the *minor helicis*, and which Santorini calls only *fibræ muſculares in plana helicis facie*, though it be a true and proper muſcle.

MAJOR-DOMO, an Italian term, frequently uſed to ſignify a ſteward, or maſter of the houſhold.

The title of *major-domo* was formerly given in the courts of princes to three different kinds of officers. 1. To him who took care of what related to the prince's table, or eating; otherwiſe called *eleater*, *præfectus menſæ*, *architriclinus*, *dapifer*, and *princeps coquorum*. 2. *Major-domo* was alſo applied to the ſteward of the houſhold. 3. The title of *major domo* was alſo given to the chief miniſter, or him to whom the prince deputed the adminiſtration of his affairs foreign and domeſtic, relating to war as well as peace. Inſtances of *major-domos* in the two firſt ſenſes are frequent in the Engliſh, French, and Norman affairs.

MAJORANA, in *Botany*. See MARJORAM.

MAIZE, or INDIAN CORN, *zea*, in *Botany*, a genus of the *monoecia triandria* claſs. Its characters are theſe: it has male and female flowers, ſituated at remote diſtances on the ſame plant; the male flowers are diſpoſed in a looſe ſpike, having oval, oblong, chaffy empalements, opening with two valves, each incloſing two flowers; theſe have two ſhort compreſſed nectariums, and three hair-like ſtamina, terminated by quadrangular ſummits, which open in four cells at the top; the female flowers, which are ſituated below the male, are diſpoſed in a thick ſpike, incloſed with leaves; theſe have thick chaffy empalements, with two valves; the flowers are compoſed of two ſhort membranaceous broad valves, which are permanent, and a ſmall germen, with a ſlender ſtyle, crowned by a ſingle ſtigma, which is hairy toward the point; the germen afterward turns to a roundiſh compreſſed ſeed, angular at the baſe, and half incloſed at its proper receptacle. Miller reckons three ſpecies, and Linnæus only one.

The Indians in New England, and many of our other ſettlements in America, had no other vegetable but *maize*, or Indian corn, for making their bread. They call it *weachin*; and where our colonies are at this time numerous, there is yet much of the bread of the country made of this grain, not of the European corn. In Italy and Germany alſo there is a ſpecies of *maize*, which is the food of the poor inhabitants.

The ear of the *maize* yields a much greater quantity of grain than any of our corn ears. There are commonly about eight rows of grain in the ear, often more, if the ground be good. Each of theſe rows contain at leaſt thirty grains, and each of theſe gives much more flour than a grain of any of our corn. The grains are uſually either white or yellowiſh, but ſometimes they are red, bluiſh, greeniſh, or olive-coloured, and ſometimes ſtriped and variegated. This ſort of grain, though ſo eſſentially neceſſary to the natives of the place, is yet liable to many accidents. It does not ripen till the end of September; ſo that the rains often fall heavy upon it while on the ſtalk, and the birds, in general, peck it while it is ſoft and unripe. Nature has, to defend it from theſe accidents, covered it with a thick huſk, which keeps off ſlight rains very well; but the birds, if not frighted away, often eat through it, and devour great quantity of the grain.

There ſeem to be three or four diſtinct ſpecies of *maize* in different parts of America. That of Virginia is very tall and robuſt, growing to ſeven or eight feet high; that of New England is ſhorter and lower. And the Indians, farther up in the country, have yet a ſmaller kind in common uſe. The ſtalk of the *maize* is jointed like the ſugar-cane; it is very ſoft and juicy, and the juice is ſo ſweet and ſaccharine, that a ſyrup, as ſweet as that of ſugar, has been often made of it; and things ſweetened with it have been found not diſtinguiſhable from thoſe done with ſugar. It has not been tried yet, whether it will cryſtallize into ſugar; but in all probability it will.

The Americans plant this corn any time from the beginning of March to the beginning of June; but the beſt ſeaſon is the middle of April. The ſavage Indians, who know nothing of our account of months, uſed to guide themſelves in the ſeed time of this uſeful plant, by the budding of ſome particular trees of that country, and by the coming up of a ſort of fiſh into their rivers, which they call the *aloofe*. Theſe things were both ſo regular, that they were in no danger of miſtaking the time.

The manner of planting *maize* is in rows, at equal diſtances, every way about five or ſix feet. They open the earth with a hoe, taking away the ſurface to three or four inches deep, and of the breadth of the hoe; they then throw in a little of the finer earth, ſo as to leave the hoe three inches deep, or thereabouts, and in each of theſe holes they place four or five grains at a little diſtance from one another. If two or three of theſe grow up, it is very well; ſome of them are uſually deſtroyed either by the birds or other animals.

When the young plants appear, they hoe up the weeds from time to time; and when the ſtalk gathers ſome ſtrength, they raiſe the earth a little about it, and continue this at every hoeing, till it begins to put forth the ears; then they enlarge the hill of earth, round the root, to the ſize of a hop-hill, and after this they leave it till the time of harveſt, without any farther care.

When they gather the ears, they either immediately ſtrip off the corn, or elſe hang up the ears, tied in traces at diſtances from one another; for if they are laid near together, they will heat and rot, or elſe ſprout and grow; but kept cool and ſeparate, they will remain good all the winter. The beſt method is to threſh out the corn as ſoon as the harveſt is over, to dry it well on mats in the ſun, and then lay it up in holes of the ground, well lined with mats, graſs, or the like, and afterwards covered at top with more earth. The moſt careful among the Indians uſe this method, and this ſort of ſubterranean granary always proves good. See TRACING.

The uſes of this plant among the Indians are very many. The great article is their making their bread of it; but beſides this, the ſtalks, when cut up before they are too much dried, are an excellent winter food for cattle; but they uſually leave them on the ground for the cattle to feed on. The huſks about the ear are uſually ſeparated from the reſt, and make a particular ſort of fodder, not inferior to our hay. The Indian women have a way of ſlitting them into narrow parts, and they then weave them artificially into baſkets and many other toys.

The original way of eating the grain, among the Indians, was this: they boiled it whole in water till it ſwelled and became tender, and then they fed on it either alone, or eat it with their fiſh and veniſon, inſtead of bread. After this, they found the way of boiling it into a ſort of pudding, after bruiſing it in a mortar; but the way of reducing it to flour is the beſt of all. They do this by parching it carefully in the fire, without burning, and then beating it in mortars, and ſifting it. This flour they lay up in bags, as their conſtant proviſion, and take it out with them when they go to war, eating it either dry or with water. The Engliſh have contrived, by mixing it into a ſtiff paſte, either by itſelf, or with rye or wheat meal, fermenting it with leaven or yeaſt, and baking it in a hot oven, to make good bread of it. They have likewiſe found out a method of making good beer, either of the bread, or by malting the grain. Phil. Tranſ. Nº 142. or Abridg. vol. ii. p. 630, &c. See SAMP.

MAKE, in *Law*, ſignifies to perform and execute.

Thus, to *make* his law, is to perform that law to which a man had formerly bound himſelf; v. gr. to clear himſelf of action commenced againſt him by his own oath, and the oath of his neighbours; otherwiſe called to wage law. See WAGER *of law*.

So, to *make* ſervices or cuſtoms, is nothing elſe but to perform what belongs to them.

MAKE-*hawk*, in *Falconry*. See HAWK.

To MAKE, in *Sea-Language*, is variouſly applied: e. g. *to make a board*. See BOARD.

To make the *land*, is to diſcover it from a diſtant ſituation, in conſequence of approaching it after a ſea-voyage: to *make* ſail is to increaſe the quantity of ſail already extended, either by letting out the reefs, and by hoiſting an additional number of ſmall ſails, or by either of theſe operations ſeparately: to *make* ſtern-way is to retreat or move with the ſtern foremoſt: to *make* water caſually ſignifies to leak; but a ſhip is ſaid to *make* foul water, when running in ſhallow water, her keel diſturbs the mud or ooze, lying at its bottom.

MAKINBOY, a name given by the people of Ireland to a kind of ſpurge, or tithymale, common there: this is a very violent purge, as all the other ſpurges are; but the Iriſh have an opinion that it will produce this effect only by being carried in the pocket. This opinion, which had been univerſally believed for many ages, was proved to be falſe by Dr. Mullen, who carried a large quantity of it about him many days together, on purpoſe to give a fair trial; but it had not any the leaſt effect on him.

MAKING *up*, a term uſed by the diſtillers to expreſs the bringing ſpirits to a certain ſtandard of ſtrength by the addition of water. See LOWERING.

It is uſed principally in the diſtilling ſpirits, after their firſt drawing, either by way of rectifying them, or of giving them the virtues of aromatic ingredients, in order to make the compound waters; ſuch as cinnamon, aniſeed, and the like. See DISTILLATION.

In the making theſe compounds, ſome uſe an alcohol, or totally inflammable ſpirit, which is much the beſt method; others uſe ordinary proof ſpirit of malt, or melaſſes. If the latter be uſed, it is beſt not to put any water with it into the ſtill; but if the former, ſo much water is to be added as will reduce it to the proof ſtrength, which is juſt an equal quantity. When this is done, there ſhould be drawn off three fifths of the whole by diſtillation; and the far better way would be to keep this liquor in this very ſtate, which is juſt the ſtrength of the trois cinques brandy of the French: but as people require theſe waters to be kept for drinking, in ſuch a ſtate as not to exceed at the utmoſt the ſtrength of proof ſpirit, generally to fall much ſhort of it, it is neceſſary to reduce this three fifths to the whole, or more than the whole quantity of the proof ſpirit put into the ſtill. The apothecaries, to this end, uſually let the ſtill continue to work without changing the receiver, till an equal quantity is produced to the ſpirit put in, or one fourth more; it being the uſual ſtandard in theſe waters to have five quarts made from a gallon of the ſpirit. By the method of doing this, by letting the ſtill run, the faints are taken into the water, and give it a vapid and diſagreeable taſte. Inſtead of this the diſtiller, when he has drawn off his three fifths of the quantity of proof, makes up the whole to the deſtined quantity, by adding the two other fifths, or more than that, if required, of common water, in which it is alſo cuſtomary to diſſolve ſome fine ſugar; and this gives a fulneſs in the mouth to the water, and makes it mellow, or loſe the fiery taſte of the ſtill much ſooner. If it be only made up to the ſtrength of proof, it will mellow much ſooner than if reduced one fifth below that ſtandard, as the oil is much more perfectly diſſolved in ſpirit of a ſtandard proof ſtrength, than in ſuch as is weaker. The water employed in the *making up*, ſhould be either ſoft and clear river-water, or elſe ſpring-water rendered ſoft by diſtillation, otherwiſe it is apt to turn the water thick, and precipitate a ſediment, eſpecially if the water be drawn lower than proof, or if the ſpirit, originally employed, partake of an alkaline nature from the ſalts uſed in its rectification, as is uſually the caſe in the malt ſpirits, the groſs oil of which requires to be ſeparated by mixing ſalt of tartar or pot-aſh with it in the ſtill in the rectification.

When it is neceſſary to *make up* waters lower than proof, they are generally cloudy: but this may be remedied, and they may be fined down in a day or two with a ſmall quantity of alum, or with whites of eggs, or the jelly of iſinglaſs beat up to a froth, and mixed in the ſame manner as is uſually done in the refining of wines.

The ſugar, added to theſe cordial waters, has not only the advantages of mellowing and filling the mouth, but it unites the oil to the ſpirit in a manner that it could never be united in without it. Shaw's Eſſay on Diſtillery.

MALA *aurea*, in *Botany*, a name by which ſome authors have called the *poma amoris*, or fruit of the lycoperſicon.

MALABAR *nut*, in *Botany*, a ſpecies of the JUSTICIA. See ADHATODA.

MALABATHRUM, among the *Ancients*, an excellent ſweet-ſcented ointment.

MALABATHRUM, *Indian leaf*, in *Botany*. See TAMALAPATRA.

MALACCA *ſtones*, a name given by many authors to the *pedro del porco*, or *hog*-BEZOAR.

MALACHE, formed of *μαλασσω*, *I ſoften*, a term uſed by authors in a different ſenſe; ſometimes expreſſing ſuch medicines as gently looſen the belly, and ſometimes ſuch ointments as relax and mollify.

MALACHI, *the prophecy of*, is one of the canonical books of the Old Teſtament, written by *Malachi*, who was probably contemporary with Nehemiah, and lived about 428 years before Chriſt. The chief corruptions which he charges upon the Jews are the ſame with thoſe for which they were reproved by Nehemiah; he forbids them to expect any farther ſucceſſion of prophets, exhorts them to obſerve the law of Moſes, and predicts the coming of Elias or John the Baptiſt, as the forerunner of the Meſſiah.

MALACHITES, or MOLOCHITES, in *Natural Hiſtory*, a ſpecies of jaſper, but of leſs beauty than moſt of thoſe of that claſs, and not quite ſo hard, for it does not ſtrike fire with ſteel. It is naturally of a pure and deep green, but ſometimes variegated with whitiſh or blackiſh ſpots and clouds. It is either of a radiated or equable texture, generally of an oval form, and the ſize of an egg; but ſometimes it forms capillary filaments. It is found in the Eaſt and Weſt Indies; alſo in many parts of Europe, as Norway, &c. Its ſpecific gravity, according to Muſchenbroeck, is from 3.5 to 3.994. It is ſometimes mixed with calcareous earth and gypſum. According to Mr. Fontana, one hundred parts of the pureſt ſort contain ſeventy-five of copper, and twenty-five of aerial acid and water. Kirwan's Elem. Min. p. 259. See JASPER.

Its amuletic virtues, formerly in great eſteem, are too ridiculous to be particulariſed. It is ſaid to be a violent purgative, operating both by vomit and ſtool, and as ſuch given in dropſies, in ſo ſmall a doſe as five or ſix grains. If, as is very probable, its green colour be owing to particles of COPPER, it is not wonderful that it ſhould have this effect; but there are ſo many better medicines for this purpoſe, as to ſuperſede its uſe.

MALACHRA, in *Botany*, a genus of the *monadelphia polyandria* claſs; the characters of which are, that the calyx is three-leaved, and that the ſeeds, which are ſingle, are covered with five coats. There are two ſpecies.

MALACIA, *Μαλακια*, a diſeaſe conſiſting in a depraved appetite, wherein the patient covets and longs for ſome particular kind of food with extraordinary earneſtneſs, and eats it to exceſs.

The word ſeems derived from the Greek *μαλακος*, *ſoft*; too lax a tone of the ſtomach being generally the occaſion of indigeſtion, and of theſe unuſual cravings.

Many authors confound this affection with another called PICA, which conſiſts in a depravation of appetite, leading the patient to covet things unnatural and abſurd, as lime, coals, &c.

The *malacia* ſeems to ariſe from an evil diſpoſition of the menſtruum in the ſtomach; or from ſome defect in the imagination, which determines it to ſome one thing rather than another.

MALACOCISSOS, in *Botany*, a name uſed by ſome authors for the common ground-ivy, or *hedera terreſtris*; and by ſome others for the marſh-marygold.

MALACODERMATA, formed of *μαλακος*, *ſoft*, and *δερμα*, *ſkin*, in *Natural Hiſtory*, a term uſed to expreſs ſuch animals as have only ſoft ſkins for their covering; in oppoſition to the oſtracodermata, which have hard ſhelly matters for their covering, ſuch as crabs, lobſters, &c.

MALACOIDES, in *Botany*. See *Baſtard* MALLOW.

MALACOPTERIGII, in *Ichthyography*, the name of a large order of fiſhes, which have not prickly fins.

The term is derived from the Greek *μαλακος*, *ſoft*, and *ϖτερυγιον*, a *fin*. The fiſh of this order, are thoſe which have bony fins, with all their extremities not pointed or ſharp, but ſoft and harmleſs. Of this order are the carp, &c.

MALACOSTOMOUS, in *Ichthyography*, the name of a large genus of fiſhes, called in Engliſh the leather-mouthed kind. Theſe fiſhes are wholly deſtitute of teeth in their jaws, but have them placed in their throats, near the orifice of the ſtomach.

The word is derived from the Greek *μαλακος*, *ſoft*, and *ϛομα*, a *mouth*. All the fiſh of this genus have their ſwimming, or air-bladder, divided into two parts; and of this genus are the carp, tench, bream, chub, and the like.

MALACOSTRACA, in *Natural Hiſtory*, a term uſed by ſome, as Ariſtotle, to diſtinguiſh what we call cruſtaceous animals of the ſea, &c. from thoſe which he calls oſtracodermata, or teſtaceous, as we expreſs it. See table of teſtaceous and cruſtaceous animals. See CRUSTACEOUS.

MALAGMA, formed of μαλασσω, *I ſoften*, a word uſed by ſome authors to expreſs a cataplaſm in general, of whatever nature, or made of whatever ingredients; but ſome have uſed it only for emollient cataplaſms.

MALANDERS, *malandria*, a diſeaſe in horſes, ſo called from the Italian *malandare, to go ill.*

It conſiſts in certain ulcerous chaps, or chinks, appearing on the inſide of the fore-legs, juſt againſt the bending of the knee, which void a red, ſharp, and pungent humour.

This diſtemper may be cured by waſhing the parts with a warm lather of ſoap, or old chamber-ley; and then applying over the cracks, a ſtrong mercurial ointment, ſpread on tow, with which they ſhould be dreſſed night and morning, till all the ſcabs fall off; but if this treatment fail, make an ointment of half an ounce of æthiops mineral, one dram of white vitriol, ſix ounces of ſoft green ſoap; and having clipped off the hair, and cleared away the ſcabs, anoint often with this, and apply the above unguent over the ſores. When they dry up, give a gentle purge or two; or let the nitre balls be taken for two or three weeks. Bartlet.

MALANKUA, in the *Materia Medica*, the name by which ſome authors have called the plant whoſe root is the round zedoary.

Many indeed eſteem the long and round zedoary the roots of different plants, but they ſeem rather to be only the different parts of the roots of the ſame ſpecies.

MALARMAT, in *Ichthyology*, a name given by authors to the fiſh called by ſome *lyra altera*, and *cornuta*. It is a ſpecies of the trigla, and is diſtinguiſhed by Artedi by the name of the trigla with many cirrhi, and with an octagonal body.

MALARUM *oſſa*, in *Anatomy*, are the cheek bones; they make the prominent upper part of the cheeks moſt remarkable in lean perſons: they form likewiſe a portion of the orbit, and complete the zygomatic arches. They have their name from the Latin *mala*, the *cheek*; they are two in number, and are ſituated in the lateral and middle parts of the face. They are, in ſome meaſure, triangular or irregularly ſquare, and are divided into two ſides, the external gently convex, the internal unequally concave.

The eminences in each bone are the ſuperior or angular orbitary apophyſis, which joins by ſuture with the external angular apophyſis of the os frontis, and aſſiſts in forming the external angle of the orbit: from this apophyſis another ſubaltern proceſs runs inward on the inſide of the bone, one ſide of which forms a portion of the orbit, the other a portion of the zygomatic foſſa: the inferior or maxillary orbitary apophyſis, which with the angular apophyſis forms the inferior external portion of the orbit: the apophyſis malaris, which is in ſome meaſure the baſis of the reſt, and together with the apophyſis maxillaris, joins the orbitary apophyſis of the os maxillare, and the zygomatic apophyſis, which makes a part of the zygoma, and alſo of the zygomatic foſſa.

The cavities are the great orbitary ſlope, which makes the inferior external portion of the edge of the orbit; the zygomatic notch above the zygoma, and one or more little holes on the outſide, and in the orbitary apophyſis. Each bone is compoſed of two pretty compact tables, with a ſmall quantity of diploe between them, except in the anterior part of the apophyſis malaris. The os malæ on each ſide is joined to the os frontis by the angular apophyſis; to the os ſphænoides, by the ſubaltern apophyſis; to the os temporis, by the zygomatic apophyſis; and to the os maxillare, by its baſis. Winſlow's Anatomy, p. 34.

MALE, the ſex which has the parts of generation withoutſide, and which has ordinarily the pre-eminence over the other.

In this ſenſe *male* ſtands oppoſed to *female*.

For the proportion of *males* to *females*, ſee MARRIAGE.

MALE *balſam apple*. See BALSAM-*apple*.

MALEBRANCHISM, the doctrine or ſentiments of father *Malebranche*, who was born at Paris in 1638, and became a prieſt of the Oratory of France in 1660, and died in 1715.

Malebranchiſm is in a great meaſure the ſame with CARTESIANISM. It muſt be owned, however, that though F. *Malebranche* thought the ſame with Des Cartes, yet he does not ſo properly ſeem to have followed him, as to have met with him.

Malebranchiſm is contained in the Recherche de la Verité; and, to give a general notion of it, we need only repeat what M. Fontenelle ſays of that work. The Inquiry after Truth, ſays he, is full of God: God is the only agent, and that too in the ſtricteſt ſenſe. All power of acting, all actions, belong immediately to him. Second cauſes are no cauſes. They are only occaſions that determine the action of God; or occaſional cauſes.

F. *Malebranche*, however, does not here lay down his ſyſtem entire, with regard to religion, or rather the manner in which he would reconcile religion to his ſyſtem of philoſophy; that he reſerved for his Entretiens Chrétiens, printed in 1677, where he proves the exiſtence of a God, the corruption of human nature by original ſin, and the neceſſity of a Mediator, and of grace.

Malebranchiſm, notwithſtanding, appears to many perſons not only ill-grounded, but even dangerous, and deſtructive to religion; and it has accordingly been vigorouſly oppoſed by many zealous French authors. The firſt was M. Foucher. After him came M. Arnaud; and in 1715, F. du Tertre, a Jeſuit, publiſhed an ample confutation (as he imagines) of his whole ſyſtem. It was alſo charged with atheiſm by F. Hardouin, in his Atheiſts Unmaſked; though his ſyſtem, formed by a warm and exuberant imagination, tends more to fanaticiſm and enthuſiaſm than to atheiſm. That part which relates to our ſeeing all things in God, has been anſwered by Mr. Locke.

MALEDICTION, *maledictio*, in *Law*, a curſe uſually annexed to donations of lands, &c. to churches and religious houſes; imprecating the moſt direful puniſhments on thoſe who ſhould infringe them.

MALICE, in *Ethics* and *Law*, is a formed deſign of doing miſchief to another; it differs from hatred. In murder, it is *malice* makes the crime; and if a man having a *malicious* intent to kill another, in the execution of his *malice*, kills a perſon not intended, the malice ſhall be connected to his perſon, and he ſhall be adjudged a murderer. The words *ex malitia præcogitata*, are neceſſary to an indictment of MURDER, &c. And this *malitia præcogitata*, or *malice prepenſe*, may be either expreſs or implied in law. Expreſs *malice* is, when one with a ſedate, deliberate mind, and formed deſign, kills another; which formed deſign is evidenced by external circumſtances, diſcovering that intention as lying in wait, antecedent menaces, former grudges, and concerted ſchemes to do him ſome bodily harm. Beſides, where no *malice* is expreſſed, the law will imply it; as where a man wilfully poiſons another, in ſuch a deliberate act the law preſumes *malice*, though no particular enmity can be proved. And if a man kills another ſuddenly, without any, or without a conſiderable provocation, the law implies *malice*; for no perſon, unleſs of an abandoned heart, would be guilty of ſuch an act, upon a ſlight or no apparent cauſe.

MALIGNANT, in *Medicine*, that quality in a diſeaſe which renders it more than ordinarily dangerous, and difficult of cure.

Malignant is generally applied to ſuch fevers as are epidemical or infectious, and are attended with ſpots and eruptions of various kinds. See *Putrid* FEVER.

MALKARABÆLA, in *Zoology*, the name of an Eaſt Indian ſpecies of ſerpent found in the iſland of Ceylon. It is remarkably variegated with white and duſky brown, in various figures.

MALL, or *Sea*-MALL, in *Ornithology*, the Engliſh name of a bird of the gull or larus kind, being the common gull, and diſtinguiſhed by authors by the name of *larus cinereus minor*, and called by Linnæus *larus canus*. It is very like the *larus cinereus major*, or HERRING-*gull*, but much ſmaller, not weighing above a pound; its head and neck are grey, with ſome brown ſpots; the lower part of the neck is white, the back is grey, and the breaſt and belly white as ſnow; the tail is alſo perfectly white, and is not forked. Theſe birds breed on the ledges of cliffs that hang over the ſea, and in winter are found in vaſt flocks on all our ſhores. See GULL.

MALLARD. See DUCK.

MALLEABLE, ſomething hard and ductile, and that may be beaten, forged, and extended under the hammer, without breaking.

All metals are *malleable*, not excepting even quickſilver; but gold is ſo in the greateſt degree of all. The chemiſts have long ſought the fixation of mercury, or to render it *malleable*. See MERCURY, and FREEZING.

It is a popular error, that the art of making glaſs *malleable* was ever known; its nature is incapable of it. For if it were ductile its pores would not be oppoſite to each other, and of conſequence it would not be tranſparent; ſo that its principal criterion would be loſt.

MALLEAMOTHE, in *Botany*, a low tree, or rather ſhrub, growing in Malabar. Of the roots are made hafts for knives, the leaves ſerve to dreſs the ground, and being fried in oil of palm, furniſh a liniment for removing the impetigo, and drying the puſtules of the ſmall pox. A decoction of the ſame, in common water, is uſed as a fomentation, to mitigate the pains of the hæmorrhoids.

The root pulverized with ginger and ſaffron, and exhibited in an infuſion of rice, cures the dropſy by powerfully promoting a diſcharge of ſuperfluous ſeroſities by the urinary paſſage. Acoſta commends the ſhrub principally for two effects; firſt, againſt fluxes of the belly, for which purpoſe, however, it is of leſs efficacy than other medicines; ſecondly, for curing all kinds of eryſipelas, eſpecially ſuch as proceed from mere bile. They macerate the whole root or trunk, bruiſed in a decoction of rice, and ſuffer them to remain there for ſome hours, that the water may contract an acidity; after which they anoint the eryſipelas therewith, and order the patient to drink a ſufficient quantity of the ſame twice a day, the ſtomach being firſt purged. They give the ſame water to thoſe who labour under an inflammation of the liver, and the burning heat of a fever; and uſe it mixed with a ſmall quantity of the juice of the leaves of tamarind, to anoint the lips of the wounds, in order to prevent an inflammation.

MALLEMUCKE, in *Ornithology*. See FULMAR.

MALLEOLI, among the Romans, bundles of any combuſtible matter beſmeared with pitch, and uſed by the Roman ſoldiers either for giving light in the night-time, or for ſetting fire to ſome of the enemies works.

The *malleoli* were ſometimes fixed to a dart or javelin, that they might be ſure to catch firm hold, and communicate the fire wherever they happen to light.

MALLEOLUS, a proceſs in the lower part of the leg, juſt above the foot.

There is one *internal*, and another *external malleolus*.

The *internal malleolus* is an eminence of the tibia; the *external* of the fibula; the two together form the ancle. See *Tab. Anat.* (*Oſteol.*) *fig.* 3 *n.* 23.

MALLEOLUS, in *Ichthyology*, a name given by Gaza and ſome others, to the fiſh called by Ariſtotle and the other old writers, *ſphyræna*, and by the Italians *luzzo marino*.

It is a beautiful fiſh, and ſeems to belong to the ſcombri, or mackrel-kind. Salvian has figured it under the name of *ſudis*, a name by which it is alſo called by Varro and ſome other old authors; but Salvian's figure is very imperfect; he has omitted the back-fin.

MALLET, a large kind of hammer, made of wood, much uſed by artificers, who work with a chiſſel, as ſculptors, maſons, and ſtone-cutters, whoſe mallet is ordinarily round; and by carpenters, joiners, &c. who uſe it ſquare. See HAMMER.

There are ſeveral ſorts of *mallets* uſed for different purpoſes on ſhip-board. The *calking-mallet* is chiefly employed to drive the oakum into the ſeams of a ſhip, where the edges of the planks are joined to each other in the ſides, deck, or bottom. The head of this *mallet* is long and cylindrical, being hooped with iron to prevent it from ſplitting in the exerciſe of CALKING. There is alſo the *ſerving-mallet*, uſed in ſerving the rigging, by binding the ſpun yarn more firmly about it than it poſſibly could be done by hand; which is performed in the following manner: the ſpun yarn being previouſly rolled up in a large ball, or clue, two or three turns of it are paſſed about the rope, and about the body of the *mallet*, which for this purpoſe is furniſhed with a round channel in its ſurface, that conforms to the convexity of the rope intended to be ſerved. The turns of the ſpun-yarn being ſtrained round the *mallet*, ſo as to confine it firmly to the rope, which is extended above the deck, one man paſſes the ball continually about the rope, whilſt the other, at the ſame time, winds on the ſpun-yarn by means of the *mallet*, whoſe handle acting as a lever, ſtrains every turn about the rope as firm as poſſible. Falconer.

MALLEUM *movens*, in *Anatomy*, a name given by Fabricius to one of the muſcles of the ear, called by Cowper the *internus auris*, and by Albinus, who had conſidered its proper uſe, TENSOR *tympani*.

MALLEUS, in *Anatomy*, denotes one of the bones of the ear; ſo called from its reſemblance to a hammer, or mallet; firſt diſcovered, as ſome aſſert, by Alexander Achillinus; though others have miſtakenly attributed it to Jac. Carpenſis. Vide Douglas Bibl. Anat. p. 48.

The *malleus*, or hammer of the ear, is a long bone with a large head, a ſmall neck, a handle, and two apophyſes, the one in the neck, the other in the handle. The top of the head is conſiderably rounded, and from thence it contracts all the way to the neck; both head and neck are in an inclined ſituation; and the eminences and cavities in it anſwer to thoſe in the body of the incus. The handle is looked on by ſome as one of the apophyſes of the *malleus*, and in that caſe it is the greateſt of the three. It forms an angle with the neck and head, near which it is ſomething broad and flat, and decreaſes gradually towards it extremity. The apophyſis of the handle, termed by others the ſmall or ſhort apophyſes of the *malleus*, terminates the angle already mentioned, being extended toward the neck, and lying in a ſtrait line with that ſide or border of the handle which lies next it. The apophyſis of the neck, called alſo the apophyſis gracilis, is in a natural ſtate very long, but ſo ſlender withal, that it is very eaſily broken, eſpecially when dry, which is the reaſon why the true length of it was for a long time unknown. It ariſes from the neck, and ſometimes appears much longer than it really is, by the addition of a ſmall dried tendon ſticking to it. When the *malleus* is in its true ſituation, the head and neck are turned upwards and inwards, the handle downward, parallel to the long leg of the incus, but more forward; the apophyſis of the handle upwards and outward, near the ſuperior portion of the edge of the tympanum, near the centre of which is the extremity of the handle; and the apophyſis gracilis forward, reaching all the way to the articular fiſſure in the os temporis. By the knowledge of this, the *malleus* of the right ear may be known from that of the left when out of their places. Winſlow's Anat. p. 49. See EAR.

MALLOW, *malva*, in *Botany*, a genus of the *monadelphia polyandria* claſs. Its characters are theſe: the flower has a double empalement, the outer compoſed of three, the inner of one leaf, cut into five broad ſegments at the brim; the flower is of one petal; it has a great number of ſtamina, which coaleſce at bottom in a cylinder, but ſpread open above; in the centre is ſituated an orbicular germen ſupporting a ſhort cylindrical ſtyle, with many briſtly ſtigmas; the empalement afterward turns to ſeveral capſules, which are joined to an orbicular depreſſed head faſtened to the column, opening on their inſide, each containing one kidney-ſhaped ſeed. Miller reckons fifteen, and Linnæus twenty-three ſpecies; two of which grow wild in moſt parts of England.

The freſh roots of a wild *mallow*, with a ſinuated leaf, are uſed as a diuretic and emollient, and the dried leaves as an ingredient in clyſters, and in emollient fomentations and cataplaſms. The ancients gave the juice of the *mallow*, in large doſes, for inflammations and obſtructions of the viſcera. A ſtrong decoction of *mallow* root is apt to be mucilaginous, and to ſit ill on the ſtomach. It is a good common drink in pleuriſies, peripneumonies, and peculiarly in caſes of gravel, or inflammations of the kidneys; alſo in ſtranguries and ſuppreſſions of urine of all kinds. Infuſions or decoctions of the leaves and flowers, and a conſerve made by boiling the freſh flowers with thrice their weight of fine ſugar, are ſometimes preſcribed for the ſame complaints.

MALLOW, *baſtard*, *malope*, in *Botany*, a genus of the *monadelphia polyandria* claſs. Its characters are theſe: the flower is ſhaped like that of the *mallow*, and hath a double empalement, the outer compoſed of three, and the inner of one leaf, cut into five ſegments; the flower is of one petal, divided into five parts to the bottom; in the centre is ſituated the column, having a great number of ſtamina and ſtyles joined cloſely to it; the germen becomes a fruit compoſed of many cells, which are collected into a head, in each of which is lodged a ſingle ſeed. There is but one ſpecies, which has greatly the appearance of the *mallow*. Miller.

MALLOW, *Jews*, *corchorus*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the flower, when it is included in a five leaved impalement, has five oblong blunt petals, and many hairy ſtamina, which are ſhorter than the petals; in the centre is ſituated an oblong furrowed germen, which becomes a cylindrical pod, having five cells, which are filled with angular pointed ſeeds. Miller reckons five ſpecies, which, being natives of the Eaſt and Weſt Indies, are too tender to thrive in the open air in England. Linnæus enumerates ſeven ſpecies.

The common *Jews mallow*, Rawwolf ſays, is cultivated about Aleppo as a pot-herb, and uſed by the Jews with their meat; and he ſuppoſes it to be the olus Judaicum of Avicenna, and the corchorum of Pliny.

A decoction of the whole plant, but eſpecially of the leaves, is beneficial to the breaſt, by moiſtening it; for which reaſon being taken with ſugar-candy, it is a preſent remedy for rough and dry coughs.

MALLOW, *Indian*, *urena*, in *Botany*, a genus of the *monadelphia polyandria* claſs. Its characters are theſe: it hath a malvaceous flower, with a double empalement, the outer being of one leaf, ſlightly cut at the brim into five parts, but the inner is five-leaved, permanent, and cut to the bottom; the flower is compoſed of five leaves, which are oblong, and blunt at their extremity, but narrow at their baſe, where they coaleſce; in the centre there are many ſtamina, which are joined, and form a column at their baſe, but ſpread open above; it has a roundiſh, five-cornered germen, with a ſingle ſtyle, and ten hairy reflexed ſtigmas; the germen changes to a pentagonal fruit, which is a berry, and divides into five cells, each having one angular ſeed. There are three ſpecies.

MALLOW, *Indian*, or *yellow*, *ſida*, in *Botany*, a genus of the *monadelphia polyandria* claſs. Its characters are theſe: the empalement of the flower is ſingle, permanent, angular, and five-pointed; the flower has one petal cut into five broad ſegments, joined at their baſe, and indented at their points; it has many ſtamina joined in a column at bottom, but ſpread open above, and an orbicular germen, ſupporting a ſhort multifid ſtyle; the germen becomes a five-cornered capſule, having five cells, each containing an angular roundiſh ſeed. There are twenty-one ſpecies.

Mallow, *marſh*, *althæa*, in *Botany*, a genus of the *monadelphia polyandria* claſs. Its characters are theſe: the flower has a double calyx; the outer cut into nine ſegments at the brim; the inner into five broad acute ſegments at the top; the flower has five petals, coaleſcing at their baſe, ſpreading open above, and ſhaped like a heart; there are many ſtamina, forming a kind of cylinder; in the center is placed the orbicular germen, ſupporting a ſhort cylindrical ſtyle; the empalement becomes a compreſſed capſule, divided into ſeveral cells, each containing one compreſſed kidney-ſhaped ſeed. There are four ſpecies.

The common *marſhmallow*, with ſingle woolly leaves, indented in ſharp ſegments, and growing naturally in moiſt places in many parts of England, though frequently cultivated in gardens, is perennial, and flowers from June to almoſt the end of ſummer.

The parts of this plant uſed in medicine, are the leaves and roots. The leaves, by decoction, afford a ſoft mucilaginous ſubſtance, good in all complaints ariſing from acrimony: of great ſervice in dyſenteries, &c. where the mucus of the inteſtines is raked off, and in many kinds of colics. It is alſo found of uſe in obſtructions of the urinary paſſages, ſtranguries, heat of urine, &c. and is by ſome held a great ſecret for the cure of a gonorrhœa. Ray and others alſo ſpeak of it as a pectoral; of uſe in coughs, and alſo pleuriſies.

Marſhmallow root is a very valuable medicine. It is emollient and diuretic, and gives great relief in diſorders of the kidneys and bladder, whether ariſing from acrimony of the urine or gravel. It is good alſo in all diſorders of the breaſt and lungs, ariſing from a thin acrimonious phlegm; in both which caſes, a decoction of the freſh root is the beſt way of giving it. In diarrhœas and dyſenteries, a ſtrong decoction of *marſhmallow* root, given clyſterwiſe, is alſo of great uſe. Externally, in form of a cataplaſm, it is excellent for ſoftening and maturating hard tumors. The root is ſometimes given in powders, from a ſcruple to a dram or two, either by itſelf, or in conjunction with other materials of a ſimilar intention, as gum tragacanth, ſtarch, &c.

The ſyrup of *marſhmallows* is made by boiling a pound of the freſh roots in a gallon of water, till half the liquor is waſted, preſſing out the decoction, and after ſettling for a night, boiling it down with four pounds of fine ſugar, till the weight of the whole is ſix pounds; this is kept in the ſhops, and occaſionally employed in ſome diſorders of the breaſt, and for ſweetening emollient decoctions in nephritic caſes. This, however, is leſs efficacious than the decoction; on account of the ſugar in the former, which makes an improper mixture with medicines of the mucilaginous kind.

Ointment of *marſhmallows*, called *unguentum dialthæa*, is applied to tumors and inflammations, as an emollient and ſuppurative; which qualities it derives from the mucilage of the plant, being boiled a long time with the oil, before any of the other ingredients are mixed. See DIALTHÆA.

The *emplaſtrum diachylon* receives much of its virtue from the ſame plant.

The *althæa* of the ancients was plainly a different plant from that which we call by that name. Our *althæa*, or *marſhmallow*, is a very common plant, and grows in watery places, principally near the ſea; but the *althæa* of the ancients was a ſcarce herb, and grew in the barren deſarts of Arabia, Aſia, and the iſland of Sicily.

The deſcriptions, as we find them in the ancients, ſeem rather to refer us to the ABUTILON, or yellow *mallow* kind, than our own *althæa*.

Mallow, *roſe*. See HOLLYHOCK.

Mallow, *ſea*, *malva marina*, in *Natural Hiſtory*, a name not very judiciouſly given by ſome writers to a ſpecies of ſubmarine ſubſtance, ſuppoſed in ſome degree to reſemble the leaves of the common *mallow*. It is very common in the places where they fiſh for coral, and grows to the rocks without any regular root; it is found at different depths, but moſt uſually far from the ſurface, and its height is uſually about two inches; it is of a duſky greeniſh colour, with an admixture of a faint yellow; it is compoſed of ſeveral leaves about half an inch broad, and a little more than that in length: each of theſe is faſtened to a pedicle of about an inch and half long; the leaves are of a fine thin membranaceous ſubſtance, but their ſtalks or pedicles are thick and rough like horn. When examined by the microſcope many glandules diſcover themſelves upon the ſurfaces of the leaves, but the ſtalks or pedicles are entirely covered with glandules in form of ſmall protuberances, which make it as rough in thoſe parts as the common ſhagreen. The ſtalks when cut tranſverſely ſhew an infinite number of pipes or veſſels running up to every part of the leaves. Count Marſigli has given an elegant figure of this, both as it appears to the naked eye, and by the microſcope.

Mallow *Syrian*, *ketmia*, or *hibiſcus*, in *Botany*, a genus of the *monodelphia polyandria* claſs. Its characters are theſe: the flower has a double permanent empalement; the outer has eight or ten narrow leaves; the inner is of one leaf, cut into five accute points; it has five heart-ſhaped petals, which join at their baſe into one; and many ſtamina, which are joined in form of a column, but expand toward the top; it has a round germen, which turns to a capſule with five cells, opening in five parts, incloſing kidney-ſhaped ſeeds. There are twenty-five ſpecies of this plant propagated in gardens, where moſt of them grow to be ſhrubs of ſix or ſeven feet high; and, in the time of their flowering, which is during a great part of the latter end of the ſummer, they make a very beautiful figure. They may all be propagated by ſowing their ſeeds in February or March on a light bed of earth; they muſt be ſuffered to remain in theſe beds till the following ſpring, being well weeded, and often watered in the ſummer. In the March following, the plants are to be tranſplanted into beds of the ſame ſort of earth, ſetting them at about ten inches diſtance every way; here they are to remain two years more, being well weeded and watered in the time; and in the March following, they ſhould be carefully removed to the places where they are to remain; they muſt be taken up carefully, without injuring the roots; the ground muſt be well watered where they are planted, and ſome mulch ſhould be laid about their roots, to prevent the ground's drying too faſt.

Some chooſe to propagate them by ſuckers from the old roots, but this is by no means adviſeable, as the plants this way raiſed are never well rooted, and are always ſubject to produce great numbers of ſuckers themſelves, which renders them very unſightly.

The Hiſtoria Plantarum aſcribed to Boerhaave, informs us, that all the ſpecies of this plant, except thoſe which taſte like ſorrel, agree in virtue with the *mallow*.

Mallow, *tree*, *varied-leaved*, or *Venetian*. See LAVATERA.

Mallow, *vervain*, a ſpecies of the *malva*, or common MALLOW. Some have called the ALCEA by this name.

Mallow, *yellow*. See *Indian* MALLOW.

MALMIGNATTO, in *Natural Hiſtory*, a name given by the inhabitants of the iſland of Cortica to a ſpecies of animal, or large inſect, called by ſome *tarantula*, and ignorantly ſuppoſed to be the ſame with the tarantula of Apulia. This iſland produces neither wolves, ſerpents, nor many other of the miſchievous and deſtructive animals which infeſt the neighbouring countries: but it produces two ſpecies of this venomous inſect, called the *malmignatto*; the one of theſe has a round body, and the other an oblong one, reſembling that of our large kind of ant; it has alſo ſix legs, not eight, and never makes any web: from all which it appears not to be a ſpider, but truly of the ant-kind, though a monſtrous ſized one, and very venomous. The round-bodied kind, by its bite, occaſions violent pains, a ſenſation of coldneſs and cramps all over the body; and the long-bodied one is yet more venomous. Its ſting occaſions an immediate lividneſs of the fleſh, with intolerable cramps and convulſions over the whole body; ſometimes the natural evacuations by ſtool and urine are alſo wholly ſtopt by it. The cure, in both caſes, is to be attempted by cutting and cauterizing the wound, and dreſſing it with Venice treacle, as alſo by giving the ſame in large doſes diſſolved in wine.

MALMSEY, or **Malvasy**, a rich luſcious kind of wine brought from Greece or Candia; ſo called from Malvaſia, a city in Peloponneſus, the ancient Epidaurus, whence this celebrated liquor was firſt brought.

That brought from Candia is now eſteemed the beſt.

Malmsey, or **Malvisy**, is alſo the name of a kind of muſcadine wine brought from Provence.

MALOBATHRUM, among the Romans, a precious kind of ointment, brought from the Indies through Syria to Rome.

MALOGRANATUM, in *Botany*. See POMEGRANATE.

MALPIGHIA, in *Botany*. See *Barbadoes* CHERRY.

MALOPE, in *Botany*. See *Baſtard* MALLOW.

MALPOLON, in *Zoology*, the name of a ſpecies of ſerpent found in the iſland of Ceylon, and beautifully variegated with red marks in the form of ſtars.

MALT denotes barley cured, or prepared to fit it for making a potable liquor, under the denomination of beer or ale. The manner of making *malt* ſir Robert Murray deſcribes as follows:—take good barley newly threſhed, &c. put about ſix Engliſh quarters into a ſtone trough, or ciſtern lined with lead, full of water, where let it ſteep till the water be of a bright reddiſh colour; which will be in about three days, more or leſs, according to the moiſture or dryneſs, and the ſmallneſs or bigneſs of the grain, and the ſeaſon of the year, or the temperature of the weather. In ſummer, *malt* never makes well; in winter, it requires longer ſteeping than in ſpring or autumn. It may be known when it is ſteéped enough, by other marks beſides the colour of the water; as by the exceſſive ſwelling of the grain, if it be over-ſteeped, and by too much ſoftneſs; being, when it is in a right temper, like the barley prepared to make broth of.

When it is ſufficiently ſteeped, take it out of the trough, and lay it on heaps to let the water drain from it; then after two or three hours turn it over with a ſcoop, and lay it in a new heap, about twenty or twenty-four inches deep.

This is called the *coming heap*, in the right management whereof lies the principal ſkill. In this heap it may lie forty hours, more or leſs, according to the fore-mentioned qualities of the grain, &c. before it comes to the right temper of *malt*; which that it may do equally is the principal thing deſired.

While it lies in this heap, it muſt be carefully looked to, after the firſt fifteen or ſixteen hours; for about that time the grains begin to put forth roots: which when they have equally and fully done, the *malt* muſt within an hour after be turned over with a ſcoop; otherwiſe the grains will begin to put forth the blade or ſpire alſo, which muſt by all means be prevented. If all the *malt* do not come equally, but that which lies in the middle, being warmeſt, comes the ſooneſt, turn it, ſo that the outmoſt may lie inmoſt; and thus manage it till it be all alike.

As ſoon as the *malt* is ſufficiently come, turn it over, and ſpread it to a depth not exceeding five or ſix inches; and by that time it is all ſpread out, begin and turn it over and over again three or four times. Afterwards turn it over in like manner once in four or five hours, making the heap deeper by degrees; and continue ſo to do for the ſpace of forty-eight hours at leaſt. This frequent turning it over, cools, dries, and deadens the grain; whereby it becomes mellow, melts eaſily in brewing, and ſeparates entirely from the huſk.

Then throw up the *malt* into a heap, as high as you can; where let it lie till it grow as hot as your hand can endure it. This uſually comes to paſs in about thirty hours. This perfects the ſweetneſs and mellowneſs of the *malt*.

After it is ſufficiently heated, throw it abroad to cool, and turn it over again about ſix or eight hours after, and then lay it on a hair-cloth, or wire ſpread under it; where, after one fire, which muſt laſt for twenty-four hours, give it another more ſlow, and afterwards, if need be, a third; for if the *malt* be not thoroughly dried, it cannot be well ground, neither will it diſſolve well in the brewing: but the ale it makes will be red, bitter, and unfit to keep.

The beſt fuel for drying it is peat, turf, or Welch coal, prepared by a previous burning; the next is charcoal. If there be not enough of one kind, burn the beſt firſt; for that gives the ſtrongeſt impreſſion. Phil. Tranſ. abr. vol. ii. p. 627, &c. Indeed the beſt and moſt natural method of drying is in the ſun, in the months of April and May. This yields the paleſt, the moſt wholeſome, and the fineſt liquor. However this be, take care the *malt* be not ſmoked in the drying. As to the complexion or colour of *malt*, the white is accounted the beſt, becauſe the moſt natural. Brown malt is dried with ſtraw for London PORTER.

The ſtrength and duration of the fire are different according as the *malt* is intended to be dried pale, amber, or brown. Pale and amber *malt* are dried with coke or culm, which, not emitting any ſmoke, give the *malt* a brighter colour, and do not impart that bad taſte which *malt* has when dried with wood, ſtraw, &c. Coke is beſt, becauſe its fire gives a ſteady and conſtant heat, whereby the *malt* is dried uniformly. If wood, or any vegetable fuel is uſed, it ſhould be extremely well dried, that it may yield the leſs ſmoke.

Almoſt every maltſter has his ſecret in making *malt*, but there are ſome neceſſary cautions to be obſerved by all, which will enſure ſucceſs in the work; theſe are, 1. That the barley be newly thraſhed, or at leaſt newly winnowed. 2. That the whole be of one kind, not mixed up of ſeveral ſorts. 3. That it be not over-ſteeped in the ciſtern, or ſo long as to make it ſoft. 4. That it be well drained. 5. That it be carefully looked after in the wet couch, ſo as to ſtop the firſt tendency of the blade to ſhooting. 6. To turn the wet couch inſide outermoſt, if the barley comes, that is, ſhoots more in the middle than on the ſides. 7. To keep it duly turning after it is out of the wet couch. 8. To give it the proper heating in the dry heap. 9. To dry and criſp it thoroughly on the kiln, but without a fierce fire, ſo as to be ſeveral days in drying a kiln of pale *malt*. Shaw's Lectures, p. 187.

By 12 Ann. ſtat. 1. cap. 2. continued yearly, and by 33 Geo. II. cap. 7. there ſhall be paid by the maker for all *malt* made in England, except it be made for exportation only; 12 Geo. cap. 4. a duty of nine pence a buſhel: and by 19 Geo. III. cap. 25. an additional duty of 15*l.* per cent. which duty is under the management of the commiſſioners and officers of exciſe. No *malt* ſhall be imported, on pain of forfeiting the ſame and its value. *Malt* brought from Scotland ſhall be entered at the port of landing, and pay the ſame duty as Engliſh *malt*, unleſs a certificate is produced that it hath paid the duty of 4½*d.* a buſhel in Scotland, and then it ſhall only pay 4½*d.* more, to make it equal with the Engliſh. Places for making *malt* are to be entered on pain of 50*l.* and the officers ſhall be permitted to enter and ſurvey without interruption, on forfeiture of 20*l.* By 2 and 3 Edw. VI. cap. 10. no perſon ſhall make any barley *malt*, except in June, July and Auguſt, which ſhall not be three weeks at leaſt in making; nor in theſe months, under ſeventeen days, on pain of forfeiting for every quarter 2*s.* and ſelling *malt* which has not been well dreſſed, ſo that there may not be fanned out of one quarter half a peck of duſt or more, incurs a forfeiture of 20*d.* for every quarter: and mixing bad *malt* with good for ſale, is liable to a forfeiture of 2*s.* for every quarter. In the proceſs of malting, preſſing *malt* in the ciſtern to prevent its ſwelling, mixing corn of one wetting with corn of a former wetting, and mixing *malt* with unmalted corn, incur each of them a penalty of 5*s.* a buſhel. 1 Geo. III. cap. 3. 2 Geo. II. cap. 1. 1 Geo. I. cap. 2. Again, mixing *malt* that has been gaged with the ungaged, ſubjects to a forfeiture of 100*l.* 1 Geo. III. cap. 3. By the ſame ſtatute the ſame penalty is inflicted on thoſe who conceal *malt* to avoid being gaged in the couch: and by 12 Ann. ſtat. 1. cap. 2. concealing *malt* to avoid the duty incurs a forfeiture of 10*s.* a buſhel: and an allowance ſhall be made of four buſhels out of twenty for the ſwelling of *malt*, within thirty hours after the ſame ſhall be thrown out of the ſteeping veſſels, and ten buſhels out of twenty, after it hath been thrown out of the ciſtern thirty hours or more. But a maltſter, not covering his barley, &c. in the ciſtern with water, and ſuffering it to remain for forty hours, ſhall not be allowed the ſaid four buſhels in every twenty. The maltſter is required to give twenty-four hours notice within a city or market town, and elſewhere forty-eight hours notice in writing to the officer, of the time of the day when he intends to wet corn to be made into *malt*; and he ſhall not begin but between four in the morning and nine in the evening: the omiſſion of ſuch notice, &c. incurs a forfeiture of 100*l.* by 3 Geo. III. cap. 13. And by 12 Ann. ſtat. 1. cap. 2. he ſhall every month make entry at the office of exciſe of all the *malt* made in ſuch month, on pain of 10*l.* Within four months after entry, he ſhall pay off the duties, on pain of forfeiting double. 1 Geo. ſtat. 2. cap. 2.

A drawback of the duty is allowed for *malt* damaged in exportation, and alſo for *malt* deſtroyed by fire or water. A compoſition of 7*s.* and 6*d.* a head by the year ſhall be made for the duties of *malt* made to be conſumed in private houſes; and the houſes of perſons thus compounding ſhall not be liable to the duty or to the ſurvey of the officers: a perſon tranſgreſſing in this reſpect ſhall forfeit 5*l.* loſe the benefit of his compoſition, and forfeit for every buſhel of *malt* 20*s.* 12 Ann. ſtat. 2. cap. 2. 33 Geo. II. cap. 7. By the laſt ſtat. and 12 Geo. III. cap. 4. no *malt* entered and made for exportation ſhall be liable to the duties, and no drawback ſhall be allowed for any *malt* exported: but the maker ſhall be allowed for his trouble 3*d.* for every quarter. By 1 Geo. III. cap. 3. there ſhall be allowed for every twenty quarters of grain made into *malt* for exportation thirty quarters of *malt* and no more, on exportation; and notice ſhall be given of ſteeping and the quantity, on pain of 50*l.* and this ſhall be kept ſeparate from that deſigned for home conſumption, on pain of 5*s.* a buſhel, 12 Geo. cap. 4. and the corn of one ſteeping ſhall be kept ſeparate from any other, until it hath been meaſured, on pain of 50*l.* 3 Geo. II. cap. 7. Perſons oppoſing officers ſhall forfeit 50*l.* 12 Geo. cap. 4. Notice of meaſuring ſhall be given; and the *malt* carried on ſhip-board, or kept ſeparate and locked up, on pain of 50*l.* Opening ſuch locks, and carrying away the *malt*, without conſent of the officer, or notice given to him, incur a forfeiture of 100*l.* The officer having received forty hours notice ſhall attend, keep an account of the *malt* delivered out, and of the perſon to whom it belongs, and give a certificate to the officer of the diviſion to which it is to be removed, who ſhall file the ſame and make entry thereof: and if the proprietor neglect to deliver ſuch certificate, he ſhall forfeit 50*l.* Thoſe intending to ſhip *malt* for exportation ſhall give forty-eight hours notice to the officer of the port in writing, with the name of the ſhip, on pain of 5*s.* a buſhel. The ſhip ſhall be locked, and perſons breaking open the hatches, forfeit 50*l.* The landing *malt* after ſhipping for exportation, ſubjects, beſides the penalty of the bond for its exportation, to a forfeiture of the ſame, and treble the value, 1 Geo. III. cap. 3. Storehouſes ſhall be cleared out in fifteen months, on pain of 50*l.* and unmalted oats or barley mixed among *malt* for exportation, incurs a forfeiture of 5*s.* a buſhel, 6 Geo. cap. 21. See MALT TAX. For the duty on barley, ſee HORDEUM. The infuſion of *malt* has been much recommended as an antiſcorbutic. See SCURVY and WORT.

Good *malt* may be made of the grain of the maize or Indian corn, but then a particular method muſt be taken for the doing it. Our barley *malt*-makers have tried all their ſkill to make good *malt* of it in the ordinary way, but to no purpoſe; that is, the whole grain will not be this way malted or rendered tender and floury, as in other *malt*; for it is found, by experience, that this corn, before it be fully malted, muſt ſprout out both ways, that is, both root and blade, to a conſiderable length, that of a finger at leaſt, and if more the better. For this purpoſe it muſt be laid in a heap a convenient time; and in this proceſs, if it be of a ſufficient thickneſs for coming, it will quickly heat and grow mouldy, and the tender ſprouts will be ſo entangled, that the leaſt moving of the heap will break them off; and the farther maturation of the grain into *malt*, will be hindered by this means; and on the other hand, if it be laid thin, and often ſtirred and opened to prevent too much heating, thoſe ſprouts which have begun to ſhoot ceaſe growing, and conſequently the corn again ceaſes to be promoted to the mellowneſs of *malt*. Phil. Tranſ. Nº 142.

To avoid all theſe difficulties, the following method is to be uſed: take away the top of the earth in a garden or field, two or three inches, throwing it up half one way, and half the other; then lay the corn for *malt* all over the ground ſo as to cover it; the earth that was pared off is now to be laid on again, and nothing more is to be done till the field is all over covered with the green ſhoots of the plant. The earth is then to be taken off, and the roots of the grain will be found ſo entangled together, that they will come up in large cakes or parcels; it muſt be gently waſhed in order to take off all the dirt, and then dried on a kiln, or on a clean floor expoſed to the ſun. Every grain of the maize will be thus tranſmuted into good *malt*, and the beer brewed with it will be very pleaſant and very wholeſome, and of an agreeable brown colour, but very clear.

It may be worth trying whether the ſame proceſs is not with due care applicable to the malting of turneps, potatoes, carrots, parſneps, and the like. It might poſſibly be of ſervice alſo to attempt this leſs laborious way of making *malt* of barley and other ſmall grains: the diſadvantages would be the not ſo eaſily ſeparating the dirt from the grain as in the larger kind; and as barley requires the root only, not the ear, to ſhoot in order to the making of *malt*, it would be ſome difficulty to know the exact time of taking it up; but with all theſe diſadvantages the method is worth a trial.

MALT, *for the manner of preparing liquors of*, ſee BREWING.

MALT *liquors* have different names as well as different virtues, properties, and uſes, both from the different manners of preparing the *malt*, whence they are diſtinguiſhed into *pale* and *brown*; and from the different manners of preparing or brewing the *liquors* themſelves, whence they are divided into *beer*, and *ale*, *ſtrong* and *ſmall*, *new* and *old*.

Malt drinks are either pale or brown, as the *malt* is more or leſs dried, on the kiln; that which is the ſlendereſt dried, tinging the liquor leaſt in brewing, and therefore being called *pale*: whereas that higher dried, and as it were roaſted, makes it of a higher colour. A mixture of both theſe makes an amber colour; whence ſeveral of theſe liquors take their name.

Now, it is certain, the pale *malt* has moſt of the natural grain in it, and is therefore the moſt nouriſhing; but for the ſame reaſon, it requires a ſtronger conſtitution to digeſt it. Thoſe who drink much of it, are uſually fat and ſleek in their bloom, but are often cut off by ſudden fevers; or, if they avoid this, they fall early into a diſtempered old age.

The brown *malt* makes a drink much leſs viſcid, and fitter to paſs the ſeveral ſtrainers of the body; but, if very ſtrong, it may lead on to the ſame inconveniencies with the pale; though a ſingle debauch wears off much more eaſily in the brown.

Dr. Quincy obſerves, that the beſt pale *malt liquors* are thoſe brewed with hard waters, as thoſe of ſprings and wells, becauſe the mineral particles, wherewith theſe waters are impregnated, help to prevent the coheſions of thoſe drawn from the grain, and enable them to paſs the proper ſecretions the better; as the viſcid particles of the grain do likewiſe defend theſe from doing the miſchief they might otherwiſe occaſion. But ſofter waters ſeem beſt ſuited to draw out the ſubſtance of high-dried *malts*, which retain many fiery particles in their contexture, and are therefore beſt loſt in a ſmooth vehicle.

For the differences in the preparation of *malt liquors*, they chiefly conſiſt in the uſe of hops, as in beer; or in the more ſparing uſe of them, as in ale.

The difference made by hops is beſt diſcovered from the nature and quality of the hops themſelves: theſe are known to be a ſubtle grateful bitter: in their compoſition, therefore, with this *liquor*, they add ſomewhat of an alkaline nature, i. e. particles that are ſublime, active, and rigid. By which means, the ropy, viſcid parts of the *malt* are more divided and ſubtilized; and are therefore not only rendered more eaſy of digeſtion and ſecretion in the body, but alſo, while in the *liquor*, they prevent it from running into ſuch coheſions as would make it ropy, vapid, and ſour.

For want of this, in unhopped drinks, that clammy ſweetneſs, which they retain after working, ſoon turns them acid, and unfit for uſe; which happens ſooner or later, in proportion to the ſtrength they receive from the *malt*, and the comminution that has undergone by fermentation.

It is a common opinion, that ale is more diuretic than beer, that is, liquor leſs hopped more than that with a greater quantity of hops in it: which may hold in ſome conſtitutions, becauſe ale being more ſmooth, ſoftening, and relaxing, where urine is to be promoted by enlarging the paſſage, as in thin, dry conſtitutions, this is the moſt likely to effect it. But where the promoting of urine is to be done by attenuating and breaking the juices, and rendering them more fluid, it is certainly beſt anſwered by thoſe drinks which are well hopped.

As to the diſpute, whether or no hops tend to breed the ſtone, it is too long to enter upon here. Quincy is of opinion, there is but little reaſon for the affirmative ſide of the queſtion; and, in general, makes no ſcruple to ſay, that, for one conſtitution damaged by beer, there are numbers ſpoiled by ale. This laſt manifeſtly fouls the glands, ſtuffs the veſſels with ſlime and viſcidity, makes the body unwieldly and corpulent, and paves the way for cachexies, jaundice, aſthmas, and at laſt incurable dropſies. The urinary paſſages, alſo, which it is ſuppoſed to clear, will, in time, be filled by it with ſlough, and matter of as ill conſequence as gravel.

The different ſtrengths of *malt liquors* alſo make their effects different. The ſtronger they are, the more viſcid parts they carry into the blood; and though the ſpirituous parts make theſe imperceptible at firſt, yet when thoſe are evaporated, which will be in a few hours, the other will be ſenſibly felt by pains in the head, nauſeouſneſs at the ſtomach, and laſſitude or liſtleſſneſs to motion. This, thoſe are the moſt ſenſible of, who have experienced the extremes of drinking theſe *liquors*, and wines; for a debauch of wine they find much ſooner worn off, and they are much more lively and briſk afterwards, than after fuddling *malt liquors*, whoſe viſcid remains will be long before they be ſhaken off.

Malt liquors therefore are, in general, the more wholeſome for being ſmall; i. e. of ſuch a ſtrength as is liable to carry a ſmall degree of warmth into the ſtomach, but not ſo great as to prevent their being proper diluters of the neceſſary food. Indeed, in robuſt people, or thoſe who labour hard, the viſcidities of the drink may be broken into a convenient nouriſhment; but in perſons of another habit and way of living, they ſerve rather to promote obſtructions and ill humours.

The age of *malt liquors* is the laſt thing by which they are rendered more or leſs wholeſome. Age ſeems to do nearly the ſame thing as hops; for thoſe *liquors* which are longeſt kept are certainly leſs viſcid; age breaking the viſcid parts, and, by degrees, rendering them ſmaller and fitter for ſecretion.

But this is always determined according to their ſtrength; in proportion to which, they will ſooner or later come to their full perfection, as well as decay; for, when ale or beer is kept till its particles are broken and comminuted as far as they are capable, then it is that they are beſt; and, beyond this, they will be continually on the decay, till the finer ſpirits are entirely eſcaped, and the remainder becomes vapid and ſour.

MALT *Diſtillery*. This is an extenſive article of trade, and by which very large fortunes are made. The art is to convert fermented *malt* liquors into a clear inflammable ſpirit, which may be either ſold for uſe in the common ſtate of a proof ſtrength, that is, the ſame ſtrength with French brandy; or is rectified into that purer ſpirit uſually ſold under the name of ſpirit of wine; or made into compound cordial waters, by being diſtilled again from herbs and other ingredients. See BREWING and WASH.

To brew with *malt* in the moſt advantageous manner, it is neceſſary, 1. That the ſubject be well prepared. 2. That the water be ſuitable and duly applied; and, 3. That ſome certain additions be uſed, or alterations made, according to the ſeaſon of the year, and the intention of the operator; and by a proper regulation in theſe reſpects, all the fermentable parts of the ſubject will thus be brought into the tincture, and become fit for fermentation.

The due preparation of the ſubject conſiſts in its being juſtly *malted* and well ground. When the grain is not ſufficiently *malted* it is apt to prove hard, ſo that the water can have but very little power to diſſolve its ſubſtance; and if it be too much *malted*, a part of the fermentable matter is loſt in that operation. The harder and more flinty the *malt* is, the finer it ought to be ground; and in all caſes, when intended for diſtillation, it is adviſeable to reduce it to a kind of finer or coarſer meal. When the *malt* is thus ground, it is found, by experience, that great part of the time, trouble, and expence of the brewing is ſaved by it, and yet as large a quantity of ſpirit will be produced; for thus the whole ſubſtance of the *malt* may remain mixed among the tincture, and be fermented and diſtilled among it. This is a particular that very well deſerves the attention of the *malt* diſtiller, as that trade is at preſent carried on; for the diſpatch of the buſineſs, and the quantity of ſpirit procured, is more attended to than the purity or perfection of it.

The ſecret of this matter depends upon the thoroughly mixing, or briſkly agitating and throwing the *meal* about, firſt in cold, and then in hot water; and repeating this agitation after the fermentation is over, when the thick turbid waſh being immediately committed to the ſtill, already hot and dewy with working, there is no danger of burning, unleſs by accident, even without the farther trouble of ſtirring, which in this caſe is found needleſs, though the quantity be ever ſo large, provided that requiſite care and cleanlineſs be uſed; and thus the buſineſs of brewing and fermenting may very commodiouſly be performed together, and reduced to one ſingle operation.

Whatever water is made choice of, it muſt ſtand in a hot ſtate upon the prepared *malt*, eſpecially if a clear tincture be deſired, but a known and very conſiderable inconvenience attends its being applied too hot, or too near to a ſtate of boiling, or even ſcalding with regard to the hand. To ſave time in this caſe and to prevent the *malt* running into lumps and clods, the beſt way is to put a certain meaſured quantity of cold water to the *malt* firſt; the *malt* is then to be ſtirred very well with this, ſo as to form a ſort of thin uniform paſte or pudding; after which the remaining quantity of water required may be added in a ſtate of boiling, without the leaſt danger of making what, in the diſtillers language, is called a pudding.

In this manner the due and neceſſary degree of heat in the water, for the extracting all the virtues of the *malt*, may be hit upon very expeditiouſly, and with a great deal of exactneſs, as the heat of boiling water is a fixed ſtandard which may be let down to any degree by a proportionate mixture of cold water, due allowances being made for the ſeaſon of the year, and for the temperature of the air.

This little obvious improvement added to the method juſt above hinted for the reducing brewing and fermentation to one operation, will render it practicable to very conſiderable advantage, and the ſpirit improved in quality as well as quantity.

A much more profitable method than that uſually practiſed for the fermenting *malt* for diſtillation, in order to get its ſpirit, is the following: take ten pounds of *malt* reduced to a fine meal, and three pounds of common wheat-meal: add to theſe two gallons of cold water, and ſtir them well together, then add five gallons of water boiling hot, and ſtir all together again. Let the whole ſtand two hours, and then ſtir it again, and when grown cold, add to it two ounces of ſolid yeaſt, and ſet it by looſely covered in a warmiſh place, to ferment.

This is the Dutch method of preparing what they call the waſh for *malt* ſpirit, whereby they ſave much trouble, and procure a large quantity of ſpirit: thus commodiouſly reducing the two buſineſſes of brewing and fermenting to one ſingle operation. In England the method is to draw and maſh for ſpirit as they ordinarily do for beer, only inſtead of boiling the wort, they pump it into large coolers, and afterwards run it into their fermenting backs, to be there fermented with yeaſt. Thus they beſtow twice as much labour as is neceſſary, and loſe a large quantity of their ſpirit by leaving the groſs bottoms out of the ſtill for fear of burning.

All ſimple ſpirits may be conſidered in the three different ſtates of low wines, proof ſpirit, and alcohol, the intermediate degrees of ſtrength being of leſs general uſe; and they are to be judged of only according as they approach to, or recede from theſe. Low-wines, at a medium, contain a ſixth part pure of inflammable ſpirit, five times as much water as ſpirit neceſſarily ariſing in the operation with a boiling heat. Proof goods contain about one half of the ſame totally inflammable ſpirit; and alcohol entirely conſiſts of it.

Malt low-wines, prepared in the common way, are exceeding nauſeous; they have, however, a natural vinoſity, or pungent agreeable acidity, which would render the ſpirit agreeable to the palate, were it not for the large quantity of the groſs oil of the *malt* that abounds in it. When this oil is detained in ſome meaſure from mixing itſelf among the low wines, by the ſtretching a coarſe flannel over the neck of the ſtill, or at the orifice of the worm, the ſpirit becomes much purer in all reſpects; it is leſs fulſome to the taſte, leſs offenſive to the ſmell, and leſs milky to the eye. Shaw's Eſſay on Diſtillery.

When theſe low-wines, in the rectification into proof ſpirits, are diſtilled gently, they leave a conſiderable quantity of this groſs fetid oil behind them in the ſtill along with the phlegm; but if the fire be made fierce, this oil is again raiſed and brought over with the ſpirit; and being now broken ſomewhat more fine, it impregnates it in a more nauſeous manner than at firſt. This is the common fault both of the *malt* diſtiller and of the rectifier; the latter, inſtead of ſeparating the ſpirit from this naſty oil, which is the principal intent of his proceſs, attends only to the leaving the phlegm in ſuch quantity behind, that the ſpirit may be of due ſtrength as proof or marketable goods, and brings over the oil in a worſe ſtate than before. To this inattention to the proper buſineſs of the proceſs, it is owing, that the ſpirit after its ſeveral rectifications, as they are miſcalled, is often found more ſtinking than when delivered out of the hands of the *malt* diſtiller. All this may be prevented by the taking more time in the ſubſequent diſtillations, and keeping the fire low and regular, the ſudden ſtirring of the fire, and the haſty way of throwing on the freſh fuel, being the general occaſions of throwing up the oil by ſpurts, where the fire in general, during the proceſs, has not been ſo large as to do that miſchief.

The uſe of a balneum Mariæ, inſtead of the common ſtill, would effectually prevent all this miſchief, and give a purer ſpirit in one rectification, than can otherwiſe be procured in ten, or indeed according to the common methods at all.

Malt low-wine, when brought to the ſtandard of proof ſpirit, loſes its milky colour, and is perfectly clear and bright, no more oil being contained in it than is perfectly diſſolved by the alcohol, and rendered miſcible with that proportion of phlegm, which is about one half the liquor; its taſte alſo is cleaner, though not more pleaſant; there being leſs of the thick oil to hang on the tongue in its own form, which is not the caſe in the low-wines, where the oil being undiſſolved, adheres to the mouth in its own form, and does not paſs lightly over it.

When proof-ſpirit of *malt* is diſtilled over again, in order to be rectified into alcohol, or, as we uſually call it, ſpirits of wine, if the fire be raiſed at the time when the faints begin to come off, a very conſiderable quantity of oil will be raiſed by it, and will run in the viſible form of oil from the noſe of the worm. This is not peculiar to *malt* ſpirit, but the French brandy ſhews the ſame phenomenon, and that in ſo great a degree, that half an ounce of this oil may be obtained from a ſingle piece of brandy.

Malt ſpirit, more than any other kind, requires to be brought into the form of alcohol, before it can be uſed internally, eſpecially as it is now commonly made up in the proof ſtate, with as much of this nauſeous and viſcous oil as will give it a good crown of bubbles. For this reaſon it ought to be reduced to an alcohol, or totally inflammable ſpirit, before it is admitted into any of the medicinal compoſitions. If it be uſed without this previous caution, the odious taſte of the *malt* oil will be diſtinguiſhed among all the other flavours of the ingredients.

Malt ſpirit, when it has once been reduced to the true form of an alcohol, is afterwards more fit for all the curious internal uſes than even French brandy, it being after this purification a more uniform, hungry, taſteleſs and impregnable ſpirit, than any other ſpirits which we eſteem ſo much finer.

A pure ſpirit being thus procured, ſhould be kept carefully in veſſels of glaſs or ſtone, well ſtopped, to prevent the evaporation of any of its volatile part. If preſerved in caſks, it is apt to impregnate itſelf very ſtrongly with the wood. The quantity of pure alcohol obtainable from a certain quantity of *malt*, differs according to the goodneſs of the ſubject, the manner of the operation, the ſeaſon of the year, and the ſkilfulneſs of the workman; according to which variations, a quarter of *malt* will afford from eight or nine, to thirteen or fourteen gallons of alcohol. This ſhould encourage the *malt* diſtiller to be careful and diligent in his buſineſs, as ſo very large a part of his profit depends wholly on the well conducting his proceſſes.

After every operation in this buſineſs, there remains a quantity of faints, which in their own coarſe ſtate ought never to be admitted into the pure ſpirit; theſe are to be ſaved together, and large quantities of them at once wrought into alcohol. It is eaſy to reduce theſe to ſuch a ſtate, that they will ſerve for lamp ſpirits. Their diſagreeable flavour being corrected by the adding of aromatics during the diſtillations, the reducing them to a perfect and pure alcohol is practicable, but not without ſuch difficulties as render it ſcarce worth the trader's while. One way of doing it is by diſtilling them from water into water, and that with a very ſlow fire. By this means a pure alcohol may be made out of the fouleſt faints.

The *malt* diſtiller always gives his ſpirit a ſingle rectification *per ſe*, in order to purify it a little, and make it up proof, but in this ſtate it is not reckoned fit for internal uſes, but ſerves to be diſtilled into geneva and other ordinary compound ſtrong waters for the vulgar.

The Dutch, who carry on a great trade with *malt ſpirit*, never give it any farther rectification than this, and it is on this account that the *malt ſpirit* of England is in general ſo much more in eſteem. The Dutch method is only to diſtil the waſh into low wines, and then to full proof ſpirit; they then directly make it into geneva, or elſe ſend it as it is to Germany, Guinea, and the Eaſt-Indies, for the Dutch have little notion of our rectification. Their ſpirit is by this means rendered very foul and coarſe, and is rendered yet more nauſeous by the immoderate uſe they make of rye meal. *Malt* ſpirit, in its unrectified ſtate, is uſually found to have the common bubble proof, as the malt diſtiller knows that it will not be marketable without it.

The whole matter requiſite to this is, that it have a conſiderable portion of the groſs oil of the *malt* well broke and mixed along with it; this gives the rectifier a great deal of trouble if he will have the ſpirit fine; but in the general run of the buſineſs, the rectifier does not take out this oil, but breaks it finer, and mixes it faſter in by alkaline ſalts, and diſguiſes its taſte by the addition of certain flavouring ingredients. The ſpirit loſes in theſe proceſſes the vinoſity it had when it came out of the hands of the *malt* diſtiller, and is in all reſpects worſe, except in the diſguiſe of a mixed flavour. Shaw's Eſſay on Diſtillery.

The alkaline ſalts uſed by the rectifier, deſtroying the natural vinoſity of the ſpirit, it is neceſſary to add an extraneous acid in order to give it a new one. The acid they generally uſe is the *ſpiritus nitri dulcis*; and the common way of uſing it is the mixing it to the taſte with the rectified ſpirit: this gives our *malt* ſpirit, when well rectified, a flavour ſomewhat like that of French brandy, but this ſoon flies off; and the better method is to add a proper quantity of Glauber's ſtrong ſpirit of nitre to the ſpirit in the ſtill. The liquor in this caſe comes over impregnated with it, and the acid being more intimately mixed, the flavour is retained. See SPIRITUS *nitri dulcis*.

MALT-*duſt*, or the duſt ſeparated from the *malt* in drying, &c. is eſteemed a warm rich MANURE for barren ground.

MALTSTER, a perſon who makes or trades in *malt*.

MALTA, *knights of*, an order of military religious, who have borne various other names; as Hoſpitalers of St. John of Jeruſalem, knights of St. John, knights of Rhodes, order of *Malta*, religion of *Malta*, &c.

About the year 1048, ſome Neapolitan merchants founded a church after the Latin rite at Jeruſalem, giving it the name of *Santa Maria della Latina*. They alſo founded a monaſtery of religious after the order of St. Bennet, for the reception of pilgrims; and afterwards an hoſpital near the monaſtery, to take care of the diſeaſed, under the direction of a maſter or rector, to be nominated by the abbot of Santa Maria della Latina. Beſides which they alſo built a chapel in honour of St. John Baptiſt.

In 1099, Godfrey of Bulloign, having taken Jeruſalem, endowed this hoſpital with ſome demeſnes which he had in France; and others imitating his liberality, the revenues of the hoſpital became conſiderably augmented. Upon this, Gerhard Torn, their rector, in concert with the Hoſpitalers, reſolved to ſeparate from the abbot and religious of Santa Maria, and to form a diſtinct congregation, under the name and protection of St. John Baptiſt: and hence it was that they had the name of *Hoſpitalers*, or *Brothers of St. John of Jeruſalem*.

Pope Paſcal II. by a bull in the year 1113, confirmed the donations made to this hoſpital, which he ſettled under the protection of the holy ſee; ordering, that the rectors, after Gerhard's death, ſhould be choſen by the Hoſpitalers: Raymond du Puy, Gerhard's ſucceſſor, took the title of *maſter*; and he gave a rule to the Hoſpitalers, which was approved by Calixtus II. in 1120. Such was the firſt riſe of the order of *Malta*.

Their firſt grand-maſter, finding the revenues of the hoſpital vaſtly to exceed what was neceſſary for the entertainment of poor pilgrims, and diſeaſed perſons, reſolved to employ the ſurplus againſt the infidels; and with this view he offered himſelf to the king of Jeruſalem.

He divided his Hoſpitalers into three claſſes: the firſt conſiſted of nobles, whom he deſtined to the profeſſion of arms, for the defence of the faith, and the protection of pilgrims; the ſecond conſiſted of prieſts or chaplains, who were to ſay maſs; and the third of ſervitors, who were not noble, but were alſo appointed for the war. He alſo regulated the manner of admitting knights brothers; and had the whole confirmed in 1130, by pope Innocent II. who gave them for arms a white croſs in a field argent; which continues ſtill the ſtandard of this order.

After the loſs of Jeruſalem, they retired firſt to Margath, then to Acre, which they defended very vigorouſly in 1290. After the entire loſs of the Holy Land they withdrew to Cyprus, where king Henry of Luſignan, whom they had followed thither, gave them the city of Limiſſon. Here they continued eighteen years, when, taking the iſland of Rhodes from the Saracens in 1308, they ſettled there. And now it was that they firſt took the name of knights, viz. *the knights of Rhodes*.

Andronicus, emperor of Conſtantinople, granted to their grand maſter, Fulk de Villaret, the inveſtiture of this order; and the donation was confirmed by pope Clement. The year following, with the aſſiſtance of Amadeus IV. duke of Savoy, they defended themſelves, and their iſland, againſt an army of Saracens. In 1480, their grand-maſter d'Aubuſſon made a vigorous defence againſt Mahomet II. and preſerved the iſland, in ſpite of a formidable army, which beſieged it for the ſpace of three months. But in 1522, it was attacked by Soliman with an army of three hundred thouſand men, and taken by him, after having been in the poſſeſſion of the knights two hundred and thirteen years.

After this loſs, the grand-maſter and knights retired firſt into the iſle of Candia. Some time after pope Clement VII. gave them Viterbo. Laſtly, Charles V. in 1530, gave them the iſland of *Malta*, which they ſtill hold: and hence they come by the appellation of *knights of Malta*; though their proper name is that of *knights of the order of St. John of Jeruſalem*; and their grand-maſter, among his other titles, ſtill retains that of *maſter of the hoſpital of St. John, and guardian of the poor of our Saviour Jeſus Chriſt*.

The order of *Malta* have no other dominions beſides their iſland, and ſome other little places in the neighbourhood, the chief whereof are Goza and Comino.

The government is both monarchical and ariſtrocatical, the grand-maſter being the ſovereign, and the chapter the ſenate. It is monarchical with regard to the inhabitants of *Malta*, and the iſles adjacent, and even with regard to the knights in every thing relating to the ſtatutes and rule of their order; and it is ariſtocratical with regard to the deciſion of any important affairs, which are not to be diſpatched but by the grand-maſter and the chapter. There are two councils; the one ordinary, compoſed of the grand-maſter as chief, and the grand-croſſes; the other complete, conſiſting of the grand-maſter, the grand-croſſes, and the two ſenior knights of each language.

By the languages of *Malta* are meant the ſeveral nations whereof the order is compoſed. Of theſe there are eight, viz. Provence, Auvergne, France, Italy, Arragon, Germany, Caſtile, and England.

The pillar (as he is called) of the language of Provence is the grand commander of the order; he of Auvergne the grand-marſhal; he of France the grand-hoſpitaler; he of Italy the grand-admiral; he of Arragon grand-conſervator, or draper, as he was anciently called; the pillar of the language of Germany is grand-bailiff; and he of Caſtile grand-chancellor; the language of England, which has been extinct ſince the time of the Reformation under king Henry VIII. had for its pillar or chief, the grand-turcopolier, or colonel of the cavalry. The language of Provence is the firſt, on account of Raimond du Puy, their firſt grand-maſter, who was a Provençal.

In each language, there are ſeveral grand-priories, and capital bailiages. To each language belongs a hall, where the knights eat, and hold their ordinary aſſemblies. Each grand-prior has a number of commanderies.

The commanderies are either magiſterial, or elſe by right, or, finally, by favour. The magiſterial are thoſe annexed to the grand-maſterſhip, whereof there is one in each grand-priory: commanderies by right are thoſe which come by right of ſeniority; their ſeniority is computed from the time of their admiſſion; but they muſt firſt have lived five years at *Malta*, and have made four caravannes, or cruiſing voyages, on the Turks and Corſairs: commanderies by favour are thoſe which the grand-maſter, or the grand-prior, have a right of conferring; one of theſe they confer every five years on whom they pleaſe.

The noble knights are called knights by right; and none but theſe can be bailiffs, grand-priors, or grand-maſters. Knights by favour are thoſe, who, not being noble of themſelves, are raiſed on account of ſome great exploit, or ſome notable ſervice, into the rank of nobles.

The ſervitors, or ſerving brothers, are of two kinds; 1. The ſervitors of war, whoſe functions are the ſame with thoſe of the knights. 2. The ſervitors of religion, whoſe whole buſineſs is to ſing the praiſes of God in the conventual church, and to officiate each in his turn as chaplain on board the veſſels and gallies of the order.

The brothers of obedience are prieſts, who, without being obliged to go to *Malta*, take the habit of the order, make the vows, and attach themſelves to the ſervice of ſome of the churches of the order, under the command of a grand-prior, or commander, to whom they pay obedience.

The knights of majority are thoſe who, according to the ſtatutes, are admitted at ſixteen years of age. The knights of minority are thoſe who are admitted from the time of their birth; which, however, cannot be done, without a diſpenſation from the pope.

The chaplains can only be admitted regularly from ten to fifteen years of age: after fifteen, they muſt have a brief from the pope; till fifteen, the grand-maſter's letter is ſufficient. Theſe are called *diacos*, and muſt give proof of their being born of creditable families.

For the proofs of nobility to be made before the admiſſion of knights, in the language of Germany, they go back ſix generations; in the reſt it is ſufficient to go back to the great-grandfather on the father's or mother's ſide.

All the knights, after their profeſſion, are obliged to wear a white croſs, or ſtar with eight points, over the cloak or coat, on the left ſide, which is the proper habit of the order, the golden croſs being only an ornament.

There are alſo female Hoſpitalers of the order of St. John of Jeruſalem, ſometimes alſo called *chevaliereſſes*, or *ſhe-knights*, of equal antiquity with the knights themſelves; whoſe buſineſs was to take care of the women-pilgrims, in an hoſpital apart from that of the men.

MALTA *earth*, in the *Materia Medica*. See MELITENSIS *terra*.

MALTHA, Μαλθη, in *Antiquity*, denotes any cement, or glutinous body, which has the faculty of binding things together.

Ancient writers make mention of divers ſorts of *maltha*, native and factitious: one of the latter much in uſe was compoſed of pitch, wax, plaſter, and greaſe.

Another kind, wherewith the Romans plaiſtered and whitened the inſides of their aqueducts, was made of lime ſlacked in wine, incorporated with melted pitch and freſh figs.

Natural *maltha* is a kind of bitumen, wherewith the Aſiatics plaiſter their walls. When this is once ſet on fire, water will not quench it; but ſerves rather to make it burn more fiercely.

MALTHA, the name of a voracious fiſh of the ſhark-kind, called the *ſorrat*, and the *lamiola* by ſome authors, a diminutive of *lamia*, ſignifying a ſmall ſhark. Its teeth are broad and pointed as thoſe of the ſhark; the fiſh has alſo many rows of theſe; the noſe is ſhort, and its fleſh lax and ſoft.

MALTHOCODE, a term by which the Greek writers expreſs the emollient topical remedies prepared with oil. Hippocrates expreſly forbids the uſe of theſe in old ulcers.

MALVA, in *Botany*. See MALLOW.

MALVERN *waters*. See *Malvern* WATERS.

MALVINDA, *ſida*, in *Botany*. See *Indian* MALLOW.

MALUS, in *Botany*. See APPLE-*Tree*.

MALUS *Aſſyria*, in *Botany*, one of the many names given by the ancients to the citron: they alſo call it *malus Medica*, and by ſeveral other names, as theſe were expreſſive of the country whence they had the fruit. See CITRON and CITREÆ *menſæ*.

MAMALUKES, MAMMELUKES, or MAMMALUCKS, the name of a dynaſtry, which reigned a conſiderable time in Egypt.

The word comes from מלך, *regere*, *imperare*, the Arabic participle whereof is ממלוך *Mamluc*, which ſignifies *ſubject*, or one under the dominion of another. Scaliger holds, that the word is Arabic, and that it properly ſignifies ſomething bought with money; but others will have it ſignify any thing acquired, either as prize or purchaſe.

The *Mamalukes* were originally Turkiſh and Circaſſian ſlaves, bought of the Tartars by Melicſaleh, to the number of a thouſand: whom he bred up to arms, and raiſed ſome to the principal offices of the empire. They killed ſultan Moadam in 1250, being affronted at his concluding a treaty with his priſoner St. Louis, without their privity. This Moadam was the laſt ſultan of the Ajoubites; to whom ſucceeded the *Mamalukes*, the firſt of whom was ſultan Azeddin, or Mouz Ibec, the Tourcoman.

Others, ſay that the *Mamalukes* were originally choſen from among the Chriſtian ſlaves; and that they were the ſame thing, in great meaſure, with the janizaries among the Turks. They never married. The firſt are ſaid to have been brought from Circaſſia; and ſome add that they firſt began to be talked of about the year 869.

MAMIRA, in the *Materia Medica of the Arabians*, a root frequently mentioned by Avicenna, Serapion, and other of the Arabian writers. It ſeems mentioned as a poiſonous drug, and is ſo deſcribed, that it ſeems to be the ſame with one ſpecies of the durunegi, or doronicum of the ſame authors, and the common doronicum of the ſhops, diſtinguiſhed from the antithora, or other ſort of durunegi, by the yellowneſs of the inſide of the root. Avicenna ſays that it is hard and woody, and formed of knots or joints. This is the very deſcription the ſame author gives of the durunegi of the firſt or poiſonous kind. Paulus Ægineta ſays its root is compoſed of ſeveral joints alſo: and Alphagus calls it a *nodoſe* or jointed root. Some have ſuppoſed that the *mamira* was the ſame plant which we call ſmall celandine, but this has no title to be placed among the plants ſuſpected as poiſonous, nor any other plea to be gueſſed at as the *mamira*, but only becauſe its roots conſiſt of many tubercles. Many things beſide have been conjectured to be the *mamira* of the Greeks and Arabians, but the DORONICUM ſeems to be the plant.

MAMMALIA, in *Natural Hiſtory*, the firſt claſs of animals in the Linnæan ſyſtem, divided into ſeven orders, viz. *primates*, *bruta*, *feræ*, *glires*, *pecora*, *belluæ*, and *cete*; comprehending forty genera, and two hundred and nineteen ſpecies.

MAMMÆ. See BREAST.

MAMMÆANÆ. See ALIMENTARY.

MAMMEE-*tree*, *mammea*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the empalement of the flower is compoſed of two ſmall oval, concave leaves, which fall off; the flower has four large concave petals, which ſpread open; it hath many awl-ſhaped ſtamina, and in the centre a roundiſh germen, which afterwards turn to a fleſhy fruit of a ſpherical figure, incloſing one, two, or three large, almoſt oval ſtones: there is one ſpecies of this tree, which grows to a large ſize in the Weſt Indies, where the fruit is ſold in the markets: it has the taſte of a peach.

Ray mentions two ſpecies of this tree, and ſays that from inciſions made in the body of it, diſtils the liquor known by the name of toddy wine. Linnæus alſo mentions two ſpecies, one of which is the American, and the other the Aſiatic *mammea*.

MAMMIFORM, MAMMIFORMIS, in *Anatomy*, a name given to two apophyſes of the bone in the back part of the ſkull, ſo called from their reſembling a breaſt.

MAMMILLARY, MAMMILLARIS, in *Anatomy*, an epithet given to two little protuberances, ſomewhat reſembling the nipples of the breaſt, found under the fore-ventricles of the brain, and ſuppoſed to be the organs of ſmelling. See *Tab. Anat. (Oſteol.) fig.* 7. *n.* 3. *fig.* 13. *lit.* d.

Theſe are called *apophyſes mammillares*.

There is alſo a muſcle called *mammillaris*, or *maſtoides*, ſerving to ſtoop the head.

MAMMOTH's *teeth*, or MAMMOUT *bones*, and MAMMON's *horns*, in *Natural Hiſtory*, names given by travellers and other writers to certain foſſil teeth, and other bones, found in Ruſſia and ſome other parts of the world, and that uſually at great depth in the earth. The Ruſſians and other people give them this name, ſuppoſing them to have belonged to an animal which they deſcribe as being of a monſtrous ſize, and living in caverns under ground. But the true account of them is, that they are in reality the teeth and other bones of an animal now unknown, there being no ſuch beaſt as theſe people deſcribe. See ELEPHANT's *Bones*, IVORY, &c.

MAN, *homo*, in *Zoology*, is ranked by Linnæus at the head of a claſs of animals, which he calls PRIMATES.

He diſtinguiſhes *men*, according to their colours; into the European, or white *men*; the American, or reddiſh-coloured *men*; the Aſiatic, or tawny-brown coloured *men*; and laſtly, thoſe of Africa, or the blacks. Linnæi, Syſtem. Natur. tom. i. pars i. p. 28, &c. Monſ. Buffon, among many other curious particulars, has given us ſeveral relating to the natural hiſtory of *man.* See Hiſtoire Naturelle, vol. iii. p. 305. edit. Paris. That ingenious author has entered into a conſiderable detail with reſpect to the varieties of the human ſpecies. See vol. iii. p. 371, ſeq. of the ſame work.

Man *of the wood.* See Orang-*Outang.*

Man, in the *Materia Medica of the Ancients*, a name by which manna has been called by the oldeſt writers. There has been, however, ſome confuſion in the hiſtory of manna, owing to the too general uſe of this word, the ſame authors uſing it as the name of ſeveral other ſubſtances of very different kinds, which came to their hands in form of ſmall granules or flakes like the manna. The fragments of frankincenſe in particular were called by this name, with the addition of the word *thuris*, and ſometimes without, *man* or *men* ſtanding ſingly for that drug.

Man, in *Mythology*, the name of a deity among the ancient Germans; whom they ſuppoſed to be the ſon of Tuiſton, and celebrated with ſongs, as the founder of their nation: and to him they conſecrated their groves and foreſts.

Man *the capſtan*, on board a *Ship*. See Capstan.

Man *the ſide*, or *ladder*, on board a *Ship*, is when an officer or any perſon of diſtinction is at the ſhip's ſide ready to come aboard, the men are commanded to waït, and help him up the ſide.

Man *the top*, or *yard* on board a *Ship*, a word of command for the men to go up to the top, or yard, for ſome particular ſervice.

Man *of war*, the ſame with a ſhip of war. See Ship and Rate.

Man-*bird*. See Birds *Anomalous*.

MANAA, in the *Jewiſh Cuſtoms*, a kind of offerings made in the temple, otherwiſe called mincha. The word *manaa* is uſed in the Septuagint.

MANACA, in *Botany*, a Braſilian bacciferous ſhrub, with an umbilicated fruit, like that of the juniper, containing three elliptical ſeeds, of the ſize of lentils; the part uſed in medicine is the root, which is great, ſolid, and whitiſh; its medullary ſubſtance, reduced to powder, has very conſiderable effects; but becauſe it works too violently, both upwards and downwards, in the ſame manner as ſcammony, or the eſula, it is uſually given only to very robuſt perſons, and then with correctives, in a juſt doſe; it has ſomewhat of a bitterneſs and acor. The root, macerated in water, makes a fomentation, or bath, for thoſe who are afflicted with wandering pains in the joints, eſpecially ſuch as are contracted by cold; the plant is uſed as a vulnerary by the Braſilians.

MANAGE, or Manege, an academy, or place for learning to ride the great horſe; as well as for breaking horſes to the proper motions and actions.

The word is borrowed from the French *manege*, and that from the Italian *maneggio*, or ſome will have it, *à manu agendo*, from acting with the hand.

In every *manege* is a centre, or place deſtined for vaulting round a pillar; a courſe or career for running the ring; and, on the ſide, are pillars, between which are placed the horſes intended for high airs.

Manege is alſo uſed for the exerciſe itſelf, either of the horſe or the rider. See Horsemanship.

MANANAOG, in the *Materia Medica*, a name by which ſome call the fruit known with us by the name of St. Ignatius's bean.

MANATI, in *Zoology*. See Sea-*Cow*.

Manati *lapis*, a name given to a bone, of which there are two found in the head of the *manati*, or ſea-cow; they are roundiſh, and are uſually of the ſize of a hand-bell. They are ſaid to have great virtues againſt the ſtone and gravel, when burnt to aſhes, and given in white wine. The world need not, however, regret the ſcarcity of this remedy, for probably any animal bone, when burnt to aſhes, is poſſeſſed of all its virtues.

MANBALLA, in *Zoology*, the Ceyloneſe name of a ſpecies of ſerpent, called alſo the *canine*, or *dog-ſerpent*, from its manner of flying at every thing that comes in its way, as our dogs do: it is of a deep brown colour, beautifully variegated with white.

MANBOTE, in our *Old Writers*, a compenſation or recompence for *homicide*, particularly due to the lord for killing his man or vaſſal.

MANCANILLA, in *Botany*, a name given by Plumier to a genus of plants, ſince characteriſed by Linnæus in the name of hippomane.

MANCHINEEL, *hippomane*, in *Botany*, a genus of the *monoecia adelphia* claſs. Its characters are theſe: it hath male and female flowers on the ſame ſpike; the male flowers come out in ſmall cluſters, from a ſhort cup-ſhaped empalement, and have no petals: the female flowers have no petal, but an oval germen, which becomes a roundiſh fruit with a fleſhy cover, incloſing a rough hard ſhell with ſeveral cells, each including one ſeed: there are three ſpecies, natives of the Weſt Indies and of New Spain. Two of the ſpecies grow almoſt as large as the oak, but the third is of humbler ſize.

The wood of this tree is much eſteemed for cabinet work, being very durable, taking a fine poliſh, and, as it is ſaid, not being eaten by worms; but the tree abounding whith a milky cauſtic juice, before they are felled, they make fires round their trunks to burn out the juice: otherwiſe thoſe who fell them would be in danger of loſing their ſight, by this juice flying into their eyes: wherever this juice touches the ſkin, it raiſes bliſters; and if it falls upon linen, it turns it black, and waſhes into holes. The like danger to the eyes is to be apprehended from the ſaw-duſt; the workmen therefore generally cover their faces with a fine lawn.

This tree produces fruit ſomewhat like a golden pippin, which if ignorantly eaten, inflames the mouth and throat to a great degree; and is very dangerous to the ſtomach, unleſs proper remedies are timely applied. Miller.

Dr. Peyſſonnel, in his obſervations on this fruit, informs us that the ſavages uſe the juice of it to poiſon their arms, the wounds of which are thereby rendered mortal; that the rain which waſhes off the leaves, and falls on the human body, cauſes bliſters to riſe like boiling oil, and that even the ſhade of the tree is fatal to thoſe who ſit under it. However timely application by purges and emetics, have prevented their ill effects. Phil. Tranſ. vol. l. art. 105. p. 772.

MANCIPLE, Manceps, in *Old Authors*, denotes a caterer. There was anciently an officer in the Temple called by this name: he is now called the ſteward; and both name and office are ſtill retained in the colleges in both univerſities.

MANCORON, a word uſed by the ancients to expreſs what they call a ſort of honey, which ſeems to have been evidently our modern sugar. They ſay that it was a ſort of dry honey found concreted in canes or reeds, and was of the conſiſtence of ſalt, and that it was found in India and Arabia Felix, and that when taken into the mouth, it broke under the teeth like ſalt.

MANCUS, formed of *manu cuſus*, in *Antiquity*, an Anglo-Saxon gold coin, equal in value to 2½ ſolidi, or thirty pence; and in weight to fifty-five Troy grains. The firſt account of this coin that occurs in the hiſtory of our country, is about the cloſe of the eighth century, in an embaſſy of Cenwulf, king of Mercia, to Leo III. requeſting the reſtoration of the juriſdiction of the ſee of Canterbury; this embaſſy was enforced by a preſent of one hundred and twenty *mancuſes.* Ethelwolf alſo ſent yearly to Rome three hundred *mancuſes*: and theſe coins are ſaid to have continued in ſome form or other, till towards the concluſion of the Saxon government. The heriots of the nobility are chiefly eſtimated by this ſtandard in Canute's laws. It came originally from Italy, where it was called ducat: and is ſuppoſed to have been the ſame with the drachma or miliarenſis, current in the Byzantine empire. Clarke on Coins, p. 280, &c. See Mark.

MANDAMUS, in *Law*, a writ iſſuing out of the court of king's-bench, ſent by the king, and directed to any perſon, corporation, or inferior court of judicature, within the king's dominions; requiring them to do ſome particular thing therein ſpecified, which pertains to their office and duty, and which the court of king's bench has previouſly determined, or, at leaſt, ſuppoſes to be conſonant to right and juſtice. This is a high prerogative writ, of a moſt extenſive remedial nature; and may be iſſued in ſome caſes, where the injured party has alſo a more tedious method of redreſs, as in the caſe of admiſſion, or reſtitution to an office: but it iſſues in all caſes where the party hath a right to have any thing done, and hath no other ſpecific means of compelling its performance. A *mandamus*, therefore, lies to compel the admiſſion or reſtoration of the party applying to any office or franchiſe of a public nature, whether ſpiritual or temporal; to academical degrees; to the uſe of a meeting-houſe, &c. It lies for the production, inſpection, or delivery of public books and papers; for the ſurrender of the regalia of a corporation; to oblige bodies corporate to affix their common ſeal; to compel the holding of a court, &c. The writ of *mandamus* is made by ſtatute 9 Ann. cap. 20. a moſt full and effectual remedy for the refuſal of admiſſion, where a perſon is entitled to an office or place in any corporation, and alſo for wrongful removal, when a perſon is legally poſſeſſed. It may alſo be iſſued in purſuance of the ſtatute 2 Geo. I. cap. 4. in caſe within the regular time no election ſhall be made of the mayor or other chief officer, of any city, borough, or town corporate, or (being made) it ſhall afterwards become void; to require the electors to proceed to election, and proper courts to be held, for admitting and ſwearing in the magiſtrates ſo reſpectively choſen. This writ iſſues to the judges of any inferior court, commanding them to do juſtice according to the powers of their office, whenever the ſame is delayed. For it is the peculiar buſineſs of the court of king's bench to ſuperintend all other inferior tribunals, and therein to inforce the due exerciſe of thoſe judicial or miniſterial powers, with which the crown or legiſlature have inveſted them; and this not only by reſtraining their exceſſes, but by quickening their negligence, and obviating their denial of juſtice. A *mandamus* may, therefore, be had to the courts of the city of London, to enter up judgment; to the ſpiritual courts to grant an adminiſtration, to ſwear a church-warden, and the like. This writ is founded on a ſuggeſtion, by the oath of the party injured, of his own right, and the denial of juſtice below: whereupon, in order more fully to ſatisfy the court that there is a probable ground for ſuch interpoſition, a rule is made (except in ſome general caſes, where the probable ground is manifeſt), directing the party complained of to ſhew cauſe why a writ of *mandamus* ſhould not iſſue; and if he ſhews no ſufficient cauſe, the writ itſelf is iſſued, at firſt in the alternative, to do thus, or ſignify ſome reaſon to the contrary; to which a return or anſwer muſt be made, at a certain day. And if the inferior judge, or other perſon to whom the writ is directed, returns or ſignifies an inſufficient reaſon, then there iſſues in the ſecond place a peremptory *mandamus*, to do the thing abſolutely; to which no other return will be admitted, but a certificate of perfect obedience and due execution of the writ. If the inferior judge or other perſon make no return, or fails in his reſpect and obedience, he is puniſhable for his contempt by attachment. But, if he, at the firſt, returns a ſufficient cauſe, although it ſhould be falſe in fact, the court of king's bench will not try the truth of the fact upon affidavits; but will for the preſent believe him, and proceed no farther on the *mandamus*. But then the party injured may have an action againſt him for his falſe return, and (if found falſe by the jury) ſhall recover damages equivalent to the injury ſuſtained; together with a peremptory *mandamus* to the defendant to do his duty. Blackſt. Com. book iii. p. 110, &c. and p. 264, &c.

Mandamus was alſe a charge to the ſheriff, to take into the king's hands all the lands and tenements of the king's widow, who, againſt her oath formerly given, married without the king's conſent.

MANDARIN, a name given by the Portugueſe to the nobility and magiſtracy of the eaſtern countries, eſpecially to thoſe of China.

The word *mandarin* is unknown in this ſenſe among the Chineſe, who in lieu thereof, call their grandees and magiſtrates *quan*, or *quan fu*, q. d. ſervant or miniſter of a prince.

There are in China nine orders of *mandarins*, or nine degrees of nobility; which have as many different animals for their characteriſtics. The firſt is diſtinguiſhed by a crane, the ſecond by a lion, the third by an eagle, the fourth by a peacock, &c.

There are in all thirty-two or thirty-three thouſand *mandarins* in China. There are *mandarins* of letters, and *mandarins* of arms; both the one and the other of which paſs ſeveral examinations: beſides civil *mandarins*, or thoſe of juſtice.

Since the time that the Tartars have rendered themſelves maſters of China, moſt of the tribunals, or courts of juſtice, &c. inſtead of one *mandarin* for a preſident, have two, the one a Tartar, and the other a Chineſe.

The *mandarinate* is not hereditary, nor are any raiſed to it but men of letters.

Mandarin is alſo a name which the Chineſe give to the learned language of the country.

Beſides the proper and peculiar language of each nation and province, they have one common to all the learned men in the empire. This they call the *mandarin* tongue, or the language of the court. Their public officers, as notaries, lawyers, judges, and chief magiſtrates, write and ſpeak the *mandarin*.

MANDATARY, *mandatarius*, he to whom a command or charge is given: and he that comes to a benefice by a *mandamus* is called by this name.

MANDATE, **Mandatum**, in the *Canon Law*, denotes a reſcript of the pope, by which he commands ſome ordinary, collator, or preſenter, to put the perſon there nominated in poſſeſſion of the firſt benefice vacant in his collation.

An apoſtolical *mandate* for the proviſion of benefices, is a monitorial and comminatory letter from the pope to a biſhop, by which he is injoined to provide a ſubſiſtence for thoſe who have been ordained by him, or his predeceſſors, from the tonſure to ſacred orders incluſively; and to allow them their ſubſiſtence till they be provided with a benefice. This practice was occaſioned by the biſhops formerly laying hands on great numbers, and afterwards abandoning them to miſery and want.

At firſt the popes only gave monitory *mandates*, which were no more than ſimple prayers and requeſts, that did not bind the ordinary; afterwards they gave preceptory *mandates*, which did not annul the proviſions of the ordinary; at laſt they ſet up executory *mandates*, by which the proviſions made by the ordinary, in prejudice of the *mandate*, were declared null; and the executor of the *mandate*, in default of the ordinary, conferred the benefice on the mandatory: but the pope's power in iſſuing theſe *mandates* is now very much reſtrained.

MANDIBULA, the JAW. See MAXILLÆ. Hence

Mandibulares, or *manducatorii muſculi*. See MASSETER.

MANDIL, or **Mandril**, the name of a kind of cap or turban worn by the Perſians.

The *mandil* is formed by firſt wrapping round the head a piece of fine white linen five or ſix ells long; over this they wrap in the ſame manner, a piece of ſilk of the ſame length, and often times of great value. To make the *mandil* genteel, care muſt be taken, that, in wrapping the ſilk, it be ſo managed, as that the ſeveral colours found in the ſeveral folds made a kind of waves, ſomewhat like what we ſee on marbled paper.

The dreſs is extremely majeſtic, but at the ſame time very heavy: it ſerves either as a ſhelter to the head from cold, or as a ſcreen from the exceſſive heat of the ſun; it is ſaid, that a blow of a cutlaſs will not penetrate it. In rainy weather they cover it with a kind of caſe or hood, made of red cloth.

The mode of the *mandril* has been for ſome time altered: during the time of Schah-Abbas II. it was round at top; in the time of Schah-Soliman, they brought one end of the ſilk out of the middle of the *mandril* over the head; and, laſtly, in the reign of Schah-Huſſein, the end of the ſilk, in lieu of its being gathered as before, was plaited in manner of a roſe; and this the Perſians acount extremely graceful, and uſe it to this day.

MANDRAKE, *mandragora*, in *Botany*. Its characters are theſe: the empalement is bell-ſhaped, and of one leaf, cut at the top into five acute ſegment; the flower hath one erect, bell-ſhaped petal, which is a little larger than the empalement; and has five awl-ſhaped ſtamina, which are arched, and hairy at the baſe; in the centre is ſituated a roundiſh germen, which turns to a large round berry, with two cells, having a fleſhy receptacle convex on each ſide, filled with kidney-ſhaped ſeeds. We have but one ſpecies of this genus at preſent in the Engliſh gardens; which grows naturally in Spain, Portugal, Italy, and the Levant.

Mandrake has been recommended in caſe of barrenneſs, but without foundation. Its freſh root is a violent purge, the doſe being from ten grains to twenty in ſubſtance, and from half a dram to a dram in infuſion. It has been found to do ſervice in hyſteric complaints, but muſt be uſed with great caution, otherwiſe it will bring on convulſions, and many other very miſchievous ſymptoms. It has alſo a narcotic quality. At preſent we only uſe the freſh leaves in anodyne and emollient cataplaſms and fomentations.

Naturaliſts tell ſtrange ſtories of this plant; but, ſetting aſide its ſoporiferous virtue, the modern botaniſts will ſcarce warrant any of them, not even that human figure ordinarily aſcribed to its roots, eſpecially ſince the diſcovery of the artifice of charletans in faſhioning it, to ſurpriſe the credulity of the people.

Mandragoras, *Chineſe*, is the plant GINSENG.

Mandrake-*wine*, *mandragorites vinum*, a ſort of medicinal impregnation of wine with the virtues of *mandrake* root. It is prepared by cutting into thin ſlices half a pound of the bark of *mandrake* roots, and ſtringing them on a thread, and letting them down into a veſſel containing nine gallons of white wine, ſo that they may hang looſely in it, and by that means fully impregnate it with their virtues. It was uſed in ſmall doſes as an anodyne and ſoporific. It had the ſame effects alſo, if only ſmelled to, and was ſometimes injected in clyſters to the ſame purpoſe. They ſay that half a pint of this liquor mixed with twelve times its quantity of wine, brings on a carus; and that even a ſmaller doſe than this, leſs diluted, is mortal.

MANDREL, a kind of wooden pulley, making a member of the turner's lathe.

Of theſe there are ſeveral kinds; as

Mandrels, *flat*, which have three or more little pegs or points near the verge, and are uſeful for turning flat boards on.

Mandrels, *pin*, which have a long wooden ſhank to fit into a round hole made in the work to be turned.

Mandrels, *hollow*, which are hollow of themſelves, and uſed for turning hollow work.

Mandrels, *ſcrew*, for turning ſcrews, &c.

MANDRIL, in *Zoology*, a ſpecies of BABOON or MONKEY.

MANDSJADE, in *Botany*, is an Indian ſiliquous or pod-bearing tree, with a ſpiked pentapetalous flower, and long pods containing nodous ſcarlet-coloured beans; the tree is one of the talleſt in the kingdom of Malabar, bears fruit the twentieth year after planting, and living near two hundred years.

The wood is of common uſe for various purpoſes, on account of its ſolidity; the leaves, reduced to powder, are uſed in the pagan religious rites; the ſeeds, which are not ungrateful to the taſte, are eaten by the common people, either boiled whole or ground to a meal: and are beſides, of great uſe to goldſmiths and jewellers, who, on account of their exact equality, employ them inſtead of grains in weighing their wares; for each maljelina, as they call them, weighs four grains, ſuch as are in uſe among the goldſmiths; who, alſo of the bruiſed ſeeds, moiſtened with water and borax, prepare a glue for conglutinating the finer ſort of veſſels, when broken. Of the bruiſed leaves the phyſicians prepare a potion for mitigating pains in the loins.

MANDUCATION, the action of *chewing*, otherwiſe called *maſtication*.

Manducation is a term ſeldom uſed but in ſpeaking of the euchariſt. The catholics maintain a real *manducation* of the body of Chriſt; the reformed, on the contrary, take this *manducation* to be only figurative, and by faith. St. Auguſtine calls it *ſpiritual manducation*.

MANE-*ſheet*, in the *Manege*, is a ſort of covering for the upper part of a horſe's head, and all round his neck, which at one end has two holes for the ears to paſs through, and then joins to the halter upon the fore-part of the head, and likewiſe to the ſurcingle, or long girth, upon the horſe's back.

MANEGE, A horſe is ſaid to *manege* when he works upon volts and airs, which ſuppoſes him broke and bred. See MANAGE.

MANEGE *for a ſoldier's horſe*, is a gallop of unequal ſwiftneſs, but ſo that the horſe changes hands readily.

MANEGE, *high*, is the high or raiſed airs, which are proper for leaping horſes. See AIRS.

MANEGED. A horſe is ſaid to be thoroughly *maneged*, or a finiſhed horſe, that is well broken, bred, and confirmed in a particular air or manege, ſo as to bear well upon the hand, know the heels, and ſit well upon the hips.

MANEQUIN, among *Painters*. See LAYMAN.

MANES, a poetical term, ſignifying the ſhades or ſouls of the deceaſed.

The heathens uſed a variety of ceremonies and ſacrifices to appeaſe the manes of thoſe who were deprived of burial. See LEMURES and LEMURIA.

MANES, *dii*, were the ſame with *inferi*, or the infernal gods, who tormented men; and to theſe the heathens offered ſacrifices, to aſſuage their indignation.

The heathen theology is a little obſcure with regard to theſe gods *manes*. Some hold, that they were the ſouls of the dead; others, that they were the genii of men; which laſt opinion ſuits beſt with the etymology of the word.

The heathens, it is pretty evident, uſed the word *manes* in ſeveral ſenſes; ſo that it ſometimes ſignified the ghoſts of the departed, and ſometimes the infernal or ſubterraneous deities, and in general all divinities that preſided over tombs.

The evocation of the *manes* of the dead ſeems to have been very frequent among the Theſſalians; but it was expreſly prohibited by the Romans. See LARES.

MANGABEY, in *Zoology*, the white eye-lid MONKEY, deſcribed by Buffon, vol. xiv. p. 244. and Pennat, Brit. Zool. p. 114.

MANGANESE. See MAGNESIA.

MANGANUM, Μαγγανον, among the Greeks, a general name for inſtruments to throw large ſtones with.

MANGARATIA, in *Botany*, a name given by ſome authors to the plant of which the common ginger of the ſhops is the root.

MANGER, in a ſhip, a circular place made with planks faſtened on the lower deck of a ſhip of war, right under the hawſes, being about a foot and a half in height; the uſe of which is to catch and receive the ſea-water, beating in at the hawſes in a ſtreſs of weather.

MANGO-*tree*, *mangifera*, in *Botany*, a genus of the *pentandria monogynia* claſs: the flower hath five petals, and the fruit is a kidney-ſhaped drupe; this is a vaſt tree, forty feet high, and eighteen in thickneſs, growing in the Eaſt Indies, where it ſpreads its numerous branches all around, at a great diſtance, being always green, and bearing fruit once or twice every year from ſix or ſeven years old to an hundred: it is propagated by inciſion, or ſowing the ſeed, in Malabar, Goa, Bengal, Pegu, and many other countries of the Eaſt.

The fruit is of a roundiſh oblong figure, flat, ſlightly ſinuated, or hollowed at the ſides, and ſhaped much like a kidney, bigger than a gooſe egg, ſmooth, ſhining, firſt green ſpeckled with white, then inclining to yellow, and at the laſt of a gold colour; it has a yellowiſh and ſucculent pulp, not unlike that of a peach, or rather a plum; firſt acid, then acido-dulcid, and pleaſant to the taſte; within the pulp is contained an oblong, compreſſed, and lanuginous ſtone, thin, yet very hard and tenacious, and including an oblong kernel, very like an almond, and of the ſame bigneſs, and of a bitteriſh though not unpleaſant taſte.

There are various ſorts of this fruit, as there are of our apples and pears, which are very different, according to the countries where they grow: that ſpecies, which is without a ſtone, and is very grateful to the palate, ſeems to us only a variety or a degenerated fruit; the fruit is cut into ſlices, and eaten either without wine, or macerated in wine; it is alſo candied, in order to its preſervation; ſometimes they open it with a knife, and fill up the middle with freſh ginger, garlick, muſtard, and ſalt, with oil or vinegar, that they may eat it with rice, or after the manner of pickled olives.

As to its temperament, this fruit is cold and moiſt, though the Indian phyſicians affirm the contrary. We make uſe of pickled mangoes which are imported to us, as we do of pickled cucumbers. The ſtones roaſted are ſaid to cure a looſeneſs, which Garcias found to be true. The wood of the tree, with cinders, is uſed for burning the carcaſes of the pagans, as being conſecrated to this rite; whence it ſerves alſo for coffins, in which they depoſit their dead; but it is but of a ſoft ſubſtance, and of a ſhort duration. The ſtalks ſupply the place of arequa, or caunga, in the chewing of betel; the ſame, calcined and reduced to powder, take away warts. Of the tender leaves, with the bark of the avancoe, that is, the ricinus, the ſeed of cummin and parpaclagam, is made a decoction, which is highly beneficial in the cough, aſthma, and other affections of the thorax. The bark of the tree pulverized, and taken in chicken broth, is an excellent diſſolvent of extravaſated and coagulated blood, occaſioned by a fall, in any part of the body. The juice of the bark, with the white of an egg, and a very little opium, taken inwardly, is a preſent remedy againſt the diarrhœa, dyſentery, and teneſmus. Of the gum of the tree, and the flowers of rice, with the addition of a ſmall quantity of opium and pepper, are prepared pills, which alſo cure all ſorts of fluxes of the belly. Of the flour of the dried kernels the natives have the art of preparing various kinds of food. James.

MANGOSTEEN, or MANGOUSTAN, *garcinia*, in *Botany*, a genus of the *dodecandria monogynia* claſs. Its characters are theſe: the flower hath a three-leaved empalement, and four roundiſh petals, which are larger than the empalement; it has ſixteen ſtamnia, formed into a cylinder; and in the centre is ſituated an oval germen, crowned by a buckler-ſhaped plain ſtigma, divided into eight parts, which becomes a thick globular berry, with one cell, including eight hairy fleſhy ſeeds, which are convex and angular. We know but one ſpecies, which grows naturally in the Molucca iſlands and New Spain. Miller. Linnæus enumerates two ſpecies.

The tree is large, and uſually much branched; the leaves are ſix inches long, and two inches wide, of a lively green, and ornamented with a double ſeries of ribs, one part of which makes a border that ſurrounds the whole verge of the leaves; the flower is ſmall, and of a pale green colour; it is compoſed of four petals, which, when they open, ſhew the rudiments of the fruit forming itſelf within; theſe leaves do not fall off at all, but remain faſtened to the bottom of the fruit till it is ripe, ſerving as a ſort of ſupport to it; the fruit grows to the bigneſs of an apple; it is perfectly round, and is covered with a hard and tough ſkin, which is the twelfth of an inch thick, and is of a lively red, ſtreaked with ſeveral yellow lines, which are ſo many filaments running along it; at the extremity there are placed ſeveral rays, which, running to the length of the tenth of an inch, meet together, and terminating in a point; the ſubſtance of the fruit is white, ſoft, and of a very agreeable taſte, approaching to that of raſpberries; the body of the fruit is compoſed of ſeveral lobes or quarters, as we call them, which will ſeparate from one another like thoſe of an orange; but they are not incloſed each in a ſeparate ſkin as thoſe are; theſe are in number the ſame with the rays at the end of the fruit, that is, there are ſeven of them. When the fruit is eaten before it is perfectly ripe, the whole is eaten together; but when it is thoroughly ripened, there is found a ſingle kernel in the middle; this is greeniſh without and white within, and is of an inſipid taſte, and therefore uſually thrown away. Mem. Acad. Scienc. Par. 1699.

This is an extremely agreeable fruit, and the eating it is never attended with any bad conſequences, even though it be eaten in ever ſo large quantities. People who are not uſed to the Indies are apt to give this the preference to all the fruits of the place; but the natives, and others who have accuſtomed themſelves to the ſmell of the *durion*, give that infinitely the preference. This is a large prickly fruit, of the ſize of a melon, of an intoxicating quality, and of a taſte like that of ſugar and cream, but with a ſmell like that of rotten onions. The ſmell is intolerable to ſtrangers, but cuſtom has made it familiar to the Indians, and they diſregard it. The peel or rind of the *mangouſtan* is a more powerful aſtringent than the pomgranate bark, and is given in decoction in diarrhœas and dyſenteries with great ſucceſs, as alſo in all other hæmorrhages. There is a ſort of wild *mangouſtan*, called by the Portugueſe *mato*, which grows in the woods both in the Eaſt Indies and in America. The fruit of this perfectly reſembles the true *mangouſtan*, but is not eatable.

MANGOUSTE, of Buffon, in *Zoology*. See ICHNEUMON.

MANGROVE, *rhizophera*, in *Botany*, a genus of the *dodecandria monogynia* claſs: the empalement and flower are each divided into four ſegments; and the ſeed, which is ſingle, is very long, and has a fleſhy baſe. Of this plant there are ſeveral ſpecies, which grow in ſalt water rivers, both in the Eaſt and Weſt Indies, where it is called *mangrave*, but as they will not grow upon land, it is needleſs to ſay more concerning them.

MANGROVE *grape*. See *Sea-ſide* GRAPE.

MANGROVE-*tree*. See *Syrian* MALLOW.

MANHEB, a word uſed by ſome chemical writers to expreſs ſcoriæ of any kind.

MANIA, *madneſs*, in *Medicine*, the moſt violent and acute ſpecies of delirium, ariſing from a perturbation of the imagination and judgment.

Signs of it. Theſe are a bold and reſolute aſpect, eyes ſuffuſed with blood, a tremulous motion of the eye-lids, great pride diſcovering itſelf in the countenance, voice, and geſture, a grinding of the teeth, an uncommon hatred to particular perſons, little ſleep, a violent cephalalgia, a quickneſs of hearing, a ringing in the ears: but it is to be obſerved, as to the firſt-mentioned ſymptom, that thoſe perſons who have become *mad* through fear, have always in their aſpect a mixture of that terror the object firſt gave, and of that natural boldneſs which ariſes from *madneſs*. The patient often lays traps and ſnares for getting other people into his power, with intent to hurt them, though they never have injured him. Sometimes mad people have been known to murder others; and they always have ſo much ſtrength as to overpower almoſt any one perſon; and though they have no actual fever, yet they are inſenſible of the external cold, and in general of other pains and injuries; nay, they are ſo loſt in ſpeculation, as often ſcarce to feel the blows and laſhes they receive in the courſe of their cure. They often do not even hear the people who ſpeak to them, and are naturally of a very jocund and chearful imagination, fancying themſelves kings and princes, and are delighted with muſic. They have a violent propenſity to venery, and ſuch an abſence of ſhame, that they will go to ſtool, or do any thing of a like kind, before any body. This is the uſual caſe in the height of the diſorder; and in its decline ſome are dull and ſtupid, others very ſorrowful and melancholy, and ſenſible of their unhappy diſorder.

The cauſe of the *mania* is thus accounted for by Quincy. As often as the ſpecies of things, wherewith we have been acquainted, are hurried together, we may be ſaid to dream; and thence in ſleep theſe ſpecies are added with other things, and variouſly compounded, from the manifold repercuſſions of the animal ſpirits, which ariſe from the cauſe producing ſleep, and preſſing the nerves, ſo as to revert the fluctuation of their juice. A delirium is therefore the dream of waking perſons, wherein ideas are excited without order or coherence, and the animal ſpirits are driven into irregular fluctuations.

If then the cauſe inducing a delirium be of that nature, that it can excite ideas or motions of a conſiderable impetus, without any regularity or order, ſuch a delirium will be attended with boldneſs or rage, and violent motions of the body; that is, a *mania* will be produced.

Now, it is plain, that all the known cauſes of this diſtemper give a greater diſpoſition to the blood for motion, and render it fluxile, but not conſiſtent, and uniformly thick enough; and therefore that they diſpoſe perſons likewiſe to continued fevers, ſince they occaſion the blood to be thrown out of the heart with an increaſed force, unleſs ſome other cauſe intervene, whereby the efficacies of theſe are interrupted in diſpoſing the blood in febrile motions; and the blood is ſo diſpoſed, as often as it can be rarefied into its minuteſt parts; that is ſo uniformly rarefied, that it can eaſily, with any force by the motion received from the heart, go into parts diviſible at the occurſions of thoſe orifices, into which it ought to be diſtributed: for then the coheſion of the parts, which can be but very ſmall, will not be any obſtruction to the increaſe and propagation of the blood's velocity. But if it happen that the efficient cauſe, or the heart, throws the blood with a greater force, or that the blood can be more eaſily propelled in any given time, it will occaſion, at the ſame time, that ſome part of the blood will be more nearly united, ſo as to form moleculæ, conſiſting of cohering particles: which moleculæ will cohere to one another, and not ſo eaſily obey the direction of the heart's propelling force. The blood hereupon cannot be uniformly rarefied, nor enter ſo eaſily into the ſmall orifices of the veſſels, and ſo ſoon travel through them: and therefore there will no fever ariſe, but a delirium without a fever, wherein the heat of the blood will be greater, and the preſſure in the brain uncertain: whence inconſtant recurſions of the ſpirits, inordinate undulations, confuſed vibrations of the nerves, and a remarkable energy of imagination, whence will proceed audacity and paſſion beyond meaſure. It is a diſeaſe very hard to cure, and is generally found to baffle the phyſician.

From diſſection of thoſe who died mad or melancholy, it appears that a congeſtion of blood or other fluids, in the veſſels of the brain, is a principal cauſe of theſe diſorders: or it may ariſe from ſuch an impreſs on ſome part of this organ of ſenſe, as excites the preternatural ſenſations which more particularly work on the imagination. Dr. Battie in his Treatiſe on *Madneſs*, having determined it to be a deluded imagination, ariſing from a preternatural ſtate or diſorder of ſenſation, the ſeat of which ſenſation he fixes in the nervous or medullary ſubſtance, derived from, or rather communicating with the brain, and the cauſe of it a preſſure upon the medullary ſubſtance contained in the nervous filaments, diſtinguiſhes *madneſs* into two ſpecies; one called *original*, which he aſcribes to an internal diſorder of the nervous ſubſtance, and the other *conſequential*, ariſing from a diſorder of the ſame nervous ſubſtance *ab extra*. The former may be known or reaſonably ſuſpected, when it neither follows nor accompanies any accident, which may be juſtly termed its external or remoter cauſe; when there is room to believe it hereditary, and when it both ceaſes and appears afreſh, without any imaginable cauſe: under all which circumſtances, he concludes it to be irremidiable by medicine. Conſequential *madneſs* ſometimes admits of relief, though it frequently becomes habitual, and, in effect, the ſame as *madneſs* ſtrictly original.

Though the brain, ſays Dr. Battie, is undoubtedly the principal ſeat of deluſive ſenſation, nevertheleſs it is not the only one: foraſmuch as the ſame ſanguinary or ſerous obſtructions are capable in any other part of the body of exciting falſe ideas, as well as in the brain, at leaſt to ſome degree, and in proportion to the quantity of medullary matter there collected, ſo as to be ſufficiently compreſſed by ſuch obſtructions. Thus the ſtomach, inteſtines, and uterus, are frequently the real ſeats of *madneſs*, occaſioned by the contents of theſe viſcera being ſtopped in ſuch a manner as to compreſs the many nervous filaments, which here communicate with one another by the meſenteric ganglia.

Perſons ſubject to it. Theſe are principally men of a choleric habit of body, and of violently paſſionate diſpoſitions. Thoſe who have continual domeſtic quarrels, are alſo frequently thrown into *madneſs* by it; and women frequently incur this diſeaſe from long ſuppreſſion of the menſes, and a habit of giving looſe to laſcivious thoughts. Suppreſſions of the hæmorrhoides, and of the evacuation of the ſemen, have ſometimes alſo driven men into *madneſs*; worms have alſo ſometimes occaſioned it, and ſometimes drunkenneſs.

Prognoſtics. *Madneſs* ariſing from immaterial cauſes, is much more difficult of cure than when it ariſes from diſorders of the bodily organs; hence when it ariſes from violent perturbations of the mind, or from intenſe ſtudy, it is almoſt incurable. When it ariſes from ſuppreſſions of the ſemen, or of the uterine or hæmorrhoidal diſcharges, there is great hope of a cure by proper means. But *mad* perſons in general, when they ſleep ſound, and always awake in outrageous fits, are to be eſteemed incurable, or at leaſt much more difficult of cure than others.

When *madneſs* proceeds from internal exoſtuſes of the cranium, or induration of the dura mater, it is incurable by art. Fracture, or intropreſſion of the cranium, and concuſſion of the head, have been ſometimes relieved. When inſolation is the cauſe, a free and early uſe of the lancet has been found uſeful. But if *madneſs* is the more immediate conſequence of the ſun's action upon the nervous ſubſtance, and if, however occaſioned, it is of conſiderable duration, it is very often incurable. From inflammation of thoſe membranes that ſurround the brain, *madneſs* is very dangerous, and frequently terminates in either apoplexy or mortification. When it is the conſequence of a chronical congeſtion of fluids, it frequently admits of relief, if timely applied; and ſuch congeſtion is leſs dangerous, and more eaſily removed, whenever the meſenteric nerves alone are affected. When produced by ſpaſm, in conſequence of the tumultuous paſſions of joy and anger, or by intoxicating drugs, and vinous ſpirits, it is generally very violent, and often fatal by its immediate effects; but if the patient is able to bear the firſt ſhock, this ſpecies of *madneſs* is much ſooner relieved than the gradual and continual muſcular conſtriction, occaſioned by the more gentle paſſions of love, grief, or deſpair; or by long and uninterrupted attention to any one object, however pleaſing. Laxity intervening between ſpaſm and delirious preſſure, whereby it becomes a remoter cauſe of *madneſs*, admits of cure, if duly applied; nor is it uncommon that the weakened membranes ſpontaneouſly recover their elaſtic tone, provided the ſpaſmodic impulſe is abated before their conſtituent fibres are diſtracted beyond their natural tendency to approximation. *Madneſs* conſequent upon gluttony or idleneſs, eaſily ſubmits to medicine, properly applied. If it is accompanied with other diſorders, the prognoſtic is to be formed from thoſe diſorders: anxiety, like original *madneſs*, when it proceeds from a natural defect in the internal conſtitution of the nervous ſubſtance, is not radically curable: if it proceeds from any external cauſe, there is a proſpect of better ſucceſs. Inſenſibility or ideotiſm, ariſing from any conſtitutional imperfection, is pronounced incurable by phyſic; nor when it appears to be only the effect of conſequential *madneſs*, has it been frequently known to be relieved by art or nature.

Method of cure. A briſk purge is firſt to be given; after this the patient is to be blooded pretty freely, ten ounces at the leaſt ſhould be taken away; after this the ſenſes are to be attempted to be rouſed by ſtrong vomits. White hellebore was famous on this occaſion among the ancients; and there are ſome caſes in which it may be given with ſafety, and with great good effect. After this the violent emotion of the blood is to be attemperated by nitrous and abſorbent medicines; and, after theſe, the ſeveral remedies uſually eſteemed ſpecifics take place. Of this number are decoctions of the red anagallis or pimpernel, the rota muraria, or white maidenhair, the ſeveral preparations of ſilver, the berries of the *herba Paris*, aſſes blood, and the like; and great care is to be taken to bring the hæmorrhoidal and menſtrual diſcharges as far as poſſible to regularity. In caſes of retention of the ſemen, purified nitre is to be given in great quantities, and may be alſo externally uſed, applying it to the teſtes in a cataplaſm. The uſe of opiates is ſcarce to be ſuffered in any delirium, but of all things is never to be given in *madneſs*, for it never gives them any ſleep, but enrages and adds to the complaint, having the ſame effect that ſtrong liquors would have upon them. The uſe of white hellebore, as a vomit, may be of great ſervice in ſome caſes; but in all hypochondriac complaints and conſequently in *madneſs*, in the cauſes of which theſe complaints have a ſhare, it is certain to increaſe the diſeaſe. Junker.

We read of a *mania* ariſing from a callous pia mater. See Med Eſſ. Edinb. vol. iv. art. 26.

Dr. Michelotti relates the cure of a young man, who, after being expoſed to very hot weather at ſea, and having committed violent debauches in drinking, became mad, without any fever. He was cured by violent bleeding, ſtarving, weak very cold drink, the cold bath, and pouring cold water on his head. Hiſt. de l'Acad. des Scienc. 1734.

Madneſs, ſays Dr. Battie, conſidered as a deluſive ſenſation, unconnected with any other ſymptom, requires the patient's being removed from all objects that act forcibly upon the nerves, and excite too lively a perception of things, more eſpecially from ſuch objects as are the known cauſes of his diſorder. The viſits, therefore, of affecting friends, as well as enemies, and the impertinent curioſity of thoſe who think it paſtime to converſe with madmen, and ſport with their paſſions, ought ſtrictly to be forbidden. On the ſame account, the place of confinement ſhould be at ſome diſtance from home, and none of his own ſervants ſhould be ſuffered to wait on him, Every unruly appetite ſhould be checked; and every fixed imagination, if poſſible, diverted. The patient's body and place of reſidence ſhould be kept clean; the air he breathes ſhould be dry and free ftom noiſome ſteams; his food eaſy of digeſtion, and ſimple, neither ſpirituous, nor high ſeaſoned; and his amuſement not too engaging, nor too long continued, but rendered agreeable by a well-timed variety; and his employment ſhould be about ſuch things as are indifferent, and which approach the neareſt to an intermediate ſtate, between pleaſure and anxiety.

In the cure of *madneſs*, ſuppoſed by Dr. Battie to ariſe from delirious preſſure of the brain, or medullary ſubſtance in the nerves, he directs our firſt attention to leſſen, divert, or diſlodge the compreſſing matter from the part affected: the intentions for which purpoſes are depletion, revulſion, removal, and expreſſion. When preſſure of the brain and nerves is ſudden, the two firſt intentions may be ſafely and effectually anſwered by the lancet and cupping glaſs, repeated in proportion to the ſtrength of the patient and the greatneſs of the preſſure.

To the ſame purpoſe are recommended the neutral ſalts, ſuch as nitre, ſal catharticus amarus, magneſia alba, tartar, and all its preparations, but more eſpecially the ſal diureticus: this latter is alſo highly extolled by Dr. Muzzel, of Berlin, in his Treatiſe of Melancholy, who directs a dram to be given three times a-day in a draught of warm water, ſweetened with honey: this with other moiſtened diet, the warm bath every night, and the fleſh-bruſh every morning, hath, he ſays, great efficacy.

To promote revulſion, in particular, we are adviſed to the uſe of the oily and penetrating ſteams, ariſing from the ſkins and other ſoft parts of animals, newly ſlain; tepid fomentations and cataplaſms, applied to the head, legs, and feet, and oily and emollient glyſters, ſinapiſms, cauſtics, errhines, and veſicatories, as alſo the rougher cathartics, emetics, and volatile diaphoretics, are liable to endanger farther conſtriction, and therefore, if employed at all, to be uſed with the utmoſt caution. In the caſe of phrenſies or ſudden inflammations, Dr. Battie is ſuſpicious of the cathartic ſalts, and even of nitre, if adminiſtered in too large doſes. Delirious preſſure, when gradual and chronical, in robuſt and plethoric habits, alſo indicates depletion and revulſion. But if the ſubject is naturally infirm, or exhauſted by preceding illneſs, the lancet muſt be cautiouſly uſed, or entirely prohibited: theſe intentions being ſafely anſwered only by the mildeſt ſolutives, as the neutral ſalts, caſſia, manna, &c. and the gums quickened with a few grains of aloes. Nevertheleſs, when the weakneſs of the patient does not contraindicate, if the ſtagnating matter refuſes to ſubmit to theſe gentle evacuants, though often and properly repeated, and more eſpecially when the nervous ſubſtance contained in the abdomen is affected, the third and fourth intentions take place; and it becomes abſolutely neceſſary to ſhake with violence the head and hypochondria, by convulſing the muſcular fibres with emetics, rougher purges, and errhines. Dr. Battie obſerves, that though bleeding is in ſome caſes ſerviceable and neceſſary, yet to a feeble or convulſed lunatic, the lancet is not leſs deſtructive than a ſword. Bliſters, cauſtics, and ſharp purges, in ſhort all painful applications, or pungent ſubſtances, are to be tried with great caution, or rather not to be tried at all in fits of fury. Nor does even defect of ſenſation allow their uſe, whenever ſuch defect is occaſioned by the preceding exceſs of the nervous energy, or when it is accompanied by ſpaſm. For the ſame reaſon, the gums, and all the fœtid anti-hyſterics, though uſeful in *madneſs* ariſing from, or complicated with ſome ſort of ſpaſmodic diſorders, are condemned in all preternatural actions of the muſcles; alſo in *madneſs* attended with a feveriſh heat, or which happens in a plethoric habit of body, or that follows an inflammatory obſtruction of the brain. Opium, though approved by Dr. Battie for allaying the more tumultuous paſſions, and obtunding an exceſs of ſenſibility, is highly dangerous in that ſpecies of the diſeaſe which approaches to ſtupor and inſenſibility. Mineral waters, drank at the fountain-head, and bathing in the ſea, or cold freſh water, though remedies that have been much depended on for the cure of *madneſs*, are contraindicated, whenever there is ſufficient reaſon to ſuſpect, that irreſoluble congeſtions of the fluids clog the membranes contiguous to the nervous ſubſtance; or that the ſolids are ſtrained beyond the poſſibility of recovering their natural elaſticity. Dr. Battie alſo pronounces vomits to be not only improper, but miſchievous, whenever there is a reaſonable ſuſpicion that the veſſels of the brain or nervous integuments are ſo much clogged or ſtrained as to endanger a rupture, or farther diſunion, inſtead of a deliverance from their oppreſſive loads. He likewiſe urges the ſame objection againſt ſuch muſcular irritation, whenever the veſſels are contracted with cold, or when their contents are rarefied with heat, and likewiſe in conſtitutions that are lax and feeble, and naturally ſpaſmodic.

The anodyne medicines proper in this caſe, are camphor, camphor with nitre, muſk, &c. and, after due evacuations, ſtrong opiates may be uſed with advantage. If muſk is given, the doſes ſhould conſiſt of from ℈ i. to ʒ ß. Opium may be given to two grains. Camphor hath been given with great benefit, from ℈ i. to ʒ i. ß in a doſe, and repeated every morning, and ſometimes morning and night. Dr. Kennier uſed to begin with an antimonial vomit, the next day he gave a large doſe of camphor, and repeated it at night, and thus continued a few days; then in the day he gave pills of æthiops, gum guaiacum, &c. and at nights the camphor, till a cure was effected; in which be often ſoon ſucceeded. Dr. Monro gives borax to ʒ ij. as a doſe for procuring ſleep. The emetics recommended in this diſorder, are thoſe of the antimonial kind; and the moſt effectual diuretics are alkaline ſalts in large doſes. Dr. Mead obſerves, that in the cure of maniacs, evacuations by the kidneys are of greater conſequence than is generally ſuppoſed: eſpecially if the *mania* is of the furious kind, and accompanied with febrile heat. See LUNATIC, MADNESS, and MELANCHOLY.

MANICA, properly a ſleeve. See HIPPOCRATES's *ſleeve.* Hildanus calls by this name a particular ſort of purſe, open at both ends, which he deſcribes in his Treatiſe de Gangræno & Sphacelo, and gives a figure thereof. This he directs to be put about a limb, juſt before the place of amputation, before the operation is performed.

MANICHEES, or MANICHEANS, MANICHÆI, a ſect of ancient heretics, who aſſerted two principles; ſo called from their author *Manes*, or *Manichæus*, a Perſian by nation, and educated among the MAGI, being himſelf one of that number before he embraced Chriſtianity.

This hereſy had its firſt riſe about the year 277, and ſpread itſelf principally in Arabia, Egypt, and Africa. St. Epiphanus, who treats of it at large, obſerves, that the true name of this hereſiarch was Cubricus; and that he changed it for *Manes*; which in the Perſian or Babyloniſh language ſignifies *veſſel.* A rich widow, whoſe ſervant he had been, dying without iſſue, left him ſtore of wealth: after which he aſſumed the title of the apoſtle or envoy of Jeſus Chriſt.

Manes was not contented with the quality of apoſtle of Jeſus Chriſt, but he alſo aſſumed that of the Paraclete, whom Chriſt had promiſed to ſend: which Auguſtin explains, by ſaying, that *Manes* endeavoured to perſuade men, that the Holy Ghoſt did perſonally dwell in him with full authority. He left ſeveral diſciples, and among others, Addas, Thomas, and Hermas. Theſe he ſent, in his life-time, into ſeveral provinces to preach his doctrine. • *Manes*, having undertaken to cure the king of Perſia's ſon, and not ſucceeding, was put in priſon upon the young prince's death, whence he made his eſcape; but he was apprehended ſoon after, and flayed alive.

However, the oriental writers, cited by D'Herbelot and Hyde, tell us, that *Manes*, after having been protected in a ſingular manner by Hormizdas, who ſucceeded Sapor in the Perſian throne, but who was not able to defend him, at length, againſt the united hatred of the Chriſtians, the Magi, the Jews, and the Pagans, was ſhut up in a ſtrong caſtle, to ſerve him as a refuge againſt thoſe who perſecuted him on account of his doctrine. They add, that, after the death of Hormizdas, Varanes I. his ſucceſſor, firſt protected *Manes*, but afterwards gave him up to the fury of the Magi, whoſe reſentment againſt him was due to his having adopted the Sadducean principles, as ſome ſay; while others attribute it to his having mingled the tenets of the Magi, with the doctrines of Chriſtianity. However, it is certain that the *Manicheans* celebrated the day of their maſter's death. It has been a ſubject of much controverſy, whether *Manes* was an impoſtor. The learned Dr. Lardner has examined the arguments on both ſides; and though he does not chooſe to deny that he was an impoſtor, he does not diſcern evident proofs of it. He acknowledges that he was an arrogant philoſopher, and a great chemiſt; but whether he was an impoſtor, he cannot certainly ſay. He was much too fond of philoſophical notions, which he endeavoured to bring into religion, for which he is to be blamed: nevertheleſs, he obſerves, that every bold dogmatiſer is not an impoſtor.

The doctrine of *Manes* was a motley mixture of the tenets of Chriſtianity with the ancient philoſophy of the Perſians, in which he had been inſtructed during his youth. He combined theſe two ſyſtems, and applied and accommodated to Jeſus Chriſt, the characters and actions which the Perſians attributed to the god Mithras.

He eſtabliſhed two principles, viz. a good and an evil one: the firſt a moſt pure and ſubtile matter, which he called *light*, did nothing but good; and the ſecond, a groſs and corrupt ſubſtance, which he called *darkneſs*, nothing but evil. This philoſophy is very ancient; and Plutarch treats of it at large in his Iſis and Oſiris.

Our ſouls, according to *Manes*, were made by the good principle, and our bodies by the evil one; thoſe two principles being, according to him, coeternal, and independent of each other. Each of theſe is ſubject to the dominion of a ſuperintending being, whoſe exiſtence is from all eternity. The being who preſides over the *light* is called God; he that rules the land of *darkneſs* bears the title of hyle or demon. The ruler of the *light* is ſupremely happy, and, in conſequence thereof, benevolent and good; the prince of *darkneſs* is unhappy in himſelf, and deſirous of rendering others partakers of his miſery, and is evil and malignant. Theſe two beings have produced an immenſe multitude of creatures, reſembling themſelves, and diſtributed them through their reſpective provinces. After a conteſt between the ruler of *light* and the prince of *darkneſs*, in which the latter was defeated; this prince of *darkneſs* produced the firſt parents of the human race. The beings engendered from this original ſtock, conſiſt of a body formed out of the corrupt matter of the kingdom of *darkneſs*, and of two ſouls, one of which is ſenſitive and luſtful, and owes its exiſtence to the evil principle; the other rational and immortal, a particle of that divine *light*, which had been carried away in the conteſt, by the army of *darkneſs*, and immerſed into the maſs of malignant matter. The earth was created by God, out of this corrupt maſs of matter, in order to be a dwelling for the human race, that their captive ſouls might, by degrees, be delivered from their corporeal priſons, and their celeſtial elements extended from the groſs ſubſtance in which they were involved. With this view God produced two beings from his own ſubſtance, viz. Chriſt, and the Holy Ghoſt: for the *Manicheans* held a conſubſtantial Trinity. Chriſt, or the glorious intelligence, called by the Perſians Mithras, ſubſiſting in and by himſelf, and reſiding in the ſun, appeared in due time among the Jews, clothed with the ſhadowy form of a human body, to diſengage the rational ſoul from the corrupt body, and to conquer the violence of malignant matter. The Jews, incited by the prince of *darkneſs*, put him to an ignominious death, which he ſuffered not in reality, but only in appearance, and according to the opinion of men. When the purpoſes of Chriſt were accompliſhed, he returned to his throne in the ſun, appointing apoſtles to propogate his religion, and leaving his followers the promiſe of the Paraclete or Comforter, who is *Manes*, the Perſian. Thoſe ſouls who believe Jeſus Chriſt to be the ſon of God, renounce the worſhip of the god of the Jews, who is the prince of *darkneſs*, and obey the laws delivered by Chriſt, and illuſtrated by *Manes*, the comforter, are gradually purified from the contagion of matter; and their purification being completed, after having paſſed through two ſtates of trial, by water and fire, firſt in the moon, and then in the ſun, their bodies return to their original maſs: for the *Manicheans* derided the reſurrection of bodies; and their ſouls aſcend to the regions of *light*. But the ſouls of thoſe, who have neglected the ſalutary work of purification, paſs, after death, into the bodies of other animals, or natures, where they remain till they have accompliſhed their probation. Some, however, more perverſe and obſtinate, are conſigned to a ſeverer courſe of trial, being delivered over, for a time, to the power of malignant aerial ſpirits, who torment them in various ways. After this, a fire ſhall break forth and conſume the frame of the world; and the prince and powers of *darkneſs*, ſhall return to their primitive ſeats of anguiſh and miſery, in which they ſhall dwell for ever. Theſe manſions ſhall be ſurrounded by an invincible guard, to prevent their ever renewing a war in the regions of *light*.

Manes borrowed many things from the ancient Gnoſtics; on which account, many authors conſider the *Manicheans* as a branch of the Gnoſtics.

In truth, the *Manichean* doctrine was a ſyſtem of philoſophy rather than of religion. They made uſe of amulets, in imitation of the Baſilidians; and are ſaid to have made profeſſion of aſtronomy and aſtrology. They denied that Jeſus Chriſt, who was only God, aſſumed a true human body, and maintained it was only imaginary: and, therefore, they denied his incarnation, death, &c. They pretended that the law of Moſes did not come from God, or the good principle, but from the evil one; and that for this reaſon it was abrogated: They rejected almoſt all the ſacred books, in which Chriſtians look for the ſublime truths of their holy religion. They affirmed, that the Old Teſtament was not the work of God, but of the prince of *darkneſs*, who was ſubſtituted by the Jews in the place of the true God. They abſtained entirely from eating the fleſh of any animal; following herein the doctrine of the ancient Pythagoreans: they alſo condemned marriage. The reſt of their errors may be ſeen in St. Epiphanius and St. Auguſtin; which laſt, having been of their ſect, may be preſumed to have been thoroughly acquainted with them.

Though the *Manichees* profeſſed to receive the books of the New Teſtament, yet, in effect, they only took ſo much of them as ſuited with their own opinions. They firſt formed to themſelves a certain idea or ſcheme of Chriſtianity; and to this adjuſted the writings of the apoſtles: pretending that whatever was inconſiſtent with this, had been foiſted into the New Teſtament by later writers, who were half Jews. On the other hand, they made fables and apocryphal books paſs for apoſtolical writings; and even are ſuſpected to have forged ſeveral others, the better to maintain their errors. St. Epiphanius gives a catalogue of ſeveral pieces publiſhed by *Manes*, and adds extracts out of ſome of them. Theſe are the Myſteries, Chapters, Goſpel, and Treaſury.

The rule of life and manners which *Manes* preſcribed to his followers, was moſt extravagantly rigorous and ſevere. However, he divided his diſciples into two claſſes; one of which comprehended the perfect Chriſtians, under the name of the *elect*; and the other, the imperfect and feeble, under the title of *auditors* or *hearers*. The *elect* were obliged to a rigorous and entire abſtinence from fleſh, eggs, milk, fiſh, wine, all intoxicating drink, wedlock, and all amorous gratifications; and to live in a ſtate of the ſevereſt penury, nouriſhing their emaciated bodies with bread, herbs, pulſe, and melons, and depriving themſelves of all the comforts that ariſe from the moderate indulgence of natural paſſions, and alſo from a variety of innocent and agreeable purſuits. The *auditors* were allowed to poſſeſs houſes, lands, and wealth, to feed on fleſh, to enter into the bonds of conjugal tenderneſs; but this liberty was granted them with many limitations, and under the ſtricteſt conditions of moderation and temperance. The general aſſembly of the *Manicheans* was headed by a preſident, who repreſented Jeſus Chriſt. There was joined to him twelve rulers or maſters, who were deſigned to repreſent the twelve apoſtles, and theſe were followed by ſeventy-two biſhops, the images of the ſeventy-two diſciples of our Lord. Theſe biſhops had preſbyters or deacons under them, and all the members of theſe religious orders were choſen out of the claſs of the elect. Their worſhip was ſimple and plain; and conſiſted of prayers, reading the ſcriptures, and hearing publick diſcourſes, at which both the auditors and elect were allowed to be preſent. They alſo obſerved the Chriſtian appointments of baptiſm and the euchariſt. They kept the Lord's day, obſerving it as a faſt; and they likewiſe kept Eaſter and Pentecoſt.

Towards the fourth century, the *Manicheans* concealed themſelves under various names, which they ſucceſſively adopted, and changed in proportion as they were diſcovered by them. Thus they aſſumed the names of Encratites, Apotactics, Saccophori, Hydroparaſtates, Solitaries, and ſeveral others, under which they lay concealed for a certain time, but could not however long eſcape the vigilance of their enemies. About the cloſe of the ſixth century, this ſect gained a very conſiderable influence, particularly among the Perſians.

Toward the middle of the twelfth century the ſect of *Manichees* took a new face, on occaſion of one Conſtantine, an Armenian, and an adherer to it; who took upon him to ſuppreſs the reading of all other books beſides the Evangeliſts, and the Epiſtles of St. Paul, which he explained in ſuch manner as to make them contain a new ſyſtem of *Manicheiſm*. He entirely diſcarded all the writings of his predeceſſors; rejecting the chimæras of the Valentinians, and their thirty æons; the fable of *Manes*, with regard to the origin of rain, and other dreams; but ſtill retained the impurities of Baſilides. In this manner he reformed *Manicheiſm*, inſomuch that his followers make no ſcruple of anathematizing Scythian Buddas, called alſo Addas, and Terebinth, the contemporaries and diſciples, as ſome ſay, and according to others, the predeceſſors and maſters of *Manes*, and even *Manes* himſelf, Conſtantine being now their great apoſtle. Afrer he had ſeduced an infinite number of people, he was at laſt ſtoned by order of the emperor.

This ſect prevailed in Boſnia and the adjacent provinces, about the cloſe of the fifteenth century; propagated their doctrines with confidence, and held their religious aſſemblies with impunity. See on the ſubject of this article, Moſheim's Eccl. Hiſt. vol. i. p. 259, &c. 8vo. edit. Lardner's Cred. of the Goſpel Hiſt. vol. viii. paſſim, and Bayle, art. *Manichees*.

MANICORDION, a muſical inſtrument, in form of a ſpinet.

Du-Cange derives the word from *monochord*, on a ſuppoſition this inſtrument has but one chord: but he is miſtaken; it has fifty, or more.

Its ſtrings are covered with pieces of ſcarlet cloth, to deaden, as well as ſoften, the ſound; whence it is alſo called the *dumb ſpinet*, and is much uſed in nunneries for the religious to learn to play on; ſo as not to diſturb the ſilence of the dormitory. Scaliger makes the *manicord* more ancient than the ſpinet or harpſichord.

MANICOU, in *Zoology*. See OPOSSUM.

MANICUM *ſtrychnum*, in *Botany*, a term uſed by the old Greek writers to expreſs a kind of nightſhade, which, when taken internally, cauſed madneſs. Pliny, deſcribing this ſpecies, ſays, that it has leaves like the ocymum or baſil; and Theophraſtus and Dioſcorides ſay it had leaves like the eruca or rocket. Where Pliny had his information is not eaſy to gueſs, for he commonly copies from theſe authors: they are, however, much more to be depended on; and as the leaves of the ocymum or baſil are not at all like thoſe of the rocket, Pliny is certainly wrong in his account; and the moſt probable reaſon for his error is that he miſtook the Greek name of the plant, to which theſe authors compared the leaves of the *manicum ſtrychnum*, and tranſlated *euzomon*, which is the name of the rocket, into ocymum, baſil; a name ſomewhat like the Greek one in ſound, but wholly different in ſignification; the two plants baſil and rocket not only having leaves very unlike one another, but being alſo of different genera. A yet greater error of Pliny, in regard to this plant, is his placing it among the eſculent garden herbs, and ſaying that it was in uſe as a food, immediately after he had told us of its cauſing madneſs in thoſe who eat it. This is an evident confuſion of the maniac ſolanum with the pomum amoris or love apple, the fruit of which is eaten in ſoups at this time.

MANIFESTO, an apology, or public declaration in writing, made by a prince, ſhewing his intentions in any enterprize, the motives that induced him to it, and the reaſons on which his right and pretenſions are founded.

MANIFESTUS *clitoridis*, in *Anatomy*, a name given by Veſalius and others to one of the muſcles of the female pudenda, called by Verheyhen ſimply the *muſculus clitoridis*, but by Albinus and Cowper, *erector clitoridis*. Verheyhen is not to be cenſured for calling it only the *muſculus clitoridis*, for it is properly the only muſcle of that part, the other generally attributed to the clitoris, and called by Riolan and others, *clitoridis inferior* and *latus*, not properly belonging to that part, but being truly a ſphincter vaginæ, or, as Albinus calls it, the *conſtrictor cunni*. See SPHINCTER.

MANIHOT, in *Botany*. See CASSADA.

MANILLE, or MENILLE, in *Commerce*, one of the principal commodities carried by the Europeans to the coaſts of Africa, to traffic with the Negroes in exchange for ſlaves. It is a large braſs ring in form of a bracelet, either flat or round, plain or engraven; with which the natives uſed to deck themſelves, putting them on the ſmall of the leg, and the thick of the arm above the elbow.

The better ſort among the Negroes wear ſilver and gold *manilles*; but theſe were of their own manufacture; moſt of the money they receive for their other merchandize, being melted into *manilles*.

MANIPULATION, a term uſed in the mines, to ſignify the manner of digging the SILVER, &c. out of the earth.

MANIPULUS, MANIPULE, among the Romans, was a little body of infantry, which, in the time of Romulus, conſiſted of a hundred men; and in the time of the conſuls, and firſt Cæſars, of two hundred.

The word properly ſignifies a handful; and, according to ſome authors, was firſt given to the handful of hay which they bore at the end of a pole, to diſtinguiſh themſelves by, before the cuſtom was introduced of bearing an eagle for their enſign; and hence alſo the phraſe, a handful of men. But Vegetius, Modeſtus, and Varro, give other etymologies of the word: the laſt derives it from *manus*, a little body of men following the ſame ſtandard. According to the former, this corps was called *manipulus*, becauſe they fought hand in hand, or all together: *Contubernium autem* manipulus *vocabatur ab eo, quod conjunctis manibus pariter dimicabant*.

Each *manipule* had two centurions, or captains, called *manipularii*, to command it; one whereof was lieutenant to the other. Each cohort was divided into three *manipules*, and each *manipule* into two centuries.

Aulus Gellius quotes an old author, one Cincius, who lived in the time of Hannibal (whoſe priſoner he was), and who, writing on the art of war, obſerves, that then each legion conſiſted of ſixty centuries, of thirty *manipules*, and of ten cohorts. And again, Varro and Vegetius mention it as the leaſt diviſion in the army, only conſiſting of the tenth part of a century; and Spartian adds, that it contained no more than ten men. This ſhews, that the *manipulus* was not always the ſame thing. See LEGION.

MANIPULUS is alſo an eccleſiaſtical ornament, worn by the prieſts, deacons, and ſubdeacons, in the Romiſh church. It conſiſts of a little fillet in form of a ſtole, three or four inches broad, and made of the ſame ſtuff with the chaſuble; ſignifying and repreſenting an handkerchief, which the prieſts in the primitive church wore on the arm, to wipe off the tears they were continually ſhedding for the ſins of the people. There ſtill remains a mark of this uſage in a prayer rehearſed by thoſe who wear it; *Merear, Domine, portare manipulum fletus & doloris*.

The Greeks and Maronites wear two *manipules*, one on each arm.

MANIPULUS, in *Phyſic*, denotes a meaſure, or fixed quantity, of herbs, or leaves, viz. a handful; or ſo much as the whole hand can graſp: it is generally marked in preſcription with *M.*

MANIQUE, in the *Materia Medica*, the name given by authors to an American root, commended greatly for curing tertian and quartan agues, and as an infallible remedy againſt venomous bites. Redi procured ſome of this famous root, and gave it many very fair trials, but could never diſcover any of theſe virtues in it.

MANIS, in the Linnæan ſyſtem of *Zoology*, a genus of brutes in the claſs of *mammalia*, having no teeth, a taper extenſile tongue, a mouth narrowed to the ſnout, and a body covered with ſcales. There are two ſpecies, one with five toes, and the other with four on the feet. See LACERTA *ſquamoſa*.

MANNA, in *Pharmacy*, a medicinal drug, of great uſe in the modern practice, as a gentle purgative, and cleanſer of the firſt paſſages.

Manna is a white ſweet juice ouſing from the branches and leaves of a kind of ASH-*tree*, being the aſh-tree with a round leaf, and of low growth, chiefly in Calabria, during the heats of ſummer.

Manna has been commonly held a kind of *mel aerium*, or honey-dew, which falling in the night, gathers on certain trees, and even on rocks, and on the earth itſelf; where it hardens with the ſun. But what refutes this opinion is, that ſuch dews melt in the ſun; whereas *manna* whitens and hardens in it. Add, that ſuch dews are only found on the tops and extremes of the leaves, whereas *manna* is chiefly found to lodge on the trunks of the branches: and that the honey-dew falls only on trees open to the air; whereas *manna* is found on trees which are under cover; as was experienced by Dr. Cornelius, who gathered *manna* from branches covered on purpoſe with cloth; and Lobel aſſures us, that *manna* had been gathered from branches of the aſh, which had been thrown the day before into a cellar. It is much more rational to rank *manna* amongſt the number of gums, which, exuding from the juice of the tree, and mixing with ſome ſaline particles of the air, is condenſed into thoſe flakes in which we ſee it.

Manna is far from being peculiar to the aſh-tree of Calabria, on which it is uſually found. It is no other than the matter of the ſenſible tranſpiration of trees and plants in general, and is found on many different kinds, in different quantities. The lime and ſycamore uſually have a great deal of it on their leaves in the heats of ſummer, and if ſteeped in water, render it ſweet and purgative. The ſweet matter found in the bottom of the trefoil, or jaſmine flowers, is alſo *manna* in a certain ſtate. The bees are well acquainted with the ſameneſs of this extravaſated juice in different plants, and collect it for their honey, as well from the leaves of the lime and ſycamore and many other trees, as from the flowers of plants. The elaboration it ſuffers under their management afterwards is all that makes the difference between that and what men collect in Calabria; and honey is *manna* in a certain ſtate.

At Briançon, in France, they collect *manna* from all ſorts of trees that grow there; and the inhabitants obſerve, that ſuch ſummers as produce them, the greateſt quantities of *manna*, are very fatal to their trees. Their walnut-trees produce annually a conſiderable quantity; but if there happen a year in which they produce more than ordinary, they uſually find many of them periſh in the following winter.

It ſeems very plain from the whole, that *manna* is only the extravaſated juice of the tree, which cannot ſurvive ſo great a loſs of it: and what not a little confirms this is, that the very hot ſummers are always thoſe which are the moſt abundantly productive of *manna.* The ancients were ſenſible of this ſpontaneous production of *manna*, of ſeveral ſpecies of trees, ſo very different from one another, and from thence fell into the error of ſuppoſing it ſomething wholly foreign to the tree; an error very natural to thoſe who did not know that the nutritive juices of very many trees are nearly, if not wholly the ſame. It was from this opinion of its origin, that they called it aerial honey.

Mr. Boyle tells us, that in Apulia and Calabria, between the months of March and November, they obtain by inciſion, from the common aſh-tree, a ſweet juice ſo like *manna*, in that ſeaſon adhering to the leaves of the ſame kind of trees, that they call it *manna del corpo, trunk-manna*; and uſe it ſucceſsfully. Works Abr. vol. i. p. 51.

The Italians gather three kinds of *manna:—Manna di corpo*, which ouſes ſpontaneouſly from the branches of the tree in the month of July. *Manna forzata*, or *forzatella*, which is not gathered till Auguſt, after an inciſion of the tree, when the flux of the firſt has ceaſed. *Manna di fronda*, which iſſues of itſelf, in little drops like a kind of ſweat, from the nervous part of the leaves of the aſh, and gathers into grains about the bigneſs of thoſe of wheat, which are hardened by the ſun in Auguſt. The leaves are frequently found ſo loaden with theſe grains, that they ſeem covered with ſnow.

This is a ſubſtance in many things very nearly related to ſugar and to honey; it is inflammable in the ſame manner, and it melts in water as eaſily as ſugar, and liquifies even in a moiſt air, and, by the aſſiſtance of heat, in rectified ſpirit alſo; the impurities only being left by both menſtrua.

M. Lemery, in his analyſis, drew from *manna* a vinous liquor, of the ſame kind with that obtained from honey. Mead may alſo be made of *manna*, in the ſame way that it is made from honey; but it is neither ſo ſtrong, nor ſo agreeable to the taſte as that of honey. From as much mead as was made from two pounds of *manna*, M. Lemery drew off by diſtillation eight ounces of a ſort of brandy, and on rectifying this, procured an ounce and half of a pure burning ſpirit, like in all reſpects to rectified ſpirit of wine. This ſpirit of *manna* is accounted by ſome a ſudorific, and is given from half a dram to a dram and a half. M. Lemery having left the remaining liquor, after the diſtillation of the ſpirituous part of the *manna* mead, in a warm place for two years, found that it depoſited to the bottoms of the bottles ſeven drams of an eſſential ſalt of *manna*, which was white, hard, brittle, and formed into fine needles, and was of an acid taſte, with an admixture of ſweet. This ſalt is purgative, and its doſe is a dram. All the remaining acid liquor being diſtilled, there remained at the bottom of the retort a quantity of matter of the conſiſtence of honey, which weighed twenty ounces; ſo that out of two pounds of *manna*, there had been twelve ounces conſumed, to make the ſpirit, and to give the acidity to the remaining liquor. This honey-like reſiduum, being finally diſtilled with a ſtrong fire, there aroſe a reddiſh liquor of an acrid taſte, and with a ſtrong empyreumatic ſmell, and with this a few drops of a blackiſh oil; after this operation, the remainder in the retort was four ounces of a very light black coal. The coal, it is to be obſerved, is here only one eighth of the weight of the *manna*, which is ſomewhat ſingular, ſince in the pureſt honey, treated in the ſame manner, it always weighs one fourth of the original whole quantity. It is plain from hence, that *manna* is a much purer ſubſtance than honey: it is alſo remarkable, that in farther treatment of this coal, there is a ſmall quantity of iron always diſcovered in it. *Manna*, honey, and all the other ſweet ſubſtances, we ſee, alſo loſe all their ſweetneſs as ſoon as ever their acid is ſeparated from their oil. Hiſt. Acad. Par. 1708. p. 56.

Manna is a ſafe and gentle purge; and is alſo uſed in broths: Altimarius, a phyſician of Naples, has written a treatiſe expreſly upon it: and Doncelli another. *Manna*, though accounted a kind of honey, purges the bile; whereas common honey increaſes it. Formerly the Syrian *manna* was in the moſt repute, but now it gives way to the Calabrian. Fuchſius obſerves, that the peaſants of mount Libanus eat *manna* ordinarily as others do honey. At Mexico they are ſaid to have a *manna*, which they eat as we do cheeſe.

The *manna* moſt eſteemed is that in flakes; which many take to be factitious, and the work of the Jews at Leghorn; but it is certainly natural: and what gives it this figure is, that they put ſtraws and ſlips of wood in the inciſions, along with the *manna* gliding, is condenſed as it comes out, and aſſumes this form.

This beſt ſort, or Calabrian *manna*, is moderately dry, friable, very light, of a whitiſh, or pale yellow colour, and, in ſome degrees, tranſparent: the inferior kinds are moiſt, unctuous, and brown. *Manna* of both ſorts, is ſometimes counterfeited by compoſitions of ſugar, honey, and purgative materials, which may be diſtinguiſhed in their ſolid form by their weight, compactneſs, and tranſparency; and in the dry and moiſt ſtate, by their taſte, and by their habitude to menſtrua. *Manna*, in doſes of an ounce and upwards, proves a gentle laxative; it operates in general with great mildneſs, ſo as to be ſafely given in inflammatory or acute diſtempers, where the ſtimulating purgatives have no place. It is particularly proper in ſtomachic coughs; in which intentions it is ſometimes made up into a linctus or lohoch, with equal quantites of oil of almonds, and ſyrup of violets. The gripes, flatulencies, and other inconveniences attending it in ſome conſtitutions, may be obviated by a ſmall addition of ſome grateful aromatic. *Manna* does not produce the full effect of a cathartic, unleſs taken in large doſes, as two ounces or more; and, therefore, is ſeldom employed for this purpoſe by itſelf: it may be commodiouſly diſſolved in the purging mineral waters, or ſharpened with the cathartic ſalts, or other purgatives: its efficacy is ſaid to be much promoted by CASSIA *fiſtularis.* Lewis.

MANNA is alſo a ſcripture term, ſignifying a miraculous kind of food, which fell from heaven, for the ſupport of the Iſraelites, in their paſſage through the wilderneſs; being in form of coriander ſeeds; its colour like that of bdellium, and its taſte like honey.

They called it *manna*, either from the Hebrew word *manah*, *a gift*, to intimate its being a gift from heaven; or from *minnah*, which ſignifies *to prepare*, becauſe the *manna* came to them ready for eating, and needed no preparation but gathering; or from the Egyptian word *man*, *what is it?* which laſt etymology ſeems the more probable, in regard the ſcripture takes notice of the ſurprize they were under when they firſt ſaw this new food deſcend.

Salmaſius however prefers another: according to him, the Arabs and Chaldeans uſed the word *man* to ſignify a kind of dew or honey that fell on the trees, and was gathered in great abundance on mount Libanus. On which footing the Iſraelites did not uſe the term *manna* out of ſurprize, but becauſe they found this food fall with the dew, in the ſame manner as the honey-dew, ſo well known to them under the name of *man* Salmaſius adds, that the *manna* of the Iſraelites was in reality no other than that honey, or dew, condenſed; and that the one and the other were the ſame with the wild honey wherewith St. John was fed in the wilderneſs; ſo that the miracle did not conſiſt in the formation of any new ſubſtance in favour of the Iſraelites, but in the punctual manner in which it was diſpenſed by Providence for the ſuſtenance of ſo vaſt a multitude.

Manna *alhagina*, a word uſed by ſome authors to expreſs that kind of *manna* called by others *manna maſtichina*, from its drops reſembling maſtich in ſmall tears. It is called *alhagina* from the plant which produces it, it being collected from the *alhagi maurorum*, in the ſame manner as the common *manna* from the Calabrian aſh.

Manna *libanotis*, in the *Materia Medica*, a name given by the old Greek writers to the ſmall flakes and fragments of the frankincenſe, which flew off the larger pieces in the gathering and putting them up. See Leptos *libanotis*.

Manna *miſtichina*, in the *Materia Medica*, a name given by ſome authors to a kind of *manna* which they deſcribe as reſembling maſtich in its colour, and the ſize of the lumps it is collected in. This is what we uſually know at this time under the name of *manna Perſicum*, or *Perſian manna*, which is at this time in uſe in medicine, in the Eaſt, as a common purge.

Manna *Perſican*, *Perſian manna*. It does not appear in the writings of the ancient Greek phyſicians, that they were acquainted with any ſpecies of *manna*, though that medicine be now ſo common in the ſhops. They had the word indeed, but they applied it to a very different ſenſe; what they called *manna* being what ſome authors ſtill call the *manna* of frankincenſe, that is ſuch pieces of the common olibanum as broke off in the carriage from the larger pieces. Phil. Tranſ. N° 472. p. 86. in vol. xliii.

The Arabians are by ſome ſuppoſed to have firſt brought what we call *manna* into uſe in medicine; but if they were not the abſolute inventors of this uſe of it, it is certain they were the firſt who made it general and common as a purge. Their country afforded ſeveral diſtinct ſpecies of *manna*, all which ſeem to have been ſo common among them, that they thought deſcriptions of them needleſs; and for that reaſon have not left us ſufficient accounts of them, from which to determine what were their characters and differences. They diſtinguiſhed three kinds of this purging medicine, under three abſolute different names, which were *manna*, *tereniabin*, and *ſiracoſt*; but it is not eaſily proved whether theſe are all now known, or by what appellations they are at this time diſtinguiſhed.

Rawwolf, in his Itinerary publiſhed by Mr. Ray, and Tournefort in his voyage to the Levant, have given the cleareſt intimations, in regard to this ſubject, of any of the known writers; and if to theſe we add Cluſius, we have among the three, all that is to be expected of any certainty upon the ſubject; yet the deſcriptions of theſe, though eye-witneſſes of all they write, have not prevented ſo eminent and late a writer as Geoffroy, from falling into an error concerning the *manna* of the Arabians. It is very evident, however, that we have ſtill one ſpecies of the *manna Arabum*, that is, the *tereniabin*, produced in ſome parts of the world, there having been ſpecimens of it ſent over into England from Peterſburgh, near which place it is collected from a plant known among botanical writers under the name of *alhagi maurorum*.

This is uſually called *manna Perſicum*; it appears at firſt ſight a mixed maſs of a dirty reddiſh-brown colour, but, upon a nearer view, it is ſeen to conſiſt of ſeveral ſorts of particles. Firſt, a great number of globular, cryſtalline, and almoſt tranſparent bodies of different ſizes, and of a yellowiſh white colour; the largeſt of theſe do not much exceed a larger coriander-ſeed in ſize, and they have ſomewhat of the appearance of ſmall lumps of maſtic, but are of a ſomewhat reddiſh caſt. Secondly, there is among theſe a large quantity of ſmall prickles, and other little woody bodies, which ſeem to have been the pedicles of leaves. Thirdly, there are a few ſmall leaves which are of firm texture, and terminate in narrow points. Fourthly, there are a large number of ſmall long reddiſh-coloured pods, of a ſweetiſh gelatinous taſte, containing from one to ſix or ſeven hard, irregular, and kidney-ſhaped ſeeds, which to the taſte are very ſour. And fifthly, there is uſually ſome ſand and earth among it. Four ounces of this *manna* diſſolved in water uſually leave about one ounce of theſe ſubſtances in the filtre.

The globules firſt deſcribed are ſomething hard, they break between the teeth like ſugar-candy, and are of a pleaſant ſweet taſte, but have much leſs of the *manna* flavour than the Calabrian, but enough of it to diſcover to what family the ſubſtance belongs: the ſeeds, ſticks, leaves, and pods, ſeem to be all of them parts of the plant which produces the *manna*; and the ſeeds having been ſown with us, have raiſed plants of the alhagi.

About the year 1537, when Rawwolf wrote his Itinerary, it appears that large quantities of this kind of *manna* were brought from Perſia to Aleppo, where it was then known by the name of *trunſchibil*, or *trunſchibin*, a corruption, doubtleſs of the word *terenjabin*, or, as it ought to be written, according to Deuſingius, *tereng jabin*.

Rawwolf alſo expreſsly informs us, that this ſpecies of *manna* was gathered from a plant called *alhagi*. This plant is minutely deſcribed by Tournefort, who confirms the account of the *manna* being gathered from it, which Rawwolf had given ſo long before.

Tournefort ſays, that it is chiefly gathered about Tauris, a city of Perſia, under the name of *trunjibin*, or *terenjabin*, mentioned by Avicenna and Serapion; he adds, that thoſe authors thought it fell upon certain prickly ſhrubs; whereas it is really the nutricious juice of the plant; and that, during the great heats in that part of the world, there are perceived ſmall round drops, as it were of honey ſtanding upon the leaves of this plant; and that theſe harden into globules about the ſize of coriander ſeeds, and are then gathered by the inhabitants, together with leaves, ſtalks, dirt, and the like foreign matter, which greatly take off from their virtue. Mr. Tournefort obſerves, that this *manna* is greatly inferior to the Calabrian in virtue; and that twenty or thirty drams of it are given for a doſe. Philoſ. Tranſ. N° 472, p. 90. ubi ſupra.

Cluſius tells us, that the *terenjabin* of the Arabians is gathered from a prickly ſhrub, ſuch as the alhagi is deſcribed to be; and Avicenna declares, that it was found upon a thorny plant; though his tranſlators have been miſled from the near reſemblance of two Arabic words, to make it ſtones, not a plant, that it was gathered from.

It appears very plainly from the whole, that this ſubſtance now known in Ruſſia and ſome other parts of the world, under the name of *manna Perſicum*, is truly the terenjabin of the Arabians and of Cluſius, Rawwolf, and Tournefort; only that the word is differently ſpelt by the latter authors, and it is probably alſo that *manna* called by Bauhine, and ſome other writers, *manna maſtichina orientalis*, from the round globules it is compoſed of, reſembling the drops of maſtich.

Manna *thuris*, the *manna of frankincenſe*, a term uſed by the ancient phyſicians to expreſs ſuch ſmall pieces of frankincense, or olibanum, as broke off from the larger in the carriage. See Leptos *Libanotis*.

MANNER, in *Painting*, &c. expreſſes that particular character obſervable in the works of painters, poets, and other artiſts, by which their pencil, hand, or ſtyle, are diſtinguiſhed.

The curious in pictures know the *manners* of the painters, and diſtinguiſh readily between the *manners* of Rubens, Titian, and Da Vinci; between the ancient and new *manner* of the ſame painter; and between the Flemiſh, and the Italian *manner*.

Manner is uſed with reſpect both to the invention, the deſign, and the colouring. The *manner* of Michael Angelo, or Raphael, may even be known in their ſcholars. Thus we ſay, ſuch a piece of Raphael's ſchool, &c.

Manners, in *Poetry*, denote the inclinations, genius, and humour, which the poet gives to his perſons, and whereby he diſtinguiſhes his characters.

Ariſtotle defines *manners* to be that which diſcovers the inclination of him who ſpeaks, and ſhews what he will reſolve upon, or what reject, before he was actually determined; whence he concludes, that *manners* have not place always, and in all kinds of diſcourſes.

One inſtance will make this definition clear. In the firſt book of Virgil, Æneas is repreſented extremely pious, determined to execute the will of the gods, at all adventures. In the fourth book he has a difficult choice propoſed; being engaged, on the one hand, out of a principle of love, gratitude, and honour, not to quit Dido; and having, on the other hand, an expreſs order from the gods to depart for Italy. Now, before it appears on which ſide he has determined, what he has before ſaid, ſhould ſhew his will and inclinations, and which part he will take. And thoſe preceding diſcourſes, which diſcover his future reſolution, make what we call the poetical *manners*.

Thoſe make it paſt doubt he will abandon Dido, to obey the gods; this he does in effect; and the *manners*, therefore, are good, and well conducted. Had he diſobeyed the orders of Jupiter, to ſtay with Dido, the *manners* had been ill; becauſe they would have foretold a reſolution contrary to what he was really to take. But had there been nothing to make us foreſee any reſolution of Æneas at all, neither that which he actually took, nor the contrary, in that caſe there had been no *manners* at all. It is the *manners*, as before obſerved, that diſtinguiſh the characters; and, unleſs the *manners* be well expreſſed, we ſhall never be acquainted with the perſons at all; nor, conſequently, ſhall we be either terrified with foreſeeing their dangers, nor melted into pity, by ſeeing their ſufferings.

The *manners* ſhould have four qualities; they ſhould be *good*, *like*, *ſuitable*, and *equal*.

The *manners* are *good*, when they are well marked, or expreſſed; that is, when the diſcourſe of the perſons makes us clearly and diſtinctly ſee their inclinations, and what good or evil reſolutions they will take. *Likeneſs* of *manners* only relates to known and public perſons, whoſe characters are in hiſtory, with which the poetic characters muſt agree; that is, the poet muſt not give a perſon any quality contrary to any of thoſe which hiſtory has already given him. And here it may be obſerved, that the evil qualities given to princes, and great men, ought to be omitted by poets, if they be contrary to the character of a prince, &c. but the virtues oppoſite to thoſe known vices ought not to be impoſed; as by making him generous and liberal in the poem, who was avaricious in the hiſtory.

The *manners* muſt likewiſe be *ſuitable*; that is, they muſt be agreeable to the age, ſex, rank, climate, and condition, of the perſon that has them. Horace obſerves, *Intererit multum Davuſne loquatur, an heros*. Again, the *manners* muſt be *equal*; that is, they muſt be conſtant, or conſiſtent, through the whole character; or the variety or inequality of the *manners*, as in nature, ſo in the drama, muſt be equal. The fearful muſt never be brave, nor the brave timorous; the avaricious muſt never be liberal, nor *vice verſâ*. In this part, Shakſpeare's *manners* are admirable.

Beſides theſe four qualities above mentioned, there is a fifth eſſential to their beauty; which is, that they be neceſſary; that is, that no vicious quality, or inclination, be given to any poetic perſon, unleſs it appear to be abſolutely neceſſary, or requiſite, to the carrying on of the action.

MANNIFERA *arbor*, in the *Materia Medica*, the name by which the round-leaved ASH, on which the manna is found, is often called.

MANNING *a hawk*, in *Falconry*, the making her tractable and tame.

MANNING *the fleet* is the providing of it with a ſufficient number of men for any expedition. One of the methods commonly recurred to for this purpoſe is that of impreſſing men, by warrants from the lord high admiral to the captains, which are by them aſſigned to their lieutenants; and to render this the more effectual, veſſels, called TENDERS, are hired into the ſervice, to proceed from place to place with thoſe officers and preſs-gangs, not only to receive volunteers, but to impreſs any ſeamen whom they find. The power of impreſſing men for the ſea-ſervice by the king's commiſſion, ſays judge Blackſtone, has been a matter of ſome diſpute, and ſubmitted to with great reluctance; though it hath very clearly and learnedly been ſhewn by ſir Michael Foſter, that the practice of impreſſing, and granting powers to the admiralty for that purpoſe, is of very ancient date, and hath been uniformly continued by a regular ſeries of precedents to the preſent time; whence he concludes it to be a part of the common law. The difficulty ariſes from hence, that no ſtatute has expreſly declared this power to be in the crown, though many of them very ſtrongly imply it. The ſtat. 2 Ric. II. c. 4. ſpeaks of mariners being arreſted and retained for the king's ſervice, as of a thing well known and practiſed without diſpute; and provides a remedy againſt their running away. By ſtat. 2 & 3 Ph. & M. c. 16. if any waterman, who uſes the river Thames, ſhall hide himſelf during the execution of any commiſſion of preſſing for the king's ſervice, he is liable to heavy penalties. By 5 Eliz. c. 5 no fiſherman ſhall be taken by the queen's commiſſion to ſerve as a mariner; but the commiſſion ſhall be firſt brought to two juſtices of the peace, inhabiting near the ſea-coaſt, where the mariners are to be taken, to the intent that the juſtices may chuſe out and return ſuch a number of able-bodied men, as in the commiſſion are contained, to ſerve his majeſty; and by 7 & 8 W. III c. 21. 2 Ann. c. 6. 4 & 5 Ann. c. 19. 13 Geo. II. c. 17, &c. eſpecial protections are allowed to ſeamen in particular circumſtances, to prevent them from being impreſſed. And ferrymen are alſo ſaid to be privileged from being impreſſed at common law; all which do moſt evidently imply a power of impreſſing to reſide ſomewhere; and, if any where, it muſt, from the ſpirit of our conſtitution, as well as from the frequent mention of the king's commiſſion, reſide in the crown alone.

But, beſide this method of impreſſing, which is only defenſible from public neceſſity, to which all private conſiderations muſt give way, there are other means tending to the increaſe of ſeamen, and for *manning* the royal navy. Pariſhes may bind out poor boys apprentices to maſters of merchantmen, who ſhall be protected from being impreſſed for the firſt three years; and if they are impreſſed afterwards, the maſter ſhall be allowed their wages, 2 Ann. c. 6. Great advantages in point of wages are given to volunteer ſeamen, in order to induce them to enter into his majeſty's ſervice, 1 Geo. II. ſtat. 2. c. 14. It is alſo uſual to promiſe, by proclamation, a bounty to all ſeamen and able-bodied landmen, who come into the ſervice by a certain time; and every foreign ſeaman who, during a war, ſhall ſerve two years in any man of war, merchantman, or privateer, is naturalized *ipſo facto*. 13 Geo. II. c. 3.

About the middle of king William's reign, a ſcheme was ſet on foot (7 & 8 W. III. c. 21) for the regiſter of ſeamen, to the number of 30,000, for a conſtant and regular ſupply of the king's fleet, with great privileges to the regiſtered ſeamen, and, on the other hand, heavy penalties in caſe of their non-appearance when called for; but this regiſtry, being judged to be rather a badge of ſlavery, was aboliſhed by 9 Ann. c. 21. Blackſt. Com. vol. i. p. 419, &c.

MANŒUVRE, in *Military Language*, conſiſts ſolely in diſtributing equal motion to every part of a body of troops, to enable the whole to form, or change their poſition, in the moſt expeditious and beſt method, ſo as to anſwer the purpoſes required of a battalion, brigade, or line of cavalry, infantry, or artillery. The term is alſo applied to the operation of managing a ſhip in an engagement.

MANOMETER, or MANOSCOPE, formed from μανος, *rarus*, and μετρον, *menſura*, &c. an inſtrument to ſhew, or meaſure, the alterations in the rarity, or denſity, of the air.

The *manometer* differs from the barometer in this, that the latter only meaſures the weight of the atmoſphere, or of the column of air over it; but the former, the denſity of the air in which it is found; which denſity depends not only on the weight of the atmoſphere, but alſo on the action of heat and cold, &c. Authors, however, generally confound the two together; and Mr. Boyle himſelf gives us a very good *manometer* of his contrivance, under the title of a *ſtatical barometer*; the ſtructure whereof ſee under BAROMETER.

The *manometer*, conſtructed by Mr. Ramſden, and uſed by captain Phipps, in his voyage to the North Pole, was compoſed of a tube of a ſmall bore, with a ball at the end; the barometer being at 29.7, a ſmall quantity of quickſilver was put into the tube, to take off the communication between the external air, and that confined in the ball and the part of the tube below this quickſilver. A ſcale is placed on the ſide of the tube, which marks the degrees of dilatation ariſing from the increaſe of heat in this ſtate of the weight of the air, and has the ſame graduation as that of Fahrenheit's thermometer, the point of freezing being marked 32. In this ſtate, therefore, it will ſhew the degrees of heat in the ſame manner as a thermometer. But if the air becomes lighter, the bubble incloſed in the ball, being leſs compreſſed, will dilate itſelf, and take up a ſpace as much larger, as the compreſſing force is leſs; therefore the changes ariſing from the increaſe of heat will be proportionably larger; and the inſtrument will ſhew the differences in the denſity of the air, ariſing from the changes in its weight and heat. Mr. Ramſden found, that a heat equal to that of boiling water, increaſed the magnitude of the air from what it was at the freezing point $\frac{404}{1000}$ of the whole. Hence it follows, that the ball and the part of the tube below the beginning of the ſcale is of a magnitude equal to almoſt 414 degrees of the ſcale. If the height of both the *manometer* and thermometer be given, the height of the barometer may be thence deduced by this rule; as the height of the *manometer* increaſed by 414 is to the height of the thermometer increaſed by 414, ſo is 29.7 to the height of the barometer.

MANONOETOC, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a ſpecies of horned owl, common in thoſe parts.

MANOR, or **MANNOR**, an ancient lordſhip, or royalty; conſiſting of demeſnes and ſervices, and of a court-baron, as incident thereto.

The word is formed from the French *manoir*, a *manſion-houſe*; and that from the Latin *manere*, *to remain* or *dwell*; as being the lord's uſual place of reſidence.

Manor is the ſame with what was formerly called *baronia*, *barony*.

A *manor* is a kind of noble fee, granted out partly to tenants, for certain ſervices to be performed, and partly reſerved to the uſe of the lord's family; with juriſdiction over his tenant, for the lands, or eſtates, held of him.

For the original of *manors*, we are told there was anciently a certain compaſs of ground, granted by the king to ſome men of worth, for him and his heirs to dwell upon, and to exerciſe ſome juriſdiction, more or leſs, within that circuit, ſuch as he thought good to grant; but performing ſuch ſervices and paying ſuch yearly rent, as by this grant was required. Now the lord afterwards parcelling the ſame to other meaner men, received rent and ſervices from them, and by that means, as he became tenant to the king, the inferiors became tenants to him.

But at this time a *manor* rather ſignifies a juriſdiction, and royalty incorporeal, than the land and ſuit: for a man may now have a *manor* in groſs, i. e. the right and intereſt of a court-baron, with the perquiſites, and another enjoy every foot of land belonging to it.

A *manor* may be compounded of divers things: as of an houſe, arable land, paſture, meadow, wood, rent, advowſon, court-baron, &c. And this ought to be, by long continuance of time, beyond man's memory.

It is held by ſome, that a *manor* cannot now be made, ſince a court-baron cannot be made; and without a court-baron, and at leaſt two ſuitors, there can be no *manor*.

A *manor* may contain one or more villages or hamlets, or only a great part of a village; and there are capital *manors* or honours, which have other *manors* under them, the lords whereof perform cuſtoms and ſervices to the ſuperior lords. There may be alſo cuſtomary *manors*, granted by copy of court roll, and held of other *manors*. But it cannot be a *manor* in law, without freehold tenants; nor a cuſtomary *manor*, without copyhold tenants. The cuſtom remains, when tenements are divided from the reſt of the *manor*, the tenants paying their ſervices; and he who hath the freehold of them may keep a court of ſurvey, &c.

MANSE, **MANSUS**, **MANSA**, or **MANSUM**, formed a *manendo*, *abiding*, as being the place of dwelling, or reſidence, in ancient *Law-Books*, denotes a houſe or habitation; either with or without land.

MANSE, *capital*, *manſium capitale*, denotes the manor-houſe or lord's court.

MANSUS *preſbyteri*, is a parſonage or vicarage-houſe, for the incumbent to reſide in.

This was originally, and ſtill remains, an eſſential part of the endowment of a pariſh-church, together with the glebe and tithes. It is ſometimes called *preſbyterium*.

MANSION, *manſio*, *a manendo*, a dwelling-houſe, or habitation, eſpecially in the country.

Among the ancient Romans, *manſio* was a place appointed for the lodging of the princes, or ſoldiers, in their journey; and in this ſenſe we read *primam manſionem*, &c. It is with us moſt commonly uſed for the lord's chief dwelling houſe within his fee; otherwiſe called the capital meſſuage or manor place: and manſion-houſe is taken in law for any houſe or dwelling of another; in caſe of committing burglary, &c.

MANSIO, or **MANSUS**, was ſometimes alſo uſed in the ſame ſenſe with HIDE; that is for as much land as one plough could till in a year.

MANSLAUGHTER, is a ſpecies of *felonious* HOMICIDE, and denotes the unlawful killing of a man, without any malice, either expreſs or implied; which may be either voluntarily, upon a ſudden heat; or involuntarily, but in the commiſſion of ſome unlawful act. As when two perſons, who before meant no harm to one another, falling out on ſome ſudden occaſion, the one kills the other; this is voluntarily *manſlaughter*. But in this and every other caſe of homicide upon provocation, if there be a ſufficient time for paſſion to ſubſide, and reaſon to interpoſe, and the perſon provoked afterwards kills the other, this is deliberate revenge, and amounts to MURDER. Thus, if a man takes another in the act of adultery with his wife, and kills him directly upon the ſpot; though this was allowed by the laws of Solon, as likewiſe by the Roman civil law, if the adulterer was found in the huſband's own houſe, and alſo among the ancient Goths; yet in England it is not abſolutely ranked in the claſs of *juſtifiable* HOMICIDE, as in the caſe of a forcible rape; but it is the loweſt degree of *manſlaughter*. Farther, if two perſons play at ſword and buckler, unleſs by the king's command, and one of them kills the other, this is involuntary *manſlaughter*, becauſe the original act was unlawful. So where a perſon does an act, lawful in itſelf, but in an unlawful manner, and without due caution and circumſpection; as when a workman flings down a ſtone or piece of timber into a ſtreet, and kills a man; this may be either miſadventure, *manſlaughter*, or murder, according to the circumſtances attending it: if it were in a country village, and he calls out to all people to have a care, it is miſadventure only; but if it were in London, or other populous towns, where people are continually paſſing by, it is *manſlaughter*, though he gives loud warning; and murder, if he knows of their paſſing, and gives no warning at all. The crime of *manſlaughter* amounts to felony, but within the benefit of clergy; and the offender ſhall be burnt in the hand, and forfeit all his goods and chattels.

By a law of king Canutus, if a man is killed openly and premeditately, the murderer ſhall be committed to the relations of the deceaſed; but if on his trial the fact be proved, but not to have been wilful, the biſhop is to judge him.

There is a *manſlaughter* puniſhable as murder, by ſtatute; by 1 Jac. I. cap. 8. if any perſon ſhall ſtab another, not having then a weapon drawn, or nor being ſtricken firſt, ſo that he dies within ſix months, although it were not of malice afore-thought, it is felony without benefit of clergy; but this doth not extend to perſons ſtabbing others *ſe defendendo*, or by misfortune, &c. with no intent to commit *manſlaughter*; and the ſtatute relates to the party only that actually gave the ſtroke, or ſtabbed the other, and not to thoſe that were aiding or abetting. Blackſt. Com.

MANSORIUS *muſculus*, in *Anatomy*, a name given by ſome writers to that muſcle of the face more generally known under the name of the MASSETER.

MANTECU, a ſort of preparation of butter uſed by the Turks when they travel with their caravans. This is firſt boiled over the fire, and then ſalted and kept in veſſels made of tough leather, worked round a wooden frame, of the ſame ſhape with the veſſels in which they bring their balſam from Mecca.

MANTEGAR, or **MAN-TYGER**, as it is ſometimes written, in *Zoology*, is the tufted APE, with a noſe and head fourteen inches long; the noſe of a deep red, face blue, and both naked; black eye-brows; ears like the human; on the top of the head is a long upright tuft of hair; and on the chin another; two long tuſks in the upper jaw; fore-feet like hands, and the nails on the fingers flat; the hind-feet have the thumbs leſs perfect, and the nails imbricated; the fore-part of the body and the inſide of the legs and arms naked; the outſide covered with mottled brown and olive hair; that on the back duſky; the buttocks red and bare; and the length from the noſe to the rump three feet two inches. This animal is very fierce and ſalacious; will ſit on its rump, and ſupport itſelf by a ſtick; and in this attitude hold a cup in its hand, and drink out of it; its food is fruit. Pennant. See *Tab.* III. *Quadrupeds*, Nº 31.

MANTELETS, in *Military Language*, a kind of moveable parapets made of planks, about three inches thick, nailed one over another, to the height of almoſt ſix feet, generally caſed with tin, ſet upon little wheels, and guided by a long pole; ſo that in a ſiege they may be driven before the pioneers, and ſerve as blinds, to ſhelter them from the enemy's ſmall ſhot.

There are alſo other ſorts of *mantelets*, covered on the top, whereof the miners make uſe, to approach the walls of a town or caſtle. See *Tab.* VIII. *Fortif. fig.* 48.

The double *mantelets* form an angle, and ſtand ſquare, making two fronts, which cover both the front and flank of the ſappers, &c. when at work: theſe have double planks, with earth rammed in between them; they are five feet high, and three in breadth, ſometimes covered with plates of iron.

It appears from Vegetius, that *mantelets* were in uſe among the ancients, under the name of vineæ; but they were built ſlighter and much larger than our's, being eight or nine feet high, as many broad, and ſixteen long; they were defended by a double covering, the one of boards, the other of faggots, with the ribs of oſiers; and were caſed without with ſkins, ſteeped in water, to prevent fire.

MANTICA, in *Zoology*, the name by which Piſo and ſome other writers have expreſſed the pouch or bag of ſkin under the belly of the *opoſſum*, into which the young are received in time of danger.

MANTICHORA, in *Natural Hiſtory*, a name given by the Roman authors to a fierce and terrible creature, which they deſcribe from the Greeks, who call it ſometimes alſo *mantichora*; but when they write more correctly, *marticora* and *martiora*. We have formed the name *man-tiger* on the ſound of the Roman name, though expreſſing a very different ſenſe: and our authors of the hiſtories of animals, figure to us under this name a terrible creature, partly from the accounts of Pliny exaggerated, and partly from their own imagination, with three rows of teeth, and with ſuch a ſhape as no animal ever poſſeſſed. See MANTEGAR. The whole ſtory of this animal ſeems founded on the love of the wonderful; and very probably the *mantichora*, properly ſpeaking, was no other than ſome of the larger hyænas, which was at firſt ill deſcribed, and afterwards more and more wonders were added to the ſtory, till all ſhadow of truth was loſt.

MANTICLUS, in *Mythology*, a name given to Hercules, under which title he had a temple without the walls of Meſſina, in Sicily. This temple was built by *Manticlus*, the chief of a colony of Meſſenians, about 964 years before Chriſt.

MANTIS, the praying locuſt. See *Tab. of Inſects*, N° 4, and LOCUST.

MANTLE, or MANTLE-*tree*, in *Architecture*, is the lower part of the breaſt or front of a chimney. It was formerly a piece of timber that lay acroſs the jambs, and ſupported the breaſt work; and by a late act of parliament, chimney-breaſts are not to be ſupported by a wooden *mantle-tree*, or turning piece, but by an iron bar, or by a brick or ſtone arch. See CHIMNEY.

MANTLE, or MANTLING, in *Heraldry*, that appearance of folding of cloth, flouriſhing, or drapery, that is in any atchievement drawn about the coat of arms.

It is ſuppoſed originally to have been the repreſentation of a *mantle*, or military habit, worn by ancient cavaliers over their armour, to preſerve it from ruſt; or, as others hold, a ſhort covering, only worn over the helmet, which, in after-times, was lengthened, and made to hang from the helmet below the whole ſhield. See *Tab. Herald. fig.* 29.

The *mantle*, is always ſaid in blazon to be doubled, that is lined throughout with one of the furs, as ermin, pean, vairy, &c. See COAT.

MANTLE *of the Knights of the Garter*. See GARTER.

MANTLE is likewiſe a term uſed in *Falconry*. They ſay the hawk *mantles*, that is, ſpreads her wings after her legs.

MANTLE, *lady's*, in *Botany*. See LADY's *mantle*.

MANUAL, *manualis*, ſignifies what is employed, or uſed by the hand, and whereof a preſent profit may be made. Thus ſuch a thing is ſaid to be in the *manual* occupation of one, where it is actually uſed or employed by him.

MANUAL is the name of a ſervice-book uſed in the church of Rome, containing the rites, directions to the prieſts, and prayers uſed in the adminiſtration of baptiſm and other ſacraments; the form of bleſſing holy water, and the whole ſervice uſed in proceſſions.

MANUAL *exerciſe*. See EXERCISE.

MANUALIS *lapis*, in *Natural Hiſtory*, the name of a ſtone found in America, of which Monardes relates, that it has great virtues in curing chaps and cracks in the hands and feet; but he does not deſcribe it.

MANUBIÆ, among the *Romans*, the ſpoils of the enemy, or rather the money made of the booty when ſold by the quæſtor.

MANUCAPTIO, in *Law*, a writ which lies for a man who being taken on ſuſpicion of felony, and offering ſufficient bail for his appearance, is refuſed to be admitted thereto by the ſheriff, or other having power to let to mainpriſe.

MANUCMANUC, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a very beautiful ſpecies of parrot, which is found very frequently wild in the woods there. It is of the ſame bigneſs with the common parrot, and is variegated with a great many different colours.

MANUCODIATA, in *Ornithology*. See *Bird of* PARADISE.

MANUDUCTOR, a name given to an ancient officer of the church; who from the middle of the choir, where he was placed, gave the ſignal for the choiriſters to ſing, and marked the meaſure, beat time, and regulated the muſic. The Greeks called him *meſachoros*, becauſe ſeated in the middle of the choir; but in the Latin church, he was called *manuductor*; from *manus*, and *duco*, *I lead*; becauſe he led and guided the choir, by the motions and geſture of the hand.

MANUFACTURE, from *manufactus*, q. d. *made with hands*, a place where ſeveral artiſts and workmen are employed in the ſame kind of work, or make a commodity of the ſame kind.

MANUFACTURE is alſo popularly uſed to ſignify the work itſelf; and by extenſion, the like work carried on independently in different parts of the country.

In this ſenſe we ſay, the woollen *manufacture*, ſilk *manufacture*, velvet *manufacture*, tapeſtry *manufacture*, muſlin *manufacture*, &c. *manufacture* of hats, ſtockings, &c.

By 23 Geo. II. c. 13. if any perſon exports any tools or utenſils uſed in the ſilk, linen, cotton, or woollen *manufactures*, he forfeits the ſame, and 200*l.* and the captain of the ſhip having knowledge thereof, 100*l.* And if any captain of a king's ſhip, or officer of the cuſtoms, knowingly ſuffers ſuch exportation, he forfeits 100*l.* and his employment; and is for ever made incapable of bearing any public office. And every perſon collecting ſuch tools for exportation, ſhall on conviction forfeit them, and 200*l.* By 21 Geo. III. c. 37. the above penalties on the captain of the ſhip and officer of the cuſtoms are augmented to 200*l.* and a perſon, having in his cuſtody, or procuring to be made any ſuch tool, ſhall forfeit the ſame, and 200*l.* and be impriſoned for twelve months. By 22 Geo. III. c. 60. any perſon exporting any ſuch tools, ſhall forfeit the ſame, and 500*l.* and any officer of a ſhip, conniving at it, ſhall forfeit 500*l.* and if it be a king's ſhip, forfeit alſo his office, and be incapacitated.

MANUFACTURERS. Perſons enticing artificers into foreign countries, incur the penalty of 500*l.* and twelve months impriſonment, for the firſt offence, for each perſon ſo ſeduced, and 1000*l.* and two years impriſonment, for the ſecond offence. 23 Geo. II. c. 13. § 1. And ſuch artificers not returning within ſix months after warning, ſhall be deemed aliens, forfeit all their lands and goods, and be incapable of any legacy or gift. 5 Geo. I. c. 27. § 3. By 22 Geo. III. c. 60. if any perſon ſhall contract with, or endeavour to perſuade any artificer concerned in printing callicoes, cottons, muſlins, or linens, or preparing any tools for ſuch manufactory, to go out of the kingdom, he ſhall forfeit 500*l.* and be impriſoned for twelve months; for a ſecond offence, 1000*l.* and be impriſoned for two years.

MANULCA, in *Antiquity*, that part of the CATAPULTA to which the cord uſed in working it was fixed.

MANULEA, in *Botany*, a genus of the *didynamia angioſpermia* claſs; the characters of which are, that the calyx is divided into five ſegments; the limb of the flower is alſo ſeparated in the ſame manner, and awl-ſhaped; the fruit is a double-celled polyſpermous capſule.

MANUMISSION, *manumiſſio*, an act whereby a ſlave, or villain, is ſet at liberty, or let out of bondage.

The word comes from the Latin *manus*, *hand*, and *mittere*, *to ſend*; *quia ſervus mittebatur extra manum, ſeu poteſtatum domini ſui.*

Some authors define *manumiſſion* an act by which a lord enfranchiſes his tenants, who till that time had been his vaſſals, and in a ſtate of ſlavery, inconſiſtent with the ſanctity of the Chriſtian faith.

Among the Romans, the *manumiſſion* of ſlaves was performed three ſeveral ways. 1. When, with his maſter's conſent, a ſlave had his name entered in the cenſus or public regiſter, of the citizens. 2. When the ſlave was led before the prætor, and that magiſtrate laid his wand, called *vindicta*, on his head. 3. When the maſter gave the ſlave his freedom by his teſtament. Servius Tullus is ſaid to have ſet on foot the firſt manner; and P. Valerius Publicola the ſecond. A particular account is given of the third in the Inſtitutes of Juſtinian.

It was not neceſſary that the prætor ſhould be on his tribunal, to perform the ceremony of *manumiſſion*: he did it any where, indifferently, in his houſe, in the ſtreet, in going to bathe, &c. He laid the rod on the ſlave's head, pronouncing theſe words, *Dico cum liberum eſſe more Quiritum*, I declare him a freeman, after the manner of the Romans. This done, he gave the rod to the lictor, who ſtruck the ſlave with it on the head, and afterwards, with his hand, on his face and back; and the notary or ſcribe, entered the name of the new freed-man in the regiſter, with the reaſons of his *manumiſſion*.

The ſlave had likewiſe his head ſhaved, and a cup given him by his maſter, as a token of freedom. Tertullian adds, that he had then alſo a third name given him: if this were ſo, three names were not a token of nobility, but of freedom.

The emperor Conſtantine ordered the *manumiſſions* at Rome to be performed in the churches.

Of *manumiſſion* there have alſo been various forms in England. In the time of the Conqueror, villains were *manumitted*, by the maſter's delivering them, by the right hand, to the viſcount, in full court, ſhewing them the door, giving them a lance and a ſword, and proclaiming them free.

Others were *manumitted* by charter. There was alſo an implicit *manumiſſion*; as when the lord made an obligation for payment of money to the bondman at a certain day; or ſued him, where he might enter without ſuit; and the like.

MANURING *of ground*, the application of a matter proper for meliorating the ſoil, and rendering it more fertile. The matters uſed for *manure* are various in various countries: the moſt ordinary are DUNG, LIME, and MARLE. In ſome parts of England and Ireland they uſe ſea-ſhells, as thoſe of cockles, periwinkles, &c. which are found to agree well with boggy, heathy, clayey, wet, or ſtiff land; as they ſeem to give it a kind of ferment, as barm does to bread, opening and looſening the clods, and by that means making way for the roots to penetrate, and the moiſture to enter into the fibres of them. This kind of *manure* continues a long time, before its effects are exhauſted; whereas lime, &c. ſpend themſelves at once. The ſhells being hard, melt away very ſlowly; ſo that the operation needs not be repeated for twenty or thirty years. The vaſt beds of foſſil ſhells, buried in many parts of the world, are not uſeleſs matter, but will ſerve to one of the greateſt purpoſes of huſbandry, the manuring of barren lands. The people of many parts of France, and in ſome places in our own country, dig up the maſſes of broken ſhells, connected into a ſort of ſtrata by marly or other earths, for this purpoſe; and ſpreading them upon the lands as dung, they ſoon moulder away, and are found extremely beneficial to the earth.

The *manure* of ſhells upon theſe lands does not produce nearly ſo great an effect for the two firſt years, as it does in the ſucceeding ones; the reaſon of which is, that it is not then ſufficiently mixed, but in ſucceeding time it breaks itſelf into a number of very ſmall particles, and theſe all become intimately blended with the molecules of earth, and produce their effect more perfectly.

Sea-ſand is often made uſe of by way of *manure*, in ſome parts of Cornwall, near the ſea-ſhore. When the ſand is much mixed with broken pieces of ſea-ſhells, it is reckoned beſt. It is ſpread upon ſuch land as is intended for wheat, or uſually in the firſt crop of four, whatever be the grain; for after four crops it is the cuſtom in Cornwall to leave the land ſix or ſeven years for paſture before it is tilled again; and the graſs will be ſo good the firſt year where this *manure* is uſed, as to be fit for mowing: this is called *mowing of gratten* by the people there. The Corniſh acre is eight ſcore yards, at eighteen feet to the yard. In one of theſe acres the farmers beſtow, according to the diſtance from the ſea-ſhore, from three hundred ſacks to one hundred, each ſack containing thirteen gallons, which is called a horſe-load, the roads in many parts of this country being ſo bad, that they are forced to carry the ſand on horſe-back from the waterſide to the land, though eight or ten miles diſtant. In this caſe the ſand coſts them in the whole about eightpence a load. Where the lands lie very diſtant from the ſhore, and from all water-carriage, they beſtow very little of this *manure*, but they do not care to be any where wholly without it. In ſome of theſe places they lay twenty load on an acre, and find a proportionable advantage from it. Where much ſand is uſed the corn is large and plentiful, and the ſtraw little. Hence has grown the old Corniſh phraſe of *a buſhel of corn to a peck of ſtraw*; which is not miraculous in a place where the ears of barley are frequently found as long or longer than the ſtalks they grow on.

Where little of this ſand is uſed, there is generally a great deal of ſtraw, and but little and hungry ears of ſmall grain. After the corn is taken off, the graſs that naturally comes up is a white clover; and where the land is any thing deep, a red kind comes up among it. This is uſually but ſhort the firſt year, but it grows thick, and affords good feeding for the cattle; and they are found to thrive the better, and give better milk than when they are fed on the high graſs, which generally ſucceeds where there has been leſs ſand uſed.

Another great advantage of the lands where much ſand is uſed, is, that no ſnow lies upon them; there is a continual winter-ſpring, and an early harveſt, uſually ſix weeks before the neighbouring lands that do not uſe it in proper quantities; ſo that all the expence of procuring it in quantities, is many ways amply repaid to the farmers. We have about Erith, and many other places, the ſame ſort of ſand in great abundance in the Thames, that is uſed with this great advantage in Cornwall; and if it ſhould be found on trial to anſwer as well, probably there would be found few places where this river would not afford it at ſome depth, or in ſome part of its bed. The coral-ſand of Falmouth is dredged up from under about a foot thickneſs of the ouze; and perhaps in the Thames, where the bottom ſeems of another nature, the ſame ſand, or ſome of equal efficacy, may be found underneath. The ſand taken up out of the Thames at Erith, is uſed by the brick-makers, and they obſerve that the graſs always grows particularly freſh and ſtrong about the edges of their heaps of it, and that clover naturally grows there among other graſs. Phil. Tranſ. Nº 113.

Sea-ſand, Dr. Berry obſerves, quickens dead land; ſo that what would otherwiſe be the barreneſt part of that country, is now the richeſt. Sea-ſalt, he obſerves, is too ſtrong and active of itſelf, and that it does beſt when mingled with loam. Glauber orders the mixture to be made up and burnt like bricks, and then applied.

In ſome countries they burn the ſurface of their heathy ground, inſtead of *manuring* it: this others think but ill huſbandry, inaſmuch as it impoveriſhes it; and, by deſtroying the ſap of the earth, and roots of the graſs, and other vegetables, renders it uſeleſs for ſeveral years after the third, when it is ploughed. See Burning *of land*.

Dr. Jackſon obſerves, that all the ground about Nantwich, where ſalt or brine is ſpilt, is, when dug up, an excellent *manure* for grazing ground; and even bricks, thoroughly impregnated with it, diſſolve and fertilize land very conſiderably.

Dr. Beal ſays, it is a common obſervation of gardeners, and ſkilful huſbandmen, that froſt and ſnow improve and fertilize the land, both more ſpeedily, and more effectually, than the influence and warmth of the ſun.

Dr. Liſter tells us, that in ſome parts of the North-riding of Yorkſhire, the ſoil is ſandy, and the people manure it with clay. The ſoil, with any other *manure*, bears nothing but rye; but with clay it bears oats, barley &c. This clay *manuring* will, by certain experience, laſt forty-five years in the ground, before it need be repeated. Burnt clay, in the quantity of about ten large cart-loads on a ſtatute acre, has been found an excellent *manure* for meadow, paſture, or corn: this may be burnt with bruſhwood or furze; and has been found very uſeful for cloſe compact ſoils, and wet cold land.

The bogs in Ireland are ſaid to be beſt improved by ſandy, or other gravelly *manures*.

In ſome counties of England, particularly in Oxfordſhire, they uſe, by way of *manure* for ſome of their lands, the cuttings and chippings of ſtones in the quarries, which is ſuppoſed to enrich the land by means of a ſalt that the ſtone contains, which being diſſolved by the weather, is imbibed by the earth.

A new kind of *manure* has lately been introduced with conſiderable advantage; and that is the waſhings of a farm-yard, conſiſting of dung and water, reſerved for this purpoſe in reſervoirs or pools, into which they are ſuffered to drain. This has been ſucceſsfully tried on meadows and fields of wheat, and has been found to yield a conſiderable quantity of graſs and grain. It may be alſo laid to great advantage on land that is freſh ſown with barley, oats, or any other grain; but on graſs it ſhould be only laid in winter time, when the rains will waſh the ſalts off the blade; or in the ſpring, when the lands are laid up for hay; as the cattle will not feed on the graſs, while the dung or ſalt adheres to the blade.

This dung-water ſhould likewiſe be carried on the land, not at a time when it rains, but in the dry weather, and at a time when the dung-water in the pools is of a deep brown colour, and ſtrongly impregnated with ſalt. By this means the land may be *manured* from time to time, and the pools kept almoſt empty for the reception of freſh matter every time it rains, and nothing will be loſt. For another uſe to which this dung-water may be applied ſee Pot-*aſhes*.

Oak-bark, after it has been uſed for the tanning of leather, when laid in a heap and rotted, is an excellent *manure*, eſpecially for ſtiff cold land; in which one load of this *manure* will improve the ground more, and laſt longer than two loads of the richeſt dungs. When this *manure* is laid on graſs, it ſhould be done ſoon after Michaelmas, that the winter rains may waſh it into the ground; for if it is laid on in the ſpring, it will burn the graſs, and inſtead of improving it, will greatly injure it for that ſeaſon. When it is uſed for corn land, it ſhould be ſpread on the ſurface before the laſt ploughing, that it may be turned down for the fibres of the corn to reach it in the ſpring; for if it lies too near the ſurface, it will forward the growth of the corn in winter. Vegetables of moſt ſorts, as the weeds of ponds and ditches, laid up to rot before they begin to ſeed, and mix it with earth or mud, and alſo buck-wheat, vetches, ſpurry, lupines, &c. ploughed into the ground when they are full grown, greatly enrich land. The refuſe of kitchen gardens laid in heaps and rotted, and fern cut down green and tender, and ſuffered to rot, will afford an excellent *manure*. The aſhes of all kinds of vegetables ſpread on the land, will much improve it; rotten wood and tan-duſt, when rotted, are a very good *manure* for ſtrong land; ſo are likewiſe bones, horns, and other parts of animals, and alſo decayed fiſh. It may be obſerved in general, that when dung or any other ſoft *manure* is uſed, it ſhould not be laid on the ground till the laſt time of ploughing, when it ſhould be buried as ſoon as poſſible, to prevent the evaporation of the ſalts.

MANUS, was anciently uſed for an oath, and for him that took it as a compurgator. And it often occurs in old records: *tertia quarta, &c.* manu *jurare*; that is, the party was to bring ſo many to ſwear with him that they believed what he vouched was true; and we read of a woman accuſed of adultery: *mulieri hoc negantur purgatio ſexta* manu *extitit indicta*: i. e. *She was to vindicate her reputation upon the teſtimony of ſix compurgators*. Reg. Eccl. Chriſt. Cant. If a perſon ſwore alone, it was *pro-*

pria manu & *unica*. The uſe of this word came probably from its being required at a perſon's hands to juſtify himſelf; or from laying the hand upon the New Teſtament, on taking the oath.

Manus *Martis*, in *Botany*, a name given by ſome authors to the common cinquefoil, or *quinquefolium vulgare*.

Manus *interoſſei*, in *Anatomy*. See Interossei.

MANUSCRIPT, a book, or paper, written with the hand. By which it ſtands oppoſed to a printed book, or paper.

A *manuſcript* is uſually denoted by the two letters MS. and, in the plural, by MSS, or MMSS. What makes public libraries valuable, is the number of ancient *manuſcripts* repoſited in them. See Alexandrian, Cambridge, Clermont, Cottonian, Harleian, Vatican, &c.

MANWORTH, in *Old Law Books*, denotes the price, or value, of a man's head.

In ancient times, every man, according to his degree, was rated at a certain price, according to which, ſatisfaction was made to his lord, if any one killed him.

MANZEL. See Caravansera.

MAO, or **Mau**, in *Botany*, a name by which ſome authors have called the *magna Indica*, or Indian mango-*tree*.

MAP, a plain figure, repreſenting the ſurface of the earth; or a part thereof, according to the laws of perſpective.

A *map* is a projection of the ſurface of the globe, or a part thereof, on a plain ſurface, repreſenting the forms and dimenſions of the ſeveral countries and rivers; with the ſituation of cities, mountains, and other places.

Maps are either *univerſal*, or *particular*.

Maps, *univerſal*, are thoſe which exhibit the whole ſurface of the earth, or the two hemiſpheres.

Maps, *particular*, are thoſe which exhibit ſome particular region, or part thereof.

Each kind are frequently called *geographical*, or *land-maps*, in contradiſtinction to *hydrographical*, or *ſea-maps*, repreſenting only the ſeas and ſea-coſts; and properly called charts.

There are three qualifications required in a *map*: 1. That all places have their juſt ſituation with regard to the chief circles of the earth, as the equator, parallels, meridians, &c. becauſe on theſe depend many properties of regions, as well as celeſtial phenomena. 2. That the magnitudes of the ſeveral countries have the ſame proportion as on the ſurface of the earth. 3. That the ſeveral places have the ſame diſtance and ſituation with regard to each other, as on the earth itſelf.

For the foundation of Maps, and the laws of projection, ſee Perspective, and Projection *of the ſphere*.—*The application thereof, in the Conſtruction of* Maps, is as follows.

Conſtruction of a Map, *the eye being placed in the axis.*—Suppoſe, v. g. the northern hemiſphere to be repreſented with the eye in the point of the axis, v. g. the ſouth pole: for the plane, whereon the repreſentation is to be made, we take the plane of the equator, and, from all the points of the ſurface of the northern hemiſphere, conceive lines, paſſing through the plane to the eye; which points, connected together, conſtitute the *map* required.

In this caſe, the equator will be the limit of the projection; the pole, the centre. The meridians will be right lines paſſing from the pole to the equator: the parallels of latitude, &c. circles concentric with the equator; and all the other circles and arches of circles, as the horizon, vertical circles, &c. ecliptic, &c. conceived in that hemiſphere, will be ellipſes, or arches of ellipſes.

The better to apprehend the projection of the circles of the plane, conceive a radiant cone, whoſe vertex is the eye, its baſe the circle to be repreſented, and its ſides the rays paſſing between the circle and the eye. Suppoſe this cone cut by the plane, it is obvious, that, according to the various poſition of the cone, there will be a different ſection, and conſequently a different line of repreſentation.

For the application of this doctrine in practice.——In a plane, v. g. a paper, take the middle point P (*Tab. Geography, fig.* 3. N° 2.) for the pole; and from this, as a centre, deſcribe a circle of the intended bigneſs of your *map*, to repreſent the equator. Theſe two may be pitched on at pleaſure, and from theſe all the other points and circles are to be determined. Divide the equator into 360°, and drawing right lines from the centre to the beginning of each degree, theſe will be meridians; whereof that drawn to the beginning of the firſt degree, we ſuppoſe the firſt meridian.

For the parallels.—There are four quadrants of the equator; the firſt 0,90; the ſecond 90,180; the third, 180,270; the fourth, 270,0; which for the better diſtinction, we will note with the letters AB, BC, CD, DA. Taking one of theſe, v. g. BC, from the ſeveral degrees thereof, as alſo from 23° 30′, and 66° 30′ thereof, draw occult right lines to the point D, marking where theſe lines cut the ſemidiameter APC; and from P, as a centre, deſcribe arches paſſing through the ſeveral points in PC.——Theſe arches will be parallels of latitude. The parallel at 23° 30′, will be the tropic of Cancer, and that at 66° 30′, the arctic circle. The meridians and parallels thus deſcribed, from a table of longitudes and latitudes, lay down the places; reckoning the longitude of each place on the equator, commencing at the firſt meridian, and proceeding to the meridian of the place; and for the latitude of the place chooſing a parallel of the ſame latitude: the point wherein this meridian and parallel interſect, repreſents the place: and in the ſame manner all the other places may be determined, till the *map* be complete.

For the ecliptic, half of which comes in this hemiſphere, we have obſerved, that it makes an ellipſis; ſo that the points through which it paſſes are to be found. The firſt point, or that wherein the ecliptic cuts the equator; is the ſame with that wherein the firſt meridian cuts the equator, which is therefore diſtinguiſhed by the ſign of Aries: the laſt point of this half ellipſis, or the other interſection of the equator, and ecliptic, viz. the end of Virgo, will be in the oppoſite point of the equator, viz. at 180°. The middle point of the ellipſis is that wherein the meridian 90 cuts the tropic of Cancer. Thus we have three points of the ecliptic determined: for the reſt, viz. for 1° and 15° of Taurus, 1° and 15° of Gemini, 1° of Leo, 1° of Virgo; the declinations of thoſe points from the equator muſt be taken from a table, and ſet off in the *map*. See Declination, &c.

Thus where the meridian of 13° cuts the parallel of 5°, that point will be 15 degrees of Aries. Where the meridian 27° cuts the parallel 11½, will be the firſt degree of Taurus; and ſo of the reſt. Theſe points, being all joined by a curve line, will be a portion of an ellipſis repreſenting the ecliptic.

Maps of this projection have the firſt qualification above required; but they are defective in the ſecond: the ſurface being ſtretched farther, as it approaches nearer the equator. For the third, they are ſtill farther erroneous. By this method may almoſt the whole earth be repreſented in one *map*, placing the eye, v. g. in the antarctic pole, and aſſuming for the plane or projection that of ſome circle near it, v. g. the antarctic circle. Nothing is here required beſides the former projection, but to continue the meridian, draw parallels on the other ſide of the equator, and complete the ecliptic; but this diſtorts too much for practice.

This projection is of all others the eaſieſt: but that where the eye is placed in the plane of the equator, is preferred for uſe. It is, in effect, of the latter kind that *maps* are ordinarily made. The former are added to them, in ſmall, by way of ſupplement, to repreſent the intermediate ſpaces left between the two hemiſpheres.—Farther, as the ſituation of the ecliptic, with regard to the earth, is continually changing; ſtrictly ſpeaking, it has no place on the earth's ſurface: but is uſed to be repreſented according to its ſituation ſome certain moment; viz. ſo as the beginning of Aries and Libra may be in the interſection of the firſt meridian and equator.

Conſtruction of Maps, *with the eye in the plane of the equator.*—This method of projection though more difficult, is yet much juſter, more natural, and more commodious, than the former. To conceive it, we ſuppoſe the ſurface of the earth cut into two hemiſpheres by the entire periphery of the firſt meridian, each of which hemiſpheres we repreſent in a diſtinct *map*. The eye is placed in the point of the equator 90° diſtant from the firſt meridian: and for the tranſparent plane, wherein the repreſentation is to be, we take the plane of the firſt meridian. In this projection, the equator is a right line, and the meridian 90° diſtant from the firſt, is alſo a right line; but the other meridians, and all the parallels of the equator, are arches of circles, and the ecliptic is an ellipſis.

The method is this. From a point E, as a centre (*fig.* 5.) deſcribe a circle according to the intended bigneſs of the *map*. This repreſents the firſt meridian, and its oppoſite; for, drawing the diameter BD, there ariſe two ſemicircles, the one whereof BAD is the firſt meridian, the other BCD its oppoſite, or the meridian of 180°. This diameter BD repreſents the meridian of 90 degrees, whereof the point B is the arctic pole, and the point D the antarctic. The diameter AC, perpendicular to that BD, is the equator. Divide the quadrants AB, BC, CD, DA, each into 90 degrees; and to find the arches of the meridians and parallels, proceed thus: divide the equator into its degrees; viz. 180 (as being indeed only half the equator); through theſe ſeveral diviſions, and the two poles, deſcribe arches of circles, repreſenting meridians, as B 1 D, B 2 D, &c.—How to find centres for deſcribing thoſe arches, ſee under the word Circle.

Indeed, the operation will be both more eaſy and accurate, if performed by a canon of tangents.

To deſcribe the parallels, the meridian BD muſt be in like manner divided into 180 degrees; then through each of theſe diviſions and the correſponding diviſions of the quadrants AB, CB, deſcribe arches of circles. Thus ſhall we have parallels of all degrees, with tropics, polars, and meridians.

The ecliptic may be deſigned two ways; for its ſituation over the earth may either be ſuch, as that its interſection with the equator may be over the place A; in which caſe the projection of its ſemicircles, from the firſt degree of Cancer, to the firſt of Capricorn, will be a ſtrait line, to be determined by numbering 23° 30′ from A towards B, and from the extreme of that numeration drawing a diameter through E: which line will be half the ecliptic in this ſituation, and may be divided, as before, into degrees, to which the numbers, ſigns, &c. are to be affixed. But if the ecliptic be ſo placed, as that its interſection with the equator is over the place A, in the firſt meridian, its projection in that caſe will be a ſegment of an ellipſis; whereof two of the points are A, C; a third that wherein the meridian 90 cuts the tropic of Cancer. The other points muſt be determined in the manner laid down above; viz. by taking the declinations and right aſcenſions of 15° of Aries, 1° of Taurus, 15° of Gemini, &c. For where the parallels, according to their ſeveral degrees of declination, cut the meridians, taken according to the ſeveral right aſcenſions, thoſe points of interſection are the points of the 15° of Aries, &c. A curve line therfore being drawn, theſe will give the projection of the ecliptic.

Nothing then remains to complete the *map*, but to take the longitudes and latitudes of places from a table; and to ſet them off on the *map*; as was directed under the former method.

In this projection the whole ſurface of the earth may be repreſented in one *map*; if inſtead of the plane of the firſt meridian, ſome other plane parallel to it, but very near the eye, be taken; for by this means the entire parallels and meridians will be deſcribed. But as this diſtorts the face of the earth too much, it is ſeldom uſed; and we rather make the two hemiſpheres in two diſtinct tables.

One great advantage in this projection is, that it repreſents the longitudes and latitudes of places, their diſtance from the pole and from the equator, almoſt the ſame as they really are on the earth. Its inconveniences are, that it makes the degrees of the equator unequal; being the greater as they are nearer the firſt meridian D A B, or its oppoſite B C D; and for this reaſon equal tracts of the earth are repreſented unequal; which defect may be in ſome meaſure remedied, by removing the eye far from the earth. And, laſtly, the diſtances of places, and ſituation, with regard to each other, cannot be well determined in maps of this projection.

Conſtruction of Maps *on the plane of the horizon*, or wherein any given place ſhall be the centre or middle. Suppoſe, for inſtance, it is deſired to have London the centre of the *map*. Its latitude, we will ſuppoſe to be 51 degrees, 32 minutes. The eye is placed in the nadir. The tranſparent table is the plane of the horizon, or ſome other plane, if it is deſired to repreſent more than a hemiſphere. Take then the point E (*fig.* 6.) for London; and from this, as a centre, deſcribe the circle A B C D to repreſent the horizon, which you are then to divide into four quadrants, and each of theſe into 90 degrees. Let the diameter B D be the meridian, B the northern quarter, D the ſouthern; the line of equinoctial eaſt and weſt ſhews the firſt vertical, A the weſt, C the eaſt, or a place of 90 degrees from the zenith in the firſt vertical. All the verticals are repreſented by right lines drawn from the centre E to the ſeveral degrees of the horizon. Divide B D into 180 degrees, as in the former methods; the point in E B, repreſenting 51 deg. 32 min. of the arch B C, will be the projection of the north pole, which note with the letter P. The point in E D, repreſenting 51 deg. 32 min. of the arch D C (reckoning from C towards D), will be the projection of the interſection of the equator and meridian of London, which note with the letter Q; and from this, towards P, write the numbers of the degrees, 1, 2, 3, &c. As alſo from Q towards D, and from B towards P; viz. 51, 52, 53, &c. Then taking the correſponding points of equal degrees; viz. 99 and 99, 88 and 88, &c. about thoſe, as diameters, deſcribe circles, which will repreſent parallels, or circles of latitude, with the equators, tropics, and polar circles. For the meridians, firſt deſcribe a circle through the three points A, P, C. This will repreſent the meridian 90 degrees from London. Let its centre be M in B D (continuing to the point N, which repreſents the ſouth pole), P N being the diameter; through M draw a parallel to A C; viz. F H, continued each way to K and L. Divide the circle, P H N F into 360 degrees, and from the point P draw right lines to the ſeveral degrees, cutting K F H L, through the ſeveral points of interſection, and the two poles P, N, as through three given points, deſcribe circles repreſenting all the meridians. The centres for deſcribing the arches will be in the ſame K L, as being the ſame that are found by the former interſection; but are to be taken with this caution, that for the meridian next BDN towards A, the moſt remote centre towards L, be taken for the ſecond, the ſecond from this, &c. The circles of longitude and latitude thus drawn, inſert the places from a table, as has been directed.

Conſtruction of Maps *on the plane of the meridian.*——This projection is taught by Ptolemy, and recommended by him as proper for that part of the earth then known. In this, the equator and parallels are arches of circles, and the meridians arches of ellipſes; the eye hanging over the plane of that meridian which paſſes over the middle of the inhabited world. But in regard the deſcription of theſe ellipſes is ſomewhat perplexing, and becauſe this method ſeems calculated only for a part of the earth, it is not now uſed.

There is a ſecond method, ſomething akin to it, which repreſents the circles of latitude by right lines, and the meridians by arches of ellipſes: as muſt be the caſe, if lines be conceived to fall from the ſeveral points of each hemiſphere, perpendicularly on the plane of the firſt meridian, and the eye be ſuppoſed at an infinite diſtance from the earth; ſo that all the rays emitted from the places of the earth to it may be accounted parallels, as well as perpendiculars to the plane of the firſt meridian.

Maps, *general*, are the hemiſpheres; which are for the moſt part conſtructed ſtereographically.

Maps, *rectilinear*, are thoſe wherein both the meridians and parallels are repreſented by right lines, which by the laws of perſpective is impoſſible; in regard there can no ſuch poſition be aſſigned the eye and the plane, as that the circles both of longitude and latitude ſhall be right lines.

In the firſt method above laid down, the meridians are right lines, but the parallels are circles: in the fifth, the parallels are right lines, and the meridians ellipſes. In all other perſpective methods, both kinds of circles are curve: one method indeed muſt be excepted, wherein the meridians are right lines, and the parallels hyperboles; as when the eye is placed in the centre of the earth, and the plane, through which it is viewed, is parallel to the firſt meridian: but this method is rather pretty than uſeful.

Rectilinear maps are chiefly uſed in navigation, to facilitate the eſtimation of the ſhip's way. See Chart.

Conſtruction of particular Maps.——*Particular Maps of large tracts*, as Europe, Aſia, Africa, and America, are projected after the ſame manner as general ones; only let it be obſerved, that for different parts, different methods may be choſen. Africa and America, for inſtance, in regard the equator paſſes through them, cannot be conveniently projected by the firſt method, but much better by the ſecond. Europe and Aſia are moſt conveniently repreſented by the third; and the polar parts, or the frigid zones, by the firſt.

To begin then, draw a right line on your plane or paper, for the meridian of the plane over which the eye is conceived to hang, and divide it into degrees, as before, which will be the degrees of latitude. Then from the tables take the latitude of the two parallels, which terminate each extreme. The degrees of theſe latitudes are to be noted in the meridian; and through them draw perpendiculars, bounding the *map* towards north and ſouth. This done, meridians and parallels are to be drawn to the ſeveral degrees, and the places to be inſerted, till the *map* is complete.

For particular Maps *of leſs extent.*——In *maps* of ſmaller portions of the earth, the geographers take another method. Firſt, a tranſverſe line is drawn at the bottom of the plane, to repreſent the latitude, wherein the ſouthermoſt part of the country, to be exhibited, terminates. In this line, ſo many equal parts are taken as that country is extended in longitude. On the middle of this ſame line erect a perpendicular, having ſo many parts as there are degrees of latitude between the northern and ſouthern limits of the country. How big theſe parts are to be, may be determined by the proportion of a degree of a great circle to a degree of the parallel repreſented by the tranſverſe line at bottom. Through the other extreme of this perpendicular, draw another perpendicular, or a parallel to the line at bottom, in which are to be ſeen as many degrees of longitude, as in the lower line, and theſe too equal to each other, unleſs the latitudes happen to be remote from each other, or from the equator.

tor. But if the loweſt parallel be at a conſiderable diſtance from the equinoctial, or if the latitude of the northern limit go much beyond that of the ſouthern; the parts or degrees of the upper line muſt not be equal to thoſe of the lower, but leſs, and that according to the proportion which a degree of the more northern parallel has to a degree of the more ſouthern. After parts have been thus determined, both on the upper and lower line, for the degrees of longitude: right lines muſt be drawn through the beginning and end of the ſame number, which lines repreſent the meridians; then through the ſeveral degrees of the perpendicular erected on the middle of the firſt tranſverſe line, draw lines parallel to that tranſverſe line: theſe will repreſent parallels of latitude. Laſtly, at the points wherein the meridians of longitude and the parallels of latitude concur, inſert the places from a table, as before directed. But though there are various modes of conſtructing theſe *maps*, they are in general defective, ſo as not to be applied with accuracy and facility to the purpoſes intended, in determining the courſes or bearings of places, their diſtances, or both.

For MAPS *of provinces*, or ſmall tracts, as pariſhes, manors, &c. we uſe another method, more ſure and accurate than any of the former. In this the angles of poſition, or the bearings of the ſeveral places, with regard to one another, are determined by proper inſtruments, and transferred to paper. This conſtitutes an art apart, called SURVEYING.

MAPS, *the uſe of*, is obvious from their conſtruction. The degrees of the meridians and parallels ſhew the longitudes and latitudes of places, and the ſcale of miles annexed, their diſtances; the ſituation of places, with regard to each other, as well as to the cardinal points, appears by inſpection, the top of the *map* being always the north, the bottom the ſouth, the right hand the eaſt, and the left the weſt; unleſs the compaſs uſually annexed ſhew the contrary.

MAPLE, *acer*, in *Botany*, a genus of the *polygamia monoecia* claſs. Its characters are theſe: it hath hermaphrodite and male flowers on the ſame tree; the hermaphrodite flowers have an empalement cut into five parts; the corolla has five petals, eight ſtamina, and one pointal; the flowers are ſucceeded by two winged capſules, joined at their baſe, each including a ſingle ſeed; the male flowers have the ſame characters, but have no ſtyle, ſo are not fruitful. There are twelve ſpecies.

The ſeveral ſorts of this tree are eaſily propagated by ſowing the ſeeds, ſoon after they are ripe, in an open bed of common earth, covering them about half an inch thick with light earth: the ſpring following they will appear above ground, and will grow to a foot high the firſt ſummer. About the Michaelmas following they are to be removed, and planted in rows at three feet diſtance, and two feet diſtance in the rows, in which place they may remain three or four years; and at that time they will be large enough to plant out into the places they are to ſtand in.

The great *maple* commonly, though very improperly called the *ſycamore-tree*, is raiſed very eaſily in this manner, and is a very valuable tree for gentlemen who have plantations near the ſea, as it bears the ſpray of the ſalt-water very well, and will defend all the reſt if planted behind them. The Norway *maple* will alſo anſwer this purpoſe. The timber of the common *maple* is far ſuperior to the beech for all uſes of the turner; and when it abounds with knots, is highly eſteemed by the joiners, for inlaying, &c. On account of the lightneſs of the wood, it is often employed by the muſical inſtrument makers: and on account of its whiteneſs, it was formerly much uſed for tables, &c.

The Virginian kinds may be propagated, either thus by ſowing, or by laying down the young branches early in the ſpring, giving them a little ſlit at the joint, by which means they will take ſufficient root in a twelve-month to be tranſplanted out. Miller.

MAPLE, *ſugar*, a kind of ſugar made from a ſpecies of the *maple*, called by monſieur Sarazin, *acer Canadenſe ſacchariſerum fructu minori*. Mr. Sarazin, a phyſician at Quebec, intending to inquire at large into the nature of this ſort of ſugar, obſerved that there were four ſpecies of *maple* common in the places where it was made, all which he ſent over to the garden at Paris. One of theſe ſpecies, diſtinguiſhed from the reſt by the ſmallneſs of its fruit, is called the ſugar-*maple*: this grows to ſixty or eighty feet high, and its juice, which is very redundant in the months of April and May, is eaſily made into a very good ſugar. They procure this juice from the tree by piercing a hole in the trunk, and placing veſſels to receive it. This juice being evaporated, yields about one twentieth part of its own weight in pure ſugar. A middle-ſized tree, of this ſpecies, will yield ſixty or eighty pints of this juice, without receiving any damage as its growth; and much more than this may be drawn, but then the tree manifeſtly ſuffers for it.

Mr. Sarazin obſerved ſome very remarkable particulars in regard to the ſaccharine quality of this juice, without which it never had it in the proper perfection. 1. The tree at the time that the juice is drawn out, muſt have its bottom covered with ſnow; and if it is not naturally ſo, the Indians know ſo well the neceſſity of it, that they always bring ſnow from elſewhere, and heap it up round it. 2. This ſnow muſt afterwards be melted away by the ſun-ſhine, not gradually thawed by a warm air. 3. There muſt have been a froſty night before the opening the hole in the trunk. It is remarkable that theſe circumſtances are ſuch as cuſtom and experience alone could have pointed out, ſince they ſeem contrary to reaſon; and ſo it is in many of the operations in chemiſtry, where the moſt ſeemingly rational means fail, while thoſe, which ſhould ſeem quite contradictory to reaſon, ſucceed. It is obſerved, that if the juice of the *maple* be not in a condition to become ſaccharine while the ſnow lies at its root unthawed, that it almoſt immediately becomes ſo on the melting of the ſnow, and its penetrating into the earth. Mem. Acad. Par. 1730.

The juice of the *maple*, unboiled, has been drank as an antiſcorbutic: the ſugar and molaſſes, which are ſaid to be leſs ſweet than thoſe extracted from the ſugar-cane, are ſuppoſed to be more medicinal in diſorders of the breaſt.

MAPPARIUS, an officer among the Romans, who in the public games, as thoſe of the Circus, and of the gladiators, gave the ſignal for their beginning, by throwing an handkerchief *(mappa)* which he had before received from the emperor, conſul, prætor, or other ſupreme officer then preſent.

MARACANA, in *Ornithology*, the name of a bird of the parrot-kind, but larger than the common ſpecies, and covered all over with bluiſh-grey feathers. It is very common in the Brazils.

The natives alſo call another bird of the parrot-kind by the ſame name, which is of a fine green on the head, neck, and back, but the crown of the head looks a little bluiſh; the tail is mixed of red and a bluiſh-green; the under part being red, as is alſo the under part of the wings; at the origin of each wing, it has alſo a red ſpot; and on each ſide of the head a brown one. The noiſe this bird makes, is oe, oe, oe.

MARACOCK, in *Botany*. See PASSION-*flower*.

MARANA, in *Botany*, a name by which ſome authors have called the ſtramonium, or thorn-apple, a plant kept in ſome gardens.

MARANTA, in *Botany*, ſee *Indian* ARROW-*root*.

MARASMUS, Μαρασμος, derived from the verb *μαραινειν*, *to waſte*, in *Medicine*, an extreme waſting, or conſumption of the whole body.

A *maraſmus* is an extreme degree of atrophy; as an hectic fever is an extreme degree of *maraſmus*.

MARAUDING, from the French, *maraude*, in *Military Language*, is a term applied to a party of ſoldiers, who, without any order, go into the neighbouring houſes or villages, when the army is either in camp or in garriſon, to plunder and deſtroy, &c.

MARAVEDI, a little Spaniſh copper COIN, worth ſomewhat more than a French denier, or half a farthing Engliſh.

The word is Arabic, and took its riſe from the *Almoravides*, a dynaſty of Moors, who paſſing out of Africa into Spain, impoſed their own name on this coin, which, by corruption, was afterwards changed into *maravedi*.—Mention is made of it in the Decretals, as well as in other Latin writers, under the name of *marabitini*.

The Spaniards always count by *maravedis*, both in commerce and in their finances, though the coin itſelf is no longer current among them. Sixty-three *maravedis* are equivalent to a rial of ſilver; ſo that the piaſter, or piece of eight rials, contains five hundred and four; and the piſtole of four pieces of eight, two thouſand and ſixteen *maravedis*.

This ſmallneſs of the coin produces vaſt numbers in the Spaniſh accounts and calculation; inſomuch that a ſtranger or correſpondent would think himſelf indebted ſeveral millions for a commodity that coſt but a few pounds.

In the laws of Spain, we meet with ſeveral kinds of *maravedis*; Alphonſine *maravedis*, white *maravedis*, *maravedis* of good money, *maravedis* Combrenos, black *maravedis*, and old *maravedis*. When we find *maravedis* alone, and without any addition, it is to be underſtood of thoſe mentioned above. The reſt are different in value, fineneſs of metal, time, &c. Mariana aſſerts, that this coin is older than the Moors; that it came from the Goths; that it was anciently equal to a third part of the rial, and conſequently of twelve times the value of the preſent *maravedi*. Under Alphonſus XI. the *maravedi* was ſeventeen times; under Henry II. ten times; and under Henry III. five times; and under John II. two times and an half the value of the preſent *maravedi*.

MARBASIS, in *Botany*, a name given by ſome to a kind of plant which they ſay climbed up trees, and there hung down from their branches in form of long jointed and naked filaments.

The word ſeems to be only a corruption of the word *anabaſis* of Pliny, which he calls alſo EPHEDRA, and gives the ſame character to.

The *marbaſis* of the ancients ſeems to mean our USNEA.

MARBLE, MARMOR, a precious kind of ſtone, found in great maſſes, and dug out of pits or quarries; being of a conſtitution ſo hard and compact, and a grain ſo fine, as readily to take a beautiful poliſh: much uſed in ornaments of buildings, as columns, ſtatues, altars, tombs, chimney-pieces, tables, and the like.

The word comes from the French *marbre*, and that from the Latin *marmor*, of the Greek μαρμαιρειν, *to ſhine*, or *glitter*.

Marbles make a peculiar genus of foſſils, the characters of which are theſe: they are bright and beautiful ſtones, compoſed of ſmall ſeparate concretions, moderately hard, not giving fire with ſteel, and fermenting with and ſoluble in acid menſtrua, and calcining in a ſlight fire.

There is an infinite number of different kinds of *marble*, and they are uſually denominated, either from their colour, their age, their country, their grain, their degree of hardneſs, their weight, or their defects: ſome are of one ſimple colour, as white or black; others ſtreaked or variegated with ſtains, clouds, waves, veins, &c. but almoſt all are opake, excepting the white, which, when cut in thin ſlices, becomes tranſparent.

By theſe characters the *marbles*, properly ſo called, are diſtinguiſhed from the PORPHYRIES and GRANITES, which are properly ſtones of a very different kind, being compoſed of very different particles, and exhibiting contrary properties. Sir William Hamilton obſerves, that many variegated *marbles*, and precious ſtones, are the produce of volcanos. Phil. Tranſ. vol. lviii. p. 12.

MARBLES, *ancient*, are thoſe, whoſe quarries are loſt, or inacceſſible to us, and whereof we have only ſome wrought pieces remaining.

MARBLES, *modern*, are thoſe whoſe quarries are ſtill open, and out of which blocks continue to be dug.

The *marbles* are a genus of bodies ſuppoſed to be very well known, becauſe ſeen every day, and in common uſe; but they are in reality, notwithſtanding that, perhaps one of the moſt confuſed, and leaſt underſtood of all the bodies of this kind. The people who work upon them, know nothing more of them than that this will, and that will not receive a poliſh in a high degree; and that this may be worked, and another refuſes the tools: and the men of ſcience have conſidered them even leſs than theſe.

The *marbles* were one of thoſe ſets of bodies that the ancients were well acquainted with, and it may give no ſmall light into their true hiſtory, to pay a ſtrict attention to what they have left us concerning them, and inquire which of thoſe in uſe among them are known to us, and which loſt, and by what names we now call their *Auguſteum*, *Tiberianum*, *Luculleum*, and the reſt. This may ſerve to give a certain account of what they knew, and perhaps may point out to the builder, ſtatuary, and phyſician, ſome new uſes, at leaſt new to us, of many of them. Hill's Hiſt. of Foſſ. p. 461.

Mr. Mendes de Coſta, in his Hiſtory of Foſſils, has arranged the different ſpecies of *marbles* into four general diviſions. The firſt diviſion comprehends thoſe of one plain uniform colour, the kinds of which are eaſily diſtinguiſhed: and this diviſion includes the black, white, aſh and grey, brown and red, yellow, blue, and green *marbles*. The ſecond diviſions contains thoſe *marbles*, which are only of two colours: and in this diviſion he has firſt placed the *marbles*, whoſe chief or ground colour is black, variegated with the other colours; as black with white, black with aſh and grey, black with brown and red, with yellow, with blue, and with green, all in their due order: and in the ſame manner he has proceeded with all the other chief colours, e. g. white with black, with grey, brown, red, &c. aſh and grey *marbles*, variegated with other colours; brown and red *marbles*, variegated with other colours, &c. His third diviſion comprehends thoſe *marbles*, that are variegated with many colours. And his fourth diviſion includes thoſe that contain ſhells, corals, and other extraneous bodies. At the end of each ſection he has given a liſt or catalogue of all the *marbles* of theſe colours, ſlightly mentioned by authors, and which ſeem of different ſpecies from thoſe which he has deſcribed. By this regular arrangement of colours, which he has purſued through the whole genus, he has made it eaſy for his readers readily to find whether a *marble*, as far as his knowledge extends, has been hitherto deſcribed or not, or whether there are any which approach it in colour, on only reviewing the ſingle ſection where thoſe colours are arranged.

MARBLE, *African*, has a black ground, diverſified with moderately large white ſpots, which do not communicate with each other: they are ſometimes alſo tinged a little reddiſh, and the *marble* has ſome marcaſitical grains intermixed with it. It admits a good poliſh, and will not ſtrike fire with ſteel.

MARBLE, *Alabandium* MARMOR, a name given by the ancients to a very remarkable gloſſy ſpecies of black marble, dug near a city of that name in Caria, and much uſed in building among the Romans.

MARBLE, *Auguſtan*. See *Egyptian* MARBLE.

MARBLE of *Auvergne*, in France, is of a pale red, mingled with violet, green, and yellow.

MARBLE of *Brabançon*, in Hainault, is black veined with white.

MARBLE of *Breſſe*, in Italy, is yellow, with ſpots of white.

MARBLE, *Brocatello*, is mingled with little ſhades of Iſabella, yellow, pale, and grey. It comes from Tortoſa in Spain, where it is dug out of an ancient quarry. There is alſo another kind of ancient *Brocatello* dug near Adrianople. There is alſo an Italian *marble*, called *Brocatello*, which is elegant and beautiful, of a fine bright yellow colour, thickly variegated with irregular veins and ſpots of purple, and ſpots or ſpaces of fine pellucid cryſtallized ſpar, and alſo of ſemipellucid ſpar: the poliſh is admirable, and equal to that of the fineſt agate; but its ſurface is not perfectly ſmooth, being generally ſomewhat flawed.

MARBLE, *Carnaggione*, is an Italian *marble*, ſo called from its fleſh-like colour, exhibiting ſhades of a pale, whitiſh, and yellowiſh caſts, and alſo of a roſy hue, ſtronger in ſome parts than others. It is capable of a very fine poliſh.

MARBLE, of *Carrara*, on the coaſts of Genoa, is very white, and fitteſt of all others for works of ſculpture. See PARIAN MARBLE.

MARBLE, *Carryſtium* MARMOR, a name given by the ancients to a ſpecies of *marble*, dug in the iſland of that name, and much uſed in ornamenting the public buildings; it was of a beautiful green, deeper than the Tiberian and Auguſtan *marble*. We meet with it ſometimes among ancient remains; and the Italian antiquaries particularly mean this, by a name alſo in uſe among us, and proſtituted to every other ſpecies of green *marble*, the *verde antiquo*.

MARBLE of *Champagne* reſembles the Brocatello, being mixed with blue in round ſtains, like partridges eyes.

MARBLE, *Chernitian*. See CHERNITES and *Lygdinum*, below.

MARBLE, *Chium* MARMOR, in the *Natural Hiſtory of the Ancients*, the name of a black *marble*, called alſo the lapis obſidianus. It is very hard and of a fine black; and beſide the many uſes which the ancients put it to, is well known among our goldſmiths by the name of the touch-ſtone, moſt of them being furniſhed with nothing better for that purpoſe than a piece of this, though the baſaltes, which might be had plentifully enough, is greatly preferable for thoſe uſes; any black *marble*, however, that is tolerably hard, will do.

MARBLE, *Cipollino*, or *Cipollin*, the true Egyptian *marble*, is of a ſea-green colour, mixed with large waves or clouds of white or pale green. Scammozzi takes this to be the ſame with that which the ancients called *Auguſtum & Tiberium marmor*; becauſe diſcovered in Egypt in the time of Auguſtus and Tiberius. This *marble* is dug in Italy, and is called *Cipollacio*, from its leek-like colour: or, according to others, from its veins ſometimes running within one another, like the coat of an onion. This is ſuppoſed to be the ſame with the *Caryſtium marmor* of the ancients.

MARBLE, *Coraliticum* MARMOR, of the ancients, was found near the river Coralius, otherwiſe Sangarus, in Phrygia, and reſembled ivory. It was probably the ſame with the CHERNITES.

MARBLE, *Coralloide*, in *Natural Hiſtory*, the name given by authors to ſuch *marbles* as have ſpecimens of the marine corals, or bodies of that kind, immerſed in them; as the ſea-ſhells are buried in, and make a part of the body of others.

There are ſeveral ſpecies of *marble* ſubject to hold theſe bodies, but we have in England principally two in uſe, the one of a greyiſh black, the other of a fine deep jetty black.

The firſt is found in many parts of Derbyſhire, and the corals it contains are of the porous kind, and of one of the moſt elegant ſpecies in the world; they are lodged in it at all angles, and in all directions, and are in general about an inch and half long, and three quarters of an inch broad, though ſome are much larger, and others ſmaller. They are compoſed of longitudinal plates, very fine and thin, and of a ſnow-white, ranged in diſtinct orders, and finely interſperſed at ſmall diſtances, with thin tranſverſe plates; the whole internal part of the coral being thus divided into a ſort of ſquare cells. This net-like diviſion runs through about three-fourths of the body, but the top has only the longitudinal plates without the tranſverſe ones. It is plain that theſe, before they were received into the bed of *marble*, had been ſuſtained in a fluid containing a very beautiful greyiſh-white ſpar, for the net-like plexus of the bed is full of this matter; but the open part at top having no plates for the retaining this matter, has remained empty till received into the *marble*, and is there found filled up with the common blackiſh matter of the reſt of the ſtratum. It is an extremely beautiful ſubſtance when poliſhed, and is uſed in many ornamental works. It is found in many parts of Derbyſhire, and in Wales.

The other, or black *coralloide marble*, is alſo a very beautiful ſpecies; it is a very cloſe compact ſubſtance, and of a fine even texture, very hard, of a deep jetty black, and capable of a high poliſh. It is elegantly variegated with fair and perfect ſpecimens of a coralloide porus, approaching to the nature of the former, but ſmaller, and of a leſs elegant texture; and among theſe has uſually a great number of ſea-ſhells, both of the turbinated and bivalve kinds. Theſe are lodged in various directions, and all of them, the corals as well as the ſhells, are of a pure ſnow-white; and as the matter and texture of the others plainly ſhewed, that they had been filled with ſpar before they were immerſed into the bed of *marble*; theſe, on the other hand, retaining now no part of their original texture, though exactly their external figure, but being all made up of the ſame plain white ſpar, plainly ſhew that they were lodged in the *marble* empty, and in their own native ſtate; for the cavities both of the corals and ſhells are all nicely filled with the matter of the *marble*; but they have now no coralline nor teſtaceous matter about them, but in tract of time have plainly periſhed, and the cavities they left in the hard and ſmooth maſs of the *marble* have been nicely and finely filled up with this ſpar, which therefore now as perfectly repreſents their figures, as if themſelves were there. Hill's Hiſt. Foſſ. p. 473.

It is found in great plenty in many parts of Ireland, particularly about Kilkenny, and is brought in great quantities to London, and uſed about chimney-pieces, and other ornamental works, and is commonly known among artificers by the name of Kilkenny *marble*.

MARBLE, *Derby*, among our artificers, a name given to a very beautiful ſpecies of *marble* found in many parts of Derbyſhire, and frequently worked into chimney-pieces in London.

It is a very ſingular and beautiful ſpecies; its conſtituent matter is a pale, fine, whitiſh-brown *marble*, of a fine cloſe texture, and very bright and glittering hue. This is ſo full of entrochi, that they make more than half the ſubſtance of the maſs; and theſe cutting in different directions, and taking a fine poliſh, add greatly to the beauty of the whole, when wrought. Hill's Hiſt. of Foſſ. p. 479.

The various forms in which theſe bodies appear in the ſtone, when cut, might give a ſuſpicion that many of them were ſome other foſſil; but this is only owing to their lying in all directions in the maſs; but when nicely examined, the oldeſt of them will be found to be no other than what a ſingle common entrochus may be cut into. They are of all ſizes, from the thickneſs of a large pin, to half an inch or more.

MARBLE, *Docimenum* MARMOR. See DOCIMENUM.

MARBLE, *Egyptian*, a name given by our artificers to a very beautiful green and white *marble*, greatly in uſe among us, and brought in great quantities from Egypt, and other places. It was alſo in frequent uſe, and in great eſteem, among the Romans, who received it alſo from Egypt, and diſtinguiſhed, without ſufficient reaſon, two kinds of it, from the different diſpoſition and orders of its variegations, and honoured them with the names of two of their emperors, in whoſe reigns they were firſt brought into uſe. Theſe were the *marmor Auguſteum* and *Tiberianum*, Thoſe pieces in which the variegations were waved and thrown into arches and circular figures, they called the *Auguſtan*, and thoſe which were marked with more diffuſed and ſcattered veins, they called the *Tiberian*. Theſe were the whole differences between the two: and if we were to acknowledge different ſpecies from ſuch differences as theſe, we muſt allow almoſt as many different ſpecies as we can ſee blocks of *marble*. This kind of *marble*, in all its appearances, is, though a very beautiful, yet a very rude, irregular, and various maſs. It is of a firm compact texture, and moderately heavy, and may be properly called a green *marble* variegated with white, for thoſe are its two conſpicuous colours; but it has theſe mixed in ſo great a variety as to afford lights and ſhades of a vaſt number of degrees of colours. It has, beſides theſe, alſo many other variegations of a duſky colour approaching to black. It is very bright and glittering, when freſh broken, and variouſly ſo in its various parts. In the white parts it is brighteſt of all, and the other colours are more lucid as they are paler, or nearer approach to the white. It has, however, among its other particles, ſome of a very beautiful green foliaceous talc. The whole is capable of a good poliſh, and is common in tables, &c. in the houſes of the polite part of the world. Hill's Hiſt. Foſſ. p. 481.

MARBLE of *Dinan*, near Liege, is of a pure black, very beautiful, and very common.

MARBLE *fuſile*, a very common, but very improper term uſed for the green or greeniſh grey *marble*, full of ſmall ſea-ſhells, of which the ſlender pillars of our Gothic buildings are made. The two kinds of *marble* called by this general name are diſtinguiſhed by Dr. Hill, by the names of, 1. *marmor vireſcens conchyliis frequenter aſperſum:* green *marble*, thick ſet with ſea-ſhells: and, 2. *marmor cinero-virens conchyliis paucioribus refertum*; greyiſh green *marble*, more thinly interſperſed with ſea-ſhells. The firſt is moſt frequent in Italy, and is the *fuſible marble* of that part of the world: and the ſecond is dug in Derbyſhire, Dorſetſhire, Suſſex, and many other parts of England, and is what the pillars in our cathedrals are made of, and is conſequently the ſpecies called *fuſible marble* in England. Hill's Hiſt. of Foſſ. p. 470.

From the length and ſlenderneſs of theſe columns it has been vulgarly ſuppoſed that they were caſt in moulds, but reaſon, and a knowledge of nature, ſufficiently explode the conjecture, ſince we well know that *marble* will burn to lime inſtead of melting in the fire, and that the ſhells it contains muſt have been calcined to powder alſo, not having been found as they now are, if it were poſſible that *marble* could have been run.

We have in England, in many places, vaſt quarries of *marble*, all full of ſea-ſhells, and theſe pillars have been all cut out of the *marble* of ſuch quarries. The ſhells it contains are of different kinds, ſome turbinated, and others bivalve, and of the tellina and punctunculus kind; and theſe being filled with a pure and white ſpar, give a fine variety to the whole *marble* when wrought.

MARBLE of *Guachenet*, near Dinan, is of a reddiſh brown, with white ſpots and veins.

MARBLE, *Herboſum* MARMOR. See HERBOSUM.

MARBLE, *Hymettium* MARMOR, a name given by many of the old writers to a ſort of white *marble*, ſometimes variegated with other colours, but remarkable for its great gloſs, and the high poliſh it was capable of; this was greatly uſed among the Romans for the columns of their public buildings.

MARBLE, *Jaſſenſe* MARMOR, a name given by the ancients to a very beautiful ſpecies of *marble*. It was remarkably hard, capable of a very fine poliſh, and was of a beautiful red, approaching to what we call blood-colour, elegantly variegated with veins and clouds of a bluiſh white.

MARBLE, *Italian*, a name uſed by our artificers for two or three of the variegated *marbles*, of great beauty, commonly wrought into chimney-pieces and other ornamental things.

The name is a very indeterminate one, many of the plain, as well as the variegated *marbles*, being from Italy, and indeed many of the variegated ones which have other peculiar names, though known to be brought from Italy, being never called by it; ſo that if any meaning is to be fixed to the word at all, it muſt be ſaid to mean ſuch of the variegated foreign *marbles* as are not diſtinguiſhed by any other peculiar title.

The artificers chiefly comprehend, however, under this name five ſpecies: 1. The common purple and white variegated one. This is a very beautiful maſs, and in general moderately fine, but of very different degrees of purity and hardneſs in its different parts. It is, in general, white, veined, ſpotted, and variegated with purple; but, in ſome blocks, the purple makes the ground, and the white the variegation, and in moſt it is variegated beſide with ſpots of pale red and brown, ſometimes of yellow, and ſometimes of a greeniſh brown. This is the moſt common *marble* of Italy. A brown and white friable one. This emulates the figure of the former in the diſpoſition of its veins, but is only of a white ground, veined with a duſky brown, and is the ſofteſt of all the *marbles*. The white part of it appears compoſed of granules, looſely hung together, and, on a near view, much reſembles loaf-ſugar of the fineſt kind, an and if ſcraped with a knife readily falls away in large granules like ſand. This is alſo common in Italy. 3. A hard variegated blue and white *marble*. This is a ſomewhat coarſe *marble*, of a rough grain, and of a looſe ſhattery texture, and is variegated with a duſky blue, and a pearl colour or bluiſh white, each making uſually an equal part of the maſs. This is very common in Italy, and great quantities of it are imported hither. 4. A fine black and yellow one, the yellow veins appearing like ſtreaks of gold. This is much eſteemed and uſed. And, 5. A purple and yellow one, of great beauty, and very great price. This has of late been ſold at a higher rate than ordinary. Hill's Hiſt. of Foſſ. p. 476, 477, 478.

MARBLE, *Kilkenny*. See *Coralloide* MARBLE, *ſupra*.

MARBLE, *Lacedæmonium* MARMOR. See LACEDÆMONIUM.

MARBLE *of Languedoc* is of a vivid red, with large white veins or ſtains, and is very common: there is ſome, whoſe white borders pretty much on the blue; but this is of leſs value.

MARBLE of *Lavee*, in Maine, has a black ground, with little narrow veins of white: there is another kind of it, red with veins of dirty white.

MARBLE, *Leſbium* MARMOR. See LESBIUM.

MARBLE, *Luculleum* MARMOR. See LUCULLEUM.

MARBLE, *Lumachello*, is ſo called, becauſe mingled with ſpots, brown, black, and white, formed of periwinkle-ſhells petrified in it. This is ancient, and its quarry is loſt.

MARBLE, *Lunenſe* MARMOR. See LUNENSE.

MARBLE, *Lychnitis* MARMOR, in the *Natural Hiſtory of the Ancients*, a name given by many to the *Parian* MARBLE, of which the fineſt ſtatues among the ancients were formed.

Varro imagines that it had this name from λυχνις, *a lamp*, becauſe, as he ſuppoſes, it was cut by candle-light in the quarries; but it ſeems much more probable, that it had it from the verb λυχνευειν, *to ſhine*, or *be bright*, from its remarkable ſplendor.

MARBLE, *Lydium* MARMOR, a name given by the ancients, not only to the black *marble*, uſed as a touchſtone for the trial of gold, &c. but alſo to another very different one, brought from the ſame place; the ground of which was red, and the veins, which were very numerous, and uſually beautifully diſpoſed, were white. This was an elegant *marble*, and was uſed in moſt of the public buildings for pavements, and covering the inner ſide of the walls.

MARBLE, *Lygdinum* MARMOR, in the *Natural Hiſtory of the Ancients*, the name of a ſort of alabaſter, which may properly be diſtinguiſhed by the name of the white kind. It is a very elegant and beautiful ſtone, of a whiteneſs greatly ſuperior both to the Parian *marble* ſo famed of old, and to the Carrara of the moderns; and in ſplendor greatly ſurpaſſing all the *marble* claſs. It is of a looſe, rough, and ſhattery texture; and when broken, is ſeen to be compoſed of a multitude of broad, flat, and large particles, of a very bright, and perfectly white *marble* ſpar. It is always found pure and free from veins, and is moderately hard in the maſs, but eaſily crumbles in ſmall pieces; it is however eaſily cut, and takes a very high and elegant poliſh. It is found in immenſe ſtrata in Egypt and Arabia, and is not uncommon in Italy. It is ſeldom found in large blocks, the ſtrata being, from the nature of the ſtone, ſubject to very frequent perpendicular fiſſures. And the ancients give us the ſame account of it, and uſed it for making vaſes and other ornamental furniture. Hill's Hiſt. of Foſſ. p. 490.

MARBLE of *Margoſſa*, in the Milaneſe, has a white ground, with browniſh veins, reſembling the colour of iron ruſt. This is very common, and extremely hard.

MARBLE, *Melleum*, MARMOR, in *Natural Hiſtory*, the name of a plain yellow marble, reſembling honey or pure Venice turpentine in colour, and thence called by Cæſalpinus, *marmor ſpecie mellis aut terebinthinæ*. It is a very beautiful *marble*, though but of one plain colour, and it is a wonder it is not more imported into England. It is of a very agreeable colour, and is conſiderably hard, and capable of a very elegant poliſh. It is dug in many parts of Italy, and is greatly eſteemed there. It never has any veins. Hill's Hiſt. of Foſſ. p. 464.

MARBLE of *Namur* is a ſpecies of black *marble*, very hard and capable of a good poliſh, without any variegations of other colours. It is dug near the city of Namur, and is common in Italy, France, and Germany. It is chiefly uſed for monuments, tomb-ſtones, and ſuch purpoſes. See LUCULLEUM *Marmor*.

MARBLE, *Numidicum* MARMOR, in the *Natural Hiſtory of the Ancients*, the name of a peculiar ſpecies of *marble*, which was of no great beauty, but ſingular in its remarkable hardneſs, and capable of a very elegant poliſh. It ſeems to have been one of the firſt *marbles* the Romans brought into uſe in pavements. It is a very firm, hard, and ſtrong kind, of a cloſe texture, and in colour of a pale aſh-coloured blue. It is found in Italy, Spain, France, and Germany, but no where ſo plentifully as in the laſt country. It is a very durable and ſtrong kind: but its want of variety in colour, makes it but little eſteemed. Hill's Hiſt. of Foſſ. p. 463.

The inhabitants of Namur and Holland call it the blue ſtone.

MARBLE, *Obſidian*. See OBSIDIANUS *Lapis* and *Chium*, above.

MARBLE, *Parian*, is antique, and much celebrated in authors; it is of a beautiful white: the greateſt part of the Grecian ſtatues where made of it. Varro calls it *lychnites*, becauſe the workmen dug it out of the quarry by lamp-light.

It is called by us, at this time, *ſtatuary marble*.

Too many of the later writers have confounded all the white *marbles* under the name of the *Parian*; and among the workmen, this and all the other white *marbles* have the common name of *alabaſters*; ſo that it is in general forgotten among them, that there is ſuch a thing as alabaſter different from *marble*; which however, is truly the caſe. Almoſt all the world alſo have confounded the Carrara *marble* with this, though they are really very different; the Carrara kind being of a finer ſtructure and clearer white than the *Parian*, but leſs bright and ſplendid, harder to cut, and not capable of ſo glittering a poliſh.

The true *Parian marble*, ſays Hill, has uſually ſomewhat of a faint bluiſh tinge among the white, and often has blue veins in different parts of it. But Da Coſta denies that theſe blue ſtreaks are ever obſervable in the true *Parian marble*, which is always of a pure white throughout: whereas, he ſays, the Saligno-*marble* has ſome admixture of that colour.

It is ſuppoſed, by ſome, to have had its name from the iſland Paros, one of the Cyclades in the Ægean Sea, where it was firſt found; but others will have it to have been ſo called from Agoracritus Parius, a famous ſtatuary, who ennobled it by cutting a ſtatue of Venus in it. Hill's Hiſt. of Foſſ. p. 462.

This *marble*, according to Pliny, was ſent for from Egypt, to adorn the frontiſpiece of that celebrated labyrinth, which was counted one of the wonders of the world.

Among the many famous ſtatues of antiquity cut of this *marble*, the valuable and elegant ſtatue of LAOCOON and his two ſons, mentioned by Pliny, lib. xxxvi. cap. 5. has eſcaped the injuries of time, and is yet preſerved at Rome, as are alſo three other elegant ſtatues of this *marble*, of Apollo, Antinous, and the trunk of a ſtatue, ſuppoſed to have been of Hercules, which is called by the common people *il Torſo*.

MARBLE of *Porta Santa*, at Rome, called *Serna*, is mingled with large clouds and veins of red, white, and grey.

MARBLE, *Portor*, has a black ground, with clouds and veins of yellow. It is dug out of the foot of the Alps towards Carrara.

MARBLE of *Rance*, in Hainault, is of a dirty red, mixed with blue and white clouds and veins: this is pretty common; but is different in degree of beauty.

MARBLE of *Savoy* is of a deep red, mixed with other colours; each piece whereof ſeems cemented on to the reſt.

MARBLE of *Sicily* is a browniſh red, ſtained with oblong ſquares of white and Iſabella, like ſtriped taffety. The ancient has very vivid colours; and the modern comes pretty near it.

MARBLE of *Signam*, in the Pyreneans, is ordinarily of a greeniſh brown, with red ſtains; though this is ſomewhat various in its colours.

MARBLE, *Thaſium* MARMOR, in the *Writings of the Ancients*, a name given to a ſpecies of *marble*, uſed in building. It had its name from the iſland Thaſus, one of the Cyclades, where it was dug; it was of a duſky greyiſh-white, and ſeemed to be compoſed of the ſame matter with the common white *marbles*, with greyiſh veins: only that the matter of the veins here did not run into thoſe determinate parcels, but were blended among the whole maſs.

MARBLE of *Theu*, near Namur in Liege, is a pure black, ſoft kind, and eaſy to work, and receives a more beautiful poliſh than thoſe of Namur and Dinan.

MARBLE, *Tiberianum* MARMOR, in the *Natural Hiſtory of the Ancients*, the name of the green and white *marble* common in tables, &c. at this time, and by our artificers called Egyptian *marble*.

The ancient Romans had it from Egypt, and we alſo have the fineſt pieces thence; though the greater part of what we uſe is not brought quite ſo far. Hill's Hiſt. of Foſſ. p. 481.

MARBLE, *Bigio Nero*, or black grey, is antique.

MARBLE, *white-veined*, has large veins with grey and blue ſtains on a white ground. It comes from Carrara.

Marble, *white*, that dug out of the Pyreneans, on the ſide of Bayonne, is inferior to that of Carrara, its grain being coarſer, and ſhining, like a kind of ſalt. It is ſomething like the ancient white Greek *marble*, whereof their ſtatues were made; but it is not ſo hard or beautiful.

Marble, *ancient black and white*, is now very rare, its quarries being entirely loſt; it is divided between a pure white and a bright black in laminæ.

Marble, *blue Turquin*, is mixed with a dirty kind of white, and comes from the coaſt of Genoa.

Marble *Fior di Perſica* comes from Italy. It conſiſts of red and white ſtains, ſomewhat yellowiſh.

Marble, *yellow*, is a kind of yellow Iſabella, without veins: it is antique, and now very rare.

Marble, *black antique*, is of a pure black, without ſtains, and ſofter than the modern black. There was ſome of it brought from Greece, called *marmor* Luculleum; but this was not ſo much priſed as that which the Egyptians brought from Ethiopia, approaching to an iron-colour, and called basaltes, or the touch-ſtone, becauſe it ſerved them for a trial of metals.

Marble, *white and black*, has a pure black ground, with ſome very white veins.

Marble, called *occhio di pavone*, or peacock's eye, is mingled with red, white, and bluiſh clouds, ſomewhat reſembling the eyes at the end of a peacock's tail.

Marble, *green, antique*, is a mixture of graſs-green and black, in clouds of unequal forms and bigneſſes; and is very rare, the quarries being loſt.

Marble, *common modern green*, improperly called Egyptian, is brought from Carrara, on the coaſt of Genoa: it is of a deep green, ſpotted with grey.

Marble, *rigid*, is that which, being too hard, works with difficulty, and is liable to ſplinter, as the black of Namur.

Marble, *fibrous*, is that full of threads or filaments.

Marble, *brittle*, is that which crumbles under the inſtrument, as the white Greek *marble*, and that of the Pyreneans, &c.

Marble, *terracy*, that which has ſoft places in it, which muſt be filled up with cement, as that of Languedoc.

There are two defects frequent in *marbles*, which augment the difficulty in cutting and poliſhing them; the one, what they ſometimes call *nails*, anſwering to the knots in wood; the other called *emeril*, is a mixture of mundic, or other minerals, forming black ſtains in the *marble*. The knots are common to all *marbles*; the emeril is peculiar to the white.

Marbles, *artificial*. The ſtucco, whereof they make ſtatues, buſts, baſſo-relievoes, and other ornaments of architecture, ought to be *marble* pulveriſed, mixed in a certain proportion with plaiſter; the whole well ſifted, worked up with water, and uſed like common plaiſter. See Stucco,

There is alſo a kind of artificial *marble* made of the flaky ſelenites, or a tranſparent ſtone, reſembling plaiſter; which becomes very hard, receives a tolerable poliſh, and may deceive a good eye. This kind of ſelenites reſembles Muſcovy talc.

There is another ſort of artificial *marble*, formed by corroſive tinctures, which penetrating into white *marble* to the depth of a line or more, imitate the various colours of other dearer *marbles*.

There is alſo a preparation of brimſtone in imitation of *marble*.

To do this, you muſt provide yourſelf with a flat and ſmooth piece of *marble*; on this make a border or wall, to encompaſs either a ſquare or oval table, which may be done either with wax or clay. Then having provided ſeveral ſorts of colours, as white-lead, vermillion, lake, orpiment maſticot, ſmalt, Pruſſian blue, &c. melt on a ſlow fire ſome brimſtone, in ſeveral glazed pipkins; put one particular ſort of colour into each, and ſtir it well together; then having before oiled the *marble* all over within the wall, with one colour quickly drop ſpots upon it of larger and leſs ſize; after this, take another colour and do as before, and ſo on till the ſtone is covered with ſpots of all the colours you deſign to uſe. When this is done, you are next to conſider what colour the maſs or ground of your table is to be; if of a grey colour, then take fine ſifted aſhes, and mix it up with melted brimſtone; or if red, with Engliſh red oker; if white, with white-lead; if black, with lamp or ivory black. Your brimſtone for the ground muſt be pretty hot, that the coloured drops on the ſtone may unite and incorporate with it. When the ground is poured even all over, you are next, if judged neceſſary, to put a thin wainſcot board upon it: this muſt be done whilſt the brimſtone is hot, making alſo the board hot, which ought to be thoroughly dry, in order to cauſe the brimſtone to ſtick the better to it. When the whole is cold, take it up, and poliſh it with a cloth and oil, and it will look very beautiful. Smith's Laboratory, p. 248.

Marble, *colouring of*. The colouring of *marbles* is a nice art, and in order to ſucceed in it, the pieces of *marble*, on which the experiments are tried, muſt be well poliſhed, and clear from the leaſt ſpot or vein. The harder the *marble* is, the better it will bear the heat neceſſary in the operation; therefore alabaſter, and the common ſoft white *marble*, are very improper to perform theſe operations upon.

Heat is always neceſſary for the opening the pores of the *marble*, ſo as to render it fit to receive the colours; but the *marble* muſt never be made red hot, for then the texture of the *marble* itſelf is injured, and the colours are burnt, and loſe their beauty. Too ſmall a degree of heat is as bad as too great: for, in this caſe, though the *marble* receive the colour, it will not be fixed in it, nor ſtrike deep enough. Some colours will ſtrike, even cold, but they are never ſo well ſunk in as when a juſt degree of heat is uſed. The proper degree is that which, without making the *marble* red, will make the liquor boil upon its ſurface. The menſtruums uſed to ſtrike in the colours muſt be varied according to the nature of the colour to be uſed. A lixivium made with horſe's or dog's urine, with four parts quick lime, and one part pot-aſhes, is excellent for ſome colours; common ley of wood-aſhes does very well for others: for ſome, ſpirit of wine is beſt; and finally, for others, oily liquors, or common white wine.

The colours which have been found to ſucceed beſt with the peculiar menſtruums, are theſe: ſtone-blue diſſolved in ſix times the quantity of ſpirit of wine, or of the urinous lixivium; and that colour which the painters call litmus, diſſolved in common ley of wood-aſhes. An extract of ſaffron, and that colour made of buckthorn berries, and called by the painters ſap-green, both ſucceed, well diſſolved in urine and quick-lime, and tolerably well in ſpirit of wine. Vermilion, and a fine powder of cochineal, ſucceed alſo very well in the ſame liquors. Dragon's blood ſucceeds very well in ſpirit of wine, as does alſo a tincture of logwood in the ſame ſpirit. Alkanet-root gives a fine colour, but the only menſtruum to be uſed for this is oil of turpentine; for neither ſpirit of wine, nor any lixivium, will do with it. There is another kind of *ſanguis draconis*, called dragon's blood in tears, which, mixed with urine alone, gives a very elegant colour. Phil. Tranſ. Nº 268. or Abridg. vol. iv. part ii. p. 205.

Beſide theſe mixtures of colours and menſtruums, there are ſome colours which are to be laid on dry and unmixed. Theſe are dragon's blood of the pureſt kind, for a red: gamboge for a yellow: green wax for a green; common brimſtone, pitch, and turpentine, for a brown colour. The *marble*, for theſe experiments, muſt be made conſiderably hot, and then the colours are to be rubbed on dry in the lump. Some of theſe colours, when once given, remain immutable, others are eaſily changed or deſtroyed. Thus the red colour given by dragon's blood, or by a decoction of logwood, will be wholly taken away by oil of tartar, and the poliſh of the *marble* not hurt by it.

A fine gold colour is given in the following manner: take crude ſal ammoniac, vitriol, and verdigris, of each equal quantities: white vitriol ſucceeds beſt, and all muſt be thoroughly mixed in fine powder.

The ſtaining of *marble* to all the degrees of red, or yellow, by ſolutions of dragon's blood or gamboge, may be done by reducing theſe gums to powder, and grinding them with the ſpirit of wine, in a glaſs mortar; but for ſmaller attempts, no method is ſo good as the mixing a little of either of theſe powders with ſpirit of wine, in a ſilver ſpoon, and holding it over burning charcoal. By this means a fine tincture will be extracted, and with a pencil dipped in this, the fineſt traces may be made on the *marble*, while cold, which, on the heating it afterwards, either on ſand, or in a baker's oven, will all ſink very deep, and remain perfectly diſtinct in the ſtone. It is very eaſy to make the ground-colour of the *marble* red or yellow by this means, and leave white veins in it. This is to be done by covering the places where the whiteneſs is to remain with ſome white paint, or even with two or three doubles only of paper, either of which will prevent the colour from penetrating in that part. All the degrees of red are to be given to *marble* by means of this gum alone; a ſlight tincture of it, without the aſſiſtance of heat to the *marble*, gives only a pale fleſh-colour, but the ſtronger tinctures give it yet deeper; to this the aſſiſtance of heat adds yet greatly; and finally the addition of a little pitch to the tincture gives it a tendency to blackneſs, or any degree of deep red that is deſired.

A blue colour may be given alſo to *marble* by diſſolving turnſol in a lixivium of lime and urine, or in the volatile ſpirit of urine; but this has always a tendency to purple, whether made by the one or the other of theſe ways. A better blue, and uſed in an eaſier manner, is furniſhed by the Canary turnſol, a ſubſtance well known among the dyers: this needs only to be diſſolved in water, and drawn on the place with a pencil: this penetrates very deep into the *marble*, and the colour may be increaſed by drawing the pencil, wetted afreſh, ſeveral times over the ſame lines. This colour is ſubject to ſpread and diffuſe itſelf irregularly; but it may be kept in regular bounds, by circumſcribing its lines with beds of wax, or any other ſuch ſubſtance. It is to be obſerved, that this colour ſhould always be laid on cold, and no heat given even afterwards to the *marble*; and one great advantage of this colour is, that it is therefore eaſily added to *marbles* already ſtained with any other colours, and it is a very beautiful tinge, and laſts a long time. Mem. Acad. Par. 1732.

This art has in ſeveral people's hands been a very lucrative ſecret, though there is ſcarce any thing in it that has not at one time or other been publiſhed.

Kircher has the honour of being one of the firſt who publiſhed any thing practicable about it. This author meeting with ſtones in ſome cabinets ſuppoſed to be natural, but having figures too nice and particular to be ſuppoſed to be nature's making, and theſe not only on the ſurface, but ſunk through the whole body of the ſtones, was at the pains of finding out the artiſt who did the buſineſs; and on his refuſing to part with the ſecret on any terms, this author with Albert Gunter, a Saxon, endeavoured to find it out; in which they ſucceeded at length very well. Their method is this: take aqua fortis and aqua regia of each one ounce, ſal ammoniac one ounce, ſpirit of wine two drams, about twenty-ſix grains of gold, and two drams of pure ſilver; let the ſilver be calcined and put into a vial, and pour upon it the aqua fortis; let this ſtand ſome time, then evaporate it, and the remainder will firſt appear of a blue and afterwards of a black colour; then put the gold into another vial, pour the aqua regia upon it, and when it is diſſolved evaporate it as the former; then put the ſpirit of wine upon the ſal ammoniac, and let it be evaporated in the ſame manner. All the remainders and many others made in the ſame manner from the other metals diſſolved in their proper acid menſtrua, are to be kept ſeparate and uſed with a pencil on the marble. Theſe will penetrate without the leaſt aſſiſtance of heat, and the figure being traced with a pencil on the *marble*, the ſeveral parts are to be touched over with the proper colours, and this renewed daily till the colours have penetrated to the deſired depth into the ſtone. After this the maſs may be cut into thin plates, and every one of them will have the figure exactly repreſented on both ſurfaces, the colours never ſpreading: the niceſt method of applying theſe, or the other tinging ſubſtances, to *marble* that is to be wrought into any ornamental works, and where the back is not expoſed to view, is to apply the colours behind, and renew them ſo often till the figure is ſufficiently ſeen through the ſurface on the front, though it does not quite extend to it. This is the method that of all others brings the ſtone to a nearer reſemblance of natural veins of this kind.

The ſame author gives another method to colour *marble*, by vitriol, bitumen, &c. forming a deſign of what you like upon paper, and laying the ſaid deſign between two pieces of poliſhed *marble*; then cloſing all the interſtices with wax, you bury them for a month or two in a damp place. On taking them up, you will find, that the deſign you painted on the paper, has penetrated the *marbles*, and formed exactly the ſame deſign on them. Kircher's Mund. Subter. lib. viii. § 1. cap. 9.

Wallerius, in his Mineralogy, vol. ii. p. 128. recommends the laſt method of Kircher; and the firſt method is copied in the Phil. Tranſ. Nº 7.

The art was practiſed by Mr. Bird, a ſtone-cutter at Oxford, before the year 1666; but his method is not recorded. Mr. Robert Chambers, of Minching Hampton, in Glouceſterſhire, diſcovered and practiſed a method of colouring *marble*, which he kept a ſecret. Mr. Da Coſta has publiſhed an account of experiments made on ſeveral pieces of *marble* ſtained by this artiſt. Phil. Tranſ. vol. li. art. 5. p. 30, &c.

Spots of oil ſtain white *marble*, ſo that they cannot be taken out. See STAINING *of Stones*.

MARBLE, *poliſhed*, is that, which, being well rubbed with free-ſtone, and afterwards with pummice-ſtone, is at laſt poliſhed with emery, if the *marble* be of ſeveral colours; and with calcined tin, if it be white. In Italy, they poliſh with a piece of lead and emery.

There are various ways of poliſhing *marble*: ſome lay three or four blocks in a row, and with another, fixed to a broad beetle, and an handle fixed at oblique angles, with ſand and water between, work the upper ſtone backwards and forwards on the lower ones, till the ſtrokes of the ſaw are worn off; after which they poliſh them with emery and putty.

MARBLES, *Arundel*. See ARUNDELIAN *marbles*.

MARBLE *colour*. To give this variegated colour to glaſs is a very eaſy operation: there needs no more than to put cryſtal frit into a pot in the furnace, and to work it before it has ſtood the uſual time to purify in the fire. Neri's Art. of Glaſs, p. 99.

MARBLE-*wood*, a name given by the people of ſome parts of America to the *lignum rhodium*, or roſe-wood, from the heart of the tree being ſometimes variegated like *marble*.

MARBLED, ſomething veined, or clouded, reſembling marble. *Marbled paper* is a paper ſtained with various clouds and ſhades, reſembling, in ſome meaſure, the divers veins of marbles; the method of making which, ſee under PAPER.

MARBLED *China-ware*, a name given by many to a ſpecies of porcelain or China-ware, which ſeems to be full of cemented flaws. It is called by the Chineſe, who are very fond of it, *tſou tchi*.

It is generally plain white, ſometimes blue, and has exactly the appearance of a piece of China which had been firſt broken, and then had all the pieces cemented in their places again, and covered with the original varniſh. The manner of preparing it is eaſy, and might be imitated with us. Inſtead of the common varniſh of the China-ware, which is made of what they call oil of ſtone and oil of fern mixed together, they cover this with a ſimple thing made only of a ſort of coarſe agates, calcined to a white powder, and ſeparated from the groſſer parts by means of water, after long grinding in mortars. When the powder has been thus prepared, it is left moiſt, or in form of a ſort of cream, with the laſt water that is ſuffered to remain in it, and this is uſed as the varniſh. Our cryſtal would ſerve full as well as theſe coarſe agates, and the method of preparation is perfectly eaſy. Obſerv. ſur les Cout. de l'Aſie.

The occaſion of the ſingular appearance of this ſort of porcelain is, that the varniſh never ſpreads evenly, but runs into ridges and veins. Theſe often run naturally into a ſort of moſaic-work, which can ſcarce be taken for the effect of chance. If the *marbled* China be deſired blue they firſt give it a general coat of this colour, by dipping the veſſel into a blue varniſh; and when this is thoroughly dry, they add another coat of this agate-oil.

MARBLES, *playing*, are moſtly imported from Holland; where it is ſaid they are made by breaking the ſtone alabaſter, or other ſubſtance, into pieces, or chips of a ſuitable ſize; theſe are put into an iron mill which turns by water: there are ſeveral partitions with raſps within, cut floatways, not with teeth, which turn conſtantly round with great ſwiftneſs; the friction againſt the raſps makes them round, and as they are formed they fall out of different holes, into which ſize or chance throws them. They are brought from Nuremburgh to Rotterdam, down the Rhine, and from thence diſperſed over Europe.

MARBLING, the art or act of painting or diſpoſing colours in ſuch a manner, that they may repreſent marble. Thus we *marble* books, paper, wood, &c. See PAPER, and *Colouring*, &c. *of* BONE.

MARBLING *of books*, among *Binders*, denotes the ſprinkling over the cover of a book firſt with ink, and afterwards with weak aquafortis. See BOOK-*binding*

They alſo *marble* books on the edges; but, in this *marbling*, there is no black uſed, but, in lieu thereof, red, blue, &c.

MARCASITE, **MARCASITA**, a ſort of metallic mineral, ſuppoſed by many to be the ſeed or firſt matter of metals. On this principle, there ſhould be as many different *marcaſites* as metals; which is alſo ſaid to be true in effect, the name being applied by ſome to every mineral body that has metallic particles in its compoſition, though not enough to make it worth working: in which caſe it would be called *ore*.

There are only three kinds in the ſhops, which are called *marcaſite* of gold, of ſilver, and of copper; though ſome repute the loadſtone to be a *marcaſite* of iron; biſmuth, *marcaſite* of tin; and zinc, or ſpelter, *marcaſite* of lead: but this we leave to the chemiſts.

Marcaſite of gold is found in little balls or nodules, about the bigneſs of nuts, nearly round, heavy, of a brown colour without. *Marcaſite* of ſilver is like that of gold, only paler coloured: within, the colour differs much, the one having a gold-colour, and the other a ſilver-colour, both ſhining and brilliant. The *marcaſite* of copper is about the bigneſs of a ſmall apple, round or oblong, brown without, yellow and ſtriated within, brilliant and ſhining.

Marcaſites are found in mines of metals; they all contain ſulphur, and a vitriolic ſalt, eſpecially that of copper: ſome of them alſo contain antimony and biſmuth.

This name is uſed in a very vague ſenſe by many writers upon foſſils, but is by ſome reſtrained to a peculiar genus of foſſils, the characters of which are, that they are compound inflammable metallic bodies, naturally conſtituting whole ſtrata; of a ſolid and firm ſubſtance, of an obſcurely and irregularly foliaceous ſtructure, and of a bright glittering appearance, very freely and readily giving fire with ſteel, not fermenting with acid menſtruums,

ſtruums, and when put into the fire, yielding a deep blue flame, and finally calcining into a purple powder.

Though the natural diſpoſition of theſe bodies be to form whole ſtrata, and they are moſt uſually found in this ſtate, yet they are at times found in looſe maſſes, as many, even of the ſtones of ſtrata, at times are. They are ſubject alſo, by their frequent admixture with adventitious matter, the ores of metals, and other foſſile bodies, to ſuch various external appearances, that their varieties are almoſt innumerable, and moſt of them are very beautiful: but though theſe accidental differences are ſo very numerous, the genuine ſpecies are very few, the naturaliſt allowing only three: theſe are, 1. The bright ſilver coloured *marcaſite*. 2. The bright gold-coloured *marcaſite*. And, 3. The pale heavy dead white *marcaſite*.

The firſt ſpecies uſually conſtitutes ſtrata of great extent, and of about a foot in thickneſs; very often much leſs, but ſcarce ever much more: it is compoſed of a number of foliaceous flakes, not regularly diſpoſed, but oddly contorted and waved, and often folding round one another; though ſometimes this ſtructure is leſs diſtinct, and the whole ſeems run into one ſolid maſs; its colour is extremely bright, very like ſilver, but more glittering. This is its common and its more pure ſtate; but it is liable to a vaſt number of varieties. Sometimes it contains a large quantity of the ore of lead or tin, and very often a duſky brown ferruginous matter is intimately mixed with it; at other times many of the angular and regularly figured phlogoniæ are immerſed in it, and ſeem to make a part of its very ſtructure; and ſometimes where it has room, its conſtituent flakes riſe on its ſurface in ſeveral conjunct ſeries, and form a very elegant foliaceous top to it. Nor is this all the difference of appearance it puts on; for very often where there has not been a ſufficient quantity of it to form itſelf into any figure alone, it is found depoſited in ſpecks, or flat cakes, of a more or leſs complex, but always of a flaky ſtructure, on ſtones or ores of various kinds; and frequently, beſide its native ſilvery white, it has all the rainbow-colours on its different parts, as differently turned to the light.

The *golden marcaſite* is a more beautiful ſubſtance than the former: it is of a leſs firm or compact ſtructure than the others, and is uſually found in very long but very thin ſtrata, and is of an extremely bright and glittering appearance, and is ſometimes found in large and miſ-ſhapen nodules or looſe maſſes. It is liable to all the accidental varieties that the former is, and in many of them makes a very elegant appearance.

The third or dead white kind, is the hardeſt and heavieſt of all: it is, in its more uſual and natural appearance, of much leſs beauty than the former kinds, but it is, like them, ſubject to various accidents, under ſome of which it makes a very gay and ſplendid appearance; it, like the reſt, ſometimes forms complete ſtrata; ſometimes detached nodules: but its moſt uſual appearance is in the horizontal cavities of other ſtrata; in theſe it often forms a ſort of baſtard-ſtratum of many yards continuance, and frequently of very conſiderable thickneſs, for it almoſt always fills up the whole vacuity, and that ſo cloſely as ſeldom to leave room for any foliaceous ſhoots at its ſurface, or protuberances at its edges, but forms a plain maſs like that of a metal melted and poured into the place; it is the ſmootheſt ſurface of all the *marcaſites*, and is ſomewhat ſoft to the touch, and in colour reſembles tarniſhed pewter.

This is its common appearance, but it ſometimes ſhews itſelf like the reſt in ſmall patches on the ſurfaces of ſtones, and is there often very beautifully foliated; it is liable alſo to all the accidents of the other kinds.

The *marcaſites* are all found in great plenty in the Engliſh and German mines. Devonſhire and Cornwall afford vaſt quantities of them; and very beautiful ones are found in Derbyſhire. They often contain the ſeveral metals, but the quantity of ſulphur has yet baffled all the attempts that have been made to work them to advantage. Hill's Hiſt. of Foſſ. p. 619.

Avicenna mentions four kinds of *marcaſite*; the golden, the ſilvery, the braſſy, and the iron *marcaſite*. He does not pretend that the two firſt contain really the metals whoſe names they bear, but ſays they are ſo called from their likeneſs in colour, and that they are thought by ſome to poſſeſs, in part, their virtues. Dioſcorides mentions only one kind, that is the braſſy pyrites or *marcaſite*. This is, of all others, the moſt common; and the preference is given by this author to ſuch of it as is of a bright braſs-colour, and ſuch as, when ſtruck againſt ſteel, yields the largeſt ſparks. This is the kind called by Avicenna and Serapion, *marcaſite nuhaſi*, and it is called by the Perſians, *hagier alruxenani*, that is, the ſtone of light or brightneſs, there being a very vivid and ſparkling luſtre in this ſtone when newly broken. The ancients uſed to calcine it, and then made it an ingredient in their ſeveral compoſitions for diſeaſes of the eyes. The calcining it renders it a ſort of colcothar of vitriol, for the ſulphureous parts burn away in the operation, and leave only the *caput mortuum* of the vitriol behind; ſome have ſuppoſed it called *lapis lucis*, from its reſtoring light to the eyes; but this is a very far-fetched etymology.

The firſt opinion of the world, in regard to this glittering ſubſtance, was, that it was almoſt all gold or ſilver, according to the colour: but the error of this opinion being ſoon diſcovered by trials, there aroſe another contrary one, that *marcaſite* never contained any metal at all. This is, in general, true of our *marcaſites*, but it is not to be extended into a general rule for thoſe of all the world. The ſearchers after royal mines are not to throw away all theſe ſubſtances as uſeleſs, wherever they find them: for Alonſo Barba, a very great judge of theſe things, and himſelf very converſant in mines, aſſures us that the *marcaſites* of the mines of Monſerrat en los Chicas contain uſually one half ſilver: and in the mines of Potoſi there is great plenty of a *marcaſite*, in which there is embodied a large quantity of the black ſilver-ore, well known there, and eſteemed one of the richeſt kinds, except the native ſilver. They always are glad to find this *marcaſite* vein, it being eſteemed a proof that the black ore is very rich in ſilver; they make the ſame ſort of obſervation in regard to orpiment and gold, that they do in regard to *marcaſite* and ſilver; that the orpiment uſually contains itſelf ſome gold, and is a certain ſign that there is gold in the neighbourhood wherever it is found. Alonſo Barba, de Met.

This name, ſays the author of the Dictionary of Chemiſtry, has long been given indifferently to all ſorts of minerals, to ores pyrites, and to ſemi-metals: lately it ſeems to be confined to PYRITES; and Wallerius propoſes to apply it only to ſuch pyrites as are regularly formed.

MARCELLIANISM, the doctrines and opinions of the *Marcellians*, a ſect of ancient heretics, towards the cloſe of the ſecond century, ſo called from *Marcellus* of Ancyra, their leader, who was accuſed of reviving the errors of Sabellius.

Some, however, are of opinion, that *Marcellus* was orthodox, and that they were his enemies the Arians who fathered his errors upon him. St. Epiphanius obſerves, that there was a great deal of diſpute with regard to the real tenets of *Marcellus*; but that, as to his followers, it is evident they did not own the three hypoſtaſes: for *Marcellus* conſidered the Son and Holy Ghoſt, as two emanations from the divine nature, which after performing their reſpective offices, were to return again into the ſubſtance of the Father; and this opinion is altogether incompatible with the belief of three diſtinct perſons in the Godhead.

MARCGRAVE, or MARGRAVE, a kind of dignity in Germany, anſwering to our MARQUISS.

The word is derived from the German *marche*, or *marke*, which ſignifies *a frontier*, formed, as Junius conjectures, from the laſt ſyllable of the Greek τεκ-μαρ, which ſignifies both *a mark*, and *a limit*; and *graffe*, *count*, *governor*; *marcgraves* being originally governors of cities lying on the frontiers of a country or ſtate.

MARCGRAVIA, in *Botany*, a genus of the *polyandria monogynia* claſs: the characters of which are, that the corolla has a ſingle petal, and is calyptriform; the calyx is ſix-leaved, and imbricated; and the fruit is a berry, conſiſting of many cells, and containing many ſeeds. There is only one ſpecies.

MARCH, MARTIUS, the third month of the year, according to the common way of computing.

Among the Romans, *March* was the firſt month; and in ſome eccleſiaſtical computations, that order is ſtill preſerved; as particularly in reckoning the number of years from the incarnation of our Saviour, which is done from the 25th of *March*.

In England, (before the alteration of the ſtyle) *March*, properly ſpeaking, was the firſt month in order, the new year commencing from the 25th; though in complaiſance to the cuſtoms of our neighbours, we uſually ranked it as the third; but, in this reſpect, we ſpoke one way, and wrote another.

Till the year 1564, the French reckoned the beginning of their year from Eaſter; ſo that there were two months of *March* in one year, one of which they called *March before Eaſter*, and the other *March after Eaſter*, and, when *Eaſter* fell within the month of *March*, the beginning of the month was in one year, and the end in another.

It was Romulus who divided the year into months: to the firſt of which he gave the name of his ſuppoſed father *Mars*. Ovid, however, obſerves, that the people of Italy had the month of *March* before Romulus's time; but that they placed it very differently, ſome making it the third, ſome the fourth, ſome the fifth, and others the tenth month of the year.

In this month it was that the Romans ſacrificed to Anna

Perenna; that they began their comitia; that they adjudged their public farms and leaſes; that the miſtreſſes ſerved the ſlaves and ſervants at table, as the maſters did in the Saturnalia; and that the Veſtals renewed the ſacred fire.

The month of *March* was always under the protection of Minerva, and always conſiſted of thirty-one days. The ancients held it an unhappy month for marriage, as well as the month of May.

MARCH, in *Military Language*, is in general the motion of a body of men from one place to another.

But the beat of the drum, when the ſoldiers are upon *march*, or beginning to *march*, is likewiſe called the *march*. It is likewiſe a word of command, when a battalion is to alter its diſpoſition.

As many accidents may happen in the *march* of an army, from defiles, marſhes, woods, and the like, it is the prudence of a general to order his *march* accordingly, and to take care that the columns of his army have a free communication one with the other. The *march* of an army is compoſed of an advance guard, the main body, and the rear guard, and is ſometimes in two, four, ſix, or eight columns, according as the ground will allow.

MARCHANTIA, in *Botany*, a genus of the *cryptogamia* claſs of plants, and of the order of *algæ*: the characters are, that it has male and female flowers on different parts of the ſame plants; the male flower ſtands on a long erect peduncle; the cup is a common perianthium of the peltated kind, divided into ſeveral ſegments, and containing under it as many flowers as there are ſegments; each flower is monopetalous, of a turbinated form, ſtanding erect, and ſomewhat ſhorter than the cup; having a ſingle ſtamen, which is a ſlender filament, longer than the flower; the anthera is oval, and commonly found burſt at the top into as many parts as there are ſegments in the perianthium; the female flower has no pedicle; the cup is a ſingle-leaved perianthium, ſeſſile, campanulated, and polyſpermous. There are ſeven ſpecies.

MARCHES, *marchia*, from the German, *march*, i. e. *limes*, or from the French *marque*, viz. *ſignum*, being the notorious diſtinction between two territories, are the limits between England and Wales, or Scotland; which laſt are divided into weſt and middle *marches*. 4 Hen. V. cap. 7. 22 Edw. IV. cap. 8. 24 H. VIII. cap. 9. And there was formerly a court, called the court of the *marches* of Wales, where pleas of debt or damages, not above the value of 50*l.* were tried and determined; and if the council of the *marches* held plea for debts above that ſum, &c. a prohibition might be awarded.

MARCHERS, or *Lords* MARCHERS, in our *Old Writers*, noblemen that lived on the marches of Wales, or Scotland. Theſe, in times paſt, according to Camden, had their laws, and power of life and death, &c. like petty kings. But ſuch powers were aboliſhed by the ſtat. 27 Hen. VIII. cap. 27. and 1 Edw. VI. cap. 10.

MARCHESVAN, in *Chronology*, the eighth month of the Jewiſh eccleſiaſtical year, anſwering to part of our October and November.

MARCHET, or MARCHETTA, a pecuniary fine, anciently paid by the tenant to his lord, for the marriage of one of the tenant's daughters.

This cuſtom obtained, with ſome difference, throughout all England and Wales, as alſo in Scotland; and it ſtill continues to obtain in ſome places. According to the cuſtom of the manor of Dinover in Carmarthenſhire, every tenant, at the marriage of his daughter, pays ten ſhillings to the lord: which, in the Britiſh language is called *gwabr merched*, i. e. *maid's-fee*. See AMABYR.

In Scotland, and the north parts of England, the cuſtom was, for the lord to lie the firſt night with the bride of his tenant; but this uſage was abrogated by king Malcolm III. at the inſtance of his queen; and, inſtead thereof, a mark was paid by the bridegroom to the lord: whence it is called *marcheta mulieris*. See BOROUGH-*Engliſh*.

MARCHIONIS *pulvis*, a term uſed for a certain compound powder, preſcribed in the Leyden Diſpenſatory, and greatly recommended by many as an anti-epileptic and abſorbent.

The ingredients are male piony-root, half an ounce, wood of miſletoe of the oak, raſpings of ivory, elks hoof, ſpodium, the tooth of the unicorn-fiſh, or, in its ſtead, the antlers of the ſtag's horn, red and white coral, and pearls, of each a dram. Theſe are all to be rubbed into a powder, with twenty leaves of pure gold, and given half a dram twice a day.

MARCIONITES, or MARCIONISTS, MARCIONISTÆ, a very ancient and popular ſect of heretics, who, in the time of St. Epiphanius, were ſpread over Italy, Egypt, Palæſtine, Syria, Arabia, Perſia, and other countries: they were thus denominated from their author *Marcion*. *Marcion* was of Pontus, the ſon of a biſhop, and at firſt made profeſſion of the monaſtical life; but he was excommunicated by his own father, who would never admit him again into the communion of the church, not even on his repentance. On this, he abandoned his own country, and retired to Rome, where he began to broach his doctrines.

He laid down two principles, the one good, the other evil: between theſe they imagined an intermediate kind of deity of a mixed nature, who was the creator of this inferior world, and the god and legiſlator of the Jewiſh nation: the other nations, who worſhipped a variety of gods, were ſuppoſed to be under the empire of the evil principle. Theſe two conflicting powers exerciſe oppreſſions upon rational and immortal ſouls; and, therefore, the ſupreme God, to deliver them from bondage, ſent to the Jews a being more like unto himſelf, even his ſon Jeſus Chriſt, clothed with a certain ſhadowy reſemblance of a body: this celeſtial meſſenger was attacked by the prince of darkneſs, and by the god of the Jews, but without effect. Thoſe who follow the directions of this celeſtial conductor, mortify the body by faſtings and auſterities, and renounce the precepts of the god of the Jews, and of the prince of darkneſs, ſhall, after death, aſcend to the manſions of felicity and perfection. The rule of manners which *Marcion* preſcribed to his followers, was exceſſively auſtere, containing an expreſs prohibition of wedlock, wine, fleſh, and all the external comforts of life. See MANICHÆANS.

Marcion denied the real birth, incarnation, and paſſion of Jeſus Chriſt, and held them to be all apparent only. He denied the reſurrection of the body; and allowed none to be baptiſed, but thoſe who preſerved their continence; but theſe, he granted, might be baptized three times.

In many things, he followed the ſentiments of the heretic Cerdon, and rejected the law and the prophets. He pretended, the goſpel had been corrupted by falſe prophets, and allowed none of the evangeliſts, but St. Luke, whom alſo he altered in many places, as well as the Epiſtles of St. Paul, a great many things in which he threw out. In his own copy of St. Luke, he threw out the two firſt chapters entire.

MARCITES, MARCITÆ, a ſect of heretics in the ſecond century, who alſo called themſelves the *perfecti*, and made profeſſion of doing every thing with a great deal of liberty, and without any fear.

This doctrine they borrowed from Simon Magus, who, however, was not their chief; for they were called *Marcites* from one *Marcus*, who conferred the prieſthood, and the adminiſtration of the ſacraments, on women.

MARCOSIANS, or COLOBARSIANS, an ancient ſect in the church, making a branch of the VALENTINIANS.

St. Irenæus ſpeaks at large of the leader of this ſect, *Marcus*, who, it ſeems, was reputed a great magician.

The *Marcoſians* had a great number of apocryphal books, which they held for canonical, and of the ſame authority with our's. Out of theſe they picked ſeveral idle fables touching the infancy of Jeſus Chriſt, which they put off for true hiſtories. Many of theſe fables are ſtill in uſe and credit among the Greek monks.

MARCULUS, among the Romans, a knocker, or inſtrument of iron to knock at the doors with.

MARDAC, in the *Materia Medica of the Ancients*, a name given by ſome to litharge. The Arabian writers have ſometimes called it by this name, and ſometimes by that of *mardeſengi*. Many of their commentators have thought that they meant two different ſubſtances by theſe two names; but it does not appear to be truly the caſe, the two words ſtanding, in different writers, for the ſame thing. Avicenna has given us a chapter on *mardac*, in which he has tranſlated the chapter of Dioſcorides on litharge: and Serapion has given us a chapter on the *mardeſengi*, in which he has given us an account of the ſame ſubſtance, under the terms that Galen uſes for the deſcription of litharge, and even quotes him for the account.

MARDAITES, in *Eccleſiaſtical Hiſtory*. See MARONITES.

MARE, *equa*, in *Zoology*, the female of the HORSE kind.

No *mares* in the world are better for breeding than the Engliſh, provided they are properly choſen for the ſort of horſe intended to be bred. The *mare*, whatever ſort of horſe is intended to be raiſed from her, ſhould be perfectly ſound, and as free from all defects as the ſtallion. They ſhould have no ſplaint, ſpavin, nor curb about them; for the colt will certainly take after them if they have. The higheſt ſpirited *mares* are beſt, and, in general, if there be any natural defect in the *mare*, it ſhould be remedied in the ſtallion; and if any in the ſtallion, it ſhould be remedied in the *mare*, as much as poſſible, in order to the having good colts.

The particular directions regarding the kinds of horſes to be bred, are theſe: if for the manege, or pads, the *mares* ſhould have their heads well ſet on, and their breaſts broad; their legs not too long, their eyes bright and ſparkling, and bodies large enough, that the foal may have room to lie in their belly. They ſhould be of a good and gentle diſpoſition, and their motions eaſy and graceful: the more good qualities the *mares* have, the better, in general, the colts will prove.

If the owner would breed for racing, or for hunting, the *mares* muſt be choſen lighter, with ſhort backs and long ſides; their legs muſt be longer, and the breaſt not ſo broad; and ſuch ſhould always be choſen as have good blood in their veins. If the ſpeed and wind of any particular *mare* have been tried, and found good, there is the more certainty of a good colt from her: but ſhe ſhould be in full health and vigour at the time, and not above ſeven years old, or eight at the utmoſt. The younger the breeders are, the better, in general, the colts will be. A *mare* may be covered any time after ſhe is three years old; but the beſt time is after ſhe is four; at this age, or between this and ſeven, ſhe will nouriſh a colt beſt of all; and though ſhe will breed till ſhe is thirteen, yet it is generally obſerved, that when ſhe is paſt ten, the colts bred from her are dull and heavy. People who regard the moon, in theſe caſes, will have their *mares* covered only between the end of the firſt quarter and the full; they pretend that theſe colts will be the moſt ſtrong and vigorous: but that thoſe begot in the waining of the moon, will always be weakly and tender. A much more eſſential caution, however, is, that before the *mare* is to be covered, ſhe ſhould be taken into the houſe for ſix weeks, at leaſt, and fed well with good hay, and oats well ſifted, to give her ſtrength to go through the operation. If there is any reaſon to ſuſpect that the *mare* will not conceive, the beſt method to inſure it is to let her blood in the neck, about ſix days before ſhe is covered: the quantity of blood taken away ſhould be about two quarts, or ſomewhat leſs. It is a general cuſtom to open the veins on both ſides the neck for this, taking half the quantity from each, but this is trifling.

The method of covering, ſo as to make it moſt ſure to ſucceed, is this: the *mare* is to be brought into ſome open place, and tied to a poſt; and the ſtallion is to leap her in the morning faſting, and as ſoon as he diſmounts, a pail of cold water is to be thrown upon her, to make her ſhrink in, and retain the ſeed. She is then to be taken away out of hearing of the horſe, and is neither to eat nor drink for four or five hours after.

It may be known if ſhe ſtands to her covering, by her keeping a good ſtomach, and not neighing at the ſight of a horſe. Some, to make it quite ſecure, put the *mare* and horſe together in an empty houſe every night, for four or five nights, taking away the horſe in the morning, and feeding him very liberally, and the *mare* very ſparingly, and particularly giving her very little water.

There muſt be proper care taken of her after covering; the ſame method of feeding her with good hay, and ſifted oats, muſt be continued three weeks or a month, and ſhe muſt be kept within doors, and without any exerciſe; her ſtable muſt be kept very clean, and her feet pared, and with thin ſhoes on. After this ſhe may be turned out for the ſummer ſeaſon, and only taken up in September, in order to be kept well fed till ſhe foals. If there be great difficulty in her foaling, or the ſecundine be retained, the method is to hold her noſtrils, ſo that ſhe cannot breathe; and if this does not do, a decoction of madder-root, or of fennel, in water, with a mixture of ale or wine, is found very effectual.

When the whole is over, the *mare* is very apt to eat up her ſecundine; but this ſhould be prevented, for it is an unnatural food for her, and will injure her health. When ſhe has licked her foal, ſome perſons ſhould ſtroak and milk her before the foal ſucks. This will make the milk come down in greater plenty, and will prevent it from clotting into lumps, or from diſagreeing with the young creature's ſtomach. It often happens, that the milk clods in the udder, and the foal being able to get none out, the *mare* is ſuppoſed to be dry, and in conſequence of this ſuppoſition, ſhe actually becomes ſo. But the remedy is eaſy: let as much milk as can be got from her be boiled with ſome lavender-flowers, and the udder bathed thoroughly with it warm, ſeveral times a day: if no milk, or not enough can be obtained from her, other milk or common water will do; for the principal effect is from the heat of the liquor, and the virtue of the lavender, which breaks the clods and lumps, and then the foal's ſucking more as it grows ſtronger, will prevent the like accident for the future.

The water given the *mare* for the firſt month after foaling, muſt be what the dealers in horſes call the white maſh, that is bran and water, ſtirred together till the liquor is white: a month after foaling, a decoction of brimſtone and ſavin will be very proper, and will give ſtrength to the colt.

After this the *mare* may be put to any moderate exerciſe, as harrowing or the like, and both ſhe and the colt will be the better for it; care only is to be taken that ſhe do not let the colt ſuck while ſhe is hot.

Many are of opinion, that the winter is a very bad time for a *mare* to be foaling; but though there is ſcarcity of graſs, the *mare* may be houſed at this time, and well fed with hard meat, and, in this caſe, it will prove better both for her and the colt; he will be better limbed and ſtronger than if fed at graſs. See Foal.

MARECA, in *Ornithology*, the name of a Braſilian ſpecies of duck, much valued there at table. It is of the ſhape of our duck; its head is grey, but has a beautiful red ſpot on each ſide, at the inſertion of the beak, and a whiteneſs in the lower part under the eyes; its breaſt and belly are of the colour of freſh-cut oak, variegated with black ſpots; its legs and feet are black; its tail grey; and its wings elegantly variegated with grey and brown; but they have in the middle a large mixture of that gloſſy green, which we ſee in the necks of our drakes. There is, beſides this, another ſpecies of the *marcca*, which is of a duſky olive-coloured brown on the back, white on the throat, and grey on the breaſt and belly, and very remarkable for the fine bright red colour of its feet.

MARENA, in *Ichthyology*, the name of a fiſh of the harengiform kind, much approaching to the nature of the common pilchard; but differing from it in that it has not the ſerrated longitudinal line under the belly, and lives in lakes, not in the ocean. It ſeldom arrives to more than five inches in length; its back is blackiſh, and its ſides white and ſilvery, and its ſcales are very looſe, and eaſily rubbed off. It is a better taſted fiſh than the pilchard, and its fleſh is firmer.

MARGA, *marle*. See Marle.

MARGARITÆ. See Pearls.

MARGARITINI are glaſs ornaments, made at Venice of ſmall glaſs tubes of different colours, which are blown at Murano, and which the women of the lower claſs wear about their arms and necks. The largeſt ſort are uſed for making roſaries. This work is performed with great diſpatch, the artiſan taking a whole handful of thoſe tubes at once, and breaking them off one after another with an iron tool. Theſe ſhort cylinders are mixed with a kind of aſhes, and put over the fire in an iron pan; and when the two ends begin to melt, by ſtirring them about with an iron wire, they are brought to a round figure; but care is taken not to leave them too long over the fire, leſt the hole through which they are to be ſtrung, ſhould be entirely cloſed by the melting of the glaſs. There are ſeveral ſtreets at Franceſco di Vigna, entirely inhabited by people whoſe ſole occupation is to make and ſtring theſe *margaritini*. Keyſler's Travels, vol. iii. p. 301.

MARGEN, in the *Materia Medica*, a name uſed by ſome of the later Greek writers, to expreſs red coral. It is founded on an error, however, the word *margen* being made from the Arabian *margian*, which does not ſignify coral, but a purple ſeawrack, or fucus, uſed in dying. See Margian.

MARGENSTEIN, in *Natural Hiſtory*, a name given by the German writers to a ſort of indurated marle, which while in the ſtrata, is nearly of the hardneſs of ſtone; but when laid on the ſurface of the earth, and expoſed to the wind and rain, ſoon diſſolves, and enters the pores of the ground, enriching the ſoil to a very great degree.

We have the ſame ſort of ſtony marle in ſome parts of England, only that our's is leſs hard, and yet takes more time to break and diſſolve in the air. They are both moſt proper for lands of a looſe loamy nature, and keep them in heart a long time.

MARG-GRAVE. See Marcgrave.

MARGIAN, in *Botany*, a name given by ſome of the ancient writers, particularly the Arabian phyſicians, to the plants called by others *argina*, or *arginem*. This is deſcribed to be a purple ſea-plant. Some have ſuppoſed that cochineal was meant by this word, but that is an error. Others have come ſomewhat nearer, in ſuppoſing it to be the name of coral; but as the ancients have ſaid that it was uſed in dying, it could not be coral; and indeed there is no other plant that it can mean, but that fucus uſed by the Greeks in dying, and called *fucus porphyrizon*, or the purple-dying ſea-plant.

MARIA *Ave*. See Ave Maria.

MARIENG-*glaſs*, in *Natural Hiſtory*, a ſpecies of cryſtal, chiefly found in Ruſſia, where, on account of its tranſparency, it is uſed for window-panes. It is a particular ſpecies of ſtone, lying in ſtrata or flakes, like ſo many ſheets of paper, and as eaſily ſeparated. It is alſo called *iſinglaſs*, and *ryſglaſs*.

MARIGOLD, in *Botany*. See Marygold.

MARINE *barometer*. See Barometer.

MARQUES *de ladre*, in the *Manege*. See Dull.

MARINE-*chair*, is a contrivance of Mr. Irwin, for facilitating the neceſſary obſervations, in order to determine the LONGITUDE at ſea. It is ſaid that Mr. Irwin, on a trial of this machine, found the longitude within twenty-three miles, or about one third of a degree.

MARINE *remains*, a term uſed by many authors to expreſs the ſhells of ſea-fiſhes, and parts of cruſtaceous and other ſea-animals, found in digging at great depths in the earth, or on the tops of high mountains. Their being lodged in theſe places, is an evident and unqueſtionable proof of the ſea's having once been there, ſince it muſt have covered thoſe places where it has left its productions.

It has been a favourite ſyſtem with many, and particularly with the late Dr. Woodward, that all theſe *marine* bodies were brought to the places where they now lie, by the waters of the univerſal deluge; which, as we are informed by holy writ, covered the whole ſurface of the globe, and even the higheſt mountains. But though this is a very ready expedient to account for many of the natural phenomena, yet there are evident proofs that it cannot have been the cauſe of all that is attributed to it; and there muſt neceſſarily have been ſome other cauſe of many of theſe remains having been placed where we now find them. Neither does the opinion of ſome particular authors, that partial inundations of different places have left theſe *marine* bodies behind them at the receſs of the waters, ſeem ſufficient to account for the multitudes of theſe remains, many of which we find thrown upon places inacceſſible to ſuch floods. Moro, de Cruſtaceis in Montib. deprehenſ.

Signior Moro has attempted to account for theſe phenomena on a new plan of reaſoning. He obſerves that it is the beſt baſis of argument to begin from facts; and that if we can certainly find how ſome part of theſe animal remains come to be depoſited at ſuch great diſtances from their natural reſidence, we may very rationally conclude, that by the ſame means, be they what they will, all the reſt were alſo brought thither. He adds, that the earth, once the bottom of the ſea, or the level ſurface of a plain, may be, and frequently has been, in the memory of man, raiſed up into a mountain by ſubterranean fires, earthquakes, and volcanos. He mentions the famous inſtance of the new iſland raiſed out of the bottom of the ſea near Santorini in the year 1707, which became of a circumference not leſs than ſix miles, and of the new mountain raiſed near Puzzoli in 1538.

Theſe, and many other like facts, prove that the origin of mountains and iſlands may have been ſuch, and that the matter they conſiſt of may have been the ſame with what was once the bottom of the ſea; and that the *marine* bodies found in theſe mountains, were ſuch as were living, or remaining of living fiſh at the time when the iſlands or mountains were ſo raiſed above the ſurface of the water which before covered it.

This is no new opinion; but this author has ſet it in a new and much ſtronger light than ever it had appeared in before, by the inſtances and examples he has brought in proof of it. Some have been fond of believing that the bodies we call *marine remains*, were never indeed any parts of living animals, but that they are merely *luſi naturæ* formed in the places were they are found; but Fabius Columna proved this to be an error, ſhewing that the ſhark's teeth, or gloſſopetræ of the iſland of Malta, when calcined by a ſtrong fire, yielded aſhes the ſame with thoſe from animal bodies, and by no means of the ſame nature with thoſe produced from calcined ſtones.

That changes of parts of the bottom of the ſea into dry land, have often been made, is proved not only from the late known inſtances, but from the teſtimonies of Strabo, Pliny, and other writers of credit: and nothing is more obvious to reaſon, than that in the ſudden riſe of ſuch parts of the bottom of the ſea, all its contents, all the ſhells, and other hard parts of fiſhes lying there, would be carried up with it.

As ſome mountains and ſome iſlands muſt have certainly been produced in this manner, it is not impoſſible but that all of them may have been ſo; and there is no more than this required to account clearly and evidently for all the vaſt profuſion of *marine* bodies at land as we find them, without having recourſe to the improbable means of the univerſal deluge, which for many plain reaſons cannot have been the cauſe; or to the effects of particular inundations, which muſt have been wholly incapable of lodging many of them there. The lodgment of ſhells in the ſolid ſtrata of mountains, is better accounted for by this ſyſtem of ſignior Moro than any other: and if it be aſked why ſome mountains afford them in great plenty, and others not at all, it will be not difficult to anſwer, by obſerving, that among the mountains of the more known parts of the world, ſome conſiſt of mere ſolid rock, and others of various ſtrata of earthy and other matter: that the firſt of theſe may be ſuppoſed primary or natural mountains, and the other ſecondary or accidental ones: and that theſe *marine remains* are always wanting in the former, and uſually are found in the latter, which is a fact greatly favourable to this ſyſtem.

There are many difficulties attending the accounts of all authors of the formation of the earth, and the lodging theſe bodies in it; nor is this laſt ſyſtem without difficulty. The cauſes here aſſigned as to the origin of mountains and iſlands, doubtleſs have been ſo in regard to ſome, but ſcarce to all; and the bodies here treated of are ſo numerous, in ſome particular places, that ſcarce any account can ſolve the difficulty of their being collected together in ſo ſtrange a manner. See *Adventitious* FOSSILS.

MARINE *ſalt*. See SALT.

MARINE *ſurveyor*, is the name of a machine contrived by Mr. H. de Saumarez, for meaſuring the way of a ſhip in the ſea. This machine is in the form of the letter Y, and is made of iron or any other metal. At each end of the lines which conſtitute the angle or upper part of that letter, are two pallets, not much unlike the figure of the log; one of which falls in the ſame proportion as the other riſes. The falling or pendant pallet meeting a reſiſtance from the water, as the ſhip moves, has, by that means, a circular motion under water, which is faſter or ſlower, according as the veſſel moves. This motion is communicated to a dial within the ſhip, by means of a rope faſtened to the tail of the Y, and carried to the dial. The motion being thus communicated to the dial, which has a bell in it, it ſtrikes exactly the number of geometrical paces, miles, or leagues, which the ſhip has run. Thus the ſhip's diſtance is attained; and the forces of tides and currents may alſo be diſcovered by this inſtrument; which, however, has been very little uſed. See a large account of it in the Abr. Phil. Tranſ. vol. vi. p. 444, &c.

MARINES, or *Marine Forces*, a body of troops employed in the ſea-ſervice, under the direction of the lords of the admiralty. Theſe forces, while on ſhore, are regulated by martial law, and to be provided with quarters, &c. 28 Geo. II. cap. 2. 29 Geo. II. cap. 6. 30 Geo. II. cap. 11.

MARINELLA, in *Botany*, a name by which ſome authors have called the great *phu*, or garden valerian.

MARINER, the ſame with ſeaman or ſailor.

The *mariners* of a ſhip are accountable to the maſter; the maſter to the owners; and the owners to the merchant, for all damages by negligence, or otherwiſe. If a *mariner* be hired, and he deſerts the ſervice before the voyage is ended, by the law marine, and by common law, he ſhall loſe his wages: and if a ſhip is loſt by tempeſt, &c. the *mariners* loſe their wages, as well as the owners their freight; and this is to oblige them to uſe their utmoſt endeavours to preſerve the ſhip.

Perſonating *mariners*, and receiving their wages, and forging letters of attorney, &c. or falſely taking out letters of adminiſtration for the receipt of ſeamen's wages, incurs a forfeiture of 200*l*. &c. 9 and 10 W. III. cap. 41. A late act has ordained, that no maſter of a ſhip ſhall retain any *mariner*, without a contract in writing for his wages, on pain of forfeiting 5*l*. And if a *mariner* refuſe to proceed afterward on the voyage, he ſhall forfeit his wages, and on complaint to a juſtice of peace, he may commit the offender to the houſe of correction, to be kept to hard labour. Alſo *mariners* abſenting from ſhips, incur a forfeiture of two day's pay for every day's abſence, to the uſe of *Greenwich* HOSPITAL; and leaving the ſame before diſcharge by writing, forfeit one month's wages. But this ſhall not debar any *mariner* belonging to a merchant ſhip, from entering into the king's ſervice, &c. and on the arrival of any ſhip, the maſter is to pay his men their wages in thirty days, or at the time of their diſcharge (deducting the penalties impoſed), on pain of 20*s*. 2 Geo. II. cap. 36. Maſters of Britiſh and Iriſh ſhips, trading to the chief ports of Spain, are to pay a certain tonnage duty to perſons there, on the freight of goods and merchandize, as a contribution for relief of ſeamen ſhipwrecked, and other diſtreſſed ſubjects, &c. 9 Geo. II. cap. 25. A like duty to be paid by all maſters of veſſels, &c. going from any part of his majeſty's dominions to Leghorn, for relieving *mariners* that are ſhipwrecked, and taken in war. 10 Geo. II. cap. 14.

By 20 Geo. II. cap. 38. for the relief and ſupport of maimed and diſabled ſeamen, and the widows and children of ſuch as ſhall be killed or drowned in the merchants ſervice, reciting that there is no penſion for ſeamen diſabled, &c. in the merchants ſervice, and that they are willing to allow 6*d*. per month out of their wages, for the relief of ſuch as ſhall be diſabled, &c. and the widows and children of ſuch as ſhall be killed, &c. a corporation is erected, by the name of the preſident and governors, for the relief and ſupport of, &c. who may purchaſe lands for building an hoſpital, and are to provide for diſabled ſeamen therein, and to allow penſions to ſuch as they ſhall think proper, their widows and children. Seamen who have not ſerved five years in the merchants ſervice, and contributed 6*d*. per month, are not to have the benefit of this act. Seamen in the merchants ſervice are to pay 6*d*. per month, which the maſter of the ſhip is to retain out of their pay, and pay it to the corporation. *Mariners* in the Eaſt India company's ſervice are exempted from the duty, and excluded the benefit of this act. 13 Geo. II. cap. 17. See *Greenwich* HOSPITAL.

Mariners wandering up and down, and who ſhall not ſettle themſelves to work, or have not a teſtimonial under the hand of a juſtice, ſhewing where they landed, and whither to go, &c. or having ſuch teſtimonial, if they exceed the time limited more than fourteen days, not being ſick in their paſſage home, &c. are guilty of felony by 39 Eliz. cap. 17. But if they cannot work, for want thereof, the two next juſtices, upon their complaint, ſhall take order that they may be provided of work; or otherwiſe may tax the whole hundred, till relief ſhall be had. Stat. ibid. And every pariſh may be charged for relieving *mariners*, as for maimed ſoldiers; and they ſhall be relieved by the treaſurer of the county, &c. 43 Eliz. cap. 3.

By 1 Geo. II. ſtat 2. cap. 14. no ſeaman aboard his majeſty's ſhip can be arreſted for any debt, unleſs the ſame be ſworn to amount to at leaſt 20*l*. The method of ordering ſeamen in the royal fleet, and keeping up a regular diſcipline there, is directed by certain expreſs rules, articles, and orders, firſt enacted by the authority of parliament, ſoon after the Reſtoration: 13 Car. II. ſtat. 1. cap. 9. but ſince new-modelled and altered, after the peace of Aix la Chapelle, 22 Geo. II. cap. 23. to remedy ſome defects, which were of fatal conſequence in conducting the preceding war. In theſe articles of the navy, almoſt every poſſible offence is ſet down, and the puniſhment thereof annexed: in which reſpect the ſeamen have much the advantage over their brethren in the land ſervice; whoſe articles of war are not enacted by parliament, but framed from time to time, at the pleaſure of the crown. For theſe articles, ſee NAVY. Blackſt. Com. vol. i. p. 420.

MARINERS-*compaſs*. See COMPASS.

MARIO, in *Ichthyology*, a name given by Pliny, and other of the old Roman authors, to a large fiſh allied to the accipenſer or ſturgeon. There ſeems, from all that they have ſaid of it, great reaſon to believe that it was the fiſh we at preſent call HUSO, or the ichthyocolla fiſh, from iſinglaſs made of it. Artedi makes this a ſpecies of the accipenſer or ſturgeon, and diſtinguiſhes it by the name of the accipenſer without tubercles.

MARJORAM, *origanum*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs. Its characters are theſe: the flower is of the lip kind, having a cylindrical compreſſed tube; the upper lip plain, erect, obtuſe, and indented; the under lip trifid, the ſegments being nearly equal; theſe are diſpoſed on ſpikes, compoſed of oval coloured leaves, placed over each other like the ſcales of a fiſh; the flowers have four ſlender ſtamina, two being as long as the petal, the other two longer, terminated by ſingle ſummits, they have a four-cornered germen, ſupporting a ſlender ſtyle, inclining to the upper lip, crowned by a bifid ſtigma; the germen afterward turns to four ſeeds ſhut up in the empalement of the flower. Miller enumerates thirteen ſpecies, and Linnæus eleven.

The common ſweet *marjoram*, though a plant ſo commonly cultivated with us, ſeldom or ever ripens its ſeeds in England: and, as it is an annual plant, we are obliged yearly to have a ſupply of its ſeeds from the ſouth of France and Italy, where it grows wild in great abundance. The ſeeds are ſown in the latter end of March, on a dry warm ſpot: and when they are come up about an inch high, they ſhould be tranſplanted into beds of rich earth, at ſix inches diſtance every way, theſe are to be watered till they have taken root, and cleared from the weeds; and it is always found that thoſe which have been tranſplanted produce finer and larger knots of heads, than thoſe which remain where they were ſown. They flower toward the latter end of July, at which time they are to be pulled up, and dried in a ſhady place for uſe. Miller.

An eſſential oil is obtained from the leaves and tops of ſweet *marjoram*, which, when carefully drawn, is of a pale yellow colour, and of a hot penetrating taſte. This plant has been chiefly recommended in diſorders of the head and nerves, in uterine obſtructions and mucous diſcharges, proceeding from a laxity and debility of the ſolids, and a ſluggiſh ſtate of the juices, and in the humoural aſthmas and catarrhs of old people. The powder of the leaves, their diſtilled water, and the eſſential oil properly diluted, are agreeable errhines, and accounted particularly uſeful in pituitous obſtructions of the noſtrils, and diſorders of the olfactory organs. Lewis.

The leaves and flowery tops of the common wild *marjoram*, which grows on dry chalky hills and gravelly grounds, in ſeveral parts of England, and flowers in June, have an agreeable aromatic ſmell, and a pungent taſte, warmer than that of the garden *marjoram*, and much reſembling thyme; with which they appear to agree in medicinal virtue. Infuſions of them are ſometimes drank as tea, in weakneſs of the ſtomach, diſorders of the breaſt, for promoting perſpiration of the fluid ſecretions in general; they are ſometimes uſed alſo in nervine and anti-rheumatic baths; and the powder of the dried herb as an errhine. Diſtilled with water, they yield a moderate quantity of a very acrid, penetrating, eſſential oil, ſmelling ſtrongly of the *marjoram*, but leſs agreeable than the herb itſelf; this oil is applied, on a little cotton, for eaſing the pains of carious teeth; and ſometimes diluted and rubbed on the noſtrils, or ſnuffed up the noſe, for attenuating and evacuating mucous humours. Lewis.

The dittany of Crete, which is a ſpecies of *origanum*, with all the leaves woolly, and nodding ſpikes of flowers, is a very warm aromatic; the leaves, which impart their virtues both to water and rectiſied ſpirit, tinging the former of a yellowiſh, and the latter of a greeniſh colour, have been chiefly recommended as emmenagogue, alexipharmic, and vulnerary. This ſort was much valued among the ancients, and applauded by their poets. It was eſteemed a ſpecific for wounds of arrows, which it drew out with wonderful eaſe, and according to them only grew in the iſland of Crete, and only in a little obſcure corner of it, whence it obtained its name *dictamnus Creticus*. It ſtill grows in that iſland. M. Tournefort, who was in Crete, deſcribes the place where it grows, and ſays it flouriſhes there almoſt all the year.

This is a perennial plant, and though a native of ſtony grounds in Greece, and the iſland of Candy, bears the ordinary winters of our own climate. The ſhops are generally ſupplied from Italy with the leaves tied up in bundles, which are often damaged or decayed, and at beſt not ſuperior to thoſe of our own growth. Lewis.

MARIS, in *Ichthyology*, a name given by Charleton and ſome others, to a fiſh called by the generality of both the ancient and modern writers, *ſmaris*, and by ſome *leucomenides*, from its whitiſh colour, and its external reſemblance to the fiſh called *mænis* and *mæna*; it is, like that fiſh, a ſpecies of the ſparus; and is diſtinguiſhed by having a black ſpot on each ſide, and the tail and belly-fins red.

MARISCA, a word uſed by chirurgical writers to expreſs an excreſcence about the anus.

MARITACACA, in *Zoology*, the name of a very remarkable American animal, more uſually known by the name of the OPOSSUM.

MARITIME, of *mare*, *ſea*, denotes any thing belonging to the ſea.

MARITIME *court*. See COURT *of Admiralty*.

MARITIME *eſtate*, is uſed in contradiction to the CIVIL and MILITARY eſtate, to expreſs that part of his majeſty's lay ſubjects, that are occupied in naval or ſea ſervice. See MARINES and NAVY.

MARITUS, in the chemical jargon, a word uſed to expreſs the ſulphur of metals. The writers on the ſubject of the philoſophers ſtone uſually expreſs themſelves in this enigmatical manner, calling ſulphur the huſband, and mercury the wife in all metals; which, as they are more or leſs perfectly combined, make the metal more or leſs pure, and approaching to perfection.

MARK, in *Matters of Commerce and Manufacture*, a certain character ſtruck or impreſſed, on various kinds of commodities, either to ſhew the place where they were made, and the perſons who made them; or to witneſs they have been viewed and examined by the officers or magiſtrates charged with the inſpection of that manufacture; or laſtly, to ſhew that the duties impoſed thereon have been regularly acquitted.

Thus are cloths, leathers, cutlery-ware, paper, plate, weights, meaſures, &c. to be *marked*.

The *mark* on goods alſo is what aſcertains the property or goodneſs thereof, &c. And if one man ſhall uſe the mark of another, to the intent to do him damage, action upon the caſe lieth. A penalty is inflicted in this caſe, by the ſtat. 23. Eliz. cap. 8.

MARK is alſo a peculiar ſign or character, known only to the trader who pitches on it; whereby, being fixed to any commodity, he recollects the price it coſt him.

Theſe *marks*, otherwiſe called *numeros*, are taken according to the fancy of thoſe who uſe them; but, ordinarily, they are choſen from among the letters of the alphabet, each having a relation to ſome particular number of figures. They are of ſo much uſe in trade, that the reader will not take it amiſs, if we inſert a little table to ſerve as a model for their conſtruction:

A	B	C	D	E	F	G	H	I	K	L	M
0	1	2	3	4	5	6	7	8	9	10	20

One example will give the whole uſe of this table. Suppoſe, v. g. I would put on a piece of ſtuff, that it coſt 37*s*. 6*d*. per ell. I put an M for 20*s*. an L for 10*s*. an H for 7*s*. and a G for 6*d*. ſo that the ſeveral letters written after each other (obſerving always to ſeparate ſhillings from pounds, and from pence, by points) will make this *mark* M. LH. G. equal to 37*s*. 6*d*.

Note, the *mark* may be diverſified infinitely, by adding other figures to the letters, in lieu of theſe.

Ordinarily ſome word of a proper number of letters, all different ones is choſen, that no relation may be traced among the letters, which may be done in the table here given.

Mark, at *Sea*, the ſame with **Land**-*mark*.

Mark, *letters of*. See **Letters** and **Marque**.

Mark, in the *Manege*. A horſe *marks*, that is he ſhews his age by a black ſpot, called the bud or eye of a bean, which appears when he is five and a half, in the cavity of the corner teeth, and is gone when the horſe is eight years old. After that age he ceaſes to *mark*, and is ſaid to have razed. See **Eye** *of a bean*.

Falſe-**Marked** is the ſame with *counter-marked*.

Mark, among *Bowlers*. See **Bowling**.

St. **Mark**'s *Goſpel*, a canonical book of the New Teſtament, being one of the four Goſpels. *St. Mark* wrote his Goſpel at Rome, where he accompanied St. Peter, in the year of Chriſt 64, or 65. Many of the moſt ancient writers aſſert, that *St. Mark* was no more than an amanuenſis or interpreter to St. Peter, who dictated this Goſpel to him; others affirm that he wrote it after St. Peter's death. It is probable that it was not compoſed long before Peter's death, and that it was not publiſhed, or did not become generally known, till after the death of Peter and Paul. This Goſpel appears, from the accounts given of it by the ancients, to contain the ſubſtance of Peter's preaching: and the Goſpel itſelf affords evidences of its being writ according to that apoſtle's diſcourſes, or according to information and directions given by him to this evangeliſt. Many circumſtances tending to Peter's honour, are not mentioned in this Goſpel: however, there are many things that occur in this Goſpel, which are omitted by the other evangeliſts; and this fact proves, that *Mark* was not an epitomiſer of Matthew, as ſome have ſuppoſed, nor of any other author. The learned have been alſo divided as to the language this Goſpel was wrote in, ſome affirming it was compoſed in Greek, which is the more general and probable opinion, others in Latin. Several of the ancient heretics received only the Goſpel of *St. Mark*: others, among the Catholics, rejected the twelve laſt verſes of this Goſpel. But Dr. Lardner refers thoſe who doubt the genuineneſs of this part of the Goſpel, for ſatisfaction to Dr. Mill, and to the obſervations of Grotius, at the beginning of that chapter, and to Beza upon the ninth verſe; and for explaining thoſe twelve verſes, and reconciling them with the other evangeliſts, he refers to Grotius and other commentators. Lardner's Cred. vol. xv. p. 209.

St. **Mark**, *canons of*, a congregation of regular canons, founded at Mantua, by Albert Spinola, a prieſt, towards the end of the twelfth century.

Spinola made a rule for them, which was approved, corrected, and confirmed, by ſeveral ſucceeding popes. About the year 1450, they were reformed, and followed only the rule of St. Auguſtine.

This congregation, which at firſt conſiſted of eighteen or twenty houſes of men, and of ſome for women, ſituate in Lombardy, and the ſtate of Venice, having flouriſhed for the ſpace of four hundred years, declined by little and little, and was at length reduced to two convents; and in 1584, that of *St. Mark* at Mantua, which was the chief, was given, by the conſent of pope Gregory XIII. to the **Camaldulians**; and ſo the congregation became extinct.

St. **Mark**, *knights of*, an order of knighthood in the republic of Venice, under the protection of *St. Mark* the evangeliſt.

The arms of the order are, a lion winged gules, with this device, *Pax tibi, Marce evangeliſta*. This order is never conferred but on thoſe who have done ſignal ſervices to the commonwealth.

Mark, or **Marc**, alſo denotes a weight uſed in ſeveral ſtates of Europe, and for ſeveral commodities, eſpecially gold and ſilver in France: where it was introduced under Philip I. about the year 1080.

The *mark* is divided into eight ounces, or ſixty-four drachms, or a hundred and ninety-two deniers or penny-weights, or a hundred and ſixty eſterlins, or three hundred mailles, or ſix hundred and forty felins, or four thouſand ſix hundred and eight grains.

In Holland, particularly at Amſterdam, the *marc* weight is alſo called Troy-weight, and is equal to that of Paris. When gold or ſilver are ſold by the *marc*, it is divided into twenty-four carats: the carat into eight penny-weights, the penny-weight into twenty-four grains, and the grain into twenty-four primes. See **Carat**.

Mark is alſo uſed among us for a money of account; and, in ſome other countries, for a coin.

The Engliſh *mark* is two thirds of a pound ſterling, or 13*s*. 4*d*. and Matthew Paris obſerves, it was of the ſame value in 1104. The ancient Saxons, as many antiquarians have ſuppoſed, called the *marc*, **Mancus**, or *mancuſa*, and *mearc*; among them it was equivalent to thirty pence, i. e. to ſeven ſhillings and ſix pence of our money. But Dr. Mills, dean of Exeter, has lately ſuggeſted that the **Mancus** and *mark* were not the ſame. Mr. Clarke obſerves, that the Daniſh ſilver *mark* was 20*s*. or one hundred Saxon pennies; and that the gold *mark* was twelve times as much; whereas the French *mark* was 13*s*. 4*d*. or one hundred and ſixty pence: and he has ſhewn, that the method of computing by the ſilver *mark* was introduced later into France, where it commenced between A. D. 1075, and 1093, than into England. He diſcovers traces of it in England from the Daniſh kings till after the time of Hen. II. The gold coins ſtruck from Edw. III. to Edw. IV. were diviſions of the *mark*, as half-*marks*, quarter-*marks*, and half-quarter-*marks*, at 6*s*. 8*d*. 3*s*. 4*d*. 20*d*. each: but from Edw. IV. when our connections with France ceaſed, the old way of computing by the pound came again into faſhion; but, as that by *marks* was jointly uſed, angels, and angelots, or half-angels at 6*s*. 8*d*. and 3*s*. 4*d*. each, paſſed ſometimes as parts of them. However, about forty years afterwards, this regard to the *marks* in our coins was quite laid aſide, and all the principal gold coins were ſtruck in proportion to the pound ſterling. Connexion of the Roman, Saxon, and Engliſh Coins, &c. p. 307, &c.

The *mark-lubs*, or *Lubeck-mark*, uſed at Hamburgh, is alſo a money of account, equal to one third of the rix-dollar, or to the French livre. Each *mark* is divided into ſixteen ſols lubs.

Mark-lubs, or *danſch*, is alſo a Daniſh coin, equal to ſixteen ſols-lubs, or twenty French ſols.

Laſtly, *mark* is a copper-coin in Sweden, equal to two pence farthing ſterling. It is divided into eight rouſtiqs, and each rouſtiq into two alleveures.

The Swediſh ſilver *mark* is a money of account, equal to three copper *marks*; though ſome make it a real coin. See **Coin**.

MARKET, a publick place in a city or town, where proviſions are expoſed to ſale.

The word is formed from the French *marché*, which ſignifies the ſame.

Market is alſo uſed for a liberty or privilege, either by grant or preſcription, whereby a town is enabled to keep a *market*.

Bracton obſerves, that one *market* ought to be diſtant from all others at leaſt ſix miles and a half, and a third of an half. See **Fair**.

In former times, it was cuſtomary to have moſt fairs and *markets* kept on Sundays, and in the church-yard, ſo that matters of buſineſs and devotion were tranſacted all at the ſame place and time; which cuſtom, though prohibited by ſeveral kings, particularly 13 Ed. I. ſtat. 2. cap. 6. was yet held up till the reign of king Hen. VI. when it was effectually ſuppreſſed, 27 Hen. VI. cap. 5. In many places they are ſtill kept in the church-yard.

In the country, things ſold in the *markets*, are to be in the uſual place appointed for the ſale; but in London, every ſhop is a *market* overt, for ſuch goods as are put there, to be ſold by the trade of the owner; though if the ſale be in a warehouſe, and not publicly in the ſhop, the property is not altered. Sale upon a Sunday, though in a fair *market*, will not alter the properties of the thing ſold.

Perſons that dwell in the country, may not ſell wares by retail in a *market*-town, except in open fairs; but countrymen may ſell goods in groſs there. 1 and 2 P. and M. cap. 7. All contracts for any thing vendible in *markets*, &c. ſhall be binding, and ſales alter the property, if made according to the following rules. 1. The ſale is to be in a place that is open, ſo that any one who paſſeth by may ſee it, and be in a proper place for ſuch goods. 2. It muſt be an actual ſale, for a valuable conſideration. 3. The buyer is not to know that the ſeller hath a wrongful poſſeſſion for the goods ſold. 4. The ſale muſt not be fraudulent, betwixt two, to bar a third perſon of his right.

5. There is to be a ſale and a contract, by perſons able to contract. 6. The contract muſt be originally and wholly in the *market* overt. 7. Toll ought to be paid, where required by ſtatute. 8. The ſale ought not to be in the night, but between ſun and ſun; though if the ſale be made in the night, it may bind the parties. Sale of goods ſtolen in London, to brokers, &c. alters not the property, 1 Jac. I. cap. 21. And the ſtatutes, which ordain that toll-takers ſhould be appointed in *markets* and fairs, to enter in their books the names of horſes, &c. ſecure the property of ſtolen horſes to the owner, although ſold in a fair or *market*, if he repays what was *bona fide*, paid for the HORSE. 2 and 3 P. and M. cap. 7. 31 Eliz. cap. 12. A piepowder COURT is incidental to a *market*, as well as a fair: keeping a fair *market*, or otherwiſe than it is granted, as on two days, when only one is granted, or on any other day than that appointed, &c. is cauſe of forfeiture. And if a perſon erects ſtalls in a *market*, and does not leave room for the people to ſtand and ſell their wares, ſo that they are thereby forced to hire ſuch ſtalls, taking money for the uſe of them is extortion.

MARKET, *court of the clerk of the*, is incident in every fair and *market* in the kingdom, to puniſh miſdemeanors therein; and a COURT of *pie poudre* is to determine all diſputes relating to private or civil property. The object of this juriſdiction (ſee ſtat. 17 Car. II. cap. 19. 22 Car. II. cap. 8. 23 Car. II. cap. 12.) is principally the cognizance of weights and meaſures, to try whether they be according to the true ſtandard thereof or no: which ſtandard was anciently committed to the cuſtody of the biſhop, who appointed ſome clerk under him to inſpect the abuſe of them more narrowly; and hence this officer though now uſually a layman, is called the clerk of the *market*. If they be not according to the ſtandard, then beſide the puniſhment of the party by fine, the weights and meaſures themſelves ought to be burnt. This is the loweſt court of criminal juriſdiction in the kingdom.

MARKET, *clerk of the*, in the king's houſehold. See CLERK.

MARKET-*towns*. See TOWNS.

MARKING-*yarn*, in ſhips of war, is white yarn ſpun the wrong way, and put into all cordage of three inches and upwards as the king's work. Blankl. Nav. Expoſ. p. 103.

MARLE, MARGA, a kind of ſlightly coherent earth, not in the leaſt ductile or viſcid when moiſt, moſt eaſily diffuſible in, and diſunited by water, and by it reduced into a ſoft looſe incoherent maſs. *Marles* are earths compoſed of different proportions of argillaceous and calcareous earths: from the latter they derive the property of effervescing with acids, and they are fuſible by fire, as all mixture of theſe two earths are. By a leſs heat, if the calcareous earth predominates, they are calcinable into a kind of quick-lime; and if the clay predominates they may be changed by fire into hard maſſes, capable of ſtriking ignited ſparks from ſteel.

The word comes from the ancient Celtic *marga*, mentioned by Pliny: it was afterwards called *margila*.

There are ſeveral ſorts of *marle*, of different colours and qualities: as the aſh and grey, the yellow, the brown, and the blue; but the principal are white and red. Of the white, ſome are not acted upon by acids, as the *terra* SAMIA and MELIA, and others are alkaline, as the TERRA *Chia* and CIMOLIA. The red *marles* are not acted upon by acids, and are uſed as manure; the aſhen grey are alkaline; the yellow are not acted upon by acids, and are uſed as manures; the brown are the different ſpecies of FULLER's earth; and the blue not acted upon by acids, are uſed for manure.

The *marles* in the northern parts of England contain ſand, and run into a ſort of loam; thoſe in Suſſex are more like fuller's earth, and therefore are by much the fatteſt and richeſt.

Marle, in general, is much of the nature of chalk; and the potters find, that when either chalk or *marle* happen to be mixed with their clay, they will burn with the reſt of the ſubſtance, and the veſſels will ſeem very ſound; but as ſoon as any water is put in them, they will run, the chalk or *marle* having been burnt into a ſort of lime, and flaking like common lime with the water.

The *marles* that are ſo ſandy, that they can ſcarce hold together, are a very good manure for cold clay-lands, and are an objection to the general rule, that *marle* is not to be uſed to clay. *Marle*, in general, ſuits beſt with hot lands, for it is apt to bind and ſadden the tough clays; but as there are no rules without their exceptions, where *marle* is not laid too thick, and is not of too binding a kind, it will often very much improve paſture grounds, though they are upon a clayey ſoil.

Cow-ſhut, or ſtone-*marle* is, in moſt countries, found under clay, or low black land, ſeven or eight feet deep: clay and ſteel *marle* ſometimes under ſandy land: in clayey ground it ſeldom lies more than three feet deep; but in ſandy ones it is often much deeper. The ſtone, ſlate, or flag *marle* is found near rivers and ſides of hills, and is a very laſting manure: the peat, or delving *marle*, is the ſtrongeſt of all, and found on the ſides of hills, and in wet boggy grounds. The paper *marle*, which lies near coals, is little eſteemed. The Suſſex *marle* commonly ſhews itſelf pretty low among the broken ſtrata of hanging grounds.

For the digging of *marle* they commonly uſe pick-axes, ſhovels, ſpades, and wheel-barrows; and where the pit is broad that they can make an eaſy aſcent, ſmall carts of four feet ten inches long, and two feet three inches wide and about fourteen inches deep, made ſo that a load is very eaſily ſhot out of them.

The goodneſs of *marles*, ſays Miller, may be better judged of by their purity and uncompoundneſs than by their colour: thus, if the *marle* will break in pieces like dice, or into thin flakes, or is ſmooth like lead ore, and without mixture of gravel or ſand; if it will ſhake like ſlate ſtones, and ſhatter after wet, or turn to duſt, when it has been expoſed to the ſun, or not ſtick together when thoroughly dry, like tough clay; but is fat and tender, and will open, and not bind, the land on which it is laid, it will be beneficial to it. Some try the goodneſs of *marle*, by putting ſome of it into a glaſs of water; and reckon it good if it diſſolves as ſoon as it comes to the bottom; if it ſparkle in the water, and feel fat between the fingers; but the ſureſt ſign of its goodneſs is, if it diſſolves by wet or froſt. The ſtrength of *marle* may alſo be known, by putting a lump of it into a glaſs of good vinegar, where a conſiderable fermentation indicates its goodneſs.

Marle is ſuppoſed by ſome to be fruitful from its ſalt and oily quality; the ſalt it is ſuppoſed to contract from the air, and, therefore, many are of opinion, that the longer it is expoſed to the air before it is uſed, the better. They lay it upon the graſs-ground, in ſome places, three or four years before they plough it up: and when they cover the arable lands with *marle*, they will not plough, in many places, to more than an inch deep, that they may not bury it. Markham indeed is of a contrary opinion, and would have it buried deep, that the ſun may not draw out its virtue. The *marles* of different places are in themſelves ſo different, that both theſe opinions ſeem right in part; the *marles* in Suſſex being found to ſucceed beſt where buried deep, as ſoon as taken from the pit; and thoſe of the north of England ſeldom doing much good to the lands, unleſs they are expoſed a long time firſt.

Others, however, aſcribe the fertilizing quality of *marle* to its calcareous earth, which is known to be a powerful fertilizer of land; or it may introduce a certain degree of tenacity into too light and ſandy ſoils, by which means the water, which is the principal pabulum of plants, is prevented from eſcaping too faſt by evaporation. The experience of the farmers in different places has ſhewn alſo, that different times are to be obſerved for the laying it on, according to its nature and that of the land to be improved by it. In Suſſex they always lay on the *marle* in the beginning of winter; and in Staffordſhire in May and June. Good *marle* will ſlake like lime with the ſun's heat, in a hot day, eſpecially if there has happened any rain. Some farmers harrow in the *marle*, juſt before they plow the land, which is a very good way to mix it perfectly. Cole-ſeed, clover, and all kinds of hay-plants, grow well upon *marled* lands. Lands ſeated on *marle* are uſually very rich, though in their own nature cold and heavy. The deeper theſe lands are turned up in plowing, the better crops they will always yield. Mortimer's Huſbandry, p. 95.

It is a very material circumſtance in the *marling* of land, to find out how much the land requires of this manure; and till experience has thoroughly ſhewn this, it is better to err in laying on too little than too much; becauſe the latter is a fault not to be remedied. It is to be obſerved alſo, that *marle* never makes ſo great improvement on land the firſt year as it does afterwards.

In Staffordſhire, they lay two hundred load of *marle* upon an acre of land of the common kind; but where the ſoil is black, looſe and ſandy, or full of worms, they will lay on three or four hundred load to an acre; it being a rule with them, that this ſort of ſoil cannot be *marled* too much. If the mould be thin, the leſs *marle* does; if deep, it muſt have the more.

It is beſt ſowing of *marled* lands under furrow; becauſe if theſe lands are well huſbanded, they will be very mellow and hollow, which will occaſion the earth's ſinking from the roots of the corn, if it ſtand too high. If *marle* ſaddens land, or makes it ſtiff or binding, it muſt be well dunged, and laid down for graſs. In Staffordſhire, after their land is *marled*, their way is to take the crops following: after the firſt crop of wheat is off, they plow in the wheat ſtubble in December, and if the weather proves froſty, to mellow it, they do not plow it again till April. They then ſow it with barley, allowing three buſhels of ſeed to an acre. The common produce of this is thirty buſhels. After they ſow peas, for which they plow only once in the February following, allowing only three buſhels of ſeed to an acre, as in the barley. Next after this, if they intend ſix crops, they ſow wheat again upon the peas-crop; the fifth crop is barley again; and the ſixth year's crop is red oats. Some ſow two or three crops more, when the ground has been well *marled*, but that is much better let alone.

In digging for the *marle* they uſe in manuring their lands in Ireland, they meet with foſſile horns, and other curious foſſils. The *marle* always lies in the bottoms of low bogs. It is never met with in any other places, and is found by boring with augres made for that purpoſe. It uſually lies at five, ſeven, or nine feet depth. The obtaining it in many places is attended with very conſiderable expences, in draining off the water. The manner of digging it is this: they employ ſix able labourers, and a ſupernumerary; and theſe cut up a hole of twelve feet ſquare, which is ſuppoſed a pit that this number of men can manage in one day. Two men dig, two throw it up, and two throw it by, and the ſupernumerary man ſupplies defects on all occaſions. For the firſt three feet they dig through a fuzzy earth, fit for making of turf or fuel. Under this lies a ſtratum of gravel, of about half a foot. Under this often, for three feet more, there is a more kindly moſs, which would make better fuel. This lower ſtratum of turf is always full of foſſile wood, which is uſually ſo ſoft, that the ſpade cuts as eaſily through it, as through the earth it lies in. Under this, for about three inches is found a ſeries of leaves, principally of the oak; theſe appear very fair to the eye, but fall to pieces on touching; and this ſtratum is ſometimes interrupted with vaſt heaps of ſeed, which ſeem to be broom or furze-ſeed. In ſome places there appear berries of different kinds; and in others, ſeveral pieces of ſea-plants, all lying in the ſame confuſed manner as the oak-leaves. Under this vegetable ſtratum there lies one of blue clay, half a foot thick, and uſually full of ſea-ſhells. This blue clay is not ſo tough as common clay, but is thrown carefully up, and uſed as *marle* in ſome places. Under this always appears the right *marle*; the ſtratum of this is uſually from two to four feet thick, and ſometimes much more. Phil. Tranſ. N° 394. p. 122.

This *marle* looks like buried lime, and is full of ſhells; which are uſually of a ſmall ſize, and of the perriwinkle kind; but there are ſeveral other ſorts, at times, found among them. Among this *marle*, and often at the very bottom of it, are found great numbers of very large horns of the deer-kind, which are vulgarly called elks horns. Theſe, where they join to the head, are thick and round; and at that joining there grows out a branch, which is about a foot long, and ſeems to have hung juſt over the creature's eyes; it grows ſtill round for about a foot above this, and then ſpreads broad, and terminates in branches, long and round, turning with a ſmall bend.

The labourers are obliged to work in a hurry in all theſe pits, ſo that they ſeldom bring them out whole. There are alſo at times, found the leg-bones, and other parts of the ſkeletons of the ſame beaſts; but this is more rarely only a few together, and but in few places.

MARLE, in *Medicine*, has been eſteemed an aſtringent, and given as ſuch in diarrhœas, dyſenteries, and hæmorrhages: the red kind is preferred for the laſt intention, though the difference is hardly worth regarding. The Germans give it alſo in fevers, in convulſions, and particularly in epileptic caſes; alſo in internal bruiſes.

MARLE *dice*, in *Huſbandry*, a name given by the people of Staffordſhire to a reddiſh *marle*, that breaks into ſmall ſquare pieces like dice, or elſe into thin flakes, in the manner of lead-ore, and looks ſmooth on the ſurface. This is a good manure, and the way of judging which of it is beſt, is to expoſe it to the air in rainy weather, or to put it in water. That which moulders ſooneſt to powder in the air, and breaks quickeſt in the water, is ſure to be the beſt, and proves very beneficial lo land.

MARLY, *machine of*, in *Hydraulics*, is a very complex machine, for raiſing water, at *Marly*, about ten miles north-weſt of Paris, the primum mobile whereof is an arm of the river Seine, which, by its ſtream, furniſhing a fall of water, of three feet, turns fourteen large wheels, which work the handles, and theſe with piſtons raiſe the water into the pumps, and with other piſtons force it up in pipes againſt the aſcent of a hill to a reſervoir in a ſtone tower. The baſon of the tower, which receives the water raiſed from the river, is 610 fathom diſtant from the river, and 500 feet higher than the lower end of the ſucking pipes of the lower engines of the machine. The baſon ſupplies an aqueduct of thirty-ſix arches; whence the water is ſeparated into different conduits, which lead it to *Marly*, and formerly led it to Verſailles and Trianon. The number of pipes in this machine is 253; and the quantity of water raiſed by it, amounts to 5258 tons in twenty-four hours, or near 220 tons per hour, or 3½ tons per minute: but the *London-bridge* WATER-*works*, with four wheels only, raiſe 11724 tons in twenty four hours, which is almoſt twice and a quarter as much. Some of the largeſt of our fire or STEAM-*engines* uſed in England, will raiſe as much water as that of *Marly* to the ſame height, and not coſt above 10000*l.*

This *machine*, which began to work in 1682, and is ſaid to have coſt above four millions of pounds ſterling, was made by one Rannequin, a common mechanic of Liege, and has a great many excellent contrivances; but yet does not raiſe all the water that it might have done, becauſe the maker did not know how to give the river Seine, all the advantages of which it was capable. Hence appears the neceſſity of a mechanic's being well acquainted with mathematics; or that able mathematicians ſhould apply themſelves to mechanics more than they do, and not think it below them to direct workmen. See Deſagul. Exper. Philoſ. vol. ii. p. 442 to 449.

According to Dan. Bernouill's computation, the effect of the *machine of Marly* is not more than $\frac{1}{56}$ of its abſolute force; that is, there is a loſs of $\frac{55}{36}$ of that force. Dan. Bernoul. Hydrodyn. p. 182.

MARLINE, on board a ſhip, is a ſmall line made of hemp untwiſted, that it may be the more gentle and pliable: its uſe is to ſeize the ends of ropes from farcing out. They uſe it alſo to ſeize the ſtraps at the arſe (as they call it) or lower end of the block. See HOUSE-*line*.

MARLING, in *Sea-Language*, denotes the art of winding any ſmall line, as *marling*, ſpun-yarn, pack-thread, &c. about a rope, ſo that every turn is ſecured by a ſort of knot, ſo as to remain fixed in caſe all the reſt ſhould be cut through by friction, &c.

Marling is commonly uſed to faſten ſlips of canvas, called parſling or PARCELLING, upon the ſurface of a rope, to prevent it from being galled by another rope that rubs againſt it, to attach the foot of a ſail to its bolt-rope, &c.

MARLING *a ſail*, is when being ſo ript out of the bolt-rope, that it cannot be ſowed in again, the ſail is faſtened by a *marline*, put through the eye-let holes, made in it for that purpoſe, under the bolt-rope.

MARLING-*ſpike*, is an iron pin, tapered to a point, and furniſhed with a large round head. It is principally uſed to penetrate the twiſts or ſtrands of a rope, in order to introduce the ends of ſome other through the intervals, in the art of knotting or ſplicing. It is alſo uſed as a lever, on many other occaſions, about the rigging, particularly in fixing the ſeizings upon the ſhrouds, block-ſtrops, clues of the ſails, &c. Falconer.

MARMALADE, a confection made of the juice or pulp of ſome fruit, as plums, apricots, quinces, boiled with ſugar to a conſiſtence.

The *marmalade* of quinces is the moſt frequent: it is ſubaſtringent, and grateful to the ſtomach.

MARMARO-*proſera*, in *Natural Hiſtory*, is a ſpecies of ſtones forming continued ſtrata, bright and beautiful, of very lively colours, and of a conſtitution ſo fine, that they will take a good poliſh: in all which particulars they agree with the genius of MARBLES, but differ from them in that they are never calcareous, nor do they ferment with acids. To the ſame claſs belong the GRANITES and the PORPHYRIES.

The *marmaro-proſera* are ſtones of a compact, uniform texture, like that of marbles; ſome of them are vitrifiable, others not; and ſome are of ſuch hardneſs as to ſtrike fire with ſteel. Of this kind is the BASSALTES. Da Coſta's Hiſt. Foſſ. p. 252, &c.

MARMARYGÆ, a word uſed by the old writers in medicine, to expreſs ſparks of fire, or the appearance of ſuch flaſhing before the eyes in ſome diſorders.

MARMOR, *marble*, in *Natural Hiſtory*. See MARBLE.

MARMORARIA, in *Botany*, a name given by ſome authors to the *brancha urſina*.

MARMORATA *aurium*, a term uſed by ſome authors to expreſs ear-wax.

MARMORELLA, in *Botany*, a name by which ſome authors have called AGRIMONY.

MARMOREUS *tartarus*, a word uſed by ſome authors to expreſs the hardeſt kind of the calculus, or STONE in the human bladder.

MARMOROIDÆ, in *Natural Hiſtory*, are ſtones, which in their nature, texture, appearance, and other properties, reſemble MARBLES; and only differ from them, in that the bodies of this genus never form continued ſtrata, but are only found in looſe independent maſſes, lodged in ſtrata of other ſubſtances. Mr. Da Coſta ſubdivides theſe into *marmoroidæ* of a plain ſtructure, and thoſe which contain ſhells, corals, and other extraneous bodies. Hiſt. Foſſils. p. 241, &c.

MARMOT-*fiſh*. See FALX.

MARMOTTE, *marmotta, mus marmota*, of Linnæus, in *Zoology*, the mountain-rat, a creature very common in many parts of Europe, and frequently carried about as a ſhew by the poor Savoyards. It is about the ſize of a leveret; its whole figure and appearance are like the common rat, whence it has its name; its fur is much harder or harſher than that of the rabbit, and its colour a reddiſh tawney; the end of its tail is black: its eyes are large and prominent, and its ears ſhort, hid in the fur, and ſeeming as if cut off; it has two large teeth at the front of each jaw, as the ſquirrel, and other creatures of this kind, and theſe are not white, but yellow, as in the beaver; its noſe and mouth are adorned with a large number of black whiſkers, making a ſort of beard; the tail is about five inches long, and the legs are thick and covered with long hair; its toes, which are four before and five behind, are diſpoſed as in the bear, and its claws are very long and ſtrong, by means of which it digs the earth very readily; it makes great uſe of its hinder legs, and ſometimes walks on them in an erect poſture; its back always appears very fleſhy and fat, though the reſt of the body be ever ſo lean. Ray, Syn. Quad. p. 221. *Tab.* III. *Quad. fig.* 32. They will play with one another in the manner of kittens, and make a ſoft and not diſagreeable noiſe on thoſe occaſions; but when they are provoked, or when they are affected, as they always are by a change of weather, they make a very ſhrill and diſagreeable ſqueaking. The *marmotte* is a creature eaſily bred up tame, and will be perfectly good-humoured and familiar, but it hates dogs. This animal, in Poland, is ſaid to herd in large communities, and to be governed by a regular policy.

There are other ſpecies in Maryland, Canada, Germany, Ruſſia, and Lapland. See *Sable*-MOUSE. Pennant's Zool. p. 270, &c.

MARONITES, in *Eccleſiaſtical Hiſtory*, a ſect of eaſtern Chriſtians, who follow the Syrian rite, and are ſubject to the pope; their principal habitation being on mount Libanus.

Moſheim informs us, that the doctrine of the MONOTHELITES, condemned and exploded by the council of Conſtantinople, found a place of refuge among the Mardaites, a people who inhabited the mounts Libanus and Antilibanus, and who, about the concluſion of the ſeventh century, were called *Maronites*, after *Maro*, their firſt biſhop; a name which they ſtill retain. None, he ſays, of the ancient writers, give any certain account of the firſt perſon who inſtructed theſe mountaineers in the doctrine of the Monothelites: it is probable, however, from ſeveral circumſtances, that is was John Maro, whoſe name they had adopted; and that this eccleſiaſtic received the name of Maro, from his having lived in the character of a monk, in the famous convent of St. Maro, upon the borders of the Orontes, before his ſettlement among the Mardaites of mount Libanus. One thing is certain, from the teſtimony of Tyrius and other unexceptionable witneſſes, as alſo from the moſt authentic records, viz. that the *Maronites* retained the opinions of the Monothelites until the twelfth century, when abandoning and renouncing the doctrine of one will in Chriſt, they were readmitted, in they ear 1180, to the communion of the Roman church. The moſt learned of the modern *Maronites* have left no method unemployed to defend their church againſt this accuſation; they have laboured to prove, by a variety of teſtimonies, that their anceſtors always perſevered in the Catholic faith, in their attachment to the Roman pontiff, without ever adopting the doctrine of the Monophyſites or Monothelites. But all their efforts are inſufficient to prove the truth of theſe aſſertions to ſuch as have any acquaintance with the hiſtory of the church, and the records of ancient times; for to all ſuch, the teſtimonies they alledge will appear abſolutely fictitious and deſtitute of authority. Eccl. Hiſt. vol. ii. p. 37, &c. 8vo. edit.

Fauſtus Nairon, a *Maronite*, ſettled at Rome, has publiſhed an apology for *Maron*, and the reſt of his nation. His tenet is, that they really took their name from the *Maron*, who lived about the year 400, and of whom mention is made in Chryſoſtom, Theodoret, and the Menologium of the Greeks. He adds, that the diſciples of this *Maron* ſpread themſelves throughout all Syria; that they built ſeveral monaſteries, and, among others, one that bore the name of their leader; that all the Syrians, who were not tainted with hereſy, took refuge among them; and that, for this reaſon, the heretics of thoſe times called them *Maronites*.

Moſheim obſerves, that the ſubjection of the *Maronites* to the ſpiritual juriſdiction of the Roman pontiff, was agreed to with this expreſs condition, that neither the popes nor their emiſſaries ſhould pretend to change or aboliſh any thing that related to the ancient rites, moral precepts, or religious opinions of this people: ſo that, in reality, there is nothing to be found among the *Maronites* that ſavours of popery, if we except their attachment to the Roman pontiff, who is obliged to pay very dear for their friendſhip. For, as the *Maronites* live in the utmoſt diſtreſs of poverty, under the tyrannical yoke of the Mahometans, the biſhop of Rome is under the neceſſity of furniſhing them with ſuch ſubſidies as may appeaſe their oppreſſors, procure a ſubſiſtence for their biſhop and clergy, provide all things requiſite for the ſupport of their churches, and the uninterrupted exerciſe of public worſhip, and contribute in general to leſſen their miſery. It is certain that there are *Maronites* in Syria, who ſtill behold the church of Rome with the greateſt averſion and abhorrence; nay, what is ſtill more remarkable, great numbers of that nation reſiding in Italy, even under the eye of the pontiff, oppoſed his authority during the laſt century, and threw the court of Rome into great perplexity. One body of theſe non-conforming *Maronites* retired into the vallies of Piedmont, where they joined the Waldenſes; another, above ſix hundred in number, with a biſhop, and ſeveral eccleſiaſtics at their head, flew into Corſica, and implored the protection of the republic of Genoa, againſt the violence of the inquiſitors. Eccl. Hiſt. vol. iii. p. 508.

The *Maronites* have a patriarch, who reſides in the monaſtery of Cannubin, on mount Libanus, and aſſumes the title of patriarch of Antioch, and the name of Peter, as if he ſeemed deſirous of being conſidered as the ſucceſſor of that apoſtle. He is elected by the clergy and the people, according to the ancient cuſtom; but, ſince their reunion with the church of Rome, he is oblige to have a bull of confirmation from the pope. He keeps a perpetual celibacy, as well as the reſt of the biſhops his ſuffragans: as to the reſt of the eccleſiaſtics, they are allowed to marry before ordination; and yet the monaſtic life is in great eſteem among them. The monks are of the order of St. Antony, and live in the moſt obſcure places in the mountains, far from the commerce of the world.

As to their faith, they agree in the main with the reſt of the Eaſtern church. Their prieſts do not ſay maſs ſingly; but all ſay it together, ſtanding round the altar. They communicate in unleavened bread; and the laity have hitherto partaken in both kinds, though the practice of communicating in one has of late been getting footing, having been introduced by little and little. In Lent they eat nothing, unleſs it be two or three hours before ſunriſing: their other faſtings are very numerous.

To **MAROON**, in *Sea-Language*, is to put one or more ſailors aſhore upon a deſolate iſland, under pretence of their having committed ſome great crime. This deteſtable expedient has been repeatedly practiſed by ſome inhuman commanders of merchant-ſhips, particularly in the Weſt Indies.

MAROTIC *ſtyle*, in the *French Poetry*, denotes a peculiarly gay, pleaſant, yet ſimple and natural manner of writing, introduced by Clement *Marot*, and ſince imitated by other authors, but with moſt ſucceſs by De la Fontaine and Rouſſeau.

The difference between the *Marotic* and the burleſque ſtyle is thus aſſigned: the *Marotic* makes a choice; the burleſque admits of all. The firſt is the moſt ſimple; but its ſimplicity has its nobleneſs; and, where its own age will not furniſh natural expreſſions, it borrows them from former times: the latter is low and grovelling, and borrows falſe and fulſome ornaments from the crowd, which people of taſte deſpiſe. The one reſigns itſelf to nature; but examines firſt of all, whether the objects ſhe preſents be fit for its paintings, and takes nothing but what carries with it ſomewhat of delicacy and mirth: the other runs headlong into buffoonery, and affects every thing that is extravagant and groteſque. See BURLESQUE.

MAROTTI, in *Botany*, is a tall tree growing in Malabar, with leaves like thoſe of the bay, bearing a round oblong fruit, including a very large, hard, and yellowiſh ſtone, containing ten or eleven kernels. The oil extracted from the ſeeds or kernels of the fruit, eaſes pains, and cures the ſcabies and itchings, being rubbed on the parts: it is good alſo for eyes infeſted with ſalt humours; and, mixed with aſhes, it is ſucceſsfully applied to impoſthumes and abſceſſes in cows, and other cattle, and beaſts of burden. Raii Hiſt. Plant.

MARQUE, *law of*. See LAW.

MARQUE, *letters of*, are letters of repriſal granted by a king or ſtate, whereby the ſubjects of one country are licenſed to make repriſals on thoſe of another; by reaſon application has been made for redreſs to the government whereto the aggreſſor belongs, three times without effect. The firſt *letter of marque*, of which we have any account in the hiſtory of this country, was iſſued by Edw. I. in 1295, againſt the ſubjects of Portugal.

Theſe letters are grantable by the law of nations, whenever

ever the ſubjects of one ſtate are oppreſſed and injured by thoſe of another; and juſtice is denied by that ſtate to which the oppreſſor belongs: and with us it is declared by ſtat. 4 Hen. V. cap. 7. that if any ſubjects of the realm are oppreſſed in time of truce by any foreigners, the king will grant *marque* in due form to all that feel themſelves aggrieved. Which form is thus directed to be obſerved: the ſufferer muſt firſt apply to the lord privy-ſeal, and he ſhall make out letters of requeſt under the privy-ſeal: and if, after ſuch requeſt of ſatisfaction made, the party required do not within convenient time make due ſatisfaction or reſtitution to the party grieved, the lord chancellor ſhall make him out letters of *marque*, under the great ſeal: and by virtue of theſe he may attack and ſeize the property of the aggreſſor nation, without hazard of being condemned as a robber or pirate. Blackſt. Com. vol. i. p. 259.

They are ſo called from the German *marke, limit, frontier*; as being *jus conceſſum in alterius principis marcas ſeu limites tranſeundi, ſibique jus faciende*; as being a right of paſſing the limits or frontiers of another prince, and doing one's ſelf juſtice. See LETTERS and REPRISALS.

MARQUETRY, *inlaid work*; a curious kind of work, compoſed of pieces of hard fine wood of different colours, faſtened, in thin ſlices, on a ground, and ſome times enriched with other matters, as tortoiſe-ſhell, ivory, tin, and braſs.

There is another kind of *marquetry* made, inſtead of wood, of glaſſes of various colours; and a third, where nothing but precious ſtones, and the richeſt marbles, are uſed: but theſe are more properly called MOSAIC *work*.

The art of inlaying is very ancient, and is ſuppoſed to have paſſed from the Eaſt to the Weſt, as one of the ſpoils brought by the Romans from Aſia. Indeed, it was then but a ſimple thing; nor did it arrive at any tolerable perfection till the fifteenth century, among the Italians. It ſeems finally to have arrived at its height in the ſeventeenth century, among the French.

Till John of Verona, a contemporary with Raphael, the fineſt works of this kind were only black and white, which are what we now call *moreſcoes*; but that religious, who had a genius for painting, ſtained his woods with dyes, or boiled oils, which penetrated them. But he went no farther than the repreſenting buildings and perſpectives, which require no great variety of colours. Thoſe who ſucceeded him, not only improved on the invention of dying the woods, by a ſecret which they found of burning them without conſuming, which ſerved exceedingly well for the ſhadows; but they had alſo the advantage of a number of fine new woods of naturally bright colours, by the diſcovery of America. With theſe aſſiſtances, the art is now capable of imitating any thing; whence ſome call it, the *art of painting in wood*.

The ground, whereon the pieces are to be arranged and glued, is ordinarily of oak or fir, well dried; and, to prevent warping, it is compoſed of ſeveral pieces glued together. The wood to be uſed, being reduced into leaves of the thickneſs of a line, is either ſtained with ſome colour, or made black for ſhadow: which ſome effect by putting it in ſand extremely heated over the fire; others by ſteeping it in lime-water and ſublimate; and others, in oil of ſulphur. Thus coloured, the contours of the pieces are formed, according to the parts of the deſign they are to repreſent.

The laſt is the moſt difficult part of *marquetry*, and that wherein moſt patience and attention are required. The two chief inſtruments uſed herein are the ſaw and the vice; the one to hold the matters to be formed: the other to take off from the extremes, according to occaſion. The vice is of wood, having one of the chaps fixed, the other moveable, and is opened and ſhut by the foot, by means of a cord faſtened to a treadle. Its ſtructure is very ingenious, yet ſimple enough, and will be eaſily conceived from the figure, *Tab.* II. *Miſcellany*, *fig.* 24. The leaves to be formed (for there are frequently three or four of the ſame kind formed together) are put within the chaps of the vice, after being glued on the outermoſt part of the deſign, whoſe profile they are to follow: then the workman, preſſing the treadle, and thus holding faſt the piece, with his ſaw runs over all the outlines of the deſign. By thus joining and forming three or four pieces together, they not only gain time, but the matter is likewiſe the better enabled to ſuſtain the effort of the ſaw; which, how delicate ſoever it may be, and how lightly ſoever the workman may conduct it, without ſuch a precaution, would be apt to raiſe ſplinters, to the ruin of the beauty of the work.

When the work is to conſiſt of one ſingle kind of wood, or of tortoiſe-ſhell, on a copper or tin ground, or *vice verſa*, they only form two leaves on one another, i. e. a leaf of metal, and a leaf of wood or ſhell: this they call ſawing in counter-parts; for by filling the vacuities of one of the leaves by the pieces coming out of the other; the metal may ſerve as a ground to the wood, and the wood to the metal.

All the pieces, thus formed with the ſaw, are marked, to know them again; and the ſhadow being given in the manner already mentioned, they veneer or faſten each in its place on the common ground; uſing for that purpoſe the beſt Engliſh glue. The whole is then put in a preſs to dry, planed over, and poliſhed with the ſkin of the ſea-dog, wax, and ſhave-graſs, as in a ſimple *veneering*; with this difference, however, that in *marquetry*, the fine branches, and ſeveral of the moſt delicate parts of the figures, are touched up, and finiſhed with a graver.

They are the cabinet-makers joiners, and toy-men, among us, who work in *marquetry*; and the enamellers and ſtone-cutters who deal in moſaic work; the inſtruments uſed in the former are moſtly the ſame with thoſe uſed by the eboniſts. See EBONY.

MARQUIS, or MARQUESS, MARCHIO, a title given to a perſon in poſſeſſion of a conſiderable demeſne erected into a *marquiſate* by letters patent; holding a middle place between the dignity of a duke and that of an earl or count.

The word, according to ſome authors, comes from the *Marcomanni*, an ancient people, who inhabited the marches of Brandenburg. Others derive it from the German *marche, limit*; and others from *marciſia*, which in the Celtic language, ſignified *a wing of cavalry*. Nicod derives it from the corrupt Greek *νομαρχια, province.* Alciat and Pauchet bring it from *marc, horſe*, taking a *marquis* to be properly an officer of horſe. Menage derives it from *marca, frontier*; and Selden, Krantzius, and Hottoman do the ſame. Laſtly, Paſquier fetches *marquis* from the old French *marche, limit*; or from *marchir, to confine*; the guard of the frontiers being committed to them. *Marquiſes* were anciently governors of frontier cities or provinces, called *marches*. In Germany, they are called *marcgraves*.

Marquis is originally a French title: the Romans were unacquainted with it. In the Notitia Imperii, they were called *comitates limitanei*. The firſt time we hear of *marquiſes, marchiones*, is under Charlemagne, who created governors in Gaſcony under this denomination.

Alciat has ſtarted a queſtion, whether a *marquis* or count ſhould have the precedence? to decide it he goes back to the ancient function of counts; and obſerves, that counts, who are governors of provinces, are above *marquiſes*, who are only governors of frontiers; and that *marquiſes*, who are governors of frontier cities, are above thoſe counts, who are governors of ſmall towns. He adds, that, in conſequence of this diſtinction, the book of fiefs ſometimes places *marquiſes* above counts, and ſometimes counts above *marquiſes*.

Froiſſart obſerves, that the *marquiſate* of Juliers was erected into a county: but now-a-days, neither *marquiſes* nor counts are any longer governors; and, as they are mere titles of honur, the counts make no ſcruple of reſigning the precedency.

King Richard the Second was the firſt who introduced the dignity of *marquis* among us, by creating Robert de Vere earl of Oxford, *marquis* of Dublin: but this was a title without office, the frontiers being governed by *lords* MARCHERS. Selden's Titles of Honour, p. 216.

MARQUIS's *coronet*. See CROWN.

MARRIAGE, a civil and religious contract, whereby a man is joined and united to a woman, for the ends of procreation.

The eſſence of *marriage* conſiſts in the mutual conſent of the parties. *Marriage* is a part of the law of nations, and is in uſe among all people. The Romaniſts account it a ſacrament.

The woman, with all her moveable goods, immediately upon *marriage*, paſſes wholly *in poteſtatem viri*, into the power and diſpoſal of the huſband.

The firſt inhabitants of Greece lived together without *marriage*. Cecrops, king of Athens, is ſaid to have been the firſt author of this honourable inſtitution among that people. After the commonwealth of Greece were ſettled, *marriage* was very much encouraged by their laws, and the abſtaining from it was diſcountenanced, and in many places puniſhed. The Lacedæmonians were very remarkable for their ſeverity towards thoſe who deferred *marriage* beyond a limited time, as well as to thoſe who wholly abſtained from it. The Athenians had an expreſs law, that all commanders, orators, and perſons entruſted with any public affair, ſhould be married men. POLYGAMY was not commonly tolerated in Greece. The time of *marriage* was not the ſame in all places; the Spartans were not permitted to marry till they arrived at their full ſtrength; the reaſon aſſigned for this cuſtom by Lycurgus was, that the Spartan children might be ſtrong and vigorous; and the Athenian laws are ſaid to have once ordered, that men ſhould not marry till thirty-five years of age. The ſeaſon of the year which they preferred for this purpoſe was the winter, and particularly the month of January, called GAMELION. The Greeks thought it ſcandalous to contract *marriage* within certain degrees of conſanguinity: whilſt moſt of the barbarous nations allowed inceſtuous mixtures.

Moſt of the Grecian ſtates, eſpecially ſuch as made any figure, required their citizens ſhould match with none but citizens, and the children were not allowed to marry without the conſent of their parents. The uſual ceremonies in promiſing fidelity was kiſſing each other, or giving their right hands, which was a general form of ratifying all agreements. Before the *marriage* could be ſolemniſed, the gods were to be conſulted, and their aſſiſtance implored by prayers and ſacrifices, which were offered to ſome of the deities that ſuperintended theſe affairs, by the parents, or neareſt relations of the perſons to be *married*. When the victim was opened, the gall was taken out and thrown behind the altar, as being the ſeat of anger and malice, and therefore the averſion of all the deities who had the care of love, as well as thoſe who became their votaries. For the particularities relating to the bride and brigegroom, ſee BRIDE and BRIDEGROOM.

The ceremonies of the Spartan *marriages* being different from all others, deſerve to be mentioned at length, as related by Plutarch. "When the Spartans had a mind "to *marry*, their courtſhip was a ſort of rape upon the "perſons they had a fancy for; and thoſe they choſe "not tender and half-children, but in the flower of their "age, and full ripe for a huſband. Matters being agreed "between them, the νυμφευτρια, or woman that contrived "and managed the plot, ſhaved off the bride's hair cloſe "to her ſkin, dreſſed her up in man's cloaths, and left "her upon a mattreſs: this done, the bridegroom en-"tered in his common cloaths, ſober and compoſed, as "having ſupped at his ordinary in the common hall, and "ſtole as privately as he could into the room where the "bride lay, untied her virgin girdle, whence λυεινζωνην, is "*to deflower*, and took her into his embraces. Having "ſtayed a ſhort time with her, he returned to his com-"rades, with whom he continued to ſpend his life, re-"maining with them as well by night as by day, unleſs "when he ſtole a ſhort viſit to his bride; and that could "not be done without a great deal of circumſpection, "and fear of being diſcovered. Nor was ſhe wanting "(as may be ſuppoſed) on her part, to uſe her wit in "watching the moſt favourable opportunities for their "meeting, and making appointments when company "was out of the way. In this manner they lived a long "time, inſomuch that they frequently had children by "their wives before they ſaw their faces by day-light. "The interview being thus difficult and rare, ſerved not "only for a continual exerciſe of their temperance, and "farthered very much the ends and intentions of *mar-"riage*, but was a means to keep their paſſion ſtill alive, "which flags and decays, and dies at laſt by too eaſy "acceſs, and long continuance with the beloved object." Potter, Archæol. book iv. c. xi. p. 295, ſeq.

The Romans, as well as the Greeks, diſallowed of POLYGAMY. A Roman might not marry any woman who was not a Roman. Among the Romans, the kalends, nones, and ides of every month, were deemed unlucky for the celebration of *marriage*, as was alſo the feaſt of the PARENTALIA, and the whole month of May. The moſt happy ſeaſon in every reſpect was that which followed the ides of June.

The Roman laws ſpeak of ſecond *marriages* in very hard and odious terms: *Matre jam ſecundis nuptiis funeſtata*, L. iii. C. de ſec. nuptiis. By theſe laws it was enacted, that the effects of the huſband or wife deceaſed ſhould paſs over to the children, if the ſurvivor ſhould marry a ſecond time. By the law *Hac edictali*, Cod. de ſec. nupt. the ſurvivor, upon *marrying* a ſecond time, could not give the perſon he married a portion more than equal to that of each of the children. In the primitive church, the reſpect to chaſtity was carried ſo high, that a ſecond *marriage* was accounted no other than a lawful whoredom, or a ſpecies of bigamy; and there are ſome ancient canons, which forbid the eccleſiaſtics from being preſent at ſecond *marriages*.

Marriage, by the Moſaic law, was ſubject to ſeveral reſtrictions: thus by Levit. chap. xviii. ver. 16. a man was forbid to marry his brother's widow, unleſs he died without iſſue; in which caſe, it became enjoined as a duty. So it was forbid to marry his wife's ſiſter, while ſhe was living, ver. 18. which was not forbidden before the law, as appears from the inſtance of Jacob.

The ancient Roman law is ſilent on this head; and Papinian is the firſt who mentions it, on occaſion of the marriage of Caracalla. The lawyers who came after him ſtretched the bonds of AFFINITY ſo far, that they placed ADOPTION on the ſame foot with nature.

Affinity, according to the modern canoniſts, renders marriage unlawful to the fourth generation, incluſive; but this is to be underſtood of direct affinity, and not of that which is ſecondary or collateral. *Affinis mei affinis, non eſt affinis meus.* It is farther to be obſerved, that this impediment of *marriage* does not only follow an affinity contracted by lawful matrimony, but alſo that contracted by a criminal commerce; with this difference, that this laſt does not extend beyond the ſecond generation; whereas the other, as has been obſerved, reaches to the fourth.

In Germany, they have a kind of *marriage* called *morganatic*, wherein a man of quality contracting with a woman of inferior rank, he gives her the left hand in lieu of the right; and ſtipulates in the contract, that the wife ſhall continue in her former rank or condition, and that the children born of them ſhall be of the ſame; ſo that they become baſtards as to matters of inheritance, though they are legitimate in effect. They cannot bear the name or arms or the family.

None but princes, and great lords of Germany, are allowed this kind of *marriage*. The univerſities of Leipſic and Jena have declared againſt the validity of ſuch contracts; maintaining, that they cannot prejudice the children, eſpecially when the emperor's conſent intervenes in the *marriage*.

The Turks have three kinds of *marriages*, and three ſorts of wives; *legitimate, wives in kebin*, and *ſlaves*. They marry the firſt, hire the ſecond, and buy the third.

The people in Java marry and have children at nine or ten years old, and the women leave child-bearing before they are thirty; and at Tonquin there are women common to any that will hire them, at eight or nine years of age.

Among all the ſavage nations, whether in Aſia, Africa, or America, the wife is commonly bought by the huſband from her father, or thoſe other relations who have an authority over her: and the concluſion of a bargain for this purpoſe, together with the payment of the price, has, therefore, become the uſual form or ſolemnity in the celebration of their *marriages*. The Hebrews alſo purchaſed their wives, by paying down a competent dowry for them; and Ariſtotle makes it one argument to prove that the ancient Grecians were an uncivilized people, becauſe they uſed to buy their wives; and in proportion as they laid aſide their barbarous manners, they left off this practice.

The Engliſh law conſiders marriage in no other light than as a civil contract; the holineſs of the matrimonial ſtate being left entirely to the eccleſiaſtical law, to which it pertains to puniſh or annul inceſtuous or other unſcriptural *marriages*. The law allows *marriage* to be good and valid, where the parties at the time of making it were willing and able to contract, and actually did contract, in the proper forms and ſolemnities required by law. The diſabilities for contracting are of two ſorts: firſt, ſuch as are canonical, and, therefore, ſufficient by the eccleſiaſtical laws to avoid the *marriage* in the ſpiritual court; ſuch as pre-contract, CONSANGUINITY, or relation by blood; and AFFINITY, or relation by *marriage*, and ſome particular corporal infirmities. But theſe diſabilities in our law do not make the *marriage ipſo facto* void, but voidable only by ſentence of ſeparation; and *marriages* are eſteemed valid to all civil purpoſes, unleſs ſuch ſeparation is actually made during the life of the parties. Thus, when a man had married his firſt wife's ſiſter, and after her death the biſhop's court was proceeding to annul the *marriage*, and baſtardize the iſſue, the court of king's bench granted a prohibition *quoad hoc*; but permitted them to proceed to puniſh the huſband for inceſt.

By 32 Hen. VIII. c. 38. it is declared, that all perſons may lawfully marry, but ſuch as are prohibited by God's law, &c. And that nothing (God's law excepted) ſhall impeach any *marriage* but within the Levitical degrees: theſe are enumerated in the eighteenth chapter of Leviticus, and are illuſtrated by lord Coke in this manner: a man may not marry his mother, father's ſiſter, mother's ſiſter, ſiſter, daughter, daughter of his ſon or daughter, father's wife, uncle's wife, father's wife's daughter, brother's wife, wife's ſiſter, ſon's wife or wife's daughter, and daughter of his wife's ſon or daughter. And a woman may not marry her father, father's brother, mother's brother, brother, ſon, ſon of her ſon or daughter, mother's huſband, aunt's huſband, ſiſter's huſband, huſband's brother, and ſon of her huſband's ſon or daughter. By the civil law firſt couſins are allowed to marry; but by the canon law both firſt and ſecond couſins are prohibited. Therefore, when it is vulgarly ſaid, that firſt couſins may marry, but ſecond couſins cannot, this probably aroſe by confounding theſe two laws; for firſt couſins may marry by the civil law, and ſecond couſins cannot by the canon law. But by the foreſaid ſtat. 32 Henry VIII. c. 38. it is clear that both firſt and ſecond couſins may marry. By the ſame ſtatute all impediments ariſing from pre-contracts to other perſons were aboliſhed, and declared of none effect, unleſs they had been conſummated with bodily knowledge; in which caſe the canon law holds ſuch contract to be a *marriage de facto*. But this branch of the ſtatute was repealed by 2 & 3 Ed. VI. c. 23. How far the act of 26 Geo. II. c. 33. (which prohibits all ſuits in eccleſiaſtical courts to compel a *marriage*, in conſequence of any contract) may collaterally extend to revive this clauſe of Henry the Eight's ſtatute, and aboliſh rhe impediment of pre-contract, judge Blackſtone leaves to be conſidered by the canoniſts. We ſhall here obſerve, that on a promiſe of *marriage*, if it be mutual on both ſides, damages may be recovered, in caſe either party refuſes to marry; and though no time for the *marriage* is agreed on, if the plaintiff avers that he offered to marry the defendant, who refuſed it, an action is maintainable for the damages; but no action ſhall be brought upon any agreement except it is in writing, and ſigned by the party to be charged. The canonical hours for celebrating *marriage* are from eight till twelve in the forenoon.

The other ſort of diſabilities are thoſe which are created, or at leaſt enforced, by the municipal laws. Theſe civil diſabilities make the contract void *ab initio*, by rendering the parties incapable of forming any contract at all. The firſt legal diſability is a prior *marriage*, or having another huſband or wiſe living; in which caſe, beſides the penalties conſequent upon it as a felony, the ſecond *marriage* is to all intents and purpoſes void. See BIGAMY, and POLYGAMY.

The next legal diſability is want of age: therefore, if a boy under fourteen, or a girl under twelve years of age, marries, when either of them comes to the age of conſent, they may diſagree, and declare the *marriage* void, without any divorce or ſentence in the ſpiritual court. However in our law it is ſo far a *marriage*, that, if at the age of conſent, they agree to continue together, they need not be married again. Another incapacity ariſes from want of conſent of parents or guardians. By ſeveral ſtatutes, viz. 6 & 7 W. III. c. 6. 7. 8 W. III. c. 35. 10 Ann. c. 19. penalties of 100*l.* are laid on every clergyman who marries a couple, either without publication of banns, which may give notice to parents or guardians, or without a licence, to obtain which the conſent of parents or guardians muſt be ſworn to. And by 4 & 5 Ph. & M. c. 8. whoſoever marries any woman-child under the age of ſixteen years, without conſent of parents or guardians, ſhall be ſubject to fine, or five years impriſonment; and her eſtate, during the huſband's life, ſhall be enjoyed by the next heir. Thus alſo in France, the ſons cannot marry without conſent of parents, till thirty years of age, nor the daughters till twenty-five; and in Holland, the ſons are at their own diſpoſal at twenty-five, and the daughters at twenty. And by the *marriage* act, viz. 26 Geo. II. c. 33. it is enacted, that all *marriages* celebrated by licence (for banns ſuppoſe notice) where either of the parties is under twenty-one, not being a widow or widower, without the conſent of the father, or, if he be not living, of the mother or guardians, ſhall be abſolutely void. However proviſion is made, where the mother or guardian is non compos, beyond ſea, or unreaſonably froward, to diſpenſe with ſuch conſent, at the diſcretion of the lord chancellor; but no proviſion is made, in caſe the father ſhould labour under any mental, or other incapacity. A fourth incapacity is want of reaſon. It is provided by 15 Geo. II. cap. 30 that the *marriage* of lunatics, and perſons under phrenſies (if found lunatics under a commiſſion, or committed to the care of truſtees by any act of parliament) before they are declared of ſound mind by the lord chancellor, or the majority of ſuch truſtees, ſhall be totally void. Laſtly, the parties muſt not only be willing and able to contract, but muſt actually contract themſelves in due form of law, to make it a good civil *marriage*. Any contract made, *per verba de præſenti*, or in words of the preſent tenſe, and in caſe of cohabitation *per verba de futuro* alſo, between perſons able to contract, was before the late act deemed a valid *marriage* to many purpoſes, and the parties might be compelled in the ſpiritual courts to celebrate it in *in facie eccleſiæ*. But theſe verbal contracts are now of no force, to compel a future *marriage*. Nor is any *marriage* at preſent valid that is not celebrated in ſome pariſh-church or public chapel, unleſs by diſpenſation from the archbiſhop of Canterbury. It muſt alſo be preceded by publication of BANNS, or by LICENCE from the ſpiritual judge. A *marriage* in purſuance of banns muſt be ſolemnized in one of the churches or chapels, where the banns were publiſhed. No parſon, vicar, &c. ſhall be obliged to publiſh banns of matrimony, unleſs the perſons to be married ſhall ſeven days before the time required for the firſt publication, deliver to him a notice in writing of their true names, and of the houſe or houſes of their reſpective abode, within ſuch pariſh, &c. and of the time that they have dwelt in ſuch houſe or houſes. And the ſaid banns ſhall be publiſhed upon three Sundays preceding the ſolemnization of *marriage* during the time of public ſervice: in caſe the parents or guardians of either of the parties who ſhall be under the age of twenty one years, ſhall openly and publicly declare, or cauſe to be declared in the church or chapel, where the banns ſhall be ſo publiſhed, at the time of ſuch publication, their diſſent to ſuch *marriage*, ſuch publication of banns ſhall be void. And when the parties dwell in divers pariſhes, the curate of the one pariſh ſhall not ſolemnize matrimony betwixt them, without a certificate of the banns being twice aſked, from the curate of the other pariſh. A *marriage* in purſuance of a licence (except a ſpecial licence) muſt be ſolemnized in ſuch church or chapel where the licence is granted, and no licence of *marriage* ſhall be granted by any archbiſhop, biſhop, &c. to ſolemnize any *marriage* in any other church, &c. than in the pariſh church, &c. within which the uſual place of abode of one of the parties ſhall have been for four weeks immediately before the granting ſuch licence. By the ſame ſtatute all *marriages* ſhall be ſolemnized in the preſence of two credible witneſſes at the leaſt, beſides the miniſter, who ſhall ſign their atteſtation thereof; and immediately after the celebration of every *marriage*, an entry thereof ſhall be made in the pariſh-regiſter, expreſſing that the ſaid *marriage* was celebrated by banns or licence; and if both or either of the parties be under age, with conſent of the parents or guardians, as the caſe ſhall be, ſigned by the miniſter, and alſo by the parties married, and atteſted by the two witneſſes preſent. It is held to be alſo eſſential to a *marriage*, that it be performed by a perſon in orders; though the intervention of a prieſt to ſolemnize this contract is merely *juris poſitivi*, and not *juris naturalis aut divini*; it being ſaid that pope Innocent III. was the firſt who ordained the celebration of *marriage* in the church, before which it was totally a civil contract. And in the times of the grand rebellion, all *marriages* were performed by the juſtices of the peace; and theſe *marriages* were declared valid, without any freſh ſolemnization, by 12 Car. II. c. 33. But as the law now ſtands, wc may upon the whole collect, that no *marriage* by the temporal law it *ipſo facto* void, that is celebrated by a perſon in orders; in a pariſh-church, a public chapel, or elſewhere by ſpecial diſpenſation; in purſuance of banns or a licence; between ſingle perſons; conſenting; of ſound mind; and of the age of twenty-one years; or of the age of fourteen in males, and twelve in females, with conſent of parents or guardians, or without it in caſe of widowhood. And no *marriage* is voidable by the eccleſiaſtical law, after the death of either of the parties; nor during their lives, unleſs for the canonical impediments of precontract if that indeed ſtill exiſts; of conſanguinity, and of affinity, or corporal imbecility, ſubſiſting previous to the *marriage*. Blackſt. Com. vol. i. p. 433, &c.

By 26 Geo. II. c. 33. the ſubſtance of which has been already recited, if any perſon ſhall ſolemnize matrimony in any other place than a church, &c. where banns have been uſually publiſhed, unleſs by ſpecial licence, or without publication of banns, unleſs licence of *marriage* be firſt obtained from ſome perſon having authority to grant the ſame, every ſuch perſon knowingly ſo offending, ſhall be guilty of felony, and tranſported for fourteen years; the proſecution to be within three years. By the ſame ſtatute, to make a falſe entry into a *marriage*-regiſter; to alter it when made; to forge or counterfeit ſuch entry, or a *marriage* licence, or aid and abet ſuch forgery, to utter the ſame as true, knowing it to be counterfeit; or to deſtroy or procure the deſtruction of any regiſter, in order to vacate any *marriage*, or ſubject any perſon to the penalties of this act; all theſe offences, knowingly and wilfully committed, ſubject the party to the guilt of felony without benefit of clergy. But this act doth not extend to the *marriages* of the royal family; nor to Scotland; nor to any *marriages* among the people called quakers, or among perſons profeſſing the Jewiſh religion, where both the parties are quakers or Jews reſpectively; nor to any *marriages* beyond the ſeas.

For the proportions which *marriages* bear to births, and births to burials, in ſeveral parts of Europe, Mr. Derham gives us the following table.

have once ordered, that men ſhould not marry till thirty-five years of age. The ſeaſon of the year which they preferred for this purpoſe was the winter, and particularly the month of January, called GAMELION. The Greeks thought it ſcandalous to contract *marriage* within certain degrees of conſanguinity: whilſt moſt of the barbarous nations allowed inceſtuous mixtures.

Moſt of the Grecian ſtates, eſpecially ſuch as made any figure, required their citizens ſhould match with none but citizens, and the children were not allowed to marry without the conſent of their parents. The uſual ceremonies in promiſing fidelity was kiſſing each other, or giving their right hands, which was a general form of ratifying all agreements. Before the *marriage* could be ſolemniſed, the gods were to be conſulted, and their aſſiſtance implored by prayers and ſacrifices, which were offered to ſome of the deities that ſuperintended theſe affairs, by the parents, or neareſt relations of the perſons to be *married*. When the victim was opened, the gall was taken out and thrown behind the altar, as being the ſeat of anger and malice, and therefore the averſion of all the deities who had the care of love, as well as thoſe who became their votaries. For the particularities relating to the bride and brigegroom, ſee BRIDE and BRIDEGROOM.

The ceremonies of the Spartan *marriages* being different from all others, deſerve to be mentioned at length, as related by Plutarch. "When the Spartans had a mind " to *marry*, their courtſhip was a ſort of rape upon the " perſons they had a fancy for; and thoſe they choſe " not tender and half-children, but in the flower of their " age, and full ripe for a huſband. Matters being agreed " between them, the *νυμφευτρια*, or woman that contrived " and managed the plot, ſhaved off the bride's hair cloſe " to her ſkin, dreſſed her up in man's cloaths, and left " her upon a mattreſs: this done, the bridegroom en" tered in his common cloaths, ſober and compoſed, as " having ſupped at his ordinary in the common hall, and " ſtole as privately as he could into the room where the " bride lay, untied her virgin girdle, whence *λυειν ζωνην*, is " *to deflower*, and took her into his embraces. Having " ſtayed a ſhort time with her, he returned to his com" rades, with whom he continued to ſpend his life, re" maining with them as well by night as by day, unleſs " when he ſtole a ſhort viſit to his bride; and that could " not be done without a great deal of circumſpection, " and fear of being diſcovered. Nor was ſhe wanting " (as may be ſuppoſed) on her part, to uſe her wit in " watching the moſt favourable opportunities for their " meeting, and making appointments when company " was out of the way. In this manner they lived a long " time, inſomuch that they frequently had children by " their wives before they ſaw their faces by day-light. " The interview being thus difficult and rare, ſerved not " only for a continual exerciſe of their temperance, and " farthered very much the ends and intentions of *mar" riage*, but was a means to keep their paſſion ſtill alive, " which flags and decays, and dies at laſt by too eaſy " acceſs, and long continuance with the beloved object." Potter, Archæol. book iv. c. xi. p. 295, ſeq.

The Romans, as well as the Greeks, diſallowed of POLYGAMY. A Roman might not marry any woman who was not a Roman. Among the Romans, the kalends, nones, and ides of every month, were deemed unlucky for the celebration of *marriage*, as was alſo the feaſt of the PARENTALIA, and the whole month of May. The moſt happy ſeaſon in every reſpect was that which followed the ides of June.

The Roman laws ſpeak of ſecond *marriages* in very hard and odious terms: *Matre jam ſecundis nuptiis funeſtata*, L. iii. C. de ſec. nuptiis. By theſe laws it was enacted, that the effects of the huſband or wife deceaſed ſhould paſs over to the children, if the ſurvivor ſhould marry a ſecond time. By the law *Hac edictali*, Cod. de ſec. nupt. the ſurvivor, upon *marrying* a ſecond time, could not give the perſon he married a portion more than equal to that of each of the children. In the primitive church, the reſpect to chaſtity was carried ſo high, that a ſecond *marriage* was accounted no other than a lawful whoredom, or a ſpecies of bigamy; and there are ſome ancient canons, which forbid the eccleſiaſtics from being preſent at ſecond *marriages*.

Marriage, by the Moſaic law, was ſubject to ſeveral reſtrictions: thus by Levit. chap. xviii. ver. 16. a man was forbid to marry his brother's widow, unleſs he died without iſſue; in which caſe, it became enjoined as a duty. So it was forbid to marry his wife's ſiſter, while ſhe was living, ver. 18. which was not forbidden before the law, as appears from the inſtance of Jacob.

The ancient Roman law is ſilent on this head; and Papinian is the firſt who mentions it, on occaſion of the marriage of Caracalla. The lawyers who came after him ſtretched the bonds of AFFINITY ſo far, that they placed ADOPTION on the ſame foot with nature.

Affinity, according to the modern canoniſts, renders marriage unlawful to the fourth generation, incluſive; but this is to be underſtood of direct affinity, and not of that which is ſecondary or collateral. *Affinis mei affinis, non eſt affinis meus.* It is farther to be obſerved, that this impediment of *marriage* does not only follow an affinity contracted by lawful matrimony, but alſo that contracted by a criminal commerce; with this difference, that this laſt does not extend beyond the ſecond generation; whereas the other, as has been obſerved, reaches to the fourth.

In Germany, they have a kind of *marriage* called *morganatic*, wherein a man of quality contracting with a woman of inferior rank, he gives her the left hand in lieu of the right; and ſtipulates in the contract, that the wife ſhall continue in her former rank or condition, and that the children born of them ſhall be of the ſame; ſo that they become baſtards as to matters of inheritance, though they are legitimate in effect. They cannot bear the name or arms or the family.

None but princes, and great lords of Germany, are allowed this kind of *marriage*. The univerſities of Leipſic and Jena have declared againſt the validity of ſuch contracts; maintaining, that they cannot prejudice the children, eſpecially when the emperor's conſent intervenes in the *marriage*.

The Turks have three kinds of *marriages*, and three ſorts of wives; *legitimate*, *wives in kebin*, and *ſlaves*. They marry the firſt, hire the ſecond, and buy the third.

The people in Java marry and have children at nine or ten years old, and the women leave child-bearing before they are thirty; and at Tonquin there are women common to any that will hire them, at eight or nine years of age.

Among all the ſavage nations, whether in Aſia, Africa, or America, the wife is commonly bought by the huſband from her father, or thoſe other relations who have an authority over her: and the concluſion of a bargain for this purpoſe, together with the payment of the price, has, therefore, become the uſual form or ſolemnity in the celebration of their *marriages*. The Hebrews alſo purchaſed their wives, by paying down a competent dowry for them; and Ariſtotle makes it one argument to prove that the ancient Grecians were an uncivilized people, becauſe they uſed to buy their wives; and in proportion as they laid aſide their barbarous manners, they left off this practice.

The Engliſh law conſiders marriage in no other light than as a civil contract; the holineſs of the matrimonial ſtate being left entirely to the eccleſiaſtical law, to which it pertains to puniſh or annul inceſtuous or other unſcriptural *marriages*. The law allows *marriage* to be good and valid, where the parties at the time of making it were willing and able to contract, and actually did contract, in the proper forms and ſolemnities required by law. The diſabilities for contracting are of two ſorts: firſt, ſuch as are canonical, and, therefore, ſufficient by the eccleſiaſtical laws to avoid the *marriage* in the ſpiritual court; ſuch as pre-contract, CONSANGUINITY, or relation by blood; and AFFINITY, or relation by *marriage*, and ſome particular corporal infirmities. But theſe diſabilities in our law do not make the *marriage ipſo facto* void, but voidable only by ſentence of ſeparation; and *marriages* are eſteemed valid to all civil purpoſes, unleſs ſuch ſeparation is actually made during the life of the parties. Thus, when a man had married his firſt wife's ſiſter, and after her death the biſhop's court was proceeding to annul the *marriage*, and baſtardize the iſſue, the court of king's bench granted a prohibition *quoad hoc*; but permitted them to proceed to puniſh the huſband for inceſt.

By 32 Hen. VIII. c. 38. it is declared, that all perſons may lawfully marry, but ſuch as are prohibited by God's law, &c. And that nothing (God's law excepted) ſhall impeach any *marriage* but within the Levitical degrees: theſe are enumerated in the eighteenth chapter of Leviticus, and are illuſtrated by lord Coke in this manner: a man may not marry his mother, father's ſiſter, mother's ſiſter, ſiſter, daughter, daughter of his ſon or daughter, father's wife, uncle's wife, father's wife's daughter, brother's wife, wife's ſiſter, ſon's wife or wife's daughter, and daughter of his wife's ſon or daughter. And a woman may not marry her father, father's brother, mother's brother, brother, ſon, ſon of her ſon or daughter, mother's huſband, aunt's huſband, ſiſter's huſband, huſband's brother, and ſon of her huſband's ſon or daughter. By the civil law firſt couſins are allowed to marry; but by the canon law both firſt and ſecond couſins are prohibited. Therefore, when it is vulgarly ſaid, that firſt couſins may marry, but ſecond couſins cannot, this probably aroſe by confounding theſe two laws; for firſt couſins may marry by the civil law, and ſecond couſins cannot by the canon law. But by the foreſaid ſtat. 32 Henry VIII. c. 38. it is clear that both firſt and ſecond couſins may marry. By the ſame ſtatute all impediments ariſing from pre-contracts to other perſons were aboliſhed, and declared of none effect, unleſs they had been conſummated with bodily knowledge; in which caſe the canon law holds ſuch contract to be a *marriage de facto*. But this branch of the ſtatute was repealed by 2 & 3 Ed. VI. c. 23. How far the act of 26 Geo. II. c. 33. (which prohibits all ſuits in eccleſiaſtical courts to compel a *marriage*, in conſequence of any contract) may collaterally extend to revive this clauſe of Henry the Eight's ſtatute, and aboliſh the impediment of pre-contract, judge Blackſtone leaves to be conſidered by the canoniſts. We ſhall here obſerve, that on a promiſe of *marriage*, if it be mutual on both ſides, damages may be recovered, in caſe either party refuſes to marry; and though no time for the *marriage* is agreed on, if the plaintiff avers that he offered to marry the defendant, who refuſed it, an action is maintainable for the damages; but no action ſhall be brought upon any agreement except it is in writing, and ſigned by the party to be charged. The canonical hours for celebrating *marriage* are from eight till twelve in the forenoon.

The other ſort of diſabilities are thoſe which are created, or at leaſt enforced, by the municipal laws. Theſe civil diſabilities make the contract void *ab initio*, by rendering the parties incapable of forming any contract at all. The firſt legal diſability is a prior *marriage*, or having another huſband or wiſe living; in which caſe, beſides the penalties conſequent upon it as a felony, the ſecond *marriage* is to all intents and purpoſes void. See Bigamy, and Polygamy.

The next legal diſability is want of age: therefore, if a boy under fourteen, or a girl under twelve years of age, marries, when either of them comes to the age of conſent, they may diſagree, and declare the *marriage* void, without any divorce or ſentence in the ſpiritual court. However in our law it is ſo far a *marriage*, that, if at the age of conſent, they agree to continue together, they need not be married again. Another incapacity ariſes from want of conſent of parents or guardians. By ſeveral ſtatutes, viz. 6 & 7 W. III. c. 6. 7. 8 W. III. c. 35. 10 Ann. c. 19. penalties of 100*l.* are laid on every clergyman who marries a couple, either without publication of banns, which may give notice to parents or guardians, or without a licence, to obtain which the conſent of parents or guardians muſt be ſworn to. And by 4 & 5 Ph. & M. c. 8. whoſoever marries any woman-child under the age of ſixteen years, without conſent of parents or guardians, ſhall be ſubject to fine, or five years impriſonment; and her eſtate, during the huſband's life, ſhall be enjoyed by the next heir. Thus alſo in France, the ſons cannot marry without conſent of parents, till thirty years of age, nor the daughters till twenty-five; and in Holland, the ſons are at their own diſpoſal at twenty-five, and the daughters at twenty. And by the *marriage* act, viz. 26 Geo. II. c. 33. it is enacted, that all *marriages* celebrated by licence (for banns ſuppoſe notice) where either of the parties is under twenty-one, not being a widow or widower, without the conſent of the father, or, if he be not living, of the mother or guardians, ſhall be abſolutely void. However proviſion is made, where the mother or guardian is non compos, beyond ſea, or unreaſonably froward, to diſpenſe with ſuch conſent, at the diſcretion of the lord chancellor; but no proviſion is made, in caſe the father ſhould labour under any mental, or other incapacity. A fourth incapacity is want of reaſon. It is provided by 15 Geo. II. cap. 30 that the *marriage* of lunatics, and perſons under phrenſies (if found lunatics under a commiſſion, or committed to the care of truſtees by any act of parliament) before they are declared of ſound mind by the lord chancellor, or the majority of ſuch truſtees, ſhall be totally void. Laſtly, the parties muſt not only be willing and able to contract, but muſt actually contract themſelves in due form of law, to make it a good civil *marriage*. Any contract made, *per verba de præſenti*, or in words of the preſent tenſe, and in caſe of cohabitation *per verba de futuro* alſo, between perſons able to contract, was before the late act deemed a valid *marriage* to many purpoſes, and the parties might be compelled in the ſpiritual courts to celebrate it in *in facie eccleſiæ*. But theſe verbal contracts are now of no force, to compel a future *marriage*. Nor is any *marriage* at preſent valid that is not celebrated in ſome pariſh-church or public chapel, unleſs by diſpenſation from the archbiſhop of Canterbury. It muſt alſo be preceded by publication of BANNS, or by LICENCE from the ſpiritual judge. A *marriage* in purſuance of banns muſt be ſolemnized in one of the churches or chapels, where the banns were publiſhed. No parſon, vicar, &c. ſhall be obliged to publiſh banns of matrimony, unleſs the perſons to be married ſhall ſeven days before the time required for the firſt publication, deliver to him a notice in writing of their true names, and of the houſe or houſes of their reſpective abode, within ſuch pariſh, &c. and of the time that they have dwelt in ſuch houſe or houſes. And the ſaid banns ſhall be publiſhed upon three Sundays preceding the ſolemnization of *marriage* during the time of public ſervice: in caſe the parents or guardians of either of the parties who ſhall be under the age of twenty one years, ſhall openly and publicly declare, or cauſe to be declared in the church or chapel, where the banns ſhall be ſo publiſhed, at the time of ſuch publication, their diſſent to ſuch *marriage*, ſuch publication of banns ſhall be void. And when the parties dwell in divers pariſhes, the curate of the one pariſh ſhall not ſolemnize matrimony betwixt them, without a certificate of the banns being twice aſked, from the curate of the other pariſh. A *marriage* in purſuance of a licence (except a ſpecial licence) muſt be ſolemnized in ſuch church or chapel where the licence is granted, and no licence of *marriage* ſhall be granted by any archbiſhop, biſhop, &c. to ſolemnize any *marriage* in any other church, &c. than in the pariſh church, &c. within which the uſual place of abode of one of the parties ſhall have been for four weeks immediately before the granting ſuch licence. By the ſame ſtatute all *marriages* ſhall be ſolemnized in the preſence of two credible witneſſes at the leaſt, beſides the miniſter, who ſhall ſign their atteſtation thereof; and immediately after the celebration of every *marriage*, an entry thereof ſhall be made in the pariſh-regiſter, expreſſing that the ſaid *marriage* was celebrated by banns or licence; and if both or either of the parties be under age, with conſent of the parents or guardians, as the caſe ſhall be, ſigned by the miniſter, and alſo by the parties married, and atteſted by the two witneſſes preſent. It is held to be alſo eſſential to a *marriage*, that it be performed by a perſon in orders; though the intervention of a prieſt to ſolemnize this contract is merely *juris poſitivi*, and not *juris naturalis aut divini*; it being ſaid that pope Innocent III. was the firſt who ordained the celebration of *marriage* in the church, before which it was totally a civil contract. And in the times of the grand rebellion, all *marriages* were performed by the juſtices of the peace; and theſe *marriages* were declared valid, without any freſh ſolemnization, by 12 Car. II. c. 33. But as the law now ſtands, we may upon the whole collect, that no *marriage* by the temporal law it *ipſo facto* void, that is celebrated by a perſon in orders; in a pariſh-church, a public chapel, or elſewhere by ſpecial diſpenſation; in purſuance of banns or a licence; between ſingle perſons; conſenting; of ſound mind; and of the age of twenty-one years; or of the age of fourteen in males, and twelve in females, with conſent of parents or guardians, or without it in caſe of widowhood. And no *marriage* is voidable by the eccleſiaſtical law, after the death of either of the parties; nor during their lives, unleſs for the canonical impediments of precontract if that indeed ſtill exiſts; of conſanguinity, and of affinity, or corporal imbecility, ſubſiſting previous to the *marriage*. Blackſt. Com. vol. i. p. 433, &c.

By 26 Geo. II. c. 33. the ſubſtance of which has been already recited, if any perſon ſhall ſolemnize matrimony in any other place than a church, &c. where banns have been uſually publiſhed, unleſs by ſpecial licence, or without publication of banns, unleſs licence of *marriage* be firſt obtained from ſome perſon having authority to grant the ſame, every ſuch perſon knowingly ſo offending, ſhall be guilty of felony, and tranſported for fourteen years; the proſecution to be within three years. By the ſame ſtatute, to make a falſe entry into a *marriage*-regiſter; to alter it when made; to forge or counterfeit ſuch entry, or a *marriage* licence, or aid and abet ſuch forgery, to utter the ſame as true, knowing it to be counterfeit; or to deſtroy or procure the deſtruction of any regiſter, in order to vacate any *marriage*, or ſubject any perſon to the penalties of this act; all theſe offences, knowingly and wilfully committed, ſubject the party to the guilt of felony without benefit of clergy. But this act doth not extend to the *marriages* of the royal family; nor to Scotland; nor to any *marriages* among the people called quakers, or among perſons profeſſing the Jewiſh religion, where both the parties are quakers or Jews reſpectively; nor to any *marriages* beyond the ſeas.

For the proportions which *marriages* bear to births, and births to burials, in ſeveral parts of Europe, Mr. Derham gives us the following table.

Names of Places.	*Marriages* to Births, as	Births to Burials, as
England in general	1 to 4.63	1.12 to 1
London	1 to 4	1 to 1.1
Hantſhire, from 1569 to 1658	1 to 4	1.2 to 1
Tiverton in Devonſhire, from 1656 to 1664	1 to 3.7	1.26 to 1
Cranbrook in Kent, from 1560 to 1649	1 to 3.9	1.6 to 1
Aynho in Northamptonſhire, for 118 years	1 to 6	1.6 to 1
Upminſter in Eſſex, for 100 years	1 to 4.6	1.8 to 1
Frankfort on the Maine, in 1695	1 to 3.7	1.2 to 1
Old, Middle, and Lower Marck, in 1698	1 to 3.7	1.9 to 1
Dominions of the Elector of Brandenburg, in 1698	1 to 3.7	1.5 to 1
Breſlaw in Sileſia, from 1687 to 91	———	1.6 to 1
Paris, in 1670, 1671, 1672	1 to 4.7	1.6 to 1

The Editor has formed the following table, ſimilar to the preceding, from the obſervations collected and referred to by Dr. Price.

Names of Places.	*Marriages* to Births, as	Births to Burials, as
London, annual medium from 1716 to 1736	— — —	18000 to 26529, or 1 to 1.4, &c.
——————— from 1759 to 1768	— — —	15710 to 22956, or 1 to 1.4, &c.
Northampton, ditto, from 1741 to 1770	— — —	155 to 191, or 1 to 1.2, &c.
Norwich, ditto, from 1740 to 1769	— — —	1057 to 1206, or 1 to 1.1, &c.
Shrewſbury, ditto, from 1762 to 1768	— — —	301 to 329, or 1 to 1.09, &c.
Mancheſter and Salford, excluſive of Diſſenters, Ditto, from 1755 to 1759	— — —	756 to 743, ———————
Ditto, ditto, including Diſſenters, from 1768 to 1772	— — —	1098 to 958, or 1.14, &c. to 1.
Gainſborough in Lincolnſhire, ditto, from 1752 to 1771	1 to 3.7	126 to 105, or 1.2 to 1.
Madeira, ditto, from 1759 to 1766	1 to 4.68	2201 to 1293, or 1.7 to 1.
Boſton in New England, from 1731 to 1752	— — —	538 to 608, or 1 to 1.13, &c.
Chriſtiana in Norway, in 1761	— — —	11024 to 6929, or 1.5 to 1.
Paris, mean of ſome of the laſt years	1 to 4.3	19100 to 19400, or 1 to 1.01, &c.
Vienna, annual medium, from 1757 to 1769	— — —	5800 to 6600, or 1 to 1.1, &c.
Amſterdam, ditto, for ſome of the laſt years	1 to 1.9, &c.	4600 to 8000, or 1 to 1.7, &c.
Copenhagen, ditto	1 to 3.04, &c.	2700 to 3300, or 1 to 1.2, &c.
Berlin, ditto, for five years, ending at 1759	1 to 3.9, &c.	3855 to 5054, or 1 to 1.3, &c.
Breſlaw, ditto, from 1633 to 1734	— — —	1089 to 1256, or 1 to 1.15, &c.
———, from 1717 to 1725	— — —	1252 to 1507, or 1 to 1.2, &c.
Rome, ditto, from 1759 to 1761	— — —	5167 to 7153, or 1 to 1.3, &c.
Vaud in Switzerland, ditto, for ten years before 1766	1 to 3.9	3155 to 2504, or 1.2, &c. to 1.

For an account of the number of male and female ſtillborn children and chryſoms, and of boys and girls under ten, of married men and married women, and of widows and widowers, who died for a courſe of years at Vienna, Breſlaw, Dreſden, Leipſic, Ratiſbon, and ſome other towns in Germany, ſee Phil. Tranſ. Abr. vol. vii. part iv. p. 46, &c.

The reader may find many curious calculations and remarks relating to this ſubject in Dr. Price's excellent work, entitled Obſervations on Reverſionary Payments.

From the preceding table it appears, that *marriages*, one with another, do each produce about four births, both in England, and other parts of Europe. Dr. Price obſerves, that the births at Paris, as may be ſeen in the table, are above four times the weddings; and therefore it may ſeem, that in the moſt healthy country ſituations, every wedding produces above four children; and though this be the caſe in Paris, for reaſons which he has given, he has obſerved nothing like it in any other great town. He adds, that from comparing the births and weddings, in countries and towns where regiſters of them have been kept, it appears, that in the former, *marriages*, one with another, ſeldom produce leſs than four children each, generally between four and five, and ſometimes above five; but in towns ſeldom above four, generally between three and four, and ſometimes under three. It is neceſſary to be obſerved here, that though the proportion of annual births to weddings has been conſidered as giving the true number of children derived from each *marriage*, taking all *marriages* one with another; yet this is only true, when, for many years, the births and burials have kept nearly equal. Where there is an exceſs of the births occaſioning an increaſe, the proportion of annual births to weddings muſt be leſs than the proportion of children derived from each *marriage*; and the contrary muſt take place where there is a decreaſe; and by Mr. King's computation about one in an hundred and four perſons *marry*; the number of people in England being eſtimated at five millions and a half, whereof about forty-one thouſand annually *marry*.

In the diſtrict of Vaud in Switzerland, the married are very nearly a third part of the inhabitants.

Major Grant and Mr. King diſagree in the proportion between males and females, the latter making ten males to thirteen females in London; in other cities and towns, and in the villages and hamlets, a hundred males to ninety-nine females; but Major Grant, both from the London and country bills, computes that there are in England fourteen males to thirteen females; whence he juſtly infers, that the Chriſtian religion, prohibiting polygamy, is more agreeable to the law of nature than Mahometaniſm, and others that allow it.

This proportion of males to females Mr. Derham thinks pretty juſt, being agreeable to what he had obſerved himſelf. In the hundred years, for inſtance, of his own pariſh regiſter of Upminſter, though the burials of males and females were nearly equal, being ſix hundred and thirty-three males, and ſix hundred and twenty-three females, in all that time; yet there were baptized ſeven hundred and nine males, and but ſix hundred and ſeventy-five females, which is 13 females to 13.7 males.

From a regiſter kept at Northampton for twenty-eight years from 1741 to 1770, it appears that the proportion of males to females that were born in that period is 2361 to 2288, or nearly 13.4 to 13. However, though more males are born than females, Dr. Price has ſufficiently ſhewn, that there is a conſiderable difference between the probabilities of life among males and females, in favour of the latter; ſo that males are more ſhort-lived than females; and as the greater mortality of males takes place among children, as well as among males at all ages, the fact cannot be accounted for merely by their being more ſubject to untimely deaths by various accidents, and by their being addicted to the exceſſes and irregularities which ſhorten life. Mr. Kerceboom informs us, that, during the courſe of 125 years in Holland, females have, in all accidents of age, lived about three or four years longer than the ſame number of males. In ſeveral towns of Germany, &c. it appears, that of 7270 married perſons who had died, the proportion of married men who died to the married women, was 3 to 2; and in Breſlaw for eight years, as 5 to 3. In all Pomerania, during nine years, from 1748 to 1756, this proportion was nearly 15 to 11. Among the miniſters and profeſſors in Scotland, twenty married men die to twelve married women, at a medium of twenty-ſeven years, or in the proportion of 5 to 3; ſo that there is the chance of 3 to 2, and in ſome circumſtancss even a greater chance, that the woman ſhall be the ſurvivor of a *marriage*, and not a man; and this difference cannot be accounted for merely by the difference of age between men and their wives, without admitting the greater mortality of males. In the diſtrict of Vaud in Switzerland, it appears that half the females do not die till the age of forty-ſix and upwards, though half the males die under thirty-ſix. It is likewiſe an indiſputable fact, that, in the beginning of life, the rate of mortality among males is much greater than among females.

From a table formed by Dr. Price, from a regiſter kept for twenty years at Gainſborough, it appears, that of thoſe who live to eighty, the major part, in the proportion of 49 to 32, are females. Mr. Deparcieux at Paris, and Mr. Wargentin in Sweden, have farther obſerved, that not only women live longer than men, but that married women live longer than ſingle women. From ſome regiſters examined by Mr. Muret in Switzerland, it appears, that of equal numbers of ſingle and married women between fifteen and twenty-five, more of the former died than of the latter, in the proportion of 2 to 1. With reſpect to the difference between the mortality of males and females, it is found to be much leſs in country pariſhes and villages than in towns; and hence it is inferred, that human life in males is more brittle than in females, only in conſequence of adventitious cauſes, or of ſome particular debility, that takes place in poliſhed and luxurious ſocieties, and eſpecially in great towns.

From the inequality, above ſtated between the males and females that are born, it is reaſonable to infer, that one man ought to have but one wife; and yet that every woman, without polygamy, may have a huſband; this ſurpluſage of males above females being ſpent in the ſupplies of war, the ſeas, &c. from which the women are exempt.

Perhaps, ſays Dr. Price, it might have been obſerved with more reaſon, that this proviſion had in view that particular weakneſs or delicacy in the conſtitution of males, which makes them more ſubject to mortality; and which conſequently renders it neceſſary that more of them ſhould be produced, in order to preſerve in the world a due proportion between the two ſexes. See EXPECTATION *of life*, and MORTALITY.

That this is a work of providence, and not of chance, is well made out by the very laws of chance, by Dr. Arbuthnot; who ſuppoſes Thomas to lay againſt John, that for eighty-two years running, more males ſhall be born than females; and, giving all allowances in the computation to Thomas's ſide, he makes the odds againſt Thomas, that it does not ſo happen, to be near five millions of millions of millions of millions to one; but for ages of ages, according to the world's age, to be near an infinite number to one.

According to Mr. Kerſſeboom's obſervations, there are about 325 children born from 100 marriages.

Mr. Kerſſeboom, from his obſervations, eſtimates the duration of *marriages*, one with another, as in the following table.

Thoſe whoſe ages, taken together, make

40 live together between	24 and	25 years.
50	22	23
60	23	21
70	19	20
80	17	18
90	14	15
100	12	13

Phil. Tranſ. N° 468. ſect. iii. p. 319.

Dr. Price has ſhewn, that on De Moivre's hypotheſis, or that the probabilities of life decreaſe uniformly (ſee COMPLEMENT *of life*) the duration of ſurvivorſhip is equal to the duration of *marriage*, when the ages are equal; or, in other words, that the expectation of two joint lives, the ages being equal, is the ſame with the expectation of ſurvivorſhip; and, conſequently, the number of ſurvivors, or (which is the ſame, ſuppoſing no ſecond *marriages)* of widows and widowers, alive together, which will ariſe from any given ſet of ſuch *marriages* conſtantly kept up, will be equal to the whole number of *marriages*; or half of them (the number of widows in particular) equal to half the number of *marriages*. Thus, the expectation of two joint lives, both 40, is the third of 46 years, or their complement, i. e. 15 years and 4 months; and this is alſo the expectation of the ſurvivor. That is, ſuppoſing a ſet of *marriages*, between perſons all 40, they will, one with another, laſt juſt this time, and the ſurvivors will laſt the ſame time. In adding together the years which any great number of ſuch *marriages*, and their ſurvivorſhips, have laſted, the ſums would be found to be equal. It is obſerved farther, that if the number expreſſing the expectation of ſingle or joint lives, multiplied by the number of ſingle or joint lives whoſe expectation it is, be added annually to a ſociety or town, the ſum gives the whole number living together, to which ſuch an annual addition would in time grow: thus, ſince 19, or the third of 57, is the expectation of two joint lives, whoſe common age is 29, or common complement 57, twenty *marriages* every year between perſons of this age would, in fifty-ſeven years, grow to 20 times 19, or 380 *marriages* always exiſting together. The number of ſurvivors alſo ariſing from theſe *marriages*, and always living together, would, in twice 57 years, increaſe to the ſame number. Moreover, the particular proportion that becomes extinct every year, out of the whole number conſtantly exiſting together of ſingle or joint lives, muſt, wherever this number undergoes no variation, be exactly the ſame with the expectation of thoſe lives, at the time when their exiſtence commenced. Thus, if it were found that a nineteenth part of all the *marriages* among any body of men, whoſe numbers do not vary, are diſſolved every year by the deaths of either the huſband or wife, it would appear, that 19 was, at the time they were contracted, the expectation of theſe *marriages*. Dr. Price obſerves, that the annual average of weddings among the miniſters and profeſſors in Scotland, for the laſt twenty-ſeven years, has been thirty-one; and the average of married perſons, for ſeventeen years, ending in 1767, had been 667. This number, divided by 31, gives 21½, the expectation of *marriage* among them; which, he ſays, is above 2½ years more than the expectation of *marriage* would be, by Dr. Halley's table, on the ſuppoſition, that all firſt, ſecond, and third *marriages* may be juſtly conſidered as commencing, one with another, ſo early as the age of thirty; and he has proved, that the expectation of two equal joint lives is to the expectation of a ſingle life of the ſame age as 2 to 3: conſequently, the expectation of a ſingle life at 30, among the miniſters in Scotland, cannot be leſs than 32.25. If we ſuppoſe the mean ages of all who marry annually to be 33 and 25, the expectation of every *marriage* would be 19 years; or one with another they would be all extinct in 19 years; the *marriages* which continue beyond this term, though fewer in number, enjoying among them juſt as much more duration, as thoſe that fall ſhort of it enjoy leſs. But it appears from the obſervations and tables of Mr. Muret, that, in the diſtrict of Vaud (dividing half the number of married perſons, viz. 38,328, by the annual medium of weddings, viz. 808) the expectation of *marriage* is only 23½ years: ſo much higher are the probabilities of life in the country than in towns, or than they ought to be, according to De Moivre's hypotheſis. Price's Obſ. &c. See EXPECTATION *of life*, LIFE-*annuities*, and SURVIVORSHIP.

MARRIAGE, *maritagium*, in *Law*, ſignifies not only the lawful joining of man and wife, but alſo the right of beſtowing a ward, or widow, in *marriage*; at well as the land given in *marriage*.

MARRIAGE, *diſſolution of*. See DIVORCE.

MARRIAGE, *forcible*. See FORCIBLE *marriage*.

MARRIAGE, *frank*. See FRANK.

MARRIAGE, *jactitation of*, in *Law*, is one of the firſt and principal matrimonial cauſes, when one of the parties boaſts or gives out, that he or ſhe is married to the other whereby a common reputation of their matrimony may enſue. On this ground the party injured may libel the other in the ſpiritual court; and unleſs the defendant undertakes and makes out a proof of the actual marriage, he or ſhe is enjoined perpetual ſilence on that head; which is the only remedy the eccleſiaſtical courts can give for this injury. Blackſt. Com. vol. iii. p. 93.

MARRIAGE *ſettlement*, is a legal act, previous to *marriage*. whereby a JOINTURE is ſecured to the wife after the death of the huſband. Theſe ſettlements ſeem to have been in uſe among the ancient Germans, and their kindred nation the Gauls. Of the former Tacitus gives us this account: *Dotem non uxor marito, ſed uxori maritus, affert: interſunt parentes & propinqui, & munera probant.* De Mor. Germ. c. 18. And Cæſar, De Bell. Gallic. lib. vi. c. 18. has given us the terms of a *marriage* ſettlement among the Gauls, as nicely calculated as any modern jointure. *Viri, quantas pecunias ab uxorbius dotis nomine acceperunt, tantas ex ſuis bonis, æſtimatione facta, cum dotibus communicant. Hujus omnis pecuniæ conjunctim ratio habetur, fructuſque ſervatur. Uter eorum vita ſuperavit, ad eum pars utriuſque cum fructibus ſuperiorum temporum pervenet.* The dauphin's commentator ſuppoſes that this Gauliſh cuſtom was the ground of the new regulations made by Juſtinian, Nov. 97. with regard to the proviſion for widows among the Romans; but ſurely there is as much reaſon to ſuppoſe, ſays judge Blackſtone, that it gave the hint for our ſtatutable jointures. Comm. vol. ii. p. 138.

See an excellent *marriage* ſettlement by Blackſtone, in the appendix to the ſecond volume of his Commentaries.

MARRIAGE, *duty of*, is a term uſed in ſome ancient cuſtoms, ſignifying an obligation on women to marry.

To underſtand this, it muſt be obſerved, that old maids, and widows about ſixty, who held fees in body, or were charged with any perſonal or military ſervices, were anciently obliged to marry, to render thoſe ſervices to the lord by their huſbands, or to indemnify the lord for what they could not do in perſon. And this was called *duty* or *ſervice of marriage*.

MARROQUIN, vulgularly MOROCCO-*leather*. See MOROCCO.

MARROW, a ſoft oleaginous ſubſtance contained in the cavities of the bones.

All the bones of the body, which have any conſiderable thickneſs, have either a large cavity, or elſe they are ſpongeous, and full of little cells; in both the one and the other is an oleaginous ſubſtance, called *marrow*, contained in proper veſicles or membranes, which open into one another.

This ſubſtance, while it lies in the cavities of the large bones, is more particularly called *marrow*; when diſperſed in the ſmall cellulous cavities, it is commonly called the medullary juice. The *marrow* of the large hollow bones is a maſs compoſed of an infinity of ſmall veſicles, or membranous cells, joined together, and communicating with each other, furniſhed with blood-veſſels and nerves, and filled with a fine ſweet oily matter. All theſe cells are ſurrounded by a fine membrane, which, like an internal perioſteum, ſticks cloſe to the inner ſurface of the bone, by means of in an infinite number of capillary veſſels, and of ſeveral other kinds of very ſmall filaments. The reticular ſubſtance of the bones runs through this medullary maſs, and, as it were, interlard it, and by this means ſuſtains it in the middle of the great cavities. The *marrow* of the cellulous or cavernous ſubſtance of the bones, is divided by ſmall bony ſepta or plates, and by filaments of the reticular ſubſtance of the bones into a vaſt number of veſicles or membranous cells, which line the bony cells, and communicate with each other.

This cellular *marrow* in the cavernous texture of ſome bones, differs from that in the great cavities of others both in colour and conſiſtence; it is liquid, and of a red colour throughout; while the other is more ſolid, and is only red on its ſurface. This difference is owing to the blood-veſſels which run through each membranous cell, whereas the *marrow* in the great cavities ſeem to be furniſhed with them in the common membrane only. Many of thoſe medullary cells are likewiſe divided by the bony filaments of the cavernous ſubſtance; and theſe ſmall filaments, as well as thoſe of the reticular texture, are covered by portions of the medullary membrane, as by a perioſteum.

The medullary membranes may be ſeparated from the liquor which they contain, by ſteeping the whole maſs in very hot water, and afterwards compreſſing it by gentle degrees. But it is to both theſe ſubſtances, taken together, that the anatomiſts give the common name of *marrow*, not to either of them taken ſingly. The medullary membrane is very ſenſible, as is likewiſe the juice, which is neceſſary to be obſerved, to underſtand properly what is meant by the ſenſibility of the *marrow*. The *marrow*, by its liquid and unctuous part, renders the bones in ſome meaſure pliable, and leſs brittle, as it continually pervades their ſubſtance in ſmall degrees: this continues to old age, and then the bones, being deprived of their *marrow*, become very brittle.

In the bones of the oſſa innominata, there are no internal large cavities; but their ſubſtance being cellulous or cavernous, they contain no medullary maſs, but their cells are all moiſtened with a medullary juice, which diſtils inceſſantly through the membrane with which they are lined. In the os femoris the *marrow* lies in a large maſs, in the middle cavity of the bone, and in ſmall diſtinct cluſters in the cells of each extremity. The firſt is penetrated at different diſtances by the bony filaments and is thereby ſuſtained in all violent motions and ſhocks as running, leaping, and the like. In the bones of the leg the diſpoſition is exactly the ſame; and in the bones of the foot, the *marrow* is ſuitable to their internal ſtructure, and is lodged in moleculæ, in the cavernous portions, and in maſſes in thoſe which have cavities to receive them. Thus the *marrow* of all the tarſal bones is diſperſed in moleculæ, becauſe their Internal ſtructure is ſpongy. In the metatarſal bones, and firſt phalanges of the toes, it is diſpoſed in the ſame manner as in the tibia and fibula, that is, it lies in moleculæ in the extremities, and in their middles in greater or leſſer maſſes, according to the ſizes of the cavities. In the other phalanges, which are entirely ſpongy, it is accordingly diſpoſed in moleculæ. In the vertebræ, ſternum, and ribs, the internal ſtructure of all which is cellular and ſpongy, the *marrow* is contained only in ſmall ſeparate portions, and is no other than a red medullary juice. The bones of the head alſo being in like manner cellular in their internal ſtructure, contain alſo their *marrow*, in like manner, in diſtinct portions, and lying in membranous cells in the diploe. Winſlow's Anatomy, p. 118, 136, 150, 152.

The tranſpiration of the unctuous matter of the *marrow* is not confined to the time of the animal's life, it is even carried on in the dead carcaſe, and is one great obſtacle to the whitening and cleaning the bones in a ſkeleton; for if there be not an opening made at one end of a bone, and the *marrow* waſhed out of the whole bone at this aperture, by means of proper liquors injected with a ſyringe, the bone, though made ever ſo white at firſt, will certainly turn yellow afterwards, by this tranſpiration of the *marrow* contained within it, which certainly happens on the leaſt heat of the weather or otherwiſe. For this reaſon it is alſo, that the workmen who uſe bones always cut them longitudinally in two, and take out all the *marrow*, and even all the ſpongy ſubſtances of the bone, which might be ſuppoſed to contain it, otherwiſe they know that the heat of any one's hand will turn their works yellow, though ever ſo white when firſt made. It is to be obſerved, that there are in the hollow bones ſeveral ſmall apertures, through which there paſs blood-veſſels, which go from the membrane encloſing the *marrow*; whence it appears that the bones are indeed nouriſhed from within as well as from without, though that be not by the *marrow*, but by the blood-veſſels only: thus the two tables of the ſkull are evidently nouriſhed; the external one by the veſſels of the pericranium, and the interior by the branches of thoſe veſſels which are ſpread along the dura mater.

It has been ſuppoſed that the quantity of *marrow* increaſed in the bones according to the increaſe of the moon; but this has been found a wholly erroneous opinion, the increaſe of the *marrow* in all the bones depending on the quantity of nouriſhment, and ſtate of reſt which the creature is allowed.

The ſenſation of the *marrow* has been a point very variouſly ſpoken of. When a limb has been taken off, and the *marrow* is left bare, if any thing touch it roughly, the patient feels an exquiſite pain. Some had ſuppoſed that this ſenſation might rather ariſe from the membranes, than from the ſubſtance of the *marrow*: this, however, was put beyond all doubt by a curious, though very cruel operation, performed before the Paris academy. A living animal had its leg taken off before the academy, and the end of the bone left very bare; the membranes were all carefully removed, to the exquiſite pain and torture of the creature; and when the pain of this was over, the end of a ſtyle was plunged into the *marrow*, without touching any other part whatever, and the creature, on this, expreſſed as violent a ſenſation of pain as from any of the former operations: this was repeated ſeveral times and always with the ſame event; ſo that it is very evident that the *marrow* is, in its natural ſtate, highly ſenſible of pain; and how much more may it be ſo in diſtempered bodies!

The ancients ſuppoſed that the *marrow* ſerved for the nouriſhment of the bones: and their reaſons for believing it were, that they ſaw no blood-veſſels enter the ſubſtance of the bones, by which they could be nouriſhed, all the veſſels of that kind, which they could diſcover, going directly into their cavities, where the blood they contained ſeem to undergo a ſort of concoction, which converted it into *marrow*, and by that means rendered it fit nutriment for the bones; and they obſerved, in proof of this, that the longer any bone was, and the more violent uſes it was intended for, the larger was its cavity for containing this nutritious matter.

Theſe reaſons, though they carry a great ſhew of probability, yet are eaſily refuted by accurate obſervation. We ſee, in young ſubjects, a vaſt number of blood-veſſels diſtributed through the ſubſtance of the bones, the texture of which, at that time, is lax and ſpongy. It is alſo to be obſerved, that there are many bones in the human body, as well as in brutes, which, according to this ſyſtem, could not be nouriſhed at all, ſince they contain a *marrow*. Of this kind alſo are the horns of deer, and many other creatures, which, though they contain no *marrow*, yet grow very vigorouſly. There are alſo other bones which are hollow, yet are only clothed with a glandulous membrane; ſuch are the cavities between ſeveral parts of the two tables of the ſkull; and in the elephant, the foliaceous bones, which are in the place of the diploe, contain no *marrow*, and are only covered with a membrane, which has ſeveral blood-veſſels ſcattered through it. The hollows of thoſe bony ſubſtances alſo which compoſe the claws of crabs, lobſters, and the like, contain no *marrow*, but only the muſcles, whoſe office it is to move thoſe parts; and yet all theſe grow, and are nouriſhed; as well as thoſe bones which contain ever ſo much *marrow* in their cavities. In fine, it may be well concluded, that it is not for the ſake of containing *marrow*, that the bones are made hollow, but merely that they may be lighter, and more fit for motion. Mem. Acad. Par. 1700.

Obſervation gives abundant proofs, that a great quantity of the *marrow* continually tranſpires through the ſolid ſubſtance of the bones, and in this action it is of great uſe, though not in the nouriſhing, yet in the preſerving of the bones, its oily and unctuous matter ſoftening the rigid fibres of which the bone is compoſed, and rendering them more ſupple, ſoft, and flexile, and conſequently the whole bone much leſs liable to break.

Spinal-MARROW. See MEDULLA *Spinalis*.

MARRUBIASTRUM, in *Botany*. See IRON-*wort*.

MARRUBIUM, in *Botany*. See HOREHOUND.

MARS, in *Mythology*, the god of war, the ſon of Jupiter and Juno, or, as Ovid tells the ſtory, of Juno alone; ſhe being diſpleaſed that Jupiter ſhould have a daughter Minerva, without female aid: being therefore a ſon of diſcontent, he was made the god of war and ſtrife. He had a ſiſter called BELLONA, the goddeſs of war.

He had for his prieſts the *ſalii* and *flamines*, who from him were called *Martiales*. They ſacrificed aſſes to him, on account of the harſh diſſonance of their voice. The vulture was a bird ſacred to him, from their always flying to thoſe places where armies are going to engage, and bloodſhed is to be expected. The uſual attributes of *Mars* are the helmet and ſpear, which he does not lay aſide, even when he is going on his amours. Several of the old Roman poets of the firſt age, ſpeak of a wife of *Mars*, called Neriene, ſignifying, according to ſome, *mildneſs*, and given to him in order to ſoften and humanziſe the roughneſs of his temper; but we find no traces of her in their later poets. The temples of *Mars* were of the Doric order, and uſually placed without the walls; hereby denoting that this deity was to preſerve the walls from the perils of war.

MARS, in *Aſtronomy*, one of the five planets, and of the three ſuperior ones; its place being between the earth and Jupiter.

Its character is ♂. Its mean diſtance from the ſun is 1524 of thoſe parts, whereof the diſtance of the ſun from the earth is 1000; its EXCINTRICITY 141; and its real diſtance 145,014,148 miles; the inclination of its orbit, that is, the angle formed by the plane of its orbit with the plane of the ecliptic, 1 degree 52 minutes; the periodical time, in which it makes its revolution round the ſun, is 686 days 23 hours; which is the length of his year, and contains 667¼ of his days; every day and night together being 40 minutes longer than with us; and its revolution about its own axis is performed in 24 hours 40 minutes.

For the diameter of *Mars*, its denſity, the force of gravity on its ſurface, &c. ſee DIAMETER, DISTANCE, and PLANETS.

Its parallax, according to Dr. Hook, and Mr. Flamſteed, is ſcarce 30 ſeconds.

In the acronical riſing of this planet, that is, when it is in oppoſition the ſun, it is found five times nearer to us than when in conjunction with him; and, therefore, he appears ſo much bigger and brighter at one time than another.

Dr. Hook, in 1665, obſerved ſeveral ſpots in *Mars*; which having a motion, he concluded the planet to turn round its centre. In 1666, M. Caſſini obſerved ſeveral ſpots in the two faces or hemiſpheres of *Mars*, which, by continuing his different obſervations very diligently, he found to move by little and little from eaſt to weſt, and to return, in the ſpace of 24 hours 40 minutes, to their former ſituation. Theſe obſervations were repeated in 1670, and confirmed by Miraldi 1704, and 1719. Whence both the motion and period, or natural day, of that planet, were determined.

Mars always appears with a ruddy, troubled light; whence we conclude, it is encompaſſed with a thick, cloudy atmoſphere; which, by diſturbing the rays of light in their paſſage and re-paſſage through it, occaſion that appearance.

Mars having his light from the ſun, and revolving round it, has an increaſe and decreaſe like the moon: it may alſo be obſerved almoſt biſected, when in its quadratures with the ſun, or in his perigæon; but never is ſeen corniculated, or falcated, as the inferior planets: which both ſhews that its orbit includes the earth's within it, and that he ſhines not by his own light. The phaſes of *Mars* were firſt diſcovered by Galileo.

This planet's diſtance from the ſun is to the diſtance of the earth and ſun, as 1½ to 1; ſo that a man, placed in *Mars*, would ſee the ſun's diameter leſs by one third than it appears to us; and, conſequently, the degree of light and heat, which *Mars* receives from the ſun, is leſs than that received by the earth, in the proportion of 4 to 9. This proportion, however, will admit of a ſenſible variation, on account of the great excentricity of this planet.

Though the period or year of this planet, as has been already obſerved, is nearly twice as long as our's; and his natural day, or the time in which the ſun appears above his horizon (ſetting aſide the conſideration of twilight), is almoſt every where equal to his night; yet it appears, that, in one and the ſame place on his ſurface, there will be but very little variety of ſeaſons, or ſcarce any difference of ſummer and winter; and the reaſon is, that the axis of his diurnal rotation is nearly at right angles with the plane of his orbit. It will be found, notwithſtanding, that places ſituate in different latitudes, that is, at different diſtances from his equator, will have very different degrees of heat, on account of the different inclination of the ſun's rays to the horizon; as it is with us, when the ſun is in the equinoxes, or in the tropics.

From this conſideration, Dr. Gregory endeavours to account for the appearance of the faſciæ in *Mars*, which are certain ſwathes or fillets ſeen in this planet, and poſited parallel to his equator: for, as among [illegible] the ſame climate has, at different ſeaſons, very unequal degrees of heat; but, as in *Mars* it is otherwiſe, the ſame parallel having always a pretty equable degree of heat, it follows, that theſe ſpots may probably be formed in *Mars*, or in his atmoſphere, as ſnow and clouds are in our's, viz. by the conſtant different intenſities of heat and cold in the different parallels; and ſo come to be extended in circles or belts, parallel to his equator, or the circle of his diurnal revolution. And this ſame principle may, perhaps, ſolve the phenomenon of Jupiter's belts; that planet, like *Mars*, having a perpetual equinox.

Beſide the ruddy colour of *Mars*, we have another argument of his being encompaſſed with an atmoſphere; and it is this: that, when any of the fixed ſtars are ſeen near his body, they appear extremely obſcured, and almoſt extinct. If this be the caſe, an eye placed in *Mars* would ſcarce ever ſee Mercury, unleſs, perhaps, in the ſun at the time of conjunction, when Mercury paſſes over his diſk, as he ſometimes appears to us, in form of a ſpot. A ſpectator in *Mars* will ſee Venus about the ſame diſtance from the ſun as Mercury appears to us; and the earth as big as Venus appears to us, and never above 48 degrees from the ſun; and when the earth is found in conjunction with, and very near, the ſun, he will ſee the earth appear horned, or falcated, and its attendant the moon of the ſame figure, and, at its utmoſt diſtance from the earth, not above 15 minutes of a degree, though they are really two hundred and forty thouſand miles aſunder. This planet being but a fifth part ſo big as the earth, if any moon attends him, ſhe muſt be very ſmall, and has not yet been diſcovered by our beſt teleſcopes.

MARS, among *Chemiſts*, ſignifies IRON; becauſe imagined to be under the influence of that planet.

Phyſical writers hold iron preferable, for all medicinal purpoſes, to STEEL, which is only a more hardened, compact iron, made ſo by art, whereby it is rendered more unfit to yield thoſe principles or parts in preparation, which the phyſician requires to be drawn out.

MARS *ſaccharatus*. See IRON.

MARS *ſulphuratus*. See IRON.

Crocus MARTIS, *ruſt of iron*. See CROCUS *martis*.

MARS, *cryſtals of*. See CRYSTAL.

MARS, *tree of*, *arbor Martis*. See ARBOR.

MARS, *games of*, *ludi Martiales*, were combats inſtituted at Rome in honour of the god *Mars*.

They were held twice in the year; once in the Circus, on the fourth of the ides of May; and a ſecond time on the firſt of Auguſt. Theſe latter were eſtabliſhed ſome time after the other, in memory of the dedication of the temple of *Mars* on that day. Theſe games conſiſted in courſes of horſes, and combats with wild beaſts. Germanicus is ſaid to have killed two hundred lions in the Circus on this occaſion. See FIELD *of Mars*.

MARSH, in *Agriculture*, &c. See MARSHY *lands*.

MARSH, or *water elder*, in *Botany*. See WAYFARING-*tree*.

MARSH-*fever*, is a ſpecies of BILIOUS *fever*.

Thoſe ſeized with the *marſh-fever* are tormented with a burning heat, and violent head-ach. They complain likewiſe of intenſe thirſt, aching of the bones, a pain of the back, great laſſitude and inquietude; and frequently of a nauſea, ſickneſs, or pain about the pit of the ſtomach; which is ſometimes attended with a vomiting of green or yellow bile, of an offenſive ſmell. The head is ſometimes ſo ſuddenly and violently affected, that without any previous complaint, the patients run about in a wild manner, as if they were mad; and would throw themſelves out of windows, or into the water, if not prevented. Pringle.

MARSH-*mallow*. See MALLOW.

MARSH-*trefoil*, *menianthes*. See *Bog*-BEAN.

MARSHAL, or MARESCHAL, *mareſcallus*, primarily denotes an officer, who has the care or the command of horſes.

Nicod derives the word from *polemarchus*, *maſter of the camp*; Matthew Paris from *Martis ſeneſcallus*. In the old Gauliſh language, *march* ſignifies *horſe*; whence *mareſchal* might ſignify him who commanded the cavalry. Spelman, Skinner, and Menage, derive it from the German *maer*, *marre*, a *mare*, or even a horſe, and *ſchalk*, *ſervant*; which makes ſome imagine the title was firſt given to farriers or thoſe who ſhod and bled horſes and that, in ſucceſſion of time, it paſſed to thoſe who commanded them. Paſquier makes four ſeveral derivations for the four ſeveral kinds of *marſhals* in uſe among the French; viz. *marſhals* of France, *marſhals de camp*, *marſhals de logis*, or quarter-maſters, and farriers, who are alſo called by the name of *marſhals*. The third he derives from *marche*, or *marchir*, *to mark*, *limit*; and the laſt from *maire*, *maſter*, and *chal*, *horſe*.

Earl-MARSHALL *of England*. See EARL-*marſhall*.

Knight-MARSHAL, or MARSHAL *of the king's houſe*, is an officer, whoſe buſineſs, according to Fleta, is to execute the commands and decrees of the lord ſteward, and to have the cuſtody of priſoners committed by the court of verge. Under him are ſix *marſhal's* men, who are properly the king's bailiffs, and arreſt in the verge of the court, when a warrant is backed by the board of green-cloth. The COURT where cauſes of this kind, between man and man, are tried, is called the *Marſhalſea*, and is under the *knight-marſhal*.

This is alſo the name of the priſon in Southwark; the reaſon of which may probably be, that the *marſhal* of the king's houſe was wont to ſit there in judgment, or keep his priſon.

There are ſome other inferior officers of this name; as,

MARSHAL of the juſtices in eyre.

A RSHAL of the king's-bench, who has cuſtody of the priſon called the king's-bench in Southwark.

This officer gives attendance upon the court, and takes into his cuſtody all priſoners committed by the court; he is finable for his abſence, and non-attendance incurs a forfeiture of his office. The power of appointing the *marſhal* of the king's-bench is in the crown. 27 Geo. II. c. 17.

In Fleta, mention is alſo made of a *marſhal of the exchequer*, to whom the court commits the cuſtody of the king's debtors, &c.

MARSHAL, or MARESCHAL, of France, is the higheſt dignity of preferment in the French armies. The dignity of *marſhal* is now for life, though, at its firſt inſtitution, it was otherwiſe. They were then only the king's firſt ecuyers under the conſtable, but in time they became the conſtable's lieutenant in the command of the army, the conſtable himſelf being then become captain-general. At firſt they were but two in number, and their allowance was but five hundred livres per annnm in time of war, and nothing in time of peace; but in the reign of Francis I. a third was added; Henry II. created a fourth. Since is has been various: Lewis XIV. increaſed it to twenty. Their office as firſt was to *marſhal* the army under the conſtable, and to command in his abſence.

They did then what the *marſhals de camp* do now; to which laſt they have given their title, and the leaſt conſiderable part of their authority.

The firſt *marſhal* does the office of conſtable in an aſſembly of the *marſhals*.

Arch-MARSHAL. See ARCH.

Clerk-MARSHAL. See CLERK.

Field-MARSHAL. See FIELD-*marſhal*.

Provoſt-MARSHAL. See PROVOST.

Sub-MARSHAL. See SUB-*Marſhal*.

MARSHALLING *a coat*, in *Heraldry*, ſignifies the due and proper joining of ſeveral coats of arms belonging to diſtinct families in one and the ſame ſhield, or eſcutcheon; together with their ornaments, parts, and appurtenances.

MARSHALSEA. See COURT *of Marſhalſea*.

MARSHY, or MARSH *lands*, a name given by our farmers to a ſort of paſture-land, or grazing-ground, which lies near the ſea, rivers, or fens.

As to lands lying near rivers, the great improvement of them is their being overflowed, which brings the ſoil of the uplands upon them, ſo that they need no other mending, though kept conſtantly mowed. The great inconveniency of theſe lands, is their being ſubject to floods, which high hills near the ſides of rivers, and the long courſe of them, beſpeak to be frequent. And though the richeſt land generally lies near ſuch rivers, yet there is the greateſt danger of the crops being ſpoiled, eſpecially when they are not incloſed; and therefore cannot be fed with cattle. This, when feeding bears any thing of a price, would be the very beſt way of managing theſe uncertain lands, and incloſing them would be highly beneficial on this account.

The *marſh*-lands in Lincolnſhire, and many other parts of England, produce a ſort of graſs, which feeds ſheep in a better manner than that of almoſt any other land, in regard to their ſize, and the quantity of wool. The ſheep about Grimſby, and ſome other places in this county, produce ſuch luſty wool, or as they call it, wool of ſo large a ſtaple, that three or four fleeces uſually make a tod of twenty-eight pounds weight. Several hundred loads of this wool are yearly carried from theſe places to Norfolk, Suffolk, and other parts of the kingdom, for the cloth manufacturers. They ſend this in large packs, which they call pockets, each containing about five and twenty hundred weight. Phil. Tranſ. N° 223.

When *marſh*-lands lie flat, it is neceſſary for the owner to keep all the water he can from them. The ſea-water in particular, is to be kept from them as much as poſſible; and this is uſually done at a very great expence, by high banks and walls.

Two things greatly wanting in theſe lands in general, are good ſhelter for the cattle, and freſh water. The careful farmer may, however, in a great meaſure, obviate theſe by digging, in proper places, large ponds to receive the rain-water, and by planting trees and hedges in certain places towards the ſea, where they may not only afford ſhelter to the cattle, but keep off the ſea breezes, which often will cut off the tops of all the graſs in theſe places, and make it look as if it had been mowed.

Theſe lands fatten cattle the ſooneſt of any, and they preſerve ſheep from the rot. It would be a great advantage to them, if there were raiſed, in the middle of every large *marſh*, banks of earth in a croſs, or in form of two ſemicircles, and theſe planted with trees; theſe would ſerve as a ſhelter for cattle, let the wind blow from what quarter it would, and would ſoon repay the expence of making.

There are, in different parts of England, very large quantities of land upon the ſea-coaſts, that would be worth taking in, though no one yet has thought of doing it. The coaſts about Boſton, Spalding, and many other parts of Lincolnſhire, give frequent inſtances of this, where the ſea falls from the land, ſo that on the outſide of the ſea-walls, on the ouſe, where every tide the ſalt water comes, there grows a good deal of good graſs, and the ouſe is firm to ride upon, when the water is upon it.

This ouſe, when taken in, hardly ſinks any thing at all, and they dig the walls from the outſide of it, all the earth they are made of, being taken from thence, and the ſea, in a few tides, filling it up again: and though the ſea, at high water, comes only to the foot of the bank, yet once in a year or two, ſome extraordinary tides go over the banks, though they are ten feet high. Theſe banks are fifty feet broad at the bottom, and three feet at the top; and the common price of making them is twenty-ſix ſhillings a pole, the earth being all carried in wheel-barrows, and the face toward the ſea, where the greateſt ſlope is, being turfed. Mortimer's Huſbandry. See FEN, and DRAINS, &c.

It is to be obſerved, that neither canals, nor even large inundations, where the water is deep, are nearly ſo dangerous in regard to people's health, or exhale ſo much noxious vapour, as *marſhy* grounds, or meadows that have been once floated, and but lately drained; and that fields, though dry in appearance, may nevertheleſs be moiſt by the tranſpiration of ſubterraneous water.

By this exhalation, as well as by that of ditches and canals, in all which innumerable plants and inſects die and rot, the atmoſphere is filled, eſpecially during the latter part of ſummer and autumn, with moiſt, putrid, and inſalutary vapours. Add to this, that *marſhy* countries being low, and without hills to receive the winds, or direct them in ſtreams upon the lower grounds, the air is apt to ſtagnate and corrupt. The common water too, being either collected from rains, and preſerved in ciſterns, or drawn from ſhallow wells, is, in hot and dry ſeaſons, ſoon corrupted; ſo that every thing conſpires, in ſummer, not only to relax the ſolids, but to diſpoſe the humours to putrefaction.

In *marſhy* countries rainy and moiſt ſeaſons differ greatly; ſince intenſe and continued heats occaſion the greateſt moiſture in the atmoſphere, by the immenſe exhalations they raiſe; whereas frequent ſhowers during the hot ſeaſon, cool the air, check the exceſs of vapours, dilute and refreſh the corrupted ſtagnating water, and precipitate all putrid and noxious effluvia. But if heavy rains, in the beginning of ſummer, are ſucceeded by great and uninterrupted heats, thoſe rains, by overflowing the meadows, ſerve only for matter of more exhalation, and to make the ſeaſon more ſickly, and the diſtempers more fatal.

The epidemic of the hot ſeaſon, and the great endemic of *marſhy* countries, is a fever of an intermitting nature, commonly of a tertian ſhape, but of a bad kind; which in the damper places, and worſt ſeaſons, appears in the form of a double tertian, remittent, continued, putrid, or even an ardent fever.

Marſhy countries are likewiſe ſubject, more than any others, to the cholera morbus, dyſentery, and a kind of ſcurvy, peculiar to a moiſt and corrupted air; the ſymptoms of which laſt agree ſo much with the ſea-ſcurvy, that they may be accounted the ſame diſeaſe; the exhalations of the canals and *marſhes*, in hot weather, acting like the vapour which riſes from the bildge-water of a ſhip. Id. ibid. p. 6, ſeq.

As to the diet neceſſary in moiſt places, it may be obſerved in general, that thoſe who can afford to live above the common rate, keep freeſt from the diſeaſes of the *marſhes*. For ſuch climates require dry houſes, the apartments raiſed from the ground, proper exerciſe, without labour in the ſun, or in the evening damps, a juſt quantity of vinous liquors, and victuals of good nouriſhment. Without ſuch helps, not only ſtrangers but the natives themſelves, are extremely ſickly, after hot and cloſe ſummers. Pringle's Obſ. on Diſeaſes of the Army.

It has been ſufficiently demonſtrated, by Dr. Prieſtley, and others, that air which ariſes from ſtagnant and putrid water, or which has been for ſome time in contact with it, muſt be very unfit for reſpiration; and, therefore, that the neighbourhood of putrid *marſhes*, on account of the noxious quality of the effluvia iſſuing from them, muſt be exceedingly inſalubrious. See EFFLUVIA.

MARSILEA, in *Botany*, a name given by Linnæus to a genus of the *cryptogamia* claſs of ferns: the male flowers of which are above the leaf; and the female part of the fructification conſiſts at the root of a roundiſh fruit, compoſed of four capſules.

MARSUIN, in *Ichthyology*, a name by which many have called the *phocæna*, or PORPESSE, a fiſh too often confounded with the dolphin.

MARSUPIALE, in *Natural Hiſtory*, a name given by Tyſon to the creature commonly called the *poſſum*, or OPOSSUM. The peculiar diſtinction of this creature from all others, is its having a pouch, or *marſupium*, under its belly, into which it receives its young in time of danger: whence the name.

MARSUPIALIS *muſculus*, in *Anatomy*, a name given by Cowper, and ſome others, to a muſcle on the thigh, called alſo by ſome, BURSALIS. It is that muſcle, called by Albinus, Winſlow, and the generality of modern authors, OBTURATOR *internus*.

MARSUPIUM *carneum*, in *Anatomy*, a name given by Spigelius, Cowper, and ſome other authors, to certain muſcles of the thigh, called by the French writers, *les petit jumeaux*, and by Albinus, *gemini*. Veſalius does not eſteem them ſeparate muſcles, but calls them only *carneæ portiones decimo femur moventium muſculo attenſæ*, fleſhy portions affixed to the tenth muſcle of the thigh.

Riolan, who calls the *pyriformis*, or pyramidal muſcle of the thigh, the *quadrigeminus*, or *quadrigeminus prior*, calls theſe the *quadrigemini ſecundi & tertii*. They are ſometimes diſtinct, ſometimes they grow together.

MART, denotes a great FAIR or MARKET, for ſelling of goods, holden every year.

Mart, *letters of*. See LETTERS.

MARTAGON, in *Botany*, a name given to ſeveral ſpecies of LILY.

MARTEAU, the name given by French naturaliſts to a peculiar ſpecies of OYSTER, called alſo *malleum* by others. It is one of the moſt curious ſhells in the world. Its figure is that of a hammer, with a very long head, or rather of a pick-ax. It has a body of moderate thickneſs, and two long arms. It is of a browniſh colour, with a beautiful tinge of a violet-blue. Notwithſtanding the ſtrange ſhape of theſe ſhells, they cloſe very exactly.

MARTIAL is ſometimes uſed to expreſs preparations of iron, or ſuch as are impregnated therewith; as the *Martial* regulus of antimony, &c.

Martial *court*. See COURT-*martial*.

Martiale *bezoardicum*. See BEZOARDICUM.

Martial *law*, is the law of war, depending upon the arbitrary, but juſt power and pleaſure of the king, or his lieutenants. The king, though in times of peace he makes no laws but by the conſent of his parliament; yet, in war, uſes abſolute power over the ſoldiery: though even this power hath been veſted, of late years, in the king, or his generals of the army, by act of parliament, and under particular reſtrictions too.

Martial law, ſays ſir Matthew Hale, is in reality no law, but ſomething indulged rather than allowed as law. The neceſſity of order and diſcipline in an army is the only thing that can give it countenance; and therefore it ought not to be permitted in time of peace, when the king's courts are open for all perſons to receive juſtice according to the laws of the land. The petition of RIGHT enacts that no ſoldier ſhall be quartered on the ſubject without his own conſent; and that no commiſſion ſhall iſſue to proceed within this land according to *martial* law. See *Martial* COURT.

MARTIALES *flores*. See FLORES *martiales*.

MARTICHORA, in *Natural Hiſtory*, the name given by the ancient Greeks to the animal which we call the MANTICHORA, or *man-tiger*.

MARTII *campus*. See CAMPUS and FIELD.

MARTIN, or *martlet*, in the *Hiſtory of Quadrupeds*, the name of a creature of the weaſel-kind, being the MUSTELA *martes* of Linnæus, with cloven feet, body of a deep yellow colour, approaching to black, and whitiſh throat. There are two ſpecies of this creature, the one called the *martes abietum*, or fir-*martin*; the other the *martes fagorum*, or beech-*martin*. The beech-*martin* is diſtinguiſhed from the other by having a larger and blacker tail, and being all over of a darker colour, and by being white on the throat, whereas the others are yellow; but the ſpecies are ſcarce kept up diſtinct, the creatures mixing with one another in the breed. When diſtinct, the beech-*martin* is found to be a much tamer creature than the other, and may be kept about houſes like a cat; and often lives of its own accord about houſes, and among old walls. Their ſkins make a valuable fur; and that of the fir-*martin*, or yellow kind, is much the moſt valuable: prodigious numbers of their ſkins being annually imported from Hudſon's Bay and Canada.

The *martin* is of the ſize of a cat, but longer bodied; its legs alſo are ſhorter, and its claws leſs ſharp, and ſhorter. Its whole body is covered with hair of a yellowiſh black, except only the throat, which, in the beech-*martin*, or tame kind, is white; and in the wild kind, or fir-*martin*, yellow: its teeth are ſharp and ſtrong, and the dog-teeth, in particular, ſtand out a great way.

The beech-*martin*, with us, inhabits woods, makes its lodge in the hollows of trees, and brings from four to ſix young at a time. It makes great havock among poultry, game, &c. and will eat mice, rats, and moles. The pine, or fir-*martin*, inhabits the north of Europe, Aſia, and America; and is found alſo in Great Britain, particularly in Scotland; where it lodges in the fir-foreſts, building its neſt at the top of the trees.

The *martin* leaves ſo ſtrong a ſcent, that the hounds, when out in a morning, will often take it, and make a noble cry. The chace in this caſe is very good while it laſts, but it is very perplexed; for the creature is not able to run long, and when ſhe is tired, ſhe gets up into a tree; the hounds often loſe her on this occaſion; but if ſhe is ſpied up in the tree, ſhe is to be hunted down with ſticks, &c. When killed, the hounds are not ſuffered to eat her fleſh, for it is unwholſome. See *Tab.* III. *of Quadrupeds*, Nº 33.

Martin, in *Ornithology*. See SWALLOW.

Martin, *Free*, in *Zoology*, is a name given in this country to a cow-calf, caſt at the ſame time with a bull-calf, which is a kind of HERMAPHRODITE; that is never known to breed, nor to diſcover the leaſt inclination for the bull: nor does the bull ever take the leaſt notice of this animal. It has all the external marks of a cow-calf, viz. the teats, and the external female parts, called by farmers the bearing. When theſe animals are preſerved, it is not for propagation, but for all the purpoſes of an ox or ſpayed heifer, viz. to yoke with the oxen, and to fatten for the table. They are much larger than either the bull or the cow, and the horns grow larger, being very ſimilar to the horns of an ox. The bellow of the free *martin* is like that of an ox; and the meat reſembles that of the ox or ſpayed heifer; being generally finer than that of the bull or cow; and is more ſuſceptible of growing fat with good food. Mr. Hunter has anatomically deſcribed three animals of this kind, in the Phil. Tranſ. vol. lxix. part i. p. 289, &c.

MARTINAZZO, in *Ornithology*, the name of a ſpecies of water-fowl, of the larus or GULL kind, the *larus nævius* of Linnæus, and called by the Dutch, the burgomaſter of Greenland; by the Corniſh people, the *waggell*, or the *great grey-gull*. It is a large bird, uſually weighing from two to four pounds. It is all over of a mottled colour of brown, grey, and white; but is much darker on the back than on the belly. The back and wing-feathers are all brown in the middle, and grey at the edges; but thoſe of the rump are moſtly white: the legs are of a dirty white. They ſay that this gull will follow the ſmaller lari, and perſecute and terrify them till they void their food in excrements half digeſted, which he afterwards picks up, eſteeming it better than freſh food; and on this account it is ſometimes called the *dung-hunter*.

MARTINGALE, invented by Evangeliſta, an eminent horſeman of Milan; a thong of leather faſtened at one end to the girths under the belly of a horſe, and at the other end to the bitt, or, which is the better way, to a thin mouth-piece of its own, to hinder him from rearing, or toſſing up his head. It is alſo of ſervice when the horſe bears upon the hand, and his head is uncertain and inconſtant, when his jaws are too tight, and when he is ſtag-necked. If the SNAFFLE is uſed with the reins faſtened low, it becomes a *martingale*, or anſwers the purpoſe better; becauſe the hand can make it ſtrict or eaſy, or both by turns, as the rider pleaſes, and the horſe requires.

MARTINO *peſcatore*, in *Ichthyology*, a name given by Salvian, and ſome others, to the RANA *piſcatrix* of authors, the *lophius* of Artedi.

St. **MARTIN'***s cope*. See Cope.

MARTIOBARBULI, among the *Romans*, a deſignation given to ſoldiers who carried leaden balls to annoy the enemy with.

MARTIORA, or Marticora, in *Natural Hiſtory*, the name which the ancient Greeks gave to the animal which the Romans called MANTICHORA.

MARTLET, in *Heraldry*, a little bird repreſented without feet, and properly alſo without a beak.

It is uſed as a DIFFERENCE, or mark of diſtinction, of a younger brother; ſome ſay, more peculiarly of the fourth brother, or family. See House. See *Tab.* II. *Heraldry*, *fig.* 72.

MARTNETS, in *a ſhip*, ſmall lines faſtened to the leetch of a ſail, being reeved through a block on the top-maſt-head, and coming down by the maſt to the deck. Thoſe *martnets* which belong to the top-ſails are faſtened after the ſame way to the heads of the top-gallant-maſts, but their fall comes down no farther than the top, when it is haled. The word is, *top the martnets*, i. e. hale them up. Their deſign is, in furling the ſail, to bring that part of the leetch which is next the yard-arm cloſe to the yard, that ſo the ſail may furl up the cloſer.

MARTYNIA, in *Botany*, a genus of the *didynamia angioſpermia* claſs. Its characters are theſe: the flower, the empalement of which is cut into five parts, has one bell-ſhaped petal of the ringent kind, with a ſwelling tube, at the baſe of which is ſituated a gibbous nectarium; it has four ſlender incurved ſtamina, which are inflexed into each other, and an oblong germen ſituated under the flower; the empalement afterwards turns to an oblong gibbous capſule, which divides into two parts, including a hard nut, ſhaped like the body of a ſtag beetle, with two incurved ſtrong horns at the end, having four cells, two of which are generally barren, the other two have an oblong ſeed in each. There are three ſpecies, natives of the ſouthern parts of North America.

MARTYR, a perſon who ſuffers torments, and even death, in defence of the truth of the goſpel.

The word is Greek, μαρτυρ, and properly ſignifies a *witneſs*. It is applied by way of eminence to thoſe who ſuffer in witneſs of the truth of the Goſpel.

Anciently thoſe who were baniſhed for the faith, were called *martyrs*, and alſo thoſe who periſhed in the holy wars. In the time of St. Auguſtine, the title of *martyr* was given to confeſſors, or thoſe who were tortured for the faith, without loſing their lives. It is Tertullian's thought in his Apologetic: *Plures efficimur, quoties metimur*; *ſemen eccleſiæ eſt ſanguis Chriſtianus.*

St. Stephen is called the *proto-martyr*, or firſt *martyr*.—Nineteen thouſand ſeven hundred are computed to have ſuffered *martyrdom* with St. Irenæus at Lyons, under the empire of Severus: ſix thouſand ſix hundred and ſixty-ſix ſoldiers of the Theban legion are ſaid to have been *martyred* in Gaul: Father Papebroch reckons ſixteen thouſand Abyſſinian *martyrs*, and one hundred and fifty thouſand others under Diocleſian alone.

Mr. Dodwell endeavours to prove, in a diſſertation expreſs, that the number of *martyrs* who ſuffered under the Roman emperors, was very moderate; alledging, that thoſe we have accounts of in the fathers, come within a very ſmall compaſs; and that, excepting Nero and Domitian, the reſt of the emperors made ſcarce any. F. Ruinart, on the contrary, endeavours to prove, that the catalogue of *martyrs* is not at all ſwelled; that the carnage was immenſe under the firſt emperors, and eſpecially in the time of Diocleſian. F. Papebroch, in his *Acta ſanctorum*, alſo makes the number of *martyrs* immenſe. The truth lies probably between the extremes.

There is ſcarce any faith or religion that does not pretend to its *martyrs:* Mahometans, heathens, idolaters, &c. all have their *martyrs*.

In the ancient church, the acts, ſayings, ſufferings, and deaths, of the *martyrs*, were preſerved with great care, in order to be read on certain days, and thus propoſed as models to future ages: and yet, notwithſtanding all this diligence, we have but very little left of them: the greateſt part of them having been deſtroyed, during that dreadful perſecution, which Diocleſian carried on for ten years, with freſh fury, againſt the Chriſtians: for a moſt diligent ſearch was then made after all their books and papers; and all of them that were found were committed to the flames. Euſebius, indeed, compoſed a *martyrology*, but it never reached down to us; and thoſe ſince compiled are extremely ſuſpected. From the eighth century downwards, ſeveral Greek and Latin writers endeavoured to make up the loſs, by compiling, with vaſt labour, accounts of the lives and actions of the ancient *martyrs:* but moſt of them have given us little elſe than a ſeries of fables, adorned with profuſion of rhetorical flowers, and ſtriking images, as the wiſer, even among the Romiſh doctors, frankly acknowledge. Nor are thoſe records, that paſs under the name of MARTYROLOGY, worthy of ſuperior credit, ſince they bear the moſt evident marks both of ignorance and falſhood.

Martyrs, *æra of*, is an æra followed in Egypt and Abyſſinia, and which even the Mahometans, ſince their becoming maſters of Egypt, frequently obſerve. See Epocha.

The æra of *martyrs* is alſo called the æra of Diocleſian.

MARTYROLOGY, from μαρτυρ, *witneſs*, and λεγω, *dico*, *I ſpeak*, or λεγω, *colligo*, *I gather*, a regiſter or catalogue of *martyrs*.

A *martyrology*, properly ſpeaking, ſhould contain no more than the name, place, and day of martyrdom of each ſaint; but the term is frequently extended to the hiſtories of martyrs. The cuſtom of collecting *martyrologies* is borrowed from the heathens, who inſerted the names of their heroes in their *faſti*, to preſerve to poſterity the memory and example of their noble actions. Baronius gives pope Clement the credit of being the firſt who introduced the cuſtom of collecting the acts of the martyrs.

The *martyrology* of Euſebius of Cæſarea was the moſt celebrated in the ancient church. It was tranſlated into Latin by St. Jerom; but the learned agree that it is not now extant. That attributed to Beda, in the eighth century, is of very doubtful authority; the names of ſeveral ſaints being there found, who did not live till after the time of Beda. The ninth century was very fertile in *martyrologies:* then appeared that of Florus, ſubdeacon of the church at Lyons; who, however, only filled up the chaſms in Beda. This was publiſhed about the year 830, and was followed by that of Waldenburtus, monk of the dioceſe of Treves, written in verſe about the year 848, and this by that of Uſuard, a French monk, and written by the command of Charles the Bald, in 875, which laſt is the *martyrology* now ordinarily uſed in the Romiſh church. That of Rabanus Maurus is an improvement on Beda and Florus, written about the year 845; that of Notker, monk of St. Gal, was written about the year 894.

The *martyrology* of Ada, monk of Ferrieres, in the dioceſe of Treves, afterwards archbiſhop of Vienne, is a deſcendant of the Roman, if we may ſo call it; for Du Sollier gives its genealogy thus: the *martyrology* of St. Jerom is the great Roman *martyrology*; from this was made the little Roman one, printed by Roſweyd; of this little Roman *martyrology* was formed that of Beda, augmented by Florus. Ado compiled his in the year 858. The *martyrology* of Nevelon, monk of Corbie, written about the year 1089, is little more than an abridgment of that of Ado; father Kircher alſo makes mention of a Coptic *martyrology*, preſerved by the Maronites at Rome. We have alſo ſeveral proteſtant *martyrologies*, containing the ſufferings of the reformed under the papiſts; viz. an Engliſh *martyrology*, by J. Fox; with others by Clark, Bray, &c.

Martyrology is alſo uſed, in the *Romiſh Church*, for a roll or regiſter kept in the veſtry of each church, containing the names of all the ſaints and martyrs, both of the univerſal church, and of the particular ones of that city or monaſtery.

Martyrology, is alſo applied to the painted or written catalogues in the Romiſh churches, containing the foundations, obits, prayers, and maſſes to be ſaid each day.

MARTZIAN, in the *Materia Medica*, a word formed by the modern Greek writers, to expreſs a ſort of ſea-plant, growing upon the rocks, and uſed in painting, dying, &c.

The word is formed of the Arabian name MARGIAN, by changing the *g* into *tz*.

MARU, in *Botany*, a name by which Dodonæus, and ſome others, have called the *cerinthe*, or *honey-wort*.

MARUBIUM, in *Botany*, &c. See Horehound.

MARVEL *of Peru*, or *Four-o'Clock-Flower*, *mirabilis*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the empalement of the flower has five oval, ſpear-ſhaped, ſmall leaves, and is erect, ſwelling, and permanent; the flower has one funnel-ſhaped petal, with a long ſlender tube ſitting upon the nectarium, which ſpreads open above, and is cut into five obtuſe ſegements; it hath five ſlender ſtamina, which adhere to the petal, which are unequal and inclined, terminated with roundiſh ſummits, with a roundiſh germen within the nectarium, which becomes an oval five-cornered nut, incloſing one ſeed. There are three ſpecies. Tournefort was informed by father Plumier, that a ſpecies of this genus, common in all the Weſt Indian iſlands, where the inhabitants call it the *four-o'clock* flower, from the flower's opening at that time of the day, was the officinal JALAP; but the late Dr. Houſton was fully informed, in the Spaniſh Weſt Indies, of the contrary, and brought over a drawing of the plant, which was made by a Spaniard at Halapa; and he carried two or three of the plants to Jamaica, where he planted them in a garden, but after he left the iſland they were deſtroyed by the hogs; however he was fully ſatisfied of its being a CONVOLVULUS: but the roots of *marvel* of Peru are purgative, and when given in a double quantity for a doſe, will anſwer the purpoſe of JALAP.

There are two varieties of the firſt ſpecies of this beautiful plant propagated in flower-gardens, which are very ornamental during the months of July, Auguſt, and September. The flowers do not open till toward the evening, while the weather is warm; but in moderate cool weather, when the ſun is obſcured, they continue open almoſt the whole day. They are to be raiſed by ſowing their ſeeds in March, on a moderate hot-bed. When they come up to the height of two inches, they are to be tranſplanted to another hot-bed; or if they are tranſplanted into pots filled with light earth, and plunged into a moderate hot-bed, while they are in the ſecond hot-bed they ſhould be ſhaded till they have taken root; after which they muſt have plenty of freſh air; and in May they muſt be gradually inured to bear the open air; in the beginning of June they may be tranſplanted into the borders of the pleaſure-garden; and after they have taken new root, they will require no farther care.

Some take up the roots when the ſtalks are dead, and lay them up in ſand till ſpring, when they are planted again into pots, and plunged into a moderate hot-bed to facilitate their taking root. And the plants, from the roots of the former year will always flower much ſtronger than the ſeedlings of the ſame year's growth. Miller.

MARUM, in *Botany*. See SAVORY, *Tree* GERMANDER, and *Herb* MASTICH.

MARY.—*Knights of St.* MARY, is a name by which ſeveral orders of knighthood are diſtinguiſhed.—As *St. Mary of the Thiſtle*. See THISTLE. *St. Mary of the Conception*. See CONCEPTION. *St. Mary of the Elephant*. See ELEPHANT. *St. Mary and Jeſus*. *St. Mary of Loretto*. *St. Mary of Mount Carmel*. See CARMEL. *St. Mary of the Teutonics*. See TEUTONIC, &c.

MARYGOLD, *calendula*, in *Botany*, a genus of the *ſyngeneſia polygamia neceſſaria* claſs. Its characters are theſe: it has a compound radiated flower, the borders or rays being compoſed of female florets, which are ſtretched out on one ſide like a tongue; the hermaphrodite flowers which compoſe the diſk are tubulous and quinquefid; the germen is ſituated under the petal; theſe flowers are barren, but the female flowers are each ſucceeded by one oblong incurved ſeed, with angular membranes.

Miller enumerates ten, and Linnæus eight ſpecies of the common *marygold*; there are the following varieties, viz. the common ſingle, the double flowering, the largeſt very double flower, the double lemon-coloured flower, and the greater and ſmaller childing *marygold*.

The flowers of the ſingle *marygold* are ſaid to be cordial and alexipharmic, to promote ſweat, and to be good for throwing out the ſmall-pox, or any other eruption.—They have been recommended alſo for promoting the menſes, and have been deemed ſo far aperient, as to be of ſervice in the jaundice, and in indurations of the ſpleen; but they appear from their ſenſible qualities to be of little activity. The midwives burn them under women whoſe labour does not come on properly, and ſuppoſe they are of great virtue in promoting the pains. They alſo diſtil a water from them, as a remedy for ſore eyes: but theſe laſt virtues are not ſo well warranted as the former.

The leaves of the plant appear to be of greater virtue than the flowers: their expreſſed juice has been given in doſes of two or three ounces, or more, as an aperient; and is ſaid to looſen the belly, and promote the natural ſecretions in general. Lewis.

MARYGOLD, *African*. See *French* MARYGOLD.

MARYGOLD, *corn*, *chryſanthemum*, in *Botany*, a genus of the *ſyngeneſia polygamia ſuperflua* claſs. Its characters are theſe: it hath a compound flower, the rays compoſed of female florets, which are extended on one ſide like a tongue; theſe have an oval germen; the hermaphrodite flowers, which compoſe the diſk, are funnel-ſhaped, divided into five parts at the top; theſe have five ſhort hairy ſtamina, and an oval germen, which afterwards becomes a ſingle, oblong, naked ſeed. Linnæus enumerates twenty-two, and Miller only twelve ſpecies, natives of various parts; one of them is the common *corn-marygold*, which grows naturally in our corn-fields.

MARYGOLD, *fig*, in *Botany*. See MESEMBRYANTHEMUM.

MARYGOLD, *French*, *tagetes*, in *Botany*, a genus of the *ſyngeneſia polygamia ſuperflua* claſs. Its characters are theſe: the common empalement of the flower is ſingle, oblong, erect, and five-cornered; the flower is compound and radiated; the ray or border is compoſed of five female half-florets, which are tongue-ſhaped; the diſk or middle is made up of hermaphrodite florets, which are tubulous, cut into five obtuſe ſegments; theſe have five ſhort hair-like ſtamina, terminated by cylindrical ſummits and an oblong germen, ſupporting a ſlender ſtyle, crowned by a bifid, reflexed ſtigma; the germen afterwards becomes a ſingle, linear, compreſſed ſeed, almoſt the length of the empalement, crowned by five acute, pointed, unequal ſcales; the female half-florets have an oblong germen, with a ſtyle and ſtigma like the hermaphrodite, and are ſucceeded by ſeeds of the ſame form, but have no ſtamina.

Miller enumerates four, and Linnæus three ſpecies, including ſeveral varieties, which are raiſed in our gardens, for the beauty of their flowers. They are propagated by ſowing the ſeeds in ſpring, on a moderately hot-bed; when the young plants come up, they muſt have air allowed them; and when three inches high, they ſhould be removed to another hot-bed, which ſhould be arched over with hoops, that it may be ſheltered with mats. They are to be planted here at about ſix inches diſtance, and when they are grown ſtronger, as about the beginning of May, they are to be taken up with a ball of earth about their roots, and placed where they are to remain: or elſe at eighteen inches diſtance in a nurſery, where, when they flower, the fineſt ſorts may be marked and removed, with a large ball of earth to their roots, either into pots, or into the borders of the flower-garden. They are very beautiful; but their ſmell is very offenſive. Miller.

MARYGOLD, *marſh*, *caltha*, in *Botany*, a genus of the *polyandria polygynia* claſs. Its characters are theſe: the flower hath no empalement, but is compoſed of five large oval petals, which are concave, and has a great number of ſlender ſtamina; in the centre are ſituated ſeveral oblong compreſſed germina, which afterward become ſo many ſhort pointed capſules, containing many roundiſh ſeeds. Linnæus reckons only one ſpecies, which grows on boggy land, in many parts of England; but Miller mentions two.

MARYGOLD, *Zoophyte*, in *Natural Hiſtory*, the name of a ſpecies of ſea-animal, of a very beautiful kind, and of the nature of thoſe commonly called *zoophytes*, or plant-animals, by the old naturaliſts. In St. Lucy's pariſh, in Barbadoes, there is a cave, in which is a baſon of very clear ſalt water: and in the midſt of this baſon lies a ſtone, which has been for many years found to be the habitation of a great number of animals of this ſpecies.

The ſtone is always covered with water; and from ſmall holes in its ſides, in ſeveral parts, there appear at all times of the year, a number of creatures repreſenting the flowers of ſome of the radiated plants, and particularly of the common *marygold*: they are yellow, and ſeem compoſed of a very great number of petals. Theſe, in their natural ſtate, are all regularly and beautifully expanded; but as ſoon as any thing diſturbs them, if it be only the motion of a ſtick, that comes within three or four inches of them, they in an inſtant cloſe all the leaves up together, and the whole body, flower, ſtalk and all, is retracted back into the hole of the ſtone; but if the water be left a few minutes undiſturbed again, they will appear, and expand themſelves in the former manner.

When they are nicely obſerved, there is a yet farther reſemblance of a flower in their ſtructure; for there ariſe from the centre of the body, certain oblong bodies, which very naturally reſemble the ſtamina ariſing from the centre of a flower; but theſe have evidently the powers of animal-limbs; for they no ſooner appear, but they dart themſelves about to the verge of the flower in ſeveral directions, and are plainly buſied in ſearch of prey.—They are compoſed of ſeveral joints, and the creature often makes them meet in the manner of a forceps, to lay hold of any thing it pleaſes. Theſe parts, however, ſeldom appear thus exerted any long time together, but are, after a time, received back into the body.

Theſe arms may eaſily be conceived to be of uſe to draw in the prey within the compaſs of the body of the animal; and as ſoon as it is there, the ſame contraction of the ſeveral rays which ſerves them to eſcape danger, and bury themſelves in the cavity of the ſtone, will alſo ſerve to hold faſt the prey till the creature has fed on it.

Beſide theſe large yellow radiated *zoophytes*, the top of the ſtone uſually affords a number of others of a blue colour, which ſtand among a ſort of veſicles of water-bladders, diſpoſed like cluſters of grapes. Philoſ. Tranſ. N° 470. p. 591.

MASSARANDIBA PISON, in *Botany*, a tree which grows in Braſil, very like our European cherry-tree, in every reſpect, except that the fruit it produces is not ſo round as our cherries. This fruit contains a very hard ſtone, and a very argeeable milky juice; which is expreſſed by the inhabitants of Brazil, and taken by way of emulſion, as a remedy for cold affections of the breaſt, and hoarſeneſs, either alone or joined with other pectorals. James.

MASSARINO, in *Ornithology*, a name given by the Portugueſe in the Brazils, to a large bird of the curlew kind, approaching to the gooſe in ſize; and more commonly known by its Braſilian name CURICACA.

MASBOTHÆI, or Mesbothæi, the name of a ſect, or rather of two ſects; for Euſebius, or rather Hegeſippus, whom he cites, makes mention of two different ſects of *Maſbothæans*. The firſt was one of the ſeven ſects that aroſe out of Judaiſm, and proved very troubleſome to the church: the other was one of the ſeven Jewiſh ſects before the coming of Jeſus Chriſt.

The word is derived from the Hebrew שבת, *ſchabat, to reſt*, or *repoſe*, and ſignifies idle, eaſy, indolent people. Euſebius ſpeaks of them, as if they had been ſo called from one *Maſbotheus*, their chief: but it is much more probable that their name is Hebrew, or at leaſt Chaldaic, ſignifying the ſame thing with a Sabbatarian in our language, that is, one who makes profeſſion of keeping ſabbath.

Valeſius will not allow the two ſects to be confounded together; the laſt being a ſect of Jews before, or at leaſt contemporary with Chriſt; and the former a ſect of heretics deſcended from them. Rufinus diſtinguiſhes them in their names; the Jewiſh ſect he calls *Maſbuthæi*; and the heretics *Maſbuthæani*. The *Maſbuthæans* were a branch of the Simonians.

MASCHARADA, in the *Italian Muſic*, is applied to muſic compoſed for the geſtures of pantomimes, buffoons, mimics, and ſuch groteſque characters.

MASCLE, or Macle, in *Heraldry*, a bearing in form of a lozenge, and voided of the field; that is, its inner part being cut out. See *Tab. Herald. fig.* 34.

He bears gules, a chevron ermin, between three *maſcles* argent, by the name of *Bellgrave*.

According to Guillim, the *maſcle* repreſents the meſh of a net, and is an honourable bearing. It only differs from a lozenge, by being voided.

MASCULINE, ſomething belonging to the male, or the ſtronger of the two ſexes.

Masculine is more ordinarily uſed, in *Grammar*, to ſignify the firſt and worthieſt of the genders of nouns.

The *maſculine* gender is that which belongs to the male kind, or ſomething analagous to it.

Moſt ſubſtances are ranged under the heads of *maſculine* or feminine. This, in ſome caſes, is done with a ſhew of reaſon, but in others it is merely arbitrary; and, for that reaſon, is found to vary according to the languages, and even according to the words introduced from one language into another. Thus the names of trees are generally feminine in Latin, and *maſculine* in the French. Farther, the genders of the ſame word are ſometimes varied in the ſame language. Thus *alvus*, according to Priſcian, was anciently *maſculine*, but is now become feminine. And *navire*, a ſhip, in French, was anciently feminine, but is now *maſculine*. See Gender.

Masculine *rime*, in the *French Poetry*, is that made with a word which has a ſtrong, open, and accented pronounciation; as all words have, excepting thoſe which have an *e* feminine in their laſt ſyllable.

For inſtance, *amour* and *jour*, *mort* and *ſort*, are *maſculine* rimes; and *pere* and *mere*, *gloire* and *memoire*, are feminine. Hence alſo verſes ending with a *maſculine* rime, are called *maſculine* verſes; and thoſe ending with a feminine rime, feminine verſes.

It is now a rule eſtabliſhed among the French poets, never to uſe above two *maſculine*, or two feminine verſes ſucceſſively, except in the looſer kinds of poetry.

Marot was the firſt who introduced this mixture of *maſculine* and feminine verſes; and Ronſard was the firſt who practiſed it with ſucceſs. The *maſculine* verſes in French, ſhould always have a ſyllable leſs than the feminine ones.

Masculine *Signs*.—Aſtrologers divide the ſigns, &c. into *maſculine* and feminine; by reaſon of their qualities, which are either active, and hot, or cold, accounted *maſculine*; or paſſive, dry, and moiſt, which are feminine. On this principle they call the Sun, Jupiter, Saturn, and Mars, *maſculine*; and the Moon and Venus, feminine. Mercury, they ſuppoſe, partakes of the two. Among the ſigns, Aries, Libra, Gemini, Leo, Sagittarius, and Aquarius, are ſaid to be *maſculine*; Cancer, Capricornus, Taurus, Virgo, Scorpio, and Piſces, are feminine.

MASH, the name of a drink given to horſes or cattle. It is made of half a peck of ground malt, put into a pail; on which is poured as much hot ſcalding water as will wet it well; then ſtirring it about half an hour, till it becomes lukewarm, and ſweet like honey, it is to be given to the horſe.

A *maſh* is only given after a purge, to make it work better; after hard labour, or for drink in time of ſickneſs.

MASK, or Masque. See Masque.

MASLACH, the name of a medicine greatly in uſe among the Turks, and called alſo *anſion* or *amphion*. It is prepared principally of opium. They take a dram of it at a time, and ſometimes two or three: they always uſe it when going to battle, and very often as a provocative to venery, as they do the crude opium.

MASLIN. See Bullimony.

MASON, a perſon employed, uſually under the direction of an architect, in the raiſing of a ſtone building.

The word comes from the French *maçon*, which ſignifies the ſame. Some derive this farther from the barbarous Latin *machio*, a *machiniſt*, in regard theſe artificers are obliged to uſe machines for raiſing walls. Du-Cange derives it from *maceria*, a name given to the long fence-walls which incloſe vineyards, &c. in which *maſons* are ſuppoſed to have been firſt employed: *Maſon eſt Maceriarum conſtuctor*. M. Huet derives it from *mas*, an old word ſignifying *houſe*; hence *maſon* is a perſon who makes *maſſes*, that is, *houſes*. In the corrupt Latin a *maſon* was called *magiſter comacinus*, which Lindenbroeck derives from Comacina, an iſland in Romania, where, in the time of the Lombards, the beſt architects were found.

The chief buſineſs of a *maſon* is to prepare the mortar, raiſe the walls from the foundation to the top, with the neceſſary retreats and perpendiculars, form the vaults, and employ the ſtones as delivered to him.

When the ſtones are large, the buſineſs of hewing or cutting them belongs to the ſtone-cutters; though theſe are frequently confounded with the *maſons*. The ornaments of ſculpture are performed by carvers in ſtone, or ſculptors. The tools or implements principally uſed by *maſons* are, the ſquare, level, plumb-line, bevel, compaſs, hammer, chiſſel, mallet, ſaw, trowel, &c.

Beſides the common inſtruments uſed in the hand, they have likewiſe machines for the raiſing of great burdens, the conducting of large ſtones, &c. The principal of theſe are the lever, wheel, pulley, &c.

Masons, *free* or *accepted*, a very ancient ſociety, or body of men, ſo called, either from ſome extraordinary knowledge of maſonry or building, which they are ſuppoſed to be maſters of, or becauſe the firſt founders of the ſociety were perſons of that profeſſion.

They are now very conſiderable both for numbers and character; being found in every country in Europe, and conſiſting principally of perſons of merit and conſideration. As to antiquity, they lay claim to a ſtanding of ſome thouſand years; and, it is ſaid, can trace up their original as early as the building of Solomon's temple— It is very doubtful when they were firſt introduced into this country: ſome have traced the origin of maſonry in general to the year 674, when GLASS-*making* was introduced: and it is certain that, after this time, many of our public buildings, in the Gothic ſtyle, were erected by men in companies, who, as ſome ſay, called themſelves *free*, becauſe they were at liberty to work in any part of the kingdom. Others have derived the inſtitution of *free maſons* from a combination among the *maſons* not to work without an advance of wages, when they were ſummoned from ſeveral counties, by writs of Edward III. directed to the ſheriffs, to aſſiſt in rebuilding and enlarging the caſtle, together with the church and chapel of St. George, at Windſor: accordingly it is ſaid, that the *maſons* agreed on tokens, &c. by which they might know one another, and to aſſiſt one another againſt being impreſſed, and not to work unleſs *free*, and on their own terms.

What the end of their inſtitution is, ſeems ſtill, in ſome meaſure, a ſecret; though ſo much of it as is known appears laudable enough, as it tends to promote friendſhip, ſociety, mutual aſſiſtance, and good fellowſhip.

The brothers of this fraternity are ſaid to be poſſeſſed of a great number of ſecrets, which have been religiouſly obſerved from age to age.

MASONRY, a branch of architecture, conſiſting in the art of hewing or ſquaring ſtones, and cutting them level, and perpendicular, for the uſes of building.

Masonry, in a more limited ſenſe of the word, is the art of aſſembling and joining ſtones together with mortar.

Hence there ariſe as many different kinds of *maſonry* as there are different forms and manners of laying or joining the ſtones. Vitruvius makes mention of ſeven kinds of *maſonry*, uſed among the ancients: three of hewed ſtone, viz. that in form of a *net*, that in *binding*, and that called the *Greek maſonry*: and three of unhewed ſtones, viz. that of an *equal courſe*, that of an *unequal courſe*, and that *filled up in the middle*. The ſeventh was a compoſition of all the reſt. See *Tab. Archit. fig.* 13. *to* 18.

Masonry, *net*, called by Vitruvius, *reticulatum*, from its reſemblance of the meſhes of a *net*, conſiſts of ſtones ſquared in the courſes, and ſo diſpoſed, as that their joints go obliquely, and the diagonals are, the one perpendicular, and the other level. This is the moſt agreeable *maſonry* to the eye; but it is very apt to crack. See *fig.* 13.

Masonry, *bound*, *inſerta*, is that wherein the ſtones were placed one over another, like tiles; the joints of the beds being level, and the mounters perpendicular. So that the joint that mounts and ſeparates two ſtones, always falls directly over the middle of the ſtone below. This is leſs beautiful than the net-work; but is more ſolid and and durable. See *fig.* 16.

Masonry, *Greek*, according to Vitruvius, is that where, after we have laid two ſtones, each of which makes a courſe, another is laid at the end, which makes two courſes; and the ſame order is obſerved throughout the building. This may be called *double binding*, in regard the binding is not only of ſtones of the ſame courſe with one another, but likewiſe of one courſe with another courſe. See *fig.* 14.

Masonry *by equal courſes*, by the ancients called *iſodomum*, differs in nothing from the bound maſonry but only in this, that its ſtones are not hewn.

Masonry *by unequal courſes*, called *pſeudiſodomum*, is alſo made of unhewed ſtones, and laid in bound work: but then they are not of the ſame thickneſs, nor is there any equality obſerved, excepting in the ſeveral courſes; the courſes themſelves being unequal to each other. See *fig.* 15.

Masonry *filled up in the middle*, called by the ancients *emplecton*, is likewiſe made of unhewed ſtone, and by courſes; but the ſtones are only ſet in order as to the courſes; the middle being filled up with ſtones thrown in at random among the mortar. See *fig.* 17.

Masonry, *compound*, is of Vitruvius's propoſing; ſo called, as being formed of all the reſt. In this, the courſes are of hewed ſtone; and the middle, being left void, is filled up with mortar and pebbles thrown in together. After this, the ſtones of one courſe, are bound to thoſe of another courſe, with cramp-irons, faſtened with melted lead. See *fig.* 18.

All the kinds of *maſonry*, now in uſe, may be reduced to theſe five; viz. *bound maſonry*; that of *brick work*, where the bodies and projectures of the ſtones incloſe ſquare ſpaces or panels, &c. ſet with brick; that *de moilon* or of ſmall work, where the courſes are equal, well ſquared, and their edges or beds ruſticated; and that where the *courſes* are *unequal*; and that *filled up in the middle* with little ſtones and mortar.

Masonry is ſometimes alſo uſed in a more general and unlimited ſenſe; ſo as, beſides proper *maſonry*, to include the hewing or ſawing the larger ſtones to fit them for building, properly called *ſtone-cutting*; and the carving of the ornaments on the members and mouldings, properly called *ſculpture*.

MASORA, a term in the *Jewiſh Theology*, ſignifying a work on the Bible, performed by ſeveral learned rabbins, to ſecure it from any alterations which might otherwiſe happen.

Their work regards merely the letter of the Hebrew text; in which they have, firſt, fixed the true reading by vowels and accents: they have, ſecondly, numbered not only the chapters and ſections, but the verſes, words, and letters of the text: and they find in the Pentateuch 5245 verſes, and in the whole Bible 23206. The *maſora* is called, by the Jews, the hedge or fence of the law, becauſe this enumeration of the verſes, &c. is a means of preſerving it from being corrupted and altered. They have, thirdly, marked whatever irregularities occur in any of the letters of the Hebrew text; ſuch as the different ſize of the letters, their various poſitions and inverſions, &c. and they have been fruitful in finding out reaſons for theſe irregularities and myſteries in them. See **Cabbalists**. They are, fourthly, ſuppoſed to be the authors of the Keri and Chetibb, or the marginal corrections of the text in our Hebrew Bibles.

The text of the ſacred books, it is to be obſerved, was originally written without any breaks, or diviſions into chapters or verſes, or even into words; ſo that a whole book, in the ancient manner, was but one continued word; of this kind we have ſtill ſeveral ancient manuſcripts, both Greek and Latin. In regard, therefore, the ſacred writings had undergone an infinite number of alterations, whence various readings had ariſen, and the orignal was become much mangled and diſguiſed, the Jews had recourſe to a canon, which they judged infallible, to fix and aſcertain the reading of the Hebrew text; and this rule they call *maſora*, *tradition*, from מסר, *tradidit*, as if this critique were nothing but a tradition which they had received from their forefathers. Accordingly they ſay, that when God gave the law to Moſes, at Mount Sinai, he taught him, firſt, the true reading of it, and, ſecondly, its true interpretation; and that both theſe were handed down by oral tradition, from generation to generation, till at length they were committed to writing. The former of theſe, viz. the true reading, is the ſubject of the *maſſora*; the latter, or true interpretation, that of the **Mishna** and **Gemara**.

According to Elias Levita, they were the Jews of a famous ſchool at Tiberias, about 500 years after Chriſt, who compoſed, or at leaſt began, the *maſora*; whence they are called *maſorites*, and *maſoretic doctors*. Aben Ezra makes them the authors of the points and accents in the Hebrew text, as we now find it; and which ſerve for vowels. See **Points**.

The age of the *maſorites* has been much diſputed. Archbiſhop Uſher places them before Jerom; Capel, at the end of the fifth century; father Morin in the tenth century; Dr. Kennicott about the year 800; Baſnage ſays, that they were not a ſociety, but a ſucceſſion of men; and that the *maſſora* is the work of many grammarians, who, without aſſociating and communicating their notions, compoſed this collection of criticiſms on the Hebrew text. It is urged, that there were *maſorites* from the time of Ezra and the men of the great ſynagogue, to about the year of Chriſt 1030; and that Ben Aſher and Ben Naphtali, who were the beſt of the profeſſion, and who, according to Baſnage, were the inventors of the *maſora* flouriſhed at this time.—Each of theſe publiſhed a copy of the whole Hebrew text, as correct, ſays Dr. Prideaux, as they could make it. The eaſtern Jews have followed that of Ben Naphtali, and the weſtern that of Ben Aſher; and all that has been done ſince is to copy after them, without making any more corrections, or *maſoretical* criticiſm.

The Arabs have done the ſame thing by their Koran, that the *maſorites* have done by the Bible: nor do the Jews deny their having borrowed this expedient from the Arabs, who firſt put it in practice in the ſeventh century.

There is a *great* and a *little maſſora*, printed at Venice, and at Baſil, with the Hebrew text, in a different character. Buxtorff has written a *maſoretic* commentary, which he called *Tiberias*. See on this ſubject Jennings's Jewiſh Ant. vol. i. p. 400, &c. and the various authors there cited.

MASORITES, Jewiſh doctors, authors of the **Masora**.

MASQUE, or **Mask**, a cover for the face, contrived with apertures for the eyes and mouth; originally worn chiefly by women of condition, either to preſerve their complexion from the weather, or out of modeſty, to prevent their being known.

Poppæa, wife of Nero, is ſaid to be the firſt inventor of the *maſque*, which ſhe did to guard her complexion from the ſun and weather, as being the moſt delicate woman, with regard to her perſon, that has been known.

Theatrical *maſques* were in common uſe, both among the Greeks and Romans; Suidas and Athenæus aſcribe the invention of them to the poet Choerilus, a cotemporary of Theſpis; Horace attributes them to Æſchylus; but Ariſtotle informs us, that the real inventor, and, conſequently, the time of their firſt introduction and uſe, were unknown. Brantome obſerves, that the common uſe of modern *maſques* was not introduced till towards the end of the ſixteenth century.

Masque is alſo uſed to ſignify any thing uſed to cover the face, and prevent a perſon's being known.

The penitents of Lyons and Avignon hide their faces with large white veils, which ſerve them for *maſques*.

Masque, in *Architecture*, is applied to certain pieces of ſculpture, repreſenting ſome hideous forms, groteſque, or ſatyr's faces, &c. uſed to fill up and adorn vacant places as in friezes, the panels of doors, keys of arches, &c. but particularly in grottos.

MASQUERADE, or **Mascarade**, an aſſembly of perſons maſqued or diſguiſed, meeting to dance or divert themſelves. This was much in uſe with us, and has been long a very common practice abroad, eſpecially in carnival time.

The word comes from the Italian *maſcarata*, and that from the Arabic *maſcara*, which ſignifies *raillery*, *buffoonery*. Granacci, who died in 1543, is ſaid to have been the firſt inventor of *maſquerades*. Encyclopedie.

MASRAKITHA, a pneumatic inſtrument of muſic among the ancient Hebrews, compoſed of pipes of various ſizes, fitted into a kind of wooden cheſt, open at the top, and ſtopped at the bottom with wood covered with a ſkin. Wind was conveyed to it from the lips, by means of a pipe fixed to the cheſt: the pipes were of lengths muſically proportioned to each other, and the melody was varied at pleaſure, by ſtopping and unſtopping with the fingers the apertures, at the upper extremity. See Kircher's figure in *Tab. Muſic*, *fig.* 10.

MASS, Massa, in *Mechanics*, the matter of any body cohering with it; i. e. moving and gravitating along with it. In this ſenſe, *maſs* is diſtinguiſhed from bulk, or volume, which is the expanſion of a body in length, breadth, and thickneſs.

The *maſs* of any body is rightly eſtimated by its weight. And the *maſſes* of two bodies of the ſame weight are in a reciprocal ratio of their bulks. See Matter.

Mass, or Messe, *miſſa*, in a religious ſenſe, denotes the office, or public prayers made in the Romiſh church, at the celebration of the euchariſt.

Nicod, after Baronius, obſerves, that the word comes from the Hebrew *miſſach*, *oblatum*; or from the Latin, *miſſa*, *miſſorum*; becauſe in former times, the catechumens and excommunicated were ſent out of the church, when the deacon ſaid, *Ite, miſſa eſt*, after ſermon, and the reading of the epiſtle and goſpel; they not being allowed to aſſiſt at the conſecration. Menage derives the word from *miſſio*, *diſmiſſing*: others from *miſſa*, *miſſion*, *ſending*; becauſe, in the *maſs*, the prayers of men on earth are ſent up to heaven.

Romiſh divines define the *maſs*, an oblation made to God, wherein, by the change of a ſenſible object by virtue of a divine inſtitution, the ſovereign dominion of God over all things is acknowledged.

This they eſteem the greateſt and moſt auguſt ceremony in uſe in the church; as being the ſacrifice of the new law, wherein the body and blood of Jeſus Chriſt are offered up to God.

They are divided about the queſtion, whether or no it be proper or allowable for the ſame perſon to celebrate *maſs* ſeveral times in one day? having the authority of pope Leo, in his letter to Dioſcorus, for the affirmative ſide of the queſtion, and that of ſeveral of the councils for the negative.

There is a great variety of maſſes in the Romiſh church; the thing acquiring new titles, and appellations, according to the different rites, intentions, and manners, in which it is performed, as well as other circumſtances. Thus they have a

Mass, *Ambroſian*, celebrated according to the rite of St. *Ambroſe*; particularly uſed in Milan. See Ambrosian.

Mass, *Engliſh*, was the form which anciently obtained in *England*.

Mass, *Gallican*, is the rite that formerly obtained in the churches of *France*.

Mass, *Greek*, is that rehearſed according to the *Greek* rites, in the *Greek* language, and by *Greek* prieſts.

Mass, *Latin*, is that uſed in the *Latin* church, in the *Latin* tongue, and according to the rites of the *Latin* church.

Mass, *Mozarabic*, or *Gothic*, is that which was formerly celebrated in Spain, the rites of which are ſtill practiſed in the churches of Toledo and Salamanca.

Mass, *high*, called alſo *grand* Mass, is that ſung by the choriſters, and celebrated with the aſſiſtance of a deacon and ſubdeacon.

Mass, *low*, is that wherein the prayers are all barely rehearſed, without any ſinging, and performed without much ceremony, or the aſſiſtance of any deacon or ſubdeacon.

Mass *of the Beata*, or *our Lady*, is that offered to God, by the means, and through the interceſſion of the *Virgin*.

Mass, *beau*, is a *maſs* rehearſed every day, at which the ladies and *beau-monde* of the place attend. This is alſo called the *perfumed maſs*.

Mass, *common*, or Mass *of the community*, in a monaſtery, is that celebrated at certain hours, whereat the whole body aſſiſts.

Masses, *ſolitary*, or *private*, were thoſe that were celebrated by the prieſt alone, in behalf of the ſouls detained in purgatory, as well as upon ſome other particular occaſions. Theſe *maſſes* were prohibited by the laws of the church in the eighth century, but they were a rich ſource of profit to the clergy. They were condemned by the canons of a ſynod, aſſembled at Mentz, under Charlemagne, as criminal innovations, and as the fruits of avarice and ſloth.

Mass *of the Holy Ghoſt*, is that celebrated at the beginning of any ſolemnity, or church aſſembly, commencing with an invocation of the *Holy Ghoſt*.

Mass, *holiday*, is that wherein certain prayers, or leſſons, are read, ſuitable to the day.

Mass *of judgment*, was that wherein a perſon cleared himſelf of any calumny, by ſome proof agreed upon.

Mass *for the death of our enemies*, was a form that obtained a long time in Spain: but it was at length aboliſhed, as inconſiſtent with Chriſtian charity.

Mass *of the dead*, or *requiem*, is that performed at the requeſt of the deceaſed: the introit whereof begins with *Requiem*. In the thirteenth century it was the cuſtom, before criminals were carried out to execution, to make them attend at a *maſs of the dead*, rehearſed for the repoſe of their ſouls.

Mass *pariſh*, or *great* Mass, is that which the parſon is obliged to rehearſe to his pariſhioners on Sundays and holidays.

Mass, *little*, is that ſaid at private altars, with leſs ceremony. The firſt *maſs* is that ſaid at break of day.

Mass *of a ſaint*, is that wherein God is invoked by the interceſſion of ſome ſaint.

Thus there are alſo *maſſes* of apoſtles, martyrs, pontiffs, virgins, &c.

Mass *of ſcrutiny*, was formerly rehearſed at the examination of catechumens, when inquiry was made as to their diſpoſition for baptiſm.

Mass, *ſilent*. See Messa *baſſa*.

Mass, *dry*, is that where there is no conſecration; as that, according to Durandus, where the prieſt cannot conſecrate, by reaſon of his having ſaid *maſs* before on the ſame day: or it is that uſed by the candidates of the prieſthood, in order to their becoming acquainted with the ceremonies; as Eckius will have it.

Mass, *votive*, is an extraordinary *maſs*, beſides that of the day, rehearſed on ſome extraordinary occaſion.

Mass *of the preſanctified*, is that in which there is no conſecration of the elements; but after ſinging ſome hymns, the bread and wine which were before conſecrated are received. This *maſs* is performed among the Greeks, who conſecrate the euchariſt in Lent only on Saturdays and Sundays. Among the Latins, it is uſed only on Good Friday.

Mass-*books*, *importing or ſelling of*, and other popiſh books, incurs a penalty of 40*s.* by 3 Jac. I. cap. 5. ſec. 25.

Mass, *Candle*. See Candle-*maſs*.

Mass, *Childer*. See Childer-*maſs*.

Mass, *Chriſt*. See Christ-*maſs*.

Mass *of pope Julius* is a very celebrated picture of Raphael, repreſenting the ceremony of the *maſs*, in the Vatican, and diſtinguiſhed by its rich and excellent colouring.

Masses, in *Painting*, denote thoſe parts of a picture which contain great lights, or great ſhadows. See Clair-obscure.

When it is almoſt dark, we only ſee the *maſſes* of a picture; i. e. the places of the greateſt lights and ſhadows.

MASSALIANS, Massaliani, certain ſectaries, ſo called from a Hebrew word ſignifying *prayer*; it being their diſtinguiſhing tenet, that a man is to be continually in prayer.

St. Epiphanius diſtinguiſhes two kinds of *Maſſalians*, the *ancient* and the *later*.

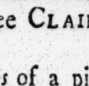
The *ancient*, according to him, were neither Jews, Chriſtians, nor Samaritans, but pure Gentiles; who, owning ſeveral gods, adored only one, whom they called Almighty.

For the *later Maſſalians*, who were by profeſſion Chriſtians, their riſe was not till about the time of St. Epiphanius. Their doctrine was that prayer alone was ſufficient to ſalvation. Many monks who loved a life of lazineſs, and were averſe from labour, at times, joined theſe *Maſſalians*. See Euchites.

MASSETER, in *Anatomy*, a triangular two-headed muſcle, which ſurrounds the lower jaw, and helps to pull it upwards in eating. See Maxilla.

The *maſſeter* is thick and ſhort, ariſing from the zygoma, and from the firſt bone of the upper jaw, and is inſerted into the lower edge of the lower jaw, from its external angle to its middle. Its fibres run in three directions; thoſe from the zygoma obliquely to the middle of the jaw, and thoſe from the upper bone of the firſt jaw croſs the former, and run to the angle of the lower jaw; and the fibres that are in its middle run perpendicularly from their origin to their inſertion. See *Tab. Anat.* (*Myol.*) *fig.* 1. *n.* 11. *fig.* 6. *n.* 6. *fig.* 7. *n.* 3.

MASSICOT. See Masticot.

MASSIMA, in the *Italian Muſic*, is a note or character made in a long ſquare, with a tail to it; thus, . It contains eight ſemi-breves in common time. This character is diſuſed in the modern muſic, for they have found other ways to ſeparate the bars, and to mark the length of notes.

MASSIVE, ſomething heavy and ſolid; a term uſed in oppoſition to tenderneſs and delicacy.

Thus we ſay, a building is too *maſſive*, that is, its walls are too thick; a wall is *maſſive*, that is, the lights and openings are too ſmall in proportion.

MASSIVE *column*. See COLUMN.

MAST *of a foreſt*, the fruit of that *genus* of trees called *glandiferous*, or *maſt-bearing*; as beech, oak, cheſnut, &c.

MAST, in *Navigation*, a large pole, or long piece of round timber raiſed in veſſels, to which are attached the yards, ſails, and rigging, in order to their receiving the wind neceſſary for navigation.

The word *maſt* ſignifies the ſame thing in French, High-Dutch, Flemiſh, and Engliſh; the Italians uſe the word *albero*, and the Spaniards *maſtil*.

In large veſſels the number of *maſts* is four: their names are the *main-maſt*, the *fore-maſt*, the *mizen-maſt*, and the *bow-ſprit*. To which ſome add a fifth; viz. a *counter-mizen*.

Main-maſt is the chief *maſt*, ſtanding upright in the middle or waſte of the veſſel; it bears the main-yard, and main-ſail.

Fore-maſt is between the *main-maſt* and the head.

Mizen-maſt is between the *main-maſt* and the ſtern.

The *bow-ſprit* lies under the beak, in the prow, or head, of the ſhip.

The *counter-mizen*, in large veſſels, and galleons, is in the ſtern. See *Tab. Ship*, *fig.* 1. *n.* 1. 19. 38. 81.

When a *maſt*, with regard to its length, is formed of one ſingle piece, it is called a *pole-maſt*: and we alſo uſe the word *maſt* to ſignify thoſe diviſions, or additional pieces, in the *maſts*, placed over one another. The *main-maſt* and *fore-maſt* have each of them two; viz. the *main-maſt*, *main-top-maſt*, *main-top-gallant-maſt*; the *fore-maſt*, *fore-top-maſt*, *fore-top-gallant-maſt*: and the *mizen-maſt* has one, viz. the *mizen-top-maſt*.

The lower *maſts* of the largeſt ſhips are compoſed of ſeveral pieces united into one body: as theſe are generally the moſt ſubſtantial parts of various trees, a *maſt*, formed by this aſſemblage, is juſtly eſteemed much ſtronger than one conſiſting of any ſingle trunk, whoſe internal ſolidity may be very uncertain. The whole is ſecured by ſeveral ſtrong hoops of iron, driven on the outſide of the *maſt*, where they remain at proper diſtances.

For the proportion of *maſts* ſir H. Manwaring gives theſe rules: whatever the breadth of a ſhip be in feet, multiply $\frac{4}{5}$ of that breadth by 3, the product is the length of her *main-maſt* in feet; thus if a ſhip be 30 feet at the midſhip beam, $\frac{4}{5}$ of 30 is 24; therefore that ſhip's *main-maſt* muſt be 24 yards, or 72 feet in length. Then for its bigneſs he allows an inch to every yard in length, and therefore this *maſt* muſt be 24 inches through, or thick. The *fore-maſt* of a ſhip muſt be $\frac{4}{5}$ of the length of the *main-maſt*, that is, in this caſe, 19 yards $\frac{1}{5}$, and thick, or through, it muſt be near 20 inches. The BOWSPRIT is always of the ſame length and bigneſs with the *fore-maſt*; and the *mizen-maſt* muſt be juſt half the length of the *main-maſt*, and half as thick.

Mr. Mungo Murray has given us the following table of the proportions for *maſts* in the royal navy, for the year 1745:

			Guns.
1000 : breadth in feet : :	748 :	main-maſt in yards	100
	756 :		90
	753 :		80
	741 :		70 and 60
	740 :		50
	747 :		44
	760 :		24
1000 : main-maſt : :	895 :	fore-maſt	100 90 80
	901 :		all the reſt
1000 : main-maſt : :	870 :	mizen-maſt	100 90 80
	866 :		all the reſt
1000 : main-maſt : :	640 :	bow-ſprit	100 90 80
	613 :		all the reſt
1000 : main-maſt : :	600 :	main-top-maſt	100 90 80
	605 :		70 60 50 40
	607 :		24
1000 : main-top-maſt : :	900 :	fore-top-maſt	100 90 80
	910 :		all the reſt
1000 : main-top-maſt : :	710 :	mizen-top-maſt	100 90 80
	717 :		all the reſt
1000 : main-top-maſt : :	480 :	main-top-gallant-maſt	100 90 80
	508 :		all the reſt
1000 : fore-top-maſt : :	480 :	fore-top-gallant-maſt	100 90 80
	505 :		all the reſt
1000 : bow-ſprit : :	360 :	ſprit-ſail-top-maſt	100 90 80

The uſe of this table is eaſily underſtood; e. g. for the main-*maſt* of a ſhip of 50 guns, 1000 : 740 : : breadth : length, i. e. ſuppoſing the breadth 41 feet, 1000 : 740 : : 41 to a fourth, which will be the length of the *maſt*; or, by the SLIDING-*rule*, draw out the ſlider till 1000 is right againſt 740, and right againſt 41, you will find $30\frac{1}{3}$ nearly, which is the length of the main-*maſt* in yards, &c.

The proportions for the diameters are as follow:

For the main and fore-*maſt* in all ſhips down to 60 guns, one inch diameter, to every yard in length.

For 50 and 40 guns, twenty-ſeven twenty-eighths of an inch diameter, to one yard in length.

For 24 guns, twelve thirteenths of an inch diameter to one yard in length.

All top-*maſts* are nine tenths of an inch diameter to one yard in length.

The fore-top-*maſt* as big as the main-top-*maſt*.

The top-gallant-*maſt*, one inch to a yard.

The mizen-*maſt* $\frac{15}{22}$ of an inch to one yard in length.

The mizen-top-*maſt* five ſixths of an inch to one yard in length.

The bow-ſprit an inch and a half to one yard.

The dimenſion of *maſts* for Eaſt India ſhips are:

	Length. *Feet.*	*Diameter.* *Inches.*
MAIN-MAST - - - - -	80 - - -	$24\frac{1}{2}$
Top-maſt - - - - - - -	50 - - -	15
Top-gallant-maſt - - - - -	28 - - -	8
FORE-MAST - - - - - -	72 - - -	24
Top-maſt - - - - - - -	48 - - -	15
Top-gallant-maſt - - - - -	25 - - -	$7\frac{1}{2}$
MIZEN-MAST - - - - -	70 - - -	17
Top-maſt - - - - - - -	36 - - -	10
Bow-ſprit - - - - - -	50 - - -	25

M. Bouguer has given us the general proportions for the length and diameter of *maſts* uſed in France, with remarks on his Traité du Navire. For an abſtract, ſee Supplement to Murray's Treatiſe on Ship-building, p. 23, &c.

MAST, *heel of a*. See HEEL.

MAST, *jury*. See JURY.

MAST, *armed*, in a ſhip, one that is made of more than one tree.

MAST, *ſpending a*, at ſea, is when it is broke by foul weather.

MAST, *ſpringing a*, at ſea, is when it is cracked in any place.

MASTED. A ſhip is ſaid to be *maſted*, when ſhe has all her maſts complete.

MASTED, *over*, or *taut-maſted*, is ſaid of a ſhip whoſe maſts are either too long or too big; which makes her lie too much down by the wind, and labour too much *a-hull*.

MASTED, *under*, or *low*-MASTED-*ſhips*, ſuch whoſe maſts are either too ſmall, or too ſhort: in which caſe ſhe cannot bear ſo great a ſail as ſhould give her true way.

MASTER, a title given to ſeveral officers and perſons of authority and command; particularly to the chiefs of the orders of knighthood, &c.

Thus we ſay, the grand *maſter* of Malta; of St. Lazarus; of the Golden Fleece; of the Free Maſons, &c.

MASTER, *magiſter*, was a title frequent among the Romans: they had their *maſter* of the people, *magiſter populi*, who was the dictator. *Maſter* of the cavalry, *magiſter equitum*, who held the ſecond poſt in an army, after the dictator. Under the later emperors there was alſo *maſters* of the infantry, *magiſtri peditum*. A *maſter* of the cenſus, *magiſter cenſus*, who had nothing of the charge of a cenſor, or ſubcenſor, as the names ſeem to intimate; but was the ſame with the *præpoſitus frumentariorum*.

MASTER *of the militia*, *magiſter militiæ*, was an officer in the lower empire, created, as it is ſaid, by Diocleſian, who had the inſpection and government of all the forces, with power to puniſh, &c. ſomewhat like a conſtable of France.

At firſt there were two of theſe officers inſtituted, the one for the infantry, and the other for the cavalry; but the two were united into one under Conſtantine. Afterwards, as their power was increaſed, ſo was their number alſo; and there was one appointed for the court, another for Thrace, another for the Eaſt, and another for Illyria. They were afterwards called *comites*, *counts*, and *clariſſimi*. Their power was only a branch of that of the *prefectus prætorii*, who by that means became a civil officer.

MASTER *of arms*, *magiſter armorum*, was an officer, or comptroller under the *maſter* of the militia.

MASTER *of the offices*, *magiſter officiorum*, had the ſuperintendance of all the officers of the court: he was alſo called *magiſter officii palatini*; ſimply *magiſter*; and his poſt *magiſteria*.

This officer was the ſame in the weſtern empire, with the curopalates in the eaſtern.

MASTER, in the Roman hiſtory and laws, is uſed for every officer who is the chief of his kind; and has others of the ſame ſpecies, or that have the ſame functions, under him. In Latin, *magiſter*, and oftentimes *proximus*, or PRIMICERIUS.

MASTER *of the armory*, is an officer who has the care and overſight of his majeſty's ARMS and ARMORY.

MASTER *at arms*, is an officer appointed to teach the officers and crew of a ſhip of war, the exerciſe of ſmall arms; to confine and plant centinels over the priſoners, and ſuperintend whatever relates to them during their confinement. He is alſo to obſerve that the fire and lights are all extinguiſhed as ſoon as the evening gun is fired, except thoſe which are permirted by proper authority, or under the inſpection of the centinels. It is likewiſe his duty to attend the gangway, when any boats arrive aboard, and ſearch them carefully, together with their rowers, that no ſpirituous liquors may be conveyed into the ſhip, unleſs by permiſſion of the commanding officer. In theſe ſeveral duties he is aſſiſted by proper attendants, called his corporals, who alſo relieve the centinels and one another, at certain periods. Falconer.

MASTER of *arts*, the firſt DEGREE taken up in foreign univerſities, but the ſecond in ours; candidates not being admitted to it till they have ſtudied in the univerſity ſeven years.

MASTER-*attendant*, is an officer in the royal dock-yards, appointed to haſten, and aſſiſt at, the fitting out or diſmantling, removing, or ſecuring veſſels of war, &c. at the port where he reſides. He is particularly to obſerve that his majeſty's ſhips are ſecurely moored, and for this purpoſe he is expected frequently to review the moorings, which are ſunk in the harbour, and obſerve that they are kept in proper repair. It is alſo his duty to viſit all the ſhips in ordinary, and ſee that they are frequently cleaned and kept in order; and to attend at the general muſters in the dock-yards, taking care that all the officers, artificers, and labourers, regiſtered at the navy-books, are preſent at their duty. Falconer.

MASTER *of the ceremonies*, an officer inſtituted by king James I. for the more ſolemn and honourable reception of ambaſſadors, and ſtrangers of quality, whom he introduces into the preſence.

The badge of this office is a gold chain and medal, having on one ſide an emblem of peace, with king James's motto; and on the reverſe the emblem of war, with *Dieu & mon droit*. He is always ſuppoſed to be a perſon of good addreſs, and maſter of languages, and has an appointment of 300 *l.* a year: he is conſtantly attending at court, and hath under him an aſſiſtant *maſter*, or deputy; at 6*s.* 8*d.* a day, who holds his place during the king's pleaſure.

There is alſo a third officer, called *marſhal of the ceremonies*, with 100 *l.* a year, whoſe buſineſs is to receive and diſtribute the *maſter's* orders, or the deputy's, for the ſervice; but, without their order, he can do nothing. This is the king's gift.

MASTERS *of chancery* are uſually choſen out of the barriſters of the common law; and ſit in chancery, or at the rolls, as aſſiſtants to the lord chancellor, and maſter of the rolls. All theſe, ſo late as the reign of queen Elizabeth, were commonly doctors of the civil law.

To them are alſo committed interlocutory reports, examination of bills in chancery, ſtating of accounts, taxing coſts, &c. and ſometimes by way of reference, they are impowered to make a final determination of cauſes.

They have, time out of mind, had the honour to ſit in the lord's houſe, though they have neither writs, nor patent to empower them; but they are received as aſſiſtants to the lord chancellor, and maſter of the rolls. They had anciently the care of inſpecting all writs of ſummons, which is now performed by the clerk of the petty-bag. When any meſſage is ſent from the lords to the commons, it is carried by the *maſters of chancery*. Before them alſo affidavits are made, and deeds and recognizances acknowledged.

Beſides theſe, who may be called *maſters of chancery ordinary* (being twelve in number, whereof the *maſter* of the rolls is reputed the chief), there are alſo *maſters of chancery extraordinary*, appointed to act in the ſeveral counties of England beyond ten miles diſtance from London, by taking affidavits, recognizances, &c. for the eaſe of the ſuitors of the court.

MASTER *of the faculties*, an officer under the archbiſhop of Canterbury, who grants licences and diſpenſations: he is mentioned in the ſtatute 22 and 23 Car. II. See COURT *of Faculties*.

MASTER-*gunner of England*. See GUNNER.

MASTER *of the horſe*, a great officer of the crown, to whom is committed the charge of ordering and diſpoſing all matters relating to the king's ſtables, races, and breed of horſes, with a ſalary of 1266*l.* 13*s.* 4*d.* a year.

He hath a power of commanding the EQUERRIES, and all the other officers and tradeſmen employed in the king's ſtables; to all which he gives by his warrant to the avenor, the oath of allegiance, &c. for the faithful diſcharge of their duty. He has the peculiar privilege of making uſe of any horſes, pages, or footmen, belonging to the king's ſtables; ſo that his coaches, horſes, and attendants are the king's, and have the king's arms and liveries.

There is alſo a *maſter* of the horſe in the eſtabliſhment of her majeſty's houſhold, with a ſalary of 800*l.* a year.

MASTER *of the houſhold* is an officer under the lord ſteward of the houſhold, in the king's gift; his buſineſs is to ſurvey the accounts of the houſhold.

Anciently the lord ſteward himſelf was called *grand-maſter of the houſhold*.

MASTER *of the jewel-office*, is an officer of the king's houſhold who has charge of all the gold and ſilver plate uſed at the king's table, or at that of any officer attending the court, and of all plate remaining in the Tower of London; as alſo of chains and looſe jewels not fixed to any garment. See JEWEL-*Office*.

MASTER *of the mint*, was anciently the title of him who is now called WARDEN *of the mint*; whoſe office is to receive the ſilver and bullion which comes to the mint to be coined, and to take care thereof.

The office of *maſter* and worker is now diſtinct: and this officer is allowed for himſelf and three clerks, 650*l.* a year.

MASTER *of the ordnance*. See ORDNANCE

MASTER *of the revels*, an officer with an appointment of 100*l.* a year, whoſe buſineſs is to order all things relating to the performance of plays, maſks, balls, &c. at court. Formerly he had alſo a juriſdiction of granting licences to all who travel to act plays, puppet-ſhews, or the like diverſions; neither could any new play be acted at either of the two houſes till they had paſſed his peruſal and licence; but theſe powers were afterwards much abridged, not to ſay annihilated, by a ſtatute for regulating play-houſes, till the licenſing plays by the lord chamberlain was eſtabliſhed. This officer was a yeoman, with 46*l.* 11*s.* 8*d.* per ann.

MASTER *of the robes*. See ROBES.

MASTER *of the rolls*, a patent officer for life; who has the cuſtody of the rolls and patents which paſs the great ſeal; and of the records of the chancery.

In the abſence of the lord chancellor, or keeper, he alſo ſits as judge in the court of chancery; and is, by ſir Edward Coke, called *his aſſiſtant*.

At other times he hears cauſes in the rolls-chapel, and makes orders and decrees. He is alſo the firſt of the maſters of chancery, and hath their aſſiſtance at the rolls: but all hearings before him are appealable to the lord chancellor.

He hath alſo his writ of ſummons to parliament, and ſits next to the lord chief juſtice of England, on the ſecond wool-pack: he hath the keeping of the parliament-rolls, and has the rolls-houſe for his habitation; as alſo the cuſtody of all charters, patents, commiſſions, deeds, and recognizances, which being made of rolls of parchment, gave riſe to the name. Anciently he was called *clerk of the rolls*.

Concerning the authority of the *maſter* of *the rolls* to hear and determine cauſes, and his general power in the court of chancery, there were (not many years ſince) divers queſtions and diſputes very warmly agitated; to quiet which it was declared by ſtat. 3 Geo. II. cap. 30. that all orders and decrees by him made, except ſuch as by the courſe of the court were appropriated to the great-ſeal alone, ſhould be deemed to be valid; ſubject nevertheleſs to be diſcharged or altered by the lord chancellor, and ſo as they ſhall not be inrolled, till the ſame are ſigned by his lordſhip. Blackſt. Com. vol. iii. p. 450.

In his gift are the ſix clerks in chancery, the examiners, three clerks of the petty-bag, and the ſix clerks of the rolls-chapel, where the rolls are kept. See ROLLS CLERK, &c.

MASTER *of a Ship*, an officer to whom is committed the direction of a merchant veſſel, who commands it in chief and is charged with the mechandizes aboard.

In the Mediterranean the *maſter* is frequently called *patron*, and in long voyages *captain*.

It is the proprietor of the veſſel that appoints the *maſter*, and it is the *maſter*, who provides the equipage, hires the pilots, ſailors, &c. The *maſter* is obliged to keep a regiſter of the ſeamen and officers, the terms of their contract, the receipts and payments, and, in general, of every thing relating to his commiſſion.

MASTER *of a ſhip of war* is an officer appointed by the commiſſioners of the navy, to take charge of navigating a ſhip from port to port, under the direction of the captain. The management and diſpoſition of the ſails, the working of a ſhip into her ſtation in the order of battle, and the direction of her movements in the time of action, and in other circumſtances of danger, are alſo more particularly under his inſpection. It is likewiſe his duty to examine the proviſions, and accordingly to admit none into the ſhip but ſuch as are found ſweet, and wholſome. He is moreover charged with the ſtowage; and for the performance of theſe ſervices, he is allowed ſeveral aſſiſtants, who are properly termed MATES and QUARTER-*maſters*.

MASTER *of the Temple*. The founder of the order of the Templars, and all his ſucceſſors, were called *magni templi magiſtri*; and ever ſince the diſſolution of the order, the ſpiritual guide and director of the houſe is called by that name. See TEMPLE and TEMPLAR.

MASTER *or keeper of the wardrobe*, an officer in the lord chamberlain's diſtrict, who has the direction of all the royal robes, as thoſe of the coronation, St. George's feaſt, and the parliament-robes; as well as of the wearing apparel, collar, of SS's, George and garter, &c.

He has alſo the charge and cuſtody of all former kings and queen's robes, remaining in the Tower; all hangings bedding, &c. for the king's houſe; and the charge and delivery of velvet and ſcarlet allowed for liveries.

He has under him a clerk of the robes, a yeoman, &c. See WARDROBE.

There are alſo ſeveral other officers under this denomination, as the *maſter* of the tennis court, with a ſalary of 132*l*. a-year; *maſter* of the barges with 100*l*. a-year; *maſter* of the harriers, with 2000l. a-year; *maſter* of the buck-hounds, with 2341*l*. a-year; *maſter* of the ſtag-hounds, with 800*l* a-year; *maſter*-falconer, with 210*l*. a-year, &c.

MASTER, *burgher*. See BURGHER.

MASTER, *fire*. See FIRE.

MASTER, *quarter*. See QUARTER.

MASTER-*arch*. See ARCH.

MASTER *load*, in *Mining*, a term uſed to expreſs the larger vein of a metal, in places where there are ſeveral veins in the ſame hill. Thus it often happens, that there are ſeven, ſometimes five, but more uſually three veins or loads, parallel to each other, in the ſame hill. Of theſe the middle vein is always much the largeſt. This is called the *maſter-load*; and the others which lie three, two, or one, on each ſide of this, are called the concomitants of the *maſter-load*.

The general breadth of the *maſter-loads*, in Cornwall, is from three to ſeven foot; they are ſeldom larger than this except in certain peculiar places, as where all the veins meet together, as they ſometimes do, and form a knot, from which they ſeparate again, and each takes its peculiar courſe; the ſize of ſuch a knot is not eaſily determined, and it is uſually very rich in tin, or the other metal of the mine. The ſeveral parts, even of the *maſter-load*, are not at all regular in breadth, but from ſix foot, it will, in ſome places, dwindle to one foot, or even to an inch broad, in a very ſmall ſpace; but the miners are not diſheartened at this, for they know it will ſoon grow wider again, unleſs really worked out. Phil. Tranſ. Nº 69.

The *maſter load* uſually lies in the hard rocky or ſhelly ſtratum, made up of metalline matter, ſpars, mundic, and other unprofitable ſubſtances, or weeds, as the miners call them, and is, as it were, all along a continued rock; but has many veins and joints as they are called. In ſome places the matter in which the ore lies is ſofter, and then it is much more eaſily worked. In Cornwall they uſually allow two ſhovel-men to three beele-men or pickers; but where the load runs in a ſofter ſubſtance, there, muſt be a greater proportion of the ſhovellers or carriers away.

There is generally water found about the *loads* of the metal; in moſt places it is met with at ſome feet deep from the *loady* ſurface; and it often runs through the heart of the *load*, not in a direct channel, but windingly, in and out, inſenſibly through the veins and joints of the *load*. When the miners have followed a *load* to ſome depth, and the water begins to be troubleſome, as it generally ſoon is, if there be any in the work, they deſcend to the bottom of the hill, where they have that conveniency, and at the loweſt price begin as little a drift as the conveniency of working or driving will permit, ſcarce half ſo big as that for a *load*; they carry this on, on a level, till they come to the work itſelf. In this the uſe of the dial is needful, which they term PLUMBING and DIALLING.

By this means the exact place of the work is known, where to bring the adit, or where to ſink down to make an air-ſhaft. Though the water is troubleſome in the *loads*, yet there is always one great conveniency attending it; which is, that where there is water, there is never want of air for the reſpiration of the miners, and the candles always burn well. But it is alſo to be obſerved, that in a ſoft, looſe, quagmire country, the earth ſometimes falls in after the workmen, in ſuch a manner as, though it does not choak up the whole ſhaft, yet it ſo far ſtops it, as to render the current of air leſs free, and the miners find the utmoſt neceſſity of opening a ſhaft for air to reſpire from the ſurface. If the ſoil be ſo ſoft as not to be able to ſupport itſelf in the working, as is ſometimes the caſe in theſe wet clayey hills, it is neceſſary to prop it up, as they go on, with boards, poſts, and the like. This adds greatly to the expence of mining; but in the working a *maſter-load*, it is often worth while. When the miners are out of heart at the trouble of walling and propping, on this occaſion, it ſometimes happens that a dipping of the *load* carries them down into a firmer ſtratum, and they are at once relieved from all that trouble and danger. See LOAD.

MASTER-PIECE, an exquiſite, or extraordinary work, or performance, in any art or ſcience.

MASTER-PIECE, *chef d'œuvre*, is particularly uſed among the French, for a work which thoſe who aſpire to be admitted maſter in any art or trade, are to perform in preſence of the maſters, or jurands, of that company, by way of ſpecimen of their capacity.

MASTER-*vault*. See VAULT.

MASTER-*wort*, *imperatoria*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: it has an umbellated flower, the principal umbel plain; with no involucrum, which the ſmall ones have; the principal umbel is uniform; and the flowers have five heart-ſhaped inflexed petals, with five hairy ſtamina; the germen is ſituated under the petals which often becomes a roundiſh compreſſed fruit, divided into two parts, and contains two oval bordered ſeeds. We have but one ſpecies of this genus. Miller.

This plant grows naturally on the Alps and Pyrennees and other mountains in Italy, and is cultivated in the gardens of botaniſts, flowers in June, and the ſeeds ripen in Auguſt. Its black and fibrous roots are only uſed in medicine, which are ſaid to purge melancholic humours. Hildanus preſcribes it alſo for the cure of a ſcirrhous ſpleen.

The root of *maſter-wort*, known in the materia medica by the name *imperatoria radix*, ſhould be choſen very fair and clean, freſh dried, hard to break; of a brown colour without, and a ſomewhat greeniſh one within; and of a ſtrong ſmell, and aromatic taſte. It is uſually long, and of the thickneſs of one's thumb, wrinkled on the ſurface, and entangled with fibres. It is eſteemed cardiac, ſudorific, and alexipharmic, good againſt peſtilential and malignant diſeaſes, and againſt poiſons. A decoction of it in wine, uſed as a gargle, is ſaid to cure the tooth-ach; and externally it is much commended for the itch, and other ſcabs and ulcers. It is alſo an ingredient in ſome of the officinal compoſitions. Pomet's Hiſt. of Drugs, p. 44.

This root is likewiſe good in flatulencies; and, if Hoffman's authority may be depended on, it is one of the moſt effectual medicines in colics ariſing from windy cauſes. The ſeeds are reckoned by many among the provocatives, and are ſaid by ſome, to be of the very firſt claſs of thoſe medicines. The roots dried, and given in powder are a powerful remedy in obſtructions of the menſes; and are of great ſervice in aſthmatic caſes, tooth-ach, and in many diſorders of the head. Simon Pauli tells us, that an ointment made of the freſh roots of this plant boiled in lard, is one of the beſt remedies known for ring-worms. The root has been alſo recommended for aſthmas, the cramp, and all cold diſeaſes of the nerves.

MASTER-*wort*, *black*, *aſtrantia*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: its flowers grow in an umbel; the involucrum of the general umbel is in one ſpecies compoſed of two large trifid leaves, and two entire, in another ſpecies of ſeveral ſmall leaves; the involucrum of the ſmall umbels is compoſed of many ſmall-pointed leaves, which are longer than the umbels, coloured and ſpread open; the empalement of the flower is permanent, erect, and cut into five ſhort acute ſegments; the flowers are compoſed of five petals, erect, bifid, and bent inward: the oblong germen is ſituated below the receptacle, and becomes an oval blunt channelled fruit, divided into two parts, having two oblong oval ſeeds, incloſed in the cover. Miller enumerates three ſpecies, and Linnæus only two, viz. the greater and leſs: theſe plants are ſeldom preſerved in botanic gardens, as there is no great beauty in their flowers: all of them grow naturally upon the Alps.

MASTER-*yaw*, a large *yaw* ſometimes remaining after ſalivation. See YAWS.

MASTICA *de ſobo*, in the *Materia Medica*, the name given by the Indians to the ſtone commonly known among authors by the name of *pedro del porco*, a ſort of BEZOAR taken out of the gall-bladder of an Indian boar. The Indians, and many of the European nations, eſteem this one of the greateſt medicines in the world in peſtilential diſeaſes, and the ſmall-pox.

MASTICATION, MASTICATIO, in *Medicine*, the action of chewing, or of agitating the ſolid parts of our food between the teeth, by means of the motion of the jaws, the tongue, and the lips, whereby it is broken into ſmall pieces, impregnated with ſaliva, and ſo fitted for deglutition, and a more eaſy digeſtion in the ſtomach.

The mixture of ſaliva with the food is of abſolute neceſſity; for the ſaliva, imbibed within the parts of it diſſolves the ſalts hid in them; and by ſo doing, prepares the food for fermentation in the ſtomach. The food, therefore, has the beginning of its digeſtion from the ſaliva, and its concluſion from the ferment in the ſtomach.

MASTICATORIES, MASTICATORIA, in *Medicine*, are ſuch remedies as are taken in at the mouth, and chewed in order to promote the evacuation of the ſalival humour: as tobacco, ginger, pepper, ſage, roſmary, thyme, maſtich, &c.

MASTICH *tree*, TURPENTINE-*tree*, or PISTACHIA *nut-tree*, in *Botany*, a genus of the *dioecia pentandria* claſs. Its characters are theſe: male and female flowers grow upon different plants; the male flowers are diſpoſed in looſe ſparſed katkins, having five pointed empalements, but no petals; they have five ſmall ſtamina, terminated by oval, four-cornered, erect ſummits; the female flowers have five ſmall trifid empalements, but no petals; they have each a large oval germen, ſupporting three reflexed ſtyles, crowned by thick prickly ſtigmas; the germen turns to a dry berry, or nut, incloſing an oval ſmooth ſeed. Linnæus enumerates five, and Miller nine ſpecies. The PISTACHIA nut, which grows upon one ſpecies of this tree, is better known in England than the tree which bears it, which grows naturally in Arabia, Perſia, and Syria, whence the nuts are annually brought to Europe. The ſpecies which is called the common *maſtich*-tree, and is known by the Latin *tilli*, or *lentiſcus*, grows naturally in Spain, Portugal, and Italy, and being an ever-green is ſometimes preſerved in green-houſes in England, through the winter.

The true *maſtich*-tree of the Levant, which furniſhes the gum *maſtich*, is, according to Miller, another ſpecies. From tranverſe inciſions made in the bark of the tree, about the beginning of Auguſt, the *maſtich* reſin, or gum, exudes in drops, which running down, and concreting on the ground, are thence ſwept up. The tree is raiſed alſo in ſeveral parts of Europe; but no reſin has been obſerved to iſſue from it in theſe climates. It has its name *maſtich*, from *maſticare*, to *chew*, becauſe it is thus uſed in Chio, and by the Turks, eſpecially the women, for ſweetening the breath, and ſtrengthening the gums and teeth: and by producing a copious excretion of ſaliva, it proves ſerviceable in catarrhous diſorders. This reſin has a light agreeable ſmell, eſpecially when rubbed or heated. It is almoſt totally ſoluble in ſpirit of wine, yielding a ſolution of a pale yellow colour, but not at all in water. It becomes ſoft and tough like wax, by being chewed. *Maſtich* is recommended in doſes from half a ſcruple to half a dram, as a mild corroborant and aſtringent, in old coughs, hæmoptyſes, diarrhœas, weakneſs of the ſtomach, &c. It is given either in ſubſtance, divided by other materials; or diſſolved in ſpirit and mixed with ſyrups; or diſſolved in water into an emulſion, by the intervention of gum Arabic or almonds. It is alſo an ingredient in varniſhes. See VARNISH.

The jewellers mix *maſtich* with turpentine and ivory-black, and lay it under their diamonds, to give them a luſtre.

Maſtich is chiefly the product of Chio: the trees that yield it are there cultivated with as much care as the vines. It brings in a revenue of eighty thouſand ducats per annum to the grand ſignior. There is alſo a kind of *maſtich* brought from Egypt, which ſerves to ſophiſticate camphor. The gum *maſtich* is in ſmall granules, and white, if good; though age makes it turn yellowiſh.

The Arabian writers, Avicenna and Serapion, in their chapters of the turpentine-tree, often mention the lentiſk and its reſin, which they ſay was very much like the reſin of the common turpentine-tree. But beſides this, Avicenna has a peculiar chapter on *maſtich*; whence it ſhould ſeem, that by the name lentiſk they do not mean the tree which produces *maſtich*, but ſome peculiar ſpecies of the turpentine-tree.

Avicenna diſtinguiſhes two kinds of *maſtich*, the one called *rumi*, and the other *cupti*: the *rumi* came from the iſland of Chio, and was white; the *cupti* was of a blackiſh colour, and brought from Egypt.

MASTICH *herb*, *maſter-thyme*, *marum vulgare*, in *Botany*, a name given to one of the ſpecies of SATUREIA.

It is a plant that grows naturally in Spain, in dry gravelly grounds, and in the like ſoils bears the ordinary winters of our climate. It flowers in June, and its flowers are ſmall, white, and ſtanding in hairy briſtly empalements: the whole plant has a grateful odour.

This plant is employed chiefly, like the Syrian *maſtich*, as an errhine. It is conſiderably pungent, though leſs ſo than the other.

MASTICH, *Syrian herb*, *marum Syriacum*, is a ſpecies of *teucrium*, or *tree* GERMANDER, which grows naturally in Syria and in the kingdom of Valencia; the flowers which are of a bright red colour, appear in July and Auguſt, but are not ſucceeded by ſeeds in England. This plant is eaſily propagated by ſlips or cuttings, planted in the ſummer months on a bed of light loamy earth, where they are to be carefully ſhaded, till they have taken root; after which they are to be removed into pots or borders. The cats are very fond of this plant, and tear it to pieces; but it is obſerved, that though they never ſpare a plant that grows ſingle or where few grow, they will ſeldom touch them when planted in large cluſters. Miller.

The leaves of this plant have a bitteriſh, aromatic, very pungent taſte; and when rubbed a little, yield a quick piercing ſmell, which provokes ſneezing. They have been chiefly made uſe of as an ingredient in ſternutatory powders, though from their ſenſible qualities, they promiſe to be applicable to more important purpoſes, and to have no ill title to the ſtimulating, attenuating, deobſtruent, antiſeptic virtues, aſcribed to them by Wedelius.

MASTICH, *Indian*, *ſchinus*, in *Botany*, a genus of the *dioecia decandria* claſs. Its characters are theſe: the flower has a ſmall empalement, with five indentures at the top; it has five ſmall petals, which ſpread open, and nine or ten ſlender ſtamina, with a roundiſh germen ſupporting a ſhort thick ſtyle, crowned by a ſingle ſtigma; the germen afterwards turns to a globular berry with one cell, incloſing one globular ſeed. There are two ſpecies, which grow naturally in the ſouthern parts of America. Miller.

A decoction of the bark of this tree, makes a fomentation of extraordinary efficacy in pains of the legs, and inflations. Of the ſmall branches are made ſerviceable tooth-picks. Of the fruit boiled in water, according to the meaſure of the decoction, they prepare either a wine, a very good ſort of drink, vinegar, or honey. A decoction of the leaves gives relief in pains proceeding from cold cauſes. Raii Hiſt. Plant.

MASTICHE *terra*, *maſtich earth*, a name given by ſome of the old writers on the materia medica to the Chio earth, or TERRA *Chia*. The reaſon of this ſtrange appellation ſeems to have been, that the fineſt *maſtich* coming from the iſland of Chio, had obtained the name of *Kie*, or *Chie*, and *maſtich* and *Chia* being thus become, in one ſenſe, ſynonymous words, the uſe of them was, in this manner, carried much farther, and the earth of that iſland called by the name of the *gum*.

The Arabians ſeem to explain this very well, in their name of this earth; they not calling it *maſtich earth*, but *thin beled almaſtichi*, that is *terra regionis maſtichis*, the earth of the country where *maſtich* is produced.

MASTICOT, or *yellow lead*, is the calx or aſhes of LEAD, gently calcined, by which it is changed to a yellow, or lighter, or deeper teint, according to the degree of calcination.

Maſticot is ſometimes uſed by painters, and it ſerves medicinally as a drier in the compoſition of ointments or plaſters.

The *maſticot* which is uſed by the Dutch as the ground of their GLAZING, is prepared by calcining a mixture of one hundred weight of clean ſand, forty-four pounds of ſoda, ſold with us under the name of barilla, and thirty pounds of pearl-aſhes.

MASTIFF-*dog*, or *band-dog*, *villaticus*, or *catenarius*, is a ſpecies of great ſize and ſtrength, and a very loud barker. Manwood ſays, that it derives its name from *maſe theſeſe*, being ſuppoſed to frighten away robbers by its tremenduous voice. Great Britain was formerly ſo noted for its *maſtiffs*, that the Roman emperors appointed an officer in this iſland, with the title of *Procurator Cynegii*, whoſe ſole buſineſs was to breed, and tranſmit from hence to the amphitheatre, ſuch as would prove equal to the combats of the place. Strabo, lib. iv. tells us, that the *maſtiffs* of Britain were trained for war, and uſed by the Gauls in their battles.

MASTIGADOUR, or SLABBERING-BIT, in the *Manege*, is a ſnaffle of iron, all ſmooth, and of a piece, guarded with with pater noſters, and compoſed of three halves of great rings, made into demi-ovals of unequal bigneſs, the leſſer being incloſed within the greateſt, which ought to be about half a foot high. A *maſtigadour* is mounted with a headſtall and two reins. A horſe by champing upon the *maſtigadour*, keeps his mouth freſh and moiſt.

To put a horſe to the *maſtigadour*, is to ſet his groupe to the manger, and his head between two pillars in the ſtable. Horſes that uſe to hang out their tongues cannot do it when the *maſtigadour* is on; for that keeps their tongues ſo much in ſubjection, that they cannot put it out.

MASTIGOPHORI, Μαϛιγοφοροι, among the Greeks, certain officers appointed to preſerve the peace, and correct ſuch as were diſorderly at the Olympic games.

MASTOIDES, Μαϛοιδεης, from μαϛος, *nipple* and ειδος, *figure*, in *Anatomy*, the ſame with *mammillaris*, is applied to ſuch proceſſes in the body as have the appearance of breaſts, or dugs, ariſing from a broad baſis, and terminating in an obtuſe top.

MASTOIDES is ſometimes alſo applied to thoſe muſcles which ſtoop the head, proceeding from the neck-bone and breaſt-bone, and terminating in the proceſs mammiformis.

MASTON, in *Botany*, a name by which Pliny and ſome other authors have called the *ſcabioſa*, or *ſcabious*, a blue-flowered plant, common among corn.

MAT, in *Sea-Language*. See MATTS.

MATCH, from the Saxon *maca*, a *companion*, becauſe, ſays, Johnſon, the *match* is companion to the gun; a kind of rope, ſlightly twiſted, and prepared to retain fire, for the uſes of artillery, mines, fireworks, &c.

It is made of hempen tow, ſpun on the wheel like cord, but very ſlack; and it is compoſed of three twiſts, which are afterwards again covered with tow, ſo that the twiſts do not appear; laſtly, it is boiled in lees of old wines; whence its colour. This, when once lighted at the end burns on gradually and regularly, without ever going out, till the whole is conſumed.

Since fuſees have been introduced in lieu of *match*-lock muſkets, the conſumption of *match* have been much leſs conſiderable than before.

MATCHING, in the *Wine Trade*, the preparing veſſels to preſerve wines and other liquors, without their growing four or vapid. See WINE.

The method of doing it is this: melt brimſtone in an iron ladle, and, when thoroughly melted, dip into it ſlips of coarſe linen cloth, take theſe out, and let them cool. This is what the wine-coopers call *match*. Take one of theſe *matches*, ſet one end of it on fire, and put it into the bung-hole of a caſk; ſtop it looſely, and thus ſuffer the *match* to burn nearly out; then drive in the bung tight, and ſet the caſk aſide for an hour or two. At the end of this time examine the caſk, and you will find that the ſulphur has communicated a violently pungent and ſuffocating ſcent to the caſk, with a conſiderable degree of acidity, which is the gas, and acid ſpirit of the ſulphur. The caſk may, after this, be filled with a ſmall wine, which has ſcarce done its fermentation, and bunging it down tight, it will be kept good, and will ſoon clarify. This is a common and a very uſeful method; for poor wines would ſcarce be kept potable, even a few months, without it. Nor could ſtums be prepared in large quantities without this help. Shaw's Lectures, p. 191.

MATE *of a merchant ſhip*, is the officer who commands in the abſence of the MASTER, and ſhares the duty with him at ſea; being charged with every thing that regards the intended management of the ſhip, the direction of her courſe, and the government of her crew.

MATE *of a ſhip of war*, is an officer under the direction of the MASTER, by whoſe choice he is generally appointed, to aſſiſt him in the ſeveral branches of his duty.

Accordingly, he is to be particularly attentive to the navigation in his watch, &c. to keep the log regularly, and examine the line and glaſſes, by which the ſhip's courſe is meaſured, and to adjuſt the ſails to the wind, in the fore part of the ſhip. He is alſo to attend diligently to the cables, ſeeing that they are well coiled and kept clean, when laid in the tier, and ſufficiently ſerved, when employed to ride the ſhip. Finally, he is to ſuperintend and aſſiſt at the ſtowage of the hold, taking eſpecial care that all the ballaſt and proviſions are properly ſtowed therein.

The number of *mates* allowed to ſhips of war and merchantmen, is always in proportion to the ſize of the veſſel. Thus a firſt-rate man of war has ſix *mates*, and an Eaſt Indiaman the ſame number; a frigate of twenty guns and a ſmall merchant-ſhip have only one in each; and the intermediate ſhips have a greater or ſmaller number, according to their ſeveral ſizes, or to the ſervices on which they are employed. Falconer.

Other officers have alſo aſſiſtants, called *mates*; as the ſurgeon, gunner, carpenter, botſwain, cook, and corporal.

MATER *metallorum*, in *Natural Hiſtory*, a name given by the Saxon mineraliſts, and thoſe of ſome other places, to a peculiar kind of MARCASITE or MUNDIC, which they ſuppoſe, according to the expreſſion, to be the mother or parent of metals.

The marcaſite they call by this name is the common yellow kind, but in a foul ſtate, it being uſually mixed with ſome poor ore of iron, or with ſome ſtony matter, which has made it concrete looſely and irregularly, and it is found ſometimes formed into thin undulated plates, and ſometimes into complex maſſes; but is always cavernous or ſpungy, or full of ſmaller or larger holes. Theſe are often empty; but in ſome pieces they contain parcels either of the pure native metals, or of rich ores. Pieces of native copper are found in ſome, and ores of iron and tin in others. And it is ſaid in Saxony, that native ſilver, in thin plates, is found in ſome few.

MATER *tenuis*, or *Pia* MATER. See MENINGES, and PIA.

MATER *dura*. See MENINGES, and DURA.

MATERFILON, in *Botany*, a name given by ſome authors to the *jacea nigra*, or common knapweed. Our Engliſh name *matfellon*, ſeems a corruption of this. See CENTAURY.

MATERIA. See MATTER.

MATERIA *chemica*, a term uſed by authors to expreſs ſuch bodies as are the peculiar objects of chemical experiments.

The *materia chemica*, in a larger ſenſe, takes in all the bodies of the globe, all theſe being the ſubjects of chemiſtry, in its extenſive ſenſe; but the curious in chemical reſearches may be deſirous of knowing, in general, what bodies they ought to procure, and have in readineſs for them. Dr. Shaw has given a liſt of theſe for his Portable Laboratory, which will ſerve in general as well as on that particular occaſion.

This collection being diſtributed under proper claſſes will come into a ſmall compaſs, and may be conveniently carried either by land or ſea, along with that uſeful furnace, and its neceſſary apparatus.

The natural arrangement of the *materia chemica* is into the general diviſion of animal, vegetable, and mineral ſubſtances. But thoſe who are deſirous of a larger collection, may enlarge the number of general diviſions, according to Becher's method, by which all chemical ſubjects are arranged into nine general claſſes; metals, minerals, decompounds, ſalts, gums, earths, ſtones, ſpirits and oils.

The claſs of metals contains gold, ſilver, copper, iron, tin, and lead; and all theſe are to be kept both in their natural and artificial ſtate; that is, in their ores, and as ſeparated from them for human uſes. To theſe natural metals are to be added to the artificial or compound ones, viz. pewter, bell-metal, braſs, gun-metal, pin-metal, Bath-metal, Wells-metal, prince's metal, London-metal, white copper, white gold, and yellow ſilver. Under minerals are included, antimony, biſmuth, zinc, marcaſite, cobalt, zaffer, ſmalt, arſenic, manganeſe, orpiment, mercury, native cinnabar, and ſulphur. All theſe are to be kept both in their natural ſtate as dug out of the earth, and as purified.

The decompounds of minerals include aurum fulminans, luna cornea, the calces of gold and ſilver, ultramarine, diſtilled verdegris, burnt copper, putty, or calcined tin, ſugar of lead, cadmia, tutty, black-lead, red-lead, litharge, white-lead, glaſs of lead, ſimple and martial regulus of antimony, glaſs and cinnabar of antimony, the preparations of quickſilver, as ſublimate, precipitate, and the reſt.

The ſame ſort of arrangement may alſo take in the ſeveral kinds of decompounds of animal and vegetable ſubſtances. Shaw's Port. Laborat.

The claſs of ſalts takes in ſea-ſalt, nitre, alum, vitriol, borax, tartar, ſugar, potaſh, and the compound ſaline fluxes for ſtubborn ores. And to theſe are to be added the tribe of artificial ſalts, of which number are the tartarum vitriolatum, fixed nitre, ſoluble tartar, terra foliata tartari, nitrum nitratum, ſal ammoniac, Epſom ſalts, volatile ſalts, and ſeveral others of a ſimilar nature.

Under the gums are ranked pitch, reſin, turpentine, wax, camphor, amber, pit-coal, jet, and all bitumens, balſams, and inſpiſſated juices.

Among the earths are taken in ores, waſhed ores, fluds, calces of metals, lime, plaiſter, gypſum, chalk, boles, ſhells, ſand, and the foſſils commonly and properly called earths, whether they be of the calcareous or of the vitreſcible kinds; that is, whether in the fire they are converted into a ſort of lime, or run into a glaſs.

Stones include flints, pebbles, quarry-ſtone, cryſtal, talc, the vulgar ſtones, and all the gems from the diamond down to the ſpars.

Laſtly, under ſpirits and oils come aqua regia, aqua fortis, oil of vitriol, ſpirit of ſalt, ſpirit of nitre, ſpirit of ſulphur, ſpirit of alum, ſpirit of vinegar, ſpirit of wine, ſpirit of urine, ſpirit of tartar, ſpirit of turpentine, oil of tartar per deliquium; the eſſential oils of nutmegs, cloves, and the like; the expreſſed oils of olives, almonds, linſeed, and the like; and the compound oils; as butter of antimony, artificial balſams, &c.

It is eaſy to ſee that this ſort of claſſing is not fit for the naturaliſt, who ſtudies bodies for their natural qualities, nor indeed for the nice diſtinguiſher of any kind; but in this manner Beecher adviſes the young operator in chemiſtry, to procure to himſelf a ſort of artificial alphabet of nature, and this will ſerve the purpoſe very well, where no more is meant than a mere *materia chemica*, to be put in ſuch order, that it may be readily had recourſe to in all its parts. With this the young operator is to proceed regularly, as he would do in learning a language. Forming firſt ſyllables out of the joining of two or more letters of this alphabet, and then words, by combining theſe firſt ſets together, and finally, whole diſcourſes; that is, forming theſe various ſimple bodies into mixts, compounds and decompounds. Becher's Phyſ. Subter. p. 179.

To avoid miſcarriages, and prevent being impoſed upon, it will be very proper to cultivate a knowledge of the productions of nature in their crude ſtate, and peculiar places of growth, where being firſt viewed and examined before they are gathered or dug up, an exact knowledge of them as nature furniſhes them, may be procured. For want of this previous qualification, men, otherwiſe of great ſagacity, have erred in their operations, and perhaps blamed the original author of a proceſs, in which they miſcarry; where they are all the while uſing a wrong ſubject, or an adulterated or imperfect one, inſtead of the true. From this miſtake alone, numberleſs complaints have ariſen of the failure and uncertain ſucceſs in the proceſſes and experiments recorded even by the beſt authors.

The perſon who would work in chemiſtry with pleaſure and ſucceſs, ſhould make a ſufficiently copious collection of a *materia chemica* of this kind, all the particulars of which he is well aſſured of, as to the genuineneſs and perfection in their kinds. Theſe being always ready, will prevent the neceſſity of ſending to the druggiſt at every turn, where the things ſent for are often either not to be had, or only in a ſophiſticated ſtate; when this alphabet of nature, compoſed of the ſeveral materials of chemical reſearches, is like the letter in a printing houſe, diſtributed and lodged in proper cells, it may readily be drawn out for uſe as occaſion requires. It is impoſſible to expreſs with how little expence and trouble, yet with how great profit and pleaſure, numerous experiments, and thoſe of the moſt difficult kind may be made, when the operator has, in this manner, all his materials about him. Becher tells us, that he has, in this manner, gone through fifty experiments in a day; and, while writing on chemical ſubjects, if any difficulty or uncertainty occurred, he immediately got up from his deſk, made the neceſſary experiment, and ſat down again to write the certain fact: ſo that he affirms, there was very little more trouble in making the experiment at the fire, than in the deſcribing the proceſs by the pen.

Materia *ſubtilis*, denotes the fine ſubtile matter, which the Carteſians ſuppoſe to prevade and penetrate freely the pores of all bodies, and to fill up all the pores ſo as not to leave the leaſt vacuity, or interſtice, between them.

This machine they have recourſe to, to ſupport the doctrine of an abſolute plenum, and to make it conſiſtent with the phenomena of motion, &c. and, accordingly, they make it act and move at pleaſure, but in vain: for were there any ſuch matter, in order for it to be be able to fill up the vacuities of other bodies, it muſt, itſelf, be entirely void of any, i. e. it muſt be perfectly ſolid, vaſtly more ſolid than gold, and, therefore, more ponderous, and reſiſt vaſtly more, which is inconſiſtent with phenomena. See Vacuum, and Plenum.

Yet ſir Iſaac Newton allows of the exiſtence of a ſubtile matter, or medium, vaſtly finer than air, penetrating the cloſeſt bodies, and contributing to the production of many of the phenomena of nature. The exiſtence of ſuch a matter he argues from the experiment of two thermometers, which being incloſed in glaſs veſſels, "one "of them exhauſted of its air, and both carried from "a cold to a warm place, the thermometer *in vacuo* grows "warm, and riſes, almoſt as ſoon as that in the air; and, "if returned into the cold place, both cool and fall "about the ſame. Hence, ſays he, is not the heat of "the warm room conveyed through the vacuum by the "vibrations of a much ſubtiler medium than air, which "remained *in vacuo* after the exhauſtion of the air? And "is not this medium the ſame whereby light is refracted, "reflected, &c?."

MATERIAL, denotes ſomething compoſed of matter. In which ſenſe the word ſtands oppoſed to immaterial. The Epicureans, Spinoſiſts, &c. own no other but *material* ſubſtances. See Substance. Among cauſes, ſome are *material*, others formal. See Cause.

Material cauſes, having no underſtanding or liberty, muſt always act in the ſame manner, when under the ſame circumſtances. Philoſophers and divines diſpute, whether or no there be any *material* forms really diſtinct from the matter? See form. The Valentinians formerly applied the term *material* to all people but thoſe of their own ſect; aſſerting that their ſouls periſhed with their bodies. Thus alſo the Stoics maintained, that none but the ſouls of their wiſe men ſurvived the body.

Material *circle*. See Circle.

Material *object*. See Object.

MATERIALISTS, a ſect in the ancient church, compoſed of perſons, who, being prepoſſeſſed with that maxim in the ancient philoſophy, *Ex nihilo nihil fit*, *Out of nothing nothing can ariſe*, had recourſe to an internal matter, on which they ſuppoſed God wrought in the creation; inſtead of admitting God alone as the ſole cauſe of the exiſtence of all things.

Tertullian vigorouſly oppoſes the doctrine of the *Materialiſts*, in his treatiſe againſt Hermogenes, who was one of their number.

Materialiſts is alſo a name given to thoſe who maintain that the ſoul of man is material; or that the principle of perception and thought is not a ſubſtance diſtinct from the body, but the reſult of corporeal organization. See Soul. There are others, called by this name, who have maintained that there is nothing but matter in the univerſe; and that the Deity himſelf is material. See Spinosism.

MATFILON, in *Botany*. See Centaury.

MAT-*weed*, in *Botany*. See Lyceum.

MATHEDORAM, a name by which ſome chemiſts have called *ſal gemm*.

MATHEMATICAL *point*. See Point.

Mathematical *ſect*, in the *Hiſtory of Learning*, is one of the two leading philoſophical ſects, which appeared towards the beginning of the ſeventeenth century: this ſect directed its reſearches by the principles of Gaſſendi, and ſought after truth by obſervation and experience. The diſciples of this ſect denied the poſſibility of erecting on the baſis of metaphyſical and abſtract truths, a regular and ſolid ſyſtem of philoſophy, without the aid of aſſiduous obſervation and repeated experiments, which are the moſt natural and effectual means of philoſphical progreſs and improvement. The advancement and reputation of this ſect, and of natural knowledge in general, were much owing to the plan of philoſophizing, propoſed by lord Bacon, to the eſtabliſhment of the Royal Society in London, to the genius and induſtry of Mr. Boyle, and to the unparalleled reſearches and diſcoveries of ſir Iſaac Newton. Barrow, Wallis, Locke, and many others were of this ſect. See Corpuscular, Experimental, and Newtonian *Philoſophy*.

The other ſect of philoſophers was the metaphysical.

MATHEMATICS, the ſcience of quantity; or a ſcience that conſiders magnitudes either as computable, or meaſurable.

The word in its original, *μαθησις*, ſignifies *diſcipline*, or *ſcience*, in the general, and ſeems to have been applied to the doctrine of quantity, either by way of eminence, or becauſe, as this had the ſtart of all other ſciences, the reſt took their common name from it.

For the origin of the *mathematics*, Joſephus dates it before the flood, and makes the ſons of Seth obſervers of the courſe and order of the heavenly bodies: he adds, that to perpetuate their diſcoveries, and ſecure them from the injuries either of a deluge, or conflagration, they had them engraven on two pillars, the one of ſtone the other of brick; the former of which, he ſays, was ſtanding in Syria in his days.

The firſt who cultivated *mathematics* after the flood, were the Aſſyrians and Chaldeans; from whom the ſame Joſephus adds, they were carried by Abraham to the Egyptians; who proved ſuch notable proficients, that Ariſtotle makes no ſcruple to fix the firſt riſe of *mathematics* among them. From Egypt, five hundred eighty-four years before Chriſt, they paſſed into Greece through the hands of Thales, who, having learned geometry of the Egyptian prieſts, taught it in his own country. After Thales, comes Pythagoras; who among other mathematical arts, paid a peculiar regard to arithmetic; fetching the greateſt part of his philoſophy from numbers: he was the firſt, as Laertius tells us, who abſtracted geometry from matter; and to him we owe the doctrine of incommenſurable magnitude, and the five regular bodies, beſides the firſt principles of muſic and aſtronomy. Pythagoras was ſucceeded by Anaxagoras, Oenopides, Briſo, Antipho, and Hippocrates of Chios; who all applied themſelves particularly to the quadrature of the circle, the duplicature of the cube, &c. but the laſt with moſt ſucceſs: this laſt is alſo mentioned by Proclus, as the firſt who compiled elements of *mathematics*.

Democritus excelled in *mathematics* as well as phyſics; though none of his works, in either kind, are extant: the deſtruction of which ſome authors aſcribe to Ariſtotle. The next in order is Plato, who not only improved geometry, but introduced it into phyſics, and ſo laid the foundation of a ſolid philoſophy. Out of his ſchool proceeded a crowd of *mathematicians*. Proclus mentions thirteen of note; among whom was Deodamus, who improved the analyſis firſt invented by Plato; Theætetus, who wrote elements; and Archytas, who had the credit of being the firſt who applied *mathematics* to real uſe in life. Theſe were ſucceeded by Neocles and Theon, the laſt of whom contributed to the elements. Eudoxus excelled in arithmetic and geometry, and was the firſt founder of a ſyſtem of aſtronomy. Menechmus invented the conic ſections, and Theudius and Hermotimus improved the elements.

As for Ariſtotle, his works are ſo ſtored with *mathematics* that Blancanus compiled a whole book of them: out of his ſchool came Eudemus and Theophraſtus; the firſt of whom wrote of numbers, geometry, and inviſible lines; the latter a mathematical hiſtory. To Ariſteus, Iſidorus, and Hypſicles, we owe the books of ſolids; which, with the other books of elements were improved, collected, and methodized by Euclid, who died two hundred and eighty-four years before Chriſt.

A hundred years after Euclid, came Eratoſthenes and Archimedes. Cotemporary with the latter was Conon, a geometrician and aſtronomer. Soon after came Apollonius Pergæus, whoſe conics are ſtill extant. To him are likewiſe aſcribed the fourteenth and fifteenth books of Euclid which are ſaid to have been contracted from Hypſicles. Hipparchus and Menelaus wrote on the ſubtenſes in a circle, the latter alſo on ſpherical triangles; Theodoſius's three books of ſpherics are ſtill extant. All theſe, Menelaus excepted, lived before Chriſt.

A. D. 70, Ptolemy of Alexandria was born; the prince of aſtronomers, and no mean geometrician: he was ſucceeded by the philoſopher Plutarch, of whom we have ſtill extant ſome mathematical problems. After him came Eutocius, who commented on Archimedes, and occaſionally mentions the inventions of Philo, Diocles, Nicodemus, Sporus, and Heron, on the duplicature of the cube. To Cteſebes of Alexandria we owe our pumps; and Geminus, who came ſoon after, is preferred by Proclus to Euclid himſelf.

Diophantus of Alexandria was a great maſter of numbers, and the firſt inventor of algebra: and among others of the ancients, Nicomachus is celebrated for his arithmetical, geometrical, and muſical works; Serenus, for books on the ſection of the cylinder; Proclus, for his comments on Euclid; and Theon has the credit, among ſome of being author of the books of Elements aſcribed to Euclid. The laſt to be named among the ancients is Pappus of Alexandria, who flouriſhed A D. 400, and is celebrated for his books of *mathematimal* collections ſtill extant.

See the progreſs of each branch of *mathematics*, with the authors who have written on it, under the reſpective heads; as GEOMETRY, ALGEBRA, ASTRONOMY, &c.

Mathematics are diſtinguiſhed, with regard to their end, into

MATHEMATICS, *ſpeculative*, which reſt in the bare contemplation of the properties of things: and

MATHEMATICS, *practical*, which apply the knowledge of thoſe properties to ſome uſes in life.

With regard to their object, *mathematics* are divided into *pure* or *abſtract*, and *mixed*.

MATHEMATICS, *pure*, conſider quantity abſtractedly, and without any relation to matter or bodies.

MATHEMATICS, *mixed*, conſider quantity, as ſubſiſting in material being; e. g. length in a road, breadth in a river height in a ſtar, or the like.

Pure mathematics, again, either conſider quantity as diſcrete, and ſo computable, as arithmetic; or as concrete, and ſo meaſurable, as geometry and trigonometry.

Mixed mathematics are very extenſive, and are diſtinguiſhed by various names, as the ſubject they conſider, and the views wherein people take them, vary; it being ſufficient to determine an art to be a branch of *mixed mathematics*, that *pure mathematics* are applicable thereto, i. e. that it may be explained and demonſtrated from the principles of arithmetic and geometry. Such are

MECHANICS, which conſider motion, or the laws of moving bodies. HYDROSTATICS, which conſider the laws of fluids, or of bodies gravitating in fluids. PNEUMATICS, the air, with regard to the laws and menſuration thereof. HYDRAULICS, the motion of fluids. OPTICS, direct light or viſion. CATOPTRICS, reflected viſion. DIOPTRICS, refracted viſion. PERSPECTIVE, the images of objects, in order to delineate or repreſent them. ASTRONOMY, the univerſe, and the phenomena of the heavens. GEOGRAPHY, the earth, both as in itſelf, and in its affections. HYDROGRAPHY, the ſea, principally as navigable. CHRONOLOGY, time, with regard to the meaſuring and diſtinguiſhing thereof. GNOMONICS, or DIALLING, ſhadows, in order for determining the hour of the day. PYROTECHNY, artificial fires, with regard both to diverſion and to the uſes of war. *Military* ARCHITECTURE, the ſtrength of places, with regard to their defence againſt an enemy. *Civil* ARCHITECTURE, (now become a branch of *mathematics*) or buildings. MUSIC, ſounds, and their effects on the ear.

For the elements of each of theſe, ſee the reſpective heads: and for an accurate ſyſtem of all the parts above mentioned (muſic alone excepted) orderly digeſted and clearly demonſtrated, ſee the excellent Wolfius's Elementa Matheſeos Univerſæ.

MATHURINS, in *Eccleſiaſtical Hiſtory*, a name given to the brethern of the Holy Trinity, from their having a monaſtery at Paris, erected in the place where there is a chapel conſecrated to St. *Mathurin*. See TRINITARIANS.

MATITES, in *Natural Hiſtory*, the name of a ſtone deſcribed by ſeveral authors. The characters they give of it are, that it is of a pale greyiſh colour, and of the form of the nipples of a woman's breaſt, ſeveral of theſe nipples appearing upon one ſtone.

There have been many abſurd and idle conjectures, as to the origin of this ſtone; but it may be eaſy to account for its figure on very plain and natural principles. We find in the earth many ſtones; reſembling exactly the figures of ſhells of various kinds, and parts of other animals. Theſe have, in general, once been the things they thus repreſent, petrified, or altered into the nature of ſtone, by the inſinuation of ſtony particles into their pores.

Among theſe, none are ſo frequent as the remains of the *echini marini*, or ſea-eggs, as we call them. Theſe we find in various forms, ſometimes ſingle ſpines, ſometimes whole ſhells, and ſometimes only parts of ſhells preſerved. It is well known, that all the *echini marini* have ſpines or ſpikes, whence they have their name; and in many of the ſpecies which we find recent on our ſhores, theſe ſpines are joined to the body of the ſhell by a ſmall protuberance, which, from its reſemblance to a nipple, we call *papilla*. Now we frequently find theſe papillæ delineated in creux, in pebbles, and other ſtones, ſometimes ſingly, and ſometimes in numbers together, in the form in which they adhered to the ſhell. We find, in other foſſils, that whatever ſhell, &c. is ſometimes delineated in creux on ſtone, is alſo ſometimes done in the elevated manner; and it is plain, that there needs no more to the formation of one of theſe *matitæ* than the petrifaction of a piece of the ſhell of one of thoſe *echini* which have large papillæ, ſuch as thoſe of the Red Sea, with ſome of its papillæ upon it. As to the colour, it is not to be limited to grey alone, but may be various as the colours of ſtones, ſince any ſpecies of ſtone may have gone to the formation of it; and whatever colour the ſtony matter was, of that will the *matites* be.

MATKNELTZEL, in *Ornithology*, the name of a bird approaching to the SNIPE kind, and called by Geſner *gallinula erithra*; and by the common people of Germany, *matkern*. It is all over of a reddiſh or ruddy hue, except the belly, which is white; on the back the colour is more duſky, and is variegated with black ſpots. On the wings the colour is nuch fairer and clearer, ſome of the longer feathers of them approaching to the colour of the painters red earth, called reddle. It is common in watery places, in many parts of Germany and Italy.

MATLOCK *Waters*. See *Matlock* WATERS.

MATO, in *Natural Hiſtory*, the name of a tree growing both in the Eaſt and Weſt Indies, and bearing a fruit of the ſize of an apple, and covered with a thick and tough red ſkin. This is called by ſome, the wild MANGOUSTAN. Its fruit perfectly reſembles that of the mangouſtan in figure, but is not eatable. Mem. Acad. Par. 1699.

MATORIUM, a word uſed by ſome of the chemical writers to expreſs the *gum ammoniacum*, and by others *galbanum*.

MATRASS, MATRACIUM, or BOLT-HEAD, a glaſs veſſel, uſed by chemiſts in digeſtions, and other operations.

The *matraſs* is made in form of a bottle ſomewhat bellied in the middle, with a long narrow neck; it is coated with earth, when it is to be placed on a very hot fire. And when it is required it ſhould be ſtopped very cloſe, they ſeal it hermetically.

The *matraſs*, uſed in aſſaying, is a veſſel of very pure and tranſparent glaſs, not too thick at the bottom, which would make it apt to burſt in the fire. It is, for this uſe, to be about eight or ten inches high, and to have an orifice ſcarce ſo much as half an inch wide, leſt the matters contained in it, being in a violent ſtate of ebullition, ſhould either riſe over the mouth of the veſſel, or at leaſt be partly thrown out in form of ſmall drops, like a thin rain, which drops always carry ſome of the metal with them. The bottom is capacious enough when it will hold an ounce or two of aqua fortis, and the height of the veſſel is of a farther uſe in making a greater repercuſſion of the fumes. The mouth ought alſo to be turned backwards. in form of a broad lip, that the ſolutions, when poured out, may not run down the ſides of the veſſel. Cramer, Art of Aſſ. p. 68.

Matraſſes are alſo uſed as receivers: as to their form, ſome are ſpherical, others flattened at the bottom, and others in the ſhape of an egg, called PHILOSOPHICAL *eggs*. The moſt convenient of all, when only a ſmall quantity of matter is uſed, are bottles of thin glaſs, called medical phials; becauſe they are cheap, made of good glaſs, and may be quickly heated, ſo that the liquor contained in them ſhall boil without danger of being broken. See *Tab*. II. *Chemiſtry*, *fig*. 22. and 23.

MATRICARIA, in *Botany*. See FEVERFEW.

MATRICE, or MATRIX. See MATRIX.

MATRICE, or MATRIX, in *Dying*, is applied to the five ſimple colours, whence all the reſt are derived or compoſed. Theſe are, the black, white, blue, red, and yellow or root colour. See DYING

MATRICE, or MATRICES, uſed by the *Letter-founders*, are thoſe little pieces of copper or braſs, at one end whereof are engraven, dent-wiſe, or *en creux*, the ſeveral characters uſed in the compoſing of books.

Each character, virgula, and even each point, in a diſcourſe, has its ſeveral *matrix*; and of conſequence, its ſeveral puncheon to ſtrike it. They are the engravers on metal that cut or grave the *matrices*.

When types are to be caſt, the *matrice* is faſtened to the end of a mould, ſo diſpoſed, as that when the metal is poured on it, it may fall into the creux, or cavity, of the *matrice*, and take the figure and impreſſion thereof. See *Letter*-FOUNDERY.

MATRICES, uſed in *Coining*, are pieces of ſteel, in form of dyes, whereon are engraven the ſeveral figures, arms, characters, legends, &c. wherewith the ſpecies are to be ſtamped.

The engraving is performed with ſeveral puncheons, which being formed in relievo, or prominent, when ſtruck on the metal, make an indented impreſſion, which the French call *en creux*. See the manner hereof under ENGRAVING *on ſteel*. See alſo COINING.

MATRICULA, a regiſter kept of the admiſſion of officers, and perſons entered into any body, or ſociety, whereof a liſt is made. Hence thoſe who are admitted into our univerſities are ſaid to be *matriculated*.

Among eccleſiaſtical authors, we find mention made of two kinds of *matriculæ*; the one containing a liſt of the eccleſiaſtics, called *matricula clericorum*; the other of the poor ſubſiſted at the expence of the church, called *matricula pauperum*.

MATRICULA was alſo applied to a kind of alms-houſe, where the poor were provided for. It had certain revenues appropriated to it, and was uſually built near the church; whence the name was alſo frequently given to the church itſelf.

MATRIMONY. See ESPOUSALS, and MARRIAGE.

MATRISYLVA, in *Botany*, a name by which ſome authors call the common honey-ſuckle, or wood-bind, and others the wood-ruffe.

MATRIX, in *Anatomy*, the womb, or that part of the female of any kind, wherein the fœtus is conceived, and nouriſhed till the time of its delivery. See WOMB, UTERUS, FOETUS, &c.

MATRIX, *ſuffocation of the*. See SUFFOCATION.

Speculum MATRICIS. See SPECULUM.

MATRIX is alſo applied to places proper for the generation of vegetables, minerals, and metals. Thus, the earth is the *matrix* wherein ſeeds ſprout; and marcaſites are by many conſidered as the *matrices* of metals.

The *matrix* of ORES is the earthy and ſtony ſubſtances in which theſe metallic metals are enveloped: theſe are very various, frequently ſpar, quartz, fluors, or horn-blend.

MATRIX *ſuccini*, in *Natural Hiſtory*, a name given by Hartman, and ſome other authors, to a ſort of ſubſtance reſembling foſſil wood, or the barks of trees, common in the cliffs of the ſhores of the Baltic, and found in digging all over Pruſſia. This is the bed in which the foſſil amber of that kingdom is lodged, and it is ſuppoſed to have no ſmall ſhare in the production or formation of that foſſil. The workmen who dig for amber always make this their guide, and follow the veins of it, never ſearching any where elſe for the AMBER. The very ſurface of this foſſil ſubſtance is often covered with a kind of amber; but this is poor, and of no value. Many authors have ſuppoſed this cortical or wood-like ſubſtance to be real foſſil wood; but this is an error. The maſſes of it are too large ever to have been trees, and their fibres run often to twenty, thirty, or forty feet diameter, in the ſame unbroken compages. It differs from trees alſo in this, that as they have been formed by ſucceſſive additions of matter by vegetation, their whole bulk is compoſed of circular ſtrata, if they may be ſo called, or additions of coats round a medulla or pith; but in this foſſil wood, as ſome have ſuppoſed it to be, there is no pith or medulla, no addition of circular coats, but the ſame vaſt maſs of it is continued to a vaſt length and breadth, in the manner of an earthy ſtratum, and is compoſed of thin laminæ, or plates laid flatwiſe, one over another. Were this ſubſtance really formed of the bodies of trees, we ſhould alſo find in it that variety of fibres which the ſeveral parts of wood are known to conſiſt of; but nothing of this kind appears; for we ſee the whole maſs conſiſt of abſolutely the ſame ſhaped fibres; and there never was found, in any of this ſubſtance, the leaſt reſemblance of a knot or leaf, or the pedicle of a leaf, as might well be expected, had leaves ever grown from it. Phil. Tranſ. N° 428. p. 14.

The foſſil wood, which is truly ſuch, and has been once vegetable matter, whatever part of the world it is found in, agrees in the ſame general marks of diſtinction; and knots, and other evident proofs of its having been once vegetable, are found in all of it; but this *matrix* of amber, whether found in Pruſſia, Denmark, or elſewhere, is ſtill of the ſame kind, and ſhews none of theſe characteriſtic marks of wood. However, notwithſtanding all this, it is ſaid, that on opening the ditches for the fortifications at Copenhagen, ſeveral large maſſes of amber were found, all of them adhering to the ſides of large bodies of trees, which were black as ebony. The pieces are preſerved in the cabinet of the king of Denmark in that place, and ſome of them weigh forty or fifty ounces. This is an additional circumſtance to the common obſervation of ſomething reſembling wood being always found where amber is, and deſerves to be conſidered, as it tends to overthrow the preſent received ſyſtem of amber being originally a mineral production.

Dr. Fothergill, in his Eſſay upon the Origin of Amber, maintains, that it is a vegetable reſin, the product, perhaps of the fir or pine kind; and that it is changed into its preſent form by a mineral acid. In proof of its reſinous nature, he alledges its aſpect, texture and form: beſides, the bodies incloſed in it are moſtly animals of the flying kind, few reptiles, except ſuch as ants, ſpiders, &c. which are found in trees, and ſcarcely ever any aquatics; and this could not happen in the ſea, nor in the earth, but upon its ſurface. He apprehends, likewiſe, that this reſin, with the trees which afforded it, were buried in the earth by the deluge, or ſome violent convulſion of the ſame kind: to which purpoſe he obſerves, that the ſubſtance of which the proper veins of amber conſiſt, hath ſeveral genuine charecteriſtics of wood ſtill remaining; the texture of amber, which is fibrous, and, when dried, capable of ſwimming in water, and burning like other wood, ſhews, he ſays, what it hath been. Nor is the amber diſpoſed in theſe veins in one continued ſtratum; but lumps of it are irregularly diſſeminated through the whole of the ſuppoſed woody maſs. The change which this wood undergoes, is produced partly by time, and completed by the vitriolic mineral acid of the earth. Such an acid, it is argued, is preſent wherever amber occurs in its proper *matrix*, and is ſometimes found in the amber itſelf. The acid of the ſalt of amber is vitriolic; and common turpentine affords, by proper management with a vitriolic acid, a conſiderable portion of the ſame chemical principles that amber does; and thoſe pieces of amber which have been found ſoft and imperfect, are nearly related to a vegetable reſin. Phil. Tranſ. vol. xliii. N° 472. p. 21, &c.

MATRIX is alſo applied figuratively for ſeveral things wherein there appears a kind of generation, and where certain things ſeem to acquire a new being, or at leaſt a new manner of being. Of which kind are the moulds wherein the printers types, or letters, are caſt; and thoſe uſed in ſtriking money and medals, in coining. See MATRICE.

MATRON, *matrona*, among the Romans, ſignified a married woman, and ſometimes alſo the mother of a family. There was, however, ſome difference between *matrona*, and *mater-familias*. Servius ſays, that ſome imagined the difference to lie in this, that *matrona* was a woman who had one child, and *mater-familias* one that had ſeveral. But others, particularly Aulus Gellius, take the name *matrona* to belong to a married woman, whether ſhe had any children or no; the hope and expectation of having them being enough to warrant the title of mother, *matrona*; and for this reaſon it is, that marriage is called *matrimony*. This opinion is ſupported by Nonius.

MATRON *of an hoſpital*. See HOSPITAL.

MATRONS, *jury of*, is a jury of twelve diſcreet women, directed by the judge to enquire into the fact, when a woman is capitally convicted, and pleads her pregnancy. This plea, though it cannot be made in ſtay of judgment, may be urged in reſpite of execution. If the jury bring in their verdict quick with child, execution ſhall be ſtaid generally till the next ſeſſion; and ſo from ſeſſion to ſeſſion, till either the woman is delivered, or proves, by the courſe of nature, not to have been with child at all. But if ſhe once hath had the benefit of this reprieve, and been delivered, and afterwards becomes pregnant again, ſhe ſhall not be entitled to the benefit of farther reſpite for that cauſe; for ſhe may now be executed before the child is quick in the womb, and ſhall not, by her own incontinence, evade the ſentence of juſtice.

If a widow feigns herſelf with child, in order to exclude the next heir, and a ſuppoſitious birth is ſuſpected to be intended, then upon the writ *de ventre inſpiciendo*, a jury of women is to be impanelled to try the queſtion, whether with child or no?

MATRONALIA, feaſts of the Romans ladies, or rather *matrons*, celebrated on the calends of March, in honour of the god Mars.

Ovid mentions many reaſons for the inſtitution of this feaſt; but the principal ſeems to have been the peace concluded between the Romans and Sabines, by the mediation of the women. The women granted to their ſervants on this occaſion the ſame privileges which were granted to the ſlaves by their maſters in the SATURNALIA.

No men living in celibacy were allowed to aſſiſt at the feaſt.

MATROSSES, ſoldiers in the train of ARTILLERY, next below the gunners, and properly apprentices to them; their duty is to aſſiſt the gunner in traverſing, ſpunging, loading, and firing of guns, &c. They carry fire-locks, and march along with the guns and ſtore-waggons, both as a guard, and to help in caſe of emergency.

MATT, in *Chemiſtry*, is a name given to an ore not perfectly deprived of its ſulphur, when fuſed: it is obtained in the firſt fuſion for the extraction of metal from ſome ores.

MATTADORE. See OMBRE.

MATTAGESS, in *Ornithology*, the Engliſh name of the largeſt ſpecies of the *lanius* or *butcher-bird*.

The word *mattageſs* is borrowed from the Savoyards, and ſignifies the murdering pye; and has been given it from its ſavage diſpoſition, and its reſemblance to the magpye in the ſhape of its tail. See BUTCHER-*bird*.

MATTS, on board a ſhip, a kind of broad, thick clouts wove out of ſpun-yarn, or of a variety of ſtrands, or ſeparate parts of a ſmall rope, or of a number of rope-yarn, twiſted into foxes; and uſed to preſerve the main and fore-yards from galling againſt the maſts at the ties, and at the gunnel of the loof. They alſo ſerve to keep the clew of the ſail from galling there; as alſo to ſave the clews of the fore-ſail from doing ſo at the beak-head and boltſprit. The longeſt and ſtrongeſt ſort of theſe *matts* are called panches.

MATTER, *materia*, *body*, or an extended, ſolid, diviſible, moveable, and paſſive ſubſtance, the firſt principle of all natural things, from the various arrangements and combinations whereof all bodies are formed.

Ariſtotle makes three principles, *matter*, form, and privation; which laſt the Carteſians throw out of the number, and others the two laſt.

The properties of *matter* we are pretty well acquainted with, and can reaſon about its DIVISIBILITY, SOLIDITY, &c. but the ſubject wherein theſe properties reſide, or their ſubſtratum, is ſtill a myſtery. Ariſtotle ſpeaks very darkly on the ſubject, defining *matter* to be *nec quid*, *nec quantum*, *nec quale*, nor any certain determinate thing at all; which many of his followers interpret ſo as to believe, that *matter* does not at all exiſt. The CARTESIANS make the eſſence of *matter*, to conſiſt in extenſion; arguing, that ſince the properties above mentioned are all that are eſſential to *matter*, ſome of them muſt conſtitute its eſſence; and, ſince extenſion is conceived prior to all the reſt, and is that without which none of the reſt can be conceived, extenſion is that which conſtitutes the eſſence of *matter*. But the concluſion here is unjuſt; for, on his principle, the exiſtence of *matter*, according to Dr. Clarke, would have the faireſt title to conſtitute its eſſence, the *exiſtere* being conceived prior to all properties, and even to extenſion. Since, then, the word extenſion appears to go farther, and to be more general, than *matter*, that impenetrable ſolidity, which is eſſential to all *matter*, and to *matter* alone, and from which all its properties manifeſtly flow, may, with more propriety, be called the *eſſence of matter*.

Again, if extenſion were the eſſence of *matter*, and ſo *matter* and ſpace the ſame thing, it would follow, that *matter* is infinite and eternal, that it is a neceſſary being, and could neither be created nor annihilated; which is abſurd. Beſides, it appears, both from the nature of gravity, the motions of comets, the vibrations of pendulums, &c. that ſpace is not *matter*; and therefore it is not extenſive, but ſolid, impenetrable extenſion, which has a power of reſiſting, that conſtitutes *matter*.

Many among the old philoſophers maintained the eternity of *matter*, out of which they ſuppoſed all things to be formed by the hands of nature; as being unable to conceive how any thing ſhould be formed out of nothing. Plato maintained, that *matter* had exiſted eternally, and concurred with God in the production of all things, as a paſſive principle, or a kind of collateral cauſe.

Matter and form, the two ſimple and original principles of all things, according to the ancients, compoſed ſome ſimple natures, which they called *elements*; out of the various combinations whereof all natural things were afterwards compoſed.

Dr. Woodward ſeems of an opinion not very unlike this, viz. that *matter* is originally and really very different, being at its firſt creation divided into ſeveral ranks, ſets, or kinds, of corpuſcles, differing in ſubſtance, gravity, hardneſs, flexibility, figure, ſize, &c. from the various compoſures and combinations of which, he thinks, ariſe all the varieties in bodies, as to colour, hardneſs, gravity, taſtes, &c. But ſir Iſaac Newton takes all thoſe differences to reſult from the various arrangements of the ſame *matter*; which he judges to be homogeneous and uniform in all bodies.

Beſides the properties of *matter* hitherto known, ſir Iſaac Newton has diſcovered a new one; viz. "That of attraction, or that every particle of *matter* has an attractive power, or a tendency towards every other particle: which power is ſtrongeſt in the point of contact, and ſuddenly decreaſes, inſomuch that it acts no more at the leaſt ſenſible diſtance; and, at a greater diſtance, is converted into a repellent force, whereby the parts fly from each other." On this principle of ATTRACTION, he accounts for the coheſion of the particles of bodies, which is otherwiſe inexplicable.

For he takes occaſion to obſerve, "That all bodies ſeem to be compounded of hard particles, even light itſelf, and all other the moſt volatile of fluids; inſomuch that hardneſs may be eſteemed a property of all uncompounded *matter*; at leaſt, the hardneſs of *matter* ſtands on as good a footing as that of its impenetrability; all the bodies we know of being either hard themſelves, or capable of being hardened. Now, if compound bodies be ſo hard, as we find ſome of them, and yet if they are very porous, and conſiſt of parts which are only laid together, the ſimple particles, which are void of pores, and were never yet divided, muſt be much harder. Now, ſuch hard particles being heaped together, can ſcarce touch one another in more than a few points; and therefore they muſt be ſeparable with much leſs force than is requiſite to break a ſolid particle, whoſe parts touch in all the ſpace, without any pores or interſtices to weaken their coheſion. How then ſhould ſuch very hard particles, only laid together, and touching only in a few points, ſtick together, and that ſo firmly as they do, without the aſſiſtance of ſomething that cauſes them to be attracted or preſſed towards each other?"

The ſame great author obſerves farther, "That the ſmalleſt particles may cohere by the ſtrongeſt attractions, and compoſe bigger particles of weaker virtue; and many of theſe may cohere, and compoſe ſtill bigger particles, whoſe virtue is ſtill weaker, and ſo on for divers ſucceſſions, until the progreſſion end in the biggeſt particles; on which the operations in chemiſtry, and the colours of natural bodies, depend, and, which, by cohering, compoſe bodies of a ſenſible magnitude. If the body is compact, and bends or yields inward to preſſion, without any ſliding of its parts, it is *hard* and *elaſtic*, returning to its figure with a force ariſing from the mutual attraction of its parts. If the parts ſlide from one another, the body is *malleable* or ſoft. If they ſlip eaſily, and are of a fit ſize to be agitated by heat, and the natural heat is great enough to keep them in agitation, the body is *fluid*; and, if it be apt to ſtick to things, it is *humid*. And the drops of every fluid affect a round figure by the mutual attraction of their parts, as the globe of the earth and ſea affects a round figure, by the mutual attraction of the gravity of its parts.”

Again, “Since metals, diſſolved in acids, attract but a ſmall quantity of the acid, their attractive force reaches but to a ſmall diſtance. Now, as in algebra, where affirmative quantities ceaſe, there negative ones begin; ſo in mechanics, where attraction ceaſes, there a repulſive virtue muſt ſucceed. That there really is ſuch a virtue, ſeems to follow from the reflections and inflections of the rays of light; the rays being repelled by bodies in both theſe caſes, without the immediate contact of the reflecting or inflecting body. The ſame thing ſeems alſo to follow from the emiſſion of light; a ray, as ſoon as ſhaken off from a ſhining body by the vibrating motion of the parts of the body, and got beyond the reach of attraction, being driven away with exceeding great velocity: for that force, which is ſufficient to turn it back in reflection, may be ſufficient to emit it. It ſeems alſo to follow, from the production of air and vapour; the particles, when they are ſhaken off from the body by heat or fermentation, ſo ſoon as they are beyond the reach of the attraction of the body, receding from it, and alſo from one another, with great ſtrength, and keeping at a diſtance, ſo as ſometimes to take up above a million of times more ſpace than they did before in the form of a denſe body; which vaſt contraction and expanſion ſeems unintelligible, by feigning the particles of air to be ſpringy and ramous, or rolled up like hoops, or by any other means than a repulſive power. The particles of fluids, which do not cohere too ſtrongly, and are of ſuch a ſmallneſs, as renders them moſt ſuſceptible of thoſe agitations which keep liquors in a fluor, are more eaſily ſeparated and rarefied into vapour, i. e. in the language of the chemiſts, they are *volatile*; rarefying with an eaſy heat, and condenſing again with cold. But thoſe which are groſſer, and ſo are leſs ſuſceptible of agitation, or which cohere by a ſtronger attraction, are not ſeparated without a ſtronger heat, or perhaps not without fermentation. And theſe laſt are the bodies which chemiſts called *fixed*; and yet theſe, being rarefied by fermentation, become true permanent air; thoſe particles receding with the greateſt force, and being moſt difficultly brought together, which, upon contact cohere the moſt ſtrongly. And becauſe the particles of permanent air are groſſer, and ariſe from denſer ſubſtances than thoſe of vapours; thence it is, that true air is more ponderous than vapour; and that a moiſt atmoſphere is lighter than a dry one, quantity for quantity. From the ſame repelling power it ſeems to be, that flies walk upon the water without wetting their feet; and that the object-glaſſes of long teleſcopes lie upon one another without touching; and that dry powders are difficultly made to touch one another ſo as to ſtick together, unleſs by melting them, or wetting them with water, which, by exhaling, may bring them together; and that two poliſhed marbles, which by immediate contact ſtick together, are yet difficultly brought ſo cloſe together as to ſtick.”

He farther obſerves, “That, all things conſidered, it ſeems probable, God, in the beginning, formed *matter* in ſolid, maſſy, hard, impenetrable, moveable particles, of ſuch ſizes, figures, and with ſuch other properties, and in ſuch proportion to ſpace, as moſt conduced to the end for which he formed them; and that theſe primitive particles, being ſolid, are incomparably harder than any porous bodies compounded of them; even ſo very hard as never to wear, and break in pieces: no ordinary power being able to divide what God himſelf made one in the firſt creation. While the particles continue entire, they may compoſe bodies of one and the ſame nature and texture in all ages; but, ſhould they wear away, or break in pieces, the nature of things depending on them would be changed. Water and earth, compoſed of old worn particles, and fragments of particles, would not be of the ſame nature and texture now with water and earth compoſed of entire particles in the beginning. And, therefore, that nature may be laſting, the changes of corporeal things are to be placed only in the various ſeparations, and new aſſociations and motions, of theſe permanent particles; compound bodies being apt to break not in the midſt of ſolid particles, but where thoſe particles are laid together, and touch in a few points.”

It ſeems farther, “That theſe particles have not only a *vis inertiæ*, accompanied with ſuch paſſive laws of motion as naturally reſult from that force, but alſo that they are moved by certain active principles, ſuch as is that of gravity, and that which cauſeth fermentation, and the cohesion of bodies. Theſe principles are to be conſidered not as occult qualities, ſuppoſed to reſult from the ſpecific forms of things, but as general laws of nature, by which the things themſelves are formed; their truth appearing to us by phænomena, though their cauſes are not yet diſcovered.”

Hobbes, Spinoza, &c. maintain all the beings in the univerſe to be *material*, and their differences to ariſe from their different modifications, motions, &c. Thus *matter*, extremely ſubtile, and in a briſk motion, they conceive, may think; and ſo they exclude all ſpirits out of the world. See HOBBISM and SPINOZISM.

Dr. Berkeley, on the contrary, argues againſt the exiſtence of *matter* itſelf; and endeavours to prove, that it is a mere *ens rationis*, and has no exiſtence out of the mind. See ABSTRACTION, BODY, and EXISTENCE.

Some late philoſophers have advanced a new hypotheſis concerning the nature and eſſential properties of *matter*. The firſt perſon who ſuggeſted, or at leaſt publiſhed an account of this hyphotheſis, was M. Boſcovich, in his Theoria Philoſophiæ Naturalis. Venice, 1763. He ſuppoſes that *matter* is not impenetrable, as before him it had been univerſally taken for granted; but that it conſiſts of phyſical points only, endued with powers of attraction and repulſion, taking place at different diſtances, that is, ſurrounded with various ſpheres of attraction and repulſion; in the ſame manner as ſolid *matter* is generally ſuppoſed to be. Provided, therefore, that any body move with a ſufficient degree of velocity, or have ſufficient momentum to overcome any power of repulſion that it may meet with, it will find no difficulty in making its way through any body whatever; for nothing will interfere, or penetrate another, but powers, ſuch as we know do in fact exiſt in the ſame place, and counterbalance and over-rule one another; a circumſtance which never had the appearance of a contradiction, or even of a difficulty. If the momentum of ſuch a body in motion be ſufficiently great, M. Boſcovich demonſtrates, that the particles of any body through which it paſſes, will not even be moved out of their place by it. With a degree of velocity ſomething leſs than this, they will be conſiderably agitated, and ignition might perhaps be the conſequence; though the progreſs of the body in motion would not be ſenſibly interrupted; and with a ſtill leſs momentum it might not paſs at all. This theory M. Boſcovich has taken great pains to illuſtrate and confirm; ſhewing, that it is by no means inconſiſtent with any thing that we know concerning the laws of mechanics, or our diſcoveries in natural philoſophy; and that a great variety of phenomena, particularly thoſe which relate to LIGHT, admit of a much eaſier ſolution upon this hypotheſis than upon any other. The moſt obvious difficulty, ſays Dr. Prieſtley, and indeed the only one that attends this hypotheſis, as it ſuppoſes the mutual penetrability of *matter*, ariſes from the difficulty we meet with in attempting to force two bodies into the ſame place. But it is demonſtrable, that the firſt obſtruction ariſes from no actual contact of *matter*, but from mere powers of repulſion. This difficulty we can overcome; and having got within one ſphere of repulſion, we fancy that we are now impeded by the ſolid *matter* itſelf. But the very ſame is the apprehenſion of the generality of mankind with reſpect to the firſt obſtruction. Why, therefore, ſays he, may not the next reſiſtance be only another ſphere of repulſion, which may only acquire a greater force than we can apply to overcome it, without diſordering the arrangement of the conſtituent particles; but which may be overcome by a body moving with the amazing velocity of light.

This ſcheme of the mutual penetration of *matter* firſt occurred to Mr. Michell, independently of any communication with Mr. Boſcovich, on reading Baxter on the Immateriality of the Soul. He found that this author's idea of *matter* was, that it conſiſted, as it were, of bricks cemented together by an immaterial mortar. Theſe bricks, if he would be conſiſtent in his reaſoning, were again compoſed of leſs bricks, cemented likewiſe by an immaterial mortar, and ſo on *ad infinitum*. This putting Mr. Michell upon the conſideration of the appearances of nature, he began to perceive that the bricks were ſo covered with this immaterial mortar, that, if they had any exiſtence at all, it could not poſſibly be perceived; every effect being produced at leaſt in nine inſtances in ten certainly, and probably in the tenth alſo, by this immaterial, ſpiritual, and penetrable *matter*. Mr. Mitchell, finding it neceſſary, in order to ſolve the appearances of nature, to admit of extended and penetrable immaterial ſubſtance, if he maintained the impenetrability of *matter*; and obſerving farther, that all we perceive by contact, &c. is this penetrable immaterial ſubſtance, and not the impenetrable one, began to think, that he might as well admit of penetrable material, as penetrable immaterial ſubſtance; eſpecially as we know nothing more of the nature of ſubſtance than that it is ſomething which ſupports properties; which properties may be whatever we pleaſe, provided they be not inconſiſtent with each other, that is, do not imply the abſence of each other. This by no means ſeemed to be the caſe, in ſuppoſing two ſubſtances to be in the ſame place at the ſame time, without excluding each other; the objection to which is only derived from the reſiſtance we meet with to the touch, and is a prejudice that has taken its riſe from that circumſtance. Dr. Prieſtley obſerves, that if he were to make any alteration in this hypotheſis, it would be to ſuppoſe the force of the ſphere of repulſion next to any of the indiviſible points, which conſtitute what we call ſolid bodies, not to be abſolutely infinite, but ſuch as may be overcome by the momentum of light. If, however, we conſider that Mr. Boſcovich makes this neareſt power of repulſion not to extend to any real ſpace, but to be confined in the indiviſible point itſelf, it may appear to be ſufficient for the purpoſe. Such is the account which Dr. Prieſtley, a zealous and able advocate for this hypotheſis, has given of it, in his Hiſtory, and preſent State of Diſcoveries relating to Light, &c. p. 390, &c.

In conformity to this hypotheſis, Dr. Prieſtley maintains, that *matter* is not that inert ſubſtance that it has been ſuppoſed to be; that powers of attraction or repulſion are neceſſary to its very being, and that no part of it appears to be impenetrable to other parts. Accordingly, he defines *matter* to be a ſubſtance, poſſeſſed of the property of extenſion, and of powers of attraction or repulſion, which are not diſtinct from *matter*, and foreign to it, as it has been generally imagined, but abſolutely eſſential to its very nature and being: ſo that when bodies are diveſted of theſe powers, they become nothing at all. However, though he ſuppoſes that theſe powers are eſſential to the being of *matter*, inſomuch that it cannot exiſt without them as a material ſubſtance at all, he by no means maintains that they are ſelf-exiſtent in it; but that from whatever ſource theſe powers are derived, or by whatever being they are communicated, *matter* cannot exiſt without them; and if that ſuperior power or being withdraw its influence, the ſubſtance itſelf neceſſarily ceaſes to exiſt, or is annihilated. Whatever ſolidity any body has, it is poſſeſſed of only in conſequence of being endued with certain powers, and together with this cauſe, ſolidity, being no more than an effect, muſt ceaſe. Dr. Prieſtley, in another place, has given a ſomewhat different account of *matter*; according to which it is only a number of centres of attraction and repulſion; or more properly of centres, not diviſible, to which divine agency is directed; and as ſenſation and thought are not incompatible with theſe powers, ſolidity, or impenetrability, and conſequently a *vis inertiæ*, only, having been thought repugnant to them, he maintains, that we have no reaſon to ſuppoſe that there are in man two ſubſtances abſolutely diſtinct from each other. Diſquiſitions on *Matter* and Spirit, 1777, paſſim. See SOUL.

Dr. Price, in a correſpondence with Dr. Prieſtley, publiſhed under the title of a Free Diſcuſſion of the Doctrines of Materialiſm and Philoſophical Neceſſity, 1778, has ſuggeſted a variety of unanſwerable objections againſt this hypotheſis of the penetrability of *matter*, and againſt the concluſions which are drawn from it. This *vis inertiæ* of *matter*, he ſays, is the foundation of all that is demonſtrated by natural philoſophers concerning the laws of the colliſion of bodies. This, in particular, is the foundation of ſir Iſaac Newton's philoſophy, and eſpecially of his three laws of motion. Solid *matter* has the power of acting on other *matter* by impulſe; but unſolid *matter* cannot act at all by impulſe; and this is the only way in which it is capable of acting, by any action that is properly its own. If it be ſaid, that one particle of *matter* can act upon another without contact and impulſe, or that matter can, by its own proper agency, attract or repel other *matter* which is at a diſtance from it, then a maxim hitherto univerſally received muſt be falſe, that "nothing can act where it is not." Sir I. Newton in his letters to Dr. Bentley, calls the notion, that *matter* poſſeſſes an innate power of attraction, or that it can act upon *matter* at a diſtance, and attract and repel by its own agency, an abſurdity into which, he thought, no one could poſſibly fall. And in another place he expreſsly diſclaims the notion of innate gravity, and has taken pains to ſhew that he did not take it to be an eſſential property of bodies. By the ſame kind of reaſoning purſued, it muſt appear, that *matter* has not the power of attracting and repelling; that this power is the power of ſome foreign cauſe, acting upon *matter* according to ſtated laws; and that, conſequently, attraction and repulſion, not being actions, much leſs inherent qualities of *matter*, as ſuch, it ought not to be defined by them. And if *matter* has no other property, as Dr. Prieſtley aſſerts, than the power of attracting and repelling, it muſt be a non-entity; becauſe this is a property that cannot belong to it. Beſides, all power is the power of ſomething; and yet if *matter* is nothing but this power, it muſt be the power of nothing; and the very idea of it is a contradiction. If matter is not ſolid extenſion, what can it be more than mere extenſion? Farther, *matter* that is not ſolid is the ſame with pore; it cannot, therefore, poſſeſs what natural philoſophers mean by the momentum or force of bodies, which is always in proportion to the quantity of *matter* in bodies, void of pore. Momentum is the cauſe of reſiſtance, and not *vice verſa*. Moreover, within the ſphere of repulſion, the attraction of coheſion takes place; and this is the power which, according to Dr. Prieſtley, unites the parts of *matter*, and gives it exiſtence. But, ſince *matter* is penetrable, will not this attraction drive all the parts of it into one another, and cauſe them to coaleſce into nothing? This effect muſt follow, unleſs there exiſts, beyond the ſphere of attraction, and nearer to *matter*, a ſecond ſphere of repulſion, which again prevents contact. Thus it appears evident, that if a power of attracting acts, it muſt contract itſelf into nothing; and that if a power of repulſion acts, it muſt diſſipate itſelf into nothing. For a farther account of the arguments *pro* and *con* on this ſubject, we muſt refer to the work already cited.

MATTER, *ætherial*. See ÆTHERIAL.

MATTER, *ſubtile*. See MATERIA *ſubtilis*.

MATTER, *quantity of*. See QUANTITY.

MATTER *of deed* ſignifies a truth to be proved, though not by any record: by which it ſtands contradiſtinguiſhed from

MATTER *of record*, which is that which may be proved by ſome record.

If a man be ſued to an exigent during the time he was in the king's wars, this is *matter in deed*, and not *matter of record*; and therefore he that will allege this for himſelf muſt come before the ſcire facias or execution be awarded againſt him; for, after that, nothing will ſerve but *matter of record*; that is, ſome error upon the proceſs appearing upon record.

MATTER, *foreign*. See FOREIGN.

MATTHEW, or *Goſpel of St. Matthew*, a canonical book of the New Teſtament. St. *Matthew* is ſaid by many to have wrote his Goſpel in Judæa, at the requeſt of thoſe he had converted, and it is thought by ſome, as Baronius, Grotius, Voſſius, Jones, Wetſtein, &c. that he began it in the year 41, eight years after Chriſt's reſurrection. But according to others, as Mill, Baſnage, Dr. Lardner, &c. who follow the teſtimony of Irenæus, this goſpel was wrote in the time of Nero, about thirty years after our Saviour's aſcenſion, or about the year 64 or 65 of the vulgar epoch. It was written, according to the teſtimony of moſt of the ancients, as Papias, A. D. 116, Irenæus in 178, Origin in 230, Euſebius in 315, Athanaſius, Cyril of Jeruſalem, Epiphanius, Gregory Nazianzen, Theodore Mopſueſtia, Jerome, Chryſoſtom, &c. in the Hebrew or Syriac language, which was then common in Judæa; but the Greek verſion of it, which now paſſes for the original, is ſaid to be as old as the apoſtolical times. However, many learned moderns, as Eraſmus, Calvin, Le Clerc, &c. are of opinion, that this goſpel was firſt wrote in Greek, which was much uſed at that time throughout the whole Roman empire, and particularly in Judæa: and it is alleged, that Papias, who firſt advanced this opinion, was a weak and credulous man. Le Clerc, Jones, Baſnage, Lardner, &c. are of this opinion. Dr. Lardner obſerves on this point, that if St. *Matthew* did not write till about thirty years after our Lord's aſcenſion, which he thinks moſt probable, he would uſe the Greek language; but if he wrote his goſpel within the ſpace of eight years after Chriſt's aſcenſion, it is moſt likely that he wrote in the Hebrew. He adds, farther, that there was very early a Greek goſpel of St. *Matthew*, cited and referred to by Clement of Rome, Ignatius, Polycarp, Juſtin Martyr, and others; that many of the ancients do not ſeem to have fully believed that *Matthew* wrote in Hebrew, becauſe they have ſhewn very little regard to the Hebrew edition of it: that there are not in our Greek goſpel of St. *Matthew* any marks of a tranſlation; that there is no where any probable account who tranſlated this goſpel into Greek;

and beſides, as the Greek goſpel was tranſlated into Hebrew in very early days of Chriſtianity, many not examining it particularly, nor indeed being able to do it, for want of underſtanding the language, might imagine, that it was firſt writ in Hebrew. Hence, according to Dr. Lardner, ſprung the opinon, that *Matthew* publiſhed his goſpel at Jeruſalem, or in Judæa, for the Jewiſh believers and at their requeſt, before he went abroad to other people: whereas he apprehends, that this goſpel, as well as the others, were writ and intended for believers of all nations; and that the Nazarene goſpel was St. *Matthew's* goſpel, tranſlated from Greek, with the addition of ſome other things, taken from the other goſpels, and from tradition. Allowing the date of this goſpel already aſſigned, he cannot conceive the reaſon why *Matthew* ſhould write in Hebrew any more than any of the other evangeliſts; for it may be reckoned highly probable, or even certain, that he underſtood Greek, before he was called by Chriſt to be an apoſtle. Whilſt a publican, he would have frequent occaſions both to write and ſpeak Greek, and could not diſcharge his office, without underſtanding that language. Lardner's Credibility, &c. vol. xv. chap. 5.

St. Matthew's *day*, is a feſtival obſerved on the twenty-firſt of September.

MATTHIOLA, in *Botany*, a genus of the *pentandria monogynia* claſs, the characters of which are theſe: the cup is a cylindrical perianthium, is very ſhort, erect, and undivided, and remains after the flower is fallen; the flower is monopetalous, and conſiſts of a very long tube, which dilates, by degrees, into a large and wide mouth, with a ſmooth or undivided edge; the ſtamina are five pointed filaments, ſhorter than the flower; the apices are ſimple; the germen of the piſtil is globoſe, and is placed beneath the cup; the ſtyle is very ſlender, and of the length of the cup; the ſtigma is large and obtuſe; the fruit is a drupe of a globoſe figure, containing only one cell, and crowned with the cup: the ſeed is a globoſe nut or ſtone, containing a kernel of the ſame globoſe form.

MATTINS, from the Italian *mattina*, or the French *matin*, *morning*, the firſt part in the daily ſervice of the Romiſh church.

Mattins are ſometimes held early in the morning, ſometimes at midnight, and ſometimes the evening before; and infirm people even in monaſteries, are diſpenſed from attending *mattins*.

MATTKEM, in *Ornithology*, a common name in Germany for the MATKNELTZEL.

MATUITUI, in *Ornithology*, the name of a Braſilian bird, of the turdus or thruſh kind, and of the bigneſs of the common ſtarling. See Curicaca.

MATULAM.—*Hydrops ad* Matulam. See Hydrops.

MATURANTIA, in *Medicine*, &c. *ripeners*; or ſuch things as promote maturation. See Suppuration.

MATURAQUE, in *Ichthyology*, the name of an American fiſh, of the harengiform kind, and having only one ſhort fin on the back. It ſeldom grows to more than four inches long, and is ſomewhat flatiſh, but not very broad; its head is very broad, and covered with a ſhelly cruſt; it is caught in lakes, not in rivers, and is a well taſted fiſh.

MATURATION *of fruit*, in *Gardening*. See Caprification, Forcing, and Hot-*beds*.

Maturation, in *Pharmacy*, a preparation of fruits, or other ſimples, gathered before their maturity, to fit them to be eaten, or for other uſes. See Fruit, &c.

MAUCUACO, in *Zoology*, is made a diſtinct genus of animals, with ſix cutting teeth, and two canine teeth in each jaw, a ſharp-pointed viſage like a fox, and feet formed like a hand. This genus comprehends ſeveral ſpecies of the LEMUR, according to the Linnæan ſyſtem. See Loris, Mongooz, &c.

MAUDIHOCA, the caſſada, or the poiſonous root of which bread is made in many parts of the Weſt Indies.

MAUDLIN, in *Botany*. See Yarrow, and Ageratum.

MAVIS, in *Ornithology*, the common name of the ſong-thruſh, or THROSTLE.

MAUNCH, the figure of an ancient ſleeve of a coat, ſo called by the heralds; and is borne in many gentlemen's eſcutcheons; as in the earl of Huntingdon's. See *Tab. Herald. fig.* 40.

MAUND, in our *Old Writers*, a kind of great baſket or hamper, containing eight bales, or two fats: it is commonly a quantity of eight bales, of unbound books, each bale having one thouſand pounds weight. Book of Rates, p. 3.

MAUNDY, or Maundey *Thurſday*. *Dies* Mandati, the Thurſday before Eaſter; ſo called from the French *mande*, i. e. *ſportula*; it being a cuſtom on that day to give a largeſs or bounty to certain poor men, whoſe feet the king formerly waſhed, as a mark of humility, and in obedience to the command of Chriſt.

St. MAUR, *congregation of*, in *Eccleſiaſtical Hiſtory*, a famous ſociety of Benedictins, which was founded in the year 1620, by the expreſs order of Gregory XV. and enriched by Urban VIII. in 1627, with ſeveral donations and privileges. This ſociety has been diſtinguiſhed by the great number of excellent rules and inſtitutions that are obſerved in it, and by the regular lives and learned labours of its members. Thoſe who have any acquaintance with the hiſtory and progreſs of learning in Europe, well know what ſignal advantages the republic of letters has derived from the eſtabliſhment of this famous congregation, whoſe numerous and admirable productions have caſt a great light upon all the various branches of philology and belles lettres, and whoſe reſearches have taken in the whole circle of ſciences, philoſophy excepted. Theſe Benedictins ſtill maintain their literary fame, by the frequent publication of laborious and learned productions in all the various branches of ſacred and profane literature.

MAUROCENIA, in *Botany*. See *Hottentot* Cherry.

MAUROUSE, the name of a creature of the deer kind, mentioned by Joſſelyn. It ſeems to be the ſame with the *dama Virginiana* of Mr. Ray, one of which creatures was, in his time, kept alive in St. James's park.

This is not certain, however; for Joſſelyn's deſcription is very imperfect; he only ſays it is like the mooſe-deer, but is ſmall, and has ſmall horns.

MAUSOLEUM, a magnificent tomb, or funeral MONUMENT, decorated with architecture and ſculpture, and inſcribed with an epitaph; erected in honour of ſome emperor, prince, or other illuſtrious perſon.

The word comes from *Mauſolus*, the name of a king of Caria, to whom Artemiſia, his widow, erected a moſt ſtately monument that has ſince been numbered among the ſeven wonders of the world; calling it, from his name, *Mauſoleum*. It was ſixty-three feet long, almoſt four hundred and eleven feet in compaſs, and about thirty-five feet high, ſurrounded with thirty-ſix columns, that were beautified in a wonderful manner. Pliny has deſcribed it, lib. xxxvi. cap. 5. Afterwards the ſame name was given to all coſtly monuments. Thus the ſtately monument was called, which Auguſtus built, during his ſixth conſulſhip, between the Flaminia Via and the Tiber, to be a burial place for him and his family, and which Strabo has deſcribed in his fifth book. It is alſo the name which Florus, lib. iv. cap. 11. gives to the monuments of the kings of Egypt, wherein Cleopatra ſhut herſelf up, and put herſelf to death. Many authorities teſtify, that the Romans gave this name to thoſe ſepulchres whoſe ſtructure was magnificent.

Mausoleum is alſo uſed to ſignify the decoration of a fictitious tomb, or catafalca, in funeral pomp.

MAW. See Abomasus.

Maw, *ſea*. See *Sea*-Mall.

MAXILLÆ, in *Anatomy*, the jaws of thoſe parts of an animal, wherein the teeth are ſet, and which ſerve for maſticating the food.

The *maxillæ* are two in number, and are denominated, from their ſituation, *ſuperior*, and *inferior*.

Maxilla *ſuperior*, or the upper jaw, is immoveable in man, and all other animals we know of; excepting parrots, crocodiles, and the acus vulgaris, or gar-fiſh. Vide Ray Synopſ. Piſ. p. 109.

The upper jaw comprehends not only the two large bones named *oſſa maxillaria*, from *maxilla*, by which this portion of the face is expreſſed, but likewiſe the two *oſſa* MALARUM, the two *oſſa* UNGUIS, or lachrymalia, the two *oſſa* NASI, the two *oſſa* PALATI, the two *oſſa convoluta*, or lower ſhells of the NOSE, and one ſingle bone called VOMER. All theſe amount to thirteen in number. In this jaw are alveoli, or ſockets, for ſixteen teeth. See *Tab. Anat.* (*Oſteol.*) *fig.* 1. *lit. d.*

Maxilla *inferior*, or the lower jaw, only conſiſts of two bones, which unite in the middle of the chin, by the intervention of a cartilage, which hardens as the child grows; and at length, about the age of ſeven years, becoming bony, joins the two bones into a continued one reſembling the Greek *υ*. See *Tab. Anat.* (*Oſteol.*) *fig.* 1. *lit. e.*

It conſiſts of two tables, betwixt which is a ſpongy ſubſtance, in children medullary. The fore-part is ſhallow, juſt ſufficient to afford ſockets for ſixteen teeth; it has two proceſſes, the *corone* and *condyloides*; four holes or foramina for the paſſage of veſſels, and five pair of proper muſcles, viz. the crotaphytes or temporal, the maſſeter, biventer or digaſtricus, pterygoideus internus, and pterygoideus externus. See each in its place.

The lower jaw is connected with the oſſa temporum by a very ſingular kind of articulation, partaking of the nature both of a ginglymus and arthrodia, and termed by Winſlow amphidiarthroſis. Its principal motions are upward and downward, and in all the different degrees thereof we can thruſt it forward, pull it backward, and turn it to either ſide; and in the ſame manner, in any degree of motion forward, backward, or laterally, we can raiſe or depreſs it. The mechaniſm of this articulation of its motions depend on a cartilage.

MAXILLÆ *quartus*, in *Anatomy*, a name given by Veſalius, and ſome others, to one of the muſcles of the lower jaw, commonly known by the name of the DIGASTRICUS, and called by Albinus, BIVENTER *maxillæ inferioris*.

MAXILLAM *attollens tertius*, in *Anatomy*, a name given by Riolanus, and ſome others, to a muſcle of the face, more generally known by the name of MASSETER.

MAXILLARY *bones*, *maxillaria oſſa*, or great bones of the upper jaw, are two in number, ſituated one on each ſide, in the anterior and middle part of the face; their conformation is very irregular, and they are of very conſiderable extent. Anatomiſts generally divide them into the external and internal ſides. By the external ſide they mean all that appears in an entire ſkull, without taking in the arch of the palate; and by the internal ſide, that which makes part of the arch of the palate, and all that is turned to the *ſeptum narium*. The ſeparation of this bone, by a ſmall tranſverſe ſuture behind the *foramen inciſorium*, is ſeldom found but in young ſubjects, before the oſſification is completed. The *maxillary* bone is almoſt all compact, and without diploe, except in the alveolary arch, and at the point of the orbitrary apophyſis.

The *oſſa maxillaria* are connected with the *os frontis*, *os ethmoides*, *os ſphenoides*, *oſſa unguis*, *oſſa malarum*, *oſſa naſi*, *oſſa palati*, *vomer*, *conchæ narium inferiores*, and with one another. They aſſiſt in forming the organ of maſtication, the arch of the palate, the cheeks, the orbits, the noſe, &c. Winſlow's Anatomy, p. 32, ſeq. See JAW.

MAXILLARY *gland*, MAXILLARIS *glandula*, a conſiderable gland of the conglomerate kind, ſituate on the inſide, under the lower jaw-bone, near the muſculus digaſtricus. It diſcharges itſelf by ſeveral branches of ducts, which form one trunk, that paſſes under the mylohyoideus, and meets with the *maxillary gland* of the other ſide within the fore-teeth of the lower jaw, having diſtinct orifices with a papilla on each ſide the frænum linguæ. See GLAND and MOUTH.

MAXILLARY *muſcles*, in fiſh, two large muſcles placed under the lower jaw, and ſerving to move it; theſe, with the two hypophthalmic muſcles, which are placed under the eyes, are the four cephalic muſcles of fiſhes according to authors.

MAXIM, denotes an eſtabliſhed propoſition or principle. In which ſenſe it amounts to much the ſame with AXIOM.

Maxims are a kind of propoſitions, which have paſſed for principles of ſcience; and which, being ſelf-evident, have been by ſome ſuppoſed innate.

A *maxim* in law is ſaid to be a propoſition, of all men confeſſed and granted without argument or diſcourſe.

Maxims of the law are holden for law; and all other caſes that may be applied to them, ſhall be taken for granted. 1 Inſt. 11. 67. 4 Rep. The *maxims* in our law-books, which are many and various, are ſuch as the following, viz. It is a *maxim*, that land ſhall deſcend from the father to the ſon, &c. That if a man have two ſons, by divers venters, and the one purchaſe lands and die without iſſue, the other ſhall never be his heir, &c. That as no eſtate can be veſted in the king, without matter of record, ſo none can be diveſted out of him but by matter of record. That an obligation, or matter in writing cannot be diſſolved by an agreement by word, without writing. Co. Litt. 11. 141. See LAW.

MAXIMUM, in *Mathematics*, denotes the greateſt quantity attainable in any given caſe.

By which it ſtands oppoſed to MINIMUM.

Methodus de **MAXIMIS & MINIMIS**, a method ſo called, in uſe among mathematicians, whereby they arrive at the greateſt or leaſt poſſible quantity attainable in any caſe.

If the ſemiordinates of any curve continually increaſe or decreaſe to ſome certain term, which once paſſed, they begin again to decreaſe or increaſe, the method whereby their *maxima & minima*, i. e. their greateſt and leaſt ſtates are determined, is called the method *de maximis & minimis*; which, it is true, may be uſed to determine other quantities that increaſe or decreaſe to any certain term; but then they muſt always be repreſented by the ſemiordinates of curves.

If a flowing quantity in an equation be propoſed to be determined by any extreme value, the rule is: having put the equation into fluxions, let the fluxion of that quantity (whoſe extreme value is ſought) be ſuppoſed $=0$; by this means, all thoſe members of the equation, in which it is found, will vaniſh, and the remaining ones will give the determination of the *maximum* or *minimum* deſired.

The reaſon of the rule is, that every *maximum* or *minimum* is, in its own nature, a ſtable quantity, becauſe at that term where a quantity becomes a *maximum* or *minimum*, it can neither be increaſing or decreaſing, to determine, therefore, any flowing quantity to a *maximum* or *minimum*, is to make it (inſtead of a flowing) a permanent one; but the fluxion of a permanent quantity is equal to nothing. This we ſhall illuſtrate by the following examples.

I. To *determine the greateſt or leaſt applicate in an algebraic curve*. Since, in curves that have a *maximum* and a *minimum*, the tangent TM (*Tab. Analyſis*, *fig*. 4. and *fig*. 26.) degenerates at length into DE, and becomes parallel to the axis, and ſo the perpendicular MH coincides with the greateſt or leaſt applicate CG; in the caſe of *maximum* and *minimum*, the ſubtangent TP becomes infinite, and the ſubnormal PH equal to nothing: but $PH=\frac{y\dot{y}}{\dot{x}}$. If then $\frac{y\dot{y}}{\dot{x}}=0$; we ſhall find $\dot{y}=0$; and becauſe of $PT=\frac{y\dot{x}}{\dot{y}}=\infty$ (the note of affinity) $\dot{x}=\infty$.

It is poſſible for the tangent HG (*fig*. 5.) to lie directly againſt the ſemidiordinate GC; in which caſe the ſubtangent PT is equal to nothing, and the ſubnormal PH is infinite. But $PT=\frac{y\dot{x}}{\dot{y}}=0$; therefore if $\frac{y\dot{x}}{\dot{y}}=0$, we ſhall have $\dot{x}=0$; or becauſe $PH=\frac{y\dot{y}}{\dot{x}}=\infty$. we find $\dot{y}=\infty$; both $\dot{x}$ and y being, in reſpect of $\dot{y}$, infiniteſimals. From the equation of the curve, therefore, we are to find the value of $\dot{y}$, which is to be made equal either to nothing, or to infinity, that we may have the value of the abſciſs, to which the greateſt applicate is co-ordinate.

II. To *cut a right line* AB (*fig*. 6.) *in ſuch a manner in* D, *that the rectangle* AD *and* DB *ſhall be the greateſt that can poſſibly be, thus conſtructed*. Let $AB=a$, $AD=x$; then will $DB=a-x$; conſequently $AD\times DB=ax-xx$ ſome *maximum*; and hence its fluxion will be equal to nothing, as being conceived at a circle to which

$$ax-xx=yy.$$

$$\text{Wherefore}\quad a\dot{x}-2x\dot{x}=2y\dot{y}=0$$

$$a-2x=0$$

$$\tfrac{1}{2}a=x$$

The line AB therefore is to be cut into two equal parts; and the ſquare is the greateſt of all rectangles, whoſe altitudes and baſes, taken together, are equal to each other.

III. To *find the fraction which ſhall exceed its cube by the greateſt quantity poſſible*. Let x denote a variable quantity, expreſſing number in general; then the exceſs of x above x^3 being univerſally repreſented by $x-x^3$, we ſhall have the fluxion of this quantity, or $\dot{x}-3x^2\dot{x}=0$; and therefore, $x=\sqrt{\tfrac{1}{3}}$, the fraction required.

IV. To *determine the greateſt rectangle that can be inſcribed in a given triangle*. Let the baſe AC of the triangle (*Tab*. III. *Analyſis*, *fig*. 66.) $=b$, and its altitude $BD=a$; and let the altitude BS of the inſcribed rectangle mc, conſidered as variable, be x: then, becauſe of the parallel lines AC, ac, it will be $BD\,(a):AC\,(b)::DS\,(a-x):\frac{ba-bx}{a}=ac$: whence the area of the rectangle, or $ac\times BS$ will be $=\frac{bax-bx^2}{a}$; whoſe fluxion $\frac{ba\dot{x}-2bx\dot{x}}{a}$ being $=0$, we ſhall have $x=\frac{1}{2}a$: and, therefore, the greateſt inſcribed rectangle is that whoſe altitude is juſt half the altitude of the triangle.

V. To *determine the greateſt cylinder*, dg, *that can be inſcribed in a given cone* ADB, ((*Tab*. III. *Analyſis*, *fig*. 67.) Let $a=BC$, the altitude of the cone $b=AD$, the diameter of its baſe; $x=fg\,(dh)$ the diameter of the cylinder, conſidered as variable; $p=\frac{3.14159}{4}$, &c. the area of the circle whoſe diameter is unity: then the areas of circles being to one another as the ſquares of their diameters, we have, $1^2:x^2::p:px^2$ the area of the circle $fsgr$. Moreover, from the ſimilarity of the triangles ABC and Adf, we have $\frac{1}{2}b\,(AC):a\,(BC)::\frac{1}{2}b-\frac{1}{2}x\,(Ad):df=\frac{ab-ax}{b}$; which multiplied by the area px^2 gives $\frac{pabx^2-pax^2}{b}$ for the ſolid content of the cylinder; which being a *maximum*, its fluxion $\frac{2pabx\dot{x}-3pax^2\dot{x}}{b}$ muſt be $=0$; conſequently $x=\frac{2b}{3}$ and $df=\frac{a}{3}$: whence it appears, that the inſcribed cylinder will be the greateſt poſſible, when the altitude thereof is juſt $\frac{1}{3}$ of the altitude of the whole cone.

VI. To *find the greateſt cone that can be inſcribed in a given ſphere.* Let A D (*fig.* 68.) the diameter of the ſphere be $= a$; ,78539, &c. the area of a circle, whoſe diameter is 1, be $= c$; and AC, the altitude of the cone, $= x$; then $CD = a - x$. Then by 35 Euc. 3. $AC \times CD = CB^2$; i. e. $x \times \overline{a - x} = ax - x^2 = CB^2$; therefore (becauſe the ſquare of the diameter is four times the ſquare of the radius) by 2 Euc. 12. $4acx - 4cx^2 =$ the area of the cone's baſe; which, by 10 Euc. 12. drawn into $\frac{1}{3}x$ is $\frac{4}{3}acx^2 - \frac{4}{3}cx^3 =$ the cone's ſolidity a *maximum*: therefore, ſince all the affirmative powers of a quantity that is a *maximum* or *minimum*, as well as the ſum, remainder, product, or quotient, ariſing from the *maximum* or *minimum*, and any invariable quantity are a *maxima* or *minima* likewiſe, $\overline{ax^2 - x^3} =$ a *maximum*: and its fluxion $2ax\dot{x} - 3x^2\dot{x} = 0$; which divided by $x\dot{x}$ gives $\overline{2a - 3x} = 0$, and $3x = 2a$, and $x = \frac{2}{3}a$: ſo that the cone will be a *maximum*, when its altitude is $\frac{2}{3}$ of the ſphere's diameter. The reader may find a variety of other examples in Simpſon's Fluxions, vol. i. ſect. 2. and Rowe's Flux. chap. 4.

The fluxion of the baſe of a curve, or its abſciſſa being given, when the fluxion of the ordinate vaniſhes, the tangent becomes parallel to the baſe, and the ordinate, moſt commonly, is a *maximum* or *minimum*, according to the rule given by authors on this ſubject, and mentioned in the preceding part of this article. But it is to be obſerved, that if the ſecond fluxion of the ordinate vaniſh at the ſame time, and the third fluxion be real, this rule does not hold; for the ordinate is, in that caſe, neither a *maximum* nor a *minimum*. If the firſt, ſecond, and third fluxions vaniſh, and the fourth fluxion be real, the ordinate is a *maximum* or *minimum*. The general rule given by Mr. Maclaurin, is, that when the firſt fluxion of the ordinate, with its fluxions of any ſubſequent ſucceſſive orders vaniſh, aud the number of all theſe fluxions that vaniſh is odd, then the ordinate is a *maximum*, or *minimum*, according as the fluxion of the next order to theſe is negative or poſitive. But if the number of all the fluxions of the ordinate, of the firſt and ſubſequent ſucceſſive orders that vaniſh, be an even number, the ordinate is then neither a *maximum* nor a *minimum*. See Treat. Fluxions, book i. chap. 9. and book ii. chap. 5. art. 859. The greateſt and leaſt ordinates are likewiſe diſcovered in ſome caſes, by ſuppoſing $\dot{y}$ to be infinite in reſpect of $\dot{x}$. But there are ſeveral exceptions to this rule. See Maclaurin. loc. cit. art. 262, 865.

A late author has formed ſome objections to the univerſality of Mr. Maclaurin's rule. See the Harmony of Ancient and Modern Geometry, by Mr. Paman. Lond. 1745, 4to. in the Preface.

MAXY, in *Mineralogy*, a name given by ſome to mundic, a ſulphureous mineral, common in the tin-mines of Cornwall, and elſewhere.

MAY, Maius, the fifth month in the year, reckoning from our firſt, or January; and the third, counting the year to begin with March, as the Romans anciently did. It was called *Maius* by Romulus, in reſpect to the ſenators and nobles of his city, who were named *majores*; as the following month was called *Junius*, in honour of the youth of Rome, *in honorem juniorum*, who ſerved him in the war; though ſome will have it to have been thus called from *Maia*, the mother of Mercury, to whom they offered ſacrifice on the firſt day of it; and Papias derives it from *Madius*, *eo quod tunc terra madeat*.

In this month the ſun enters Gemini, and the plants of the earth in general begin to flower.

The month of *May* was under the protection of Apollo; and in it alſo they kept the feſtival of Bona Dea, that of the goblins, called LEMURIA; and the ceremony of REGIFUGIUM, or the expulſion of the kings.

The vulgar have a great opinion of the virtues of *May*-DEW, and *May*-BUTTER.

The month of *May* has ever been eſteemed favourable to love; and yet the ancients, as well as many of the moderns, look on it as an unhappy month for marriage. The original reaſon may perhaps be referred to the feaſt of the Lemures, which was held in it. Ovid alludes to this in the fifth of his Faſti, when he ſays,

> *Nec viduæ tædis eadem, nec virginis apta*
> *Tempora; quæ nupſit, non diuturna fuit:*
> *Hac quoque de cauſa, ſi te proverbia tangunt,*
> *Menſe malum* Maio *nubere vulgus ait.*

May-*apple*. See Duck's-*foot*.

May-*buſh*. See Medlar.

May-*dew*. See Dew.

May-*duke*, a ſpecies of CHERRY.

May-*lily*. See Lily *of the valley*.

May-*weed*. See Chamomile.

MAYA, in *Natural Hiſtory*, a name given by the people of the Phillippine iſlands to a ſmall ſpecies of ſparrow, much leſs than our's, and very common among them. It feeds on rice, and is very deſtructive of it.

MAYS. See Maize.

MAYHEM. See Mahim.

Mayhem, *appeal of*. See Appeal.

MAYL, in *Falconry*, ſignifies to pinion the wings of a HAWK.

MAYOR, or Maior, the chief magiſtrate or governor in the cities, and moſt corporation-towns of England; choſen annually by his peers out of the number of the aldermen. See Alderman.

The word, according to Verſtegan, comes from the ancient Engliſh *maier*, *able*, *potent*, of the verb *may*, or *can*. The *mayor* of the place is the king's lieutenant, and, with the aldermen and common-council, can make laws, called *bye-laws*, for the government of the place. He has alſo the authority of a kind of judge, to determine matters, and to mitigate the rigour of the law.

King Richard I. A. D. 1189, firſt changed the bailifs of London into *mayors*; by whoſe example others were afterwards appointed.

Mayors of corporations are juſtices of peace, *pro tempore*, and they are mentioned in ſeveral ſtatutes; but no perſon ſhall bear any office of magiſtracy concerning the government of any town, corporation, &c. that hath not received the ſacrament, according to the church of England, within one year before his election; and who ſhall not take the oaths of ſupremacy, &c. Stat. 13 Car. II. cap. 1.

Mayor's-*court*. See Court.

MAZA, a name given by the ancients to a ſort of food, in common uſe among the poorer ſort of people. It is made of the meal of parched barley, ſprinkled with ſome liquid, and was eaten with honey, or with defrutum.

Hippocrates every where ſpeaks of this as of a coarſe kind of bread, and adviſes the changing the common finer bread, in the ſpring ſeaſon, for this coarſer kind, as a thing very conducive to health. He ſeems every where to conſider bread as the drier, and *maza* the moiſter diet.

Maza, Μαζα, among the Athenians, a ſort of cake, which was the common fare of ſuch as were entertained at the public expence in the common-hall, or PRYTANEUM. Theſe cakes were made with flour boiled with water and oil. Pitiſc. Lex. Ant. in voc.

MAZE, in *Gardening*. See Labyrinth.

MAZONOMUS, among the *Ancients*, a very large diſh, commonly of wood, in which the MAZA was ſerved.

MAZORAH, among the Jews, denotes the ſcience of reading the ſcriptures. See Masorah.

MAZUR, a ſpecies of birds, which the Arabian ſailors eſteem very lucky, becauſe it lays its eggs cloſe by the ſea-ſhore before good weather; ſo that when theſe are obſerved, they promiſe themſelves a ſafe voyage. They alſo pretend that this bird gives notice to ſailors, when the ſhip approaches any danger, by flying and fluttering up and down.

MEAD, a wholeſome, agreeable liquor, prepared of honey and water.

One of the beſt methods of preparing *mead* is as follows: Into twelve gallons of water ſlip the whites of ſix eggs; mixing theſe well together, and to the mixture adding twenty pounds of honey. Let the liquor boil an hour, and when boiled, add cinnamon, ginger, cloves, mace, and a little roſemary. As ſoon as it is cold, put a ſpoonful of yeſt to it, and tun it up, keeping the veſſel filled as it works; when it has done working, ſtop it up cloſe; and when fine, bottle it off for uſe.

Thorley ſays, that *mead*, not inferior to the beſt of foreign wines, may be made in the following manner: put three pounds of the fineſt honey to one gallon of water, and two lemon-peels to each gallon; boil it half an hour, well ſcummed; then put in, while boiling, lemon-peel: work it with yeſt; then put it in your veſſel with the peel, to ſtand five or ſix months, and bottle it off for uſe. If it is to be kept for ſeveral years, put four pounds to a gallon of water.

The author of the Dictionary of Chemiſtry directs to chuſe the whiteſt, pureſt, and beſt-taſted honey, and to put it into a kettle with more than its weight of water: a part of this liquor muſt be evaporated by boiling, and the liquor ſcummed, till its conſiſtence is ſuch, that a freſh egg ſhall be ſupported on its ſurface, without ſinking more than half its thickneſs into the liquor; then the liquor is to be ſtrained, and poured through a funnel into a barrel; this barrel, which ought to be nearly full, muſt be expoſed to heat as equable as poſſible, from 20 to 27 or 28 degrees of Mr. Reaumur's thermometer, taking care that the bung-hole be ſlightly covered, but not cloſed. The phenomena of the ſpirituous fermentation will appear in this liquor, and will ſubſiſt during two or three months, according to the degree of heat; after which they will diminiſh and ceaſe. During this fermentation, the barrel muſt be filled up occaſionally with more of the ſame kind of liquor of honey, ſome of which ought to be kept apart, on purpoſe to replace the liquor which flows out of the barrel in froth. When the fermentation ceaſes, and the liquor has become very vinous, the barrel is then to be put into a cellar, and well cloſed; a year afterwards the *mead* will be fit to be put into bottles.

The duty on *mead* ſold by retail, or otherwiſe, is 11½*d.* a gallon, to be paid by the maker.

MEADIA, *Dodecatheon*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower has a permanent empalement of one leaf, cut into five long ſegments, which are reflexed; the flower hath one petal cut into five parts, whoſe limb is reflexed backward; it has five ſhort ſtamina, ſitting in the tube, connected at the top with a conical germen, terminated by an obtuſe ſtigma; the empalement becomes an oblong oval capſule, with one cell, opening at the top, and filled with ſmall ſeeds; we have but one ſpecies of this plant, which is a native of Virginia, and was named after Dr. Mead.

MEADOW, in *Huſbandry*, in its general ſignification, means paſture, or graſs land, annually mown for hay; but is more particularly applied to lands that are ſo low as to be too moiſt for cattle to graze upon them, in winter, without ſpoiling the ſward.

Too much water, and too little are equally prejudicial to *meadow*-grounds. The beſt lands for *meadow*-paſture are either low lands, or hanging grounds, where there is a rich ſoil and a moiſt bottom; eſpecially where any little brook, or running ſpring, may be brought over it; and where there is ſome deſcent in the *meadow*, that the water may not lodge on it. Theſe *meadows* are much better for the farmer than thoſe near large rivers, where great crops are often loſt.

Thoſe that may be overflowed at pleaſure are called water-*meadows*; theſe ſhould never be overflowed till the end of March, except once or twice in winter, when there are ſuch floods as bring a great deal of ſoil from the upper lands; and, if the ſeaſon ſhould prove dry, it will be of great ſervice to the graſs, if the *medows* are overflowed again; but then the cattle ſhould not be turned in till the ſward is dry enough to bear their weight. Miller recommends the weeding of *meadows* in April and October, with a ſpaddle, and rolling them with a heavy roller in ſpring and autumn.

MEADOW *graſs*. See GRASS.

MEADOW *rue*. See RUE.

MEADOW *ſaffron*. See SAFFRON.

MEADOW *ſweet*. See SPIRÆA.

MEADOW *trefoil*. See TREFOIL.

MEAL. The *meal* or flour of England is the fineſt and whiteſt in the world. The French is uſually browner, and the German browner than that. Our flour keeps well with us, but in carrying abroad it often contracts damp, and becomes bad. All flour is ſubject to breed worms; theſe are white in the white flour, and brown in that which is brown; they are therefore not always diſtinguiſhable to the eye; but when the flour feels damp, and ſmells rank and muſty; it may be conjectured that they are there in great abundance.

The colour and the weight are the two things which denote the value of *meal* or flour; the whiter and the heavier it is, other things being alike, the better it always is. Pliny mentions theſe two characters as the marks of good flour, and tells us, that Italy, in his time, produced the fineſt in the world. This country, indeed, was famous before his time for this produce; and the Greeks have celebrated it; and Sophocles, in particular, ſays, that no flour is ſo white, or ſo good as that of Italy. The corn of this country has, however, loſt much of its reputation ſince that time; and the reaſon of this ſeems to be, that the whole country being full of ſulphur, alum, vitriol, marcaſites, and bitumens, the air may have, in time, affected them ſo far, as to make them diffuſe themſelves through the earth, and render it leſs fit for vegetation; and the taking fire of ſome of theſe inflammable minerals, as has ſometimes happened, is alone ſufficient to alter the nature of all the land about the places where they are. Deſland. Trait. Phyſ.

The flour of England, though it pleaſes by its whiteneſs, yet it wants ſome of the other qualities valuable in flour; the bread that is made of it is brittle, and does not hold together, but after keeping a few days becomes hard and dry, as if made of chalk, and is full of cracks in all parts; and this muſt be a great diſadvantage in it, when intended for the ſervice of an army, or the like occaſions, where there is no baking every day, but the bread of one making muſt neceſſarily be kept a long time.

The flour of Picardy is very like that of England, and after it has been kept ſome time, is found improper for making into paſte or dough. The French are forced either to uſe it immediately on the grinding, or elſe to mix it with an equal quantity of the flour of Britanny, which is coarſer, but more unctuous and fatty; but neither of theſe kinds of flour keep well.

The flour of almoſt any country will do for the home conſumption of the place, as it may be always freſh ground; but the great care to be uſed in ſelecting it is in order to the ſending it abroad, or furniſhing ſhips for their own uſe. The ſaline humidity of the ſea air ruſts metals, and fouls every thing on board, if great care be not taken in the preſerving them. This alſo makes the flour damp and mouldy, and is often the occaſion of its breeding inſects, and being wholly ſpoiled.

The flour of ſome places is conſtantly found to keep better at ſea than that of others; and when that is once found out, the whole caution needs only be to carry the flour of thoſe places. Thus the French find, that the flour of Poitou, Normandy, and Guienne, all bear the ſea-carriage extremely well, and they make a conſiderable advantage by carrying them to their American colonies.

The choice of flour for exportation being thus made, the next care is to preſerve it in the ſhips: the keeping it dry is the grand conſideration in regard to this; the barrels in which it is put up ought to be made of dry and well-ſeaſoned oak, and not to be larger than to hold two hundred weight at the moſt. If the wood of the barrels have any ſap remaining in it, it will moiſten and ſpoil the flour; and no wood is ſo proper as oak for this purpoſe, or for making the bins and other veſſels for keeping flour in at home, ſince, when once well dried and ſeaſoned, it will not contract humidity afterwards. The beech-wood, of which ſome make their bins for flour, is never thoroughly dry, but always retains ſome ſap. The fir will give the flour a taſte of turpentine; and the aſh is always ſubject to be eaten by worms. The oak is preferable, becauſe of its being free from theſe faults; and when the ſeveral kinds of wood has been examined in a proper manner, there may be others found as fit, or poſſibly more ſo, than this for the purpoſe. The great teſt is their having more or leſs ſap. See FLOUR and WOOD.

MEAL *worm*. See WORM.

MEALY *tree*. See WAYFARING *tree*.

MEAN, the *middle*, between two extremes.

Thus we ſay, the *mean* motion of a planet; its *mean* diſtance, &c. meaning a motion or diſtance, which as far exceeds the leaſt diſtance or motion, as it is exceeded by the greateſt.

MEAN, in *Logic*. See MEDIUM.

MEAN *anomaly*, in *Aſtronomy*. See ANOMALY.

MEAN *axis*, in *Optics*. See AXIS.

MEAN $\left\{\begin{array}{l}\textit{conjunction,}\\ \textit{oppoſition,}\end{array}\right\}$ in *Aſtronomy*, is when the *mean* place of the ſun is in $\left\{\begin{array}{l}\textit{conjunction,}\\ \textit{oppoſition,}\end{array}\right\}$ with the *mean* place of the moon in the ecliptic. See CONJUNCTION and OPPOSITION.

MEAN *diameter*, in *Gauging*. See DIAMETER and GAUGING.

MEAN *diſtance of a planet from the ſun*, in *Aſtronomy*, is the right line drawn from the ſun, to the extremity of the conjugate axis of the ellipſis in which the planet moves; and this is equal to the ſemitranſverſe axis, and is ſo called becauſe it is a *mean* between the planet's greateſt and leaſt diſtance from the ſun.

MEAN *motion*, in *Aſtronomy*, that whereby a planet is ſuppoſed to move equally in its orbit, and is always proportional to the time.

MEAN *proportion*. See EXTREME *proportion*.

MEAN *time*. See TIME.

MEAN, in *Law*, refers either to time, or dignity. Thus, in the firſt ſenſe we ſay, his action was *mean* betwixt the diſſeſin made to him, and his recovery; i. e. in the interim.

In the ſecond ſenſe, we ſay, there is lord *mean* or MESNE.

MEASLES, *morbilli*, in *Medicine*, a cutaneous diſeaſe, conſiſting in a general appearance of eruptions, not tending to ſuppuration; accompanied with a fever.

This diſtemper ſeems to bear a great affinity to the ſmall-pox, and appeared in Europe about the ſame time with it: the ſymptoms being in many reſpects the ſame, the cauſe nearly the ſame, and the regimen and cure not much different.

The *meaſles* are moſt common in the ſpring ſeaſon, and generally diſappear in ſummer: they are preceded, like other fevers, by alternate fits of heat and cold, with ſickneſs and loſs of appetite; the tongue is white, but generally moiſt; there is a ſhort cough, a heavineſs of the head and eyes, drowſineſs, and a running at the noſe; but ſometimes the cough does not come before the eruption has appeared. There is an inflammation and heat in the eyes, accompanied with a defluxion of ſharp tears, and great acuteneſs of ſenſation, ſo that they cannot bear the light without pain: the eye-lids frequently ſwell ſo as to occaſion blindneſs. The patient generally complains of his throat; and a vomiting or looſeneſs often precedes the eruption. The ſtools in children are commonly greeniſh: they complain of an itching in the ſkin, and are remarkably peeviſh. Bleeding at the noſe is common, both before, and in the progreſs of the diſeaſe. The eruptions, which, Dr. Watſon obſerves, are merely ſymptomatic, and not critical as in the ſmall-pox, uſually appear about the fourth day, like flea-bites, firſt on the face, then upon the breaſt, and afterwards on the extremities. Theſe may be diſtinguiſhed from the ſmall-pox by their ſcarcely riſing above the ſkin. The fever, cough, and difficulty of breathing, inſtead of being removed by the eruption, as in the ſmall-pox, are rather increaſed, but the vomiting generally ceaſes. About the ſixth or ſeventh day, from the time of ſickening, the *meaſles* begin to turn pale upon the face, and afterwards upon the body; ſo that by the ninth day they entirely diſappear. The fever, however, and difficulty of breathing often continue, eſpecially if the patient has been kept upon too hot a regimen. A violent looſeneſs ſometimes ſucceeds the *meaſles*, in which caſe the patient's life is in imminent danger. Thoſe who die of the *meaſles*, generally expire about the ninth day from the invaſion, and are commonly carried off by a peripneumony, or inflammation of the lungs. The moſt favourable ſymptoms are a moderate looſeneſs, a moiſt ſkin, and a plentiful diſcharge of urine. The dangerous ſymptoms are a ſudden diſappearance of the ſpots, a delirium, great weakneſs, vomiting, reſtleſſneſs, and difficulty of ſwallowing. If the ſpots turn pale too ſoon, or purple ſpots appear among them, theſe are unfavourable ſymptoms. When a continual cough, with hoarſeneſs, ſucceeds the diſeaſe, there is reaſon to ſuſpect an approaching conſumption of the lungs. The regimen in this diſeaſe ſhould be cool, the food light, and the drink diluting. Acids and ſmall beer are not ſo proper in the *meaſles* as in the ſmall-pox. The moſt ſuitable liquors are decoctions of liquorice with marſh-mallow roots and ſarſaparilla, infuſions of linſeed, or of the flowers of elder, baum-tea, clarified whey, barley-water, &c. which, if the patient be coſtive, may be ſweetened with honey, or mixed occaſionally with a little manna. Bleeding is commonly neceſſary in this diſeaſe, eſpecially when the fever runs high, and is attended with difficulty of breathing. Bathing the feet and legs in lukewarm water, and, when there is a tendency to vomiting, warm water or weak camomile-tea, in order to encourage it, will be ſerviceable. The throat may be ſoftened, and the tickling cough relieved, by licking ſperma ceti and ſugar-candy pounded together; or by taking occaſionally a ſpoonful of the oil of ſweet almonds, with ſugar-candy diſſolved in it; or by drawing the ſteam of warm water into the lungs. If the *meaſles* ſhould ſuddenly diſappear, recourſe muſt be had to the ſame treatment as in the ſimiliar circumſtance of the Small-*pox*, the patient muſt be ſupported with wine and cordials. Bliſtering plaſters muſt be applied to the legs and arms, and the body rubbed with warm flannels. Warm poultices may alſo be applied to the feet and palms of the hands. When purple or black ſpots appear, the patient's drink ſhould be ſharpened with ſpirits of vitriol; and if the putrid ſymptoms increaſe, the Peruvian bark muſt be adminiſtered, as in the ſmall-pox.

This practice of giving the bark in the *meaſles* was firſt introduced by Dr. Cameron of Worceſter, who obſerves, that it prevents the retroceſſion of the morbid acrimony, and continues the efflorescence on the ſkin, ſometimes ſo long as the twelfth day. In this way, ſays Dr. Percival, the cough and other inflammatory ſymptoms are in a great meaſure obviated; and the patient is freed from all danger of a peripneumony, the fatality of which Sydenham deſcribes in ſuch ſtrong terms.

Opiates ſhould never be given except in caſes of extreme reſtleſſneſs, a violent looſeneſs, or when the cough is very troubleſome. For children, the ſyrup of poppies is ſufficient; and a tea-ſpoonful or two may be occaſionally given, according to the age of the patient, or the violence of the ſymptoms. When the *meaſles* are gone off, the patient ought to be purged, as in the ſmall-pox: and if it is ſucceeded by a diarrhœa, this may be checked by a gentle doſe of rhubarb, taken for ſome days in the morning, and an opiate at night: and if theſe fail, bleeding will be commonly effectual.

The *meaſles* is a diſeaſe more troubleſome than dangerous; though it often inclines to conſumptions, by a cough which it leaves behind. If ſuch ſymptoms appear, ſmall quantities of blood may be often let at proper intervals; and the patient ſhould drink aſſes milk, remove to a free air, if in a large town, and ride daily on horſeback; and keep cloſe to a diet of milk and vegetables.

The *meaſles* may be inoculated by means of the hot ſharp rheum which diſtils from the eyes, or blood, or by means of flannels placed under the arm-pits, or cotton rubbed upon the ſkin, and applied where the puncture is made. Tiſſot aſſures us, that he practiſed the Inoculation of the *meaſles* for twelve years, with great ſucceſs. Dr. Home, of Edinburgh, propoſed, by inoculating the *meaſles*, to leſſen its mortality, and to prevent the cough, and other diſorders, which are the conſequences of this diſeaſe in the natural way: and his experience manifeſts the advantages of this practice, and that they even exceed thoſe which attend the inoculation of the ſmall-pox. Buchan's Dom. Med. chap. 24. art. 11, 19, 20. London Med. Obſ. vol. iv. vol. v. art. 25. Home's Med. Facts and Exp. Tiſſot's Advice, p. 235.

MEASNE. See Mesne.

MEASURE, Mensura, in *Geometry*, denotes any certain quantity aſſumed as one, or unity, to which the ratio of other homogeneous or ſimiliar quantities is expreſſed.

This definition is ſomewhat more agreeable to practice than that of Euclid, who defines *meaſure* a quantity, which being repeated any number of times, becomes equal to another. Which only anſwers to the idea of an arithmetical *meaſure*, or quota part.

Measure *of an angle* is an arch deſcribed from the vertex *a*, (*Tab.* III. *Geomet. fig.* 60.) in any place between its legs; as at *d f*.

Hence angles are diſtinguiſhed by the ratio of the arches, deſcribed from the vertex between the legs, to the peripheries.

Angles then are diſtinguiſhed by thoſe arches; and the arches are diſtinguiſhed by their ratio to the periphery. Thus the angle *l a c* is ſaid to be of ſo many degrees as there are in the arch *f d*. See Angle.

To *meaſure* the height of a hill, ſee the latter part of the article Levelling.

Measure *of a figure*, or plane ſurface, is a ſquare, whoſe ſide is one inch, foot, yard, or ſome other determinate length.

Among geometricians, it is uſually a rod, called a *ſquare rod*, divided into ten ſquare feet, and the ſquare feet into ſquare digits. Hence ſquare *meaſures*.

Measure *of a line* is any right line taken at pleaſure, and conſidered as unity.

The modern geometricians, uſe a decempeda, or rod, divided into ten equal parts, called *feet*. The feet they ſubdivide into ten digits, the digit into ten lines, &c. This decimal diviſion of the *meaſure* was firſt introduced by Stevinus, probably from the example of Regiomontanus. The index or character of the decempedæ he made 0, that of feet 1, of digits 2, of lines 3, &c. which, becauſe the *meaſure* was ſubdivided in a decuple ratio, were the logarithms of the diviſion. Bayer, in lieu of theſe, expreſſed the logarithms by the Roman characters; v. g. 5 perches, 4 feet, 3 digits, and 2 lines, he expreſſed thus; $5^{\circ}, 4', 3'', 2'''$. It is frequently moſt commodious to ſeparate the integers, or rods, from the fractions, by a point; thus, inſtead of $5^{\circ}, 4', 3'', 2''$, to write 5.432. F. Noel obſerves, that, among the Chineſe, the decimal diviſion obtains in their common *meaſures*, and even in their weights.

Measures, *line of*. See Line.

Measure *of the maſs*, or *quantity of matter*, in *Mechanics*, is its weight; it being apparent, that all the matter which coheres and moves with a body, gravitates with it: and it being found by experiment, that the gravities of homogeneal bodies are in proportion to their bulks: hence, while the maſs continues the ſame, the abſolute weight will be the ſame, whatever figure it put on: but, as to its ſpecific weight, it varies as the quantity of ſurface varies. See Weight.

Measure *of a number*, in *Arithmetic*, is ſuch a number as divides another, without leaving any fraction; thus 9 is a *meaſure* of 27.

Measure, *common*. See Common *meaſure*.

Measure *of a ſolid* is a cube, whoſe ſide is one inch, foot, yard, or other determined length.

Among geometricians, it is ſometimes a rod or perch, called a *cubic perch*; divided into cubic feet, digits, &c. Hence cubic *meaſures*, or *meaſures* of capacity. See Cube and Timber.

Measure *of velocity*, in *Mechanics*, is the ſpace paſſed over by a moving body in any given time.

To *meaſure* a velocity, therefore, the ſpace muſt be divided into as many equal parts as the time is conceived to be divided into. The quantity of ſpace anſwering to ſuch an article of time, is the *meaſure* of the velocity.

Measure, *univerſal* and *perpetual*, is a kind of *meaſure* unalterable by time, to which the *meaſures* of different nations and ages might be reduced, and by which they might be compared and eſtimated. Such a *meaſure* is very deſirable, if it could be attained. Huygens, in his Horol. Oſcill. propoſes, for this purpoſe, the length of a pendulum, vibrating ſeconds, taken from the point of ſuſpenſion to the point of oſcillation. The third part of ſuch a pendulum may be called the horary foot, and ſerve as a ſtandard to which the *meaſure* of all other feet may be referred. Thus, v. g. the proportion of the Paris foot to the horary foot would be that of 864 to 881; becauſe the length of 3 Paris feet is 864 half lines, and the length of a pendulum, vibrating ſeconds, contains 3 horary feet, or 3 feet 8 $\frac{1}{2}$ lines, i. e. 881 half lines. But this *meaſure*, in order to its being univerſal, ſuppoſes, that the action of gravity, is every where the ſame, which is contrary to fact; and, therefore, it would really ſerve only for places under the ſame parallel of latitude; and in order to its being perpetual, it ſuppoſes that the action of gravity continues always the ſame in the ſame place. See PENDULUM.

MEASURE, in a legal commercial and popular ſenſe, denotes a certain quantity or proportion of any thing, bought, ſold, valued, or the like.

The regulation of WEIGHTS and *meaſures* ought to be univerſally the ſame throughout the kingdom, and ſhould, therefore, be reduced to ſome fixed rule or ſtandard; the prerogative of fixing which was veſted, by our ancient law, in the crown. This ſtandard was originally kept at Wincheſter; and we find, in the laws of king Edgar, cap. 8. near a century before the Conqueſt, an injunction, that the one *meaſure*, which was kept at Wincheſter, ſhould be obſerved throughout the realm. With reſpect to *meaſures* of length, our ancient hiſtorians (Will. Malm. in Vita Hen. I. Spelm. Hen. I. apud Wilkins, 299.) inform us, that a new ſtandard of longitudinal *meaſure* was aſcertained by king Henry I. who commanded that the ulna, or ancient ell, which anſwers to the modern yard, ſhould be made of the exact length of his own arm: and one ſtandard of *meaſures* of length being once gained, all others are eaſily derived from hence; thoſe of greater length by multiplying, thoſe of leſs by ſubdividing the original ſtandard. Upon theſe principles the ſtandards were firſt made; which, being originally ſo fixed by the crown, their ſubſequent regulations have been generally made by the king in parliament. Thus, under king Richard I. in his parliament holden at Weſtminſter, A. D. 1197, it was ordained, that there ſhould be only one weight and one *meaſure* throughout the kingdom, and that the cuſtody of the aſſiſe or ſtandard of weights and *meaſures* ſhould be committed to certain perſons, in every city and borough. See ALNAGER. In king John's time, this ordinance of king Richard was frequently diſpenſed with for money; (Hoved. A. D. 1201.) which occaſioned a proviſion to be made for inforcing it, in the great charters of king John and his ſon.

The ſtatute of Magna Charta, cap. 25, ordains, that there ſhall be but one *meaſure* throughout England, according to the ſtandard of the exchequer; which ſtandard was formerly kept in the king's palace; and in all cities, market-towns, and villages, it was kept in the churches. By 17 Car. I. cap. 19. there is to be one weight and *meaſure*, and one yard, according to the king's ſtandard, and whoſoever ſhall keep any other weight or *meaſure*, whereby any thing is bought or ſold, ſhall forfeit for every offence 5*s*. And by 22 Car. II. cap. 8. water *meaſure*, as to corn or grain, or ſalt, is declared to be within the ſtatute 17 Car. I. And if any ſell grain or ſalt, &c. by any other buſhel, or *meaſure*, than what is agreeable to the ſtandard in the Exchequer, commonly called Wincheſter *meaſure*, he ſhall forfeit 40*s*. &c. Notwithſtanding theſe ſtatutes, in many places and counties there are different *meaſures* of corn and grain; and the buſhel in one place is larger than in another; but the lawfulneſs of it is not well to be accounted for, ſince cuſtom or preſcription is not allowed to be good againſt a ſtatute. Selling by falſe *meaſure* being an offence by the common law, may be puniſhed by fine, &c. upon an indictment at common law, as well as by ſtatute. See the ſtatute 11 Hen. VII. cap. 4. which inflicts particular fines for offences, pillory, &c.

Meaſures are various, according to the various kinds and dimenſions of the things *meaſured*. Hence ariſe

MEASURES, *lineal* or *longitudinal*, for lines or lengths:

MEASURES, *ſquare*, for areas or ſuperficies: and

MEASURES, *ſolid* or *cubic*, for bodies and their capacities.

All which again are very different in different countries, and in different ages, and even many of them for different commodities. Whence ariſe other diviſions of *domeſtic* and *foreign meaſures*, *ancient* and *modern* ones, *dry* and *liquid meaſures*, &c. The buſineſs of *meaſures* has been ſo confuſedly and imperfectly delivered by Engliſh writers, that the reader will not be diſpleaſed with the pains we have here taken to diſembroil and ſupply it. Under this head he will find enumerated the various general ſtanding *meaſures*, long, ſquare, and cubic, now or heretofore in uſe, with their proportions and reductions: for particulars he muſt be contented to be referred to the particular heads; as FOOT, DIGIT, ELL, TUN, GALLON, BUSHEL, PERCH, LEAGUE, FURLONG, &c.

MEASURES, *long*, or **MEASURES** *of application*. *The Engliſh ſtandard long* MEASURE, for commerce, or that whereby the quantities of things are ordinarily eſtimated in the way of trade, is the yard; containing three Engliſh feet; equal to three Paris feet one inch $\frac{3}{12}$ of an inch; or $\frac{7}{9}$ of a Paris ell. Its diviſions are the foot, ſpan, palm, inch, and barley-corn, which ſee under their reſpective heads. Its multiplies are the pace, fathom, pole, furlong, and mile. The proportions theſe ſeverally bear to each other will be expreſſed in a table for the purpoſe. — *Aſſay of meaſures*. See ASSAY.

MEASURE, *the French ſtandard*, for commerce, is the aune or ell, containing three Paris feet ſeven inches eight lines, or one yard $\frac{2}{7}$ Engliſh; the Paris foot royal exceeding the Engliſh by $\frac{62}{1000}$ parts, as in one of the following tables. This ell is divided two ways; viz. into halves, thirds, ſixths, and twelfths; and into quarters, half-quarters, and ſixteenths.

This ell holds throughout the greateſt part of France; excepting at Troys, in Champagne; at Arc, in the Barrois; and in ſome parts of Picardy and Burgundy, where the ell contains only two feet five inches one line; in Bretagne, where it contains four feet two inches eleven lines; and at St. Genoux, in Berry, where it exceeds the Paris ell by eight lines. See ELL. But in Languedoc, particularly at Marſeilles, Montpelier, Thoulouſe, in Provence, and in Guienne, they meaſure by the canna, which at Thoulouſe, and in Guienne, contains five Paris feet five inches and ſix lines; or one Paris ell and a half. But at Montpelier, and throughout the Lower Languedoc, as alſo in Povence and Avignon, and even Dauphiné, the canna is ſix feet and nine lines, or one Paris ell and two thirds. See CANNA.

We have lately had ſome accurate compariſons between ſome of the French weights and *meaſures*, and thoſe of England, the reſult of which is, 1. The Paris half toiſe, as ſet off on the ſtandard kept in the Royal Society, contains of Engliſh inches, by the ſame ſtandard, 38.355, whence it appears, that the Engliſh yard and foot is, to the Paris half toiſe and foot, nearly as 107 to 114; for as 107 to 114 ſo is 36 to 38.35514.

2. The Paris two marc, or ſixteen ounce weight, weighs Engliſh troy grains 7560; whence it appears, that the Engliſh troy pound of twelve ounces, or 5760 grains, is to the Paris two marc, or ſixteen ounce weight, as 16 to 21; that the Paris ounce weighs Engliſh troy grains 472.5, and that conſequently the Engliſh troy ounce is to the Paris ounce as 64 is to 63.

3. The Engliſh avoirdupois pound weighs troy grains 7004; whence the avoirdupois ounce, whereof ſixteen make a pound, is found equal to 437.75 troy grains.— And it follows, that the troy pound is to the avoirdupois pound, as 88 to 107 nearly; for as 88 to 107 ſo is 5760 to 7003.636: that the troy ounce is to the avoirdupois ounce, as 80 to 73 nearly; for as 80 to 73 ſo is 480 to 438. And, laſtly, that the avoirdupois pound and ounce is to the Paris two marc weight and ounce, as 63 to 68 nearly; for as 63 to 68 ſo is 7004 to 7559.873. See WEIGHT.

4. The Paris foot, expreſſed in decimals, is equal to 1.0654 of the Engliſh foot, or contains 12.785 Engliſh inches. Phil. Tranſ. Nº 465. ſect. 5. See FOOT.

MEASURE, *the ſtandard*, *in Holland*, *Flanders*, *Sweden*, and good part of *Germany*, many of the Hans-towns, as *Dantzick*, and *Hamburgh*; and at *Geneva*, *Frankfort*, &c. is likewiſe the ell: but the ell, in all theſe places, differs from the Paris ell. In Holland, it contains one Paris foot eleven lines, or four ſevenths of the Paris ell. The Flanders ell contains two feet one inch five lines and a half line; or ſeven twelfths of the Paris ell. The ell of Germany, Barbant, &c. is equal to that of Flanders.

MEASURE, *the Italian*, is the bracchio, brace, or fathom: this obtains in the ſtates of Modena, Venice, Florence, Lucca, Milan, Mantua, Bologna, &c. but it is of different lengths. At Venice it contains one Paris foot eleven inches three lines, or eight fifteenths of the Paris ell. At Bologna, Modena and Mantua, the brace is the ſame as at Venice. At Lucca it contains one Paris foot nine inches ten lines, or half a Paris ell. At Florence, it contains one foot nine inches four lines, or forty-nine hundredths of a Paris ell. At Milan, the brace for meaſuring of ſilks is one Paris foot ſeven inches four lines, or four ninths of a Paris ell: that for woollen cloths is the ſame with the ell of Holland. Laſtly at

Bergamo the brace is one foot ſeven inches ſix lines, or five ninths of a Paris ell. The uſual *meaſure* at Naples, however, is the canna, containing ſix feet ten inches and two lines, or one Paris ell and fifteen ſeventeenths.

Measure, *the Spaniſh*, is the vara, or yard, in ſome places called the barra; containing ſeventeen twenty-fourths of the Paris ell. But the *meaſure* in Caſtile and Valencia is the pan, ſpan, or palm; which is uſed, together with the canna, at Genoa. In Arragon, the vara is equal to a Paris ell and a half, or five feet five inches ſix lines.

Measure, *the Portugueſe*, is the cavedos, containing two feet eleven lines, or four ſevenths of a Paris ell; and the vara, a hundred and ſix whereof make a hundred Paris ells.

Measure, *the Piedmonteſe*, is the ras, containing one Paris foot nine inches ten lines, or half a Paris ell.

In Sicily, their *meaſure* is the canna; the ſame with that of Naples.

Measures, *the Muſcovite*, are the cubit, equal to one Paris foot four inches two lines; and the arcin, two whereof are equal to three cubits.

Measures, *the Turkiſh* and *Levant*, are the picq, containing two feet two inches and two lines, or three fifths of the Paris ell. The Chineſe *meaſure*, the cobre; ten whereof are equal to three Paris ells. In Perſia, and ſome parts of the Indies, the gueze, whereof there are two kinds; the royal gueze, called alſo the *gueze monkelſer*, containing two Paris feet ten inches eleven lines, or four-fifths of the Paris ell; and the ſhorter gueze, called ſimply *gueze*, only two thirds of the former. At Goa and Ormuz, the *meaſure* is the vara, the ſame with that of the Portugueſe, having been introduced by them. In Pegu and ſome other parts of the Indies, the cando or candi, equal to the ell of Venice. At Goa, and other parts, they uſea a larger cando, equal to ſeventeen Dutch ells; exceeding that of Babel and Balſora by $\frac{7}{8}$ *per centum*. and the vara by $6\frac{1}{2}$. In Siam, they uſe the ken, ſhort of three Paris feet by one inch. The ken contains two ſoks, the ſok two keubs, the keub twelve nious or inches, the niou to be equal to eight grains of rice, i. e. to about nine lines. At Camboia, they uſe the haſter; in Japan, the tatam; and the ſpan on ſome of the coaſts of Guinea.

Engliſh Long Measures *or* Measures *of application.*

Barley-corn											
3	Inch										
9	3	Palm									
27	9	3	Span								
36	12	4	$1\frac{1}{3}$	Foot							
54	18	6	2	$1\frac{1}{2}$	Cubit						
108	36	12	4	3	2	Yard					
180	60	20	$6\frac{2}{3}$	5	$3\frac{1}{3}$	$1\frac{2}{3}$	Pace				
216	72	24	8	6	4	2	$1\frac{1}{5}$	Fathom			
594	198	66	22	$16\frac{1}{2}$	11	$5\frac{1}{2}$	$3\frac{3}{10}$	$2\frac{3}{4}$	Pole		
23760	7920	2640	880	660	440	220	132	110	40	Furlong	
190080	63360	21120	7040	5280	3520	1760	1056	880	320	8	Mile

Scripture long Measures.

								Engl. Feet	Inch. Dec.
Digit								0	0,912
4	Palm							0	3,648
12	3	Span						0	10,944
24	6	2	Cubit					1	9,888
96	24	8	4	Fathom				7	3,552
144	36	12	6	$1\frac{1}{2}$	Ezekiel's reed			10	11,328
192	48	16	8	2	$1\frac{1}{3}$	Arabian Pole		14	7,104
1920	480	160	80	20	$13\frac{2}{3}$	10	Scænus, meaſuring line	145	11,04

N.B. There was another ſpan uſed in the Eaſt, equal to $\frac{1}{4}$ of a cubit.

Grecian Long Measures *reduced to Engliſh.*

												Engl, Paces.	Feet.	Inch. Dec.
Dactylus, Digit												0	0	0,7554$\frac{11}{16}$
4	Doron, Dochme											0	0	3,0218$\frac{3}{4}$
10	$2\frac{1}{2}$	Lichas										0	0	7,5546$\frac{7}{8}$
11	$2\frac{3}{4}$	$1\frac{1}{10}$	Orthodoron									0	0	8,3101$\frac{9}{16}$
12	3	$1\frac{1}{5}$	$1\frac{1}{11}$	Spithame								0	0	9,0656$\frac{1}{4}$
16	4	$1\frac{6}{10}$	$1\frac{5}{11}$	$1\frac{1}{3}$	Pous, foot							0	1	0,0875
18	$4\frac{1}{2}$	$1\frac{4}{5}$	$1\frac{7}{11}$	$1\frac{1}{2}$	$1\frac{1}{8}$	Pygme, cubit						0	1	1,5984$\frac{3}{8}$
20	5	2	$1\frac{9}{11}$	$1\frac{2}{3}$	$1\frac{1}{4}$	$1\frac{1}{9}$	Pygon					0	1	3,109$\frac{3}{8}$
24	6	$2\frac{2}{5}$	$2\frac{2}{11}$	2	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	Pecus, cubit larger				0	1	6,13125
96	24	$9\frac{3}{5}$	$8\frac{8}{11}$	8	6	$5\frac{1}{3}$	$4\frac{4}{5}$	4	Orgya, pace			0	6	0,525
9600	2400	960	$872\frac{8}{11}$	800	600	$533\frac{1}{3}$	480	400	100	Stadius Aulus furlong		100	4	4,5
76800	19200	7680	$6981\frac{9}{11}$	6400	4800	$4266\frac{2}{3}$	3840	3200	800	8	Million, mile	805	5	0

Jewiſh long or Itinerary **Measures**

						Eng. Miles.	Paces	Feet. Dec.
Cubit						0	0	1,824
400	Stadium					0	145	4,6
2000	5	Sab. day's journey				0	729	3,0
4000	10	2	Eaſtern mile			1	403	1,0
12000	30	6	3	Paraſang		4	153	3,0
96000	240	48	24	8	A days journey	33	172	4,0

Roman long **Measures** *reduced to Engliſh*

										Engl. Paces.	Feet.	Inch. Dec.
Digitus tranſverſus										0	0	0,725¾
1'	Uncia									0	0	0,967
4	3	Palmus minor								0	0	2,901
16	12	4	Pes							0	0	11,604
20	15	5	1¼	Palmipes						0	1	2,505
24	18	6	1½	1⅓	Cubitus					0	1	5,406
40	30	10	2½	2	1⅔	Gradus				0	2	5,01
80	60	20	5	4	3⅓	2	Paſſus			0	4	10,02
10000	7500	2500	625	500	416⅔	250	125	Stadium		120	4	4,5
80000	60000	20000	5000	4000	3333⅓	2000	1000	8	Milliare	967	0	0

Proportions of ſeveral long **Measures** *to each other, by M. Picard.*

The Rhinland or Leyden foot (12 whereof make the Rhinland perch) ſuppoſed	696
The Engliſh foot	675½
The Paris foot	720
The Amſterdam foot, from that of Leyden, by Snellius	629
The Daniſh foot (two whereof make the Daniſh ell)	701$\frac{8}{10}$
The Swediſh foot	658¼
The Bruſſels foot	609⅓
The Dantzick foot, from Hevelius's Selenographia	636
The Lyons foot, by M. Auzout	757⅔
The Bologna foot, by the ſame	843
The braccio of Florence, by the ſame, aud father Merſenne	1290
The palm of the architects at Rome, according to the obſervations of Meſſ. Picard and Auzout	494¼

The Roman foot in the Capitol, examined by Meſſ. Pacard and Auzout	653 or 653½
The ſame from the Greek foot	652
From the vineyard Mattei	657½
From the palm	658¼
From the pavement of the Pantheon, ſuppoſed to contain ten Roman feet	653
From a ſlip of marble in the ſame pavement, ſuppoſed to contain 3 Roman feet	650
From the pyramid of Ceſtius, ſuppoſed to contain 95 Roman feet	653½
From the diameters of the columns in the arch of Septimius Severus	653⅓
From a ſlip of porphyry in the pavement of the Pantheon	653⅓

See on this ſubject Phil. Tranſ. vol. li. art. 69. p. 774.

Proportions of the long **Measures** *of ſeveral nations to the Engliſh foot, taken from Mr. Greaves, Auzout, Picard, and Eiſenchmid.* See Foot.

The Engliſh ſtandard foot being divided into 1000 equal parts, the other meaſures will have the proportions to it which follow:

	Feet	Inches
Engliſh foot	1000	12
Paris foot	1068	12,816
Venetian foot	1162	13,944
Rhinland foot	1033	12,396
Straſburg foot	952	11,424
Norimberg foot	1000	12
Dantzick foot	944	11,328
Daniſh foot	1042	12,504
Swediſh foot	977¼	11,733
Derahor cubit of Cairo	1824	21,888
Perſian ariſh	3197	38,364
Greater Turkiſh pike	2200	26,4
Leſſer Turkiſh pike	2131	25,572

	Feet	Inches
Braccio at Florence	1913	22,956
Braccio for woollen at Siena	1242	14,904
Braccio for linen at Siena	1974	23,688
Canna at Naples	6880	82,56
Vera at Almeria and Gibraltar	2760	33,12
Palmo di Archtetti at Rome	7320	87,84
Fanna di Archtetti	7320	87,84
Palmo di bracchio di mercantia	695½	8,346
Genoa palm	815	9,78
Bolognian foot	1250	15
Antwerp ell	2283	27,396
Amſterdam ell	2268	27,216
Leyden ell	2260	27,12
Paris drapers ell	3929	47,148
Paris mercer's ell	3937	47,244

Measures, *ſquare or ſuperficial.* Engliſh ſquare or ſuperficial *meaſures* are raiſed from the yard of 36 inches, multiplied into itſelf; and this producing 1296 ſquare inches in the ſquare yard, the diviſions of this are ſquare feet and inches; and the multiples, poles, roods, and acres, as in the table.

French ſquare meaſures are regulated by 12 ſquare lines in the inch ſquare; 12 inches in the foot, 22 feet in the perch, and 100 perches in the arpent or acre.

Engliſh ſquare **Measures**.

Inches						
144	Feet					
1296	9	Yards				
3600	25	2$\frac{7}{9}$	Paces			
39204	272¼	30¼	10,89	Poles		
1568160	10890	1210	435,6	40	Rood	
6272640	43560	4840	1743,6	160	4	Acre

Bergamo the brace is one foot ſeven inches ſix lines, or five ninths of a Paris ell. The uſual *meaſure* at Naples, however, is the canna, containing ſix feet ten inches and two lines, or one Paris ell and fifteen ſeventeenths.

Measure, *the Spaniſh*, is the vara, or yard, in ſome places called the barra; containing ſeventeen twenty-fourths of the Paris ell. But the *meaſure* in Caſtile and Valencia is the pan, ſpan, or palm; which is uſed, together with the canna, at Genoa. In Arragon, the vara is equal to a Paris ell and a half, or five feet five inches ſix lines.

Measure, *the Portugueſe*, is the cavedos, containing two feet eleven lines, or four ſevenths of a Paris ell; and the vara, a hundred and ſix whereof make a hundred Paris ells.

Measure, *the Piedmonteſe*, is the ras, containing one Paris foot nine inches ten lines, or half a Paris ell.

In Sicily, their *meaſure* is the canna; the ſame with that of Naples.

Measures, *the Muſcovite*, are the cubit, equal to one Paris foot four inches two lines; and the arcin, two whereof are equal to three cubits.

Measures, *the Turkiſh* and *Levant*, are the picq, containing two feet two inches and two lines, or three fifths of the Paris ell. The Chineſe *meaſure*, the cobre; ten whereof are equal to three Paris ells. In Perſia, and ſome parts of the Indies, the gueze, whereof there are two kinds; the royal gueze, called alſo the *gueze monkelſer*, containing two Paris feet ten inches eleven lines, or four-fifths of the Paris ell; and the ſhorter gueze, called ſimply *gueze*, only two thirds of the former. At Goa and Ormuz, the *meaſure* is the vara, the ſame with that of the Portugueſe, having been introduced by them. In Pegu and ſome other parts of the Indies, the cando or candi, equal to the ell of Venice. At Goa, and other parts, they uſea a larger cando, equal to ſeventeen Dutch ells; exceeding that of Babel and Balſora by ⅞ *per centum.* and the vara by 6½. In Siam, they uſe the ken, ſhort of three Paris feet by one inch. The ken contains two ſoks, the ſok two keubs, the keub twelve nious or inches, the niou to be equal to eight grains of rice, i. e. to about nine lines. At Camboia, they uſe the haſter; in Japan, the tatam; and the ſpan on ſome of the coaſts of Guinea.

Engliſh Long Measures *or* Measures *of application.*

Barley-corn											
3	Inch										
9	3	Palm									
27	9	3	Span								
36	12	4	1⅓	Foot							
54	18	6	2	1½	Cubit						
108	36	12	4	3	2	Yard					
180	60	20	6⅔	5	3⅓	1⅔	Pace				
216	72	24	8	6	4	2	1⅕	Fathom			
594	198	66	22	16½	11	5½	$3\frac{3}{10}$	2¾	Pole		
23760	7920	2640	880	660	440	220	132	110	40	Furlong	
190080	63360	21120	7040	5280	3520	1760	1056	880	320	8	Mile

Scripture long Measures.

								Engl. Feet	Inch. Dec.
Digit	—	—	—	—	—	—	—	0	0,912
4	Palm	—	—	—	—	—	—	0	3,648
12	3	Span	—	—	—	—	—	0	10,944
24	6	2	Cubit	—	—	—	—	1	9,888
96	24	8	4	Fathom	—	—	—	7	3,552
144	36	12	6	1½	Ezekiel's reed	—	—	10	11,328
192	48	16	8	2	1⅓	Arabian Pole	—	14	7,104
1920	480	160	80	20	13⅔	10	Scænus, meaſuring line	145	11,04

N.B. There was another ſpan uſed in the Eaſt, equal to ¼ of a cubit.

Grecian Long Measures *reduced to Engliſh.*

												Engl. Paces.	Feet.	Inch. Dec.
Dactylus, Digit	—	—	—	—	—	—	—	—	—	—	—	0	0	$0,7554\frac{11}{16}$
4	Doron, Dochme	—	—	—	—	—	—	—	—	—	—	0	0	3,0218¾
10	2½	Lichas	—	—	—	—	—	—	—	—	—	0	0	7,5546⅞
11	2¾	$1\frac{1}{10}$	Orthodoron	—	—	—	—	—	—	—	—	0	0	$8,3101\frac{9}{16}$
12	3	1⅕	$1\frac{1}{11}$	Spithame	—	—	—	—	—	—	—	0	0	9,0656¼
16	4	$1\frac{6}{10}$	$1\frac{5}{11}$	1⅓	Pous, foot	—	—	—	—	—	—	0	1	0,0875
18	4½	1⅘	$1\frac{7}{11}$	1½	1⅛	Pygme, cubit	—	—	—	—	—	0	1	1,5984⅜
20	5	2	$1\frac{9}{11}$	1⅔	1¼	$1\frac{1}{9}$	Pygon	—	—	—	—	0	1	3,109⅜
24	6	2⅖	$2\frac{2}{11}$	2	1½	1⅓	1⅕	Pecus, cubit larger	—	—	—	0	1	6,13125
96	24	9⅗	$8\frac{8}{11}$	8	6	5⅓	4⅘	4	Orgya, pace	—	—	0	6	0,525
9600	2400	960	$872\frac{8}{11}$	800	600	533⅓	480	400	100	Stadius Aulus furlong	—	100	4	4,5
76800	19200	7680	$6981\frac{9}{11}$	6400	4800	4266⅔	3840	3200	800	8	Million, mile	805	5	0

Jewiſh long or Itinerary MEASURES

						Eng. Miles.	Paces	Feet. Dec.
Cubit						0	0	1,824
400	Stadium					0	145	4,6
2000	5	Sab. day's journey				0	729	3,0
4000	10	2	Eaſtern mile			1	403	1,0
12000	30	6	3	Paraſang		4	153	3,0
96000	240	48	24	8	A days journey	33	172	4,0

Roman long MEASURES *reduced to Engliſh*

										Engl. Paces.	Feet.	Inch. Dec.
Digitus tranſverſus										0	0	0,725¾
1'	Uncia									0	0	0,967
4	3	Palmus minor								0	0	2,901
16	12	4	Pes							0	0	11,604
20	15	5	1¼	Palmipes						0	1	2,505
24	18	6	1½	1⅓	Cubitus					0	1	5,406
40	30	10	2½	2	1⅔	Gradus				0	2	5,01
80	60	20	5	4	3⅓	2	Paſſus			0	4	10,02
10000	7500	2500	625	500	416⅔	250	125	Stadium		120	4	4,5
80000	60000	20000	5000	4000	3333⅓	2000	1000	8	Milliare	967	0	0

Proportions of ſeveral long MEASURES *to each other, by M. Picard.*

The Rhinland or Leyden foot (12 whereof make the Rhinland perch) ſuppoſed	696
The Engliſh foot	675½
The Paris foot	720
The Amſterdam foot, from that of Leyden, by Snellius	629
The Daniſh foot (two whereof make the Daniſh ell)	$701\frac{8}{10}$
The Swediſh foot	658¼
The Bruſſels foot	$609\frac{3}{5}$
The Dantzick foot, from Hevelius's Selenographia	636
The Lyons foot, by M. Auzout	757⅔
The Bologna foot, by the ſame	843
The braccio of Florence, by the ſame, aud father Merſenne	1290
The palm of the architects at Rome, according to the obſervations of Meſſ. Picard and Auzout	494¼

The Roman foot in the Capitol, examined by Meſſ. Pacard and Auzout	653 or 653½
The ſame from the Greek foot	652
From the vineyard Mattei	657½
From the palm	658¼
From the pavement of the Pantheon, ſuppoſed to contain ten Roman feet	653
From a ſlip of marble in the ſame pavement, ſuppoſed to contain 3 Roman feet	650
From the pyramid of Ceſtius, ſuppoſed to contain 95 Roman feet	$653\frac{5}{2}$
From the diameters of the columns in the arch of Septimius Severus	653⅓
From a ſlip of porphyry in the pavement of the Pantheon	653⅔

See on this ſubject Phil. Tranſ. vol. li. art. 69. p. 774.

Proportions of the long MEASURES *of ſeveral nations to the Engliſh foot, taken from Mr. Greaves, Auzout, Picard, and Eiſenchmid.* See FOOT.

The Engliſh ſtandard foot being divided into 1000 equal parts, the other meaſures will have the proportions to it which follow:

	Feet	Inches
Engliſh foot	1000	12
Paris foot	1068	12,816
Venetian foot	1162	13,944
Rhinland foot	1033	12,396
Straſburg foot	952	11,424
Norimberg foot	1000	12
Dantzick foot	944	11,328
Daniſh foot	1042	12,504
Swediſh foot	977¾	11,733
Derahor cubit of Cairo	1824	21,888
Perſian ariſh	3197	38,364
Greater Turkiſh pike	2200	26,4
Leſſer Turkiſh pike	2131	25,572

	Feet	Inches
Braccio at Florence	1913	22,956
Braccio for woollen at Siena	1242	14,904
Braccio for linen at Siena	1974	23,688
Canna at Naples	6880	82,56
Vera at Almeria and Gibraltar	2760	33,12
Palmo di Archtetti at Rome	7320	87,84
Fanna di Archtetti	7320	87,84
Palmo di bracchio di mercantia	695½	8,346
Genoa palm	815	9,78
Bolognian foot	1250	15
Antwerp ell	2283	27,396
Amſterdam ell	2268	27,216
Leyden ell	2260	27,12
Paris drapers ell	3929	47,148
Paris mercer's ell	3937	47,244

MEASURES, *ſquare or ſuperficial.* Engliſh ſquare or ſuperficial *meaſures* are raiſed from the yard of 36 inches, multiplied into itſelf; and this producing 1296 ſquare inches in the ſquare yard, the diviſions of this are ſquare feet and inches; and the multiples, poles, roods, and acres, as in the table.

French ſquare meaſures are regulated by 12 ſquare lines in the inch ſquare; 12 inches in the foot, 22 feet in the perch, and 100 perches in the arpent or acre.

Engliſh ſquare MEASURES.

Inches						
144	Feet					
1296	9	Yards				
3600	25	$2\frac{7}{9}$	Paces			
39204	272¼	30¼	10,89	Poles		
1568160	10890	1210	435,6	40	Rood	
6272640	43560	4840	1743,6	160	4	Acre

Grecian ſquare meaſures were the plethron, or acre, by ſome ſaid to contain 1444, by others 10,000 ſquare feet; and aroura, the half of the plethron. The aroura of the Egyptians was the ſquare of 100 cubits.

Roman ſquare MEASURES *reduced to Engliſh.*

The integer was a jugerum or acre, which they divided like the libra, or as: thus,

				Jugerum contained				
		Unciæ		Sq. Feet.	Scrup.	Eng. Roods.	Sq. Pol.	Sq. Fect.
1	As	12	As	28800	288	2	18	250,05
$\frac{11}{12}$	Deunx	11	Deunx	26400	264	2	10	183,85
$\frac{5}{6}$	Dextans	10	Dextans	24000	240	2	2	117,64
$\frac{3}{4}$	Dodrans	9	Dodrans	21600	216	1	34	51,42
$\frac{2}{3}$	Bes	8	Bes	19200	192	1	25	257,46
$\frac{7}{12}$	Septunx	7	Septunx	16800	168	1	17	191,25
$\frac{1}{2}$	Semis	6	Semis	14400	144	1	1	125,03
$\frac{5}{12}$	Quincunx	5	Quincunx	12000	120	1	0	58,82
$\frac{1}{3}$	Triens	4	Triens	9600	96	0	32	264,85
$\frac{1}{4}$	Quadrans	3	Quadrans	7200	72	0	24	198,64
$\frac{1}{6}$	Sextans	2	Sextans	4800	48	0	16	132,43
$\frac{1}{12}$	Uncia	1	Uncia	2400	24	0	8	66,21

MEASURES, *cubical*, or MEASURES *of capacity for liquids.* *Engliſh liquid meaſures* were originally raiſed from troy-weights; it being enacted by ſeveral ſtatutes, that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, ſhould weigh a gallon of wine *meaſure*; the diviſions and multiples whereof were to form the other *meaſures*: at the ſame time it was alſo ordered, that there ſhould be but one *liquid meaſure* in the kingdom; yet cuſtom has prevailed; and there having been introduced a new weight, viz. the avoirdupois, we have now a ſecond ſtandard gallon adjuſted thereto, and therefore exceeding the former in the proportion of the avoirdupois weight to troy weight. From this latter ſtandard are raiſed two ſeveral *meaſures*, the one for ale, the other for beer. For the method of reducing one into the other, ſee WEIGHT.

The ſealed gallon at Guildhall, which is the ſtandard for wines, ſpirits, oils, &c. is ſuppoſed to contain 231 cubic inches; and, on this ſuppoſition, the other *meaſures* raiſed therefrom will contain as in the following tables; yet, by actual experiment made in 1688, before the lord mayor and the commiſſioners of exciſe, this gallon was only found to contain 224 cubic inches; it was however agreed to continue the common ſuppoſed contents of 231 cubic inches; ſo that all computations ſtand on their old footing. Hence, as 12 is to 231, ſo is 14$\frac{12}{20}$ to 281$\frac{1}{2}$, the cubic inches in the ale gallon; but in effect the ale quart contains 70$\frac{1}{2}$ cubic inches; on which principle the ale and beer gallon will be 282 cubic inches. See on this ſubject, Phil. Tranſ. vol. xlvi. art. 15. p. 54.

The ſeveral diviſions and multiples of theſe *meaſures*, and their proportions, are exhibited in the tables underneath.

MEASURES, *French liquid*. At Paris, and in a great part of the kingdom, the *meaſures*, to begin with the ſmalleſt, are, the poſſon, which contains ſix cubic inches, or four Paris ounces of water at the freezing point; two poſſons make the demi-ſeptier; two demi-ſeptiers the ſeptier or chopine; two chopines, a pint; two pints, the quart or pot; four quarts, the gallon or ſeptier of eſtimation; and thirty-ſix ſeptiers, the muid, which is ſubdivided into two demi-muids, four quarter-muids, and eight half-quarter-muids. From the quart are likewiſe raiſed the *meaſures* uſed in other parts, as the queue uſed in Orleans, Blois, &c. containing a Paris muid and a half, or four hundred and twenty pints; the tun uſed at Bayonne and Bourdeaux, conſiſting of four bariques, and equal to three Paris muids; at Orleans to two; ſo that the firſt tun contains eight hundred and ſixty-four pints, and the ſecond five hundred and ſeventy-ſix. See TUN. The demi-queue uſed in Champagne, ninety-ſix quarts; the pipe uſed in Anjou and Poictou, containing two buſſards equal to two demi-queues of Orleans, &c. or a muid and a half of Paris, or four hundred and thirty-two points. The millerolle uſed in Provence, containing ſixty-ſix Paris pints; and the poinçon uſed at Nantes, in Touraine, and the Bleſſois, equal to half the Orleans tun. The poinçon uſed at Paris is the ſame with the demi-queue.

MEASURES, *Dutch liquid*. At Amſterdam, their *meaſures*, to begin with the diminutions, are mengles, or bottles, equal to French pots, and containing two pounds four ounces, marc, of an ordinary liquor. The mengle is divided into two pints, four half-pints, eight muſſies, ſixteen half muſſies, &c. ſeven hundred and ſeventy mengles make their tun. The viertel, or quarter, conſiſts of five mengles, and one-ſixth of a mengle. The wine viertel is juſt ſix mengles. The ſtekan, or ſtekaimen, contains ſixteen mengles. The anker contains two ſtekans; and four ankers, the awn. For oils they uſe the tun, which contains ſix awms, or ahms; equal to ſixteen hundred Paris pints. See AAM.

MEASURES, *Spaniſh liquid*, are, the bota, containing between thirty-ſix and thirty-ſeven Dutch ſtekans, holding about a thouſand weight. The bota conſiſts of thirty arrobas, each weighing twenty-eight pounds. Each arroba is again divided into eight azumbres, and the azumbre into four quarts. The pipe conſiſts of eighteen arrobas.

MEASURES, *Portugueſe liquid*, are botas, almudes, cavadas, quartas; and for oil, alquiers, or cantars. The Portugueſe bota is ſomewhat ſmaller than the Spaniſh; the latter being equal to thirty-ſix or thirty-ſeven ſtekans, and the former only to twenty-five or twenty-ſix. The quartas is one-fourth of the cavadas. The cavadas, or cavado, is the ſame with the Dutch mengle. Six cavadas make an alquier, and two alquiers one almude, or almoud; twenty-ſix almudes, a bota.

MEASURES, *Italian liquid*. At Rome is the boccale, or pot, containing a little more than a Paris pint. Seven boccales and a half make the rubbo; and thirteen rubbos and a half, the brenta; ſo that the brenta contains ninety-ſix boccales. At Florence, the ſtaro, or ſtaio, containing three bariles, and the barile twenty-ſix fiaſcos, or flaſks, which are nearly equal to Paris pints. At Verona they uſe the baſſa, ſixteen whereof make a brenta; the brenta contains ninety-ſix boccales, or thirteen rubbos and a half. At Venice the amphora containing two bottes; the botte, four bigoncios; the bigoncio, four quarts; the quart, four tiſchaufferas. The Venetian botte is again divided into moſtachios, ſeventy-ſix whereof make the amphora. At Ferrara the maſtilly, containing eight ſechios. In Iſtria, ſechios; ſix whereof make the urna. In Calabria and Apulia, pignatolis, equal to French pints; thirty-two pignatolis make the ſtaro, or ſtaio; and ten ſtaros the ſalma.

MEASURES, *German liquid*. The fuder is uſed almoſt throughout all Germany, but with ſome difference in its length, as well as its ſubdiviſions. The fuder is ſuppoſed the load of a cart with two horſes. Two fuders and a half make the roeder ſix awms, the fuder; twenty fertels, the awm; and four maſſems, or maaſſes, the fertel; ſo that the roeder contains one thouſand two hundred maaſſes, the fuder four hundred and eighty, the awm eighty, and the fertel forty-one. At Nuremberg, the diviſion of the fuder is into twelve heemers, and the heemer into ſixty-four maaſſes. At Vienna, they divide the fuder into thirty-two heemers, the heemer into thirty-two achtelings, and the achteling into four ſelitins: the awm, there, is eighty moaſſes; the fertel, called alſo *ſchrewe*, four maaſſes; and the driclinck twenty-four heemers. At Augſbourg, the fuder is divided into eight jez; the jez into two muids, or twelve beſons; the beſon into eight maaſſes, which makes ſeven hundred ſixty-eight maaſſes in the fuder, as in that of Nuremberg. At Heidelberg, the fuder is divided into ten awms; the awm into twelve vertels; and the vertel into four maaſſes. In Wirtemberg, the fuder is divided into awms; the awm into ſixteen yunes; the yune into ten maaſes.

MEASURES, *liquid, on the coaſts of Barbary*. At Tripoli, &c. they uſe the rotolo, or rotoli; thirty-two whereof make the matuli. At Tunis, forty-two of the rotoli of Tripoli make a matara, or mataro; and the other places on the ſame coaſt uſe nearly the ſame *meaſures*. It may be here obſerved, that moſt, if not all the eaſtern nations, with whom the Europeans traffic, have not any ſuch thing as *meaſures* of capacity, whether for things liquid or dry; but that they ſell every thing, even liquors, by the weight. We may, however, rank among the number of *liquid meaſures*, the cocos and canan of Siam. The firſt are the cocos ſhells cleared of their kernel. And ſince theſe are not all of the ſame capacity, they meaſure them with cauris, or little ſhells found in the Maldives, which alſo ſerve for money in ſome ſtates of the Indies. Some cocos hold a thouſand cauris, and ſome only five hundred. Above the cocos is the canan, a little *meaſure* uſed in the ſame country, and called by the Portugueſe *choup*; holding about a Paris quart.

Engliſh Measures *of capacity of liquids.*
Wine-Measure.

Solid Inches.									
28⅞	Pint								
231	8	Gallon							
4158	144	18	Rundlet						
7276½	252	31½	1¾	Barrel					
9702	336	42	2⅓	1⅔	Tierce				
14553	504	63	3½	2	1½	Hogſhead			
19279	672	84	4⅔	2⅔	2	1⅓	Puncheon		
29106	1008	126	7	4	3	2	1½	Butt or Pipe	
58212	2016	252	14	8	6	4	3	2	Ton

Ale-Measure.

Pints					
8	Gallon				
64	8	Firkin			
128	16	2	Kilderkin		
256	32	4	2	Barrel	
384	48	6	3	1½	Hogſhead

Beer Measure.

Pints						
8	Gallon					
72	9	Firkin				
144	18	2	Kilderkin			
228	36	4	2	Barrel		
432	54	6	3	1½	Hogſhead	
864	108	12	6	3	2	Butt

N. B. In all places without the bills of mortality, 34 gallons ſhall be reckoned for a barrel of beer or ale to the exciſe.

Attic Measures *of capacity for liquids, reduced to the Engliſh Wine*-Meaſure.

										Gall.	Pints.	Sol. Inch Dec.
Cochliarion										0	$\frac{1}{120}$	0,0356$\frac{5}{12}$
2	Cheme									0	$\frac{1}{60}$	0,0712⅚
2½	1½	Myſton								0	$\frac{1}{48}$	0,089$\frac{11}{48}$
5	2½	2	Concha							0	$\frac{1}{24}$	0,178$\frac{11}{24}$
10	5	4	2	Cyathus						0	$\frac{1}{12}$	0,356$\frac{11}{12}$
15	7½	6	3	1½	Oxubaphon					0	⅛	0,535⅜
60	30	24	12	6	4	Cotyle				0	½	2,141½
120	60	48	24	12	8	2	Xeſtes, ſextary			0	1	4,283
720	360	288	144	72	48	12	6	Chos, congius		0	6	25,698
8640	4320	3456	1728	864	576	144	7	12	Metretes, amphora	10	2	19,626

Measures *of capacity for liquids, reduced to the Engliſh Wine*-Meaſure.

										Gall.	Pints.	Sol. Inch. Dec.
Ligula										0	$\frac{1}{48}$	0,117$\frac{5}{12}$
4	Cyathus									0	$\frac{1}{12}$	0,469⅔
6	1½	Acetabulum								0	⅛	0,704½
12	3	2	Quartarius							0	¼	1,409
24	6	4	2	Hemina						0	½	2,818
48	12	8	4	2	Sextarius					0	1	5,636
288	72	48	24	12	6	Congius				0	7	4,942
1152	288	192	96	48	24	4	Urna			3	4½	5,33
2304	576	384	192	96	48	8	2	Amphora		7	1	10,66
46080	11520	7680	3840	1920	960	160	40	20	Culeus	143	3	11,095

Jewiſh Measures *of capacity for liquids, reduced to the Engliſh Wine*-Meaſure.

							Gall.	Pints.	Sol. Inch.
Caph							0	⅝	0,177
1⅓	Log						0	⅚	0,211
5⅓	4	Cab					0	3⅓	0,844
16	12	3	Hin				1	2	2,533
32	24	6	2	Seah			2	4	5,067
96	72	18	6	3	Bath, epha		7	4	15,2
960	720	180	60	30	10	Coron, chomer	75	5	7,625

Measures, *cubical, or of capacity for things dry. Engliſh dry* or *corn* Measures, are raiſed from the Wincheſter gallon, which contains $272\frac{1}{4}$ ſolid inches, and is to hold of pure running or rain water, nine pounds thirteen ounces. This ſeems to ſtand on the foot of the old wine gallon, of 224 cubic inches; 12 being to $14\frac{12}{20}$, as 224 to $272\frac{1}{4}$. Yet by an act of parliament, made 1697, it is decreed, that a round buſhel, eighteen inches and a half wide, and eight deep, is a legal Wincheſter buſhel. But ſuch a veſſel will only hold 2150.42 cubic inches; conſequently the gallon will contain $268\frac{4}{5}$ cubic inches. The diviſions and multiples are in the table following.

Measures, *French dry*, are, the litron, buſhel, minot, mine, ſeptier, muid, and tun. The litron is divided into two demi-litrons, and four quarter-litrons, and contains thirty-ſix cubic inches of Paris. By ordonnance, the litron is to be three inches and a half high, and three inches ten lines broad. The litron for ſalt is larger, and is divided into two halves, four quarters, eight demi-quarters, and ſixteen meſurettes. The French buſhel is different in different juriſdictions. At Paris it is divided into demi-buſhels; each demi-buſhel into two quarts; the quart into two half-quarts; and the half-quart into two litrons: ſo that the buſhel contains ſixteen litrons. By ordonnance, the Paris buſhel is to be eight inches two lines and an half high; and ten inches broad, or in diameter, within-ſide. The minot conſiſts of three buſhels; the mine of two minots, or ſix buſhels; the ſeptier of two mines, or twelve buſhels; and the muid of twelve ſeptiers, or an hundred forty-four buſhels. *The buſhel for oats*, is eſtimated double that of any other grain; ſo that there go twenty-four buſhels to make the ſeptier, and two hundred eighty-eight to make the muid. It is divided into four picotins; the picotin containing two quarts, or four litrons. *The buſhel for ſalt* is divided into two half-buſhels, four quarters, eight half-quarters, and ſixteen litrons; four buſhels make a minot, ſixteen a ſeptier, and a hundred ninety-two a muid. *The buſhel for wood*, is divided into halves, quarters, and half-quarters. Eight buſhels make the minot, ſixteen a mine; twenty mines, or three hundred and twenty buſhels, the muid. For *plaſter*, twelve buſhels make a ſack, and thirty ſix ſacks a muid. For *lime*, three buſhels make a minot, or forty-eight minots a muid. The minot is, by ordonnance, to be eleven inches nine lines high; and fourteen inches eight lines in diameter. The minot is compoſed of three buſhels, or ſixteen litrons; four minots make a ſeptier, and forty-eight a muid. The French mine is no real veſſel, but an eſtimation of ſeveral others. At Paris, the mine contains ſix buſhels, and twenty-four make the muid; at Rouen, the mine is four buſhels; and at Dieppe, eighteen mines make a Paris muid. See Muid. The ſeptier differs in different places: at Paris, it contains two mines, or eight buſhels; and twelve ſeptiers the muid. At Rouen, the ſeptier contains two mines, or twelve buſhels. Twelve ſeptiers make a muid at Rouen, as well as at Paris; but twelve of the latter are equal to fourteen of the former. At Toulon, the ſeptier contains a mine and a half; three of which mines make the ſeptier of Paris. See Septier. The muid, or muy, of Paris, conſiſts of twelve ſeptiers; and is divided into mines, minots, buſhels, &c. That for oats is double that for other grain; i. e. contains twice the number of buſhels. At Orleans, the muid is divided into mines; but thoſe mines only contain two Paris ſeptiers and a half. In ſome places they uſe the tun in lieu of the muid; particularly at Nantes, where it contains ten ſeptiers of ſixteen buſhels each, and weighs between two thouſand two hundred and two thouſand two hundred and fifty pounds. Three of theſe tuns make twenty-eight Paris ſeptiers. At Rochel, &c. the tun contains forty-two buſhels, and weighs two per cent. leſs than that of Nantes. At Breſt, it contains twenty buſhels, is equal to ten Paris ſeptiers, and weighs about two thouſand two hundred and forty pounds. See Tun.

Measures, *Dutch, Swediſh, Poliſh, Pruſſian*, and *Muſcovite dry*. In theſe places they eſtimate their dry things on the foot of the *laſt*, *leſt*, *leth*, or *lechi*, ſo called, according to the various pronunciations of the people who uſe it. In Holland, the laſt is equal to nineteen Paris ſeptiers, or thirty-eight Bourdeaux buſhels, and weighs about four thouſand five hundred ſixty pounds; the laſt they divide into twenty-ſeven mudes, and the mude into four ſchepels. In Poland, the laſt is forty Bourdeaux buſhels, and weighs about four thouſand eight hundred Paris pounds. In Pruſſia, the laſt is a hundred and thirty-three Paris ſeptiers. In Sweden and Muſcovy, they meaſure by the great and little laſt; the firſt containing twelve barrels, and the ſecond half as many. See Last. In Muſcovy, they likewiſe uſe the cheſford, which is different in various places: that of Archangel is equal to three Rouen buſhels.

Measure, *Italian dry*. At Venice, Leghorn, and Lucca, they eſtimate their dry things on the foot of the ſtaro or ſtaio; the ſtaro of Leghorn weights fifty-four pounds; a hundred and twelve ſtaros, and ſeven-eights are equal to the Amſterdam laſt. At Lucca, a hundred and nineteen ſtaros make the laſt of Amſterdam. The Venetian ſtaro weighs a hundred twenty-eight Paris pounds: the ſtaro is divided into four quarters. Thirty-five ſtaros, and one-fifth, or a hundred and forty quarters, and four-fifths, make the laſt of Amſterdam. At Naples and other parts, they uſe the tomola, or tomalo, equal to one-third of the Paris ſeptier. Thirty-ſix tomoli and a half make the carro: and a carro and a half, or fifty-four tomoli, make the laſt of Amſterdam. At Palermo, ſixteen tomoli make the ſalma; and four mondili, the tomolo. Ten ſalmas and three-ſevenths, or a hundred and ſeventy-one tomoli and three-ſevenths, make the laſt of Amſterdam.

Measures, *Flemiſh dry*. At Antwerp, &c. they meaſure by the viertel; thirty-two and a half whereof make nineteen Paris ſeptiers. At Hamburgh, the ſchepel; ninety whereof make nineteen Paris ſeptiers.

Measures, *Spaniſh and Portugueſe dry*. At Cadiz, Bilboa, and St. Sebaſtian, they uſe the fanega; twenty-three whereof make the Nantes or Rochel tun, or nine Paris ſeptiers and a half: though the Bilboa fanega is ſomewhat larger, inſomuch that twenty-one fanegas make a Nantes tun. At Seville, &c. they uſe the anagoras, containing a little more than the Paris mine; thirty-ſix anagoras make nineteen Paris ſeptiers. At Bayonne, &c. the concha; thirty whereof are equal to nine Paris ſeptiers and a half. At Liſbon, the alquier, a very ſmall *meaſure*, two hundred and forty whereof make nineteen Paris ſeptiers, ſixty the Liſbon muid.

Engliſh dry or corn Measures.

Solid Inches									
$34\frac{1}{32}$	Pint								
$272\frac{1}{4}$	8	Gallon							
$544\frac{1}{2}$	16	2	Peck						
2178	64	8	4	Buſhel					
	128	16	8	2	Strike				
	265	32	16	4	2	Carnock or coom			
17424	512	64	32	8	4	2	Seam or quarter		
	3072	384	192	48	24	12	6	Weigh	
	5120	640	320	80	40	20	10	$1\frac{2}{3}$	Laſt

But if the corn gallon contain only 268,8 ſolid inches, the Measures will be as follow:

Solid inches				
268,8	Gallon			
537,6	2	Peck		
2150,4	8	4	Buſhel	
17203,2	64	32	8	Quarter

N. B. Some make five quarters a weigh, and two weighs a laſt; and others reckon ten quarters to the weigh, and twelve weighs to the laſt.

Jewiſh dry MEASURES *reduced to Engliſh.*

							Hecks.	Gall.	Pints.	Sol. Inch.
						Gachal	0	0	0 $\frac{17}{20}$	0,031
20						Gab	0	0	2$\frac{5}{6}$	0,073
36	1$\frac{4}{5}$					Gomor	0	0	5$\frac{1}{10}$	1,211
120	6	3$\frac{1}{3}$				Seah	1	0	1	4,036
360	18	10	3			Epha	3	0	3	12,107
1800	90	50	15	5		Letteeh	16	0	0	26,500
3600	180	100	30	10	2	Chomer, coron	32	0	1	18,969

Attic dry MEASURES *reduced to Engliſh.*

							Pecks.	Gall.	Pints.	Sol. Inch.
						Cachliarian	0	0	0	0276$\frac{7}{0}$
10						Cyathus	0	0	0	2,763$\frac{1}{2}$
15	1$\frac{1}{2}$					Oxubaphon	0	0	0	4,144$\frac{3}{4}$
60	6	4				Cotyle	0	0	0	16,579
120	12	8	2			Xeſtes, ſextary	0	0	0	33,158
180	18	12	3	1$\frac{1}{2}$		Choinix	0	0	1	15,705$\frac{1}{4}$
8640	864	576	144	72	48	Medimnus	4	0	6	3,501

Roman dry MEASURES *reduced to Engliſh.*

							Peck.	Gall.	Pints.	Sol. Inch Dec.
						Ligula	0	0	0$\frac{1}{48}$	0,01
4						Cyathus	0	0	0$\frac{1}{12}$	0,04
6	1$\frac{1}{2}$					Acetabulum	0	0	0$\frac{1}{8}$	0,06
24	6	4				Hemina	0	0	0$\frac{1}{2}$	0,24
48	12	8	2			Sextarius	0	0	1	0,48
384	96	64	16	8		Semi d.	0	1	0	3,84
768	192	128	32	16	2	Modius	1	0	0	7,68

The uſual MEASURE *of wood for firing*, is the CORD; four feet high, as many broad, and eight long; this is divided into two half cords, called *ways*, and by the French *membrures*, from the pieces ſtuck upright to bound them; or *voys*, as being ſuppoſed half a waggon-load.

The MEASURE *for horſes* is the HAND, or handful; which by the ſtatute contains four inches.

MEASURE is alſo uſed to ſignify the cadence and time obſerved in poetry, dancing, and muſic, to render them regular and agreeable.

The different *meaſures* or metres, in poetry, are the different manners of ordering and combining the quantities, or the long and ſhort ſyllables. Thus hexameter, pentameter, iambic, ſapphic verſes, &c. conſiſt of different *meaſures*.

In Engliſh verſes, the *meaſures* are extremely various and arbitrary, every poet being at liberty to introduce any new form that he pleaſes. The moſt uſual are, the heroic, generally conſiſting of five long, and five ſhort ſyllables; and verſes of four feet; and of three feet and a cæſura, or ſingle ſyllable.

The ancients, by variouſly combining and tranſpoſing their quantities, made a vaſt variety of different *meaſures*. Of words, or rather feet, of two ſyllables, they formed a ſpondee, conſiſting of two long ſyllables; a pyrrhic, of two ſhort ſyllables; a trochee, of a long and a ſhort ſyllable; and an iambic, of a ſhort and a long ſyllable.

Of their feet of three ſyllables, they formed a moloſſus, conſiſting of three long ſyllables; a tribrach, of three ſhort ſyllables; a dactyl, of one long and two ſhort ſyllables; and an anapæſt, of two ſhort and one long ſyllable.

The Greek poets contrived a hundred and twenty-four different combinations or *meaſures*, under as many different names, from feet of two ſyllables to thoſe of ſix.

MEASURE, in *Muſic*, the interval, or ſpace of time, which the perſon, who beats time, takes between the raiſing and falling of his hand or foot, in order to conduct the movement, ſometimes quicker, and ſometimes ſlower, according to the kind of muſic, or the ſubject that is ſung or played.

The *meaſure* is that which regulates the time we are to dwell on each note. See TIME.

The ordinary or common *meaſure* is one ſecond, or ſixtieth part of a minute, which is nearly the ſpace between the beats of the pulſe or heart; the ſyſtole or contraction of the heart anſwering to the elevation of the hand; and its diaſtole, or dilatation, to the letting it fall. The *meaſure* uſually takes up the ſpace that a pendulum, of of two feet and a half long, employs in making a ſwing or vibration. The *meaſure* is regulated according to the different quality or value of the notes in the piece; by which the time, that each note is to take up, is expreſſed. The ſemi-breve, for inſtance, holds one riſe, and one fall; and this is called the *meaſure*, or *whole meaſure*; ſometimes the *meaſure-note*, or *time-note*; the minim, one riſe, or one fall; and the crotchet, half a riſe, or half a fall, there being four crotchets in a full *meaſure*.

MEASURE, *binary* or *double*, is that wherein the riſe and fall of the hand are equal.

MEASURE, *ternary* or *triple*, is that wherein the fall is double to the riſe; or where two minims are played during a fall, and but one in a riſe. To this purpoſe the number 3 is placed at the beginning of the lines, when the *meaſure* is intended to be triple; and a C, when the *meaſure* is to be common or double. This riſing and falling of the hands was called by the Greeks *αρσις* and *θεσις*. St. Auguſtine calls it *plauſus*, and the Spaniards *compas*. See ARSIS and THESIS.

MEASURES, *powder*, in *Artillery*, are made of copper, and contain from an ounce to twelve pounds: theſe are very convenient in a ſiege, when guns or mortars are loaded with looſe powder, eſpecially in ricochet firing, &c.

MEASURING, MENSURATION, defined *geometrically*, is the aſſuming any certain quantity, and expreſſing the proportion of other ſimilar quantities to the ſame.

MEASURING, defined *popularly*, is the uſing a certain known meaſure, and determining thereby the preciſe extent, quantity, or capacity of any thing.

Meaſuring, in the general, makes the practical part of GEOMETRY. From the various ſubjects whereon it is employed, it acquires various names, and conſtitutes various arts. Thus,

MEASURING *of lines*, or quantities of one dimenſion, we call LONGIMETRY; and when thoſe lines are not extended parallel to the horizon, ALTIMETRY. When the different altitudes of the two extremes of the line are alone regarded, we call it LEVELLING.

Measuring *of ſuperficies*, or quantities of two dimenſions, is variouſly denominated, according to its ſubjects: when converſant about lands, it is called GEODESIA, or SURVEYING: in other caſes, it is called ſimply *meaſuring*.

The inſtruments uſed are the ten-foot rod, chain, compaſs, circumferentor, &c.

Measuring *of ſolids*, or quantities of three dimenſions, we call STEREOMETRY; where it is converſant about the capacities of veſſels, or the liquors they contain particularly, GAUGING.

The inſtruments for this art are the gauging-rod, ſliding-rule, &c.

From the definition of *meaſuring*, where the *meaſure* is expreſſed to be ſimilar or homogeneous to, i. e. of the ſame kind with the thing meaſured, it is evident, that in the firſt caſe, or in quantities of one dimenſion, the *meaſure* muſt be a line; in the ſecond, a ſuperficies; and in the third, a ſolid. For a line, v. gr. cannot *meaſure* a ſurface; to *meaſure*, being no more than to apply the known quantity to the unknown, till the two become equal. Now a ſurface has breadth, and a line has none: and if one line have no breadth, two or a hundred have none. A line, therefore, can never be applied ſo often to a ſurface, as to be equal to it, i. e. to *meaſure* it. And from the like reaſoning it is evident, a ſuperficies, which has no depth, cannot become equal to, i. e. cannot *meaſure*, a ſolid, which has.

While a line continues ſuch, it may be meaſured by any part of itſelf: but when the line begins to flow, and to generate a new dimenſion, the *meaſure* muſt keep pace, and flow too; i. e. as the one commences ſuperficies, the other muſt do ſo too. Thus we come to have *ſquare meaſures*, and *cubic meaſures*.

Hence we ſee why the *meaſure of a circle* is an arch, or part of the circle; for a right line can only touch a circle in one point, but the periphery of a circle conſiſts of infinite points. The right line, therefore, to meaſure the circle, muſt be applied infinite times, which is impoſſible. Again, the right line only touches the circle in a mathematical point; which has no parts or dimenſions, and has conſequently no magnitude; but a thing that has no magnitude or dimenſions, bears no proportion to another, that has; and cannot therefore meaſure it. Hence we ſee the reaſon of the diviſion of circles into 360 parts or arches, called *degrees*. See ARCH, CIRCLE, and DEGREE.

Measuring *triangles*, or from three given ſides or angles to determine all the reſt, is called TRIGONOMETRY.

Measuring *of the air*, its preſſure, ſpring, &c. is called AEROMETRY, or PNEUMATICS.

MEAT, *cibus*. See FOOD.

Meats, *dreſſing of*. See DRESSING.

Meats, *dry*. See XEROPHAGY.

Meats, *white*. See WHITE.

MEATUS *auditorius*, the entrance of the EAR; that is a cartilaginous ſubſtance, irregularly divided with fleſhy membranous interpoſitions in ſeveral parts of it, not unlike the bronchi in the lungs, only that the fleſhy fibres are here thicker. The inner part, or that next the brain, is bony. It is lined throughout with a thick membrane, derived from the ſkin, which is continued on the membrana tympani, where it becomes thinner. See *Tab. Anat.* (*Oſteol.*) *fig.* 13. *lit. f.*

From the beginning of the *meatus*, almoſt half-way, ariſe a great number of ſmall hairs, at whoſe roots iſſues the ear-wax, which is entangled in thoſe hairs, the better to break the impetus of the external air, and prevent its too ſuddenly ruſhing in on the membrana tympani.

Meatus *cyſticus*. See CYSTICUS *Ductus*.

Meatus *urinarius*, or *urinary paſſage*, in women, is very ſhort, lined internally with a very thin membrane; next to which is a coat of a white ſubſtance. Through this coat, from ſome lacunæ in it, paſs ſeveral ducts, which convey a limpid glutinous matter, ſerving to anoint the extremity of the urethra. See *Tab. Anat.* (*Splanch.*) *fig.* 9. *lit. r. fig.* 11. *lit. k.*

MEB, or *Sea*-MEB, in *Ornithology*, the name of a water-bird of the larus or GULL-*kind*, which is all over of a duſky grey on its upper part: its head is blackiſh at the top, and the beak is red; the legs are ſhort and black, and the wings very long, reaching beyond the tail when folded.

MECAXOCHITL, in the *Materia Medica*, the name of the *piper longum humilius*, or ſmall American long pepper.

MECHANICS, MECHANICA, Μηχανικη, a mixed mathematical ſcience, which conſiders motion, and moving powers, their nature and laws, with the effects thereof, in machines, &c. It is diſtinguiſhed by ſir Iſaac Newton into practical and rational *mechanics*: the former treats of the *mechanical* powers and of their various combinations: rational *mechanics* comprehends the whole theory of motion, and ſhews, when the powers or forces are given, how to determine the motions that are produced by them; and *vice verſa*.

That part of *mechanics*, which conſiders the motion of bodies ariſing from gravity, is by ſome called STATICS—in diſtinction from that part which conſiders the *mechanical* powers, and their application, and which is properly called *mechanics*. See MECHANICAL *Powers*.

The term *mechanics* has of old been, and ſtill is, uſed in a double ſenſe in very different ſciences, both with reſpect to their objects and principles. For the name *mechanics* is applied equally to that ſcience which treats of the equilibrium and compariſon of powers; and to that ſcience in which the nature, generation, and alteration of motion are explained. To avoid ambiguity, therefore, it would be proper to give the name *ſtatics* to the ſcience of the equilibrium and compariſon of powers, and to reſtrain the term *mechanics* to the ſcience of motion.

Theſe two ſciences not only differ as to their objects and principles, but alſo with reſpect to the times in which they have been cultivated. Some of the principles of *ſtatics* were eſtabliſhed by Archimedes; but Galileo laid the firſt foundation of *mechanics*, when he inveſtigated the deſcent of heavy bodies: and ſince his time, by the aſſiſtance of the new methods of computation, a great progreſs has been made, particularly by ſir Iſaac Newton, in his Principia. This admirable work is now rendered more acceſſible to beginners by the learned comment of the fathers le Seur and Jacquier, printed, with the text, at Geneva, 1739, 4to. 1742, 4 vols. 4to. We have alſo the ſciences of ſtatics and *mechanics* treated of under the name of Phoronomia, by the late learned profeſſor Herman. Amſt. 1716, 4to. Mr. Euler's *Mechanica*, ſive de Motus Scientia, is ſufficiently recommended by the name of the author, well known as one of the moſt eminent mathematicians in Europe. This work, however, did not eſcape the cenſure of a late ingenious writer; but granting the juſtneſs of his remarks, it may by ſaid, that a few inaccurate expreſſions, owing to analogies carried too far, and to the ſtyle of infiniteſimals, are but ſmall flaws in ſuch a work. As to ſtatics, the ſubject has been almoſt exhauſted by Varignon, in his Mechanique, Paris, 1725, 2 vols. 4to.

The doctrine of machines or engines is a principal branch of *mechanics*; but has not as yet been treated as it deſerves. We ſhall here inſert a few obſervations on this uſeful ſubject, from a late eminent author.

In treating of machines, we ſhould conſider the weight that is to be raiſed, the power by which it is to be raiſed, and the inſtrument or engine by which this effect is to be produced. There are two principal problems that ought to be reſolved in treating of each of them.

The firſt is, to determine the proportion, which the power and weight ought to have to each other, that they may juſt ſuſtain one another, or be in equilibrio.

The ſecond is, to determine what ought to be the proportion of the power and weight to each other in a given machine, that it may produce the greateſt effect poſſibly, in a given time.

All the writers on *mechanics* treat of the firſt of theſe problems, but few have conſidered the ſecond, though equally uſeful with the other.

As to the firſt problem, this general rule holds in all powers: ſuppoſe the engine to move, and reduce the velocities of the power and weight to the reſpective directions in which they act; find the proportions of thoſe velocities; then if the power be to the weight as the velocity of the weight is to the velocity of the power; or, which amounts to the ſame thing, if the power multiplied by its velocity, gives the ſame product as the weight multiplied by its velocity, this is the caſe wherein the power and weight ſuſtain each other, and are in equilibrio; ſo that in this caſe, the one would not prevail over the other, if the engine was at reſt; and if it is in motion, it would continue to proceed uniformly, if it were not for the friction of its parts, and other reſiſtances.

The ſecond general problem in *mechanics*, is, to determine the proportion which the power and weight ought to bear to each other, that when the power prevails, and the machine is in motion, the greateſt effect poſſible may be produced by it in a given time. It is manifeſt, that this is an enquiry of the greateſt importance, though few have treated of it. When the power is only a little greater than that which is ſufficient to ſuſtain the weight, the motion is too ſlow; and though a greater weight is raiſed in this caſe it is not ſufficient to compenſate the loſs of time. When the weight is much leſs than that which the power is able to ſuſtain, it is raiſed in leſs time; and this may happen not to be ſufficient to compenſate the loſs ariſing from the ſmallneſs of the load. It ought, therefore, to be determined when the product of the weight, multiplied by its velocity, is the greateſt poſſible; for this product meaſures the effect of the engine in a given time, which is always the greater in proportion as the weight which is raiſed is greater, and as the velocity with which it is raiſed is greater. We ſhall therefore ſubjoin ſome inſtances of this kind, that may be demonſtrated from the common elementary geometry; wiſhing that farther improvements may be made in this moſt uſeful part of *mechanics*.

When the power prevails, and the engine begins to move, the motion of the weight is at firſt gradually accelerated. The action of the power being ſuppoſed invariable, its influence in accelerating the motion of the weight decreaſes, while the velocity of the weight increaſes. Thus the action of a ſtream of water, or air, upon a wheel, is to be eſtimated only from the exceſs of the velocity of the fluid above the velocity already acquired by the part of the engine which it ſtrikes, or from their relative velocity. On the other hand, the weight of the load that is to be raiſed, and the friction, tend to retard the motion of the engine; and when theſe forces, viz. thoſe that tend to accelerate it, and thoſe that tend to retard it, become equal, the engine then proceeds with the uniform motion it has acquired.

Let AB (*Tab.* IV. *Mechanics*, *fig.* 50.) repreſent the velocity of the ſtream, AC, the velocity of the part of the engine which it ſtrikes, when the motion of the machine becomes uniform; and CB will repreſent their relative velocity, upon which the effect of the engine depends. It is known that the action of a fluid, upon a given plane, is as the ſquare of this relative velocity; conſequently the weight raiſed by the engine, when its motion becomes uniform, being equal to this action, it is likewiſe as the ſquare of CB. Let this be multiplied by AC, the velocity of the part of the engine impelled by the fluid; and the effect of the engine in a given time will be proportional to $AC \times CB^2 =$ (ſuppoſing CB to be biſected in D) $AC \times 2CD \times 2DB = 4AC \times CD \times DB$; conſequently, the effect of the engine is greateſt when the product of AC, CD, and DB is greateſt. But it is eaſy to ſee, that this product is greateſt when the parts AC, CD, and DB, are equal; for if you deſcribe a ſemicircle upon AD, and the perpendicular CE meet the circle in E, then $AC \times CD = CE^2$, and is greateſt when C is the centre of the circle; ſo that in order that $AD \times CD \times DB$ may be the greateſt poſſible, AD muſt be biſected in C; and CB having been biſected in D, it follows, that AC, CD, DB, muſt be equal; or that AC, the velocity of the part of the engine impelled by the ſtream, ought to be but one third of AB, the velocity of the ſtream. In this caſe, when (abſtracting from friction) the engine acts with the utmoſt advantage; the weight raiſed by it is to the weight that would juſt ſuſtain the force of the ſtream, as the ſquare of CB, the relative velocity of the engine and ſtream, to the ſquare of AB, which would be the relative velocity, if the engine was quieſcent; that is, as 2×2 to 3×3, or 4 to 9. Therefore, that the engine may have the greateſt effect poſſible, in ought to be loaded with no more than $\frac{4}{9}$ of the weight, which is juſt able to ſuſtain the efforts of the ſtream. See Mac Laurin's Account of ſir Iſaac Newton's Diſcov. p. 171. and Fluxions, art. 908.

Again, ſuppoſe that a given weight P, (*fig.* 51.) deſcending by its gravity in the vertical line, raiſes a greater weight W, likewiſe given, by the rope PMW (that paſſes over the fixed pulley M) along the inclined plane BD, the height of which BA is given; and let it be required to find the poſition of this plane, along which W will be raiſed in the leaſt time, from the horizontal line AD to B. Let BC be the plane upon which if W was placed, it would be exactly ſuſtained by P; in which caſe, P is to W as AB to BC. But W is to the force with which it tends to deſcend along the plane BD, as BD to AB; conſequently the weight P is to that force, as BD to BC. Therefore the exceſs of P above that force (which exceſs is the power that accelerates the motion of P and W) is to P, as $BD - BC$ to BD: or taking BH upon BC equal to BD, as CH to BD. But it is known that the ſpaces deſcribed by motions uniformly accelerated, are in the compound ratio with the forces which produce them and the ſquares of the times; or, that the ſquare of the time is directly as the ſpace deſcribed in that time, and inverſely as the force; conſequently, the ſquare of the time, in which BD is deſcribed by W, will be directly as BD, and inverſely as $\frac{CH,}{BD,}$ and will be leaſt when $\frac{BD^2}{CH}$ is a minimum; that is, when $\frac{BC^2}{CH} + CH + 2BC$, or (becauſe $2BC$ is invariable) when $\frac{BC^2}{CH} + CH$, is a minimum. Now as when the ſum of two quantities is given, their product is a maximum when they are equal to each other; ſo it is manifeſt, that, when their product is given, their ſum muſt be a minimum, when they are equal. Thus it is evident, that as in *fig.* 50. the rectangle or product of the equal parts AC and CD was equal to CE^2; ſo the rectangle of any two unequal parts, into which AD may be divided, is leſs than CE^2, and AD, is the leaſt ſum of any two quantities, the product of which is equal to CE^2. But the product of $\frac{BC^2}{CH}$ and CH is BC^2, and conſequently given: therefore the ſum of $\frac{BC^2}{CH}$ and CH is leaſt, when theſe parts are equal, that is, when CH is equal to BC, or BD equal to $2BC$. It appears, therefore, that when the power P and weight W are given, and W is to be raiſed by an inclined plane, from the level of a given point A to the given point B in the leaſt time poſſible; we are firſt to find the plane BC, upon which W would be ſuſtained by P, and to take the plane BD double in length of the plane BC; or we are to make uſe of the plane BD, upon which a weight that is double of W could be ſuſtained by the power P.

For another example, ſuppoſe a fluid, moving with the velocity and direction AC, (*fig.* 52.) ſtrike the plane CE; and ſuppoſe that this plane moves parallel to itſelf in the direction CB, perpendicular to CA, or that it cannot move in any other direction. Then let it be required to find the moſt advantageous poſition of the plane CE, that it may receive the greateſt impulſe from the action of the fluid. Let AP be perpendicular to CE in P, draw AK parallel to CB, and let PK be perpendicular upon it in K, and AK will meaſure the force with which any particle of the fluid impels the plane EC, in the direction CB. For the force of any ſuch particle being repreſented by AC, let this force be reſolved into AQ parallel to EC, and AP perpendicular to it; and it is manifeſt, that the latter AP only has any effect upon the plane CE. Let this force AP be reſolved into the force AL perpendicular to CB, and the force AK parallel to it; then it is manifeſt, that the former, AL, has no effect in promoting the motion of the plane in the direction CB; ſo that the latter AK, only, meaſures the effort by which the particle promotes the motion of the plane CE in the direction CB. Let EM and EN be perpendicular to CA and CB, in M and N; and the number of particles, moving with directions parallel to AC, incident upon the plane CE, will be as EM. Therefore the effort of the fluid upon CE being as the force of each particle, and the number of particles together, it will be as $AK \times EM$; or, becauſe AK is to AP $(= EM,)$ as EN to CE, as $\frac{ME^2 \times EN}{CE}$; ſo that CE being given, the problem is reduced to this, to find when $EM^2 \times EN$ is the greateſt poſſible or a maximum. But becauſe the ſum of EM^2 and of EN^2 $(= CM^2)$ is given, being always equal to CE^2, it follows that $EN^2 \times EM^4$, is greateſt, when $EN^2 = \frac{1}{3} CE^2$; in the ſame manner as it was demonſtrated above, that when the ſum of AC and CB (*fig.* 50.) was given, $AC \times CB^2$ was greateſt, when $AC = \frac{1}{3} AB$. But when $EN^2 \times EM^4$ is greateſt, its ſquare root $EN \times EM^2$ is of neceſſity at the ſame time greateſt. Therefore the action of the fluid upon the plane CE, in the direction CB, is greateſt when $EN^2 = \frac{1}{3} CE^2$, and conſequently $EM^2 = \frac{2}{3} CE^2$; that is, when EM, the ſine of the angle ACE, in which the ſtream ſtrikes the plane, is to the radius, as the $\sqrt{2}$ to $\sqrt{3}$; in which caſe it eaſily appears, from the trigonometrical tables, that this angle is of 54° 44′.

Several uſeful problems in *mechanics* may be reſolved by what was ſhewn in the preceding paragraph. If we repreſent the velocity of the wind by AC, a ſection of the ſail of a wind-mill perpendicular to its length by CE, as it follows, from the nature of the engine, that its axis ought to be turned directly towards the wind, and the ſail can only move in a direction perpendicular to the axis, it appears, that when the motion begins, the wind will have the greateſt effect to produce this motion, when the angle ACE, in which the wind ſtrikes the ſail, is of 54° 44′. In the ſame manner, if CB repreſent the direction of the motion of a ſhip, or the poſition of her keel, abſtracting from her lee-way, and AC be the direction of the wind, perpendicular to her way, then the moſt advantageous poſition of the ſail CE, to promote her motion in the direction CB, is when the angle ACE in which the wind ſtrikes the ſail, is of 54° 44′. The beſt poſition of the rudder, where it may have the greateſt effect in turning round the ſhip, is determined in like manner. And the ſame angle enters likewiſe into the determination of the figure of the rhombuſes that form the baſes of the cells in which the bees depoſit their honey, in the moſt frugal manner. See Honey-*Comb*.

But it is to be carefully obſerved, that when the ſine of the angle ACE is to the radius as $\sqrt{2}$ to $\sqrt{3}$; or, which is the ſame thing, when its tangent is to the radius as the diagonal of a ſquare to its ſide; this is the moſt advantageous angle only at the beginning of the motion of the engine; ſo that the ſails of a common wind-mill ought to be ſo ſituated, that the wind may indeed ſtrike them in a greater angle than that of 54° 44′. For it is demonſtrable, that when any part of the engine has acquired the velocity c, the effort of the wind upon that part will be greateſt, when the tangent of the angle in which the wind ſtrikes it is to the radius, not as the $\sqrt{2}$ to 1, but $\sqrt{2 \times \frac{9cc}{4aa}} \times \frac{3c}{2a}$ to 1, the velocity of the wind being repreſented by a. If, for example, $c = \frac{1}{3}a$; then the tangent of the angle ACE ought to be double of the radius; that is, the angle ACE ought to be of 63° 26′. If $c = a$; then ACE ought to be of 74° 19′. This obſervation is of the more importance, becauſe, in this engine, the velocity of the parts of the ſail remote from the axis, bears a conſiderable proportion to the velocity of the wind, and perhaps ſometimes is equal to it; and becauſe a learned author, Mr. Daniel Bernouilli, has drawn an oppoſite concluſion from his computations in his Hydrodynamics, by miſtaking a minimum for a maximum; where he infers, that the angle in which the wind ſtrikes the ſail, ought to decreaſe as the diſtance from the axis of motion increaſes; that of $c = a$, the wind ought to ſtrike in an angle of 45°; and that if the ſail be in one plane, it ought to be inclined to the wind, at a medium, in an angle of 50°. How he fell into theſe miſtakes, is ſhewn by Mr. Mac Laurin, in his Fluxions, § 914.

In like manner, though the angle ACE of 54° 44′ be the moſt advantageous at the beginning of the motion, when a ſhip ſails with a ſide wind; yet it ought to be enlarged afterwards as the motion increaſes. In general, let A*a* (*fig*. 52.) parallel to CB, be to AC, as the velocity which the engine has already acquired in the direction CB, to that of the ſtream; upon AC produced take AD to AC as 4 to 3, draw DG parallel to CB, and let a circle deſcribed from the centre C with the radius C*a*, meet DG in *g*; and the plane CE ſhall be in the moſt advantageous ſituation for promoting the motion of the engine, when it biſects the angle *a*C*g*.

It is generally ſuppoſed, that a direct wind always promotes the motion of a ſhip, the ſail being perpendicular to the wind, more than any ſide-wind; and this has been affirmed in ſeveral late ingenious treatiſes; but, to prevent miſtakes, we are obliged to obſerve, that Mr. Mac Laurin has demonſtrated the contrary, in his Treatiſe of Fluxions, § 919; where other inſtances of this ſecond general problem in *mechanics* are given, to which we refer. See Mac Laurin's Account of ſir Iſaac Newton's Philſoſophical Diſcoveries, book ii. chap. 3. p. 173.

MECHANICAL, ſomething that relates to *mechanics*, or is regulated by the nature and laws of motion.

In which ſenſe we ſay, *mechanieal* powers, *mechanical* properties or affections, *mechanical* principles, reaſoning, knowledge, &c.

Mechanical *affections*, are ſuch properties in matter, as reſult from their figure, bulk and motion.

Mechancal *cauſes*, are thoſe founded on ſuch affections.

Mechanical *force*. See Force.

Mechanical *ſolutions*, are accounts of things on the ſame principles.

Mechanical *philoſophy*, is the ſame with what we otherwiſe call the *corpuſcular philoſophy*; viz. that which explains the phenomenon of nature, and the operations of corporeal things, on the principles of *mechanics*; viz. the motion, gravity, figure, arrangement, diſpoſition, greatneſs, or ſmallneſs of the parts which compoſe natural bodies. See Corpuscular.

Mechanic, or **Mechanical** *powers*, (ſo called), are thoſe machines which are uſed for raiſing greater weights, or overcoming greater reſiſtances than could be effected by the natural ſtrength without them; the power of ſtrength being applied to one part of the machine, and another part of the machine applied to the weight or reſiſtance.

The ſimple machines whereby power is gained, are ſix in number, viz. the LEVER, the *wheel and axle*, or AXIS *in peritrochio*, the PULLEY (or rather ſyſtem of pullies), the *inclined* PLANE, the WEDGE, and the SCREW. Of theſe, all ſorts of mechanical engines do conſiſt; and in treating of them, ſo as to ſettle their theory, we muſt conſider them as mechanically exact, and moving without friction. Although theſe machines are treated of at large under their proper heads, it may not be amiſs to give a ſhort account of them all here.

1. A *lever* is an inflexible bar, turning upon a ſupporting prop as its centre of motion, which muſt be firm enough to bear the lever and the weight with which it is charged. There are three kinds of levers, and in each of them the velocity of each point is directly as its diſtance from the prop.

A lever is ſaid to be of the firſt kind when the prop is between the weight and the power. Here, the power and weight balance each other, when the power is in proportion to the weight as the diſtance of the weight from the prop is to the diſtance of the power from it; ſo that if a weight be twenty pounds, and at one foot from the prop, a power of one pound at twenty feet from the prop will balance the weight, ſuppoſing the lever itſelf to have no weight. To this ſort of lever may be reduced all iron crows, ſciſſars, pinchers, candle-ſnuffers, and the like.

A lever is ſaid to be of the ſecond kind, when the weight is between the prop and the power. Here the lever and weight balance each other when the power is in proportion to the weight as the diſtance of the weight from the prop is to the diſtance of the power from it. Of this ſort are doors turning on hinges, oars, and ſuch knives as are fixed at the point.

A lever is ſaid to be of the third kind when the power is between the weight and the prop. In this, the power and weight balance each other, when the power is in proportion to the weight, as the diſtance of the weight from the prop is to the diſtance of the power from it: but this lever is never uſed where power is wanted to be gained; for in it, the intenſity of the power applied, muſt always exceed the intenſity of the weight to be raiſed, or reſiſtance to be overcome. Of this ſort are the bones of our legs and arms, and the wheels of clocks and watches.

2. In the *wheel and axle*, where the power is applied to the wheel, and the weight drawn up by a rope winding round the axle, the velocity of the power is to the velocity of the weight, as the circumference of the wheel is to the circumference of the axle, and the advantage gained by the machine is in the ſame proportion: for the power and weight balance each other when the power is in proportion to the weight, as the circumference of the axle is to the circumference of the wheel. See *Tab. Mech. fig*. 7. This machine is the principal part of a common *crane*.

3. A *pulley*, that only turns on its axis, and does not riſe with the weight, ſerves only to change the direction of the power; for it gives no mechanical advantage thereto. But when, beſides the upper pullies, which turn round in a fixed frame, or block, there is a block of pullies moving equally faſt with the weight, the velocity of the weight is to the velocity of the power as one is to twice the number of pullies in the moveable block: and the power and weight balance each other when the power is in proportion to the weight, as one is to twice the number of pullies in the moveable block.

4. An *inclined* PLANE is like one half of a wedge which has been cut in two equal parts lengthwiſe. A weight raiſed, or a reſiſtance moved, by an inclined plane, moves only through a ſpace equal to the height of that machine, in the time that a power drives it through a ſpace equal to its whole length. Therefore, the velocity of the power is in proportion to the velocity of the weight, as the length of the machine is to its thickneſs or height at the back; and the power and weight balance each other when the power is in proportion to the weight, as the thickneſs of the plane is to its length. All edge tools, which are chamfered (or ground down only on one ſide to the edge) are inclined planes, as far as the chamfer goes from the edge.

5. A *wedge*, in the common form, is like two inclined planes, joined together at their baſes; and the thickneſs of theſe planes (oppoſite their ſharp edges) make the back of the wedge, to which the power of the ſledge or hammer is applied in cleaving of wood.

When two equal reſiſtances act perpendicularly againſt oppoſite ſides of the wedge, and a power acts perpendicularly againſt the back of the wedge, the velocity of the power is in proportion to the velocity of the reſiſtance on either ſide, as the length of the ſide is to half the thickneſs of the back: and the power balances the reſiſtance of the wood, when the power is in proportion to the reſiſtance, as half the thickneſs of the back of the wedge is to the length of either of its ſides, if the ſharp edge goes to the bottom of the cleft in the wood. But when the wood ſplits before the wedge, as it generally does, the power balances the reſiſtance, when the former is to the latter as half the thickneſs of the wedge (when it is driven quite into the wood) is to the whole length of the cleft below the back of the wedge.

6. The *ſcrew* may be conſidered as if it were an inclined plane, wrapt round a cylinder. In this machine, the power muſt turn the cylinder quite round, in the time that the weight or reſiſtance (as in a common preſs) moves through a ſpace equal to the diſtance between the threads or ſpirals of the ſcrew. Therefore, the velocity

of the power is in proportion to the velocity of the weight or reſiſtance, as the circumference of a circle, deſcribed by the power, is to the diſtance between the ſpirals of the ſcrew: and the power and reſiſtance balance each other, when the former is to the latter as the diſtance between the ſpirals is to the circumference of the circle deſcribed by the power. This machine, beſides the advantage peculiar to itſelf, has generally the benefit of the wheel and axle, on account of the winch or lever by which it is turned.

Of theſe ſix ſimple machines, all the moſt compound engines in the world are made. As the ſcrew includes the inclined plane, and two equally inclined planes make the wedge, we have all the mechanical powers combined together in a common jack, if it be turned by the fly; for then we have alſo the lever, the wheel and axle, and the pullies.

Thus, in a frame ABCD, *Tab.* IV. *Mechanics*, *fig.* 53. faſtened by the nut O upon the ſtand OO, and held together by the pillars VW and Bq, is adapted firſt the piece EF, whoſe fans or flies may be put in motion by the wind, or drawn by a hair faſtened at F, which repreſents the lever and balance: at right angles to this piece is joined the perpendicular ſpindle GH having upon it the endleſs ſcrew H, which may be alſo conſidered as a wedge. This endleſs ſcrew or worm takes the ſkew teeth of the wheel K, which is the axis in peritrochio, and, in turning round, winds up the ſtring LM upon its axis, which paſſing round the pullies at M and N, or drawing by a tackle of five, raiſes the weight P. But as the ſcrew has no progreſſive motion on its axis, it cannot here be ſaid to comprehend the inclined plane; therefore, in order to make this machine take in all the *mechanical* powers, we may add the inclined plane, rqQR by making it reſt on the ground at QR, and on the pillar qB, at qr, and thereby the force of the power drawing at F, will be farther increaſed in the proportion of QT to TS. The whole force gained by this machine is found by comparing the ſpace gone through by the point F, with the height through which the weight is raiſed, in any determinate number of revolutions of F. An hundred pounds weight at P will be eaſily raiſed by the hair of a man's head drawing at F.

If an engine conſtructed in this manner be uſed for raiſing a weight, by means of a power applied to the fly, the power will balance the weight, if it be in proportion to the weight as the velocity of the weight is to the velocity of the fly. Now, conſidering how faſt the fly moves with reſpect to the motion of the weight, it is evident, that a crane, conſtructed in the manner of a common jack, would be an engine of very great power. But then the time loſt in raiſing the weight would alſo be very great: for, in any machine or engine whatever, the time loſt in working it will be as great as the power gained by it.

If machines or engines could be made without friction, the leaſt degree of power added to that which balances the weight, would be ſufficient to raiſe it. In the lever, the friction is next to nothing; in the wheel and axle it is but ſmall; in the pullies it is very conſiderable; and in the inclined plane, wedge, and ſcrew, it is very great. The univerſal law or principle in all *mechanical* machines or engines, made to gain power, is, that the power gained will be always as great as the velocity of the power exceeds the velocity of the weight or reſiſtance: and, upon this principle, it is eaſy to compute the power, force, or advantage, of any ſimple machine or compound engine, whatever.

E. gr. If the body A (*Tab. Mechanics*, *fig.* 6.) be triple the body B, and each of them be ſo fixed to the extremities of a lever AB, whoſe fulcrum, or fixed point is C, as that the diſtance of BC be triple the diſtance CA; the lever cannot be inclined on either ſide, but the ſpace BE, paſſed over by the leſs body, will be triple the ſpace AD, paſſed over by the great one. So that their motions or moments will be equal, and the two bodies in equilibrio.

Hence that noble challenge of Archimedes, *datis viribus, datum pondus movere*; for as the diſtance CB may be increaſed infinitely, the power or moment of A may be increaſed infinitely. So that the whole of *mechanics* is reduced to the following problem.

Any body, as A, *with its velocity* C, *and alſo any other body as* B, *being given; to find the velocity neceſſary to make the moment, or quantity of motion, in* B, *equal to the moment of* A, *the given body.* Here, ſince the moment of any body is equal to the rectangle under the velocity, and the quantity of matter; as B : A : : C : to a fourth term, which will be c, the celerity proper to B, to make its moment equal to that of A. Wherefore in any machine or engine, if the velocity of the power be made to the velocity of the weight, reciprocally as the weight is to the power; ſuch power will always ſuſtain; or, if the power be a little increaſed, it will move the weight.

Let, for inſtance, AB be a lever, whoſe fulcrum is at C; and let it be moved into the poſition aCb. Here, the velocity of any point in the lever is as the diſtance from the centre. For let the point A deſcribe the arch Aa, and the point B the arch Bb; then theſe arches will be the ſpaces deſcribed by the two motions: but ſince the motions are both made in the ſame time, the ſpaces will be as the velocities. But it is plain, the arches Aa and Bb will be to one another as the radii AC and CB, becauſe the ſectors ACa, and BCb, are ſimiliar: wherefore the velocities of the points A and B are as their diſtances from the centre C.

Now if any powers be applied to the ends of the lever A and B, in order to raiſe its arms up and down; their force will be expounded by the perpendiculars Sa, and bN; which, being as the right ſines of the former arches, aA and Bb, will be to one another alſo as the radii AC and CB; wherefore the velocities of the powers are alſo as their diſtances from the centre. And ſince the moment of any body is as its weight, or gravitating force, and its velocity, conjunctly; if different powers or weights be applied to the lever, their moments will always be as the weights and the diſtances from the centre conjunctly. Wherefore, if to the ſame lever there be two powers or weights applied reciprocally proportional to their diſtances from the centre, their moments will be equal; and if they act contrarily, as in the caſe of a ſteelyard, the lever will remain in an horizontal poſition, or the balance will be in equilibrio. And thus it is eaſy to conceive how the weight of one pound may be made to equibalance a thouſand, &c.

Hence alſo it is plain, that the force of the power is not at all increaſed by engines; only the velocity of the weight in either lifting or drawing is ſo diminiſhed by the application of the inſtrument, as that the moment of the weight is not greater than the force of the power. Thus, for inſtance; if any force can raiſe a pound weight with a given velocity, it is impoſſible by any engine to effect, that the ſame power ſhall raiſe two pound weight with the ſame velocity: but by an engine it may be made to raiſe two pound weight, with half the velocity; or 1000 times the weight with $\frac{1}{1000}$ of the former velocity.

We ſhall here introduce into one view, an account of the principal methods that have occurred to us of explaining and demonſtrating the fundamental property of the ſeveral *mechanical* powers. It has been already obſerved, that, with regard to the lever, when any two forces act againſt each other on its arms, they will continue in equlibrio, if their quantities are inverſely as the diſtances between the points to which they are applied, and the point or fulcrum round which the lever turns. The demonſtration commonly aſcribed to Archimedes, is founded upon this principle, that when any cylindric or priſmatic body is applied upon a lever, it has the ſame effect as if its whole weight was united and applied at the middle point of its axis. Let AB, *Tab.* IV. *Mechanics*, *fig.* 54. be a cylinder, of an uniform texture, C its middle point; and it is manifeſt, that if the point C be ſupported, the equal halves of the cylinder, CA and CB, will balance each other about the point C, and the body will remain in equilibrio. Let the cylinder AB be diſtinguiſhed into any unequal parts, AD and DB; biſect AD in E, and DB in F; then a power applied at E, equal to the weight of the part AD, with a contrary direction, will ſuſtain it; and a power applied at F, equal to the weight of the part DB, with a contrary direction, will ſuſtain that part; ſo that theſe two powers acting at E end F, reſpectively equal to the weights of AD and DB, have preciſely the ſame effect as a prop at C, ſuſtaining the whole cylinder AB, and may be conſidered as in equilibrio with a power, acting at C, equal to the whole weight of the cylinder. But the diſtance $CE = CA - AE = \frac{1}{2}AB - \frac{1}{2}AD = \frac{1}{2}DB$; and, in like manner, the diſtance $CF = CB - BF = \frac{1}{2}AB - \frac{1}{2}DB = \frac{1}{2}AD$; conſequently CE is to CF as DB to AD; that is, as the power applied at F to the power applied at E, theſe being in equilibrio with the weight of the whole cylinder applied at C. From which it appears, that powers applied at E and F, which are to each other in the proportion of CF to CE, ſuſtain one another about the centre C.

It has been objected by M. Huygens, and others, to this demonſtration of Archimedes, that, when the whole cylinder is diſtinguiſhed into two ſegments, part of the weight of the greater ſegment acts on the ſame ſide of the fulcrum with the leſſer ſegment; and, therefore, when the whole weight of the greater ſegment is contracted into its middle point on one ſide of the fulcrum, and acts altogether againſt the leſſer ſegment, it requires ſome proof to ſhew, that this contracted weight will be balanced by the weight of the leſſer ſegment. M. Huygens propoſed a method of his own, depending on a poſtulatum aſſumed in common with Archimedes, and needing demonſtration, viz. that when equal bodies are placed on the arms of a lever, the one which is fartheſt from the fulcrum will prevail and raiſe the other up.

Sir Iſaac Newton demonſtrates the fundamental propoſition concerning the lever, from the reſolution of motion: let C, *fig.* 55. be the centre of motion in the lever KL; let A and B be any two powers applied to it at K and L, acting in the directions KA and LB. From the centre of motion, C, let CM and CN be perpendicular to thoſe directions in M and N; ſuppoſe CM to be leſs than CN, and from the centre C, at the diſtance CN, deſcribe the circle NHD, meeting KA in D. Let the power A be repreſented by DA, and let it be reſolved into the power DG acting in the direction CD, and the power DF perpendicular to CD, by completing the parallelogram AFDG. The power DG, acting in the direction CD from the centre of the circle, or wheel, DHN towards its circumference, has no effect in turning it round the centre, from D towards H, and tends only to carry it off from that centre. It is the part DF only that endeavours to move the wheel from D towards H and N, and is totally employed in this effort. The power B may be conceived to be applied at N as well as at L, and to be wholly employed in endeavouring to turn the wheel the contrary way, from N towards H and D. If therefore the power B be equal to that part of A which is repreſented by DF, theſe efforts, being equal and oppoſite, muſt deſtroy each other's effect; that is, when the power B is to the power A, as DF to DA, or (becauſe of the ſimiliarity of the triangles, AFD, DMC) as CM to CD or as CM to CN, then the powers muſt be in equilibrio; and thoſe powers always ſuſtain each other that are in the inverſe proportion of the diſtances of their directions from the centre of motion; or when the product of the one power multiplied by the diſtance of its direction from the centre, is equal to the product of the power on the other ſide multiplied by the like diſtance from it.

Mr. Maclaurin propoſes a new method of demonſtrating the law of equilibrium in the lever, which ſeems, he ſays, to be founded on the plaineſt and moſt evident principles: theſe principles are the following, viz. that if equal powers act at equal diſtances on different ſides of the fulcrum or centre of motion, with directions oppoſite and parallel to each other, they will have the ſame effect: and that, if gravity be ſuppoſed to act in parallel lines, and the fulcrum be between the bodies, whoſe powers are eſtimated, it muſt bear the ſum of their weights; becauſe the lever being loaded with thoſe weights, it muſt give way if the fulcrum does not ſuſtain their ſum: but if the powers are on the ſame ſide of the fulcrum, in which caſe one of them muſt pull upwards whilſt the other pulls downwards, that there may be an equilibrium, it is then only loaded with the difference of the powers.

Suppoſing, therefore, firſt, two equal powers, A and B, *fig.* 56. acting in the directions AF, BH, to carry a body C, upon the lever AB, placed at C at equal diſtances from them; it is evident, that, in this caſe, each of the powers A and B ſuſtains one half of the weight C, by dividing it equally between them. Imagine now that the power A is taken away, and that inſtead of reſting upon it, the end A of the lever reſts upon a prop at A; it is manifeſt that the power B, and the prop at A ſuſtain, as before, each one half of the weight C; the prop now acting, in every reſpect, as the power at A before; and, the equilibrium continuing, it appears, that in this caſe, a power B equal to one half of the weight C ſuſtains and balances it, when the diſtance of C from the prop A is one half of the diſtance of B from the ſame; that is, when B is to C, as CA to BA, or $B \times BA = C \times CA$. From this ſimple inſtance we ſee, that powers act upon a lever not by their abſolute force only, but that their effect neceſſarily depends upon the diſtance of the point where they act from the prop, or centre of motion; and particularly, that a power balances a double power which acts at half its diſtance from the prop, on the ſame ſide of it, with an oppoſite direction.

The caſe when the two powers act on the different ſides of the prop, follows from this, by the principles already laid down. For let BH and CG (*fig.* 57.) repreſent the directions and forces with which the powers B and C act upon the lever; upon BA produced take AE equal to AC, or $\frac{1}{2}$ AB, and in place of the power CG ſubſtitute an equal power EK at E, with an oppoſite direction; and, by the firſt of thoſe principles, this power EK will have the ſame effect as CG, only the prop or centre of motion A will now ſuſtain the ſum of the forces EK and BH, by the ſecond of thoſe principles. But the equilibrium between the powers BH and EK will continue as it was before, between BH and CG; ſo that the powers BH and EK, will be in equilibrio, when the power BH is one half of EK, and the diſtance of EK from the prop A is one half of the diſtance of BH from the ſame; that is, when the power at B is to the power at E, as AE to AB, or $B \times BA = E \times EA$. In this caſe, the prop A being loaded with both the powers B and E which act with the ſame direction, its reaction muſt be equal to their ſum $EK + BH = 3BH$, and muſt be in the oppoſite direction AF. In place of this reaction let us now (*fig.* 58.) ſubſtitute a power AF at A, equal to thrice BH; and in place of the power EK, let us ſubſtitute a prop at E, ſuſtaining that end of the lever BE; and ſince the equilibrium continues as before, it follows that the prop or centre of motion, being at E, the power BH ſuſtains the power AF which is triple of BH, when the diſtance of BH from the prop E is triple of the diſtance of the power AF from the ſame, that is, when $BH \times BE = AF \times AE$.

If we ſuppoſe the power EK to remain (*fig.* 59.) but the end B of the lever EB to reſt upon a prop, then the powers AF and EK will ſuſtain and balance each other, the prop at B now coming in place of the power BH; in which, $AF = 3BH$, and $EK = 2BH$; ſo that AF is to EK as 3 to 2; and the diſtances EB and AB being in the ſame proportion, it appears that when two powers in the proportion of 3 to 2 act upon a lever on the ſame ſide of the prop, or centre of motion, with oppoſite directions, at diſtances in the proportion of 2 to 3, they then ſuſtain each other. We have demonſtrated therefore, that when the powers are in the proportion either of 2 to 1, or of 3 to 1, or of 3 to 2, and the diſtances of their application from the centre of motion are in the inverſe proportion, then thoſe powers balance each other, or are in equilibrio.

Upon BE produced (*fig.* 60.) take $EL = EA$; and in place of the power AF ſubſtitute a power $LM = AF$, but with a contrary direction, this power LM will have the ſame effect to turn the lever round the centre of motion E as AF had; conſequently it will be in equilibrio with the power BH, as AF was. Therefore when two powers LM and BH in the proportion of 3 to 1, act upon a lever with the ſame direction, they are in equilibrio, if their diſtances from the centre of motion LE and EB be in the ratio of 1 to 3; that is, when $LM \times LE = BH \times BE$. In this caſe, the powers LM and BH acting with the ſame direction, the prop E muſt ſuſtain their ſum $LM + BH = 4BH$, by the ſecond principle above premiſed. Therefore a power at L as 3, and a power acting at B with the ſame direction as 1, are ſuſtained by a power acting at E, with a contrary direction, as 4. From which it follows, by ſubſtituting in the place of the power LM a prop at L, that a power at B as 1 ſuſtains a power at E as 4, acting with a contrary direction, when BL is to EL as 4 to 1; that is, when the powers are inverſely as their diſtances from the prop, or centre of motion. By ſubſtituting the prop at B in the place of the power BH, it appears that a power LM at L, as 3, ſuſtains a power, acting with an oppoſite direction, at E, as 4, when their diſtances LB and EB from the prop B, are to each other as 4 to 3, or when $LM \times LB = EK \times EB$. By taking upon LB produced $Be = BE$, (*fig.* 61.) and in place of the power at E, ſubſtituting an equal power at e with a contrary direction, it appears, that a power at L as 3 ſuſtains a power acting at e, with the ſame direction, as 4, when the diſtance LB is to the diſtance eB, as 4 to 3. In this caſe, the prop at B ſuſtains the ſum of the powers acting at L and e, that is, a power equal to ſeven times BH. From which it follows, by ſubſtituting a prop at L, or e, in place of the powers that act there, that a power at e as 4 ſuſtains a power at B as 7, about the centre of motion L, when their diſtances from it eL, BL are to each other as 7 to 4: and that a power at L as 3 ſuſtains the power at B as 7, about the centre of motion e, when their diſtances from it, Le and Be, are to each other as 7 to 3.

By proceeding in this manner it appears, that when the powers are to each other as number to number, and when their diſtances from the centre of motion are in the inverſe ratio of the ſame numbers, then the powers ſuſtain each other, or are in equilibrio. From which it is eaſy to ſhew, in general, that when the powers are to each other in any ratio, though incommenſurable, and the diſtances of their application from the centre of motion in the ſame inverſe ratio, then they are in equilibrio; becauſe the ratio of incommenſurable quantities may be always limited to any degree of exactneſs at pleaſure between a greater and a leſſer ratio of number to number. To Mr. Maclaurin's demonſtration it has been objected, that it cannot be applied when the arms of the lever are incommenſurable, and as it cannot conclude generally, it muſt, therefore, be imperfect. Dr. Hamilton, having obſerved that theſe ſeveral methods of demonſtrating the fundamental property of the lever are liable to objections, propoſes a new proof, depending on the following poſtulatum, viz. if a force be uniformly diffuſed over a right line, ſo that an equal part of the force acts upon every point of the line, and if the whole force acts according to one and the ſame plane, this force will be ſuſtained, and the line kept in equilibrio, by a ſingle force applied to the middle point of the line equal to the diffuſed force, and acting in a contrary direction. He alſo premiſes his lemma: if a right line be divided into two ſegments, the diſtances between the middle of the whole line and the middle points of the ſegments, will be inverſely as the ſegments. This is ſelf-evident when the ſegments are equal; and, when they are unequal, ſince half of the whole line is equal to half of the greater and half of the leſſer ſegment, it is plain, that the diſtance between the middle of the whole line and the middle of one ſegment, muſt be equal to half of the other ſegment, ſo that theſe diſtances muſt be to each other inverſely as the ſegments.

Let the line G H, then, *fig.* 62. whoſe middle point is D, be divided into the unequal ſegments G L and L H, whoſe middle points are C and F, and let two forces or weights, A and B, which are to each other as the ſegments G L and L H, be applied to their middle points C and F, and let them act perpendicularly on the line G H: then (by the lemma) the weights A and B will be to each other inverſely as C D and F D (the diſtances of the points C and F, to which they are applied from the middle of the whole line); if then a third force or weight E, equal to the ſum of the forces A and B, be applied to the point D, and acts on the line in an oppoſite direction; I ſay theſe three forces will ſuſtain each other, and keep the line in equilibrio. For let us ſuppoſe the force E to be removed and inſtead of it another force, equal alſo to the ſum of A and B, to be uniformly diffuſed over the whole line G H, and to act directly againſt the forces A and B, then the part of this force which acts on the ſegment G L, will be equal to the force A, and therefore will be ſuſtained by it (poſtulatum); and the other part, which is diffuſed over the ſegment L H, will be equal to and ſuſtained by the force B, ſo that the forces A and B will ſuſtain this diffuſed force and keep the line in equilibrio. Let now two other forces act alſo on this line in oppoſite directions, one of them the force E acting on the point D, as was firſt ſuppoſed to do, and the other an uniformly diffuſed force equal to E (and conſequently equal to the other diffuſed force), then theſe two additional forces will alſo balance each other, and therefore the equilibrium will ſtill remain. So that the two forces A and B, and a diffuſed force acting on one ſide of the line ſuſtains the force E, and a diffuſed force acting on the other ſide: but it is manifeſt, that in this equilibrium, the two diffuſed forces acting on oppoſite ſides are perfectly equivalent, and therefore if they are taken away from both ſides, the equilibrium muſt ſtill remain. Hence it appears that the three weights or forces A, B, and E, any two of which are (by the conſtruction) to each other inverſely as their diſtances from the third, will ſuſtain each other and keep the line on which they act in equilibrio; which is the firſt and moſt ſimple caſe of the property of the lever: for here the directions of the weights are ſuppoſed to be perpendicular to the line on which they act, and it is evident that, if one of the points C, D, or F be fixed or conſidered as a fulcrum, the weights acting on the other two points will continue to ſupport each other. The ſecond caſe of the property of the lever is eaſily deduced from the firſt; for when two weights act on the arms of a lever in oblique directions, and are to each other inverſely as the perpendicular diſtances of the lines of direction from the centre of motion, then by the reſolution of forces, it is eaſily proved that the parts of thoſe forces which act perpendicularly on the arms of the lever, and which only are exerted to turn the lever, are to each other inverſely as the lengths of thoſe arms; and therefore by the firſt caſe they muſt balance each other.

From what has been above demonſtrated, it appears, that the powers with which any two forces move or endeavour to move the arms of a lever, are as the rectangles, under lines proportional to the forces, and the perpendicular diſtances of their lines of direction from the fulcrum; and alſo that when two bodies acting on the arms of a lever ſuſtain each other, if one of them be removed farther from the fulcrum, it will preponderate; but if it be brought nearer to the fulcrum, the other weight will prevail: becauſe the product to which its force is proportional will be increaſed in the firſt caſe, and diminiſhed in the ſecond.

When a weight is to be raiſed by means of an axle and wheel, it is faſtened to a chord that goes round the axle, and the power, which is to raiſe it, is hung to a chord that goes round the wheel. If then the power be to the weight as the radius of the axle to the radius of the wheel, it will juſt ſupport that weight; as will eaſily appear from what was proved of the lever. For the axle and wheel may be conſidered as a lever, whoſe fulcrum is a line paſſing through the centre of the wheel and middle of the axle, and whoſe long and ſhort arms are the radii of the wheel and axle which are parallel to the horizon, and from whoſe extremities the chords hang perpendicularly. And thus an axle and wheel may be looked upon as a kind of perpetual lever, on whoſe arms the power and weight always act perpendicularly, though the lever turns round its fulcrum. And in like manner when wheels and axles move each other by means of teeth on their peripheries, ſuch a machine is really, a perpetual compound lever: and, by conſidering it as ſuch, we may compute the proportion of any power to the weight it is able to ſuſtain by the help of ſuch an engine. And ſince the radii of two contiguous wheels, whoſe teeth are applied to each other, are as the number of teeth in each, or inverſely as the number of revolutions, which they make in the ſame time: we may, in the computation, inſtead of the ratio of theſe radii, put the ratio of the number of teeth on each wheel; or the inverſe ratio of the number of revolutions they make in the ſame time.

The moſt natural method of explaining the effects of the pulley, that is, of computing the proportion of any power to the weight it can ſuſtain by means of any ſyſtem of pullies is, by conſidering that every moveable pulley hangs by two ropes equally ſtretched, which muſt bear equal parts of the weight; and therefore when one and the ſame rope goes round ſeveral fixed and moveable pullies, ſince all its parts on each ſide of the pullies are equally ſtretched, the whole weight muſt be divided equally amongſt all the ropes by which the moveable pullies hang. And conſequently if the power which acts on one rope be equal to the weight divided by the number of ropes, or double the number of moveable pullies, that power muſt ſuſtain the weight.

The ſeveral caſes in which the wedge is applied may be comprehended in one general propoſition; let the equicrural triangle A B C, (*fig.* 63.) repreſent a wedge, the lines A B and C B will be the ſides of the wedge, A C its baſe or back, and its height will be the line P B biſecting the baſe A C and alſo the vertical angle A B C. When any two reſiſting forces act on the ſides of a wedge in directions which make equal angles with the ſides (as they are always ſuppoſed to do), a power acting perpendicular at P on the baſe of the wedge will keep the reſiſting forces in equilibrio, when it is to the ſum of theſe forces, as the ſine of half the vertical angle of the wedge, to the ſine of the angle which the directions of the forces contain with the ſides of the wedge.

For let E and F be two bodies acting on the ſides of the wedge, and let them be firſt ſuppoſed to act in the directions E P and F P perpendicular to the ſides; then ſince the power P acts perpendicularly on the baſe A C, if theſe three forces keep the wedge in equilibrio, they will be to each other as the ſides of a triangle to which their directions are parallel, or (which is the ſame thing) as the ſides of the triangle A B C to which their directions are perpendicular. Therefore the power P is to the ſum of the reſiſting forces which it ſuſtains as A C the baſe of the wedge to the ſum of the ſides, or as P A, half the baſe, to A B one of the ſides; but P A is to A B as the ſine of P B A, half the vertical angle of the wedge, to the radius which is the ſine of a right angle, and the directions of the reſiſting forces are ſuppoſed in this caſe to contain a right angle with the ſides of the wedge.

Let now the reſiſting bodies E and F be ſuppoſed to act on the wedge in directions parallel to the lines D P and O P, which make oblique angles with its ſides, draw E G and F K perpendicular to thoſe lines. From what has been proved it appears that the power P, is to the force with which it is able, by means of the wedge, to protrude the reſiſting bodies in the directions P E and P F as the ſine of half the vertical angle to the radius, let this protruding force be expreſſed by the line P E, and let it be reſolved into two forces expreſſed by the lines P G and G E, the former of theſe only will act in oppoſition to the reſiſting bodies, therefore the whole protruding force of the power is to the force with which it acts againſt the reſiſting bodies E and F in the directions P D and P O as P E to P G, or (becauſe the triangles E P G and D P E are ſimilar) as P D to P E, that is as the radius to the ſine of the angle P D E; compounding therefore the ratio of the ſine of half the vertical angle to the radius, with the ratio of the radius to the ſine of the angle P D E, the power P, when the wedge is kept in equilibrio, will be to the force with which it protrudes the reſiſting bodies in directions oppoſite to thoſe in which they act, as the ſine of half the vertical angle to the ſine to the angle P D E or P O F, which the directions of the reſiſting forces contain with the ſides of the wedge.

Hence, when the directions in which reſiſting bodies act on a wedge are given, we may eaſily find two lines that will expreſs the proportion between the reſiſtance and the power which ſuſtains it by means of the wedge. For from P, the middle point of the wedge, draw the line P D meeting one of the ſides, and parallel to the direction in which the reſiſting force acts on that ſide, then the power will be to the reſiſtance as P D to P B the height of the wedge. For P D and P B are to each other as the ſines of the oppoſite angles, in the triangle P B D, that is, as the ſines of half the vertical angle, and the angle which the direction of the reſiſting force contains with the ſide of the wedge.

From what has been demonſtrated we may deduce the proportion of the power to the reſiſtance it is able to ſuſtain in all the caſes in which the wedge is applied. Firſt, when in cleaving timber the wedge fills the cleft, then the reſiſtance of the timber acts perpendicularly on the ſides of the wedge, therefore, in this caſe, when the power which drives the wedge, is to the coheſive force of the timber as half the baſe to one ſide of the wedge, the power and reſiſtance will be in equilibrio.

Secondly, when the wedge does not exactly fill the cleft, which generally happens becauſe the wood ſplits to ſome diſtance before the wedge: let E L F repreſent a cleft into which the wedge A B C is partly driven; as the reſiſting force of the timber muſt act on the wedge in directions perpendicular to the ſides of the cleft, draw the line P D in a direction perpendicular to E L the ſide of the cleft, and meeting the ſide of the wedge in D; then the power driving the wedge and the reſiſtance of the timber, when they balance, will be to each other as the line P D to P B the height of the wedge.

Thirdly, when a wedge is employed to ſeparate two bodies that lie together on a horizontal plane, for inſtance two blocks of ſtone; as theſe bodies muſt recede from each other in horizontal directions, their reſiſtance muſt act on the wedge in lines parallel to its baſe C A; therefore the power which drives the wedge will balance the reſiſtance when they are to each other as P A half the breadth of the wedge to P B its height; and then any additional force ſufficient to overcome the reſiſtance ariſing from the friction of the bodies on the horizontal plane will ſeparate them from each other.

With reſpect to the inclined plane; let the line A B, *fig.* 64. repreſent the length of an inclined plane, A D its height, and the line B D we may call its baſe. Let the circular body G E F be ſuppoſed to reſt on the inclined plane, and to be kept from falling down it by a ſtring C S tied to its centre C. Then the force with which this body ſtretches the ſtring will be to its whole weight as the ſine of A B D, the angle of elevation, to the ſine of the angle which the ſtring contains with a line perpendicular to A B, the length of the plane. For let the radius C E be drawn perpendicular to the horizon, and C F perpendicular to A B, and from E draw E O parallel to the ſtring and meeting C F in O: then, as the body continues at reſt, and is urged by three forces, to wit, by its weight in the direction C E, by the reaction of the plane in the direction F C, and by the reaction of the ſtring in the direction E O; the reaction of the ſtring, or the force by which it is ſtretched, is to the weight of the body as E O to C E: that is, as the ſine of (the angle E C O, which is equal to) A B D, the angle of elevation, to the ſine of the angle E O C, equal to S C O, the angle which the ſtring contains with the line C F perpendicular to A B the length of the plane.

When therefore the ſtring is parallel to the length of the plane, the force with which it is ſtretched, or with which the body tends down the inclined plane, is to its whole weight, as the ſine of the angle of elevation, to the radius, or as the height of the plane to the length. And in the ſame manner it may be ſhewn, that when the ſtring is parallel to B D, the baſe of the plane, the force with which it is ſtretched is to the weight of the body as A D to B D, that is, as the height of the plane to its baſe. If we ſuppoſe the ſtring, which ſupports the body G E F, to be faſtened at S, and that a force by acting on the line A D, the height of the plane, in a direction parallel to the baſe B D, drives the inclined plane under the body, and by that means makes it riſe to a direction parallel to A D: then, from what was proved in the third caſe of the wedge, it will appear, that this force muſt be to the weight of the body, as A D to B D, or rather in a proportion ſomewhat greater; if it makes the plane move on and the body riſe.

From this laſt obſervation we may clearly ſhew the nature and force of the ſcrew; a machine of great efficacy in raiſing weights, or in preſſing bodies cloſely together. For if the triangle A B D be turned round a cylinder whoſe periphery is equal to B D, then the length of the inclined plane B A will riſe round the the cylinder in a ſpiral manner, and form what is called the thread of the ſcrew, and we may ſuppoſe it continued in the ſame manner round the cylinder, from one end to the other; and A D, the height of the inclined plane, will be every where the diſtance between two contiguous threads of this ſcrew, which is called a convex ſcrew. And a concave ſcrew, may be formed to fit this exactly, if an inclined plane every way like the former be turned round the inſide of a hollow cylinder, whoſe periphery is ſomewhat larger than that of the other. Let us now ſuppoſe the concave ſcrew to be fixed, and the convex one to be fitted into it, and a weight to be laid on the top of the convex ſcrew: then, if a power be applied to the periphery of this convex ſcrew to turn it round, at every revolution the weight will be raiſed up through a ſpace equal to the diſtance between the two contiguous threads, that is to the line A D, the height of the inclined plane B A; therefore ſince this power, applied to the periphery acts in a direction parallel to B D, it muſt be to the weight it raiſes as A D to B D, or as the diſtance between two contiguous threads, to the periphery of the convex ſcrew.

The diſtance between two contiguous threads is to be meaſured by a line parallel to the axle; if we now ſuppoſe that a hand-ſpike or handle is inſerted into the bottom of the convex ſcrew, and that the power which turns the ſcrew is applied to the extremity of this handle, which is generally the caſe; then as the power is removed farther from the axis of motion, its force will be ſo much increaſed, and therefore ſo much may the power itſelf be diminiſhed. So that the power, which, acting on the end of a handle, ſuſtains a weight by means of a ſcrew, will be to that weight, as the diſtance between two contiguous threads of the ſcrew, to the periphery deſcribed by the end of the handle. In this caſe we may conſider the machine as compoſed of a ſcrew and a lever, or as ſir Iſaac Newton expreſſeth it, *Cuneus a vecte impulſus.* See Maclaurin's Account of ſir Iſaac Newton's Phil. Diſc. book ii. chap. 3. Hamilton's Phil. Eſſ. eſſ. 1. or Phil. Tranſ. liii. p. 116.

Mechanical is alſo applied to a kind of *reaſoning*, which of late has got great ground, both in phyſics and medicine; thus denominated, as being conformable to what is uſed in the contrivance, and accounting for the properties and operations of machines. See Medicine.

This manner of thinking and arguing, Dr. Quinſey inſiſts, is the reſult of rightly ſtudying the powers of a human mind, and the ways by which it is only fitted to get acquaintance with material beings: for conſidering the animal body as a compoſition out of the ſame matter from which all other bodies are formed, and to have all thoſe properties which concern a phyſician's regard, only by virtue of its peculiar make and conſtructure; it naturally leads a perſon to conſider the ſeveral parts, according to their figures, contexture, and uſe; either as wheels, pullies, wedges, levers, ſcrews, chords, canals, ciſterns, ſtrainers, or the like; and throughout the whole of ſuch inquiries, to keep the mind cloſe in view of the figures, magnitudes, and *mechanical* powers of every part or movement; juſt in the ſame manner as is uſed in inquiring into the motions and properties of any other machine. For which purpoſe it is frequently found helpful to deſign, or picture out in diagrams whatſoever is under conſideration, as it is cuſtomary in common geometrical demonſtrations.

The knowledge obtained by this procedure is called *mechanical knowledge.*

Mechanical is alſo uſed, in *Mathematics*, to ſignify a conſtruction or proof of ſome problem, not done in an accurate and geometrical manner, but coarſely and unartfully, or by the aſſiſtance of inſtruments; as are moſt problems relating to the duplicate of the cube, and the quadrature of the circle.

Mechanical *arts.* See Arts.

Mechanical *curve.* See *Tranſcendental* Curve.

MECHANISM *of the barometer.* See Barometer.

Mechanism *of the double microſcope*, &c. See Microscope.

MECHOACAN, **Mechoacanna**, called alſo *white jalap*, *white rhubarb*, and *American ſcammony*, a medicinal root, taking its name from a province of Mexico, from whence it is brought in thin tranſverſe ſlices, like Jalap, but larger and whiter. *Mechoacan* ſcarcely yields one ſixth part ſo much reſin as jalap does. It is a ſpecies of bindweed. See Convolvulus.

Mechoacan was firſt introduced about the year 1524, and uſed as a purgative before jalap, though the latter is now in more general uſe, as being found more efficacious: yet *mechoacan* is the milder and more gentle of the two, and on that account is preferable. The ſeat of its action is chiefly in the extreme parts; for which reaſon it is accounted good in arthritic pains. It has the advantage of needing no preparation, or corrective; and of purging in its own proper ſubſtance, as it grows.

It purges ſerous humours from all parts of the body; and helps the dropſy, jaundice, and rheumatiſm, working with gentleneſs, and without griping; and therefore it is fit for weakly tender conſtitutions; but by reaſon that a larger quantity muſt be given than moſt people are willing to take, it is grown very much out of uſe. The doſe in ſubſtance is from one dram to two or more.

M. Boulduc found, by analyſing it, that it contains twelve times as much ſalt as reſin; but neither the ſaline nor reſinous extract purge ſo freely as the ſubſtance, even though taken in large doſes; nor do they even purge ſo eaſily.

In the choice of *mechoacan*, perefer thoſe pieces which are the browneſt within, and whoſe ſubſtance is the cloſeſt, and moſt compact,

MECONIUM, μεκωνιον, from μεκων, *poppy*, in *Pharmacy*, is the juice of the POPPY, drawn by inciſion and dried.

Meconium differs from opium, in that this firſt ouſes out ſpontaneouſly, after an inciſion made in the heads of the poppies, whereas the other is drawn by violence, both from the heads and leaves, and even from the whole plant, bruiſed and preſſed together.

The college of London directs the dried heads, cut and cleared from the ſeeds to be boiled in water, in the proportion of three pounds and a half to ſix gallons, and now and then ſtirred to prevent their burning, till only about one third part of the liquor remains, which will be almoſt entirely ſoaked up by the poppies; the decoction is to be ſtrongly preſſed out, boiled down to about four pints, then ſtrained whilſt hot, firſt through a ſieve, and afterwards through a fine woollen cloth, and ſet by for a night to ſettle: to the liquor poured off clear ſix pounds of double refined ſugar are to be added; and the mixture boiled till its weight comes to nine pounds or a little more, that it may become a ſyrup of a proper conſiſtence. An ounce of this ſyrup is reckoned equivalent to about a grain of opium. See DIACODIUM.

MECONIUM is alſo a black thick excrement, gathered in the inteſtines of a child during the time of geſtation.

In colour and conſiſtence it reſembles pulp of caſſia. It is alſo thought to reſemble *meconium*, or juice of poppy; whence it takes its name. See INFANT.

MEDAL, MEDALIA, a ſmall figure, or piece of metal, in form of a coin, deſtined to preſerve to poſterity the portrait of ſome great man, or the memory of ſome illuſtrious action.

Scaliger derives the word from the Arabic *methalia*, a coin whereon is impreſſed the figure of a human head. Menage and Voſſius rather derive it from *metallum*. Du-Cange obſerves, that the obolus was anciently called *medalia quaſi medietas nummi*; as being half of another coin.

Medals may be diſtinguiſhed by the metal of which they are made; which is commonly one of the three metals ſignified by the three A's, which, on ſeveral coins, are placed after the name of the mint-maſter, viz. gold, ſilver, and copper or braſs. There are alſo ſome *medals* compoſed of two different metals, not by melting them together, but either by plating over braſs or iron with ſilver; a ſort of falſe money, which had its riſe in the triumvirate of Auguſtus; or by laying a rim of a different metal round the edge of a *medal*. Thoſe of the latter ſort are called by antiquaries *contorniati*, from the French *contour*, which ſignifies the outlines that define a figure. F. Hardouin allows theſe no higher antiquity than the thirteenth century; others date them from the fifth; and others make them as ancient as the time of Nero. *Medals* may again be diſtinguiſhed by their different ſizes. The ſize of the ancient *medals* is from three inches to one-fourth of an inch in diameter. Thoſe of the larger ſize or volume are called MEDALLIONS. The others, which are very various, are ranked into three claſſes, viz. large, middle, and ſmall; and the claſs is determined, not ſo much by the breadth and thickneſs of the *medal* itſelf, as by the ſize of the head that is ſtamped upon it. The ſhape of *medals* is rather roundiſh than perfectly round.

MEDAL, *the parts of a*, are the two ſides; one whereof is called the *face*, or *head*, the other the *reverſe*.

On each ſide is the area, or field, which makes the middle of a *medal*; the rim, or border; and the EXERGUM, which is beneath the ground whereon the figures repreſented are placed. On the two ſides are diſtinguiſhed the type, and the inſcription or legend. The type, or device, is the figure repreſented; the legend is the writing, eſpecially that around the *medal*; though, in the Greek *medals*, the inſcription is frequently in the area. See LEGEND. What we find in the EXERGUM is frequently no more than ſome initial letters, whoſe meaning we are uſually unacquainted with; though ſometimes too they contain epochas, or words that may be accounted an inſcription.

The exergue contains ſometimes the date of the coin, expreſſing in what conſulſhip of the emperor it was ſtruck: as COS. III. upon the reverſe of an Antoninus. Sometimes it ſignifies the place where it was ſtruck, and to which the coin properly belonged, as S. M. AL. for *ſigna Moneta Alexandriæ*, upon the reverſe of a Licinius. Sometimes the name of a province, the reduction of which the *medal* is deſigned to celebrate; as Judæa in the reverſe of a Veſpaſian. On the face of *medals* we have commonly the portrait of ſome great and illuſtrious perſon; uſually, if not always, in profile. The conſular *medals* have commonly the heads of ſome of their gods, or of their ancient kings, or of Rome, which is a manly face wearing a helmet. The heads of the Roman kings are generally dreſſed with a diadem; Julius Cæſar was the firſt among the Romans who ſtruck his own head upon the coin, in which he was followed by all the ſucceeding emperors. The proper dreſs of the imperial head is a crown, commonly of laurel, the right of wearing which was decreed to Julius Cæſar by the ſenate, and afterwards continued to his ſucceſſors. Beſides, there are ſeveral crowns found in *medals*, as the roſtral, mural, radiated, &c. The emperor Juſtinian was the firſt who uſed an arched crown, ſurmounted with a croſs; ſuch as is wore by Chriſtian kings at this day. Some heads of emperors are wholly naked, as thoſe of Auguſtus, Nero, Galba, and ſome others. Though it is obſerved, that a naked head, ſtruck in the imperial ages, is a ſign that it is not the head of an emperor, but of one of his ſons, or the preſumptive heir of the empire. The heads of the gods are diſtinguiſhed by their proper crown; as Ceres, by a crown of ears of corn; Flora, by a crown of flowers, &c. See CROWN. Heads are alſo diſtinguiſhed, not only by their dreſs, but by certain ſymbols attending them; as the LITUUS, which is the ſymbol of the Pontifex Maximus. We have alſo on *medals* the heads of queens and other ladies of high rank; chiefly the wives of the emperors. Some *medals* are alſo charged with two heads, either ſet face to face, as the *medal* of Severus and the empreſs Domna, or back to back, as that of Julius Cæſar and Octavianus, afterwards Auguſtus, his adopted ſon and ſucceſſor: and ſome few are ſtamped with three heads or more in the face. The titles are alſo generally found upon the face of the *medal*. Theſe are titles of honour, as Imperator Cæſar, Auguſtus, given to all the Roman emperors after Octavianus; Dominus firſt aſſumed by Aurelian, and uſed by his ſucceſſors: other titles are aſcribed to particular perſons on account of their virtues, as Pius to Antoninus, aſſumed alſo by Commodus with the addition of Felix; Pater Patriæ, firſt beſtowed on Cicero for diſcovering and defeating the conſpiracy of Catiline, and afterwards aſſumed by the emperors; Juſtus, the title of Piſcennius; Beatiſſimus and Feliciſſimus, of Diocleſian; Optimus and Clemens, decreed to Trajan by the ſenate; Maximus, aſſumed by Conſtantine; and Invictus, by Victorinus. Other titles are the names of offices; as COS. for conſul, with a number annexed to it, ſignifying how many times the perſon has been thus elected: Tribunitia poteſtas, with the year of the tribuneſhip commonly expreſſed after the title as TRIB. POT. X. or XVI. &c. The office of Pontifex maximus, expreſſed by P. M. was aſſumed by the emperors, and generally expreſſed among their titles from Auguſtus to Conſtantine, by whom it was refuſed: it was reaſſumed by Julian, and laid aſide by Gratian. Julius Cæſar aſſumed the title of Dictator perpetuus; Claudius that of Cenſor; and Domitiam made himſelf Cenſor perpetuus.

Some authors imagine, that the ancient *medals* were uſed for money. M. Patin has a chapter expreſs to prove, that they had all a fixed regular price in payments, not excepting even the medallions. F. Joubert is of the ſame opinion. Others, on the contrary, maintain, that we have no real money of the ancients; and that the *medals* we now have never had any courſe as coins. Between theſe two extremes there is a medium, which appears by much more reaſonable than either of them. See MONEY.

MEDALS are divided into *ancient* and *modern*.

MEDALS *ancient*, are either of the higher or lower antiquity. The former claſs conſiſt of ſuch as were ſtruck before the end of the third century: the latter, of ſuch as were ſtruck between the third and ninth centuries.

The *ærugo* of ancient *medals* adds greatly to their value. It is ſometimes found of a blue, ſometimes of a crimſon, and ſometimes of a violet colour. It is ſaid to be inimitable by art; for as to that produced by ſal ammoniac and vinegar, it comes far behind it in beauty. The genuine kind inſinuates itſelf into the fineſt ſtrokes of the letters, &c. without effacing them, better than any enamel; it is only obſerved on braſs coins; for as to thoſe of ſilver, the *ærugo* deſtroys them, and therefore is to be carefully ſcoured off with vinegar, or lemon juice. Joubert Scienc. des Medail. ſect. 8. Act. Erud. Lipſ. 1694. p. 226.

MEDALS, *modern*, or thoſe ſtruck within theſe few hundred years. See COIN.

Among the ancient *medals*, ſome are Greek, others Roman. Theſe may be diſtinguiſhed into two claſſes, viz. thoſe of the ſtate, and thoſe of particular cities and colonies: for beſides the money coined by the ſtate, it appears that divers cities and colonies had the privilege of coining; where it is probable the chief magiſtrate was the mint-maſter. Hardouin has publiſhed a large catalogue of Grecian and Roman *medals* of this ſort in a quarto volume, intitled, *Nummi antiqui Populorum et Urbium illuſtrati.* Vaillant has explained the devices and inſcriptions of *medals*, in two volumes of the Latin colonies, in which he has alſo given cuts of the *medals* themſelves. The *medals* belonging to cities were ſo numerous, that above two hundred may ſtill be collected of the Greek cities only. The Greek *medals* are the moſt ancient. That people ſtruck *medals* in all the three metals, with ſuch exquiſite art as the Romans could never come up to. The Greek *medals* have a deſign, accuracy, force, and a delicacy that expreſſes even the muſcles and veins; and it muſt be owned goes infinitely beyond any thing of the Romans.

There are alſo Hebrew *medals*; and Punic, Gothic, and Arabic *medals*, which make new claſſes in the ancient and modern ones.

MEDALS *conſular*, are ſo called to diſtinguiſh them from the imperial; not that they were ſtruck by order of the conſuls, but becauſe, in thoſe times, the republic was governed by conſuls. Of theſe, father Joubert reckons about fifty or ſixty of gold; two hundred and fifty of copper; and near a thouſand of ſilver. Goltzius has deſcribed them in a chronological order, according to the Faſti Conſulares; and Urſinus has diſpoſed them genealogically, according to the order of the Roman families.

M. Patin has collected an entire ſeries of them, in the ſame order with Urſinus: and only computes one thouſand thirty-ſeven conſulars, which relate to one hundred ſeventy-eight Roman families. M. Vaillant, and M. Morel, each promiſed a new edition of the conſular *medals*. M. Vaillant kept his word, and his book was printed before he died, in three volumes folio.

The conſular *medals* are certainly the moſt ancient *medals* of the Romans, and yet thoſe of copper and ſilver do not go beyond the four hundred eighty-fourth year of Rome; nor thoſe of gold beyond the five hundred forty-ſixth. If any are produced of an older date, they are condemned as ſpurious.

MEDALS, *among the Imperial*, we diſtinguiſh between the *upper* and the *lower empire:* the upper empire commenced under Julius Cæſar, and ended about the year of Jeſus Chriſt two hundred and ſixty: the lower empire comprehends near one thouſand two hundred years; viz. till the taking of Conſtantinople. It is the cuſtom, however, to account all the imperial *medals*, till the time of the Palæologi, among the antique; and yet we have no imperial *medals* of any conſiderable beauty, later than the time of Heraclius, who died in 641.

After the time of Phocas and Heraclius, Italy became a prey to the Barbarians; ſo that the monuments we have remaining of thoſe two emperors, finiſh the ſet, or ſeries of imperial *medals*. To theſe are added the *medals* of the lower empire, and of the Greek emperors; whereof a ſeries may be made as low as our times, taking in the modern ones. M. Patin has made an ample collection of the imperial *medals*, till the time of Heraclius.

The Gothic *medals* make part of the imperial ones; they are ſo called, as having been ſtruck in the times of the Goths, and in the declenſion of the empire, and ſavouring of the ignorance and barbarity of the age.

As to modern *medals*, they are ſuch as have been ſtruck in Europe, ſince the uſurpation of the Goths has been extinct, and ſculpture and engraving have begun to reflouriſh. The firſt was that of the famous reformer John Huſs, in 1415. If any pretend to be more ancient, they are ſpurious. In France there were none ſtruck with the king's effigy before the reign of Charles VII.

The ſtudy of modern *medals* is ſo much the more uſeful, as they afford more light than the ancient, and mark the times and conſequences of events more preciſely; whereas the inſcriptions of the ancient *medals* are very ſhort and ſimple, and generally they are without any date. Add to this, that the ancient *medals* are extremely liable to be counterfeited by reaſon of the conſiderable price they bear; but in the modern there is not that danger of being impoſed upon.

There are few true Hebrew *medals:* thoſe which we ſee of the heads of Moſes and Jeſus Chriſt, are ſpurious and modern. We have a few ſhekels of copper and ſilver with Hebrew or Samaritan legends, but none of gold; though there is mention made of one in the king of Denmark's cabinet. F. Souciet has a diſſertation on the Hebrew *medals*, commonly called SAMARITAN *medals*, where he diſtinguiſhes accurately between the genuine and the ſpurious; and ſhews that they are true Hebrew coins, ſtruck by the Jews, but on the model of the ancients; and that they were current before the Babyloniſh captivity.

MEDALS, *ſingular*, in the popular ſenſe, are ſuch as are not found in the cabinets of the curious, and are only met with by chance; but in the ſtricter ſenſe, they are ſuch whereof there is not above one of the kind extant. The Otho, in large copper, is a *ſingular medal.* When a *medal* exceeds the value of ten or twelve piſtoles, it is worth what the owner pleaſes. The Peſcennius Niger, and Pertinax, are very rare in all metals. The Didius Julianus is hardly found any where but in large copper. Carteron, a Dutchman, and ſome others, have made mills on purpoſe to ſtrike *medals* that never were; as thoſe of Cicero, Virgil, Priam, &c.

MEDALS, *Greek*, are ſuch as have either the heads of Greek emperors, or Greek inſcriptions.

MEDALS, *falſe* or *ſpurious*, are thoſe counterfeited, and put off for antique, when they are not.

MEDALS, *mutilated*, are thoſe that are not entire, or are much defaced.

MEDALS, *redintegrated*, are thoſe wherein we find the letters REST, which ſhew that they have been reſtored by the emperors.

MEDALS, *dipt*, are ſtruck of pure copper, and afterwards ſilvered. This is a contrivance that the curious have frequent recourſe to, in order to complete their ſilver ſets.

MEDALS, *covered* or *plated*, are thoſe which have only a thin ſilver leaf over the copper, but which are ſtruck ſo artfully, that the cheat does not appear without cutting them; theſe are the leaſt ſuſpected.

MEDALS, *grained* or *indented*, are thoſe whoſe edges are cut, or notched like teeth, which is a ſign of purity and antiquity. They are common among the conſulars, but we have none later than Auguſtus. There are ſeveral of them, however, among thoſe of the kings of Syria.

MEDALS, *countermarked*, are thoſe which have marks cut either on the ſide of the head, or of the reverſe. Theſe countermarks ſerve to denote the change of their value; and this kind is much inquired for by the curious.

MEDALS, *caſt*, are thoſe which are not ſtruck, but caſt in a mould.

MEDALS *without reverſe.* See REVERSE.

Medals have been ſtruck in three kinds of metals, which make three ſeveral ſets or ſeries, in the cabinets of the curious. That of gold is the leaſt numerous, as not conſiſting of above one thouſand, or twelve hundred of the imperial; that of ſilver may contain about three thouſand imperial; and that of braſs, or copper, of the three ſeveral ſizes, viz. the great, the middle, or the ſmall, conſiſts of ſix or ſeven thouſand, all imperial.

It is not either the metal, or the ſize, which makes a *medal* valuable; but the ſcarcity of the head, or of the reverſe, or the legend. Some *medals* are common in gold, which yet are very rare in copper; and others very rare in ſilver, which in copper and gold are very common. The reverſe is ſometimes common, where the head is ſingular; and ſome heads are common, whoſe reverſes are very ſcarce.

There are alſo *medals* very ſcarce in ſome ſets, and yet very common in others: for inſtance, there is no Antonia in the ſets of large copper, and the middle copper is forced to ſupply its place. The Otho is very rare in all the copper ſets, and yet common in the ſilver ones. Othos, of the large copper, are held at an immenſe price; and thoſe of the middle copper at forty or fifty piſtoles. And the Gordians Afric are rated near as high. Singular *medals* are invaluable.

M. Vaillant has collected all the *medals* ſtruck by the Roman colonies; F. Hardouin thoſe of the Greek and Latin cities; F. Norris that of Syria. M. Morel alſo undertook an univerſal hiſtory of *medals*, and promiſed cuts of twenty-five thouſand. He ranges them under four claſſes; the firſt contains the *medals* of kings, cities, and people, which have neither the name nor image of the Roman emperors; the ſecond contains the conſular *medals*; the third the imperial *medals*; and the fourth, the Hebrew, Punic, Parthian, French, Spaniſh, Gothic, and Arabic. He begins with the imperial, and brings them down as low as Heraclius: he places the Latin in order before the Greek.

Ad. Occo, a German phyſician, and count Mezzabarba have endeavoured to range the *medals*, in a chronological order; but that is impracticable; for in many of the imperial *medals* there is no mark, either of the conſulate, or of the year of the reign; and ſince Gallienus there are few of the Roman imperial *medals* that bear the leaſt footſteps of chronology.

The moſt noted *medalliſts*, or authors on *medals*, are Antonius Auguſtinus, Wolf Lazius, Ful. Urſinus, a learned antiquary, Æneas Vicus, Huber Goltzius, a famous graver, Oiſelius, Seguin, Occo, Triſtan, Sirmond, Vaillant, Patin, Noris, Spanheim, Hardouin, Morel, Joubert, Mezzabarba, Beger, &c.

There is an Introduction to the Knowledge of *Medals*, by Dr. Jennings, publiſhed in 1764, which may be uſeful to convey a general acquaintance with the ſubject.

For the manner of ſtriking *medals*, ſee Coining.

Medals, *academy of*. See Academy.

Medal, *repairing a*. See Repairing.

Medals, *reſtitution of*. See Restitution.

Medals, *votive*. See Votive.

Medals, *impreſſions of*. A very eaſy and elegant way of taking impreſſions of *medals* and coins, not generally known, is this: melt a little iſinglaſs glue, made with brandy, and pour it thinly over the *medal*, ſo as to cover its whole ſurface; let it remain on for a day or two, till it is thoroughly dry and hardened, and then taking it off, it will be fine, clear, and hard as a piece of Muſcovy glaſs, and will have a very elegant impreſſion of the coin. Shaw's Lectures, p. 430.

Sulphur is ſometimes uſed to take off impreſſions of *medals*, coins, &c. The method is this: having made a ledge of clay about the work, whoſe impreſſion is deſired, and carefully oiled the whole, gently pour brimſtone melted in a covered veſſel, to prevent its firing, upon the metal. About the edge of this mould make a border of clay, as before, and lightly oil the internal ſurface of both; then gradually put into it, to the thickneſs of about a quarter of an inch, a mixture made up with calcined alabaſter and water, to the conſiſtence of ſtiff honey. This ſoon growing hard, may be taken out of the mould, and gives figures of the coin or *medal*.—Boyle's Works abr. vol. i. p. 151. A method ſomewhat different is deſcribed under the article Brimstone.

The brittleneſs of ſulphur is a great objection to this method, and the plaiſter of Paris, which is often uſed for taking impreſſions, is too ſoft: however a coat or layer of thin metal, formed over the plaiſter, would be a conſiderable defence. This is the cheapeſt and moſt convenient metal for this purpoſe: let thin tin-foil, ſuch as is uſed for ſilvering looking-glaſſes, be laid over the *medal* or coin intended to be taken off, and then rubbed either with a bruſh, the point of a ſkewer or a pin, till it has received perfectly the impreſſion of the *medal*; then pare off the tin-foil round the edge of the *medal*, till it is brought to the ſame circumference; afterwards the *medal* muſt be reverſed, and the tin-foil will drop off into a chip-box or mould ready to receive it; the concave ſide of the foil, or that which is laid on the face of the *medal*, being uppermoſt; upon this pour plaiſter of Paris, made in the uſual manner, and when dry, the caſt figure may be taken out of the box or mould, with the tin-foil ſticking on the plaiſter, the convex ſide being now uppermoſt, in which poſition it is to be kept in the cabinet after it becomes dry. To have an impreſſion very perfect, the thinneſt tin-foil ſhould be made uſe of. The impreſſions taken in this manner almoſt equal ſilver *medals* in beauty, and are very durable. If the box or mould be rather larger than the impreſſion of tin-foil, the plaiſter, when poured on, runs round its edges, and forms a kind of white frame or circular border round the foil, whence the new made *medal* appears more neat and beautiful. If this tin-foil is gilt with gold leaf, by means of thin iſinglaſs glue, the *medal* will reſemble gold.

We have an eaſy method of procuring the true impreſſion or figure of *medals* and coins, by Mr. Barker in the Philoſ. Tranſ. Nº 472. ſect. 13. vol. xliii. p. 77.

Take a perfect and ſharp impreſſion on the fineſt black ſealing-wax, of the coin or *medal* you deſire. Cut away the wax round the edges of the impreſſion; then with a preparation of gum-water, of the colour you would have the picture, ſpread the paint upon the wax-impreſſion with a ſmall hair-pencil, obſerving to work it into all the ſinking or hollow places, theſe being the riſing parts of the *medal*; and the colouring muſt be carefully taken from the other parts with a wet finger. Then take a piece of very thin poſt-paper, a little larger than the *medal*, and moiſten it quite through. Place it on the wax impreſſion, and on the back of the paper lay three or four pieces of thick woollen cloth or flannel, of about the ſame ſize. The impreſſion, with its coverings ſhould be placed between two ſmooth iron plates, about two inches ſquare, and one tenth of an inch thick.

Theſe muſt be carefully put into a ſmall preſs, made of two plates of iron, about five inches and a half long, one inch and a half wide, and half an inch in thickneſs, having a couple of long male ſcrews running through them, with a turning female ſcrew on each, to force the plates together. Theſe being brought evenly together by means of the ſcrews, will take off a true and fair picture of the *medal*; which, if any deficiencies ſhould appear, may eaſily be repaired with a hair-pencil or pen, dipped in the colour made uſe of.

If a relievo only be deſired, nothing is neceſſary but to take a piece of card, or white paſte-board, well ſoaked in water, then placing it on the wax-mould, without any colouring, and let it remain in the preſs for a few minutes, a good figure will be obtained.

This method of taking off *medals*, &c. is convenient, and ſeems much more ſo than the ſeveral inventions uſually practiſed in ſulphur, plaiſter of Paris, paper, &c. wherein a mould muſt be formed, either of clay, horn, plaiſter, or other materials, which require time and trouble.

Some take impreſſions on paper from the *medals* themſelves, by paſſing them through the rolling-preſs, and colouring them afterwards; but this is not only more difficult, but does great injury to the *medals*, by impairing the ſharpneſs of their moſt delicate and expreſſive ſtrokes: whereas wax does not hurt the fineſt *medal* in the leaſt degree; and though a brittle ſubſtance, yet it effectually reſiſts the force of a downright preſſure.

Red ſeems the beſt colouring, and therefore black wax is directed to be uſed; but if the pictures are choſen in black and white, to reſemble copper-plates, the wax ſhould be red; for the wax and paint ought to be of different colours, in order to diſtinguiſh when the colour is laid on properly, or rightly cleared away.

The ſubſtance of *medals*, being metalline, is liable to be corroded; and the figures being raiſed, are alſo liable to be effaced by friction. Hence it is rare to find any perfectly preſerved. Gems are not ſubject to theſe inconveniencies. See Gem.

MEDALLION, or Medalion, a *medal* of extraordinary bigneſs.

The word is formed from the French *medaillon*, or Italian *medaglion*, which ſignify the ſame; and which were originally formed from *metalliones*, a name by which theſe pieces are frequently called in ancient Latin writers.

Medallions are ordinarily a kind of *medals*, which princes uſe to preſent, as a token of honour or eſteem; for which reaſon the Romans call them *miſſilia*.

Medallions were never any current coins, as medals probably were: they were ſtruck purely to ſerve as public monuments, or to make preſents of.

There cannot be any ſet made of them, even though the metals and ſizes ſhould be joined promiſcuouſly. The beſt cabinets do not contain above four or five hundred, though M. Morel judges them to be above a thouſand.

Authors vary about the time when they firſt began to be ſtruck. Some antiquaries will have it under the empire of Theodoſius; but this muſt be a miſtake; for there were ſome ſtruck even in the upper empire: witneſs a Nero, a Trajan, and an Alexander Severus, ſtill extant.

Medallions of gold are very rare, as alſo thoſe of a large copper.

Medallions are diſtinguiſhed from medals by the volume, that is, by the thickneſs and compaſs, as well as by the largeneſs and relievo of the head.

Medallion, in *Architecture*, is any circular tablet on which are emboſſed figures or buſtos: ſuch as I. introduced in the tympanum of the pediment, *Tab. Architecture, fig.* 40.

MEDEA, the name of a ſtone deſcribed by Pliny and the ancients. They ſay it was black, and was variegated with gold-coloured veins; and that when rubbed in water, it yielded a yellowiſh red juice, which had the flavour of wine. We know no ſtone at preſent anſwering theſe characters. Rulandus, indeed, mentions a kind of black hæmatites, or blood-ſtone, which tinges water to a ſaffron colour. This account he takes from Encelius; but this wants the much greater character, of giving it the taſte of wine.

MEDENA, a word uſed by Paracelſus to expreſs an inveterate kind of ulcer.

MEDEOLA, *climbing African aſparagus*, in *Botany*, a genus of the *hexandria trigynia* claſs. Its characters are theſe: the flower has no empalement; it has ſix oblong oval petals, and ſix awl ſhaped ſtamina terminated by incumbent ſummits, and three horned germina terminating the ſtyle; the germina afterwards turn to a roundiſh trifid berry, with three cells, each containing one heart-ſhaped ſeed. Miller reckons four, and Linnæus only two.

MEDES, *empire of the*. See EMPIRE.

MEDIALE, in *Botany*, a name given by the ancients to the central part of any tree. It is ſometimes uſed to ſignify the ſpungy pith that fills up the young branches of a tree, as in the elder and the like; and ſometimes for the firm and hard ſubſtance, called the heart of the wood, and found to be much harder than any other part of it. Thus the name of *tree* to which the word *mediale* is annexed, muſt be the means of explaining what is meant by the word, whether a ſpongy pith, or a ſound hard wood. The moſt accurate writers, however, make a diſtinction which ought to be kept up, that is, the calling the heart, or ſound internal part of the wood, only *mediale*, and the ſpungy part within the elder, &c. *medulla*.

MEDIANA, the name of a vein, or little veſſel, made by the union of the cephalic and baſilic, in the bend of the elbow. It is not a particular vein, or a third vein of the arm, as ſome authors imagine, but merely a branch of the baſilica; which running into the inner part of the elbow, unites with the cephalica, and forms a common vein, called *mediana*, and by the Arabs, the *black vein*. See *Tab. Anat. (Angeiol.) fig. 6. lit. p.*

MEDIANA *linea*, a line, or ſeam, running down the middle of the tongue, and dividing it into two equal parts; though not ſo effectually, but that the blood-veſſels of the one ſide communicate with thoſe of the other. See TONGUE.

MEDIANÆ, *columnæ*, in Vitruvius, are the columns in the middle of a portico, whoſe intercolumnation is to be larger than thoſe of the angular columns.

MEDIANTE in *Muſic*. *The mediante of a mode* is that note which is a third higher than the final; or that which divides the fifth of every authentic mode into two-thirds. See MODE and THIRD.

This term is chiefly in uſe among the French.

MEDIASTINA, the name of a vein of the mediaſtinum.

MEDIASTINUM, in *Anatomy*, a double membrane, formed by a duplicature of the pleura; ſerving to divide the thorax and the lungs into two parts, and to ſuſtain the viſcera, and prevent their falling from one ſide of the thorax to the other. See THORAX.

It proceeds from the ſternum, and paſſing ſtrait down through the middle of the thorax to the vertebræ, divides its cavity into two. It contains the heart between its two laminæ, and it affords a paſſage to the vena cava, the œſophagus, and the ſtomachic nerves. The membranes of the *mediaſtinum* are finer and thinner than the pleura, and have a little fat. It receives branches of veins and nerves from the mamillary and diaphragmatic, particularly one called *mediaſtina*; its nerves come from the ſtomachic; it has alſo ſome lymphatics, which open in the thoracic duct.

The *mediaſtinum* divides the thorax longitudinally into two parts: and by means of it, one lobe of the lungs may officiate, if the other be hindered by a wound on the other ſide. Sometimes there is a matter contained betwixt its membranes, immediately under the ſternum, which may occaſion the tapping of this place.

This membrane is ſubject to an inflammation, the pain of which ſtrikes obliquely from the ſternum through the breaſt to the back, attended with a difficulty of breathing, cough, and ſometimes ſpitting. The cauſe, ſymptoms, and cure, are much the ſame with thoſe of the PLEURISY; but ſuppuration, which is with difficulty avoided, is always fatal.

MEDIASTINUM *cerebri*, the ſame with SEPTUM *trnſverſum*.

MEDIATE, or INTERMEDIATE, a term of relation to two extremes, applied to a third, which is in the middle between them. See MEAN, and MEDIUM.

Subſtance is a genus with regard to man; but between the two there are other *mediate* genuſſes, as body and animal.

Mediate ſtands oppoſed to *immediate*: thus when we ſay that God and man concur to the production of man; God is the *mediate* cauſe, man the *immediate*.

MEDIATE *mode*. See MODE.

MEDIATORS *of queſtions*, in our old writers, were ſix perſons authorized by ſtatute, who, upon any queſtion ariſing among merchants, relating to any unmercable wool, or undue packing, &c. might, before the mayor, or officers of the ſtaple, upon their oath, certify and ſettle the ſame; to whoſe order and determination therein the parties concerned were to give entire credence, and ſubmit. 27. Edw. III. ſtat. 2. c. 24.

MEDIATORS, Μεσαζοντες, under the emperors of Conſtantinople, officers of ſtate, who had the direction of all affairs tranſacted at court. Their chief, or preſident, was called *megas meſazon*, μεγας μεσαζων, and anſwered, to the prime or grand viſier of the Turks. Hofm. Lex in voc.

MEDIC VETCHING. See SAINTFOIN.

MEDICA, in *Botany*. See LUCERNE.

MEDICA, *baſtard*. See *Snail* TREFOIL.

MEDICA, *malus*, in *Botany*, a name given by ſome authors to the citron-tree.

MEDICAL *ſtones*. See STONE.

MEDICAGO, in *Botany*. See *Snail* TREFOIL.

MEDICAMENTOSUS *lapis*. See LAPIS.

MEDICINAL *hours* are thoſe parts of the day ſuppoſed moſt proper to take medicines in.

Of which there are uſually reckoned four; viz. in the morning faſting, about an hour before dinner, about four hours after dinner, and going to bed; but, in acute caſes, the times are to be governed by the ſymptoms and aggravation of the diſtemper, without regard to any *medicinal hours*.

MEDICINAL *waters*. See WATER.

MEDICINALIS *ſacculus*. See SACCULUS.

MEDICINE, MEDICINA, the art of healing.

Medicine, popularly called *phyſic*, conſiſts, according to Boerhaave, in the knowledge of thoſe things by whoſe application life is either preſerved ſound and healthy, or when diſordered is again reſtored to its priſtine healthineſs.

Galen defines *medicine* the art of preſerving preſent health, and of retrieving it when loſt; Hippocrates, the addition of what is wanting, and the retrenchment of what is redundant; and Herophilus, the knowledge of things good, indifferent, and ill with regard to health.

Medicine muſt have been nearly coeval with the world. The injuries and viciſſitudes of the air, the nature and qualities of foods, the violence of external bodies, the actions of life, and, laſtly, the fabric of the human compages, muſt have rendered diſeaſes almoſt as old as mankind; and the preſence of a diſeaſe, as it brings with it a painful ſenſation, or the loſs, perhaps, of the uſe of a limb, does, by a neceſſary mechanical impulſe, both in brutes and men, compel the diſeaſed to ſeek for help, and to apply remedies, either by mere experiment, or by inſtinct, and ſpontaneous appetite: hence aroſe the art of *medicine*, which, in this ſenſe, has been always everywhere among mankind.

Ancient hiſtories and fables tell us, that, in a little time from the flood, *medicine* was ſo well cultivated by the Aſſyrians, Babylonians, Chaldæans, and magi, that they were able to remove preſent diſeaſes, and prevent future ones. Hence it paſſed into Egypt, Lybia Cyrenaica, and Crotona; and thence into Greece, where it flouriſhed, principally in the iſlands of Cnidus, Rhodes, and Cos, and in Epidaurus.

The firſt foundations of the art were laid by chance, natural inſtinct, and events unforeſeen; theſe were improved by the memory of the ſucceſs of former experiments: by writing down diſeaſes, their remedies and events, on columns, paintings, and the walls of their temples: by expoſing the ſick in the markets, and public ways, that thoſe who paſſed by might enquire into the diſeaſe, and communicate a remedy, if they knew any; and, laſtly, by analogy, or reaſoning, from a compariſon of things already obſerved, with things preſent, and things to come.

The art at length received a much greater degree of perfection, by the appointing of phyſicians; ſome for the cure of particular diſeaſes, and others for diſeaſes in general; by an accurate obſervation of the diſeaſe, and its ſymptoms; and by an exact deſcription of the remedy, and its uſe: immediately upon which, it got among the prieſts, and at length was confined to particular families; deſcending by way of inheritance, from father to ſon: which again proved a great bar to its progreſs. The extiſpicy, or inſpecting the entrails of beaſts uſed by the prieſts; the cuſtom of embalming dead carcaſes; and even butchery itſelf, promoted the knowledge of the human fabric, and of the cauſes both of health, diſeaſes, and death.

Laſtly, the diſſecting of live animals for philoſophical purpoſes, diſtinct narratives of the cauſe, riſe, increaſe, criſis, declenſion, end, and effect of diſeaſes; and the knowledge of *medicines*, their choice, preparation, application, powers, and events, ſeemed to have almoſt brought the art to its perfection.

Hippocrates, who was contemporary with Democritus, and perfectly acquainted with every thing then diſcovered, and beſides furniſhed with a great number of obſervations of his own, collecting into one all that was valuable and uſeful, compiled a body of Greek *medicine*; and was the firſt who deſerves the title of a true *phyſician*: for being a maſter of the εμπειρια, experience, as well as of analogy and reaſon, and withal well verſed in a pure philoſophy, he firſt made phyſic rational; and laid the foundation of the dogmatical *medicine*, which has ever ſince obtained. See HIPPOCRATISM.

What Hippocrates had done continued a long time ſacred and unaltered, and was the ſtanding practice of many ages; at length Aretæno the Cappadocian digeſted it into a more orderly body; whence, in various places, at various times, and by various hands, particularly the Alexandrian ſchool, it was farther altered and improved, till at length it came into the hands of Claud. Galen; who, collecting the ſcattered parts, digeſting thoſe which were confuſed, and explaining every thing by the rigid doctrines of the Peripatetics, did both a great deal of ſervice and a great deal of injury to the noble art; he being the firſt who introduced the doctrine of the elements, the cardinal qualities, and their degrees, the four humours, &c. into *medicine*: and on theſe he made the whole art to depend.

After the ſixth century, the arts were not only extinguiſhed, but almoſt all memory of them was loſt, till the ninth; from which to the thirteenth, *medicine* was vigorouſly cultivated, by the Arabs in Aſia, Africa, and Spain; who applying themſelves particularly to the ſtudy of the materia medica, and its preparations, and to the operations of ſurgery, rendered both more juſt and more copious at the ſame time: and yet Galen's errors became now more predominant than ever.

At length, however, they were purged out and exploded by two different means; principally indeed by the reſtoration of the pure diſcipline of Hippocrates, in France; and then alſo by the experiments and diſcoveries of chemiſts and anatomiſts; till at length the immortal Harvey, overturning, by his demonſtrations, the whole theory of the ancients, laid a new and certain baſis of the ſcience. Since his time, *medicine* is become free from the tyranny of any ſect; and is improved by ſure diſcoveries in anatomy, chemiſtry, phyſics, botany, mechanics, &c.

Hence it appears that the art originally conſiſted ſolely in the faithful collecting of obſervations; and that, a long time after, they began to inquire, and diſpute, and form theories: the firſt part has ever continued the ſame; but the latter has been always mutable.

For the ſeveral ſects that have ariſen in *medicine*, ſee DOGMATIC, CHYMISTRY, EMPIRIC, GALENIST, HERMETICAL, and *Paracelſiſts*, or FIRE-*philoſophers*.

Medicine is divided into five principal branches. The firſt conſiders the human body, its parts and fabric, life and health, and the effects following from them: this is called *phyſiology*, the *doctrine of the animal œconomy*, or *of the uſe of the parts*: and its objects, now enumerated, are called *res naturales*, or things according to nature.

The ſecond branch conſiders the diſeaſes of the human body, their differences, cauſes, and effects; and is called *pathology*, as it conſiders the diſeaſes; *ætiology*, as it inquires into their cauſes; *noſology*, when it examines their differences; and laſtly, *ſymptomatology*, when it explains their effects. The objects of this part are called *res præternaturales*, or beyond nature. For the modern method of claſſing diſeaſes, ſee NOSOLOGY.

The third branch conſiders the ſigns or ſymptoms, and how to apply them to uſe; ſo as to judge both in a ſound and a diſeaſed body, what will be the degree, order, and effect, of the health or the diſeaſe; this is called *ſemeiotica*: its objects are things both natural, non-natural, and preternatural.

The fourth branch conſiders the remedies, and their uſe, whereby life may be preſerved; whence it is called *hygieine*: its objects are what we ſtrictly call *non-natural*.

Laſtly, the fifth furniſhes the materia medica, its preparation, and manner of exhibition, ſo as to reſtore health, and remove diſeaſes: and is called *therapeutica*, comprehending the *diætetica*, *pharmaceutica*, *chirurgica*, and *iatrica*.

MEDICINE, *clinical*, *medicina clinica*. See CLINICA.

MEDICINE, *characters in*. See CHARACTERS.

MEDICINE, *pandects in*. See PANDECT.

MEDICINES, or MEDICAMENTS, denote any natural ſubſtance, applied to a human body, in order to anſwer ſome intention of cure. So that they differ from aliments, which preſerve the body in a ſound ſtate, whereas *medicines* reſtore it when impaired; and from poiſons, which tend to deſtroy the body. All the parts of diet may indeed be termed alimentary *medicines*, inaſmuch as they may ſerve to confirm health, againſt the firſt approaches of a diſeaſe; as poiſons, which are always detrimental to the body, have been called deleterious *medicines*.

Medicines are either ſimple or compound: ſimple *medicines* are thoſe which are formed ſpontaneouſly, or by the aſſiſtance of nature alone; and thoſe are called compound, which are owing to the art and induſtry of men, and to the mixtures of various ſimples put together.

The principal differences of ſimple *medicines* are taken either from their form and texture, or from their virtues. In reſpect of their texture, they are divided into minerals, vegetables, and animals; each of which diviſions is termed a claſs, kingdom, or family.

In what the ancients have left us concerning the *medicines* they uſed, there is the utmoſt confuſion and obſcurity; the ſame ſubſtance is frequently called by many different names; ſome *medicines* are barely mentioned by them, without any account or their nature or deſcription; and in regard to many others, the virtues aſcribed by them to one ſimple, have been, by later writers, attributed to others. To clear up, and ſet right all thoſe difficulties, at this time, would be a taſk as difficult as it would be uſeful. So great and ſo many virtues are aſcribed, by different authors, to particular *medicines*, that, if they could be depended on, each ought to be looked on as an almoſt univerſal remedy: but as many of theſe virtues are merely imaginary, it requires even the greateſt caution to diſtinguiſh the fictitious from thoſe which truly belong to them; and though the knowledge of the virtues of *medicines*, be at this time carried to a very great length, there are nevertheleſs many things remaining yet to be diſcovered, and room enough ſtill to enrich the ſcience with new ſpecific remedies; nor will the judicious phyſician find leſs worthy employment for his thoughts, in endeavouring to determine the manner in which thoſe *medicines* act, whoſe effects are already known, and to aſcertain the ſafeſt and beſt methods of adminiſtering them.

Such *medicines* as are of a terreſtrial, or other the like nature, and will not diſſolve in water, the new Diſpenſatory of the College has ordered to be prepared in the following manner: they are firſt to be pounded in a mortar and then levigated with a little water, upon a hard and ſmooth marble, into an impalpable powder, and afterwards dried upon a chalk-ſtone, and then ſet by for a few days, in a warm, or at leaſt a very dry place. In this manner are to be prepared amber, antimony, bezoar, which ſhould be levigated with ſpirit of wine inſtead of water, blood-ſtone, calamy, firſt calcined for the uſe of the makers of braſs, chalk, coral, crabs claws, crabs eyes (ſo called), egg-ſhells cleanſed from the membrane adhering to them by boiling in water, oyſter-ſhells firſt cleanſed, pearls, verdegris, tutty.

In antimony, calamy, and tutty, ſingular care ought to be taken to reduce them to the moſt ſubtle powder that can be. Pemberton's College Diſp. p. 145.

Medicines are again diſtinguiſhed with regard to the manner of their application, into *internal* and *external*.

MEDICINES, *internal*, are thoſe taken in at the mouth.

MEDICINES, *external* or *topical*, are thoſe applied outwardly to any particular part.

With regard to the different manner of their operation, *medicines* are diſtinguiſhed into *agglutinants*, *alterants*, *ſtomachics*, *aſtringents*, *evacuants*, *incarnatives*, *ſpecifics*, &c.

MEDICINES *from metals*. See METALS.

MEDICINES, *pocket*, in *Surgery*, are ſuch neceſſary remedies as the ſurgeon ought never to be without, but always to carry in a convenient caſe or box about him. Theſe are the common digeſtive ointment, and the brown or Ægyptian ointment, for cleanſing and digeſting foul ulcers; and ſome vulnerary balſams, as the *linimentum Arcæi*, or the balſam of Peru, of Gilead, or Capivi, or the Samaritan balſam: to theſe muſt alſo be added a plaiſter or two, as the diachylon, or ſtypticum Crollii; ſince one or other of theſe is almoſt conſtantly wanted. Neither ſhould there be wanting a piece of blue vitriol for the taking down luxuriant fleſh, and to ſtop hæmorrhages; but if vitriol is wanting, burnt alum, red precipitate, the infernal ſtone, or any other corroſive *medicine*, will ſupply its place in corroſive intentions, and the laſt will alſo ſerve to open abſceſſes, to make iſſues, and perform many other operations of that kind. With theſe there ſhould always be kept in readineſs a quantity of ſcraped lint, that the ſurgeon may be able to give immediate aſſiſtance to wounded perſons, ſince, if he is unprepared for this, they may be eaſily taken off by an hæmorrhage, a circumſtance which ought alſo to prevail with the ſurgeon never to be wholly unprovided with bandages. Heiſter's Surg. p. 11.

MEDICINES, *mechanical operation of*. To account for the operations of *medicines* mechanically, ſeems to have been the favourite ſcheme of phyſicians and phyſiologers of the laſt and preſent century. Stahl, and his diſciples, reject theſe accounts, and think them ſufficiently refuted by the operation of opium, and of aſtringents. One grain of opium, properly taken, will for a time aſſuage pains all over the body. A very few grains of crocus martis aſtringens ſometimes ſtop an hæmoptyſis, before they can be ſuppoſed to have entered into the humours of the body. Is it not paſt all belief, ſay they, that ſo few grains, mixed with ſo many pounds of fluids, ſhould retain any mechanical force, eſpecially as it is well known that aſtringents loſe their force by dilution? They farther urge, that the various effects of the ſame *medicine*, are a refutation of the mechanical hypotheſis; thus emetics ſometimes purge, and *vice verſa*; aſtringents increaſe hæmorrhages; opium excites alacrity in ſome, inſtead of ſtupefying. Again, the ſight, or even bare imagination of ſome *medicines*, will produce a ſenſible effect on the body, without any contact. Stahl, and his followers, therefore, hold, that *medicines* operate chiefly by exciting the vital ſenſe; and that this is the chief effect of *medicines*, even where they ſeem moſt to act mechanically.

Hoffman, Heiſter, and others, have attacked the hypotheſis of Stahl. We ſhall not pretend to give any farther account of the controverſy: perhaps in this, as in others, there may be a good deal of logomachy: ſtrictly ſpeaking, mechanical principles muſt be ſufficient to account for the operation of *medicines*, as this ſometimes undoubtedly depends (in the *primæ viæ* at leaſt) on chemical principles; and nobody has hitherto been able to account mechanically for the phenomena of chemiſtry. The laws of the *minima naturæ* have not hitherto been reduced to thoſe of the preſſure and impulſe of large ſenſible maſſes. And perhaps when the laws, that obtain in the minute parts of matter, have been found, we ſhall ſtill be at a loſs to account for all the phenomena of animated bodies, particularly the human.

Heiſter ſays, Stahl pretends that the rational ſoul and nature are ſynonymous terms: and that it is the rational ſoul which formed the fœtus in the womb, and which directs all vital, animal, and natural actions, to the preſervation of the body; hence ſometimes exciting evacuations, ſometimes ſpaſms, to get rid of diſorders.—Heiſter Diſſert. de Medecin. Mechan. præſtantia in Compend. Medicin. Practic. where he endeavours to refute the Stahlians.

Juncker, who wrote according to Stahl's principles, does not deny that there is ſomething mechanical in the operation of *medicines* independently of the will or ſpontaneity of nature; but he aſſerts that their chief operation is owing to nature, which makes uſe of the remedy to attain its end. His words are, *Operationem medicomentorum ab ipſa natura gubernari innumeræ confirmant obſervationes. Licet enim non negamus, ſubeſſe interdum actioni eorum aliquid mechanici a naturæ arbitrio non pendentis, tanti tamen hoc non eſt habendum, ut operandi modus illi maxime adſcribi mereatur. A potiori enim ſit denominatio, & natura utitur remedio ad finem ſuum.* Juncker, Conſpect. Therap. p. 1, 2.

A late author obſerves, as to *medicines*, that let what diſeaſe ſoever be named, and any *medicine* as univerſally uſeful in it, yet he can ſhew circumſtances of patients, or of the diſeaſe, where that *medicine* would be very improper. He mentions ſeveral inſtances of this kind. See Medic. Eſſ. Edinb. vol. i. p. 267, ſeq.

A general idea of the manner wherein *medicines* operate on a human body, as explained by the ſect of mechanical phyſicians, may be conceived from what follows.

A few different ſorts of particles, variouſly combined, will produce a great variety of fluids; ſome may have one ſort, ſome two, ſome three, or more. If we ſuppoſe only five different ſorts of particles in the blood, and call them *a*, *b*, *c*, *d*, *e*, their ſeveral combinations, without varying the proportions in which they are mixed, will be theſe following; but whether more or leſs, need not be determined:

ab : *ac* : *ad* : *ae* :
bc : *bd* : *be* : *cd* :
ce : *de* : *abc* : *adc* :
abd : *abe* : *ace* : *ade* :
bdc : *bde* : *bec* : *dec* :
abcd : *abce* : *acde* : *abde* : *bcde* : *abcde*.

No theory of ſecretion has hitherto been able to give any tolerable account of the operation of ſuch *medicines* as promote an evacuation. For if the humours be equally mixed with the blood, that is, if the blood be in every part of the body the ſame, and its particles be not more apt to form certain humours in ſome certain parts of the body than others; or if they be not forced, by the power of ſome *medicine*, to form ſuch humours; then the quantities of humour, ſeparated in equal times, will always be as the velocity of the blood; but the velocity of the blood is ſeldom doubled by any *medicine*, and never tripled by the moſt acute fever. The quantity of the humour, however, drawn off by evacuating *medicines*, is often twenty times greater than the natural quantity; and therefore, upon ſuppoſition that the humours are everywhere equally mixed with the blood, the operation of evacuating *medicines* can never be accounted for.

Though this argument has the ſtrength of a demonſtration, yet there are ſome who explain the operation of purgative, and other evacuating *medicines*, by a ſtimulating faculty; whereby the ſluggiſh juices are not only forced out, but the obſtructed canals opened, and the motion of the blood quickened. But though ſuch a power be allowed, it would remain to be explained, why certain *medicines* do only ſtimulate certain glands? For it is evident, 1. That evacuating *medicines* have ſome other power, beſides the ſqueezing out ſtagnant juices; becauſe, when they are all ſqueezed out, they ſtill evacuate as much, if they be repeated, as they did before: as is plain, by continuing a ſalivation for many days. 2. We cannot ſuppoſe, that all bodies have every where, and at all times, juices ſtagnating; but theſe *medicines* conſtantly produce their effects, more or leſs, at all times. 3. If the veſſels be ſuppoſed to be obſtructed, an evacuating *medicine* could but double the quantity that was evacuated, before it was taken. 4. If theſe *medicines* operate only theſe ways, then in a healthful body, where there were no obſtructions, they would have no effect at all. 5. If the removing obſtructions were the cauſe of a greater quantity evacuated, then the evacuation ſhould ſtill continue in a greater degree than before the obſtruction was removed; whereas in fact, we conſtantly find it leſs, as the *medicine* works off. 6. Though a *medicine*, by ſtimulating a veſſel, may quicken the motion of the fluid in that veſſel; yet it can never increaſe the quantity of fluid running through it, in equal ſpaces of time: becauſe it quickens the motion of the fluid only by contracting the veſſel; and therefore the faſter the fluid is made to run through the veſſel, the leſs fluid does the orifice of the veſſel admit; and conſequently, after the veſſel is contracted by the ſtimulating *medicine*, the ſecretion will be leſs, inſtead of being greater.

That a ſtimulus cauſes the part on which it acts to contract, is matter of fact; and alſo that purgative *medicines* do ſtimulate the bowels; but it may perhaps be likewiſe ſaid, they ſtimulate the heart and arteries, and increaſe their force, becauſe they not only quicken, but raiſe the pulſe; ſo that a greater quantity of blood is ſent to the glands of the guts. This may be granted; but not that it is the principal action of purgative *medicines*; becauſe that, by the ſame force, a greater quantity of blood is ſent to all the other glands of the body, whoſe fluids are not, however, ſenſibly increaſed; and the glands of the inteſtines receive a leſs quantity, in proportion, than any others, becauſe they cannot be ſo much dilated by the greater force of the blood, as others, which are not ſo much ſtimulated by the *medicine*.

There are others, who will have evacuting *medicines* endued with an attenuating quality, by which they diſſolve all the coheſions of the particles of the blood, and ſo ſet the ſeveral humours at liberty, to paſs through their proper glands; but if theſe *medicines* have a power univerſally to diſſolve all the coheſions of the blood, then every evacuating *medicine* would equally and indifferently increaſe the quantity of every ſecretion. Mercury would as conſtantly purge as ſalivate, and nitre promote perſpiration as well as urine; but this is repugnant to experience. If they have a power to diſſolve certain coheſions, and not others, this is but ſetting certain particles at liberty to paſs through their proper glands, which were not ſo before; and is a preparing the humours, in order to increaſe the quantity of ſecretion. Evacuating *medicines* muſt therefore have a power to affect ſome particles and not others; that is, to repel ſome, and attract, retain, and alter others; and this is what may be affirmed to be in all *medicines*, and is what a thouſand chemical experiments demonſtrate.

The ſeveral humours then being formed, by the different coheſion of the particles of blood, the quantity of a humour ſecreted by any gland muſt be in a proportion compounded of the proportion that the number of the particles cohering in ſuch a manner as is proper to conſtitute the humour which paſſes through the gland, bears to the maſs of blood; and of the proportion of the quantity of blood that arrives at the gland. And hence it follows, that where there is a determinate quantity of a certain humour to be ſeparated, the number of particles that are proper to compoſe the ſecreted liquor, muſt be reciprocally proportional to the quantity of the blood that arrives at the gland; and therefore, if the quantity of the ſecretion is to be increaſed, the number of particles muſt be increaſed; if the ſecretion is to be leſſened, the number of particles, proper for ſuch a ſecretion, muſt be leſſened in the ſame proportion.

Medicines, therefore, which can alter the coheſions and combinations of the particles, may either increaſe or diminiſh the quantity of any ſecretion. Thus, ſuppoſe the humour, which paſſes through the glands of the inteſtines, to be compoſed of three or four ſeveral ſorts of particles; that *medicine*, which will eaſily cohere to thoſe particles, and, by cohering, increaſe their mutual attractions, ſo as they may unite in greater numbers at, or before they arrive at the inteſtines, than they would have done, if the *medicine* had not been given, muſt neceſſarily increaſe the quantity of humour which paſſes through the glands of the inteſtines; if the quantity of blood which arrives at the glands, be not diminiſhed in the ſame proportion, as the number of particles is increaſed. After the ſame manner do diuretics, ſudorifics, and *medicines* which promote all other ſecretions, operate.

Why increaſing the quantity of ſome ſecretions ſhould diminiſh that of others, is not eaſy to explain on any other principle; for if the blood be equally mixed, in every part of the body, with all the humours which are ſeparated from it; that is, if the mixture of the blood be every where alike, ſo that every humour bears the ſame proportion to the reſt of the arterial blood in one part of the body that it does in another; and if every humour has its own proper gland through which it is ſeparated; then what is ſeparated by one gland is not ſubtracted from another, and conſequently does not diminiſh the quantity of humour which flows to this other, but does indeed rather increaſe the quantity of this other ſecretion: for the more any one humour is carried off, the greater proportion any other remaining in the blood, bears to the remaining blood; and therefore the more any one ſecretion is increaſed, the more all the reſt ſhould be increaſed likewiſe.

But if all the humours be compoſed by a combination of a few different ſorts of particles, then the more apt theſe particles are to run into any one ſort of combination, the leſs all other combinations muſt be ſo; and conſequently the increaſing any one ſecretion muſt neceſſarily diminiſh the quantity of all others; but more eſpecially of that which has the moſt of the ſame ſort of particles. See SECRETION, HUMOUR, &c.

MEDICINES, *capital*. See CAPITAL.

MEDICINES, *chalaſtic*. See CHALASTIC.

MEDICINES, *hypochondriacal*. See HYPOCHONDRIACAL.

MEDICINES, *hyſteric*. See HYSTERIC.

MEDICINE-*cheſt*, is a portable cheſt, containing all ſorts of *medicines* neceſſary for a campaign or voyage, together with ſuch inſtruments as are moſt neceſſary and uſeful for the purpoſes of ſurgery.

MEDIETAS *linguæ*, an inqueſt impanelled, whereof the one half conſiſt of natives or denizens, the other of aliens.

It is uſed in pleas, wherein the one party is a ſtranger, and the other a denizen. Solomon de Stanford a Jew, in the time of Edward I. had a cauſe tried before the ſheriff of Norwich, by a jury of *ſex probos & legales homines, & ſex legales Judæos de civitate Norvici*. See JURY.

MEDIMNUM, Μεδιμνον, among the Greeks, a meaſure of capacity, holding ſix Roman *modii* or buſhels.

MEDINE, an Egyptian piece of money, of iron ſilvered over, and about the ſize of a ſilver three-pence.

MEDINUS, a name given by ſome to the MEDUS, a ſtone celebrated by the writers of the middle ages for many imaginary virtues.

MEDITATION, an act by which we conſider any thing cloſely, or wherein the ſoul is employed in the ſearch or conſideration of any truth.

In our religion, it is uſed to ſignify a conſideration of the objects and grand truth of the Chriſtian faith.

Myſtic divines make a great difference between *meditation* and *contemplation*: the former conſiſts in diſcurſive acts of the ſoul, conſidering methodically, and with attention, the myſteries of faith, and the precepts of morality; and is performed by reflections and reaſonings, which leave behind them manifeſt impreſſions on the brain. The pure contemplative have no need of *meditation*, as ſeeing all things in God at a glance, and without any reflection.

When a man, therefore, has once quitted *meditation* and is arrived at contemplation, he returns no more; and according to Alvarez, never reſumes the oar of *meditation*, except when the wind of contemplation is too weak to fill his ſails.

MEDITERRANEAN, ſomething incloſed within land; or that is remote from the ocean.

MEDITERRANEAN is more particularly uſed to ſignify that large ſea which flows between the continents of Europe and Africa, entering by the ſtreights of Gibralter, and reaching into Aſia, as far as the Euxine Sea, and the Palus Mæotis.

The *Mediterranean* was anciently called the Grecian Sea, and the Great Sea. It is now cantoned out into ſeveral diviſions, which bear ſeveral names. To the weſt of Italy it is called the Liguſtic or Tuſcan Sea; near Venice, the Adriatic; towards Greece, the Ionic and Ægean; between the Helleſpont and the Boſphorus, the White Sea, as being very ſafe; and beyond, the Black Sea, its navigation being dangerous.

The Britiſh trade carried on by means of the *Mediterranean* Sea, is of the laſt conſequence to Great Britain; and the permanent preſervation thereof depends on the poſſeſſion of the town and fortifications of Gibraltar.

The counterfeiting of *Mediterranean* paſſes for ſhips to the coaſt of Barbary, &c. or the ſeal of the admiralty office to ſuch paſſes, is felony, without benefit of clergy. Stat. 4 Geo. II. cap. 18.

MEDITRINALIA, among the Romans, feaſts inſtituted in honour of the goddeſs *Meditrina*, and celebrated on the thirtieth of September. They were ſo called from *medendo*, becauſe the Romans then began to drink new wine, which they mixed with old, and that ſerved them inſtead of phyſic.

MEDITULLIUM is uſed by anatomiſts for that ſpongy ſubſtance between the two plates of the cranium, and in the interſtices of all laminated bones.

MEDIUM, a Latin term, ſignifying *middle*, or MEAN.

MEDIUM in *Logic*, or *medium of a ſyllogiſm*, called alſo the *mean*, or *middle term*, by the Italians *mezzo termino*, is an argument, reaſon, or conſideration, for which we affirm, or deny any thing: or, it is the cauſe why the greater extreme is attributed to, or denied of the leſs, in the concluſion.

Thus, in the ſyllogiſm, "Every good thing is to be deſired: but all virtue is good; therefore all virtue is to be deſired:" the term *good* is the *medium*; *virtue* the leſs extreme, and *to be deſired* the greater.

It is called *medium*, as being a kind of mediator between the ſubject and predicate; or becauſe the extremes are ſo diſpoſed as to affirm, or deny, by means hereof. Some call it *argumentum tertium*, a third argument; and others ſimply *argumentum*, as being the cauſe why we aſſent to the concluſion.

Mediums, or *middle terms*, are the things principally ſought for, in diſcourſing; ſo that the invention of *mediums* makes the moſt eſſential part of logic. But the rules commonly given by logicians for that purpoſe, are mere impertinencies In effect, no ſuch rules can be given; nor have we any way of coming at ſuch *mediums* or reaſons, but by a cloſe attention to clear ideas.

MEDIUM, in *Arithmetic*, or an *arithmetical medium* or *mean*, called in the ſchools *medium rei*, is that which is equally diſtant from each extreme; or which exceeds the leſſer extreme, as much as it is exceeded by the greater, in reſpect of quantity, not of proportion.

Thus, nine is a *medium* between ſix and twelve.

MEDIUM, *geometrical*, or *mean*, called in the ſchools *medium perſonæ*, is that where the ſame ratio is preſerved between the firſt and ſecond, as between the ſecond and third terms; or that which exceeds in the ſame ratio, or quota of itſelf, as it is exceeded.

Thus, ſix is a geometrical *medium* between four and nine. See *Geometrical* PROPORTION.

This is a *medium* which virtue is ſuppoſed to obſerve; whence ſome call it *medium quoad nos*, as having a view to circumſtances, times, places, perſons, &c. Diſtributive juſtice obſerves a geometrical *medium*; commutative juſtice, an arithmetical one.

MEDIUM *participationis*, in the *Schools*, is that ſaid to be compounded of the two extremes. Thus, man, who is partly body, partly mind, is a *medium* by participation of the two extremes; ſo is warmth the *medium* of heat and cold, &c.

MEDIUM *negationis*, or *remotionis*, is that from which both extremes are derived; or it is a ſubject capable of receiving both extremes, and yet not neceſſarily poſſeſſed of either.

In which latter ſenſe, the will is a *mean* with reſpect to virtue and vice; and the underſtanding, with reſpect to knowledge and ignorance.

MEDIUM *quod*, or *medium ſuppoſiti*, is ſomewhat between the agent and patient, which receives the action of the one, before it arrive at the other.

In this ſenſe, air is a *medium* between the fire and the hand heated thereby.

MEDIUM *quo*, is the form, or faculty, whereby an agent produces an effect: in which ſenſe, heat is ſaid to be the *medium* or *mean* whereby fire acts on the hand.

MEDIUM *ſub quo*, is that which orders the power to act complete in general, without determining it to any particular object: in which ſenſe, light is the *medium* under which the eye perceives any colour.

MEDIUM *in quo*, is that, by inſpection whereof a power is produced in any thing, of knowing or perceiving another: ſuch is a ſpeculum, as it ſhews an object; an image, as it repreſents the reality, &c.

MEDIUM, in *Mechanical Philoſophy*, is that ſpace or region through which a body paſſes in its motion towards any point.

Thus ether is ſuppoſed to be the *medium* wherein the heavenly bodies move. Air the *medium* wherein bodies move near our earth. And water is the *medium* in which fiſhes live and move. And glaſs is alſo a *medium* of light, as it affords a free paſſage.

That denſity or conſiſtence in the parts of the *medium*, whereby the motion of bodies in it is retarded, is called *the reſiſtance of the medium*; which, together with the force of gravity, is the cauſe of the ceſſation of the motion of projectiles.

MEDIUM, *ſubtile*, or *ætherial*. Sir Iſaac Newton makes it probable, that, beſides the particular aerial *medium*, wherein we live and breathe, there is another more univerſal one, which he calls an *ætherial medium*; vaſtly more rare, ſubtile, elaſtic, and active, than air; and by that means freely permeating the pores and interſtices of all other *mediums*, and diffuſing itſelf through the whole creation; and by the intervention hereof he thinks it is, that moſt of the great phenomena of nature are effected. See ÆTHER.

This *medium* he ſeems to have recourſe to, as the firſt and moſt remote phyſical ſpring; and the ultimate of all natural cauſes. By the vibrations of this *medium*, he takes heat to be propagated from lucid bodies; and the intenſeneſs of heat increaſed and preſerved in hot bodies, and from them communicated to cold ones.

By this *medium* he takes light to be reflected, inflected, refracted, and put alternately in fits of eaſy reflection and tranſmiſſion; which effects he alſo elſewhere aſcribes to the power of attraction; ſo that this *medium* appears the cauſe and ſource even of attraction.

Again, this *medium* being much rarer within the heavenly bodies, than in the heavenly ſpaces, and growing denſer, as it recedes farther from them, he ſuppoſes the cauſe of the gravitation of theſe bodies towards each other, and of the parts towards the bodies.

Again, from the vibrations of this ſame *medium*, excited in the bottom of the eye by the rays of light, and thence propagated through the capillaments of the optic nerves into the ſenſory, he takes viſion to be performed; and ſo hearing, from the vibrations of this or ſome other *medium*, excited in the auditory nerves by the tremors of the air, and propagated through the capillaments of thoſe nerves into the ſenſory; and thus of the other ſenſes.

And again, he conceives muſcular motion to be performed by the vibrations of the ſame *medium*, excited in the brain at the command of the will, and thence propagated through the capillaments of the nerves into the muſcles; and thus contracting and dilating them.

The elaſtic force of this *medium*, he ſhews, muſt be prodigious. Light moves at the rate of conſiderably more than 70,000,000 miles in about ſeven minutes; yet the vibrations and pulſes of this *medium*, to cauſe the fits of eaſy reflection, and eaſy tranſmiſſion, muſt be ſwifter than light, which is yet 700,000 times ſwifter than ſound. The elaſtic force of this *medium*, therefore, in proportion to its denſity, muſt be above 490,000,000,000 times greater than the elaſtic force of the air, in proportion to its denſity; the velocities and pulſes of the elaſtic *mediums* being in a ſubduplicate ratio of the elaſticities and the rarities of the *mediums*, taken together. And thus may the vibration of this *medium* be conceived as the cauſe alſo of the elaſticity of bodies.

Farther, the particles of this *medium* being ſuppoſed infinitely ſmall, even ſmaller than thoſe of light; if they be likewiſe ſuppoſed, like our air, to have a repelling power, whereby they recede from each other, the ſmallneſs of the particles may exceedingly contribute to the increaſe of the repelling power, and conſequently to that of the elaſticity and rarity of the *medium*, and ſo fit it for the free tranſmiſſion of light, and the free motions of the heavenly bodies. In this *medium* may the planets and comets roll without any conſiderable reſiſtance. If it be 700,000 times more elaſtic, and as many times rarer, than air, its reſiſtance will be above 600,000 000 times leſs than that of water; a reſiſtance that would make no ſenſible alteration in the motion of the planets in ten thouſand years.

And is not ſuch a *medium* better diſpoſed for the heavenly motions, than that of the Carteſians, which fills all ſpace adequately, and without leaving pores, and is vaſtly denſer than gold, and therefore muſt reſiſt more?

If any aſk how a *medium* can be ſo rare? let him tell how the air, in the upper regions of the atmoſphere, can be above a hundred thouſand times rarer than gold; how an electrical body can, by friction, emit an exhalation ſo rare and ſubtile, yet ſo potent, as though its emiſſion occaſions no ſenſible alteration in the weight of the body, yet it ſhall be diffuſed through a ſphere of two feet in diameter, and carry up leaf copper, or leaf-gold, at the diſtance of a foot from the electrical body; or how the effluvia of a magnet can be ſo ſubtile, as to paſs a plate of glaſs without any reſiſtance or diminution of force; yet ſo potent, as to turn a magnetic needle beyond the glaſs.

That the heavens are not filled with any other, but ſuch a ſubtile ætherial *medium*, is evident from phenomena: whence elſe are thoſe laſting and regular motions of the planets and comets, in all manner of courſes and directions; and how are ſuch motions conſiſtent with that reſiſtance which muſt reſult from that denſe fluid *medium*, wherewith the Carteſians fill the heavens?

The reſiſtance of fluid *mediums* ariſes partly from the coheſion of the parts of the *medium*, and partly from the vis inertiæ of matter. The firſt, in a ſpherical body, is nearly as the diameter, or, at moſt, as the factum of the diameter, and the velocity of the body. The latter is as the ſquare of that factum. Thus are the two kinds of reſiſtance diſtinguiſhed in any *medium*; and, being diſtinguiſhed, it will be found, that almoſt all the reſiſtance of bodies, moving in ordinary fluids, ariſes from the vis inertiæ. The part which ariſes from the tenacity of the *medium*, may be diminiſhed, by dividing the matter into ſmaller parts, and making thoſe more ſmooth and ſlippery; but the other will ſtill be proportional to the denſity of the matter, and cannot be diminiſhed any other way, but by a diminution of the ſame.

Thus the reſiſtance of fluid *mediums* is nearly proportional to their denſities; and thus the air we breathe, being about nine hundred times lighter than water, muſt reſiſt about nine hundred times leſs than water: as, in effect, the ſame author has found it does by experiments on pendulums. Bodies moving in quickſilver, water, or air, do not appear to meet with any other reſiſtance but what ariſes from the denſity and tenacity of thoſe fluids; which they muſt, were their pores filled with a denſe and ſubtile fluid.

Heat, it is found, diminiſhes the tenacity of bodies very much; yet does it not decreaſe the reſiſtance of water, ſenſibly. The reſiſtance of water, therefore, ariſes chiefly from its vis inertiæ; conſequently, if the heavens were as denſe as water, or as quickſilver, they would not reſiſt much leſs: if abſolutely denſe, without any vacuum, be the particles never ſo ſubtile and fluid, they would reſiſt much more than quickſilver. A ſolid globe, in ſuch a *medium*, would loſe above half its motion, while it moves thrice the length of its own diameter; and a globe not perfectly ſolid, ſuch as the planets, would loſe more.

To make way therefore for the laſting motions of the planets and comets, the heavens muſt be empty of all matter, except, perhaps, ſome very fine effluvia, from the atmoſpheres of the earth, planets, and comets; and ſome ſuch ætherial *medium* as we have deſcribed. A denſe fluid can ſerve for no purpoſe, in the heavens, but to diſturb the celeſtial motions, and make the frame of nature languiſh; and in the pores of bodies, it can only ſerve to check the vibrating motion of their parts, wherein their heat and activity conſiſt. Such a *medium*, therefore, unleſs we had ſome evidence of its exiſtence, muſt be given up; and, that given up, the hypotheſis of light conſiſting in a preſſion falls alſo to the ground.

MEDIUM, in *Botany*, a name given by Dioſcorides to the violet, and by Lobel to the ſea-flag-flower, or *iris maritima Narbonenſis*.

MEDIUM *ſeptum*. See SEPTUM.

MEDIUS *venter*, in *Anatomy*, denotes the breaſt or THORAX.

MEDIUS, *Glutæus*. See GLUTÆUS.

MEDLAR, *meſpilus*, in *Botany*, a genus of the *icoſandria pentagynia* claſs. Its characters are theſe: the empalement of the flower is permanent, of one leaf, cut into five ſpreading concave ſegments; the flower is compoſed of five roundiſh, concave petals, which are inſerted in the empalement; the number of ſtamina is different in the different ſpecies, from ten to twenty or more, which are alſo inſerted in the empalement; the germen is ſituated under the flower, and ſupports an uncertain number of ſtyles, from three to five; it afterwards becomes a roundiſh oval berry, carrying the empalement on its top, and incloſing four or five hard ſeeds. Linnæus enumerates ſeven, and Miller twenty-two ſpecies.

We have two kinds of *medlar* propagated very frequently in orchards, for the ſake of their fruit; the one is the common *medlar*, or, as it is called by ſome, the Nottingham *medlar*; the other, the Dutch *medlar*. Miller makes theſe two varieties of the ſame ſpecies. The firſt of theſe was once almoſt the only kind known in England; but ſince the other has been introduced, it is found ſo much ſuperior in the ſize and flavour of the fruit, that it is now almoſt the only kind thought worth the cultivating. They are propagated by budding or grafting them upon the hawthorn, or the pear-ſtock, upon either of which they take very well, and may be afterwards tranſplanted into the fruit-garden, either as ſtandards, or trained up againſt an eſpalier, in both which methods they will ſucceed very well. If the larger ſort are trained up in an eſpalier, the fruit will be much larger; but great care muſt be taken in the pruning, not to ſhorten the bearing branches, for the fruit is almoſt all produced at the extremities of theſe. The *medlar* will grow on any ſoil; but on a moiſt and ſtrong ſoil the fruit will growlarger, and on a dry one it will, though ſmaller, be much better taſted. The fruit ſhould be ſuffered to remain on the branches till October, at which time it will begin to fall of itſelf, and it ſhould then be gathered in the middle of a dry day, and laid up in a dry place till ſoft, and beginning to decay, which is uſually about a month after it is gathered; at this time they are fit for eating; for, till they begin to decay, they are too harſh for the palate.

Medlars are cooling, drying, and binding, eſpecially before they are ripe; and are uſeful in all kinds of fluxes. The ripe fruit eaten too freely is ſubject to bind the ſtomach, and cauſe the colic. The lapilli, or hard ſeed, are accounted good for the gravel and ſtone: they are an ingredient in the *ſyrupus myrtinus*. Miller's Bot. Off.

MEDLAR, *parſley-leaved*. See SERVICE-*tree*.

MEDLEY. See CHANCE-*medley*.

MEDULLA *oſſium*, or *marrow of the bones*, is a ſoft fatty ſubſtance, placed in the cavities or pores of divers bones. See MARROW.

The *medulla* is incloſed in a membrane, and is devoid of ſenſe: it is red in the greater cavities, white in the leſs, and ſoft and ſucculent in ſpongy bodies.

From this is ſecreted the MEDULLARY *oil*.

MEDULLA *cerebri* and *cerebelli*, denotes the white ſoft part of the brain and cerebellum, covered on the outſide with the cortical ſubſtance, which is of a more dark or aſhy colour. See the origin, ſtructure, and uſe thereof, under BRAIN and CEREBELLUM.

MEDULLA *oblongata*, is the *medullary* part of the brain and cerebellum, joined in one; the fore-part of it coming from the brain, and the hind part from the cerebellum. See *Tab. Anat. (Oſteol.) fig.* 5. *lit. d. d.*

It lies on the baſis of the ſkull, and is continued through the great perforation thereof into the hollow of the vertebræ of the neck, back, and loins; though only ſo much of it retains the name *oblongata*, as is included within the ſkull. After its exit thence, it is diſtinguiſhed by the name of *medulla ſpinalis*.

The ſubſtance of the *medulla oblongata*, being only an aggregate of thoſe of the brain and cerebellum, muſt, like them, be purely fibrous or nervous, and only an aſſemblage of minute tubes for the conveyance of the animal ſpirits. It ariſes, as it were, from four roots; whereof the two largeſt ſpring from the brain, and are called *crura*: the two leſſer from the cerebellum, which Dr. Willis calls *pedunculi*.

Upon inverting it, the firſt thing that appears upon its trunk is a protuberance, ſomewhat like a ring, and for that reaſon called *protuberantia annularis*. Then follow ten pair of nerves, which have their origin here, and are hence ſent to the ſeveral parts of the body. Immediately under the firſt pair, or the olfactories, appear two ſmall arteries, or branches, of the carotides. The ſecond pair, or optics, being cut off, there appears the infundibulum, which ends in the glandula pituitaria, and, on each ſide, the carotid arteries enter the ſkull. In the lateral ventricles of the *medulla* are two prominences on each ſide, the one pair called *corpora ſtriata*, from the appearance of ſtripes, or nervous fibres, within them; their outer ſubſtance being cortical or glandulous, like the reſt of the ſurface of the brain, though not ſo deep. Betwixt the *corpora ſtriata* is a broad thin production of the *medulla*, called *fornix*; and underneath them lie two other prominences, called *thalami nervorum opticorum*. On either ſide of theſe is a plexus of blood-veſſels, called *plexus choroides*. And under the fornix a narrow aperture, called the *rima*, which lets into the infundibulum; which is a paſſage from the third ventricle to the glandula pituitaria, through the *medulla* of the brain; being lined with the pia mater. Under this, in the ſinus called *ſella equina*, or *turcica*, upon the os cribroſum, is the glandula pituitaria; which is ſurrounded with a plexus of veſſels, called *rete mirabile*, only viſible in brutes. On the hind part of the third ventricle is a ſmall foramen, called *anus*, leading to the fourth ventricle of the cerebellum: at the orifice of this is ſeated a ſmall gland, which, from its fancied reſemblance to a pine-apple, is called *conarium*, or *glandula pinealis*; where Des Cartes and his followers imagine the ſeat of the ſoul to be. On the backſide of the *medulla oblongata*, near the cerebellum, are four protuberances, whereof the upper and larger are called *nates*, the under and leſſer *teſtes*. Between theſe and the proceſſes of the cerebellum, is the fourth ventricle, from its figure called *calamus ſcriptorius*. On the *medulla oblongato*, near its extremity, are four other prominences, two on each ſide, called CORPORA *pyramidalia*, and OLIVARIA.

MEDULLA *ſpinalis*, or the *ſpinal marrow*, is a continuation of the *medulla oblongata*, or *medullary* part of the brain, without the ſkull.

It conſiſts, as the brain does, of two parts, a white or *medullary*, and a cineritious or glandulous one; the former without, and the other within. The ſubſtance of the exterior part is much the ſame with that of the corpus calloſum, only ſomewhat tougher, and more fibrous; which difference becomes the more apparent, as it deſcends the lower; on account of the ſtraightneſs of the cavity, which, growing gradually more narrow, preſſes the *medullary* fibres cloſer together, and renders them more compact, and gathers them into more diſtinct faſciculi, till, having deſcended the whole tract of the ſpina, they end in the cauda equina. It is the origin of moſt of the nerves of the trunk of the body: it ſends out thirty pair on each ſide of the limbs, the great cavities, and other parts; which are nothing but faſciculi of *medullary* fibres, covered with their proper membranes.

The *ſpinal marrow* is generally ſaid to be covered with four coats: the firſt, or external one, is a ſtrong nervous ligament, which ties the vertebræ together, to the inſide of which it firmly adheres. The ſecond is a production of the dura mater; it is exceedingly ſtrong, and ſerves to defend the *ſpinal marrow* from any hurt from the flexures of the vertebræ.

The third is a production of the arytænoides, and is a thin pellucid membrane, lying between the dura and pia mater, or the ſecond and fourth membranes of the *medulla*. This membrane gives a coat to the nerves that go out of the ſpina, which is the inner membrane of the nerves, as the dura mater gives the outer. The fourth coat is a continuation of the pia mater, and is an extremely thin, fine, tranſparent membrane, ſtrictly embracing the whole ſubſtance of the *medulla*, dividing it in the middle into two tracts, and making, as it were, two columns of it. See *Tab. Anat. (Oſteol.) fig.* 6.

In fiſh, the ſpinal marrow does not run through the middle of the vertebræ, as it does in other animals, but is carried through a whole ſeries of the apophyſes, which ſtand on the upper part of the bone, and are therefore called the *apophyſes dorſales*, to diſtinguiſh them from the others, which their ſituation occaſions to be called the lateral and ventral. All theſe dorſal apophyſes of the vertebræ are hollow at their baſe, and by that means afford a continued channel for this marrow. The baſes of the lower apophyſes, reaching from the anus to the tail, have alſo the ſame ſort of hollow at their baſe; but this ſerves only for the paſſage of the larger blood-veſſels.

Hydrops MEDULLÆ *Spinalis*. See SPINA *bifida*.

MEDULLARY *oil* is no more than the finer and more ſubtile parts of the *medulla*, or marrow of the bones. See MARROW and OIL.

This, Dr. Havers obſerves, paſſes not into the bones through ducts, but by ſmall pores formed into veſicles or glandules, which are conglomerated into diſtinct lobules, contained in ſeveral membranes inveſting the whole marrow; all which veſicles or bags are propagated from the outward coat of the arteries; and by theſe it paſſes from one to another, till it arrives at the ſides, or extreme parts of the bone. That part of it, which is ſupplied to the interſtices of the joints, goes into them by paſſages, penetrating through the bone into thoſe cavities, and formed for that end. The uſe of this oil is either common to all the bones, whoſe temper it preſerves, and keeps from being too brittle; or more peculiarly to the joints, where it is very ſerviceable: 1. To lubricate the bones at their extremities, that they may move more eaſily and free. 2. To keep the ends of the articulated bone from growing hot with motion. 3. To preſerve the joints from wearing by attrition, and rubbing one againſt another. And, 4. To preſerve the ligaments of the joints from dryneſs and rigidity, and to lubricate thoſe parts which ſlide upon the bones, and keep the cartilages, which are joined to them, flexible.

MEDUS, or **MEDINUS**, a name given by the writers of the middle ages to a ſtone brought from Media, of which they ſay there were two kinds, the one black, and the other green. They attribute many ſtrange virtues to theſe ſtones; the black they ſay was a fatal poiſon when taken inwardly, but that if wetted with milk, and rubbed upon the ſkin of a woman with child, it cauſed her to bring forth a boy. This, and a number of others as probable virtues, did theſe ignorant and fanciful writers beſtow at pleaſure on ſtones never known to the world before, and of which themſelves gave no deſcriptions. This ſeems to be only a falſe hiſtory of the *medea* of Pliny.

MEDUSA, in *Natural Hiſtory*, the name of a genus of inſects, of the order of GYMNARTHRIA.

The body of the *meduſa* is of an orbiculated convex figure, of a gelatinous ſubſtance, and not hairy; the tentacula, or the plicæ, which ſerve inſtead of them, are ſituated in the centre of the under part of the animal.

Authors have deſcribed them under the names *urticæ marinæ*, and *pulmones marini*. See URTICA *marina*.

Mr. Banks, in his paſſage from Madeira to Rio de Janeiro, diſcovered a new ſpecies of the *meduſa*, which, when brought aboard by the caſting net, had the appearance of metal violently heated, and emitted a white light. With theſe animals were taken ſmall crabs of three different ſpecies, altogether new, each of which gave as much light as the glow-worm, though the creature was not ſo large by nine-tenths. Theſe luminous animals gave that appearance to the SEA, which has been mentioned by many navigators, and of which various reaſons have been aſſigned. It appeared to emit flaſhes of light exactly reſembling thoſe of lightning, only not ſo conſiderable, but ſo frequent, that ſometimes eight or ten were viſible at the ſame moment.

MEDUSA's *head*, in *Botany*. See SPURGE.

MEDUSÆ *caput*, in *Natural Hiſtory*, a name given by authors to the *ſtella marina*, called by ſome from its various branchings, *ſtella aboreſcens*. Rumphius, Geſner, and many other authors, have deſcribed this ſtrange fiſh in its recent ſtate; and in the Acta Eruditorum, we have an accurate figure, and a very remarkable account of one which was found foſſil, and preſerved in a remarkably perfect manner in ſtone.

The ſtone in which it was found was of the fiſſile or ſlaty kind; and it was ſo large as to extend over a piece of this ſtone of four feet in length, and between three and four in breadth. The body of the fiſh, from which all the reſt ſeem originally to have ariſen, lay at one corner of this ſtone, and the arms extended themſelves lengthways in a very diſtinct and natural manner the whole length of the ſtone; and from theſe there parted, on every ſide, other ſmaller ones, and theſe were finally divided into others more minute, in ſuch a manner as to repreſent the niceſt painting. Act. Erudit. ann. 1725. p. 377.

The ſtudy of foſſils is more improved by this ſingle ſpecimen than by thouſands of others, and by the reaſonings of almoſt as many authors. The foſſils called *entrochi*, have always perplexed the writers on theſe ſubjects to account for; ſome having judged them a ſort of ſtony vegetables; ſome a *luſus naturæ*; and others, as different things; but in this table the whole fiſh is ſo perfectly preſerved, that there can remain not the leaſt doubt of its being really the *ſtella arboreſcens*; and in this both the figure and author's words expreſs, in the plaineſt manner poſſible, that the long arms or branches reaching from one end to the other of the ſtone are compoſed of a number of *entrochi* as it were, tied together in the ſame manner as the ſingle joints of thoſe *entrochi*, which we meet with, are to one another: or, in plain fact, that our *entrochi*, which have perplexed us ſo much to account for their origin, are in reality the fragments of the arms or branches of this fiſh. Theſe branches in this famous ſpecimen, were compoſed of what we call *trochitæ*, and had many rudiments of ſmaller branches, as well as perfect ones, growing from their ſides, and would have been ſo many common *entrochi*, if broken off.

What was moſt remarkable in this foſſile was, however, the ſeparating of ſmaller branches which ran entire to their ends, and there terminating in an infinite number of ſmall ramifications, all growing from one head, they formed cluſters of four or five inches in diameter, and of an inconceivable beauty, reſembling the compound flower of ſome elegant plant. The matter of the large branches when examined, appeared to be the ſame with that of the common *entrochi*, that is, ſpar. The author calls it *ſelenites*, but that was a word indeterminately uſed by authors, till of late, for all plated and bright foſſils.

It is plain that this complete fiſh could have no way come into this ſtone but at the time when it was yet moiſt and ſoft: and the author calls it *novum diluvii monumentum*, *a new remembrancer of the deluge*.

MEDUSÆ *caput*, or MEDUSA's *head*, in *Ancient Mythology*, occurs frequently both on the breaſt-plates and ſhield of MINERVA; in ſome of which it is the moſt beautiful, and in others the moſt ſhocking object. In ſome figures the face is repreſented as dead, but with the moſt perfect features that can be conceived; in others, her face is full of paſſion, and her eyes convulſed; and in many others, the look is altogether frightful, and formed on purpoſe to inſpire terror. The beauties and horrors of *Meduſa's* face are mentioned by the Roman poets. Ov. Met. iv. ver. 793. Lucan, lib. ix. ver. 680. Virg. Æn. viii. ver. 438. Spence's Polymetis, p. 61.

MEEKNESS, in *Ethics*, is a virtue which conſiſts in bearing affronts, reproaches and injuries, with a due compoſure of mind. Its oppoſite vice is *revenge*.

MEER, in *Mining*, a ſpace containing twenty-nine yards in length in any vein.

MEER-*ſtake*, in *Mining*, is a pin of wood drove into the ſuperficies of the earth, to ſhew the extent or end of a *meer* of ground.

MEER-*ſwiin*, in *Ichthyology*, a name given by ſome to a ſea-fiſh, more uſually known by the name of *capriſcus*. See GOAT-*fiſh*.

MEETER. See METRE.

MEGADOMESTICUS. See DOMESTIC.

MEGÆRA, in *Mythology*, one of the three FURIES. She is repreſented with ſerpents on her head, and two diſtinguiſhed ones over her forehead, as her ſiſters have, and, like them, with torches. She is not mentioned ſo frequently by the Roman poets as the others are. Virgil gives us a deſcriptive picture of her, where he is ſpeaking of the puniſhment of the Lapithæ; who were ſaid to be always placed round a table very richly and plentifully ſet out, with a looſe piece of rock hanging over their heads, as juſt ready to fall; and this fury attending cloſe by, to watch and menace them, the moment they endeavoured to taſte any one of the tempting things ſet before them. Æn. vi. ver. 607.

MEGALARTIA, Μεγαλαρτια, in *Antiquity*, a feſtival in honour of Ceres, being the ſame with THESMOPHORIA.

MEGALASCLEPIA, Μεγαλασκληϖεια, in *Antiquity*, a feſtival in honour of Eſculapius. See ASCLEPIA.

MEGALENSIA, or MEGALESIA, in *Antiquity*, ſolemn feaſts celebrated among the Romans on the twelfth of April, in honour of the great mother of the gods, that is, Cybele or Rhea: wherein were ſports or combats held before the temple of that goddeſs.

They were called *megalenſia*, from the Greek μεγαλη, *great*; Cybele being accounted the great goddeſs.

MEGAMETER. See MICROMETER.

MEI *miſerere*. See MISERERE.

MEIDANS, in the *Eaſtern Nations*, are a ſort of country-ſeats, where the greater people have often ſummer-houſes, to which they retire on the three days of the week in which they do not attend the paſha's divan, and where they divert themſelves with ſeeing their ſlaves ride, ſhoot, and throw the dart, while they are regaling with their pipe and coffee.

MEINOR. See MAINOUR.

MEIOSIS, in *Rhetoric*, is a figure, which is a ſpecies of the HYPERBOLE.

MEL. See HONEY.

MEL *cedrinum*, in the *Materia Medica of the Ancients*, a term uſed to expreſs a ſort of liquid manna, uſed rather as a pleaſant ſweet in foods than as a medicine, and which ſeems to have been the ſame with the *mel roſcidum* of Galen, and with the liquid manna of mount Sinai; that mountain having been the place where it was annually collected in large quantities, even in Galen's time; and the account Bellonius gives of the manner of collecting it in his time, agreeing very well with what Galen has left about it. It is, however, an error in Bellonius, to ſuppoſe this to be the *terenjabin* of the Arabians, that being evidently a ſolid, not a liquid ſubſtance, and being from all accounts the ſame with what is now called MANNA *Perſicum*, or Perſian manna.

The *mel cedrinum* is a term uſed only by Hippocrates for this ſubſtance, and ſeems ſo odd, that many are apt to believe there is an error of the text, and that the author never meant any ſuch thing. Foeſius is of opinion, that theſe ought to be read as two diſtinct names, with a comma between them, and that the author only meant by them two ſubſtances very well known in his time, which were common honey, and the liquid ſubſtance called *cedrinum*, or CEDRIA.

MEL *roſcidum*, in the *Materia Medica of the Ancients*, a name given to a kind of liquid manna collected in their time, as it is at preſent, in conſiderable quantities, on mount Sinai. The monks who collect it call it *terenjabin*, after the name of a kind of manna, common among the Arabians. But this is an error, the terenjabin of thoſe authors not being a liquid manna, but the ſmall round kind, collected from the *alhagi maurorum*, and now called *manna Perſicum*. It does not appear that the *mel roſcidum*, or any other ſpecies of manna, was uſed in medicine by the ancients; this was eſteemed a curioſity, rather than a thing of any uſe, by Galen; and other authors ſay, it was ſweeter than honey itſelf, with no farther account; whence it ſeems rather to have been uſed as a delicacy than as a medicine. See TERENJABIN, and MANNA *Perſicum*.

MELA, a ſurgeon's inſtrument, called alſo SPECULUM, and by the vulgar a PROBE.

Its uſe is to probe ulcers, or draw a ſtone out of the penis: its form is various, according to the uſe it is intended for.

MELALEUCA, in *Botany*, a genus of the *polyadelphia polyandria* claſs; the characters of which are, that the empalement is divided into five ſegments; the flower has five petals, and many filaments joined together in five bodies; the ſtyle is ſingle, and the fruit is a three-valved capſule containing three cells, and half covered with a berried empalement. There is only one ſpecies.

MELAMPODIUM, in *Botany*, a genus of the *ſyngeneſia polygamia neceſſaria* claſs: its characters are, that the receptacle is chaffy and conical; the down is ſingle-leaved and concave, and the empalement is compoſed of five leaves. There are two ſpecies.

MELAMPYRUM. See *Cow*-WHEAT.

MELAN *pharmacon*, a word uſed by Hippocrates, and by ſome ſuppoſed to mean common writing ink. He orders this to be poured upon the cranium, in caſe of a fiſſure, in order to diſcover how far it has penetrated. Galen ſeems to refer to this, in ſome places, and mentions his having treated of it in his book of ulcers; but as no ſuch medicine is found preſcribed here, it is probably one of the loſt compoſitions of the ancients. In the ſpurious edition of Hippocrates his book treating on the diſeaſes of women, there is a black medicine ordered to be made of the ſquamæ and flos æris.

MELANAETOS, in *Ornithology*. See *Black* EAGLE.

MELANCHOLY, formed from μελας, *black*, and χολε, *bile*, in *Medicine*, a low kind of delirium, without a fever; uſually attended with fear, heavineſs and ſorrow, without an apparent occaſion. Or, as ſome define it, a diſeaſe which conſiſts in the perturbation or injury of the imagination, which prevents it from forming a regular and determinate idea of things, as at other times; ſo that its due operations are interrupted, and often ſecond ideas, having no connection with the firſt, crowd in, and are ſucceeded by actions no way analogous to that firſt idea, and therefore appearing irrational.

The ancients attributed this diſeaſe to black and cloudy ſpirits, ariſing as vapours from a redundant atrabilary humour.

Some of the moderns aſcribe it to the irregular motion of the ſpirits, and their acid conſtitution; and others, who ſeem to know it better, to too heavy and viſcid a blood, which permits not a ſufficiency of ſpirits to be ſeparated in the brain, to animate and invigorate the nerves and muſcles: laſtly, others attribute it to a dryneſs of the meninges of the brain.

Some enumerate two ſpecies of *melancholy*; the erratic, and the apoplectic.

The erratic *melancholy* is that ſpecies of the diſorder, which moſt generally ſeizes patients in the month of February. It is ſo called, becauſe thoſe who labour under it cannot remain for an hour in one place, but continually wander about, without knowing where they go. It is by the Arabians called *kutubuth*, from an animal, which, as they inform us, perpetually moves up and down on the ſurface of ſtagnant waters.

The oppoſite of this erratic *melancholy* is the apoplectic *melancholy*; for as in the former the patients are reſtleſs, and wander about from one place to another, ſo in the latter every circumſtance is reverſed; for the patients appear ſtupid, and, being apparently deſtitute of a locomotive faculty, ſeem to be fixed to a particular place.

Authors diſtinguiſh *melancholy* into three kinds; the ſad, the merry, and the mixt, partaking of the nature of both; but in all theſe the cauſe is the ſame, and the difference is only owing to the temperament and habit of the patient.

This diſtemper has, however, its more eſſential differences, on account of the cauſes from which it is produced. In ſome people, it ſeems wholly to depend upon a falſe prefiguration and judgment of things in the mind; and in this caſe it is uſually habitual and incurable. In others it ariſes from injuries of the body; and in theſe it always is obſerved to bear a proportion to the injury or debility of the parts. This peculiar ſpecies is called hypochondriac *melancholy*: and finally, in others, it ſeems of a mixt nature; as when it has taken its firſt origin from diſtemperatures in the body, but is afterwards ſo increaſed by mental diſorders, that even after the total removal of the corporeal ones, it ſtill remains in all its force upon the mind. This is a too common, and very unhappy caſe.

This diſeaſe is varied an infinite number of ways according to the temperament and ideas of the perſon affected with it. It is a ſpecies of madneſs, and only differs from a downright mania in degree.

Signs of it. Theſe are a perpetual anxiety of mind, without any rational cauſe; a diſtaſte and diſlike to every thing, even before it comes in ſight, and often a wearineſs even of life itſelf. A frequent weeping for imaginary cauſes, or for no cauſe at all. Many people, in this caſe, ſeem always to want room; they are for opening all the windows they can, and for running out into the ſtreets or fields, thinking themſelves every where impriſoned; others leave their houſes, and dread being taken up for capital offences, though never guilty of any; and in others, theſe diſtemperatures of the mind are evidently joined with others of the body, ſuch as palpitations of the heart, ſighing very deeply, painful reſpiration, ſtrictures of the tonic motions of the parts, tremblings, paleneſs of the countenance, and extenuation of the body. Sometimes, inſtead of theſe reſtrictions, there are frequent remiſſions of the ſame tonic motions, whence ariſe ſudden fluſhings of the face, uncertain heats in the body, and a general laſſitude and loſs of ſtrength. In moſt caſes of this kind, there is an obſtinate coſtiveneſs of the bowels, and the affections of the mind are increaſed by terrible watchfulneſs; and if the perſons ſleep a little, they are terrified with troubleſome dreams all the while; if of ſanguine habits, they are continually dreaming of blood, of battles, and of fires; and if of phlegmatic conſtitutions, of water and drowning. Dreadful apprehenſions happen alſo between ſleeping and waking, and they uſually awake in agonies, with violent tremblings, and difficulty of reſpiration. In the merry *melancholy*, the alienations of the patient's mind are employed about chearful, and often obſcene ideas; and ſometimes their fancy exalts them to the ſtate of kings and princes.

Perſons ſubject to melancholy. Theſe are principally men of great learning, and of ſedentary lives, hypochondriac people, and ſuch as are troubled with diſorders of the ſpleen; and to theſe are to be added women ſubject to hyſteric complaints.

Cauſes of it. Theſe are principally a ſpiſſitude of the blood, and a detention of it about the vena portæ; a bad diſpoſition of the internal parts, as a ſcirrhous or ulcerous conſtitution in them, or an actually ulcerated ſtate. Perſons who are afflicted with *melancholy* from theſe cauſes, are uſually ſubject to very unruly paſſions, and thoſe of various kinds; love, fear, dejection of ſpirits, deſpair, and anger, are often very predominant in them. A ſuppreſſion of the hæmorrhoidal diſcharges in men, and of the menſtrual ones in women, will alſo frequently throw them into this diſtemper; as will alſo an overgreat application to ſtudy, eſpecially on abſtruſe ſubjects; a conſcientious dread from paſt crimes; continual diſappointment in the expectations; and ſometimes a timorous diſpoſition, brought on in infancy, by the folly of nurſes.

Prognoſtics in it. That kind of *melancholy* which is brought on by immaterial cauſes alone, ſuch as that ariſing from too intenſe ſtudy, or other imaginations or effects of the mind, is always much more obſtinate and difficult of cure than that which depends upon material cauſes, and has its origin in a diſtempered ſtate of the body. The hypochondriac *melancholy* is the moſt eaſy of all to be cured, eſpecially if the hæmorrhoidal diſcharges can be brought on regularly again; yet even theſe caſes muſt be taken in time; for when the *melancholy*, even from ſuch cauſes, is become habitual, it will remain after the cauſe is removed which gave them origin.

Method of treatment. Melancholy, when it depends on immaterial cauſes, requires phyſic for the mind rather than for the body; and the frequent converſation with an ingenious friend, of a calm and quiet diſpoſition, will go farther towards a cure than a thouſand medicines. Perſons in this ſtate muſt be as little thwarted or contradicted as poſſible; and whips and chains are to be avoided, unleſs in caſes of the moſt extreme neceſſity: this is alſo a method equally neceſſary in thoſe caſes where habit has confirmed upon the mind that diſorder, which at firſt aroſe merely from material cauſes. But when the diſeaſe not only ariſes, but as yet depends entirely upon material cauſes, the cure is eaſy, and is to be performed in the following manner. The primæ viæ are to be cleanſed by purges, particularly thoſe made of black hellebore: and after this the patient is to be blooded in the foot, taking away about ſix ounces; then the blood is to be attemperated by giving, three or four times a day, powders compoſed of purified nitre, and the common abſorbents; and after a due uſe of theſe, the parts are to be reſtored to their priſtine tone and vigour by the milder chalybeates; the greateſt care muſt alſo be taken to bring the hæmorrhoidal diſcharges in men, and the menſtrual ones in women, to a natural and proper ſtate; and then a ſufficient quantity of weak liquors drank at meals; and a moderate degree of exerciſe, will bring the patient uſually to an abſolute ſtate of health.

Hypochondriac *melancholy* always is more relieved by bleeding than by any other practice; and indeed all attempts of a cure are vain, if this be not firſt done; purified nitre, diſſolved in ſmall quantities in all the patient's drink, will, in time, be found to do great things alone, as to a cure. It is the practice of ſome perſons to give vomits in theſe caſes: but they often turn *melancholy* into a true MANIA.

There is a lower ſpecies of *melancholy*, called low ſpirits, to which perſons of weak nerves are more or leſs ſubject. Generous diet, the cold bath, exerciſe, and amuſements, are the moſt likely means to remove this complaint. It is much increaſed by ſolitude, and indulging gloomy ideas, but may often be relieved by chearful company and ſprightly amuſements. When low ſpirits are owing to a weak, relaxed ſtate of the ſtomach and bowels, an infuſion of the Peruvian bark, with cinnamon or nutmeg, will be proper. Steel joined with aromatics may likewiſe be beneficial; but the greateſt advantage is to be expected from riding and a proper diet. When this diſorder ariſes from a foulneſs of the ſtomach and inteſtines, or obſtructions in the hypochondriac viſcera, aloetic purges will be proper. The Harrow-gate ſulphur has been ſometimes ſerviceable in this caſe. When low ſpirits proceed from a ſuppreſſion of the menſtrual or hæmorrhoidal flux, theſe evacuations may be reſtored, or others, as iſſues, ſetons, &c. ſubſtituted in their place. Dr. Whytt obſerves, that nothing has ſuch ſudden good effects in this caſe as bleeding. When low ſpirits have been occaſioned by long continued grief, anxiety, or diſtreſs of mind, relief muſt be ſought from agreeable company, variety of amuſements, and change of place. Perſons afflicted with this diſorder ſhould avoid every kind of exceſs, eſpecially of venery, and ſtrong liquors. Buchan's Dom. Med. p. 485, &c.

MELANCHOLY *thiſtle*. See THISTLE.

MELANCHOLY *tree*, *nyctanthus*. See *Arabian* JASMINE.

MELANCHORYPHUS, in *Natural Hiſtory*, the name of a bird, in the neſts of which the ancients tell us they found the callais or turquoiſe. This ſeems a very ridiculous ſtory, and the whole to be only founded on the reſemblance of colour between that ſtone and the eggs of this bird. It has been alſo diſputed among authors, what was meant by the *melancoryphos* of the ancients; the general opinion is, that it was that little bird which, from the blackneſs at the top of the head, we call the *black-cap*, but the ancients themſelves ſeem to have meant a ſomewhat larger bird by it; for they tell us, that the ficedula, at a certain time of the year, changed colour, and became the *melanchoryphos*, or black-crown. There is no great foundation for ſuch an opinion as this, but it may, however, ſerve to ſhew, that theſe two birds were much of a ſize.

MELANOCERASUS, a name given by ſome botanical authors to the *ſolanum lethale*, or *bella-donna*, a poiſonous ſort of nightſhade, with a beautiful berry, reſembling a large black cherry.

MELANOGOGUES, Μελανοϛωγα, formed from *μελας*, *black*, and *αγω*, *to draw*, are ſuch medicines as are ſuppoſed particularly to purge off atra bilis or black choler. But there is no ſuch ſpecies of choler now regarded; and conſequently this diſtinction of evacuants is but little uſed.

MELANOPIPER, in the *Materia Medica*, a name given by ſome writers to the common black PEPPER.

MELANTERIA, in *Natural Hiſtory*, the name of a foſſil ſubſtance, much talked of by the ancient writers in medicine, and ſuppoſed by moſt of the moderns to have been loſt among the later ages. This, however, is an erroneous opinion; for it is really produced at this time in many parts of the world, though its reſemblance to ſome of the other foſſils, in its external appearance, has made it almoſt univerſally overlooked by the writers on theſe ſubjects. It is, in its moſt perfect ſtate, a very beautiful ſubſtance, of a cloſe, even, and regular texture, moderately heavy, and of a very beautiful yellow, like that of the fineſt gold. It is, in this ſtate, found in looſe irregular lumps, never very large, being uſually only from an ounce to two ounces in weight, and of a ſmooth, even, and poliſhed ſurface. This is the caſe when it is pure and ſolid, and it is then alſo of as bright and fine a colour on the outſide as within.

This is a ſtate, however, in which it is very rarely found; we uſually meet with it either in the form of a downy efflorescence on various ſpecies of vitriolic minerals, particularly on the common marcaſites and pyritæ; or elſe in looſe, ſhattery, and friable maſſes, of rough ſurfaces, of a ſpongy texture, and of a coarſe duſky yellow; in either of theſe ſtates, however, it ſo much reſembles a more or leſs pure native ſulphur, that it is generally miſtaken for that body. It makes no effervеſcence with acid menſtruums; and when put into the fire, is found not to be inflammable, but calcines firſt to a whitiſh, and finally to a ſtrong red colour.

Water diſſolves a part of its ſubſtance, and this may again be procured ſeparate from the liquor, by evaporation and cryſtallization, and then it appears in form of rhomboidal bluiſh-green cryſtals.

It is found in the mines of ſome parts of the Hartz-foreſt in Germany, and is often met with on the ſides of hills in many parts of the Eaſt Indies, and in America it is uſually miſtaken in all theſe places for a native ſulphur. Hill's Hiſt. of Foſſ. p. 627.

MELANTZANA, in *Botany*, a name given by many authors to the MAD-*apple*, called more uſually *melongena*.

MELANTHIUM, in *Botany*, a genus of the *hexandria trigynia* claſs; its characters are, that the flower has ſix petals, and that the filaments proceed from the elongated claws of the flower.

MELANURUS, in *Ichthyology*, the name of a fiſh caught in the Mediterranean, and ſometimes, though rarely, in the Britiſh ſeas, and called by ſome writers *occulata*, and *occhiata*.

It is of an oblong and rounded body, and its back very little prominent, and of a bluiſh-black: its ſides are of a ſilvery-white, but are variegated with duſky tranſverſe ſtreaks; it ſeldom exceeds five or ſix inches in length; and its tail has a remarkable black ſpot in it, whence it has its name, as it has that of *occulata*, from the largeneſs of its eyes. The *melanurus* is a ſpecies of the SPARUS.

MELAONES, a word uſed by certain authors for a black kind of worm found in meadows, in the month of May, which, when bruiſed, emits an agreeable ſmell. Some alſo have called a ſmall ſpecies of beetle by the ſame name.

MELAS, *μελας*, *black*, is an epithet applied by ancient authors in medicine, in a peculiar ſenſe, to the colour of the ſkin; and alſo, to ſome particular remedies. In conformity hereto, in the firſt place, a perſon who has a black or ſable colour preternaturally diſſolved over his ſkin, as in the black jaundice, is called *melanchrus*, or *melanchros*.

MELASMA, a ſugillation, or black mark, from a bruiſe.

MELASSES. See MOLOSSES.

MELASTOMA, in *Botany*. See *American* GOOSBERRY-*tree*.

MELCHITES, in *Eccleſiaſtical Hiſtory*, were thoſe Chriſtians in Syria, Egypt, and the Levant, who in the ſeventh century, though not Greeks, followed the doctrines and ceremonies of the Greek church. They were called *melochites*, i. e. *Royaliſts*, from the Hebrew *Melech*, *king*, by their adverſaries, by way of reproach, on account of their implicit ſubmiſſion to the edict of the emperor Marcian, in favour of the council of Chalcedon. For the ſame reaſon the emperor Juſtinian had the epithet Chalcedonenſis given him.

MELCHIZEDECHIANS, or MELCHISEDEKIANS, ancient ſectaries, ſo called, becauſe they raiſed *Melchizedech* above all creatures, and even above Jeſus Chriſt.

The author of this ſect was one Theodotus; whence the *Melchizedechians* become more commonly known by the name of Theodotians; all the difference between thoſe and the ſtrict Theodoſians conſiſting in that particular article relating to *Melchizedech*; who, according to them, was the great and ſupreme virtue.

This ſect was revived in Egypt towards the cloſe of the third century by Hierax. See HIERACITES. Thoſe alſo in later times, who have maintained, that *Melchizedech* was the ſon of God in a human form, may be diſtinguiſhed by this appellation. See Cumæus de Rep. Hæbræorum.

MELDFEE, in our *Old Writers*, a recompence due and given to him that made the diſcovery of any breach of penal laws, committed by another perſon, called the promoter's or informer's fee.

The word is Saxon, from *meldfeoh*.

MELEAGRIS, in *Ornithology*. See TURKEY.

MELEAGRIS *Numida*. See GUINEA-*hen*.

MELECH, a word uſed by ſome of the chemical writers to expreſs SALT.

MELECHIL, a word ſometimes uſed as the name of the gum BDELLIUM, and ſometimes as that of the fruit of a tree of the palm kind, much uſed by the ancients as a cordial and reſtorative. The word *mokel* has the ſame double ſenſe, and both are, by the more accurate writers, determined in their meaning by the epithets annexed to them, the gum *bdellium* being called *molechil*, or *mokel Judaicum*, and the fruit *mokel mechenſe*; yet the conſequence even of this has been more confuſion; for the later writers ſuppoſed, that the fruit was not produced by a palm-tree, but by the ſame tree which produced the gum.

MELEGEION, a word uſed by ſome writers in medicine to expreſs a fetid matter, of the conſiſtence of honey, diſcharged from old ulcers.

MELES, in *Zoology*. See BADGER.

MELET, in *Ichthyology*, a name uſed by ſome for a ſmall tranſparent ſea-fiſh, called by authors, HEPSETUS and *anguilla*, and by ſome ATHERINA.

MELETIANS, in *Eccleſiaſtical Hiſtory*, the name of a conſiderable party, who adhered to the cauſe of *Meletius*, biſhop of Lycopolis, in Upper Egypt, after he was depoſed about the year 306, by Peter biſhop of Alexandria, under the charge of his having ſacrificed to the gods, and having been guilty of other heinous crimes; though Epiphanius makes his only failing to have been an exceſſive ſeverity againſt the lapſed. This diſpute, which was at firſt a perſonal difference between Meletius and Peter, became a religious controverſy; and the *Meletian* party ſubſiſted in the fifth century: but was condemned by the firſt council of Nice.

MELIA, Μελια, of the Greek writers, the name of a vegetable that often occurs in the Greek naturaliſts, and which has ſo many ſignifications, that it is not eaſy to underſtand the authors, without being well acquainted with them. All late writers have perplexed the world by miſcalling things, and thence rendering names ſynonymous and confuſed, which were at firſt clear and diſtinct; but the confuſion of the ſenſes of the word *melia* is as old as the earlieſt writers we are acquainted with: Theophraſtus complains of it in his time.

The moſt common uſe of the word is for the *fraxinus*, or aſh-tree. The ancients uſed to make the handles of their ſpears and darts of this, and therefore they ſometimes called them *melia*. This word was alſo uſed as the name of a ſeed, called alſo by ſome *meline*. This was of the nature of panic, and by ſome confounded with the panic. Suidas mentions this as different from the panic; but Diocles ſeems to have made them the ſame ſeed. Pliny has tranſlated the paſſage from Diocles, and by an unaccountable error, has called the plant *melfrugum*, and ſays, that it has the ſame virtues with millet.

MELIA, in *Botany*, the name which Linnæus calls the AZEDARACH, or BEAD-*tree*.

MELIA *terra*, in *Natural Hiſtory*, a name given by ſome authors to the *melinum*, or white earth of the iſland of Melos, uſed among the ancients in painting; but in the works of Dioſcorides and Galen ſignifying a ſubſtance of a very different kind; the MELINUM of the painters having been a *marle*, and the *melia terra* of the phyſicians a tripela.

The *terra melia* of Dioſcorides, and the ancient phyſicians, is a dry, looſe, and harſh earth, found in maſſes of different ſize, and lodged among the looſer ſtrata of other matter, never making a ſtratum of itſelf. It is very firm and hard, of a pale greyiſh white or light aſh-colour, very heavy, of a looſe, open, and ſpungy texture, and of a rough, uneven, and duſty ſurface. It adheres ſlightly to the tongue, and does not ſtain the hands, and leaves a duſt after the handling, which is ſo harſh as to make a grating noiſe, when the fingers are afterwards rubbed together. It makes no effervеſcence with acids. It is found in all the iſlands of the Archipelago, and was uſed by the ancients for the ſame purpoſes with the pumices. Hill's Hiſt. of Foſſ. p. 68.

MELIANTHUS, in *Botany*. See HONEY-*Flower*.

MELICA, in *Botany*, a name given by ſome authors to the plant which produces the *ſorgum*, or *Indian* MILLET.

MELICA, in the Linnæan ſyſtem of *Botany*, a genus of the *triandria digynia* claſs: the characters of which are, that the empalement has two valves, and is compoſed of two flowers; and that the rudiment of the flower is lodged among the ſmall flowers. There are five ſpecies.

MELICA is alſo a word uſed by the ancients as the name of a food of a refrigerating and moiſtening quality. It ſeems to have been a kind of *oxygala*; for Galen, when he directs perſons of a hot habit to uſe a refrigerating diet, among other aliments of that kind, directs the eating of *melica*, which, he ſays, is prepared of milk. Conſtantine, in his book of Agriculture, mentions *melica*, and ſays it was made by pouring milk into an earthen veſſel, firſt well impregnated with boiling hot vinegar, by means of which there was a ſeparation of the milk into whey and curd.

MELICERIOLA, a diminutive of the word MELICERIS, a ſmall encyſted tumor.

MELICERIS. Μελικερις, a tumor, or abſceſs, incloſed in a cyſtis, conſiſting of matter not unlike honey; whence its name. The *meliceris* is otherwiſe called ATHEROMA. It gathers without pain, and gives way upon preſſure, but returns again: it is to be cured by warm diſcutients.

MELICHLORUM, in *Natural Hiſtory*, a name given by ſome of the ancient writers to a ſpecies of jaſper, of a greeniſh-yellow, uſually found variegated with other colours.

MELICOCCA, in *Botany*, a genus of the *octandria monogynia* claſs: its characters are, that the empalement is divided into four ſegments: that the four petals are reflexed below the calyx; that the ſtigma is ſubpeltated, and the fruit a coriaceous drupe. There is only one ſpecies.

MELILOT, in *Botany*, a ſpecies of TREFOIL: *melilot* grows naturally among corn in many parts of England, where it is a troubleſome weed; and ripening about the ſame time with the corn, is often ground with it, being difficult to ſeparate from it: in ſuch caſe it ſpoils the bread, or whatever the flour is uſed for, by giving it a ſtrong taſte, like the plaſter made from it.

Melilot is ſcarce ever given internally; but uſed externally, it is a great emollient, reſolvent, and digeſtive. It is a good ingredient in glyſters, cataplaſms, and fomentations of this intention. The flowers are recommended by ſome in infuſion, in the manner of thoſe of chamomile, as a remedy for the *fluor albus*. It formerly gave the name to one of the officinal plaſters, which received from the *melilot* a green colour and an unpleaſant ſmell, without any addition to its efficacy.

MELINTZANIUM, in *Botany*, a name given by the later Greek writers to the plant called *ſtrychnus* by the earlier writers of that nation. Theophraſtus, and all the old Greeks, uſed the word *ſtrychnus*, and ſay there are three kinds, two of which are poiſonous, and the other not. The firſt cauſing madneſs, the ſecond cauſing ſleep, and the third bearing an eſculent fruit. The laſt is the plant we call *pomum amoris*, the fruit of which is at this time eaten by many people.

Fuchſius confeſſes that he does not know what to make of the word; but it is wonderful that the ſimilitude of ſound between this and the *melanzana* and *melongena* did not lead him to the knowledge of what it was, as he was acquainted with thoſe words.

MELINUM, in *Natural Hiſtory*, the name of an earth, famous in the earlieſt ages of painting, being the only white of the great painters of antiquity; and, according to Pliny's account, one of the colours with which alone they performed all their works.

It is a fine white marly earth, of a very compact texture, yet remarkably light; a ſort of texture which muſt render any earth fit for the painter's uſe, that is of a proper colour. It is frequently found forming a ſtratum in the earth, lying immediately under the vegetable mould. It is of a very ſmooth, but not gloſſy ſurface; is very ſoft to the touch, adheres firmly to the tongue, is eaſily broken between the fingers, and ſtains the ſkin in handling. It melts readily in the mouth, and is perfectly fine, leaving not the leaſt grittineſs between the teeth. Thrown into water, it makes a great bubbling and loud hiſſing noiſe, and moulders away into a fine powder. It does not ferment with acids, and ſuffers no change in the fire. Theſe are the characters by which the *melinum* of the ancients is diſtinguiſhed from all the other white earths. It is ſtill found in the ſame place from whence the painters of old had it, which is that from whence it has its name, the iſland of Milo, called Melos by the Greeks, and is common in moſt of the adjacent iſlands. It has been of late tried here as a paint, and is found not to make ſo bright a white as the other ſubſtances now in uſe among the painters, but ſeems not liable, like them, to turn yellow; and if ſo, would be worth the conſideration of perſons in the colour-trade, eſpecially as it may be had in any quantities for carriage. Hill's Hiſt. of Foſſ. p. 45.

MELINUS *color*, Μηλινον χρωμα, in *Antiquity*, a colour often mentioned in ſpeaking of the habits of players. It was a reddiſh yellow, or the colour of ripe apples, in Greek called μηλα, and their colour μηλοειδες χρωμα.

MELISMATICO *ſtylo*. See STYLE.

MELISSA, in *Botany*. See BAUM.

MELITENSIS *terra*, *earth of Malta*, in the *Materia Medica*, an earth of which there are two very different kinds, the one of the genus of the boles, the other of the marles. The latter is that known by medicinal authors under this name; the former is the Malta earth now in uſe: but both being brought from the ſame place, are confuſedly called by the ſame name.

The Malteſe bole, which is what we uſe now, is a fine earth, of a cloſe compact texture, and very heavy; when dug, it is of a very pure white, but is apt to contract a yellowneſs in drying, and become of a cream colour. It is of a very ſmooth and ſhining ſurface, ſcarce at all ſtains the ſkin in handling, adheres ſtrongly to the tongue, and melts into a butter-like ſubſtance in the mouth. It makes no effervеſcence with aqua fortis, or any other acid menſtruum, and ſuffers no change of colour in the fire. Hill.

The Malteſe marle, which is the *terra Melitenſis* of medicinal authors, is a looſe, crumbly, and very light earth, of an unequal and irregular texture, and when expoſed to the weather, ſoon falls into a fine ſoft powder; but when preſerved and dried, it becomes a looſe light maſs, of a dirty white colour, with a greyiſh caſt; it is rough to the touch, adheres firmly to the tongue, is very eaſily crumbled to powder between the fingers, and ſtains the hands. Thrown into water it ſwells, and afterwards moulders away into a fine powder. It ferments very violently with acid menſtruums.

Both kinds are found in great abundance in the iſland of Malta, and the latter has been much eſteemed as a remedy againſt the bites of venomous animals, but with how much juſtice we cannot ſay. The other has ſupplied its place in the German ſhops, and is uſed there as a cordial, a ſudorific, and aſtringent. Hill.

MELITITES, Μελιτιτης, in *Natural Hiſtory*, an indurated clay of a yellowiſh colour, but in many reſpects approaching to the nature of the morocthus or French chalk;

which, when pulverized, yields with water a milky liquor, of a taſte ſomewhat like honey: whence it takes its name.

It is a ſmooth ſubſtance, of a compact texture and great weight, of a fine, even, gloſſy ſurface, ſmooth and ſoft to the touch, does not adhere to the tongue, nor ſtain the fingers; but drawn along a rough ſurface, leaves a fine ſlender white line, and ſhaved into very thin pieces, has ſome degree of tranſparence. It does not ferment with acids, and burns to a pure white.

It is found in mines of metals, and ſeems to partake pretty much of the nature of lead; having a ſweetneſs ſomewhat like that of the ſal ſaturni, but much fainter. It only differs from the galactite, in that it is milder to the taſte. See GALACTITES. The ancients uſed it in inflammations of the eyes, and to dry ulcers.

They alſo applied it externally in ulcers, and gave it inwardly as a ſoporific to people who were to ſuffer pain, ſuppoſing it would make them leſs ſenſible of it. It is at preſent very common in Italy, and probably in many other places, but is not known or regarded.

MELITITES *lapis*, a name given by ſome authors to ſome of the rounder ſpecies of *echinitæ*, from their reſembling an apple in their ſhape.

MELITTIS, *baſtard baum*, or *baum-leaved archangel*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs: its characters are, that the empalement is broader than the tube of the flower; the upper lip of the flower is plane, the lower crenated, and the antheræ cruciated. There is only one ſpecies.

MELITTOMA, a word uſed by the ancients to expreſs a ſort of ſweet-meat, or confection, made with pleaſant ingredients mixed in honey.

MELIUS *inquirendum*, in *Law*, a writ which lieth for a ſecond inquiry to be made of what lands and tenements a man died ſeiſed, where partiality is ſuſpected upon the writ called *diem clauſit extremum*.

MELLAGO, a word uſed by medicinal writers to expreſs any medicine that has the conſiſtence and ſweet taſte of honey. It is often applied to the rob, or inſpiſſated juice of fruits, mixed with ſugar in the making.

MELLE, or MULLI. The Peruvians, by gently rubbing the fruit of this tree between their hands in warm water, deprive it of all its ſweetneſs; after which they ſtrain the liquor, and leaving it a few days to ſubſide, it becomes a very tranſparent drink, and by boiling becomes an excellent kind of honey.

MELLEGUETTA, in the *Materia Medica*, a name uſed by ſome authors for the great cardamom, commonly called grain of paradiſe.

MELLINE, in *Botany*, a name given by many of the ancient writers to the garden-plant we call BAUM. It had the name *melline* from its yielding honey to the bees.

It has many other names, derived from the ſame ſource; ſuch as *apiaſtrum*, from *apis*, the bee, *meliphyllum*, the honey-leaf, and from this, *meliſſophyllum*. Many alſo are of opinion, that the *amello* of Virgil is the ſame plant.

MELLISODIUM, a word uſed by ſome chemical writers to expreſs burnt lead.

MELITTA, in *Natural Hiſtory*, the name of a genus of the *echini marini*, of the general claſs of the placentæ. The characters of the *melitta* are, that they are plain and flatted ſhells, with their edges arched and waved, and have on their ſuperfices two or more oblong apertures, which reach to the baſe. Of this genus there are two known ſpecies: 1. A ſmooth one with a circular vertex. 2 A ſcutellated kind, reſembling the ſhell of the tortoiſe, and with a pentagonal vertex. See *Tab. of Teſtaceous Animals*, Nº 9.

MELOCARPUS, a word uſed by ſome of the old authors to expreſs the fruit of the ARISTOLOCHIA, or *birthwort*, uſed in ſome external applications.

MELOCHIA, in *Botany*, a genus of the *monadelphia pentandria* claſs: its characters are, that it is pentagynous, and that the fruit is a five-celled ſingle-ſeeded capſule. Linnæus reckons ſix ſpecies: Miller makes this genus a ſpecies of the corchorus or *Jew's*-MALLOW.

MELODY, Μελωδια, compounded of *μελι*, *honey*, and *ωδη*, *ſinging*, in *Muſic*, is the agreeable effect of different muſical ſounds, ranged or diſpoſed in a proper ſucceſſion.

Melody is the effect only of one ſingle part, voice, or inſtrument; by which it is diſtinguiſhed from *harmony*; though in common ſpeech, theſe two are frequently confounded.

Harmony is properly the agreeable reſult of the union of two or more concording muſical ſounds heard in conſonance, i. e. at one and the ſame time; ſo that harmony is the effect of two parts at leaſt: as therefore a continued ſucceſſion of muſical ſounds produces *melody*, ſo does a continued combination of theſe produce harmony.

Though the term melody be chiefly applicable to the treble, as the treble is chiefly diſtinguiſhed by its air; yet ſo far as the baſs may be made airy, and to ſing well, it may be alſo properly ſaid to be *melodious*. Of the twelve harmonical intervals of muſical ſound, diſtinguiſhed by the names of *ſecond leſſer*, *ſecond greater*; *third leſſer*, *third greater*; *fourth*; *falſe fifth*, *fifth*; *ſixth leſſer*; *ſixth greater*; *ſeventh leſſer*, *ſeventh greater*, and *octave*; all *melody*, as well as harmony, are compoſed: for the octaves of each of theſe are but replications of the ſame ſound; and whatever is ſaid of any or all of theſe, ſounds, is to be underſtood alſo of their octaves.

MELODY, *for the rules of*. See COMPOSITION.

MELOE, in *Zoology*. See *Oil* BEETLE.

MELOLANTHUS, the name of a very peculiar ſort of beetle, which is found in all parts of England, and in many other countries among trees and hedges. The French call them *hanneton*, and we *cock-chafers*, *dorrs*, and by many other names. The name *melolanthus* is as old as Ariſtotle, and is given this creature from its feeding on the bloſſoms of the crab or wild apple. We have, of late years, had great damages done by the grubs of theſe beetles working under ground; but in Ireland they have been uſed to come in ſwarms, in certain years, in the beetle ſtate, and have been ſo terrible to that country, that the people have called them locuſts.

The firſt time they are remembered by authors to have appeared in this vaſt abundance, in that country, was in the year 1688. They then appeared in the ſouth-weſt part of the county of Galway; they appeared firſt upon the coaſt, and were brought by a ſouth-weſt wind, a wind ſo common there, that it may almoſt be called the trade-wind of Ireland; from the coaſt they ſoon ſpread over the inland parts of the country, and were ſeen every where in ſuch numbers, as were ſcarce to be conceived. They never ſtirred in the day time, but were ſeen covering the leaves and branches of trees and hedges, and in many places hanging down in prodigious cluſters on one another's backs, in the manner of bees when they ſwarm. As ſoon as the ſun ſet, they uſed to leave the hedges, &c. and take wing, gathering in bodies, and making a humming confuſed noiſe like that of drums at a diſtance. They ſometimes formed bodies together, that darkened the air for three or four miles ſquare. They flew ſo low ſometimes, that it was ſcarce poſſible for a perſon going along, to make his way through them; and by ſtriking againſt the faces and necks of women and children, they did much miſchief, every one leaving a mark behind it; and thoſe of this ſex or age, who had been among them, came home all over bruiſes.

This however, was little to the miſchief they did the fields; for though the middle of the ſummer was the ſeaſon in which they came, they had in a few days eaten up all the leaves of the trees ſo completely, that they all looked as bare as in the depth of winter. The noiſe they made, while eating in vaſt numbers together, was like that of ſawing timber. The gardens fared no better than the hedges, for they eat up leaves, young ſtalks, and fruit, and every thing that was green and ſoft there, and left only a parcel of naked ſticks behind them. Many of the trees, thus ſtripped, wholly periſhed. Phil. Tranſ. Nº 234.

MELOMELI, a word uſed by the ancients, to expreſs honey impregnated with quinces.

MELON, *melo*, in *Botany*, a ſpecies of the CUCUMBER, in the Linnæan ſyſtem. Its characters are theſe: it hath male and female flowers on the ſame plant; the male flowers have a bell-ſhaped empalement, of one leaf, whoſe border is terminated by five awl-ſhaped briſtles, and one bell-ſhaped petal, faſtened to the empalement, and cut into five ſegments at the brim; it hath three ſhort ſtamina inſerted in the empalement, joined together; two of which have bifid points; the female flowers have no ſtamina or ſummits, but have a very large oval germen, ſituated below the flower, which turns to an oval fruit with ſeveral cells, filled with oval, acute-pointed, compreſſed ſeeds, incloſed in a ſoft pulp. There is a great variety of this fruit cultivated in different parts of the world, many of them of no value, ſize being regarded too much in the markets. That ſort called the Cantaleupe *melon*, ſo called from a place in the neighbourhood of Rome, where this fruit has been long cultivated, and whither it was brought from Armenia, is in the greateſt eſteem among the curious in every part of Europe.

Beſides this, there are alſo the Romana, the Succado, the Zatte, the ſmall Portugal or Dormer, and the black Galloway *melons*, moſt of which are cultivated for an early crop.

The proper management and culture of *melons* are as follow: the ſeeds ſhoul bed procured from good *melons*, of the ſoundeſt ſort and higheſt flavour, produced, as ſome have adviſed, in a diſtant garden; for if ſowed on the place where it was raiſed and ripened, it is very apt to degenerate. This ſeed ſhould be kept three years before it is ſowed, but not more than ſix, and it ſhould be ſowed at two ſeaſons, or if at three, it will be ſtill better: the firſt for the early crop, to be raiſed under frames, ſhould be ſown about the middle of February; the ſecond to be raiſed in the ſame manner, is to be ſowed about the middle of March; and thoſe which are deſigned for hand or bell-glaſſes, or to be covered with oil-papers, ſhould not be ſown till about a week in April.

For thoſe of the firſt ſeaſon, ſeeds may be ſown on the upper ſide of a cucumber-bed, if there be any; or, a proper quantity of new looſe dung muſt be provided, and thrown on a heap to ferment, and turned over, that it may acquire an equal heat, and the plants muſt be raiſed and managed like CUCUMBERS, until they are planted where they are to remain. The beds or ridges, where the plants are to remain, ſhould be placed in a warm ſituation, ſo that they may be defended from all cold and ſtrong winds, and incloſed in a good reed fence. In preparing the earth for theſe plants, the Dutch and German gardeners form a mixture of a third part of hazel loam, a third part of the ſcouring of ditches and ponds, and the ſame quantity of very rotten dung: which they mix up at leaſt one, and often two years, before they make uſe of it, frequently turning it over, ſo that the parts may be well incorporated; but the compoſt in which Mr. Miller has found *melon* plants to ſucceed beſt in England is two-thirds of freſh gentle loam, and one-third of rotten neat's dung: if theſe are mixed together one year before it is wanted, ſo as to have the benefit of a winter's froſt and ſummer's heat, obſerving to turn it over often, and never ſuffering weeds to grow upon it, this will be found equal to any compoſt whatever. Before the plants appear, there ſhould be a quantity of new dung thrown in a heap, allowing about fifteen wheelbarrows full to each light; which muſt be turned over two or three times, and in a fortnight it will be fit for uſe; when the trench muſt be dug to receive the dung, where the bed is deſigned to be made, which in a dry ground ſhould not be leſs than a foot, or a foot and a half deep. The frames ſhould then be placed over the bed to keep out the wet; but no earth ſhould be laid upon it for three or four days, till it is found of a proper temperature of heat. When this is the caſe, the earth may be laid upon it, about two inches thick, except in the middle of each light, where the plants are to be placed, which muſt be raiſed into a hill, fifteen inches high or more, terminating in a flat cone: in two or three days after the earth is put on the bed, it will be of a proper temper to receive the plants; which ſhould be carefully taken up with a trowel, ſo as to preſerve all the fibres of their roots; or if the beds cannot be ready for them in time, ſoon after the third or rough leaf is put out, it will be a good method to put each plant into a ſmall pot while they are young, and theſe may be plunged into the hot bed where they were raiſed, or in a cucumber-bed, where there is room; and when the bed is ready, the plants may be turned out of the pots, with the whole ball of earth to their roots: and this is the beſt method for the Cantaleupe *melon*. When the plants are placed on the top of the hills, they ſhould be gently watered once or twice, till they have taken good root; and when they are well fixed in the new beds, a greater quantity of earth ſhould be laid on the beds, preſſed down as cloſe as poſſible, and raiſed at leaſt a foot and a half thick upon the dung all over the bed; obſerving alſo to raiſe the frames, that the glaſſes may not be too near the plants, leſt the ſun ſhould ſcorch them. When the plants have four leaves, the top of the plants ſhould be pinched off with the finger and thumb, that they may put out lateral branches for producing the fruit; and when two or more of theſe lateral ſhoots are produced, they muſt alſo be pinched to force out more. The management of theſe beds is much he ſame as that of cucumbers: except that *melons* require more air, and very little water. In five or ſix weeks the plants will ſpread over the bed, and reach to the frames, when the alleys between the beds ſhould be dug out; or in caſe of one bed, a trench ſhould be made on each ſide, about four feet wide, as low as the bottom of the bed; and hot dung wheeled in for a lining, to the ſame height as the dung of the bed; this ſhould be trodden down cloſe, and covered with the ſame earth that was laid on the bed, to the thickneſs of a foot and half or more, treading it down as cloſe as poſſible. In this way the bed will be extended to the width of twelve feet, that the roots of the plants may ſpread quite through it; and the beds will alſo acquire a freſh warmth, which will be of great ſervice in ſetting of the fruit. When the vines have extended ſo as to fill the frames, and want more room, the frames ſhould be raiſed up with bricks about three inches high, to admit the ſhoots of the vines to run out under them. When the fruit appears, the vines ſhould be carefully looked over three times a week: and one ſhould be choſen upon each runner, that is ſituated neareſt the ſtem, having the largeſt foot ſtalk, and appearing to be the ſtrongeſt fruit; then pinch off all the other fruit which may appear upon the ſame runner; and pinch off the end of the runner at the third joint above the fruit; and if the runner is gently pinched at the next joint above the fruit, it will ſtop the ſap, and ſet the fruit. There is alſo another method practiſed by ſome gardeners to ſet this fruit, which is the taking off ſome of the male flowers, whoſe farina is juſt ripe and fit for the purpoſe, laying them over the female fruit, and gently ſtriking with the nails the male flowers, to ſhake the farina into the female flowers; whereby they are impregnated, and the fruit will ſoon after ſwell, and manifeſt viſible ſigns of being perfectly ſet; ſo that where the plants are under frames, and the wind excluded from them, which is wanted to convey the farina from the male to the female flowers, this practice may be very neceſſary. The glaſſes of the hot-bed ſhould alſo be raiſed high, to admit a large ſhare of air to the plants, otherwiſe the fruit will not ſet; and if the ſeaſon ſhould prove very warm, the glaſſes may be frequently drawn off, eſpecially in an evening, to receive the dews, provided there is little wind ſtirring: but they ſhould not remain off the whole night, leſt the cold ſhould prove too great. When the plants have extended themſelves from under the frames, in cold weather their extremities ſhould be covered every night with mats, and the plants ſhould be watered once in a week in dry warm weather, in the alleys between the beds.

For thoſe *melons* that are raiſed under bell or hand-glaſſes, the plants ſhould be raiſed in the manner already directed, and about the latter end of April, in a forward ſeaſon, the beds may be made. For this purpoſe, a ſufficient quantity of hot dung ſhould be provided, allowing eight or nine good wheelbarrows of dung to each glaſs. For one bed extended in length, the trench ſhould be dug out three one-half feet wide, and of ſuch a length that the glaſſes may not be placed nearer than four feet to each other: in digging the trench, it ſhould be ſo ſituated, as to allow for the widening of the bed three or four feet on each ſide; the depth muſt depend on the nature of the ſoil, and when there is no danger of the beds being injured by the wet, the lower it is made, the better. When the dung, prepared as before, is laid on the bed, there ſhould be a hill for each plant, one foot and a half high, and the other part need not be covered more than four inches thick; the glaſſes ſhould then be placed over the hills, and in two or three days after the beds are made they will be fit for receiving the plants which ſhould be removed in the manner already directed. Theſe plants muſt be watered at firſt, to ſettle the earth to their roots, and ſhaded every day, till they have taken new root; and if the nights prove cold, it will be proper to cover the glaſſes with mats, in order to preſerve the warmth of the bed. If ſeveral beds are made, they ſhould be placed at eight feet diſtance from each other. When the plants have taken good root, their tops muſt be pinched off, and the pruning muſt be the ſame as for thoſe under frames. In the day-time, when the weather is warm, the glaſſes ſhould be raiſed on the oppoſite ſide to the wind, to admit freſh air to the plants; and when they reach the ſides of the glaſſes, in favourable weather, the glaſſes muſt be ſet up on three bricks, that the vines may have room to run out under them; but when this is done, the beds ſhould be covered all over with earth ro the depth of one foot and a half, and trod down as cloſe as poſſible; and in cold nights, the beds ſhould be covered with mats. And as the vines of the Cantaleupe *melons* cannot bear wet without injury, it will be neceſſary to arch the beds over with props, to ſupport the mats, that they may be ready at all times for covering when they require it. If the weather ſhould prove cold, hot dung may be laid to theſe beds in the manner directed for thoſe under frames. Some have lately raiſed their *melons* with conſiderable ſucceſs, under oiled paper: but great care muſt be taken not to keep theſe coverings too cloſe over them. And Miller adviſes to bring up the plants under hand or bell-glaſſes, till they begin to extend themſelves under the glaſſes, and, then inſtead of the covering of mats, to put over them the paper, done over with linſeed oil.

The farther management of *melons*, after their fruit is ſet, is to keep pulling off all the ſuperfluous fruit, and to pinch off all weak runners; and alſo to turn the fruit gently twice a week, that each ſide may have equal benefit of the ſun and air. When the fruit is fully grown, care ſhould be taken to cut it at a proper time; for if it is left a few hours upon the vines, it will loſe much of its delicacy; therefore the vines ſhould be looked over at leaſt twice in a day: and if the fruit intended for the table is cut early in the morning, before the ſun has warmed it, it will be much better flavoured, but if it ſhould be neceſſary to cut any afterwards, it ſhould be put into cold ſpring water or ice, to cool it before it is brought to table; and that cut in the morning ſhould be kept in the cooleſt place till it is uſed. The ſigns of this fruit's maturity is, its beginning to crack near the foot ſtalk, and its beginning to ſmell, which never fail: but the Cantaleupe *melons* ſeldom change their colour till they are too ripe. Miller.

Mr. Reynolds has communicated to the Society of Arts the following method of raiſing *melons* without earth, dung, or water. About a month before the ſeeds are ſown, he prepares a bed of caſt-off tanner's bark, four feet deep, ſix feet wide, and twelve feet in length: this he covers with four lights, ſo as not to admit rain or water. March, he ſays, is a proper ſeaſon for this purpoſe. When the bed becomes warm, which generally happens in about twenty days, a few *melon*-ſeeds are put into warm milk, in an earthen veſſel, which is preſſed down into the bark-bed, where it remains thirty-ſix hours in order to promote the vegetation of the ſeeds. Then at equal diſtances he directs to open four holes in the bed, each nine inches in diameter, and five inches deep: having in readineſs about a peck of pounded bark, like ſaw-duſt, ſome of it to be put at the bottom of the holes, to the thickneſs of three inches: on this bark ſome of the ſeeds are to be placed, and preſſed down with the fingers: then the ſeeds are covered with two inches more of the powdered bark, preſſing the whole down with the hand. When the plants are advanced to a proper ſize, the beſt are choſen, and the others caſt away; thoſe that are reſerved are ordered to be properly pruned, and to have as much warm air as poſſible during the ſummer. In this way, he ſays, he has raiſed as good *melons* as can be deſired.

When a *melon* is perfectly fine, it is full, without any vacuity: this is known by knocking upon it: and when cut, the fleſh muſt be dry, no water running out, only a little dew, which is to be of a fine red colour. Large *melons* are not to be coveted, but firm and well-flavoured ones. Our gardeners who raiſe *melons* for ſale, ſow the ſeeds of the larger rather than the good kinds, and they increaſe the ſize of theſe by much watering the roots; but this ſpoils the taſte. Some of the French raiſe at this time particularly fine *melons*, by a method kept as a ſecret, but which we find, on a ſtrict inquiry, is no other than the ingenious Mr. Quintiny's, of that nation, publiſhed near eighty years ago in our Philoſophical Tranſactions.

The *melons* particularly proper to be treated in this manner, are thoſe which have a thin and ſomewhat embroidered ſkin, not divided by ribs, and have a red pulp, dry and melting on the tongue, not mealy, and of a high flavour. Theſe are what ſucceed in the following method, and are greatly improved in ſize and flavour by it.

When the ſeeds of this *melon* are placed in the ground, the firſt thing that appears is a pair of ſeminal leaves, or ears, as the gardeners call them. Between theſe two leaves there ſhoots, ſome days after, a leaf called the firſt leaf, or knot; and out of the ſame place, after ſome days more, there ſhoots another leaf, called the ſecond knot. Out of the midſt of this ſtalk of the ſecond knot, there ſhoots a third knot: this third knot muſt be cut off at its inſertion, without hurting the branch of the ſecond knot from whence it grows. Out of this place there will grow, after this cutting, a branch, which will be what the gardeners call the firſt arm; and this arm will, in the ſame manner as the firſt plant, ſhoot out, firſt one, then a ſecond, then a third knot; this third knot muſt be cut again as before, and thus the third knots are all along to be cut off, and arms or branches will grow up in the places of them, all the way in the ſame manner as the firſt; and it is at thoſe arms that the *melons* will be produced; and they will be always good, if the foot or root be well nouriſhed in good earth, and cheriſhed by a good hot bed and the ſun. The foot of the *melon* muſt never be ſuffered to paſs into the dung, and the earth muſt not be watered but moderately, when it is ſeen to grow too dry; but in this caſe it muſt be moderately moiſtened in time, leſt the ſhoot ſuffer by it. Twice or three times a week is often enough to water in the drieſt weather, and this muſt always be done about ſunſet; and when the heat of the ſun is too violent, the *melons* muſt be covered with ſtraw-mats from eleven in the morning to about two in the afternoon. When it rains much, the *melons* muſt alſo be covered, leſt it hurt them by too much moiſture. Phil. Tranſ. N° 45.

If the root produce too many branches, the weakeſt are to be cut off, and only three or four left; and thoſe which are left are to be ſuch as have their knots closeſt to one another, When the plants are removed from the ſeed-bed to the places where they are to ſtand, if they are very ſtrong, they ſhould be planted ſingle; but if otherwiſe, two are to be ſet in each hole.

When they are planted ſingle, the two branches, which always grow on each ſide from the baſe of the ſeed-leaves, are to be left on: but when two plants are ſet together, theſe branches are to be cut off, otherwiſe all the branches will be too numerous, and they will entangle and ſpoil one another.

When the *melons* are knit, two of them only are to be left upon each foot, chooſing thoſe which are beſt placed, and next to the firſt and principal ſtalk, that is, to the heart of the foot. None but fair fruits are to be left, and ſuch as have a thick and ſhort tail; and the foot of the *melon* muſt be ſhort, well truſſed, and not far diſtant from the ground. *Melons* of a long ſtem, and having the ſtalk of the leaf too long and ſlender, are never vigorous.

All the ſuperfluous branches muſt be cut off from time to time, as they ſhoot out.

There ſometimes ſhoots out a branch more than is here mentioned, between the two ſeed-leaves or ears. If this is ſtrong and vigorous it is to be kept on, but if weakly, it is beſt to take it off, for it will never bear good fruit.

MELON-*ſeeds*. We read of *melon*-ſeeds thirty-three years old, vegetating and producing a fine number of plants. Phil. Tranſ. N° 475. ſect. 6. and in N° 464, we read of *melon*-ſeeds forty-three years old, producing fruit.

Melon-ſeed is cooling and diuretic, and has the ſame virtues with the other cold ſeeds, as they are called. See GOURD.

MELONS, *petrified*, a name given by the people who have written books of travels, &c. to certain ſtones found on mount Carmel. The monks who inhabit that mountain at this time, and who pretend to be the followers of Elias the prophet, tell a legendary ſtory about theſe ſtones, which has given occaſion to the name. They ſay, that when Elias lived on that mount, a certain gardener paſſing by his cave with *melons*, the prophet aſked one of them; but the fellow replying, that they were not *melons*, but ſtones that he carried, the prophet miraculouſly fulfilled the ſaying, and converted them into ſtones. Travellers who are fond of theſe ſtories were uſually glad to pick up one of theſe ſacred ſtones as they went on; and the monks have been careful enough to gather all they could find for the better opportunity of obliging their viſiters; ſo that though they were once very common, they are now only to be had by the favour of theſe people,

Breynius is the only author who has given a good account of them; he ſays, that they are ſpheric or ſpheroidal ſtones, of various ſizes, from that of an hen's egg to that of the largeſt *melon*, or even more than that. They are generally found bedded in a very hard ſand-ſtone, of a greyiſh or aſh-colour; but they come out whole on breaking the ſtone, and are of a ſmooth ſurface; a greyiſh colour, or ſometimes a browniſh ferrugineous hue. When they are broken, there is always a cavity found in them, ſometimes regular and even, ſometimes very irregular, and generally proportioned to the bigneſs of the ſtone. This cavity is lined on both ſides with minute cryſtals, which are very bright and pellucid, and have their points ſtanding toward the centre of the cavity. The ſubſtance of the ſtone itſelf approaches to the nature of marble, of a yellowiſh colour, and capable of a good poliſh; when wrought looking very like the Florentine marble. This is a cruſt of about half an inch or an inch in thickneſs, according to the bigneſs of the ſtone, and ſometimes this is covered with a paler-coloured cruſt, of the thickneſs of a ſtraw, which in ſome degree reſembles the bark or rind of the fruit. Theſe ſtones are truly a ſort of concave natural nodules, of the nature of our hollow flints. They have had no fruit for their matrix, nor have ever had any of the ribs and furrows which the *melon* has, nor any mark of the ſtalk; and within they have neither the natural diviſions of the *melon*, nor any thing reſembling the ſeeds. It is not only the want of many parts abſolutely eſſential to the fruit ſuppoſed to be petrified, which ſhews that opinion to be erroneous; but the courſe of nature, in petrifactions in general, argues alſo greatly againſt it.

The things we meet with, in this ſtate, are all of them ſuch as are naturally hard, dry, and permanent, and none of the tender and ſucculent bodies, ſuch as the *melon*, and the like fleſhy fruits, which muſt neceſſarily rot in the water that conveys the ſtony matter, before it could at all enter their pores. And the ſtones are certainly analogous to thoſe concave nodules of a ferrugineous colour, in the cavities of which amethyſts are produced; and to that genus of ſtones which Woodward calls concave cryſtalline balls, common in many parts of the world.

The fallacy of an extravagant opinion in regard to foſſils of any particular form, is not peculiar to theſe ſtones, as witneſs the ſmall ſhells petrified and found in Egypt, which from their flat and roundiſh ſhape, are ſaid to be the lentiles, which the children of Iſrael eat when making the pyramids: the *cornua Ammonis*, which is the remains of a ſea-ſhell, and yet is ſuppoſed to be a petrified ſerpent; the *nummi minerales*, which are the operculums of ſhell-fiſh, but are generally ſuppoſed by the vulgar, about the places where they are found, to be medals and coins petrified with lying in the earth, and many the like follies. Breyn. de Melon. Petr. Mont. Carm.

Melon-*thiſtle*. See *Melon* THISTLE.

Melon, *water*, or CITRUL, *anguria*, in *Botany*. Its characters are theſe: it has male and female flowers on the ſame plant: which are both of them of the open bell-ſhaped kind, of one leaf; the male flowers have three ſhort ſtamina joined together; the female flowers reſt upon an oval germen, which becomes an oblong fleſhy fruit; having five cells filled with compreſſed ſeeds, rounded at the extremities. There is one ſpecies which is cultivated in warm countries, and is much eſteemed for its cooling fruit.

Linnæus has joined the citrul to the GOURD; and the *anguria* to the cucumber, and made a diſtinct genus of the *anguria*, in the claſs of *monoecia diandria*, having male and female flowers, the empalement of each being divided into five ſegments, and the flower bearing five petals; the fruit is a double-celled polyſpermous apple. Of this genus he reckons three ſpecies.

There is little difference in cultivation required between this and the muſk *melon*.

The ſeeds have the ſame medicinal qualities aſcribed to them, as thoſe of the gourd.

MELONGENA, in *Botany*, a ſpecies of the ſolanum or NIGHT-SHADE. See MAD-*Apple*.

MELOPŒIA, a name given by the ancients to that part of MUSIC, which anſwers to the HARMONICA.

MELOPEPO, *calabaſh*, in *Botany*, a ſpecies of the *cucurbita* or GOURD. Some make this a diſtinct genus of plants, of a middle nature, as their name expreſſes, between the melon and the pompion.

The ſpecies of this genus, enumerated by Mr. Tournefort, are fourteen.

MELOTIS, a word uſed by the chirurgical writers to expreſs a ſmall probe, properly one intended to be uſed only to the ear.

MELOTHRIA, *ſmall creeping cucumber*, in *Botany*, a genus of the *triandria monogynia* claſs: its characters are, that the empalement is of one leaf, bell-ſhaped, and cut ſlightly at the brim into five parts; the flower is wheel-ſhaped, having a tube of the length of the empalement; in the centre of the flower is ſituated the pointal, ſupporting a cylindrical ſtyle, accompanied by three conical ſtamina, inſerted in the tube of the flower, and extended to the ſame length; the pointal becomes an oval ſmall berry, having three diviſions, in which are lodged ſmall flat ſeeds. There is only one ſpecies.

MELPOMENE, the name of one of the nine MUSES; who is repreſented with a maſk to denote her preſiding over the ſtage; and diſtinguiſhed from THALIA, the comic Muſe, by greater dignity in her look, ſtature, and dreſs. *Melpomene* was ſuppoſed to preſide over all melancholy ſubjects, as well as tragedy. See Horace, lib. i, od. 24. v. 4. lib. iii. od. 30. v. ult.

MELT. See MILT.

Melting-*cone*, in *Aſſaying*, is a ſmall veſſel made of copper or braſs, of a conic figure, and of a nicely poliſhed ſurface within. Its uſe is to receive melted metals, and ſerve for their precipitation, which is effected, when two bodies melted together, and yet not mixing perfectly with one another in the fuſion, ſeparate in the cooling into two ſtrata, on account of their different ſpecific gravity. This precipitation might be made in the ſame veſſel in which the fuſion is performed; but then the melting-pot or crucible muſt be broken every time to get it out, whereas the conic ſhape, and poliſhed ſurface of this veſſel, makes it eaſily got out without violence. The ſhape of this veſſel is alſo of another uſe in the operation; for by means of it, the heavy matter ſubſiding to a point, is formed into a perfect and ſeparate regulus, even where the whole quantity, as is very frequently the caſe, has been but very ſmall.

When the quantity of the melted matter is great, it is common to uſe, inſtead of this cone, a large braſs or iron mortar, or any other conveniently ſhaped braſs or iron veſſel. It is neceſſary, when the cone is of braſs, to be cautious that it be not made too hot; for the brittleneſs of that metal, when hot, makes it eaſily break, on the ſtriking with any force on that occaſion, to make the melted maſs fall out.

Theſe, and all other moulds for the receiving melted metals, muſt always be well heated before the maſs is poured into them, leſt they ſhould have contracted a moiſture from the air, or have been wetted by accident, in which caſe the melted metal will be thrown out of them with great violence and danger. They ought alſo to be ſmeared over with tallow on their inſide, that the regulus may be the more eaſily taken out of them, and the ſurface of the mould not corroded by the melted maſs poured in.

If a very large quantity of a metal is, however, to be received into them; and eſpecially if any thing ſulphureous have place among it, this caution of tallowing the moulds does not prove ſufficient; for the large quantity of the maſs makes it continue hot ſo long, that this becomes but a ſlight defence to the ſurface of the mould. In this caſe the aſſayer has recourſe to a lute, reduced to a thin pap with water, which being applied in form of a very thin cruſt, all over the inſide of the cone, or mould, ſoon dries up, indeed, but always preſerves the ſides of the veſſel from the corroſion of the maſs. And this caution is found neceſſary, even when pure copper is melted alone, without any mixture of ſulphur. See *Tab.* II. *of Chemiſtry*, N° 25.

Melting *fire*. See FIRE.

Melting, *ſurveyor of*. See SURVEYOR.

MEMECYLON, in *Botany*, a name by which ſome authors have called the *arbutus*, or ſtrawberry-tree, a ſhrub preſerved in the gardens of the curious. Ger. Emac. Ind. 2.

Memecylon, in the Linnæan ſyſtem of *Botany*, is a diſtinct genus of the *octandria monogynia* claſs; its characters are, that the empalement has an entire margin, and the flower a ſingle petal; the fruit is a berry crowned with a cylindric empalement. There is only one ſpecies.

MEMAICULA, in the *Materia Medica of the Ancients*, a name given to a fruit, ordered in ſome compoſitions as an aſtringent and a cooler. When the Greek writers uſe this word, their Latin tranſlators uſually render it by the word *unedo*. Pliny ſays, that *unedo* is the name of the fruit of the *arbutus*, or ſtrawberry-tree; but we find the earlieſt Latin writers do not countenance this. Varro calls the fuit of the *arbutus* by the name *arbutus*, as he does the fruit of the mulberry or morus, by the name *morus*. And it ſeems to have been contrary to the general cuſtom of the times to have impoſed a name upon a fruit, different from that of the tree which bore it. Some of the commentators ſay that the *memaicula*, or *unedo*, was no other than the common wood-ſtrawberry: and Ægineta in one place ſays, that the fruit of the *camarus*, that is, of the *arbutus*, was called *memaicula*; but in another place he gives a much better explication of the word, ſaying, that ſome of the Greeks uſed it as the name of the fruit of the CORNUS *mas*, or male cornel-tree.

MEMBERS, in *Anatomy*, the exterior parts, ariſing from the trunk or body of an animal, like the boughs from the trunk of a tree.

In which ſenſe, *members*, *membra*, amount to much the ſame with *limbs*, *artus*: though ſome make a difference between the two; reſtraining *members* more immediately to the fleſhy parts which cover the limbs, and artus to the bones and nerves. Phyſicians divide the body into three regions or venters; the head, the breaſt, and the lower ventricle; and the extremities, which are the *members*.

Member, in *Architecture*, denotes any part of a building; as a frieze, cornice, or the like.

Member is ſometimes alſo uſed for MOULDING.

Member, in *Grammar*, is applied to the parts of a period, or ſentence.

Member is alſo uſed to denote ſome particular order or rank in a ſtate or government: thus we ſay, *member* of a corporation, *member* of parliament, *member* of the council, &c.

MEMBERED, or Membred, in *Heraldry*, is when the beak, or legs, or feet of an eagle, griffin, or other bird, are of a different colour from the reſt of the body.

MEMBRANA, in *Anatomy*. See MEMBRANE.

Membrana *carnoſa*. See PANNICULUS, &c.

Membrana *nictitans*. See NICTITATING.

Membrana *tympani*. See TYMPANUM and FORAMEN.

Membrana *urinaria*. See ALLANTOIS.

MEMBRANE, Membrana, in *Anatomy*, a ſimilar part of an animal body; being a thin, white, flexible, expanded ſkin, formed of ſeveral ſorts of fibres, interwoven together, and ſerving to cover, or wrap up, certain parts of the body.

The *membranes* of the body are various; and variouſly denominated. Such are the perioſteum, pleura, pericardium, peritonæum, &c. which ſee under their proper articles. Such alſo are the *adipoſa*, *carnoſa*, and *nictitating*.

Thoſe *membranes* which ſerve as integuments or covers of veſſels, are called *coats*, or *tunics*; and thoſe which cover the brain, are, by a peculiar name, called *meninges*.

The fibres of *membranes* give them an elaſticity, whereby they can contract, and cloſely graſp the parts they contain; and their nervous fibres give them alſo an exquiſite ſenſe, which is the cauſe of their contractions. They can therefore ſcarcely ſuffer the ſharpneſs of medicines, and they are difficultly united, when wounded. In their texture, there is a number of ſmall glands which ſeparate an humour, fit for moiſtening the parts they contain. By reaſon of the thinneſs and tranſparency of the *membranes*, the ramifications of the blood-veſſels are more apparently ſeen in them than in any other part of the body: here the innumerable diviſions, windings and turnings, ſerpentine progreſſions, and frequent inoſculations, not only of veins and arteries together, but alſo of veins with veins, and arteries with arteries, make a moſt agreeable embroidery, and delicate net-work, covering the whole *membrane*.

The uſe of the *membranes* is to cover and wrap up the parts, and ſtrengthen them; to ſave them from external injuries; to preſerve the natural heat; to join one part to another; to ſuſtain ſmall veſſels, and the nerves which run through their duplicatures; to ſtop the returning of the humours in their veſſels, as the valves ſtop the returning of the blood in the veins and heart; of the chyle in the thoracic duct; and of the lympha in the lymphatic veſſels.

Anatomiſts generally aſſert that there is a *membrana communis muſculorum*, or *membrane*, common to all the muſcles: being led into that miſtake by the aponeuroſis of ſeveral; whereas, upon ſtricter obſervation, there is no ſuch thing to be found.

The *membrana propria muſculorum*, is that which immediately covers all and every one of the fibres of a muſcle, and is cloſely tacked to them. There is another common *membrane*, called *membrana communis vaſculorum*; which is a thin *membrane*, accompanying almoſt all the veſſels of the body. See MUSCULAR *Membrane*.

All theſe *membranes* receive veins, arteries, and nerves, from the parts which are neareſt to them.

Mr. Leewenhoek has been at the pains of examining with great nicety, the fine *membranes* which incloſed the faſciculi or ſmall bundles of fibres of which a muſcle is compoſed. Between theſe faſciculi the *membrane* is of a conſiderable thickneſs, but it divides itſelf every way into very fine and ſmall branches. This *membrane* is evidently compoſed of a number of ſmall veſſels, and theſe may be diſtinguiſhed not only in its thick parts, but even where it is ever ſo ſmall and fine, ſo far as the microſcope can trace it; but this it not ſo far as might be wiſhed; for the *membrane* ſtill divides itſelf in its progreſs into more and more ramifications, and where it envelopes only a ſingle fibre, is not to be diſtinguiſhed with any degree of preciſion, even with the beſt microſcopes. The ſmall veſſels extended through this *membrane*, are doubtleſs intended to convey nouriſhment to it; but it is very certain that the globules of blood can never paſs into ſuch ſmall canals. Phil. Tranſ. Nº 122. p. 140.

MEMBRANE, *adipoſe*, in *Anatomy*, denotes a membrane inveſting the body, immediately under the cutis; ſuppoſed to be the baſis of the fat, which is lodged in the ſpaces between its fibres, and in peculiar cells formed herein.

Anatomiſts are divided as to the reality of this *membrane*; moſt of the later writers taking it to be no other than the exterior *membrane* of the membrana carnoſa, or muſculorum communis.

It was the opinion of Boerhaave, that the ſeat of the *lues venerea*, or pox, was in the *membrana adipoſa*. There are many ſeeming difficulties which have prevented the generality of the learned world from giving into this; but there have been ſeveral particular caſes, the ſymptoms of which ſeem to prove it really to be ſo.

Of theſe Dr. Huxham gives one, which alone may ſeem ſufficient to prove the reality of it. This is of a gentleman of about twenty-ſeven years of age, and of a hot bilious conſtitution, who ſome years before his death had got a gonorrhœa, and before that was cured, a ſecond, and after that a third; and after all theſe, had frequent impure converſations with the negro women in the Weſt Indies, who probably had that worſt ſpecies of pox, the yaws. He had, after this, a terrible itching under his ſkin, and a very ſtinking breath, and ſpit corrupt matter, but had no running ulcer, bubo, node, or other of the common ſymptoms of a confirmed pox; but after repeating his raſh conduct with ſome women in England, he had a gonorrhœa, of which he could not get cured; but a bubo appeared in the groin, and ſwellings about the anus.

One of theſe breaking diſcharged a great quantity of matter, and after that others appeared, the bubo would not ſuppurate, and ſcabs appeared in ſeveral parts of his body. He was fumigated with cinnabar, and a ſalivation propoſed; but after taking at times five drams of calomel, he had not the leaſt ſoreneſs of the gums, though that medicine had not purged nor vomited him. At length turbith vomits, and large doſes of mercurials, to which he had been much accuſtomed before, brought on a ſoreneſs of the mouth; but the ſpitting was tough, and did not amount to a pint a day. During this courſe the ſcaly eruptions increaſed, and he was at length covered with them all over, and his limbs ſwelled, and even burſt in many places, the fiſſures diſcharging a ſtinking ichorous matter.

Hot baths and mercurial ointments were uſed on this, but the diſeaſe ſtill increaſed under theſe means; the ſcales grew ſo ſtiff, that he could not move his limbs, and ulcers appeared in many parts, particularly a large tumor on each breaſt, which diſcharged vaſt quantities of an oily ſtinking matter. It was obſervable, that where theſe tumors and ulcers appeared, they only ran under the ſkin, being entirely ſeated in and feeding on the *membrana adipoſa*, ſo that the muſcles and tendons underneath appeared as fair and florid as in the moſt healthy conſtitution.

It was now plain, that mercury could do nothing toward a cure in any form, and the old method of ſweating was attempted with warm baths, to looſen the ſcales; by this means they came off apace in the manner of thoſe of the confluent ſmall-pox, but larger, ſome of theſe being four or five inches over. In a week's time, the coat of mail was cleared off, and his breath became ſweet; but the ulcers ſtill diſcharging great quantities, and notwithſtanding all that had been done, two large ſhankers appeared on the glans, and a bubo in each groin: he was alſo ſeized with a cough, and ſpit purulent and bloody matter. It was evident that the whole *membrana adipoſa* had been conſumed from the external part of the body, and the diſeaſe now began to ſeize on that part of it which inveſted the more vital parts; but nature could ſupport it no longer, and he died in the moſt extreme degree of a pocky conſumption. It is obſervable that not one bone in the whole body appeared to be touched, though he died with more than forty ulcers upon him. Phil. Tranſ. Nº 460 p. 671

MEMBRANES *of the eye*. See EYE.

MEMBRANE, *nictitating*. See NICTITATING.

MEMBRANACEOUS *leaf*. See LEAF.

MEMBRANOSA *armilla*. See ARMILLA.

MEMBRANOSUS, or *muſculus faſciæ latæ*, in *Anatomy*, is a ſmall and pretty long muſcle, ſituated a little obliquely upward and downward on the fore part of the hip. It is fixed above to the outſide of the anterior ſuperior ſpine of the os ilium, between the inſertions of the glutæus medius, and ſartorius. From thence its fleſhy fibres run down a little obliquely backward, forming a very flat body, four fingers breadth in length, and two in breadth, which lies between two laminæ of the FASCIA *lata*, and is inſerted therein by ſhort tendinous fibres. Winſlow. See *Tab. Anat. (Myol.) fig.* 2. *n.* 34. *fig.* 1. *n.* 48. *fig.* 6. *n.* 34.

MEMBRAS, in *Ichthyology*, a name given by Rondeletius, Aldrovand, and other writers to the HERRING.

MEMBRED. See MEMBERED.

MEME. *Que eſt* MEME. See QUE.

MEMIREN, in the *Materia Medica*, the name by which Serapion and ſome other authors have called the pilewort, or ſmall celandine

MEMITHA, in the *Materia Medica of the Ancients*, the name of a plant which ſome have ſuppoſed to be our cerinthe, but others the glaucium, or yellow-horned poppy.

MEMOIRS, or MEMORIALS, a term now much in uſe for hiſtories compoſed by perſons who had ſome ſhare or concern in the tranſactions they relate, or who were eye-witneſſes of them; anſwering to what the Latins called *commentarii*.

The French are great dealers in this way of writing, and have an infinite number of books of *memoirs*, containing, for the generality, the lives, actions, intrigues, amours, &c. of the writers.

MEMOIRS is alſo uſed for a journal of the acts and proceedings of a ſociety; or a collection of the matters debated, tranſacted, &c. therein. Such are the *Memoirs* of the Royal Academy of Sciences, &c.

MEMORY, *μνήμη*, a power or faculty of the mind, which receives, retains, and exhibits again, as occaſion requires, all ſorts of ideas preſented to the underſtanding.

Of all the faculties, there is none harder to account for, or that has perplexed philoſophers more, than the *memory*. Some will have it a mere organ, as the eye, ear, &c. Dr. Hook, in an *Eſſay towards a mechanical Account of Memory*, makes it to conſiſt in a ſtock of ideas or images, formed occaſionally by the mind, cut of the fine parts of the brain, and diſpoſed or laid by in order.

Deſcartes and his followers maintain, that the animal ſpirits, exciting a motion in the moſt delicate fibres of the brain, leave a kind of traces or footſteps, which occaſion our *remembrance*. Hence it happens, that by paſſing ſeveral times over the ſame things, the ſpirits becoming accuſtomed to the ſame paſſages, leave them open, and ſo make their way without any effort or labour; and in this conſiſts the eaſe wherewith we recollect ſuch ideas. Thus wine is found to ſharpen the *memory*, in regard the ſpirits of the wine put the animal ſpirits in motion, and agitate the fibres of the brain more briſkly.

Father Malebranche expreſſes his notion of *memory* thus: “It being granted, that all our different perceptions are owing to changes happening in the fibres of the principal part of the brain, wherein the ſoul more immediately reſides, the nature of the *memory* is obvious: for as the leaves of a tree, that have been folded for ſome time in a certain manner, preſerve a facility or diſpoſition to be folded again in the ſame manner; ſo the fibres of the brain, having once received certain impreſſions by the courſes of the animal ſpirits, and by the action of objects, preſerve, for ſome time, a facility to receive the ſame diſpoſition. Now it is in this facility that *memory* conſiſts; for we think the ſame things, when the brain receives the ſame diſpoſitions.

“Farther, as the animal ſpirits act ſometimes more briſkly, and ſometimes more languidly, on the ſubſtance of the brain; and as ſenſible objects make much deeper, and more laſting impreſſions, than the imagination alone; it is eaſy, on this ſcheme, to conceive why we do not remember all things alike: why a thing, for inſtance, ſeen twice, is repreſented more vividly to the mind than another ſeen but once: and why things that have been ſeen, are uſually remembered more diſtinctly, than thoſe that have been only imagined, &c.

“Old men are defective in *memory*, and cannot learn any thing without much difficulty, becauſe they want animal ſpirits to make new traces, and becauſe the fibres of the brain are become too hard to receive, or too moiſt to retain, ſuch impreſſions. For the ſame reaſon, thoſe who learn with the greateſt eaſe, forget the ſooneſt; in regard when the fibres are ſoft and flexible, objects make a ſlight impreſſion, which the continual courſe of animal ſpirits eaſily wears off. On the contrary, the fibres of thoſe who learn ſlowly, being leſs flexible, and leſs ſubject to be ſhaken, the traces are more deeply engraven, and laſt the longer.

“From all which obſervations it follows, that the *memory* is abſolutely dependent on the body; being impaired or ſtrengthed, according to the changes that befall the body; a fall, the tranſports of a fever, &c. being frequently found to eraſe or blot out all the traces, to bear away all the ideas, and to cauſe an univerſal forgetfulneſs.”

The chief difficulty that clogs this doctrine of *memory* is to conceive how ſuch an infinite number of things, as the head is ſtored with, ſhould be ranged in ſo much order in the *memory*, as that the one ſhould not efface the other; and how, in ſuch a prodigious aſſemblage of traces impreſſed on the brain, the animal ſpirits ſhould awake preciſely thoſe which the mind has occaſion for.

Memory, according to Mr. Locke, is, as it were, the ſtorehouſe of our ideas. For the narrow mind of man not being capable of having many ideas under view and conſideration at once, it was neceſſary to have a repoſitory, in which to lay up thoſe ideas which it may afterwards have uſe of. But our ideas being nothing but actual perceptions in the mind, which ceaſe to be any thing when there is no perception of them; this laying up of our ideas in the repoſitory of the *memory*, ſignifies no more than this, that the mind has a power, in many caſes, to revive perceptions it has once had, with this additional perception annexed to them, that it has had them before. And it is by the aſſiſtance of this faculty, that we are ſaid to have all thoſe ideas in our underſtandings, which we can bring in ſight, and make the objects of our thoughts, without the help of thoſe ſenſible qualities which firſt imprinted them there.

Attention and repetition help much to the fixing ideas in our *memories*: but thoſe which make the deepeſt and moſt laſting impreſſions, are thoſe which are accompanied with pleaſure and pain. Ideas but once taken in and never again repeated, are ſoon loſt; as thoſe of colours in ſuch as loſt their ſight when very young.

The *memory* of ſome men is tenacious even to a miracle; but yet there ſeems to be a conſtant decay of all our ideas, even of thoſe which are ſtruck deepeſt, and in minds the moſt retentive; ſo that if they be not ſometimes renewed, the print wears out, and at laſt there remains nothing to be ſeen.

Thoſe ideas that are often refreſhed by a frequent return of the objects or actions that produce them, fix themſelves beſt in the *memory*, and remain longeſt there: ſuch are the original qualities of bodies, viz. ſolidity, extenſion, figure, motion, &c. and thoſe that almoſt conſtantly affect us, as heat, and cold.

In *memory*, the mind is oftentimes more than barely paſſive; for it often ſets itſelf to work to ſearch ſome hidden ideas; ſometimes they ſtart of their own accord; and ſometimes tempeſtuous paſſions tumble them out of their cells. This faculty other animals ſeem to have to a great degree, as well as men, as appears by birds learning of tunes, and their endeavours to hit the notes right. For it ſeems impoſſible that they ſhould endeavour to conform their voices (as it is plain they do) to notes whereof they have no idea. Eſſay concerning Hum. Und. book ii. chap. 10.

Dr. Hartley, agreeably to his mechanical theory of the human mind, defines *memory* to be that faculty by which traces of ſenſations and ideas recur, or are recalled, in the ſame order and proportion, accurately or nearly, as they were once preſented: and he obſerves, that *memory* depends entirely or chiefly on the ſtate of the brain, which is peculiarly conformable to his notion of VIBRATIONS. The rudiments of *memory*, he ſays, are laid in the perpetual recurrency of the ſame impreſſions, and cluſters of impreſſions: and thus he endeavours to account for the peculiar imperfections of the *memory* in children and aged perſons, as well as for other facts pertaining to the exerciſe of this faculty. Obſ. on Man, vol. i. p. 374, &c.

For the difference between *memory* and imagination, ſee IMAGINATION.

Seneca ſays of himſelf, that, by the mere effort of his natural *memory*, he was able to repeat two thouſand words upon once hearing them, each in its order; though they had no dependence or connexion on each other. After which he mentions a friend of his, Portius Latro, who retained in his *memory* all the declamations he had ever ſpoken, and never found his *memory* fail him, even in a ſingle word. He alſo mentions Cyneas, ambaſſador to the Romans from king Pyrrhus, who, in one day, had ſo well learnt the names of his ſpectators, that the next he ſaluted the whole ſenate, and all the populace aſſembled, each by his name. Pliny ſays, that Cyrus knew every ſoldier in his army by name; and L. Scipio, all the people of Rome. Charmipas, or rather Carneades, when required, it is ſaid, would repeat any volume found in the libraries as readily as if he were reading. Dr. Wallis tells us, that without the aſſiſtance of pen and ink, or any thing equivalent, he was able in the dark, by mere force of *memory*, to perform arithmetical operations, as multiplication, diviſion, extraction of roots, &c. to forty places. Particularly, that, in February 1671-2, at the requeſt of a foreigner (by night in bed) he propoſed to himſelf a number of fifty-three places, and found its ſquare root to twenty-ſeven places; and, without ever writing down the number, dictated it from his *memory*, at his next viſit, twenty days afterwards.

The perfection of *memory* conſiſts in two things; readily to admit the impreſſions or images of things; and to preſerve them from oblivion, that the underſtanding may have recourſe to them, and employ them for ſuch purpoſes, as reaſon ſhall direct. In order to aſſiſt and improve this faculty, every kind of intemperance and exceſs muſt be carefully avoided; and when we would commit any thing to *memory*, our firſt concern ſhould be to underſtand it thoroughly; writing down any thing is likewiſe a great advantage towards remembering it; care ſhould likewiſe be taken not to overburden the *memory*: ſuch ſeaſons ſhould be made choice of as are moſt proper for the exerciſe of this faculty, ſuch are the evening and morning; and the moſt effectual way of gaining a good *memory*, is its conſtant and moderate exerciſe. Ward's Or. vol. ii. ſect. 51.

MEMORY, *local*, or *artificial*, is an art, or invention, by means whereof the *memory* is ſuppoſed to be aided, ſtrengthened, and enlarged.

This art ſeems to conſiſt in nothing elſe but a certain method of coupling or aſſociating the ideas of things to be remembered, with the ideas of other things, already diſpoſed orderly in the mind, or that are before the eyes. It is of an old ſtanding, having been practiſed by many of the ancient orators; ſome whereof are ſaid to have made uſe of paintings, images, and emblems, on this occaſion; though others contented themſelves with the parts, members, ornaments, furniture, and other circumſtances of the place where they were to ſpeak. Muretus tells us that a young man of Corſica pretending to do wonders this way, Muretus put him to the trial; and upon dictating to him two or three thouſand words, ſome Greek, ſome Latin, ſome Barbarous; all without any relation to each other, and the greateſt part without any meaning at all; the artiſt immediately, and without any heſitation, or the leaſt ſtumbling or diſplacing, repeated them all, from firſt to laſt, in the ſame order wherein they had been dictated; and this done, beginning where he ended, he repeated them all backwards, from laſt to firſt. Adding, that this was but a ſlight eſſay of his *memory*; and that he would undertake to repeat thirty-ſix thouſand words in the ſame manner.

The truth is, this art ſeems better calculated for retaining things without any coherence or dependence on one another, as mere words or ſounds, &c. than for things where reaſon or judgment are any way required.

Raim. Lully took ſo much pains with it, that it now goes by his name, being called *Lully's art*.

Many have been the attempts, in all ages, to aſſiſt the *memory*. Some have had recourſe to medicine, ſuch as Horſtius, Marſilius, Ficinus, Johnſton, and others. That good health, a good digeſtion, and a mind free from care, are helps in this reſpect, is an old obſervation. That attention, application, frequent recapitulation, are neceſſary, is known to every one. But whether, beſides natural health and parts, and the exerciſe of our faculties, art may not give a farther aſſiſtance to *memory*, has been a queſtion. Simonides is ſaid to have been the firſt who found out the art of *memory*. His method was by a choice of *places* and *images*, as a repoſitory of ideas; ſuch, for inſtance, as a large houſe divided into ſeveral apartments, rooms, cloſets, &c. All theſe, and their order, were to be rendered extremely familiar to the imagination and *memory*. Then, whatever was to be remembered, was by ſome ſymbolical repreſentation or another, as an anchor for navigation, to be connected with ſome part of the houſe, or other artificial repoſitory, in a regular manner. Cicero and Quintilian give us ſome account of this method, and ſpeak of it with reſpect. Several moderns have attempted improvements of artificial *memory*. There was a collection of various treatiſes of this kind publiſhed at Leipzig; this and Bruxius's Simonides Redivivus, are commended by Morhof. Paſchius gives us ſome account alſo of ſeveral authors who have treated of this art. It is certainly of uſe in hiſtory and chronology. The chief artifice, in this reſpect, is to form an artificial word, the letters of which ſhall ſignify numbers. Hence a date or *æra* may more eaſily be recapitulated and remembered than without ſuch a contrivance. This invention is mentioned as a ſecret known to few, by Paſchius. It has been proſecuted lately in England, by Dr Grey.

The method is this: to remember any thing in hiſtory, chronology, geography, &c. a word is formed, the beginning whereof being the firſt ſyllable or ſyllables of the thing to be remembered, does, by frequent repetition, of courſe draw after it the latter parts, which is ſo contrived as to give the anſwer. Thus, in hiſtory, the deluge happened in the year before Chriſt 2348. This may be ſignified by the word Dél *étok*; Del ſtanding for deluge, and *etok* for 2348. How theſe words came to ſignify theſe things, or contribute to the remembering them, is now to be ſhewn.

The firſt thing to be done, is to learn exactly the following ſeries of vowels and conſonants, which are to repreſent the numerical figures, ſo as to be able at pleaſure to form a technical word, which ſhall ſtand for any number, or to reſolve a word already formed into the number it ſtands for.

a	*e*	*i*	*o*	*u*	*au*	*oi*	*ei*	*ou*	*y*
1	2	3	4	5	6	7	8	9	0
b	*d*	*t*	*f*	*l*	*s*	*p*	*k*	*n*	*z*

Here *a* and *b* ſtand for 1, *e* and *d* for 2, *i* and *t* for 3, and ſo on. Theſe letters are aſſigned arbitrarily to the reſpective figures, and may very eaſily be remembered. The firſt five vowels in order naturally repreſent 1, 2, 3, 4, 5. The diphthong *au*, being compoſed of *a*, 1, and *u*, 5, ſtands for 6; *oi* for 7, being compoſed of *o*, 4 and *i*, 3; *ou* for 9, being compoſed of *o*, 4 and *u*, 5: the diphthong *ei* will eaſily be remembered for 8, being the initials of the word. In like manner for the conſonants, where the initials could conveniently be retained, they are made uſe of to ſignify the number, as *t* for 3, *f* for four, *s* for ſix, and *n* for 9. The reſt were aſſigned without any particular reaſon, unleſs that poſſibly *p* may be more eaſily remembered for 7, or *ſeptem*, *k* for 8, or *οκτω*, *d* for 2, or *duo*; *b* for 1, as being the firſt conſonant, and *l* for 5, being the Roman letter for 50, than any others that could have been put in their places. Mem. Techn. p. 2, 3. It is farther to be obſerved, that *z* and *y* being made uſe of to repreſent the cypher, where many cyphers meet together, as 1000, 1000000, &c. inſtead of a repetition of *azyzyzy*, &c. let *g* ſtand for 100, *th* for a thouſand, and *m* for a million. Thus *ag* will be 100, *ig* 300; *oug* 900, &c. *ath* 1000, *am* 1000000, *loum* 59000000, &c. Ib. p. 5. Fractions may be ſet down in the following manner: let *r* ſignify the line ſeparating the numerator and denominator, the firſt coming *before*, the other *after* it; as *iro* $\frac{3}{4}$, *urp*, $\frac{5}{7}$, *pourag* $\frac{79}{100}$, &c. When the numerator is 1 or unit, it need not be expreſſed, but begin the fraction with *r*; as *re* $\frac{1}{2}$, *ri*, $\frac{1}{3}$, *ro* $\frac{1}{4}$, &c. So in decimals, *rag* $\frac{1}{100}$, *rath* $\frac{1}{1000}$. Ibid.

This is the principal part of the method, which conſiſts in expreſſing numbers by artificial words. The application to hiſtory and chronology is alſo performed by artificial words. The art herein conſiſts in making ſuch a change in the ending of the name of a place, perſon, planet, coin, &c. without altering the beginning of it, as ſhall readily ſuggeſt the thing ſought, at the ſame time that the beginning of the word, being preſerved, ſhall be a leading or prompting ſyllable to the ending of it ſo changed. Thus in order to remember the years in which Cyrus, Alexander, and Julius Cæſar, founded their reſpective monarchies, the following words may be formed; for Cyrus, Cyr*uts*; for Alexander, Alex*ita*; for Julius Cæſar, Juli*os*. *Uts* ſignifies, according to the powers aſſigned to the letters before mentioned, 536; *ita* is 331, and *os* is 46. Hence it will be eaſy to remember, that the empire of Cyrus was founded 536 years before Chriſt, that of Alexander 331, and that of Julius Cæſar, 46. Mem. Techn. Introd. p. viii. and ix.

For the farther application of this method, we refer to the ingenious author of the laſt recited book. We ſhall only add, that *technical verſes* contribute much to the aſſiſtance of the *memory*, both as they generally contain a great deal in a little compaſs, and alſo becauſe, being once learned, they are ſeldom or never forgot. The author before quoted has given us ſeveral ſpecimens of ſuch verſes in hiſtory, chronology, geography, and aſtronomy, as alſo the Jewiſh, Grecian and Roman coins, weights and meaſures, &c. He adviſes his reader to form the words and verſes for his own uſe himſelf; as he perhaps will better remember them than thoſe formed by the author. Lib. citat. Introduct. p. xi.

As to Simonides' method, Quintilian ſays he will not deny it to be of ſome uſe; for inſtance, in repeating a multitude of words in the order they occur, and in things of this nature: but he thinks it of leſs uſe in getting by heart a continued oration, and in this reſpect rather an incumbrance. He himſelf adviſes, if the ſpeech to be remembered be long, to get it by heart in parts, and thoſe not very ſmall. The partition ought chiefly to be made according to the different topics. He thinks it beſt to get things by heart tacitly, and if the better to fix the attention, the words be pronounced, yet it ſhould be in a low voice. Apt diviſions help the *memory* greatly. But after all, the great art of *memory* is exerciſe; to get many things by heart, and daily, if poſſible. Nothing increaſes more by uſe, or ſuffers more by neglect, than the *memory*. At whatever age a man aims at the improvement of this faculty, he ſhould patiently ſubmit to the uneaſy labour of repeating what he has read or written. Here, as in other caſes, where habits are to be acquired, exerciſe ſhould be increaſed by degrees. Quint. Inſt. Orat. lib. xi. cap. 2. p. 989.

Lord Bacon enumerates ſeveral helps to *memory*, as order, artificial place, verſe, whatever brings an intellectual thing to ſtrike the ſenſes, and thoſe things which make an impreſſion by means of a ſtrong paſſion, as fear, ſurprize, &c. Thoſe things alſo ſink deepeſt, and dwell longeſt in the *memory*, which are impreſſed upon a clear mind unprejudiced either before or after the impreſſion, as the things we learn in childhood, or think of juſt before going to ſleep; as likewiſe the firſt time things are taken notice of.

A multitude of circumſtances alſo, or, as it were, handles or holds to be taken, help the *memory*; as the making many breaks in writing, reading or repeating aloud: but as to this laſt, ſee Quintilian's opinion before mentioned. Thoſe things which are expected, and raiſe the attention, ſtick better than ſuch as paſs ſlightly over the mind; whence if a man reads any writing twenty times over, he will not remember it ſo well, as if he read it but ten times with trying between whiles to repeat it, and conſulting the copy where his memory failed. Bacon's Works abr. vol. ii. p. 475. See alſo vol. i. p. 135, 136. vol. iii. p. 176, and the article MNEMONIC *Tables*.

MEMORY, *weakneſs of the*, in many caſes, is to be conſidered as a diſeaſe, and is looked on in that light by the medical writers, who have preſcribed various remedies for it. The principal cauſes of this debility, are a too frequent and conſtrained uſe, or rather abuſe of it, in the getting by rote numbers of words and ſyllables, particularly in the learning different languages; a paralytic affection in the head; violent external injuries in the ſame part; violent pains in the head attended with deliriums, or attending a PHRENITIS. And to theſe are to be added drunkenneſs, and abuſe of venery.

Prognoſtics. All debilities of *memory* are cured with great difficulty by medicines alone; and indeed this complaint is ſeldom removed, unleſs the whole frame of mind and courſe of life be altered; all paſſions avoided, and exceſs of every kind left off. But of all other kinds, that debility of *memory* which proceeds from a paralytic diſorder of the head, particularly when that diſorder affects the tongue, is found to be the moſt obſtinate and difficult of cure. Much ſleep, or exceſſive waking, are equally hurtful to the *memory*, and frequently bring on an almoſt total loſs of it.

Method of treatment. All ſuch medicines as are of an agreeable taſte or odour, are generally ſuppoſed to be of ſervice in ſtrengthening the *memory*; and *lignum aloes*, ambergris, and ſome other of the ſcented drugs, have been known to do great good. The aromatic, volatile, and ſpirituous medicines, alſo all help in this caſe, if taken in ſmall doſes, and continued for a long time together. The analeptics and nervine medicines are alſo greatly recommended, but they are ſeldom found of uſe; for among people afflicted with a debility of *memory*, many are thoſe of robuſt conſtitutions and ſtrong appetites who eat already more than nature requires, and have therefore very little uſe for analeptics or nutritive things. Bleeding in ſmall quantities frequently repeated, in caſes where there is no contrary indication, frequently prove of great ſervice in this caſe; but the *primæ viæ* are firſt to be cleanſed before ſuch a courſe is entered upon. Many greatly recommend bags of aromatics to the head, and to be conſtantly worn in caps; but it is much to be feared theſe can have but very little effect. Junck. Conſp. Med. p. 682.

MEMPHITES, or *lapis* MEMPHITICUS, a ſort of ſtone mentioned by Dioſcorides, Pliny, and other natural hiſtorians, ſuppoſed to be found in Egypt, not far from the city of Cairo, the ancient Memphis, whence its name.

The property it is famed for is, that being pulverized and ſmeared on any part of the body to be cut off, it deadens it ſo, as that the patient ſhall receive no pain, they ſay, from the operation.

MEN—*Midſhipmen*, *Moot*, *Port*, *Queſt*, *Sides*, *Twelve*, *Veſtry* MEN. See the adjectives.

MEN *allegro*, in the *Italian Muſic*, is uſed to denote a movement not ſo briſk and lively as ALLEGRO.

MEN *forte*, in the *Italian Muſic*, intimates that the part to which it is added ought to be played or ſung not ſo ſtrong or ſo loud as the reſt.

MEN *preſto*, in the *Italian Muſic*, ſignifies leſs quick. See PRESTO.

MENAGE, Fr. denotes a collection of animals; whence we have derived the word *menagery*.

MENAIS, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that it has an hypocrateriform flower, a three-leaved empalement, and that the fruit is a four-celled berry, containing a ſingle ſeed. There is only one ſpecies.

MENALD *deer*, a ſpecies of the common fallow-DEER, beautifully variegated.

MENANDRIANS, the moſt ancient branch of Gnoſtics; thus called from Menander their chief, ſaid by ſome, without ſufficient foundation, to have been a diſciple of Simon Magus, and himſelf a reputed magician.

He taught, that no perſon could be ſaved, unleſs he were baptized in his name: and he conferred a particular ſort of baptiſm, which would render thoſe who received it immortal in the next world: exhibiting himſelf to the world, with the phrenſy of a lunatic more than the founder of a ſect, as a promiſed ſaviour. For it appears by the teſtimonies of Irenæus, Juſtin, and Tertullian, that he pretended to be one of the ÆONS ſent from the pleroma, or eccleſiaſtical regions, to ſuccour the ſouls that lay groaning under bodily oppreſſion and ſervitude; and to maintain them againſt the violence and ſtratagems of the dæmons that hold the reins of empire in this ſublunary world. As this doctrine was built upon the ſame foundation with that of Simon Magus, the ancient writers looked upon him as the inſtructor of *Menander*. See SIMONIANS.

MENDÆANS, in *Eccleſiaſtical Hiſtory*. See HEMEROBAPTISTS.

MENDICANTS, *beggars*, a term applied to ſeveral orders of religious, who live on alms, and go a begging from door to door.

The religious ſociety diſtinguiſhed by this appellation ſurpaſſed all the reſt in the purity of its manners, the extent of its fame, the number of its privileges, and the multitude of its members. Its order was firſt eſtabliſhed in the 13th century, and the members of it, by the tenor of their inſtitution, were to remain entirely deſtitute of all fixed revenues and poſſeſſions; though in proceſs of time their number became a heavy tax upon the people. Innocent III. was the firſt of the popes who perceived the neceſſity of inſtituting ſuch an order, and accordingly he gave ſuch monaſtic ſocieties, as made a profeſſion of poverty, the moſt diſtinguiſhing marks of his protection and favour. They were alſo encouraged and patronized by the ſucceeding pontiffs, when experience had demonſtrated their public and extenſive uſefulneſs. But when it became generally known, that they had ſuch a peculiar place in the eſteem and protection of the rulers of the church, their number grew to ſuch an enormous and unwieldy multitude, and ſwarmed ſo prodigiouſly in all the European provinces, that they became a burthen, not only to the people, but to the church itſelf. The great inconvenience that aroſe from the exceſſive multiplication of the *Mendicant* orders was remedied by Gregory X. in a general council, which he aſſembled at Lyons, in 1272. For here all the religious orders that had ſprung up after the council held at Rome, in 1215, under the pontificate of Innocent III. were ſuppreſſed; and the extravagant multitude of *Mendicants*, as Gregory called them, were reduced to a ſmaller number, and confined to the four following ſocieties or denominations, viz. the DOMINICANS, the FRANCISCANS, the CARMELITES, and the AUGUSTINS, or the hermits of St. Auguſtin.

As the pontiffs allowed theſe four *mendicant* orders the liberty of travelling wherever they thought proper, of converſing with perſons of every rank, of inſtructing the youth and multitude wherever they went; and as theſe monks exhibited, in their outward appearance and manner of life more ſtriking marks of gravity and holineſs, than were obſervable in the other monaſtic ſocieties, they aroſe all at once to the very ſummit of fame, and were regarded with the utmoſt eſteem and veneration through all the countries of Europe. The enthuſiaſtic attachment to theſe ſanctimonious beggars went ſo far, that, as we learn from the moſt authentic records, ſeveral cities were divided, or cantoned into four parts, with a view to theſe four orders; the firſt part being aſſigned to the Dominicans, the ſecond to the Franciſcans, the third to the Carmelites, and the fourth to the Auguſtinians. The people were unwilling to receive the ſacraments from any other hands than thoſe of the *Mendicants*, to whoſe churches they crowded to perform their devotions, while living, and were extremely deſirous to depoſit there alſo their remains, after death: nor did the influence and credit of the *Mendicants* end here; for we find in the hiſtory of this, and of the ſucceeding ages, that they were employed, not only in ſpiritual matters, but alſo in temporal and political affairs of the greateſt conſequence, in compoſing the differences of princes, concluding treaties of peace, concerting alliances, preſiding in cabinet councils, governing courts, levying taxes, and other occupations, not only remote from, but abſolutely inconſiſtent with, the monaſtic character and profeſſion. However, the power of the Dominicans and Franciſcans greatly ſurpaſſed that of the other two orders: inſomuch that theſe two orders were, before the Reformation, what the JESUITS have been ſince that happy and glorious period, the very ſoul of the hierarchy, the engines of the ſtate, the ſecret ſprings of all the motions of the one and the other, and the authors and directors of every great and important event, both in the religious and political world. By very quick progreſſion their pride and confidence arrived at ſuch a pitch, that they had the preſumption to declare publicly, that they had a divine impulſe and commiſſion to illuſtrate and maintain the religion of Jeſus; they treated with the utmoſt inſolence and contempt all the different orders of the prieſthood; they affirmed, without a bluſh, that the true method of obtaining ſalvation was revealed to them alone; proclaimed, with oſtentation, the ſuperior efficacy and virtue of their indulgences; and vaunted, beyond meaſure, their intereſt at the court of heaven, and their familiar connections with the Supreme Being, the Virgin Mary, and the ſaints in glory. By theſe impious wiles, they ſo deluded and captivated the miſerable and blinded multitude, that they would not entruſt any other but the *Mendicants* with the care of their ſouls. They retained their credit and influence to ſuch a degree, towards the cloſe of the fourteenth century, that great numbers of both ſexes, ſome in health, others in a ſtate of infirmity, and others at the point of death, earneſtly deſired to be admitted into the *mendicant* order, which they looked upon as a ſure and infallible method of rendering heaven propitious. Many made it an eſſential part of their laſt wills, that their bodies after death, ſhould be wrapped in old ragged Dominican or Franciſcan habits, and interred among the *Mendicants*. For ſuch was the barbarous ſuperſtition and wretched ignorance of this age, that people univerſally believed they ſhould readily obtain mercy from Chriſt, at the day of judgment, if they appeared before his tribunal aſſociated with the *mendicant* friars.

About this time, however, they fell under an univerſal odium; but being reſolutely protected againſt all oppoſition, whether open or ſecret, by the popes, who regarded them as their beſt friends, and moſt effectual ſupports, they ſuffered little or nothing from the efforts of their numerous adverſaries. In the fifteenth century, beſides their arrogance, which was exceſſive, a quarrelſome and litigious ſpirit prevailed among them, and drew upon them juſtly the diſpleaſure and indignation of many. By affording refuge, at this time to the BEGUINS in their order, they became offenſive to the biſhops, and were hereby involved in difficulties and perplexities of various kinds. They loſt their credit in the ſixteenth century, by their ruſtic impudence, their ridiculous ſuperſtitions, their ignorance, cruelty, and brutiſh manners. They diſcovered the moſt barbarous averſion to the arts and ſciences, and expreſſed a like abhorrence of certain eminent and learned men, who endeavoured to open the paths of ſcience to the purſuits of the ſtudious youth, recommended the culture of the mind, and attacked the barbariſm of the age in their writings and diſcourſe. Their general character, together with other circumſtances, concurred to render a reformation deſirable, and to accompliſh this happy event. Moſheim's Eccl. Hiſt. vol. iii. paſſim.

Among the number of *Mendicants* are alſo ranked the Capuchins, Recollects, Minims, and others, who are branches or derivations from the former.

MENENCHYTA, in *Medicine*, certain compoſitions of medicinal ingredients made for injecting into the womb, in the cure of ſeveral diſeaſes of that part.

MENIAN *column*. See COLUMN.

MENING, in *Botany*, a name given by the people of Guinea to a plant of the *ricinus* or *palma Chriſti* kind, which they uſe in medicine: they dry and powder the leaves, and then give them to be ſnuffed up the noſtrils, to cure all ſorts of ſtuffings or ſtoppages in the head. Its leaves reſemble thoſe of the finch and ivy, and are hairy; whence Petiver has named it *ricinus Guineenſis hæderæ quinquefoliæ Virginianæ facie foliis hirſutis*. It is not known to grow any where in America. Philoſ. Tranſ. N° 232.

MENINGES, Μηνιγγες, in *Anatomy*, the coats, or membranes, wherewith the BRAIN is inveſted.

The Arabs call them *mothers*; whence we uſually call them in Latin the PIA and DURA MATER.

There are two *meninges*, external and internal, called *meninx craſſa*, and *tenuis*.

Between the two, lies another fine tranſparent membrane, called *arachnoides*; but the beſt anatomiſts take this for no more than the external lamina of the pia mater.

MENINGOPHYLAX, a word uſed by Celſus as the name of a chirurgical inſtrument, contrived for guarding the membranes of the brain while the bone of the cranium it raſped or cut, after the operation of the trepan.

MENIPEAN, *ſatira* MENIPEA, a kind of ſatire conſiſting of proſe and verſe intermixed.

It is thus called from Menippus, a Cynic philoſopher, who delighted in compoſing ſatyrical letters, &c. In imitation of him, Varro alſo wrote ſatires under the title of *Satiræ Menippæ*: whence this ſort of compoſition is alſo denominated *Varronian ſatire*.

Among the moderns, there is a famous piece under this title, firſt publiſhed in 1594, againſt the chiefs of the league, called alſo the *Catholicon* of Spain. It is eſteemed a maſter-piece for the time.

MENISCUS, in *Optics*, a glaſs or lens, concave on one ſide, and convex on the other; ſometimes alſo called *lunula*. See LENS, and OPTIC *glaſs*.

In a *meniſcus*, if the diameter of the convexity be equal to that of the concavity, a ray, falling parallel to the axis, will continue parallel thereto after refraction.

Such a *meniſcus*, therefore, will neither collect nor diſperſe the rays; and is therefore of no uſe in dioptrics.

To find the focus of a *meniſcus*, the rule is, as the difference of the ſemidiameters of the convexity and concavity is to the ſemidiameter of the convexity, ſo is the diameter of the concavity to the diſtance of the focus from the *meniſcus*. Hence, if the ſemidiameter of the concavity be triple the ſemidiameter of the convexity, the diſtance of the focus from the *meniſcus* will be equal to the ſemidiameter; and therefore the *meniſcus* will be equivalent to a lens equally convex on either ſide.

Again, if the ſemidiameter of the concavity be double that of the convexity, the diſtance of the focus will be equal to the diameter; and therefore the *meniſcus* will be equivalent to a plano-convex lens.

If the ſemidiameter of the concavity be quintuple that of the convexity, the *meniſcus* will be equivalent to a ſphere.

The ſemidiameter, therefore, of the convexity being given, that of the concavity required to remove the focus to any given diſtance from the *meniſcus*, is eaſily found.

MENISPERMUM, in *Botany*. See MOON-*ſeed*.

MENNONITES, a ſect in the United Provinces, in moſt reſpects the ſame with thoſe in other places called ANABAPTISTS.

They had their riſe in 1536, when *Menno Simon*, a native of Frieſland, who had been a Romiſh prieſt, and a notorious profligate, reſigned his rank and office in the Romiſh church, and publicly embraced the communion of the Anabaptiſts.

Menno was born at Witmarſum, a village in the neighbourhood of Bolſwert, in Frieſland, in the year 1505, and died, in 1561, in the duchy of Holſtein, at the country ſeat of a certain nobleman, not far from the city of Oldeſloe, who, moved with compaſſion by a view of the perils to which *Menno* was expoſed, and the ſnares that were daily laid for his ruin, took him, with certain of his aſſociates, into his protection, and gave him an aſylum. The writings of *Menno*, which are almoſt all compoſed in the Dutch language, were publiſhed in folio, at Amſterdam, in the year 1651. About the year 1537, *Menno* was earneſtly ſolicited by many of the ſect with which he connected himſelf, to aſſume, among them, the rank and functions of a public teacher; and as he looked upon the perſons who made this propoſal, to be exempt from the fanatical phrenſy of their brethren at Munſter, (though, according to other accounts, they were originally of the ſame ſtamp, only rendered ſomewhat wiſer by their ſufferings,) he yielded to their intreaties. From this period to the end of his life, he travelled from one country to another, with his wife and children, exerciſing his miniſtry, under preſſures and calamities of various kinds, that ſucceeded each other without interruption, and conſtantly expoſed to the danger of falling a victim to the ſeverity of the laws. Eaſt and Weſt Frieſland, together with the province of Groningen, were firſt viſited by this zealous apoſtle of the Anabaptiſts; from thence he directed his courſe into Holland, Gelderland, Brabant, and Weſtphalia, continued it through the German provinces that lie on the coaſts of the Baltic Sea, and penetrated ſo far as Livonia. In all theſe places his miniſterial labours were attended with remarkable ſucceſs, and added to his ſect a prodigious number of followers. Hence he is deſervedly conſidered as the common chief of almoſt all the Anabaptiſts, and the parent of the ſect that ſtill ſubſiſts under that denomination. *Menno* was a man of genius, and directed by a very ſound judgment; he poſſeſſed a natural and perſuaſive eloquence, and ſuch a degree of learning as made him paſs for an oracle in the eſtimation of the multitude. He appears, moreover, to have been a man of probity, of a meek and tractable ſpirit, gentle in his manners, pliable and obſequious in his commerce with perſons of all ranks and characters, and extremely zealous in promoting practical religion and virtue, which he recommended by his example, as well as by his precepts. The plan of doctrine and diſcipline drawn up by *Menno* was of a much more mild and moderate nature than that of the furious and fanatical ANABAPTISTS, whoſe tumultuous proceedings have been recited under that article, but ſomewhat more ſevere, though more clear and conſiſtent than the doctrine of the wiſer branches of that ſect, who aimed at nothing more than the reſtoration of the Chriſtian church to its primitive purity. Accordingly, he condemned the plan of eccleſiaſtical diſcipline, that was founded on the proſpect of a new kingdom, to be miraculouſly eſtabliſhed by Jeſus Chriſt on the ruins of civil government and the deſtruction of human rulers, and which had been the fatal and peſtilential ſource of ſuch dreadful commotions, ſuch execrable rebellions, and ſuch enormous crimes. He declared, publicly, his diſlike of that doctrine, which pointed out the approach of a marvellous reformation in the church by the means of a new and extraordinary effuſion of the Holy Spirit. He expreſſed his abhorrence of the licentious tenets, which ſeveral of the Anabaptiſts had maintained, with reſpect to the lawfulneſs of polygamy and divorce, and finally, conſidered as unworthy toleration thoſe fanatics who were of opinion that the Holy Ghoſt continued to deſcend into the minds of many choſen believers, in as extraordinary a manner as he did at the firſt eſtabliſhment of the Chriſtian church, and that he teſtified this peculiar preſence to ſeveral of the faithful, by miracles, predictions, dreams, and viſions of various kinds. He retained, indeed, the doctrines commonly received among the Anabaptiſts, in relation to the baptiſm of infants, the millennium, or thouſand years reign of Chriſt upon earth, the excluſion of magiſtrates from the Chriſtian church, the abolition of war, and the prohibition of oaths enjoined by our Saviour, and the vanity, as well as the pernicious effects, of human ſcience. But while *Menno* retained theſe doctrines in a general ſenſe, he explained and modified them in ſuch a manner, as made them reſemble the religious tenets that were univerſally received in the proteſtant churches; and this rendered them agreeable to many, and made them appear inoffenſive even to numbers who had no inclination to embrace them. It however ſo happened, that the nature of the doctrines conſidered in themſelves, the eloquence of *Menno*, which ſet them off to ſuch advantage, and the circumſtances of the times, gave a high degree of credit to the religious ſyſtem of this famous teacher among the Anabaptiſts, ſo that it made a rapid progreſs in that ſect. And thus it was in conſequence of the miniſtry of *Menno*, that the different ſorts of Anabaptiſts agreed together in excluding from their communion the fanatics that diſhonoured it, and in renouncing all tenets that were detrimental to the authority of civil government; and, by an unexpected coalition, formed themſelves into one community.

Though the *Mennonites* uſually paſs for a ſect of Anabaptiſts, yet M. Herman Schyn, a *Mennonite* miniſter, who has publiſhed their hiſtory and apology, maintains, that they are not Anabaptiſts, either in principle or by origin. However, nothing can be more certain than this fact, viz. that the firſt *Mennonite* congregations were compoſed of the different ſorts of Anabaptiſts, of thoſe who had been always inoffenſive and upright, and of thoſe who, before their converſion by the miniſtry of *Menno*, had been ſeditious fanatics: beſides it is alledged, that the *Mennonites* do actually retain, at this day, ſome of thoſe opinions and doctrines, which led the ſeditious and turbulent Anabaptiſts of old to the commiſſion of ſo many and ſuch enormous crimes: ſuch particularly is the doctrine concerning the nature of Chriſt's kingdom, or of the church of the New Teſtament, though modified in ſuch a manner as to have loſt its noxious qualities, and to be no longer pernicious in its influence.

The *Mennonites* are ſubdivided into ſeveral ſects; whereof the two principal are the *Flandrians*, or FLEMINGIANS, and the WATERLANDIANS. The opinions, ſays Moſheim, that are held in common by the *Mennonites*, ſeem to be all derived from this fundamental principle, that the kingdom which Chriſt eſtabliſhed upon earth, is a viſible church or community, into which the holy and juſt alone are to be admitted, and which is conſequently exempt from all thoſe inſtitutions and rules of diſcipline, that have been invented by human wiſdom, for the correction and reformation of the wicked. This principle, indeed, was avowed by the ancient *Mennonites*, but it is now almoſt wholly renounced; nevertheleſs, from this ancient doctrine, many of the religious opinions, that diſtinguiſh the *Mennonites* from all other Chriſtian communities, ſeem to be derived: in conſequence of this doctrine, they admit none to the ſacrament of baptiſm, but perſons that are come to the full uſe of their reaſon; they neither admit civil rulers into their communion, nor allow any other members to perform the functions of magiſtracy; they deny the lawfulneſs of repelling force by force, and conſider war, in all its ſhapes, as unchriſtian and unjuſt: they entertain the utmoſt averſion to the execution of juſtice, and more eſpecially to capital puniſhments; and they alſo refuſe to confirm their teſtimony by an oath. The particular ſentiments that divided the more conſiderable ſocieties of the *Mennonites* are the following; the rigid *Mennonites*, called the FLEMINGIANS, maintain with various degrees of rigour, the opinions of their founder *Menno*, as to the human nature of Chriſt, alledging that it was produced in the womb of the Virgin, by the creating power of the Holy Ghoſt; the obligation that binds us to waſh the feet of ſtrangers, in conſequence of our Saviour's command; the neceſſity of excommunicating and avoiding, as one would do the plague, not only avowed ſinners, but alſo all thoſe who depart, even in ſome light inſtances pertaining to dreſs, &c. from the ſimplicity of their anceſtors; the contempt due to human learning, and other matters of leſs moment. However, this auſtere ſyſtem declines, and the rigid *Mennonites* are gradually approaching towards the opinions and diſcipline of the more moderate WATERLANDIANS.

The firſt ſettlement of the *Mennonites*, in the United Provinces, was granted them by William, prince of Orange, towards the cloſe of the ſixteenth century; but it was not before the following century, that their liberty and tranquility were fixed upon ſolid foundations, when, by a confeſſion of faith, publiſhed in the year 1626, they cleared themſelves from the imputation of thoſe pernicious and deteſtable errors that had been laid to their charge. In order to appeaſe their inteſtine diſcords, a conſiderable part of the Anabaptiſts of Flanders, Germany, and Frieſland, concluded their debates in a conference held at Amſterdam, in the year 1630, and entered into the bonds of fraternal communion, each reſerving to themſelves a liberty of retaining certain opinions. This aſſociation was renewed and confirmed by new reſolutions, in the year 1649; in conſequence of which the rigorous laws of *Menno* and his ſucceſſors were, in various reſpects, mitigated and corrected. Moſheim's Eccl. Hiſt. vol. iv. p. 141, &c. vol. v. p. 46. 8vo.

MENOGENIEN, in *Botany*, a name by which ſome authors have called the *pæonia*, or common garden piony.

MENOLOGY, MENOLOGIUM, from μην, *month*, and λογος, *diſcourſe*, in the Greek church, is much the ſame with MARTYROLOGY, or CALENDAR, in the Latin.

The Greek *menologium* is divided into the ſeveral months in the year; and contains an abridgment of the lives of the ſaints, with a bare commemoration of the names of ſuch whoſe lives were never written. The Greeks have various *menologies*; and the Romans tax them with inſerting divers heretics, in their *menologies*, as ſaints.—Baillet treats of them at large.

MENSÆ *domeſticus*. See DOMESTICUS.

MENSALIA, MENSALS, ſuch parſonages or livings as were formerly united to the tables of religious houſes; and therefore by canoniſts called *menſal* benefices. See PARSONAGE and BENEFICE.

MENASRII, among the Romans, officers appointed to manage the public treaſury, being ſometimes three, and ſometimes five in number.

MENSES, CATAMENIA, in *Medicine*, the monthly evacuations from the uterus of women not with child, or not giving ſuck.

They are ſo called from *menſis*, *month*, the period wherein they return. They are alſo called *flowers*, *courſes*, &c. By the Jewiſh law, a woman was unclean while the *menſtrual* blood flowed; and the man who touched her, or the moveables ſhe had touched, was declared unclean. Levit. xv.

The *menſes* make one of the moſt curious and difficult phenomena in the whole human body; for the explanation whereof many *hypotheſis* have been framed, though the matter is yet ſcarcely aſcertained.

It is generally agreed by all, that the neceſſity women are under for ſome extraordinary ſupply to compenſate the expence, and ſupport them during the time of geſtation, was the final reaſon why this redundance at other times was given them, which continues whilſt this neceſſity ſubſiſts, and ceaſes when, according to the conſtitution of the female frame, it is no longer required: but this is all they agree in. Some, not content with this occaſion alone, will have the *menſtruous* blood offend in quality more than quantity; which they argue from the pain it gives many women in the evacuation; with many other idle notions.

Others aſcribe this effect to an imaginary dominion of the moon over the bodies of women. This was formerly the prevailing opinion: though the ſmalleſt reflection would have ſhown the weakneſs of it: for, had this purgation been owing to the influence of the moon, all women of the ſame age and temperament, would have found it at the ſame periods and revolutions of the moon, i. e. at the ſame time; which all experience ſhews to be falſe.

There are two other opinions, which carry with them great probability, and are argued with a great deal of ſtrength and reaſon; in both which the quality of the blood is allowed to be innocent, but they ſtill differ about the reaſon of its iſſue. The former is that of Dr. Bohn and Dr. Freind, who maintain this flux to be the reſult of a *plethora*, or plenitude; and to be evacuated only for relief againſt the quantity.

Dr. Freind, who has maintained the cauſe of a *plethora* with the greateſt ſtrength and clearneſs, ſuppoſes, that this *plethora* ariſes from a coacervation in the blood-veſſels of a ſuperfluity of aliment, which, he thinks, remains over and above what is expended by the ordinary ways; and that women have this *plethora*, and not men, becauſe their bodies are more humid, and their veſſels, eſpecially the extremities of them, more tender, and their manner of living generally more inactive, than that of men; and that theſe things concurring, are the occaſion that women do not perſpire ſufficiently to carry off the ſuperfluous alimentary parts, till they be accumulated in ſuch quantity as to diſtend the veſſels, and force their way through the capillary arteries of the *uterus*. It is ſuppoſed to happen to women more than the females of other ſpecies, which have the ſame parts, becauſe of the erect poſture of the former, and the *vagina*, and other canals, being perpendicular to the horizon; ſo that the preſſure of the blood is directed towards their orifices: whereas in brutes they are parallel to the horizon, and the preſſure wholly is on the ſides of thoſe veſſels. The diſcharge, he thinks, happens in this part rather than in any other, as being more favoured by the ſtructure of the veſſels; the arteries being very numerous, and the veins ſinous and winding, and therefore more apt to retard the impetus of the blood, and conſequently, in a plethoric caſe, to occaſion the rupture of the extremities of the veſſels, which may laſt, till, by a ſufficient diſcharge, the veſſels are eaſed of their overload.

This is the ſubſtance of Dr. Freind's theory; from whence he very mechanically and very philoſophically accounts for the ſymptoms.

To his argument, why women have *menſes* rather than men, we may add from Boerhaave, that, in the former, the *os ſacrum* is wider, and ſtands farther out, and the *os coccygis* farther in; the *oſſa innominata* wider, and farther apart; and the loweſt of them, as well as the lower eminences of the *os pubis*, farther outwards than in the latter. Hence in women, the latitude or expanſion about thoſe bones, and the capacity of the *pelvis*, is vaſtly great in proportion to thoſe of men; and yet, in a woman not pregnant, there is not much to fill this expanſe. Again, the foreſide of the thorax is ſmoother in women than in men, and the blood-veſſels, lymphatics, adipoſe and nervous veſſels, membranes, and fibres, are much laxer in women than in men: whence all their cavities, cells, veſſels, &c. are more eaſily repleniſhed, and the humours aggregated in them; beſides, that they are found to perſpire leſs than men, and to arrive much ſooner at their maturity, or *ακμη* of increaſe. To which he adds the conſideration of the ſoft pulpous texture of the uterus, and the vaſt number of veins and arteries with which it is filled.

Hence, a healthy maid, being arrived at her growth, begins to prepare more nutriment than is required for the ſupport of the body; which, as there is not to be any farther accretion, muſt of neceſſity fill the veſſels, and eſpecially thoſe of the uterus and breaſts, they being the leaſt compreſſed. Theſe will be dilated more than the others; whence the lateral vaſcules evacuating their humour into the cavity of the uterus, it will be filled and extended. Hence a pain, heat, and heavineſs, will be felt about the loins, pubes, &c. the veſſels of the uterus, at the ſame time, will be ſo dilated as to emit blood into the cavity of the uterus, and its mouth will be lubricated and looſened, and blood iſſue out. As the quantity of blood is diminiſhed, the veſſels will be leſs preſſed, and will contract themſelves again cloſer, ſo as again to retain the blood, and let paſs the groſſer part of the ſerum; till at length only the uſual ſerum paſſes. Again, there are more humours prepared, which are more eaſily lodged in veſſels once dilated; and hence the *menſes* go and return at various periods in various perſons.

This hypotheſis, however plauſible, is oppoſed by Dr. Drake, who maintains, that there is no ſuch repletion, or, at leaſt that it is not neceſſary to menſtruation; arguing, that, if the *menſes* were owing to a plethora ſo accumulated, the ſymptoms would ariſe gradually, and the heavineſs, ſtiffneſs, and inactivity, neceſſary ſymptoms of a plethora, would be felt long before the period were completed, and women would begin to be heavy and indiſpoſed ſoon after evacuation, and the ſymptoms would increaſe daily; which is contrary to all experience; many women, who have them regularly and eaſily, having no warning, nor any other rule to prevent an indecent ſurprize than the meaſure of the time; in which, ſome that have ſlipped, have been put to confuſion and ſhifts, no ways conſiſtent with the notice a plethoric body would give. He adds, that even in thoſe who are difficultly purged this way, the ſymptoms, though very vexatious and tedious, do not make ſuch regular approaches as a gradual accumulation neceſſarily requires. If we conſider what violent ſymptoms, come on in an hour, we ſhall be extremely puzzled to find the mighty acceſſion of matter, which ſhould, in an hour, or a day's time, make ſuch great alterations. According to the hypotheſis, the laſt hour contributes no more than the firſt, and of conſequence the alteration ſhould not be greater in the one than in the other, ſetting aſide the bare eruption.

This is the ſubſtance of what is argued againſt Dr. Freind's theory; which, it muſt be owned, notwithſtanding theſe objections, is ſtill the moſt rational and conſiſtent that has yet been advanced.

Thoſe who oppoſe it, give into the doctrine of fermentation, and maintain the evacuation of blood in thoſe parts to be the effect of an effervescence or ebullition of the blood. This opinion has been maintained by many, particularly by Dr. Charleton, Bale, De Graaf, and Drake; the two firſt of whom ſuppoſe a ferment peculiar to the women, which produces this flux, and affects that part only, or at leaſt principal. Dr. Graaf, leſs particular in his notion, only ſuppoſes an effervefcence of the blood, raiſed by ſome ferment, without aſſigning how it acts, or what it is. The ſudden turgeſcence of the blood occaſioned them all to think, that it aroſe from ſomething till then extraneous to the blood, and led them to the parts principally affected to ſeek for an imaginary ferment, which no anatomical inquiry could ever ſhew, or find any receptacle for, nor any reaſoning neceſſarily infer. Again, that heat, which frequently accompanies this turgeſcence, led them to think the caſe more than a plethora, and that there was ſome extraordinary inteſtine motion at that time.

Dr. Drake improves on the doctrine of a ferment; and contends, not only that it is neceſſary there ſhould be a ferment, but a receptacle alſo for this ferment; concluding, from the ſuddenneſs and violence of the ſymptoms, that a great quantity muſt be conveyed into the blood in a ſhort time, and conſequently, that it muſt have been ready gathered in ſome receptacle, where, while it was lodged, its action was reſtrained. But he goes farther ſtill, and pretends to aſcertain the place, &c. both of the one and the other, making the gall-bladder to be the receptacle, and the bile the ferment. This liquor he thinks well adapted to raiſe a fermentation in the blood, when diſcharged into it in a quantity; and as it is contained in a receptacle that does not admit of a continual iſſue, it may be there reſerved, till, in a certain period of time, the bladder becoming turgid and full, through the compreſſion of the incumbent viſcera, it emits the gall; which, by the way of the lacteals, inſinuating itſelf into the blood, may raiſe that effervefcence, which occaſions the aperture of the uterine arteries.

To confirm this he alledges, that perſons of a bilious conſtitution have the *menſes* either more plentifully, or more frequently, than others; and that diſtempers, manifeſtly bilious, are attended with ſymptoms reſembling thoſe of women labouring under difficult menſtruation. If it be objected, that on this principle, men ſhould have *menſes* as well as women, he anſwers, that men do not abound in bile ſo much as women, the pores of the former being more open, and carrying off more of the ſerous part of the blood, which is the vehicle of all the other humours; and, conſequently, a greater part of each is diſcharged through them than in women, wherein the ſuperfluity muſt either continue to circulate with the blood, or be gathered into proper receptacles; which is the caſe in the bile. The ſame reaſon he gives why menſtruation ſhould not be in brutes; the pores of theſe being manifeſtly more open than thoſe of women, as appears from the quantity of hair which they bear; for the vegetation whereof, a large cavity, and a wider aperture of the glands, is neceſſary, than where no ſuch thing is produced: yet there is ſome difference between the males and females even among theſe, ſome of the latter having their *menſes*, though not ſo often, nor in the ſame form and quantity, as women.

He adds, that the ſeveral phenomena of the *menſes*, whether in a natural, a regular, or diſeaſed caſe, flow naturally and readily from this hypotheſis; and that whatever may be accounted for from a plethora, or from any particular ferment, may, without any ſtraining, be applied to this.

Females generally begin to menſtruate about the age of fourteen or fifteen, and ceaſe about fifty; though inſtances have occurred of their commencing ſooner and continuing longer. There are, therefore, two critical periods in the lives of females, which require their particular attention. In order to eſcape the CHLOROSIS, and other ſimilar diſeaſes, incident to that period of life when the *menſes* commence, they ſhould avoid indolence and inactivity, and accuſtom themſelves to exerciſe in the open air as much as poſſible. Unwholeſome food, dulneſs of diſpoſition, and ſtrait cloaths, are very injurious to females at this ſeaſon. The diſcharge in the beginning is ſeldom ſo inſtantaneous as to ſurpriſe them unawares. The eruption is generally preceded by ſymptoms that indicate its approach; ſuch as a ſenſe of heat, weight, and dull pain in the loins; diſtenſion and hardneſs of the breaſts; head-ach; loſs of appetite; laſſitude; paleneſs of the countenance; and ſometimes a ſlight degree of fever. When theſe ſymptoms occur, every thing ſhould be carefully avoided which may obſtruct the menſtrual flux, and all means uſed to promote it; as ſitting frequently over the ſteams of warm water, drinking warm diluting liquors, &c. When the *menſes* have begun to flow, great care ſhould be taken to avoid every thing that tends to obſtruct them; ſuch as fiſh, and all kinds of food that are hard of digeſtion, and cold acid liquors. Cold is likewiſe hurtful at this period, as alſo anger, fear, grief, and other affections of the mind: from whatever cauſe this flux is obſtructed, except in the ſtate of pregnancy, proper means ſhould be uſed to reſtore it: and if exerciſe in a dry, open, and rather cool air, wholeſome diet, generous liquors in a weak and languid ſtate of the body, chearful company, and amuſement fail, recourſe muſt be had to medicine. When obſtructions proceed from a weak relaxed ſtate of the ſolids, ſuch medicines as tend to promote digeſtion, to brace the ſolids, and aſſiſt the body in preparing good blood, ought to be uſed. The principal of theſe are iron and Peruvian bark, with other bitter and aſtringent medicines. Filings of iron may be infuſed in wine or ale, two or three ounces to a quart,

quart; and after it has ſtood for two or three weeks, it may be filtered, and about half a wine-glaſs of it taken twice a day: or prepared ſteel may be taken in the doſe of half a dram, mixed with a little honey or treacle, three or four times a day. As the breathing of ſome patients is affected by the uſe of iron, the following form of adminiſtering it will generally ſucceed: ℞ lim. mart. ʒ vi. gum. ammon. ſapon. Venet. ad ʒ ij. ſpec. arom. ʒ i. aloes ʒ ß. ſyrup. q. ſ. f. pil. mediocr. The bark and other bitters may be taken in ſubſtance or infuſion, as is moſt agreeable to the patient. When obſtructions proceed from a viſcid ſtate of the blood, and for women of a groſs or full habit, evacuations and ſuch medicines as attenuate the humours, are neceſſary. The patient in this caſe ought to be bled, to bathe her feet frequently in warm water, to take now and then a cooling purge, and to live upon a ſpare thin diet. Her drink ſhould be whey, water, or ſmall beer, and ſhe ought to take ſufficient exerciſe. A tea-ſpoonful of the tincture of black hellebore may alſo be taken twice a day in a cup of warm water. The ſal diureticus may be given from ʒ ß to ʒ ij, three times a day. A ſluggiſh, viſcid ſerum, may alſo be corrected by repeated doſes of tinctura ſacra, or of the pil. Ruff. adminiſtered ſo as to keep the bowels from coſtiveneſs. When the head-ach and ſickneſs in the ſtomach affect the patients, Dr. Alſton extols the uſe of borax, given in a fluid ſtate. Opiates are often very uſeful for removing thoſe ſpaſms which are excited by a painful approach of the *menſes*, and which frequently retard or obſtruct their courſe. This caſe of painful menſtruation deſerves particular attention; becauſe it impairs the health of patients by its preſent effects, and ſeems to render them leſs prolific in future. Dr. Fothergill has afforded relief to ſeveral by the following proceſs: let the patient have by her a few pills, conſiſting of extr. theb. gr. i. each, made ſoft with a little of any kind of conſerve. She is to take one of theſe pills the moment ſhe finds the pain attending this diſcharge coming on. A pill may be taken every hour till the pain goes off; and more than two of theſe pills will ſeldom be required; but it muſt be taken in ſuch a quantity as to mitigate the pain. Let the patient keep either in or upon the bed, at leaſt in a recumbent poſture; drinking moderately of any diluting liquor, as the herb teas, weak whey, or thin broth. When the time is paſt, a courſe of chalybeate bitters, in ſmall doſes may be continued till within a few days of the return; and the belly ſhould be kept open by ſome proper laxative; two or three grains of cathart. extract. with half the quantity of calx antimonii illota, taken every night, will often ſucceed perfectly well. This excruciating pain ſeems to be ſpaſmodic, and to proceed from the extreme irritability of the uterine ſyſtem. In caſes both of the retenſion and ſuppreſſion of the *menſes*, i. e. when they do not begin to flow at the period of life in which they may be expected, and when they ceaſe from other cauſes beſides conception, to return at their uſual and proper periods, the application of electricity is a very efficacious and certain remedy. Mr. Birch, in his Conſiderations on the Efficacy of Electricity for removing Female Obſtructions, 1779, has enumerated ſeven caſes, in which the electrical power has been very ſucceſsfully employed. With reſpect to the mode of applying this remedy, Mr. Cavallo, in his Eſſay on the Theory and Practice of Medical Electricity, 1780, p. 63. ſays, that ſmall ſhocks, i. e. of about one twentieth of an inch, may be ſent through the pelvis; ſparks may be taken through the cloaths from the parts adjacent to the ſeat of the diſeaſe; and alſo the electric fluid may be tranſmitted, by applying the metallic or wooden extremities of two directors (ſee ELECTRICITY) to the hips, in contact with the cloaths, part of which may be removed, in caſe they are too thick. The number of ſhocks may be about twelve or fourteen; the other applications may be continued for two or three minutes. But either ſtrong ſhocks, or a ſtronger application of electricity than the patient can conveniently bear, ſhould be carefully avoided; for by thoſe means, ſometimes more than a ſufficient diſcharge is occaſioned, which is not eaſily cured.

Mr. Birch adviſes one of the directors to be introduced through the pocket, or down the back of the ſtays, ſo as to reach the lower part of the ſpine, nearly upon the os ſacrum, while the other is placed below the peak of the ſtays. When the directors are thus ſituated, the ſhock is expected to paſs immediately through that part of the pelvis which is included between the directors. One of them is then removed from under the peak of the ſtays, and placed under one foot, and afterwards under the other. Some lateral ſtrokes are afterwards tranſmitted acroſs the pelvis, after having introduced a director through each pocket hole.

When the obſtruction of the *menſes* is the effect of other maladies inſtead of giving medicines to force that diſcharge, which might be dangerous, endeavours ſhould be uſed to reſtore the patient's health and ſtrength. When that is effected the other will return of courſe.

When the menſtrual flux is too great, the patient becomes weak, the colour pale, the appetite and digeſtion are bad, and œdematious ſwellings of the feet, dropſies, and conſumptions, often enſue. This frequently happens to women about the age of forty-five or fifty, and is very difficult of cure. It may proceed from a ſedentary life; a full diet, conſiſting chiefly of ſalted, high ſeaſoned, or acrid food; the uſe of ſpirituous liquors; exceſſive fatigue; relaxation; a diſſolved ſtate of the blood; violent paſſions of the mind, &c. In order to reſtrain the flux, the patient ſhould be kept eaſy both in body and mind. If it be very violent, ſhe ought to lie in bed with her head low; to live upon a cool and ſlender diet, as veal or chicken broths, with bread, and to drink decoctions of nettle-roots, or the greater comfrey. If theſe fail, ſtronger aſtringents may be uſed, as Japan earth, alum, elixir of vitriol, the Peruvian bark, &c. Dr. Buchan directs two drams of alum, and one of Japan earth to be pounded together, and divided into eight or nine doſes, one of which may be taken three times a day. Perſons whoſe ſtomachs cannot bear the alum, may take two ſpoonfuls of the tincture of roſes three or four times a day, to each doſe of which ten drops of laudanum may be added. If theſe ſhould fail, half a dram of the Peruvian bark, in powder, with ten drops of the elixir of vitriol, may be taken in a glaſs of red wine four times a day.

The diſcharge of the *menſes* is interrupted naturally during pregnancy; but this is not always the caſe, becauſe ſome have been three months, ſome ſix months, and ſome during the whole time of geſtation, though in leſs quantity than at other times. The *menſes* are moſtly interrupted during the time of giving ſuck; though many women have a return about the third or fourth month after delivery, and almoſt all have been again in the ninth or tenth month. In caſes of obſtruction, the menſtrual blood hath diſcharged itſelf by other outlets.

It uſually happens that this periodical diſcharge ceaſes between the age of forty and fifty; and the ſeaſon in which this takes place, is critical to the ſex. However, thoſe who ſurvive this period, without contracting any chronical diſeaſe, become more healthy and vigorous than they were before. About this time, ſome are afflicted with the well known ſymptoms of plethora, heat, fluſhings, reſtleſs nights, troubleſome dreams, and unequal ſpirits; others are attacked with inflammations of the bowels, or other internal parts; ſpaſmodic affections of various parts, ſtiffneſs in the limbs, ſwelled ancles, with pain and inflammation, the piles, and other effects of plenitude. Thoſe of full plethoric habits, accuſtomed to copious evacuations, will find great relief by bleeding frequently in moderate quantities, keeping the bowels lax, moderating their diet, and uſing ſufficient exerciſe, that is not too heating. If an immoderate flux of the *menſes* happens at this period, it ſhould be reſtrained by gentle laxatives, cooling medicines, reſt, anodynes, a moſt ſparing not too liquid diet, rather than by very copious bleedings and aſtringents of any kind. Dr. Fothergill obſerves that various purgations of aloes, the tinctura ſacra, pil. Ruffi, elixir proprietatis, and other compoſitions of this kind, are recommended as proper purgatives to be uſed on the ceſſation of the *menſes*. But many inconveniencies have ariſen from theſe heating medicines; as the piles, ſtrangury, immoderate diſcharges of the *menſes*, racking pains in the loins, and other ſimilar complaints. Rhubarb, ſena, magneſia, ſulphur medicines, ſmall doſes of jalap, and various combinations of theſe, may be ſubſtituted in the room of the others, and will ſupply ſufficient variety to the preſcriber and patient. When the *menſes* are about to go off, they appear for the moſt part irregularly both in time and quantity; once in a fortnight, three, five, or ſix weeks; ſometimes very ſparingly, at other times in immoderate quantities. Great loſſes of this kind are often prevented by taking away four or five ounces of blood, a few days after the firſt menſtrual ſuppreſſion. If a patient has in early life been ſubject to cutaneous eruptions, ſore eyes, glandular ſwellings, or other obvious marks of morbid humours ſubſiſting in the conſtitution, and all which may have diſappeared about the time the *menſes* became regular, an iſſue is an adviſable drain, and may prevent many inconveniences. If at this time ulcerous ſores break out about the ancles, or in other parts of the body, they ought to be continued open, or artificial drains ſubſtituted in their ſtead; for thoſe who will have them dried up are ſoon after carried off by acute diſeaſes, or fall into thoſe of a chronic nature. Buchan's Dom. Med. chap. xlviii. Lond. Med. Obſ. art. 17.

MENSIS. See Month.

Mensis *chymicus*. See Menstruum.

Mensis *vetitus*. See Fence-*month*.

MENSORES, among the Romans, harbingers or officers, whoſe buſineſs it was to go and fix upon lodgings for the emperor, when he took a journey to any of the provinces. Their office was alſo to mark out encampments, and aſſign every regiment its poſt.

Mensores alſo ſignified land-ſurveyors, architects, or appraiſers of houſes and public buildings. Thoſe likewiſe who diſtributed the proviſions in the army, were called *menſores frumentarii*; and ſervants who waited at table had the appellation of *menſores*.

Mensores was likewiſe the title of officers among the Romans appointed to receive the proviſions brought to the city by ſea, and to ſee them carefully laid up and preſerved in public granaries, of which there were great numbers.

MENSTRUAL, or Menstruous, a term in *Medicine*, applied to the blood which flows from women in their ordinary monthly purgations. See Menses.

Menstrual *epacts*. See Epact.

Menstrual *longitude of the moon*. See Argument.

MENSTRUUM, Solvent, or Dissolvent, in *Chemiſtry*, any liquor that will diſſolve, that is, ſeparate the parts of hard bodies.

The term takes its riſe from this, that ſome chemiſts pretend the complete diſſolution of a mixed body cannot be effected in leſs than forty days; which period they call a *philoſophical month*.

Aqua regalis is a *menſtruum* for gold; aqua fortis, and ſpirit of nitre, for moſt other metals; and common water for ſalts, &c.

Menſtruum is properly defined a body, which, being applied to, or intermixed with another, does ſo diſſolve it, as that all the diſſolving parts float among the parts diſſolved, and ſo divides it into its minuteſt parts, as that the parts of the diſſolvent are intermixed with thoſe of the body diſſolved. Whence it appears that every *menſtruum*, in diſſolving a body, is likewiſe diſſolved itſelf; ſo as, with the body it diſſolves, to make up one body.

Menstruums may be divided into two claſſes: the firſt conſiſts of ſuch as are fluid; the ſecond of ſuch as are ſolid; that is, they are either actually divided, or they muſt be ſo before they act.

Menstruums, *fluid*, are water, dew, oils, ſaline and acid ſpirits, alkalies, ſalts, &c.

Menstruums, *ſolid*, are ſuch as muſt be made fluid before they will diſſolve: ſuch are moſt ſalts, nitre, vitriol, &c.

All *menſtruums*, at the time they act as ſuch, that is, at the time they are diſſolving, act as fluids; whether ſuch *menſtruum* be a fluid or ſolid. Thus, e. g. ſilver, is a *menſtruum* with regard to gold; for if you take an ounce of ſilver, melt it in the fire, and add a grain of gold, all the parts of the ſilver will intermix themſelves with the parts of the gold: ſo as that the gold and ſilver, which before were ſeparate, now make but one maſs. But gold and ſilver are only *menſtruums* as they are diſſolved by the fire; i. e. as they are rendered fluid.

As many more things might be done in chemiſtry than we now find practicable if we had more *menſtruums* than are at preſent known, it muſt be a ſubject of infinite uſe in chemiſtry to diſcover new ones. To this purpoſe let it be conſidered, that in whatever way ſalts are united with other ſalts, new *menſtruums* are produced by the mixture.

Thus if pure alkali be added to a ſolution of ſea-ſalt, earthy matter is precipitated, and the ſalt afterwards obtained by cryſtallization, from the clear liquor, will be a ſea-ſalt much purer than before, and capable of acting on bodies in a different manner.

The ſame fixed alkali being added to the brine of nitre, makes the liquor thick and milky, and precipitates an earthy matter: after which the nitre, obtained by cryſtallization, is much purer than before.

When fixed alkali is added to the brine of ſal ammoniac, it lays hold of the acid of that ſalt, and ſets the volatile alkali of the compoſition free, and ſuffers it to fly off in the air, leaving only a very pure and fixed ſea-ſalt at the bottom of the veſſel. If a pure volatile alkali be added to the brine of ſea-ſalt, it makes the liquor thick, then purifies it, and flies off; and it does the ſame when added to a ſolution of nitre; and when added to a ſolution of ſal ammoniac, it, in like manner, purifies the ſalt without altering its nature, and flies off as it was poured on. Vegetable acids produce but little alteration on being mixed with ſea-ſalt, nitre, and ſal ammoniac. Fermented vegetable acids, even after being purified by diſtillation, produce no great alteration when mixed with the ſame ſalts. If calcined vitriol, or alum be mixed with nitre and diſtilled, they yield aqua fortis, which contains nothing of the acid vitriol, or alum, but is a mere ſpirit of nitre; and if mixed with ſea-ſalt, and treated in the ſame manner, the produce is a ſpirit of ſalt; and if with nitre and ſea-ſalt together, they make an aqua regia. So if nitre and calcined vitriol be melted together in an open fire, the acid of the nitre is diſcharged, and a kind of tartarum vitriolatum is left behind. Sea-ſalt, treated in the ſame manner, leaves a ſort of Glauber's ſalt behind; and, in general, what way ſoever it be by which ſalts are joined with ſalts, new ſaline productions and new *menſtruums* will ariſe; whence the art of chemiſtry may be perpetually improved, and new *menſtruums* will give new phenomena on different bodies. New *menſtruums* of particular virtues may alſo be made, by variouſly combining the known *menſtruums* together; and this may be done by an almoſt infinite variety of ways: much may be alſo done by reducing every known *menſtruum* to its utmoſt degree of purity. And, laſtly, by reducing ſome of them into the minuteſt particles they can be reduced to, whether by art or nature; for upon theſe three particulars the extaaordinary ſkill of the chief chemiſts ſeems principally to depend. For inſtance, ſuppoſe an extremely pure, ſtrong, and ſubtle fermented vegetable acid was wanting: take fine verdigriſe prepared from copper corroded by the ſubtile vapour of a fermenting acid; add to it twenty times its weight of the ſtrongeſt diſtilled vinegar that can be made; digeſt them together, till the verdigriſe is thoroughly diſſolved, and the whole become a deep green liquor; purify this by filtration, and inſpiſſate it over a gentle fire to a pellicle; ſet it in a quiet place, where it will ſhoot into cryſtals like emeralds, conſiſting of an acid vinegar and diſſolved copper; pour off the liquor, collect the cryſtals, and evaporate as before; and by this means collect all the cryſtals that can be obtained; then dry theſe, and diſtil them in a retort, and the produce will be a moſt pure and ſtrong vegetable acid, nor in the leaſt partaking of the nature of copper. But this experiment will not ſucceed with lead, tin, or any other of the metals ſoluble in vinegar; for the copper attracts the acid free of its water, and again reſtores it unaltered; but the others, though they equally attract and ſeparate it, yet always yield it altered and impure. Zwelſer imagined this acid to be the alkaheſt, or univerſal diſſolvent; but Tachenius ſoon proved that it was no other than diſtilled vinegar of a much greater purity than uſual.

To ſhew that by the compounding one *menſtruum* with another, new, and often excellent ſalts may be produced, let it be conſidered, that the regenerated tartar, properly prepared, may be intimately united to a pure alcohol, and thus produce a vegetable *menſtruum*, compoſed by the moſt cloſe union, of the moſt ſubtile vegetable particles, viz. alkali, acid, and ſulphur; whence the effect of ſuch a liquor cannot but be extremely great, both as a *menſtruum* and a medicine. So again, if a pure ſtrong alkaline ſpirit be united with pure alcohol, it produces an admirable *menſtruum*, called the offa Helmontii, which intimately diſſolves diſtilled vegetable oils, and thus, makes a *menſtruum* compounded of the genuine vegetable ſulphur, and an alkali, and is perhaps one of the beſt medicines, as well as the beſt *menſtruums* hitherto known.

In like manner pure ſpirit of nitre ſaturated with the alkaline ſpirit of ſal ammoniac, makes a kind of volatile nitre, and thus affords an opportunity of examining, by experiments, whether the great things expected from a volatile nitre, by the chemiſts, will be performed by it or not. Experiments of this kind are extremely worth proſecuting. It is not certain whether any *menſtruum* will diſſolve any ſubſtance without the aſſiſtance of fire, as no experiment could ever be made in any place deſtitute of all fire; there being evidently fire in our utmoſt known degree of cold; and we all know that *menſtruums*, of whatever kind, act greatly the better for being aſſiſted by heat.

Menſtruums can ſcarce act as ſuch, unleſs reduced to a fluid form, or at leaſt approaching thereto; this is chiefly given them by means of fire, air, water, and triture. Theſe are the four cauſes which uſually excite latent powers of *menſtruums*. Certain *menſtruums* contain a cauſe within themſelves apparently capable of exciting motion, though in reality it depends upon the near approach of ſome other body. Thus ſtrong ſpirit of nitre confined in a cloſe veſſel, yields an acid fume conſtantly playing about the ſurface of the liquor, and iſſuing out whenever the veſſel is unſtopped. So alſo the alkaline ſpirit of ſal ammoniac yields a fume never obſerved to be at reſt; and the ſpirit of this ſalt, made with lime, yields a fume much more volatile and moveable: all the bodies of this kind therefore ſtrangely retain, and ſtrangely excite motion. We are always to remember alſo that air, even in the coldeſt places, has always a ſtrong vibratory motion, and therefore may often excite theſe motions in theſe bodies; as on the other hand ſolutions are often immediately performed by means of the motion peculiar to the *menſtruum* ariſing from it; while another motion of a different kind, and proceeding from a different cauſe, would not produce the effect. Thus, for inſtance, if a fine piece of Engliſh chalk be calcined in a ſtrong fire, or even in the focus of a burning-glaſs, it will ſcarce alter its nature by this violent motion, nor again by being expoſed to a hot or cold air, either at reſt, or agitated by winds; and though if long boiled in water, or a brine of ſalt of tartar, it will not diſſolve; yet it immediately melts and diſappears when put into cold vinegar: whence we ſee there is a very great difference between the motion excited by the reciprocal force of the ſolvent and ſolvend, and the motion excited by fire, air, water, and impulſe. The acrimony of a *menſtruum*, with reſpect to a human body, ſo as to excite pain, corrode or conſume the parts thereof, is no ſign that ſuch a *menſtruum* is ſuited to diſſolve other bodies, as appears from oil of vitriol, ſpirit of nitre, ſpirit of ſalt, and aqua regia, which though they readily conſume fleſh, yet do not conſume or diſſolve wax and ſulphur, though theſe two may be eaſily diſſolved in the body. Many bodies incapable of ſolution in certain *menſtruums*, may be ſuited for diſſolving therein, by being previouſly diſſolved in other *menſtruums*. Thus if common ſulphur be boiled ever ſo long in alcohol, it diſſolves no more than a ſtone in water; but if the ſulphur be firſt melted with ſalt of tartar into a duſky maſs, the alcohol will then diſſolve it: ſo alſo powdered antimony remains untouched after boiling in alcohol; but if firſt boiled to a dry maſs in an alkaline lixivium; this maſs preſently yields a golden tincture to alcohol. Some chemiſts have conceived ſo highly of this regular and ſucceſſive application of different *menſtruums*, particularly Mr. Boyle and Mr. Homberg, that they ſay even metals may by this means be reſolved into their component running mercury and fixing ſulphur. Thus they aſſert, that if ſilver be firſt diſſolved in ſpirit of nitre, and then long digeſted with pure fixed alkali, and afterwards ſeveral times ſublimed with ſal ammoniac, it will at length by means of theſe reſuſcitating ſalts, afford a true running mercury; in which operation the acids procure an entrance for the alkalies into the ſubſtance of the metal; as the fixed alkalies procure admiſſion to the volatile ones, which elſe could not enter. Boerhaave waves diſputing upon the point, whether the metals can be thus reſolved into their running mercuries, and only affirms, that after many trials, he was never able to effect it. Boerh. Chem. part i. p. 562, ſeq.

It is an error to think a *menſtruum* cannot be too ſtrong. Oil of vitriol diluted with ſeveral times its weight of water, diſſolves iron beſt. So aqua fortis diluted, works beſt in lead. And Mr. Boyle makes the like obſervation as to the ſolution of ſilver.

MENSTRUUM, *animal*. There are of the animal *menſtruums* very many both of the natural and artificial kind; the natural are blood, ſerum, gall, urine, ſaliva, rennet, whey, butter-milk, &c. moſt of which, being properly employed, will either produce or diſcharge colours, and might be made ſerviceable in the painting and dying trades. Thus recent urine diſcharges the common ink out of linen, &c. Blood affords, by proper management, the noble Pruſſian blue; and gall is a natural yellow, well deſerving to be treated in the manner of blood in that preparation. Of the artificial kind are the ſpirit of urine produced by chemiſtry, which ſerves to produce, alter, and deſtroy a vaſt number of colours. The liquors diſtilled from recent, or fermented whey, buttermilk, &c. might be alſo found of great value; and variouſly compounding theſe ſeveral animal ſubſtances, even by random trials, or chance experiments, new diſcoveries in colours might be made; though much more, probably, by a right reaſoning and analogy. As, for inſtance, the common bones burnt to a blackneſs, being found to afford the bone black, the experiment was eaſily transferred to ivory, and ſo the ivory black was diſcovered and ſo of the reſt. Shaw's Lectures, p. 183.

MENSTRUUM *peracutum*. Mr. Boyle gives the name of *menſtruum peracutum* to a *menſtruum* made by pouring on the rectified oil of butter of antimony as much ſtrong ſpirit of nitre as would ſerve to precipitate out of it all the bezoarticum minerale; and then with a ſmart fire diſtilling off the liquor which would come over, and cohobating it upon the antimonial powder. Works Abr. vol. i. p. 260, 377.

He put ſome highly refined gold into a large proportion of this *menſtruum peracutum*, where it diſſolved ſlowly and quietly; and he found at the bottom of the glaſs a conſiderable quantity of white powder, which the *menſtruum* would not touch, and which was alſo indiſſoluble in aqua regia. The ſolution of gold being abſtracted, and the gold again reduced into a body, yielded, upon a ſecond ſolution, more of the white powder. This powder he melted down into a metal, anſwering in colour, malleability, ſolubility in aqua fortis, and in bitterneſs to the taſte of that ſolution, to ſilver. Hence he infers, that notwithſtanding the ſuppoſed unchangeableneſs of gold, this experiment ſhews it to be really changeable into ſilver, or at leaſt into a new kind of metal very different from gold. And he therefore concludes, that there is no impoſſibility in the nature of the things, that one metal ſhould be tranſmuted into another. Ibid. p. 260. 262.

By diſſolving gold in this *menſtruum peracutum*, Mr. Boyle alſo tells us, he made the gold riſe in the retort, in the top and neck of which it was found in the form of yellow and reddiſh ſublimate. Works Abr. vol. i. p. 263. 377. See PHILOSOPHER'S *ſtone*.

MENSTRUUM, *univerſal*. See ALKAHEST.

MENSTRUUMS, *as to the action of*, ſir Iſaac Newton accounts for it from the acids wherewith they are impregnated. The particles of acids are found to be endued with a ſtrong attractive force, wherein their activity conſiſts, and by virtue whereof they diſſolve bodies. Theſe acids he ſuppoſes of a middle nature between water and hard bodies, and to attract both. By this attraction they gather together about the particles of bodies, whether metallic, ſtony, or the like, and adhere to them very cloſe, ſo as ſcarce to be ſeparable from them by diſtillation, or ſublimation. Thus ſtrongly attracted and gathered together on all ſides, they raiſe, disjoin, and ſhake aſunder, the particles of bodies, i. e. they diſſolve them; and by the attractive power whereby they ruſh againſt the particles of the bodies, they move the fluid, and ſo excite heat, ſhaking ſome of the particles to that degree as to convert them into air, and ſo generating bubbles. See ACID.

Dr. Keil gives us the theory or foundation of the action of *menſtruums*, in ſeveral propoſitions; which the reader may find recited under the article ATTRACTION. See alſo FERMENTATION.

From thoſe propoſitions we ſee the reaſons of the different effects of different *menſtruums*; why ſome bodies, for inſtance metals, diſſolve in a ſaline *menſtruum*: others again, as reſins, in a ſulphureous one, &c. particularly why ſilver diſſolves in aqua fortis, and gold only in aqua regalis; all the varieties whereof are accountable for, from the different degrees of coheſion, i. e. of attraction in the parts of the body to be diſſolved, the different diameters and figures of its pores, the different degrees of attraction in the *menſtruum*, and the different diameters and figures of its parts.

Suppoſe, e. gr. the attraction of gold to that of ſilver to be as a to b; and of ſilver to aqua fortis as b to d; but that of aqua fortis to aqua regia as d to c; let f ſignify the magnitude of particles in aqua fortis, and r thoſe in aqua regia; c the coheſion of gold, and g the coheſion of ſilver: if the diameters of the particles f be greater than the diameters of the pores of gold, they can never diſſolve the gold, let their attractive force be ever ſo ſtrong. But if $\overline{b-f\times d}$ be greater than g, then the ſilver will yield to the *menſtruum* whoſe particles are f, and leſs than the pores of ſilver; and if $\overline{b-e\times r}$ be leſs than g, the ſilver will never diſſolve in the *menſtruum*, the particles whereof are r, and the attractive force c. But if $\overline{a-e\times r}$ be greater than c, the *menſtruum* made up of the particles r, and whoſe attractive force is c, will be able to penetrate and diſſolve the gold.

How a *menſtruum* may ſuſpend bodies much heavier than itſelf, which very often happens, may be conceived by conſidering, that the parts of no fluid can be ſo eaſily ſeparated, but they will a little reſiſt, or retard the deſcent of any heavy bodies through them; and that this reſiſtance is, *cæteris paribus*, ſtill proportionable to the ſurface of the deſcending bodies; but the ſurfaces of the bodies do by no means increaſe, or decreaſe, in the ſame proportion as their ſolidities do; for the ſolidity increaſes as the cube, but the ſurface only as the ſquare of the diameter. Small bodies, therefore, will have much larger ſurfaces, in proportion to their ſolid contents, than larger bodies will; and conſequently, when exceedingly diminiſhed, may eaſily be buoyed up in the liquor.

For a fuller account of the nature and operation of different *menſtrua*, ſee DISSOLVENT, DISSOLUTION, SOLVENT, and SOLUTION.

MENSTRUUM, in *Pharmacy*, chiefly denotes a body that will extract the virtues of ingredients by infuſion, decoction, or the like. See EXTRACT, INFUSION, and DECOCTION.

MENSURATION, the act, or art of MEASURING.

MENTAL, ſomething that relates, or is reſtrained, to the operation of the underſtanding.

Thus, a *mental* prayer is ſuch a one as is made merely in the mind, without pronouncing one word of it.

Mental reſervations are the refuge of hypocrites. See RESERVATION.

MENTHA, in *Botany*. See MINT.

MENTUM, in *Anatomy*, the lower part of the FACE, beneath the mouth; which we otherwiſe diſtinguiſh by the name of *chin*.

MENTZELIA, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe; the flower has five petals, ſomewhat longer than the five-leaved ſpreading empalement, and many erect briſtly ſtamina; from the long cylindrical germen, which is ſituated under the flower, ariſes a briſtly ſtyle; the germen turns to a cylindrical long capſule, with one cell, containing many ſmall ſeeds. There is one ſpecies, a native of La Vera Cruz.

MENYANTHES, in *Botany*. See *Bog*-BEAN.

MEPHITIS, or MEPHITICAL *exhalation*, denotes a poiſonous and noxious ſteam iſſuing out of the earth. See DAMP and *Mephitic* AIR. See alſo EFFLUVIA, and GROTTO *del Cani*.

MEPHITIS, in *Mythology*, is a name given to Juno, becauſe ſhe is ſuppoſed to preſide over ſtinking exhalations, or corrupted and noxious air; and hence it was uſed to ſignify ſuch noxious air itſelf. According to Scaliger, the world is Etruſcan, and derived from the Syrians, with whom it ſignified any ſtinking ſmell. Juno had a temple among the Hirpines under this appellation.

MER.—*Ouſter le* MER. See OUSTER.

MERCATOR's *chart*, or *projection*, is a ſea-chart, or projection of the ſurface of the earth in plano.

For the conſtruction, uſe, advantages, &c, of which, ſee *Mercator*'s CHART.

MERCATOR's *ſailing*, is that performed loxodromically, by means of *Mercator's* charts. See *Mercator's* SAILING.

MERCATORUM *feſtum*, among the Romans, a feſtival kept by the mercantile people on the ides or 15th of May, in honour of Mercury, to whom they ſacrificed a ſow; then ſprinkling themſelves with the water of a fountain called *aqua Mercurii*, they prayed the God to proſper their trade.

MERCHANT, *mercator*, is one who buys and trades in any thing: and as merchandize includes all goods and wares expoſed to ſale in fairs or markets, ſo the word *merchant* formerly extended to all ſorts of traders, buyers, and ſellers. But every one that buys and ſells is not at this day under the denomination of a *merchant*; only thoſe who traffic in the way of commerce, by importation or exportation, or carry on buſineſs by way of barter or exchange, and who make it their living to buy and ſell, by a continued aſſiduity, or frequent negociation in the myſtery of merchandizing, are eſteemed *merchants*. Thoſe who buy goods, to reduce them by their own art or induſtry, into other forms than they are of, and then to ſell them, are artificers and not *merchants*. Bankers, and ſuch as deal by exchange, are properly called *merchants*. Lex. Mercat. or Merch. Com. 23.

The *mercantile* profeſſion is eſteemed noble, and independent. In France, by two arrets of Louis XIV. the one of 1669, the other of 1701, the nobility are allowed to trade, both by land and ſea, without derogating from their nobility: and we have frequent inſtances of merchants ennobled in that country, in regard to the utility of their commerce, and the manufactures they have ſet up. In Bretagne, even a retail trade does not derogate from nobility.

When the nobles of that province are diſpoſed for commerce, they let their nobility ſleep; that is, they do not loſe it, but only ceaſe to enjoy the privileges of their nobleſſe while their commerce continues; and re-aſſume it on their giving over trade, without any letters or inſtrument of re-habilitation.

In republics trading is ſtill more valued; but no where more than in England, where the younger ſons and brothers of the beſt families are frequently bred up to *merchandize*. Add to this, that many of the Italian princes are the principal merchants of their ſtates; and think it no diſcredit to make their palaces ſerve as warehouſes; and that many of the kings of Aſia, and moſt of thoſe of the coaſt of Africa and Guinea, traffic with the Europeans, ſometimes by their miniſters, and ſometimes in perſon.

There are companies of *merchants* in London for carrying on conſiderable joint-trade to foreign parts. See COMPANY.

Beſides theſe companies, there are other *merchants*, who are diſtinguiſhed by the country to which they trade; as Dutch *merchants*, who trade to the Weſt Indies; Canary and Portugal *merchants*: Italian *merchants*, who trade to Leghorn, Venice, &c. French, and Spaniſh *merchants*.

The law of England, as a commercial country, pays a very particular regard to foreign *merchants*, in innumerable inſtances. Thus it is provided by Magna Charta, c. 30. that all *merchants*, unleſs beforehand publicly prohibited, ſhall have ſafe conduct to depart from, to come into, or tarry in, and to go through England, for the exerciſe of *merchandize*, without any unreaſonable impoſts, except in time of war: and if a war breaks out between us and their country, they ſhall be attached, if in England, without harm of body or goods, till the king, or his chief juſticiary, be informed how our *merchants* are treated in the land with which we are at war; and if our's are ſecure in that land, they ſhall be ſecure in our's. Upon which Monteſquieu remarks, with admiration, that the Engliſh have made the protection of foreign *merchants* one of the articles of their national liberty: and alſo, that the Engliſh know better than any other people upon earth, how to value at the ſame time theſe three great advantages, religion, liberty, and commerce. In this reſpect their diſpoſition is very different from the genius of the Roman people; who, in their manners, their conſtitution, and even in their laws treated commerce as a diſhonourable employment, and prohibited the exerciſe of it to perſons of birth, rank, or fortune; and equally different from the bigotry of the canoniſts, who looked on trade as inconſiſtent with Chriſtianity, and determined at the council of Melfi, under pope Urban II. A. D. 1090, that it was impoſſible with a ſafe conſcience to exerciſe any traffic, or follow the profeſſion of the law. See COMMERCE.

If a difference ariſe between the king and any foreign ſtate, alien *merchants* are to have forty days notice, or longer time, to ſell their effects and leave the kingdom. 27 Ed. III. cap. 17.

The principal qualifications requiſite for the profeſſion of a *merchant*, are, 1. To know how to keep books ſingle or double, viz. journals, ledgers, and others. 2. To draw invoices, contracts, charter-parties, policies of aſſurance, bills of exchange, letters miſſive, &c. 3. To know the relations between the money, weights, and meaſures, of ſeveral countries. 4. To know the places where the ſeveral kinds of *merchandize* are manufactured, in what manner made, what the materials compoſed of, and whence; the preparation the materials require before they are wrought; and the *merchandizes* afterwards. 5. The lengths and breadths of ſtuffs, as ſilks, wools, hairs, linens, &c. the regulations of the places where they are manufactured; and their different prices at different ſeaſons. 6. The dying, and the ingredients for the formation of the different colours. 7. The *merchandizes* that abound, or are more rare, in one country than another; their kinds and qualities; and the manner of trafficking in them to the beſt advantage, whether by land, by ſea, or river. 8. The commodities permitted or prohibited, both for the import and export of a ſtate. 9. The price of exchange, according to the courſe of ſeveral places, and what it is that raiſes or lowers it. 10. The duties to be paid, both at the import and export of wares, according to the uſage of the place, the tariffs, regulations, &c. 11. The manner of packing, bailing, and tunning *merchandizes*, to keep them either in magazines, or in voyages, &c. 12. On what terms a *merchant*-veſſel may be freighted and inſured. 13. The goodneſs and value of every thing requiſite for the conſtruction or refitting of veſſels, the prices of woods, cordage, maſts, anchors, ſails, and other neceſſaries. 14. The wages ordinarily given captains, officers, and ſailors; and the manner of contracting with them. 15. The foreign languages, which may be reduced to four principal ones; viz. the Spaniſh, uſed almoſt through all the Eaſt, particularly on the coaſt of Africa, from the Canaries to the Cape of Good Hope; the Italian, uſed throughout the coaſts of the Mediterranean, and many places of the Levant; the Teutonic or German, uſed throughout moſt countries of the North; and the French, which is now become almoſt univerſally current. 16. The conſular juriſprudence, the laws, cuſtoms, companies, colonies, chambers of inſurance, conſulates in the ſeveral countries; and, in general, all the ordinances, regulations, and policies, relating to commerce.

MERCHANT *court*, or *Court*-MERCHANT, a kind of judicatory power, inveſted in *merchants*, choſen for that purpoſe, in ſeveral parts of Europe: in order to decide and determine in a ſummary way, all differences and litigations among themſelves and their dependents.

The affairs of *merchants* are accompanied with ſuch variety of circumſtances, ſuch new and unuſual contingencies, which change and differ in every age, with a multitude of niceties and punctilios; and thoſe again altering, as the cuſtoms and uſages of countries and ſtates do alter, that it has been found impracticable to make any laws that could extend to all caſes: and our law itſelf does tacitly acknowledge its own imperfection in this caſe, by allowing the custom of *merchants* to paſs a kind of law in caſes of difficulty.

Merchant-*ſhip*. See Ship.

Merchant-*law*. See Law.

Merchant-*ſtatute*. See Statute.

Merchant, *tenant per ſtatute*. See Tenant.

MERCHENLAGE, *Merciorum lex*, was the law of the people here called the Mercians. Camden, in his Britannia, ſays, that in the year 1016, this kingdom was divided into three parts; whereof the Weſt Saxons had one, governing it by the laws called Weſt Saxonlage, which contained theſe nine ſhires, viz. Kent, Suſſex, Surrey, Berks, Hampſhire, Wilts, Somerſet, Dorſet, and Devon; the Danes had the ſecond, containing fifteen ſhires, i. e. York, Derby, Nottingham, Leiceſter, Lincoln, Northampton, Bedford, Bucks, Hertford, Eſſex, Middleſex, Norfolk, Suffolk, Cambridge, and Huntingdon, which was governed by the laws called Danelage: and the third part was in poſſeſſion of the *Mercians*, whoſe laws were called *Merchenlage*, and contained eight ſhires, Glouceſter, Worceſter, Hereford, Warwick, Oxford, Cheſter, Salop, Stafford; from which three, king William I. choſe the beſt, and with the other laws ordained them to be the laws of the kingdom. Camd. Brit. p. 94. See Common *Law*.

MERCHET. See Marchet.

MERCURIAL, ſomething that conſiſts of or bears a relation to *mercury*, or quick-ſilver.

We ſay alſo, a *mercurial* perſon, to denote a perſon of a briſk, volatile complexion; ſuch perſons being ſuppoſed by aſtrologers to be under the more immediate influence of the planet *Mercury*. We ſay, *mercurial* fumes, *mercurial* ſpirits, &c. with reference to the mineral *mercury*.

Mercurial *medicines*. See Mercurials.

Mercurial *phoſphorus*, *ſalivation*, *thermometer*. See the ſubſtantives.

Mercurial *unguents*, *frictions*, &c. See Salivation.

Mercurial *waters*. See Water.

MERCURIALS, medicines compoſed or prepared of mercury, or quick-ſilver.

The principal of the claſs of *mercurials* are, mercurius albus, or white precipitate of mercury; ſweet and corroſive ſublimate of mercury; calomel; artificial cinnabar; turbith mineral; prince's powder; æthiops mineral, &c. See each under its proper article.

The medicinal efficacy of mercury depends on its extreme diviſibility, and the fineneſs of its particles, and on their gravity or weight. By means of the firſt, it finds a paſſage into the inmoſt receſſes of the animal ſtructure, and, when properly guarded, does not exert itſelf till it comes into the remoteſt ſcenes of action; where moſt other medicines either do not arrive, or at leaſt not till their force is abated. This property it has in common with camphor.

By the latter it is enabled to make ſtill more conſiderable alterations in the animal œconomy, by rendering the fluids thinner, and breaking open the ſecretory paſſages; and this effect it has in common with chalybeats.

It may be added, that the ſame property whereby it becomes ſo powerful a deobſtruent, indicates, that it is to be avoided in hectics, and all caſes where the conſtitution is drawn low by too profuſe evacuations: in regard *mercurials* tend to keep up or increaſe the exceſs of impetus in the fluids, and that over-capacity in the ſecretory orifices, wherein the defect of ſuch a conſtitution ſeems to conſiſt.

MERCURIALIS, in *Botany*. See Mercury.

MERCURIFICATION, in *Metallurgic Chemiſtry*, the obtaining the *mercury* from metallic minerals in its fluid form. For the effecting this, thoſe who have been engaged in theſe reſearches, have propoſed three methods. The firſt is by means of a certain mercury, ſo prepared as to have a diſſolving power, by which it could take up the mercuries of metals in the ſame manner as water diſſolves ſalt from aſhes. The ſecond is by means of certain regenerating ſalts, ſuch as ſal ammoniac, which are to detain the more earthy parts of metals, and leave their mercuries ſeparate or inſeparable from them by ſublimation or otherwiſe; and the third method is by means of a large lens or burning glaſs, in the focus whereof if any metal be applied, its mercurial part is ſaid to ſeparate and go off in fume, which when collected and condenſed, appears to be running mercury.

The firſt of theſe methods would be very eaſy, if the proper mercury were to be readily produced; the ſecond is extremely laborious, and requires much patience and reiteration. But the third ſeems eaſy enough, and practicable to advantage, when a glaſs of three or four feet in diameter is at hand, the ſky ſerene, and the ſun ſhines ſtrong.

For other proceſſes, the reader may conſult Junker's Conſpectus Chemiæ. But theſe mercurified metals, or their mercurial principle rendered ſenſible, are a kind of philoſophical mercury, which, although they reſemble ordinary mercury, are nevertheleſs ſaid, by perſons exerciſed in ſuch ſtudies, to differ from it conſiderably, by having a greater ſpecific gravity, by more effectually penetrating and diſſolving metals, by a ſtronger adheſion to theſe, and by a leſs volatility.

MERCURY, ☿, in *Aſtronomy*, the ſmalleſt of the inferior planets, and the neareſt to the ſun.

The mean diſtance of *Mercury* from the ſun is to that of our earth from the ſun as 387 to 1000: and his real diſtance from the ſun 36,841,468 miles. The inclination of its orbit, that is, the angle formed by the plane of its orbit with the plane of the ecliptic, is 6 degrees 54 minutes; its diameter to that of the earth, is nearly as 1 to 3, or 2600 miles; and therefore the globe of *Mercury* will be to that of the earth as 1 to 27. See Diameter, Distance, Excentricity, and Planets.

According to ſir Iſaac Newton, the heat and light of the ſun on the ſurface of *Mercury*, are almoſt ſeven times as intenſe as on the ſurface of the earth in the middle of ſummer: which, as he found by experiments made for that purpoſe by a thermometer, is ſufficient to make water boil. Such a degree of heat, therefore, muſt render *Mercury* uninhabitable to creatures of our conſtitution. And if bodies on its ſurface be not inflamed, and ſet on fire, it muſt be becauſe their degree of denſity is proportionably greater than that of ſuch bodies is with us. The revolution of *Mercury* round the ſun, or his year, is performed in eighty-ſeven days twenty-three hours; his diurnal revolution, or the length of his day, is not yet determined; nor is it certain whether he has ſuch a motion round his own axis or not.

What variety of weather or ſeaſons it may be liable to, we are ſtill at a loſs to determine; as not knowing the inclination of his axis to the plane of his orbit. The force of gravity on the ſurface of *Mercury* is unkown. Its denſity, and conſequently the gravitation of bodies towards the centre, cannot be accurately determined; but no doubt it muſt exceed that of our earth, by reaſon of the exceſs of heat there.

Mercury changes its phaſes, like the moon, according to its ſeveral poſitions with regard to the ſun and earth; except only that he never appears quite full, becauſe his enlightened ſide is never turned directly towards us, but when he is ſo near the ſun as to be loſt to our ſight in his beams. And as his enlightened ſide is always towards the ſun, it is plain that he ſhines not by any light of his own; for if he did, he would conſtantly appear round.

The ſituation of this planet proves evidently, that the hypotheſis of Ptolemy is falſe: for *Mercury* is ſometimes obſerved betwixt the earth and ſun; and ſometimes beyond the ſun. But the earth is never found between *Mercury* and the ſun; which however muſt happen, if the ſpheres of all the planets encompaſſed the earth, as a centre, according to the Ptolemaic ſcheme.

The diameter of the ſun, viewed from *Mercury*, would appear almoſt three times as big as it appears on our earth; that planet being nearly thrice as near him as we are; and therefore the ſun's diſk would appear ſeven times as large as to us. *Mercury*'s greateſt diſtance from the ſun, with regard to us, never exceeds twenty-eight degrees (ſee Elongation); whence it is ſeldom viſible, being commonly either loſt in the ſun's light, or, when the moſt remote from the ſun, in the crepuſculum. The beſt obſervations of this planet are thoſe made when it is ſeen on the ſun's diſk; for, in its lower conjunction, it paſſes before the ſun like a little ſpot, eclipſing a ſmall part of his body, only obſervable with a teleſcope.

The node from which *Mercury* aſcends northward above the ecliptic, is in the fourteenth degree of Taurus; the oppoſite in the fourteenth degree of Scorpio. The earth is in theſe points on the 6th of November, and 4th of May, new ſtyle; and when *Mercury* comes to either of his nodes at his inferior conjunction about theſe times, he will appear in this manner to paſs over the diſc of the ſun. But in all other parts of his orbit, his conjunctions are inviſible, becauſe he either goes above or below the ſun. The firſt obſervation of this kind was that of Gaſſendi, in November, 1631. Several ſubſequent obſervations of the like tranſits are collected in Du Hamel's Hiſt. of the Royal Acad. of Sciences, p. 470. ed. 2.

Mr. Whiſton has given us an account of ſeveral periods at which *Mercury* may be ſeen on the ſun's diſc, viz. in 1782, Nov. 12th, at $3^h\ 44^m$ in the afternoon; in 1786, May 4th, at $6^h\ 57^m$ in the afternoon; in 1789, Dec. 6th at $3^h\ 55^m$ in the afternoon; and in 1799, May 7th, at $2^h\ 34^m$ in the afternoon. There will be ſeveral intermediate tranſits, but none of them viſible at London. See Dr. Halley's Accounts of the Tranſits of *Mercury* and Venus, in Phil. Tranſ. N° 193.

To an inhabitant of *Mercury*, the ſolar ſpots will appear to traverſe his diſk ſometimes in a right line from eaſt to weſt, and ſometimes elliptically. As the other five planets are above *Mercury*, their phenomena will be nearly the ſame there as with us. Venus and the earth, when in oppoſition to the ſun, will ſhine with full orbs, and afford a noble light to that planet.

Mercury, *mercurialis*, in *Botany*, a genus of the *dioecia enneandria* claſs. Its characters are theſe: it has male and female flowers in different plants; the male flowers have a ſpreading empalement, cut into three concave ſegments, but have no petals; they have nine or twelve erect hairy ſtamina; the female flowers have no petals, but have two awl-ſhaped acute-pointed nectariums, to each of which there is a ſingle broad germen, ſupporting two reflexed ſtyles, which turn to a twin capſule, ſhaped like a ſcrotum, having two ſhells, each containing one roundiſh ſeed. Linnæus enumerates four, and Miller three ſpecies.

The ſpecies called French *mercury*, with branched ſtalks, and ſmooth gloſſy leaves, grows wild in gardens and dunghills. It is of an emollient nature, and eaten in the manner of ſpinach, which, when cultivated in a garden, it greatly excels. If eaten largely, it opens the bowels. A cataplaſm of the leaves is much recommended in pains of the limbs, in tumors, and even in ulcers, which it cleanſes and diſpoſes to heal. Poor people in country places uſe it as a cataplaſm for the rheumatiſm, and even for the gout, with ſucceſs. In the ſhops, it is chiefly kept as an ingredient in decoctions for glyſters.

There is another ſpecies, called cynocrambe, and dog's *mercury*, with rough leaves and unbranched ſtalks, which grows wild in woods and hedges: this, though more acceptable to the palate, as an oleraceous herb, than the foregoing, has lately been found to poſſeſs noxious qualities, and act as a violent narcotic. See Phil. Tranſ. Nº 203.

Mercury, *Engliſh*, in *Botany*. See Goose *Foot*.

Mercury, in *Chemiſtry*, and *Natural Hiſtory*, denotes a fluid MINERAL matter, perfectly reſembling ſilver in fuſion.

Mercury is known under a great number of denominations: the common name among the ancients was *hydragyrum*, q. d. water of ſilver. The moderns commonly call it *mercury*, from ſome ſuppoſed relation it bears to the planet of that name. In Engliſh it is popularly called *quick-ſilver*, from its appearance. Many of the chemiſts call it *Proteus*, from the variety of forms, colours, &c. it paſſes through in their preparations.

Naturaliſts are divided what claſs of foſſils to range *mercury* under: ſome make it a metal; others a ſemi-metal; and others an imperfect metal.

Boerhaave obſerves, that it is very improperly called a *metal*, inaſmuch as it has not all the characters of ſuch a body; nor ſcarce any thing in common with the other metals, except weight, and ſimilarity of parts: thus, for example, it is neither diſſolvable by fire, nor malleable, nor fixed. In effect, it ſeems to conſtitute a peculiar claſs of foſſils; and is rather the mother or baſis of all metals than a metal itſelf.

However, it appears from the experiments of Profeſſor Braun, at Peterſburgh, recited under the article FREEZING, which aſcertain the fixation of *mercury* by cold, that this, like other metals, is fluid or ſolid, according to the greater or leſs quantity of fire with which it is penetrated: and if we only ſee it in a fluid ſtate, it is becauſe it is ſo fuſible that ſo ſmall a degree of heat can keep it fluid, that even in the greateſt natural colds, a ſufficient quantity of heat always remains for that purpoſe. Beſides, *mercury* agrees likewiſe with other metals, as their parts, when in fuſion, attract one another, and run into globules, and, from a ſtate of fluidity, paſs into a ſolid ſtate, not all at once, but ſucceſſively, and vice verſâ.

Perfect metals, according to M. Homberg, &c. are nothing but pure *mercury*, whoſe little particles are penetrated on all ſides, and filled with the matter of light, which unites and binds them together into a maſs, ſo that the parts of fluid *mercury*, which are ſuppoſed to be little ſolid globes, in their metallification are rendered rough and uneven, being pierced on all ſides, and having their pores or perforations filled with the matter of light. By ſuch means they loſe their firſt conformation, and the politure and ſmoothneſs of their ſurfaces, which is one of the principal cauſes of the fluidity of *mercury*.

The chemiſts make *mercury* one of their hypoſtatical principles: not, as M. Homberg obſerves, that it anſwers the character of a principle, which is that whoſe ſubſtance cannot be analyſed, or reduced into matters more ſimple; but becauſe the analyſis has not yet been diſcovered; though it is poſſible it may hereafter, there being little doubt but that *mercury* is a compound. This is the more probable, becauſe *mercury* may be deſtroyed; which never happens to ſimple bodies. The manner of deſtroying *mercury* is, firſt, by changing it into a perfect metal, by introducing a ſufficient quantity of light within its ſubſtance; and then expoſing this metal to a burning glaſs, where, in a little time, it evaporates almoſt wholly into ſmoke, leaving nothing behind but a light earthy duſt.

Mercury, *characters* or *properties of*, are, firſt, that of all bodies it is the heavieſt, after gold and platina; and ſtill the purer it is, the heavier: nay, ſome of the philoſophers even hold, that *mercury*, well purged of all its ſulphur, would be heavier than gold itſelf. The ordinary proportion between them is that of fourteen to nineteen. If any *mercury* be found to weigh more than according to this ratio, it may be ſafely concluded to have gold in it. See *Specific* Gravity.

The ſecond character of *mercury* is, to be of all bodies the moſt fluid; that is, its parts ſeparate and recede from each other by the ſmalleſt force. Conſequently, of all bodies it is that whoſe parts cohere the leaſt, or are the leaſt tenacious; and therefore of all others is the leaſt ductile and malleable. The parts of water do not divide ſo readily as thoſe of quick-ſilver; and the parts of oil much leſs: there is a certain tenacity even in the parts of ſpirit of wine, which reſiſts ſeparation; but there is ſcarce any coheſion at all in the parts of *mercury*. Neverthele ſs, the integrant parts of *mercury*, like thoſe of melted metals, do really attract each other, and always acquire a convex or ſperical form, when they touch bodies with which they have no tendency to unite.

The third property of *mercury*, which, indeed, depends on the ſecond is, that of all bodies it is diviſible into the minuteſt parts. Thus, being expoſed to the fire, it reſolves into a fume ſcarce perceivable to the eye; but, in whatever manner it be divided, it ſtill retains its nature, and is the ſame ſpecific fluid. For the vapours of diſtilled or volatilized *mercury*, received in water, or on moiſt leather, or the like, become pure *mercury*; and if *mercury* be mixed with other bodies, in order to fix it, it is eaſily ſeparable from them again by fire, and reducible into pure *mercury* as before.

The fourth character is, to be extremely volatile, being convertible into a fume even by a ſand-heat. In effect it does not ſuſtain the fire long enough either to boil, or to ignite: though it muſt be added, if the fire be at firſt very gentle, and increaſe by eaſy degrees, it may be retained therein a pretty long time, and be fixed ſo at length as to become ignited in the crucible, as we learn from ſome very tedious experiments made at Paris.

That *mercury* is volatile, even in the temperature of the atmoſphere, when its ſurface is expoſed to a vacuum, has been long evident from obſervations on the barometer, in ſome of which, expoſed in the ſun, a perfect diſtillation is perpetually going on; the inviſible mercurial vapour always riſing on the warmer ſide of the tube, and then forming into globules, and running down on the oppoſite ſide, in the form of denſe fluid *mercury*. But Dr. Prieſtley found, that this heavy ſubſtance is not leſs volatile, when confined by vitriolic acid air, though preſſed with the weight of the atmoſphere; and that it is in ſome meaſure volatile, even when expoſed to common air. Exp. and Obſ. on Air, vol. v. ſect. 23.

The gilders are but too well acquainted with the vapours of *mercury*, which frequently render them epileptic and paralytic, and ſometimes ſalivate them; being of ſo penetrating a nature as to take away any ſcirrhous tumors, though very apt to reach and deſtroy the noble parts.

It may here be obſerved, that *mercury* ſeems to ſuffer no change from a heat that is not ſuperior to that of boiling water. With a great heat it is entirely diſſipated in vapours, like other volatile bodies. But it undergoes no alteration by having been thus reduced into vapour; for if the evaporation be made in cloſe veſſels, that is, if the *mercury* be diſtilled, its vapours when condenſed, will form the ſame *meccury* as before the operation. *Mercury* remains unchangeable by repeated diſtillations. Boerhaave diſtilled eighteen ounces of *mercury* five hundred times, without perceiving any other change than that its fluidity and ſpecific gravity were a little increaſed, and that ſome grains of a fixed matter remained; which ſmall changes were probably produced by a purification of the *mercury* rather than by any real alteration of it. The vapours of *mercury*, like thoſe of all other volatile bodies, if they cannot eſcape, or be condenſed, cauſe violent exploſions.

By digeſtion, in a ſtrong heat, continued for ſeveral months, the ſurface of *mercury* is gradually changed into a reddiſh earthy powder, without any metallic luſtre, which floats upon the ſurface of the fluid *mercury*, without incorporating with it. Thus any quantity of *mercury* may be entirely converted into a red powder. Boerhaave kept *mercury* in digeſtion for fifteen years, without obſerving any change, unleſs that upon its ſurface a little black powder had been formed, which by trituration was eaſily reducible into fluid *mercury*.

Dr. Prieſtley has ſhewn, by paſſing the electrical exploſion over the ſurface of *mercury*, that this black matter conſiſts of *mercury* ſuperphlogiſticated; the phlogiſton coming from the electric matter when the exploſions are taken in common air, but chiefly from the vitriolic acid air, which abounds with it when they are taken in that air.

If *mercury* be expoſed to the focus of a burning-glaſs on a piece of charcoal, on a tile, or in a coppel, it is very ſoon wholly diſſipated in form of a thick ſmoke: but if precipitate per ſe be placed in the focus, it ſeems at firſt to melt and run, but immediately after is diſſipated in a thick ſmoke, leaving a ſmall quantity of an extremely fine powder upon the tile, in form of a ſhort down. This powder, on being continued in the focus, finally runs together into yellowiſh glaſs; in ſeveral parts of which there may be diſtinguiſhed ſmall white, ſhining, metalline particles, which ſeem to be ſilver. If the precipitate per ſe be expoſed to the focus on a piece of charcoal, it is ſeen to melt and to run into ſmall globules of pure *mercury*, which ſoon after begin to fume, and are diſſipated entirely. It appears, therefore, upon the whole, that there is in *mercury* an oil, as ſome have called it, or inflammable principle, which may be ſeparated by long digeſtion over a ſlow fire; and that the matter diveſted of that, is no longer *mercury*, but a mere calx or red earth, which is properly the baſis of this metal: that this calx does not vitrify in the manner of the other calces of the metals, being too volatile, and flying off eaſily in the fire; and, finally, that this oil of *mercury* is not different from the other oils, even thoſe of the vegetable kind, ſince common charcoal could ſupply its place by means of its oil or PHLOGISTON, and reſtore the calx to running *mercury* again. As to the ſmall remainder of earth, after the diſſipation of the calx of *mercury*, which run into glaſs with metalline ſpecks, it is much to be queſtioned whether it be not owing to ſome impurity in the *mercury*. Mem. Acad. Par. 1709.

The extreme denſity and gravity of *mercury* ſeem to prove that much of the earthy element, the eſſential properties of which are ſolidity and fixity, enters into its compoſition. On the other hand, its exceeding great volatility and fuſibility muſt proceed from the preſence of ſome other principle which is eminently volatile and fuſible. Is this principle PHLOGISTON? or is it Becher's mercurial earth? is it the union of this inflammable principle, and of this mercurial earth? Theſe are objects worthy the curioſity of thoſe who have taſte and talents for the ſublimeſt reſearches in chemiſtry. Macquer.

The volatility of *mercury* may be diminiſhed by ſeveral methods, ſome of which we ſhall mention. 1. *Mercury* calcined by heat, called the precipitate per ſe, ſuſtains during ſome time a red heat, and by expoſure to the heat of a burning-glaſs is vitrifiable. 2. Dr. Brandt relates a curious experiment, from which *mercury* appears capable of being ſo detained and fixed by digeſtion with gold, that a conſiderable part of it cannot be ſeparated from this metal by the moſt intenſe heat. 3. *Mercury* may be rendered conſiderably leſs volatile by being combined with vitriolic acid, but eſpecially with the vitriol of ſilver, or the ſalt formed by ſilver and vitriolic acid. The ſalt may be united with a conſiderable portion of *mercury*, with which it forms a concrete ſubſtance, fuſible by fire, but capable of ſuſtaining, according to Dr. Lewis, the greateſt heat that can be applied to glaſs veſſels, without diſſipation of the *mercury*. 4. Neumann ſays, that if *mercury* ſublimate be frequently ſublimed with ſal ammoniac, and each time the ſublimed matter mixed with the reſiduum, the whole becomes at laſt ſo fixed in the fire, that it cannot be any more ſublimed. *Mercury* expoſed to the vapour of melted lead, or thrown into boiling linſeed oil, loſes its fluidity, and becomes ſo ſolid, that it may be formed into toys and ſmall utenſils: this, indeed, properly ſpeaking, is only an apparent fixation of *mercury*, ſince all its fluidity is reſtored to it by a little heat; nevertheleſs this experiment proves, that ſome principle in theſe ſubſtances, probably their phlogiſton, is capable of acting ſenſibly on *mecury*.

The fifth property of *mercury*, is, that it eaſily enters, and intimately adheres to gold, leſs eaſily to other metals, with difficulty to copper, and ſcarce at all to iron.

Mercury may very well be allayed and united with all metallic ſubſtances, excepting, iron, arſenic, and the ſemimetal called nickel, in the following order: gold, ſilver, lead, tin, copper, zinc, and regulus of antimony.

The union of *mercury* with antimony is very difficult, but has been effected by Monſ. Malouin. See Hiſt. Acad. Scienc. 1740.

The ſame gentleman ſucceeded alſo in uniting *mercury* with tin and lead, ſo as to improve theſe metals in ſome reſpects, rendering them harder, whiter, and more ſonorous. Hiſt. Acad. ibid.

Biſmuth unites with it more intimately than any other metallic body, and remarkable promotes the union of lead with it: *mercury*, impregnated with a little biſmuth, was found to diſſolve conſiderable maſſes of lead in a heat no greater than than that of the human body. Hence with theſe metals *mercury* has been frequently adulterated. This abuſe may be diſcovered by the *mercury* contracting a dull-coloured ſkin upon the ſurface, or ſtaining paper blackiſh, by its not running freely into round globules, but forming tears or vermicular ſtriæ: by its leaving, on evaporating a little of it, a powdery matter, or coloured ſpot on the bottom of the veſſel; and by its producing a turbid milkineſs during its diſſolution in aqua fortis.

If *mercury* be diſſolved in aqua fortis, ſo that the ſolution be clear and total, and if, whilſt it is yet warm, ſome lead filings be poured in by degrees, the lead will be precipitated into a white powder, and the *mercury* reduced into a maſs of running quickſilver. Boyle's Works Abr. vol. i. p. 318.

All fat and oily matters, vegetable and animal, act upon *mercury*, ſo as to divide its parts and perfectly extinguiſh it. Mr. Plenck, of Vienna, having tried ſeveral ſubſtances, both animal and vegetable, for the extinction of *mercury*, found none that anſwered equally with gum arabic. He has therefore lately recommended a mixture of quickſilver and gum arabic, as preferable to all the mercurial preparations hitherto known; being in all caſes ſafe, rarely or never producing a ſalivation, and acting ſoon on the venereal virus. He directs one dram of purified quickſilver and two drams of the gum to be ground together in a ſtone mortar, adding by degrees half a ſpoonful of water, till the quickſilver diſappears, and the whole becomes a viſcid grey mucilage, in a ſhort time; half an ounce of ſyrup, and eight ounces of a ſimple water are then gradually added, and two ſpoonfuls of the mixture given every morning and evening: but the experience of other eminent phyſicians has not ſufficiently confirmed the ſuperior excellence of this mercurial preparation. See AMALGAMATION, ALLAY, and AFFINITY.

Indeed we have heard much among the adepts about making an amalgama with *mercury* and iron; but the experiment would never ſucceed with that ingenious chemiſt Dr. Boerhaave. It is poſſible there may be ſome way of binding thoſe two bodies together; and no doubt an amalgama, might be made, if a large quantity of gold were added to the iron: but then, if the compound were beaten into duſt in water, the iron would waſh away, and the gold remain. On this account it is, that ſuch as have occaſion to handle quickſilver, always make choice of iron inſtruments for that purpoſe. We have known women, in a ſalivation, to have their ear-rings grow white and ſoft with the effluvia of the *mercury*; and hence the gilders, to lay gold on any other body, diſſolve it in hot *mercury*; which done, they apply the ſolution on the body to be gilt, ſuppoſe ſilver; then ſetting it over the coals, the *mercury* flies away, and leaves the gold adhering like a cruſt to the ſilver. Laſtly, rubbing this cruſt with lapis hæmatites, the ſilver is gilt.

The ſixth character is, that of all fluids, it is the coldeſt, and the hotteſt, ſuppoſing the circumſtances the ſame.

Boerhaave ſhews, that fire is equally diffuſed through all bodies; and that there is in reality the ſame degree thereof in *mercury*, as in ſpirit of wine; and yet if you try with your finger, *mercury* in the cold is much colder, and over the ſame fire conſiderably hotter, than this ſpirit. This property depends on the great weight of *mercury*: for the heat and cold of all bodies is, *cæteris paribus*, as their weights. Now *mercury* being fourteen times heavier than water; if both of them be expoſed in a winter's night to the ſame cold, the mercury muſt be ſo much colder than water, as it is heavier. So alſo, if they be both applied to the ſame degree of heat, while the water becomes warm, the *mercury* will be hot enough to burn the hands.

The ſeventh property is, that it is diſſoluble by almoſt all acids, and unites itſelf with them, at leaſt with all foſſile acids. Thus it is diſſolved in oil of vitriol, ſpirit of ſulphur per campanam, ſpirit of nitre, and aqua regia.

It is prepared with oil of vitriol, into turbith mineral; with ſpirit of ſulphur into cinnabar; and with aqua regia, or ſpirit of ſea-ſalt, or ſal gemmæ, into corroſive ſublimate. Vitriolic acid in its original ſtate does not act, or but very weakly, upon *mercury*. Theſe two ſubſtances cannot be united together, unleſs the acid be very highly concentrated, and a very ſtrong heat applied; both which conditions concur in diſtillation. Nitrous acid diſſolves *mercury* very readily; and this ſolution preſents phenomena very ſimilar to thoſe of the ſolution of ſilver by the ſame acid. The acid ſhould be very pure, and the ſolution may be made without heat. Marine acid, when liquid does not act ſenſibly upon *mercury* in its ordinary ſtate, even when aſſiſted with a boiling heat. But when this acid, very concentrated and reduced into vapours, meets *mercury* alſo in vapours, theſe two bodies eaſily unite together, and even intimately. The ſeveral combinations of *mercury* with the vitriolic, nitrous, and marine acids, may be decompoſed by all intermediate ſubſtances, which, having in general a ſtronger affinity with acids than metallic ſubſtances, decompoſe all metallic ſolutions by acids: theſe intermediate ſubſtances are abſorbent earths, and alkaline ſalts, both fixed and volatile. They may be decompoſed alſo, and particularly corroſive ſublimate, by ſeveral metallic ſubſtances, ſuch as tin, regulus of antimony, and copper.

Vinegar and vegetable acids have ſcarcely any action upon ordinary *mercury*, otherwiſe than by dividing it, with a little agitation, into very ſmall globules; and hence we are furniſhed with a method of detecting the frauds of druggiſts, &c. who make a practice of ſophiſticating quick-ſilver with lead. Take a mortar, and rub the *mercury* with vinegar therein; if the vinegar grow ſweetiſh, it is a proof there is a mixture of lead; if copper has been mixed with the *mercury*, it will turn greeniſh or bluiſh; if there be no adulteration, the *mercury* and vinegar will both remain as before.

However, *mercury* may be diſſolved in vegetable acids. This is done by reducing it to a calx by a long digeſtion. A ſcruple of this calx may be diſſolved in an ounce of diſtilled vinegar in a boiling heat. The ſolution being filtred and expoſed to the cold, will in part be changed into fine cryſtals. This calx diſſolves likewiſe in the juice of lemons, Rheniſh wine, and other vegetable acids.

But a precipitate of *mercury*, made from its ſolution in aqua fortis, by means of oil of tartar *per deliquium*, and well edulcorated by boiling water, is more eaſily diſſolved in diſtilled vinegar. It may even be diſſolved cold without digeſtion: and the acid of vinegar, as well as all other vegetable acids, are capable of contracting a very intimate union with *mercury*.

The eighth property is, that it is the moſt ſimple of all bodies next after gold: accordingly, we find it the ſame in all its parts, ſo far as our obſervation goes. If a ſingle grain of *mercury* be diſſolved in ſpirit of nitre, a proportionable part of the grain will be diſtributed into every minute particle of the menſtruum; and by diluting the whole with an ounce of aqua ſtygia, the whole grain of *mercury* will be revived. Had we the *mercury* of the philoſophers, called alſo *vital mercury*, *mercury of metals*, &c. ſo much talked of, it is aſſerted, it would be ſtill much more ſimple than gold: for from gold we can ſometimes ſeparate *mercury*, and ſometimes ſulphur; but, from pure *mercury*, nothing beſide itſelf can be obtained.

Neverthelеſs *mercury* very powerfully attracts moiſture from the air, and to this circumſtance ſome have aſcribed its fixation by cold, in the Peterſburgh experiments; but this will not account for its malleability in that hardened ſtate.

The ninth property of *mercury* is, not to be in any meaſure acrid in its native ſtate; for it ſhews no acrimony to the taſte, nor does it corrode any body; and if a carcaſe were to be buried in quick-ſilver, it might doubtleſs remain there without being any way hurt.

The extraordinary effects, however, it produces in the body, have given people a notion of its being acrid. But the caſe is, that, when received into the blood, it acts by its weight and velocity; whence it tears and deſtroys the veſſels, and thus occaſions thoſe great alterations which lead the chemiſts into their miſtakes.

In effect, all its medicinal operations are to be accounted for from the properties already enumerated.

Beſide the numerous other phenomena attending this remarkable mineral, the light it gives when ſhaken in a glaſs tube, which proceeds from electricity, is not to be omitted. See *Barometrical* PHOSPHORUS.

If *mercury* be put into large exhauſted tubes, and theſe afterwards rubbed to excite their electricity, it is obſerved, that they give on all ſides, rays of a bright and very lively light. See ELECTRICITY.

MERCURY, *mines of*. The chief are thoſe of Hungary, Spain, Friuli in the Venetian Territories, and Peru. Conſiderable quantities are alſo brought from the Eaſt Indies. The greater part of our quick-ſilver is brought us from Friuli, where there are abundance of mines belonging to the emperor, though now mortgaged to the Dutch. It is found under three ſeveral forms: 1. In ruddy glebes or clods, called *cinnabar*. 2. In hard ſtony glebes, or a mineral ſubſtance of a ſaffron, and ſometimes a blackiſh colour. 3. It is alſo found pure: for, upon opening holes in the beds of ſtones, &c. there ſometimes guſhes a vein or ſtream of pure *mercury*, called *virgin mercury*.

This laſt ſort is moſt valued: Paracelſus and Baſil Valentine prefer it far to any other ſort, for chemical operations. Dr. Brown aſſures us, in his travels, that inquiring of one of the directors of the quick-ſilver mines, wherein the difference between this and common *mercury* conſiſted; he was anſwered that virgin *mercury*, mixed and amalgamated with gold, renders the ſulphur of the gold volatile; but this has been ſeveral times tried without ſucceſs.

This *virgin mercury*, called *jungfraw* by the German miners, is uſed for that which diſcovers itſelf without the aſſiſtance of fire. This is ſometimes ſeen in drops, globules, or large maſſes in the ore, or falls in drops from the crevices in the roof or walls of the mines, or, finally, is found in large quantities in the hollows of the rocks. Its more common appearance is in ſmall parcels, and often in ſingle globules, ſcarce large enough to be diſcerned by the naked eye, lodged in great abundance in the pores of a ſoft foſſile ſtone, of a pale bluiſh colour, from which it is eaſily ſeparated by pounding and waſhing. In is alſo found in ſome places lodged in the ſame manner, on ſome of the harder ſtones, and in various ſpecies or earths. Theſe large collections of pure virgin quick-ſilver often diſcover themſelves by burſting out in ſmall ſtreams in the mines of Friuli. They ſometimes are ſurpriſed with a ſtream of it like a thread, which gradually increaſing to the thickneſs of a packthread, continues to run three or four days, and diſcharges in that time a vaſt quantity of the quick-ſilver; if the miners can follow this ſpring to the head, they generally obtain a large quantity more; and often this ſort of ſpringing up of it leads them to very rich veins of the mine which they did not before know of. They give the ſame name of *jungfraw* or virgin quick-ſilver alſo to that *mercury* which has no need of fire for the ſeparation, but is waſhed out of its ores by a ſieve and large quantities of water, continually and forcibly running on it.

The ores of quick-ſilver often contain a large quantity of that mineral imbedded in them in this form, and often ſo mixed in other parts with ſulphurs, as to be diſguiſed into cinnabar; in this caſe a great deal is ſeparated by this waſhing, which at the ſame time frees the ore from dirt, and renders it fitter for the operation of the fire, by which a great deal more is then extracted.

However, though *mercury* be often found native, yet it is much more frequently found in the form of an ore; its particles being penetrated by, and intimately mixed with ſulphur; and the concrete being by no means to be known for quick-ſilver to the naked eye, but being a red maſs of a ſtony hardneſs, called CINNABAR: and we are very ſure that it is quick-ſilver penetrated by ſulphur, that makes this ore, becauſe we are not only able to ſeparate quick-ſilver from it, but by a mixture of quick-ſilver and ſulphur, we are able to make a red ſtony maſs, perfectly the ſame with this. The cinnabar is of a different form and appearance, according to the quantity of ſulphur it contains, being uſually ſtriated, ſometimes with finer ſtriæ; and the quantity of *mercury* in this is very great, the richeſt maſſes containing ſix parts of *mercury* to one of ſulphur, and the poorer uſually half. It is ſometimes found in large and purer maſſes, and ſometimes in ſmaller particles, lodged in different earths and ſtones: theſe are ſometimes few in number, and placed ſeparately, ſo as to be of little value; but in other maſſes they are placed very thick in congeries, and are then ſeparated by pounding and waſhing, and worked for *mercury*. Beſide this pure ore of *mercury*, there is another much leſs rich; but which is worked in ſome places to conſiderable advantage: as the former is a mixture of *mercury* and ſulphur alone, this is a mixture of thoſe two, and of many other ſubſtances, and appears in form of a moderately hard ſtone, uſually of a duſky orange colour, but not rarely of a greeniſh brown, and ſometimes blackiſh. This has very little brightneſs, and nothing of the ſtriated texture of the cinnabar.

Kircher, in his Mundus Subterraneus, gives a very terrifying deſcription of the quick-ſilver mine of Friuli. It is remarkable, that the entrance into it is not high up in the hills, as is uſually the caſe; but upon level ground, and in the ſtreets of the town. This ſubjects the miners to great inconveniences from water, though they have excellent machines for draining the mine. The deſcent is by ladders near ninety fathoms deep. There are no damps in theſe mines; but the miſchiefs ariſing from the *mercury* itſelf getting into the bodies of the workmen, are much greater and more general, though not ſo ſudden, as the effects of the damps in our lead and coal mines, and ſuch places. The elaboratory belonging to theſe mines has furnaces capable of working fifty retorts at a time. There are generally ſixteen of theſe furnaces at work at once, ſo that eight hundred retorts is the uſual number in conſtant uſe. The retorts ſtand in double rows on each ſide of the furnace, a row of thirteen below, and a row of twelve above.

Method of procuring or ſeparating **Mercury** *from the ore or earth.*—They firſt grind the mineral glebe into powder; this done, they pour a great quantity of water upon it, ſtirring and working the whole briſkly about till the water becomes exceeding thick and turbid. This water having ſtood till it be ſettled, they pour it off, and ſupply its place with freſh, which they ſtir and work as before. This they repeat, and continue to do, till the water at length comes away perfectly clear; then, all remaining at the bottom of the veſſels is *mercury*, and other metallic matter. To this *mercury*, &c. they add the ſcoriæ or filings of iron, putting the whole in large iron retorts, and ſo diſtilling it; by which means all the heterogeneous, metallic, and ſtony part, is ſeparated therefrom; and the *mercury* procured pure.

In ſome places where the ore is very rich, they only powder it and put it into long-necked earthen veſſels, which they ſtop with bundles of moſs: theſe they invert into other veſſels buried in the ground, and then making a fire about them, the *mercury* ſeparates and drains through the moſs into the under-pots.

As to the *mercury* in cinnabar, they do not find it worth while to diſtil, and get it out; cinnabar ſelling at too high a price alone.

The miſerable people, condemned or hired to work in theſe mines, all die in a little time. They are firſt affected with tremors, and proceed to ſalivation; then their teeth drop out; and they are ſeized with pains all over, eſpecially in their bones, which the *mercury* penetrates: and thus they die.

A common precaution they uſe, is to hold a piece of gold in the mouth, to imbibe the effluvia, and intercept their paſſage into the body. Dr. Pope tells us of one he ſaw in the mines of Friuli, who, in half a year's time, was ſo impregnated with the metal, that on putting a piece of braſs in his mouth, or even rubbing it in his fingers, it would turn white as ſilver.

In Spain, the melting and exhaling of the mineral is performed with more care, and with an engine contrived for that purpoſe.

The manner of ſeparating *mercury* from its ore, when not ſulphureous, is this: take a pound of the ore beat to powder; this with the aſſayer muſt ſtand for one centner; put this into a glaſs retort coated half way to its neck, which muſt be long, and turned back with ſuch declivity, that a glaſs recipient may be applied perpendicularly to it. The retort muſt be of ſuch a ſize, that the belly of it may be filled nearly two thirds with the ore; and muſt be placed ſo that nothing of the fluid, adherent to the neck of it, may fall into the cavity of the belly, but that the whole may run forward into the recipient, which muſt be filled with cold water: this muſt be ſo placed as to receive the noſe of the retort about one half inch into the water. The joints need not be lutted. Cramer's Art of Aſſaying, p. 350.

Let the retort be ſurrounded with burning coals, placed at a diſtance, leſt it burſt; by degrees bring the coals nearer, and at length cloſe to the retort; add freſh charcoal, and make it ſlightly red-hot. When this fire has been continued an hour, take off the recipient, firſt ſtriking the neck of the retort to throw off the looſe drops that may hang there; and in the bottom of the water you will find the *mercury*. This proceſs may be alſo performed in a ſand-heat; but the bottom of the retort muſt touch the bottom of the veſſel that contains the ſand, and that be made red-hot. The *mercury* is to be ſeparated from the water by filtration.

The ore of the mine of Juan Cabelaca, in Peru, which is conſiderable, is of a whitiſh red, like bricks half-burnt; it is firſt broken, then expoſed to the fire, by ſpreading it on a layer of common earth, wherewith the grate of an earthen furnace is covered; under which is lighted a little fire of an herb, called by the Spaniards *icho*: which is of that neceſſity in theſe works, that the cutting of it is prohibited for the ſpace of twenty leagues round. In proportion as the mineral heats, the *mercury* riſes volatilized into ſmoke; which ſmoke, finding no vent through the capital of the furnace, which is exactly luted, eſcapes through an hole made for that purpoſe, communicating with ſeveral earthen cucurbits fitted within one another. The water at the bottom of each cucurbit condenſing the ſmoke, the quickſilver precipitates, and is taken out, when the operation is over. In this proceſs, there are three things remarkable: the firſt, that the farther the cucurbits are from the furnace, the more they are filled with quickſilver; the ſecond, that they all grow ſo hot, that they would break, were they not ſprinkled from time to time with water; thirdly, that the workmen employed never hold it long, but become paralytic, and die hectic.

Mercury, *the method of purifying*, from extraneous ſubſtances is important for the purpoſes of medicine and of the arts, and eſpecially for ſome nice chemical operations. *Mercury* may be cleanſed from duſt, by ſtraining it though ſhamoy leather; from greaſe, by waſhing it with an alkaline lixivium; from any alkaline matter by vinegar; from lead or biſmuth, with which it is frequently adulterated, by diſtillation; from ſulphur, by mixing it with quick-lime or with filings of iron, and then diſtilling the mixture. Sometimes ſulphur is added to the *mercury*, and both are ſublimed together into cinnabar; then iron filings are added to this compound to abſorb the ſulphur, and the pure *mercury* is diſtilled off. Mr. Malouin recommends uniting the quick-ſilver with antimony inſtead of ſulphur. The beſt method of purifying *mercury* is by reducing it into æthiops mineral, with which twice the quantity of quick-lime or filings of iron is to be mixed, and by diſtilling it from this mixture. In all diſtillations of *mercury*, the addition of filings of iron ſeems to render the *mercury* more fluid and bright. Its purity may be known, by obſerving that it does not ſoil clean white paper; that it has no pellicle on its ſurface; that when triturated with water, it does not ſoil the water; that when expoſed to fire, in an iron ſpoon or ladle, it does not crackle; and, laſtly, that it is perfectly and entirely ſoluble in pure ſpirit of nitre, without any depoſition. See Barometer.

Mercury, *the uſes of*, are very conſiderable, as in gilding, making looking-glaſſes, in refining gold, &c. See each under its head.

But eſpecially in medicine, and particularly for the cure of the venereal diſeaſe, raiſing ſalivations, and on other occaſions.

This fluid, ſuppoſed by the Greeks to be poiſonous and corroſive, was introduced into medicine by the Arabians, as an ingredient in external applications, againſt different cutaneous maladies. The practice was followed by ſome phyſicians in Europe towards the end of the thirteenth century; but was not eſtabliſhed or looked upon in general to be ſafe, till about the beginning of the ſixteenth, when the venereal diſtemper, then lately received from America, was found to yield to mercurial applications alone: and now alſo the internal uſe of *mercury* began to be ventured on, in this and in other diſeaſes. Crude and fluid *mercury* taken internally, produces no effect on the body; becauſe the adheſion of its integrant parts to each other, hinders their diviſion and diſtribution, or ſolution, without which it cannot have any effect. In its crude ſtate, therefore, it does nothing but load the ſtomach and inteſtines. It falls downwards by its weight, and goes out of the body with the fæces, in the ſame ſtate in which it entered. Hence ſome have been induced to give a pound or more in violent conſtipations, in order to open obſtructions that had reſiſted the common methods of cure by purgatives, relaxants, and emollients. But the practice has been attended with no remarkable ſucceſs.

Dr. Dover, in his Phyſician's Legacy to his country, having recommended crude *mercury* or quick-ſilver as a moſt beneficial medicine for ſeveral diſeaſes, it had for ſome time a great run at London, which occaſioned the writing a great many pamphlets for and againſt it. Dr. Cheyne alſo greatly recommends this medicine in his treatiſe, intitled, the Rational Method of curing Diſeaſes.

The authors of the Medical Eſſays of Edinburgh aſſure us, that though ſome they knew had taken an ounce or two of crude *mercury* each morning for ſeveral weeks, yet they knew no inſtance of its increaſing any of the ſenſible evacuations; but they have been told, that ſome who uſed it thus, had paſſed ſome of it with their urine, and that the hands of others, taking this medicine, had tinged their ſnuff-boxes, &c.

But we have an account of the effects of crude *mercury* on a perſon who had the advice of his phyſician for the taking it, in a remarkable caſe recorded in the Philoſophical Tranſactions, about the time when Dr. Dover had brought it into ſuch general uſe; and as the effects of it, in this caſe, may ſerve to caution people as to the uſe of it, it may be proper to give the ſubſtance of it, which is this: a perſon had long been ſubject to great difficulty in going to ſtool, for which he at length took ſeveral ounces of crude *mercury* at different times, but without relief. Upon the opening of the abdomen their iſſued out a great quantity of wind, before the ſtomach or guts were wounded. The ſtomach was empty, and its inner coat violently inflamed. The ſmall guts were, in many places, fouled with a black powder, reſembling æthiops mineral, and in ſeveral parts of them were found ſmall globules of quick-ſilver. The black powder was doubtleſs the quickſilver altered into a ſort of æthiops in the body. The colon was inflamed and diſtended, and contained ſix quarts of liquid excrement, among which was a great deal of crude *mercury*, and of the ſame black powder. This gut alſo was inflamed on the outſide, and had formed an abſceſs where it adhered to the omentum; the other guts in contact with this part alſo ſhared this diſorder. In the lower part of the colon the coats became ſcirrhous, and the paſſage was very ſmall. Some of the valves were alſo become ſcirrhous, and obſtructed the paſſage, and a ſmall plum-ſtone was found buried in the villoſe coat of this inteſtine. This had alſo formed a ſmall abſceſs, which diſcharged itſelf into the pelvis. What part of theſe ſymptoms was owing to the taking the quick-ſilver is eaſily ſeen; and ſuch effects may be guarded againſt for the future, by obſerving the ſtate of the patient before it is given. Phil. Tranſ. Nº 442. p. 295.

But when *mercury* is much divided, ſo that its molecules cannot again unite and form fluid *mercury* by the interpoſition of proper ſubſtances, it operates with great power, and extends its action through the whole habit. In theſe forms, whether taken internally, or introduced into the blood from external applications, it ſeems to liquefy all the juices of the body, and may be ſo managed as to promote excretion through all the emunctories. The ſalutary effects of mercurials have, in many caſes, very little dependence on the quantity of ſenſible evacuation. Venereal maladies and chronical diſtempers proceeding from a viſcidity of the humours and obſtructions of the ſmall veſſels, are often ſucceſsfully cured by mercurials taken in ſuch doſes as not to produce any remarkable diſcharge: eſpecially if aſſiſted by diaphoretics, and a warm diluting regimen. In this view, camphor, and the reſin or extract of guaiacum, are frequently joined to the *mercury*; and to the more active preparations, a little opium: which not only promotes the diaphoreſis, but prevents the *mercury* from irritating the firſt paſſages, and running off by the groſſer emunctories. Mercurials are always pernicious in the true ſcurvy, and in conſtitutions inclined to this diſeaſe, whoſe humours are diſpoſed to a putreſcent ſtate; and a long continued uſe of *mercury* colliquates the whole maſs of blood, and tends to weaken the nerves, ſo as to bring on tremors and paralyſes. Mercurials are deſtructive to inſects, perhaps of every kind: they are ſometimes given internally againſt worms, and Van Helmont ſays, that water in which *mercury* has lain ſome time, though inſipid, will deſtroy worms; and Mr. Boyle ſeems to recommend it as an innocent and uſeful coſmetic. Works Abr. vol. iii. p. 345.

Mercurials are alſo applied externally, in unguents, for deſtroying cutaneous animalcula. See Itch. *Mercury* has of late been recommended as an effectual antidote againſt the poiſon of a mad dog. See Madness.

Mercury diſſolved by rubbing it ſtrongly with any chemical oil, or with Venice turpentine, has been given to the quantity of a ſcruple, half a dram, or two ſcruples in a day. Such pills keep ſome people's bellies open, others they purge, and a gentle ptyaliſm has ſometimes been occaſioned, nay, a high ſalvation has been raiſed by them. See Medic. Eſſ. Edinb.

Chemiſts having obſerved that ſome ſimple preparations of antimony and *mercury* had ſurpriſing effects in the cure of obſtinate diſtempers, employed their art to change theſe Herculean medicines into various ſhapes, to ſeparate their noxious and uſeleſs parts, and to combine their active principles. To theſe labours are owing the butter and cinnabar of antimony, *mercurius vitæ*, bezoard mineral, ſolar, lunar, jovial, and ſeveral other preparations, on which the moſt exorbitant encomiums have been laviſhed. But with all this care, many of theſe remained inactive, and others incorrigible, and unfit for uſe. However, it is certain that theſe two minerals, properly combined, have wonderful effects. We have, in the Medical Eſſays of Edinburgh, a preparation of Dr. Plummer, which is much recommended from the experience of its effects. See Plummer's *Æthiops*.

Mercury is often uſed in anatomical preparations, eſpecially for ſuch parts that do not eaſily retain air, as the lungs, or ſpleen, and glans penis. See Monro, in Med. Eſſ. Edinb. vol. iii. art. 10. But it is to be obſerved, that the quick-ſilver does conſiderable damage to the ſmall cells of the lungs and glans.

Mercury is divided with different materials for internal uſe, and given as an alterative and as an anthelmintic, from two or three grains to eight or more. Half a dram of quick-ſilver is ground with two ſcruples and a half of prepared crabs eyes, and called *alkalizate mercury*; or with half a dram of brown ſugar-candy, and two drops of oil of juniper berries, which laſt ingredient renders the union of the *mercury* with the ſugar more perfect, and called *mercurius ſaccharatus*. See Pills.

Mercury, *the preparations of*, are very various; this metal making one of the moſt conſiderable articles in the chemical pharmacy. The moſt common preparations now in uſe, are, ÆTHIOPS *mineral*, æthiops cum igne, differing from the other only in the more intimate coalition of the *mercury* and ſulphur, by melting the latter over a gentle fire, and gradually ſtirring into it the quick-ſilver; care being taken to cover the veſſel when it ſeems diſpoſed to catch flame: *factitious* CINNABAR; *corroſive ſublimate of* MERCURY, MERCURIUS *dulcis*, *calcined* MERCURY, or *precipitate per ſe*, *white precipitate of* MERCURY, red precipitate or red corroſive *mercury*, *coralline* MERCURY, and TURBITH *mineral*.

Mercury, *calcined*, *mercurius calcinatus*, a new and more expreſſive name for the preparation of *mercury*, commonly called *precipitate per ſe*. It is made by ſetting purified quick-ſilver for ſeveral months in a ſand-heat, in a glaſs veſſel with a broad bottom, and opening it to the air by a ſmall hole, till it is reduced to a red power.

The quick-ſilver muſt have a communication with the external air, as is neceſſary to the calcining of all the metals. This opening is beſt made, not as in the common bolt-heads, but at the lower end of a ſtem, going into the body of the glaſs; that if the quick-ſilver riſe with the heat, it may not, by aſcending into the ſtem, be removed out of the heat that is to calcine it.

A greater heat, ſufficient to make the *mercury* freely diſtil, not only does not promote the calcination, but revives ſuch part, as has been already calcined into *mercury* again. See Mercury *ſupra*. According to Mr. Cavendiſh, calcined *mercury* is only quick-ſilver which has abſorbed deplogiſticated air from the atmoſphere during its preparation; ſo that by giving it a ſufficient heat, the dephlogiſticated air is driven off, and the quick-ſilver acquires its original form. Hence he infers, that *mercurius calcinatus* and red precipitate, though prepared in a different manner, are very nearly the ſame thing. Phil. Tranſ. vol. lxxiv. part i. p. 141. This red powder has been by ſome greatly eſteemed in venereal caſes, as the moſt effectual and certain of the mercurials. Miſaubin's pills are ſuppoſed to be of this kind: but as it is diſpoſed to occaſion gripes, it has been uſual to join with it a ſmall quantity of opium, and ſome warm aromatic material. The doſe is from half a grain to two grains; five or ſix grains are ſaid to vomit and purge violently.

Mercury, *coralline*, *mercurius corallinus*, the name given in the London Diſpenſatory to a preparation of *mercury*, commonly known by the name of ARCANUM *corallinum*. It is prepared in this manner: pour upon the red corroſive *mercury*, commonly called *red precipitate*, thrice its weight of rectified ſpirit of wine, digeſt them together in a gentle heat for two or three days, often ſhaking the phial, then ſet fire to the ſpirit, and continue ſtirring the powder till the ſpirit is burnt away.

This operation proceeds upon the principle of ſpirit of wine dulcifying acid ſpirits.

This medicine, notwithſtanding this preparation, is a very rough one, operating, generally, in doſes of a few grains, both upwards and downwards.

Mercury, *incaleſcent*. See Incalescent.

Mercury, *oil of*, the name given by the chemiſts to a preparation of *mercury* in a fluid form, by means of a ſtrong acid. The preparation is this: calcine *mercury* with oil of vitriol to a dry ſnowy calx: ſuffer it to cool, then put it into a glaſs, and pour upon it an equal quantity of oil of vitriol; let this boil away almoſt to a dryneſs, carefully avoiding the poiſonous fumes; then increaſe the fire, and by degrees reduce it to a dryneſs again; which is, in this ſtate, a very difficult and tedious taſk. When the powder is dry, put the ſame quantity of oil of vitriol again to it, and proceed as before: at length it will ſcarce dry by means of ever ſo long or ſtrong a fire, but only ceaſe flowing freely, and become ſomewhat rigid like a fixed oil. It is then highly ſharp, cauſtic, and not to be touched, like the *ignis gehennæ* of Paracelſus. By this means the *mercury* is ſo fixed with the oil of vitriol, as not to be evaporated, or fly off, by the action of a very violent fire. By this proceſs we ſee the method of impregnating, ſaturating, and increating metals by acids to any degree, and alſo of fixing, in a great degree, volatile *mercury* by them; but no metal is hence to be expected, for in whatever manner *mercury* is fixed with acids, it is always recoverable again in its priſtine ſtate, by grinding it with twice its weight of iron filings, and diſtilling in a glaſs retort, with the greateſt degree of a ſand heat. Boerhaave.

Mercury, *ointment of*. See Unguent.

Mercury, *pills of*. See Pills.

Mercury, *plaſter of*. See Emplastrum and Plaster.

Mercury, *red precipitate of*, is prepared by inſpiſſating the ſolution of *mercury* in aqua fortis, over a gentle fire; when there remains a white maſs highly cauſtic called *calx of mercury*: this calx is then calcined with a gradual heat, and becomes firſt brown, then yellow, and at length, on increaſing the heat, of a deep red colour. It is called *red precipitate*, but improperly, for it it not a PRECIPITATE. If the aqua fortis uſed for the diſſolution has been previouſly drawn over from a ſmall proportion, on the one hundred and twenty-eight part of its own weight, of ſea-ſalt, the red maſs is ſuppoſed more readily to aſſume the ſparkling appearance which is looked upon as the characteriſtic of its goodneſs. This preparation is employed as an eſcharotic, and mixed with ointments and cerates, as a digeſtive; in which intention Mr. Sharp obſerves, that it is very effectual.

Mercury, *white precipitate of.* **Mercurius** *precipitatus albus.* This is compounded of crude *mercury* driven over from ſea-ſalt in a retort, or revived from common cinnabar, and diſſolved in aqua fortis; then a brine prepared of ſpring-water and ſea-ſalt is filtred through a cap-paper, and the ſolution of *mercury* dropped gradually into this brine; whence there is a white powder precipitated, which is to be waſhed from all its acrimony with ſome ſimple diſtilled water, or warm ſpring-water, and afterwards dried.

This is the the common precipitate of the ſhops, uſually called *white precipitate*. Its operation is moſtly by ſtool, ſometimes by vomit; and it will ſalivate, if ordered accordingly. It is recommended by Boerhaave as one of the beſt of the mercurials, and ſaid, in doſes of three grains, to purge and vomit gently. It appears, however, too corroſive for internal uſe; and it is indeed corroſive to ſuch a degree, as to be employed by the farriers for an eſcharotic. Spirit of ſal ammoniac, or other volatile alkalies, dropt into a filtered ſolution of ſublimate, abſorb a part of the acid, and the *mercury*, retaining ſo little as to be indiſſoluble, renders the liquor milky, and ſubſides, on ſtanding, in form of a fine white powder, which waſhed by repeated affuſions of hot water becomes inſipid, and is the *white mercurial precipitate* of the Edinburgh Pharmacopœia. If an equal weight of crude ſal ammoniac be diſſolved along with the ſublimate, fixed alkalis, added to this ſolution, extricate the volatile alkali of the ſal ammoniac, and the precipitate, which is that of the London Pharmocopœia, proves the ſame, as if the volatile alkali alone had been added in its pure ſtate. This *white precipitate* is frequently mixed with pomatums for the itch, and other foulneſſes of the ſkin; for which purpoſe, it is neceſſary at the ſame time to keep the body laxative, and to take ſomething inwardly to take hold of the mercurial principles, and prevent their raiſing ſalivation, which they may otherwiſe do.

Mercury, *corroſive ſublimate of*, **Mercurius** *ſublimatus corroſivus*, is a compound of forty parts of quick-ſilver, rubbed with one part or more of ſublimate already made, till it is divided into minute grains, then ground with twenty-eight parts of nitre, then with thirty-three of common ſalt, and afterwards, for a little time longer, with ſixty-ſix of calcined green vitriol: the mixture is then put into a matraſs, and that ſet in a furnace with a ſand-heat, under which a fire being kept to its greateſt height for twelve or fifteen hours, the *mercury* will be ſublimed, and ſtick to the top of the veſſel.

Mr. Boulduc deſcribes an eaſy manner of making corroſive ſublimate. He pours equal quantities of quick-ſilver and dephlegmated oil of vitriol into a retort, then draws off part of the acid, which does not incorporate with the quick-ſilver, the fire is continued till the white maſs of diſſolved *mercury* is dry, when he ſpeedly mixes it with equal parts of dried ſea-ſalt, and ſublimes it in the common way.

If the maſs obtained by inſpiſſating a ſolution of *mercury* in aqua fortis, be powdered and mixed with equal its weight of dried ſea-ſalt, and the mixture put into a matraſs, of which it may fill nearly one half, and ſet in a ſand-heat gradually increaſed, almoſt all the *mercury* will be ſatiated with the marine acid, and form with it a ſaline compound, which being ſublimed, concretes into a white maſs called *corroſive ſublimate*. If the vitriolic acid be uſed inſtead of the nitrous, the event will be the ſame: in the one caſe a *ſal catharticus* will be formed; in the other a *nitrum cubicum*.

This ſublimate is a violent eſchatoric, and eats away proud fleſh; half a dram of it diſſolved in a pint of lime-water, turns it yellow, which is then called *phagedænic* water; it is uſed to waſh ulcers, and tetterous eruptions. A ſtrong ſolution, made by boiling the ſame quantity of powdered ſublimate, with equal its weight of alum, in a pint of common water, till half the liquor is waſted, is the ALLUMINOUS *water* applied to the ſame purpoſe. Small doſes of this corroſive preparation, properly diluted, have been ventured on internally. Boerhaave relates, that if a grain be diſſolved in an ounce of water, and a dram of this ſolution ſoftened with ſyrup of violets, taken twice or thrice a day, it will perform wonders in many diſtempers reputed incurable. Van Swieten brought it into more general uſe, for the cure of venereal maladies: he diſſolves a grain of the ſublimate in two ounces of proof ſpirit, but rectified ſpirit diſſolves it more perfectly, and gives of this ſolution from one to two ſpoonfuls twice a day, continuing the medicine ſo long as any of the ſymptoms remain, with a low diet, and plentiful dilution. There are many inſtances in the London Medical Obſ. and Inq. of the ſucceſs of this method.

Mercury, *ſweet ſublimate of*. **Mercurius** *ſublimatus dulcis*, or *aquila alba*, is a compoſition of the preceding corroſive ſublimate with crude *mercury*, ground together till no *mercury* appear, and then put into a bolt-head, well ſtopped, and ſet in a ſand-heat, with a gentle fire, for the ſpace of two hours; which heat is to be then increaſed for three hours longer, and, laſtly, made very ſtrong, for as much more. When this is cold, the glaſs is broken, and the ſublimate ſeparated from the light flowers at top, and the duſt at bottom. This is then powdered afreſh, and the operation repeated in the ſame manner three times. If it be farther repeated, to a ſixth time, it is called CALOMEL.

The college of Edinburgh directs the ſublimation to be repeated three or four times; that of London, ſix times. *Mercurius dulcis* in large doſes, with cinnabar of antimony, is recommended in nervous diſeaſes, palſy, hemiplegia, epilepſy, and apoplexy. Med. Eſſ. Edinb.

Mr. Dictericus gives us theſe rules for knowing whether ſublimate is ſufficiently edulcorated in making *mercurius dulcis*. If after rubbing the *mercury* on gold, the gold becomes only pale, and not white, the *mercury* is dulcified enough: or if ſweet *mercury* becomes black when mixed with lime-water, it is fit for uſe; but if either the gold becomes white, or the *mercury* is of a brown or yellow colour, after mixing with lime-water, it is not ſufficiently dulcified. Commerc. Norem. 1737. hebd. 29. ſect. 2.

Mercurius dulcis appears to be the beſt and ſafeſt of the mercurial preparations that can be taken in a ſolid form: as a ſialagogue, five, ten, and ſometimes fifteen grains, made into a bolus or pills, are repeated every night or oftener, till the ptyaliſm begins: as an alterative, it is given from one to two or three grains. It generally anſwers beſt in ſmall doſes, which may be repeated with due caution, every evening, for a conſiderable time without inconvenience.

Mercury, *emetic yellow*, *mercurius emeticus flavus*, a name given in the late London Diſpenſatory to the mercurial preparation commonly known by the name of TURBITH *mineral*.

Mercury, *fixing of.* The ſuppoſition of a ſympathy between *mercury* and gold has been the great baſis of the attempts of the alchemiſts of all times, toward the making gold of it. But if they mean that the common *mercury* has this ſympathy with gold, the contrary is proved by that remarkable proceſs, in which it appears that *mercury* will incaleſce with that metal. If they mean that *mercury* which they call the ſeed of metals, it is hard to offer any thing in argument againſt it, this being a ſort of ideal ſubſtance which nobody has yet ſeen. It is much diſputed by the alchemiſts, whether there be or be not any ſuch thing as *mercury* that will heat or incaleſce with gold, or produce a ſenſible heat in the maſs, on being only ſimply mixed with that metal reduced to fine parts. It has been ſaid by ſome, that thoſe *mercuries* which they call *mercurii corporum*, that is, ſuch as have been extracted from the complete metals by certain proceſſes, which they keep as inviolable ſecrets, will incaleſce on the mixture with gold; and on this they build their proceſſes. But the negative part of the queſtion is more generally maintained, the famous *mercuries* of metals being held as non-entities with them; and even the ſearchers after tranſmutation of metals have in general acknowledged, that they themſelves never ſaw in any ſuch incaleſcence of *mercury* with gold, though they had heard others ſpeak of it as a thing they had ſeen. A *mercury*, however, was ſome years ago produced before the Royal Society, which in the hands of the preſident himſelf, on the faireſt trial, did incaleſce with that metal. Phil. Tranſ. Nº 122.

Among the ſeveral methods recommended for the fixing this fluid metal into ſolid ſilver, oil of talc, and oil of the human fæces, are the moſt ſtrongly affirmed to be the infallible mediums. The firſt of theſe which has been ſo much miſunderſtood, by reaſon of its name, as to be ſearched for in the ſtone talc, is truly an oil prepared from the flowers of zink. See *Oil of* TALC.

The other is required to be clear and colourleſs as water, and without any ill ſmell. Theſe were qualities ſo difficultly to be found in an oil of that fœtid matter, that both the one and the other of theſe oils were looked upon by many as impracticable proceſſes. But after the firſt had been made by two or three chemiſts, Mr. Homberg at length hit upon the laſt, but without finding any the leaſt tendency to ſuch an effect in it, or any change at all produced by it on *mercury*, after ever ſo long digeſtion, or ever ſo many proceſſes. Mem. Acad. Par. 1711. See PHILOSOPHER's *Stone*.

Mercury, *animated*, is quick-ſilver impregnated with ſome ſubtile and ſpirituous particles, ſo as to render it capable of growing hot when mingled with gold.

Mercury, or **Mercury** *of bodies*, is alſo uſed by chemiſts to denote the third of the principles or elements of natural bodies, called alſo ſpirit.

In this ſenſe, *mercury* is defined the moſt ſubtile, light, volatile, penetrating, and active part of all bodies. See Spirit.

Mercury *of life*, *mercurius vitæ*, may, acccording to Mr. Boyle, be moderated in its evacuating quality, by continually ſtirring it in a flat glazed earthen veſſel, over a fire, till it emits no fumes, and turns of a grey colour; and he thinks this is the *mercurius vitæ purgans* ſo often mentioned by Riverius. Boyle, Works abr. vol. i. p. 74.

Mr. Godfrey obſerves, that what is called *mercurius vitæ*, prepared of ſublimate *mercury* and antimony, has no *mercury* in it, but is the reguline part of the antimony, with the acid of the ſublimate; and what remains is the *mercury* formed into cinnabar by the ſulphur of the antimony. See Algarot.

Mercury *of metals*, or of the *philoſophers*, is a pure fluid ſubſtance in form of common running *mercury*, ſaid to be found in all *mercury*, and capable of being extracted from the ſame.

The notion of *mercury* of metals is founded on the common ſyſtem of the chemiſts, that *mercury* or quick-ſilver is the baſis or matter of all metals; and that metals are only *mercury* fixed by a certain ſulphur.

Mr. Boyle aſſures us, he had a way of drawing a true running *mercury* or quick-ſilver, from antimony.

Mercury alſo ſerves as a title for books, and papers of news; ſo called from the heathen deity Mercury, ſuppoſed the meſſenger of the gods.

Thus we have monthly *mercuries*; and the French have a gallant *mercury*, &c.

In the like ſenſe, *mercury* is always figuratively applied to perſons who make it their buſineſs to collect news, or to run about and diſtribute it.

Mercury, in *Heraldry*, denotes the purple colour in the coats of ſovereign princes.

Mercury, in *Mythology*, the ſon of Jupiter and Maia. He was the god of merchandize, and therefore was ſometimes painted with a wand in his left hand, and a bag of money in his right. He was alſo the god of eloquence, and the meſſenger of the gods; he is pictured therefore with a herald's ſtaff in his hand, entwined with two ſnakes; wings on his feet, to ſhew his ſpeed; and a broad-brimmed beaver with wings. He had a general power delegated to him, by Jupiter, of conducting the ſouls of men to their proper place, after their parting from the body; and re-conducting them to our world again, when there was any particular occaſion for it. He was, moreover, the god of all gainful arts; whence the proverb κοινὸς ἑρμῆς, i. e. *commune lucrum*; eſpecially of things found by chance; the inventor of the lyre, and of the exerciſe of wreſtling. He was the patron of thieves, having himſelf been expert that way; and the guide of travellers, for which reaſon he had ſtatues four ſquare ſet up to him in croſs-roads. See Terminus. There are ſeveral marks whereby *Mercury* may be known; among which we may reckon the lightneſs aud agility of his perſon as the chief; but the moſt remarkable of his diſtinguiſhing attributes are his petaſus, or winged cap; the talaria, or wings to his feet; and his wand, with two ſerpents about it, which they call his caduceus. Sometimes he is alſo repreſented with the chlamys, faſtened over his ſhoulders on his breaſt, and floating behind him in the air. He is likewiſe diſtinguiſhed by his ſword, with which he killed Argus, called Harpè. As the make of *Mercury* ſeems to be all intended for lightneſs and diſpatch, the ancients might borrow this idea of him from his planetary character: thus Lucan, Pharſal. i. v. 663. in ſpeaking of *Mercury*, as the guiding intelligence of a planet, marks the ſwiftneſs of his motion.

Mercury is ſometimes alſo uſed for the Torricellian experiment, or barometer.

Though *mercury* be not ordinarily ſuſtained in a tube above the height of twenty-eight or twenty-nine inches; yet M. Huygens has found, that *mercury*, well purged, and in a cloſe ſtill place, will be ſuſtained to the height of ſeventy-two inches. See Torricellian.

MERCY, in *Law*. See Misericordia.

MERDESENGI, in the *Materia Medica of the Arabians*, a name given by Serapio to litharge. Avicenna calls this ſubſtance mardac, and it has been erroneouſly ſuppoſed from this, that *mardac* and *merdeſengi* were not the ſame ſubſtance; but this is a falſe conjecture.

MERDIVORÆ, from *merda*, *dung*, and *voro*, *I devour*, the *dung-eaters*, in *Natural Hiſtory*, the name given by authors to ſeveral flies, which feed on excrements of different animals. Of theſe there are three kinds very common among us; 1. The coprophagus, which is of a dun colour, with a reddiſh head, and a white ſtreak along the middle of it; 2. The red *dung-fly*, which has ſilvery wings, a red body, and black ſhoulders; and, 3. The green one, which is of a very glittering hue, and has ſilvery wings.

MERGANSER, in *Ornithology*, the name of a large water-fowl, called in Engliſh, the *gooſander*, and by ſome authors, the *harle*.

This is the mergus *merganſer* in the Linnæan ſyſtem: the bill of the male of this ſpecies, is about three inches long, narrow, and finely ſerrated: the colour of the bill as well as of the irides is red; the head is large, and the feathers on the hind part long and looſe; the colour black, finely gloſſed with green; the upper part of the neck the ſame; the lower part and under ſide of the body of a fine pale yellow; the upper part of the back and inner ſcapulars are black; the lower part of the back and tail are aſh-coloured; the tail conſiſts of eighteen feathers; the greater quill-feathers are black, the leſſer white, ſome of which are edged with black; the coverts at the ſetting on of the wings are black; the reſt white; and the legs of a deep orange colour. The female of this ſpecies is called dundiver. Theſe birds frequent our rivers and freſh waters, eſpecially in hard winters; they are never ſeen in the ſouthern parts of Great Britain during ſummer, when they retire far north to breed. They are great divers, and live on fiſh. Their fleſh is extremely rank, and ſcarce eatable. Pennant.

MERETRIX, among the Romans. The *meretrices* were the better ſort of courtezans, and differed much from the *proſtibulæ*, or common proſtitutes, who had bills or inſcriptions, *tituli*, over their doors, and were ready at all times to entertain their cuſtomers; whereas the *meretrices* entertained none but at night.

The *meretrices* were diſtinguiſhed from the matrons by their dreſs, being obliged to wear the *toga* and ſhort tunics, like thoſe of the men; whereas the matrons wore the *ſtola*, which was a garment that reached down to their feet, as did likewiſe their *palla*, or outer robe.

MERGEN, a word uſed by ſome of the chemical writers to expreſs coral.

MERGER, in *Law*, is where a leſſer eſtate in lands, &c. is drowned in the greater; as, if the fee comes to tenant for years or life, the particular eſtates are *merged* in the fee: but an eſtate tail cannot be *merged* in an eſtate fee; for no eſtate in tail can be extinct, by the acceſſion of a greater eſtate to it. If a leſſor, who had the fee, marries with the leſſee for years, this is no *merger*, becauſe he hath the inheritance in his own, and the leaſe in right of his wife. And where a man hath a term in his own right, and the inheritance deſcends to his wife, ſo that he hath a freehold in her right, the term is not *merged* or drowned.

MERGUS, in the Linnæan ſyſtem of *Ornithology*, the name of a diſtinct genus of birds, of the order of the *anſeres*.

The diſtinguiſhing characteriſtic of this genus is, that the beak is ſomewhat cylindric, and has a crooked point.

The characters of this genus, according to Mr. Ray, are theſe: the feet are webbed, the three fore-toes being connected by a membrane, but the hinder toe is left looſe; the beak is narrow, hooked at the end, and ſerrated.

Of this genus are the merganser, the *mergus cucullatus*, with a globoſe creſt, white on the ſides, with a black margin, the body blackiſh on the upper part, and whitiſh on the lower; the feet and beak are black: this is alſo called *anas criſtatus*, and bird of the wind: it is found in America: the *albellus* of Aldrovand, called *mergus ceratus major*, the greater creſted diver, and *mergus Rheir*, the diver of the Rhine, and commonly known in England by the name of the smew: the head is adorned with a long creſt, white above and black beneath; the forehead is marked with a large oval black ſpot; the body is white, the back and temples black, and the wings are variegated with black and white: it feeds on fiſh, and is very common on our coaſts: the *mergus ſerrator*, or *ſerula* of the Venetians: the *mergus caſtor*, with an aſh-coloured creſt, the lower part of the body ferruginous, white throat, and beak and feet blackiſh: and the *mergus minutus*, with the head of a light grey colour, and an oval black ſpot from beyond the eyes to the bill, and a white ſpot under the eye. Ray makes this to be the female of the *albellus*, which it greatly reſembles, though it is diſtinguiſhed by the name of *lough diver*.

Mergus *cirratus minor*, in *Ornithology*, a name by which Geſner calls the *capo negro*, a ſpecies of duck, called in Engliſh the *tufted* duck.

MERIDIAN, in *Aſtronomy*, a great circle of the ſphere, paſſing through the zenith, nadir, and poles of the world, croſſing the equinoctial at right angles, and dividing the ſphere into two hemiſpheres, the one eaſtern, and the other weſtern.

Or, the *meridian* is a vertical circle, as A Z B N (*Tab. Aſtron. fig.* 6.) paſſing through the poles of the world, P and Q.

It is called *meridian*, from the Latin *meridies*, *noon*, or *midday*, becauſe when the ſun is in this circle, it is noon in thoſe places ſituated under it.

Meridian, in *Geography*, is a great circle, as P A Q D (*Tab. Geography*, *fig.* 7.) paſſing through the poles of the earth,

earth P and Q: and any given place at Z. So that the plane of the terreſtrial *meridian* is in the plane of the celeſtial one.

Hence, 1. as the *meridian* inveſts the whole earth, there are ſeveral places ſituated under the ſame *meridian*. And 2. as it is noon-tide whenever the center of the ſun is in the *meridian* of the heavens; and as the *meridian* of the earth is in the plane of the former; it follows, that it is noon at the ſame time, in all places ſituate under the ſame *meridian*. 3. There are as many *meridians* on the earth, as there are points conceived in the equator. In effect, the *meridians* always change, as you change the longitude of the place; and may be ſaid to be infinite; each reſpective place from eaſt to weſt having its reſpective *meridian*.

MERIDIAN, *firſt*, is that from which the reſt are accounted, reckoning from weſt to eaſt. The firſt *meridian* is the beginning of longitude.

The fixing of the firſt *meridian* is a matter merely arbitrary; and hence different perſons, nations, and ages, have fixed it differently; whence ſome confuſion has ariſen in geography. The rule among the ancients was, to make it paſs through the place fartheſt to the weſt that was known. But the moderns knowing, that there is no ſuch place in the earth as can be eſteemed the moſt weſterly, the way of computing the longitudes of places from one fixed point is much laid aſide.

Ptolemy aſſumed the *meridian* that paſſes through the fartheſt of the Canary Iſlands as his firſt *meridian*; that being the moſt weſtern place of the world then known. After him, as more countries were diſcovered in that quarter, the firſt *meridian* was removed farther off. The Arabian geographers choſe to fix the firſt *meridian* upon the utmoſt ſhore of the weſtern ocean. Some fixed it to the iſland of St. Nicholas near Cape Verd; Hondius to the iſle of St. James; others to the iſland of Del Corvo, one of the Azores; becauſe on that iſland the magnetic needle, at that time, pointed directly north, without any variation; and it was not then known that the variation of the needle is itſelf ſubject to variation. The lateſt geographers, particularly the Dutch, have pitched on the Pike of Teneriffe; others on the iſle of Palm, another of the Canaries; and, laſtly, the French, by command of their king, on the iſland of Fero, another of the Canaries.

But, without much regard to any of theſe rules, our geographers and map-makers frequently aſſume the *meridian* of the place where they live, or the capital of their country for a firſt *meridian*; and thence reckon the longitudes of their places.

The aſtronomers in their calculations uſually chooſe the *meridian* of the place where their obſervations are made, for their firſt *meridian*; as Ptolemy at Alexandria; Tycho Brahe at Uranibourg; Riccioli at Bologna; Mr. Flamſteed at the royal obſervatory at Greenwich; and the French at the obſervatory at Paris.

In the Philoſophical Tranſactions, there is a ſuggeſtion, that the *meridians* vary in time. This ſeems very probable, from the old *meridian line* in the church of St. Petronio at Bologna, which is found to vary no leſs than eight degrees from the true *meridian* of the place at this time; and from that of Tycho at Uranibourg, which M. Picart obſerves, varies eighteen minutes from the modern *meridian*. If there be any thing of truth in this hint, Dr. Wallis ſays, the change muſt ariſe from a change of the terreſtrial poles (here on earth, of the earth's diurnal motion), not of their pointing to this or that of the fixed ſtars: for if the poles of the diurnal motion remain fixed to the ſame place on the earth, the *meridians*, which paſs through theſe poles, muſt remain the ſame.

But the notion of the changes of the *meridian* ſeems overthrown by an obſervation of M. Chazelles, of the French Academy of Sciences, who, when in Egypt, found that the four ſides of a pyramid built three thouſand years ago ſtill looked very exactly to the four cardinal points. A poſition which can never be looked upon as fortuitous!

MERIDIAN *of a globe*, or *ſphere*, is the brazen circle, in which the GLOBE hangs and turns.

It is divided into four nineties, or three hundred and ſixty degrees, beginning at the equinoctial: on it, each way, from the equinoctial, on the celeſtial globes, is counted the ſouth and north declination of the ſun or ſtars; and on the terreſtrial globe, the latitude of places north and ſouth. There are two points on this circle, called the *poles*; and a diameter, continued from thence through the center of either globe, is called the axis of the earth, or heavens, on which they are ſuppoſed to turn round.

On the terreſtrial globes there are uſually thirty-ſix *meridians* drawn, one through every tenth degree of the equator, or through every tenth degree of longitude.

The uſes of this circle are, to ſet the globes to any particular latitude, to ſhew the ſun's or a ſtar's declination, right aſcenſion, greateſt altitude, &c.

MERIDIAN *line*, an arch, or part, of the *meridian* of the place, terminated each way by the horizon.

Or, a *meridian line* is the interſection of the plane of the *meridian* of the place with the plane of the horizon, vulgarly called a *north and ſouth line*, becauſe its direction is from one pole towards the other.

The uſe of a *meridian line* in aſtronomy, geography, dialling, &c. is very great, and on its exactneſs all depends; whence infinite pains have been taken by divers aſtronomers to fix it to the utmoſt preciſion. M. Caſſini has diſtinguiſhed himſelf by a *meridian line* drawn on the pavement of the church of S. Petronio, at Bologna, the largeſt and moſt accurate in the world; being 120 feet in length. In the roof of this church, a thouſand inches above the pavement, is a little hole, through which the ſun's image, when in the *meridian*, falling upon the line, marks his progreſs all the year. When finiſhed, M. Caſſini, by a public writing, informed the mathematicians of Europe, of a new oracle of Apollo, or the ſun, eſtabliſhed in a temple, which might be conſulted, with entire confidence, as to all difficulties in aſtronomy. See GNOMON.

To draw a MERIDIAN *line.* Knowing the ſouth quarter pretty nearly, obſerve the altitude F E (*Tab. Aſtronomy, fig.* 8.) of ſome ſtar on the eaſtern ſide thereof, not far from the *meridian* H Z R N: then, keeping the quadrant firm on its axis, ſo as the plummet may ſtill cut the ſame degree, only directing it to the weſtern ſide of the *meridian*, wait till you find the ſtar has the ſame altitude as before, *f*, *e*. Laſtly, biſect the angle E C *e*, formed by the interſection of the two planes wherein the quadrant is placed at the time of the two obſervations, by the right line H R. This H R is a *meridian line*.

Or thus: on the horizontal plane, from the ſame center C (*fig.* 9.) deſcribe ſeveral arches of circles B A, *b a*, &c. and on the ſame center C erect a ſtyle, or gnomon, perpendicular to the plane A C B, a foot or half a foot long. About the twenty-firſt of June, between the hours of nine and eleven in the morning, and between one and three in the afternoon, obſerve the points B, *b*, &c. A, *a*, wherein the ſhadow of the ſtyle terminates. Biſect the arches A B, *a b*, &c. in D, *d*, &c. If then the ſame right line D E biſect all the arches A B, *a b*, &c. it will be the *meridian line* ſought.

In regard the extremity of the ſhadow is ſomewhat hard to determine, it is beſt to have the ſtyle flat at top, and to drill a little hole, noting the lucid ſpot projected by it on the arches A B and *a b*, inſtead of the extremity of the ſhadow. Otherwiſe the circles may be made with yellow, inſtead of black, &c.

A good *meridian line* for regulating clocks and watches may be had by the following method: make a round hole, almoſt a quarter of an inch in diameter, in a thin plate of metal; and fix the plate in the top of a ſouth window in ſuch a manner, that it may recline from the zenith at an angle equal to the co-latitude of your place, as nearly as you can gueſs; for then the plate will face the ſun directly at noon on the equinoctial days. Let the ſun ſhine freely through the hole into the room, previouſly darkened; and hang a plumb-line to the ceiling of the room, at leaſt five or ſix feet from the window, in ſuch a place as that the ſun's rays, tranſmitted through the hole, may fall upon the line when it is noon by the clock; and having marked the ſaid place on the ceiling, take away the line. Having adjuſted a ſliding-bar to a dove-tail groove, in a piece of wood about eighteen inches long, and fixed a hook into the middle of the bar, nail the wood to the above mentioned place in the ceiling, parallel to the ſide of the room in which the window is; the groove and bar being towards the floor. Then hang the plumb-line upon the hook in the bar, the weight or plummet reaching almoſt to the floor: when this is done, find the true ſolar time, and thereby regulate your clock or watch. Then, at the moment of next noon by the clock, when the ſun ſhines, move the ſliding-bar in the groove until the ſhadow of the plumb-line biſects the image of the ſun on the floor, wall, or on a white ſcreen placed on the north ſide of the line; the plummet or weight at the end of the line hanging freely in a pail of water, placed below it on the floor. By repeated corrections, on the following days, with the ſun and clock, this method may be brought to a very great exactneſs. This *meridian line* will not only be ſufficient for the regulation of clocks and watches, to the true mean time, by equation tables, but alſo for moſt aſtronomical purpoſes. Ferguſon's Lect. on ſelect Subjects, &c. lect. x.

Several authors have invented particular inſtruments and methods for the deſcribing of *meridian lines*, or rather for determining equal altitudes of the ſun in the eaſtern and weſtern parts of the heavens; as Mr. Grey, Dr. Derham, &c. in the Philoſophical Tranſactions. But as the former of the methods above delivered ſuffices for aſtronomical obſervations, and the latter for more ordinary occaſions, we ſhall forbear to give any deſcriptions thereof.

From what has been ſhewn it is evident, that whenever the ſhadow of the ſtyle covers the *meridian line*, the center of the ſun is in the *meridian*; and therefore it is then noon. And hence the uſe of a *meridian line* in adjuſting the motion of clocks, &c. to the ſun.

Hence alſo, if the *meridian line* be biſected by a right line O V, drawn perpendicularly through the point C, O V will be the interſection of the *meridian*, and firſt vertical; and, conſequently, O will ſhew the eaſt point, and V the weſt.

Laſtly, if a ſtyle be erected perpendicularly in any other horizontal plane, and a ſignal be given when the ſhadow of the ſtyle covers the *meridian line* drawn in another plane, noting the apex, or extremity, of the ſhadow projected by the ſtyle, a line drawn from that point through that wherein the ſtyle is raiſed, will be a *meridian line*.

One *meridian line* being given, another may be drawn upon another horizontal plane by the following method: hang a thread with a plummet exactly over the ſouth end of the *meridian line* given, and another thread with a plummet over the ſouth end of the plane upon which the *meridian line* is to be drawn; let one perſon obſerve at noon the moment when the ſhadow of the firſt thread falls exactly upon the *meridian* given, and let another obſerver, at the ſame time, mark two diſtant points in the ſhadow of the ſecond thread: a line drawn through thoſe points is the *meridian line* required. By the ſame method may a *meridian line* be found upon a ſouth wall, by marking two points in the ſhadow of a thread hung at a little diſtance from it: if the *meridians* are near, he that obſerves the ſhadow of the firſt thread may let the other know the moment it falls upon the *meridian line* by ſaying *now*: if they are far diſtant, it ſhould be done by the motion of the hand, becauſe ſound takes ſome time to paſs from one place to another. The *meridian line* is the baſis of aſtronomical obſervations: a *meridian line* being found, there may be placed over it a quadrant or ſextant in ſuch a manner, that though it be moved up or down to give it different elevations, in order to view through the ſights of it the celeſtial bodies at their different altitudes; yet the plane of that ſide of the inſtrument upon which the degrees are marked ſhall continue all the while in the plane of the *meridian*. Of this kind is the MURAL *arc* in the royal OBSERVATORY at Greenwich. See MERIDIAN *altitude*.

MERIDIAN *line*, on a dial, is a right line ariſing from the interſection of the *meridian* of the place with the plane of the dial.

This is the line of twelve o'clock, and from hence the diviſion of the hour-line begins.

MERIDIAN, *magnetical*, is a great circle, paſſing through or by the magnetical poles; to which the magnetic needle or needle of the mariners compaſs, if not otherwiſe hindered, conforms itſelf.

MERIDIAN *altitude* of the ſun or ſtars is, their altitude when in the *meridian* of the place where they are obſerved. See ALTITUDE.

To take the MERIDIAN *altitude of the ſtars.* Aſtronomers make two principal kinds of obſervations of the ſtars, the one when they are in the *meridian*, and the other when in vertical circles.

For *meridian* obſervations there are two inſtruments principally uſed, the quadrant and gnomon.

To take the MERIDIAN *altitude with a quadrant.* If the poſition of the *meridian* be known, and the plane of an aſtronomical quadrant to be placed in the *meridian* line, by means of the plumb-line ſuſpended at the center, the *meridian* altitudes of the ſtars, which are the principal obſervations whereon the whole art of aſtronomy is founded, may eaſily be determined.

The *meridian* altitude of a ſtar may likewiſe be had by means of a pendulum-clock, if the exact time of the ſtar's paſſage by the *meridian* be known. Now it muſt be obſerved, that the ſtars have the ſame altitude for a minute before and after their paſſage by the *meridian*, if they be not in or near the zenith; but if they be, their altitudes muſt be taken every minute when they are near the *meridian*; and then their greateſt altitudes will be the *meridian* altitudes ſought.

As to the manner of obſerving, it is found very difficult to place the vane of the quadrant in the *meridian* exactly enough to take the *meridian* altitude of a ſtar; for, unleſs there be a convenient place, and a wall, where the quadrant may be firmly faſtened in the plane of the *meridian*, which is not eaſily had, we ſhall not have the true poſition of the *meridian* proper to obſerve the ſtars. It will be much eaſier, therefore, on ſeveral accounts, to uſe the portable quadrant, by which the altitude of the ſtar may be obſerved a little before its paſſage over the *meridian*, every minute, till its greateſt altitude be found. Here, though we have not the true poſition of the *meridian* by this means, yet we have the apparent *meridian* altitude of the ſtar.

Though this method, in the general, be very good, and free of any ſenſible error; yet, in caſe a ſtar paſſes by the *meridian* near the zenith, it proves ſomewhat defective: for in theſe kinds of obſervations, the inconvenient ſituation of the obſerver, the variation of the ſtar's azimuth ſeveral degrees in a little time, the alteration of the inſtrument, and the difficulty of replacing it vertically, will prevent the obſervations from being made oftener than in every four minutes; but in each minute the altitude varies about fifteen minutes of a degree, ſo that there will be the difference of a degree in the ſtar's altitude between each obſervation. In ſuch caſes, therefore, it will be better to have the true poſition of the *meridian*, or the exact time wherein the ſtar paſſes the *meridian*, in order either to place the inſtrument in the *meridian*, or to obſerve the altitude of the ſtar the moment it paſſes the *meridian*.

To find the MERIDIAN *altitude of the ſun, &c. by a gnomon,* ſee GNOMON. By other means, ſee ALTITUDE.

MERIDIAN *teleſcope*. See TELESCOPE.

To meaſure the degrees of the MERIDIAN. See DEGREE.

To obſerve the tranſits or paſſages of the heavenly bodies acroſs the plane of the MERIDIAN. A *meridian* line being found, hang two threads with plummets exactly over it, at a little diſtance from one another, and they will be in the plane of the *meridian*: if you place your eye cloſe to one of the threads, in ſuch a manner that you make it cover the other, and both appear as one thread; when a ſtar is behind the threads, it is in the *meridian*. By the ſame method the ſun may be viewed, through a ſmoaked glaſs; when the threads paſs through his center, he is in the *meridian*: but the beſt way of obſerving the ſun, moon, ſtars, or planets, is through a teleſcope placed in the *meridian*, with two croſs hairs, one of which is in a vertical, the other in a horizontal poſition; when the vertical hair paſſes through the center of the ſun he is in the *meridian*.

MERIDIANI, in *Antiquity*, is a name which the Romans gave to a kind of gladiators, who entered the arena about noon, after the beſtiarii (who fought in the morning againſt beaſts) had finiſhed. See GLADIATOR.

They were thus called from *meridies*, i. e. *noon*, the time when they exhibited their ſhews.

The *meridiani* were a ſort of artleſs combatants, who fought man with man, ſword in hand: hence Seneca takes occaſion to obſerve, that the combats of the morning were full of humanity, compared with thoſe which followed.

MERIDIONAL *diſtance*, in *Navigation*, the ſame with departure, or eaſting and weſting; being the difference of longitude between the meridian, under which the ſhip now is, and any other meridian, which ſhe was under before.

MERIDIONAL *parts*, *miles*, or *minutes*, in *Navigation*, are the parts by which the meridians in a *Mercator*'s CHART do increaſe, as the parallels of latitude decreaſe.

The co-ſine of the latitude of any place being equal to the radius, or ſemidiameter, of that parallel; therefore, in the true ſea-chart, or nautical planiſphere, this radius being the radius of the equinoctial, or whole ſine, of ninety degrees, the *meridional* parts at each degree of latitude muſt increaſe, as the ſecants of the arch contained between that latitude, and the equinoctial, do decreaſe.

In order to underſtand this, it is neceſſary to conſider, 1. That the diſtance between any two meridians at the equator is to their diſtance in any parallel of latitude as radius is to the co-ſine of that latitude. Let P D F E, *Tab. Navigation, fig.* 13. repreſent the fourth part of a ſphere; E being the center, P the pole, E D the radius of the equator, A B the radius of a parallel of latitude: then each of the arcs P B D, P C *d*, will repreſent a quadrant of a meridian; D *d* an arc of the equator; and B C an arc of a parallel of latitude: D B expreſſes the latitude, and P B the complement of the latitude, whoſe right ſine is B A. But the circumference of a circle, whoſe radius is E D, is to the circumference of a circle, whoſe radius is A B, and conſequently like arcs D *d*, B C, intercepted between the ſame two meridians, as E D is to A B, i. e. as radius to the co-ſine of the latitude. Whence it is eaſy to conſtruct a table ſhewing in what proportion the degrees of longitude diminiſh in every latitude. See ſuch a table under article DEGREE *of latitude*.

2. Any part of a parallel of latitude is to a like part of a meridian, as radius to the ſecant of the latitude to that parallel. Let P D E, *Tab. Navigation, fig.* 14. repreſent a quadrant of a meridian, where P is the pole, and D E the radius of the equator; A B is the radius of a parallel of latitude, or the co-ſine of the latitude, whoſe ſine is B F, and ſecant E C. Then E F : E B : : E D : E C; or co-ſine latitude : rad. : : rad. : ſecant of the latitude, in that parallel. Therefore part of a parallel of latitude is to a like part of the equator as the radius is to the ſecant of the latitude to that parallel: conſequently, ſince like parts of the meridian and equator are equal, as great circles, any part of a parallel of latitude is to a like part of a meridian, as radius to the ſecant of the latitude to that parallel.

3. The diſtance of any parallel of latitude, A, from the equator is expreſſed by the ſum of the ſecants of all the arcs between the equator and that parallel. For, as radius to the ſecant of the latitude A, ſo is a diminiſhed degree of longitude in the latitude A, or a degree of that parallel to a degree of the meridian: but the degrees of latitude, or of the meridian, are to be lengthened in proportion as the degrees of longitude decreaſe: therefore, as radius to the ſecant of the latitude A, ſo is a natural degree of the meridian to a lengthened degree in the latitude A; radius being here as unity, and one natural degree as unity alſo: therefore, the length of a degree in any latitude is as the ſecant of that latitude, or may be expreſſed by that ſecant: but the diſtance of any parallel from the equator is the ſum of all the ſucceſſive arcs between the equator and that parallel: conſequently, the diſtance of that parallel is expreſſed by the ſum of the ſecants of all theſe arcs between the equator and that parallel of latitude: and, therefore, by the addition of the ſecants of ſmall arcs, the diſtances of the parallels of latitude from the equator are obtained.

The tables, therefore, of *meridional* parts, in books of navigation, are to be made by a continual addition of ſecants, calculated in ſome books, as in ſir Jonas Moor's Tables, Robertſon's Navigation, &c. for every degree and minute of latitude; and theſe will ſerve either to make or graduate a Mercator's chart, or to work the Mercator's ſailing.

Mr. Wright, to whom we are indebted for this excellent diſcovery, made his table for the diviſion of the nautical meridian, or the table of *meridional* parts, as follows: the *meridional* parts for 1 minute be made equal to the ſecant of 1 minute; thoſe of 2′ equal to the ſum of the ſecants of 1′ and 2′; thoſe of 3′ equal to the ſum of the ſecants of 1′, 2′, and 3′; thoſe of 4′ equal to the ſum of the *meridional parts* of 3′ and the ſecant of 4′; and ſo on by a conſtant addition of the ſecants: Mr. Oughtred, ſir Jonas Moor, Dr. Wallis, Dr. Halley, and others, have endeavoured to find methods of conſtructing theſe tables with greater accuracy than by the addition of the ſecants to every minute.

To uſe them you muſt enter the table with a degree of latitude at the head, and with the minute on the firſt column towards the left hand; and in the angle meeting you will have the *meridional* parts.

Having the latitude of two places, to find the *meridional* miles or minutes, between them; conſider whether the places be, one under the equinoctial, and the other wide thereof; or the one on the one ſide of the equinoctial, and the other on the other; or whether they both lie on the ſame ſide.

If one place lie under the equator, the *meridional* minute next under the degree of latitude of the other place, is the *meridional* difference of latitude, or latitude inlarged.

If one be in north, and the other in ſouth latitude, the *meridional* minutes, correſponding to the two latitudes, added together, give the *meridional* minutes between them.

Both places lying towards the ſame pole, ſubtract the *meridional* parts anſwering to the leſs latitude, from thoſe of the greater, the remainder gives the *meridional* minutes.

In the Philoſophical Tranſactions, N° 219, Dr. Halley has given a very curious paper relating to the diviſion of the nautical meridian, by a quite different method from Mr. Wright's; and containing a method of performing the problems of ſailing according to the true chart, by the help of Briggs's, or the common table of logarithmic tangents, without a table of *meridional* parts. Dr. Halley avails himſelf of a principle, firſt accidentally diſcovered by Mr. Henry Bond, and publiſhed about the year 1645, that the meridian line was analogous to a ſcale of logarithmic tangents of half the complements of the latitude. This analogy was firſt demonſtrated by Mr. James Gregory, in his Exercitationes Geometricæ, publiſhed in 1688, and more elegantly and conciſely by Dr. Halley himſelf; who has alſo ſhewn *(ubi ſupra)* how to apply this analogy, by means of any ſyſtem of logarithms, for computing the interval of the *meridional* parts anſwering to any two given latitudes. The reader may find this ſubject well illuſtrated by Mr. Robertſon, in his Elements of Navigation, book viii. p. 142, &c. See alſo Phil. Tranſ. vol. xlvi. p. 559, &c.

To find the *meridional* parts to any ſpheroid, with the ſame exactneſs as in a ſphere.

Let the ſemi-diameter of the equator be to the diſtance of the ſocus of the generating ellipſe from the center, as m to 1. Let A repreſent the latitude for which the *meridional* parts are required, s the ſine of the latitude, the radius being unit; find the arc B, whoſe ſine is $\frac{s}{m}$; take the logarithmic tangent of half the complement of B, from the common tables; ſubtract this logarithmic tangent from 10.0000000, or the logarithmic tangent of 45°: multiply the remainder by $\frac{7915.7044678978}{m}$, &c. and the product ſubtracted from the *meridional* parts in the ſphere, computed in the uſual manner for the latitude A, will give the *meridional* parts expreſſed in minutes for the ſame latitude in the ſpheroid, provided it be oblate.

Example: if $m\,m : 1 :: 1000 : 22$, then the greateſt difference of the *meridional* parts in the ſphere and ſpheroid is 76.0929 minutes: in other caſes it is found by multiplying the remainder above mentioned by 1174.078.

When the ſpheroid is oblong, the difference of the *meridional* parts in the ſphere and ſpheroid, for the ſame latitude, is then determined by a circular arc. Phil. Tranſ. N° 461. ſect. 14. See alſo Maclaurin's Fluxions, art. 195—899.

Mr. Murdoch has ſolved this problem by infinite ſeries, and has computed a table of *meridional* parts for an oblate ſpheroid, ſuch as is mentioned in the foregoing example. See his Treatiſe, intitled, Mercator's Sailing applied to the true Figure of the Earth. Lond. 1741. 4to.

MERIS, μερις, *a part*, in *Muſic*, an appellation given by Mr. Sauveur to the forty-third part of an octave. See Mem. Acad. Scienc. 1701.

MERIT, in *Theology*, is uſed to ſignify the moral goodneſs of the actions of men, aud the reward due to them.

The Romiſh ſchoolmen diſtinguiſh two kinds of *merit* towards God: the one of *congruity*, the other of *condignity*.

MERIT *of congruity* is when there is no juſt proportion between the action and the reward; but he who beſtows the reward ſupplies, by his goodneſs or liberality, what was wanting in the action, Such is the *merit* of a ſon towards his father: but this is only *merit* in an improper ſenſe.

MERIT *of condignity* is when there is an abſolute equality and a juſt eſtimation between the action and the reward: as in the wages of a workman.

Thoſe of the reformed religion diſclaim all *merit of condignity* towards God; even their beſt works, they own, do not *merit* at his hands. Hence the doctrine of *condign merits* makes one of the great articles of controverſy between the Romiſh and reformed churches.

MERIT, *order of*. See ORDER.

MERLANGUS, in *Ichthyography*, a name given by Bellonius and ſome other authors, to a ſmall ſpecies of whiting, or *aſellus mollis*, called by the Venetians *mollo*, and by ſome other nations the *capelon*.

MERLANUS, a name given by ſome writers in ichthyography to the common WHITING, or *aſellus mollis ſive albus*.

MERLIN, in *Ornithology*, the name of the yellow-legged FALCON.

The *merlin* does not breed in England, but migrates here in October, about the time when the booby diſappears. It flies low, and is often ſeen along the ſides of roads, ſkimming from one ſide of the hedges to the other, in ſearch of prey. See ÆSALON, and HAWK, and *Tab.* III. *Birds*, N° 32.

MERLON, in *Fortification*, that part of the parapet, from fifteen to eighteen feet in length, which lies betwixt two EMBRASURES.

The word comes from *merula*, or *merla*, which, in the corrupt Latin, was uſed for a *battlement*.

To ſtake out the *merlons*, meaſure from each end of the wall, twelve feet, there ſtick a ſtake, and plant other ſtakes at every intermediate eighteen feet: when this is done on the inſide of the wall, let other ſtakes be planted on the outſide, either directly oppoſite to the former, or in the line towards the place where the gun is more particularly intended to deliver its ſhot. Plant other ſtakes on the inſide, one a foot diſtant on each ſide of the former, and this will leave ſpaces of two feet each for the inner opening of embraſures: then, on the outſide, plant other ſtakes at five or ſix feet diſtance from the former ones, one on each ſide, and the ſpaces of ten or twelve feet will be marked out for the outſide openings of the embraſures. In the direction of the pickets, which limit the inner and outer openings of the embraſures, let ſingle rows of faſcines be ſtaked down acroſs the wall, and theſe will be the ſides of the embraſures: fill the intermediate ſpaces, or *merlons*, with rows of faſcines laid lengthwiſe to the wall, and this will be the firſt floor of the *merlon*, which is to be picketted down, and the hollows filled with earth. Let other floors be raiſed in like manner, until the *merlons* are carried up to about five or ſix feet, or more if neceſſary; and on the top of each let a bed or floor of earth be laid of about eight or twelve inches thick.

MERLUCIUS, *gadus merlucius* of Linnæus, in *Ichthyology*, the name of a fiſh commonly called the HAKE, and by ſome authors the *aſellus alter*.

It is a moderately large fiſh, growing to two feet or more in length, and reſembling the common pike in figure, from whence it has its name, *merlucius, quaſi maris lucius, the ſea pike*. It in ſome meaſure reſembles the common whiting in colour, the back being of a pale greyiſh hue, and the belly of a dirty white; the head is flat and broad; the mouth very wide; and the teeth very long and ſharp, particularly thoſe of the lower jaw. It is covered with ſmall ſcales. Its tail is not forked. It is caught in the Engliſh and other ſeas, and being a coarſe fiſh is ſeldom admitted to table, either freſh or ſalted: when cured it is known by the name of *Poor John*. *Tab.* III. *Fiſh*. No. 26.

There was formerly a large ſtationary fiſhery of hake on the Nymph bank off the coaſt of Waterford: two ſhoals of theſe fiſh appeared there twice in the year; and they were ſalted and ſent to Spain, particularly to Bilboa.

MERMAID, or Merman, a ſea-creature, frequently talked of, and ſuppoſed half human and half a fiſh.

However naturaliſts may doubt of the reality of *mermen* or *mermaids*, if we might believe particular writers, there ſeems teſtimony enough to eſtabliſh it. In the year 1187, as Larrey informs us, ſuch a monſter was fiſhed up in the county of Suffolk, and kept by the governor for ſix months. It bore ſo near a conformity with man, that nothing ſeemed wanting to it beſides ſpeech. One day it took the opportunity of making its eſcape, and plunging into the ſea, and was never more heard of. Hiſt. d'Angleterre, p. i. p. 403.

In the year 1430, we are told, that, after an huge tempeſt, which broke down the dykes in Holland, and made way for the ſea into the meadows, &c. ſome girls of the town of Edam, in Weſt-Frieſland, going in a boat to milk their cows, perceived a *mermaid* embarraſſed in the mud with a very little water. They took it into their boat, and brought it with them to Edam, dreſſed it in women's apparel, and taught it to ſpin. It fed like one of them, but could never be brought to offer at ſpeech. Some time after it was brought to Haerlem, where it lived for ſome years, though ſtill ſhewing an inclination to the water. Parival relates that they had given it ſome notions of a Deity, and that it made its reverences very devoutly whenever it paſſed by a crucifix. Delices d'Hollande.

In the year 1560, near the iſland of Manar, on the weſtern coaſt of the iſland of Ceylon, ſome fiſhermen are ſaid to have brought up, at one draught of a net, ſeven *mermen* and *maids*; of which ſeveral Jeſuits, and among the reſt F. Hen. Henriques, and Dimas Boſquez, phyſician to the viceroy of Goa, are ſaid to have been witneſſes. And it is added, that the phyſician, who examined them with a great deal of care, and made diſſections thereof, aſſerted that all the parts, both internal and external, were found perfectly conformable to thoſe of men. See the Hiſt de la Compagne de Jeſus, p. ii. tom. iv. N° 276, where the relation is given at length.

We have another account, as well atteſted, of a *merman*, near the great rock called Diamond, on the coaſt of Martinico. The perſons who ſaw it gave in a preciſe deſcription of it before a notary: they affirmed, that they ſaw it wipe its hand over its face, and even heard it blow its noſe.

Another creature of the ſame ſpecies, was caught in the Baltic, in the year 1531, and ſent as a preſent to Sigiſmund king of Poland, with whom it lived three days, and was ſeen by all the court. And another very young one was taken near Rocca de Sintra, as related by Damian Goes.

The king of Portugal, and the grand-maſter of the order of St. James, are ſaid to have had a ſuit at law, to determine which party theſe monſters belonged to. See Sea-*cow*, and Siren. See Pontopiddan's Nat. Hiſt. of Norway, vol. ii. p. 186, &c.

MERO *motu*. See Ex *mero*.

MEROPS, in *Ornithology*, the name of a bird called alſo *apiaſter*, and in Engliſh the *bee-eater*.

It reſembles the king-fiſher in ſhape, and is of the ſize of a black-bird. Its beak is long, black, and a little crooked, and the iriſes of its eyes are a fine red; its head is long and large; the feathers growing at the inſertion of the upper chap are of a bluiſh green, but thoſe in the middle of the head are white; the crown, however, a little more backward, is of a reddiſh brown, ſometimes with a ſlight admixture of green; and there runs on each ſide a black line from the angle of the beak through the orbit of the eyes; its neck and ſhoulders are green, but with a caſt of redneſs; and its belly and breaſt are blue; the tips of the long wing-feathers are blackiſh, and the reſt are variegated with a bright green and a fine orange-colour; its tail is of a fine blue, and the two middle feathers of it are longer than any of the others. Its legs are very ſhort and thick, and are of the ſame form with the king-fiſher's. It is very common in Italy, and extremely ſo in the iſland of Crete; but it is not known in England. It feeds on bees and other inſects, and ſometimes on ſeeds. Ray. See *Tab.* III. *of Birds*, N° 33.

The entire bird and its heart are recommended in cardiac, icterical, and ſtomachic diſorders: the gall mixed with honey and the juice of rue is ſaid to cure ſuffuſions of the eyes.

In the Linnæan ſyſtem, *merops* forms a genus of *picæ*, characteriſed by a bent, compreſſed, carinated beak; a tongue fringed at the apex; and feet formed for walking; and comprehending ſix other ſpecies, beſides the bee-eater above deſcribed. *Tab.* III. *Fiſh*. N° 24.

MEROS, in *Ichthyology*, the name of a very large American fiſh, growing to five or ſix feet long, and called by the Braſilians, *cugupu-guacu*. Its head is very large, and its mouth wide and toothleſs; its eyes have a black pupil and a yellow iris; it hath five fins, one running the whole length of the back and reaching nearly to the tail; the anterior part of this is narrow, and armed with ſmall but ſharp ſpines; the other part is broader, and ſuſtained by ſofter rays; behind the anus is one like the hinder part of that on the back, and two others behind the gills, which are large and broad; the tail fin is very large and broad, and much more ſo at its extremity than at its origin; the ſcales are ſmall; the head, back, and ſides are of a browniſh grey; and its belly white. It is accounted a well-taſted fiſh. Ray. *Tab.* III. *Fiſh*. N° 24.

MEROVINGIAN *character* derives its name from Meroüée, the firſt king of France of that race, which reigned 333 years, from Pharamond to Charles Martel. This race is ſaid by ſome to have terminated in Childeric III. A. D. 751. There are many MSS in the French libraries ſtill extant in this character. See Spect. de la Nat. vol. vii. p. 190.

MERSION. See Immersion, and Emersion.

MERUIT. *Quantum* Meruit. See Quantum.

MERULA, in *Ornithology*. See Black-*bird*, and Amzell; and *Tab.* III. *Birds*, N° 29 and N° 30.

MERULA, in *Ichthyology*, the name of a ſea-fiſh of the turdus or wraſſe kind, of a ſhort and flat figure, and all over of a dull and dead bluiſh black. The back, ſides, and belly are all of this colour, as are alſo even the fins and tail. It is a fiſh not much eſteemed, being of an inſipid watery taſte, but is ſold among the poorer ſort in the Italian markets. Rondelet.

Merula *aquatica*, the name of a bird, called the *water*-ouzel in Engliſh.

Merula *fluviatilis*, in *Ichthyology*, a name given by Schoneveldt, and ſome other writers, to the common tench. Theſe are whimſical and arbitrary names, and expreſs nothing. Artedi has much better diſtinguiſhed the fiſh, having taken away even its generical name, and reduced it to the *cyprini*, of which genus it is evidently a ſpecies: he has called it the *black mucous cyprinus*, with an even not forked or invected tail. This is a name by which it can never be miſtaken.

Merula *ſaxatilis*, a name given by ſome to the tordo *marino*.

MERZENIUS, in *Botany*, a name uſed by ſome authors for marjoram.

MES-AIR, or Mezair, in the *Manege*, is a manege half terra *a terra*, and half corvet: ſo that the *mezair* is higher than the action of the former, and lower than that of the latter. In this action uſe the ſame aids as in working upon *curvets*. Give the aids of the leg with delicacy, and no ſtronger than is juſt neceſſary to carry your horſe forward. Remember when you cloſe your legs to make him go forward, to puſh with the outward in ſuch a degree as to keep your horſe confined, and to aſſiſt the other in driving him forward; as it is not neceſſay to lay ſo much ſtreſs on the inner leg, becauſe that ſerves only to guide the horſe, and make him cover and embrace the ground that lies before him. Berenger's Horſemanſhip, vol. ii. p. 116.

MESANGIA, in *Natural Hiſtory*, the name of a bird common in France and Italy; it is of the ſize and ſhape of the ficedula, and differs from it very little, except the having a black ſpot upon the head. This ſeems to be the *melancoryphos* of the ancients, who ſuppoſed, as many do at this time, that the ficedula changed into this bird. The ficedula or fig-eater, comes into the gardens in France only at the time when the figs, which are its proper food, are ripe: theſe it devours in an inſatible manner, and, as ſoon as it is done with them, goes away again. Soon after this the *meſangia* or black-cap appears, and is ſuppoſed to be the ſame bird, with the addition of this beautiful ornament. The ancients were very fond of this imaginary change of one bird into another; and Ariſtotle tells us, that the upupa is the ſame bird with the cuckow, only changed in the colour and diſpoſition of its feathers. Æſchylus tells us in the ſame manner, according to the opinion of his times, that the cuckow ſings all the ſummer, and after that diſappears; and that ſoon afterwards it comes again in a new form, with a plume upon its head, and is called the *upupa*.

MESARÆUM, μεσαραιον, in *Anatomy*, the ſame with MESENTERY.

MESARÆUM is alſo uſed in a more reſtrained ſenſe, for a part or diviſion of the MESENTERY; being that faſtened to the ſmall guts.

That part of the meſentery which is faſtened to the thick guts is called MESOCOLON.

MESARAIC *veſſels*, in the general ſenſe, are the ſame with MESENTERIC.

In common uſe *meſaraic* is more frequently applied to the veins, and meſenteric to the arteries of the meſentery.

MESAZONTES, μεσαζοντες, officers under the emperors of Conſtantinople. See MEDIATOR.

MESE, in the *Greek Muſic*, was the ultimate note of the meſon tetrachord, and anſwers to Guido's *a la mi re*. See DIAGRAM

MESEMBRYANTHEMUM, in *Botany*, the name by which Dillenius, Linnæus, and others, have called the plants uſually named *ficoides*, or *fig-marygold*, a genus of the *icoſandria pentagynia* claſs. Its characters are theſe: the flower hath a permanent ſpreading empalement of one leaf, which is cut at the top into five acute parts; it hath one petal, which is cut into many linear ſegments almoſt to the bottom, and ranged in ſeveral ſeries, but joined together at the baſe; within theſe are ranged a great number of hairy ſtamina; under the flower is ſituated an obtuſe five-cornered germen, ſupporting ſometimes five, aud often ten or more ſtyles; the germen afterwards becomes a roundiſh fleſhy fruit, having as many cells as there are ſtyles, filled with ſmall ſeeds.—Linnæus enumerates forty-five, and Miller forty-ſeven ſpecies.

Theſe plants are moſt of them natives of the Cape of Good Hope, from whence their ſeeds were firſt brought to Holland, and the plants raiſed in many curious gardens, and have ſince been communicated to moſt parts of Europe. Moſt plants of this genus have beautiful flowers, which appear at different ſeaſons of the year.

All the ſorts are perennial plants, except two, which are annual. The perennial ſorts are eaſily propagated by cuttings during any of the ſummer months; ſuch of them as have ſhrubby ſtalks and branches do very readily take root, when planted in a bed of light ſoil, and covered either with mats or glaſſes; but when they are covered with the latter, they muſt be ſhaded every day when the ſun is warm.

When the cuttings are planted, it will be neceſſary to give them a little water to ſettle the ground about them, but it ſhould be done with caution, for it is to be obſerved in general, that too much wet will ſpoil them.

Thoſe whoſe ſtalks and leaves are very ſucculent, ſhould have their cuttings taken from the plants ten days or a fortnight before they are planted, that their wounded part may heal and dry. They ſhould be guarded from wet by glaſſes, and require leſs watering than the others. The firſt ſort called the Egyptian kali, grows naturally in Egypt, and is burnt for pot-aſh; and is eſteemed the beſt ſort for making hard ſope and the beſt glaſs. The ſecond ſort is the ICE-*plant*. Miller.

MESENTERIC, or MESARAIC, an epithet given to two arteries ariſing from the deſcending aorta, and proceeding to the meſentery.

There is an upper, or ſuperior *meſenteric*, which goes to the upper part of the meſentery; and a lower, or inferior *meſenteric*, which diſtributes itſelf through the lower part. See *Tab. Anat. (Angeiol.) fig.* 1. *n.* 43. 45.

We have alſo a *menſenteric vein*, compoſed of an infinity of veins proceeding from the meſentery; which, with the vena ſplenica, ariſing from the ſpleen, forms the vena porta.

Ruyſch painted the *meſaraic* arteries and veins as having different courſes in the diſtribution of their branches in the inteſtines. Albinus attributes this miſtake to Ruyſch's having injected the arteries at one part of the inteſtines, and the veins at another; and by a ſingle figure repreſenting the internal cellular membrane of the ilium, with both arteries and veins injected, ſhews their courſes to be the ſame.

Anatomiſts alſo reckon a *meſenteric nerve*, which ariſes from the intercoſtal, and ſends ſeveral branches to the meſentery.

MESENTERIC *plexus*, a plexus, or piece of net-work, formed by the branches or ramifications of the par vagum. The *plexus meſentericus magnus*, or *great meſenteric plexus*, is formed out of the concurrent branches of ſeveral other plexuſes, and ſends its nervous fibres through the whole meſentery, along with the meſaraic veſſels, which, with various circumligations, they accompany to the inteſtines.

MESENTERIC, *omphalo*. See OMPHALO *meſenteric*.

MESENTERICA *febris*. See *Inteſtinal* FEVER.

MESENTERY, MESENTERIUM, formed of μεσος, *middle*, and εντερον, *inteſtine*, or MESARÆUM, in *Anatomy*, a fatty membranous body; thus called as being placed in the middle of the inteſtines, which it connects to one another.

The *meſentery* is almoſt of a circular figure, with a narrow production; to which the end of the colon, and the beginning of the rectum, are tied.

It is about four fingers and a half in diameter; its circumference, being full of plaits and foldings, is about three ells in length. The inteſtines are tied like a border on this circumference of the *meſentery*: there are three inches of the inteſtines thus faſtened.

The *meſentery* itſelf is ſtrongly tied to the three firſt vertebræ of the loins. It is compoſed of three laminæ; the inner, upon which the glands and fat lie, and the veins and arteries run, is its own proper membrane; and the other two, which cover each ſide of the proper membrane, come from the peritonæum. Between the two external laminæ of the *meſentery* run the branches of the arteria meſenterica, ſuperior and inferior, which bring the blood to the inteſtines; and the venæ meſaraicæ, which, being branches of the porta, carry the blood back to the liver. Here the large branches of both arteries and veins communicating with one another, march directly to the guts; where, with the nerves that form the plexus meſentericus, they divide into an infinite number of ſmall branches, which ſpread themſelves extremely fine upon the coats of the inteſtines. The venæ lacteæ, and lymphatic veſſels, run likewiſe upon the *meſentery*, in which there are alſo ſeveral veſicular glands; the biggeſt of which, in the middle of the *meſentery*, is called *pancreas Aſellii*; theſe glands receive the lympha and chyle from the lacteal veins.

The *meſentery* has been ordinarily divided into two parts, the meſaræum, and meſocolon: the firſt appended to the inteſtina tenuia, and the latter to the craſſa: but this is a diviſion of no great moment.

The uſe of the *meſentery* is, firſt, to gather the inteſtines into a narrow compaſs, that the courſe of the chyliferous veſſels towards their common receptacle may be but ſhort; next, to cover and protect them and the blood-veſſels, and to correct and diſpoſe the inteſtines, ſo as to ſecure them from any entanglement that might hinder their periſtaltic motion.

The *meſentery* is ſubject to inflammation, which is attended with a languid ſlow fever, without any thirſt or other violent ſymptom, a loſs of appetite, a ſenſe of tenſion and weight below the ſtomach, with much hardneſs, and only diſcoverable by preſſing upon it. Inflammations of the *meſentery* generally terminate in abſceſſes, and bring on a corruption of the membrane; the morbific matter is ſometimes tranſlated to other parts, without being removed from the habit; ſo that the diſorder often recurs. The method of cure is the ſame as that for an inflamed LIVER or SPLEEN.

MESERA, a name given by ſome medical writers to the Alexandrian tutty.

MESHES *of nets*, the openings or interſtices between the threads.

MESIRE, a name given by Avicenna to a diſtemperature of the liver, attended with a ſenſe of heavineſs, tumor, inflammation, and pungent pain, and always with thirſt, a dry mouth, and a parched black tongue.

MESITICUM, among the Romans, a toll paid for a place to ſell goods in the forum.

MESMARCHURES, in the *Manege*. See PASTERN.

MESN, or Meſne, a term in *Law*, ſignifying him who is lord of a manor, and ſo hath tenants holding of him; yet he himſelf holds of a ſuperior lord.

The word is properly derived from *maiſne, quaſi minor natu*; becauſe his tenure is derived from another, from whom he holds.

Meſn alſo denotes a writ, which lieth where there is lord *meſn* and tenant; and the tenant is diſtrained for ſervices due from the *meſn* to the ſuperior lord.

This is the nature of a writ of right; and in this caſe the tenant ſhall have judgment to be acquitted or indemnified by the *meſne* lord; and if he makes default therein, or does not appear originally to the tenant's writ, he ſhall be forejudged of his *meſnalty*, and the tenant ſhall hold immediately of the lord paramount himſelf.

Meſne *proceſs*. See Proceſs.

MESOCHOROS, μεσοχορος, among the ancients. The *meſochori* were muſicians who preſided in concerts, and by beating a deſk in a regular manner with their feet, directed the meaſure of their muſic. For this purpoſe in the theatre they wore wooden clogs on their feet, that they might be better heard, which were called by the Greeks, *crupezia*.

Meſochorus, among the Romans, was alſo uſed for a perſon in public aſſemblies, appointed to give the ſignal for acclamation at the proper time, that all might join in it at once.

MESOCOLON, μεσοκωλον, in *Anatomy*, that part of the Meſentery, which, having reached the extremity of the ileum, contracts and changes its name. At this place the particular lamina, which is turned to the right ſide, forms a ſmall tranſverſe fold, called ligamentum coli dextrum. Afterwards the *meſocolon* aſcends towards the right kidney, where it ſeems to be loſt by the immediate adheſion of the colon to that kidney, and to the firſt incurvation of the duodenum. Then it appears again, and increaſing in breadth, continues its courſe almoſt tranſverſely under the liver, ſtomach, and ſpleen, where it begins to turn downward, under the left hypochondrium, towards the kidney on the ſame ſide. Through the whole courſe the *meſocolon* extends in breadth, and forms nearly a tranſverſe ſemicircular plane, very little plaited at its great circumference. By this circumference or edge, it is connected to the colon, and hides that ligamentary band of this inteſtine, which runs along its ſmall curvature. By its ſhort or ſmall edge, it forms the triangular caſe of the duodenum, and by its great edge, the external coat of the colon, in the ſame manner as the meſentery does that of the ſmall inteſtines. As it paſſes under the large extremity of the ſtomach, it adheres a little to the lower portion of that extremity, as the diaphragm does to the upper. Having got below the left kidney, it contracts and forms another tranſverſe fold, called ligamentum coli ſiniſtrum. Afterwards it expands again, and runs down on the left pſoas muſcle towards the laſt vertebræ of the loins. This deſcending portion is fixed to the convolutions of the colon in the ſame manner as the ſuperior portion is to the arch of that inteſtine. The *meſocolon* by its adheſion to the colon forms a kind of ſeptum tranſverſum, between the ſmall inteſtines and the viſcera contained in the epigaſtrium; and this ſeptum ſupports the liver and ſtomach under the arch of the diaphragm, juſt as much as it is ſuſtained by the inteſtines. Winſlow.

MESOCUROS, μεσοκουρος, in *Antiquity*, an actreſs in tragedies, who had the middle part of her head ſhaven: but others think that *meſocuros* ſignifies a girl or very young woman.

MESOGLOSSI, a name given by ſome writers to the muſcles of the tongue, more uſually called by anatomiſts, the genioglossi.

MESOLABE, Meſolabium, a mathematical inſtrument, invented by the ancients for finding two mean proportionals mechanically, which they could not come at geometrically. See Proportional.

It conſiſts of three parallelograms, moving in a groove to certain interſections. Its figure is deſcribed by Eutocius, in his commentary on Archimedes.

MESO-LOGARITHM, a term uſed by Kepler to ſignify the logarithms of the co-ſines and co-tangents; the former of which lord Neper calls *antilogarithms*, and the latter *differentiales*.

Theſe are alſo called *artificial ſines and tangents*.

MESO-PLEURII, derived from μεσος, *middle*, and ϖλευρον, *rib*, in *Anatomy*, the intercoſtal muſcles.

Meſo-Pleurii is ſometimes alſo uſed for the intermediate ſpaces between the coſtæ, or ribs.

MESOPYSCNI, μεσοπυκνοι, in the *Ancient Muſic*, was an appellation given to ſuch chords as formed the middle notes of the ſpiſſa. There were five *meſopyſcni* in the ſcale. See Pycni and Spiſſum.

MESO-RECTUM, in *Anatomy*, is a particular production of the peritonæum, inveſting the inteſtinum rectum.

This production is very narrow, and about the middle of the foreſide of the rectum; it forms a tranſverſe ſemicircular fold, which appears when the inteſtine is empty, but is loſt when it is filled. Winſlow.

MESORO, in *Ichthyology*, a name given by Salvian to that fiſh which we call the butterfly-fiſh, the biennus, or blennius, of other authors.

Meſoro is alſo uſed by the Italians for the fiſh commonly called the uranoscope, or *ſtar-gazer*.

MESOTHENAR, in *Anatomy*, a flat and nearly triangular muſcle, lying between the firſt phalanx of the thumb and the bottom of the palm of the hand. It is inſerted by a very broad baſis in the ligament which connects the os magnum to that which ſupports the thumb. It is likewiſe inſerted along the internal or angular part of that bone of the metacarpus which ſupports the middle finger, and in the ſmall extremity of that which anſwers to the index; from thence the fibres contracting to an angle, terminates in a flat tendon of different breadths, which is inſerted in that ſide of the head of the firſt phalanx of the thumb, which is turned to the hollow of the hand, and in the neighbouring part of the baſis of the ſecond phalanx, by means of the ſecond ſeſamoid bone belonging to that joint. Winſlow.

MESPILEUS *lapis*, in *Natural Hiſtory*, a name given to ſome ſpecies of the echinitæ, from their reſemblance to the ripe fruit of a medlar. This was a name given them before they were much known, and they were ſome time afterwards called, from their five lines on the ſurface, *pentexoche*.

MESPILUS, in *Botany*. See Medlar.

MESS, in *Sea-Language*, denotes a particular company of the officers or crew of a ſhip, who eat, drink, and aſſociate together, whence *meſs-mate*, denoting one of theſe with reſpect to another.

MESSALIANS. See Euchites.

MESSE, or Mass, *miſſa*. See Mass.

Messa *baſſa*, ſilent maſs whiſpered by the prieſt during a muſical performance.

Messe *de capella*, in the *Italian Muſic*, is uſed for maſſes ſung by their grand chorus. In theſe various fugues, double counterpoints, and other ornaments are uſed.

Messe *concertati*, in the *Italian Muſic*, wherein the parts reciting are intermixed with choruſſes.

MESSENGERS, in the *Engliſh Polity*, are carriers of letters and meſſages; or, more particularly, certain officers, chiefly employed under the direction of the ſecretaries of ſtate, and always in readineſs to be ſent with all manner of diſpatches, foreign and domeſtic.

They are always employed with the ſecretaries warrants to take up perſons for high treaſon, or other offences againſt the ſtate, which do not ſo properly fall under the cognizance of the common law; and, perhaps, are not proper to be divulged in the ordinary courſe of juſtice. The priſoners they apprehend are uſually kept at their own houſes, for each of which they are allowed by the government 6*s.* 8*d.* per day. When they are diſpatched abroad, they have an allowance for their journey, as ſtated; viz. to Paris, 30*l.* to Holland, 25*l.* to Edinburgh, 30*l.* to Ireland, 30*l.* and ſo to other places in proportion. Part of which money is advanced to them for their journey.

Of theſe *meſſengers* in ordinary there are forty, at 45*l.* a year, beſides daily pay when employed. Their poſts, if purchaſed, are eſteemed worth 300*l.*

Messengers *of the exchequer*, are officers attending the exchequer, in the nature of purſuivants: they are four in number: their buſineſs is to attend the chancellor and auditor, and to carry their letters, precepts, &c.

Messenger *of the preſs*, a perſon, who, by order of the court, ſearches printing-houſes, bookſellers ſhops, &c. in order to diſcover ſeditious books, &c.

There are alſo other officers diſtinguiſhed by this appellation; as the *meſſenger* of the lord chancellor, of the great wardrobe, the two *meſſengers* of the yeomen of the guards, *meſſenger* to the gentlemen penſioners, nine *meſſengers* to the commiſſioners of bankruptcy, &c.

MESSERSMIDIA, in *Botany*, a genus of the *pentandria monogynia* claſs: the corolla of which is infundibuliform, and the fruit a ſuberoſe berry, ſeparating into two parts, each of which contains a double ſeed. There is only one ſpecies.

MESSIAH, a term ſignifying *anointed*, or *ſacred*; and, in that ſenſe, applied to kings and prieſts: but, particularly, by way of eminence, to Jesus Christ, the Saviour promiſed by the prophets of the old Jewiſh law.

The word comes from the Hebrew מָשׁוּחַ, *maſcuach*, *anointed*, of the verb מָשַׁח, *maſchach*, *to anoint*; whence Jeſus Chriſt claims the title on a manifold account: 1.

As having been anointed king of kings from all ages. 2. As chief of the prophets. 3. As high prieſt of the law of grace, or prieſt for ever after the order of Melchizedek.

The prophecies in the Old Teſtament, which relate to the coming of the *Meſſiah*, are very numerous: ſome of which may be found in Gen. iii. 15. xlix. 10. Iſaiah vii. 14. c. xi. c. lii. liii. which the Targum of Jonathan interprets of the *Meſſiah*. Dan. ix. 25. Micah, iv. 1—5. c. v. 2—4. Haggai, ii. 6, 9. Zech. iii. 8—10. vi. 12, 13. ix. 9—12. Mal. iii. 1—4. iv. 2—6, &c.

It has been alſo urged, that there are ſome remarkable paſſages in Joſephus, Philo, Tacitus, Suetonius, and Celſus, which ſhew that the expectation of the *Meſſiah*, agreeable to the ſcripture prophecies, prevailed in ſome degree among the heathen nations; and many have ſuppoſed that there is ſome reference of this kind in the fourth eclogue of Virgil. We ſhall only add farther, that the beſt Chriſtian writers lay little ſtreſs on the prophecy of Chriſt cited by Abulpharagius, out of the books of Zerduſh or Zoroaſter, nor on the pretended prophecy of Confucius, among the Chineſe; nor on thoſe of the SIBYLLINE oracles, among the Romans.

The Jews ſtill wait for the coming of the *Meſſiah*, being infatuated with the notion of a temporal *Meſſiah*, that is to be a mighty conqueror, and to ſubdue all the world. Moſt of the modern rabbins, according to Buxtorf, believe that the *Meſſiah* is already come, but that he keeps himſelf concealed, and will not manifeſt himſelf becauſe of the ſins of the Jews. Some of the Jews, however, in order to reconcile thoſe prophecies that ſeem to contradict each other, as to the character and condition of the *Meſſiah*, have had recourſe to the hypotheſis of two *Meſſiahs*, who are yet to ſucceed each other; one in a ſtate of humiliation and ſuffering; the other of glory, ſplendor, and power. The firſt, they ſay, is to proceed from the tribe of Ephraim, who is to fight againſt Gog, and to be ſlain by Annillus, Zech. xii. 10. The ſecond is to be of the tribe of Judah, and lineage of David, who is to conquer and kill Annillus, and reſtore the kingdom of Iſrael, reigning over it in the higheſt glory and felicity.

Jeſus Chriſt aſſerts himſelf the *Meſſiah*. In St. John iv. 25. the Samaritan woman ſays to Jeſus, *I know that when* Meſſiah *comes, who is called* the Chriſt, *he will tell us all things. Jeſus anſwered her, I that ſpake to thee am he.*

There are ſeveral impoſtors, who have endeavoured to paſs for *Meſſiahs*, as Chriſt himſelf predicted, J. Lent, a Dutchman, has written a hiſtory of *falſe Meſſiahs, De Pſeudomeſiis*. The firſt he mentions was one Barcochab, who appeared under the empire of Adrian. The laſt was rabbi Mordecai, who began to be talked of in 1682. A little before him; viz. in 1666, appeared Sabbethai Sebi, who was taken by the Turks, and turned Mahometan.

MESSIEURS, a French title of honour, or civility, lately introduced into our language; being the plural of *monſieur*, and equivalent to the Engliſh ſirs, or gentlemen.

The French lawyers always begin their pleadings and harangues with *meſſieurs*; which word is alſo frequently repeated in the courſe of their ſpeeches; on which occaſion it anſwers to our Engliſh word *gentlemen*.

The French ſay, *Meſſieurs du parlement*; *du conſeil*; *des comptes*, &c.

MESSUAGE, MESSUAGIUM, in *Law*, a dwelling-houſe with ſome land adjoining, aſſigned for its uſe.

By the name of *meſſuage* may a garden, ſhop, mill, cottage, chamber, cellar, or the like, paſs.

In Scotland, *meſſuage* denotes what we call the *manor-houſe*, viz. the principal dwelling-houſe within the barony.

MESUA, called by ſome *India roſe cheſnut*, in *Botany*, the name of a genus of plants of the *monadelphia polyandria* claſs, the characters of which are theſe: the perianthium is permanent, and conſiſts of four ſmall oval leaves; the flower conſiſts of four large hollow and rounded petals; the ſtamina are numerous filaments, of the length of the cup; the antheræ are ſimple; the germen of the piſtil is roundiſh; the ſtyle is ſimple; and the ſtigma indented in four places. The fruit is a four-cornered ſingle-ſeeded nut. There is only one ſpecies.

MESYMNIUM, a name which the ancients gave to a part of their tragedy, or to certain verſes in their tragedies. The *meſymniun* was a kind of burden, as *Io Pæan*; *O Dithyrambe*; *Hymen, O Hymenææ*; or the like; which, when placed at the end of a ſtrophe, was called *ephymnium*; and when inſerted in the middle of a ſtrophe, *meſymnium*. See STROPHE, and CHORUS.

METACAL, an Ægyptian weight, uſed in the weighing of pearls, and conſiſting either of a carrat and a half, or of two carrats. Sixteen of theſe carrats make a dram, each of the carrats weighing four grains, and twelve drams an ounce.

METACARPIUS, a ſmall very fleſhy muſcle, ſituated obliquely between the large internal annular or tranſverſe ligament of the carpus, and the whole inſide of the fourth metacarpal bone.

It is fixed by a ſmall ſhort tendon to the os orbiculare; and to the neighbouring part of the large ligament of the carpus; from thence its fibres run more or leſs obliquely toward the inſide of the fourth metacarpal bone, in the outer edge of which they are inſerted. The fibres of this muſcle are of unequal lengths, and extend all the way to the articulation of the firſt phalanx of the little finger, with the fourth metacarpal bone; but they have no manner of relation to that finger. Winſlow.

METACARPUS, or METACARPIUM, from μετα, *behind*, and καρπος, *hand*, in *Anatomy*, that part of the hand between the wriſt and the fingers. See *Tab. Anat. (Oſteol.) fig.* 3. *n.* 10. 10. *fig.* 7. *n.* 13. See CARPUS.

The *metacarpus* conſiſts of four bones, which anſwer to the four fingers; whereof that which ſuſtains the fore-finger, is the biggeſt and longeſt. They are all round and oblong, a little convex towards the back of the hand, and concave and plain towards the palm; they are hollow in the middle, and full of marrow; they touch one another only at their extremities, leaving ſpaces in their middle, in which lie the muſculi interoſſiei.

In their upper end there is a ſinus, which receives the bones of the wriſt; their lower extremity is round, and is received into the ſinus of the firſt bones of the fingers.

The inner part of the *metacarpus* is called the palm, and the outer the back of the hand.

The ancient anatomiſts reckoned five bones in the *metacarpus*, including that bone which is now looked upon to be the firſt phalanx of the thumb. Theſe bones are all long, thicker at their extremities than in the middle, and of unequal length and bigneſs: the two firſt are ſometimes, though very rarely, equal, and the others leſſen by degrees from them. Anatomiſts, in their deſcriptions, divide each of theſe bones into a middle and two extremities, or into a baſis, body, and head. The baſes of them all are angular, and turned toward the carpus, and their head rounded like condyles, and turned towards the fingers. Both extremities are covered with cartilages, and the heads remain for a long time very diſtinct epiphyſes.

The metacarpal bones are moved on the carpus by the muſcles called ulnares and radiales, and by all the muſcles in general that go to the fingers, and by ſo many auxiliares. The number of metacarpal muſcles would be increaſed, if the firſt phalanx of the thumb were conſidered as a metacarpial bone. Winſlow. See METACARPIUS.

METACARPUS, *fractures of the*. In fractures of the hand or *metacarpus*, the beſt method of reducing or replacing the bone, is to extend the hand upon a ſmooth table, and while an aſſiſtant holds the whole hand evenly in that poſture, the ſurgeon is to replace the bones; and, when that is carefully and perfectly done, to ſecure them with a proper bandage. Heiſter.

METACARPUS, *luxation of the*. The four ſmall bones in the palm of the hand are ſometimes luxated from the carpus to which their upper parts are connected; this happens from external violences, not unfrequently, notwithſtanding that theſe bones naturally muſt much reſiſt ſuch a luxation; for the two carpal bones, which are ſeated in the middle between the two external ones, cannot be diſlocated to either ſide, as the two external ones, which ſuſtain the firſt and little fingers, cannot be luxated inwardly, but are very eaſily driven outward; and each of them may be luxated on the fore or back part of the hand; but whichever of theſe happens, the particular diſorder may be diſcovered and examined by feeling and inſpecting, and the cure may be performed by extending the hand on a flat board or table, and replacing with the thumb whatever of the bones have ſtarted from their natural ſituation. Heiſter.

METACHORESIS, a word uſed by Galen to expreſs a receſs of a morbid humour from one part of the body to another, a thing very common in many diſtempers.

METACHRONISM, formed of μετα, and χρονος, *time*, in *Chronology*, an error in computation of time, either on the ſide of defect or exceſs.

METACISM, METACISMUS, in *Grammar*, a defect in the pronunciation of the letter *M*.

Iſidore repreſents the *metaciſm* as a final *m*, followed by a vowel, as *bonum aurum, Bethlehem erat*, &c.

METACOE, in *Botany*, a name given by the people of Guinea to a plant, of which they are very fond, becauſe of its virtues as a balſamic and vulnerary. Its leaves, being bruiſed and applied to a freſh wound, cure it. They have alſo another uſe for it, twiſting the dried leaves into a ſort of match for their muſkets. Phil. Tranſ. N° 232.

METACONDYLI is uſed by ſome authors for the outmoſt bones, or joints of the fingers, next the nails.

METAGITNION, μεταγειτνιων, in *Chronology*, the ſecond month of the Athenian year. It contained twenty-nine days, and anſwered to the latter part of our July and beginning of Auguſt. The Bœotians called it *Panemus*, and the people of Syracuſe, *Carnius*.

It is ſo called from *Metagitnia*, one of Apollo's feſtivals kept in it.

METAL, μεταλλον, in *Natural Hiſtory*, a ſimple, ponderous, ſhining, fixed, opake body, that fuſes, and becomes fluid, by fire, and by cold coagulates and hardens into a ſolid maſs, capable of being diſtended under the hammer.

Metal is ſaid to be ſimple; as it may be affirmed of every the minuteſt particle of a *metal*, e. g. a grain of gold, that it is gold, or has all the properties of GOLD. *Fuſible* by fire; that is, when expoſed to a great fire, it diſſolves into parts which are eaſily moveable among themſelves, or are in actual motion. See FUSION. *Fixt*, i. e. bearing the fire without flying off in vapours; though it is only up to a certain degree that *metals* are fixed; for, by the large burning-glaſſes of Meſſ. Tſchirnhauſen and Villette, all *metals* are found to evaporate.

Such is the proper idea of *metals*, which is not applicable to any other body in nature; for a diamond, or other ſtone, though a ſimple body, is not fuſible in the fire, nor capable of being ſtretched under the hammer. And ſalt, though diſſolvable by fire, is not malleable, but breaks under the hammer.

There are, indeed, certain woods, which yield, in ſome meaſure, to the hammer; but then they fall to duſt in the fire; and ſo of the reſt.

Authors have commonly reckoned ſix *metals* in all nature; viz. gold, lead, ſilver, copper, iron, and tin; to which we may alſo add a ſeventh, viz. platina. See the nature, characters, productions, uſes, &c. of each, under its proper article. See alſo the ſequel of this article.

To theſe *mercury*, or *quickſilver*, is uſually added; but ſome have objected to the metallic character of MERCURY; though, in reality, it is poſſeſſed of the diſtinguiſhing properties of *metals*.

The common radical character of *metals* is, that of all known bodies they are the heavieſt. By Dr. Halley's experiments, the weight of gold to that of glaſs is determined to be as 9 to 1; and the weight of tin, the lighteſt of all *metals*, to that of gold, as 7 to 19; which conſiderably ſurpaſſes the weight of all ſtones, marbles, gems, and other the moſt ſolid bodies, as appears from the tables of ſpecific gravities. Nor is there any body in nature but a metal that is one third of the weight of gold; and, therefore, though the natural bodies, from which *metals* differ the leaſt, are earthy and pyritous matters, on account of their ſolidity and denſity; yet *metals* and ſtones are very different; the heavieſt ſtones which are unmetallic being much lighter than the lighteſt *metals*. A cubic foot of marble weighs 252 pounds, and an equal bulk of tin, the lighteſt of *metals*, weighs 516 pounds: the difference is much greater when the weight of ſuch a ſtone is compared with that of gold, a cubic foot of which is 1326 pounds.

The Royal Society furniſh us with various experiments of this kind. The weights of the ſeveral *metals*, and other ſolids, they have examined hydroſtatically, by weighing them in the air, and in water; and the weights of the fluids, by weighing an equal portion of each. By ſuch experiments they find, that taking the ſame weights of water and gold, the bulk or magnitude of the former, is to the latter, as 19636 to 1000; conſequently, that the weight of gold is to water, nearly as 19 to 1. See GOLD and *Specific* GRAVITY.

The ſpecific gravity of *metals* can, however, never be very exactly determined, as it varies a little from many cauſes; firſt, according to the different heat of the atmoſphere, which expands water, and other fluids, infinitely more than it does ſolid bodies, which it alſo expands in different degrees; and by that unequal diminution of the weight makes it impoſſible to aſſign them a conſtant proportion, unleſs the heat be determined with the greateſt exactneſs. Secondly, according to the ſeveral degrees of purity in the water, which difference is ſometimes found not inconſiderable. Thirdly, according to the different purity of the *metals*; for there is hardly any *metal* found ſo very pure, but that it may be eaſily demonſtrated to be mixed with ſome others. Fourthly, according to the different weight of the atmoſphere itſelf; though the effects of its variations be not ſo conſiderable as of the reſt.

Hence it is that there are, in a manner, as many different accounts of the ſpecific gravities of *metals* as there are authors who have given an account of their experiments on the ſubject. However, except the *metals* be of a very great impurity, the ſum of all the variations, reſulting from all theſe cauſes, is not ſufficient to hinder any *metal* from being certainly diſtinguiſhed from any other *metal*, by its ſpecific gravity.

Slight variations in hydroſtatical experiments are indeed neither new things, nor are they by any means avoidable, either in making theſe or other experiments of affinity to them. By way of proof to ſuch as may diſtruſt this, from their never having made ſuch experiments themſelves, two very eminent teſtimonies may be produced. That moſt induſtrious and diligent mathematician Merſennus candidly acknowledges, that when he has occaſion to mention the experiments of the learned Ghetaldus, and of the accurate French engineer Monſieur Petit, with his own, there will be often a variety of weight of ſome few grains; but he ſays, it is only like the variety of aſtronomical obſervations, which do almoſt always differ alſo by a few minutes or ſeconds; and to this he afterwards adds, that he expected not an exact uniformity between the obſervations of Ghetaldus, &c. already made, and the trials of any new experimenter, who would go through the work again. And our famous experimenter, the lord Verulam confeſſes, that it is not to be doubted, but that many of the bodies which he has ſet down in the table he has given, of their dimenſions and weights, differ in the ſame ſpecies or denomination, ſome being heavier than others, and that therefore there is ſome contingency in the affair; ſo that it is not neceſſary that the individuals he made his trials upon ſhould be exact ſtandards of the weight of their reſpective ſpecies, or ſhould, which makes directly to our preſent purpoſe, agree altogether to a tittle with the experiments of other men. Boyle, Hydroſt. Experim. in Pref.

But this ſcarce evitable imperfection of hydroſtatical experiments does not hinder, but that by their help we may make good eſtimates of the weights and bulks of very many bodies; and theſe eſtimates will be found not only preferable to thoſe that can be made of the ſame bodies by geometrical inſtruments, but accurate enough to be very uſeful on a great number and variety of occaſions.

Beſides the fuſibility, malleability, fixedneſs in the fire, and gravity pertaining to *metals*, in a peculiar degree, as ſuch, and diſtinguiſhing them from other ſubſtances, they poſſeſs alſo other properties, which we ſhall here enumerate. Thus, the opacity of *metals* is much greater than that of any unmetallic ſubſtance: this reſults from their denſity: and theſe two properties produce a third, peculiar alſo to *metals*, viz. a capacity of reflecting infinitely more light than any other body, to which they owe their diſtinguiſhing luſtre, called the metallic luſtre: hence *metals*, whoſe ſurfaces are poliſhed, form mirrors, repreſenting the images of bodies more clearly than any other matter. It is obſerved alſo, that although the ſeveral metallic ſubſtances differ conſiderably in hardneſs and fuſibility, yet, in general, they are leſs hard and leſs fuſible than ſome earths. Farther, *metals* cannot unite with any earthy ſubſtance, not even with their own earths, when theſe are deprived of their metallic ſtate: hence, when they are melted, they run as much as poſſible into globes; and a *metal*, in a ſtate of fuſion, always endeavours to acquire a convex or ſpherical form. Moreover, all *metals* are, in general, ſoluble by all acids; and form neutral ſalts with metallic baſes; but the affinity of *metals* to acids is leſs than that of abſorbent earths and alkaline ſalts; and therefore any *metal* may be ſeparated from any acid by theſe earthy and ſaline alkalies.

Alkaline ſalts are alſo capable of acting upon all metallic ſubſtances, and of keeping them diſſolved by proper management. *Metals* may, in general, be united with ſulphur and liver of ſulphur; but they have leſs affinity with ſulphur than with acids, ſo that ſulphur may be ſeparated from them by acids. All *metals* may, under certain reſtrictions, be united with each other, by which means they form different allays, poſſeſſing peculiar properties. See ALLAY and AMALGAMATION. They have alſo a ſtrong affinity with the inflammable principle, and are capable of receiving it ſuperabundantly. Laſtly, oily ſubſtances ſeem to be capable of acting upon all *metals*. Theſe ſeveral properties agree, in general, to all metallic ſubſtances: but beſides the properties peculiar to each *metal*, ſome properties are common to a certain number of them: and hence they have been divided into ſeveral claſſes. See *Species* of METALS.

However, though all *metals* poſſeſs the properties above enumerated, we are by no means to conclude, that they poſſeſs them in the ſame degree. The order, ſays the ingenious author of the Dictionary of Chemiſtry, in which *metals*, compared with each other, poſſeſs moſt eminently their principal properties, is as follows, beginning always with that *metal* in which the property is moſt conſiderable. 1. Specific gravity and denſity. Gold, platina, mercury, lead, ſilver, copper, iron, and tin. 2. Opacity. If *metals* differ in this reſpect, the ſame order will ſerve for opacity as for denſity. 3. *Metallic* luſtre or brilliancy. Platina, iron, or rather ſteel, ſilver, gold, copper, tin, lead. It is obſerved, however, by the tranſlator, that, if platina, the reflecting power of which cannot eaſily be determined, be excluded, their reflecting powers will be more nearly in the following order: ſilver, quickſilver, tin, gold, iron, copper, lead. 4. Ductility. Gold, ſilver, copper, iron, tin, lead. The ductility of mercury and platina are not yet determined. 5. Hardneſs. Iron, platina, copper, ſilver, gold, tin, and lead. 6. Tenacity. Gold, iron, copper, ſilver, tin, lead. The tenacity of mercury is not known, and that of platina, though probably very conſiderable, not determined. 7. Fuſibility. Mercury, tin, lead, ſilver, gold, copper, iron, and laſtly platina. See *Table of* AFFINITY.

METALS, *as to the origin and formation of*, various are the ſentiments of philoſophers, ancient and modern. M. Tournefort is of opinion, that *metals*, as well as all other minerals, have their origin from ſeeds, like plants; and that they have veſſels with juices circulating in them, &c. See STONE.

Plato will have the cauſe of *metals* to be a humid vapour, incloſed in the bowels of the earth, which, being variouſly intermixed with parts of the earth, produces various metals. Plotin maintains ſulphur to be the father of *metals*; and an oleaginous viſcous humour, the mother. Lidyat endeavours to prove all *metals*, generated by a ſubterranean fire; urging, among other reaſons, that many *metals*, when taken out of the earth, are exceedingly hot. Du Hamel ſhews, that *metals* do not take their riſe either from any vaporous exhalations, or from water, or from earth; but are generated of mercury, ſulphur, and ſalt. He adds, that *metals* take their matter and weight from the mercury they contain, and their tincture and form from the ſulphur.

The ſame author owns the firſt rudiment of a *metal* to be a ſaline ſubſtance ſwimming in water, which water is by little and little carried off. By how much the terreſtrial parts are more exquiſitely mixed with the aqueous or humid, by ſo much is the *metal* more heavy and firm, as having fewer and ſmaller pores. Hence its ductility; for its parts being extremely ſmall, denſe, and complicated, may be drawn out into a very ſpacious ſurface: on which account it is, that gold exceeds all other *metals* both in weight and ductility. Hence alſo its fixity, its parts being too cloſe and denſe to be exhaled. The water defends the earth from being burnt, and the earth the water from flying off; neither forſakes the other, but each is bound in an indiſſoluble knot. The moiſture gives ductility, the earth ſolidity. Where the mixture is leſs perfect, whether the earth or the water prevail, the *metal* will neither have ſo much weight, as having larger pores; nor will it bear the fire ſo well For if the earth prevail, as in iron, or the water, as in lead; heat will ſet the one at liberty from the other; the moiſture evaporates, and the earth is reduced into ſcoria, &c.

Dr. Woodward maintains, that all *metals*, now found in the ſtrata of the earth, owe their preſent condition to the deluge; when he alſo imagines the preſent ſtrata of ſtone, earth, marble, &c. were formed.

The *metallic* and mineral matter, now found in the perpendicular intervals or fiſſures of the ſeveral ſtrata, whereof the earth is compoſed, was, according to him, at the time of the deluge, lodged in the bodies of thoſe ſtrata; and has been brought thence, and tranſmitted into theſe intervals ſince that time; the intervals themſelves not exiſting till the ſtrata were formed, and broken again, to let the water from the earth.

Now the water, which he imagines is conſtantly aſcending from the great abyſs towards the ſurface of the earth, continually pervading the ſtrata, detaches out of their pores and interſtices ſuch *metallic* and mineral corpuſcles as it finds looſe in its way, carrying them along with it to the perpendicular intervals; where having a freer paſſage than before, it deſerts them, and leaves them in thoſe intervals. And this he takes to be the way in which all *metals*, now found in thoſe places, were brought thither, and ſtill continue to increaſe.

Thoſe in the ſtrata, however, he obſerves, do not, nor can increaſe; but, on the contrary, are continually leſſened and diminiſhed, by ſo much as has been conveyed into the perpendicular intervals, and brought forth of the ſurface of the earth by ſprings and exhalations from the abyſs, &c.

The ſame ingenious author complains of the great uncertainty and inconſtancy in the mineral and *metallic* kingdom; neither colour, figure, nor ſituation in the earth, being to be depended on, ſo as to allow any poſitive judgment to be formed from them. A pyrites or marcaſite, for inſtance, ſhall have the colour and brightneſs of gold or ſilver, and yet afford nothing but a little vitriol and ſulphur; while what is but a pebble in appearance ſhall have a mixture of a valuable *metal* in it. It is common too to find the ſame *metal* ſhot into a great number of different forms, as well as to find different kinds of *metal* of the ſame form. And as to their place in the earth, there is the ſame uncertainty; they being ſometimes found in the perpendicular fiſſures or intervals of the ſtrata, ſometimes interſperſed in the bodies of the ſtrata, and ſometimes in both. The ſame *metals* are alſo placed indifferently in all kinds of terreſtrial matter, or in ſtrata of very different natures. They are frequently intermixed with each other, ſo that it is a rare thing to find any of them pure and ſimple; but copper and iron ſhall often be in the ſame maſs, as alſo gold and copper, ſilver and lead, tin and lead; nay, ſometimes all fixt together in the ſame lump.

The French chemiſts have been very curious in their enquiries into the nature and production of *metals*. M. Geoffroy, from a mixture of ſulphur with a vitriolic ſalt, and an argillous earth, brought an iron, which he maintained to be a new production, or a compoſition reſulting from the aſſemblage of certain principles which exiſted ſeparately in the ingredients that formed the *metal*; in a word, that it was an artificial iron. And obſerving that there were parcels of this *metal* in the coloured aſhes of plants, and of moſt other inflammable ſubſtances, he concluded that it might be formed there alſo by the union of the ſame three principles.

This was oppoſed by M. Lemery the younger, who maintained that the iron contained in the aſhes of plants was not formed there by calcination, but was really exiſtent in the plants themſelves; being raiſed in their veſſels along with the juices of the earth; and farther, that all the ingredients whereof M. Geoffroy's artificial iron was formed, do really contain iron in themſelves, either in ſmaller or larger quantities; not the argilla only, where the iron is eaſily diſcovered by an animated knife; nor the oil of vitriol, which is drawn from a mineral, the ground whereof is iron; but alſo linſeed oil, whereof M. Geoffroy's ſulphur was made; and even that of turpentine, ſweet almonds, &c. relating withal the operations whereby each of thoſe oils may be reduced to an earth wherein is iron.

To this it was anſwered, that in what manner ſoever iron be procured from the ſeveral ingredients ſeparately, there will be ſtill found infinitely leſs in them, than when mixed; and that, of conſequence, the mixture produces iron; that as for oils, it is evident they are not ſimple ſubſtances, but are compoſed of an earth, an acid, and a ſulphureous or inflammable part; which are the three preciſe principles required for the formation of iron: ſo that, according to all appearance, it is of an aſſemblage of thoſe ſulphurs, ſalts, and earth, in the oil, that the iron is formed by calcination; and therefore that the means uſed to the iron in the ingredients, are the very ſame with thoſe by which it is compoſed. See IRON.

Hence alſo appears, that vegetable matters contain the principles of minerals. But M. Geoffroy goes farther; and to ſupport his doctrine of the production of *metals*, he undertakes to prove, that the principles of vegetables, and thoſe of minerals, are eſſentially the ſame; and that one may readily, and with eaſe, decompound minerals by ſeparating their principles, and compound them again by ſubſtituting principles taken from vegetables in lieu of thoſe taken away.

To clear this point, he examines and compares the principles of mineral and vegetable ſalts. The principal in the mineral claſs are nitre, ſea-ſalt, and vitriol; all which ſalts we find in plants. The eſſential ſalt of the parietaria is wholly nitrous, and melts on the coals like ſalt petre. The fixed ſalts of the carduus benedictus, abſinthium, kali, &c. contain a great deal of ſea-ſalt, which cryſtallizes in cubes, and decrepitates on the coals. Add, that the greateſt part of the fixt ſalts of plants, calcined to a certain degree, yield a ſtrong ſmell of ſulphur; which can proceed from nothing but a vitriolic ſalt, rarefied and volatilized by the oil of the plant. By theſe ſalts we may be able to judge of all the other ſalts of plants; for the volatile ſalts are nothing elſe but fixed ſalts diſengaged from the groſſeſt part of their earth, and joined with parts of oil. Farther, there is ſcarce any reaſon to doubt, that the acid juices, drawn from vegetables, are of the ſame nature with the mineral acids; with this only difference, that the acids of plants have been extremely rarefied by fermentation, and united ſo cloſely with ſulphurs, that it is not without a great deal of difficulty that they are ſeparated. Thus, diſtilled vinegar, which we make no ſcruple of ranking among the vitriolic acids, does only differ from ſpirit of ſulphur, ſpirit of vitriol, or even the cauſtic oil of vitriol, in that the acids in the vinegar are diffuſed among a great deal of phlegm, and ſtrongly united to a great deal of oil, which yet may be ſeparated. By diſſolving copper in the acid of vinegar, ſeparated as much as poſſible from its oil, there are formed cryſtals, like in figure to thoſe of blue vitriol. From all which it appears, that the ſalts of plants do not differ eſſentially from thoſe of minerals.

As for ſulphurs, the inflammable or ſulphureous principle is the ſame in vegetables as in minerals. And M. Geoffroy even ſhews, that the principle of inflammability in common ſulphur is the ſame with that which renders the fat of animals, the oils and reſins of plants, and the bitumens of the earth, inflammable. To which he adds, that this ſame ſulphureous principle is not only likewiſe found in *metallic* ſubſtances, but that it is this which gives them their fuſibility, ductility, and metalline forms. Thus antimony, which is a ſubſtance approaching the neareſt of any to a *metal*, is little elſe but a burning ſulphur. By exhaling this, it loſes its *metallic* form, and turns to a kind of grey aſhes, which, being melted, inſtead of *metal*, becomes glaſs; and by melting this over again, and adding to it ſome inflammable matter, again it returns into a regulus. See the ſequel of this article, and MINERAL.

Stahl maintains, that *metals* have the ſame origin with the earth itſelf, and that theſe and the *metallic* veins that contain them, were formed at the firſt creation of the earth. However, there is reaſon to believe, that *metals* and their mines are continually formed in the bowels of the earth by various proceſſes, ſuch as earthquakes, according to the ſyſtem of Lomonoſow, &c. adapted to this purpoſe.

METALS, *as to the ſpecies of*, there are four which the chemiſts call *imperfect*, becauſe their principles are not bound ſo faſt together, but that the force of a common fire deſtroys them; ſo that by its continued action they are changed into an earth deprived of all the characteriſtic properties of *metals*; theſe are, iron, copper, lead, and tin; the others, which are ductile or malleable, and which alſo remain fixed in the moſt violent and long continued fire, without diminution of weight or other ſenſible alteration, are gold, ſilver, and platina: theſe, therefore, are called *perfect metals*.

The *metallic* ſubſtances, which, as well as the imperfect *metals*, loſe their *metallic* properties by expoſure to fire, but which alſo have no ductility, or fixity, are diſtinguiſhed from the others by the name of *ſemi-metals*. Of this claſs are five: regulus of antimony, biſmuth, zinc, regulus of cobalt, and regulus of arſenic; to which ſome have added nickel. Laſtly, mercury, which has all the general properties of *metals*, makes a claſs ſeparate from the others; becauſe in purity and gravity it is ſimilar to the perfect *metals*, and in volatility to the *ſemi-metals*. Its fuſibility alſo ſo far ſurpaſſes that of any other *metallic* matter, that it is ſufficient to diſtinguiſh it from all, and to give it a diſtinct claſs. Of the fourteen *metallic* ſubſtances above enumerated, three were unknown to the ancients, viz. platina, regulus of cobalt, and nickel.

In the firſt four, it is eaſy to ſee the principle of inflammability: they become all fuſible by the addition of ſaltpetre, either in a greater or leſs degree. But the principle is more conſpicuous ſtill in the duſt or ſmall filings of the *metals* let fall in the flame of a candle, than in the lump. In gold and ſilver, the ſulphureous principle is not ſo obvious. No heat but that of the ſun collected into a focus, is able to decompound them; but, no doubt, even theſe have the ſame principles with the other *metals*, though they are not ſo eaſily ſeen. In gold, as well as in the imperfect *metals*, the baſis is an earth capable of vitrification, as appears by the glaſs remaining after the calcination of gold in a burning-glaſs; and there is reaſon to believe, that the greateſt part of what is exhaled in ſmoke during the operation, is the ſulphureous principle mixed with ſalts.

As to ſilver, there is ſomething in it extremely various. When purified with antimony, it vitrifies by the burning-glaſs: but if purified with lead, it leaves nothing behind it but grey aſhes. The baſis of this *metal* is doubtleſs an earth capable of vitrification; and what exhales in ſmoke, is apparently a mixture of ſulphur, ſalts, and a little earth, volatilized by the fire.

From all theſe, and many more obſervations of the ſame kind, M. Geoffroy ventures to draw the following concluſions; that the ſubſtances whereof *metals* are compoſed, do not differ eſſentially from thoſe which compoſe vegetables: that the imperfect *metals* are compoſed of a ſulphur, vitriolic ſalt, and vitrifiable earth: that this ſulphureous principle is more or leſs ſtrongly joined with the other principles; very ſtrongly in gold and in ſilver, leſs in antimony, and very little in mineral ſulphur: that the principle of inflammability may be ſeparated from *metallic* ſubſtances, either by culinary fire, or by the ſun: that the *metal*, thus deſpoiled of its principle, is converted into aſhes; and that theſe aſhes, purſued farther with a violent fire, vitrify; and that ſuch aſhes or glaſſes, by the application of ſome inflammable matter, again reſume the *metallic* form they had loſt: that it is by theſe means linſeed-oil turns clay into iron: that, if we knew all the other *metallic* earths, they might likewiſe be immediately converted into *metals*, by the projection of ſome proper inflammable matter: that the ſaline and earthy parts, found in proper vitriol, furniſh the earthy vitrifiable part, which makes the baſis or ground of iron; and that it receives the *metallic* form from the ſulphureous principle of the oil; that the iron found in the aſhes of plants, was produced there in the ſame manner; and that it is a compoſition of the vitrifiable earth of the plants, the acid of thoſe plants, and their oily or inflammable principle. But it has been ſufficiently proved by many writers, that by Mr. Geoffroy's experiments, iron is only reduced or revived, but is not produced.

The ſame author, the better to aſcertain the conſtituent parts of *metals*, made a great number of experiments on them with the duke of Orlean's large burning-glaſs; the reſult whereof falls in with, and confirms the doctrine laid down above. From theſe experiments, he gathers, that the four *metals*, which we call *imperfect*; viz. iron, copper, tin, and lead, are compoſed of a ſulphur, or oily ſubſtance, capable of burning, and a *metallic* earth, capable of vitrification. That from this ſulphur proceed the opacity, brightneſs, and malleability of a *metal*. That this *metallic* ſulphur does not appear at all different from the oil or ſulphur of vegetables, or even that of animals; and that it is the ſame in mercury, as in the four imperfect *metals*. That theſe four *metals* have for their baſis an earth ſuſceptible of vitrification; that this earth is different in each of the four *metals*, in that it vitrifies differently in each; and that on this difference in vitrifying, depends the difference of *metals*.

The learned Boerhaave, after an accurate ſurvey of the ſeveral *metals*, their characters, properties, preparations, uſes, &c. draws the following corollaries concerning the general nature of *metals*. 1. That which diſtinguiſhes *metals* from all other bodies, as well as from each other, is their heavineſs; though every *metal* has its peculiar weight, which no art is able to imitate, and which depends, as Helmont and the chemiſts expreſs it, on the anatic homogeneity of their parts. Now, the later philoſophers have proved, that all corporeal magnitude has juſt ſo much reality in it, as it has weight; and therefore, if you have found the heavineſs of any *metal*, you have, at the ſame time, found its corporeity. Sir Iſaac Newton, treating of gravity, and Huygens of the pendulum, ſhew, that weight and reality are correſpondent. 2. The *metals* appear to be ſimple, yet they are really compounds. Their component principles, according to the ancients, are ſulphur and mercury: to which ſome of the moderns have added ſalt; but it is certain, ſalt is no conſtituent part, or ingredient, of *metals*, but rather ſomething external adhering to them. All *metals* conſiſt of two parts or principles: mercury, as the baſis, or matter; and ſulphur, as the binder, or cement; the firſt, the ſubſtratum, or *metallic* matter; and the ſecond, that which renders it fixed and malleable. The mercury, it is to be noted, is the ſame with our quickſilver, only defecate, and clear of any heterogeneous matter; whereas the common quickſilver is always mixed. As to the ſulphur, it is not the vulgar foſſile ſulphur, but a peculiar ſort of matter ſpecifically denominated *ſulphur of metals*, concluded by ſome of our lateſt and beſt chemiſts, particularly M. Homberg, to be fire: which being mixed with the mercury, fixes it, and, according to the different degrees of its union and coheſion therewith, produces different *metals*.

This doctrine of the compoſition of *metals* is confirmed by an experiment of Mr. Boyle, who tells us, that, after having retained mercury a long time in a moderate fire, he took a piece of gold out of it, which, it was apparent, was not in the mercury before it was expoſed to the fire. M. Homberg has alſo an experiment to the ſame effect; from which he concludes, that gold conſiſts of a ſulphureous igneous part, and a heavy mercurial part fixed thereby; and that, upon taking away the ſulphureous or fiery part, the gold muſt be converted into fluid mercury. 3. All *metals* muſt firſt be mercury, before they be gold; and the thing ſuperadded to common mercury, whereby it is prevented from becoming gold, is a ſharp volatile body, which, when heated, becomes corroſive, and emits fumes; which are the true properties of the foſſile ſulphur. 4. If any *metal*, or other body, could be found, that only differed from gold in its wanting weight, it were impoſſible ever to make gold of it; and, on the contrary, if a body could be had, that is as heavy as gold, all the other properties, as colour, fixity, ductility, &c. might eaſily be added. And hence the more knowing among the alchemiſts hold the primary matter of gold to be quickſilver; which, ſay they, is gold at heart, as coming neareſt to gold in point of ſpecific gravity. Only there is a corroſive body, i. e. ſulphur, adhering to it, which if it were ſeparated, you would have gold; or, if it were only inverted, ſilver.

And accordingly, on ſuch principles, whoever would make gold out of any other foreign matter, muſt remember, that the more his matter differs from mercury, in weight, &c. the leſs gold it will make. See PHILOSOPHER'S *ſtone*.

3. Therefore *metals* are tranſmutable into one another:

for, if mercury be the common matter of all *metals*, and if all the difference lie in the fixing ſpirit or ſulphur, which, as it is leſs or more ſubtile or pure, conſtitutes this or that *metal*, it is no way improbable that they ſhould be tranſmuted by a purer fixing ſulphur taking place of a corroſive one, and fixing the matter into a more perfect *metal*.

6. The pureſt *metals* reſult from the pureſt and moſt defecate mercury, and the ſmalleſt quantity of the ſubtileſt ſulphur. Hence, mercury of gold is heavier than common mercury, and has always ſome impure part that is lighter than gold; and could that be taken away, and the fixing ſpirit be added, it would become heavier than gold.

7. The imperfect *metals* conſiſt of impure mercury, and imperfect ſulphur, with ſome other valuable heterogeneous matter in it: this, fuſed by the fire, emits a fume, which whitens copper; after which, the ſulphur exhales yet farther. The reality of ſuch a third matter is evinced by this circumſtance, that all the baſer *metals* are reſolvable not only into mercury and ſulphur, but alſo into ſcoria or ſordes, which are lighter and more earthy than either of the other, and accordingly ſwim therein.

8. Upon the whole, it appears, that in the three nobler *metals*, gold, mercury, and ſilver, it is principally the greater or leſs proportion of the ſulphur to the mercury that determines them to be gold, mercury, or ſilver; that it is by this proportion thoſe ſeveral *metals* are defined and denominated; and that, from this difference of proportion, flow all the ſpecific differences of colour, weight, fixity, ductility, volatility fuſibility, ſolubility, ſalubrity, &c.

9. That in the other baſer *metals*, beſides this different proportion of the two principles, there intervenes another cauſe of diverſity; viz. a third principle, or matter of an earthy kind, and very different from either of the reſt; which, adhering to the pure elemental ſulphur, corrupts and adulterates, and variouſly modifies it; and from the different circumſtances of this third principle, conſidered along with thoſe of the ſulphur itſelf, reſult the ſpecific differences of the more imperfect *metals*, as to weight, colour, and their other qualities.

The ſyſtem of *metallization*, which ſuppoſed ſalt, ſulphur, and mercury, to be the conſtituent elements of *metals*, ſubſiſted under various modifications, till Becher evinced, that theſe three principles are in themſelves compound bodies, and, therefore, could not be properly elements of bodies; and, purſuing his reflexions on this ſubject, he was led to conſider *metals*, and all bodies of the ſame nature, as compounded of three ſubſtances, which he called earths. The firſt is the ſaline or vitrifiable earth; the ſecond is the fat or inflammable earth; and the third the mercurial or volatile earth. According to his theory, theſe three earths enter into the compoſition of all *metals*; the perfection of which depends on their more perfect combination, and their difference on the degree in which one of theſe principles prevails over the others, and the various proportions in which they are combined in various *metals*. Becher has endeavoured to demonſtrate the exiſtence of theſe three priniciples by reaſoning and experiment. In proof of the exiſtence of a vitrifiable earth in *metals*, he alleges their calcination by fire, gold and ſilver excepted, or their tranſmutation into an earth or aſhes, which farther urged by fire is changed into glaſs. The inflammable principle or phlogiſton of *metals*, is neceſſary to correct and temper the dryneſs of the former, and is generally admitted. The mercurial earth according to him, is the moſt eſſential principle of *metals*, and ſerves to give them their *metallic* form. The other two *metals* poſſeſs, in common with ſtones, vegetables, &c. but this mercurial earth, joined to the two others, gives *metals* that ductility which is peculiar to them, and which conſtitutes their metallic nature. This theory has been adopted and illuſtrated by Stahl, and many other chemiſts; who maintain, that the mercurial principle above mentioned exiſts copiouſly in mercury; that it alſo exiſts in marine acid, to which it gives its ſpecific character; and that by extracting it from this acid, or from any other body containing it copiouſly, and combining it with ſimple earths theſe may acquire a *metallic* character, and be rendered capable of receiving phlogiſton, and of being completely *metalliſed*. Thoſe *metals*, in which the mercurial earth exiſts moſt copiouſly and ſenſibly, are mercury, ſilver, lead, and arſenic. It has been urged as a ſtrong preſumption in favour of the exiſtence of this third principle in *metals*, that no method has yet been diſcovered of producing *metals*, by merely combining phlogiſton with ſome matter which is certainly known to be ſimple earth. Beſides, it is not eaſy to conceive, how from only two certain principles ſo many very different compounds, as the ſeveral *metallic* ſubſtances are, ſhould reſult. On the other hand, the exiſtence of this mercurial principle is only probable, and there are many reaſons to doubt of it. It is agreed, that marine acid, mercury, arſenic, and the other ſubſtances in which the mercurial earth is ſuppoſed to abound, are very volatile; and therefore, that this principle muſt likewiſe be volatile: conſequently, when *metals* are decompoſed by combuſtion, or by detonation with nitre, a conſiderable part of this volatile principle muſt be diſſipated. Hence it muſt be impoſſible to remetallize the calxes of *metals* without recombining not only their loſt phlogiſton, but alſo their loſt mercurial earth. But it is well known, that by addition of phlogiſton alone theſe calxes may be metalliſed, and that no mercurial principle is neceſſary. Henkel maintains, that the mercurial earth is not a diſtinct ſubſtance, but conſiſts only in a beginning of union of phlogiſton with earth, or in a diſpoſition which an earth has of uniting intimately with the inflammable principle. Other very conſiderable chemiſts have alſo been of opinion, that two principles, viz. earth and phlogiſton, are ſufficient to form a *metal*, and have rejected the mercurial principle of Becher. The ſolidity, the conſiſtence, and eſpecially the gravity, which *metals* poſſeſs in a degree ſuperior to all other bodies, will not allow us to doubt, that the earthy element, of which theſe are the characteriſtic properties, enters largely into their compoſition, and makes their baſis. And the facility with which they combine with almoſt all inflammable matters, and with all thoſe which have great affinity with phlogiſton, ſuch as acids, joined to their incapacity of being allayed with meagre matters that are purely earthy or watery, which have no diſpoſition to unite with phlogiſton, furniſh alſo very ſtrong reaſons for believing, that the inflammable principle enters largely into the compoſition of *metals*. But the cleareſt and moſt ſatisfactory demonſtration of the exiſtence of this principle, is the combuſtibility of all *metals* capable of decompoſition in this way, and their ſubſequent reduction with all their properties, by the re-union of the inflammable principle. Beſides, the deſtructible *metals* perfectly reſemble, in the ſtate of COMBUSTION, all bodies containing phlogiſton. When expoſed to fire in cloſe veſſels, they become red-hot, melt or ſublime, according to their nature, but undergo no other alteration. But imperfect *metals*, expoſed to fire, with acceſs of air, burn more or leſs ſenſibly as their inflammable principle is more or leſs abundant, or more or leſs combined. Beſides, the phlogiſton of *metals* is conſumed by DETONATION with nitre more quickly and more completely than by ordinary calcination or combuſtion; and nitre is alkaliſed by the *metallic* detonations in the ſame manner as in its detonation by coals: and farther, imperfect *metals*, treated with the vitriolic and nitrous acids, which have an affinity with phlogiſton, are more or leſs deprived of their inflammable principle. It is alſo evident, that phlogiſton is one of the conſtituent parts of *metals*, becauſe their eſſential properties are altered in proportion to the quantity of it taken from them: thus, the reſiduum of *metallic* matters, after calcination, departs from the *metallic* character, and approaches to the nature of mere earth. The opacity, brilliancy, ductility, gravity, fuſibility, volatility, and all the properties by which *metallic* ſubſtances differ from ſimple earths, are diminiſhed, or entirely diſappear, by taking from them their inflammable principle; ſo that after the utmoſt calcination they reſemble mere earths, which can no longer be combined with acids or with *metals*, but are capable of uniting with purer earths. In this ſtate they are called calces, or *metallic* earths. See CALX.

Another proof of the exiſtence of the inflammable principle in *metals*, is deduced from the reduction of *metallic* calces into *metals*, by the addition of phlogiſton alone. Thus, if the earth of a *metal* be mixed with any inflammable matter, which either is, or can be changed into the ſtate of coal, together with ſome ſalt capable of facilitating fuſion, but which, from its quantity or quality, is incapable of receiving the inflammable principle; and if the whole be put into a crucible, and the fuſion promoted by a fire gradually raiſed, then an efferveſcence will happen, accompanied with a hiſſing noiſe, which continues for a certain time, during which the fire is not to be increaſed; afterwards, when the whole has been well fuſed, and the crucible taken from the fire and cooled, we ſhall find at the bottom, upon breaking it, the *metal*, the earth of which was employed for the operation, poſſeſſed of all the properties which it had before CALCINATION and REDUCTION. This transformation of an earthy ſubſtance into a *metal*, is ſolely cauſed by the phlogiſton paſſing from the inflammable matter to the *metallic* earth; becauſe, in whatever manner, and with whatever ſubſtance, *metallic* earths be treated, they cannot ever be reduced into *metals* without a concurrence of ſome ſubſtance containing phlogiſton; and the nature of this ſubſtance is indifferent, becauſe the inflammable principle is the ſame in all bodies containing it; and farther, if, after the operation, the ſubſtance furniſhing the phlogiſton be examined, we ſhall find that it has loſt as much of that principle as the *metallic* earth has received. Theſe and other facts that might be recited concerning the decompoſition and the recompoſition, or REVIVIFICATION of *metals*, prove inconteſtibly, that they are all compoſed of EARTH and PHLOGISTON. And, in general, if we reflect on the eſſential properties of the earthy and inflammable principles, we ſhall eaſily perceive that theſe properties, being combined and modified by each other, without the ſaline principle of ſome chemiſts, perhaps without the mercurial principle of Beccher, ought to produce the properties of *metals*. Dict. Chem. art *Metals*. Mem. Acad Par. 1709 See MINERAL. The number of metallic ſubſtances, anſwering to this definition, now known, are 17: viz. gold, platina, ſilver, copper, iron, lead, tin, mercury, zinc, regulus of antimony, regulus of arſenic, biſmuth, cobalt, nickel, regulus of manganeſe, ſyderites and regulus of molybdena. Of theſe, gold, ſilver, platina, and mercury are reckoned perfect or noble *metals*; becauſe, when calcined, they recover their phlogiſton without the addition of any phlogiſtic ſubſtance: whereas copper, iron, lead, and tin cannot be entirely reduced without ſuch addition, and hence are called ignoble or imperfect. However, all theſe (even mercury when ſolid) are malleable to a great degree, and hence called *entire metals*; whereas zinc, regulus of antimony, &c. are ſcarce at all malleable, and hence are called *ſemi metals*: however zinc and purified nickel are more malleable than any of the reſt. Hence there are four perfect *metals*, four imperfect, eight entire, and nine *ſemi-metals*. Kirwan's Elem. Min. p. 227. The principle which is combined with *metals*, during their CALCINATION, and which augments their weight, ſeems to be nothing more than the pureſt portion of the air we breathe, which, in this operation, paſſes from a ſtate of expanſibility to a ſtate of ſolidity.

METALS *for ſpecula*. See SPECULUM.

METALS, *colours from*. As *metals* have a ſtrong texture in their metalline form, ſo they preſerve their natural colours durable, unleſs corroded or diſſolved by particular menſtruums, after which their ſolutions ſtrike particular durable colours, or afford the ſtrongeſt ſtains.

Iron diſſolved in ſtale ſmall beer gives the beautiful yellow and different ſhades of buff-colour, uſed in printing linens and cottons, &c. When ſublimed with ſal ammoniac it alſo affords a yellow; and the common iron-moulds made by ink are owing to the iron diſſolved in the copperas of which ink is made.

Copper melted with zinc appears of a gold-colour; diſſolved in aqua fortis, it affords a beautiful green; and in any alkali a beautiful blue. And theſe ſolutions may be reduced to dry colours by cryſtallization or evaporation; and the ſame *metal*, precipitated out of aqua fortis with common ſalts, gives the turquoiſe-colour to white glaſs. Tin, a white or colourleſs *metal*, affords a light blue colour, when fluxed with antimony and nitre. The ſame *metal* is neceſſary in ſtriking the ſcarlet-dye, with aqua fortis and cochineal; and its calx, by ſtrong infuſion, turns to a glaſs of an opal colour.

Lead, corroded by the fumes of vinegar, gives the fine white ceruſs; burnt in a ſtrong naked fire, it becomes the ſtrong red-lead, or minium; and melted into a glaſs with ſand, is of the hyacinth colour. Shaw's Lectures, p. 171.

Silver being diſſolved in aqua fortis, if chalk be put to the ſolution, turns of a beautiful purple or amethyſt-colour; and its own ſolution, though pale as water, durably ſtains the nails, ſkin, or hair, brown or black.

Quickſilver mixed with brimſtone makes a black maſs, and this, by ſublimation, affords the beautiful red pigment, called cinnabar, or vermilion; and the ſolution of quickſilver being precipitated with common ſalt, yields a ſnow white powder, which alſo turns black by being mixed with ſulphur.

Gold, diſſolved in aqua regia, affords a fine yellow liquor, which ſtains animal ſubſtances beautifully purple; and if the ſolution be ſufficiently weakened with water, and mixed with a ſolution of tin, a fine red or purple powder may be procured, very uſeful for ſtaining of glaſs and paſtes to a beautiful red.

It appears from the experiments of ſir Iſaac Newton, relating to the changes of colour that take place in pellucid colourleſs ſubſtances, that the leſs refrangible COLOURS are exhibited by the greater thickneſs of air, water, and glaſs; and that as the thickneſs of thoſe ſubſtances is diminiſhed, they reflect the more refrangible colours. Hence he infers, that nothing more is requiſite for producing all the colours of natural bodies, than the ſeveral ſizes and denſities of their particles. Accordingly he attributes the colours of permanently coloured bodies to the ſame cauſe by which they were produced in colourleſs ſubſtances, viz. to the various thickneſſes of their component particles. But no experiments were made on permanently coloured bodies, in order to eſtabliſh the truth of ſir Iſaac Newton's opinion, till the ingenious Mr. Delaval directed his attention to this ſubject. From obſerving the circumſtances above recited, and more largely illuſtrated under the article COLOURS, it appeared to him, that, if permanently coloured bodies are ſubject to the ſame laws as tranſparent colourleſs ſubſtances are, all ſuch permanently coloured bodies, whenever the ſize of their particles is diminiſhed, ſhould undergo a change of colour, by aſcending from the leſs refrangible to the more refrangible colours; and that ſuch bodies, when the ſize of their particles is augmented, ſhould undergo a contrary change, their colour in this caſe deſcending from the more refrangible to the leſs refrangible colours. In order to confirm this concluſion, he made a great variety of experiments with vegetable, animal, and mineral ſubjects, whereby the ſize of their particles, upon which their colours depend, might be diminiſhed or increaſed. The methods which he uſed, in order to diminiſh the ſize of the particles of thoſe bodies which were the ſubject of inquiry, were by diſſolving, attenuating, &c. by means of chemical ſolvents, heat, putrefaction, dilution, &c. The contrary effects were brought about by ſuch means as are known to condenſe, incraſſate, or unite the particles of bodies into larger maſſes, as by coagulation, precipitation, evaporation, by diminiſhing the force of the ſolvents, &c. The *metals* afforded him numerous inſtances in confirmation of the doctrine above explained; for almoſt every operation, to which they are ſubject, exhibits a change of colour correſponding to this doctrine. This is particularly the caſe with regard to the imperfect *metals*; for every change of their texture is accompanied by a correſpondent change of colour. We can only enumerate ſome of the principal reſults which Mr. Delaval obtained from a great number of well conducted experiments. Thus, the green vitriol of iron is changed, in proportion as it is deprived of its ſolvent part, by expoſing it to a ſtrong heat, &c. to yellow, orange, red, and purple; and by a contrary proceſs, viz. by a farther attenuation, by means of the phlogiſticated lixivium, in the proceſs of *Pruſſian* BLUE, &c. the colour of the iron aſcends from green to blue; ſo that all the primary colours are produced from the ſame metal, in proportion as its particles are attenuated or incraſſated. It appears likewiſe, that when iron is divided into very ſmall parts by means of a large quantity of glaſs, and by a violent heat, its colour is blue; but in proportion as it is leſs divided, by the mixture of a ſmaller quantity of glaſs, or the application of leſs heat, its colours are green, yellow, and red. From iron diſſolved in its ſeveral menſtrua, colours are produced in proportion as the ſolvent power of thoſe menſtrua is greater or leſs. Thus, iron diſſolved in its ſtrongeſt acid ſolvent, the vitriolic acid, gives green; in its weaker acid ſolvents, the marine and nitrous acids, yellow and orange; and in its weakeſt acid ſolvents, the vegetable acids, red. The colours of the calces of iron precipitated from its ſolution in the vitriolic and nitrous acid, deſcend from green to yellow, and from yellow to red; whereas the changes of colour ariſing from the ſolution of theſe calces, proceed in a contrary order, and aſcend. Mineral ſubſtances are alſo frequently impregnated with iron, and their colours correſpond with the ſtate of the iron contained in them.

In the ſame manner the colours of the ſolution of mercury in the nitrous acid vary, in proportion as the ſolvent is extricated from it, from yellow to orange, and then to red. Thus alſo, thoſe ſubſtances which have the greateſt affinity with the acid of the corroſive ſublimate produced by the ſolution of mercury in the marine acid, diſengage from its ſolution a red precipitate; and thoſe, whoſe affinity with it is leſs, produce a yellow one. But theſe colours are liable to ſome variation, according to the greater or leſs quantity of acid in the ſolution. Mercury diſſolved in the vitriolic and in the vegetable acids, exhibits, in proportion as its ſolvent is taken from it, the ſame colours which, under ſimilar circumſtances, are afforded by that metal diſſolved in the other acids. All theſe mercurial preparations become red, when they are deprived of the principal part of their menſtruum; and mercury calcined by heat, without the addition of any acid, acquires the ſame colour. Its colour, however, is ſubject to variation, from the action of its ſolvents; and thus the phoſphoric acid changes the red to yellow and white. The ſame law obtains in the changes of colour to which the mineral mangaueſe is ſubject; for Mr. Delaval found, that by means of the different degrees of power in the ſeveral ſolvents, theſe colours were produced in their regular priſmatic order, viz. yellow, green, blue, purple, and red. The various phenomena of the *ſympathetic* INK of M. Hellot conform to the ſame law, and are urged by Mr. Delaval as arguments to eſtabliſh it. Heat and cold, he obſerves, are not neceſſary agents in the production or ſuppreſſion of the colour. But it appears, that the alterations are effected by the moiſture of the air, attracted by the ſaline matter when cold, and expelled from it when heated. When this ink is expoſed to a moderate heat, in a white china cup, and when the greater part of the water is evaporated, the ſaline matter becomes green. This colour ariſes from a ſuperfluous quantity of the marine acid, which ſoon flies off, and leaves the remaining part blue, ſlightly inclining to green. It alſo foams a hard dry maſs, which, in a few minutes after its removal from the fire, grows moiſt, and aſſumes a light red colour. Theſe alterations may be often renewed, by alternately heating and cooling the coloured matter; which does not again become green, after the ſuperfluous marine acid is once evaporated. But a drop of ſpirit of ſalt, added to the red or blue maſs, immediately renders it green. When preparations of cobalt are acted upon merely by heat, the order of the changes of colour effected in them, is ſuch as, in other inſtances, conſtantly ariſes from that means of attenuation. Thus, when the yellow ſolution of this mineral, in the marine acid, is heated, it aſſumes a green colour, paſſing from a leſs to a more refrangible colour. When this ſolution is cooled, the yellow is reſtored.

Mr. Delaval obſerves, that, as the inflammable matter in the entire *metals*, acts ſtrongly on the rays of light, it is neceſſary to calcine or to divide them into extremely minute particles, in order to examine ſeparately the action of the calx, or fixed matter, on the rays of light. In order, therefore, to examine all the *metals* in the like circumſtances, by reducing them into the ſmalleſt particles, and depriving them of their phlogiſton as much as poſſible, he expoſed each of them, united with a proper quantity of the pureſt glaſs, without any additional ingredient, to the greateſt degree of fire which they are capable of bearing, without having all colour whatever deſtroyed. In this ſtate it appears, from a variety of experiments and facts, that they actually do, without any exception, exhibit colour in the order of their denſities, as follow: gold, red; lead, orange; ſilver, yellow; copper, green; and iron, blue. He has alſo ſhewn that the other preparations of the *metals*, viz. their ſolutions, precipitates, cryſtals, &c. do for the moſt part exhibit the ſame colour, in the order of their denſities, though not ſo invariably as their glaſſes; ſome ſmall variation of colour happening in the more imperfect *metals*, probably from a change of denſity in their different preparations. Thus, gold acquires a red colour, by a minute diviſion of its particles, without any addition. In the proceſs of calcining lead in the furnace, the firſt of the primary colours which it acquires is yellow; the calx paſſing from that colour through orange into red. This variety of colours proceeds from the imperfection of the *metal*; which probably, during its calcination, receives a ſmall portion of phlogiſton, as well as air; for the effect of ſuch an union muſt probably be a change of colour from orange to red: as ſir Iſaac Newton has ſhewn, that bodies reflect more ſtrongly in proportion as they poſſeſs more phlogiſton: and that the leſs refrangible colours require a greater power to reflect them. The preparations of ſilver are yellow: the two moſt imperfect metals, copper and iron, being very eaſily acted upon by almoſt all menſtrua, the colours of their ſolutions, &c. viz. green and blue are apt to change into each other's order; the copper in ſome ſolvents becoming blue, and the iron green, and in other ſolvents *vice verſa*; which probably depends on the increaſe or diminution of their denſities. The preparations, &c. of mercury have been already examined. The ſpecific gravity of platina being nearly equal to that of gold, it is found, agreeably to the Newtonian doctrine, confirmed by Mr. Delaval, that the precipitates and cryſtals obtained from ſolutions of this *metal* are red; and that a ſolution of it in aqua regia to perfect ſaturation is of a dark red, though when diluted, yellow. Delaval's Experimental Inquiry into the Cauſe of the Changes of Colours in opake and coloured Bodies, &c. 1777, paſſim. Phil. Tranſ. vol. lv. art. 3. p. 10, &c.

METALS, *fluxes of*. See FLUXES.

METALS, *granulation of*. See GRANULATION.

METALS, *medicines from*. All medicines that have LEAD in their compoſition, are ſcarce to be truſted for internal uſe; for we have numerous inſtances of the poiſonous nature of this *metal*, in the workers at the white lead or ceruſs-houſes, and indeed in all who work on that *metal*, and it were enough to baniſh the internal uſe of *ſaccharum ſaturni*, and the *tinctura antiphthiſica*, to read in the Miſcellanea Curioſa, Decad. 3. Obſ. 30. how many men were poiſoned at a time by drinking of pricked wine, which had been rendered ſweet by litharge.

Metals, however, do not act in the body, unleſs diſſolved; whence large quantities of crude mercury being ſwallowed, prove harmleſs for want of a proper menſtruum to diſſolve it in the ſtomach; but when crude mercury is diſſolved in its proper menſtruum, as in the making corroſive ſublimate, we ſee it becomes one of the ſtrongeſt poiſons. Lead, iron, and copper, being much more eaſily diſſolved than quickſilver, are ſeldom taken without ſome remarkable effect, which muſt always prove the greater, the more of an acid humour, or in caſe of copper, even an alkaline is lodged in the ſtomach or inteſtines. The internal uſe of the cryſtals of ſilver, though ſometimes ſucceſsfully given in dropſical caſes, ſhould hardly be truſted, on account of their corroſive acrimony, which has ſometimes occaſioned bloody ſtools, and extreme weakneſs. The common tinctures of copper and ſolutions of blue vitriol, can ſcarce be taken internally with ſafety; as being not only emetic, but in ſome degree corroſive and poiſonous. Even the *aurum fulminans* cannot be ſafely given till thoroughly waſhed from its ſalts: and even then, if it meet with an acid ſolvent in the ſtomach, it may do very great miſchief. Iron and tin have not been found ſo pernicious in the body, but rather beneficial, eſpecially iron, when properly prepared and uſed.

Metallic bodies corroded by acids, generally erode when applied to ſores. Some of theſe, ſublimate mercury for inſtance, and particularly arſenic, have ſhaken the whole frame of the body, when applied externally; and mercurial preparations do ſometimes enter the blood, and produce a ſalivation. Med. Eſſ. Edinb. vol. v. art. 24.

METALS, *ſalts of*. The ſalts of the ſeveral *metals* have been medicines long known in the world, and are of excellent uſe in the cure of many diſeaſes: but they might be of yet infinitely more ſervice to the world, if a happier way of extracting them could be found than the general one now in uſe, of doing it by acids, and ſuch ſtrong and corroſive menſtruums. Beſide the miſchiefs theſe menſtruums bring as corroſives, which is aſſuredly much leſs than is vulgarly ſuppoſed, becauſe they loſe the greater part of this in acting on the *metal*, they produce a great number of bad effects, and render the ſalts unfit for a great number of uſes, by making them all vitriols, that is by converting them into ſalts which, like the common native vitriols, have a ſeptic and violently acrimonious quality. The cryſtals, or ſalt of ſilver, called by the chemiſts lunar vitriol, are a plain inſtance of this.

Borrichius and Kunkel deviſed another method to be uſed for obtaining the ſalts of *metals*. This was the uſe of fire inſtead of acids, as the menſtruum that ſhould prey upon the *metal*, and ſeeking the ſalts of all *metals* from the mere action of a reverberatory furnace; but this method, though a very laudable attempt, yet is by no means calculated to be of general uſe, becauſe the quantity of ſalts thus obtained is very ſmall, and that obtained with great pains and expence. Kunkel has given the world an account of the effects of another method of treating *metals*, of which he relates wonders; but he conceals the method. The ſolemn manner in which he declares the fact, however, ſeems to imply, that what he relates is truth; and he every where ſpeaks from his own perſonal knowledge, and the work of his own hands. The menſtruum he uſed was known by himſelf and many others, at Hall in Saxony, under the name of *eſſentia dulcis*; he ſacredly affirms, that this was neither acid nor corroſive, even in the ſlighteſt degree; that it left behind it no fæces, no ſaline nor earthy matter on evaporation alone; and that it more approached to the nature of ſpirit of wine than to any other known liquid. He ſays, that this liquor diſſolved even gold, and that ſo perfectly, that it would all riſe with the liquor in diſtillation. Mercury being diſſolved in it, and the ſolution diſtilled in a retort, he ſays, that only a ſmall quantity of earthy matter remained in the retort, which was white, of a ſpongy texture, and fixed in the fire; and that the reſt of the body of the quickſilver was converted into a thin colourleſs and pellucid ſpirit in the receiver: and that gold, treated in the ſame manner, and diſtilled with a very gentle heat, was left at the bottom of the retort in form of a reſin; and that this reſin was ſoluble in common rectified ſpirit of wine, as was alſo the earth of the mercury; and that ſome days after the ſolution of this laſt earth, the ſalt with which this ſubſtance abounded, would ſeparate itſelf from the menſtruum, and form regular cryſtals at the ſide of the glaſs. This, he ſays, is the true ſalt of mercury, containing all the virtues of that *metal*, and not converted into a vitriol or corroſive ſubſtance, by means of the menſtruum uſed to extract it. When the ſalt has thus formed as many ſhoots as it will yield by this proceſs, the remaining liquor is to be evaporated gently, and there will be found a like ſalt at the bottom of the veſſel, of a white colour, an agreeable ſmell, and inſipid to the taſte: this, he ſays, is ſo fixed in the fire, that it is no more to be deſtroyed or altered by it, like the *metal* from which it is obtained. It readily melts into a maſs in the fire, but if it be not immediately after that taken off from the fire, it will run through whatever veſſel it is melted in.

The author attributes to this ſalt all the wonderful virtues that the *metal* is made from is known to poſſeſs; and gives inſtances of cures performed by it, which are ſo well atteſted as ſcarce to leave any doubt of his veracity. He ſays, it works mildly by ſtool, urine, and ſweat. The caſes he gives of cures performed by it, are theſe: two women, who were very bad with the venereal diſeaſe, two men in the laſt ſtages of hectic fevers. ſeveral perſons in bad kinds of the ſmall-pox, and ſome in peripneumonies. The reſin-like ſubſtance into which gold is converted by the ſame operation, he ſays alſo may be transformed in the ſame manner into a white and ſubtile ſalt, of a very penetrating taſte; and to this he attributes great virtues in the cure of hæmorrhages and epileptic caſes, and adds that it is an ingredient of the black compound powder, ſo famed for epileptic caſes, prepared at the public orphan hoſpital at Hall. Kunkel's Diſſert. de Sal. Met.

Metal, *prince's*. Copper, though one of the leſs precious *metals*, has yet been found of ſo great uſe in the common affairs of life, that ſcarce any other has been ſubject to ſo many trials for its improvement, or the rendering it either more beautiful or more fit for certain purpoſes.

One of the firſt diſcoveries in theſe attempts was the making it into braſs, by means of an addition of lapis calaminaris: and though it was not at that time known to be a ſtone which contained any *metal*. yet the braſs was always found to weigh one third more than the copper which had been uſed in the proceſs.

This yellow *metal* gave many people hopes of making copper approach yet nearer to gold, and without knowing that zinc was the ſeparated *metalline* part of lapis calaminaris, the experimenters ſoon found, by happy accidents, or repeated chance mixtures, that it would give copper a yet finer and purer yellow; but it was alſo found, that this mixed *metal* was much more brittle than braſs made in the common way. This, however, did not prevent the world from ſtill valuing it for ſuch works as were to be finiſhed by caſting, and did not require the hammer; and we, who firſt had it in perfection, called it *prince's metal*, from Prince Rupert, whom ſome ſuppoſed to have been the inventor of it, in 1680. But the greateſt perfection this *metal* was ever brought to, was by two Frenchmen, Mr. La Croix, and Mr. Le Blanc. Their methods of making the compoſition, though both beautiful, were very different. Mr. Le Blanc's was the brighteſt, and of the moſt elegant and lively colour; but Mr. La Croix's was greatly ſuperior to that in ductility and ſoftneſs, ſo that it was very eaſily malleable.

Mr. La Croix invented a ſort of varniſh or lacquer for his *metal*, which added a ſomewhat deeper tinge to it, as it was naturally rather too pale; and had this farther advantage, that while it remained on the *metal*, it preſerved it from ruſt or decay. This is a very material point in regard to a *metal* of which copper is the baſis, ſince that is, of all *metals*, moſt ſubject to be injured by the air, or by the contact of liquids of almoſt any kind. Mr. Le Blanc's *metal* is of a deeper, yet equally lively colour, and remarkably bright; and is of ſuch a temper as to be admirably fitted for working. The whole hiſtory of theſe *metals* is certainly, that they are compoſed of zinc and copper in different proportions the one to the other; but it is not eaſy, without the help of numerous experiments, to determine what is to be the true proportion for either.

The microſcope, however, ſhews a manifeſt difference, which may lead ſomewhat towards it; for the *metal* of La Croix is ſeen to be compoſed merely of a number of irregular ſtriæ, while the other is diſcovered to conſiſt of always two regular beds of them, which meet in the center of the piece; hence it is that this is always brittle, and will not well poliſh. The fabric of theſe *metals* was long kept a ſecret; but it was always to be diſcovered by melting it in a crucible in a ſtrong fire, when it always ſent up plain flowers of zinc, and the remaining *metal* appeared no other than copper altered by calamine; that is, common braſs. Mem. Acad. Par. 1732. See Gold-*coloured metal*.

Metal, *bell*, is a compoſition of copper and tin melted together. See Bell.

Metals, *bluing of*. See Bluing *of iron*.

Metals, *painting on*. See Painting.

Metals, *ruſt of*. See Rust.

Metals, *line of*. On Gunter's ſector are ſometimes two lines thus called, and noted with the characters of the ſeven *metals*, ☉, ☾, ☿, ♄, ♀, ♂, and ♃; their uſe is, to give the proportions between the ſeveral *metals* as to their magnitudes and weights.

Metals, *tincture of*. See Tincture.

Metal, *to be laid under*, in *Gunnery*, is when the mouth of a gun lies lower than her breech.

Metal, in *Heraldry*. There are two *metals* uſed in heraldry, by way of colours, viz. gold and ſilver; in blazon called *or* and *argent*.

In the common painting of arms, theſe *metals* are repreſented by white and yellow, which are the natural colour of thoſe *metals*.

In engraving, gold is expreſſed by dotting the coat, &c. all over; and ſilver by leaving it quite blank.

It is a general rule in heraldry, never to place *metal* upon *metal*, nor colour on colour; ſo that if the field be of one of the *metals*, the bearing muſt be of ſome colour, and *vice verſa*; otherwiſe the arms are falſe: though this rule admits of ſome exceptions.

METALEPSIS, in *Rhetoric*, is a figure in which two or more tropes, and thoſe of a different kind, are contained under one word; ſo that ſeveral gradations, or intervening ſenſes, come between the word that is expreſſed, and the thing deſigned by it. Thus, when Sylla ſays of Julius Cæſar, *In one Cæſar there are many Marius's*. Suet. in Vit. c. 1. This is a *metalepſis*. So when Virgil deſcribing that part of the African coaſt, where Æneas arrived with his ſhips, ſays, *a dark wood hung over it*. Æn. lib. i. ver. 165; and in the words of Dido, Æn. lib. iv. ver 664, the ſame figure is uſed.

METALLIC, or Metalline, an adjective applied to any thing that bears a relation to *metals*.

Metallic *germination*, *mines*, *vegetation*, and *vitriols*. See the reſpective ſubſtantives.

METALLORUM *crocus*, *mater*, and *ſulphur*. See the reſpective articles.

METALLURGY, the art of *metals*, that is, of preparing and working *metals*, from the glebe or ore, to the utenſil. See Mineralogy.

Metallurgy includes what relates to the finding of the metallic glebe or ore in the mine; the judging of its kind and richneſs, or the proportion of metal therein; the digging or ſeparating it from the earth, and other matters: and the purifying and diſpoſing it into a complete, pure, malleable metal.

Boerhaave divides *metallurgy* into four parts. The firſt teaches how metals grow in the mines, how they are diſcovered, and how procured out of the ſame; the ſecond, how to ſeparate the metallic from the other matter of the ore; the third how to reduce the ſeparated matter to its ſimplicity and ductility; the fourth to work, gild, poliſh, and imitate the finer metals in the coarſer.

Dr. Shaw, however, reſtrains *metallurgy* to thoſe operations required to ſeparate metals from their ores, for the uſes of life. Theſe operations are of two kinds, or ſmaller and large; with regard to which the whole art of *metallurgy* may be divided into two parts, Assaying and Smelting.

Dr. Cramer obſerves, that the art of aſſaying conſiſts in a well-made ſeparation of minerals, eſpecially metals, and in a diviſion of the ſeveral conſtituent parts of them from each other, in order that the quantity and quality of each in particular may be known: it is plain that thoſe operations which belong to the general claſs of ſolution, appertain ſtrictly and primarily to this; and that the others which are performed by the aſſayer, are only ſecondary or auxiliary operations. But there is hardly any chemical operation which is not ſometimes neceſſary to be performed in the art of aſſaying: there are many on the contrary, which are peculiar to aſſaying alone; therefore we ſhall here give a general view of thoſe which properly belong to it; or of thoſe which, though taken from chemiſtry at large, are nevertheleſs uſed by aſſayers; only firſt obſerving that every primary docimaſtical operation may, on account of its effects, be called ſolution; ſince, in every operation, the menſtrua, among which the air and fire have a right to be claſſed, effect a ſolution, by interpoſing themſelves between the parts of the objects to be changed. See Menstruum and Flux.

Now a docimaſtical ſolution is either	Dry	Fuſion	
		Vitrification.	Theſe may be called almoſt univerſal, becauſe they diſſolve either the whole maſs, or, at leaſt, by much the greater part of the ſubject in hand.
		Scorification.	
		Coppelling.	
		Reduction.	
		Amalgamation.	
		Sublimation.	
		Cementation.	
		Roaſting.	We may call theſe partial, as they all diſſolve but one part of the ſubject in hand.
		Calcination.	
		Eliquation by fuſion.	
	or		
	Moiſt	Elutriation.	All theſe are partial, and ſeparate ſome parts from the others.
		Edulcoration.	
		Quartation.	
		Moiſt precipitation.	

An account of each of theſe may be found under their proper heads.

Dr. Shaw, after mentioning the manner of extracting metal from the ore, by aſſaying and ſmelting, gives ſeveral axioms and canons of *metallurgy*, among which are the following: that the art of aſſaying is hitherto imperfect, but capable of receiving conſiderable improvement from chemical and mechanical knowledge; that the troubleſome and expenſive method of ſeparating gold from ſilver by quartation, may be advantageouſly ſuperſeded, or ſet aſide, by means of fuſion, or a dexterous management of the fire; that gold or ſilver are ſeldom rendered abſolutely pure, or ſeparated from all other kinds of metallic or mineral matters; and that to purify them in this manner requires the uſe of better methods than thoſe commonly uſed for that purpoſe; though the thing itſelf is ſtill performable by art and a ſuitable proceſs; that ſulphur has different effects upon different metals; which effects being well noted, rules of practice might thence be derived, for the farther improvement of *metallurgy*; that the ignobler metals are ſeparable from each other by the application of proper degrees of heat, ſo as to make the more fuſible melt away from the leſs fuſible, at leaſt with the aſſiſtance of lead; that all metals are reducible by burning or calcination, to terreſtrial powders, which, by being melted with any inflammable matter, aſſume their metalline form; that the great enemies to ductility, or the true metallic nature, are ſulphur, cobalt, and things compounded thereof; but that all unctuous or inflammable bodies are friendly to metals, and promote or reſtore their ductility, when melted therewith; that copper may be made to approach to the colour of gold, and at the ſame time not loſe, but increaſe its ductility, by being amalgamated with, and diſtilled from quickſilver; and that probably many artificial or compound metals are diſcoverable by mixing various metalline and mineral bodies together, ſo as greatly to enrich and improve the art of *metallurgy*; that, in general, ores are no more than a natural looſe mixture of metallic matter with earthy and ſulphureous ones; whence artificial ores may be readily made by calcining a metal with ſulphur, and mixing it with earth, ſo as with heat to form ſolid lumps of ore, reſembling thoſe dug out of the mines; and that numerous experiments remain to be made, and facts of nature or obſervations to be regiſtered, or the relations of bodies to be found, before this uſeful ſubject of *metallurgy* can be brought to perfection.

METAMORPHISTS, a ſect of heretics in the ſixteenth century, whoſe diſtinguiſhing tenet was, that the body of Jeſus Chriſt was, upon his aſcenſion into heaven, changed and metamorphoſed into God.

METAMORPHOSIS, Μεταμορφωσις, formed of *μετα*, *change*, or removal from one place or ſtate to another, and *μορφη*, *form*, or *figure*, *transformation*; the change of a perſon or thing into another form.

The ancients held two kinds of *metamorphoſes*; the one real, the other apparent. The *metamorphoſis* of Jupiter into a bull, and of Minerva into an old woman, were only apparent. That of Lycaon into a wolf, and of Arachne into a ſpider, and the like, they ſay, were of the real kind.

Moſt of the ancient *metamorphoſes* include ſome allegorical meaning, relating either to phyſics or morality. Ovid's *Metamorphoſes* is a collection of hiſtories of ſuch tranſformations, poetically related. Some authors are of opinion, that a great part of the ancient philoſophy is couched under them; and Dr. Hook has made an attempt to unriddle and lay open the hidden meanings of ſeveral of them.

METAPEDIUM, in *Natural Hiſtory*, a name given by ſome authors to a kind of ſtone, called by others *metatarſum*, and ſuppoſed to imitate a human foot. It is only a *luſus naturæ* in the formation of a common pebble.

METAPHOR, METAPHORA, *μεταφορα*, *tranſlation*, or *diſplacing*, of *μετα*, *trans*, and *φερω*, *I bear*, or *carry*, in *Rhetoric*, a figure of ſpeech, or a ſpecies of TROPE, whereby a word is transferred from its proper ſignification to another, different from it, by reaſon of ſome ſimilitude between them; or whereby the proper denomination of one thing is applied to another; which other thing is more elegantly explained by this tralatitious or foreign name, than by that which naturally belongs to it. As, when we ſay, the light of the underſtanding; to burn with zeal; to float between hope and deſpair, &c.

The *metaphor* is the moſt common of all the figures of ſpeech; and is that uſually meant, when we ſay a thing is ſpoken figuratively.

The *metaphor* is a ſhort ſimile; or, as Cicero calls it, a ſimilitude reduced to a ſingle word; an image being thereby called from its proper ſubject to give the reſemblance of another. An ALLEGORY is no more than a continued *metaphor*.

Quintilian ſays, that a *metaphor* is a ſhort ſimilitude, and differs from it only in this, that the former is compared to the thing we deſign to expreſs, and the latter is put for it. It is a ſimilitude, when I ſay of a man, he has acted like a lion; and a *metaphor*, when I ſay, he is a lion. But though *metaphors* are uſually taken from a ſimilitude between two things; yet ſometimes they are founded in the ſimilitude which two things bear to each other, in ſome particular reſpect, by means of which, what properly belongs to one of them is transferred to the other: the former of which are called ſimple *metaphors*, and the latter analogous. Hence the rudder of a ſhip may be called its reins; for what the reins are to a horſe, that the rudder is to a ſhip, in guiding and directing it. Again, ſome *metaphors* are reciprocal, in which the ſimilitude holds either way. Thus to ſteer and govern are uſed reciprocally, both of a ſhip and a ſtate; the proper expreſſions being to ſteer a ſhip, and govern a ſtate, and the contrary *metaphorical*. From this account, therefore, of the nature of *metaphors*, it may be defined, the application of a word by way of ſimilitude to ſome other thing than what it properly ſignifies.

Quintilian diſtinguiſhes *metaphors* into four kinds: the firſt, when a word is transferred from one animal to another; as when Livy ſays, that Cato uſed to *bark* at Scipio; or, when our Saviour calls Herod, *fox*. The ſecond, when the word is transferred from one inanimate to another; as *bridle* for *laws*. The third, when inanimates are applied to animates; as the *flower* of youth. And the laſt, when animates are applied to inanimates; as the river *diſdained* its bounds. And *metaphors* of this kind, which give life and action to inanimate things, are eſteemed the fineſt and ſtrongeſt.

As the *metaphor* is intended to ſet things before the eyes, it becomes ſo much the more perfect, as it ſhews them the more vividly, by repreſenting them in motion and action. Cicero, ſpeaking of a *metaphor*, calls it, the moſt florid manner of expreſſion, and brighteſt ornament of language, that conſiſts of ſingle words. A *metaphor* ſhould have nothing in it either coarſe or ſhocking, or that may raiſe it above the ſimplicity of nature, ſo as to be forced and harſh: nor ſhould it appear a *metaphor* to any, but thoſe who view it very cloſely. A *metaphor* ſhould never be carried too far; for, in that caſe, it degenerates into puerility. *Metaphors* ſhould always be followed in the ſame kind; they become unnatural, when different images are introduced. In all *metaphorical* dictions, there ſhould be a kind of ſuitableneſs to each other; different ideas are always abſurd; as in this inſtance, the church was beſieged with a deluge of troubles, where the two images, *ſiege* and *deluge*, have no relation.

There is nothing young writers are more faulty in, than the indiſcreet uſe of *metaphors*: thoſe who affect the marvellous, are eternally on the *metaphorical* ſtrain; nor know any bounds or reſtraint. They, who underſtand them beſt, uſe them with the greateſt reſerve. Mr. Addiſon propoſes it as a rule for writers, to imagine their *metaphors* actually painted before them, and to view and examine the juſtneſs of their application and aſſemblage under thoſe circumſtances; throwing every thing out of the writing, but what might be retained in the picture. Card. Perron preſcribes this general rule for *metaphors*, that they muſt always deſcend from the genus to the ſpecies; and never go backwards from the ſpecies to the genus: thus, we ſay figuratively, the *bonds of ſociety*, and not the *human cords* which tie us together; *bond* being a genus, and *cord* a ſpecies.

METAPHRAST, METAPHRASTES, a tranſlator, or perſon who renders an author in another form, or another language, word for word.

A *metaphraſe*, *μεταφρασις*, uſually ſignifies ſomething more than either a paraphraſe, or a tranſlation: according to Baillet, a *metaphraſt* implies a tranſlator, gloſſator, and interpolator, all at once.

METAPHYSICS, METAPHYSICA, *tranſnaturalis*, a branch of ſcience, about whoſe nature and idea there is ſome difference among authors.

The word is formed from the prepoſition *μετα*, *trans*, *beyond* or *above*; and *φυσις*, *nature*, or *φυσικη*, *natural*.

Some define *metaphyſics*, that part of ſcience which conſiders ſpirits and immaterial beings; which others chooſe to diginguiſh by the name of PNEUMATICS.

Others keeping cloſe to the etymology of the word, explain *metaphyſics* by *trans-natural*, or *præter-natural*, or even *poſt-natural philoſophy*: becauſe it is ſubſequent in contemplation to the phyſical, though prior to it in the real order of beings.

Others, with more propriety, conceive *metaphyſics* to be what ſome others call ONTOLOGY, or *ontoſophy*, i. e. the doctrine *de ente*, or of being, *quatenus* being.

In the ſame view, ſome philoſophers call this ſcience by the name *philoſophia*, or *ſcientia generalis*, as being the foundation, or, as it were, the ſtamen or root from whence all the other parts of philoſophy ariſe, and wherein they all meet; its object being *being* in the abſtract, or general, not reſtrained to this or that ſpecies of beings; not to ſpirit any more than body; ſo that the doctrines of *metaphyſics* are applicable to all beings whatever.

Philoſophers, again, are divided as to the notion of a ſcience *de ente* in general. Some hold it real, preciſe, and ſolid enough to be demonſtrated; but others judge it too obſcure, faint, and confuſed, to be admitted into philoſophy.

Being, abſtracted from every ſort of ſpecies of being, is certainly a very vague term, and does not ſeem to give ſcope enough for a ſcience: we do not ſee how it can affect the mind as an object. Add, that the common *metaphyſics* cannot demonſtrate any part of its ſubject, but aſſume the whole: there are no principles or axioms, whereon to demonſtrate *metaphyſics* which contain the principles of all other ſciences.

The firſt, who wrote profeſſedly on the ſubject of *metaphyſics*, is Ariſtotle. Indeed, he is the firſt who uſes the word: Μεταφυσικα, is the title of one of his books; but this ſome of his commentators will have to ſignify no more than *after the books of phyſics*. M. du Hamel, taking the prepoſition μετα in the ſenſe of *poſt*, is even of opinion, that the word was coined by Ariſtotle's followers: and that it was unknown to Ariſtotle himſelf.

Ariſtotle's *metaphyſics* ſeem to have been intended for a kind of natural theology. The *metaphyſics* of Ariſtole have been lately illuſtrated by the ingenious Mr. Harris, in his treatiſe intitled, Philoſophical Arrangements, 8vo. 1775. F. Malebranche and Mr. Locke have written much more clearly and conſiſtently of *metaphyſics* than any of the ancients.

METAPHYSICAL, ſomething belonging to METAPHYSICS.

The word is alſo uſed to denote ſomething ſubtile, abſtract, and refined. In which ſenſe we ſay, Such a reaſoning, ſuch a proof, is too *metaphyſical*, &c.

A *metaphyſical* caſe is an imaginary or chimerical caſe, which can ſcarce ever happen, or not without much difficulty; and which ought not be laid down as a rule for common occaſions.

METAPHYSICAL *certitude*, *diſtinction*, *evidence*, *form*, *perfection*, *univerſality*. See the reſpective ſubſtantives.

METAPHYSICAL *ſect*, in the *Hiſtory of Learning*, is one of the two great ſects into which the philoſophical world was divided about the beginning of the ſeventeenth century. This ſect followed the ſyſtem of Des Cartes, and conſidered truth as attainable by abſtract reaſoning; and from a ſmall number of abſtract truths, deduced a long ſeries of propoſitions, in order to arrive at a preciſe and accurate knowledge of God and nature, of body and ſpirit. The *metaphyſical* philoſophers, ſuppoſing that many things are known by man with the utmoſt certainty, diſcovered an undue propenſity to form their opinions and doctrines into a regular ſyſtem. The other ſect was the MATHEMATICAL. See CARTESIANS.

METAPLASM, METAPLASMUS, compounded of μετα, and ϖλασσω, *fingo*, in *Grammar*, a tranſmutation, or change, made in a word, by adding, retrenching, or altering, a letter or ſyllable thereof.

METAPTOSIS, a word uſed by many phyſical writers to expreſs a change of one diſtemper into another, whether it be by *diadoche* or *diadexis*, as it is called; when the change is for the better, and the morbid matter removes from a more noble to an ignoble part: or by *metaſtaſis*, when the change is for the worſe, and the morbid matter removes from an ignoble, to a more noble part.

METASTASIS, Μεταςασις, in *Medicine*, the removal of a morbid humour from one part to another; frequently obſerved in nervous caſes.

A *metaſtaſis*, or tranſlation, is ſometimes alſo found in the groſſer humours; the refluent blood taking up digeſted matter from one part, and diſpoſing it upon another.

METASTASIS, Μεταςασις, *remotio*, in *Rhetoric*, is uſed for the removing the blame from the perſon accuſed to another perſon, or laying it upon ſomething as a cauſe. Thus Adam's excuſing himſelf by blaming Eve, is an example of the former; and the laying the crime of drunkenneſs upon the wine, is an inſtance of the latter.

METATARSIUS, a fleſhy maſs lying under the ſole of the foot, fixed by one end in the fore-part of the great tuberoſity of the os calcis, and that running forward from thence, terminates in a kind of ſhort tendon, which is fixed in the tuberoſity, and poſterior part of the lower ſide of the fifth bone of the *metatarſus*. It may move this bone, much after the ſame manner as the metacarpius moves the fourth bone of the metacarpus. Winſlow.

METATARSUM, in *Natural Hiſtory*, a name given by authors to a ſort of ſtone ſuppoſed to repreſent a human foot. See METAPEDIUM.

METATARSUS, from μετα *beyond*, and ταρσος, *the tarſus*, in *Anatomy*, that part of the human ſkeleton, containing the middle of the foot. See *Tab. Anat.* (*Oſteol.*) *fig.* 3. *n.* 30. *fig.* 7. *lit. ee.*

The *metatarſus* conſiſts of five bones, reaching from the heel to the toes; whereof that which ſuſtains the great toe, is the thickeſt, and that which ſuſtains the next toe, the longeſt: the reſt grow each ſhorter than the other. They are longer than the bones of the metacarpus; in other things they are like them, and are articulated to the toes, as theſe are to the fingers.

METATHESIS Μεταθεσις, formed of μετα, *trans*, and ϑεσις, *poſition*, *tranſpoſition*, a grammatical figure, whereby letters or ſyllables of a word are tranſpoſed, or ſhifted out of their natural ſituation; as *Evandre* for *Evander*; *I præ* for *præi*.

METATHESIS, a word uſed by medical writers for a change of place in ſuch humours, or other diſeaſed parts, as cannot be abſolutely removed or ſent off. Thus a *metatheſis* of a cataract is a depreſſion thereof, ſo that it no longer ſhuts out the light.

METATOR, among the Romans, a quarter-maſter. Out of every legion a tribune, and ſome centurions, were appointed to go before the army, in order to chooſe a place for a camp, and aſſign and mark out quarters to each legion.

METAXA, a word uſed by ſome medical writers to expreſs ſilk.

METEGAVEL, in our *Old Writers*, a tribute or rent paid in victuals; which was a thing uſed in this kingdom, as well with the king's tenants as others, till the reign of king Henry the Firſt.

The word is Saxon, *metagavel*; i. e. *cibigablum, ſeu vectigal.*

METEL, in *Natural Hiſtory*, the name of a ſort of nux *vomica*, of the ſame ſhape with the common kind, but ſomewhat larger.

METEMPSYCHI, in *Church Hiſtory*, heretics, who, in imitation of the Pythagoreans, maintained the tranſmigration of ſouls. See METEMPSYCHOSIS.

METEMPSYCHOSIS, Μετεμψυχωσις, formed of μετα, *beyond*, and εμψυχω, *I animate*, or *enliven*, in the *Ancient Philoſophy*, the paſſage or tranſmigration of the ſoul of a man, after death, into the body of ſome other animal.

Pythagoras and his followers held, that, after death, men's ſouls paſſed into other bodies, of this or that kind, according to the manner of life they had led. If they had been vicious, they were impriſoned in the bodies of miſerable beaſts, there to do penance for ſeveral ages; at the expiration whereof, they returned afreſh to animate men. But, if they had lived virtuouſly, ſome happier brute, or even a human creature, was to be their lot.

What led Pythagoras into this opinion was, the perſuaſion he had, that the ſoul was not of a periſhable nature: whence he concluded, that it muſt remove into ſome other body, upon its abandoning this. Lucan treats this doctrine as a kind of officious lye, contrived to mitigate the apprehenſion of death, by perſuading men, that they only changed their lodging; and only ceaſed to live, to begin a new life.

Reuchlin denies this doctrine; and maintains, that the *metempſychoſis* of Pythagoras implied nothing more than a ſimilitude of manners, deſires, and ſtudies, formerly exiſting in ſome perſon deceaſed, and now revived in another alive. Thus, when it was ſaid, that Euphorbus was revived in Pythagoras, no more was meant than that the martial virtue, which had ſhone in Euphorbus at the time of the Trojan war, was now, in ſome meaſure, revived in Pythagoras, by reaſon of the great reſpect he bore the athletæ. For thoſe people wondering how a philoſopher ſhould be ſo much taken with men of the ſword, he palliated the matter, by ſaying, that the ſoul of Euphorbus, i. e. his genius, diſpoſition, and inclinations, were revived in him. And this gave occaſion to the report, that Euphorbus's ſoul, who periſhed in the Trojan war, had tranſmigrated into Pythagoras.

Ficinus aſſerts, that what Plato ſpeaks of the migration of a human ſoul into a brute, is intended allegorically, and is to be underſtood only of the manners, affections, and habits, degenerated into a beaſtly nature by vice. Serranus, though he allows ſome force to this interpretation, yet inclines rather to underſtand the *metempſychoſis* of a reſurrection.

Pythagoras is ſaid to have borrowed the notion of a *metempſychoſis* from the Egyptians; others ſay, from the ancient Brachmans. It is ſtill retained among the BANIANS, and other idolaters, of India and China; and makes the principal foundation of their religion. So extremely are they bigotted to it, that they not only forbear eating any thing that has life, but many of them even refuſe to defend themſelves from wild beaſts. They burn no wood leſt ſome little animalcule ſhould be in it; and are ſo very charitable, that they will redeem from the hands of ſtrangers, any animals that they find ready to be killed. See PYTHAGOREANS.

METEMPTOSIS, from μετα, *poſt*, and πιπτω, *cado*, *I fall*, a term in *Chronology*, expreſſing the ſolar equation, neceſſary to prevent the new moon from happening a day too late.

By which it ſtands contradiſtinguiſhed from *proemptoſis*, which ſignifies the lunar equation, neceſſary to prevent the new moon from happening a day too ſoon.

The new moons running a little backwards, that i , coming a day too ſoon at the end of three hundred and twelve years and a half; by the *proemptoſis*, a day is added every three hundred years, and another every two thouſand four hundred years; on the other hand, by the *metemptoſis*, a biſſextile is ſuppreſſed each one hundred thirty-four years; that is, three times in four hundred years. Theſe alterations are never made but at the end of each century; that period being very remarkable, and rendering the practice of the calendar eaſy.

There are three rules for making this addition, or ſuppreſſion, of the biſſextile-day, and, by conſequence, for changing the index of the epacts. 1. When there is a *metemptoſis* without a *proemptoſis*, the next following, or lower index muſt be taken. 2. When there is a *proemptoſis* without a *metemptoſis*, the next preceding or ſuperior index is to be taken. 3. When there are both a *metemptoſis*, and a *proemptoſis*, or when there is neither the one nor the other, the ſame index is preſerved. Thus, in 1600, we had D; in 1700, by reaſon of the *metemptoſis*, C was taken; in 1800, there will be both a *proemptoſis* and a *metemptoſis*; ſo the ſame index will be retained. In 1900, there will be a *metemptoſis* again, when B will be taken, which will be preſerved in 2000, becauſe there will then be neither the one nor the other. This is as far as we need compute for it: but Clavius has calculated a cycle of 301800 years; at the end of which period, the ſame indices return in the ſame order. See Epact.

METEOR, in *Phyſiology*, a changeable, moveable, imperfect mixt body, or reſemblance of a body, appearing in the atmoſphere, formed out of a matter that floats there, and exhibiting various appearances.

The Greeks call them, *μετεωρα*, q. d. *ſublimia*, or *high-raiſed*, from μετα, and εωρα, *pro* αιωρα, from αειρω, *tollo*; the Latins, *impreſſiones*, as making ſigns or impreſſions in the air.

Meteors are of three kinds:

Meteors, *igneous* or *fiery*; ſuch are lightning, thunder, the Aurora borealis, ignis fatuus, draco volans, falling ſtars, and other fiery phenomena, appearing in the air.

Meteors, *aerial* or *airy*, conſiſt of flatulent and ſpirituous exhalations; ſuch are winds, whirlwinds, and hurricanes.

Meteors, *aqueous* or *watery*, are compoſed of vapours, or watery particles variouſly ſeparated, and condenſed by heat and cold; ſuch are clouds, rainbows, hail, ſnow, rain, dew, and the like. See each in its proper place.

The formation of *meteors* is explained pretty largely by Deſcartes, in a treatiſe expreſs. Ariſtotle and Gaſſendus have alſo handled the ſame ſubject. Dr. Woodward's opinion is, that the matter of many *meteors* is, in great meaſure, of a mineral nature; that the mineral particles, contained in the ſtrata of the earth, are raiſed by the ſubterraneous heat, together with the vapours aſcending from the abyſs, and pervading thoſe ſtrata; eſpecially at ſuch times as the ſun's heat is ſufficient to penetrate the exterior parts of the earth, and to make room for their eſcape into the atmoſphere. Theſe ſulphureous, nitrous, and other active and volatile mineral particles, form various *meteors*, according to the various circumſtances attending their combination. The nature, cauſes, &c. of each are explained under its diſtinct article.

METEOROLOGICAL *journal*, is a table recording the daily ſtate of the air, exhibited by the barometer, thermometer, hygrometer, anemometer, and other *meteorological* inſtruments. We have many journals of this kind kept at the houſe of the Royal Society, and by different obſervers in other places, in the Philoſophical Tranſactions, the Memoirs of the Academy of Sciences, and ſimilar publications.

METEOROLOGY, the doctrine of meteors; explaining their origin, formation, kinds, phenomena, &c.

METEOROMANCY, a ſpecies of divination by meteors, principally by lightning and thunder: this method of divination paſſed from the Tuſcans to the Romans, with whom, as Seneca informs us, it was held in high eſteem.

METEOROS, μετεωρος, from μετα, and αιρω, *to elevate*, in *Medicine*, elevated, ſuſpended, ſublime, erect, tumid. Thus μετεωρα αλγηματα, are expounded by Galen, Com. ad Aph. 7. lib. vi. ſublime pains: thoſe which are above the peritonæum, or affect the ſuperficial and external parts of the body. Theſe pains are oppoſed to ſuch as are deeply ſeated, and called τα μη μετεωρα, not ſublime, but deep, and ſeated within the peritonæum.

METEOROSCOPE, from μετεωρος, *high*, and σκοπος, of σκεπτομαι, *I view, obſerve*, a name which the ancient mathematicians gave to ſuch inſtruments as they uſed for obſerving and determining the diſtances, magnitudes, and places of the heavenly bodies; many of which they regarded as meteors.

The name however, may much more properly be applied to meteorological inſtruments.

METESSIB, an officer of the eaſtern nations, who has the care and overſight of all the public weights and meaſures, and ſees that things are made juſtly according to them.

METHEGLIN, a drink prepared of honey; one of the moſt pleaſant and general drinks the northern parts of Europe afford; and much uſed among the ancient inhabitants.

The word is Welſh, *meddyglin*, where it ſignifies the ſame.

There are divers ways of making it; one of the beſt whereof follows: put as much new honey, naturally running from the comb, into ſpring-water, as that, when the honey is thoroughly diſſolved, an egg will not ſink to the bottom, but be juſt ſuſpended in it; boil this liquor for an hour, or more, till ſuch time as the egg ſwim above the liquor about the breadth of a groat; when very cool, next morning, it may be barrelled up: adding to each fifteen gallons an ounce of ginger, as much of mace and cloves, and half as much cinnamon, all groſly pounded; a ſpoonful of yeaſt may be alſo added at the bung-hole, to promote the fermentation. When it has done working, it may be cloſely ſtopped up; and after it has ſtood a month, it ſhould be drawn off into bottles.

The duty on *metheglin*, ſold by retail or otherwiſe, is 11½*d*. a gallon. See Mead.

METHOD, Methodus, from μεθοδος, in *Logic*, and *Rhetoric*, the art or rule of diſpoſing things in ſuch a manner, as that they may be eaſily comprehended; either in order to diſcover the truth, which we ourſelves are ignorant of; or to ſhew or demonſtrate it to others when known, or to fix it in the memory. See Disposition.

Gaſſendus diſtributes *method*, with regard to its object, into three kinds, or branches; viz. inventionis, *the method of invention*, or diſcovering a truth unknown.

Methodus judicii, the method of judging or determining of a truth, or poſition, propoſed.

And *methodus demonſtrationis*, or method of demonſtration; that is, of exhibiting it to another.

Method is diſtributed by others into two general kinds, viz. *natural* and *arbitrary*. *Natural method* is that which obſerves the order of nature, and proceeds in ſuch a manner, as that the knowledge of things which follow depends in a great meaſure on the things which go before. *Arbitrary method* leaves the order of nature, and accommodates itſelf to many purpoſes: as to treaſure up things, and retain them in the memory; to harangue and perſuade mankind to any practice in the religious or civil life; or to delight, amuſe, or entertain the mind. This kind of *method* is chiefly purſued in poetry and oratory.

Natural method is again ſubdivided into two kinds; the one of *reſolution*, which is that we generally uſe in our enquiry after truth. The other of *compoſition*, by which the truth, once found, is taught or imparted to others.

In the *method of reſolution*, called alſo by geometers the *analytic method*, we proceed from ſome general known truths to others, which belong to ſome particular or ſingular thing.

In the *method of compoſition*, called alſo the *ſynthetic method*, we propoſe ſome certain general truths, from which we produce particular truths.

If, in the method of reſolution, we lay down any axioms, it is not immediately in the beginning, and all together, but as they are found neceſſary in the diſquiſition: on the contrary, in the *method* of compoſition, they are propoſed all together in the beginning, before there is any abſolute need of them.

The two *methods* differ from each other, as the *methods* of ſearching out a genealogy, either by deſcending from the anceſtors to their poſterity, or by aſcending from the poſterity to the anceſtors: both of them have this in common, that their progreſſion is from a thing known to another unknown. Thoſe things, that are known in each, are ſet in the front, or firſt place, that by them we may be able to arrive at thoſe which are not known.

Dr. Watts, in his excellent Treatiſe on Logic, has compriſed the general requiſites of true *method* in the purſuit or communication of knowledge, under the following heads. It muſt be, 1. Safe or ſecure from error: in order to which great care ſhould be uſed in laying the foundations of a diſcourſe, or the ſcheme of our thoughts, on any ſubject: the primary and fundamental propoſitions ſhould not only be evident and true, but made familiar to the mind, by dwelling on them before we proceed farther; our ground ſhould be made firm in every ſtep; and we ſhould draw up all our propoſitions and arguments with ſo much caution, and expreſs our ideas with ſuch a juſt limitation, as may preclude or anticipate any objections. 2. Plain and eaſy: for which purpoſe, we ſhould begin always with thoſe things that are beſt known and moſt obvious, and proceed by regular and eaſy ſteps to things that are more difficult ; nor ſhould we affect exceſſive haſte in learning or teaching any ſcience, nor hurry at once into the midſt of it ; nor again crowd too many thoughts and reaſonings into one ſentence or paragraph, beyond the apprehenſion or capacity of our readers or hearers ; we ſhould alſo avoid too many ſubdiviſions ; and acquire in early life, a clear and eaſy way of expreſſing our conceptions. 3. Diſtinct : in order to which no needleſs heterogeneous matter ſhould be introduced ; every complicated theme or idea ſhould be divided into its diſtinct ſingle parts, as far as the nature of the ſubject, and our preſent deſign require ; we ſhould call every idea, propoſition, and argument, to its proper claſs, and keep each part of the ſubject in its own place ; and in the partition of our diſcourſe into diſtinct heads, take heed that particulars do not interfere with the general, nor with each other. 4. Full, or without defect : and this is neceſſary in explaining a ſubject ; in enumerating its parts or properties ; in aſſerting or proving any truth ; in illuſtrating or arguing a point of difficulty ; in drawing up a narrative ; and in ſolving any difficulty. 5. Short, or without ſuperfluity : for this purpoſe, all needleſs repetitions, tedious prolixity, long parentheſes, uſeleſs explications, proofs, and refutations, and all ſcholaſtic forms, ſhould be carefully avoided. 6. Proper to the ſubject, the deſign, and the age and place in which we dwell. 7. Connected : in order to this, we ſhould keep our main deſign always in view, and preſerve an apparent tendency in all the parts of our diſcourſe towards it ; the mutual relation and dependence of the ſeveral branches of our diſcourſe ſhould be ſo juſt and evident, that every part may lead onward to the next ; and we ſhould acquaint ourſelves with all the proper and decent forms of tranſition from one part of the diſcourſe to another, and practiſe them as occaſion offers.

The *ſynthetic method* is only practicable in things, whoſe principles we perfectly know ; as in geometry, which is wholly employed in the conſideration of abſtract modes, of which our mind has clear and adequate ideas. When the inquiry is into ſubſtances, as in phyſics, we cannot make uſe of the *method of compoſition*, becauſe their kinds and intimate eſſences are unknown to us.

This *method* has not been by any ſo juſtly and accurately obſerved as by the mathematicians, whoſe principles are perfectly known : its laws, therefore, will be beſt drawn from their practice : for which, ſee COMPOSITION.

The ſupreme law of the philoſophical *method* is, to premiſe that which is neceſſary towards the underſtanding or eſtabliſhing what follows.

The mathematical and philoſophical *methods* are the ſame, as may be ſeen by the practice of the geometers of antiquity, who conſtantly obſerve the law here mentioned.

Several authors, as Ramus, Meſſrs. de Port-Royal, &c. have accuſed Euclid of want of *method*. Had theſe gentlemen attended to the ſupreme law of all true *method*, they would have been more cautious in their cenſures.

METHOD, *methodus*, is more particularly uſed, in *Mathematics*, for divers particular proceſſes for ſolving problems. In this ſenſe we ſay

METHOD *of exhauſtions*. See EXHAUSTIONS.

METHOD *of fluxions*. See FLUXIONS.

METHOD *de maximis & minimis*, &c. See MAXIMUM.

METHOD *of tangents*. See TANGENTS.

METHOD *differential*, &c. See DIFFERENTIAL.

METHOD *exponential*, &c. See EXPONENTIAL.

METHOD *poriſtic*. See PORISTIC.

METHODISTS, in *Botany*, perſons who have attempted that ſtudy upon certain principles, and have beſtowed their labours upon the diſpoſition and arrangment of plants, and allotted them proper and diſtinctive names. See BOTANY.

METHODISTS, in *Eccleſiaſtical Hiſtory*, is a denomination applied to different ſects, both papiſts and proteſtants. The popiſh *Methodiſts* were thoſe polemical doctors, of whom the moſt eminent aroſe in France towards the middle of the ſeventeenth century, in oppoſition to the Huguenots or proteſtants. The *Methodiſts*, from their different manner of treating the controverſy with their opponents, may be divided into two claſſes. The one may comprehend thoſe doctors, whoſe method of diſputing with the proteſtants was diſingenuous and unreaſonable, and who followed the examples of thoſe military chiefs, who ſhut up their troops in intrenchments and ſtrong holds, in order to cover them from the attacks of the enemy. Of this number were the Jeſuit Veron, who required the proteſtants to prove the tenets of their church by plain paſſages of ſcripture, without being allowed the liberty of illuſtrating thoſe paſſages, reaſoning upon them, or drawing any concluſions from them ; Nihuſius, an apoſtate from the proteſtant religion ; the two Walenburgs, and others who confined themſelves to the buſineſs of anſwering objections and repelling attacks ; and cardinal Richelieu, who confined the whole controverſy to the ſingle article of the divine inſtitution and authority of the church. The *Methodiſts* of the ſecond claſs were of opinion, that the moſt expedient manner of reducing the proteſtants to ſilence, was not to attack them by piecemeal, but to overwhelm them at once, by the weight of ſome general principle or preſumption, ſome univerſal argument, which comprehended, or might be applied to all the points conteſted between the two churches : thus imitating the conduct of thoſe military leaders, who, inſtead of ſpending their time and ſtrength in ſieges and ſkirmiſhes, endeavoured to put an end to the war by a general and deciſive action. Theſe polemics reſted the defence of popery upon preſcription ; the wicked lives of proteſtant princes who had left the church of Rome ; the crime of religious ſchiſm ; the variety of opinions among proteſtants, with regard to doctrine and diſcipline ; and the uniformity of the tenets and worſhip of the church of Rome. To this claſs belong Nicolle, the Janſeniſt doctor, the famous Boſſuet, &c. Moſh. Eccl. Hiſt. vol. iv. p. 307, &c. 8vo.

The proteſtant *Methodiſts* form a very conſiderable claſs principally of the lower people in this country. They ſprung up about fifty years ago, at Oxford, and were ſoon divided into two parties, the one under the direction of Mr. George Whitefield, and the other under that of the two brothers, John and Charles Weſley. Theſe leaders, and, if we except Mr. William Law, founders of *Methodiſm*, were educated at Oxford, and received epiſcopal ordination ; and always profeſſed themſelves advocates for the articles and liturgy of the eſtabliſhed church : though they more commonly practiſed the diſſenting mode of worſhip. But conceiving a deſign of forming ſeparate communities, ſuperior in ſanctity and perfection to all other Chriſtian churches, and impelled to a very conſiderable degree by a zeal of an enthuſiaſtic and extravagant kind, they became itinerant preachers, and, being excluded from moſt of our churches, exerciſed their miniſtry in private houſes, fields, &c. not only in Great Britain and Ireland, but alſo in America : thus collecting a very conſiderable number of hearers and proſelytes, both amongſt the members of the eſtabliſhed church and the diſſenters. The theological ſyſtem of Mr. Whitefield and his followers is Calviniſtic : that of Mr. Weſley and his diſciples Arminian ; and the latter maintains the poſſibility of attaining ſinleſs perfection in the preſent ſtate. The ſubordinate teachers of both theſe claſſes of *Methodiſts*, are generally men of no liberal education, and they pretend to derive their miniſterial abilities from ſpecial communications of the ſpirit. The *Methodiſts* of both parties, like other enthuſiaſts, make true religion to conſiſt principally in certain affections and inward feelings, which it is impoſſible to explain, but which, when analyſed, ſeem to be mechanical in their ſpring and operation, and they generally maintain, that Chriſtians will be moſt likely to ſucceed in the purſuit of truth, not by the dictates of reaſon, or by the aids of learning, but by laying their minds open to the direction and influence of divine illumination : and their conduct has been directed by impulſes.

METHODISTS, METHODICI, in the *Hiſtory of Medicine*, a ſect of ancient phyſicians, who reduced the whole art of healing to a few common principles or appearances.

The *Methodiſts* were the followers of Theſſalus ; whence they were alſo called *Theſſalici*. They were ſtrenuouſly oppoſed by Galen in ſeveral of his writings ; who ſcrupled not to aſſert, that the *methodical hereſy* ruined every thing that was good in the art.

Quincy miſtakenly uſes *Methodiſts*, *Methodici*, for thoſe phyſicians, who adhere to the doctrine of Galen, and the ſchools, and who cure with bleedings, purges, &c. duly applied according to the ſymptoms, circumſtances, &c. in oppoſition to empirics and chemiſts, who uſe violent medicines, and pretended ſecrets or noſtrums.

METHONICA, in *Botany*. See *Superb* LILY.

METOCHE, Μετοχη, in the *Ancient Architecture*, a term uſed by Vitruvius, to ſignify the ſpace or interval between the dentils. See *Tab. Archit. fig.* 28. See DENTICLES.

Baldus obſerves, that, in an ancient MS. copy of that author, the word *metatome* is found for *metoche*. Hence Daviler takes occaſion to ſuſpect, that the common text of Vitruvius is corrupted ; and concludes, that it ſhould not be *metoche*, but *metatome*, q. d. ſection.

METONIC *cycle*, in *Chronology*. See CYCLE, and *Golden* NUMBER.

METONYMY, Μετωνυμια, from μετα, *trans*, and ονομα, *nomen*, *name* ; a rhetorical trope, conſiſting in a tranſmutation or change of names ; or a putting of the effect for the cauſe, or the ſubject for the adjunct ; and *vice verſa*. The *metonymy* is the moſt conſiderable of all the tropes next to a METAPHOR, whether we conſider its force and elegancy, or the frequent uſe of it both in ſpeaking and writing. It is ſometimes alſo called *tranſnominatio*, and differs not much from the HYPALLAGE.

There are four kinds of *metonymics* in principal uſe: the firſt, when we put the inventor for the thing invented; as Bacchus for wine, Ceres for bread. The ſecond, when the effect is put for the cauſe, whether the agent, or only the means and inſtrument: thus Virgil, Æn. vi. v. 844. calls the two Scipios, the deſtruction of Libya, becauſe they were the agents who effected it; and Horace, Carm. i. 1, 2. compliments Mæcenas with the titles of being his guard and honour, that is, his guardian and the author of his honour: and the author is put for his works. The third, when the ſubject is put for the adjunct. By ſubject here in a large ſenſe of the word, may be underſtood that, wherein ſome other thing is contained, or about which it is converſant; as likewiſe the poſſeſſor with reſpect to the thing he poſſeſſes, and the thing ſignified when put for the ſign of it: thus, in the firſt of theſe ways, the ſeat of any faculty or affection is put for the faculty or affection itſelf; as in the phraſes, a man of a clear head or of a warm heart: the place, where any actions are performed, is put for the actions done in it; the country or place of reſidence for the inhabitants; the time for the perſons living in it: in the ſecond way, the object is uſed for the perſon, or thing employed about it: as when Cicero, pro Mil. cap. 4. ſays, in time of battle, the laws, i. e. the judges, are ſilent. By the third way, we ſay to deſtroy or ruin a man, meaning not his perſon but his eſtate. In the laſt way, ſtatues and pictures are called by the names of the perſons which they repreſent.

The fourth kind of *metonymy* is that in which the adjunct is put for the ſubject, which is done in the ſame variety of ways as the former.

Voſſius adds two other ſpecies of *metonymy*, viz. of the antecedent and the conſequent, which bear ſome analogy to the cauſe and effect, as the one does at leaſt give occaſion to the other. By the former, to hear, when ſpoken of a ſuperior, ſometimes ſignifies to grant or comply with: by the latter, it is not unuſual to ſay, I ſubſcribe, or ſet my hand to ſuch a thing, meaning that we aſſent or agree to it, &c.

METOPE, or METOPA, in *Architecture*, the ſquare ſpace or interval between the triglyphs, in the Doric frieze. See *Tab. Archit. fig.* 25. Nº 9.

The word, in the original Greek, ſignifies the diſtance between one aperture, or hole, and another, or between one triglyph and another; the triglyphs being ſuppoſed to be ſolives or joiſts that fill the apertures. It is derived from μετα, *inter*, *between*, and οπη, *foramen*.

The ancients uſed to adorn theſe parts with carved works, or paintings, repreſenting the heads of oxen, veſſels, baſons, and other utenſils of the heathen ſacrifices.

As there is found ſome difficulty in diſpoſing the triglyps and *metopes* in that juſt ſymmetry which the Doric order requires; ſome architects make it a rule, never to uſe this order but in temples.

METOPE, *ſemi*, is a ſpace ſomewhat leſs than half a *metope*, in the corner of a Doric frieze.

Le Clerc obſerves, that the beauty of *metopes* conſiſt in their regularity, on appearing to be perfect ſquares; and yet when they are equally ſquare, they appear to be leſs in height than in breadth, on account of the projecture of the little bandelet; for which reaſon they ſhould be made a minute or two more in height than in breadth, in order to make their appearance uniform.

He alſo obſerves, that when the triglyphs and *metopes* follow each other regularly, the columns muſt only ſtand one by one; excepting thoſe of the inner angles, which ought always to be accompanied by two others, one on each ſide; and here it is worth remarking, that theſe two columns which accompany that of the angle, are not leſs neceſſary on account of the ſolidity of the building, than of the regularity of the intercolumniations.

METOPIUM, in *Botany*, a name given by Pliny to the plant which produces the gum ammoniacum. He ſays that the ancient Greeks called it alſo by this name, but in that he errs. See AMMONIAC.

METOPOSCOPY, Μετωποσκοπια, from μετοπον, *frons*, *forehead*, and σκοπια, *inſpection*, of σκεπτομαι, *I view*, the art of diſcovering the temperament, inclinations, and manners of perſons, by inſpecting their features, and the lines in their faces, and eſpecially of their foreheads.

Metopoſcopy, is no more than a branch of phyſiognomy; the latter taking its conjectures from all parts of the body; but both the body and the branch are extremely precarious, not to ſay vain.

Ciro Spontoni, who has written on the ſubject of *metopoſcopy*, obſerves, that there are ſeven principal lines to be conſidered in the forehead; each of which has its peculiar planet. The firſt is the line of Saturn, the ſecond of Jupiter, &c.

METRE, or METER, Μετρον, in *Poetry*, denotes a ſyſtem of feet of a juſt length. Ariſtides defines *metre*, a ſyſtem of feet compoſed of diſſimilar ſyllables, of a juſt extent. In which ſenſe *metre* amounts to much the ſame with genus carminis, or the ſort of verſe, and differs from rhythm.

METRENCHYTES, a name given by chirurgical writers to a ſort of ſyringe, contrived on purpoſe for injecting medicinal ſubſtances into the womb.

METRETES, the name of a meaſure uſed among the ancients, containing ſomewhat more than nine gallons.

METRICAL *verſes* are thoſe conſiſting of a determinate number of long and ſhort ſyllables; as thoſe of the Greek and Latin poets.

Capellus obſerves, that the genius of the Hebrew language is incompatible with *metrical* poetry.

METRICE, or METRICA, among the *Ancients*, was that part of poetry employed about the quantities of ſyllables, feet, ſorts of metre, or verſe, &c.

METROCOMIA, from μητηρ, *mother*, and κωμη, *town*, or *village*, a term in the *Ancient Church Hiſtory*, ſignifying a borough, or village, that had other villages under its juriſdiction.

What a metropolis was among cities, a *metrocomia* was among country towns. The ancient *metrocomiæ* had each its chorepiſcopus or rural dean, and here was his ſee or reſidence. See METROPOLIS and CHOREPISCOPUS.

METRONOMII, Μετρονομοι, among the Athenians, officers that inſpected all ſorts of meaſures except thoſe of corn; there were five of them in the city, and double that number in the Pyræus, in which the greateſt mart in Attica was kept.

METROPOLIS, Μετροπολις, from μητηρ *mother*, and πολις, city; the *mother-city*, &c. the capital of a country, or province: or the principal city, and, as it were, mother of all the reſt.

METROPOLIS is alſo applied to archiepiſcopal churches, and ſometimes to the principal or mother-church of a city. The Roman empire having been divided into thirteen dioceſes, and one hundred and twenty provinces, each dioceſe, and each province had its metropolis, or capital city, where the proconſul, or the vicar of the empire, had its reſidence.

To this civil diviſion the eccleſiaſtical was afterwards adapted, and the biſhop of the capital city had the direction of affairs, and the pre-eminence over all the biſhops of the province. His reſidence in the *metropolis* gave him the title of *metropolitan*.

This erection of *metropolitans* is referred to the end of the third century, and was confirmed by the council of Nice. Indeed archbiſhop Uſher, and De Marca, maintain it to be an eſtabliſhment of the apoſtles; but in vain: for it is next to certain, that the eccleſiaſtical government was regulated on the plan of the civil; and that it was hence the name and authority of *metropolitans* were given to the biſhops of the capital cities of the empire, or the provinces that compoſed it. This is ſo true, that, in the conteſt between the biſhop of Arles and the biſhop of Vienne, each of whom laid claim to the *metropolitanſhip* of the province of Vienne, the council of Turin appointed, that whichever of them could prove his city to be the civil metropolis, ſhould enjoy the title and rights of eccleſiaſtical *metropolitan*.

Nothing is more evident than the perfect equality that reigned among the primitive churches; nor does there even appear, in the firſt century, the ſmalleſt trace of that aſſociation of provincial churches, from which, ſays Moſheims, councils and *metropolitans* derive their origin. The order and decency of thoſe aſſemblies which were called councils, and introduced towards the cloſe of the ſecond century, required, ſays this author, that ſome one of the provincial biſhops met in council, ſhould be inveſted with a ſuperior degree of power and authority; and hence, he adds, the rights of *metropolitans* were derived. See PATRIARCHS.

Though the eccleſiaſtical government, however, was modelled on the political, yet, in Gaul, and ſome other countries, the diſtinctions of *metropolitan* and primate were not obſerved till very late. As the præfectus Galliæ reſided by turns at Trevoux, Vienne, Arles, and Lyons, he communicated the rank and dignity of *metropolitan* and primitive to each of them in their turn; and yet none of the Gallican biſhops aſſumed to themſelves the rights, nor even the precedence, of *metropolitans*. The epiſcopate levelled them all, and they had no regard but to the privileges of ſeniority. This equality laſted till the fifth century, when the conteſt between the biſhops of Vienne and Arles was ſet on foot.

M. Du Pin obſerves, that in the provinces of Africa, excepting thoſe whereof Carthage was the *metropolis*, the place where the moſt aged biſhop reſided became the *metropolis:* the reaſon of which, without doubt, was this, that neither the proconſul, nor præfectus, ever fixed their reſidence any where.

The ſame author obſerves, alſo, that in Aſia, there were *metropoliſes* merely nominal; that is, which had no ſuffragan, nor any rights of *metropolitans*. The biſhops of Nice, Chalcedon, and Berytus, had the precedence of the other biſhops, and the title of *metropolitans*, but this without any other prerogative beſides the honour of the appellation; they themſelves being ſubject to their *metropolitans*.

A *metropolitan* has the privilege of ordaining his ſuffragans; and appeals from ſentences paſſed by the ſuffragans are preferred to the *metropolitan*. See ARCHBISHOP.

METROPTOSIS, a word uſed by ſome medical authors to expreſs a falling down of the womb, or prolapſus uteri. There is a plaſter calculated to be of ſervice againſt this caſe, and called, hence, *emplaſtrum metropticum*.

METTESHEP, or METTENSCHEP, in our old writers, an acknowledgment paid in a certain meaſure of corn; or a fine or penalty impoſed on tenants, for defaults in not doing their cuſtomary ſervice in cutting the lord's corn.

METUPORANGA, in *Ornithology*, the name of a Braſilian bird, called by ſome *tepetototl*, and by Aldrovand by the too general name *gallus Indicus*.

It much approaches to the gallinaceous fowls, called *mitu* and *pauxi*, of the ſame country, but differs from them in having no tail, if the deſcriptions of authors are accurate, and from the *mitu* in having a protuberance of the ſize of a cherry over the top of its beak. Margrave.

METYS, a word uſed by many of the ancient writers to expreſs a ſubſtance collected by bees, in order to the ſtopping up cracks and crevices in their hives.

The old authors mention three kinds of ſubſtances uſed by the bees on this occaſion, the *metys*, *piſſoceros*, and *propolis*. The moderns uſe only the latter term to expreſs every thing of this kind. The *metys* and *piſſoceros* ſeeming to have been only the ſame PROPOLIS, more or leſs mixed with wax. This ſubſtance is a reſin, of a middle conſiſtence between the hard and the fluid ones. It is uſually of a reddiſh brown on the ſurface, and yellow within, and is collected from ſeveral trees, of which the poplar ſeems to be the principal, and the willow the next.

MEU, in *Botany*. See SPIGNEL.

MEVELEVITES, in *Modern Hiſtory*, a ſort of derviſes, or religious, among the Turks, ſo called from Meveleva, their founder. They affect to be very patient, humble, modeſt, and charitable; but in reality are very debauched and diſhoneſt.

MEVIUM, a name mentioned by Fallopius and others, as given by ſome medical writers to the venereal diſeaſe.

MEUM, in *Botany* See SPIGNEL.

MEUTANG, in *Botany*, the name of a flower much eſteemed by the Chineſe, which, on that account, they call the king of flowers. It is larger than our roſe, and imitates its figure, only its leaves are more expanded. As its ſmell comes ſhort of that of the roſe, ſo in beauty the roſe is outdone by it. It has no prickles, and its colour is a mixture of white with purple, but ſo as to incline moſt to white; yet ſometimes there are found reddiſh and yellow ones. The tree it grows on is not unlike our alder-tree, and is cultivated throughout that large empire with great care, being covered in the ſummer time with a ſhade to defend it from the ſcorching heat of the ſun.

MEWING, a diſorder incident to all kinds of birds; being the caſting of their feathers.

MEZAIR, in the *Manege*. See MESAIR.

MEZANINE, or MEZZANINE, a term uſed by ſome architects to ſignify an Attic, or little ſtory contrived occaſionally over the firſt ſtory, for the conveniency of a wardrobe, or the like.

The word is borrowed from the Italians, who call *mezzanini* thoſe little windows, leſs in height than breadth, which ſerve to illuminate an Attic, or entreſole.

MEZEREON, in *Botany*. See SPURGE *Laurel*.

MEZUZOTH, in the *Jewiſh Cuſtoms*, certain pieces of parchment, which the Jews fix to the door-poſts of their houſes, taking that literally which Moſes commands them, ſaying, "Thou ſhalt never forget the laws of thy "God, but thou ſhalt write them upon the poſts of thy "houſe, and on thy gates." This expreſſion means nothing elſe, but that thou ſhalt always remember them, whether thou comeſt into thy houſe, or goeſt out. But the Hebrew doctors imagined, that the law-giver meant ſomething more than this. They pretended that, to avoid making themſelves ridiculous, by writing the commandments of God without their doors, or rather to avoid expoſing themſelves to the profanation of the wicked, they ought, at leaſt, to write them on a parchment, and to encloſe it in ſomething. Therefore they wrote theſe words upon a ſquare piece of parchment, prepared on purpoſe with a particular ink, and a ſquare kind of character. Deut. vi. 4, 5, 6, 7, 8, 9. "Hear O Iſrael "the Lord our God is one Lord, &c." Then they left a little ſpace, and afterwards went on, Deut. xi. 13. "And it ſhall come to paſs, if thou ſhalt hearken dili"gently to my commandments, &c." as far as, "Thou "ſhalt write them upon the door-poſts of thy houſe, &c." After this they rolled up the parchment, and put it into a caſe of reeds, or other matter; they wrote on the end of the caſe the word *Shadai*, which is one of the names of God; and they put it at the doors of their houſes, chambers, and all places moſt frequented; they fixed it to the knockers of the door, on the right ſide; and as often as they entered in, or went out, they touched it in this place, with the end of their finger, which they afterwards kiſſed out of devotion. The Hebrew word *mezuza* properly ſignifies the door-poſts of a houſe; but it is alſo given to this roll of parchment now mentioned. Leo of Modena may be here conſulted.

MEZZA *pauſa*, in the *Italian Muſic*, *half a pauſe*, intimates that the part wherein it is found muſt lie ſtill the time of a ſemibreve in common time. See PAUSE.

MEZZA *tirata*. See TIRATA.

MEZZO *ſoprano*, in the *Italian Muſic*, is the high tenor, which has the cleff C on the ſecond line.

MEZZO-TINTO, in *Sculpture*, a particular manner of engraving figures on copper.

Mezzo-tinto is ſaid to have been firſt invented by prince Rupert, about the year 1649; and Mr. Evelyn, in his Hiſtory of Chalcography, gives us a head, performed by that prince, in his way; though Mr. Le Blond is ſaid to have introduced it into practice, with the greateſt ſucceſs.

The prince laid his grounds on the plate with a channelled roller; but one Sherwin, about the ſame time, laid his grounds with a half-round file, which was preſſed down with a heavy piece of lead. Both theſe grounding tools have been laid aſide for many years; and a hand-tool, reſembling a ſhoemaker's cutting-board-knife with a fine crenelling on the edge, was introduced by one Edial, a ſmith by trade, who afterwards became a *mezzo-tinto* painter.

It is very different from the common way of engraving. To perform it, they rake, hatch, or punch the ſurface of the plate all over with a knife, or inſtrument made for the purpoſe, firſt one way, then the other, acroſs, &c. till the face of the plate be thus entirely furrowed with lines or furrows, cloſe and as it were contiguous to each other; ſo that, if an impreſſion was thus taken from it, it would be one uniform blot, or ſmut.

This done, the deſign is drawn, or marked, on the ſame face; after which, they proceed with burniſhers, ſcrapers, &c. to expunge or take out the dents, or furrows, in all the parts where the lights of the piece are to be; and that more or leſs, as the lights are to be ſtronger or fainter: leaving thoſe parts black, which are to repreſent the ſhadows, or deepenings of the draught.

As it is much eaſier to ſcrape or burniſh away parts of a dark ground correſponding with the outline of any deſign ſketched upon it, than to form ſhades upon a light ground, by an infinite number of hatches, ſtrokes, and points, which muſt all terminate with exactneſs on the outline, as well as differ in their force and manner, the method of ſcraping, as it is called, in *mezzo-tinto*, conſequently becomes much more eaſy and expeditious, than any other method of ENGRAVING. The inſtruments uſed in this kind of engravings are CRADLES, SCRAPERS, and BURNISHERS.

In this engraving, the plate muſt be prepared and poliſhed in the ſame manner as for other ENGRAVING (ſee alſo COPPER-*plates*); and afterwards divided equally by lines, parallel to each other, and traced out with very ſoft chalk. The diſtance of theſe lines ſhould be about one third of the length of the face of the CRADLE, which is to be uſed, and theſe lines ſhould be marked with capital letters, or ſtrokes of the chalk. The cradle is then to be placed exactly betwixt the two firſt lines, and paſſed forwards in the ſame direction; being kept as ſteady as poſſible, and preſſed upon with a moderate force. The ſame operation muſt be repeated with reſpect to all the other lines; till the inſtrument has thus paſſed over the whole ſurface of the plate. Other lines muſt be drawn then from the extremities of the other two ſides, in the ſame manner; which, interſecting the firſt at right angles, will with them form ſquares; and the ſame operation muſt be repeated, with the cradle, as in the caſe of the firſt. New lines muſt then be drawn diagonally, and the cradle paſſed betwixt them as before; and when the firſt diagonal operation is performed, the lines muſt be croſſed at right angles as the former, and the cradles paſſed betwixt them in the ſame manner. The plate having undergone the action of the cradle, according to the diſpoſition of the firſt order of lines, a ſecond ſet muſt be formed, having the ſame diſtances from each other as the firſt. But they muſt be ſo placed as to divide thoſe already made into ſpaces one third leſs than the whole extent; i. e. every one after the firſt on each ſide will take in one third of that before it, e. g. beginning at A, of which the firſt third muſt be left out; a third of B will conſequently be taken in; and ſo of the reſt. Theſe lines of the ſecond order muſt be marked with ſmall letters, or leſſer ſtrokes, to diſtinguiſh them from the firſt; and the ſame treatment of the plate muſt be purſued, with reſpect to them, as was practiſed for the others. When this ſecond operation is finiſhed, a third order of lines muſt be made; the firſt of which, e. g. in A, muſt omit two thirds of it, and conſequently take in two thirds of B, &c. By theſe means the original ſpaces will be exactly divided into equal thirds; and the cradle muſt be again employed betwixt theſe lines as before. When the whole of this operation is finiſhed, it is called *one turn*; but, in order to produce a very dark and uniform ground, the plate muſt undergo the repetition of all theſe ſeveral operations, for above twenty times; beginning to paſs the cradle again betwixt the firſt lines, and proceeding in the ſame manner through all the reſt. When the plate is prepared with a proper ground, the ſketch muſt be calked on it, by rubbing the paper on the backſide with chalk. It is alſo proper to overtrace it afterwards with black-lead or Indian ink. The ſcraping is then performed, by paring or cutting away the grain of the ground in various degrees; ſo that none of it is left in the original ſtate, except in the touches of the ſtrongeſt ſhade. The general manner of proceeding is the ſame as drawing with white upon black paper. The maſſes of light are firſt begun with; and thoſe parts, which go off into light in their upper part, but are brown below: the reflections are then entered upon; after which the plate is blackened with a printer's blacking-ball made of felt, in order to diſcover the effect: and then the work is proceeded with; obſerving always to begin every part in the places where the ſtrongeſt lights are to be.

The art of ſcraping *mezzo-tintoes* has been applied to the printing with a variety of colours, in order to produce the reſemblance of paintings. The inventor of the method of doing this was J. C. Le Blon, a native of Frankfort, and pupil of Carlo Marata, between the years 1720 and 1730. It was eſtabliſhed by the inventor on this principle, that there are three primitive colours, of which all the reſt may be compoſed, by mixing them in various proportions: that any two of theſe colours being mixed together, preſerve their original power, and only produce a third colour, ſuch as their compound muſt neceſſarily give; but if tranſparent colours be mixed, and three primitive kinds compounded together, they deſtroy each other, and produce black, or a tendency to it, in proportion to the equality or inequality of the mixture; and that, if, therefore, theſe three colours be laid, either ſeparately, or upon each other, by three plates, engraved correſpondently, on theſe principles, to the colouring of the deſign, the whole variety of teints neceſſary may be produced. The requiſites, therefore, to the execution of any deſign in this method of printing, are as follow. 1. To ſettle a plan of the colouring to be imitated; ſhewing where the preſence of each of the three ſimple colours is neceſſary, either in its pure ſtate, or combined with ſome other, to produce the effect required; and to reduce this plan to a painted ſketch of each, in which not only the proper outlines, but the degree of ſtrength ſhould be expreſſed. 2. To engrave three plates according to this plan, which may print each of the colours exactly, in the places where, and proportion in which they are wanted. 3. To find three tranſparent ſubſtances, proper for printing with theſe three primitive colours. The manner of which Mr. Le Blon prepared the plates was as follows: the three plates of copper were firſt well fitted with reſpect to ſize and figure to each other, and grounded in the ſame manner as thoſe deſigned for *mezzo-tinto* prints: and the exact place and boundary of each of the three primitive colours, conformably to the deſign, were ſketched out on three papers, anſwering in dimenſions to the plate. Theſe ſketches were then calked on the plates; and all the parts of each plate, that were not to convey the colour, to which it was appropriated, to the print, were entirely ſcraped away, as in forming the light of *mezzo-tinto* prints. The parts that were to convey the colour were then worked upon; and where the moſt light or diluted teints of the colour were to be, the grain in the ground was proportionably taken off; but where the full colour was required, it was left entire. In this regard was had, not only to the effects of the colour in its ſimple ſtate, but to its combined operation, either in producing orange-colour, green, or purple, by its admixture with one alone; and likewiſe to its forming brown, grey, and ſhade of different degree; by its co-operation with both the others. But though the greateſt part of the engraving was performed in the *mezzo-tinto* manner, yet the graver was employed occaſionally for ſtrengthening the ſhades; and for correcting the outline, where it required great accuracy and ſteadineſs. It was found neceſſary ſometimes to have two ſeparate plates for printing the ſame colour, in order to produce a ſtronger effect: but the ſecond plate, which was uſed to print upon the firſt, was intended only to glaze and ſoften the colours in particular parts that might require it. With reſpect to the black and brown teints, which could not be ſo conveniently produced, in a due degree, by the mixture of the colours, umber and black were likewiſe uſed.

With reſpect to the order in which the plates are to be applied, it may be proper to obſerve, that the colour which is leaſt apparent in the picture ſhould be laid on firſt; that which is betwixt the moſt and leaſt apparent, next; and that which predominates, laſt; except where there may be occaſion for two plates, for the ſame colour, as was before mentioned; or where there is any required for adding browns and ſhades.

Mr. Le Blon applied this art to portraits, and ſhewed, by the ſpecimens he produced, the poſſibility of its being brought, by farther improvements, to afford imitations of painting, which might have ſome value. It is nevertheleſs much better adapted to the ſimpler ſubjects, where there are fewer intermixtures of colours; and where the accuracy of the reflections, and demi-teints are not ſo eſſentially neceſſary to the truth of the deſign, from the greater latitude of form, and diſpſiotion of the colour, as in plants, anatomical figures, and ſome ſubjects of architecture. But perhaps plates engraved, or rather finiſhed, with the tool, particularly with reſpect to the outline, would be better accommodated in ſome of theſe caſes, than thoſe prepared only by ſcraping.

Mr. Cochin remarks, at the end of an account he has given of Mr. Le Blon's manner, that though this ingenious artiſt confined this method principally to the uſe of three colours; yet ſhould this invention be again taken up and cultivated, there would be more probability of ſucceſs in uſing a greater variety: and that ſeveral different kinds might be printed by one plate; provided they were laid on in their reſpectively proper places, by printing balls, which ſhould be uſed for that colour only. His hint might however be very greatly improved, by the further aſſiſtance of pencils, accommodated to the plates, for laying on the colours in the proper parts.—Handmaid to the Arts, vol. ii. p. 182, &c. Encyclopedie, Art. GRAVEUR *en Couleurs*, &c.

For the method of taking off *mezzo-tinto* prints in glaſs, ſee BACK-*painting*.

MIASMA, μιασμα, is uſed to ſignify ſuch particles, or atoms, as are ſuppoſed to ariſe from diſtempered, putrefying, or poiſonous bodies; and to affect people at a diſtance.

MICA, in *Natural Hiſtory*, a name given by authors who have written of foſſils to many of the bractearia, or ſmall-ſpangled TALCS, whether in pure maſſes of themſelves, or immerſed in the matter of other foſſils. It conſiſts of thin, flexible, ſhining plates; which by expoſure to fire become brittle and crumble, and by violent heat are vitrifiable. *Mica* is either colourleſs and tranſparent, or it is coloured, red, brown, green, or black, and ſemi-tranſparent.

The principal kinds of theſe are the white and the yellow, from their colour and ſplendid appearance, called the ſilver and gold glimmer, or *mica aurea* and *mica argentea*.

Theſe have frequently led people of ſanguine imaginations, who have met with them in different places, to ſuppoſe they had found ores of gold and ſilver, but they in reality contain not the leaſt grain of either of thoſe metals, and are mere talc in ſmall flakes, accidentally coloured. The yellow kind is found in many parts of the world, but no where ſo plentifully as in Arabia and Ægypt. In Germany and France there is alſo conſiderable plenty of it, and in our American plantations it is found in great abundance; nor is England without it even in various forms.

We have ſome of it in pure homogeneous maſſes; ſome mixed among ſtony matter, and ſome among ſand. The white is very plentiful in Sileſia and Bohemia, and alſo in France, Italy, and England. It is like the former; found either pure, or mixed among the matter of ſtone, and makes a very glittering and beautiful appearance. The coloured *micas* generally contain ſome metallic matters, chiefly iron, and are much more fuſible than thoſe which are pure and colourleſs: and Mr. Juſti pretends that he has diſcovered a new metallic ſubſtance in yellow *mica*, which was of a blackiſh grey colour, but when mixed with gold heightened the luſtre, without deſtroying the malleability of this metal, though itſelf is brittle.

The *micas* have a ſoft touch reſembling that of unctuous ſubſtances; they are not ſoluble by acids; they are incapable of yielding ſparks, when ſtruck by ſteel, as flints do; or of forming a tenacious paſte, with water, as clay does; or of hardening, when calcined and mixed with water, as gypſum does. *Mica* is, therefore, neither a calcareous, ſiliceous, argillaceous, nor gypſeous earth. The colourleſs tranſparent *mica* called Muſcovite glaſs, is uſed as panes for windows. Dr. Hook has deſcribed the beautiful colours that appear in thin plates of Muſcovy glaſs, in his Micrographia, p. 48.

In Jemptland, a crumpled kind of *mica* is manufactured into kettles and other veſſels, and alſo for hearths. The powder of this ſtone is mixed with ſea-ſalt, and from the mixture a marine acid is obtained by diſtillation.

MICAH, in *Scripture Hiſtory*, one of the minor prophets, who was contemporary with Iſaiah, and whoſe prophecy, foretelling the captivity of the ten tribes, and the advancement and eſtabliſhment of the Chriſtian church, very much reſembles his.

MICARAGUÆ *pomum*, a name given by ſome authors to the Spaniſh pear.

MICHAELMAS, the feaſt of St. Michael the archangel, held on the 29th of September.

MICHAEL's *wing*. See WING.

MICHAII, a word uſed by ſome of the chemical writers to expreſs copper.

MICHALALATLI, in *Ornithology*, a name by which Nieremberg informs us ſome of the Mexicans call the ACHALALACTLI.

MICHELIA, in *Botany*, the name of a genus of plants, of the *poliandria polyginia* claſs, the characters of which are theſe: that the calyx is compoſed of three leaves; that the flowers have fifteen petals; and that the fruit are berries containing four ſeeds.

MICROCOSM, μικροκοςμος; formed from μικρος, *little*, and κοσμος, *world*, a Greek term, literally ſignifying *little world*; chiefly underſtood of *man*, who is ſo called by way of eminence, as being an epitome of all that is wonderful in the great world, or macrocoſm.

MICROCOSMETER, a name given by Dolœus to an imaginary being, which he ſuppoſes to reſide in the brain, and direct all the actions.

MICROCOUSTICS, the ſame with MICROPHONES.

MICROGRAPHIA, MICROGRAPHY, compounded of μικρος, *ſmall*, and γραφη, *deſcription*, a deſcription of the parts and portions of objects that are too ſmall to be viewed without the aſſiſtance of a microſcope.

MICROMETER, an aſtronomical machine, which, by means of a very fine ſcrew, ſerves to meaſure extremely ſmall diſtances in the heavens; as the apparent diameters of the planets, to a great degree of accuracy.

The word comes from the Greek, μικρος, *parvus*, and μετρον, *menſura*: in regard a ſmall length, e. g. an inch, is hereby divided into vaſt numbers of parts, e. g. in ſome 2800, and in others more.

This inſtrument is ſo contrived as to move a fine wire parallel to itſelf, in the plane of the picture of an object, formed in the focus of a teleſcope, and with great exactneſs to meaſure its perpendicular diſtance from a fixed wire in the ſame plane; and thus are meaſured ſmall angles, ſubtended by remote objects at the naked eye. E. g. Let a planet be viewed through a teleſcope; and when the parallel wires are opened to ſuch a diſtance as to appear exactly to touch two oppoſite points in the circumference of the planet, it is evident, that the perpendicular diſtanee between the wires is then equal to the diameter of the picture of the planet, formed in the focus of the object-glaſs. Let this diſtance, whoſe meaſure is given by the mechaniſm of the *micrometer* hereafter, deſcribed, be repreſented by the line *p q*, *Tab.* III. *Optics*, *fig.* 44. then ſince the meaſure of the focal diſtance *q* I may be alſo known, the ratio of *q* L to *q p*, that is, of the radius to the tangent of the angle *q* L *p*, will give the angle itſelf by a table of ſines and tangents; and this angle is equal to the oppoſite angle P L Q, which the real diameter of the planet ſubtends at L, or at the naked eye.

There is ſome controverſy about the invention of the *micrometer*. Meſſ. Auzout and Picard have the credit of it in common fame, as being the firſt who publiſhed it, in the year 1666; but Mr. Townley, in the Philoſophical Tranſactions, reclaims it for one of our own countrymen, Mr. Gaſcoigne. He relates, that, from ſome ſcattered papers and letters of this gentleman, he had learnt, that, before our civil wars, he had invented a *micrometer*, of as much effect as that ſince made by M. Auzout, and had made uſe of it for ſome years, not only in taking the diameters of the planets, and diſtances upon land, but in determining other matters of nice importance in the heavens; as the moon's diſtance, &c.

Mr. Gaſcoigne's inſtrument fell into the hands of Mr. Townley, who ſays, that by the help of it, he could make above forty thouſand diviſions in a foot. This inſtrument being ſhewn to Dr. Hooke, he gave a drawing and deſcription of it, and propoſed ſeveral improvements in it, which may be ſeen in the Philoſophical Tranſactions Abr. vol. i. p. 217. Mr Gaſcoigne divided the image of an object, in the focus of the object-glaſs, by the approach of two pieces of metal, ground to a very fine edge, in the place of which, Dr. Hooke would ſubſtitute two fine hairs ſtretched parallel to one another. Two other methods of Dr. Hooke, different from this, are deſcribed in his Poſthumous Works, p. 497, &c. An account of ſeveral curious obſervations which Mr. Gaſcoigne made by the help of his *micrometer*, particularly in the menſuration of the diameter of the moon and other planets, may be ſeen in the Phil. Tranſ. vol. xlviii p. 190. where Dr. Bevis refers to an original letter of Mr. Gaſcoigne, to Mr. Oughtred, written in 1640-1 for an account given by the author of his own invention, &c.

Monſ. de la Hire, in a diſcourſe on the æra of the inventions of the *micrometer*, pendulum clock, and teleſcope, read before the Royal Academy of Sciences in 1717, makes M. Huygens the inventor of the *micrometer*. That author, he obſerves, in his Obſervations on Saturn's Ring, &c. publiſhed in 1659, gives a method of finding the diameters of the planets by means of a teleſcope; viz. by putting an object, which he calls *virgula*, of a proper bigneſs to take in the diſtance to be meaſured, in the focus of the convex object-glaſs: in this caſe, ſays he, the ſmalleſt object will be ſeen very diſtinctly, in that place of the glaſs. By ſuch means, he adds, he meaſured the diameters of the planets, as he there delivers them.

This *micrometer*, M. De la Hire obſerves, is ſo very little different from that publiſhed by the marquis De Malvaſia, in his Ephemerides, three years after, that they ought to be eſteemed the ſame: and the *micrometer* of the marquis differed yet leſs from that publiſhed four years after his by Auzout and Picard. Hence, M. De la Hire concludes, that it is to M. Huygens the world is indebted for the invention of the *micrometer*; without taking any notice of the claim of our countryman Mr. Gaſcoigne, which, however, is prior by many years to any of them.

M. De la Hire ſays, that there is no method more ſimple or commodious for obſerving the digits of an eclipſe, than a net in the focus of the teleſcope. Theſe, he ſays, were generally made of ſilken threads, and for this particular purpoſe ſix concentric circles had alſo been made uſe of, drawn upon oiled paper; but he adviſes to draw the circles on very thin pieces of glaſs, with the point of a diamond. He alſo gives ſeveral particular directions to aſſiſt perſons in uſing them. In another memoir he ſhews a method of making uſe of the ſame net for all eclipſes, by uſing a teleſcope with two object glaſſes, and placing them at different diſtances from one another. Ac. Par. 1701, and 1717.

MICROMETER, *conſtruction and uſe of the*. Wolfius deſcribes a *micrometer* of a very eaſy and ſimple ſtructure, firſt contrived by Kirchius, thus:

In the focus of a teleſcope fit a braſs or iron ring A B (*Tab. Aſtron. fig.* 11). with female ſcrews diametrically oppoſite to each other; into theſe inſert male ſcrews C E and F B, of ſuch length as that they may be turned in the tube, ſo as to touch each other: and with this inſtrument very ſmall ſpaces in the heavens may be accurately meaſured.

For when any objects, viewed through a tube, appear contiguous to the ſcrews, if theſe be turned till they juſt touch two oppoſite points, whoſe diſtance is to be meaſured, it will be evident how many threads of the ſcrew they are apart. To determine how many ſeconds anſwer to each thread, applying the tube towards the heavens, turn the ſcrews, till they touch two points, whoſe diſtance is already accurately known; and obſerve the number of threads correſponding to that interval; thus, by the rule of three, a table may be made of the ſeconds correſponding to the ſeveral threads; by means whereof, without greater labour, the diſtances of any points may be determined.

The ſtructure of another *micrometer*, with the manner of fitting it to the teleſcope, and applying it, is as follows: A B C g (*Tab. Aſtron. fig.* 12.) is a rectangular braſs frame, the ſide A B being about three inches long, and the ſide B C, as likewiſe the oppoſite ſide A g, about ſix inches; and each of the three ſides about eight tenths of an inch deep: the two oppoſite ſides of this frame are ſcrewed to the circular plate, to be mentioned hereafter.

The ſcrew P, which has exactly forty threads in an inch, being turned round, moves the plate G D E F, along two grooves made near the tops of the oppoſite ſides of the frame; and the ſcrew Q, having the ſame number of threads in an inch as P, moves the plate R N M Y along two grooves, made near the bottom of the ſaid frame, in the ſame direction as the former plate moves, but with only half the velocity of that other: theſe ſcrews are turned both at once, and ſo the plates are moved along the ſame way, by means of a handle turning the endleſs ſcrew S, whoſe threads fall in between the teeth of the pinions on the ſcrews P and Q. And note, that two half revolutions of the endleſs ſcrew S carry the ſcrew P exactly once round.

The ſcrew P turns the hand a, faſtened thereto, over a hundred equal diviſions, made round the limb of a circular plate, to which the above named two oppoſite ſides of the frame are ſcrewed at right angles: the teeth of the pinion on the ſcrew P, whoſe number is 5, take into the teeth of a wheel on the backſide of the circular plate, whoſe number is 25. Again, on the axis of this wheel is a pinion of two, which takes into the teeth of another wheel, moving about the centre of the circular plate, on the outſide thereof, and having fifty teeth; this laſt wheel moves the leſſer hand b once round the above mentioned circular plate in the $\frac{1}{100}$ part of the time the hand a is moving round: for becauſe the number of teeth in the pinion of the ſcrew P are 5, and the number of teeth of the wheel this pinion moves, are 20; therefore the ſcrew P moves four times round in the time that wheel is moving once round. Farther, ſince there is a pinion of two which takes into the teeth of a wheel, whoſe number is 50; therefore this wheel with 50 teeth will move once round in the time that the wheel of 20 teeth moves 25 times round; and, conſequently, the ſcrew P, or hand a, muſt move a hundred times round in the ſame time as the wheel of 50 teeth, or the hand b, has moved once round.

Hence it follows, that if the circular plate W, which is faſtened at right angles to the other circular plate, be divided into two hundred equal parts, the index x, to which the handle is faſtened, will move five of thoſe parts in the ſame time in which the hand a moves one of the hundred diviſions round the limb of the other circular plate. Thus by means of an index x, and plate W, every fifth part of each of the diviſions round the other plate may be known.

Farther, ſince each of the ſcrews P and Q have exactly forty threads in an inch; therefore the upper plate G D E F will move one inch while the hand a moves forty times round; the four thouſandth part of an inch while the hand moves over one of the diviſions round the limb; and the twenty thouſandth part of an inch while the index x moves one part of the two hundred round the limb of the circular plate W: and the under plate R N M Y will move half an inch, the two thouſandth part of an inch, and the ten thouſandth part of an inch, the ſame way, in the ſaid reſpective times.

Hence, if the under plate, having a large round hole therein, be fixed to a teleſcope, ſo that the frame is moveable, together with the whole inſtrument, except the ſaid lower plate; and the ſtraight ſmooth edge H I, of the fixed plate A B I H; as likewiſe the ſtraight ſmooth edge D E, of the moveable plate G D E F, be perceivable through the round hole in the under plate, in the focus of the object-glaſs; then when the handle of the *micrometer* is turned, the edge H I, of the narrow plate A B I H, fixed to the frame, and D E, of the moveable plate, will appear through the teleſcope equally to approach to, or recede from, each other.

By theſe edges we ſhall be able to meaſure the apparent diameters of the ſun, moon, &c. the manner of doing which take as follows:

Suppoſe, in looking at the moon through the teleſcope, you have turned the handle till the two edges D E and H I are opened, ſo as juſt to touch or claſp the moon's edges; and that there were twenty-one revolutions of the hand a, to complete that opening: firſt ſay, as the focal length of the object-glaſs, which ſuppoſe ten feet, is to radius, ſo is one inch to the tangent of an angle ſubtended by one inch in the focus of the object-glaſs; which will be found twenty-eight minutes thirty ſeconds: again, becauſe there are exactly forty threads of the ſcrews in one inch; ſay, if forty revolutions of the hand a give an angle of $28' 30''$, what angle will twenty-one revolutions give? The anſwer will be, fifteen minutes eight ſeconds; and ſuch was the moon's apparent diameter. And ſo may the apparent diameters of any other objects be taken. It muſt be here obſerved, that the diviſions on the top of the plate G D E F are diagonal diviſions of the revolutions of the ſcrews, with diagonal diviſions of inches againſt them; thus, as the ſaid plate ſlides along, theſe diagonals are cut by diviſions made on the edge of the narrow plate K L, fixed to the oppoſite ſides of the frame by means of two ſcrews. Theſe diagonal diviſions ſerve for a regiſter to count the revolutions of the ſcrews, and to ſhew how many there are in an inch, or the parts of an inch.

Dr. Derham tells us, that his *micrometer* is not, as uſually, to be put into a tube, but to meaſure the ſpectres of the ſun on paper (of any radius), or to meaſure any part of them. By this means he can eaſily, and very exactly, with the help of a fine thread, take the declination of a ſolar ſpot at any time of the day; and, by his half-ſeconds watch, meaſure the diſtance of the ſpot from the ſun's eaſtern and weſtern limb.

A *micrometer* of the beſt ſort is made in this manner: in the middle of an oblong plate of braſs, A B, *Tab.* III. *Optics*, *fig.* 45, there is cut an oblong hole, $a\,b\,c\,d\,e\,f$, (to be placed in the focus of a teleſcope), having a fine wire $b\,e$ extended lengthways over the middle of it, at right angles to two ſlender braſs bars or ſights $g\,h$, $i\,k$ lying croſs the hole; of which $g\,h$ is fixt to the plate A B by ſcrews at g and h, but $i\,k$ is moved parallel to $g\,h$ by twiſting a round knob C fixt upon one end of a long iron ſcrew D E, which turns upon a tapering point at its end D, while its other end turns round in a hole at E in the center of an index-plate E F, fixt at right angles to the main plate A B. The long ſcrew D E works through two hollow ſcrews in two cubical blocks of braſs fixt behind the plate $l\,m$, bent ſquare to the plate $n\,o$, that ſlides upon the main plate A B, either backward or forward, and carries a perpendicular arm $o\,p$ extended over the hole $b\,e$; while p the extremity of the arm $o\,p$ ſlides under a braſs ledge $q\,r$, ſcrewed to the main plate A B, along the ſide of the hole. One ſide $s\,t$, of the moveable ſight-plate $i\,k\,s\,t$, lies over the arm $o\,p$, being fixt to it by the flat-headed ſcrews at s and t, the holes in the plate $s\,t$ being oblong or larger than the ſhanks of the ſcrews, to give liberty for placing the edge $i\,k$ coincident with $g\,h$, when carried up to it by turning the ſcrew D E by the knob C; the part $i\,k$, which projects over the arm $o\,p$, being hammered down to lie flat upon the main plate A B. The edge $i\,k$, after this adjuſtment, will always move parallel to the edge $g\,h$; its inclination to the ſcrew D E being every where the ſame, provided the ſcrew be ſtraight, and the interval of the concave ſcrews behind $l\,m$ be ſufficiently great and their motion ſteady. For this purpoſe about a quarter-round of a third concave ſcrew preſſes upon the long ſcrew D E at v, the block of it being fixt to the middle of a ſpringing plate $w\,v\,x$; whoſe extremities lying behind the blocks at l, m, not ſo near as to touch them, are preſſed towards them with ſcrews at w and x; which occaſions the block at v to ſpring upon the ſcrew D E, and to hold it tight to the oppoſite ſide of the concave ſcrews at l, m. To prevent any motion lengthways in the ſcrew D E, its tapering point D turns in a hollow point at the end of an oppoſite ſcrew y, which working through a fixt block at z, holds up the ſhoulder of the long ſcrew D E. againſt the back of the index-plate, where its neck is inſerted.

The two indexes upon the plate E F ſhew the number of revolutions and parts of a revolution of the ſcrew D E, anſwering to the interval of the ſights $g\,h$, $i\,k$. In the outward plate there is a circular ſlit $\alpha\beta\gamma$, which diſcovers part of the diviſions upon the circumference of an inner plate, turned about a center by two wheels and pinions within: ſo that for every revolution of the ſcrew and index E F, which ſhews the parts of it, one diviſion upon the plate $\alpha\beta\gamma$, paſſes by a fixt point at β; which ſhews the number of revolutions anſwering to the intervals of the ſights $g\,h$, $i\,k$.

This *micrometer* has lately received a very great improvement by an ingenious contrivance of the reverend Dr. James Bradley, profeſſor of Aſtronomy, at Oxford, for turning it in its own plane about the interſection δ of the fixt ſight $g\,h$ and of the tranſverſe wire $b\,\delta\,e$, without ſtirring the teleſcope: which is thus executed. Upon the backſide of the main-plate turned upwards, and here repreſented by the parallelogram G H I K, *fig.* 46. there is laid ſuch another plate L M N O, of the ſame breadth and thickneſs but ſomewhat ſhorter; in the middle of which there is an oblong hole, anſwering to the other in the lower plate, but ſomewhat larger; being terminated at its ſides by the ſtraight lines $\epsilon\,\zeta$, $\eta\,\theta$, and at its ends by the concave arches $\theta\,\iota\,\epsilon$, $\zeta\,\kappa\,\eta$, whoſe common center is the point δ abovementioned. The concave arch $\varepsilon\iota\theta$ ſlides round this centre againſt a concentric convex arch of an annular plate $\lambda\mu\nu$; ſomewhat longer than the concave arch, of the ſame thickneſs as the upper parallelogram, and ſtrongly ſcrewed to the under one, round that end of the hole which is neareſt to the center δ: and at the ſame time the other concave arch $\zeta\kappa\eta$ ſlides alſo againſt another concentric convex arch $o\varpi$, of another annular plate juſt as thick as the upper parallelogram, and ſtrongly ſcrewed to the under one. This convex arch $o\varpi$ is ſhorter than the contiguous concave one $\zeta\kappa\eta$, to give room for the circular motion of the plates; which are held together by two annular plates ſimilar to $\lambda\mu\nu$ and $o\varpi$, but ſomewhat broader, to cover the coincident arches when laid over them, and ſcrewed down to the reſpective annular plates underneath. The circular motion upon theſe arches about their center δ, is gradually given to the upper parallelogram by an endleſs ſcrew at ϱ, having an axis $\sigma\tau$, laid croſs the end of the under parallelogram, and turning upon a point at one end, and in a collar at the other, both fixt to the under plate; while the ſpiral thread ϱ, moves the teeth of a braſs arch fixt at v, to the end of the upper parallelogram.

To hold the micrometer in the tube of a teleſcope, along each ſide of the upper parallelogram, there is fixt a long braſs plate about an inch broad; having its oppoſite ſides bent contrary ways, ſo as to form two oppoſite ledges, about one-eighth of an inch broad, at right angles to the intermediate part of the plate as repreſented in the ſigure. One of the ledges of each plate is placed inwards along the ſides of the upper parallelogram, and is firmly fixt to it by ſeveral ſcrews. The figure $\varphi\chi\psi\omega$ repreſents one of the equal and oppoſite holes cut in the ſides of a ſquare tube, through which the *micrometer* is put; the notches $\varphi\chi$ being made to receive the ledges of the ſide-plates, to keep the plate of the *micrometer* perpendicular to the tube at a juſt diſtance from the object glaſs. Which diſtance being once determined by trials, as above explained, muſt be kept invariable in all obſervations, by ſtops or pins, if the tube conſiſts of two or more joints that draw in and out.

The meaſures of the *micrometer*.

	Inches.
The length of the plate A B	8,0
Its breadth M N	3,6
Its thickneſs	0,½
Length of the hole be	3,5
Its breadth $gh=\delta e$	2,2
Breadth of the hole in the other plate at $\zeta\eta$	2,6
Length of the ſcrew D E	5,5
Its thickneſs	0,3
The line Ab	1,6
The interval $lm=wx$	3,0
Length of the ſide cheeks	4,5
Their breadth	0,8
Their ledges	0,2
Diameter of the index-plate	3,1
Its thickneſs (being double with two wheels within)	0,3
The greateſt opening of the ſights gh, $ik=\delta e$	2,2

Threads of the ſcrew in an inch, 40

The inch is divided by the index-plates into 40 times 40, or 1600 equal parts. Inſtead of the braſs ſights gh, ik, two others, with parallel wires a, may be ſcrewed on at pleaſure.

When the ſight-plates are made to coincide, the two indexes of the revolutions an dtheir parts muſt be ſet to the beginning of the numerations upon the index-plates. Then as the ſights are opened, it is evident from the make of a ſcrew, that the numbers of revolutions will be as the intervals of the ſights, and conſequently as the angles ſubtended by them at the centre of the object-glaſs; the intervals being inſenſibly different from the arches that meaſure theſe ſmall angles. Therefore when any one angle correſponding to a given number of revolutions, is determined by experiment, an angle correſponding to any other number of revolutions may be found by the rule of three. And thus may tables be made to ſhew by inſpection the number of minutes and ſeconds in an angle anſwering to any given number of revolutions and parts.

To determine ſome one angle, the larger the better, becauſe the ſame error in the determination will be proportionably ſmaller in a given angle deduced from it; fix the teleſcope upon any known ſtar in the equator, or very near it, and open their ſights to their utmoſt limit and note the number of revolutions of the ſcrew. Then by a pendulum-clock obſerve the interval of time in the ſtar's tranſit over the given interval of the ſights, and having turned it into minutes and ſeconds of an arch, they are the meaſure of the angle required. But if the ſtar be remote from the equator, the number of minutes and ſeconds thus found, muſt be diminiſhed in the ratio of the radius of the ſine of the ſtar's diſtance from the pole.

To this *micrometer* Dr. Bradley applied an ingenious contrivance, whereby it is adapted for taking the difference of right aſcenſion and declination of ſuch objects as are at a greater diſtance than the teleſcope will take in at once, but which paſs through the aperture of it at different times. Let A B C, *fig.* 47. repreſent a flat ring of braſs, fixed on the focus of the teleſcope; and abc a ſmaller concentric ring lodged in a circular groove turned within the larger, and kept in the groove by three ſmall plates of braſs fixed to the outward ring, and extended over the edge of the inner one. Upon the inner ring is fixt a concentric arch of a wheel de, having teeth cut in its convexity, which are driven round by the threads of an endleſs ſcrew, whoſe axis DEF turns in a collar at E and upon a point at F, both fixt to the outward ring. The hairs gh, ik croſs at right angles in f the centre of the rings; and when the teleſcope is ſo fixt that the image of the ſtar falls upon f, let it move along any line fq, and by turning the ſcrew DEF, and by conſequence the hair fk, about the fixt point f till it touches the ſtar at q, it will then coincide with the tract of the ſtar's motion; and then all other ſtars will move parallel to it as was required.

To find the difference of declination of two ſtars, he obſerves the times of their appulſes to the edges of two ſlender braſs bars gio, gkp, fixt to the inner ring, and equally inclined to its diameter gh in ſuch angles that the perpendiculars fi, fk, on each ſide of fg, ſhall be ſeverally equal to half fg; and conſequently that the whole baſe ik, of the equicrural triangle igk, ſhall be equal to its perpendicular height fg; and by conſequence that the difference of any two baſes ifk, lmn ſhall be equal to fm, the difference of their heights; ſo that the difference of the times of the tranſits of two ſtars over theſe baſes, may give the difference of the declinations. Smith's Optics, art. 876, &c.

Mr. Caſſini firſt made uſe of four croſs hairs or threads, interſecting one another at half right angles, for determining the difference of right aſcenſions and declinations of objects near the ſame parallel: but the *micrometer*, according to its latter improvements, will anſwer this purpoſe with greater exactneſs. Dr. Maſkelyne has publiſhed directions for the uſe of it, extracted from Dr. Bradley's papers, in the Philoſ. Tranſ. vol. lxii. art. 6. p. 46, &c.

A conſiderable improvement with regard to the *micrometer*, was communicated to the Royal Society, in 1743, by Mr. Servington Savery, an account of which, extracted from the minutes by Mr. Short, was publiſhed in the Phil. Tranſ. for 1753. vol. xlviii. art. 26. The firſt hint of ſuch a *micrometer* was ſuggeſted by Mr. Roemer, in 1675: and M. Bouguer propoſed a ſimilar conſtruction to that of Mr. Savery, in 1748, for which ſee HELIOMETER. The late Mr. Dollond made a farther improvement in this kind of *micrometer*, an account of which was given to the Royal Society by Mr. Short, and publiſhed in the Phil. Tranſ. vol. xlviii. art. 27. Inſtead of two object glaſſes, he uſed only one, which he neatly cut into two ſemi-circles, and fitted each ſemi-circle in a metal frame, ſo that their diameters ſliding in one another, by means of a ſcrew, may have their centers ſo brought together as to appear like one glaſs, and ſo form one image; or by their centers receding, may form two images of the ſame object: it being a property of ſuch glaſſes, for any ſegment to exhibit a perfect image of an object, although not ſo bright as the whole glaſs would give it. If proper ſcales are fitted to this inſtrument, ſhewing how far the centers recede, relative to the focal length of the glaſs, they will alſo ſhew how far the two parts of the ſame object are aſunder, relative to its diſtance from the object glaſs; and conſequently give the angle under which the diſtance of the parts of that object are ſeen. This divided object-glaſs *micrometer*, which was applied by the late Mr. Dollond to the object end of a reflecting teleſcope, has been with equal advantage adapted by his ſon to the end of an achromatic teleſcope, is ſo eaſy of uſe, and affords ſo large a ſcale, that it is generally looked upon by aſtronomers as the moſt convenient and exact inſtrument for meaſuring ſmall diſtances in the heavens. However, the common *micrometer* is peculiarly adapted for meaſuring differences of right aſcenſion, and declination of celeſtial objects, but leſs convenient and exact for meaſuring their abſolute diſtances; whereas the object-glaſs *micrometer* is peculiarly fitted for meaſuring diſtances, but has been generally ſuppoſed improper for meaſuring differences of right aſcenſion and declination. But Dr. Maſkelyne has found that the latter may be applied with very little trouble, and ſmall additional expence to this other purpoſe as well as the former; and he has furniſhed the directions neceſſary to be followed when it is uſed in this manner. The addition requiſite for this purpoſe is a cell, containing two wires, interſecting each other at right angles, placed in the focus of the eye-glaſs of the teleſcope, and moveable round about, by the turning of a button. For the deſcription of this apparatus, together with the method of applying and uſing it, we ſhall refer to Mr. Maſkelyne's paper on the ſubject, in the Phil. Tranſ. vol. lxi. part ii. art. 49, p. 536, &c.

After all, the uſe of the object-glaſs *micrometer* is attended with difficulties, ariſing from the alterations in the focus of the eye, which are apt to cauſe it to give different meaſures of the ſame angle at different times. In order to obviate theſe difficulties, Mr. Maſkelyne, in 1776, contrived a priſmatic *micrometer*, or a *micrometer* conſiſting of two achromatic priſms, or wedges, applied between the object-glaſs and eye-glaſs of an achromatic teleſcope, by moving of which wedges nearer to or farther from the object-glaſs, the two images of an object produced by them appeared to approach to or recede from each other, ſo that the focal length of the object-glaſs becomes a ſcale for meaſuring the angular diſtanee of the two images. The rationale and uſe of this *micrometer* are explained in the Phil. Tranſ. vol. lxvii. part ii. art. 36. p. 799, &c. A ſimilar invention by the abbé Rochon, and improved by the abbé Boſcovich, was alſo communicated to the Royal Society, and publiſhed in the ſame volume of the Tranſactions, art. 35, p. 789, &c. Mr. Ramſden, an ingenious optician, has lately deſcribed two new *micrometers*, which he has contrived with a view of remedying the defects of the object-glaſs *micrometer*. One of theſe is a catoptric *micrometer*, which beſide the advantage it derives from the principle of reflection, of not being diſturbed by the heterogeneity of light, avoids every defect of other *micrometers*, and can have no aberration, nor any defect ariſing from the imperfection of materials, or of execution; as the extreme ſimplicity of its conſtruction requires no additional mirrors or glaſſes to thoſe required for the teleſcope; and the ſeparation of the image being effected by the inclination of the two ſpecula and not depending on the focus of any lens or mirror, any alteration in the eye of an obſerver cannot affect the angle meaſured. It has peculiar to itſelf the advantages of an adjuſtment, to make the images coincide in a direction perpendicular to that of their motion; and alſo of meaſuring the diameter of a planet on both ſides of the zero, which will appear no inconſiderable advantage to obſervers who know how much eaſier it is to aſcertain the contact of the external edges of two images than their perfect coincidence. A (*Tab.* III. *Optics*, *fig.* 48.) repreſents the ſmall ſpeculum of a reflecting teleſcope of Caſſegrain's conſtruction, to which this *micrometer* is adapted, divided into two equal parts; one of which is fixed on the end of the arm B; the other end of the arm is fixed on a ſteel axis X, which croſſes the end of the teleſcope C. The other half of the mirror A is fixed on the arm D, which arm at the other end terminates in a ſocket *y*, that turns on the axis X; both arms are prevented from bending by the braces *a a*. G repreſents a double ſcrew, having one part *e* cut into double the number of threads in an inch to that of the part *g*; the part *e* having a hundred threads in one inch, and the part *g* fifty only. The ſcrew *e* works in a nut F in the ſide of the teleſcope, while the part *g* turns in a nut H, which is attached to the arm B; the ends of the arms B and D, to which the mirrors are fixed, are ſeparated from each other by the point of the double ſcrew preſſing againſt the ſtud *h*, fixed to the arm D, and turning in the nut H on the arm B. The two arms B and D are preſſed againſt the direction of the double ſcrew *e g* by a ſpiral ſpring within the part *n*, by which means all ſhake or play in the nut H on which the meaſure depends, is entirely prevented.

From the difference of the threads on the ſcrew at *e* and *g* it is evident, that the progreſſive motion of the ſcrew through the nut will be half the diſtance of the ſeparation of the two halves of the mirror, and conſequently the half mirrors will be moved equally in contrary directions from the axis of the teleſcope C.

The wheel V fixed on the end of the double ſcrew has its circumference divided into 100 equal parts, and numbered at every fifth diviſion with 5, 10, &c. to 100, and the index I ſhews the motion of the ſcrew with the wheel round its axis, while the number of revolutions of the ſcrew is ſhewn by the diviſions on the ſame index. The ſteel ſcrew R may be turned by the key S, and ſerves to incline the ſmall mirror at right angles to the direction of its motion.

The other *micrometer* invented and deſcribed by Mr. Ramſden, is ſuited to the principle of refraction. This *micrometer* is applied to the erect eye-tube of a refracting teleſcope, and is placed in the conjugate focus of the firſt eye-glaſs; in which poſition, as the image is conſiderably magnified before it comes to the *micrometer*, any imperfection in its glaſs will be magnified only by the remaining eye-glaſſes, which in any teleſcope ſeldom exceeds five or ſix times: and beſides, the ſize of the *micrometer* glaſs will not be the $\frac{1}{10}$ th part of the area which would be required, if it were placed at the object-glaſs; and yet the ſame extent of ſcale is preſerved, and the images are uniformly bright in every part of the field of the teleſcope. This *micrometer* is repreſented *Tab.* III. *Optics*, *fig.* 49. A is a convex or concave lens divided into two equal parts by a plane acroſs its center; one of theſe ſemi-lenſes is fixed in a frame B, and the other in the frame E, which two frames ſlide on a plate H, and are preſſed againſt it by thin plates *a a*: the frames B and E are moved in contrary directions by turning the button D; L is a ſcale of equal parts on the frame B; it is numbered from each end towards the middle with 10, 20, &c. There are two verniers on the frame E, one at M, and the other at N, for the conveniency of meaſuring the diameter of a planet, &c. on both ſides of the zero. The firſt diviſion on both theſe verniers coincides at the ſame time with the two zeros on the ſcale L, and, if the frame is moved towards the right, the relative motion of the two frames is ſhewn on the ſcale L by the vernier M; but if the frame B be moved towards the left the relative motion is ſhewn by the vernier N.

This *micrometer* has a motion round the axis of viſion, for the conveniency of meaſuring the diameter of a planet, &c. in any direction, by turning an endleſs ſcrew F, and the inclination of the diameter meaſured with the horizon is ſhewn on the circle *g* by a vernier on the plate V. The teleſcope may be adjuſted to diſtinct viſion by means of an adjuſting ſcrew, which moves the whole eye-tube with the *micrometer* nearer or farther from the object-glaſs, as teleſcopes are generally made; or the ſame effect may be produced in a better manner, without moving the *micrometer*, by ſliding the part of the eye-tube *m* on the part *n*, by help of a ſcrew or pinion. The *micrometer* is made to take off occaſionally from the eye-tube, that the teleſcope may be uſed without it. Phil. Tranſ. vol. lxix. part ii. art. 27.

The *micrometer* has not only been applied to teleſcopes, and employed for aſtronomical purpoſes; but there have been various contrivances for adapting it to microſcopical obſervations. Mr. Leewenhoek's method of eſtimating the ſize of ſmall objects was by comparing them with grains of ſand, of which a hundred in a line took up an inch. Theſe grains he laid upon the ſame plate with his objects, and viewed them at the ſame time. Dr. Jurin's method was ſimiliar to this; for he found the diameter of a piece of fine ſilver wire, by wrapping it as cloſe as he could about a pin, and obſerving how many rings made an inch; and he uſed this wire in the ſame manner as Leewenhoeck uſed his ſand. Dr. Hooke uſed to look upon the magnified object with one eye, while, at the ſame time, he viewed other objects, placed at the ſame diſtance, with the other eye. In this manner he was able, by the help of a ruler, divided into inches and ſmall parts, and laid on the pedeſtal of the microſcope to caſt, as it were, the magnified appearance of the object upon the ruler, and thus exactly to meaſure the diameter which it appeared to have through the glaſs; which being compared with the diameter as it appeared to the naked eye, eaſily ſhewed the degree in which it was magnified. A little practice, ſays Mr. Baker, will render this method exceedingly eaſy and pleaſant.

Mr. Martin, in his Optics, recommends ſuch a *micrometer* for a microſcope as had been applied to teleſcopes; for he adviſes to draw a number of parallel lines on a piece of glaſs, with the fine point of a diamond, at the diſtance of $\frac{1}{40}$ of an inch from one another, and to place it in the focus of the eye-glaſs. By this method, Dr. Smith contrived to take the exact draught of objects viewed by a double microſcope; for he adviſes to get a lattice, made with ſmall ſilver wires or ſquares, drawn upon a plain glaſs by the ſtrokes of a diamond, and to put it into the place of the image, formed by the object-glaſs. Then by transferring the parts of the object, ſeen in the ſquares of the glaſs or lattice upon ſimilar correſponding ſquares drawn on paper, the picture may be exactly taken. Mr. Martin alſo introduced into compound microſcopes another *micrometer*, conſiſting of a ſcrew. See both theſe methods deſcribed in his Optics, p. 277.

The moſt minute and accurate diviſion of any ſcale which the editor has ever ſeen, is performed by Mr. Coventry of Southwark. The *micrometers* of his conſtruction are parallel lines drawn on glaſs, ivory or metal, from the 10th, to the 10,000th of an inch. Theſe may be applied to microſcopes, for meaſuring the ſize of minute objects, and the magnifying power of the glaſſes; and to teleſcopes, for meaſuring the ſize and diſtance of objects, and the magnifying power of the inſtrument. For meaſuring the ſize of an object in a ſingle microſcope, lay it on a *micrometer*, whoſe lines are ſeen magnified in the ſame proportion with it, and give at one view the real ſize of the object. For meaſuring the magnifying power of the compound microſcope, the beſt and moſt ready method is the following. On the ſtage in the focus of the object glaſs, lay a *micrometer*, conſiſting of an inch divided into one hundred equal parts; count how many diviſions of the *micrometer* are taken into the field of view; then lay a two-foot rule parallel to the *micrometer*: fix one eye on the edge of the field of light, and the other eye on the end of the rule, which move, till the edge of the field of light and the end of the rule correſpond; then the diſtance from the end of the rule to the middle of the ſtage will be the half of the diameter of the field: e. gr. if the diſtance be ten inches, the whole of the diameter will be twenty, and the number of the diviſions of the *micrometer* contained in the diameter of the field, is the magnifying power of the microſcope. Thus, ſuppoſe the number of diviſions ſeen in the *micrometer* to be $\frac{50}{100}$ths, and that the diameter of the field meaſures with the rule twenty inches; the $\frac{50}{100}$th of 20 inches is 40, which is the diameter of the field; $40 \times 40 = 1600$ the ſuperficies, and $1600 \times 40 = 64000$, the magnified cube of the object: in like manner each object-glaſs or magnifier muſt be proved, and a table kept of their ſeveral magnifying powers. For meaſuring the height and diſtance of objects by a *micrometer* in the teleſcope, ſee TELESCOPE. Mr. Adams has applied a *micrometer*, which inſtantly ſhews the magnifying power of any teleſcope.

MICROPHONES, inſtruments contrived to magnify ſmall ſounds, as *microſcopes* do ſmall objects.

MICROPUS, in *Botany*. See *Baſtard* CUDWEED.

MICROSCOPE, Μικροσκοπειον, formed of μικρος, *ſmall*, and σκεπτομαι, *I conſider*; an optical inſtrument, by means whereof very minute objects are repreſented exceedingly large, and viewed very diſtinctly, according to the laws of refraction or reflection.

Microſcopes are properly diſtinguiſhed into ſimple, or *ſingle*; and compound, or *double*.

MICROSCOPES, *ſingle*, are thoſe which conſiſt of a ſingle lens, or a ſingle ſpherulſt.

MICROSCOPEES, *compound*, conſiſt of ſeveral lenſes duly combined. As optics have been improved, other varieties have been contrived, in the ſorts of *microſcopes*: hence *reflecting microſcopes*, *water microſcopes*, &c.

When, and by whom, *microſcopes* were firſt invented, is not certainly known. Huygens tells us that one Drebell, a Dutchman, had the firſt *microſcope*, in the year 1621, and that he was reputed the inventor of it: though F. Fontana, a Neapolitan, in 1646, claims the invention to himſelf, but dates it from the year 1618. As a teleſcope inverted is a *microſcope*, the diſcovery might eaſily enough have ariſen from thence.

Nothing more is certain concerning *microſcopes*, than that they were firſt uſed in Germany about the year 1621. According to Borellus, they were invented by Zacharias Janſen, in conjunction with his ſon, who preſented the firſt *microſcopes* they had conſtructed to prince Maurice, and Albert, archduke of Auſtria. William Borell, who gives this account in a letter to his brother Peter, ſays, that when he was ambaſſador in England, in 1619, Cornelius Drebell ſhewed him a *microſcope*, which he ſaid, was the ſame that the archduke had given him, and had been made by Janſen himſelf. Borellus de vero Teleſcopii inventore, p. 35. See LENS.

MICROSCOPES, *foundation and theory of ſingle*. If an object A B (*Tab*. IV. *Optics*. *fig*. 50.) be placed in the focus of a ſmall convex lens, or a ſimple *microſcope* D E, and the eye be applied cloſe to the other ſide of the *microſcope*, *the object will be ſeen diſtinct, in an erect ſituation, and magnified in the ratio of the diſtance of the focus to the diſtance wherein objects are to be placed to be ſeen diſtinctly by the naked eye.*

For the object A B being placed in the focus of the convex lens D E, the rays iſſuing from the ſeveral points thereof, after refraction, will be parallel to each other: conſequently, the eye will ſee it *diſtinctly*, by virtue of what is proved under the word TELESCOPE.

Farther, ſince one of the rays A F, proceeding from the point A, after refraction, becomes parallel to the incident ray; and therefore, ſetting aſide the thickneſs of the lens, is found directly againſt it; and the ſame holds true of all the other rays carried to the eye; the rays A F and B F, to which the reſt coming from A and B are parallel, will enter the eye in the ſame manner as if they entered without paſſing through the lens; and will therefore appear erect, as if the lens were away.

Laſtly, it is manifeſt, that the object A B will be ſeen under the ſame angle as if viewed by the naked eye: but ſince it appears very diſtinct, whereas to the naked eye, at the ſame diſtance, it would appear extremely confuſed; it is the ſame thing as if the object ſhould ſeem removed to the diſtance F H, wherein it is viewed with equal diſtinctneſs, and under the ſame angle: the diameter of the object A B, therefore, will be to the apparent diameter I K, as F C to F H; i. e. as the diſtance of the focus of the lens to the diſtance wherein an object is to be placed, in order to view it diſtinctly. Since, therefore, the interpoſition of the glaſs has no other effect than to render the appearance diſtinct, by helping the eye to increaſe the refraction of the rays in each pencil, it is plain that the greater apparent magnitude is entirely owing to a nearer view than could be taken by the naked eye.

Huygens, in Dioptrics, prop. lix. p. 222, takes it for granted that an object, ſeen with the naked eye, is then in its utmoſt diſtinctneſs when ſeen at the diſtance of eight digits, or tenths of a foot; which agrees pretty near with the obſervations of others; who make the neareſt limit of diſtinct viſion to be eight inches. So that if the glaſs be a ſmall round globule, whoſe focal diſtance is $\frac{1}{20}$ of an inch, this globule will magnify as 8 to $\frac{1}{20}$, or as 160 to 1.

MICROSCOPES, *laws of ſingle*. 1. Simple *microſcopes* magnify the diameter of the object A B in the ratio of the diſtances of the focus F C to an interval of eight digits: e. gr. if the ſemidiameter of a lens, equally convex on both ſides, be half a digit, and conſequently its focal diſtance the ſame: $AB : IK :: \frac{1}{2} : 8 :: 1 : 16$; that is, the diameter of the object will be increaſed in a ſedecuple proportion, or as ſixteen to one. 2. Since the diſtance F H is conſtant, viz. eight digits; by how much the diſtance of the focus F C is ſmaller, ſo much the ſmaller ratio will it have to F H; conſequently the diameter of the object will be ſo much the more magnified. 3. Since, in plano-convex lenſes, the diſtance of the focus is equal to the diameter; and, in lenſes equally convex on both ſides, to the ſemidiameter: ſimple *microſcopes* will enlarge the diameter ſo much the more, as they are ſegments of ſmaller ſpheres. 4. If the diameter of the convexities of a plano-convex lens, and a lens convex on both ſides, be the ſame, viz. = 1; the diſtance of the focus of the firſt will be 1, of the ſecond $\frac{1}{2}$: conſequently, the ſemidiameter of the object A B will be to the apparent one, in the firſt caſe, as 1 to 8; in the latter, as $\frac{1}{2}$ to 8; i. e. as 1 to 16. A lens, therefore, convex on both ſides, magnifies twice as much as a plano-convex lens.

As the whole depends on the juſt and ſteady ſituation of objects with regard to the lens, various methods have been contrived to that end; whence we have ſeveral different kinds of ſingle *microſcopes*. The moſt ſimple is as follows.

1. A B (*fig*. 51.) is a little tube, to one of whoſe baſes, B C, is fitted a plain glaſs, to which an object, viz. a gnat, wing of an inſect, down, or the like, is applied; to the other baſe, A D, at a proper diſtance from the object, is applied a lens convex on both ſides, whoſe ſemidiameter is about half an inch; the plain glaſs is turned to the ſun, or the light of a candle, and the object is ſeen magnified; and if the tube be made to draw out, lenſes of different ſpheres may be uſed.

Again, a lens, convex on both ſides, is incloſed in a cell A C, (*fig*. 52.) and by a ſcrew H is there faſtened: through the pedeſtal C D paſſes a long ſcrew, by means whereof, and the female ſcrew I, a ſtyle or needle, fixed perpendicular to its extreme, is kept firm at any diſtance from the lens: in E is a little tube, on which, and on the point G, the various objects are to be diſpoſed: thus there may be lenſes of various ſpheres applied.

2. But the *microſcope* which is found to anſwer the end beſt, is Mr. Wilſon's pocket *microſcope*, which has nine different magnifying glaſſes, eight of which may be uſed with two different inſtruments, for better applying them to various objects. One of theſe inſtruments is repreſented at A A B B (*fig*. 53.) and is made of ivory or braſs; it has three thin braſs plates at E, and a ſpiral ſpring of ſteel-wire H within it; to one of the thin plates of braſs is fixed a piece of leather F, with a ſmall furrow, G, both in the leather and braſs to which it is fixed: in one end of this inſtrument there is a long ſcrew D, with a convex glaſs C, placed in the end of it: in the other end of the inſtrument there is a hollow ſcrew *o o*; wherein any of the magnifying glaſſes, M, are ſcrewed, when they are to be made uſe of. The nine different magnifying glaſſes are all ſet in ivory, eight of which are ſet in the manner expreſſed at M. The greateſt magnifier is marked upon the ivory, wherein it is ſet, with N° 1, the next N° 2, and ſo on to N° 8; the ninth glaſs is not marked, but is ſet in the manner of a little barrel box of ivory, as at *b*. At *e e* is a flat piece of ivory, whereof there are eight belonging to this ſet of microſcopes (though any one

who has a mind to keep a regiſter of objects may have as many of them as he pleaſes); in each of them there are three holes *fff*, wherein three or more objects are placed between two thin glaſſes, or talcs, when they are to be uſed with the greater magnifiers.

The uſe of this inſtrument A A B B is this. Having taken the handle W from the inſtrument in *fig.* 54, and ſcrewed it upon the button S, take one of your flat pieces of ivory *e e*, or ſliders (if you pleaſe to call them ſo), and ſlide it betwixt the two thin plates of braſs at E, through the body of the *microſcope*, ſo that the object you intend to look upon be juſt in the middle: remarking that you put that ſide of the plate *e e*, where the braſs rings are fartheſt from the end A A; then you are to ſcrew into *o o* (the hollow ſcrew in the end of the body of your *microſcope)* the 3d, 4th, 5th, 6th, or 7th magnifying glaſs M; which being done, put the end A A cloſe to your eye, and while you are looking through your magnifying glaſs upon the object, you are to ſcrew in or out the long ſcrew D, which moving round upon the leather F, held tight to it by the ſpiral wire H, will bring your object to the true diſtance; which you will know by ſeeing it clearly and diſtinctly: but ſince in the greater magnifiers you can ſee but a ſmall part of the object, viz. the legs or claws of a flea; while you are looking upon any part of the object, if you take hold of the end of the plate or ſlider *e e*, whereon the object lies, and move it gently, you may ſee the whole object ſucceſſively, or any part of the object you pleaſe; and if that part of the object you deſign to look upon be out of the true diſtance, remember your end ſcrew D, can always bring it in, by ſcrewing it one way or the other.

After this manner may be ſeen all tranſparent objects, duſts, liquids, cryſtals of ſalts, ſmall inſects, ſuch as fleas, mites, &c. If they be inſects that will creep away, or ſuch objects as one intends to keep, they may be placed between the two regiſter glaſſes *ff*. For by taking out (with the point of a pen-knife or ſmall plyers) the ring that keeps in the glaſſes *ff*, where the object lies, they will fall out of themſelves; ſo you may lay the object between the two hollow ſides of them, and put the ring in as it was before; but if the objects be duſts or liquids, a ſmall drop of the liquid, or a little of the duſt laid on the outſide of the glaſs *ff*, and applied as before, will be ſeen very eaſily.

As to the firſt, ſecond, and third magnifying glaſſes, being marked with a + upon the ivory wherein they are ſet, they are only to be uſed with thoſe plates or ſliders that are alſo marked with a +, wherein the objects are placed between two thin talcs; becauſe the thickneſs of the glaſſes in the other plates or ſliders, hinders the object from approaching to the true diſtance from theſe greater magnifiers. But the manner of uſing them is the ſame with the former; only remember to be careful when you put in or pull out the plate or ſlider *e e*, whereon the object lies, or move it from one object to another, not to let it rub your magnifying glaſs; which is done by unſcrewing a little the end ſcrew D, when you put in or pull out your plate, or move it from one object to another.

For ſeeing the circulation of the blood at the extremities of the arteries and veins, in the tranſparent parts of fiſhes tails, &c. there are two glaſs tubes, the one bigger and the other leſſer, as expreſſed at *g g*, wherein the fiſh is to be put; when theſe tubes are to be uſed, you are to unſcrew the end ſcrew D in the body of the *microſcope*, until the tube *g g* can be received eaſily into that little cavity G of the braſs plate faſtened to the leather F, under the other two thin plates of braſs at E. When the tail of your fiſh lies flat to the glaſs tube, ſet it oppoſite to your magnifying-glaſs, and by ſcrewing in or out your end ſcrew D, as is ſaid before, you may eaſily bring it to the true diſtance, and ſee the blood circulate with great pleaſure.

If you would ſee the blood circulate in a frog's foot, chooſe ſuch a frog as will juſt go into your tube; then with a little ſtick expand the hinder foot of the frog, and apply it cloſe to the ſide of the tube, obſerving that no part of the frog hinders the light from coming on its foot; and when you have it at the juſt diſtance, by means of the ſcrew D, as aboveſaid, you will ſee the rapid motion of the blood in its veſſels, which are very numerous, in the tranſparent thin membrane that is between the frog's toes. For this object the 4th and 5th magnifiers will do very well; but you may ſee the circulation in the tails of water-newts with the 6th and 7th glaſſes, becauſe the globules of the blood of thoſe newts are as big again as the globules of the blood of frogs or ſmall fiſh, as has been taken notice of in N° 280 of the Philoſophical Tranſactions, p. 1184.

The circulation cannot ſo well be ſeen by the firſt, ſecond, and third magnifiers, becauſe the thickneſs of the glaſs tube wherein the fiſh lies, hinders the approach of the object to the focus of the magnifying glaſs.

The other inſtrument (*fig.* 54.) is made of braſs or prince's metal, with joints P P P to turn eaſily any way, and with a ſmall pair of tongs G G, which open at the points K, by preſſing together the two heads of the pins I I, for taking up of objects. At the other end of theſe tongs G G, is ſcrewed on a round piece of block wood H, with a piece of ivory let into it, for placing opake objects on, according to their difference of colour. Upon the end L there is a ſcrew, upon which the glaſs *b* ſet in the barrel-box may be ſcrewed. When the other glaſſes are to be uſed, there is a ring R of braſs to be ſcrewed on the end L, into which ring all the other glaſſes M, may be ſcrewed. So when any object is taken up in the points of the tongs K, or laid upon the other end H, it may very eaſily (as one who ſees the inſtrument will perceive) be applied to the true focal diſtance of any of the glaſſes M, by the help of the joints P P P, and by means of the ſcrew C, with the wheel D, which being regulated by a ſpring N, will bring the object to the exact diſtance for diſtinct viſion.

The glaſs placed in the manner of a barrel box at *b*, is only to be uſed with the braſs inſtrument (or in your hand) being the leaſt magnifier for greater objects, ſuch as fleas and common inſects, &c. remembering to put the hole *b* next to your eye.

In the viewing objects, one ought to be careful not to hinder the light from falling on them, by the hat, peruke, or any other thing, eſpecially in looking at opake objects; for nothing can be ſeen with the beſt of glaſſes, unleſs the object be at a due diſtance, with a ſufficient light. The beſt lights for the plates or ſliders, where the object lies between the two glaſſes, is a clear ſky-light, or where the ſun ſhines on any white thing, or the reflexion of the light from a looking-glaſs. The light of a candle is likewiſe good for the viewing of very ſmall objects, though it be a little uneaſy to thoſe who are not practiſed in *microſcopes* to find it out. The only uſe of the convex lens at C is to collect the light into a narrower compaſs where it falls upon the object, after it has paſſed through a moderate hole in the leather F.

For the convenience of thoſe who would draw, or make any ſketches or deſigns of *microſcopical* objects, they may alſo have a pedeſtal to fix the two inſtruments above deſcribed, and make them ſtationary to any convenient light. This pedeſtal may be placed on a table, and after the object and light are fixed, as many perſons as pleaſe may view the object without any trouble or difficulty in finding the light. Phil. Tranſ. abr. vol. iv. p. 199, &c.

What has been ſaid hitherto, is to be underſtood of *lenticular microſcopes*; for *ſpherical* ones, their doctrine will be underſtood from what follows.

If an object A B (*fig.* 55.) be placed in the focus of a glaſs ſpherule F, and the eye be behind it, e. gr. in the focus G; the object will be ſeen diſtinct, in an erect ſituation, and magnified, as to its diameter, in a ratio of $\frac{3}{4}$ of the diameter E I. to the diſtance at which objects are to be placed to be ſeen diſtinctly with the naked eye.

The firſt part of the propoſition is proved in the ſame manner of ſpheres, as of lenſes. As, then, a good eye ſees an object diſtinctly at the diſtance of eight digits, a glaſs ſpherule will enlarge the diameter of an object in a ratio of $\frac{3}{4}$ of the diameter to 8 digits. Suppoſe, then, the diameter of the ſpherule E $\frac{1}{10}$ of a digit, C E will be $=\frac{1}{20}$, and $FE=\frac{1}{40}$; and therefore $FC=\frac{1}{20}+\frac{1}{40}=\frac{3}{40}$. Conſequently, the true diameter of an object to its apparent one is in the ratio of $\frac{3}{40}$ to 8; i. e. as 3 to 320, or as 1 to 106 nearly.

Now a lens, convex on both ſides, increaſes the diameter in a ratio of the ſemidiameter to the ſpace of eight digits; wherefore $\frac{1}{2}$ having a leſs ratio to 8 than $\frac{3}{4}$, if a lens and a ſphere have the ſame diameter, the former will magnify more than the latter; and, pretty much after the ſame manner, it may be ſhewn, that a ſphere, of a leſs diameter, magnifies more than another of a large one.

For the methods of caſting little glaſs ſpherules for MICROSCOPES, there are various. The firſt perſon who improved ſingle *microſcopes* by uſing ſmall globules of glaſs, made by melting them in the flame of a candle, was Hartſocker, who thus diſcovered the animalcula in ſemine maſculino, and laid the foundation of a new ſyſtem of GENERATION. Wolfius deſcribes the following method of making globules of this kind: a ſmall piece of very fine glaſs, ſticking to the wet point of a ſteel needle, is to be applied to the extreme bluiſh part of the flame of a lamp, or which is better, to the flame of a ſpirit of wine, to prevent its being blackened: being there melted and run into a little round drop, it is to be removed from the flame, upon which it inſtantly ceaſes to be fluid; folding, then, a thin plate of braſs, and making very ſmall ſmooth perforations, ſo as not to leave any roughneſs on the ſurfaces; and, farther, ſmoothing them over, to prevent any glaring, fit the ſpherule between the plates againſt the apertures, and put the whole in a frame, with objects convenient for obſervation.

Mr. Adams gives another method, thus: take a piece of fine window-glaſs, and raiſe it, with a diamond, into as many lengths as you think needful, not exceeding an eighth of an inch in breadth; then holding one of thoſe lengths between the fore-finger and the thumb of each hand, over a very fine flame, till the glaſs begins to ſoften, draw it out till it be as fine as a hair, and break; then, applying each of the ends into the pureſt part of the flame, you have two ſpheres preſently, which you may make larger, or leſs, at pleaſure: if they ſtay long in the flame, they will have ſpots; ſo they muſt be drawn out immediately after they are turned round. As to the ſtem, break it off as near the ball as poſſible; and, lodging the remainder of the ſtem between the plates, by drilling the hole exactly round, all the protuberances are buried between the plates; and the *microſcope* performs to admiration.

Mr. Butterfield, in the Phil. Tranſ. N° 141, recommends, for making glaſs globules clear and without ſpecks, the flame of a lamp, made with rectified ſpirit of wine, and inſtead of a cotton wick fine ſilver-wire, doubled like a ſkain of thread; then having beaten ſome fine glaſs to powder, and waſhed it clean, he directs to take a little of it upon the ſharp point of a ſilver needle, wetted with ſpittle, and to hold it in the flame, turning it about till it melts, and becomes quite round. When many globules are thus formed, he rubs them with ſoft leather; and having ſeveral ſmall pieces of thin braſs plates, twice as long as they are broad, he doubles them up into the form of a ſquare, and puſhes a fine hole through the middle of them; and having rubbed off the burr about the holes with a whetſtone, and blackened the inſide of the plates with the ſmoke of a candle, he places a globule between the two holes, and tacks the plates together with two or three rivets.

After theſe manners may ſpheres be made much ſmaller than any lens; ſo that the beſt ſingle *microſcopes*, or thoſe which magnify the moſt, are made thereof. For ſuppoſe the diameter of a ſpherule to be $\frac{1}{16}$ of a digit, the diſtance of its focus will be $\frac{1}{64}$; and therefore its real diameter to its apparent one, as $\frac{1}{32}+\frac{1}{64}$; that is, as $\frac{3}{64}$ to 8, or as 3 to 512; or, laſtly, as 1 to 170. The ſurface of an object, therefore, will be increaſed by it in the proportion of 1 to 28900, and its bulk in a ratio of 1 to 4913000.

Mr. Leewenhoeck and M. Muſchenbroeck have ſucceeded very well in ſpherical *microſcopes*; and the apparatus of the latter is much commended; but we forbear any deſcriptions thereof; it being eaſy for any, who conſiders the ſtructure of thoſe conſiſting of lenſes, to conceive how thoſe of ſpheres may be contrived.

Mr. Leewenhoeck's *microſcopes* were all ſingle ones; each of them conſiſting of a ſmall double convex glaſs ſet in a ſocket, between two ſilver plates, rivetted together, and pierced with a ſmall hole; and the object was placed on the point of a needle, ſo contrived, as to be placed at any diſtance from the lens. If the objects were ſolid, he faſtened them with glue; and if they were fluid, or, on other accounts, required to be ſpread on glaſs, he placed them on a ſmall piece of Muſcovy talc, or glaſs blown very thin, which he afterwards glued to his needle. He had, however, a different apparatus for viewing the circulation of the blood, which he could fix to the ſame *microſcopes*. Thoſe which he bequeathed to the Royal Society were contained in a ſmall Indian cabinet, in the drawers of which were thirteen little boxes or caſes, in each of which were two *microſcopes*, neatly fitted up in ſilver; and both the glaſs and the apparatus were made with his own hands. The greateſt magnifier among theſe enlarged the diameter of an object about 160 times. Phil. Tranſ. abr. vol. vi. p. 129, &c. Id. vol. viii. p. 121, &c.

The ſmalleſt globules, and conſequently the greateſt magnifiers for *microſcopes* that have yet been executed, were made by F. Di Torre of Naples, who, in 1765, ſent four of them to the Royal Society. The largeſt of them was only two Paris points in diameter, and is ſaid to magnify the diameter of an object 640 times; the ſecond was the ſize of one Paris point, magnifying the diameter 1280 times, and the third no more than one half of a Paris point, or the 144th part of an inch in diameter, and was ſaid to magnify the diameter of an object 2560 times, and conſequently the ſquare of ſuch a diameter 6,553,600 times. But ſince the focus of a glaſs globule is at the diſtance of one-fourth of its diameter, and, therefore, that of the third globule of Di Torre, above mentioned, only the 576th part of an inch diſtant from the object, it muſt be with the utmoſt difficulty that globules ſo minute as theſe can be employed to any purpoſe; and Mr. Baker, to whoſe examination they were referred, conſiders them as matters of curioſity rather than of real uſe. Phil. Tranſ. vol. lv. p. 246. vol. lvi. p. 67, &c. For an account of obſervations made with theſe globules on the blood, ſee Blood.

Microscope, *water*. Mr. S. Gray, and, after him, Wolfius, and others, have contrived *water-microſcopes*, conſiſting of ſpherules, or lenſes of water, inſtead of glaſs, fitted up ſomewhat after the manner of thoſe above mentioned (as ſpheres of water may be likewiſe uſed inſtead of glaſs in any of the common *microſcopes*.) But ſince the diſtance of the focus of a lens or ſphere of water is greater than that of one of glaſs (the ſpheres whereof they are ſegments being the ſame), *water-microſcopes*, magnify leſs, and are therefore leſs eſteemed than thoſe of glaſs. The ſame Mr. Gray firſt obſerved, that a ſmall drop or hemiſpherule of water, held to the eye by candle-light or moonlight, without any other apparatus, magnified the animalcula contained in it, vaſtly more than any other *microſcope*. The reaſon is, that the rays, coming from the interior ſurface of the firſt hemiſphere, are reflected ſo as to fall under the ſame angle on the ſurface of the hind hemiſphere, to which the eye is applied, as if they came from the focus of the ſpherule; whence they are propagated to the eye in the ſame manner as if the objects were placed without the ſpherule in its focus.

Hollow glaſs ſpheres, of the diameter of about half a digit, filled with ſpirit of wine, are frequently uſed for *microſcopes*; but they do not magnify near ſo much.

Microscopes, *theory of compound, or double*. Suppoſe an object glaſs E D, (*fig*. 56. N° 1.) the ſegment of a very ſmall ſphere, and the object A B placed without the focus F.

Suppoſe an eye-glaſs G H, convex on both ſides, and the ſegment of a ſphere greater (though not too great) than that of D E; and let it be ſo diſpoſed behind the object, as that if CF : CL :: CL : CK; the focus of the eye-glaſs may be in K.

Laſtly, ſuppoſe LK : LM :: LM : LI.

If, then, O be the place wherein an object is ſeen diſtinct with the naked eye; the eye, in this caſe, being placed in I, will ſee the object A B diſtinctly, in an inverted ſituation, and magnified in a compound ratio of M K to L K, and L C to C O; as is proved from the laws of dioptrics; i. e. the image itſelf is larger than the object, and we are able to view it diſtinctly at a leſs diſtance. E. g. If the image be twenty times larger than the object, and by the help of the eye-glaſs we are able to view it five times nearer than we could have done with the naked eye, it will, on both theſe accounts, be magnified 5 times 20, or 100 times.

Microscopes, *laws of double*. 1. The more an object is magnified by the *microſcope*, the leſs is its *field*, i. e. the leſs of it it takes in at one view.

2. To the ſame eye-glaſs may be ſucceſſively applied object-glaſſes of various ſpheres, ſo as that both the entire objects, but leſs magnified, and their ſeveral parts, much more magnified, may be viewed through the ſame *microſcope*. In which caſe, on account of the different diſtance of the image, the tube L K, in which the lenſes are fitted, ſhould be made to draw out. For the proportion of the object-glaſs to the eye-glaſs, ſome commend the ſubduple ratio, and ſome the ſubſeſquiſextile. De Chales will have the ſemidiameter of the convexity of the object-glaſs to be $\frac{1}{3}$ of a digit, or, at moſt, $\frac{1}{2}$; in the eye glaſs an entire digit, or even $1\frac{1}{2}$. Cherubin makes the ſemidiameter of the object-glaſs $\frac{1}{4}$, $\frac{1}{3}$, or $\frac{1}{2}$ of a digit; the ſemi-diameter of the eye-glaſs $1\frac{3}{4}$, or $1\frac{1}{2}$ of a digit.

3. Since it is proved, that the diſtance of the image L K from the object-glaſs D E will be greater, if another lens, concave on both ſides, be placed before its focus; it follows, that the object will be magnified the more, if ſuch a lens be here placed between the object-glaſs D E, and the eye-glaſs G H. Such a *microſcope* is much commended by Conradi, who uſed an object-lens, convex on both ſides, whoſe ſemidiameter was two digits, its aperture equal to a muſtard-ſeed; a lens, concave on both ſides, 12, or at moſt 16 digits; and an eye glaſs, convex on both ſides, of 6 digits.

4. Since the image is projected to the greater diſtance, the nearer another lens, of a ſegment of a larger ſphere, is brought to the object-glaſs; a *microſcope* may be compoſed of three lenſes, which will magnify prodigiouſly.

5. From theſe conſiderations it follows, that the object will be magnified the more, as the eye-glaſs is the ſegment of a ſmaller ſphere; but the field of viſion will be the greater, as the ſame is a ſegment of a larger ſphere. If, then, two eye-glaſſes, the one a ſegment of a larger, the other of a ſmaller ſphere, be ſo combined, as that the object appearing very near through them, i. e. not

farther diſtant than the focus of the firſt, be yet diſtinct; the object, at the ſame time, will be exceedingly magnified, and the field of viſion much greater then if only one lens was uſed; and the object will be ſtill more magnified, and the field enlarged, if both the object and eye-glaſs be double. But in regard an object appears dim, when viewed through ſo many glaſſes, part of the rays being reflected in paſſing through each, the multiplying of lenſes is not adviſeable; and the beſt, among compound *microſcopes*, are thoſe which conſiſt of one object-glaſs and two eye-glaſſes.

Dr. Hooke tells us, in the preface to his Micrography, that in moſt of his obſervation he uſed a *microſcope* of this kind, with a middle eye-glaſs of a conſiderable diameter, when he wanted to ſee much of the object at one view, and took it out when he would examine the ſmall parts of an object more accurately; for the fewer refractions there are, the more light and clear the object appears.

For a *microſcope* of three lenſes, De Chales commends an object glaſs of $\frac{1}{3}$ or $\frac{1}{4}$ of a digit; and the firſt eye glaſs he makes 2 or $2\frac{1}{2}$ digits; the diſtance between the object-glaſs and eye-glaſs about twenty lines. Conradi had an excellent *microſcope*, the object-glaſs whereof was half a digit, and the two eye-glaſſes (which were placed very near) four digits; but it anſwered beſt, when, in lieu of the object-glaſs, he uſed two glaſſes, convex on both ſides, their ſphere about a digit and a half, or at moſt two, and their convexities touching each other within the ſpace of half a line. Euſtachius de Divinis, inſtead of an object-glaſs convex on both ſides, uſed two plano-convex lenſes, whoſe convexities touched; Grindelius did the ſame, only that the convexites did not quite touch. Zahnius made a binocular *microſcope*, wherein both eyes were uſed.

It is obſerved that compound *microſcopes* ſometimes exhibit a fallacious appearance, by repreſenting convex objects concave, and *vice verſa*. See Phil. Tranſ. N° 476, p. 387.

MICROSCOPE, *ſtructure or mechaniſm of a double.* The induſtry and addreſs of our countryman, Mr Marſhal, here deſerve to be remembered; the moſt commodious *double microſcope* is of his contrivance. In this the eye-glaſs is at W (*fig.* 57.) the object-glaſs at C, the middle glaſs at A 1; B is the cover or lid, to keep out the duſt from the eye-glaſs W; X is the place of the eye, W a ſcrew where the eye-glaſs lies; A 1 a ſcrew where the middle glaſs lies; A 2 the draw, where the outermoſt tube A 1 A 2 is disjoined from the inner one, of the ſame length; Z the frame or baſis on which the *microſcope* ſtands firm; T a ſmall drawer in the frame or baſis, with a ledge or till in it, having ſix partitions to hold ſo many ſeveral object-glaſſes, one magnifying more than another, and fixed in braſs cells ready to ſcrew on at C, and marked 1, 2, 3, 4, 5, 6; theſe partitions are alſo marked 1, 2, 3, 4, 5, 6; the other part of the drawer ſerves to hold the object-plate *a*; a pair of ſmall nippers *b*, to take up, or handle any object conveniently; another object-plate *d*, having one ſide white and the other black, to fix your objects upon, as black upon white, and white objects on black. L, M, is a braſs ball and ſocket, on which the whole body of the *microſcope* is moveable, ſo as to lie in any poſition for the light. K, O, a ſquare braſs pillar, on which the *microſcope* is moveable up and down, by means of the collar E, into which the arm D (holding the *microſcope*) is continued. G another braſs collar ſliding up and down on the pillar K, O, having a ſmall ſcrew H, by which it is, as occaſion ſerves, fixed faſt to the ſaid pillar, at any height. I a large braſs nut, in whoſe centre is a female ſcrew, fitted to the male ſcrew F, which is fixed on the collar E; by the turning of which nut I (the collar G being firſt fixed to the pillar by the ſcrew H) the *microſcope* is raiſed up or down on the pillar, and made to come nearer or go farther from the object P *c*; and, which is alſo a very great advantage, the axis of the *microſcope* is always kept perpendicular to that point of the object, over which it was firſt placed; ſo that here is not the inconvenience which occurs in other glaſſes of often loſing the ſight of the object, by ſcrewing the glaſs C higher or lower. P Q is a glaſs object-plate fixed in a braſs frame, whoſe arm N N is fixed to the pillar by means of the nut O. The arm N N hath it in a ſlit, by which it is eaſily put on, or taken off the pillar, and by which it may be fixed upon it at any diſtance. P a ſmall fiſh lying on the glaſs plate, that the circulation of the blood may be ſeen in the end of the tail-fin, at *c*. R a convex glaſs, by whoſe help a bright ſpot of light is brought from a candle at S, ſtanding on the ground, while the *microſcope* ſtands on the edge of a table or ſtool, which ſpot of light *c* ſerves to render the circulation more conſpicuous. V a lead coffin to be put on the fiſh, to hinder it from ſpringing away, and moving his tail out of the light. 1, 2, 3, 4, 5, 6, are marks on the pillar K O, to ſhew the reſpective diſtances of the object-glaſs from the object you look upon, according as the object-glaſſes you make uſe of magnify more or leſs. Thus, for inſtance, if you uſe the object-glaſs 5 or 6 (either of which will ſhew the circulation of the blood) you muſt fix the upper edge of the collar E, at the mark 5 or 6 on the pillar. And then the *microſcope* will be very near its exact diſtance from the object; ſo that by a ſmall turn or two of the nut I one way or the other, to be found by trial, you may ſoon fit it exactly to your own eye.

By this *microſcope* liquors alſo may be very commodiouſly examined; for if you place a ſmall drop of any liquor on the glaſs plate, juſt in the middle of the ſpot of light *c*, the parts of it will become very viſible, and its animalcula, if it have any, will be diſcovered. And thus may the eels in vinegar, the ſmall creatures in black-paper water, or in waters where wheat, barley, &c. has been infuſed, the eels and other ſmall living creatures in puddle-warter, be as plainly ſeen as by almoſt any other *microſcope*.

In the *microſcope*, in which the objects are illuminated by reflection, made by Mr. Culpeper and Mr. Scarlet, as an improvement of Mr. Marſhal's, the inner tube, *a b*, (*fig.* 58.) which ſlides in the outer *c d*, holds all the glaſſes. The eye-glaſs is at *a a*, the broad middle glaſs at *b b*, and the object glaſs, being ſet in a button at *e*, is ſcrewed upon the end of a narrower tube *f g*; which being fixed in the baſe of the inner tube, paſſes freely through a hole in the baſe of the outer. The buttons that contain the ſeveral object-glaſſes are marked 1, 2, 3, &c. and the convexity of the inner tube is alſo marked with dotted circles, numbered 1, 2, 3, &c. in order to bring that circle to coincide with the mouth *c c* of the outer tube, whoſe number is the ſame as that of the object-glaſs then made uſe of. But if the object does not yet appear quite diſtinct, the button *e* upon the ſnout *f g* muſt be gradually unſcrewed, to bring the glaſs nearer to the object placed below it. Of theſe glaſſes the greater magnifiers are known by their having ſmaller apertures.

The baſe *d d* of the outer tube is ſupported by three braſs pillars, fixed into a wooden pedeſtal *h*; and a little below the oject-glaſs *f*, a circular plate *i k l* is lodged like a ſtage between the pillars, three ſemicircular notches being cut in its circumference to receive the pillars, and to reſt upon three rings that ſurround them. Three ſmall braſs circles *m n*, with holes through the middle of them, are to be placed over the hole *k* in the middle of the ſtage; and then the ivory plate *o* may be put between the two uppermoſt of theſe circles, which are preſſed together by a ſpiral ſpringing wire lodged between the two undermoſt; the two outermoſt being held together by three ſmall pillars paſſing through three holes in the circumference of the middle circle. For viewing the circulation of the blood, the button *p*, on the under ſide of the frame of a broad plane glaſs *q r*, being put through a ſlit *i*, made in the ſtage, a ſmall braſs plate *s*, under the ſtage, muſt be ſhoved inwards, till a ſmaller ſlit in it embraces the neck of the ſaid button; and then the fiſh being laid upon this glaſs, and covered with the coffin *t*, its tail may be brought exactly under the object-glaſs by turning the glaſs *p q* about the button, or by ſhoving it inwards or outwards along the ſlit *i* in the ſtage. The circular object-plate *v x* has a like button in its center, to be put into the ſame ſlit as before; and then the different objects, placed between two talcs in the holes made round the circumference of the plate, may be viewed ſucceſſively by turning the plate about its centre.

All theſe tranſparent objects are illumininated extremely well in this *microſcope*, either by candle-light or ſky-light reflected upwards from a concave looking glaſs *y z*, placed in a frame from the center *h* of the pedeſtal. While you are viewing the object through the *microſcope*, turn this concave upon its horizontal poles *y*, *z*, and you will ſoon find out that poſition of it wherein it reflects the moſt light through the hole *k* upon the object; and this happens when it reflects the rays very obliquely. Opake objects, when laid upon a black ebony or a white ivory plate, put into the hole *k* upon the ſtage, may be illuminated by candle-light tranſmitted through a double convex lens $\alpha\beta$; the foot γ, of the frame $\alpha\beta\gamma$, in which it turns, being put into the hole *l* in the ſtage. The candle muſt be placed in a line drawn from the object through the middle of this lens, at ſuch a diſtance from it as ſhall cauſe the ſpot of light upon the object-plate to be the narroweſt. By day-light this lens gives little or no advantage to the direct ſky light.

To fit *microſcopes*, as well as TELESCOPES, to ſhort-ſighted eyes, the object-glaſs and the eye-glaſs muſt be placed a little nearer together, ſo that the rays of each pencil may not emerge parallel, but may fall diverging upon the eye.

MICROSCOPE, *reflecting*, is properly that which magnifies by reflection, as the above mentioned ones do by reafraction.

The ſtructure of ſuch a *microſcope* may be conceived thus: near the focus of a concave ſpeculum, A B *(fig.* 59.*)* place a minute object C, that its image may be formed larger than itſelf in D; to the ſpeculum join a lens, convex on both ſides, E F, ſo as the image D may be in its focus.

The eye will here ſee the image inverted, but diſtinct, and enlarged; conſequently, the object will be larger than if viewed through the lens alone.

The inventor of this *microſcope* is the great ſir I. Newton; but the objects appear dim in it.

Any teleſcope is converted into a *microſcope*, by removing the object-glaſs to a greater diſtance from the eye-glaſs. And ſince the diſtance of the image is various, according to the diſtance of the object from the focus; and it is magnified the more, as its diſtance from the object-glaſs is greater; the ſame teleſcope may be ſucceſſively converted into *microſcopes*, which magnify the object in different degrees.

The conſtruction of this *microſcope* is more particularly explained in *fig*. 60. in which, inſtead of the lens d e f, there is placed a ſmall ſpeculum *d e f*; ſo that the object *a c b* being placed above it, at a little greater diſtance from the focus *g*, has its image A C B, formed by reflection, as in the other caſe it was by refraction, through the lens d f. Now if we ſuppoſe the focal diſtance of the object ſpeculum *d e f* and lens d e f the ſame, the effect of the *microſcope* in other reſpects will be the ſame alſo.

For the diſtance of the object *a b* above the ſpeculum, will be equal to the diſtance of the object a b below the lens, in order that the image may be formed at the ſame diſtance C *e*. The poſition of the object will be inverted; for all the rays flowing from the point *a*, will be reflected by the ſpeculum to the point A, in the ſame manner as if they came by refraction through the lens, from the point a. Thus the part *b* in the object will be reflected to the focus B in the image, which, therefore, is inverted. The power of magnifying will alſo be the ſame in this and in the reflecting TELESCOPE of a ſimilar conſtruction. For ſince the image A B and the object *a b* are ſeen under equal angles from the vertex *e* of the ſpeculum, the triangles *a c b* and A *e* B will be ſimilar, and therefore A B : *a b* : : C *e* : *c e*; but in the other it is A B : a b : : C e : c e. But the latter ratio of theſe analogies is the ſame in both, and conſequently the firſt is ſo too. This *microſcope* is not ſo eaſy to manage as the common ſort. For viſion by reflection, as it is much more perfect, ſo it is far more difficult than that by refraction. Nor is this *microſcope* ſo uſeful for any but very ſmall or tranſparent objects. For the object, being between the ſpeculum and image, would, if it were large and opake, prevent a due reflexion.

In Dr. Smith's reflecting *microſcope* there are two reflecting mirrors, one concave and the other convex, and the image is viewed by a lens. To explain it, let A D, *(fig.* 61.) be a large concave ſpeculum, and *a d* a ſmall convex one, each perforated in the middle with the holes B C, *b c*. Both theſe are ſegments of the ſame ſphere, or ground on tools of an equal radius; viz. of two inches that ſo the focal diſtance of each ſpeculum may be juſt one inch.

Theſe two ſpeculums are placed at the diſtance of about 1½ inch from each other that ſo an object O P Q, being placed a little below the ſmaller ſpeculum, might be between the focus F and center E of the larger ſpeculum. Things thus circumſtanced, the rays P A, P D, which flow from the point P in the object, on the ſpeculum. A D will be reflected towards a focus *p*, where an image *o p q* would be formed, if the rays were not intercepted by the convex ſpeculum *a d*; and the point *p* being nearer than its focus *f*, the rays A *a*, D *d*, which tend or converge towards it, will be reflected to a focus *P*, where the laſt image, *O P Q*, will be formed, to be viewed through the eye-glaſs G, by the eye at I.

This *microſcope*, though far from being executed in the beſt manner, performed, Dr. Smith ſays, nearly as well as the very beſt refracting *microſcopes*; ſo that he did not doubt but that it would have excelled them, if it had been executed properly. Dr. Smith's own account of this inſtrument may be ſeen in his Optics, Remarks, p. 94.

MICROSCOPE, *ſolar*, called alſo the camera obſcura *microſcope*, was invented by Mr. Lieberkuhn in 1738 or 1739, and is compoſed of a tube, a looking-glaſs, a convex lens, and a Wilſon's *microſcope*. The tube *(fig.* 62) is braſs, near two inches in diameter, fixed in a circular collar of mahogany, with a groove on its periphery on the outſide, denoted by 2, 3, and connected by a cat-gut to the pulley 4 on the upper part; which turning round at pleaſure, py the pin 5 within, in a ſquare frame, may be adjuſted eaſily to a hole in the ſhutter of a window, by the ſcrews 1, 1, in ſuch a manner that no light can paſs into the room but through the aforeſaid tube. Faſtened to the frame by hinges, on the ſides that goes without the window, is a looking-glaſs G, which, by means of a jointed braſs-wire, 6, 7, and the ſcrew H 8, coming through the frame, may be moved either vertically or horizontally, to throw the ſun's rays through the braſs tube into the darkened room. The end of the braſs tube without the ſhutter has a convex lens, 5, to collect the rays, thrown on it by the glaſs G, and bring them to a focus in the other part, where D is a tube ſliding in and out, to adjuſt the object to a due diſtance from the focus; and to the end G of another tube F, is ſcrewed one of Wilſon's ſimple pocket *microſcops*, containing the object to be magnified in a ſlider; and by the tube F, ſliding on the ſmall end E of the other tube D, it is brought to a true focal diſtance.

The ſolar *microſcope* has been introduced into the ſmall and portable, as well as the large CAMERA *obſcura*; and if the image be received upon a piece of half-ground glaſs, ſhaded from the light of the ſun, it will be ſufficiently viſible. M. Lieberkuhn made conſiderable improvements in his ſolar *microſcope*, particularly in adapting it to the view of opake objects; and M. Æpinus, Nov. Com. Petrop. vol. ix. p. 326, has contrived, by throwing the light upon the foreſide of any object, before it is tranſmitted through the object lens, to repreſent with equal advantage all kinds of objects by it. In this improvement, the body of the common ſolar *microſcope* is retained, and only an addition made of two braſs plates, C A and B A *(fig.* 63.*)* joined by a hinge, and kept at a proper diſtance by a ſcrew. A ſection of theſe plates, and of all the neceſſary parts of the inſtrument, may be ſeen in *fig*. 64. where *c*, *a*, repreſent rays of the ſun converging from the illuminating lens, and falling upon the mirror *d b*, which is fixed to the nearer of the braſs plates. From this they are thrown upon the object at *e f*, and thence are tranſmitted through the object lens at K, and a perſoration in the farther plate, upon a ſcreen, as uſual. The uſe of the ſcrew *n* is to vary the diſtance of the two plates, and thereby to adjuſt the mirror to the object with the greateſt exactneſs. For Mr. Euler's method of introducing viſion by reflected light into this *micorſcope*, ſee MAGIC *lantern*.

The **MICROSCOPE** *for opake objects* was alſo invented by M. Lieberkuhn about the ſame time with the former, and remedies the inconvenience of having the dark ſide of an object next the eye; for by means of a concave ſpeculum of ſilver, highly poliſhed, in whoſe center a magnifying lens is placed, the object is ſo ſtrongly illuminated, that it may be examined with eaſe. A convenient apparatus of this kind, with four different ſpeculums and magnifiers of different powers, was brought to perfection by Mr. Cuff. Phil. Tranſ. N° 458. § 9.

MICROSCOPIC *objects*. All things too minute to be viewed diſtinctly by the naked eye, are proper objects for the *microſcope*. Dr. Hooke has diſtinguiſhed them to be exceeding ſmall bodies, exceeding ſmall pores, or exceeding ſmall motions.

Exceeding ſmall bodies muſt either be the parts of larger bodies, or things, the whole of which is exceedingly minute, ſuch as ſmall ſeeds, inſects, ſalts, ſands, &c.

Exceeding ſmall pores are the interſtices between the ſolid parts of bodies, as in ſtones, minerals, ſhells, &c. or the mouths of minute veſſels in vegetables, or the pores in the ſkin, bones, and other parts of animals.

Exceeding ſmall motions are the movements of the ſeveral parts or members of minute animals, or the motion of the fluids, contained in either animal or vegetable bodies. Under one or other of theſe three heads, almoſt every thing about us affords us matter of obſervation, and may conduce both to our amuſement and inſtruction.

An examination of theſe objects, however, ſo as to diſcover truth, requires a great deal of attention, care, and patience, with ſome ſkill and dexterity, to be acquired chiefly by practice, in the preparing, managing, and applying them to the *microſcope*.

Whatever object offers itſelf as the ſubject of our examination, the ſize, contexture, and nature of it, are firſt to be conſidered, in order to apply it to ſuch glaſſes, and in ſuch a manner as may ſhew it beſt. The firſt ſtep ſhould always be to view the whole together, with ſuch a magnifier as can take it in all at once, and after this the ſeveral parts of it may the more fitly be examined, whether remaining on the object, or ſeparated from it. The ſmaller the parts are which are to be examined, the more powerful ſhould be the magnifiers employed; the tranſparency or opacity of the object muſt alſo be conſidered, and the glaſſes employed accordingly ſuited thereto; for a tranſparent object will bear a much greater magnifier than one which is opake, ſince the nearneſs that a glaſs muſt be placed at, unavoidably darkens an object if in its own nature opake, and renders it very difficult to be ſeen, enleſs by the help of the apparatus contrived for that purpoſe, which has a ſilver ſpeculum. Moſt objects however became tranſparent by being divided into extremely thin parts.

The nature of the object alſo, whether it be alive or dead, a ſolid or a fluid, an animal, a vegetable, or a mineral ſubſtance, muſt likewiſe be conſidered, and all the circumſtances of it attended to, that we may apply it in the moſt advantageous manner. If it be a living object, care muſt be taken not to ſqueeze or injure it, that we may ſee it in its natural ſtate and full perfection. If it be a fluid, and that too thick, it muſt be diluted with water; and if too thin, we ſhould let ſome of its watery parts evaporate. Some ſubſtances are fitteſt for obſervation when dry, others when moiſtened; ſome when freſh, and others after they have been kept ſome time.

Light is the next thing to be taken care of; for on this the truth of all our obſervations depends; and a very little obſervation will ſhew how very different objects appear in one degree of it to what they do in another; ſo that every new object ſhould be viewed in all degrees of light, from the greateſt glare of brightneſs to perfect obſcurity, and that in all poſitions to each degree, till we hit upon the certain form and figure of it. In many objects it is very difficult to diſtinguiſh between a prominency and a depreſſion, a black ſhadow and a black ſtain, and in colour between a bright reflection and whiteneſs. The eye of a fly in one kind of light appears like a lattice drilled full of holes, in the ſun-ſhine like a ſolid ſubſtance covered with golden nails; in one poſition like a ſurface covered with pyramids, in another with cones, and in others with ſtill different ſhapes.

The degrees of light muſt always be ſuited to the object; if that be dark, it muſt be ſeen in a full and ſtrong light; but if tranſparent, the light ſhould be proportionably weak; for which reaſon there is a contrivance both in the ſingle and double *microſcope* to cut off abundance of the rays, when ſuch tranſparent objects are to be examined by the largeſt magnifiers. The light of a candle for many objects; and eſpecially for ſuch as are very bright and tranſparent, and very minute, is preferable to day-light: for others a ſerene day-light is beſt; but ſunſhine is the worſt light of all, for it is reflected from objects with ſo much glare, and exhibits ſuch gaudy colours, that nothing can be determined from it with any certainty. This, however, is not to be extended to the ſolar, or *camera obſcura microſcope*; for in that nothing but ſun-ſhine can do, and the brighter that is the better; but in that way we do not ſee the object itſelf on which the ſun-ſhine is caſt, but only the image or ſhadow of it exhibited on a ſcreen; and therefore no confuſion can ariſe from the glaring reflection of the ſun's rays from the object to the eye, which is the caſe in other *microſcopes*. But then in that ſolar way we muſt reſt contented with viewing the true form and ſhape of an object, without expecting to find its natural colour; ſince no ſhadow can poſſibly wear the colour of the body it repreſents.

Moſt objects require alſo ſome management, in order to bring them properly before the glaſſes. If they are flat and tranſparent, and ſuch as will not be injured by preſſure, the beſt way is to incloſe them in ſliders between two Muſcovy talcs or iſinglaſſes. In this way the feathers of butterflies, the ſcales of fiſhes, and the farinæ of flowers, may be very conveniently preſerved, as alſo the parts of inſects, the whole bodies of minute ones, and a great number of other things. Theſe are to be kept in ſliders, each containing three, four, or more holes, and theſe muſt not be filled promiſcuouſly: but all the things preſerved in one ſlider ſhould be ſuch as require one and the ſame magnifying power to view them, that there may not be a neceſſity of changing the glaſſes for every object; and the ſliders ſhould be marked with the number of the magnifier it is proper to be viewed with. In placing the objects in the ſliders, it is always proper to have a ſmall magnifier, of about an inch focus, in your hand, to examine and adjuſt them by, before they are fixed down with the rings.

Small living objects, ſuch as lice, fleas, bugs, mites, minute ſpiders, &c. may be placed between theſe talcs without injuring them, if care be taken to lay on the braſs rings without preſſing them down, and they will remain alive many weeks in this manner; but if they are too large to be treated thus, they ſhould be either preſerved between two concave glaſſes, or elſe viewed immediately, by holding them in the pliers, or ſticking them on the point at the other end of that inſtrument.

If fluids come under examination, to diſcover the animalcules in them, a ſmall drop is to be taken with a hair-pencil, or on the nib of a clean pen, and placed on a plate of glaſs; and if they are too numerous to be thus ſeen diſtinctly, ſome water warmed, by holding it in the mouth, muſt be added to the drop, and they will then ſeparate and be ſeen diſtinctly. This is particularly neceſſary in viewing the animalcules in the *ſemen maſculinum* of all creatures; which, though extremely minute, are always ſo numerous, that without this caution their true form can ſeldom be ſeen. But if we are to ſee the ſalts in a fluid, the contrary method muſt be obſerved, and the plate of glaſs muſt be held gently over the fire, till part of the liquor is evaporated.

The diſſection of minute animals, as lice, fleas, &c. requires patience and care; but it may be done very accurately by means of a needle and a fine lancet, placing the creature in a drop of water, for then the parts will readily unfold themſelves, and the ſtomach, guts, &c. be very diſtinctly ſeen.

Theſe ſeem the beſt ways of preſerving tranſparent objects; but the opake ones, ſuch as ſeeds, woods, &c. require a very different treatment, and are beſt preſerved and viewed in the following manner.

Cut cards into ſmall ſlips about half an inch long, and a tenth of an inch broad; wet theſe half way of their length in gum-water, and with that faſten on ſeveral pieces of the object, and as the ſpots of cards are of different colours, ſuch ſhould be choſen for every object as are the moſt different from its own colours. Theſe are very convenient for viewing by the *microſcope* made for opake objects with the ſilvered ſpeculum; but they are proper for any *microſcope* that can view opake bodies.

A ſmall box ſhould be contrived for theſe ſlips, with little ſhallow holes for the reception of each; and this is conveniently done, by cutting pieces of paſte-board, ſuch as the covers of books are made of, to the ſize of the box, ſo that they will juſt go into it, and then cutting holes through them with a ſmall chiſſel, of the ſhape of the ſlips of card, theſe paſte-boards having then a paper paſted over their bottom, are cells very proper for the reception of theſe ſlips, which may be taken out by means of a pair of plyers, and will always be ready for uſe.

Great caution is to be uſed in forming a judgment on what is ſeen by the *microſcope*, if the objects are extended or contracted by force or dryneſs.

Nothing can be determined about them, without making the proper allowances; and different lights and poſitions will often ſhew the ſame object as very different from itſelf. There is no advantage in any grerter magnifier than ſuch as is capable of ſhewing the object in view diſtinctly; and the leſs the glaſs magnifies, the more pleaſantly the object is always ſeen.

The colours of objects are very little to be depended on, as ſeen by the *microſcope*; for their ſeveral component particles being by this means removed to great diſtances from one another, may give reflections very different from what they would, if ſeen by the naked-eye.

The motions of living creatures alſo, or of the fluids contained in their bodies, are by no means to be haſtily judged of, from what we ſee by the *microſcope*, without due conſideration; for as the moving body, and the ſpace wherein it moves, are magnified, the motion muſt be ſo too; and therefore that rapidity with which the blood ſeems to paſs through the veſſels of ſmall animals muſt be judged of accordingly. Suppoſe, for inſtance, that a horſe and a mouſe move their limbs exactly at the ſame time, if the horſe runs a mile while the mouſe runs fifty yards; though the number of ſteps are the ſame in both, the motion of the horſe muſt notwithſtanding be allowed the ſwifteſt; and the motion of a mite, as viewed by the naked eye, or through the *microſcope*, is perhaps not leſs different. Baker's Microſcope, p. 52. 62. See *Table of* Microscopic *objects*.

MICTUS *cruentus*. See *Bloody* Urine.

MID, or **Middle**, in *Philoſophy* and *Mathematics*. See Mean, and Medium.

MIDDLE *latitude*, in *Navigation*, is half the ſum of two given latitudes.

Middle *latitude ſailing*, is uſed for a method of working the ſeveral caſes in ſailing, nearly agreeing with Mercator's way, but without the help of meridional parts. See Sailing.

Middle *region*. See Region,

Mid-*feather*, in the Engliſh *Salt-works*, the name given to a ſort of partition placed in the middle of the furnace, over which the pan is ſet for boiling the ſea-water or brine into ſalt.

This partition divides the body of the furnace into two chambers. See Salt.

Mid-heaven, *medium cœli*, in *Aſtronomy*, is that point of the ecliptic which culminates, or is in the meridian. See Culmination.

MIDA, in *Natural Hiſtory*, the name of a worm or maggot, of which is produced the purple fly, ſound on bean-flowers, and thence called the bean-fly.

MIDAD *alhendi*, in the *Materia Medica of the Arabians*, a name given to the common indigo blue.

The expreſs meaning of the words is India ink; but this is an erroneus name, founded on Pliny's miſunderſtanding the words of Dioſcorides. The Greeks in general have called the common writing ink *melan*: but they have alſo uſed this word *melan* as an adjective, expreſſive not only of black, but of deep blue. Thus Theophraſtus has called both the violet flowers and the fine deep blue ſapphires, *melanes*. Pliny, finding him call the indigo when of a very fine and deep colour, *melan Indicon*, thought it to be different from the common indigo, and thence ſuppoſed it a ſort of Indian ink. Thus Indian ink has become a ſort of name for this blue.

MIDAS's *ear-ſhell*, in *Conchyliology* See Trumpet-*ſhell*.

MIDDLING-*teeth*, in the *Manege*, are the four teeth of a horſe that come out at three years and a half, in the room of other four foal-teeth, ſeated between the nippers and the corner-teeth; from which ſituation they derive the title of *middling*. There is one of them above, and one below, on each ſide of the jaws. See Teeth.

MIDRIFF, in *Anatomy*. See Diaphragm.

MIDSHIP, is a term of diſtinction, applied by ſhipwrights to ſeveral pieces of timber which lie in the broadeſt part of the veſſel.

Midship-*beam*, is the beam upon which the extreme breadth of the ſhip is formed, and which is ſituated in the *midſhip* frame, nearly in the middle of her length, ſerving as a ſtandard from whence the dimenſions and proportion of the maſt and yards are to be taken. See Beam.

Midship-*frame*, is a name given to that timber, or combination of pieces, formed into one timber, which determines the extreme breadth of the ſhip, as well as the figure and dimenſion of all the inferior timbers.

Midship-*men*, are officers on board a ſhip of war, whoſe ſtation, when they are on duty, is, ſome on the quarter-deck, others on the poop, &c.

Their buſineſs is, to mind the braces, to look out, and to give about the word of command from the captain, and other ſuperior officers. They all aſſiſt, on occaſion, both in ſailing the ſhip, and in ſtowing and rummaging the hold; and in performing the neceſſary buſineſs of the veſſel, either aboard or aſhore. The number of *midſhipmen* like that of all other officers, is always in proportion to the ſize of the ſhip to which they belong. Thus a firſt-rate man of war has twenty-four, and the inferior rates a ſuitable number in proportion. No perſon can be appointed a Lieutenant, without having previouſly ſerved two years in the royal navy in this capacity, or in that of Mate, beſides, having been at leaſt four years in actual ſervice at ſea, either in merchant ſhips, or in the royal navy.

MIDSUMMER *day*, is the feſtival of St. John the Baptiſt, held on the 24th of June. See Quarter *day*.

MIDYON, a word uſed by Theophraſtus, as the name of a ſpecies of oak. It is preſcribed by ſome of the old phyſicians in their compoſitions; but it is uſually ſuppoſed to ſtand there by an error of the copies; the word meant being miſy.

MIFRES, a name by which ſome writers have called Asphaltum.

MIGRATION, or Transmigration, the paſſage or removal of any thing out of one ſtate, or place, into another; particularly of colonies of people, birds, &c. into other countries.

The *migration of the ſouls of men* into other animals after death, is the great doctrine of the Pythagoreans, called the Metempsychosis.

The *migration of birds*, as the ſwallow, quail, ſtork, crane, fieldfare, woodcock, nightingale, and other birds of Passage, is a very curious article in natural hiſtory, and furniſhes a notable inſtance of the powerful inſtinct impreſſed by the Creator. Dr. Derham obſerves two things remarkable therein; the firſt, that theſe untaught, unthinking creatures, ſhould know the proper times for their paſſage, when to come, and when to go; as alſo, that ſome ſhould come when others go. No doubt, the temperature of the air, as to cold and heat, and their natural propenſity to breed their young, are the great incentives to thoſe creatures to change their habitation. But why ſhould they at all change their habitation? and why is not ſome certain place to be found, in all the terraqueous globe, affording them convenient food and habitation all the year round?

The ſecond, that they ſhould know what way to ſteer their courſe, and whither to go? What inſtinct is it, that moves a poor fooliſh bird to venture over vaſt tracts of land and ſea? if it be ſaid, that, by their high aſcents up into the air, they can ſee acroſs the ſeas; yet what ſhould teach or perſuade them, that another land is more proper for the purpoſe than this? that Britain, for inſtance, ſhould afford them better accommodation than Egypt? than the Canaries? than Spain? or any other of the intermediate countries? Phyſico-Theol. p. 349.

Lud. de Beaufort remarks, that birds, in their *migration*, obſerve a wonderful order and polity: they fly in troops, and ſteer their courſe through vaſt unknown regions, without the compaſs. Coſmol. Divin. It is to be added that the birds of paſſage are all peculiarly accommodated by the ſtructure of their parts, for long flights.

Naturaliſts are divided as to the places whither birds of paſſage retire when they leave us. Mr. Willughby thinks the ſwallows fly into Egypt and Ethiopia.

Olaus Magnus ſays, they lurk in holes, or under water; which is confirmed by Etmuller, who aſſures us, that he ſaw a buſhel of them taken out of a frozen fiſh-pond, all hanging together, head to head, feet to feet, &c. in one cluſter. Diſſert. ii. c. 10. Olaus adds, that this is a common thing in the northern countries; and that ſuch a cluſter being carried accidentally by ſome boys into a ſtove, the ſwallows after thawing, began to fly about, but weakly, and only for a very little time.

A farther confirmation of this account was given by Dr. Colas, a perſon very curious in ſuch things, to the Royal Society. Speaking of the way of fiſhing in the northern parts, by breaking holes, and drawing their nets under the ice, he related, that he ſaw ſixteen ſwallows ſo drawn out of the lake of Samrodt, and about thirty out of the king's great pond at Roſineilen; and that at Schlebitten, near a houſe of the earl of Dohna, he ſaw two ſwallows juſt come out of the waters that could ſcarce ſtand, being very wet and weak, with their wings hanging on the ground. He added, that he had often obſerved the ſwallows to be weak, for ſome days, after their firſt appearance.

Some of our own countrymen have given credit to the ſubmerſion of ſwallows; and Klein patroniſes this doctrine in his Hiſt. Av. 205, 206. But they aſſign no reaſon, why theſe birds are capable of enduring ſo long a ſubmerſion without being ſuffocated, or without decaying in an element ſo unnatural to them; when we know that the otter, the cormorant, and the grebes ſoon periſh if caught under ice, or entangled in nets: and it is well known, that theſe animals will continue much longer under water than any others to whom nature hath denied that particular ſtructure of heart, neceſſary for a long reſidence beneath that element. Mr. John Hunter, having diſſected many ſwallows found nothing in them different from other birds as to the organs of reſpiration; whereas all thoſe animals which he had diſſected, of the claſs that ſleep during winter, ſuch as lizards, frogs, &c. had a very different conformation in thoſe organs He farther adds his opinion, that theſe animals breathe in their torpid ſtate; and, as far as his experience reaches, he knows they do; and he, therefore, eſteems it a very wild opinion, that terreſtrial animals can remain any long time under water without drowning.

There is another more probable opinion, with reſpect to the diſappearance of ſwallows, which has high antiquity to ſupport it. Ariſtole and Pliny aſſert, that theſe birds do not remove very far from their ſummer habitation, but winter in the hollows of rocks, and during that time loſe their feathers. We have had many late inſtances of ſome ſpecies of ſwallows having been diſcovered in a torpid ſtate, on the cliffs of the Rhine, in old dry walls and ſand-hills in Scotland, in the chalky cliffs of Suſſex, in hollow trees, and lead mines, &c. Theſe ſeveral places are ſuppoſed to be the lurking habitations of later hatches, or of thoſe young birds that are incapable of diſtant *migrations*; where they generally continue inſenſible and rigid, though, like flies, they may ſometimes be re-animated by an unſeaſonable hot day in the midſt of winter. From theſe facts, it is reaſonable to conclude, that, though one part of the ſwallow tribe migrates, others may have their winter-quarters nearer home. If it ſhould be aſked, why ſwallows alone are found in a torpid ſtate, and not the many other ſpecies of ſoft-billed birds, which likewiſe diſappear about the ſame time? the following reaſon, ſays Mr. Pennant, may be aſſigned. No birds are ſo much on the wing as ſwallows; none fly with ſo much rapidity and ſwiftneſs; none are obliged to ſuch ſudden and various evolutions in their flight; none are at ſuch pains to take their prey: and none exert their voice more inceſſantly; whence they ſuffer a great expence of ſtrength and ſpirits, and acquire ſuch a texture of blood, as other animals do not experience; and become thus diſpoſed to a more laſting repoſe than other birds. But notwithſtanding this conceſſion, it is moſt probable, that ſwallows in general, as well as other birds, migrate from colder into warmer climates, in ſearch of proper food, a ſure aſylum from man during the time of courtſhip, incubation, and nutrition, and a temperature of air ſuiting their conſtitutions.

The generality of birds that remain the winter with us, have ſtrong bills, or are enabled to feed on what they can find at that ſeaſon; thoſe which leave us, have uſually very ſlender bills, and their food is the inſects of the fly kind; which diſappearing towards the approach of winter, compel them to ſeek them in regions where they may be found; and the length of the wings of the generality of theſe birds, enables them to prey flying, if there be food for them in their way, and to continue a long time on the wing without reſt.

The various conjectures about the places to which they retire, are owing to want of ocular teſtimony; but if we conſider the vaſt tracts of land yet unknown to us, we cannot doubt but there may be many places for them, in which we can have had no opportunities of finding them. But the moſt probable conjecture ſeems, that the places to which they retire lie probably in the ſame latitude in the ſouthern hemiſphere, as the places from whence they depart; where, the ſeaſons reverting, they may enjoy the like agreeable temperature of the air. And, if theſe places are ſuppoſed to be divided from them by two large ſeas, why may not ſome other parts of the ſouthern hemiſphere, which are leſs diſtant, ſerve their turn?

This, certainly, ſeems much more reaſonable than that they ſhould remain on our ſide of the northern tropic, within a few degrees of which, at the winter ſolſtice, it is ſo cold as frequently to produce ſnow; which, by diſperſing ſuch inſects as birds that feed upon the wing ſubſiſt on, muſt make them periſh, were they not to remove to thoſe warmer climates where they may ſtill find food.

The ſwallows, as they cannot ſubſiſt ſo long in cold ſeaſons as ſome other birds of paſſage, which feed after the diſappearance of flies in the air, on what inſects they find in their receſſes, viſit us later, and depart from us ſooner, than the reſt. The nightingales, and ſome other birds, which leave us for the winter, are ſeen, ſometimes, a month after the ſwallows; and from the whole it ſeems natural to infer, that the ſwallows paſs the tropic of Cancer, though it is not yet known to what place they at length retire.

The manner of the birds of paſſage journeying to their ſouthern abode may vary, according to the different ſtructure of their bodies, and their power of ſupporting themſelves in the air. Thoſe birds with ſhort wings, ſuch as the redſtart, blackcap, &c. though they are incapable of ſuch long flights as the ſwallow, or of flying with ſo much celerity, yet may paſs to leſs diſtant places, and by ſlower movements. Swallows and cuckows may perform their paſſage in a very ſhort time; but there is for them no neceſſity for ſpeed, ſince every day's paſſage affords them an increaſe of warmth, and a continuance of food.

Providence, which has guided the defenceleſs animals in many other inſtances to the ſafeſt methods of performing their neceſſary works, may have inſtructed many of theſe birds which have ſhorter paſſages to make, or places to ſtop at by the way, to fly only in the night, that they may be ſecure from the birds of prey; and Mr. Cateſby gives a proof that ſome ſpecies do ſo, from his own obſervation; for, lying on the deck of a ſloop on the north ſide of Cuba, himſelf and the whole company heard ſucceſſively, for three nights, flights of rice birds, which are eaſily diſtinguiſhed from all other birds by their notes, and which were paſſing over their heads northerly; which is their direct way from Cuba, and the ſouthern continent of America, from whence they got to Carolina, annually, about the time that rice begins to ripen, and from whence they return ſouthward again, when it is gathered, and they are become fat.

That this is the caſe alſo with ſome ſpecies of ſwallows, has been proved beyond contradiction by M. Adanſon, Hiſt. de Senegal, p. 67. We often obſerve them collected in innumerable flocks on churches, on rocks, and on trees, previous to their departure hence; and Mr. Collinſon proves their return here, perhaps, in equal numbers, by two curious relations of undoubted credit; the one communicated to him by Mr. Wright, maſter of a ſhip, and the other by the late Sir Charles Wager; who both deſcribed to the ſame purpoſe what happened to each of them in their voyages. "Returning home, ſays ſir Charles, in the ſpring of the year, as I came into ſoundings in our channel, a great flock of ſwallows came and ſettled upon my rigging: every rope was covered; they hung on one another like a ſwarm of bees; the decks and carving were filled with them. They ſeemed almoſt famiſhed and ſpent, and were only feathers and bones; but being recruited with a night's reſt, took their flight in the morning." This apparent fatigue proves that they muſt have had a long journey, conſidering the amazing ſwiftneſs of theſe birds; ſo that in all probability they had croſſed the Atlantic ocean, and were returning from the ſhores of Senegal, or other parts of Africa.

The ſhort winged birds are ſuppoſed little qualified for long flights, particularly the quail, which is a bird never ſeen long together on the wing, or making any long flights; its not doing this frequently is however no proof that it is not able to do it; nor does the ſtructure of its body at all beſpeak its inability; and Bellonius affirms, that he ſaw them in great flights paſſing over, and repaſſing, the Mediterranean ſea, at the very ſeaſons when they leave us, and they return again. The ſame inſtinct that directs theſe birds to depart to diſtant countries, doubtleſs alſo directs them to the ſhorteſt way, and ſends them to the narroweſt cuts, not the wider ſeas, to croſs.

Among the birds of paſſage, we have ſome alſo which come to us in the autumn, at the time when the ſummer birds are leaving us; and go from us again in the ſpring at the times when theſe return; theſe, however, are only four kinds; the fieldfare, the redwing, the woodcock, and the ſnipe; and of theſe the two laſt often continue with us through the ſummer, and breed; ſo that the two firſt ſeem the only kinds that certainly leave us at the approach of ſpring, retiring to more northern parts of the continent, where they live the ſummer, and breed; and, at the return of winter, are driven ſoutherly from thoſe frigid climes, in ſearch of food, which there the ice and ſnow muſt deprive them of.

There are many others alſo, particularly of the duck or wading kind, that breed and make their ſummer abode in the deſolate fenny parts of our iſland; and when the ſeverity of our winters deprives them of their food, neceſſity forces them to retire toward the ſea in numerous flights; where they find water unfrozen, and where they remain till the return of ſummer; but thoſe cannot properly be called birds of paſſage.

It ſeems pretty evident from the whole, that the ſummer birds of paſſage leave us only in ſearch of a more warm climate, and a greater plenty of food; both which advantages they procure to themſelves by their alternate change of climate; but the *migration* of the winter birds of paſſage is not ſo eaſily accounted for, ſince there is no ſuch apparent neceſſity for their leaving us, either on the ſcore of food, or climate. The place of the ſummer retirement of theſe birds is Sweden, and ſome other countries in that latitude; but as they would find thoſe places too cold and deſtitute of proviſion, were they to haſten immediately to them on their departure from us, they journey along gradually, and prolong their paſſage through the more moderate countries of Germany and Poland; by which means they do not arrive at their northern habitations, where they are to paſs their ſummer, and where they breed, till the ſeverity of the cold is ſo far abated as to render it pleaſing to them, and there is proper food there for them; and when they reviſit us the following winter, their journey is performed in the ſame leiſurely manner.

Sweden, and the other countries whence they come to us, ſeem the proper home of theſe birds; ſince there they were bread; and the journey they take to us being only for a warmer climate, and a plenty of food, it is no wonder that, when theſe benefits are to be expected again in their native place, they return to it.

The principal food of theſe birds, while with us, is the fruit of the white-thorn, or haws, which hang on our hedges, in winter, in prodigious plenty; but where they breed, and ſeem to live moſt at eaſe, as in Sweden, &c. there are no haws, nor indeed in many of the countries through which they journey in their way; ſo that it is evident they change their food in their paſſage. And upon the whole it appears, that Providence has created birds, &c. with conſtitutions and inclinations adapted to their different degrees of heat and cold; which, to them, are moſt agreeable, and to which they will travel from places which to other animals might ſeem more agreeable: by this means no part of the globe is without its inhabitants. Phil. Tranſ. vol. xliv. p. 435, &c. vol. li. p. 459. &c. Pennant's Britiſh Zoology, vol. i. p. 406, &c. vol. ii. p. 709, &c.

MIGNONETTE, in *Botany*. See *Baſe* ROCKET.

MIHA, in the *Materia Medica*, a name uſed by ſome authors for ſtyrax.

MILAX, a name by which *ſmilax* is often meant by the Greek writers.

MILDEW, *rubigo*, a diſeaſe happening to plants, cauſed by a dewy moiſture, which falling on them, and continuing, for want of the ſun's heat to draw it up, by its acrimony corrodes, gnaws, and ſpoils, the inmoſt ſubſtance of the plant, and hinders the circulation of the nutritive ſap; upon which the leaves begin to fade, and the bloſſoms and fruit are much prejudiced.

According to Cook and Mortimer, *mildew* is a thick clammy vapour, exhaled in the ſpring and ſummer from plants, bloſſoms, and even from the earth itſelf, in cloſe ſtill weather, when there is neither ſun enough to draw it on high, nor wind enough to diſperſe it. Hanging thus in the lower regions, when the evening's cold comes on, it condenſes, and falls on the plants; by its thick clammy ſubſtance ſtops up their pores, and thus prevents perſpiration, and hinders the ſap from aſcending to nouriſh the flowers, ſhoots, &c.

It is added that this dew, falling on the top of a ſhoot of a cherry-tree about midſummer, has been found to ſtop the ſhoot; ſo that the tree has ſhot forth in other places. On plants which have ſmooth leaves, as the oak, &c. the dew hangs, and may be ſeen, taſted, &c. others, whoſe leaves are rougher imbibe it. When it falls on wheat, &c. it ſpots the ſtems with a colour different from the natural one.

Theſe dews, Mr. Mortimer takes to be the principal food of bees; being ſweet, and eaſily convertible into honey. Some have ſuppoſed the blight and *mildew* to be both the ſame thing, but very erroneouſly. The *mildew*, properly ſo called, ſometimes reſts upon the leaves of trees in form of a fatty juice, and ſometimes on the ears of corn; it is tough and viſcous to the touch, and the ſun's heat drying it up, it becoms yet more viſcous and hard, and ſo daubs over the young grains in the ear, that they can never after expand themſelves properly, nor grow to their due ſize or weight. Bearded wheat is leſs ſubject to the *mildew* than the common ſort; and it is obſerved, that newly dunged lands are more ſubject to the *mildew* than others. The moſt happy remedy for this is out of the farmer's power, but often happens naturally; this is a ſmart ſhower of rain, and immediately afterwards a briſk wind: this wholly diſperſes it. If the *mildew* is ſeen before the ſun has any power, it has been recommended by many to ſend two men into the field with a long cord, each holding one end, and drawing this along through the ears, the dew will be diſlodged from them before the ſun's heat is able to dry it to that viſcous ſtate in which it does the miſchief. Some alſo ſay, that lands which have for many years been ſubject to *mildews*, have been cured of it by ſowing ſoot with the corn, or immediately after it. See Blight, Dew, Honey-*Dew*, and *Perſpiration of* Plants.

MILE, in *Geography*, a long meaſure, whereby the Engliſh, Italians, and ſome other nations, uſe to expreſs the diſtance between places. See Measure.

In which ſenſe *mile* is uſed to the ſame purpoſe with *league*, uſed by the French and other nations.

The *mile* is of different extent in different countries. The geographical or Italian *mile* contains a thouſand geometrical paces, mille paſſus, whence the word *mile* is derived. The Engliſh *mile* conſiſts of eight furlongs, each furlong of forty poles, and each pole of ſixteen feet and a half: ſo that it is equal to one thouſand ſeven hundred and ſixty yards, or five thouſand two hundred and eighty feet.

Caſimir has made a curious reduction of the *miles*, or leagues, of the ſeveral countries in Europe into Roman feet, which are equal to the Rhinland feet generally uſed throughout the North.

		Feet
The mile of Italy	—	50000
of England	—	5454
of Scotland	—	6000
of Sweden	—	30000
of Muſcovy	—	3750
of Lithuania	—	18500
of Poland	—	19850
of Germany, the ſmall		20000
The middle	—	22500
The largeſt	—	25000
of France	—	15750
of Spain	—	21270
of Burgundy	—	18000
of Flanders	—	20000
of Holland	—	24000
of Perſia, called alſo paraſanga		18750
of Egypt	—	25000

MILES, a Latin term, which, in its general import, ſignifies *ſoldier*.

In our Engliſh laws and cuſtoms, *miles* is peculiarly appropriated to a knight, called alſo *eques*.

MILIARENSIS, in *Antiquity*, a ſilver coin of the empire, ſubſtituted by Conſtantine in the room of the Denarius; and ſo called becauſe he fixed the price of the pound of gold at 1000 pieces of this new ſilver. But as he divided the pound of gold alſo into 72 ſolidi, each ſolidus really contained 13 $\frac{1}{9}$ *miliarenſes*, though it paſſed for 14; which difference between the real and current value of the solidus, in relation to the *miliarenſis*, muſt have occaſioned diſputes in the payment of ſmall ſums. To remedy this inconvenience, it was thought proper to alter the weight of the ſilver money, and having fixed the price of the pound of ſilver at five ſolidi, to coin ſixty pieces out of it, which retained the name *miliarenſes*, though the pound of gold was worth but 864. It does not appear how many *miliarenſes* Conſtantine coined out of the pound of ſilver: but if the piece of gold was nearly the ſame in his reign, as when five ſolidi were worth a pound of ſilver, the pound muſt have been worth $14\frac{2}{5}$ pounds of ſilver; and 1000 divided by $14\frac{2}{5}$ gives $69\frac{4}{9}$ for the number of *miliarenſes* coined out of the pound. Therefore it is probable, that Conſtantine's number was either 69 or 70. If the former, each piece ſhould weigh $73\frac{8}{23}$ Troy grains; if the latter $72\frac{3}{10}$. According to the former eſtimate, the proportion of gold to ſilver was almoſt $14\frac{1}{2}$ to 1; according to the latter, $14\frac{2}{7}$ to 1. Phil. Tranſ. vol. lxi. part ii. p. 513. See Follis.

MILFOIL. See Yarrow.

Milfoil *water*. See *Water* Violet, Myriophyllum, and Utricularia.

MILIARIUM, the name of a tall and narrow veſſel, uſed in the bathing of the ancients, for heating water to any degree, to give warmth to the reſt. See Mem. Acad. Inſcript. vol. i. p. 127.

MILIARY *fever*. See Fever.

Miliary *glands, glandulæ* Miliares, in *Anatomy*, a great number of ſmall glands interſperſed throughout the ſubſtance of the cutis, or ſkin.

The *miliary glands* are the organs whereby the matter of ſweat, and inſenſible perſpiration, is ſecreted from the blood.

They are interwoven with the pyramidal papillæ of the ſkin, and are each ſerved with a branch of an artery, vein, and nerve; as alſo with a proper excretory duct, through which the fluid matter ſecreted from the blood in the ſubſtance of the gland, is excreted, and ſent forth at the pores, or perforations, of the cuticle.

Miliary *herpes*. See Herpes.

MILIOLUM, a word uſed by ſome medical writers to expreſs a ſmall tumor in the eye-lid, of the ſize and ſhape of the ſeed of a common millet.

MILITANT, a term underſtood of the body of Chriſtians, while here on earth.

The Romaniſts divide the church into *militant*, patient, and triumphant: the *militant* is on earth; the patient, or paſſive, they place in purgatory; and the triumphant in heaven.

MILITARE *ærarium*. See Ærarium.

MILITARIS *toga*. See Toga.

Militaris *via*. See Via.

MILITARY, ſomething belonging to the *militia*, or ſoldiery. Thus,

Military *architecture* denotes the art of fortification. See Architecture, and Fortification.

Military *art*, is the art or ſcience of making or ſuſtaining war to advantage. See War.

Military *column*. See Column.

Military *court*. See Court *of Chivalry*.

Military *eſtate* includes the whole of the ſoldiery; or ſuch perſons as are peculiarly appointed among the reſt of the people for the ſafegurd and defence of the realm. See Soldier.

Military *execution*, the delivery of a city or country up to be ravaged and deſtroyed by the ſoldiers, upon its refuſing to pay contribution money. See Execution.

Military *exerciſes* are the evolutions or various manners of ranging and exerciſing ſoldiers. See Exercise.

Military *feuds*. See Feud.

Military *fever*, a kind of malignant fever frequent in armies, by reaſon of the ill food, &c. of the ſoldiers. See Fever and Hospital *Fever*.

Military *government* is the ſupreme command and diſpoſal of all the *military* power of a nation, by land and ſea.

Military *law*. See Law *of arms*, and Martial.

Military *machine*. See Machine.

Military *order*. See Order, and Knighthood.

Military *pyrotechny*. See Pyrotechny.

Military *rewards*. See Rewards.

Military *tenures*. See Tenure.

Military *teſtament*, among the Romans, was what we call a nuncupative will; or a teſtament made only by word of mouth, in the preſence of two witneſſes.

This was a privilege peculiar to the ſoldiery, and to them only when in the field; for at other times they were ſubject to the common laws in this reſpect. See Soldier.

Military *ways*, *viæ militares*, are the large Roman roads, which Agrippa procured to be made through the empire, in the time of Auguſtus, for the more convenient marching of troops, and conveyance of carriages.

N. Bergier has wrote the hiſtory of the origin, progreſs, and amazing extent, of theſe *military roads*, which were paved from the gates of Rome, to the extreme parts of the empire. See WAY.

MILITES *candidati.* See CANDIDATI.

MILITIA, a collective term, underſtood of the body of ſoldiers, or perſons who make profeſſion of arms.

The word comes from the Latin *miles*, *a ſoldier*; and *miles* from *mille*, which was anciently wrote *mile*. For in levying ſoldiers at Rome, as each tribe furniſhed a thouſand, *mille*, or *mile*, *men*; whoever was of that number, was called *miles*.

MILITIA, in its proper and more reſtrained ſenſe with us, is uſed to ſignify the inhabitants, or, as we call them, the *train bands*, of a town or county; who arm themſelves, on a ſhort warning, for their own defence. In which ſenſe *militia* is oppoſed to regular ſtated forces. Soon after the reſtoration of king Charles II. when the military tenures were aboliſhed, it was thought proper to aſcertain the power of the *militia*, to recognize the ſole right of the crown to govern and command them, and to put the whole into a more regular method of military ſubordination; and the order in which the *militia* now ſtands by law, is principally built upon the ſtatutes which were then enacted, viz. 13 Car. II. cap. 6. 14 Car. II. cap. 3. 15 Car. II. cap. 4.

It is true the two laſt of them are apparently repealed; but many of their proviſions are re-enacted, with the addition of ſome new regulations, by the preſent *militia* laws; the general ſcheme of which is to diſcipline a certain number of the inhabitants of every county, choſen by lot, for three years, and officered by the LORD *lieutenant*, the deputy lieutenants, and other principal landholders, under a commiſſion from the crown. They are not compellable to march out of their counties, unleſs in caſe of invaſion or actual rebellion, nor in any caſe compellable to march out of the kingdom. They are to be exerciſed at ſtated times; and their diſcipline in general is liberal and eaſy; but when drawn out in actual ſervice, they are ſubject to the rigour of martial law, as neceſſary to keep them in order. This is the conſtitutional ſecurity, which our laws have provided for the public peace, and for protecting the realm againſt foreign or domeſtic violence, and which the ſtatutes 2 Geo. III. cap. 20, &c. 9 Geo. III. cap. 42. declare is eſſentially neceſſary to the ſafety and proſperity of the kingdom. Blackſt. Com. book. i. p. 411, &c.

By the 2 Geo. III. cap. 20. all former acts relating to the raiſing of the *militia* are repealed, except in ſuch caſes as are therein ſpecially directed to be ſubject to the proviſions of the former acts, or any of them; particularly with regard to the city of London, the Tower Hamlets, and the Cinque Ports. The ſtatutes now in force, relating to the *militia*, excluſive of the annual acts concerning their clothing and pay, are the following: 2 Geo. III cap. 20 3 Geo. III. cap. 10. 4 Geo. III. cap. 17. 5 Geo. III. cap. 34. 5 Geo. III. cap. 36. 6 Geo. III. cap. 10. 7 Geo. III. cap. 17. 9 Geo. III. cap. 42. 10 Geo. III. cap. 9. 11 Geo. III. cap. 32. 16 Geo. III. cap. 3. 18 Geo. III. cap. 59. 19 Geo. III. cap. 44. 19 Geo. III. cap. 72. 19 Geo. III. cap. 76.

The whole number of private men to be raiſed, excluſive of certain places that are excepted, is 30,740; in various proportions for the ſeveral counties. The perſons exempted from ſerving in the *militia*, or providing ſubſtitutes, are peers of this realm; commiſſioned officers in his majeſty's other forces, or in any of his caſtles and forts; non-commiſſioned officers and private men ſerving in any of his majeſty's other forces; commiſſioned officers ſerving, or who have ſerved four years in the *militia*; members of either of the univerſities; clergymen; licenſed teachers of any ſeparate congregations; conſtables, or other ſuch peace-officers: articled clerks, apprentices, ſeamen, or ſea-faring men; perſons muſtering and doing duty in any of his majeſty's dock yards; perſons free of the company of watermen of the river Thames; perſons employed and muſtered in the Tower of London, Woolwich Warren, the ſeveral gun-wharfs at Portſmouth, Chatham, Sheerneſs, and Plymouth, or at the powder mills, magazines, or the houſes under the direction of the board of ordnance; and poor men who have three children born in wedlock. Perſons ballotted, that refuſe to ſerve or provide a ſubſtitute, ſhall forfeit 10*l.* and at the expiration of three years, be liable to ſerve again, in perſon or by ſubſtitute. Thoſe who have ſerved are to be returned home in due time, ſo that they may reach the county to which they belong, if abſent from it, by the expiration of their term: unleſs they ſhall conſent to ſerve again. The enliſting of perſons enrolled to ſerve in the *militia*, for ſervice in his majeſty's other forces, ſhall be deemed null and void. The *militia* are required to be trained and exerciſed by regiment or battalion, twice in a year, fourteen days at each time, or once in a year for twenty-eight days together: and the penalty of not appearing, or deſerting, is the immediate payment of 20*l.* or impriſonment for ſix months, or till the money is paid. In caſe of actual invaſion or immediate danger of it, or rebellion in this kingdom, his majeſty, communicating the occaſion to parliament, if ſitting, or declared in council, and notified by proclamation, if parliament be not ſitting, may order the *militia* to be embodied, put under the command of general officers, and led to any part of the kingdom, but not to go out of it; and they ſhall be ſubject to the acts againſt mutiny and deſertion. And any perſon not appearing, ſhall forfeit 40*l.* or be impriſoned for twelve months. Officers of the *militia*, during the time of ſervice, are exempted from the office of ſheriff; and private men from highway duty, from pariſh offices, and ſerving in his majeſty's other forces by ſea or land. *Militia* men, when ſick, are entitled to relief; and their deſtitute families to a weekly allowance out of the poor rates of the pariſh, &c. to which they belong. If they are maimed or wounded in actual ſervice, they are intitled to the benefit of Chelſea-hoſpital: they may ſet up trades in any part of the kingdom.

MILITUM *curia.* See CURIA.

MILITUM *expenſis levandis.* See EXPENSIS.

MILIUM, in *Botany*. See MILLET.

MILIUM *arundinaceum*, in *Botany*, a name by which ſome authors call the lacrymæ Jobi, or Job's tears.

MILIUM *Indicum*, in *Botany*, a name by which ſome authors call the maize, or Indian wheat.

MILK, *lac*, a white juice, or humour, which nature prepares in the breaſts of women, and in the udders of other animals; for the nouriſhment of their young.

Milk is thicker, ſweeter, and whiter, than the chyle itſelf, from which it is derived; and that, probably, without much more artifice or alteration than the leaving behind ſome of its aqueous parts.

The ancients held it formed from the blood; but the moderns are of opinion it comes from the pure chyle, conveyed by the arteries to the breaſts, and without any other coction filtrated through the glands whereof they are compoſed, like urine through the reins; without undergoing any conſiderable change.

According to M. Leewenhoeck's obſervations, *milk* conſiſts of little globules ſwimming in a clear tranſparent liquor, called *ſerum*, or *whey*.

Milk is a compoſition of three different kinds of parts; butyrous, caſeous, and ſerous. The *butyrous* parts are the cream and oil that ſwim at top, and give it an opake white colour; the *caſeous* are the groſſer parts, which ſerve as a mucilage to keep the oily part ſuſpended, and thoſe that coagulate, and are made into cheeſe; the *ſerous* are properly a lympha, and theſe make what we call a *whey*, ſerving as a vehicle for the other two. So that *milk* may be juſtly called an animal emulſion. In its pure ſtate it diſcovers no marks of any acid or alkaline quality: its taſte is agreeable and ſweet; it contains none or very few parts, that are volatile with the heat of boiling water: and its ſmell is very weak. It is eaſily acted upon and coagulated by the ſmalleſt quantity of acid, and alſo by the mixture of an alkali, which gives it a ſoponaceous quality. *Milk* is alſo ſuſceptible of a ſpontaneous fermentation, by which it becomes acid, and is coagulated. But this ſpontaneous curdling and acidity are avoided, in the making of cheeſe for aliment, or whey for medicine, by mixing with the *milk*, before it has become too old, the ſmalleſt quantity of acid neceſſary for coagulation, and by accelerating this coagulation with a convenient heat. Dr. Drake ſays, that *milk* is nothing but oil and water united by the artifice of nature, perhaps by the intervention of ſome peculiar ſalts, which *milk* itſelf, however ſweet at firſt, does, after a little ſtanding, diſcover to be pretty plentifully therein.

The whey of *milk* contains, beſides a ſaccharine fermentable ſubſtance, ſeveral kinds of ſalts, which may be obtained by cryſtallization. If three-fourths of clarified whey be evaporated, and the remainder ſet in a cool place, a certain quantity of reddiſh cryſtals will be formed: this is the eſſential *ſalt of milk*. It is called the *ſugar of milk* from its taſte, which is manifeſtly ſaccharine. If the cryſtals are well drained, diſſolved in pure water, and cryſtallized, they will be much whiter and leſs ſaccharine. By repeating the operation, the cryſtals may be rendered perfectly white and almoſt taſteleſs.

Or, the ſalt of *milk*, may be prepared by boiling whey to one half, then filtrating it; the coction and filtration are to be continued, till the liquor becomes of the conſiſtence of a ſyrup. This being put into a cellar to cryſtallize, the ſalt will be formed into a cake of a ſaccharine taſte, reſembling manna.

This preparation is Dr. Gaubius's, and is ſomewhat different from that which Valentini, in his Medicina Nov. Antiq. alledges to be the famous ſaccharum lactis, ſo much cried up by Lodovicus Feſti, and recommended by others as an infallible cure for the gout. Med. Eſſ. Edinb.

Milk is found in the breaſts of women after they have been pregnant about four months. The fermentation of the *milk* in the breaſts, the firſt day after a woman is delivered, often occaſions a fever, which takes its name therefrom.

The colour of ſaffron, the bitterneſs of wormwoods, and the ſmell of garlick are given to the *milk* of a woman who eats theſe plants; and alſo the purgative and inebriating efforts of certain ſubſtances are communicated from a nurſe to a child. See *Women*'s MILK.

Ariſtotle ſays, there are ſome men who have *milk* in their breaſts. Cardan tells us, he ſaw one that had enough to ſuckle a child.

In the Philoſophical Tranſactions, we have an account of a wether brought to *milk* by the ſucking of a lamb; which lamb was maintained by it all the ſummer, till it was weaned.

Milk, corrupted in the ſtomachs of children, occaſions moſt of the diſeaſes incident to that age. Dohel, a Daniſh phyſician, who has wrote expreſly on this ſubject, tells us, an excellent remedy in ſuch caſe is, a glaſs of water with a little ſalt diſſolved in it: this acts as an emetic, and throws up the matter that occaſioned the diſorder. Celſus alſo mentions this remedy.

Galen obſerves, that, in animals fed with *milk*, the greateſt part of the food of the mother is, for that time, converted into that humour.

Hoffman found, by experiments, that the *milk* of cows and of goats contained more of the butyraceous and caſeous, and leſs of the ſerous and of the ſaccharine particles, than human *milk*, and the *milk* of aſſes.

There are ſeveral kinds of *milk*, uſed not only as food, but as phyſic: as cows *milk*, aſſes *milk*, mares *milk*, ſheeps *milk*, and goats *milk*. Theſe are preſcribed as proper to alter a ſharp thin blood into a craſis more ſoft, balſamic, and nutritive; and in conſtitutions where they fit the firſt paſſages, they muſt be very good for that end, as being ready prepared into nutriment, ſo far as is required for their admiſſion into the blood: but where the juices of the ſtomach are ſharp, theſe liquors are apt to be turned into curd. Whenever *milk*, therefore, of what kind ſoever, is ordered in conſumptions, and as a reſtorative, it is with good reaſon joined with the teſtaceous powders, and ſuch things as are proper to deſtroy thoſe acidities.

Aſſes *milk* is ſaid to be a great beautifier and preſerver of the ſkin. Poppœa, wife of the emperor Nero, uſed it for that purpoſe; having four or five hundred aſſes conſtantly in her retinue, to furniſh her every morning with a freſh bath. The receipt for making what is called artificial aſſes *milk* is as follows:

℞ limac. terreſt. contus. xviii. Raſur. C. Cervi, Hordei perlati, Rad. eryngii, ſing: unc. i. aquæ puræ lib. vi. coque leni igne in vaſe figulino vitriato ad lib. iii; dein cola & adde ſyrupi balſamici ſeſcunciam. Capiat æger mane & veſperi quotidie unc. iv. hujus liquoris miſtas cum lactis vaccin. recentis p. æ. Med. Tranſ. vol. ii. p. 341.

Milk is evidently one of the beſt nouriſhments of the body; and it is not wonderful that it ſhould prove ſo, when we conſider that in all caſes of nouriſhment the proximate matter taken to nouriſh ought to be as like as may be to the body to be nouriſhed by it. We ſubſiſt by the ſame things by which we are generated, and even while in the ſtate of a ſœtus in the womb, we are nouriſhed not by blood, as ſome ſuppoſe, but by a lacteous juice, which is ſeparated from the blood in the uterus by means of the placenta, as it is in the breaſts of women who give ſuck, by glandules and tubuli deſtined for that purpoſe. Meats which we daily feed upon paſs down into the ſtomach indeed in their own form, but they do not nouriſh us till they are changed into chyle, or a milky liquor.

Milk being analyſed is found to be compoſed of fatty, ſerous, and terreſtrial parts; and theſe its conſtituent principles being eaſily mixed and ſeparated again, are made of it matter for the nouriſhment of the different parts of the body. The ſerous part, which is alſo nitrous, being a proper vehicle to convey through the veſſels the fatty parts, which are as well adapted to all the offices of nutrition as any ſubſtance can be.

It is eaſy to infer from this account of *milk* that it is not only a proper food for children, but for grown people alſo; but proper regulations are to be obſerved as to its uſe in particular caſes; no aliment any more than this being capable of ſuiting all conſtitutions and circumſtances. Meat in the ſtomach is converted into chyle, or a ſubſtance like *milk*: this chyle paſſes into the heart through the blood-veſſels, and its fineſt and moſt ſpiritutuous parts are there tranſmuted into the red part of the blood; and after this the other groſſer parts of it are by different elaborations transformed into bile, and the ſeveral other humours of the body. It is evident that theſe humours, as well as the blood itſelf, muſt all have a ſupply; and that meat cannot give this ſupply, till it is converted into chyle or *milk*; how much labour then is ſaved the animal functions by giving at once into the ſtomach chyle ready formed, that is *milk*; and in caſes where the action or juices of that organ are ſo debilitated as not to be of power to convert the meat into chyle, what remains but that the perſon muſt die ſlowly, by want of the ſupplies of the ſeveral fluids of the body, if ſomething be not given that is capable of paſſing into the blood with leſs preparation than meats are; and what is ſo proper on ſuch an occaſion as *milk*, which is already ſo nearly allied to the nature of the fluid that ſhould have been there ſeparated from meat, that it will really ſupply all its offices?

Milk is apt to occaſion one or two very oppoſite diſorders, fluxes and coſtiveneſs. This is remedied by diluting it with water, or by proper correctives, or by chuſing that kind of *milk* which beſt ſuits the conſtitution, and the diſeaſes to be treated. E. gr. The *milk* of goats has been found to ſuit better than cow's milk with thoſe perſons, whoſe conſtitutions diſpoſe them to diarrhœas.

Milk-diet is uſeful in the GOUT and STONE.

Dr. Cheyne recommends *milk* and ſeed diet with water for drink, as the ſureſt preſervative againſt diſeaſes, and cure of them. See CANCER, PALSY, FITS, GOUT, and STONE.

Upon opening a vein, eſpecially after meals, *milk* is ſometimes found inſtead of blood. See Phil. Tranſ. Nº 6. p. 100.

We have ſeveral mineral *milks*, and ſome artificial ones, ſo called from their reſemblance of the natural. As,

MILK *of the moon*, *lac lunæ*, a name given by naturaliſts to foſſile agaric, a white light marle. See LAC *lunæ*.

Some ſay, it is chiefly found in ſilver mines, and that it is a flower ſublimed from the ore of that metal; whence its denomination, *flower of ſilver*.

MILK *of ſulphur*, *lac ſulphuris*, a preparation of flowers of ſulphur, and ſalt of tartar; preſcribed by phyſicians, as a ſudorific. See SULPHUR *præcipitatum*.

MILK-*water*. See WATER.

MILK, *virgin's*, *lac virginale*, compoſed of roch alum, ſpring-water, litharge, and vinegar; uſed as a coſmetic, to drive in pimples, and check any cutaneous eruptions, by its cooling, reſtringent quality. See VIRGIN'*s milk*.

MILK, in the *Wine Trade*. The coopers know very well the uſe of ſkimmed *milk*, which makes an innocent and efficacious forcing for the fining down of all white wines, arracks, and ſmall ſpirits; but is by no means to be uſed for red wines, becauſe it diſcharges their colour. Thus, if a few quarts of well-ſkimmed *milk* be put to a hogſhead of red wine, it will ſoon precipitate the greater part of the colour, and leave the whole nearly white; and this is of known uſe in the turning red wines, when pricked, into white: in which a ſmall degree of acidity is not ſo much perceived.

Milk is, from the quality of diſcharging colour from wines of uſe alſo to the wine-coopers, for the whitening of wines that have acquired a brown colour from the caſk, or from having been haſtily boiled before fermenting; for the addition of a little ſkimmed milk in theſe caſes, precipitates the brown colour, and leaves the wines almoſt limpid, or of what they call a water whiteneſs, which is much coveted abroad in wines, as well as in brandies.

MILK, *women's*. The *milk* is often a very troubleſome and dangerous thing to women in their lyings-in, and ſubjects them to many painful diſorders. About the third or fourth day after delivery they are uſually affected with chillineſſes and ſhiverings, which are well known to be owing to that cauſe, and are therefore not to be treated as a diſeaſe, nor any medicines to be given in them; only it is proper to keep the perſon warm, and promote perſpiration, eſpecially in the breaſts. Sometimes indeed this ſymptom is joined with a febrile heat, or a real *inflammatory* FEVER, which is then to be taken off by the proper means.

The *milk*-fever, to which women are ſometimes ſubject after delivery, is partly owing to the abſurd cuſtom that prevails, of not putting the child to the breaſt for the firſt two or three days, till the *milk* flows freely of itſelf. The more immediate cauſes of this diſorder are a diſtention of the nerves in the breaſt, and an abſorption of the *milk*, which hath become acrid by ſtagnating in the breaſt, for want of being drawn either by the child or ſome other perſon. In this caſe, the ſafeſt courſe is plentiful dilution, gentle evacuations, and fomentations of the parts affected: a thin cooling diet ſhould be uſed, till the violence of the ſymptoms is abated. See *Miliary* FEVER.

Hoffman obſerves, that this fever of child-bed women might be prevented, if they, during their pregnancy, were regular in their diet, uſed moderate exerciſe, took now and then a gentle laxative of manna, rhubarb, or cream of tartar: not forgetting to bleed in the firſt months, and avoid all ſharp air. When the labour is coming on, it is not to be haſtened with forcing medicines, which inflame the blood and humours, or put them into unnatural commotions. Care ſhould alſo be taken, after the birth, that the natural excretions proceed regularly, and, if the pulſe be quick, a little nitrous powder or ſome other cooling medicines ſhould be adminiſtered.

Very frequently there come on inflammations of the breaſt of the eryſipelatous kind; theſe are uſually taken off by the external uſe of ſpirit of wine and camphor with a little ſaffron in it, by embrocating them with a little warm linſeed oil, or applying to them the leaves of red cabbage, and by carefully keeping the parts warm. See TUMORS *of the breaſts*.

The *milk* often proves very difficult to be drawn out; this is to be helped by keeping the body carefully open by carminative and emollient clyſters, by keeping up a gentle diaphoreſis, and by attemperating medicines mixed with the milder alexipharmics. The breaſts are all the time to be kept carefully covered with flannel, and gently preſſed and rubbed at times; and finally they are to be drawn by means of a pipe, or by the mouth of an experienced perſon.

Every mother who has *milk* in her breaſts, ought either to ſuckle her own child, or to have her breaſts frequently drawn at leaſt for the firſt month: this would prevent many of the diſeaſes which prove fatal to women in child-bed.

MILK, *deficiency of*, is alſo a very common complaint, and it is in ſome caſes abſolute, there being no *milk* at all derived into the breaſts; in others, it is only a partial one, there being ſome *milk*, though not enough to ſupply the child with nouriſhment. A total deficiency of *milk* moſt frequently happens to perſons who have their firſt child when ſomewhat advanced in years, and to ſuch as are of a choleric diſpoſition; but a partial deficiency of it is often owing to a ſaltneſs of the ſerum, and ſometimes to the want of nouriſhment, and often is brought on by ſorrow.

When ſaline and bilious humours are in fault, then lac lunæ, calcined cryſtal, and other abſorbent powders become of great uſe: ſome alſo preſcribe the powder of earth-worms carefully dried, and the voiding the humours by ſtool, by means of gentle purges: when a want of nouriſhment is the only occaſion of it, the *milk* may always be recovered in a proper quantity by means of good foods, with *milk* and other nouriſhing fluids.

MILK, *an over-abundance of*, is as common a complaint as a deficiency of it, and requires as much care in the treatment, otherwiſe the perſon is frequently ſubject to nodes and abſceſſes in the breaſt. The proper remedies are the eating and drinking more ſparingly, and the letting two children ſuck inſtead of one.

Many people do not ſuckle their children, and therefore find it neceſſary to drive away their *milk* abſolutely. This is beſt done by taking internally the digeſtive ſalts, with diaphoretic and diuretic medicines. Externally it is proper to apply to the breaſts bags of the dried leaves of parſley, mint, chervil, &c. with the ſeeds of coriander and parſley, and a little camphor; and ſpirit of wine with camphor and a little ſaffron is to be rubbed in, or linen rags wetted in it and applied. Cerates may alſo be made of white wax melted in oil of almonds, with a little camphor, and applied to the breaſts freſh every morning and evening, or oftener, if neceſſary.

MILK, *a too great thickneſs of the*, is another common complaint with nurſes; this is to be laid ſometimes to the diet, ſometimes to the concoction, and ſometimes to the unnatural tenuity of the humours; in this caſe the *milk* is often perfectly watery, and the child is thrown into an atrophy by it. The remedies for this are change of diet, and a purging of the primæ viæ by ſome gentle catharic, and afterwards a ſtrengthening of them by bitters, and ſtomachic medicines. Sometimes alſo it is neceſſary to evacuate the ſerous humours by the common phlegmagogues, ſuch as jalap in proper dozes, mixed with a little powdered ginger, which is an excellent corrective for it. The *milk* is ſometimes ſalt to the taſte, and ſometimes of a bilious yellow colour; and theſe diſtemperatures of it uſually throw the child into colics, diarrhœas, vomitings, cutaneous eruptions, with ſcabs, and ſometimes abſolute ulcerations and ſometimes into fevers. In this caſe the nurſe or patient is to take the abſorbent and nitrous medicines, with intermediate purges; thus, powders of crabs-eyes, oyſter-ſhells, and purified nitre, with ſmall doſes of rhubarb occaſionally taken, often perfect a cure: but during the courſe of taking theſe remedies, and for ſome time afterwards, the diet muſt be under ſome regulations; particularly ſalt foods are to be avoided; and all acids, aromatics, and ſtrong liquors either wholly let alone, or taken very ſparingly. The perſon muſt alſo carefully avoid all violent paſſions of the mind, as anger, fear, and the like; and abſtain from all violent emotions of the body.

A contrary extreme to the thinneſs and watery appearance of the *milk* before deſcribed, is, a *mucous thickneſs of it*. This is principally dangerous and troubleſome to the parent, as it is apt to bring on tumors and nodes in the breaſt. The method of treatment in this caſe, is to give gentle alexipharmics for ſome days, then the gentle laxative medicines in ſmall doſes, and finally to allow a moderate uſe of wine.

MILK, *ſtagnations of the*. Theſe are very frequent in lyings-in, and are to be diſcuſſed by the ſame method as was before ordered for the ſending it back, in caſes where perſons do not chuſe to give ſuck; and, to the things there directed, may be added, the internal uſe of ſpermaceti, and of calcined mountain cryſtals, in powder; and externally, cataplaſms of ſpermaceti with ſome volatile urinous ſalt, and the gentle compreſſions of the breaſts by wearing ſtreight cloths about the part.

Nodes of the breaſts often ariſe from the abundance and the mucous nature of the *milk*. They are to be diſcuſſed by plaſters of ſpermaceti, with aniſe, parſley, and coriander ſeeds; and by gently rubbing with a ſoft fleſh-bruſh, as alſo by wearing ſome animal's ſkin that has a thick fur on it, which at once ſerves the double office of warmth and a gentle friction. See TUMORS *of the Breaſts*.

Abſceſſes of the breaſts very often happen alſo from the ſame cauſes; and theſe, when there appear no hopes of diſcuſſing them are always to be brought to ſuppuration as quick as poſſible. A maturating plaſter is to be laid on the parts that are to be broke, and the other parts are to be rubbed with ſpirit of wine and camphor, and ſaffron infuſed in it. When the matter in the abſceſs is ripe, if the ſkin do not burſt of itſelf it is to be immediately opened with a lancet; after this a plaſter of equal parts of diachylon ſimplex and that with the gums, with a little camphor mixed in it, is to be applied; and afterwards digeſtives are to be wholly avoided, and no dreſſings but balſamics allowed. The liquor of myrrh, or a mixture of eſſence of myrrh, and amber, and ſpirits of turpentine, make an admirable dreſſing: and internally, gentle purges are to be given, and the milder diuretics with the nitrous and ſaline medicines.

Cracks and fiſſures of the nipples are another very troubleſome complaint with thoſe who give ſuck. The beſt applications to theſe, are the oil of eggs, with the liquamen of the buds of the poplar, oil of wax, linſeed oil ſhook together with the whites and yolks of eggs, a liniment made of marygold flowers and freſh butter, an ointment of liquorice, and the liquor produced from the flowers of mullein and marygolds, heated together in an oven: or they may be anointed with a mixture of oil and bees wax; or a little powdered gum arabic may be ſprinkled on them. Hungary water applied to the nipples has ſometimes a good effect. The ſucking out the *milk* by means of a glaſs-pipe, is very neceſſary during the continuance of this complaint; but the beſt method of preventing it, is the applying white wax to the nipples for ſome time before, as well as after the time of the labour. If the complaint ſhould prove obſtinate, a cooling purge may be given, which generally removes it.

The ſmallneſs of the nipples is a trouble to many nurſes; when the complaint is only owing to their lying-in, the breaſts are to he forced out by the ſucking of a robuſt child of ſix or more months old, by the application of the common glaſs pipe, firſt made warm, and by the ſucking of a grown perſon, experienced in ſuch caſes: all natural accidents of this kind may be cured by this means; but often the nipples have been ſo forced in by the ſtays, at the very time of their growth in young girls, and this force continued ſo long that no art is able to recal them to their natural ſtate, or make them fit for an infant to ſuck from.

The miſchief that ſometimes attend perſons who have given ſuck, in the weaning of children, or on the death of a child, and the *milk* being left undrawn out, are to be avoided by letting ſome other child ſuck a little at a time, and that leſs and leſs every day, and by drawing afterwards a little every day with a pipe.

It is very common among nurſes to be extremely ſcrupulous about diet, and to require the niceſt foods for the creating good *milk*; but it is evident, that though ſome care is neceſſary to this purpoſe, yet it is not this: for the poorer people, who live on the coarſeſt food, often have the richeſt *milk*. The whole neceſſary caution ſeems to conſiſt in avoiding exceſs, and feeding as much as poſſible on ſimple foods, without too many vegetables, and not to lead too ſedentary a life.

Things hard of digeſtion are to be abſtained from, as alſo acids; too ſalt meats, and all flatulent things, and the acrid and aromatic things are to be very carefully meddled with; ſince, though they do not affect the mother, they ſeldom fail to bring diſtempers upon the child. There is no better drink for thoſe who give ſuck than malt-liquors, when they are well ſettled and clear. Stronger things, even wine in thoſe who are habituated to it, though it do not hurt them, are to be refrained from, ſince they ſubject the child to convulſions and many other diſorders.

Over large draughts of cold liquors, and the expoſing the breaſts too much to the cold, are often the cauſes of very great diſorders both in the mother and the child. Gentle exerciſe, and motion of the body in general, is highly ſerviceable to nurſes; as is alſo that of the breaſts in particular, by gently ſhaking and preſſing them for throwing off the aqueous part of the *milk*, and filling the lactiferous ducts more freely and copiouſly than would otherwiſe be done. The improper methods of dreſs in ſome places, and ſqueezing the girls into ſlenderneſs by ſtraight ſtays, often occaſion the lactiferous ducts to be ſo contracted, and the nipple ſo repreſſed, that no art can afterwards bring the perſon to be properly qualified for ſuckling a child. Junker's Conſp. Med. p. 732, ſeq.

Violent paſſions of the mind are extremely injurious to thoſe who give ſuck. It is very common to ſee nodes and abſceſſes of the breaſts brought on by theſe alone, and eryſipelatous inflammations are as frequent in perſons of other habits from the ſame cauſes. The child alſo is often thrown into diarrhœas, by theſe means; and in general, it is a very neceſſary rule to ſqueeze and ſhake the breaſts to diſcharge the *milk* after a great fright, or a violent fit of paſſion, before the child is ſuffered to ſuck. If the menſes appear at the time of giving ſuck, the child is uſually greatly injured by the alteration the *milk* ſuffers. When women are newly laid in, if the breaſts become turgid, and there is danger of the *milk*'s coagulating in them, the child, if it be ſtrong, ſhould be immediately put to ſuck; but if otherwiſe, the breaſts are to be gently ſhaken and preſſed to diſcharge the redundance, or another child, or grown perſon, put to ſuck them.

MILK, *extract of*, a ſweet dry extract of cow's milk made by evaporation.

Fred. Hoffman recommends this extract boiled with pure water to the quantity of what is exhaled of the *milk*, as an excellent drink in many diſorders, where *milk* itſelf is not proper.

Milk is often thought improper with purgatives, and it certainly does render ſome perſons coſtive; but this does not hold generally, nor perhaps for a long time, even in thoſe whom it may ſo affect at firſt. Hoffman recommends an ounce of manna diſſolved in a pint of *milk* as a good laxative.

MILK *vetch*. See ASTRAGALUS.

MILK *vetch*, *baſtard*. See VETCH.

MILK-*wood*. See TRUMPET-*flower*.

MILK-*wort*, *polygala*, in *Botany*, a genus of the *diadelphia octandria* claſs. Its characters are theſe: the flower has a ſmall permanent empalement, and is ſhaped like thoſe of the butterfly kind; the number of petals indeterminate, the wings are large, plain, and extend beyond the other petals; the ſtandard is tubulous, ſhort, and reflexed at the brim, where it is bifid; the keel is concave, compreſſed, and bellied toward the top; it has eight ſtamina in two bodies, included in the keel, terminated by ſingle ſummits; and an oblong germen ſupporting an erect ſtyle, terminated by a thick bifid ſtigma; the germen becomes a heart-ſhaped capſule, having two cells each containing one ſeed. Miller enumerates only ſeven ſpecies, ſome of them natives of Europe, others of America; but Linnæus reckons twenty-ſix ſpecies.

The common *milk-wort* is frequently found in dry meadows, and flowers in July; the herb itſelf is only uſed; its bitter taſte proves it to be of a hot and drying quality. The leaves, boiled in wine, purge bile by ſtool. The roots have been found to produce the ſame effects in pleuriſies as the SENEKA, in a lower degree.

MILK-WORT, or *wart-wort*. See SPURGE.

MILK-WORT, *ſea*. See GLAUX.

MILKY *grotto*. See GROTTO.

MILKY *way*, *via lactea*, or *galaxy*. See GALAXY.

MILL, in propriety, denotes a machine for grinding corn, &c. but, in a more general ſignification, is applied to all machines whoſe action depends on a circular motion.

Of theſe there are ſeveral kinds, according to the various methods of applying the moving power; as water-*mills*, wind-*mills*, *mills* worked by horſes, &c.

Few people are ignorant, that corn is ground by two *mill*-ſtones, placed one above the other, without touching.

The lower *mill*-ſtone is immoveable, but the upper one turns upon a ſpindle. The oppoſite ſurfaces of the two ſtones, which act to grind the corn, are not plane or flat; but the upper one is hollow, and the under one ſwells up; each of them being of a conic figure, whoſe axis indeed is very ſhort, in proportion to the diameter of its baſe: for the upper one being ſix feet in diameter, is hollowed but about one inch at its centre; and the lower one riſes but about three-fourths of an inch. Theſe two *mill*-ſtones come nearer and nearer towards their circumference, whereby the corn that falls from the hopper has room to inſinuate between them as far as two-thirds of the radius, which is the place where it begins to be ground, and where it makes the greateſt reſiſtance that it is capable of; the ſpace between the two ſtones being in that place about but two-thirds or three-fourths of the thickneſs of a grain of corn. But as the millers have the liberty of raiſing or ſinking the upper ſtone a little, they can proportion its diſtance from the lower one, according as they would have the flour finer or coarſer.

In order to cut and grind the corn, both the upper and under *mill*-ſtones have channels or furrows cut in them, proceeding obliquely from the centre towards the circumference. And theſe furrows are each cut perpendicularly on one ſide, and obliquely on the other, into the ſtone; which gives each furrow a ſharp edge, and in the two ſtones, they come, as it were, againſt one another, like the edges of a pair of ſciſſars; and ſo cut the corn to make it grind the eaſier, when it falls upon the places between the furrows. Theſe are cut the ſame way in both ſtones when they lie upon their backs, which makes them run croſs-ways to each other, when the upper ſtone is inverted by turning its furrowed ſurface towards that of the lower. For if the furrows of both ſtones lay the ſame way, a great deal of the corn would be drove onward in the lower furrows, and ſo come out from between the ſtones without ever being cut. When the furrows become blunt and ſhallow by wearing, the running ſtone muſt be taken up, and both ſtones new dreſt with a chiſſel and hammer. But by this repeated operation, their thickneſſes, and conſequently their weight diminiſh; and it is obſerved, that when they come to have but three-quarters, or half of the thickneſs which they had when new, they produce but three quarters or half the flour which they yielded at the beginning.

The circular motion of the upper *mill*-ſtone brings the corn out of the hopper by jerks, and cauſes it to recede from the centre towards the circumference, where being quite reduced to flour, it is thrown out of the *mill*, by the centrifugal force of the ſtone, through a hole provided on purpoſe.

The diameter of common *mill*-ſtones, according to Dr. Deſaguliers, is from five to ſeven feet, and their thickneſs, twelve, fifteen, or eighteen inches: the laſt thirty-five or forty years; and when they have been long uſed, ſo that their thickneſs is conſiderably diminiſhed, they are cut anew, to give their ſurface a contrary figure to what they had before: ſo that the upper *mill*-ſtone is made the lower.

In water-*mills*, the momentum of the water is the moving power, and the attrition of the two ſtones in grinding, is the force to be overcome. Of theſe there are two kinds, viz. thoſe where the force of the water is applied above the wheel, and thoſe where it is applied below the wheel; the former being called over-ſhot, and the latter under-ſhot *mills*: and to theſe we may add a breaſt-*mill*, where the water ſtrikes againſt the middle of the wheel.

In a common breaſt-*mill*, where the fall of water may be about ten feet, A A, *Tab.* V. *Mechanics*, *fig.* 65, N° 2. is the great wheel, which is generally about ſeventeen or eighteen feet diameter, from *a* the outermoſt edge of any float board, to *b*, that of its oppoſite float. To this wheel the water is conveyed through a channel, and falling upon the wheel, turns it round. On the axis B B, of this wheel, and within the *mill*-houſe, is a wheel D, about eight or nine feet diameter, having ſixty-one cogs, which turn a trundle E, containing ten upright ſtaves or rounds; and when this is the number of cogs and rounds, the trundle will make $6\frac{1}{10}$ revolutions for one revolution of the wheel. The reaſon of adding an odd cog, called the hunting cog, to the wheel, is this; that, as every cog comes to the trundle, it may take the next ſtaff or round behind the one which it took in the former revolution, and thus it will wear all the parts of the cogs and rounds which work upon one another equally, and to equal diſtances from one another in a little time; and make a true uniform motion throughout the whole work. The trundle is fixed upon an iron axis called the ſpindle, the lower end of which turns in a braſs foot, fixed at F, in the horizontal beam S T, called the bridge-tree; and the upper part of the ſpindle turns in a wooden buſh fixed into the lower *mill*-ſtone, which lies upon beams in the floor Y Y. The top part of the ſpindle above the buſh is ſquare, and goes into a ſquare hole in a ſtrong iron croſs, *a b c d*, *fig.* 66. N° 2. called the rynd; under which, and cloſe to the buſh, is a round piece of thick leather upon the ſpindle, which it turns round at the ſame time as it does the rynd. The rynd is let into grooves in the under ſurface of the running *mill*-ſtone G, *fig.* 65. N° 2. and ſo turns it round in the ſame time that the trundle E is turned round by the cog-wheel D. This *mill*-ſtone has a large hole quite through its middle, called the eye of the ſtone, through which the middle part of the rynd and upper end of the ſpindle may be ſeen;

whilſt the four ends of the rynd lie hid below the ſtone in their grooves.

The end T of the bridge-tree T S (which ſupports the upper *mill*-ſtone G upon the ſpindle) is fixed into a hole in the wall; and the end S is let into a beam Q R called the brayer, whoſe end R remains fixed in a mortiſe: and its other end Q hangs by a ſtrong iron rod P, which goes through the floor YY, and has a ſcrew-nut on its top at O; by the turning of which nut, the end Q of the brayer is raiſed or depreſſed at pleaſure; and conſequently the bridge-tree T S and upper *mill*-ſtone. By this means the upper *mill*-ſtone may be ſet as cloſe to the under one, or raiſed as high from it, as the miller pleaſes. The nearer the *mill*-ſtones are to one another, the finer they grind the corn; and the more remote from one another, the coarſer.

The upper *mill*-ſtone G is incloſed in a round box H, which does not touch it any where; and is about an inch diſtant from its edge all around. On the top of this box ſtands a frame for holding the hopper *k k*, to which is hung the ſhoe I, by two lines faſtened to the hind-part of it, fixed upon hooks in the hopper, and by one end of the crook-ſtring K faſtened to the fore-part of it at *i*; the other end being twiſted round the pin L. As the pin is turned one way, the ſtring draws up the ſhoe cloſer to the hopper, and ſo leſſens the aperture between them; and as the pin is turned the other way, it lets down the ſhoe, and enlarges the aperture.

If the ſhoe be drawn up quite to the hopper, no corn can fall from the hopper into the *mill*; if it be let a little down, ſome will fall: and the quantity will be more or leſs, according as the ſhoe is more or leſs let down. For the hopper is open at bottom, and there is a hole in the bottom of the ſhoe, not directly under the bottom of the hopper, but forwarder towards the end *i*, over the middle of the eye of the *mill*-ſtone.

There is a ſquare hole in the top of the ſpindle, in which is put the feeder *e* (*fig.* 66. N^{o} 2.) this feeder (as the ſpindle turns round) jogs the ſhoe three times in each revolution, and ſo cauſes the corn to run conſtantly down from the hopper, through the ſhoe, into the eye of the *mill*-ſtone, where it falls upon the top of the rynd, and is, by the motion of the rynd and the leather under it, thrown below the upper ſtone, and ground between it and the lower one. The violent motion of the ſtone creates a centrifugal force in the corn going round with it, by which means it gets farther and farther from the centre, as in a ſpiral, in every revolution, until it be thrown quite out; and, being then ground, it falls through a ſpout M, called the *mill*-eye, into the trough N. When the *mill* is fed too faſt, the corn bears up the ſtone, and is ground too coarſe; and beſides, it clogs the *mill* ſo as to make it go too ſlow. When the *mill* is too ſlowly fed, it goes too faſt, and the ſtones, by their attrition, are apt to ſtrike fire againſt one another. Both which inconveniencies are avoided by turning the pin L backwards or forwards, which draws up or lets down the ſhoe; and ſo regulates the feeding as the miller ſees convenient.

Sometimes, where there is a ſufficient quantity of water, the cog-wheel in *fig.* 65. turns a large trundle, on whoſe axis is fixed a horizontal wheel, with cogs all around its edge, turning two trundles at the ſame time; whoſe axis or ſpindles turn two *mill*-ſtones. When there is not work for them both, either may be made to lie quiet, by taking out one of the ſtaves of its trundle, and turning the vacant place towards the horizontal cog-wheel. And there may be a wheel fixed on the upper end of the great upright axle of this wheel for turning a couple of boulting *mills*; and other work for drawing up the ſacks, fanning and cleaning the corn, ſharpening of tools, &c.

As the water acts upon an over-ſhot *mill* both by impulſe and weight, ſo does it likewiſe upon a breaſt-*mill*, or that where the water comes upon the breaſt or middle part of the wheel: and here, though the weight of the water is not ſo great as in the over-ſhot *mill*, being contained in the buckets of the lower quarter only; yet the impulſe of the water is much greater, the height of the water being increaſed nearly the ſemi-diameter of the great wheel, all other things being equal. If the height of the water remain the ſame, the aperture of the penſtock muſt be enlarged to nearly twice the area, that the force may be the ſame; ſo that to produce the ſame effect, twice as much water is neceſſary for the breaſt-*mill* as for an over-ſhot one, every thing elſe being the ſame.

Mr. Ferguſon obſerves, that where there is but a ſmall quantity of water, and a fall great enough for the wheel to lie under it, the bucket or over-ſhot wheel is always uſed. But where there is a large body of water, with a little fall, the breaſt or float-board wheel muſt take place. As to the under-ſhot *mill*, it is evident there can be only the impulſe from the water; and therefore, the height of the water remaining the ſame, there muſt be a larger aperture of the penſtock for the diſcharge of a greater quantity of water in the ſame time, in order to produce the ſame effect as the over-ſhot or breaſt-*mill*; whence a greater expence of water will be made here than in any other *mill*, and can only be ſupplied for a conſtancy by a river; and where this can be had, the under-ſhot is the eaſieſt, cheapeſt, and moſt ſimple ſtructure, a *mill* is capable of.

Dr. Deſaguliers, having had occaſion to examine many under-ſhot and over-ſhot *mills*, generally found that a well made over-ſhot *mill*, ground as much corn, in the ſame time as an under-ſhot *mill*, with ten times leſs water; ſuppoſing the fall of water at the over-ſhot to be twenty feet, and at the under-ſhot to be about ſix or ſeven feet: and he generally obſerved, that the wheel of the over-ſhot *mill* was of fifteen or ſixteen feet diameter, with a head of water of four or five feet, to drive the water into the buckets with ſome momentum.

Mr. Ferguſon has given the following directions how to conſtruct water-*mills*, ſo as to be in the greateſt degree of perfection; and alſo a table calculated from his rules, for the ſake of thoſe mill-wrights who either cannot calculate, or do not like to take the trouble.

When the float-boards of the water-wheel move with a third part of the velocity of the water that acts upon them, the water has the greateſt power to turn the *mill*: and when the *mill*-ſtone makes about ſixty revolutions in a minute, it is found to do its work the beſt. For, when it makes but about forty or fifty, it grinds too ſlowly, and when it makes more than ſeventy, it heats the meal too much, and cuts the bran ſo ſmall that a great part thereof mixes with the meal, and cannot be ſeparated therefrom by ſifting or boulting. Conſequently, the utmoſt perfection of *mill*-work lies in making the train ſo, as that the *mill*-ſtone ſhall make about ſixty turns in a minute when the water-wheel moves with a third part of the velocity of the water. To have it ſo, obſerve the following rules:

1. Meaſure the perpendicular height of the fall of water, in feet, above the middle of the aperture, where it is let out to act by impulſe againſt the float-boards on the loweſt ſide of the under-ſhot wheel.

2. Multiply this conſtant number 64.2882, by the height of the fall in feet, and extract the ſquare root of the product, which ſhall be the velocity of the water at the bottom of the fall; or the number of feet the water moves *per* ſecond.

3. Divide the velocity of the water by 3; and the quotient ſhall be the velocity of the floats of the wheel in feet *per* ſecond.

4. Divide the circumference of the wheel in feet, by the velocity of its floats; and the quotient ſhall be the number of ſeconds in one turn or revolution of the great water wheel on whoſe axis the cog-wheel that turns the trundle is fixed.

5. Divide 60 by the number of ſeconds in a turn of the water-wheel or cog-wheel; and the quotient ſhall be the number of turns of either of theſe wheels in a minute.

6. By this number of turns divide 60 (the number of turns the *mill*-ſtone ought to have in a minute) and the quotient ſhall be the number of turns the *mill*-ſtone ought to have for one turn of the water or cog-wheel. Then,

7. As the required number of turns of the *mill*-ſtone in a minute is to the number of turns of the cog-wheel in a minute, ſo muſt the number of cogs in the wheel be to the number of ſtaves in the trundle on the axis of the *mill*-ſtone, in the neareſt whole number that can be found.

By theſe rules the following table is calculated; in which the diameter of the water-wheel is ſuppoſed to be 18 feet (and conſequently its circumference $56\frac{4}{7}$ feet), and the diameter of the *mill*-ſtone to be five feet.

Perpendicular height of the fall of water in feet.	Velocity of the water in feet per ſecond.	Velocity of the wheel in feet per ſecond.	Numb. of turns of the wheel in a minute.	Required number of turns of the *mill*-ſtone for each turn of the wheel	Neareſt number of cogs and ſtaves for that purpoſe		Numb. of turns of the *mill*-ſtone for one turn of the wheel by theſe cogs and ſtaves.	Numb. of turns of the *mill*-ſtone in a minute by theſe cogs and ſtaves.
					Cogs	Staves.		
1	8.02	2.67	2.63	21.20	127	6	21.17	59.91
2	11.40	3.78	4.00	15.00	105	7	15.00	60.00
3	13.89	4.63	4.91	12.22	98	8	12.25	60.14
4	16.04	5.35	5.67	10.58	95	9	10.56	59.87
5	17.93	5.98	6.34	9.46	85	9	9.44	59.84
6	19.64	6.55	6.94	8.64	78	9	8.66	60.10
7	21.21	7.07	7.50	8.00	72	9	8.00	60.00
8	22.68	7.56	8.02	7.48	67	9	7.44	59.67
9	24.05	8.02	8.51	7.05	70	10	7.00	59.57
10	25.35	8.45	8.97	6.69	67	10	6.70	60.09
11	26.59	8.86	9.40	6.38	64	10	6.40	60.16
12	27.77	9.26	9.82	6.11	61	10	6.10	59.90
13	28.91	9.64	10.22	5.87	59	10	5.90	60.18
14	30.00	10.00	10.60	5.66	56	10	5.60	59.36
15	31.05	10.35	10.99	5.46	55	10	5.40	60.48
16	32.07	10.69	11.34	5.29	53	10	5.30	60.10
17	33.06	11.02	11.70	5.13	51	10	5.10	59.67
18	34.02	11.34	12.02	4.96	50	10	5.00	60.10
19	34.95	11.65	12.37	4.85	49	10	4.80	60.61
20	35.86	11.92	12.68	4.73	47	10	4.70	59.59
1	2	3	4	5	6		7	8

Example. Suppoſe an under-ſhot *mill* is to be built where the perpendicular height of the fall of water is 9 feet: it is required to find how many cogs muſt be in the wheel, and how many ſtaves in the trundle, to make the *mill*-ſtone go about 60 times round in a minute, while the water-wheel-floats move with a third part of the velocity with which the water ſpouts againſt them from the aperture at the bottom of the fall.

Find 9 (the height of the fall) in the firſt column of the table; then againſt that number, in the ſixth column, is 70, for the number of cogs in the wheel, and 10 for the number of ſtaves in the trundle: and by theſe numbers, we find in the eighth column that the *mill*-ſtone will make $59\frac{57}{100}$ turns in a minute, which is within half a turn of 60 and near enough for the purpoſe; as it is not abſolutely requiſite that there ſhould be juſt 60 without any fraction: and throughout the whole table the number of turns is not quite one more or leſs than 60.

The diameter of the wheel being eighteen feet, and the fall of water 9 feet, the ſecond column ſhews the velocity of the water at the bottom of the fall, to be $24\frac{5}{60}$ feet per ſecond; the third column the velocity of the float-boards of the wheel to be $8\frac{2}{100}$ feet per ſecond; the fourth column ſhews that the wheel will make $8\frac{52}{100}$ turns in a minute: and the ſixth column ſhews that for the *mill*-ſtone to make exactly 60 turns in a minute, it ought to make $7\frac{5}{100}$ (or ſeven turns and five hundred parts of a turn) for one turn of the wheel.

Dr. Barker has invented a water-*mill*, that has neither wheel nor trundle: this is repreſented in *fig.* 72. in which A is a pipe or channel that brings water to the upright tube B. The water runs down the tube, and thence into the horizontal trunk C, and runs out through holes at *d* and *e* near the ends of the trunk on the contrary ſides thereof.

The upright ſpindle D is fixed in the bottom of the trunk, and ſcrewed to it below by the nut *g*; and is fixt into the trunk by two croſs bars at *f*: ſo that if the tube B and trunk C be turned round, the ſpindle D will be turned alſo.

The top of the ſpindle goes ſquare into the rynd of the upper *mill*-ſtone H, as in common *mills*; and as the trunk, tube, and ſpindle turn round, the *mill*-ſtone is turned round thereby. The lower, or quieſcent *mill*-ſtone is repreſented by I; and K is the floor on which it reſts, and wherein is the hole L for letting the meal run through, and fall down into a trough which may be about M. The hoop or caſe that goes round the *mill*-ſtone reſts on the floor K, and ſupports the hopper, in the common way. The lower end of the ſpindle turns in a hole in the bridge-tree G F, which ſupports the *mill*-ſtone, tube, ſpindle, and trunk. This tree is moveable on a pin at *h*, and its other end is ſupported by an iron-rod N fixt into it, the top of the rod going through the fixt bracket O, and having a ſcrew-nut *o* upon it, above the bracket. By turning this nut forward or backward, the *mill*-ſtone is raiſed or lowered at pleaſure.

Whilſt the tube B is kept full of water from the pipe A, and the water continues to run out from the ends of the trunk; the upper *mill*-ſtone H, together with the trunk, tube, and ſpindle, turns round. But if the holes in the trunk were ſtopt, no motion would enſue; even though the tube and trunk were full of water. For,

If there were no hole in the trunk, the preſſure of the water would be equal againſt all parts of its ſides within. But, when the water has free egreſs through the holes, its preſſure there is entirely removed: and the preſſure againſt the parts of the ſides which are oppoſite to the holes, turns the machine. See Deſaguliers's Exp. Phil. vol. ii. p. 417, &c. p. 431, &c. p. 459, &c. Ferguſon's Mechanics, p, 45, &c. 4to ed. and ſupp. p. 10. See alſo on this ſubject, an elaborate paper of Mr. Smeaton, containing an account of a number of experiments, in order to eſtimate the natural powers of water and wind to turn *mills*, in the Phil. Tranſ. vol. li. art. 18. p. 100, &c. Perſons riotouſly aſſembling and deſtroying, or maliciouſly burning, any wind-ſaw *mill*, wind-*mill*, or water-*mill*, &c. ſhall be guilty of felony, without benefit of clergy, by 9 Geo. III. c. 29.

Mills, *wind*, are, with reſpect to their working parts, little different from thoſe of water-*mills*; but they are turned by the force of wind gathered in their ſails.

Of theſe, ſome are called *vertical*, others *horizontal*, according to the poſition of the ſails; or, rather according to the direction of their motion, with regard to the horizon.

For the beſt form of horizontal ſails, and alſo for determining the poſition of the axis of *wind-mills*, ſee **Wind-*mill*** and **Mechanics**.

Mills, *portative* or *hand*, are thoſe kept in motion by the hand; or elſe whoſe *mill*-ſtones are turned, or piſtons driven by the force of horſes or other beaſts. Thus, if the cog-wheel D, *fig.* 65, N° 2. be made about eighteen inches diameter, with thirty cogs, the trundle as ſmall in proportion, with ten ſtaves, and the *mill*-ſtones be each about two feet in diameter, and the whole work be put into a ſtrong frame of wood, as repreſented in the figure, the engine will be a *hand mill* for grinding corn or malt in private families. And then it may be turned by a winch inſtead of the wheel A A; the *mill*-ſtone making three revolutions for every one of the winch. If a heavy fly be put upon the axle B, near the winch, it will aſſiſt greatly in regulating the motion.

If the cog-wheel that turns the trundle or trundles of a *mill* be placed horizontally, horizontal levers may be fixed into its vertical axis, and horſes applied to theſe for turning the *mill*; which is often done where water cannot be had for that purpoſe.

The uſe of *mills* and *mill*-ſtones, according to Pauſanias, was firſt invented by Myla, ſon of Meleges, firſt king of Sparta; though Pliny attributes the invention of every thing belonging to bread and baking, to Ceres: Polydore Virgil was not able to diſcover the author of ſo uſeful a machine. It is doubted whether or no water-*mills* were known to the Romans, there being no mention made, in the Digeſt, but of *mills* turned by ſlaves and aſſes. Salmaſius, however, and Gothofred, will not allow water-*mills* to have been unknown to the ancient Romans, though they were not in ordinary uſe. Wind-*mills* are of much more modern invention: the firſt model of theſe was brought from Aſia into Europe, in the time of the holy wars.

Mill is alſo uſed for any machine, which being moved by ſome external force, ſerves to give a violent impreſſion on things applied to it.

Mills, in this ſenſe, are machines of vaſt uſe in the manufactures, arts, and trades; for the making and preparing divers kinds of merchandizes. The principal are thoſe which follow.

Mills, *forge*, turned by water, ſerve to raiſe and let fall one or more huge hammers, to beat and form the iron into bars, anchors, and other maſſive works.

Mill, *fulling*, is a *water-mill* which raiſes and beats down large wooden piſtons in proper veſſels called *pools*, or *troughs*; in order to full, ſcour, and cleanſe woollen ſtuffs.

Mill, *gunpowder*, is that uſed to pound and beat together the ingredients whereof gunpowder is compoſed.

This is done in a kind of iron or braſs mortar, by means of iron peſtles wrought by a wheel without-ſide the *mill*, turned by the water falling on it.

Mills, *leather*, are uſed to ſcour and prepare with oil, the ſkins of ſtags, buffaloes, elks, bullocks, &c. to make what they call *buff-leather*, for the uſe of the ſoldiery.

This is effected by means of ſeveral large piſtons, riſing and falling on the ſkins, in large wooden troughs, by means of a wheel without-ſide, turned by the force of water.

Mills, *linen*, do not differ much from *fulling-mills*. Their uſe is, to ſcour linens, after their having been firſt cleanſed when taken out of the lixivium, or ley. Some of theſe go by water, and the generality by horſes.

Mills, *oil*, whether turned by men, water, hand, or horſe, ſerve to bruiſe or break the nuts, olives, and other fruits and grains, whoſe juice is to be drawn, by expreſſion, to make oil.

Mill, *paper*, a *water-mill*, furniſhed with ſeveral large hammers, which beat or pound the rags or cloth in a kind of wooden troughs; and thus, by reducing them to little pieces, turn them into a kind of pulp, by means of water conveyed into the troughs by a pipe for that purpoſe.

Mill, *ſawing*, is a *water-mill*, ſerving to ſaw ſeveral planks or boards, at the ſame time.

Theſe are frequent in France, eſpecially in Dauphiné. They were lately prohibited in England, where they were begun to be introduced, from a view to the ruin of the ſawyers, which muſt have enſued.

There are alſo *Silk*-**Mills**, for ſpinning, throwing, and twiſting ſilks; which are large round machines in form of turrets, five or ſix feet high, and ſix yards in diameter; which, being turned, either by the force of water, or that of men, work at the ſame time an infinity of bobbins faſtened thereto, whereon the ſilk had been wound to be here ſpun and twiſted.

There are abundance of *mills* of this kind in France, eſpecially about Lyons and Tours, ſome of which are ſo diſpoſed, as that three of them will go at the ſame time, and by the ſame wheel wrought by water or by ſtrength of hand. That in the Hôpital de la Charité at Lyons, is wonderful, a ſingle man working no leſs than forty-eight of theſe *mills*. See **Silk**, and **Winding** *of Silk*.

Mill, *ſtamping*. See Stamping.

Mill, *ſugar*, is a machine that ſerves to bruiſe the ſugar-canes, and expreſs the liquor or juice contained therein.

The *ſugar-mills* are very curious contrivances. Of theſe there are four kinds, being turned either by water, wind, men, or horſes.

Thoſe turned by the hand were firſt in uſe; but they are now laid aſide, as being an intolerable hardſhip on the poor negroes, who were doomed thereto, beſides the ſlowneſs of their progreſs.

Wind-mills are the moſt modern: but they are yet ſomewhat rare, excepting in St. Chriſtopher's and Barbadoes, and among the Portugueſe. Theſe make good diſpatch but have this inconvenience, that they are not eaſily ſtopped; which proves frequently fatal to the negroes who feed them.

Mills, *tan* or *bark*, wrought by water or horſes, ſerve to cut certain barks into a coarſer ſort of powder, proper for the tanning of hides, &c.

Mills *for ſword-blades* are likewiſe moved by water. They are frequent at Vienne in Dauphiné. By working heavy hammers they forge thoſe excellent ſword-blades, called *blades of Vienne*.

The uſes and operations of theſe ſeveral mills, more at large, ſee under Paper, Fulling, Sugars, &c.

Mill, in *Coinage*, is a machine uſed to prepare the laminæ, or plates of metal, and to give them proper thickneſs, hardneſs, and conſiſtence, before they be ſtruck, or ſtamped.

This machine has not been long known among us; but is of ſome ſtanding in Germany. It conſiſts of ſeveral wheels dented like thoſe of clocks, &c. which move two cylinders of ſteel, between which the metal is paſſed to be brought to its proper thickneſs. It was firſt turned with water, ſince with horſes. See Coinage.

Mill, among *Gold Wire-Drawers*, is a little machine conſiſting of two cylinders of ſteel, ſerving to flatten the gold or ſilver wire, and reduce it into laminæ, or plates. See Gold Wire.

They have alſo *mills* to wind the gold wire or thread on the ſilk: theſe are compoſed of ſeveral rows of bobbins all turned at the ſame time.

Mill-*dams*. A very firm way of making theſe in a quick or running ſand, which is uſually found a very troubleſome circumſtance in the making them, is by laying the foundation with unſlacked lime; which, by ſlacking among the ſand, runs together into a hard ſtone, which gives a very firm and ſure foundation. Plott's Staffordſhire, p. 336.

Mill-*pool*, a ſtock or pond of water, by the force of which the motion of a *water-mill* is effected.

The dam of a *mill-pool* is raiſed much in the ſame manner as directed for Fish-ponds.

Mill-*ſtones*. The *mill-ſtones* which we find preſerved from ancient times, are all ſmall, and very different from thoſe in uſe at preſent. Thoreſby mentions two or three ſuch found in England, among other Roman antiquities, which were but twenty inches broad; and there is great reaſon to believe that the Romans, as well as the Egyptians of old, and the ancient Jews, did not employ horſes, or wind, or water, as we do, to turn their *mills*, but made their ſlaves and captives of war do this laborious work; they were in this ſervice placed behind theſe *mill-ſtones*, and puſhed them on with all their force.—Sampſon, when a priſoner to the Philiſtines, was treated no better, but was condemned to the *mill-ſtone*, in his priſon. The runner, or looſe *mill-ſtone*, in this ſort of grinding, was uſually very heavy for its ſize, being as thick as broad. This is the *mill-ſtone* which it is expreſsly prohibited in Scripture to take in pledge, as lying looſe it was more eaſily removed. The Talmudiſts have a ſtory, that the Chaldæans made the young men of the captivity carry *mill-ſtones* with them to Babylon, where there ſeems to have been a ſcarcity at that time; and hence, probably, their paraphraſe renders the text "have "borne the *mills*, or *mill-ſtones*;" which might thus be true in a literal ſenſe. They have alſo a proverbial expreſſion of a man with a *mill-ſtone* about his neck; which they uſe to expreſs a man under the ſevereſt weight of affliction. This alſo plainly refers to this ſmall ſort of ſtones.

MILLAINS, according to Mr. Wingate, are the third ſubdiviſion of the primes in Gunter's line; and expreſs the thouſandth part of ſuch primes.

MILLEFOLIUM, in *Botany*. See Yarrow.

MILLEMORBIA, in *Botany*, a name given by ſome authors to the ſcrophularia, or figwort, from its ſuppoſed virtues in many diſeaſes.

MILLENARII, **Millenarians**, in *Eccleſiaſtical Hiſtory*, a ſect among Chriſtians, chiefly in the primitive church; who hold that Jeſus Chriſt is to come again, and reign on earth for the ſpace of a thouſand years; during which time, the faithful are to enjoy all manner of temporal bleſſings; and at the expiration of this term, the day of judgment is to take place.

The *Millenarii* are alſo called *Chiliaſts*, *Chiliaſtæ*, from the Greek χιλιας, *mille*, *a thouſand*.

This opinion of the *Millenarii* is very ancient, and may be traced back almoſt as far as the time of the apoſtles. It had its origin from a paſſage in the Apocalypſe too literally underſtood, wherein mention is made of Chriſt's reign on earth, &c.

The opinion of S. Papias, in the ſecond century, to whom Euſebius aſcribes the origin of this notion of a *millennium*, ſays Mr. Launoy, touching the new kingdom of Jeſus Chriſt on earth, after the reſurrection, was held for near three centuries, before it was charged as erroneous; as appears from eccleſiaſtical hiſtory. It was allowed of, and followed, under various interpretations, by ſeveral of the greateſt men among the primitive fathers, as Irenæus, Juſtin Martyn, Lactantius, Tertullian, &c.

Towards the cloſe of the ſecond century, the credit of this opinion began to decline, principally through the influence and authority of Origen, who oppoſed it with the greateſt warmth, becauſe it was incompatible with ſome of his favourite ſentiments.

Nepos, an Egyptian biſhop, endeavoured to reſtore this opinion to its former credit, in a book written *againſt the Allegoriſts*, for ſo he called by way of contempt the adverſaries of the *millenarian* ſyſtem. But Dionyſius of Alexandria, a diſciple of Origen, ſtopped the growing progreſs of this doctrine by his private diſcourſe, and alſo by two learned and judicious diſſertations concerning the *divine promiſes*. Jerome is alſo ſaid to have oppoſed this *millenary* reign of Chriſt. The ancient *Millenarians* generally held, according to the account of the learned Dr. Whitby, that the temple, or the city of Jeruſalem, ſhould be rebuilt, and that the land of Judæa ſhould be the habitation of thoſe riſen ſaints, who were to reign on earth a thouſand years; that this reſurrection was not to be confined to the martyrs only, but that all the juſt were then to riſe and reign with Chriſt; and that this reign ſhould alſo extend to the juſt who were found alive at this firſt reſurrection; that Jeſus Chriſt ſhall then come down from heaven, and be ſeen on earth, and there reign with his ſervants; and that they ſhall then fare deliciouſly, and enjoy the richeſt wines and moſt delicious fruits, build houſes, plant vineyards and eat the fruits of them, and propagate their ſpecies. The *millennium*, according to this writer, is a glorious ſtate of the church, commencing after the fall of antichriſt; and the ſubſequent converſion of the Jews to the Chriſtian faith, in which it ſhall flouriſh in peace and plenty, in righteouſneſs and holineſs, and in a pious offſpring, for a thouſand years, under the undiſturbed, though not perſonal government of Chriſt, over both Jews and Gentiles, which ſhall then be united in one church.

MILLENNIUM, compounded of *mille*, *a thouſand*, and *annus*, *a year*, a term literally ſignifying a *thouſand years*; chiefly uſed for the time of our Saviour's expected ſecond appearance, and reign on earth.

Mr. Whiſton, in ſeveral of his writings, has endeavoured to ſupport the notion of a *millennium*. According to his computation it was to have commenced about the year 1720.

MILLEPEDA, in *Conchyliology*, the name given by authors to a ſpecies of murex of the ſpider-ſhell kind, ſo called from the great number of prominences in the ſhape of points called feet in this ſeries of ſhells, which ariſe from its lip which is greatly extended. The body of the ſhell is full of bumps and tubercles, and the tail is long and crooked.

MILLEPEDES, in *Zoology*, well known inſects, uſed on many occaſions in medicine. This inſect is otherwiſe called *aſellus*, being a ſpecies of oniscus, in Engliſh the *wood-louſe*. Mr. Ray deſcribes ſeven different ſpecies of this inſect, ſome of which we ſee every day, others are more rare. The blue kind, which rolls itſelf up into a ball, is the proper medicinal kind; though there is another ſort of a pale browniſh grey, ſmaller, flatter, and thinner than the former, and having the laſt diviſion of the body not annular but pointed, and a forked tail, which is of the ſame quality. They are found in cellars, and under ſtones and logs of wood in cold moiſt places.

Millepedes are ſo generally known, that moſt perſons ſeem to be maſters of their medicinal uſes, and take them in many caſes without any other direction. They are, by all experience, found to be very diuretic and abſterſive, which makes them not only frequent in preſcriptions for diſorders in the kidneys, but alſo in obſtructions of the viſcera, and particularly in the jaundice.

They abound with a nitrous ſalt, which they ſeem to derive from the earthy diet they live on. This is ſomewhat volatilized by its digeſtion and circulation in the inſect; as ſuch ſalt always is more or leſs, in proportion to the digeſtive powers of the animal, into whoſe blood it enters; yet not ſo much but that it is brackiſh and pungent upon the palate. This makes their deterſive qualities extend farther than the larger glands, and enables them to ſcour even the minuteſt paſſages, and keep the nerves clear from viſcidities, and ſuch things as would clog their ſprings; whence they are reckoned good in palſies, epilepſies, and all nervous diſtempers.

As they open and cleanſe away viſcoſities, and by their minuteneſs and aſperities cut their way through any obſtructions, they are good in ſtrumas, and all inveterate tumors or ulcers. Remarkable cures have been performed in each way by a long uſe of them. But it is much to be doubted, whether their virtues are ſo conſiderable as they are generally ſuppoſed to be, at leaſt when given in the cuſtomary doſes. They are beſt adminiſtered in ſubſtance, or bruiſed in white wine, the liquor being taken without ſettling.

The *millipedes præparatæ* of the ſhops are reduced to powder, either by incloſing them in a thin canvaſs cloth, and ſuſpending them over hot ſpirit of wine in a cloſe veſſel, till they are killed by the ſteam and rendered friable; or by including them in a proper veſſel and drying them with a very gentle heat.

There are alſo ſeveral chemical preparations of *millepedes*, as ſpirit, volatile ſalt, oil, and wine of *millepedes*.

The college of Edinburgh directs two ounces of live *millepedes* to be ſlightly bruiſed, and digeſted for a night in a pint of Rheniſh wine, after which the liquor is to be preſſed through a ſtrainer.

Beſide theſe proper *aſelli*, there are ſome other ſpecies commonly called *pulices marini*, which ſeem greatly to approach to their nature. Theſe are, 1. the horned ſea *pulex*; its body is compoſed of twelve joints; it has ſeven pair of legs, and the hinder ones are longer than the others; the antennæ are a pair of very large horns, and at the baſe of theſe there ſtand two other very ſhort and ſlender ones; it has fins to ſwim with, and it is of a whitiſh colour, and very ſlender body. 2. The *pulex marinus* of Bellonius; this is of the ſhape of the common *aſelli*, but ſomewhat ſlenderer and rounder bodied, and its legs are much longer; its back is brown; its eyes are large and black, and the antennæ are articulated and have two ſmall ones growing from their roots; its body is pellucid, and it moves very ſwiftly in the water; the tail is compoſed of a large bundle of hairs. This is found in great plenty under ſtones, by the ſides of rivers, near the ſea. 3. The freſh-water *pulex*; this differs very little from the laſt ſpecies, but is ſingular in the places it inhabits, which are the banks and mud of hot ſprings, in which no other animal can live. Ray.

MILLEPORA, in *Natural Hiſtory*, a name by which Linnæus diſtinguiſhes that genus of *lithophytes*, of a hard ſtructure and full of holes, which are not ſtellate or radiated, and whoſe animal is the hydra, in which it differs from the MADREPORA, and comprehending fourteen different ſpecies.

In the *millepora*, the animal which forms and inhabits it occupies the ſubſtance: and it is obſerved, that the *milleporæ* grow upon one another: theſe little animals produce their ſpawn, which attaching itſelf either to the extremity of the body already formed, or underneath it, gives a different form to this production. Hence the various ſhapes of the *millepora*, which is compoſed of an infinite number of the cells of thoſe little inſects, which all together exhibit different figures, though every particular cellula has its eſſential form, and the ſame dimenſions, according to its own ſpecies. Philoſ. Tranſ. vol. xlvii. p. 467.

MILLERIA, in *Botany*, a genus of the *ſyngeneſia polygamia neceſſaria* claſs: the characters of which are, that it hath no receptacle nor down; that the calyx has three valves; and that the radius is half the corolla. There are two ſpecies.

MILLERS-*thumb*, in *Ichthyology*, an Engliſh name for the fiſh called alſo the bull-head, and by authors the cottus; being the COTTUS *gobio* of Linnæus. It is common in all our clear brooks; lying generally at the bottom, and depoſiting its ſpawn in a hole formed by it in the gravel. It ſeldom exceeds three inches and a half in length; its head is large, broad, thin at its circumference, and on the middle part of the covers of the gills is a ſmall crooked ſpine, turning inwards; the eyes and teeth are ſmall; the body grows ſlender towards the tail; the colour is duſky mixed with yellow; and the belly whitiſh.

MILLET, *millium*, in *Botany*, a genus of the *triandria digynia* claſs. Its characters are theſe: it is of the corn or graſs tribe, with one flower in each chaff; the petal of the flower is bivale, and ſmaller than the empalement; it hath three very ſhort hairy ſtamina, and a roundiſh germen with two hairy ſtyles; the germen turns to a roundiſh ſeed, covered by the petal of the flower. Miller reckons four, and Linnæus five ſpecies.

The firſt ſort grows naturally in India, but is now cultivated in many parts of Europe, as an eſculent grain. The ſecond grows naturally at la Vera Cruz.

The common *millet* was originally brought from the eaſtern countries, where it is ſtill greatly cultivated: from whence we are furniſhed annually with this grain, which is by many perſons greatly eſteemed for puddings, &c. This is ſeldom cultivated in England, but as a curioſity in ſmall gardens, or for poultry, as its ſeeds generally ripen well.

It muſt be ſown in the beginning of April, upon a warm dry ſoil, but not too thick, becauſe theſe plants, dividing into ſeveral branches, ſhould have much room. When they come up they ſhould be cleared from weeds; after which they will, in a ſhort time, get the better of them. In Auguſt they will ripen, when they muſt be cut down, and the ſeeds beat out, as is practiſed for other grain; but when it begins to ripen, if it be not protected from birds, they will ſoon devour it. Miller.

Millet is reckoned by Pliny the moſt fertile of all grain; one grain of it producing three Roman ſextaries.

Millet is cooling, drying, and binding, ſomewhat windy, and not eaſily digeſted; a ſtrong decoction of it with figs and raiſins, mixed with wine, and drank warm in bed, is a very good ſudorific, though it is ſeldom uſed.

Millet, by conſent of authors both ancient and modern, is refrigerating and drying; it is of bad juice, difficult of digeſtion, binds the belly, and generates flatulencies; it is however well known to be a very grateful food to many nations at preſent. In former times it ſerved to make bread, under a dearth of better corn, as we are aſſured by Dioſcorides, Pliny, Galen, and others of the ancients. Among the Italians, ſays C. Bauhine, loaves are made of *millet*, which are yellow, and eaten hot by many, not out of neceſſity, but for their ſweetneſs; but, when this bread is grown hard, it is quite black. Of the flour of *millet* and milk, the Italians make fine cakes, which muſt be eaten as ſoon as dreſſed, or elſe they become glutinous, and ungrateful to the taſte.

A pudding prepared of *millet*, boiled in milk with an addition of butter, and ſugar ſprinkled over it, is much in requeſt among the Germans at preſent; and theſe puddings have been long ago introduced into England, and are ſtill in faſhion.

The flour of *millet* was formerly uſed in fomentations, for the gripes, and for pains of the head and nerves; it was applied externally in bags, becauſe the uſe of it in cataplaſms was difficult, on account of its friability. If the membrane of the brain happens to be wounded, it is excellently conglutinated, ſays Archigenes, by infuſing thereon the juice of calaminth, and ſprinkling it with dry flour of *millet*. A decoction of *millet*, with figs and raiſins is called, by Heurnius, a noble ſudorific and diuretic. Or, take of a decoction of *millet*, boiled till it burſts, four ounces; white wine, two ounces: let the patient take it hot. Cheſneau.

Millet is diuretic and aſtringent; the ſeeds are of extraordinary ſervice in diſeaſes of the lungs, and exulcerations of the kidneys: made into a cataplaſm, they are anodyne and reſolvent. Hiſt. Plant. adſcript. Boerhaave.

MILLET, *Indian*, *holcus*, in *Botany*, a genus of the *polygamia monoecia* claſs. The characters are, that it hath male and hermaphrodite flowers on the ſame plant; the male flowers are ſmall, and have a bivalve chaff; they have neither petals, nor any proper empalement, but have three hairy ſtamina, terminated by oblong ſummits; the hermaphrodite flowers are ſingle, in a ſtiff bivalve chaff; they have three hairy ſtamina, terminated by oblong ſummits, with a roundiſh germen, ſupporting two hairy ſtyles, crowned with plumoſe ſummits; the germen becomes an oval ſingle ſeed, wrapped up in the chaff. There are ſeveral ſpecies of graſs that belong to this genus.

The African *millet* has been lately recommended by M. Tſchiffeli, of Switzerland, to the attention of the European farmers, as a very uſeful plant; becauſe it thrives in all ſorts of ſoils; it requires neither much dung nor great tillage; it is not ſubject to the depredations of birds, which are very fond of panic and common *millet*; it yields very large returns, and does not exhauſt the land in proportion to the largeneſs of the crops.

MILLIARE, or **MILLIARIUM**, among the Romans, denoted *a mile*, conſiſting of a thouſand paces, *mille paſſus*; whence the name.

In the Roman empire, the *milliaria*, in all the great roads, were marked with ſtones, or columns erected for that purpoſe; commencing from a column in the heart of the city, called *milliare aureum*.

Thoſe columns were alſo hence denominated *milliary columns.*

MILLIARIA *cohors.* See COHORS *equitata.*

MILLIARY *fevers*, *glands*, *herpes*, *terms.* See the ſeveral ſubſtantives.

MILLING, in the *Manufactories*, an operation called alſo FULLING.

MILLING, or *throwing of ſilk*, is the laſt preparation of ſilk before dying; ſerving to twiſt it, more or leſs, according to the work for which it is intended.

To prepare the ſilk for *milling*, they firſt put it in boiling water, incloſed between two linen cloths. The mill is a ſquare machine, compoſed of ſeveral pieces of wood, mortiſed in each other, ſo as to form a kind of large cage, in the centre whereof are two wheels placed parallel over each other, whoſe axis bears on two poſts. When the machine is ſimple, a ſingle man turns theſe wheels by means of a little cog in which they catch, and a large handle.

The wheels, put in motion by the handle, communicate their motion to eight windles, or reels, or even more, according to the largeneſs of the machine; on the flights or arms whereof the ſilk is wound from off two rows of bobbins placed on each ſide the machine; each row at the height of one of the two wheels in the centre. Theſe bobbins have their motion by means of leathern thongs, which bear on little cylinders of wood that ſupport them, and turn at length on the two wheels at the centre; ſo that the ſilk on each bobbin twiſts as it winds, and forms its ſeparate ſkain.

The ſmalleſt wheel moves two hundred of theſe bobbins, over which a ſingle perſon is ſufficient to inſpect, to put new bobbins or ſpoils in lieu of thoſe diſcharged of their ſilk, and to knot the ends when they break. See WINDING *of ſilk.*

MILLION, in *Arithmetic*, the number of ten hundred thouſand; or a thouſand times a thouſand.

A *million of* GOLD, or *million of money*, is ſometimes underſtood of a *million* of pounds; and ſometimes of a *million* of crowns.

MILLION *bank.* See BANK.

MILLMOTH, in *Natural Hiſtory*, the name of an inſect approaching to the nature of the beetle, but having no ſheath wings. It is common in the abode of millers and bakers, and other perſons who deal in meal.

MILPHOSIS, μιλφωσις, a Greek word uſed by the ancient medical writers, as a name of the diſeaſe of the eyelids, by which the hairs fall off from them, and the edges become red and tumid.

MILL-REE, or MILLE-RAY, a Portugueſe gold coin current for ſomewhat more than the Spaniſh piſtole.

The *mill-ree* is thus called, as conſiſting of a thouſand REES. It is alſo called a *St. Stephen*, from the figure of that martyr impreſſed thereon.

They have alſo a *mill-ree* of the little croſs, which in reality is only half the former; and whoſe value is that chiefly uſed in computations. See COIN.

MILOHYOIDÆUS. See MYLOHYOIDÆUS.

MILT, in *Anatomy*, a popular name for the SPLEEN.

MILT, or MELT, in *Natural Hiſtory*, the ſoft ROE in fiſhes; thus called becauſe it yields, by expreſſion, a whitiſh juice reſembling milk.

The *milt* is properly the ſeed, or ſpermatic part of the male fiſh.

The *milt* of a carp is reckoned a choice bit.

It conſiſts of two long whitiſh irregular bodies, each included in a very thin fine membrane. M. Petit conſiders theſe as the teſticles of the fiſh wherein the ſeed is preſerved: the lower part, next the anus, he takes for the veſiculæ ſeminales. Vide Mem. Acad. R. Scien. anno 1733. p. 291.

In the *milt* of a living cod-fiſh there are ſuch incredible numbers of thoſe ſmall animalcules found in the male-ſeed of all animals, that in a drop of the juice of it, no more in quantity than a ſmall grain of ſand, there are contained more than ten thouſand of them; and, conſidering how many ſuch quantities there are in the whole *milt* of one ſuch fiſh, it is not exceeding the bounds of truth to affirm, that there are more animals in one *milt* of it, than there are living men at one time upon the whole face of the earth. However ſtrange and romantic ſuch a conjecture may appear at firſt ſight, a ſerious conſideration, and calculation, will make it appear very plain. A hundred ſuch grains of ſand as here mentioned, will make about an inch in length; therefore in a cubic inch there will be a million of ſuch ſands.

The *milt* of one of theſe fiſhes is frequently about the quantity of fifteen cubic inches, it muſt therefore contain fifteen millions of quantities as big as one of theſe ſands; and if there be ten thouſand animals in each of thoſe quantities, there muſt be, in the whole, a hundred and fifty thouſand millions: which is a number vaſtly exceeding the number of mankind, even though we were to ſuppoſe the whole earth as populous as Holland. See Philoſophical Collections, p. 4. See *Fecundity of* FISH.

MILT *waſte*, or CETERACH *aſplenium*, in *Botany*, a plant nearly allied to the fern; being, in the Linnæan ſyſtem, a genus of *cryptogamia filices* claſs. The leaves are notched toward the ſide and downy; have a ſquamous duſt, in which, by the help of a microſcope, membranous capſulæ, or ſeed-pods, lying cloſe to one another, are perceived; every one furniſhed with a little round rope, which, by its conſtruction, opening the fruit into two parts, pour forth certain very ſmall ſeeds; the root is fibrous. It grows upon old, ſhady, moiſt walls, in many parts of England; but it is rarely cultivated.—Linnæus reckons twenty ſpecies.

The leaves are recommended as a pectoral ſimilar to maidenhair; to which they have been frequently joined in infuſions and apozems; and likewiſe as an aperient in obſtructions of the viſcera. They poſſeſs likewiſe a diuretic virtue, and appear to gently carry off ſand, cleanſe the kidneys, and allay pains in the urinary paſſages. The way of uſing them is to drink infuſions of them in the morning, as tea, with the addition of ſuch other medicines as particular caſes may require. See CETERACH.

MILTOS, in the *Natural Hiſtory of the Ancients*, the name of what we call reddle, a red earth of the ochreous kind, uſed in painting. The Greeks uſed the word in a leſs determinate ſenſe, and called all the red earths by this name, with adjectives derived from the names of the places where they were found, &c. to denote their differences. See REDDLE.

MILVAGO, in *Ichthyology*, a name given by Geſner and ſome others, to a fiſh called by authors in general *milvus* and *cuculus*, and by ſome *lucerna*, and the FLYING *fiſh.* It is a ſpecies of the TRIGLA, and is called, by Artedi, the trigla with a ſnout bified at the extremity, and the ſide-lines forked near the tail.

MILUS, μιλος, a name given by the Greek writers to a plant uſed in garlands, and ſometimes to a tree. Theophraſtus evidently uſes it as the name of a tree, and Crato as that of the garland-herb.

MILVUS, in *Ichthyology.* See FLYING *fiſh.*

MILVUS, in *Ornithology.* See KITE, and BUZZARD.

MIME, MIMUS, a term in the ancient comedy, ſignifying a BUFFOON, or *mimic*, who acted by poſtures ſuitable to the perſon or ſubject he repreſented.

The word comes from the Greek μιμος, *imitator*; formed of μιμεομαι, *I imitate.* The ſame comedians were alſo ſometimes called *pantomimes*, becauſe of their counterfeiting all manner of poſtures and geſtures.

MIMESIS, μιμησις, in *Rhetoric*, a figure, whereby the words, geſtures, ſpeech, actions, &c. of another perſon are imitated. See IMITATION.

MIMOSA, in *Botany.* See SENSITIVE *plant.*

MIMULUS, in *Botany*, CYNOPHYNEIUM, or MONKEY FLOWER, a genus of the *didynamia angioſpermia* claſs. Its characters are theſe: the flower has a quadridented, priſmatic, permanent empalement; it is of the lip or ringent kind, whoſe brim is divided into two lips; the upper lip is erect, divided at the top into two parts; the lower lip is broad and trifid, the middle ſegment being the leaſt, the palate convex and bifid; it has four ſlender ſtamina, two longer than the other, terminated by bifid kidney-ſhaped ſummits; and a conical germen, which turns to an oval capſule, with two cells, filled with ſmall ſeeds. Miller mentions only one ſpecies, which grows naturally in moiſt grounds in North America.—Linnæus enumerates two ſpecies.

MIMUSOPS, in *Botany*, a genus of the *octandria monogynia* claſs. Its characters are, that the empalement is compoſed of eight leaves; that the flower has ſixteen petals; and that the fruit is an acuminated drupe.—There are two ſpecies.

MINA, μινα. The Attic *mina* was either nummary or ponderal; in the firſt acceptation it was the ſixtieth part of a talent, and contained a hundred drachmæ, or denarii, amounting in our coin to three pounds four ſhillings and ſeven pence. *Mina*, conſidered as a weight, was alſo divided into a hundred drachmæ. See DRACHMA, and DENARIUS.

Mina was alſo a medicinal weight, conſiſting of ſixteen Roman ounces, anſwering to our avoirdupois pound, as appears by Dioſcorides and Galen, and Cleopatra in Coſmeticis.

There was alſo another *mina* more lately introduced, which conſiſted of 12½ ounces. See COIN and WEIGHT.

MINAGGNHINIM, a pulſatile inſtrument of muſic, among the Hebrews, which was a ſquare table of wood, fitted with a handle; over this table was ſtretched an iron chain, or hempen cord, paſſing through balls of wood or braſs, which ſtruck againſt the table, when the inſtrument was ſhook, and occaſioned a clear ſound, which might be heard at a great diſtance. See Kircher's figure of it, in *Tab. Muſic*, *fig.* 9.

MINCA, a name given by the ancients to a very coarſe and bad kind of myrrh.

MINCHA, in the *Jewiſh Cuſtoms*, offerings of meal, cakes, or biſcuits, made in the temple of the Lord. The Seventy have ſometimes preſerved this word in their tranſlation; but inſtead of *mincha* they read *manaa*, which doubtleſs was the received pronunciation in their time. We find *manaa* in the ſame ſenſe, in Baruch i. 10. Levit. ii. 3, &c. See the Greek of Jerem. xvii. 26. Dan. ii. 46. 2 Kings viii. 5, 9. xvii. 7. xx. 12. 2 Chron. vii. 7. Nehem. xiii. 5, 9. &c. Calmet. Dict. Bibl.

MIND, *mens*, denotes a thinking or underſtanding being. See SPIRIT.

Philoſophers generally allow three kinds of *minds*, viz. *God*, *angels*, and the human *ſoul*. For a thinking being muſt either be finite or infinite: if infinite, it is *God*; and if finite, it is either joined with a human body, or not; if the latter, it is an *angel*; if the former, a *ſoul*.

The *human mind* is properly defined a thinking rational ſubſtance: by *thinking*, it is diſtinguiſhed from body; and by *reaſoning*, from God and angels, who are ſuppoſed to ſee and know things intuitively, without the help of deduction and diſcourſe.

MIND, *affection of the*. See AFFECTION.

MINDERERI *ſpiritus*. See VINEGAR.

MINE, in *Natural Hiſtory*, a place under ground, where metals, minerals, or even precious ſtones, are dug up.

As, therefore, the matter dug out of *mines* is various; the *mines* themſelves acquire various denominations; as *gold-mines*, *ſilver-mines*, *copper-mines*, *iron-mines*, *diamond-mines*, *ſalt-mines*, *mines of antimony*, *of alum*, &c.

For *gold* and *ſilver-mines*, the richeſt and moſt celebrated are thoſe of Peru and Chili, in America. *Iron-mines* are more abundant in Europe than elſewhere. *Copper-mines* are chiefly found in Sweden, Denmark, and England. *Lead* and *tin-mines* abound moſt in England and Wales. *Quickſilver-mines* in Hungary and Spain. *Diamond-mines* in the Eaſt Indies, and in the Braſils. *Salt-mines* in Poland, &c.

Metallic-mines are chiefly found in mountains; though the reaſon thereof does not appear. It is probable, plains may abound as much therewith, would people dig deep enough. But plains are commonly cultivated; and beſide, the water will ſcarce allow them to be dug. Add, that the metallic veins always run either horizontal or oblique; and for that reaſon are eaſieſt found on the ſides of eminences. See LOAD, TRAINING, &c.

There are ſome *mines* wherein the metals are found at their firſt opening very crude and imperfect; which yet, in time, grow ripe and rich. Alonſo Barba relates, that in Potoſi, ſtones have frequently been at firſt thrown aſide, as not containing any thing conſiderable of metal; and yet have been found many years afterwards exceeding full thereof. Cæſalpinus aſſures us, that earths, which before yielded no metal at all, ſometimes became very fertile veins. In an iſland of the Tyrrhene ſea, after the *iron-mines* have been exhauſted, they ſtop them up about ten years; at the end whereof, it is ſaid, they find them as rich as before: many of theſe facts, however, are but ſlightly atteſted. *For the formation of mineral and metallic matters in mines*, ſee MINERAL.

The king by his prerogative hath all *mines* of gold and ſilver to make money; and where gold and ſilver in *mines* is of greater value, which are called royal mines. But by ſtatute no mines of copper or tin ſhall be adjudged a royal *mine*, though ſilver be extracted. 1 W. & M. c. 30. And perſons having *mines* of copper, tin, lead, &c. ſhall enjoy the ſame, although claimed to be royal *mines*; but the king may have the ore (except in Devon and Cornwall) paying to the owners of the *mines*, within thirty days after it ſhall be raiſed, and before removed, 16*l.* per ton for copper-ore waſhed, and made merchantable; for lead-ore 9*l.* per ton; tin or iron, 40*s.* &c. Stat. 5 W. & M. c. 6. If any perſon maliciouſly ſet on fire any *mine*, or pit of coal, he ſhall ſuffer death as a felon, by ſtat. 10 Geo. II. c. 32. Stealing ore out of *mines* is no larceny, except only thoſe of black-lead, the ſtealing ore out of which is felony without benefit of clergy, by 25 Geo. II. c. 10.

MINE-*adventurers, company of*, had its firſt riſe about the year 1690, when certain *mines* of lead and copper were found in South Wales, which were divided by the proprietors into twenty-four ſhares; and in 1693 ſubdivided into four thouſand and eight ſhares, for the term of twenty-two years and a half; to which term five years more were added in 1698, and the affairs of the company regulated by a new conſtitution. In 1704, queen Anne granted a charter of incorporation to this company; in conſequence of which ſeveral new ſhares were added, ſo that the whole number amounted to ſix thouſand and twelve. However, the intereſts of this corporation were ſo ill managed, that the proprietors and creditors petitioned parliament in 1710, and a committee of the houſe of commons was appointed to enquire into its ſtate. The reſult of the enquiry was a cenſure on the principal managers; and though, in 1711, a law was paſſed for the better regulation of the company, and the relief of the creditors and proprietors, nothing could preſerve it from ſinking.

MINE, in the *Art of War*, denotes a ſubterraneous canal or paſſage dug under the wall or rampart of a fortification intended to be blown up by gunpowder.

The paſſage of a *mine* leading to the powder is called the GALLERY. Theſe paſſages or galleries made within the fortification, before the place is attacked, and from which ſeveral branches are carried to different places, are generally four feet wide, and five feet high, and the earth is ſupported from falling in by arches and walls, as they are to ſerve for a conſiderable time; but when *mines* are to be uſed in a ſhort time; the galleries are only about three feet wide and five high, and the earth is ſupported with wooden frames or props. When the gallery is carried on to the place where the powder is to be lodged, called the CHAMBER, the miners make this generally of a cubical form, large enough to hold the wooden box, which contains the powder neceſſary for the charge; this box is lined with ſtraw and ſand-bags, to prevent the powder from contracting any dampneſs. The chamber is ſunk ſomewhat lower than the gallery, unleſs the beſieged can raiſe the water in the ditch, and incommode the gallery; in which caſe the chamber is made higher than the gallery, that the water may not be let in and ſpoil the *mine*. The line, drawn from the centre of the ſpace containing the powder, perpendicular to the neareſt ſurface, is called the *line of leaſt reſiſtance*; the pit or hole, made by a *mine* when ſprung, is called the *excavation*. The fire is conveyed to the *mines* by a pipe or hoſe, made of coarſe cloth, whoſe diameter is about an inch aud a half, called *ſauciſſon*, extending from the chamber to the entrance of the gallery, to the end of which is fixed a match, that the miner who ſets fire to it may have time to retire before it reaches the chamber. In order to prevent the powder from becoming damp, the ſauciſſon is laid in a ſmall trough, called *auget*, with ſtraw in it, and round the ſauciſſon, with a wooden cover nailed upon it. There are various kinds of *mines*, which acquire different names; as royal *mines*, ſerpentine *mines*, forked *mines*, as their paſſages are ſtraight, oblique, winding, &c. The *mines* made by the beſiegers in the attack of a place are ſimply called *mines*, and thoſe made by the beſieged COUNTER-*mines*. They are both made in the ſame manner, and for the like purpoſes, viz. to blow up their enemies and their works; only the principal galleries and *mines* of the beſieged are uſually made before the town is beſieged. The beſieged generally make a great many ſmall *mines* under the glacis, of about ſix, ſeven, or eight feet deep under ground, which are called *fougaſſes* or *fougades*. They make likewiſe another ſort, called *coffers* or *caiſſons*, which are a kind of wooden boxes three or four feet long, and a foot or eighteen inches wide, which they bury four, five, or ſix feet under the glacis, and about four yards diſtant from each other.

MINES, *hiſtory of*. It is obſerved by writers on this ſubject, that *mines* were in uſe long before the invention of gunpowder; for the ancients made galleries or ſubterraneous paſſages under the walls of places, and ſupported them with ſtrong props; filling the interval with all kinds of combuſtibles, which being ſet on fire burnt their props, and, the walls being no longer ſupported, fell, whereby a breach was made. The beſieged alſo made uſe of ſimilar paſſages from the town under the beſiegers machines, with which they battered the walls, in order to deſtroy them. But the art of mining has received great improvements ſince the invention of gunpowder. The firſt *mines* which we read of, ſince the diſcovery of gunpowder, were uſed, in 1487, by the Genoeſe, in the attack of Serezanella, a town belonging to Florence: however, as theſe failed, they were neglected for a conſiderable time. The firſt ſucceſsful application of the blowing of *mines* in ſieges was in the kingdom of Naples, in the year 1503; when Pietro de Navarre by this means poſſeſſed himſelf of a fort garriſoned by the French. But the firſt celebrated uſe of theſe *mines* in oppoſing the progreſs of the beſiegers was in the years 1666, 1667, 1668, at the ſiege of Candia; though they had been often practiſed in the defence of places before, in a leſs memorable manner; for by the aſſiſtance of this invention principally, the city of Candia kept the whole power of the Ottoman empire at bay for three years ſucceſſively. Since that time the advantage of *counter-mines* hath been better underſtood. The laſt eminent inſtance of their great utility was in the defence of Turin, in 1706: for ſo effectually were the beſiegers traverſed thereby, that, after near four months of open trenches, they were not in poſſeſſion of more than the counterſcarp, and even then, eleven pieces of their cannon were blown up by the defendants but three or four days before the place was relieved.

The firſt profeſſed writer on *mines* was the celebrated M. Vauban; he was ſucceeded by M. de Valliere, one of the greateſt maſters in the art of mining; who, uniting theory with experiment, diſcovered, by meaſuring ſeveral excavations, that the pit or hole made in the earth, when the *mine* was ſprung, was not an inverted cone (*Tab.* VIII. *Fortification, fig.* 49.) nor a fruſtum of a cone (*fig.* 50.) as Vauban and others had ſuppoſed, but nearly a paraboloid (*fig.* 51.); and his tables were computed according to that figure. It has been generally admitted by miners, that the diameter of the pit or hole made by the *mine* was always twice the line of the leaſt reſiſtance, and that this diameter ſhould never exceed this proportion. But M. Belidor undertook to remove this prejudice; and however generally it may ſtill prevail, he ſeems to have proved by many experiments, which have ſince been repeated by others, that the diameter of the hole made by a *mine* may be increaſed to any length in regard to the depth of the *mine*.

Mines, *theory of.* The eſtimation of the proper quantity of powder with which a *mine* is to be loaded in any kind of ſoil, or at any depth under ground, in order to produce any propoſed effect, is the moſt difficult part of the whole art of mining. This depends not only on the quantity of earth to be blown up, but likewiſe on the tenacity of the different ſoils in which the *mines* are made. The quantity of earth to be raiſed depends on the figure of the excavation; for if this is known, the ſolid content may be determined by geometry; and by weighing exactly a cubic foot of that ſoil, we can eaſily diſcover what weight is to be raiſed; and by knowing what quantity of powder is required to raiſe a certain weight, the tenacity of the parts may alſo be had, by making a *mine* ſo as to produce a good effect; and ſubtracting the quantity of powder, neceſſary to raiſe the weight of the ſolid from the charge of the *mine*, the remainder would be the quantity neceſſary to overcome the tenacity. It is, however, diſputed, as we have already obſerved, what the figure of the excavation is: it was at firſt imagined to be an inverted cone, as ACB (*fig.* 49.) whoſe vertex is in the centre of the chamber, and the radius of its baſe AD equal to its axis CD; but this being found to allow too ſmall a charge, it was next ſuppoſed to be a fruſtum of a cone, as AEFB (*fig.* 50.) whoſe leſſer baſe EF is equal to the line CD of leaſt reſiſtance, and the greater AB equal to twice that line. On this laſt ſuppoſition, ſaid to be confirmed by the experiments of M. Maigrigny, under M. Vauban, near Tournay, miners have computed their tables of the quantities of powder neceſſary for charging *mines* at different depths.

However, M. Belidor diſputed the concluſions of Maigrigny; whoſe experiments were examined by direction of the chief commander of the artillery of La Fere, in the conſtruction of more than a hundred and fifty *mines* between the years 1725 and 1730. In the courſe of this enquiry, ſeven *mines* were made, whoſe line of leaſt reſiſtance was ten feet, and loaded with the following quantities of powder, viz. the firſt with 120℔; the ſecond with 160℔; the third with 200℔; the fourth with 240℔; the fifth with 280℔; the ſixth with 320℔; and the ſeventh with 360℔. Theſe *mines* being ſprung one after another, and their excavations examined, the diameters of their baſes were found to be as follow: that of the firſt 22⅔ feet; the ſecond, 26 feet; the third, 29 feet; the fourth, 31¼ feet; the fifth, 33½ feet; the ſixth, 36 feet; and the ſeventh, 38 feet. Theſe experiments invalidated the principles of Maigrigny; nevertheleſs miners have ſtill doubted, whether the diameter of the excavation can be made greater than double the line of leaſt reſiſtance, or whether the excavation itſelf will not become like a well or pit when overcharged. As to the true figure of the excavation, this was diſcovered by M. de Valliere, and aſcertained by others after him, to be very nearly a paraboloid, as AEB (*fig.* 51.) having the centre of the powder or charge in the focus C, CD the line of leaſt reſiſtance, AB the diameter, and CA the radius. Mr. Muller, however, obſerves, that, though the figure of the excavation is a paraboloid, the quantity of the earth to be blown up ſhould be eſtimated by the part ALMB, cut off by a plane LM, paſſing through the focus or centre C of the chamber, parallel to the horizon AB; the other part LEM being occaſioned by the force of the powder preſſing downwards; becauſe, he ſays, the exploſion of gunpowder, acting on all ſides alike, muſt condenſe the ſolid under the chamber from L to M, by its preſſure downwards, ſo long as it preſſes the earth above LM upwards; and it cannot be ſaid, that any particle of earth under the horizontal line LM can be drove upwards. In order to find the content of this ſolid, let $EK=EC=\frac{1}{4}$ of P, or the parameter; and it appears from the well known properties of the PARABOLA, that $AD^2=ED\times P$; $LM=P$; and $CA=KD$. And in the right-angled triangle CDA, $CD^2+DA^2=CA^2=KD^2$; and, therefore, $\sqrt{CD^2+DA^2}=KD$; whence, if CD and DA are given, the line KD, and conſequently CK, or its equal CL, will be known; and, therefore, if the line of leaſt reſiſtance CD, and the radius DA of the baſe are given, the parameter may be found. Moreover, the ſolid content of the PARABOLOID is equal to half the cylinder of the ſame baſe and altitude; if r expreſſes half the circumference, whoſe radius is unity; i. e. if $r=1.57$; then, becauſe $1:2r$, or the radius to the circumference as the ſquares of the radii CL, DA, are to the æras of their circles; we have $rED\times AD^2$ for the ſolid content of AEB, and $rEC\times CL^2$ for the ſolid LEM; therefore their difference $rED\times AD^2-rEC\times CL^2$, will expreſs the ſolid required. But if P expreſſes the parameter LM, then will $P\times ED=AD^2$, and $P\times CE=CL^2$, and theſe values ſubſtituted in the expreſſion of the ſolid, give $rP\times ED^2-rP\times EC^2$: or, becauſe $ED=EC+CD$, and $KD=CD+2EC$, we ſhall have this expreſſion reduced to $rP\times CD\times KD$. But as r is a conſtant number, it may be neglected in comparing the ſolids; and then $P\times CD\times KD$, will be the expreſſion of the ſolid. And when two excavations are compared together, which have the ſame line of leaſt reſiſtance CD, the ſolid will be expreſſed by the rectangle $P\times KD$. Hence if this ſolid, or the quantity of earth to be raiſed, and the line CD of the leaſt reſiſtance be given, the parameter P may be found; and having the parameter and the line CD, the equation $P\times ED=AD^2$, will give the radius AD of the baſe. For if $CD=c$, and the given ſolid $ALMB=a$, then becauſe $CE=\frac{1}{4}P$, the expreſſion $P\times CD\times KD$, will give $Pc\times\overline{\tfrac{1}{2}P+c}=a$, or $PPc+2Pcc=2a$, and $PP+2Pc=\frac{2a}{c}$, to which adding cc, we ſhall have

$$PP+2cP+cc=\frac{2a}{c}+cc;\ \text{and}\ P+c=\sqrt{\frac{2a}{c}+cc}.$$

In comparing *mines* together, which have the ſame line of leaſt reſiſtance, the rectangle $P\times KD$, gives $PP+2cP=2a$, to which adding cc, we ſhall have $PP+2cP+cc=2a+cc$, whoſe ſquare root is $P+c=\sqrt{2a+cc}$. By means of theſe equations, all the different problems relating to *mines* are eaſily ſolved, on the ſuppoſition, that the forces of powder are proportional to their quantities, and, therefore, the charges alſo proportional to the quantities of earth to be raiſed in the ſame ſort of ſoil, i. e. in ſoil of the ſame denſity and tenacity. Some writers, however, aſſert, that the elaſtic force of powder is greater in proportion, in larger quantities than in ſmall ones, which Mr. Muller denies; and M. Belidor gives another reaſon for diminiſhing the charges of *mines*, as the earth to be raiſed increaſes; which is, that not only the weight of the earth to be raiſed is to be conſidered, but likewiſe the preſſure of the atmoſphere over the ſurface of the excavation, which preſſure is as the baſes of the excavation, and theſe as the ſquares of the diameters; whereas the weights of ſimilar ſolids are as the cubes of theſe diameters; and, therefore, this preſſure being leſs, in proportion, in larger bodies than in ſmaller, the charges ought rather to be leſſened in large *mines* than in the ſmall. But this reaſoning ſeems to be contradicted by experiments.

In order to know the quantity of powder neceſſary for blowing up a *mine* in a particular ſoil, ſeveral *mines* are to be made in it, having their lines of leaſt reſiſtance equal, but loaded with different quantities of powder, till one is found to have the deſired effect. When this is found, the diameter of its baſe muſt be meaſured with the greateſt accuracy, and likewiſe the line of leaſt reſiſtance; and when theſe lines are determined, the parameter P of the parabola is found by the equation $KD=\sqrt{AD^2+CD^2}$; and, having the parameter given, the quantity of earth or ſolid is found by the ſolid $P\times CD\times KD$, or by the rectangle $P\times KD$, as the lines of leaſt reſiſtance are different or the ſame. This ſolid, and the charge of the *mine*, will ſerve to find the effect of any other *mine* made in the ſame ſoil when the charge is given; or to determine the charge, ſo that the diameter of the baſe ſhall be of any given length, by means of the equation $P\times ED=AD^2$. The ſame being performed in all the different ſoils, which generally occur in making *mines*, will ſerve to make *mines* of any depth, or placed in any ſoil.

The miners divide the different ſoils into five ſpecies.

1. looſe earth or ſand.
2. common middling light ſoil.
3. into loom or ſtrong ſoil.
4. potters clay, or ſtiff ſoil.
5. clay mixed with ſtones.
6. all kind of maſonry.

It has been found, that a cubic foot of the firſt weighs 95℔; of the ſecond, 124; of the third, 126; of the fourth, 135; and 160 of the fifth. But as to maſonry, it cannot be determined to any degree of exactneſs, as depending on the different kinds of ſtones or bricks of which they are made.

It is pretended, that there are nine pounds of powder required to raiſe a cubic toiſe of the firſt kind; 11 of the ſecond; 13 of the third; 15 of the fourth; 18 of the fifth; and 20 or 25 to raiſe a cubic toiſe of maſonry above ground; and 35 or 40 for raiſing the ſame quantity under ground.

Theſe are the French weights and meaſures, which being reduced into Engliſh, give 8 ℔ of powder for the firſt kind of ſoil; 9.8 for the ſecond; 11.6 for the third; 13.4 for the fourth; 16 for the fifth; 18 or 22.3 for the maſonry above ground; and 31 or 35 for raiſing the ſame quantity under ground.

In the ſecond volume of M. Vauban's Attack and Defence of Places, he ſays, that the following rules never fail.

A cubic toiſe of common earth requires 14 pounds of powder to be raiſed.

Stiff ſand or loom, which may be dug without being ſupported, requires 17 pounds per toiſe.

Mixt earth requires 18 pounds per toiſe.

Potters clay or ſtiff ſoil, 19 pounds per toiſe.

Fat or ſtiff earth mixt with pebble ſtone, 22℔.

Wet ſand, which cannot be dug without being ſupported, 15℔.

Theſe rules of Mr. Vauban make therefore the charges greater than thoſe of later miners.

But this is a matter which muſt be decided by experiments; and when theſe are made with ſufficient exactneſs, it will be eaſy to find the proper charge of a *mine*, ſo as the diameter of its baſe be of any given length; or when that length is given, to determine the charge required. E. gr. Let it be required to find the diameter of a *mine* made in the ſecond ſort of ſoil; which being loaded with 100℔ of powder, ſay, if 11 pounds raiſe a cubic toiſe, or 216 cubic feet of earth, how much will raiſe 100℔; the fourth term, which is 1964, will be $=a$; and $2a=3928$; and ſuppoſing the line of leaſt reſiſtance CD to be 10 feet, then will $c=10$; hence the equation $c+P=\sqrt{\frac{2a}{a}+cc}$, will give $c+P=\sqrt{402.8}=20$; or $P=10$, and $EC=\frac{1}{4}P=2.5:ED=12.5$; whence the equation $P\times ED=\overline{AD^2}$, gives $10\times 12.5=12.5=\overline{AD^2}$, or $AD=11.2$ nearly.

But to ſhew how far this theory agrees with the experiments mentioned before, we may ſuppoſe the firſt to be true, and from thence proceed to find what the diameters of the baſes of the others will be. All the lines of leaſt reſiſtances of theſe *mines* were ten feet each, the diameter of the baſe of the firſt mine was found to be $22\frac{2}{3}$ feet; ſo that AD is $=11.33$, or $=11.4$. $CD=10$; theſe values being ſubſtituted in the equation $KD=\sqrt{\overline{CD^2}+\overline{AD^2}}$, will give $KD=\sqrt{229.96}=15.16$; and $2KC=P=10.32$; hence theſe values being ſubſtituted in the rectangle $P\times KD$, becauſe the line of leaſt reſiſtance is here always the ſame, gives $10.32\times 15.16=156.5$, for the ſolid, which muſt be remembered, becauſe it is the ſtandard number whereby the other ſolids are determined.

Now if 120℔ gives 156.5, how much gives the charge 160℔ of the ſecond for its ſolid, the fourth term gives $208\frac{2}{3}=a$, and $2a=417\frac{1}{3}$; this value, as well as that of $c=10$, being ſubſtituted in $P+c=\sqrt{2a+cc}$, gives $P+c=\sqrt{517.4}=22.7$; hence $P=12.7$, $EC=\frac{1}{4}$,$P=3.2$, and $ED=13.2$. Now theſe values being ſubſtituted in $P\times ED=\overline{AD^2}$, give $\overline{AD^2}=167.64$, and $AD=13$ nearly; and as AB has been found by meaſurement to be about 26, it ſhews that this computation anſwers very nearly the experiment.

If as the charge 120 of the firſt is to the charge 200 of the third, ſo is the ſolid 156.5 of the firſt to the ſolid of the third; we ſhall have $a=260.84$, or $2a=521.68$; and as $c=10$, the equation $P+c=\sqrt{2a+cc}$ gives $P+c=\sqrt{621.68}=24.93$ nearly; hence $P=14.93$, $\frac{1}{4}P=EC=3.73$, and $ED=13.73$; theſe values being ſubſtituted in $P\times ED=\overline{AD^2}$, give $AD=14.32$, and $AB=28.64$; which anſwers nearly the experiment; it was found that $AB=29$ nearly.

If we proceed thus with regard to the 4th, 5th, 6th, and 7th experiments, we ſhall find the diameters of the baſe to be as follows; that of the 4th, 31.2; that of the 5th, 33.2; the 6th, 35.3; and that of the 7th, 37.4; which anſwers pretty near the experiments.

In this method of conſtructing *mines*, any opening may be made, whatever be the line of reſiſtance; and by making this line ſmall, and loading the *mine* with more powder, the inconvenience of a large excavation, which affords lodgment to the beſiegers, is avoided: beſides, the ſhafts and galleries are ſooner made, and ſeveral *mines* may be placed under one another, by which the ſame ſpot of ground may be blown up ſeveral times.

If it were required to make a *mine* in the ſame ſort of ſoil as that in which the ſeven experiments mentioned before were made, ſo that the line of the leaſt reſiſtance ſhall be equal to the radius of the baſe, and each of ten feet, and to find the quantity of powder neceſſary for its charge. Becauſe $AD=CD=10$, the equation $KD=\sqrt{\overline{AD^2}+\overline{CD^2}}$, will give $KD=\sqrt{200}=14.14$; hence $P=8.28$; theſe values being ſubſtituted in $P\times KD$, will give 117 nearly, for the ſolid; then if we ſay, as the ſolid 156.5, of the firſt experiment, is to the ſolid 117, ſo is the charge 120 to the charge required, it will be 90℔ nearly. But if it was required to find the quantity of powder neceſſary to raiſe a cubic fathom, or 216 cubic feet of this ſoil; then becauſe $CD=10$ has been neglected in the ſolid 156.5, of the firſt experiment, as likewiſe the ratio r, therefore the quantity muſt be multiplied by $r\times 10$; or becauſe $r=1.57$ by 15.7, which will give 2457; then if we ſay, as 2457 requires 120℔ of powder, how much will 216 require; and the fourth term, which is 10.5℔, will be the number ſought. From whence it appears, that the ſoil, in which theſe experiments were made, was a light ſort of ſoil, ſomewhat lighter than that which is taken by the miners for the ſecond ſort.

M. De Valliere ſuppoſes, in his table, inſerted below, that a *mine*, whoſe line of leaſt reſiſtance and radius of the baſe are each ten feet, requires $93\frac{3}{4}$℔ for its charge. Now, if it be required to find what kind of ſoil theſe *mines* are made in, by ſubſtituting the number for CD, AD, in the equation $KD=\sqrt{AD^2+CD^2}$, we ſhall have $KD=\sqrt{200}=14.4$, and $P=8.28$; now theſe values being ſubſtituted in $rP\times CD\times KD$, we ſhall have $15.7\times 8.28\times 14.14=1838$; then if we ſay, as 1838 is to $93\frac{3}{4}$, ſo is 216 to 11. This fourth term will expreſs the number of pounds of powder required to raiſe a cubic fathom of the ſame ſort of ſoil, which therefore is the ſecond ſort.

The preceding computations have been made of French weights and meaſures, to ſhew how nearly the foregoing theory agrees with the experiments made at La Fere. It remains now to apply it to our own weights and meaſures; becauſe eight pounds of powder will raiſe a cubic fathom of earth of the firſt ſort; if we ſay a cubic fathom, or 216 cubic feet is to eight pounds, as 1838 cubic feet is to 68.074 pounds, this fourth term will be the charge of a *mine*, whoſe line of reſiſtance is ten feet as well as the radius of the baſe: in the ſame manner are found the charges of the ſame *mine* in the reſt of the ſoils. But the ſhorteſt way of computing tables is to ſubtract the logarithm of 216 from that of 1838, which gives 9298917; now if to this logarithm we add thoſe of 8, 9.8, 11.6, 13.4, 16; the weight of the powder required to raiſe a cubic fathom of the different ſoils, found before; we ſhall have 1° 83298, 2° 92112, 3° 99435, 4° 05699, 5° 14301, for the logarithms of the charges of a *mine* whoſe line of leaſt reſiſtance is 10 feet, and the diameter of the baſe 20.

Valliere's TABLE for the Charges of *Mines*.

Length of the line of leaſt reſiſtance.	Charge of powder.		Length of the line of leaſt reſiſtance.	Charge of powder.		Length of the line of leaſt reſiſtance.	Charge of Powder.		Length of the line of leaſt reſiſtance.	Charge of Powder.	
Feet.	lb.	oz.	Feet.	lb.	oz.	Feet.	lb.	oz.	Feet.	lb.	oz.
1	0	2	11	124	12	21	868	3	31	2792	4
2	0	12	12	162	0	22	998	4	32	3072	0
3	2	8	13	205	15	23	1140	10	33	3369	1
4	6	0	14	257	4	24	1296	0	34	3680	12
5	11	11	15	316	4	25	1558	9	35	4019	8
6	20	4	16	384	0	26	1647	12	36	4374	0
7	32	2	17	460	9	27	1815	4	37	4748	11
8	48	0	18	516	12	28	2058	0	38	5144	4
9	68	5	19	643	0	29	2286	7	39	5561	2
10	93	12	20	750	0	30	2530	4	40	6000	0

By this conſtruction the radii of the baſes being always equal to the lines of leaſt reſiſtances, the ſolids are ſimilar, and therefore are to one another as the cubes of their axes; that is, as the cubes of the lines of leaſt reſiſtances. So that taking any one of the charges to be true, the others will be found by ſaying, as the cube of the axis whoſe charge is given is to its charge, ſo is the cube of the axis of any other *mine* to its charge.

For example, let the charge $93\frac{3}{4}$ of the *mine*, whoſe line of leaſt reſiſtance is 10 feet, be given; and it be required to find the charge of any other *mine* whoſe line of leaſt reſiſtance is given, ſuppoſe 15: then ſay, as the cube 1000 of 10 is to the cube 3375 of 15, ſo is the charge $93\frac{3}{4}$ to the charge required, which is 316.4, or 316 pounds 6 ounces, which is 2 ounces more than in the table. In the ſame manner is found the charge of a *mine* whoſe line of leaſt reſiſtance is 20; or becauſe 20 is double of 10, the cube of 20 will be octuple the cube of 10; and therefore $8 \times 93\frac{3}{4}$, or 750 pounds, will be the charge for that mine.

A Table of the Charges of *Mines* according to Muller's Theory.

Diamteer	Charge	Diameter	Charge	Diameter	Charge
Feet.	℔	Feet.	℔	Feet.	℔
22	150	42	639	62	1518
24	181	44	711	64	1621
26	217	46	773	66	1741
28	255	48	857	68	1842
30	297	50	946	70	1980
32	344	52	1020	72	2098
34	394	54	1115	74	2243
36	452	56	1205	76	2372
38	502	58	1299	78	2501
40	560	60	1406	80	2648

In this table the line of leaſt reſiſtance is ſuppoſed to be always 10 feet, and the charges producing the openings at the ſides of them from 22 feet to 80. It is ſuppoſed that the charge $93\frac{3}{4}$ of a *mine*, whoſe line of leaſt reſiſtance and radius of the baſe are each 10 feet, is given, and from thence all the reſt are computed by means of theſe equations, $KD = \sqrt{AD^2 + CD^2}$, and $P \times KD = a$; and by comparing the diameters of the baſes found, by means of theſe equations, to be rather leſs than thoſe found by experiments, it is preſumed that the diameters marked in this table will not be found leſs, but rather greater in practice.

In order to find the ſize of the boxes, generally made cubical, in which the powder is lodged; as a cubic foot of common powder weights about 55 pounds, if we ſay as 55 is to unity, ſo is any other quantity to its cube; i. e. if the given quantity of powder be divided by 55, the quotient will be the cube required, and its cube root will be the length of the ſide of the box. The box muſt always be made a fourth bigger than it ſhould be, on account of the ſtraw and ſand-bags put in it, for keeping the powder free from wet; ſo that if the quantity of powder be 360 pounds, the fourth part of it, or 90, muſt be added, and the ſum 450 divided by 55, whoſe quotient is 8.1818, and the ſquare root of this, or 2.86 feet, or 34 inches, will be the ſize required. If the chamber happens to be placed on a rock, or any other hard ſubſtance, the force or action of the powder downwards, meeting with great reſiſtance, will be employed in raiſing the earth upwards; and conſequently the effect of the *mine* will be much greater than that produced by the ſame quantity of powder, placed on a ſofter ſubſtance. On which account, if a platform of ſtrong planks were made under the chambers, there would be a leſs quantity of powder required for the charge of the *mine*. When the *mine* is properly loaded, the gallery is ſtopped up with ſtones, earth, and dung, well rammed, five or ſix feet farther from the chamber than the length of the line of leaſt reſiſtance. And for preventing the *mine* from burſting through the gallery, and to make it have its effect upwards, the gallery is made with one or two turnings, at right angles to each other, and ſtrongly ſecured with buttreſſes and planks, and the intervals rammed with ſtones and earth.

Many writers have eſtimated the operation of *mines* on the falſe ſuppoſition, that their entonnoir, or excavation, is the fruſtum of a cone; and therefore, in order to eſtimate the weight of the matter to be blown up, they have only to compute the ſolidity of ſuch a fruſtum in cubic fathoms, and to multiply the number of fathoms by the number of pounds of powder neceſſary for raiſing the matter it contains; and if this cone contains matters of different weights, to take a mean between them all; always having a regard to their degree of coheſion. As to the diſpoſition of *mines*, there is one general rule, which is, that the ſide towards which one would determine the effect, be the weakeſt; but this varies according to occaſions and circumſtances.

Mines, *different ſorts of*. A *mine* which has only one chamber is called a ſingle *mine*, as A, *fig*. 52. If it has two chambers, it is called double, as *fig*. 53. and if it has three, tripple, as *fig*. 54, &c. the names being taken from the number of chambers. If a ſingle *mine* is made under the rampart, to make breach, the entrance O, *fig*. 52. muſt not be oppoſite to the place where the chamber is deſigned to be, but on one ſide or other; and the gallery with two turnings, that it may be ſtopped with greater ſecurity, and that the diſtance of the entrance O to the chamber A may be greater than the length of the line of leaſt reſiſtance: otherwiſe the *mine* would have its effect that way. It muſt alſo be obſerved, that the chamber is placed in the middle of a counterſcarp, by which means it will make a greater breach than if it were placed in the earth behind the wall. When a double *mine* is made under the rampart for making breach, the entrance O, *fig*. 53. is made, as nearly as can be gueſſed, in the middle, between two counter-forts; the gallery being carried quite through the wall in a direct line, turns afterwards to the right and left, in the form of a T; from whence it is alſo called a T *mine*; and the chambers are alſo placed in the next counter-forts, but exactly at equal diſtances from the direct gallery: this double *mine* will make a much larger breach than the ſingle one, and it is for that reaſon preferred to any other.

But when a triple *mine* is to be made under the rampart, the opening O, *fig*. 54. is to be made directly oppoſite to the counter-ſort, if poſſible, and carried directly through the wall, and turned to the right and left in the ſame manner as the former; and the chambers A, B, at both ends, are placed in the two adjacent counter-forts. As to the gallery of the third, C, it is carried round the middle counter-fort, and the chamber placed under its extremity; this laſt is generally charged with fifty pounds of powder more than either of the others; but great care muſt be taken to carry the auger of this laſt chamber in zig-zags, ſo as to be equal in length to that of the chamber B, otherwiſe the fire would not reach them all three at the ſame time, and thereby the chamber C not take fire, which ſometimes happens, and then the effect does not anſwer the expectation.

There are ſeldom or ever more made than a triple under the ramparts in ſieges; but when a work is to be demoliſhed, they make then as many as will demoliſh a whole face at once; which is done by giving the fire to all at the ſame time; that is, all the ſauciſſons are brought into one, and ſo contrived, as that their parts from the chambers to the common junction may be exactly equal. Muller's Syſtem of Artillery, &c. vol. vi. part iii. p. 206, &c.

Mine, *chamber of a*. See Chamber and Mine.

Mine, *counter*. See Counter-*mine* and Mine.

Mine, *gallery of a*. See Gallery and Mine.

Mine, *knight of the*, is a military honour, anciently conferred on perſons who had diſtinguiſhed themſelves in engagements in *mines*.

Mine-*ſhips*, are ſhips filled with gunpowder, incloſed in ſtrong vaults of brick or ſtone, to be fired in the midſt of an enemy's fleet. See Fire-*ſhip*.

Mine is alſo a French measure.

Mine-*dial* is a box and needle, with a braſs ring divided into 360 degrees, with ſeveral dials graduated thereon; generally thus made for the uſe of *miners*.

MINERA, in *Medicine*, the ſeat, or rather matter of a disease.

The term is applied by ſome authors to thoſe parts of the body wherein there are collections and coacervations of humours made; which, hardening, form obſtructions, and produce diſeaſes.

In this ſenſe we ſay, the *minera morbi*, &c.

MINERAL, in *Natural Hiſtory*, is ſometimes uſed in the general for fossil; and applied to any body, ſimple or compound, dug out of a ſubterraneous place or *mine*; from which it takes its denomination.

In this ſenſe, metals, ſulphurs, foſſil ſalts, ſemi-metals, &c. are *minerals*.

On this principle, they divided *minerals* into two claſſes; the one *fuſible*, and *malleable*; i. e. which melt with fire, and ſtretch on the anvil; which are what we properly call METALS. The others want thoſe two properties; and are what in the ſtricteſt ſenſe we call *minerals*.

Some divide *minerals* into *ſimple* and *compound*. To the firſt belong *ſtones*; *ſalts*, as alum, nitre, &c. *inflammable minerals*, as ſulphur and bitumen; and *metals*, as gold, &c. Other more accurate writers reſtrain the word *mineral* to what we otherwiſe call *ſemi-metal*; as antimony, cobalt, &c.

MINERAL, in this ſenſe, may be defined a compound foſſil, wherein there is ſomething diſcovered, in all reſpects, like metal, only that is not malleable; joined or compounded with ſome other foſſil, as ſalt, ſulphur, ſtone, or earth.

Such are *antimony*, *cinnabar*, *biſmuth*, *calaminaris*, *vitriol*, *pyrites*, *marcaſites*, *cobalt*, *oker*, the *magnet*, *lapis hæmatites*, and *armenus*. See each under its proper article.

Some attribute the formation of *minerals* to the action of the ſun without; ſome to the central fire within; and ſome think the cold does all by uniting, condenſing, and congealing certain juices of the earth.

Deſcartes takes metals to have been formed from the beginning of the world; and to have ranged themſelves, by the laws of gravity, about the centre. In proceſs of time, he ſuppoſes theſe to have been corroded by the acid ſalts, &c. and abundance of the parts thereof carried up along with thoſe ſalts by the ſubterranean heat, and depoſited in divers parts of the earth.

Monſ. Tournefort ſuppoſes ſeeds of *minerals*, as of animals and vegetables. Every thing, according to him, comes from eggs, even ſtones; and the largeſt rocks, he thinks, were originally no more than grains of ſand. See his ſyſtem more at length under the article STONE.

The alchemiſts maintain, that metals proceed from a certain primum ens, or firſt ſeed of metals, which, they ſay, is a kind of moiſt vapour, or gas, that changes the earth and juice it meets with in a vein into a *mineral* body or ſubſtance; and thence converts the *minerals* into ores or metals, by a continued fermentation or elaboration in the mines, cauſed by the archeus, or heat that acts in the veins, as it proceeds from the centre of the earth. But this doctrine of mineral fermentation is poſitively denied by the celebrated Boerhaave, who, in his Hiſtory of Fermentation, aſſerts, that it belongs only to the vegetable kingdom. Others maintain, that all metals and *minerals* were at firſt created in the very ſame ſtate and nature, in which they are always found, without undergoing any kind of alteration. The moſt common opinion, among the miners in Cornwall, is, that crude immature *minerals* nouriſh and feed the ores, with which they are intermixed in the mines; and that the *minerals* themſelves, will, in proceſs of time, be converted into ores productive of thoſe metals, to which they have the neareſt affinity, and with which they have the greateſt intercourſe. Others, as Mr. Geoffroy, contend that METALS, &c. may be the reſult of the mixture of certain matters, which had nothing metallic in them. Thus, in the aſhes of all vegetables we find a ferruginous matter, which the loadſtone attracts; and yet it will be hardly ſaid, that iron exiſted in the plants. We ſee no ſigns of iron in clay, work it in what manner you will; and yet add to it linſeed-oil, and by fire you will procure IRON: the like may be ſaid of divers other matters.

Hence it is probable, metals may be formed by a mere combination of different ingredients; much like ſulphur, which we all know is made by adding an inflammable principle to a vitriolic ſalt. The earth may every where abound with thoſe matters, which are continually circulating through its pores and canals, and which, meeting with an earth homogeneous to them, fix thereto; and commence *minerals*,

Mr. Pryce, in his Mineralogia Cornubienſis, p. iv. ſuppoſes it moſt reaſonable to conclude, that metals were made and implanted in veins at or very ſoon after the creation of the world: but that they are ſubject to a degree of fluctuation in common with all matter; approaching to, or receding from their ultimate degree of perfection, either quicker or ſlower, as they are of greater or leſs ſolid and durable frame and conſtitution. He ſuppoſes, that in every metal there is a peculiar magnetiſm, and an approximation of particles, ſui generis, by which its component principles are drawn and united together; particularly the matters left by the decompoſition of the waters paſſing through the contiguous earth or ſtrata, and depoſited in their proper nidus; till by the accretion of more or leſs of its homogeneous particles, it may be denominated either rich or barren.

The *minerals*, metals, and ſtones, lie in beds; and have done ſo ever ſince the flood, if not from the creation; yet it is highly probable they have a faculty of growing in their reſpective beds; and that, as the beds are robbed and emptied by miners, ſo after a while they recruit again. Thus vitriol, Mr. Boyle thinks, may grow by the help of the air, and that alum does the ſame. We are aſſured (ſays that author) by the experienced Agricola, that the earth or ore of alum, being robbed of its ſalts, will, in tract of time, recover them again, by being expoſed to the air.

As for metals, there is good reaſon to believe they grow likewiſe, from what has been alledged by Mr. Boyle in his obſervations about the growth of metals, and particularly as to the growth of iron. To the inſtances he brings from Pliny, Fallopius, Cæſalpinus, and others, we may add, that in the foreſt of Dean, in Glouceſterſhire, the beſt iron, and in the greateſt quantities, is found in the old cinders, which they melt over again. This ſome impute to the negligence of the former melters in not exhauſting the ore. And Dr. Derham thinks it rather owing to the new impregnations of the old ore, or cinders, from the air, than to any ſeminal principle in the ore itſelf.

The chemiſts generally take *minerals* to be nothing elſe but imperfect metals, and imperfect metals to be perfect ones, which, not having arrived at maturity, may be perfected by chemical operations, and raiſed to perfection. This agreeable, but fatal deluſion, has given riſe to the ſect of philoſophers who ſtudy the philoſopher's ſtone.

In the Engliſh tranſlation of the Dictionary of Chemiſtry, art. *ores*, we have ſome ingenious conjectural remarks, concerning the formation of *minerals*. Thoſe ores, it is ſaid, which are found under water, upon the ſurface of the earth, in fiſſures of mountains and ſubterranean cavities, accumulated, but not accreted to the contiguous rocks, ſeem from their looſe, unconnected, broken appearances to have been conveyed by alluvion.

All martial ochres have probably been ſeparated from vitriolic ferruginous waters, either ſpontaneouſly or by calcareous earth; and theſe waters ſeem to have acquired their metallic contents by diſſolving the vitriol which is produced by the ſpontaneous decompoſition of martial pyrites. The ochres of copper, zinc, and perhaps of ſeveral other metals, have probably been precipitated from vitriolic waters by ſome ſubſtance, as calcareous earth more diſpoſed to combine with acids; and theſe vitriolic waters have probably been rendered metalliferous, by diſſolving the vitriols produced by a combuſtion of cupreous pyrites, and of the ore of zinc called blend; for theſe *minerals* are not, as martial pyrites is, ſuſceptible of decompoſition ſpontaneouſly, that is, by air and moiſture.

The metalliferous nodules and ſpots ſeem to have been infixed in ſtones while theſe were yet ſoft. Perhaps the metalliferous and lapideous particles were at once diſſolved and ſuſpended in the ſame aqueous menſtruum, and during the concretion, cryſtallized diſtinctly, as different ſalts do, when diſſolved in the ſame fluid.

The earths and ſtones uniformly coloured by metals, were alſo probably in a ſoft ſtate while they received theſe tinges. The opake-coloured ſtones ſeem to have received their colour from metallic calces mixed and diffuſed through the ſoft lapideous ſubſtance; and the tranſparent coloured ſtones have probably received their colours from vitriolic ſalts, or from metalic particles diſſolved in the ſame water which ſoftened or liquified the ſtony ſubſtance; which metallic ſalts and particles were ſo much diffuſed, that they could not be diſtinctly cryſtallized. That all ſtones have been once liquid and diſſolved in water, appear probable not only from their regular cryſtallized forms, but alſo from the ſolubility of ſome ſtone, as of gypſeous and calcareous earths, in water: and from the water which we know is contained in the hardeſt marbles, as well as in alabaſters; to which water theſe ſtones owe the cryſtallization of their particles.

The veins called cumulated, and the entire metalliferous mountains, are believed by Wallerius to be analogous to the modules. Theſe metalliferous ſubſtances ſeem to have been originally formed or concreted in the places where they are found.

The metalliferous ſtrata have probably been inſinuated between the lapideous ſtrata, after the ſeparation of theſe from each other by ſome violent cauſe; in the ſame manner in which we ſuppoſe that the clay and toad-ſtone have been inſinuated between the ſeveral ſtrata of lime-ſtone in Derbyſhire. The matters thus inſinuated may have been either fluid, which would afterwards cryſtallize, and form entire regular maſſes; or they may have been the ruins of ſhattered ſtrata and veins brought by waters, and there depoſited; in which caſe they will appear broken and irregular. The metalliferous ſtrata, although frequently confounded with the horizontal or dilated veins, may be diſtinguiſhed, according to Wallerius, from theſe, by the following properties: 1. They are generally thinner and much broader than the veins called dilated. 2. They are ſeldom found at a greater depth than an hundred perches, and generally in the neighbourhood of veins, from which they probably have received their contents. 3. From their want of the thin incruſtations called fimbriæ, which are frequently interpoſed betwixt the rock and the ore or its matrix; and from their want of the other properties of veins.

But in veins, properly ſo called, the ſtrongeſt marks exiſt of ores having been there concreted, and not carried thither and depoſited in their preſent ſtate. Their regular unbroken appearance, their accretion to the contiguous rock, either immediately or by invention of a matrix, the regular appearance of this matrix interveloping the ore, the frequent cryſtallization of the ore and of the other contents of the vein, indicate that ores, as well as the other ſolid contents, have been there concreted from a fluid to a ſolid ſtate.

Moſt authors believe, that veins, and the perpendicular clefts in the ſtony ſtrata of mountains, called fiſſures, have been produced by the ſame cauſe; or rather, they conſider veins only as fiſſures filled with metalliferous matters. They farther believe, that fiſſures have been occaſioned by the exſiccation of ſtrata, while theſe were paſſing from a fluid to a ſolid ſtate. Wallerius thinks, that fiſſures have been formed from exſiccation, but that veins were channels made through the ſtrata, while yet ſoft and fluid, by water, or by the more fluid parts of the ſtrata penetrating and forcing a paſſage through the more ſolid parts. He thinks, that theſe fluid parts conveyed thither their metalliferous and ſtony contents, which were there coagulated or concreted. He ſupports his opinion by obſerving that all the veins of the ſame ſtratum generally run parallel to each other; that they frequently bend in their courſe; that the ſame vein is ſometimes contracted and ſometimes dilated; that veins are frequently terminated by being ſplit or divided into inferior veins; that veins are frequently wider at bottom than at top, whereas fiſſures are always wideſt at top, and are very narrow below: all which appearances, he thinks, could not have been produced by exſiccation. From theſe reaſons, fiſſures appear to have had a different, and, from the disjunction and rupture of veins croſſed by fiſſures, they ſeem to have had a later origin than veins. Whether fiſſures could have been produced by the very gradual exſiccacion of theſe large maſſes or ſtrongly coherent matter; or whether they have been produced by the ſame violent cauſes, namely, earthquakes, by which the ſtrata in which fiſſures are generally found, have been broken and deranged, and by which metalliferous mountains themſelves have been formed, or their ſtrata raiſed above their original level; as ſome others have, with great probability, conjectured; it is not eaſy to determine.

Veins are ſeldom, if ever, found but in mountains; the reaſon of which may not improbably be, that in metalliferous mountains we have acceſs to the more ancient ſtrata of the earth, which in plains are covered with ſo many depoſited, alluvial, and other later ſtrata, that we can ſeldom if ever reach the former. That theſe mountains conſiſt of ſtrata which have been originally lower than the upper ſtrata of adjacent plains, appears from an obſervation which has been made, that the ſtrata of mountainous countries dip with more or leſs declivity as they approach the plains, till they gradually ſink under the ſeveral ſtrata of thoſe plains, and are at laſt immerſed beyond the reach of miners. This leading fact in the natural hiſtory of the earth has been obſerved by a ſagacious philoſopher, Mr. Michell, in his Conjectures concerning Earthquakes, &c. Philoſ. Tranſ. 1760.

That the inferior ſtrata of the earth contain large quantities of pyritous, ſulphureous, and metalliferous matters, appears, 1. From the ſubterranean fires in thoſe inferior ſtrata, which produce volcanos, and probably earthquakes (as Mr. Mitchell ingeniouſly conjectures.) 2. From the obſervation, that all kinds of mountains are not equally metalliferous; but that veins, eſpecially, are only found in thoſe mountains, which, being compoſed of very ancient ſtrata, are called primæval, which form the chains and extenſive ridges on the ſurface of the earth, which direct the courſe of the waters, and which conſiſt of certain ſtrata, the thickneſs of each of which, its generic qualities, and its poſition relatively to the other ſtrata, are, in different parts of the chain of mountains where that ſtratum is found, nearly uniform and alike, notwithſtanding that the numbers, and the inclinations of the ſtrata compoſing contiguous mountains, or even different parts of the ſame mountain, are often very various; and therefore that veins are ſeldom, if ever, found in the mountains called by authors diluvial and temporary, which are ſingle, or detached, which conſiſt not of ſtrata uniformly diſpoſed, but of alluvial maſſes, in which fragments of ores may be ſometimes, but veins never, found. Nevertheleſs, ſingle, and ſeemingly detached, mountains in ſmall iſlands have ſometimes been found to be metalliferous. But we muſt obſerve that theſe mountains conſiſt of uniform ſtrata; that iſlands themſelves, eſpecially ſmall iſlands, may be conſidered as eminent parts of ſubmarine ranges of mountains; and that the mountains of ſuch iſlands may be conſidered as apices or tops only of inferior mountains.

Thoſe mountains are ſaid to be moſt metalliferous which have a gentle aſcent, a moderate height, and a broad baſis, the ſtrata of which are nearly horizontal, and not much broken and disjoined. In theſe mountains, at leaſt, the veins are leſs interrupted, more extended, and conſequently more valuable to miners, than the veins in lofty, craggy, irregular, and ſhattered mountains.

Authors diſpute concerning the time in which ores have been formed, ſome referring it to the creation of the world, or to the firſt ſubſequent ages; and others believing, that they have been gradually from all times, and are now daily formed. From the accretion of ores and of their matrices to their proper rocks, and from the inſertion of metalliferous nodules and ſtriæ in the hardeſt ſtones, we are inclined to believe that the matter of theſe veins and nodules are nearly coveal with the rocks and ſtones in which they are inveloped. Nevertheleſs, we cannot doubt that ſmall quantities, at leaſt of ores, are ſtill daily formed in veins, fiſſures, and other ſubterranean cavities. Several well atteſted inſtances confirming this opinion are adduced by authors: Cronſtedt mentions an incruſtation of ſilver-ore that was found adhering to a thin coat of lamp-black, or of ſoot, with which the ſmoke of a torch had ſoiled a rock in a mine at Koningſberg, in Norway; and that this incruſtation of ſilver-ore had been formed by a metalliferous water paſſing over the rock. Lehman affirms, that he poſſeſſes ſome ſilver-ore attached to the ſtep of a ladder, found in a mine in Hartz, which had been abandoned two hundred years ago; and that ſeveral ſteps of ladders ſimilarly incruſted had been found. Many other inſtances are mentioned by authors, of galena, pyrites, ſilver-ores, and other metalliferous ſubſtances having been found adhering to wood, to foſſil coal, to ſtalactitical incruſtations, to oyſter-ſhells, and other recent ſubſtances. From theſe, and from ſimilar inſtances which have occurred, there is reaſon to believe, that not only ochres and fragments of ores may, with other alluvial matters, be now daily depoſited, but alſo that ſmall quantities of mineralized ores are recently formed; although many hiſtories mentioned by Becher, Barba, Henckel, and other authors, of the entire renovation of exhauſted veins, and eſpecially thoſe of the growth and vegetation of metals and of ores, appear to be at leaſt doubtful.

Various opinions have been publiſhed concerning the formation of mineralized ores. According to ſome, theſe ores were formed by coagulation of the fluid maſſes found in mines, called *guhrs*. See Guhr.

Other authors believe, that ores have been formed by the condenſation of certain *mineral*, metallic, ſulphureous, and arſenical vapours, with which they ſuppoſe that mines abound. Some have even affirmed, that they have ſeen this vapour condenſe, and become in a few days changed into gold, ſilver, and other metallic matters. It has been above obſerved, that from ſeveral appearances which occur in veins, there is great reaſon to believe, that ores have not been carried thither and depoſited in their preſent ſtate, but have been there concreted and cryſtallized, that is, changed from a fluid to a ſolid ſtate. But the fluidity of the metalliferous matters at the time of their entrance into veins, may have been occaſioned either by their having been diſſolved in water, if they are capable of ſuch ſolution, or by their having been raiſed in form of vapour by ſubterranean fires. For the diſpoſition to cryſtallize is acquired by every homogeneous ſubſtance that is fluid, whether it has received its fluidity by being melted by fire, or by being diſſolved in a liquid menſtruum, or by being reduced to the ſtate of vapour. Thus cryſtals of ſulphur have been obſerved to be daily formed by the ſulphureous vapours which exhale in the neighbourhood of volcanos. The volatility of the two mineralizing ſubſtances, ſulphur and arſenic, and the power which volatile bodies poſſeſs of elevating a certain portion of any fixed matter which happens to be united with them, render it probable, that the greateſt part, at leaſt, of minerallized ores have been formed of vapours exhaled from ſubterranean fires, through the cracks of the intervening ſtrata, occaſioned by thoſe earthquakes which have, in a ſingular manner, broke and deranged the ſtrata of metalliferous countries, and which, as has been above remarked, have been probably occaſioned by, at leaſt have certainly been always accompanied with, ſubterranean fires.

Minerals, *Engliſh*. Dr. Woodward has obſerved, that the Engliſh *minerals* are much more valuable and numerous, than has been generally ſuppoſed. Fullers-earth a thing ſo cheap as to be diſregarded by many, he obſerves, is of almoſt as much value to our commerce as any article of foreign production. The property this earth has of imbibing oil and greaſe, is not confined to the trifling ſervice of taking out accidental ſtains in cloaths, but it is of ſo much uſe in cleanſing the wool and the cloth made of it, that we could never have flouriſhed in the cloth trade in the manner we have done had we not this foſſil among us ſo very plentiful and cheap, and at the ſame time ſo excellently good. This earth is one inſtance of the pre-eminence of our ſoil above others. Another inſtance we have in our black-lead or wadd, a *mineral* of great uſe and value in ſeveral branches of trade and arts; and which is found no where fine and good, except in England, and in our colonies; and that of the laſt place, though better than the black-lead of other nations, is greatly inferior to our own.

The amber and jet of England are found in conſiderable quantity, and are equal to thoſe of any other part of the world. Our canal coal comes very near the beauty of jet, and even our common coal for firing is greatly ſuperior in goodneſs, to that of any other part of the world, and is no where found in ſuch vaſt plenty as with us. The Engliſh earth and gravel are well known to be ſuperior to thoſe of other countries, in none of which ſuch graſs-plats or ſuch gravel-walks are to be ſeen, as in the Engliſh gardens. We have ſtones, ſlates, flags, and other neceſſary foſſils for building, in ſufficient plenty.

Vitriol and alum are found in greater plenty in England, than in any other country; and are ſo eaſily worked or procured from their ores that we can ſell them cheaper than any other people.

Tin is another article in which England has always had a great pre-eminence: the county of Cornwall alone produces more tin than all the world beſide; and the tin of England is well known to excel that of other nations, as well in value as in quantity.

Lead ore is alſo richer in England than in any other country, and is found in greater quantity here than any where elſe: beſide this, it runs more kindly in the fire, and requires leſs trouble and expence in the working, than any other lead: and is, when wrought, much finer and more ductile than any other lead.

This does not ariſe from any peculiarity in the metal, for lead is the ſame in all countries, when equally purified; but the ſpar which lies about, and is mixed with our lead-ore, is of ſuch a nature and diſpoſition, that it is eaſily wrought upon and readily parts from it, leaving the metal more pure than it can be procured by the common large operations in other countries; ſo that they are forced to ſend it away much leſs pure than ours is.

Copper and iron are alſo found in England in very great plenty, and ſeveral ores of theſe metals have of late been brought into uſe, which were not known before the modern improvements in chemiſtry.

Mineral, *Æthiops*. See ÆTHIOPS, and MERCURY.

Mineral, *turbith*. See TURBITH, and MERCURY.

Mineral *oil*. See OIL.

Minerale *bezoardicum*. See BEZOARDICUM.

Mineral, *cryſtal*. See CRYSTAL *mineral*.

Mineral *kermes*. See KERMES *mineral*.

Mineral *waters*, are thoſe, which at their ſpringing forth from under-ground, are found impregnated with ſome *mineral* matter; as ſalt, ſulphur, vitriol, &c. See WATER.

Such are hot baths, ſpaws, purging, &c. ſprings.

Mineral *waters, earth of*. See EARTH.

Mineral *juices*. See JUICES.

Mineral *courts*, *curiæ minerales*, in *Law*, courts for regulating the concerns of lead mines; as *ſtannary courts* are for tin.

MINERALOGY, that previous part of metallurgy, which teaches the ways of finding, judging, and digging of mines.

Mineralogy is an art that requires a conſiderable compaſs of knowledge before it can be practiſed to advantage; for this art requires a competent ſkill in the nature, effluvia, and effects of mineral matters, whether earths, ſalts, ſulphurs, ſtones, ores, bitumens, gems, or metals: it likewiſe requires a knowledge of the internal ſtructure of the earth, and its various ſtrata, with a competent ſkill in ſubterraneous architecture, menſuration, hydraulics, levelling, and mechanics: without theſe, we can never judge what mountain, plain, or valley, is proper to be dug; in what manner to dig it; how to diſcharge the water that may flow upon the works; how the beds of ore and ſtone will dip or run; how the various kinds of earths, marble, and other mineral or metallic matters are to be burſt through or broken; or how the general proceſs of mining ſhould be conducted, in order to procure with the leaſt expence, or bring to open day, the principal matter or ore required. Shaw's Lectures, p. 240.

And, even when all theſe difficulties are conquered, no more than half the work is effected; and the end can ſtill be never obtained, without a tolerable exact knowledge of ſeveral chemical operations, viz. trituration, torrefaction, lotion, calcination, cementation, fuſion, amalgamation, and the like; whence it might be laid down as a rule, that every directing mineraliſt ſhould not only be tolerably verſed in the ſeveral parts of natural philoſophy, but particularly be well acquainted with chemiſtry.

Many mines have been diſcovered by accident; a torrent firſt laid open a rich vein of the ſilver mine at Friburg, in Germany. Sometimes a violent wind, by blowing up trees, or overturning the parts of rocks, has diſcovered a mine. The ſame has happened by violent ſhowers, earthquakes, thunder, the firing of woods, or even the ſtroke of a plough-ſhare, or a horſe's hoof.

The art of mining does not wait for theſe favourable accidents, but directly goes upon the ſearch and diſcovery of ſuch mineral veins, ores, or ſands, as may be worth the working for metal.

The artificial inveſtigation and diſcovery of mines depend upon a particular ſagacity, or acquired habit of judging, from particular ſigns, that metallic matters are contained in certain parts of the earth, not far below its ſurface.

The metallic veins are commonly encompaſſed with a ſort of ſtone peculiar to the mine, and are accompanied with ſeveral ſtrata of different matters, as clay, gravel, rock, &c. Thoſe who work in mines, know by the ſize and colour of the ſtones, when they approach the vein.

They diſcover that there is a mine in the mountain by the marcaſites or mineral ſtones falling from it; by the mineral taſte of the waters; by the quality of the exhalations raiſed from it; and by the difference between the earth over the mines, and that of the neighbouring parts in the cold time of ſpring and autumn; the froſt lying on the adjacent places, when it thaws about the mines. Add, that the ground's producing but little graſs, and that ſhort, pale, and colourleſs, is an indication of a mine.

Some pretend to diſcover mines by the ſole virtue of the hazle-tree, out of which they form a forked ſtick, called VIRGULA *divinatoria*, which, they ſay, turns of itſelf, in their hands, but differently, according to the different nature of the metals or minerals, underneath. This artifice made a great noiſe in France towards the end of the ſeventeenth century; and the corpuſcular philoſophy was called to account for it. But it is now in little credit.

But when no evident ſigns of a mine appear, the ſkilful mineraliſt uſually bores into the earth, in ſuch places as, from ſome analogy of knowledge, gained by experience, (or by obſerving the ſituation, courſe, or nature of other mines) he judges many contain metal.

This method of boring conſiſts in the uſe of a ſet of ſcooping irons, made with joints, ſo as to be lengthened at pleaſure; and thruſt down to a conſiderable depth below the ſurface of the earth, ſo as, when taken out again, to bring back ſamples of the earth, or mineral matter, from the depth whereto the iron deſcended; much after the manner that ſamples of ſugar are taken, by the inſtrument called a reſt, out of the hogſhead.

This method of exploring mines is called by the tinners coſteening, from *cothas ſtean*, i. e. fallen or dropt tin. See SHOAD.

Another method of diſcovering loads of mines is by working DRIFTS acroſs the country, i. e. from north to ſouth, and vice verſâ: and this method is equally cheap and certain. Another very effectual way is by driving an ADIT from the loweſt ground, either north or ſouth, whereby there is a certainty of cutting all loads at twenty, thirty, or forty fathoms deep, if the level admits of it.

After a mine is found, the next thing to be conſidered is whether it may be dug to advantage. In order to determine this, we are duly to weigh the nature of the place, and its ſituation as to wood, water, carriage, healthineſs, and the like, and compare the reſult with the richneſs of the ore, the charge of DIGGING, STAMPING, WASHING, and SMELTING. This is a matter of œconomical prudence.

A mine is either found in a mountain, a hill, a valley, or a flat; of theſe, mountains and hills are dug with greateſt eaſe and conveniency, chiefly becauſe the drains and burrows, that is, the adits and avenues, may be here readily cut both to drain off the water, and to form gangways for bringing out the ore. In whatever place the mine lies we are to look for the veins, which rains or other accidents may have diſcovered; and where ſuch a vein is found, if it be tolerably large and rich, it is beſt to open the mine there. Otherwiſe the moſt commodious place for ſituation is to be choſen, that is, neither on a flat, nor to the tops of mountains, but in their ſides.

The beſt ſituation for a mine, is a mountainous, woody, wholeſome ſpot, of a ſafe eaſy aſcent, and bordering upon a navigable river. For wood is indiſpenſably neceſſary for making the engines and inſtruments, building the huts, fencing in the works, and working the ores. But though wood ſhould be wanting, if a navigable river be nigh, that may be ſupplied, as water-carriage is cheap.

Water, however, muſt never be wanting. This is beſt ſupplied by a large river, and is neceſſary on a thouſand occaſions, to waſh the ores, turn the works, &c. Good convenience of carriage muſt alſo be regarded, both for the carrying the ore or the metal to market, and the bringing neceſſaries to the workmen: for proviſions are ſeldom to be found where there are mines. See DIGGING, and TRACING.

The places abounding with mines are generally healthy as ſtanding high, and every way expoſed to the air; yet, ſome places, where mines are found, prove poiſonous, and can upon no account be dug, though ever ſo rich. The way of examining a ſuſpected place of this kind, is to make experiments upon brutes, by expoſing them to the effluvia or exhalations, to find the effect.

Mines are compoſed of VEINS, which are oblong tracts, forming maſſes of metals and ores, and lying in the ſtony ſtrata of mountains, &c. Theſe veins are very different in their direction, as well as in length, breadth, and depth. Some are ſtraight, and others curved; ſome are perpendicular to the horizon, and others parallel to it; and the reſt are of the intermediate degrees of declivity. Thoſe which ſtretch obliquely from the ſurface of the earth towards its central parts, are called deep veins: others, that lie ſhallow and circular, ſo as to encompaſs a large ſpace, are called ſpreading veins; others again, whoſe length is inconſiderable in relation to their length and breadth, are called accumulated veins.

The dimenſions, the quality, and the quantity of contents, and many other circumſtances of veins, are alſo very various. Miners diſtinguiſh the ſeveral kinds of veins by names expreſſive of their differences. Thus veins are ſaid to be deep; perpendicular; horizontal, or hanging, or dilated; rich; poor; morning, noon, evening, and night veins, by which their direction towards that point of the compaſs, where the ſun is at any of theſe diviſions of the natural day, is ſignified.

The ſtratum of earth or ſtone lying above a vein is called its roof: and the ſtratum under the vein is called its floor. Some parts of veins are conſiderably thicker than others. Small veins frequently branch out from large veins, and ſometimes theſe branches return into the trunk from which they iſſued. Theſe veins, from which many ſmaller veins depart, have been obſerved to be generally rich.

Veins are terminated variouſly. 1. By a gradual diminution, as if they had been compreſſed, while yet ſoft, by ſuperincumbent weight; or by ſplitting and dividing into ſeveral ſmaller veins: or, 2. They are terminated abruptly, together with their proper ſtrata in which they lie. This abrupt termination of veins and ſtrata is occaſioned by their being croſſed by new ſtrata running tranſverſely to the direction of the former; or by perpendicular fiſſures through the ſtrata; which fiſſures are frequently filled with alluvial matters, or with water, or are empty. Theſe perpendicular fiſſures ſeem to have been occaſioned by ſome rupture or derangement of the ſtratum through which the vein paſſes, by which one part of it hath been raiſed or depreſſed, or removed aſide from the other, probably by earthquakes. Where the vein is terminated abruptly it does not ceaſe, but is only broken and diſjoined; and is often recovered by ſearching in the analogous parts of the oppoſite ſide of the deranged ſtratum. A principal part of the art of miners conſiſts in diſcovering the modes of theſe derangements from external marks, that they may know where to ſearch for the diſjointed vein.

The contents of veins are metals and metalliferous mineral kinds, as, the ſeveral ſorts of ores, pyrites, blends, guhrs, vitriols; the ſeveral kinds of fluors, ſpars, quartz, hornblend, in which the ores are generally imbedded, or inveloped, and to which therefore the name, matrix of the ore, is applied; ſtalactites; cryſtallizations of theſe metalliferous and ſtony ſubſtances encruſting the ſmall cavities of the circumjacent rock; and laſtly, water, which flows or drops through crevices in that rock.

In a vein, ores are found ſometimes attached to the rock or ſtratum through which the vein runs, but more frequently to a matrix which adheres to the rock; and ſometimes both theſe kinds of adheſion occur in the ſame vein at different places. Frequently betwixt the matrix and the rock is interpoſed a thin cruſt of ſtone or of earth, called by authors the fimbria of the ore.

The matrix or the ſtone in which the ore lies inveloped, is of various kinds in different veins. And ſome kinds of ſtone ſeem better adapted than others to give reception to any ore, or to the ores of particular metals. Thus quartz, ſpar, fluors, and horn-blend give reception to all ores and metals; but ſlates chiefly to copper and ſilver, and never to tin; calcareous and ſparry matrices to lead, ſilver, and tin; and mica to iron.

Veins lie in ſtrata of different kinds of ſtone; but more frequently in ſome kinds of ſtone than in others. Thus of the ſimple or uncompounded ſtones which compoſe ſtrata, the following are metalliferous: calcareous ſtones; ſlaty ſand ſtone (cos fiſſilis arenoſus Wallerii); feltſpar (ſpatum pyrimachum ſive ſcintillans); quartz; ſometimes jaſper; frequently ſlates: and chiefly micaceous or talky ſtones; and horn-blend (lapis corneus Wallerii; bolus indurata particulis ſquamoſis Cronſtedt.) No veins have been found in gypſeous or in ſiliceous ſtrata, although cherts and flints frequently contain metallic particles, and ſome inſtances have been obſerved of ores of ſilver and of tin in alabaſter. Of compound ſtones, thoſe are ſaid to be chiefly metalliferous which conſiſt of particles of horn-blend. Veins have alſo been found in the red granite; but ſeldom, if ever, in any other granite, or in prophyry. In general, veins are more frequently found in ſoft, fiſſile, and friable ſtrata than in thoſe which are compact and hard.

A vein ſometimes paſſes from one ſtratum into the inferior contiguous ſtratum. Sometimes even the veins of one ſtratum do ſo correſpond with thoſe of an inferior ſtratum, the contiguity of which with the former is interrupted by a maſs of different matter through which the veins do not paſs, that they ſeem originally to have been continued from one ſtratum to the other. Thus in the mines of Derbyſhire, where the veins lie in ſtrata of lime-ſtones, the contiguity of which ſtrata with each other is interrupted in ſome places by a blue marle or clay, and in other places by a compound ſtone called toad-ſtone; the veins of one ſtratum frequently correſpond with the veins of the inferior ſtratum of lime-ſtone, but are never continued through the interpoſed clay or toad-ſtone. But we muſt obſerve, that theſe interpoſed maſſes, the blue marle, clay, and toad ſtone, have not the uniform thickneſs obſervable in regular ſtrata, but are (eſpecially the toad-ſtone) in ſome places a few feet in depth, and in others ſome hundreds of yards. The above diſpoſition ſeems to indicate, that theſe ſeveral ſtrata of lime-ſtone have been originally contiguous; that the veins now diſjoined have been once continued; that theſe ſtrata of lime-ſtone have been afterwards ſeparated by ſome violent cauſe, probably by the ſame earthquakes which have in a ſingular manner ſhattered the ſtrata of this mountainous country; that the interſtice thus formed between the ſeparated ſtrata have been filled with ſuch matters as the waters could inſinuate, probably with the mixed comminuted ruins of ſhattered ſtrata; or, with the lava of neighbouring volcanos, of which many veſtiges remain.

When a vein of ore is found, and all things prepared for the work, if the vein be of the deep kind, it is firſt to be laid bare, and a pit to be ſunk upon it, at the mouth of which a ſhed is to be raiſed, and a crane, or a barrel and winch fixed, for craning up the ore. The pit is to be ſunk either perpendicular or oblique, as the vein happens to run. It is alſo uſual in this caſe, to cut a burrow or ADIT into the ſide of the hill, which ſhould be twice as high as it is wide, that the workmen may commodiouſly paſs along it with their barrows and burdens: if this ſide pit reaches to the firſt pit, it becomes a true barrow, open at both ends, and renders the work more eaſy and commodious, as the ore may be wheeled out in barrows inſtead of being craned to the mouth of the pit. After the ſame manner, it is uſual to dig many caverns into the ſides of the mountain, in order to ſcoop out the ore; ſo that ſometimes there are thus ſeveral burrows made, to the eaſe and advantage of the work.

The art of DIGGING the veins, varies according to the nature of the vein, or according as it ſoft or hard. The ſoft vein is generally dug with the ſpade, and turned out into wooden trays, placed underneath to receive it: but the hard veins are knocked out with a gad, or kind of chiſſel and hammer. But, if the ore is ſo hard as to be incapable of breaking in this manner, they uſually ſoften it with fire, which has the power of rendering the hardeſt and moſt flinty ſtones brittle and friable. But a ſtill more expeditious method is the working with gun-powder, by means whereof, much of the hardeſt rock may be ſhivered and ſplit in a very little time; a ſmall parcel of powder being laid in a long hollow cut for that purpoſe, after the nature of a gun-barrel, and fired as it were at a touch-hole; a ſmall vent, where the quick match is applied, being left for the purpoſe, and the orifice being otherwiſe hard ſtopped up with clay.

The manner of purſuing and digging all ſorts of veins, the ways of under-propping, and diſcharging the water from the works, the ſinking of air-ſhafts, curing of damps, and the like, to the beſt advantage, requires more philoſophy than the generality of mere workmen, or the common miners have, though their experience may as much aſſiſt the theoretic philoſopher, as the diſcernment of the latter may that of the former.

The neceſſity of cleaving and opening rocks has been always accounted one of the moſt troubleſome articles in the buſineſs of mining; they being often compoſed of ſuch ſtone as tools can work but very ſlowly upon in the common ways. Fire and gunpowder have been the two things principally had recourſe to on theſe occaſions; and both ſucceſsfully, but in different ways. The fire calcines ſtones, and they then eaſily become ſhattered to pieces, and give way to tools that would not touch them before; but in this caſe, beſide the expence of wood, the hindrance of the labourers is an article to be conſidered, for the rocks are made ſo hot all about the place where the fire has been, that the people cannot get to work again for a day or two, and then the effect of the fire reaches but a little way in the rock.

Gunpowder makes its way much farther, and at the ſame time is much cheaper, and does not delay the work, but the labourers may go on immediately afterwards. There have been many ways contrived of uſing this, but one of the ſimpleſt and beſt, ſeems that delivered by Mr. Beaumont, in the Philoſophical Tranſactions. For this there are only three ſimple inſtruments required, a borier, a gun, and the quinet or wedge. Theſe are the names the miners on Meudip-hills give the inſtruments. The borier is an iron inſtrument, ſteeled at the end; it is two feet two inches long, and is ſomewhat thicker at the ſteeled end than in any other part: the uſe of this is to make the hole in the rock deep enough to receive the powder. The gun is about ſix inches long, and an inch and quarter in diameter; and has a hole drilled through it, to receive the priming. The quinet is a wedge of iron of about ſix inches long, and ſo ſhaped that its flat part on one ſide joins with a flat part in the gun made to receive it, and by that means the gun is faſtened very firmly in its place. Phil. Tranſ. Nº 167, p. 854.

The manner of uſing theſe inſtruments, is this; one man holds the borier on the rock, turning it round while another forces its point in by blows of a large hammer on the other end. When the hole is made ſomewhat deeper than the length of the gun, they dry it with a rag, and then put into it two or three ounces of powder; over this they lay a paper, and then they put the gun into the hole and faſten it in by driving in the quinet or wedge againſt its flat part. When the powder and gun are thus fixed, they paſs down a wire through the hole drilled in the gun, and with this they pierce a hole through the paper which covers the powder; they then prime the gun and lay a train with a lighted match; but all go out of the mine before the gunpowder takes fire, and as ſoon as it has gone off, they go down to work again, finding the rock ſplit and the inſtruments unhurt. The paper in this caſe is put over the powder only that the tools may be ſafely employed in driving down the gun and the quinet, becauſe were not the powder covered it might do miſchief to the workmen, by going off by ſome ſpark cauſed by ſtriking either againſt thoſe inſtruments, or againſt the rock itſelf.

MINERVA, in *Mythology*, derived according to ſome *â minis*, from the threats of her ſtern countenance, otherwiſe called *Pallas*, is the goddeſs of wiſdom and the arts; and the only one of the offspring of Jupiter to whom pertain the prerogatives of the ſupreme rank of divinity.

Minerva is repreſented, both by the painters and poets of antiquity, as a beauty of the ſeverer kind: the diſtinguiſhing character of her face is dignity and a certain ſternneſs, which has more of maſculine than feminine in it: and, therefore, more apt to ſtrike one with awe and terror, than to charm one, at firſt ſight. Her dreſs and attributes are adapted to the characters of her face; ſhe moſt uſually appeared with a helmet on her head, and a plume that nodded formidably in the air; in her right hand ſhe ſhook her ſpear, and in her other graſped her ſhield, with the head of the dying MEDUSA upon it; the ſame figure appears alſo on her breaſt-plate; and ſometimes the goddeſs herſelf is repreſented as having living ſerpents about her breaſts, and about her ſhoulders; ſhe is alſo accompanied with a cock, which is a fighting bird, and correſponding to her character as the inventreſs and preſident of war, and an owl, which ſees in the dark and, therefore is the image of wiſdom. It is probable that the Romans conſidered JUPITER, JUNO, and *Minerva*, as one and the ſame divinity, under three different names: among which names, that of Jupiter might ſignify ſupreme goodneſs; that of *Minerva*, ſupreme wiſdom; and that of Juno, ſupreme power: thus the learned Dr. Cudworth obſerves, Intell. Syſt. b. i. c. 4. p. 450. that the three Capitoline gods, Jupiter, Juno, and *Minerva*, may be underſtood to have been nothing elſe but ſeveral names and notions of one ſupreme deity, according to its ſeveral attributes and manifeſtations.

MINERVALIA, among the Romans, called alſo *Quinquatria*, were feaſts celebrated in honour of Minerva. One of theſe feaſts commenced on the third of January, and another on March 19th, and laſted five days. The firſt day was ſpent in prayers to the goddeſs; the reſt in offering ſacrifice, ſeeing gladiators fight, acting tragedies upon mount Albanus, and reciting pieces of wit, wherein the conqueror had a prize given him. Scholars had then a vacation, and made a preſent to their maſters, which was called *Minerval*.

MINIATURE, or MIGNATURE, a delicate kind of painting conſiſting of little points or dots, inſtead of lines; uſually done on vellum, ivory, or paper, with very thin, ſimple water-colours.

The word comes from the Latin *minium*, *red-lead*; that being a colour much uſed in this kind of painting. The French frequently call it *mignature*, from *mignon*, *fine*, *pretty*, on account of its ſmallneſs and delicacy: and it may be ultimately derived from μικρος, *ſmall*.

Minature is diſtinguiſhed from other kinds of painting by the ſmallneſs and delicacy of its figures, the weakneſs of their colours, and faintneſs of the colouring; and on this account it requires to be viewed very near.

Thoſe colours that have the leaſt body are the beſt and moſt commodious for painting in *miniature*; ſuch are carmine, ultramarine, fine lakes, and green made of the juices of ſeveral kinds of herbs and flowers.

The colours commonly uſed in *minature* painting are for *red*, carmine, lake, roſe-pink, vermilion, red-lead, ſcarlet-oker, common India-red, red oker, Venetian red, and Spaniſh brown: for *blue*, ultramarine, ultramarine aſhes, Pruſſian blue, verditer, indigo, ſmalt, blue bice, and litmus: for *yellow*, gamboge, Naples yellow, Dutch pink, Engliſh pink, gall-ſtone, maſticot, French berry waſh, turmeric waſh, zedoary waſh, and tincture of ſaffron: for *green*, ſap-green, verdigriſe, diſtilled verdigriſe, and terra verte: for *purple*, true Indian red, archal, and logwood waſh: for *brown*, biſtre, umbre, brown oker, Cologn earth, and terra Japonica: for *white*, flake white, white lead, calcined hartſhorn, pearl white, Troy white, lake white, and egg-ſhell white: and for *black*, Indian ink, lamp-black, ivory black, and blue black.

Painting in *miniature* is the niceſt and moſt tedious of all others, being performed wholly with the point of the pencil.

There are ſome painters who never uſe any white colour in *minature*, but make the ground of the vellum ſerve to raiſe their figures; in which caſe, the lights appear bright in proportion to the depth and ſtrength of the colours of the figures. Others before they go to work, give the vellum a light waſh with white lead, well prepared and purified.

When paper of any proper kind is uſed, it is ſufficient to prime it with iſinglaſs ſize, thickened properly with pearl white, and any pigment which will give the ground the deſired colour. But common paper may be rendered ſtronger and fitter for receiving the colours, by laying on the back of it a coat of ſtarch, boiled with water to a moderate conſiſtence, and rendeted more tenacious by the addition of a little iſinglaſs. This ſhould be laid on very ſmoothly with a bruſh, and the paper, when nearly dry, muſt be put betwixt two leaves of a book, or betwixt two ſheets of paper and two boards, and compreſſed by a weight laid upon them. Two ſheets of paper cemented together by the ſtarch and iſinglaſs, and treated in the ſame manner, make a very commodious ſubſtance for painting in *miniature*. Vellum requires only to be ſtrained on a paſteboard, and primed in the ſame manner, and if it ſhould be greaſy, rubbed over with the gall of any beaſt.

When the colours are laid on flat without dotting, though the figures be ſmall, and the ground either vellum or paper, it is not called *minature*, but *waſhing*.

The colours for *minature* may be mixed up with a ſolution of gum Arabic, or gum tragacanth, in water, or with iſinglaſs ſize. For the method of preparing ivory for *miniatures*, ſee IVORY.

MINICULATOR, among the Romans, a ſervant who embelliſhed any writing with MINIUM.

MINIM, in *Muſic*, a note, or character of time, equal to two crotchets, or half a ſemibreve.

The invention of the *minim* is aſcribed to a certain prieſt in Navarre, but the firſt who uſed it was Philip de Vitriaco, in whoſe time it was the ſmalleſt note in practice. See TIME and CHARACTERS *of Muſic*.

MINIM, *ſextuple of the*. See SEXTUPLE.

MINIMA *naturæ*, or MINIMA *naturalia*, among *Philoſophers*, the primary particles, whereof bodies conſiſt; the ſame with what are otherwiſe called CORPUSCLES, and ATOMS.

MINIMA, in the *Higher Geometry*, the ſmalleſt quantities attainable in any given caſe. See MAXIMUM.

MINIMA, *per*. See PER *minima*.

MINIMENTS, or MUNIMENTS. See MUNIMENTS.

MINIMI *digiti extenſor*. See EXTENSOR.

MINIMI *digiti pedis abductor*. See ABDUCTOR.

MINIMS, MINIMI, an order of religious, inſtituted about the year 1440, by S. Francis de Paulo, confirmed in 1473, by Sixtus IV. and by Julius II. in 1507. See BONS-*hommes*.

Theſe have improved on the humility of the MINORS, by terming themſelves *Minimi* or *Minims*, q. d. leaſt, or ſmalleſt.

MINIMUS *glutæus*. See GLUTÆUS.

MINION, a ſort or CANNON, or piece of ordnance, whereof there were formerly two kinds; large and ordinary, anſwering to our ſix-pounders. See GUN.

MINISTER, one that ſerves or conducts the public worſhip of God.

In the reformed church, prieſts, or thoſe ordained to preach and do the other functions of the prieſthood, are called abſolutely and ſimply *miniſters*.

In which ſenſe, biſhops, &c. are ſaid to be *miniſters* of God, *miniſters* of the Word, of the Goſpel, &c. In ſome churches they are alſo called *paſtors*.

MINISTERS *of the altar* are properly thoſe who attend, and aſſiſt the prieſt at the adminiſtration of the euchariſt. See DEACON and SUBDEACON.

Officers of ſtate, &c. are called the king's *miniſters*; as adminiſtering the affairs of juſtice, policy, &c. for him.

MINISTER *of ſtate*, is he with whom a prince entruſts the adminiſtration of his government; or to whom he commits the care and direction of the principal affairs thereof.

Boethius is propoſed as a model for *miniſters* of ſtate.

The grand vizier is the prime *miniſter* of the Ottoman empire.

MINISTERS, *foreign*, or the *miniſters of foreign princes*, are their ambaſſadors, envoys, agents, or reſidents in the courts of other princes.

There are two kinds of foreign *miniſters*. *Miniſters* of the firſt rank, who are alſo called EMBASSADORS, and *envoys extraordinary*.

And *miniſters* of the ſecond rank, who are the ordinary reſidents.

Thoſe of the firſt rank have a repreſentative character, which the others have not; though theſe laſt are ſome times inveſted with fuller powers than the former.

MINISTER is alſo the title which certain religious orders give to their ſuperior.

In this ſenſe we ſay, the *miniſter* of the Mathurins, or Trinitarians.

MINISTER, among the *Jeſuits*, is the ſecond ſuperior of each houſe; thus called, as being an aſſiſtant to the ſuperior, or rector.

The general of the Cordeliers order is alſo called the *miniſter-general*. See JESUITS.

MINISTRY, or MINISTERY, a profeſſion, office, or employment, which a perſon diſcharges for the ſervice of God, the public, or ſome particular perſon.

In which ſenſe we ſay, a biſhop muſt give account to God of his *miniſtry*, &c.

MINISTRY is alſo uſed for the government of a ſtate, by ſome great miniſter, under the ſovereign authority.

In which ſenſe we ſay, the *miniſtry* of the cardinal de Richlieu, &c.

MINISTRY is alſo frequently uſed as a collective word, ſignifying the miniſters or officers of ſtate.

Thus we ſay, the *miniſtry* oppoſed a thing; meaning, the miniſters oppoſed it.

MINIUM, in the *Natural Hiſtory of the Ancients*, a name given to what we now call CINNABAR, or native mineral of a ſhining red colour, out of which quickſilver was extracted. This native mineral becoming much in uſe was ſoon adulterated; and that commonly with lead-ore calcined to a redneſs; and hence, after the two words *minium* and *cinnabar* had been long uſed in common, the cinnabar became retained only to the native mineral, and the *minium* to that adulterated with lead ore, or to the red adulterating matter alone, which is the ſenſe in which it is ſtill uſed.

Minium, or *red* LEAD, is a calx of lead of a vivid yellowiſh red colour, which colour it acquires by a ſlow calcination and reverberation. The *minium* in commerce is chiefly brought from Holland, where large quantities of it are manufactured.

The method in which *minium* is made in large quantities with us, is this: they firſt burn lead in a furnace into a kind of litharge, by continually ſtirring it while melted with an iron rake; this they afterwards grind with two pair of ſtones, which deliver it from one to another, the firſt pair grinding it coarſer, the ſecond finer; theſe are worked by means of a mill, which moves ſix pair of them at once. When thus reduced to a fine powder, it is waſhed and then put into a furnace, and is burnt with a reverberatory fire for two or three days, all the while they continue ſtirring it with a large iron rake, hung on a ſwivel or iron hook; and toward the end of the time they watch its being of the right colour. When this is doing, the fire muſt not be carried beyond a certain degree, leſt the matter clod and run together.

The proceſs by which *minium* is prepared is deſcribed in the following manner by M. Jars. The furnace is of the reverberatory kind, with two fire-places at the ends; each fire-place being ſeparated from the area, or body of the furnace, by a wall twelve inches high. The fire-places are fifteen inches broad, and their length is equal to the breadth of the whole furnace, which is about eight or nine feet. The length of the area from one place to the other is nine or ten feet. The quantity of lead uſed in one operation is about 1500 pounds, of which nine parts are lead obtained from furnaces where the ore is ſmelted, and one part is lead extracted from the ſcoria which is formed in ſmelting the ore. This latter kind is ſaid to be neceſſary, as the former could not alone be reduced into powder. All the lead is at once put into the area, the bottom of which is level. The calx, as faſt as it is formed, is drawn to one ſide by means of a rake ſuſpended by a chain before the mouth of the furnace. In four or five hours the whole quantity of the lead is calcined; or, if any pieces remain uncalcined, they are ſeparated and kept for the next operation. The heat employed is that of a cherry-red, and the fire-places and mouth are kept open, that the air may accelerate the calcination. The powder or calx is to be frequently ſtirred to prevent its concreting, and when this operation has been continued about twenty-four hours, the matter is taken out of the furnace, and laid on a flat pavement. Then cold water is thrown on it, to give it weight, as the workmen ſay; but rather (as M. Jars thinks) to make it friable. It is then to be ground in a mill, and the finer part is ſeparated by waſhing, while the coarſer part, reſerved for ſome following operation, is to be placed at the mouth of the furnace in order to retain the melted lead. The fine powder, which is now of a yellow colour, is again put into the ſame or a ſimilar furnace, and expoſed to a very moderate fire, from thirty-ſix to forty-eight hours: during which time, it is ſtirred frequently to prevent its concreting; and the powder gradually acquires its proper red colour. The *minium* is then to be taken out of the furnace, cooled, and ſifted through an iron ſieve placed in a caſk. Mem. de l'Academie Royal a Paris, 1770. See CALCINATION.

MINIUM, in *Medicine*, is uſed externally; it obtunds the acrimony of the humours, allays inflammations, and is excellent in the cleanſing and healing of old ulcers: it is uſed on theſe occaſions, in many of the plaſters and ointments of the ſhops; it is an ingredient in the officinal compoſition, called *emplaſtrum de minio*, uſed as a deſicative and cicatrizer; though more rarely than that made in the ſame manner with litharge, becauſe it does not ſtick ſo well, and is more difficult of preparation.

It was with *minium* the ancient Roman and Grecian ladies tinged their nails and faces of a red-colour. For, as to our modern paints, without doubt, they were not known in thoſe days.

The bright orange colour of *minium* might render it valuable in painting, if it could ſtand with certainty in either oil or water. But as it is ſubject to become black, it cannot be ſafely truſted, except in hard varniſhes: and is, therefore, ſeldom uſed in oil, or even in water, unleſs for very groſs purpoſes, or as a ground for vermillion. The goodneſs of the *minium* may be diſtinguiſhed by the brightneſs of its colour: and the adulteration to which it is liable may be detected, by putting an ounce of it into a crucible, with an equal quantity of charcoal-duſt, well mixed together, and placing the crucible in a common fire ſufficient to melt lead, which is to be covered with another ſmall crucible inverted into it. When it has been continued for ſome time on the fire, take it out and ſtrike it againſt the ground, the *minium* will thus be reduced to its metallic ſtate; and its diminiſhed weight, when freed from the charcoal duſt and cold, will indicate the proportion of adulterated matter. *Minium* is alſo uſed as a FLUX in forming the ENAMEL for grounds, and in GLAZING, &c.

MINNIN, a ſtringed inſtrument of muſic among the ancient Hebrews, having three or four chords to it. See Kircher's figure of it, *Tab. Muſic*, *fig*. 6. Though there is reaſon to queſtion the antiquity of this inſtrument; both becauſe it requires a hair-bow, which was a kind of *plectrum* not known to the ancients, and becauſe it ſo much reſembles the modern viol. Kircher took the figure of this, the *machul chinnor*, and *pſaltery*, from an old book in the Vatican library. Hawkins's Hiſt. Muſic, vol. i. p. 255.

MINOR, a Latin term, literally denoting *leſs*, uſed in oppoſition to *major*, greater.

Thus we ſay, St. James *Minor*, Aſia *Minor*, the *minor* excommunication, &c.

MINOR *ædilis.* See ÆDILE.

MINOR *anticus ſerratus.* See SERRATUS.

MINOR *barons.* See BARON.

MINOR, *canis.* See CANIS.

MINOR *gaſtricus.* See GASTRIC.

MINOR *oculi obliquus.* See OBLIQUUS.

MINOR *orders.* See ORDERS.

MINOR, *rectus.* See RECTUS.

MINOR, *teres.* See TERES.

MINOR, *urſa.* See URSA.

MINOR, in *Law*, denotes a perſon under age, or who, by the laws of the country, is not yet arrived at the power of adminiſtering his own affairs, or the poſſeſſion of his eſtate.

Among us, a perſon is a *minor* till the age of twenty-one: before which time his acts are invalid. See AGE, and INFANT.

It is a maxim in the common law, that in the KING there is no *minority*, and therefore he hath no legal guardian; and his royal aſſents and grants to acts of parliament are good, though he has not in his natural capacity attained the legal age of twenty-one.

The *minority* of the kings of Sweden, Denmark, and the provinces of the empire terminates at eighteen years; and that of the kings of France at fourteen, by an ordonnance of Charles V. in 1374.

It is alſo provided by the cuſtom and law of PARLIAMENT, that no one ſhall ſit and vote in either houſe, unleſs he be twenty-one years of age. This is likewiſe expreſly declared by ſtat. 7 and 8 Will. III. cap. 25. with regard to the houſe of commons.

MINOR, in *Logic*, is the ſecond propoſition of a formal or regular SYLLOGISM, called alſo the ASSUMPTION.

MINOR, in *Muſic*, is applied to certain concords which differ from, or are lower than, others of the ſame denomination by a leſſer ſemitone, or four commas.

Thus we ſay, a third *minor*, or leſſer third: or a ſixth major and *minor*.

Concords that admit of major and *minor*, i. e. greater and leſs, are ſaid to be *imperfect* CONCORDS.

MINORESSES. See *St.* CLARE.

MINORS, or *Friars* MINORS, an appellation which the FRANCISCANS aſſume, out of ſhew of humility; calling themſelves *fratres minores*, i. e. *leſſer brothers*; and ſometimes *Minorites*.

There is alſo an order of regular *Minors* at Naples, which was eſtabliſhed in the year 1588, and confirmed by Sixtus V.

MINORATIO, a word uſed by the ancients to expreſs a ſlight or moderate evacuation, only ſerving to leſſen the humours, not to carry them off.

MINOS, in *Mythology*, one of the three judges of hell, of rank ſuperior to the other two, viz. Æacus and Rhadamanthus. Homer repreſents him as ſitting with a ſcepter in his hand, in the midſt of the ghoſts of departed mortals, who plead their reſpective cauſes in his preſence. Virg. Æn. vi. v. 432. places an urn by him, containing the ſeveral lots of mankind. The particular diſtrict of Ades, over which he was ſuppoſed to preſide, was EREBUS: and it was his office to determine the character and final condition of the ſpirits cited to his tribunal. *Minos*, it is ſaid, was the firſt king of Crete, and conſidered as the wiſeſt legiſlator of antiquity; on which account he obtained the honour of being judge in the inviſible world. This *Minos*, whoſe inſtitutes are ſaid to have ſerved as a model for thoſe of Lycurgus, flouriſhed, according to Selden, one thouſand four hundred and ſixty-two years, but, according to the abbé Banier only one thouſand three hundred and twenty years before Chriſt.

MINOTAUR, MINOTAURUS, in *Antiquity*, a fabulous monſter, much talked of by the poets; feigned to be half man and half bull.

The *minotaur* was brought forth by Paſiphae, wife of Minos II. king of Crete. It was ſhut up in the labyrinth of that iſland; and at laſt was killed by Theſeus.

Servius gives us the explication of this fable. He ſays that a ſecretary of king Minos, named Taurus, *bull*, had an intrigue with the queen Paſiphae, in the chamber of Dædalus; and that ſhe was at length delivered of twins, one of which reſembled Minos, and the other Taurus. This occaſioned the production to be reputed monſtrous.

MINOVERY, formed of the French *main-œuvre*, q. d. *handy-work*, a treſpaſs committed in the FOREST, by ſomething that is a man's handy-work; as an engine to catch deer, &c.

MINOW, or MINIM, in *Ichthyology*, a name given by the Engliſh to the ſmall fiſh, called by authors the phoxinus. According to the new Artedian ſyſtem, this is a ſpecies of the CYPRINUS; and the *cyprinus phoxinus* of Linnæus, with the dorſal fin conſiſting of eight rays, a brown ſpot on the tail, and a pellucid body. The lateral line of this fiſh is of a golden colour; the back flat, and of a deep olive; the ſides and belly vary much in different fiſh; in a few they are of a rich crimſon, in others bluiſh, and in others white; the body is ſlender and ſmooth, the ſcales being extremely ſmall; the tail is forked and marked near the baſe with a duſky ſpot; the whole length ſeldom exceeds three inches. The *minow* is found in ſhoals in many of our ſmall gravelly ſtreams. Pennant.

MINSTER, Saxon, *mynſter*, or *mynſtre*, anciently ſignified the church of a monaſtery or convent.

MINSTREL, an ancient term for a fidler, or player on any other kind of muſical inſtrument.

Borel derives the word from *manus* and *hiſtrio*, one who diverts with the hand; or from *minor hiſtrio*, *little buffoon*: Du-Cange from *miniſtellus*, a diminutive of *miniſter*, becauſe the *minſtrels* were anciently ranked among the lower officers, miniſters, or ſervants.

According to Dr. Percy in his Eſſay on the ancient Engliſh *Minſtrels*, the word is derived from the French *meneſtrier*; and was not in uſe here before the Norman conqueſt: and it is remarkable, that our old monkiſh hiſtorians do not uſe the word *citharoedus*, *cantator*, or the like, to expreſs a *minſtrel* in Latin; but either *mimus*, *hiſtrio*, *joculator*, or ſome other word that implies geſture. Hence it ſhould ſeem that the *minſtrels* ſet off their ſinging by mimickry or action; or according to Dr. Brown's hypotheſis, united the powers of melody, poem, and dance. Theſe *minſtrels* were probably the genuine ſucceſſors of the ancient bards, who joined the arts of poetry and muſic, and ſung verſes to the harp of their own compoſing. After the converſion of the Saxons to Chriſtianity, the poets and *minſtrels* became two ſeparate profeſſions: and the latter continued to be a diſtinct order of men, and got their livelihood by ſinging verſes to the harp at the houſes of the great: where they were hoſpitably and reſpectfully received, retaining many of the honours ſhown to their predeceſſors the Bards and Scalds. And though ſome of them only recited the compoſitions of others, many of them ſtill compoſed ſongs themſelves, and all of them could probably invent a few ſtanzas on occaſion. There are two remarkable facts in hiſtory, which prove that the profeſſion of a *minſtrel* was held in great reverence among the Saxon tribes, as well as among their Daniſh brethren. In the year 878, when king Alfred wiſhed to learn the true ſituation of the Daniſh army, which had invaded his realm, he aſſumed the dreſs and character of a *minſtrel*, *fingens ſe joculatorem, aſſumpta cithara*, &c. and under this character, though he could not but be known to be a Saxon, obtained an honourable reception. About ſixty years after, a Daniſh king made uſe of the ſame diſguiſe to explore the camp of our king Athelſtan. The *minſtrel* was, therefore, a priviledged character with both theſe people: and ſo late as the reign of Edw. II. the *minſtrels* were eaſily admitted into the royal preſence; an inſtance of which is mentioned by Stow, Survey of Lond. 1703, p. 469. In the fourth year of Richard II. John of Gaunt erected at Tutbury, in Staffordſhire, a court of *minſtrels*, with full power to receive ſuit and ſervice from the men of this profeſſion within five neighbouring counties, to enact laws and determine their controverſies, &c. for which they had a charter. See Plott's Hiſt. Staff. p. 435, &c. The *minſtrels* continued down to the reign of Elizabeth; in whoſe time, however, they had loſt much of their dignity, and were ſinking into contempt and neglect; yet ſtill they ſuſtained a character far ſuperior to any thing we can conceive at preſent of old ballads. Towards the end of the ſixteenth century this claſs of men loſt all credit, and were ſunk ſo low in the public opinion, that in the thirty-ninth year of Elizabeth, a ſtatute was paſſed by which *minſtrels*, wandering abroad, were included among rogues, vagabonds, and ſturdy beggars, and were adjudged to be puniſhed as ſuch. This act ſeems to have put an end to the profeſſion, for after this time they are no longer mentioned. Judge Blackſtone obſerves, that in ſome manors, the copyholders were bound to perform many ſervile offices for the lord, who found them meat and drink, and ſometimes (as is ſtill the uſe in the highlands of Scotland) a *minſtrel* or piper for their diverſion. Comm. b. ii. p. 96.

MINT, the place where the king's money is coined.

Anciently there were *mints* in moſt cities of England.

The chief *mint*, at preſent, is the Tower of London.

MINT, *officers of the*, are, 1. The *warden*, who is the chief, and is to receive the bullion, and overſee all the other officers. This officer has, for himſelf and a clerk, 450*l.* a year. 2. The *maſter-worker*, with an annual ſalary for himſelf and three clerks, of 650*l.* who receives the bullion from the warden, cauſes it to be melted, and delivered to the moniers; and takes it from them again when coined. 3. *Comptroller*, with a ſalary, for himſelf and clerk, of 350*l.* a year, who is to ſee that the money be made to the juſt aſſize, and to overſee the officers. 4. The *aſſay-maſter*, who weighs the ſilver and gold, and ſees whether it be STANDARD See REMEDY. This officer has, for himſelf and clerk, 225*l.* a year. 5. The two *auditors*, who take all the accounts. 6. The *ſurveyor of the melting*, who is to ſee the ſilver caſt out, and that it be not altered after it is delivered to the melter, i. e. after the aſſay-maſter has made a trial of it. 7. The *clerk of the irons*, who is to ſee that the irons be clean, and fit to work with. Theſe two offices are united in one perſon, who has, for himſelf and clerk, 132*l.* 10*s.* a year, and alſo a deputy. 8. The *chief engraver*, who engraves the dies and ſtamps, for the coinage of money, who has a ſalary of 200*l.* a year: there is alſo a *ſecond engraver*, with 80*l.* a year, and aſſiſtant. 9. The *melters*, who melt the bullion before it comes to coining. 10. The *blanchers*, who anneal, or boil and cleanſe the money. 11. The *porter* and *office-keeper*, who keep the gate, &c. of the *mint*. 12. The *provoſt* of the *mint*, at 100*l.* a year, who provides for all the moniers, and overſees them. And, laſtly, the *company of moniers*, each of whom has 40*l.* a year; ſome of which ſhear the money, ſome forge it, ſome ſtamp or coin it, and ſome round and mill it. In this office, there are alſo the *weigher* and *teller*, who, for himſelf and clerk, has a ſalary of 142*l.* 10*s.* a year; his deputy; king's clerk, and clerk of the paper, with 100*l.* a year, and his deputy; *ſurveyor of the money-preſſes*, at 40*l.* a year; *ſolicitor* at 60*l.* a year; warden's deputy, maſter's deputy, comptroller's deputy, and ſubordinate clerks. See COINAGE.

MINT was alſo a pretended place of privilege, in Southwark, near the king's bench, put down by ſtatute. If any perſons, within the limits of the *mint*, ſhall obſtruct any officer in the ſerving of any writ or proceſs, &c. or aſſault any perſon therein, ſo as to receive any bodily hurt, the offender ſhall be guilty of felony, and be tranſported to the plantations, &c. Stat. 9 Geo. I.

MINT, *mentha*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs. Its characters are theſe: it has a lip-flower of one petal; the mouth is cut into four almoſt equal ſegments, the upper being a little larger and indented; it has four erect ſtamina, the two neareſt being the longeſt; in the bottom of the tube is ſituated a four-pointed germen, which turns to four naked ſeeds, ſitting in the empalement. Miller enumerates eighteen and Linnæus ſixteen ſpecies.

All the ſorts of *mint*, of which we have ſeveral propagated in gardens for medicinal uſe, are to be propagated by parting the roots in ſpring, or planting cuttings in any of the ſummer months, but they muſt have a moiſt ſoil; and if the weather proves dry, they will require very frequent waterings, after they are firſt planted. They ſhould be planted in beds of four feet width, with walks two feet wide between them, and ſhould be ſet at five inches diſtance. And they ſpread ſo faſt at the roots that the beds ſhould never ſtand above three years before they are taken up and tranſplanted; for the roots after this time will matt and clog together, ſo as to choak one another.

Many people are fond of *mint*-ſallad early in the ſpring; the way to propagate this, is to take up ſome roots of *mint* before Chriſtmas, and plant them pretty cloſe upon a moderate hot-bed, covering them an inch deep with freſh earth; the beds muſt then be either covered with mats or frames and glaſſes, and in a month's time the *mint* will come up, and will ſoon be fit for uſe.

When *mint* is cut for drying, it ſhould be done juſt when it is in flower, and muſt always be done in a dry day; for if cut in wet weather, the leaves will change black. It ſhould then be tied in ſmall bunches, and hung in a ſhady place upon lines.

If the ſoil be good, *mint* will afford three crops every ſpring; but after July, they ſeldom are ſo good, ſo that the ſhoots made after that time ſhould be ſuffered to remain till the end of September, to be cut for drying. After this cutting, there ſhould be about an inch of freſh earth ſifted over them, which will make them ſhoot much better the following ſpring. Miller.

No plant grows ſo vigorouſly and readily in water as *mint*; and, therefore, none is ſo proper for trying experiments in vegetation.

Spear-mint is a name commonly given to the narrow-leaved ſpiked *mint*; this herb has a ſtrong, agreeable aromatic ſmell, and a bitteriſh, roughiſh, moderately warm taſte. It is in general uſe as a reſtringent, ſtomachic, and carminative; in vomitings and weakneſs of the ſtomach, there are, perhaps, few ſimples of equal efficacy. The leaves are ſometimes taken in ſubſtance, beaten with thrice their weight of fine ſugar into a conſerve. By diſtillation, a pound and a half of the dry leaves communicate a ſtrong impregnation to a gallon of water, yielding the common ſimple *mint*-water of the ſhops; which is occaſionally made ſtill richer in the virtue of the *mint*, by ſteeping in it for three or four hours, in a warm place, a freſh quantity of the herb, as half an ounce to a pint: the diſtilled water proves rather more elegant if drawn from the freſh than from the dry plant. Along with the aqueous fluid an eſſential oil diſtils, called the eſſential oil of *mint*, of a pale yellowiſh colour, changing by age to a reddiſh, and at length to a dark red; in quantity near an ounce from ten pounds of the freſh herb in flower, ſmelling and taſting ſtrongly of the *mint*, but ſomewhat leſs agreeable than the herb itſelf. The officinal ſpirituous water of *mint* is prepared by drawing off a gallon of proof ſpirit from a pound and a half of the dried leaves, which will be ſtrongly impregnated with *mint*.

The *water-mint*, with leaves ſomewhat oval ſet on pedicles and long ſtamina ſtanding out from the flowres, and the *hairy water-mint*, with long hairy leaves, having no pedicles, and broad ſpikes of flowers, grow wild in moiſt meadows, marſhes, and on the brinks of rivers, and flower towards the end of ſummer. Theſe are leſs agreeable in ſmell than the *ſpear-mint*, and in taſte bitterer and more pungent. They yield a much ſmaller proportion of eſſential oil; but partake of the virtues of *ſpear-mint*, in an inferior degree. The *hairy water-mint* is ſuppoſed to be the *auricularia* or ear-wort, celebrated by Marloe for the cure of deafneſs; though probably not more effectual againſt that complaint than the other *water-mint* againſt nephritic ones, in which it is ſaid to have been formerly an empirical ſecret.

Pepper-mint is a ſpecies of *mint* with acuminated leaves, on very ſhort pedicles, and the flowers ſet in ſhort thick ſpikes or heads. It is a native of this kingdom, and raiſed plentifully in gardens, for medicinal purpoſes.— This ſpecies has a more penetrating ſmell than any of the other *mints*; and a much ſtronger and warmer taſte. It is a medicine of great importance in flatulent colics, hyſteric depreſſions, and other ſimilar complaints. In diſtillation with water, it yields a conſiderable quantity of eſſential oil, of a pale greeniſh yellow colour, which becomes darker coloured by age, very light, ſubtle, and poſſeſſing in a high degree the ſpecific ſmell and penetrating pungency of the *pepper-mint*. A ſimple and a ſpirituous diſtilled water, drawn in the ſame proportions as thoſe of *ſpear-mint*, and the eſſential oil, are kept in the ſhops. Lewis's Mat. Med.

MINT, *corymbiferous*, in *Botany*, a name given by ſome to a ſpecies of TANZY.

MINT, *cat's*, the Engliſh name of a genus of plants, called by botanical writers *cataria*. See CATMINT.

MINTERS, or MONIERS. See MONEYERS and MINT.

MINTING is ſometimes uſed for the COINING of money.

MINUARTIA, in *Botany*, a genus of the *triandria trigynia* claſs. Its characters are, that it has a five-leaved calyx, no corolla, and the fruit is a ſingle-celled three-valved capſule containing ſeeds. There are three ſpecies.

MINUET, or MENUET, in *Muſic*, a compoſition anſwering to a kind of dance of the ſame name, ſaid to be invented at Poictou; the motion whereof is triple, with three crotchets in a bar $\frac{3}{4}$, though it is commonly performed in the time $\frac{3}{8}$. It has commonly two ſtrains, each played twice over; the firſt has four or eight bars; the laſt note of which ſhould be either the *dominant* or *mediant* of the mode, never the final; and the ſecond has eight bars, it uſually ends on the final of the mode, with a pointed minim or whole bar.

The word is ſaid to be derived from the French *menu*, *little*, and ſignifying a ſmall pace.

MINUS, in *Algebra*. See CHARACTERS *in Arithmetic*.

MINUS, *quo*, in *Law*. See QUO *minus*.

MINUSCULÆ, in *Printing*, denote the ſmall and running letters; as contradiſtinguiſhed from *majuſculæ*, or capitals.

MINUTE, from the Latin *minutus*, *ſmall*, in *Geography* and *Aſtronomy*, is the ſixtieth part of a degree.

In which ſenſe *minute* is alſo called *prime*, or *prime-minute*.

The diviſions of degrees are fractions, whoſe denominators increaſe in a ſexagecuple ratio; that is, a *minute* or prime is $= \frac{1}{60}$; a ſecond, or ſecond *minute*, $= \frac{1}{3600}$, &c.

In aſtronomical tables, &c. *minutes* are expreſſed by acute accents, thus,′; the ſeconds by two,″; the thirds by three,‴.

MINUTE in *Computation of Time*, is uſed for the ſixtieth part of an hour.

MINUTE, in *Architecture*, uſually denotes the ſixtieth ſometimes only the thirtieth, part or diviſion, of a MODULE.

Minute is alſo uſed to ſignify a ſhort memoir, or ſketch of any thing haſtily taken in writing.

In this ſenſe we ſay, the *minutes* of the proceedings of the houſe of lords, &c.

Minutes *of emerſion.* See EMERSION.

Minutes, *meridional.* See MERIDIONAL.

Minute *tithes*, *minores decimæ*, ſmall tithes of wool, lambs, pigs, butter, cheeſe, &c. See TITHE.

MINX, in *Zoology*, is the name of an animal in North America, very much reſembling the OTTER.

MIPARTY, *chamber of.* See CHAMBER.

MIQUELETS, a kind of foot-ſoldiers, inhabiting the Pyrenean mountains; armed with piſtols under their belts, a carbine, and a dagger. The *miquelets* are dangerous people for travellers to meet.

MIRABILE, *rete.* See RETE.

MIRABILIS, in *Botany.* See MARVEL *of Peru*.

Mirabilis *aqua.* See WATER.

MIRABOLANS, or MIROBALANS, in *Pharmacy.* See MYROBALANS.

MIRACLE, in a popular ſenſe, is a *prodigy*, or an extraordinary event, that ſurpriſes us by its novelty.

Miracle, in a more accurate and philoſophical ſenſe, is an effect that does not follow from any of the regular laws of nature; or which is inconſiſtent with ſome known law thereof; or contrary to the ſettled conſtitution and courſe of things: accordingly all *miracles* preſuppoſe an eſtabliſhed ſyſtem of nature, within the limits of which they operate, and with the order of which they diſagree.

Spinoza denies, that any power can ſuperſede that of nature; or that any thing can diſturb, or interrupt, the order of things; and accordingly defines a *miracle* to be a rare event, happening in conſequence of ſome laws that are unknown to us.

Divines define a *miracle*, an extraordinary and wonderful effect above the power of nature, wrought by God, to manifeſt his power or providence; or to give credit to ſome meſſenger ſent from himſelf. Thus Jeſus Chriſt evinced the truth of his miſſion, and his doctrine, by *miracles*; and thus alſo did Moſes. But there are ſcarce any theological writers, that preciſely agree in their definition of a *miracle*. Mr. Locke defines it to be a ſenſible operation, which being above the comprehenſion of the ſpectator, is, in his opinion, contrary to the courſe of nature, and taken by him to be divine. Dr. Clarke's definition of a *miracle*, in the theological ſenſe of the word, is this: that it is a work effected in a manner unuſual, or different from the common and regular method of Providence, by the interpoſition either of God himſelf or of ſome intelligent agent ſuperior to man, for the proof or evidence of ſome particular doctrine, or in atteſtation to the authority of ſome particular perſon. According to Dr. Sykes, a *miracle* is a deſigned effect, ſenſible, unuſual in itſelf, beyond the art and power of man to do. Dr. Chandler ſays, that a *miracle* is an action done, or an operation viſibly performed by any being, which is really and truly above the reach, natural power, and capacity of that being who does it, of himſelf, and without the aſſiſtance of ſome ſuperior agent to perform. With this Dr. Hutchenſon's definition nearly coincides, viz. that it is a work far exceeding human power, yet performed by the command, or upon the volition of a man. And the ſame writer farther obſerves, that, though *miracles* may prove the ſuperintendency of a voluntary agent, and that the univerſe is not guided by neceſſity or fate; yet that mind muſt be weak and inadvertent, who needs them to confirm the belief of a wiſe and good Deity; ſince the deviation from general laws, unleſs upon very extraordinary occaſions, muſt be a preſumption of inconſtancy and weakneſs rather than of a ſteady wiſdom and power; and muſt weaken the beſt arguments we have for the ſagacity and power of the univerſal mind. Inquiry into the Original of the Ideas of Beauty, &c.

A late ingenious and learned writer objects to all thoſe definitions of *miracles*, which repreſent them as effects unuſual, above human power, and manifeſting the interpoſition of ſuperior power: becauſe, he ſays, the term unuſual does not diſtinguiſh real *miracles* from many things which are not miraculous, ſuch as the rare and uncommon appearances of nature: nor does the calling a *miracle* an effect above human power, diſtinguiſh it from all other effects equally above human power, produced by ſuperior beings, when acting within their uſual ſphere, which, for that reaſon, cannot be miraculous. Beſides, as this definition comprehends many things, which are not miraculous, and to which no perſons apply the term; ſo it excludes many things which are allowed by all to be proper *miracles*. For there ſeems to be a difference between effects above human power, or which argue a higher degree of power, and effects which argue a power barely different from human, and in no manner ſuperior to it. According to this definition, beaſts and birds may work *miracles*; for they do many things that are above the power of man. Moreover, this definition, inſtead of deſcribing *miracles* by the nature of the works themſelves, deſcribe them by their author, and the degree of power neceſſary to their performance. To which it may be added, that works which argue only a power more than human, can be no abſolute proofs of a divine interpoſition: and farther, the laſt part of the definition, manifeſting the interpoſition of ſuperior power, is ſuperfluous; becauſe it is only ſaying effects above human power muſt be produced by a power above it.

This writer conſiders the contrariety or conformity of the event itſelf to thoſe laws by which the world is governed in the courſe of God's general providence, as the only circumſtance which denominates and conſtitutes it a proper *miracle* or not: and, therefore, before we can pronounce with certainty any effect to be a true *miracle*: it is neceſſary (and nothing more is neceſſary than) that the common courſe of nature be in ſome degree firſt underſtood. *Miracles*, in this view, are not impoſſible to the power of God, nor neceſſarily repugnant to our ideas of his wiſdom and immutability. Neither do they imply any inconſiſtency in the divine conduct, or a defect or diſturbance of the laws of nature: ſo that in the general idea of *miracles*, conſidered as variations from the common courſe of nature, there is nothing that can furniſh a certain univerſal proof againſt their exiſtence; and there is a power ſuperior to nature, which is ever able, and which in certain circumſtances may reaſonably over-rule what was at firſt eſtabliſhed. The writer, now cited, farther maintains, that *miracles* are neither the effects of natural cauſes, nor of ſuperior created intelligences, acting from themſelves alone; but that they are always to be aſcribed to a divine interpoſition; i. e. that they are never wrought, but either immediately by God himſelf, or by ſuch other beings as he commiſſions and empowers to perform them. In proof of this propoſition, he alledges, that the ſame arguments which prove the exiſtence of ſuperior created intelligences, do much more ſtrongly conclude againſt their acting out of their proper ſphere. Farther, the ſuppoſition of the power of any created agents to work *miracles* of themſelves, in this lower world, is contradicted by the obſervation and experience of all ages; there being, in fact, no proper evidence of the truth of any *miracles*, but ſuch as may be fitly aſcribed to the deity. Moreover, the laws of nature being ordained by God and eſſential to the order and happineſs of the world, it is impoſſible God ſhould delegate to any of his creatures a power of working *miracles*, by which thoſe divine eſtabliſhments may be ſuperſeded and controlled. Beſides, the aſcribing to any ſuperior beings, God excepted, and thoſe immediately commiſſioned by him, the power of working *miracles* ſubverts the foundation of natural piety, and is a fruitful ſource of idolatry and ſuperſtition. It is farther urged, that if *miracles* were performed in favour of falſe doctrines, mankind would be expoſed to frequent and unavoidable deluſion: and, if they may be performed without a divine permiſſion, and in ſupport of falſhood, they cannot be credentials of a divine miſſion, and criterions of truth. So that, upon the whole, if ſuperior beings really poſſeſs the miraculous powers which ſome writers have aſcribed to them, the exerciſe of thoſe powers, by good and evil agents, would either expoſe mankind to neceſſary and invincible error, or entirely deſtroy the credit and uſe of *miracles*, under the idea of criterions of truth and authentic credentials of a divine miſſion. If we appeal to the evidence of revelation, on this ſubject, we ſhall find, that the view which the ſcripture gives us of good angels, of the devil and his angels, as alſo of the ſouls of departed men, is inconſiſtent with their liberty of working *miracles*: and the view which the ſacred writers give us of the gods of paganiſm is alſo abſolutely inconſiſtent with their poſſeſſing a power of working *miracles*. Nevertheleſs, it has been much diſputed, how far it may be in the power of the devil to work *miracles*? or wherein the ſpecific difference lies between the *miracles* of Moſes, and thoſe of Pharoah's magicians? thoſe of Jeſus Chriſt and the apoſtles, and thoſe of Simon Magus and Apollonius Tyaneus? Whether the latter were any more than mere deluſions of the ſenſes; or whether any ſupernatural and diabolical power concurred with them. See MAGICIAN; under which article it is ſhewn, that the magicians, diviners, and ſorcerers of antiquity, who pretended by the aſſiſtance of the heathen deities, &c. to foretel future events, or to work *miracles*, are branded in ſcripture as mere impoſtors, incapable of ſupporting their pretenſions by any works or predictions beyond human power or ſkill. The ſcripture likewiſe reproaches the pretences to inſpiration and *miracles*, made by falſe prophets, in ſupport of error and idolatory, as the ſole effects of human craft and impoſture. And, therefore, ſince angels, whether good or evil, the ſpirits of departed men, the heathen deities, magicians, and falſe prophets, are the only agents, who have ever been conceived as capable of working *miracles*, either in oppoſition to God, or without an immediate commiſſion from him; and the ſcripture denies to all theſe the power of performing any *miraales*; it does in effect deny, that any ſingle *miracle* has ever been performed without the immediate interpoſition of God. It is likewiſe alledged, that the ſcriptures repreſent the one true God, as the ſole creator and ſovereign of the world, which he governs by fixed and invariable laws; that to him they appropriate all *miracles*, and that they urge them as demonſtrations of his divinity and ſole dominion over nature, in oppoſition to the claims of all other ſuperior beings. The ſcriptures alſo uniformly repreſent all *miracles*, as being, in themſelves, an abſolute demonſtration of the miſſion and doctrine of the prophets, at whoſe inſtance they are performed; and never directs us to regard their doctrines as a teſt of the *miracles* being the effect of divine interpoſition. Accordingly, the *miracles* of Chriſt, in particular, were a demonſtration (not a partial and conditional, but a complete and abſolute demonſtration) of his miſſion from God: and they were farther deſigned to evince his peculiar character as the Meſſiah or anointed; i. e. his regal commiſſion and power, or his right by divine deſignation to dominion and judicature over mankind. And it may be obſerved, with reſpects to all the *miracles* of the New Teſtament, that their divinity, conſidered in themſelves, is always either expreſly aſſerted, or manifeſtly implied; and they are accordingly urged as a deciſive and abſolute proof of the divinity of the doctrine and teſtimony of their performers, without ever taking into conſideration the nature of the doctrine, or of the teſtimony to be confirmed It is alſo ſhewn, that the ſcriptures have not recorded any inſtances of real *miracles* performed by the devil; in anſwer to the objections drawn from the caſe of the magicians in Egypt, from the appearance of Samuel, after his deceaſe, to Saul, which was either the work of human impoſture or a divine *miracle*, and from our Saviours's temptation in the wilderneſs, which the writer, to whom we now refer, conſiders as a divine viſion. *Miracles*, conſidered as the peculiar works of God, afford a divine teſtimony to the perſon on whoſe account they are wrought, and to that doctrine or meſſage, which he delivers in the name of God. And this proof from *miracles* of the divine commiſſion, and doctrine of a prophet, is in itſelf deciſive and abſolute. It is alſo the moſt natural and agreeable to the common ſenſe of mankind in all ages. It is the moſt eaſy and compendious proof of a new revelation. *Miracles* are farther a very powerful method of conviction, making a ſtrong impreſſion upon the heart, at the ſame time that they carry light to the underſtanding. Nor is the neceſſity of *miracles* leſs evident than their propriety and advantage, in atteſting a divine commiſſion and propagating a new revelation. They alſo ſerve to revive and confirm the principles of natural religion, and to recover men from thoſe two oppoſite extremes of atheiſm and idolatry. Finally, the evidence of *miracles*, whether of power or knowledge, is the fitteſt to accompany a ſtanding revelation; becauſe it is not confined to one age or nation, but may be extended over the whole globe, and conveyed to the moſt diſtant generations. On the nature and deſign of *miracles*, already illuſtrated in this article, ſee Farmer's Diſſertation on *Miracles*, &c. 8vo. 1771, paſſim.

On the other hand, Dr. Clarke, who allows that *miracles* may be wrought by other agents beſides the Deity, obſerves, that it cannot certainly be diſtinguiſhed, by the *miracle* itſelf, whether any extraordinary interpoſition of ſome power ſuperior to men be the immediate interpoſition of God himſelf, or of ſome good angel, or of ſome evil angel. The only poſſible ways, ſays this learned writer, by which a ſpectator may certainly and infallibly diſtinguiſh whether *miracles* be indeed the works either immediately of God himſelf, or of ſome good angel employed by him; and conſequently the doctrine witneſſed by the *miracles* be infallibly true and divinely atteſted: or whether, on the contrary, the *miracles* be the works of evil ſpirits, and conſequently the doctrine a fraud and impoſition upon men, are theſe: if the doctrine atteſted by *miracles* be in itſelf impious, or manifeſtly tending to promote vice; then without all queſtion, the *miracles*, how great ſoever they may appear to us, are neither wrought by God himſelf nor by his commiſſion. If the doctrine, atteſted by *miracles*, be in itſelf indifferent, or ſuch as cannot, by the light of nature and right reaſon alone, be certainly known whether it be true or falſe; and at the ſame time, in oppoſition to it, and in proof of the direct contrary doctrine, there be wrought other *miracles*, more and greater than the former, or at leaſt attended with ſuch circumſtances as evidently ſhew the power by which the latter are wrought to be ſuperior to the power that produced the former: then that doctrine, which is atteſted by the ſuperior power, muſt neceſſarily be believed to be divine. This, he apprehends, was the caſe of Moſes, and the Egyptian MAGICIANS. If, in the laſt place, the doctrine atteſted by *miracles* be ſuch as, in its own nature and conſequences, tends to promote the honour and glory of God, and the practice of univerſal righteouſneſs among men; and yet nevertheleſs be not in itſelf demonſtrable, nor could, without revelation, have been diſcovered to be actually true; and there is no pretence of more or greater *miracles*, on the oppoſite ſide, to contradict it: which is the caſe of the doctrine and *miracles* of Chriſt; then the *miraclec* are unqueſtionably divine, and the doctrine muſt, without all controverſy, be acknowledged as an immediate and infallible revelation from God. In order to obviate the objection, that we prove in a circle the doctrine by the *miracles*, and the *miracles* by the doctrine; he adds, that the *miracles*, in this way of reaſoning, are not at all proved by the doctrine; but only the poſſibility and the good tendency, or at leaſt the indifferency of the doctrine, are a neceſſary condition or circumſtance, without which the doctrine is not capable of being proved by any *miracles*. The doctrine muſt be in itſelf poſſible and capable of being proved, and then *miracles* will prove it to be actually and certainly true. Boyle's Lecture, Sermons, &c. p. 226, &c.

The Romans attribute *miracles* to their emperors Adrian and Veſpaſian. The church of Rome abounds in *miracles:* if we believe their writers, ſome of their monks have wrought more *miracles* than all the apoſtles; and this without any viſible neceſſity for them.

As full as that church pretends to be of ſaints, it is a rule with them, that none are ever canonized till there be a good proof of their having wrought *miracles*. So that were all thoſe allowed good *miracles*, and to have happened out of the common order of nature, they are ſo numerous, one would be tempted to think there was no order or law of nature at all.

Some proteſtant writers have maintained, that the power of working *miracles* was exerciſed in the Chriſtian church, during the three or four firſt centuries; in proof of which they alledge that of the THUNDERING *legion*, &c. But Dr. Middleton, in his Free Inquiry into the miraculous Powers, which are ſaid to have ſubſiſted in the Chriſtian Church, &c. has maintained a very different opinion. And it muſt be acknowledged, that the evidence of the facts is, to ſay the leaſt of it, very doubtful.

The many and ſtupendous *miracles*, which are ſaid to have been wrought by the Chriſtian miſſionaries, who were ſent to convert the barbarous nations, in the eighth century, have loſt, in our times, the credit they obtained in former ages.

St. Auguſtine is a ſtrong advocate for *miracles*. He mentions ſeveral, whereof he was an eye-witneſs; and others, whereof he was informed by thoſe that were. In the ſingle city of Hippo, he tells us there were ſeventy *miracles* wrought in the ſpace of two years, on the building a chapel in honour of St. Stephen. There are thoſe, however, who ſet aſide the authority of all *miracles*; thinking it unbecoming the wiſdom of God to eſtabliſh ſuch laws, as that he ſhould find it frequently neceſſary to ſuperſede. And as the former, from the avowed authority of ſome *miracles*, fetch an argument for the truth of all, pleaſing thoſe which are allowed as well as thoſe which are queſtioned; ſo theſe alledge the falſe ones very unfairly, as concluſions againſt all.

MIRACLE, *chemical*. See MAGNESIA.

MIRALETUS, in *Ichthyology*, a name given by Bellonius, and ſome other writers, to the ſpecies of ray, commonly called by others *raja oculata*. This is accurately diſtinguiſhed, by Artedi, by the name of the ray with a ſmooth back and belly, and with a row of ſpines round the eyes, and three other rows of them on the tail.

MIRE *drum*, or **MIRE** *ſnipe*. See BITTERN, and HERON.

MIRROR, a *ſpeculum*, or body, which exhibits the images of objects preſented to it by reflection.

The uſe of *mirrors* is very ancient. Mention is made of brazen *mirrors*, or looking-glaſſes, in Exodus xxxviii. 8. where Moſes is ſaid to have made a *brazen laver*, or baſon, *of the looking-glaſſes of the women continually aſſembled at the door of the tabernacle.* It is true ſome modern commentators will not allow the *mirrors* themſelves to have been braſs; but of glaſs, only ſet or framed in braſs. But the moſt learned among the rabbins do all allow, that in thoſe times the *mirrors* made uſe of by the Hebrew women in dreſſing their heads were of metal; and that the devout women, mentioned in this paſſage, made preſents to Moſes of all their *mirrors*, to make the brazen laver. See the Jeſuit Bonfrerius's comment on this text. See GLASS.

It might likewiſe be proved, that the ancient Greeks made uſe of brazen *mirrors*, from divers paſſages among the ancient poets.

MIRROR, in the more confined ſenſe of the word, is peculiarly uſed to ſignify a ſmooth ſurface of glaſs, tinned and quickſilvered on the back-ſide; which exhibits the images of objects oppoſed thereto. See LOOKING-GLASS.

MIRROR, in *Catoptrics*, denotes any poliſhed body impervious to the rays of light, and which of conſequence reflects them equally.

Thus water in a deep well or river, and ſmooth poliſhed metals, are ranked among the number of *mirrors*.

In this ſenſe, the doctrine of *mirrors* makes the ſubject of CATOPTRICS.

The doctrine of MIRRORS *is founded on the following general principles.* 1. Light reflected from any *mirror*, or ſpeculum, makes the angle of incidence equal to that of reflection; which ſee demonſtrated under the word REFLECTION.

Hence, a ray of light, as H B, (*Tab.* II. *Optics*, *fig.* 26. N° 2.) falling perpendicularly on the ſurface of a ſpeculum D E, will be reflected back upon itſelf: as we find by experience it actually is.

From the ſame point of a *mirror*, therefore, B, there can not be ſeveral rays reflected on the ſame point; ſince, in that caſe, all the angles of incidence muſt be equal to the ſame angle of reflection C B G, and therefore to each other; which is abſurd. Nor can the ray A B be reflected to two or more points; ſince, in that caſe, all the angles of reflection would be equal to the ſame angle of incidence A B F: which is likewiſe abſurd.

2. From every point of a *mirror*, are reflected rays thrown on it from every point of a radiant object. Since then rays coming from different parts of the ſame object, and ſtriking on the ſame point of the *mirror*, cannot be reflected back to the ſame point; the rays which flow from different points of the ſame radiating object are again ſeparated after reflection: ſo that each point ſhews whence it came.

Hence it is, that the rays reflected from *mirrors* exhibit the objects to view. Hence alſo, it appears, that rough uneven bodies muſt reflect the light in ſuch manner as that rays coming from different points will be blended or thrown confuſedly together.

Mirrors may be divided into *plane*, *concave*, *convex*, *cylindrical*, *conical*, *parabolical*, and *elliptical*.

MIRRORS, *plane*, are thoſe which have a plane or flat ſurface.

Theſe, by a popular name, we call *looking-glaſſes*.

For the manner of making plane *mirrors*, or ſpecula, ſee LOOKING-GLASS.

MIRRORS, *laws and phenomena of plane.* 1. In a plane *mirror*, every point of an object, as A, (*Tab.* IV. *Optics*, *fig.* 65.) is ſeen in the interſection B, of the cathetus of incidence A B, with the reflected ray C B.

Let C D and F E be two reflected rays, correſponding to the incident rays A D, A E: then, ſince the vertical angle C D G = E D B; and the angle of reflection C D H = A D G the angle of incidence, A D H will be = C D G = E D B. And H E F = D E B, and H E F = A E G, therefore D E B = A E G. But A E G + A D E, as well as B E D + B D E, are leſs than two right angles; conſequently the reflected rays F E and C D met in B, and in the equiangular triangles A D E and D E B, having D E common, D B = D A. Wherefore, ſince the angle B D G = C D H = A D G, the angles at G will be equal, and conſequently A B perpendicular to H G: i. e. A B is the cathetus of incidence: and, therefore, the reflected rays F E and C D meet with the cathetus of incidence A B in the ſame point B: and the radiant point A is ſeen in B.

Hence, 1. as all the reflected rays meet with the cathetus of incidence in B; by whatever reflected ray the radiant point A be ſeen, it will ſtill appear in the ſame place. Conſequently, any number of perſons, viewing the ſame object in the ſame *mirror*, will all ſee it in the ſame place behind the *mirror*. And hence it is, that the ſame object has only one image, and that we do not ſee it double with both eyes.

Hence, alſo, the diſtance of the image B, from the eye C, is compounded of the ray of incidence A D, and the reflected ray C D: and the object A radiates reflectedly in the ſame manner as it would do directly, were it removed into the place of the image.

2. The image of a radiant point, B, appears juſt ſo far behind a plane *mirror*, as the radiant point is before it: becauſe A G = B G.

Hence, if the *mirror* H G be placed horizontally, the point A will ſeem ſo much below the horizon, as it is really elevated above it: conſequently, erect objects will appear as if inverted; and therefore men ſtanding on their feet, as if on their heads. Or, if the *mirror* be faſtened to the ceiling of a room, parallel to the horizon, objects on the floor will appear above the cieling as much as they really are below it; and inverted.

3. In a plane *mirror*, the images are perfectly ſimilar, and equal to the objects; for every point of the object is ſeen in the cathetus of incidence, and the *mirror* biſects that part of it which is intercepted between the radiant point and its image. And hence the uſe of *mirrors* as looking-glaſſes.

4. In a plane *mirror*, things on the right hand appear as on the left; and *vice verſa*.

Hence, alſo, we have a method of meaſuring any inacceſſible altitude, by means of a plane *mirror*. Thus, the *mirror* being placed horizontally in C, (*fig.* 66.) retire from it till ſuch time as the top of the tree be ſeen therein. Meaſure the height of the eye D E, the diſtance of the ſtation from the point of reflection E C, and the diſtance of the foot of the tree from the ſame: then to E C, C B, and E D, find a fourth proportional A B. This is the altitude ſought.

5. If a plane *mirror* A E (*fig.* 67.) be inclined to the horizon E H, in an angle of 45 degrees, an object C B perpendicular to it will appear parallel I K, and the horizontal object L B, perpendicular in M K.

For produce B C till it meets the *mirror* in A; then as H is a right angle, and E = 45°, A will be = 45°: therefore, if from B be drawn B G perpendicular to the *mirror* A E, A B G will be = 45°; and A G = G B. Let G K be = G B, and the image of B will be in K: draw K A, and becauſe K G = G A and G a right angle, K will be = 45°, and therefore K A parallel to E H. In the ſame manner it may be ſhewn, that the point C would appear in I. and conſequently the image I K will be parallel to the horizon E H; and *vice verſa*.

Hence, the eye being placed beneath the *mirror*, the earth will appear perpendicularly over it: or if placed over the earth will appear perpendicularly under it. Hence, alſo, a globe, deſcending down a plane a little inclined, may, by means of a *mirror*, be exhibited as mounting up a vertical plane, to the great ſurprize of ſuch as are unacquainted with catoptrics. And hence we have a method of repreſenting ourſelves as if flying: for a *mirror* inclined to the horizon under an angle of 45°, we have obſerved, will repreſent vertical objects as if horizontal; conſequently, a large *mirror* being ſo diſpoſed, as you advance towards it, you will ſeem to move horizontally; and nothing will be wanting to the appearance of flying, but to ſtrike out the arms and legs. It muſt be added however, that as the floor is elevated along with you, your feet will ſtill be ſeen to walk as along a vertical plane. To deceive the eye entirely, therefore, it muſt be kept from the feet.

6. If the object A B (*fig.* 68.) be parallel to the ſpeculum C D, and equally diſtant from it, with the eye; the reflecting line C D will be half the length of the object A B.

Let the eye O be in the object A B, or let the ſpectator view himſelf in a glaſs. Since A B is parallel to C D, the image G H will be parallel to it likewiſe.— From O let fall O L perpendicular to C D, which, continued to I, will be alſo perpendicular to G H; therefore, O L and O I will be the reſpective altitudes of the triangles O C D and O G H, which triangles, having the angles $x = o$ and $u = y$, are ſimilar: conſequently C D : G H : : O L : O I; and as O L = $\frac{1}{2}$ O I, by art. 2 above, C D will be = $\frac{1}{2}$ G H = $\frac{1}{2}$ A B.

And hence, to be able to ſee the whole body in a plane *mirror*, its height and breadth muſt be half your height and breath. Conſequently the height and breadth of any object to be ſeen in a *mirror* being given, we have alſo the height and breadth of the *mirror* wherein the whole object will appear, at the ſame diſtance with the eye.

Hence alſo, as the length and breadth of the reflecting part of the ſpeculum are ſubduple of thoſe of the object to be reflected; the reflecting part of the *mirror* is to the ſurface reflected in a ſubquadruple ratio. Conſequently, the reflecting portion being a conſtant quantity, if in any place you ſee the whole body in a *mirror*, you will ſee it in every other place, whether you approach nearer or recede farther from it.

7. If an object A B (*fig.* 69. N° 2.) be parallel to the *mirror*

IF; the length of the reflected line AB is to the reflecting part of the ſpeculum CD as the ſum of the incident and reflected rays $BD+DO$ to the reflected ray OD; or as the ſum of the diſtances of the eye and of the object from the ſpeculum, viz. $OI+BF$ to the diſtance of the eye OI. For $GE : CD :: OE : OD$; i.e. becauſe $GE=AB$, and $DE=DB$, $AB : CD :: OD+DB : OD$. Moreover, $OE : OD :: OK : OI$, therefore $GE : CD :: OK : OI$; conſequently, ſince $IK=FE=BF$, and $GE=AB$, we ſhall have $AB : CD :: OI+BF : OI$.

8. A ſpectator will ſee his own image as far beyond the ſpeculum as he is before it; and as he moves to or from the ſpeculum, his image will, at the ſame time, move towards or from him on the other ſide, but apparently with a double velocity, becauſe the two motions are equal and contrary. In like manner, if while the ſpectator is at reſt, an object be in motion, its image behind the ſpeculum will be ſeen to move at the ſame rate. And if the ſpectator moves, the images of objects that are at reſt will appear to approach or recede from him, after the ſame manner as when he moves towards real objects.

9. If ſeveral *mirrors*, or ſeveral fragments or pieces of a *mirror*, be all diſpoſed in the ſame place, they will only exhibit an object once.

10. If two plane *mirrors*, or ſpecula, meet in any angle, the eye, placed within that angle, will ſee the image of an object placed within the ſame, as often repeated as there may be catheti drawn determining the places of the images, and terminated without the angle.

Hence, as the more catheti, terminated without the angle, may be drawn as the angle is more acute; the acuter the angle, the more numerous the images. Thus Z. Traber found, at an angle of one third of a circle, the image was repreſented twice, at $\frac{1}{4}$ thrice, at $\frac{1}{5}$ five times, and at $\frac{1}{12}$ eleven times.

Farther, if the *mirrors* be placed upright, and ſo contracted; or if you retire from them, or approach to them, till the images reflected by them coaleſce, or run into one, they will appear monſtrouſly diſtorted: thus, if they be at an angle ſomewhat greater than a right one, the image of your face will appear with only one eye; if the angle be leſs than a right one, you will ſee three eyes, two noſes, two mouths, &c. At an angle ſtill leſs, the body will have two heads. At an angle ſomewhat greater than a right one, at the diſtance of four feet, the body will be headleſs, &c. Again, if the *mirrors* be placed, the one parallel to the horizon, the other inclined to it, or declined from it, it is eaſy to perceive, that the images will be ſtill more romantic. Thus, one being declined from the horizon to an angle of 144 degrees, and the other inclined to it, a man ſees himſelf ſtanding with his head to another's feet.

Hence it appears, how *mirrors* may be managed in gardens, &c. ſo as to convert the images of thoſe near them into monſters of various kinds; and ſince glaſs *mirrors* will reflect the image of a lucid object twice or thrice, if a candle, &c. be placed in the angle between two *mirrors*, it will be multiplied an infinite number of times. On theſe principles are founded various catoptric machines, ſome of which repreſent objects infinitely multiplied and diſtorted; others infinitely magnified, and ſet at vaſt diſtances.

MIRRORS, *burning*. See BURNING-*glaſs*.

MIRRORS, *convex*, are thoſe whoſe ſurface is convex.

Note, by *convex* ſurfaces, authors generally mean ſuch as are ſpherically convex.

Manner of preparing or making convex ſpecula, or MIRRORS.

There are various methods uſed by divers artiſts; particularly as to the matter or compoſition for the ſilvering. One of the beſt that is known, is given us by Wolfius, thus:

Melt one part of tin, another of biſmuth, together; and to the melted maſs add two parts of mercury: as ſoon as the mercury begins to evaporate into ſmoke (which it preſently does), the whole compoſt is to be thrown into cold water, and when well cooled, the water decanted off. The mixture is then to be ſtrained through a linen cloth two or three-fold; and what is thus ſeparated, poured into the cavity of a glaſs ſphere: this ſphere is to be turned gently round its axis till the whole ſurface is covered, the reſt being reſerved for future uſe.

If the ſphere were of coloured glaſs, the *mirror* will be ſo too. And in the ſame manner may conic, elliptic, cylindric, and other *mirrors*, be made.

How they may be made of metal, ſee under *concave* MIRROR. See alſo SPECULUM.

MIRRORS, *laws or phenomena of convex*. 1. In a ſpherical convex *mirror*, HCI (*fig.* 70.) the reflected ray EM concurs with the cathetus of incidence DL, and the incident ray DN with the cathetus of reflection EL, between the tangent AB, and the centre L. For the perpendiculars, or catheti of incidence, obliquation, and reflection, are in the plane of reflection, and, therefore, in the plane which touches the ſpeculum in the point of incidence C; the tangent AC makes a right angle with the cathetus of obliquation FC; but the reflected ray EC or CM, makes with it an acute angle u, and, therefore, falls between the tangent AC, and the cathetus of obliquation CL. Wherefore, ſince CL and DL meet in the centre L, the reflected ray EM ought to interſect the cathetus of incidence DL between the tangent and the centre. In the ſame manner it is ſhewn, that the incident ray DN ought to meet with the cathetus of reflection between the tangent and the centre. Hence, the image of a radiant point appears between the centre and the tangent, becauſe it appears in the concourſe of the reflected ray and cathetus of incidence.

2. In a ſpherical convex *mirror*, the cathetus of incidence DL (*fig.* 70.) is to DB, the diſtance of the object from the tangent at the point of reflection C, as LM, the diſtance of the image from the centre, is to MP, the diſtance of the image from the tangent. Since $o=x$, and $x=m$, o will be equal to m, and, therefore, the right line CP biſecting the angle DCM, cuts the baſe DM into two parts, which are in the ſame proportion with the ſides; conſequently, $DP : PM :: DC : CM$; and if DF be drawn parallel to CM, u will be $=p$, and, as $u=y$, $p=y$, and $DF=DC$. Therefore, ſince $DF\ (DC) : MC :: DL : ML$, DL will be to $ML :: DP : PM$; and, therefore, $DL : DP :: ML : PM$. Hence, becauſe $DL>DP$, and $ML>PM$; and, therefore, ML much greater than RM, the diſtance of the image from the centre is greater, but from the tangent leſs than half the ſemidiameter; and the image is nearer to the tangent than the centre.

Hence, alſo, the diſtance of the object from the tangent is greater than that of the image; and, conſequently, the object is farther diſtant from the ſpeculum than the image.

3. If the arch BD (*fig.* 71.) intercepted between the point of incidence D, and the cathetus AB; or the angle C, formed in the centre of the *mirror* by the cathetus of incidence AC, and that of obliquation FC, be double the angle of incidence, the image B will appear on the ſurface of the ſpeculum.

4. If the arch intercepted between the point of incidence and the cathetus; or the angle C, formed in the centre of the *mirror* by the cathetus of incidence, and the cathetus of obliquation, be more than double the angle of incidence, the image will be without the *mirror*.

5. If the arch intercepted between the point of incidence, and the cathetus; or the angle, formed in the centre of the *mirror* by the cathetus of incidence, and that of obliquation, be leſs than double the angle of incidence, the image will appear within the ſpeculum.

6. In a convex *mirror*, a remoter point A (*fig.* 72.) is reflected from a point F, nearer the eye O, then any nearer point B in the ſame cathetus of incidence.

Hence, if the point of the object A be reflected from the point of the *mirror* F, and the point of the object B, from the point of the *mirror* E; all the intermediate points between A and B will be reflected from the intermediate points of the ſpeculum between F and E; and conſequently, FE will be the line that reflects AB.

Hence, alſo, a point of the cathetus B ſeems at a greater diſtance Cb from the centre C, than a more remote one, A.

7. A nearer point B (*fig.* 73.) not in the ſame cathetus with a remoter H, is reflected to the eye O, from a nearer point of the ſpeculum, than the remoter H.

Hence, if the point of an object A be reflected from the point of a *mirror* C, and the point of the object B, from the point of the ſpeculum D, all upon the ſame point O; all the intermediate points between A and B will be reflected from all the intermediate points between C and D. Conſequently, the image FG of the object BA is contained between the cathetus BE and AE.

8. In a ſpherical convex *mirror*, the image is leſs than the object.

And hence the uſe of ſuch *mirrors* in the art of painting, where objects are to be repreſented leſs than the life.

9. In a convex *mirror*, the more remote the object, the leſs its image; and, again, the ſmaller the *mirror* the leſs the image.

10. In a convex *mirror*, the right hand is turned to the left, and the left to the right; and magnitudes perpendicular to the *mirror* appear inverted.

11. The image of a right line, perpendicular to the *mirror*, is a right line; but that of a right line either oblique to the *mirror*, or parallel thereto, is convex.

12. Rays reflected from a convex *mirror* diverge more than if reflected from a plane *mirror*.

Hence light, by being reflected from a ſpherical *mirror*, is weakened; and, conſequently, the effects of reflected light are weaker than thoſe of direct. Hence alſo, myopes ſee remote objects more diſtinctly in a convex *mirror*, than they do directly.

Rays reflected from a convex *mirror* of a ſmaller ſphere diverge more than thoſe reflected from a larger. Conſequently, the ſight is more weakened, and its effects are leſs conſiderable in the former caſe than in the latter.

Mirrors, *concave*, are thoſe whoſe ſurface is concave. Theſe are generally made of a mixed metal.

Note, by *concave*, authors commonly mean *ſpherically concave*.

Mirrors, *manner of preparing or making concave*. Firſt, a mould is to be provided for caſting them. In order to this, take clay well dried, pulverize and ſift it; mix it up with water, and then ſtrain or filtre it; with this work up horſe-dung, and hair ſhred ſmall, till the maſs be ſufficiently tough; to which, on occaſion, may be added charcoal-duſt, or brick-duſt, well ſifted.

Two coarſe moulds are then prepared of a gritty ſtone, the one concave, the other convex; which are to be ground by one another with wet ſand between, till ſuch time as the one perfectly fits the other. By this means a perfect ſpherical figure is acquired.

The maſs, prepared before, is now to be extended on a table by means of a wooden roller, till it be of a thickneſs proper for the *mirror*; and then being ſtrewed with brick-duſt to prevent its ſticking, it is laid over the convex mould, and ſo gets the figure of the *mirror*. When this is dry, it is covered with another lay of the ſame maſs; which once dried, both the covers, or ſegments of the clay, are taken off. The innermoſt of the two being laid aſide, the ſtone mould is anointed with a pigment prepared of chalk and milk, and the outer cover again put over it.

Laſtly, the joining being covered over with the ſame clay whereof the cover is formed, the whole mould is bound together with an iron wire, and two holes are cut through the cover, the one for the melted matter of the *mirror* to be poured through, the other for the air to eſcape at, to prevent the *mirror*'s being ſpoiled with bubbles.

The mould being thus prepared, eight parts of copper, one of Engliſh tin, and five of biſmuth are melted together; a little of the mixture is take out with a laddle, and, if it be too red, when cold, more tin is put in; if too white, more copper; the maſs is then poured into the mould before prepared, and ſo aſſumes the figure of a *mirror*.

Some with ten parts of copper mix four of Engliſh tin, and a little antimony and ſal ammoniac, ſtirring the maſs about as long as any fumes ariſe in it: others have other compoſitions, many of which are deſcribed by Schottus and Zahnius.

The *mirror*, being thus caſt, is cemented to a wooden frame, and thus worked to and fro over the convex ſtone mould, firſt with water and ſand, and laſtly, without ſand till it be fit for poliſhing; the ſtone mould is then covered with paper, and that is ſmeared over with tripoli duſt, and calx of tin, over which the *mirror* is worked to and fro till it has got a perfect poliſh. And in the ſame manner are glaſs *mirrors* poliſhed, excepting that the convex ſurface is there worked in the concave mould. When the *mirrors* are very large, they are fixed on a table, and firſt ground with a gritty ſtone, then with pumice, then with fine ſand, by means of a glaſs cemented to a wooden frame; and, laſtly, they are rubbed with calx of tin, and tripoli duſt, on a wet leather.

For concave *mirrors* of glaſs, the mould is uſually made of alabaſter; the reſt is as in metal *mirrors*. See Speculum, Grinding, and Polishing.

Mirrors, *laws and phenomena of concave*. 1. If a ray, as K I (*fig.* 74.) fall on a concave *mirror* E I, under an inclination of 60 degrees, and parallel to the axis A B, the reflected ray I B will cuncur with the axis A B in the pole of the glaſs B. Since $m=60°$, n alſo will be $=60°$, and becauſe K I is parallel to the axis A B, $i=60°$, and $u=60°$; therefore C B = C I, the radius. Conſequently the point B, in which the reflected ray I B concurs with the axis, is in the ſurface of the ſpeculum. If the inclination of the incident ray be leſs than 60 degrees, as that of E H, the reflected ray E F will concur with the axis at the diſtance B F, which is leſs than a fourth part of the diameter. Since $o=x$, and, on account of the parallels H E and A B, $o=y$, we ſhall have $x=y$, and therefore, $EF=FC$; but $CF+EF>EC$, and $CE=CB$; therefore $CF+EF>CB$; conſequently $CF>FB$; i.e. F B is leſs than half the radius C B, or a fourth part of the diameter. And, univerſally, the diſtance of the point F, wherein the ray H E concurs with the axis, from the centre C, is to half the radius C D in the ratio of the whole ſine, to the coſine of inclination. For by the laſt demonſtration it appears, that F E is = F C; therefore if from F a perpendicular F D be let fall on E C, L C, will be $=\frac{1}{2}CE$; but if C F be taken for the whole ſine, C D will be the ſine of the angle D F C, or the coſine of the angle D C F; i. e. of the inclination D E H; and, therefore, C F is to C D as the whole ſine is to the coſine of the inclination.

Hence it is inferred, by calculation, that in a concave ſpherical *mirror*, whoſe breadth ſubtends an angle of ſix degrees, parallel rays meet, after reflection, in a part of the axis leſs than the one thouſand four hundred fifty-ſeventh part of the radius; if the breadth of the concave *mirror* be 12, 18, 24, 30, 36 degrees; the part of the axis wherein the parallel rays meet, after reflection, is leſs than $\frac{1}{363}$, $\frac{1}{160}$, $\frac{1}{89}$, $\frac{1}{56}$, $\frac{1}{36}$, the radius.

And on this principle it is, that Burning *glaſſes* are formed.

For ſince the rays diffuſed through the whole ſurface of the concave *mirror*, after reflection, are contracted into a very ſmall compaſs, the light and heat of the parallel rays muſt be prodigiouſly increaſed thereby; viz. in a duplicate ratio of the breadth of the *mirror*, and the diameter of the circle wherein all the rays are collected; and ſince the ſun's rays are, as to any purpoſes on earth, parallel, it is no wonder that concave *mirrors* ſhould burn with ſo much violence.

From this ſame principle is likewiſe deduced a method of repreſenting the images of objects in a dark room; which ſee under Camera *obſcura*.

2. A lucid body being placed in the focus F, of a concave *mirror* E I (*fig.* 74.) the rays, after reflection, become parallel. For parallel rays are by reflection united in a focus; but if the luminous body be in the focus F, that which was before the reflected ray E F will be now the incident ray, and *vice verſâ*; therefore the reflected ray E H will now become parallel to the axis A B, and all the reflected rays parallel to one another.

Hence an intenſe light may be projected to a vaſt diſtance, by a lighted candle, &c. placed in the focus of a concave *mirror*.

Hence alſo, if the parallel rays be received by another concave *mirror*, they will again concur in its focus, and burn.

Zahnius mentions an experiment of this kind made at Vienna, where two concave *mirrors*, the one ſix the other three feet diameter, being placed about twenty-four feet apart, with a live coal in the focus of the one, and a match and tinder in the other, the rays of the coal lighted the tinder.

3. If a lucid body be placed between the focus F (*fig.* 75.) and the *mirror* H B C, the rays, after reflection, will diverge from the axis B A. If the lucid body were in F, the reflected ray C E would be parallel to the axis A B, and therefore it would conſtantly preſerve the ſame diſtance from the axis. But ſince $DCG>FCG$, KCG will be $>ECG$; and, therefore, C K will fall beyond C E, and cannot be parallel to the axis, but muſt continually diverge from the axis, the diſtance from it increaſing: whence it follows, that light is weakened by reflection.

4. If a lucid body be placed between the focus F, and the centre G, as in I, the rays, after reflection, will meet in the axis beyond the centre. In this caſe $IHG \angle FHG$, and, therefore, $GHA \angle GHL$; conſequently, the reflected ray H A recedes from the parallel towards the axis, and its diſtance from the axis will be continually diminiſhed, till at length it concurs with the axis. But if the lucid body be placed in A, that which was before the reflected ray A H will now become the incident ray, and *vice verſâ*. If, therefore, the lucid body be placed beyond the centre G, the rays after reflection will concur with the axis between the focus F and centre G.

Hence, if a candle be placed in I, the image will appear in A; if it be placed in A, its image will be in I: in the intermediate points between I and A, the ſection of light will be a circle; and that ſo much the greater, as it is nearer the point of concourſe.

5. If a luminous body be placed in the centre of the *mirror*, all the rays will be reflected back upon themſelves; for as they fall perpendicularly on the ſpeculum, they will be reflected into themſelves.

Hence, if the eye be placed in the centre of a concave *mirror*, it will ſee nothing but itſelf, and that confuſedly through the whole *mirror*.

6. If a ray falling from the point of the cathetus *h* (*fig.* 76.) on the convex *mirror* *h* F, be, together with its reflex I F, continued within the concavity of the *mirror*, F H will be the incident ray from the point of the cathetus H, and F O its reflex. For $hFE=IFM$; but $hFE=MFO$, and $IFM=EFH$; therefore $MFO=EFH$; and, conſequently, if H F be taken for the incident ray from the point H, F O will be the reflected ray.

Hence, ſince the point of the cathetus H in the image of the point *b* in the convex *mirror*, but the point *b* the image of H in the concave; if the image of an object, reflected by a convex ſpeculum, be ſeen by a reflection made in its concavity, it will appear like the object itſelf.

And ſince the image of an infinite cathetus is leſs in a convex glaſs than one fourth of its diameter; a portion of the cathetus, leſs than a fourth part of the diameter, may appear of any magnitude required in a concave one. A point, therefore, diſtant from a concave ſpeculum leſs than one fourth of the diameter, muſt appear behind the *mirror* at any diſtance, how great ſoever.

Since the image of any object, how broad ſoever, is contained in a convex ſpeculum, between the two lines of incidence of its extreme points; if an object be placed between the two lines, at a diſtance leſs than one fourth of its diameter, the breadth of the image, how great ſoever, may all appear.

Since then the image of an object included between two lines, at a diſtance leſs than one fourth of the diameter, may exceed the juſt height and breadth of the object; nay, may be made of any magnitude, how big ſoever; objects placed between the focus and *mirror* muſt appear of enormous magnitudes in concave *mirrors*; the image being ſo much the greater in the concave *mirror*, as it is leſs in the convex.

In a convex *mirror*, the image of a remote object appears nearer the center than that of a nearer object: therefore, in a concave *mirror*, the image of an object remote from the *mirror* appears at a greater diſtance than that of a nearer object, provided the diſtance of the object from the center be leſs than a fourth part of the diameter.

In a convex ſpeculum, the image of a remote object is leſs than that of a near one: therefore, in a concave one, the image of an object placed between the focus and the *mirror*, is nearer the focus than the ſpeculum.

The image, therefore, of an object receding continually from a concave ſpeculum, becomes continually greater, provided it do not recede beyond the focus, where it becomes confuſed; and as it approaches, it grows continually leſs.

In a convex ſpeculum, if the ſphere, whereof it is a ſegment, be ſmaller, the image is ſmaller than in another of a larger ſphere: therefore in a concave, if the ſphere, whereof it is a ſegment, be ſmaller, the image will be larger than in another whoſe ſphere is larger: whence concave *mirrors*, if they be ſegments of very ſmall ſpheres, will do the office of microſcopes.

7. If an object A B (*fig.* 77.) be placed between a concave *mirror* and its focus, its image will appear behind the *mirror*, in an inverted ſituation. Let A B be the length of the object: ſince the point A is ſeen in the cathetus C *a*, and the point B in the cathetus C *b*, the higher point is ſeen in the higher place *a*, and the lower in the lower *b*; or the object appears behind the *mirror* in an erect ſituation. But if A B repreſent the breadth of the object, it appears in the ſame manner that the part to the right correſponds with the right, and the left to the left, both of the object and image. However, in direct viſion the right hand part of an object correſponds to the left of the ſpectator, and the left to the right; and, therefore, in a concave ſpeculum, the parts to the left hand of an object between the focus and ſpeculum appear to the right, and the right to the left.

8. If an object A B (*fig.* 78.) be placed between the focus and the center, its image E F will appear inverted, and in the open air, beyond the center, the eye being placed beyond the center. For the rays, by which the point A is reflected, concur in the cathetus G F, beyond the centre C in F, and thoſe by which the point B is reflected, concur in the cathetus D F, beyond the center C in E; therefore the point B radiates on the eye placed peyond E F as from E, and the point A as from F; conſequently B is ſeen in E, and A in F, and the image of the object is ſeen beyond the centre in an inverted poſition.

9. If an object E F be placed beyond the centre C, and the eye likewhiſe beyond the centre, the image will appear inverted in the open air, between the center and the focus. Hence, the inverted images of objects placed beyond the center, are reflected by a concave *mirror*, erect; and may be received on a paper applied between the center and the focus, eſpecially if the room be dark; if the object E F be farther diſtant from the center than the focus, the image will be leſs than the object; becauſe A C is leſs than E C, and, therefore, $AB < EF$.

On this principle, concave *mirrors*, eſpecially thoſe which are ſegments of large ſpheres, and are capable of reflecting entire objects, exhibit many pleaſing phænomena. Thus, if a man flouriſh his ſword againſt the *mirror*, another comes out thereof, and meets him with the ſame motions; and the image of his head coming out of the *mirror*, if he ſtrike with his real ſword, the imaginary ſword will ſtrike his real head. If he ſtretch out is hand, another hand will be ſtretched out of the *mirror*, and meet it at a great diſtance in the open air, &c. And on the ſame principle are conſtructed catoptric ciſtulæ; which, when looked into, exhibit images much bigger than the cheſt. See CATOPTRIC *ciſtula*.

10. The image of a right line, perpendicular to a concave *mirror*, is a right line; but all oblique or parallel lines are concave. For ſince every point of a line perpendicular to the ſpeculum is in the cathetus of incidence, its image will of courſe be a right line. But if A B (*fig.* 77.) be parallel, or oblique to the ſpeculum, and C F be drawn from the center C perpendicular to A B, C A will be greater than C D; and, therefore, as $CF = CE$, $FD > AE$; conſequently the point D will appear farther behind the ſpeculum than A. Therefore ſince *c* is farther diſtant from D, than *a* from A, and *b* from B, the image *a c b* will appear concave.

MIRRORS, *cylindrical*, *conical*, *parabolical*, and *elliptical*, or ſpecula, are thoſe terminated by a ſurface reſpectively cylindrical, conical, parabolical, and ſpheroidical.

To prepare, or make, cylindrical, conical, parabolical, elliptical, and *hyperbolical* MIRRORS. For the *cylindrical* and *conical* ſort, if they are to be of glaſs, the method of preparing them is the ſame as that already laid down for convex *mirrors*.

If of metal, they are to be made after the manner of concave *mirrors*, only that the clay moulds there deſcribed, require other wooden ones of the figure of the *mirror*.

For *elliptical*, *parabolical*, and *hyperbolical mirrors*, the mould is to be thus prepared. On a wooden or brazen plane or table, deſcribe the figure of an ellipſis, A B (*fig.* 79.) a parabola, or an hyperbola, C D (*fig.* 80.) after the manner taught under thoſe heads; which done, cut out the figure from the plane with all the accuracy imaginable.

To the elliptic figure fit an axis, as E F, with two fulcra to ſuſtain it, &c. and a handle to move it; lay a quantity of the clay, above deſcribed, under it; and turn about the axis by the handle, till the plane A B hath turned, or impreſſed the elliptical figure exactly upon it.

The axis of the parabolical or hyperbolical figure C D, is to be fixed at the vertex E in ſuch a manner as that it may always remain erect; this is to be turned about as above, till it hath given its own figure to the clay applied about it. The part of the mould, thus formed, is to be dried, and either ſmeared over with fat, or ſprinkled with brickduſt; then a convex mould is to be made, by putting a quantity of the ſame clay into the cavity thus formed. This latter is called the *male*, as the former the *female* mould. The male mould, being well dried, is to be applied within the female, in ſuch a manner, as only to leave the intended thickneſs of the *mirror* between them. The reſt as for concave *mirrors*.

Theſe *mirrors* are not made without the utmoſt difficuly; becauſe, if the moulds be ever ſo juſt, the figure of the *mirror* is apt to be damaged in the GRINDING. See SPECULUM.

MIRRORS, *phenomena, or properties of cylindrical.* 1. The dimenſions of objects correſponding length-wiſe to the *mirror* are not much changed; but thoſe correſponding breadthwiſe have their figures altered, and their dimenſions leſſened ſo much the more, as they are farther from the *mirror*; whence ariſes a very great diſtortion.

2. If the plane of reflection cut the cylindric *mirror* through the axis, the reflection is performed in the ſame manner as in a plane *mirror*; if it cut it parallel to the baſe, the reflection happens in the ſame manner as in a ſpherical *mirror*; if, laſtly, it cut it obliquely, or be oblique to its baſe, the reflection is the ſame as in an elliptical *mirror*. Hence, as the plane of reflection never paſſes through the axis of the *mirror*, except when the eye and objective line are in the ſame plane; nor parallel to the baſe, except when the radiant point and the eye are at the ſame height, the reflection, in a cylindrical *mirror*, is uſually the ſame as in an elliptical one.

3. If a hollow cylindrical *mirror* be oppoſed directly to the ſun, inſtead of a focus of a point, the rays will be reflected into a lucid line, parallel to its axis, at a diſtance ſomewhat leſs than a fourth part of its diameter. Hence ariſes a method of drawing anamorphoſes, i. e. wild, deformed figures, on a plane, which appear beautiful and well proportioned, when viewed in a cylindrical *mirror*.

MIRRORS, *for elliptic*, *parabolic*, *conic*, and *pyramidal*, we are not much acquainted with their properties: only that in the firſt, if a ray ſtrike on it from one of its focuſes, it is reflected into the other; ſo that a lighted candle being placed in one, its light will be collected in the other. That the ſecond, inaſmuch as all the rays they reflect meet in one point, make the beſt burning-glaſſes of all others.

And, laſtly, that wild, irregular figures, may be ſo drawn on a plane, as that, the eye being placed over the axis of the two laſt, they ſhall appear beautiful, and well proportioned. See Anamorphosis.

MIROUETTE, in the *Manege*, is uſed for a dapple-*bay*.

MIS, a particle prefixed to divers words, particularly law-terms; denoting ſome default or defect. As, in *miſpriſion*; *miſdicere, to ſcandalize one*; *miſdocere, to teach amiſs*, &c.

MISANTHROPY, μισανθρωπια, formed of μισος, *hatred*, and ανθρωπος a *man*, a general diſlike or averſion to man, and mankind. In which ſenſe it ſtands oppoſed to *philanthropy*, or the love of mankind.

MISAVENTURE, or Misadventure, *homicide by*, in *Law*, is where a man, doing a lawful act, without any intention of hurt, unfortunately kills another: as where a man is at work with a hatchet, and the head of it flies off and kills a ſtander-by; or, where a perſon qualified to keep a gun, is ſhooting at a mark, and undeſignedly kills a man; for the act is lawful, and the effect is merely accidental.

In the caſe of *miſadventure*, the law preſumes negligence, or at leaſt a want of ſufficient caution in him who was ſo unfortunate as to commit it; who, therefore, is not altogether faultleſs. The penalty inflicted by our laws is ſaid by ſir Edward Coke to have been anciently no leſs than death; though others affirm, with greater reaſon, that it conſiſted in a forfeiture, as ſome ſay, of all the goods and chattels; according to others, of only part of them, by way of fine or weregild; which was probably diſpoſed of, as in France, for pious uſes, or for the benefit of the ſoul of the deceaſed. However, the delinquent has now, and has had as early as our records will reach, a pardon, and writ of reſtitution of his goods as a matter of courſe and right, only paying for ſuing out the ſame; and, to prevent this expence, in caſes where the death has notoriouſly happened by *miſadventure*, or in ſelf-defence, the judges will uſually permit, if not direct, a general verdict of acquittal. See Homicide.

Staundford diſtinguiſhes between *aventure* and *miſaventure*. The firſt he makes to be mere chance: as if a man, being upon or near the water, be taken with ſome ſudden ſickneſs, and ſo fall in, and be drowned; or into the fire, and be burnt.

Miſaventure, according to him, is when a man comes to his death by ſome outward violence; as the fall of a tree, the running of a cart-wheel, the ſtroke of a horſe, or the like.

MISCARRIAGE. See Abortion; and for the method of preventing, ſee Pregnancy.

MISCHIEF, *malicious*, or *damage*, in *Law*, is a ſpecies of injury to private property, which the law conſiders as a public crime. This is ſuch as is done, not *animo furandi*, or with an intent of gaining by another's loſs; but either out of a ſpirit of wanton cruelty, or diabolical revenge. Any damage ariſing from this miſchievous diſpoſition, though only a treſpaſs at common law, is now by a multitude of ſtatutes made penal in the higheſt degree. 22 Hen. VIII. c. 11. 43 Eliz. c. 13. 22 & 23 Car. II. c. 7. 1 Ann. ſtat. 2. c. 9. & 4 Geo. I. c. 12. 12 Ann. c. 18. 1 Geo. I. c. 48. 6 Geo. I. c. 23. 9 Geo. I. c. 22. See Black *act*. 6 Geo. II. c. 37. 10 Geo. II. c. 32. 28 Geo. II. c. 19. 6 Geo. III. c. 36 & 48. See Felony.

MISCHNA, or Misna, from שנה, *iteravit*, a part of the Jewiſh Talmud.

The *Miſchna* contains the text; and the Gemara, which is the ſecond part of the Talmud, contains the commentaries; ſo that the Gemara is, as it were, a gloſſary on the *Miſchna*.

The *Miſchna* conſiſts of various traditions of the Jews, and of explanations of ſeveral paſſages of ſcripture: theſe traditions, ſerving as an explication of the written law, and ſupplement to it, are ſaid to have been delivered to Moſes during the time of his abode on the Mount; which he afterwards communicated to Aaron, Eleazer, and his ſervant Joſhua. By theſe they were tranſmitted to the ſeventy elders, by them to the prophets, who communicated them to the men of the great ſanhedrim, from whom the wiſe men of Jeruſalem and Babylon received them. According to Prideaux's account, they paſſed from Jeremiah to Paruch, from him to Ezra, and from Ezra to the men of the great ſynagogue, the laſt of whom was Simon the Juſt; who delivered them to Antigonus of Socho; and from him they came down in regular ſucceſſion to Simeon, who took our Saviour in his arms; Gameliel, at whoſe feet Paul was educated, and laſt of all to Rabbi Judah the Holy, who committed them to writing in the *Miſchna*. But Dr. Prideaux rejecting this Jewiſh fiction, obſerves, that after the death of Simon the Juſt, about two hundred and ninety-two years before Chriſt, the *Miſchnial* doctors aroſe, who, by their comments and concluſions, added to the number of thoſe traditions, which had been received and allowed by Ezra, and the men of the great ſynagogue; ſo that towards the middle of the ſecond century, after Chriſt, under the empire of Antoninus Pius, it was found neceſſary to commit theſe traditions to writing; more eſpecially as their country had conſiderably ſuffered under Adrian, and many of their ſchools had been diſſolved, and their learned men cut off; and, therefore, the uſual method of preſerving their traditions had failed. Rabbi Judah, on this occaſion, being rector of the ſchool of Tiberias, and preſident of the ſanhedrim in that place, undertook the work, and compiled it in ſix books, each conſiſting of ſeveral tracts, which altogether make up the number of ſixty-three. Prid. Connect. vol. ii. p. 468, &c. ed. 9.

This learned auther computes that the *Miſchna* was compoſed about the 150th year of our Lord; but Dr. Lightfoot ſays, that Rabbi Judah compiled the *Miſchna* about the year of Chriſt 190, in the latter end of the reign of Commodus; or, as ſome compute, in the year of Chriſt 220. Dr. Lardner is of opinion that this work could not have been finiſhed before the year 190, or later. Collect. of Jewiſh and Heathen Teſtimonies, &c. vol. i. p. 178. Others, however, apprehend, that the *miſchna* was not committed to writing till near the middle of the fifth century, alledging that St. Auſtin, who died in the year 430, ſays expreſſy (Cont. Adverſ. Leg. & Proph. lib. ii. c. 1.) that the Jewiſh traditions were not in writing. And yet that it was written before 500 ſeems evident, becauſe in 548 Juſtinian interdicted the uſe of it in the Synagogues. Kennicot's State of the Hebrew Text, vol. ii. p. 443.

Thus the book called the *miſchna* was formed; a book which the Jews have generally received with the greateſt veneration. The original has been publiſhed, with a Latin tranſlation, by Surenhuſius, with notes of his own, and others from the learned Maimonides, &c. in 6 vols. fol. Amſterd. A. D. 1698—1703. See Talmud.

It is written in a much purer ſtyle, and is not near ſo full of dreams and viſions as the Gemara.

MISCONTINUANCE, in *Law*, the ſame with discontinuance.

MISDEMEANOUR, an offence, or fault, particularly when in the execution of an office.

A crime, or *miſdemeanour*, ſays judge Blackſtone, is an act committed, or omitted, in violation of a public law, either forbidding or commanding it. This general definition comprehends both crimes and *miſdemeanours*; which, properly ſpeaking, are mere ſynonymous terms; though, in common uſage, the word *crimes*, is made to denote ſuch offences as are of a deeper and more atrocious dye; while ſmaller faults, and omiſſions of leſs conſequence, are comprized under the gentler name of *miſdemeanours* only.

High crimes and miſdemeanours denote offences of a heinous nature, next to high treaſon.

MISE, a French term, literally denoting expence, or diſburſement: it is uſed in our law-books in divers acceptations. Sometimes for the profits of lands; ſometimes for taxes, or taillages; and ſometimes for expences, or coſts: as *pro miſis & cuſtagiis*, for coſts and charges in the entries of judgments, &c.

Mise more peculiarly denotes an honorary gift, or cuſtomary preſent, wherewith the people of Wales uſed to ſalute every new king and prince of Wales, at their entrance upon the principality.

Anciently, the *miſe* was given in cattle, wine, corn, &c. for the ſupport of the prince's family; but when that dominion was annexed to the Engliſh crown, the gift was changed into money. The county of Flint paid two thouſand marks, &c. for the *miſe*.

The county of Cheſter alſo a *miſe* or tribute of five thouſand marks at the change of every owner of the ſaid earldom, for enjoying the privilege of that palatinate. At Cheſter they have a *miſe*-book, wherein every town and village in the county is rated what to pay towards the *miſe*.

Mise is alſo uſed in ſpeaking of a writ of right. What in other actions is called an *iſſue*, in a writ of right is called a *miſe* or *me*: ſo that *to join the miſe upon the mere*, is as much as to ſay, to join iſſue on the mere right, i. e. to join upon this point, whether has the more right, the tenant or demandant.

Yet even in a writ of right, if a collateral point be tried, it is there called an *iſſue*, not a *miſe*.

Mise is alſo ſometimes uſed corruptly for *meaſe*, a meſſuage or tenement.

In ſome manors, a *miſe* or *meaſe* place is taken for ſuch a meſſuage or tenement as yields the lord an heriot at the death of the tenant.

MISEN, Misson, or Mizen, in a *Ship*, denotes either the maſt, or ſail of that name; but at ſea, they always mean the ſail when the word *mizen* is uſed.

This is the hindmoſt of the fixed ſails of a ſhip, extended ſometimes by a gaff, and ſometimes by a yard, which croſſes the maſt obliquely; the fore-end reaching always down to the deck, and the after-end being peeked up as high above the middle of the yard, where it is attached to the maſt. The figure of the *miſen* is a trepazium, or parallelogram, one of whoſe corners is cut off by a diagonal, extended from one of its ſides to the oppoſite corner, which becomes the peek of the *miſen*. Some great ſhips require two *miſens*; in which caſe that next the main-maſt is called the *main-miſen*, and that next the poop the *benaventure miſen*.

The uſe of the *miſen* is, to keep the ſhip cloſe to a wind; wherefore if a ſhip is apt to gripe too much, they uſe no *miſen*. But it is often uſed when a ſhip rides at anchor, to back her a-ſtern; ſo that ſhe may not foul her anchor, on the turning of the tide; and ſometimes a ſhip lies a-try with her *miſen* only.

Misen-*maſt* is the maſt upon which the *miſen* and its top-ſail and ſtay-ſails are ſupported, beſides other ſails, which are ſet occaſionally, as the driver, ring-tail, &c. See *Tab. Ship, fig.* 1 *n.* 1. 13. 19. and Mast.

Misen, *change the*, is an order to bring the *miſen-yard* over to the other ſide of the maſt. *Peek the miſen*, i. e. put the *miſen* right up and down the maſt.

Misen, *ſet the*, at *Sea*, the word of command to fit the *miſen-ſail* right as it ſhould ſtand. *Spell the miſen*, i. e. let go the ſheet, and peek it up.

Misen-*ſtay*, in a *Ship*. See Stay.

Misen-*yard*, in a *Ship*. See Yard.

MISERERE, *have mercy*, the name, and firſt word of one of the penitential pſalms; being that commonly given by the ordinary to ſuch condemned malefactors as are allowed the benefit of the clergy: whence it is alſo called the *pſalm of mercy*.

Miserere *mei*, denotes a kind of colic, or diſorder of the inteſtines, wherein the excrements, inſtead of paſſing off the common way, are often thrown up by the mouth.

The *miſerere mei* is the ſame with what we otherwiſe call *volvulus*, and iliac *paſſion*.

MISERICORDIA, *mercy*, in *Law*, an arbitrary amerciament, or puniſhment impoſed on any perſon for an offence.

Where the plaintiff or defendant in any action is amerced, the entry is always *ideo in miſericordia*.

It is thus called, according to Fitzherbert, becauſe it ought to be but ſmall, and leſs than the offence, according to the tenor of Magna Charta.

Mulcta lenior ſic dicto, quod leniſſima imponitur miſericordia; *graviores enim mulctas* fines *vocant*; *atrociſſimas*, redemptiones. See Fine and Redemption.

Hence, if a man be unreaſonably amerced in a court not of record, as a court baron, &c. there is a writ called *moderata miſericordia*, directed to the lord, or his bailiff, commanding them to take moderate amerciaments.

Misericordia *communis*, is when a fine is ſet on the whole county, or hundred.

Misericordia *in cibis & potu*, in our *Old Writers*, is uſed for any gratuitous portion of meat and drink, given to the religious in convents beyond their ordinary allowance. Matt. Paris. And in ſome convents they had a ſtated allowance of theſe over-commons upon extraordinary days, which were called *miſeracordiæ regulares*.

MISFEASANCE, in *Law*, a miſdeed or treſpaſs. Whence alſo *miſfeaſor*, a treſpaſſer.

MISGUM, in *Ichthyology*, the name of a fiſh of the anguilliform kind, but broader and flatter than the eel, and of much the ſame ſize from the head to the tail; it has five black lines, one on the back, two, which are ſomewhat broader, in the middle of the ſides, and two others, which are narrower lower down; theſe are all extended from the head to the tail; the intermediate ſpaces, and the belly, are of a ſomewhat bluiſh white, dotted with black ſpots; the fins are alſo ſpotted in the ſame manner; the mouth is ſmall and round, like that of the lamprey, and is ſurrounded with beards, ſix on the upper jaw, and four on the under; and there are two other very ſlender ones near the noſtrils; the eyes are ſmall; the gills four on a ſide; and beſide the back fin there are four, two near the gills, and two lower on the body. This is a common fiſh about the German ſhores, and is eſteemed a very delicate one at the table; it lays its ſpawn in March, and is in beſt ſeaſon for eating in January and February. It is caught principally in ſtanding and muddy waters; and it is ſaid, that when out of water, it makes a ſort of hiſſing noiſe.

MISKERING, *miſkerring*. See Abishering.

MISLETOE. See Mistletoe.

MISNA. See Mischna.

MISNOMER, compounded of *mis*, which in compoſition ſignifies *amiſs*, and *nomer*, *to name*, in *Law*, a wrong name, or the uſing of one name for another.

A *miſnomer* furniſhes one of the principal pleas in Abatement.

MISPRISION, derived from the old French *meſpris*, a *neglect* or *contempt*, in *Law*, ſignifies a neglect or overſight, and is generally uſed to denote all ſuch high offences as are under the degree of capital, but nearly bordering upon them.

Miſpriſions are generally divided into two ſorts: negative, which conſiſt in the concealment of ſomething which ought to be revealed; and poſitive, which conſiſt in the commiſſion of ſomething which ought not to be done.

Misprision *of clerks*, is a neglect of clerks, in writing, or keeping records.

By the *miſpriſion of clerks*, no proceſs ſhall be annulled, or diſcontinued. And juſtices of aſſize ſhall amend the defaults of clerks miſ-ſpelling a ſyllable, or letter, in writing.

Misprision *of felony*, which is the concealment of a felony which a man knows, but never aſſented to, is puniſhable, in a public officer, by ſtat. Weſtm. 1. 3. Ed. I. c. 9. with impriſonment for a year and a day; in a common perſon with impriſonment for a leſs diſcretionary time; and in both with fine and ranſom at the king's pleaſure, declared by the judges in his courts of juſtice. Juſtices of the Common Pleas have a power to aſſeſs any amerciaments upon perſons offending by *miſpriſions*, contempts or neglects, for not doing, or miſdoing, any thing, in or concerning fines.

Misprision *of treaſon*, is a negligence in not revealing treaſon, where a perſon knows it to be committed.

It is enacted by ſtat. 1 & 2 Ph. & Mar. c. 10. that a bare concealment of treaſon ſhall be only held a *miſpriſion*; which concealment becomes criminal, if the party appriſed of the treaſon does not, as ſoon as conveniently may be, reveal it to ſome judge of aſſize, or juſtice of the peace. Beſides, the ſtatute 13 Eliz. c. 2. enacts, that thoſe who forge foreign coin, not current in this kingdom, their aiders, abettors, and procurers, ſhall all be guilty of *miſpriſion* of treaſon. The puniſhment of *miſpriſion* of treaſon is loſs of the profits of lands during life, forfeiture of goods, and impriſonment during life.

MISSA. See Mass.

MISSAL, *miſſale*, a maſs-book, containing the ſeveral maſſes to be uſed on the ſeveral days, feaſts, &c.

The Roman *miſſal* was firſt compiled by pope Gelaſius, and afterwards reduced into better order by pope Gregory the Great; who called it the *book of ſacraments*.

Each dioceſe, and each order of religious, have their particular *miſſal*, accommodated to the feſtivals of the province, or of the order.

MISSELTOE. See Mistletoe.

MISSEL-*bird*, in *Ornithology*, the common Engliſh name of the larger ſpecies of thruſh, called alſo the *ſhrite* and by authors the *turdus viſcivorus major*. It is much larger than any other of the thruſh-kind; its legs and feet are yellow; its head of a browniſh lead colour, and its back, tail, and rump of the ſame colour, with an admixture of yellow; but in the ſummer months it a little changes its colour, and becomes more grey, or of the colour of unripe pickled olives; its throat, breaſt, and belly, are all variegated with black ſpots; the middle of its belly whitiſh, and the upper part of its breaſt, and part of its ſides, and the under feathers of its tail, yellowiſh; its bill is ſhorter and thicker than that of other thruſhes, and of a duſky colour, except the baſe of the lower mandible, which is yellow. It uſually is ſeen on the top branches of tall oaks, elms, and other high trees, and ſings very ſweetly, and is the largeſt bird that has any melody in its note. It begins its ſong, ſitting on the ſummit of a high tree, very early in the ſpring; often with the new year, in blowing ſhowery weather, whence it is called in Hampſhire the ſtorm-cock; the note of anger or fear is very harſh, between a chatter and ſhriek. It remains the whole year with us, flies ſingly, except with its female, and drives all the leſſer ſpecies of thruſhes from it. It is the beſt of all the kinds for the table.

MISSEN-*maſt*, or Mizzen-*maſt*. See Misen.

Mizen-*ſail*. See Misen.

MISSILIA, among the Romans, a name given to largeſſes, thrown among the people on occaſion of games and ſhews, ſuch as ſmall gold or ſilver coins, ſweetmeats, and ſometimes animals, as ſheep, oxen, deer, &c. which were let looſe to be carried off by the people.

The word comes from *mittere*, *to throw*, or *let looſe*.

MISSING-*wood*, a phraſe uſed among *Bowlers*. See Bowling.

MISSION, *miſſio*, among the Romans, a term uſed to ſignify the emperor's ſending to reſcue a wounded gladiator from his antagoniſt. The *munerarii*, or perſons who exhibited the games, and likewiſe the people, uſed to reſcue a favourite gladiator. The manner of their ſignifying this favour, was *pollice preſſo*, or with the thumb hid in the palm of the hand. However the gladiator was only ſaved for that time; whereas by the rudis he had a free diſcharge.

Mission. See Emission, Manumission, Remission, and Transmission.

Miſſion, in *Theology*, denotes a power or commiſſion to preach the Goſpel. Jeſus Chriſt gave his diſciples their *miſſion* in theſe words, *Go, and teach all nations*, &c.

The Romaniſts reproach the Proteſtants, that their miniſters have no *miſſion*; as not being authoriſed in the exerciſe of their miniſtry, either by an uninterrupted ſucceſſion from the apoſtles, or by miracles, or by any extraordinary proof of a vocation.

Many among us deny any other *miſſion* neceſſary for the miniſtry, than the talents neceſſary to diſcharge it.

Miſſion is alſo uſed for an eſtabliſhment of people zealous for the glory of God, and the ſalvation of ſouls; who go and preach the goſpel in remote countries and among infidels.

There are *miſſions* in the Eaſt, as well as in the Weſt Indies. Among the Romaniſts, the religious orders of St. Domimic, St. Francis, St. Auguſtine, and the Jeſuits, have *miſſions* in the Levant, America, &c.

The Jeſuits have alſo *miſſions* in China, and all other parts of the globe, where they have been able to penetrate. The Mendicants abound in *miſſions*.

There have been alſo ſeveral proteſtant *miſſions* for diffuſing the light of Chriſtianity through the benighted regions of Aſia and America. Of this kind has been the Daniſh *miſſion*, planned by Frederic IV. in 1706. And the liberality of private benefactors in our own country has been alſo extended to the ſupport of *miſſionaries* among the Indians in America, &c.

Miſſion is alſo the name of a congregation of prieſts and laymen, inſtituted by Vincent de Paul, and confirmed in 1632, by pope Urban VIII. under the title of *Prieſts of the Congregation of the Miſſion.*

Theſe profeſs to make it their whole buſineſs to aſſiſt the poor people in the country; and to this purpoſe they oblige themſelves never to preach, or adminiſter any of the ſacraments, in any town where there is an archbiſhop, biſhop, or provincial reſiding.

The prieſts of the *Miſſion* were alſo intruſted with the direction and government of a female order, called *Virgins of Love*, or *Daughters of* Charity, whoſe office it was to adminiſter aſſiſtance and relief to indigent perſons, who were confined to their beds by ſickneſs and infirmity. This order was founded by a noble virgin, whoſe name was Louiſa le Gras, and received, in the year 1660, the approbation of pope Clement IX.

They are ſettled in moſt provinces of France, Italy, Germany, and in Poland. At Paris they have a ſeminary which they call the *Foreign Miſſion*, where youth are bred up, and qualified for *miſſions* abroad.

MISSIONARY, an eccleſiaſtic who devotes himſelf and his labours to ſome *miſſion*, either for the inſtruction of the orthodox, the conviction of heretics, or the converſion of infidels. See Jesuits.

MISSIVE, ſomething ſent to another. From the Latin *mitto, I ſend.*

We ſay *miſſive* letters, or letters *miſſive*, meaning letters ſent from one to another.

In propriety, *letters miſſive* are letters of buſineſs, but not buſineſs of great concern; in contradiſtinction from letters of gallantry, letters on points of learning, diſpatches, &c. See Letters.

MIST, a meteor, called alſo Fog.

The bluiſh *miſt* which we ſometimes ſee on our fields and paſtures in a morning, though often innocent, yet has been in ſome places found to be the actual cauſe of murrain, and other fatal diſeaſes among the horned cattle. Dr. Winklar gives, in the Philoſophical Tranſactions, an account of a murrain affecting the cattle in Italy and other places, which was evidently ſeen to ſpread itſelf over the countries in form of a blue *miſt*. Wherever this was perceived, the cattle were ſure to come home ſick; they appeared dull and heavy, and refuſed their food; and many of them would die in four and twenty hours. Upon diſſection there were found large and corrupted ſpleens, ſphacelous and corroded tongues; and in ſome places thoſe people who were not careful of themſelves in the management of their cattle, were infected and died as faſt themſelves. The principal cauſe of this diſeaſe ſeems to be the exhalation of ſome unwholeſome ſteams from the earth; and it was obſervable, that there had been three earthquakes in Italy the year before it happened.

The method of cure which ſucceeded beſt, was this: as ſoon as any beaſt appeared to be ſick, they examined the tongue, and if aphthæ or little bliſters were found on it, they ſcraped it with a ſilver inſtrument made with ſharp teeth at the ſides, till it bled in all thoſe parts where the aphthæ were; the blood was then wiped away with a cloth, and the whole tongue waſhed ſeveral times with vinegar and ſalt. After this the following medicine was given internally: take of ſoot, brimſtone, gunpowder and ſalt, of each equal parts: mix theſe in as much water as will make a mixture thin enough to be ſwallowed, and let a ſpoonful be given for a doſe three or four times a day. The cattle which were in health had this medicine given them, as well as the ſick; and the conſequence was, that very few died in Swiſſerland, while almoſt all died in other places.

It was very remarkable that this contagion, on this occaſion, ſeemed to travel ſlowly, but regularly on: it came at the rate of about two German miles in twenty-four hours; this it kept regularly to during the whole time of its raging, and never appeared in very diſtant places at the ſame time.

The whole ſurface of the earth emitting theſe effluvia, no cattle eſcaped them in the courſe of their way, but thoſe which were kept within doors at rack and manger fell ill at the ſame time, and in the ſame manner with thoſe in the open fields.

Dr. Slare was of opinion, that it was owing to certain inſects, which could not fly faſter than at the rate of two German miles a day; and that they travelled regularly, and ſpread the miſchief where they paſſed; but there wanted ſome judicious perſons, verſed in theſe obſervations, to have examined both the ſtate of the air, and the beaſts, on this occaſion. Phil. Tranſ. N° 145.

MISTLETOE, Misletoe, or Misseltoe, *viſcum*, in *Botany*, a genus of the *dioecia triandria* claſs: it has male and female flowers upon ſeparate plants; the male flowers have an empalement compoſed of four oblong leaves, and no petals, but have four ſummits, which are oblong and acute pointed, faſtened to the leaves of the empalement; the female flowers have an empalement of four ſmall oval leaves ſitting upon the germen, but have no petals or ſtamina; with an oblong three cornered germen, ſituated under the germen, having no ſtyle, but crowned by an obtuſe ſtigma; the germen afterwards turns to a globular ſmooth berry with one cell, including a fleſhy heart-ſhaped ſeed. Linnæus enumerates ſix ſpecies.

We have but one ſpecies of this genus in Europe, which is the *miſtletoe* with white berries, a plant of the paraſite kind, growing, not on the ground, but on other trees, as the oak, apple-tree, pear-tree, white-thorn, aſh, lime, willow, elm, &c. Miller's Gard. Dict.

Miſtletoe grows to the height of about two feet. It conſiſts of ſeveral ſtems which are uſually covered with a greeniſh, ſometimes a yellowiſh bark, and are about the thickneſs of the finger, hard, woody, and divided by knots; from which ſpring the leaves, which grow by two and two, oppoſite to each other; they are oblong, thick, of a greeniſh or yellowiſh colour, veined their whole length, and rounded at the end Its flowers grow by three and three, trefoil-wiſe, at the extremes of the branches: each flower is a ſort of yellow calyx, one third of an inch in diameter, divided into four parts.

The fruit likewiſe grow by three and three, at the extremes of the branches; they are a kind of white roundiſh berries, not unlike pearls, containing a flattiſh ſeed, in form of a heart, covered with a fine ſilvered membrane, and environed with a viſcid, glutinous humour, of a whitiſh colour, wherein the ſeed naturally buds or germinates, and puts forth two eyes. From this juice it is, that the Latins denominate the plant *viſcum*. The fruit grows on different branches from the flowers. The uncommon ſort whereon the *miſtletoe* grows has occaſioned abundance of fabulous notions, both as to its production and virtues.

Pliny, and moſt naturaliſts, relate, that thruſhes, being exceeding fond of the berries of the *miſtletoe*, ſwallow them, and caſt them out again on the branches of trees where they uſe to perch; and, by this means, gives occaſion to a new production of *miſtletoe*. Hence that proverb, *Turbis ſibi cacat malum*; the *viſcum* being ſometimes uſed as bird-lime. By cracking the berries, alſo, with their bills, or claws, they are ſuppoſed to let out the viſcous juice, which facilitates their ſticking.

It has been formerly ſuppoſed that the *miſtletoe* was produced as a ſort of excreſcence from the tree on which it is found; but time and experiments have ſhewn, that it is raiſed like other plants, from ſeeds. Its berries are of a viſcous nature, and ſticking to the beaks of birds that eat them, they may be rubbed off againſt the branches of other trees, and there take root and grow; but this is not neceſſary for their propagation, for the great numbers of plants of it, uſually found on the ſame trees, ſeem to prove very plainly, that it is produced by the falling of its ſeeds, like all other plants, but that the matrix for theſe is not earth, but the branches of a living tree.

The trees on which *miſtletoe* is principally found, are the apple, the aſh, and other ſmooth-rinded ones, ſuch as the white-thorn, the crab, the hazle, and maple. It is very rarely found upon the oak; and though it may eaſily be propagated by its ſeeds on other trees, yet it has not been found to take readily upon the oak. However, the *miſtletoe* of the laſt has been always accounted the beſt, which opinion, as Mr. Ray obſerves, may be owing to the ſuperſtitious honour paid by the ancient Druids to the oak.

When a berry of *miſtletoe* is cruſhed and broken againſt the bark of a tree, the viſcous matter which ſurrounds the ſeed ſoon dries away into a thick and tough ſkin, which ſurrounds the ſeed, and keeps it faſt down to the bark; but the rains frequently waſh theſe off afterwards, eſpecially when they have fallen upon the ſmoother part of the bark, or upon ſuch parts of a tree as are clean and free from moſs. And hence it is, that moſt of the *miſtletoe* we find, is either found upon the under part of the branch of a tree from whence the rain could not ſo eaſily diſlodge it, or on ſuch as have a rough bark, or are in part covered with the common tree-moſſes.

Mr. Duhamel, determined to inveſtigate the nature of this odd plant, put ſeveral of the ſeeds of it into ſmall ſlits, which he cut in the barks of different trees, by that means to defend them from being waſhed away by rains, and theſe all ſucceeded well and ſhot, except thoſe he planted on the fig, on which he made ſeveral unſucceſsful attempts; the miſchief done to the ſeeds by the milky juice of this tree was probably the cauſe of this.

It is no wonder that *miſtletoe* grows equally on all ſorts of trees, ſince there requires no more to make it grow than the effect of the rains and night dews; and this author found the ſeeds ſhooting on earthen pots and ſtones, which he kept ſhaded from the heat of the ſun; and from parallel experiments it ſhould ſeem alſo, that the tranſpiration of trees helps greatly the germination of theſe ſeeds.

The ſeeds of *miſtletoe* ſown, if we may ſo call it, on the bark of trees in February, begin to ſhoot in June, and at that time there are ſeen two little round bodies iſſuing out at the two angles of the triangular ſeeds; but as theſe ſeeds are ſubject to ſome irregularities in their figure, ſo they alſo are in their germination, for from the oval ſeeds there is only one ſhoot, and from thoſe which are irregularly angular, there are ſometimes four or five.

Each of theſe round bodies is faſtened to a pedicle, which has its inſertion in the fleſhy part of the ſeed, in which there is a ſort of grooves, which make it ſeem as if theſe pedicles came out of a ſort of caſe.

This ſort of germination is peculiar to *miſtletoe*, no other ſeed ſhooting out ſo many radicles.

The length of theſe radicles is in a great meaſure owing to the poſition of the ſeed on the branch of the tree, for they always grow in length till they reach the bark.

It is to be obſerved alſo, in regard to the germination of theſe ſeeds, that they are the only ones in which the radicle takes indifferently any direction, in all other ſeeds it points ever downwards only. The ſeeds of *miſtletoe* will ſhoot equally well on the upper and under ſides of a branch of a tree, and thoſe on the upper will bend their radicles downward, while thoſe on the under will ſtrike theirs directly upward with the ſame eaſe.

The radicles of *miſtletoe* are, as has been already obſerved, compoſed of a little round body, ſuſtained by a pedicle. When this pedicle has grown to ſuch a length that the round body touches the bark, it opens before into the ſhape of the trunks of flies, and other inſects, and by this means touching cloſely at all its edges, it becomes faſtened extremely firm to the tree. From this reſemblance in ſhape to the trunks of ſmall animals, M. Du Hamel calls theſe radicles the trunks of the ſeed of *miſtletoe*. The ends of theſe trunks of the radicles are alſo faſtened to the bark of the tree by a viſcous matter, which when the trunk is gently raiſed, is drawn out into ſtrings on all ſides to ſome length.

In the inner part of this trunk, or open button, there are two ſubſtances to be diſtinguiſhed; in the center there is a white granulated matter, and round that a greeniſh one; both theſe are juicy, but the outer leſs ſo than the central white part; the outer one is plainly the ſame with the outer rind of the root of the *miſtletoe*, or the ſecond bark of its trunk. Theſe both very quickly adhere to the tree, ſtriking their ſeveral granulæ into it, and theſe furniſh afterwards the roots of the *miſtletoe*. The outward bark of *miſtletoe* is thin, of a deep green, and ſomewhat rough; it is ſtronger than that which it covers; and this is not extended to the roots of the plant, but ſpreads over the bark of the tree at the bottom of the ſtalk, juſt as the feet of the corals and other ſea plants do over ſtones.

The viſcous matter, by which the trunk adheres to the tree, is furniſhed from all parts of the radicle, but principally from its outer bark, and is not at all owing to the juices of the tree, ſince it is found as abundantly on thoſe radicles which have been made to adhere to ſtones, as on thoſe which have been on trees. A little time fixes theſe trunks very firmly; but it is obſervable, that though the outer bark or edge of theſe open balls adheres equally all round to the bark of the tree, the granulæ of the inner ſubſtance always direct themſelves to and inſinuate in the little clefts or cracks of the rind of the tree. While the ſeeds of *miſtletoe* are in this ſtate, they may be tranſplanted to other places, and ſet on other trees, and ſeldom fail to thrive.

Seeds of this plant may be made to ſhoot on ſtones, and will fix their trunks to them, but here they naturally ſoon periſh; they may however be removed from theſe ſtones to the branches of trees, as ſoon as they have affixed themſelves, and being then in a ſtate of drawing nouriſhment, they will affix themſelves to the tree, and from its juices begin to thrive immediately.

It has been very naturally ſuppoſed by thoſe who thought the *miſtletoe* no perfect plant, that it had no roots, nay even thoſe who allowed it to be a perfect plant, and producible from ſeeds, yet have ſuppoſed it had no root. Malpighi, however, affirms that he plainly ſaw the root. And Tournefort countenances the ſame opinion; but neither of theſe authors hath perfectly deſcribed them.

In that part of the branch of a tree where the *miſtletoe* grows, there is always obſerved a thickneſs, and the bark is always chopped in ſeveral places; but the roots of the *miſtletoe* are by no means to be ſeen externally, being hid both by the bark of the tree, and by the expanſion of the bark of the plant itſelf at its bottom. It is neceſſary, therefore, for the diſcovery of the roots, to raiſe very nicely both the bark of the plant, and that of the tree; but the hardneſs of theſe barks, and their ſtrict attachment to the roots, make this difficult; and there is indeed no way of ſucceeding well in the attempt, but by boiling the part in water, and making nice diſſections of it before it is cold.

It has been ſuppoſed by many, that the roots of the *miſtletoe* penetrated the woody ſubſtance of the tree; but though appearances make greatly for this ſyſtem, it is by no means true in fact. The roots of the young plants, when they have penetrated through all the laminæ of the bark; and reach the wood, turn off, as the roots of plants do which meet with ſtones, &c. in their paſſage, and ſpread horizontally between the inner bark and wood, or elſe re-aſcend the bark, the looſe and juicy nature of which is much fitter for affording them nouriſhment than the hard ſubſtance of the wood.

There are alſo found always a multitude of woody excreſcenſes, like warts and wens, about the place where the *miſtletoe* grows; theſe are formed like the woody galls produced on trees by the punctures of inſects, by an extravaſation of the woody juices. Theſe make the ſwelling about the part of the branch where the *miſtletoe* grows, and as they become woody, and ſwell about the roots, ſerve to cover them with hard wood, which they never penetrated. Theſe make it probable enough that the roots of *miſtletoe* never penetrate hard wood; but what proves it much more evidently is, that if the branches of trees full of *miſtletoe* plants be cut and ſplit in different directions, juſt at the place of the inſertion of the plant, the ſeveral annular circles of the wood within are found perfect, regular, and in their natural ſtate, ſo far as the branch was formed at the time the *miſtletoe* took root upon it; theſe ſhew the age of the branch at that time, but above theſe there are always ſeveral other laminæ, which are what have been formed ſince the time of the *miſtletoe's* growing there; and thoſe which have been formed out of the inner laminæ of the bark, in which the roots of *miſtletoe* had made many wounds and great extravaſations of the juices, are found, though woody, full of the roots of the plant, and are very irregular, and full of the tubera which thoſe extravaſations occaſion, by no means appearing like the annular circles of the wood formed before. The ligneous fibres in the outer, or ſince formed wood, are laid in very irregular directions, and the roots of the *miſtletoe* may be eaſily diſtinguiſhed among them by their colour.

The *miſtletoe*, as the bark in which its roots were ſpread, hardened into wood, would be in the ſtate of a tree, planted in an earth which, by degrees, petrified about it, and muſt periſh; but nature has provided for it in this caſe; for as theſe roots are impriſoned in wood, and a new bark is formed by the ſap of the tree, the trunk of the *miſtletoe* ſends out a new ſeries of roots, which ſpread through this in like manner; ſo that though a plant of *miſtletoe* has ever ſo many ſeries of its roots embodied in the hard wood, from which it can have no nouriſhment, it has alſo ſome, ſufficient for its ſupport, ſpread in its new-formed bark.

Another thing very remarkable in thoſe plants of *miſtletoe*, many of the roots of which are lodged in the hard wood, is, that the roots diffuſed through the bark have often a large tubercle at their ends, which probably is furniſhed with numerous openings for receiving the juices by which the plant is to be nouriſhed, and ſerves in the place of many roots.

There are ſometimes indeed found plants of *miſtletoe* which live wholly by the nouriſhment they receive from the wood; theſe are in the ſtate of grafts of common fruit trees; but they are rare, and it very ſeldom ſucceeds when the *miſtletoe* is attempted to be propagated by the common method of grafting, though the plants of *miſtletoe* may very eaſily be grafted, by approach, into one another.

Though this plant is evidently propagated by its ſeeds, yet it alſo propagates itſelf very often by ſuckers, and it is not uncommon to find young ſhoots at a finger's breadth or two from the old one. The gardeners, who value their trees, are very careful to deſtroy the *miſtletoe* from them, and that very properly, ſince it is extremely obvious from what has been obſerved, that it robs the tree it grows on of a great deal of its nutritious juice. The common method of cutting off the plants to this purpoſe, is, however, by no means ſufficient; for the old ſtock frequently puſhes out new ſhoots, and the roots afford ſuckers, ſo that the caſe becomes worſe than before. There is indeed no way of deſtroying it, but by the cutting away with it a part of the tubercle it forms on the branch where it grows.

The roots of *miſtletoe*, while young, are green, very tender, and granulated, as is alſo the bark of the older ones; but theſe have a woody filament within. They are not regularly round, but are often flat, and uſually adapted in their ſhape to the place where they are lodged; and about their inſertions it is not unfrequent to ſee a ſort of elongation of their bark, which blends itſelf with the bark of the tree on which they grow.

The progreſs of the branches of *miſtletoe* is much ſlower than that of the roots. The firſt year, and often the ſecond, is ſpent wholly on their part, in raiſing themſelves into an erect poſture, and very often this operation proves fatal to them.

It is a very ſingular circumſtance in this plant, that its ſeeds produce ſingly ſeveral young plants. No other vegetable has this property. It is true, indeed, that two young hazels have been ſeen to riſe from the ſame nut; but then we know very well, that nuts have frequently double kernels in the ſame ſhell; but here the ſeed is contained ſingly in a berry, and, to all examination, appears of a ſimple uniform ſtructure, though it doubtleſs is compoſed according to the number of young plants it will produce, of three, four, or more perfect ſeeds.

When the young plant of the *miſtletoe* ſeed has freed itſelf from the huſk at its end, and raiſed itſelf upright, it is found terminated at the end by a ſort of button, like that of other young ſhoots, which contain the leaves. This button ſtands, however, unaltered all the firſt year, and ſometimes all the ſecond; in the ſpring following there appear from the button two leaves, and in the alæ of theſe leaves there are ſeen two other buttons; and afterwards their iſſue from theſe buttons branches, terminated uſually by two, but ſometimes by three leaves. Theſe are the produce of the third or fourth year; all the ſucceeding years there are new buttons formed in the alæ of the leaves, and the branches from theſe expand themſelves ſo regularly, that very frequently the whole ſhrub is of a regularly round figure.

The old leaves become yellow, and fall off, and there come no new ones in their places, ſo that the old ſtalk, and conſequently the whole inner part of the plant, is naked, and the leaves are only found on the circumference growing on the young branches.

It is a remarkable obſervation, that every button of the *miſtletoe* contains the rudiments of three young branches, and hence every knot ought to be furniſhed with ſix branches; and this would ever be the caſe, but that ſeveral of the young branches die either before or ſoon after their emerging from the button.

Miſtletoe will grow on all kinds of trees; but it does not grow on all with the ſame ſtrength and vigour. The pear, the apple, the white thorn, and the lime, are trees it grows on very ſucceſsfully. The oak, the hazel, and the juniper are very ſtarving for it. Mr. Du Hamel could never make it ſucceed by ſowing on the laſt of theſe trees; but it has ſometimes been found naturally propagated on it, though in a ſtarving condition. It will alſo grow on annual plants, but on theſe it never can come to any height, as their ſtalks periſhing at the approach of winter, the *miſtletoe* periſhes with them. Mr. Du Hamel took great pains to ſow and try to raiſe it on the ground, and ſucceeded ſo well as to make the ſeeds ſhoot, and their radicles grow to ſome length; but finding no proper hold to fix themſelves upon, they all periſhed; whence it ſeems that this is abſolutely a paraſitical ſhrub, and can grow no where but on ſome other tree. Mem. Acad. Par. 1740.

As for the virtues of *miſtletoe*, it ſeems of the moſt efficacy in the epilepſy; againſt which ſome will have it a ſpecific. Dr. Colbatch has wrote expreſsly to prove it ſuch. It has been alſo preſcribed in apoplexies, lethargics, and vertigoes; and worn about the necks of children, to prevent convulſions, and eaſe the cutting of their teeth. However the leaves and branches of *miſtletoe*, though formerly recommended as ſpecifics in convulſive and other nervous diſorders, are now fallen into general neglect, and do not appear to have any conſiderable medicinal power. Half a dram, or a dram of the wood or leaves in ſubſtance, or an infuſion of half an ounce, the doſes commonly preſcribed, have no ſenſible effect.

The virtues aſcribed to the *miſtletoe* may, perhaps, be the remains of the religious honours paid it by the ancient Gauls; among whom the Druids aſſembled conſtantly on the firſt day of the year, went in queſt thereof with hymns and other ceremonies and rejoicings, diſtributing it again among the people, as a thing ſacred; after having firſt conſecrated it, crying *Au guy l' an neuf*, to proclaim the new year.

This cry is ſtill kept up at Picardy, where they add *plantez*, to wiſh a plentiful new year.

M. Perrault obſerves, that the *miſtletoe* is full of a diſagreeable juice, which weakens the tree whereon it grows; and that the fruit has always a diſagreeable taſte while it ſticks on it.

MISUSER, in our *Old Writers*, an abuſe of any liberty or benefit: as he ſhall make fine for his *miſuſer*. Old. Nat. Br. 149.

By *miſuſer*, a charter of a corporation may be forfeited; ſo alſo an office, &c.

MISY, in *Natural Hiſtory*, the name of a foſſile ſubſtance, uſed very frequently by the ancients in medicine, and ſuppoſed to be one of their now loſt medicines, but erroneouſly; it being ſtill very common in the Turkiſh dominions, and not unfrequently found in the mines at Cremnitz in Hungary. It is a conſiderably firm ſubſtance, though of an irregular and ſeemingly not compact texture, and much reſembles ſome of our gaudy marcaſites; but that it wants their hardneſs and their weight, and is not inflammable.

It is at preſent no where put to any uſe. The ancients eſteemed it of the ſame nature with the CHALCITIS, but that it poſſeſſed thoſe virtues in a more remiſs degree; they had it from Ægypt and Cyprus, and uſed it externally in hæmorrhages, and ſome cutaneous eruptions.

Misy, in *Botany*, a name given by Theophraſtus, and all the old Greek writers, to a kind of truffle or ſubterranean muſhroom, of a very delicate flavour. The truffles of Numidia, and ſome other parts of Africa, were always eſteemed ſuperior to thoſe of any other part of the world. They are called *terfez*, *camaha*, or *kema*, by ſome later writers, and were brought to Rome, and ſo greatly eſteemed, that no diſh was ranked above them. Theſe were called Lybian truffles by the Romans, and they ſeem to have been the ſame with the Cyrenean *miſy* of the Greeks. It is to be obſerved, that the Greeks in general, in early times, were very little acquainted with the affairs of Africa; and all that they had from this part of the world, was ſaid to come from Cyrene, ſome old cities of their forefathers being there, and keeping up a friendſhip and traffic with them. The *thyon*, a tree growing plentifully in almoſt all parts of Africa, and which is the ſame with the citrus of the Romans, was in this manner attributed to Cyrene, by the ſame Theophraſtus. And thus, when ſpeaking of truffles, he adds, that the Cyrenean *miſy* ſurpaſſed all the other kinds in flavour; his words ſtand at large in Athenæus; and thence Pliny has taken his account, which he cloſes in this manner; "The thing which they call *miſy*, in the province of "Cyrene, is of this kind; but it is more fleſhy and of "a finer taſte and ſmell." This is the ſenſe of Pliny, as the text ſtands in our copies; but it is probable that he tranſlated Theophraſtus better than they, at leaſt as we know that what he ſays is not his own, but taken from that author, we have a right to underſtand it in his way, and that is, that the roots of this Cyrenean *miſy* have a delicate ſmell reſembling that of meat, or fleſh newly cut. Pliny, lib. xix. cap. 3.

It is very certain, that this Cyrenean *miſy* of the old Greeks is the ſame thing with the delicate African truffle or terfez of Leo Africanus, and the moderns: and Pliny had read ſome of the ancients who were ſenſible of this, and had taken from them an account that the African truffles are the fineſt in the world; and yet did not perceive, that theſe African truffles were the ſame with the Cyrenean *miſy*, which he immediately after mentions from Theophraſtus.

MITCHELLA, in *Botany*, a genus of the *tetandria monogynia* claſs: with a ſingle-petaled flower, four ſtigmas, and a bifid four-ſeeded berry. There is only one ſpecies.

MITCHELS, among *Builders*, are purbeck ſtones, from fifteen inches ſquare to two feet, ſquared and hewed ready for paving.

MITE, in *Natural Hiſtory*, the name of a ſmall animal, very well known and found in old cheeſe, and in many other bodies, both recent and periſhing.

To the naked eye the *mites* in cheeſe appear like moving particles of duſt, but the microſcope diſcovers them to be perfect animals, having as regular a figure and performing all the functions of life as perfectly as creatures that exceeds them many times in bulk. See *Tab. of Microſcopical Objects, Claſs* 1.

They are cruſtaceous animals, and are uſually tranſparent; the principal parts of them are the head, the neck, and the body; the head is ſmall in proportion to the body, and has a ſharp ſnout, and a mouth that opens and ſhuts like a mole's; they have two ſmall eyes, and are extremely quick-ſighted; and when you have once touched them with a pin, you will eaſily perceive how cunningly they avoid a ſecond touch.

They are of different ſorts; for ſome of them have ſix legs, and others have eight: each leg has ſix joints ſurrounded with hairs, and two little claws at the extremity, with which it very nicely takes hold of any thing; the hinder part of the body is plump and bulky, and ends in an oval form, from which there iſſue out a few exceeding long hairs; other parts of the body and head are alſo beſet with thin and long hairs.

The males and females are eaſily diſtinguiſhed in theſe little animals. The females are oviparous, as the louſe and ſpider, and from their eggs the young ones are hatched in their proper form, without having any change to undergo afterwards. They are however, when firſt hatched, extremely minute: and, in their growing to their full ſize, they caſt their ſkins ſeveral times.

Theſe little creatures may be kept alive many months between two concave glaſſes, and applied to the microſcope at pleaſure. They are thus often ſeen *in coitu*, conjoined tail to tail; and this is performed by an incredible ſwift motion.

Their eggs in warm weather, hatch in twelve or fourteen days; but, in winter, they are much longer; theſe eggs are ſo ſmall, that a regular computation ſhews, that ninety millions of them are not ſo large as a common pigeon's egg. Baker's Microſcope, p. 18.

Mites are very voracious animals; they not only prey upon cheeſe, but upon all ſorts of dried fleſh, fiſh, fruits, and ſeeds; and almoſt on all things which have ſome degree of moiſture, without ever being wet; and they have often been ſeen to eat one another. Their manner of eating is by thruſting alternately one jaw forward and the other backward; and in this manner grinding their food; and after they have done feeding, they ſeem to chew the cud.

There are ſeveral leſſer diſtinctions obſervable in the *mites*, which are found among different ſubſtances. Thoſe in malt-duſt and oat-meal are much nimbler than the cheeſe-*mites*, and have more and longer hairs. The *mites* among figs reſemble beetles, and have two feelers at the ſnout, and two very long horns over them; theſe have only ſix legs, and are more ſluggiſh than thoſe in malt-duſt. Thoſe found among figs have alſo very long hairs, and thoſe beſet at certain diſtances with other ſmaller hairs; whence Mr. Leewenhoek conjectures that theſe longer and larger hairs are jointed at thoſe places where the ſhort ones are found.

There is a ſort of wandering *mites* found wherever there is any thing that they can feed on; theſe are often found in form of a white duſt, and are not ſuſpected to to be living creatures.

The *mite* is an animal very tenacious of life; it will live months without food; and Mr. Leewenhoeck had one which lived eleven weeks on the point of a pin, on which he had fixed it for examining it by his microſcope. Leewenhoeck's Arcan. Nat. tom. iv. p. 368.

MITE, a ſmall coin, formerly current; equal to about one third part of a farthing.

MITE alſo denotes a ſmall weight uſed by the moniers. It is equal to the twentieth part of a grain, and is divided into twenty-four doits.

MITELLA, in *Botany*. See SANICLE.

MITELLA, in *Surgery*, a name given to the ſcarf for ſuſpending the arm when injured.

MITHRA, *feaſts of*, in *Antiquity*, were feaſts celebrated among the Romans in honour of *Mithra*, or the ſun. The moſt ancient inſtance of this *Mithra*, among the Romans, occurs in an inſcription dated in the third conſulate of Trajan, or about the year of Chriſt 101. This is the dedication of an altar to the ſun, under the name of *Mithræ deo Soli Mithræ*. But the worſhip of *Mithra* was not known in Egypt and Syria in the time of Origen, who died about the year of Chriſt 263: though it was common at Rome for more than a century before this time. The worſhip of *Mithra* was proſcribed at Rome in the year 378, by order of Gracchus, prefect of the prætorium. According to M. Freret, the feaſts of *Mithra* were derived from Chaldea, where they had been inſtituted for celebrating the entrance of the ſun into the ſign Taurus.

MITHRAX, in *Natural Hiſtory*, the name given by Pliny and the ancients, to a gem found in Perſia, which when held up to the ſun ſhewed many colours. It was probably no other than the OPAL. Hence the barbarous writers of the middle ages ſeem to have taken their account of the *mithridates*.

MITHRIDATE, MITHRIDATIUM, in *Pharmacy*, an antidote or compoſition, in form of an ELECTARY; ſerving either as a remedy, or a preſervative againſt poiſons. *Mithridate* is one of the capital medicines in the apothecaries ſhops, being compoſed of a vaſt number of drugs; among which are, *opium*, *myrrh*, *agaric*, *ſaffron*, *ginger*, *cinnamon*, *ſpikenard*, *frankincenſe caſtor*, *pepper*, *gentian*, &c.

It is accounted a cordial, opiate, ſudorific, and alexipharmic. Matthiolus ſays, it is more effectual againſt poiſons than Venice treacle, and much eaſier to be made.

It takes its name from its inventor, Mithridates king of Pontus, who is reported to have ſo fortified his body againſt poiſons, with antidotes and preſervatives, that when he had a mind to diſpatch himſelf, he could not find any poiſon that would take effect.

The receipt of it was found in his cabinet, written with his own hand, and was carried to Rome by Pompey. It was tranſlated into verſe by Damocrates, a famous phyſician, and hence called *confectio Damocratis*; and was afterwards tranſlated by Galen, from whom we have it. It has undergone conſiderable alterations ſince the time of its royal preſcriber.

MITHRIDATE *muſtard*. See TREACLE *Muſtard*.

MITHRIDATE, *muſtard baſtard*, is a ſpecies of IBERIS.

MITHRIDATES, in *Natural Hiſtory*, the name of a ſtone found in ſome parts of Perſia, ſeeming to be the ſame as the mithridax or mithrax.

MITHRIDAX, in *Natural Hiſtory*, the name of a gem deſcribed by Solinus, to which he aſcribes qualities the ſame with thoſe given by Pliny to the MITHRAX; and therefore probably the ſame ſtone with it.

MITRALES *valvulæ*, MITRAL *valves*, in *Anatomy*, two valves in the HEART; thus called from their reſembling the figure of a mitre.

They are placed at the orifice of the pulmonary vein, in the left ventricle of the heart. Their office is to cloſe the orifice thereof, and to prevent the return of blood through the pulmonary vein into the lungs again.

MITRE, MITRA, from Μιτρα, which ſignifies the ſame; a pontifical ornament, worn on the head by biſhops, and certain abbots, on ſolemn occaſions.

The *mitre* is a round cap pointed, and cleft at top, with pendants hanging down on the ſhoulders, and fringed at both ends. The biſhop's is only ſurrounded with a fillet of gold, ſet with precious ſtones; the archbiſhop's iſſues out of a ducal CORONET. See *Tab.* III. *Heraldry*, *fig.* 121. Theſe are never uſed otherwiſe than on their coats of arms. Abbots wear the *mitre* turned in profile, and bear the croſier inwards, to ſhew that they have no ſpiritual juriſdiction without their own cloiſters.

The pope has alſo granted to ſome canons of cathedrals the privilege of wearing the *mitre*. The counts of Lyons are alſo ſaid to have aſſiſted at church in *mitres*.

In Germany, ſeveral great families bear the *mitre* for their creſt; to ſhew that they are advocates, or feudatories, of ancient abbeys, or officers of biſhops, &c.

The pope has four *mitres*, which are more or leſs rich, according to the ſolemnity of the feaſt-days they are to be worn on. The *mitre* was originally the women's head-dreſs, as the hat was that of the men. This appears from Remulus in Virgil, who reproaches the Trojans, that they were dreſſed like women, and wore *mitres*,

> *Et tunicæ manicas & habent redimicula* mitræ.

The cardinals anciently wore *mitres*, before the hat, which was firſt granted them by the council of Lyons, in 1243. Authors make no mention of the *mitre* as an epiſcopal ornament, before the year 1000.

MITRE, in *Architecture*, is the workmen's term for an angle that is juſt 45 degrees, or half a right one.

If the angle be a quarter of a right angle, they call it a *half-mitre*.

To deſcribe ſuch angles, they have an inſtrument called the *mitre-ſquare*; with this they ſtrike *mitre-lines* on their quarters, or battens; and for diſpatch, they have a *mitre-box*, as they call it, which is made of two pieces of wood, each about an inch thick, one nailed upright on the edge of the other; the upper piece hath the *mitre-lines* ſtruck upon it, on both ſides, and a kerf, to direct the ſaw in cutting the *mitre-joints* readily, by only applying the piece into this box.

MITRE is uſed by the writers of the Iriſh hiſtory for a ſort of baſe money, which was very common there about the year 1270, and for thirty years before, and as many after. There were, beſides the *mitre*, ſeveral other pieces called according to the figures impreſſed upon them, roſaries, lionades, eagles, and by the like names. They were imported from France, and other countries, and were ſo much below the proper currency of the kingdom, that they were not worth ſo much as a half-penny each. They were at length decryed in the year 1300, and good coins ſtruck in their place. Theſe were the firſt Iriſh coins in which the ſcepter was left out. They were ſtruck in the reign of Edward, the ſon of our Henry the Third, and are ſtill found among the other antiquities of that country. They have the king's head in a triangle full-faced. The penny, when well preſerved, weighs twenty-two grains: the half-penny ten grains and a half.

MITRED *abbots*. See ABBOT.

MITTA, in our *Old Writers*, is an ancient Saxon meaſure. Its quantity is not certainly known; but it is ſaid to be *menſura decem modiorum*, a meaſure of ten buſhels. Doomſday.

Mitta or *mitcha*, being beſides a meaſure for ſalt and corn, is uſed for the place where the chaldrons were put to boil ſalt. *Chalderias quoque ad ſal conficiendum cum propriis ſedibus* mitchæ *vocantur*.

MITTENDARII, among the Romans, commiſſioners ſent into the provinces by order of the *præfectus prætorii*, or captain of the guards, upon ſome public account, as to inſpect the behaviour and management of provincial governors, and obſerve whatever was amiſs; all which they were to lay before the præfect, who had authority to remedy ſuch abuſes.

MITTENDIS *recordo & proceſſu*. See RECORDO.

MITTENDO *manuſcriptum pedis finis*, in *Law*, a writ judicial, directed to the treaſurer and chamberlains of the exchequer, to ſearch for and tranſmit the foot of a fine, acknowledged before juſtices in eyre, into the common-pleas, &c.

MITTER *l'eſtate*, and *mitter le droit*. See RELEASE.

MITTIMUS, in *Law*, a writ by which records are ordered to be transferred from one court to another; ſometimes immediately, as out of the king's bench into the exchequer; and ſometimes by a certiorari into the chancery; and from thence, by a *mittimus*, into another court.

Mittimus is alſo uſed for a precept in writing, directed by a juſtice of peace to a gaoler, for the receiving and ſafe-keeping a felon, or other offender, by him committed to the gaol.

This is a warrant under the hand and ſeal of the juſtice, containing the cauſe of the commitment of the offender.

MITU, or MITU-PORANGU, in *Ornithology*, the name of a Braſilian bird of the pheaſant kind, according to Margrave, and the generality of thoſe who ſpeak of it; but ſuppoſed by Mr. Ray rather to approach to the nature of the peacock or turkey-cock: and in the Linnæan ſyſtem a ſpecies of the CRAX.

It is larger than the common Engliſh cock, and is all over the back, wings, &c. of a fine deep black; but on the belly of a partridge-brown; and has a ſeries of fine gloſſy black feathers on its head, which it occaſionally raiſes up in a ſort of creſt; its beak is very beautiful, broad at the baſe and narrow at the point, and of a fine bright red; its tail is very long, and it can at pleaſure raiſe and expand it like the turkey. It is very eaſily tamed, and loves to rooſt on trees. Its fleſh is very fine and delicate. See *Tab.* III. *of Birds*, N° 34.

MIXING *of mortar*. See MORTAR.

MIXT, or MIXT *body*, in *Philoſophy*, is that which is compounded of divers elements or principles.

By which, *mixt* ſtands contradiſtinguiſhed from *ſimple*, or *elementary*, which is applied to bodies conſiſting of one principle only; as the chemiſts take ſulphur, ſalt, &c. to be.

The ſchoolmen define a *mixt body* to be a whole, reſulting from ſeveral ingredients, altered or new modified, by the mixture. On which principle the ſeveral ingredients do not actually exiſt in the *mixt*; but they are all changed, ſo as to conſpire to a new body, of a different form from the form of any of the ingredients. But the modern philoſophers rarely conceive the term in ſo much ſtrictneſs. The buſineſs of chemiſtry, we ſay, is to reſolve *mixt bodies* into their principles, or component parts.

The ſchool-philoſophers diſtinguiſh *mixt bodies* into perfect and imperfect.

Mixts, *perfect*, are the claſs of organized and animated bodies, where the elements, or ingredients of which they are compoſed, are changed, or transformed, by a perfect mixture. Such are plants, beaſts, and men.

Mixts, *imperfect*, are unorganized and inanimate bodies, the forms whereof remain ſtill the ſame as of the ingredients that conſtitute them. Such are meteors, minerals, metals, &c.

Mixt, in *Chemiſtry*. See AGGREGATE.

Mixt, or *mixed action*, in *Law*. See ACTION.

Mixt *angle*, *cloth*, *fable*. See ANGLE, CLOTH, and FABLE.

Mixt *figure*, in *Geometry*, is that which conſiſts partly of right lines, and partly of curve lines.

Mixt *force*, *hiſtory*, *mathematics*. See FORCE, HISTORY, and MATHEMATICS.

Mixt or *mixed larceny*. See LARCENY.

Mixt *mode*. See MODE.

Mixt *number*, in *Arithmetic*, that which is partly an integer, and partly a fraction: as $4\frac{1}{2}$.

Mixt *obligation*. See OBLIGATION.

Mixt *ratio*, or *proportion*, is when the ſum of the antecedent and conſequent is compared with the difference between the antecedent and conſequent—as if

$$\begin{array}{c} 3 : 4 :: 12 : 16 \\ a : b :: c : d \end{array}$$

then

$$\begin{array}{c} 7 : 1 \ldots :: 28 : 4 \\ a+b : a-b :: c+d : c-d. \end{array}$$

Mixt *ſalts*, *ſtairs*, *ſervice*. See SALTS, STAIRS, and SERVICE.

Mixt *tythes*, are thoſe of cheeſe, milk, &c. and of the young of beaſts. See TITHE.

MIXTILINEAR *angle*. See ANGLE.

MIXTION, MIXTIO, or MISTIO, the act of *mixing*; or the union and coalition of divers corpuſcles into one body. The Peripatetics, who hold an alteration eſſential to *mixtion*, define it the union of ſeveral altered ingredients, or miſcibles.

Mixtion makes a conſiderable operation in the chemical and Galenical pharmacy; where divers powders, ſpecies, and other ſimples, are ſaid to be *mixed*, *miſceri*, though without any communication, or tranſition of the virtues of one into thoſe of another. See COMBINATION and COMPOSITION.

MIXTURE, MIXTURA, or MISTURA, in a philoſophical ſenſe, is an aſſemblage, or union, of ſeveral bodies of different properties, in the ſame maſs.

To determine the ratio of the ingredients of a *mixture*, is that celebrated problem propoſed by Hiero, king of Syracuſe, to Archimedes, on occaſion of a crown of gold, wherein the workman had fraudulently mixed ſilver; the ſolution whereof was matter of ſo much tranſport to that divine mechanic. See HIERO's *Crown*.

Mixture, in *Matters of Drapery*, denotes the union or blending of ſeveral wools of different colours, not yet ſpun. Hence a *mixture*, or mixed ſtuff, is that whoſe woof and warp are of wools of different colours, dyed and mixed before they were ſpun. See CLOTH.

Mixture, in *Pharmacy*, differs from a JULEP in this reſpect, that it receives into its compoſition not only ſalts, extracts, and other ſubſtances diſſoluble in water, but alſo earths, powders, and ſuch ſubſtances as cannot be diſſolved.

The principal *mixtures* are the following:

Aſtringent mixture is made by mixing ſimple cinnamon-water, and common water, of each three ounces; ſpirituous cinnamon-water, an ounce and a half; and half an ounce of japonic confection. A ſpoonful or two of this *mixture* may be taken every four hours, in recent dyſenteries, after the neceſſary evacuations, interpoſing every ſecond or third day a doſe of rhubarb.

Diuretic mixture is prepared by mixing five ounces of mint-water, ſix drams of vinegar of ſquills, half an ounce of ſweet ſpirit of nitre, and an ounce and a half of ſyrup of ginger. Two ſpoonfuls of this *mixture* may be taken twice or thrice a day, in obſtructions of the urinary paſſages.

Laxative abſorbent mixture is formed by rubbing one dram of magneſia alba, in a mortar, with ten or twelve grains of the beſt Turkey rhubarb, and adding three ounces of common water, and ſimple cinnamon-water and ſyrup of ſugar, of each one ounce. In the diſeaſes of children ariſing from acidities, a table-ſpoonful of this *mixture* may be repeated three times a-day: when it is intended to purge, the doſe may be increaſed; or, for very young children, diminiſhed.

Saline mixture is made by diſſolving a dram of the ſalt of tartar in four ounces of boiling water, and, when cold, dropping into it ſpirit of vitriol, till the efferveſcence ceaſes; and then adding of pepper-mint-water, two ounces, and of ſimple ſyrup, one ounce. This *mixture* may occaſionally ſupply the place of the *ſaline* JULEP.

Simple mixture, the name of a form of medicine uſed in the preſcriptions of ſome modern phyſicians. It is made by mixing ten ounces of the ſpiritus theriacalis camphoratus of Bates, ſix ounces of ſpirit of tartar, and two ounces of ſpirit of vitriol; theſe are to be ſet in a glaſs, hermetically ſealed, for three weeks, that they may be perfectly mixed; the doſe is a dram or thereabouts. Its virtues are, that it reſiſts putrefaction, promotes ſweat, and is of great ſervice in malignant fevers.

Squil mixture is made by mixing of ſimple cinnamon-water, five ounces; vinegar of ſquils, one ounce; ſyrup of marſh-mallows, an ounce and a half. This *mixture*, by promoting expectoration, and the ſecretion of urine, proves ſerviceable in aſthmatic and dropſical caſes. A table-ſpoonful of it may be taken frequently. Buchan.

MIZEN. See MISEN.

MIZNEPHETH, in the *Jewiſh Antiquities*, a kind of mitre worn by the high-prieſt. See CIDARIS.

MIZQUITL, in *Botany*, a name uſed by ſome authors for that ſpecies of the acacia, or Egyptian thorn, whoſe unripe fruit affords the inſpiſſated juice, which is the true ſuccus acaciæ of the ſhops, and whoſe gum naturally flowing from the trunk and branches is the true gum arabic.

MNEME-CEPHALICUM *balſamum*, the name of a famous compound balſam, ſaid to have been purchaſed from a certain Engliſh Phyſician by Charles duke of Burgundy, at the price of ten thouſand florins. Some who have been very laviſh in its praiſes have affirmed, that it has a power of preſerving in the mind the remembrance of all things that are paſt; but this ſeems ſtretching the praiſe of it a little too far. It is prepared in the following manner: take of the juices of the leaves of baum, and baſil juices, of the flowers of tamariſk, lilies, primroſes, roſemary, lavender, borrage, and broom, of each two ounces; of lilies of the valley, roſes, and violets, each one ounce; of cubebs, cardamoms, grains of paradiſe, and yellow ſaunders, carpobalſamum, Florentine iris, ſaffron, ſavory, piony flowers, and thyme, of each half an ounce; of liquid ſtorax, ſtorax calamita, oppopanax, bdellium, galbanum, gum-ivy, and labdanum, of each ſix drams; roots of long birth-wort and piony, and oil of turpentine, ſpikenard, coſtus, bays, maſtich, ben, and ſpike, of each five drams. The dry ingredients are to be beaten to powder, then mixed with the reſt, and a ſufficient quantity of water being added, the whole is to be diſtilled by an alembic, and the oil carefully ſeparated from the water. The method of uſing it is this: the firſt two months the paſſages of the ears and noſtrils are to be anointed with the bigneſs of a pea of it every day; then for two months longer, the ſame is to be repeated every third day; after this it is to be uſed once a week, then once a fortnight, till a year is expired; and after this it is to be uſed once in two months for the ſucceeding years. This is the account of Sennertus. Senner. Pract. lib. i. cap. 5.

MNEMONIC *tables*. Among the artificers to aſſiſt the memory, this is one of great uſe.

Mnemonic tables exhibit in a regular manner, what is to be remembered of the ſame ſubject. And although the ſciences ought to be taught in a ſcientifical manner, as much as poſſible, and that every thing ſhould be ſo placed as to be intelligible and demonſtrable from what has preceded it; yet tables ought not to be rejected, as they are helps to retain the doctrines of which the mind has had ſufficient evidence. In ſuch tables the properties of things are to be expreſſed conciſely; illuſtrations and demonſtrations ſhould be left out, as the propoſition ought to have been made ſufficiently clear and certain, before it is regiſtered in the table. Hence the contents of ſuch tables ought only to be the definitions, and the propoſitious relative to the ſubject. If a ſubject require a long table, this may be ſubdivided into ſmaller; by making firſt a table of the moſt general heads, and referring from each of theſe heads to a ſeparate table; by this means the order and connection of the whole will be preſerved. Such tables would produce a local and *artificial* MEMORY, of great uſe to the retention and recollection of things. They would greatly facilitate a diſtinct view of the properties of their ſubjects, and facilitate recapitulation. Beſides, as the expreſſions uſed in ſuch tables ought to be very conciſe, ſo as juſt to be ſufficient to excite the idea of the object to be remembered, ſoon after that idea has been acquired; after ſome time a certain obſcurity will be found in peruſing the tables which will give us timely warning that our ideas begin to fade, and that they ought to be renewed. And this may be done without much trouble, if not too long delayed.

MNEVIS, in *Mythology*, the name of a ſacred bull worſhiped by the Egyptians at Heliopolis. This *Mnevis* was, according to Bryant, a compound of *Men-neuas*, the lunar god Nevas, the ſame as Noas, or Noah. The name relates to the ſame perſon who, in Crete, was ſtyled Minos; and the ſame alſo who was repreſented under the emblem of the Men-taur or Mino-taurus. Ant. Myth. vol. ii. p. 416, &c.

MNEMOSYNE, in *Mythology*, the goddeſs of memory; which, according to Diodorus, was the daughter of Cœlum and Terra, and the ſiſter of Saturn and Rhea. Jupiter, according to the poets, fell in love with *Mnemoſyne*; and ſhe became the mother of the nine Muſes.

MNIUM, in *Natural Hiſtory*, the name of a genus of moſſes of the *cryptogamia* claſs of plants; the characters of which are theſe: it has heads of two different kinds, the one ſort naked and duſty, having no calyptra or other covering; the others are regular capſules, like thoſe of the hypnum and brium, containing a fine powder, and covered with a calyptra or hood. This diverſity in the fructification diſtinguiſhes the *mnia* from all the other moſſes; but theſe diverſly conſtructed heads are in ſome ſpecies found on the ſame plants; in others, on different ones of the ſame ſpecies, as the male and female flowers are in hemp, mercury, and many other of the larger plants. The ſtalks which ſupport the membranaceous heads are long, and naked; thoſe which ſupport the naked heads, are in ſome naked, in others covered with leaves; but they are in all ſhorter than the others. See *Tab. of Moſſes*, N° 7.

It is the general opinion, that the fine powder, incloſed in the capſules of the hypnum and bryum, is of the nature of the farina fœcundans of the flowers of plants, and ſerves to impregnate the buds or young ſhoots in the alæ of the leaves, which are the female part of the fructification in this claſs of plants; and in this ſenſe the membranaceous heads of the *mnia* contain a like farina, which impregnates the globules in theſe naked heads, and qualifies them for acting as ſeeds or young plants; but all this is rather hypotheſis and conjecture than obſervation; though Dillenius does ſuppoſe he has ſeen the germination from the globules of the duſty heads in one ſpecies of the *mnium*. Haller ſays, that theſe duſty heads are only ſo many congeries of young plants, when viewed with good glaſſes, and that therefore the *mnium* is not properly a genus of plants, but ſhould be referred to the bryums, to which it belongs. All this, however, is yet but lightly founded, and the more natural opinion ſeems to be that of ſuppoſing the powder in the capſules of all the moſſes a true ſeed, not a farina. See MOSS.

There are properly two orders of the *mniums*. Thoſe of the firſt order are erect; thoſe of the latter procumbent, or creeping. Of the firſt order there are four known ſpecies of the creeping or procumbent *mniums*, there are only three known ſpecies. Linnæus enumerates twenty-three different ſpecies.

MOAR-*loore*, in *Huſbandry*, a term uſed to expreſs a peculiar diſtemperature of corn, generally comprehended under the common term of a blight. In this caſe the earth ſinks away from the roots of the corn, and leaves the plant ſtanding in great part above ground with naked roots: theſe being too weak to ſupport the ſtalks, the plants fall and the ears become light. This is a diſtemperature peculiar to corn growing on light and looſe lands.

The remedy is this: turn a ſhallow furrow againſt the rows, when they are ſtrong enough to bear it, and the mould is fine and dry, the motion of the ſtalks with the wind will draw in this looſe powder, and it will ſpread itſelf equally among all the plants of the row though it be triple or quadruple. It is eaſy to ſee that this remedy is only practicable in the method of the horſehoeing huſbandry; for in the common way of ſowing, there are no means of relief in this caſe: and, in general, the horſehoeing huſbandry prevents the falling of the wheat, the ſtalks never drooping ſo abſolutely in the drilled wheat as they do in that ſown in the common way.

MOAT, in *Fortification*, a deep trench dug round a town or fortreſs to be defended, on the outſide of the wall, or rampart. See *Tab.* II. *Fortif. fig.* 21. *lit. h h h*, &c.

The depth and breadth of a *moat* often depend on the nature of the ſoil; according as it is marſhy, rocky, or the like. The brink of the *moat* next the rampart in any fortification is called the *ſcarp*, and the oppoſite one the *counterſcarp*. See DITCH.

MOAT, *dry*, is that which is deſtitute of water: this ought to be deeper than one which is full of water.

MOAT, *lined*, is that whoſe ſcarp and counterſcarp are caſed with a wall of maſon's work lying aſlope.

MOAT, *flat-bottomed*, is that which hath no ſloping, its corners being ſomewhat rounded.

MOAT, *angle of the*. See ANGLE.

MOATAZALITES, MOTAZALITES, or *ſeparatiſts*, a religious ſect among the Turks, who deny all forms and qualities in the divine Being: or who diveſt God of his attributes.

There are two opinions among the Turkiſh divines concerning God. The firſt admits metaphyſical forms, or attributes; as, that God has wiſdom, by which he is wiſe; power, by which he is powerful; eternity, by which he is eternal, &c.

The ſecond allows God to be wiſe, powerful, eternal; but will not allow any form or quality in God, for fear of admitting a multiplicity.

Thoſe who follow this latter opinion are called *Moatazalites*: they who follow the former, *Sephalites*.

The *Moatazalites* alſo believed that the word of God was created *in ſubjecto*, as the ſchoolmen term it, and to conſiſt of letters and ſound; copies thereof being written in books to expreſs or imitate the original; they denied abſolute predeſtination, and affirmed that man is a free agent. This ſect is ſaid to have firſt invented the ſcholaſtic divinity, and is ſubdivided into no leſs than twenty inferior ſects, which mutually brand one another with infidelity. Sale's Prelim. Diſc. p. 159, &c.

MOBILE, *moveable*, any thing ſuſceptible of motion, or that is diſpoſed to be moved either by itſelf, or by ſome other prior *mobile*, or mover.

Mobile, *primum*, in the *Ancient Aſtronomy*, was a ninth heaven, or ſphere, imagined above thoſe of the planets, and fixed ſtars.

This was ſuppoſed to be the firſt mover, and to carry all the lower ſpheres round along with it; by its rapidity communicating to them a motion whereby they revolved in twenty-four hours. But the diurnal revolution of the planets is now accounted for, without the aſſiſtance of any ſuch *primum mobile*.

Mobile, *perpetuum*. See *Perpetual* Motion.

MOBILES, in the *Ancient Muſic*, was an appellation given to the two intermediate chords of a tetrachord; becauſe their variations produced the different genera and ſpecies of muſic. They were called by the Greeks *κινητοι*, or *κινȣμενοι*.

MOBILIA *bona*, in the *Civil Law*, are what in common law, &c. we call *moveables*, or *moveable goods*.

MOBILITY, in the *Schools*, &c. an aptitude or facility to be moved.

The *mobility* of mercury is owing to the ſmallneſs and ſphericity of its particles; and it is this which alſo renders its fixation ſo difficult.

The hypotheſis of the *mobility* of the earth is the moſt plauſible; and is that univerſally admitted by the later aſtronomers.

Pope Paul V. appointed commiſſioners to examine the opinion of Copernicus touching the *mobility* of the earth. The reſult of their enquiry was, a prohibition to aſſert, not that the *mobility* was poſſible, but that it was actually true: that is, they allowed the *mobility* of the earth to be held as an hypotheſis, which gives an eaſy and ſenſible ſolution of the phænomena of the heavenly motions; but forbad the *mobility* of the earth to be maintained as a theſis, or real effective thing; becauſe they conceived it contrary to ſcripture. See Copernican *ſyſtem*.

MOCHLICA, a term by which ſome authors call the violent or draſtic purges.

MOCHO, or Mocoa *ſtones*. See Agat and Dendritis.

MOCHUS, in *Botany*, a name uſed by ſome authors for the orobus, or bitter vetch. Dodonæus, beſide others, calls it by this name.

MOCK *bird*, the name of an American bird called, by Ray, *turdus Americanus minor canorus*, and very much approaching to the cæruleus or blauvogel. It is of the ſize of the common lark; its beak is ſhort and ſtrait; its tail very long; and its whole body of a very fine deep blue. It vies with the nightingale in melody, and is called by the Indians *contlatolli*, which is ſaid to ſignify four hundred tongues.

Mock *lead*, *Mineralogy*, a name given by the Engliſh writers to a ſort of foſſil, called alſo BLENDE and GALENA. It has very much the appearance of an ore of lead, being bright and gloſſy, of a bluiſh black colour, and plated; but on trial it is found to yield very little or none at all of that metal.

Mock *nightingale*. See Black-*cap*.

Mock *orange*, in *Botany*. See Philadelphus.

Mock *privet*. See *Mock* Privet.

Mock, or running a *muck*, is a practice that has prevailed time immemorial in Batavia. To *run a muck*, in the original ſenſe of the word, is to get intoxicated with *opium*, and then ruſh into the ſtreet, with a drawn weapon, and kill any one that comes in the way, till the party is himſelf either killed or taken priſoner. If the officer takes one of theſe *omocks*, or *mohawks* (as they have been called by an eaſy corruption) alive, he has a conſiderable reward, and the unhappy wretches are always broken alive on the wheel: but ſuch is the fury of their deſperation, that three out of four are neceſſarily deſtroyed, in attempting to ſecure them.

MODAL, in *Logic*, &c. a term applied to propoſitions which include certain conditions and reſtrictions.

MODE, or Mood, *modus*, in *Philoſophy*, a *manner* of being; or a quality or attribute of a ſubſtance, or ſubject, which we conceive as neceſſarily depending on the ſubject, and incapable of ſubſiſting without it.

Mr. Locke defines *modes* to be thoſe ideas (he ſhould have ſaid *things*) which do not imply any ſuppoſition of ſubſiſting by themſelves, but are conſidered as mere dependences, and affections of ſubſtances.

Our ideas of things may be reduced to two kinds: the one of things, which we conceive ſeparately, and by themſelves, called *ſubſtances*; and the other of things which we conceive as exiſting in others, in ſuch manner as that we cannot allow them exiſting without them, and theſe we call *modes* or *accidents*.

It is the characteriſtic, then, of a true *mode*, to have ſuch a relation to ſome ſubject, as not to be clearly and diſtinctly conceivable without conceiving the ſubject, whereof it is a *mode*, at the ſame time: when on the other hand, the conception of the ſubject does not at all infer or require that of the *mode*.

Thus, what gives us to know, that thought is not a *mode* of extended ſubſtance, or matter, is, that extenſion, and the other properties of matter, may be divided from thought, without ceaſing to conceive thought all the while.

We always conſider things as clothed with certain *modes*, except we reflect on them in the abſtract, or general; and it is the variety of *modes*, and the relations, that occaſions the great variety of denominations of the ſame thing. They are the various *modes* of matter, e. g. that make all the diverſity of bodies, or corporeal beings, in nature.

There are various diviſions and kinds of *modes*: as, 1. *eſſential* or *accidental*. An *eſſential mode*, or ATTRIBUTE, is that which belongs to the very nature or eſſence of the ſubject wherein it is; and the ſubject can never have the ſame nature without it, as roundneſs in a bowl, ſolidity in matter, thinking in a ſpirit, &c. and this is *primary*, when it is the firſt or chief thing, that conſtitutes any being in its particular eſſence or nature, and makes it to be that which it is, and diſtinguiſhes it from all other beings, as roundneſs in a bowl: or *ſecondary*, which is any other attribute of a thing, that is not of primary conſideration, called a PROPERTY; as volubility in a bowl. An *accidental mode*, or ACCIDENT, is ſuch a *mode*, as is not neceſſary to the being of a thing; for the ſubject may be without it, and yet remain of the ſame nature which it had before; or it is that *mode*, which may be ſeparated from its ſubject, as blackneſs or whiteneſs in a bowl, learning in a man, &c.

2. *Modes* are *abſolute* and *relative*, An *abſolute mode* is that which belongs to its ſubject; without reſpect to any other beings whatſoever. A *relative mode* is derived from the regard which one being has to others: thus, roundneſs and ſmoothneſs are the *abſolute modes* of a bowl; but greatneſs and ſmallneſs are *relative*. See Relation.

3. *Modes* are *intrinſical* or *extrinſical*. The former are conceived to be in the ſubject or ſubſtance; as when we ſay a globe is round, &c. The latter *mode* is a manner of being which ſome ſubſtances attain by reaſon of ſomething that is external or foreign to the ſubject, and is called external denomination; as the globe lies within two yards of the wall, &c.

4. *Modes* are alſo *inherent* or *adherent*, i. e. *proper* or *improper*. *Adherent modes* ariſe from the joining of ſome accidental ſubſtance to the chief ſubject, which yet may be ſeparated from it; as when a bowl is wet, &c. *Inherent modes* have a ſort of in-being in the ſubſtance itſelf; as the bowl is ſwift or round, &c.

5. *Action* and *paſſion*, uſing the terms in a philoſophical ſenſe, are modes which belong to ſubſtances; as when a ſmith with a hammer ſtrikes a piece of iron, the ſmith and hammer are agents or ſubjects of action, and the iron is the patient, or ſubject of paſſion.

6. *Modes* may be divided into *natural*, *civil*, *moral*, and *ſupernatural*, all which pertain to the apoſtle Paul, who was a little man, a Roman by the privilege of his birth, a man of virtue or honeſty, and an inſpired apoſtle.

7. *Modes* belong either to *body*, or to *ſpirit*, or to both. *Modes* of *body* belong only to matter, or corporeal beings; ſuch are FIGURE, REST, MOTION, &c. Theſe are *primary*, when they belong to bodies, conſidered in themſelves, whether there were any man to take notice of them or no, as ſhape, ſize, &c. or *ſecondary*, which are ſuch ideas as we aſcribe to bodies, on account of the various impreſſions that are made on the ſenſes of men by them, called ſecondary qualities: ſuch are all colours, ſounds, taſtes, ſmells, and all tactile qualities. See Quality. *Modes* of *ſpirit* belong only to minds, ſuch are KNOWLEDGE, WILL, &c. *Modes* belonging to body and ſpirit are called mixt or human *modes*, becauſe they are found in human nature, ſuch are SENSATION, IMAGINATION, PASSION, &c. in which there is a concurrence of the operation of animal and intellectual nature.

8. There are alſo *modes* of other *modes*, which, though they ſubſiſt in and by the ſubſtance, as the original ſubject of them, are properly and directly attributed to ſome *mode* of that ſubſtance; thus ſwiftneſs and ſlowneſs are *modes* of motion, which is itſelf the *mode* of a body.—Watt's Logic. p. i. c. 2. § 3 and 4.

Mr. Locke divides *modes* into *ſimple*, and *mixt* or *compound.*

Modes, *ſimple*, are combinations of ſimple ideas of the ſame kind, or even of the ſame ſimple ideas divers times repeated; as a dozen, a ſcore, &c. which are only the ideas of ſo many diſtinct units put together.

The modifications of any ſimple idea, Mr. Locke obſerves, are as perfectly different and diſtinct ideas in the mind as thoſe the moſt remote and inconſiſtent: thus, *two* is as diſtinct from *three*, as blindneſs is from heat. With this view that author examines the *ſimple modes* of ſpace; which are found to be diſtance, capacity, extenſion, figure, place, and duration.

The mind has ſeveral diſtinct ideas of *ſliding*, *rolling*, *walking*, *creeping*, &c. which are all but the different modifications of motion. *Swift* and *ſlow* are two different ideas of motion, the meaſures whereof are made out of the diſtance of time and ſpace put together.

The like variety we have in ſounds; every articulate word is a different modification of ſound, as are all notes of different length put together, which makes that complex idea called *time*.

The *modes* of colours might be alſo very various; ſome of which we take notice of as the different degrees, or as they are termed, *ſhades of the ſame colour*. But ſince we ſeldom make aſſemblages of colours without taking in figure alſo, as in painting, &c. thoſe which are taken notice of, do moſt commonly belong to mixed *modes*; as *beauty*, *rainbow*, &c. All compounded taſtes and ſmells are alſo *modes* made up of the ſimple ideas of thoſe ſenſes.

As to the *modes of thinking*; when the mind turns its view inward upon itſelf, *thinking* is the firſt idea that occurs, wherein it obſerves a great variety of modifications; and therefore frames to itſelf diſtinct ideas.

Thus the perception annexed to any impreſſion on the body made by an external object, is called *ſenſation*. Where an idea recurs without the preſence of the object, it is called *remembrance*. When ſought after by the mind, and brought again in view, it is called *recollection*. When held there long under attentive conſideration, it is called *contemplation*. When ideas float in the mind without regard or reflection, it is called, in French, a *reverie*. When the ideas are taken notice of, and, as it were regiſtered in the memory, it is *attention*. When the mind fixes its view on any one idea, and conſiders it on all ſides, it is *intention* and *ſtudy*.

Of theſe various *modes* of thinking, the mind forms as diſtinct ideas, as it does of white and red, or of a ſquare, or a circle.

Modes, *mixt*, are combinations of ſimple ideas of ſeveral kinds; as in *beauty*, which conſiſts in a certain compoſition of colour, figure, &c. *theft*, which is the concealed change of poſſeſſion of any thing, without conſent of the proprietor, &c.

There are three ways whereby we get ideas of *mixt modes*: 1. By experience and obſervation of things themſelves: thus, by ſeeing two men wreſtle, we get the idea of wreſtling. 2. By invention, or voluntary putting together of ſeveral ſimple ideas of our own minds: ſo he that firſt invented printing, had an idea of it firſt in his mind before ever it exiſted. 3. By explaining the names of actions we never ſaw, or notions we cannot ſee; and by enumerating all thoſe ideas, which go to the making them up: thus, the *mixt mode* which the word *lye* ſtands for is made up of the ſimple ideas. (1.) Articulate ſounds. (2.) Certain ideas in the mind of the ſpeaker. (3.) Words, the ſigns of theſe ideas. And, (4.) thoſe ſigns put together by affirmation, or negation, otherwiſe than the ideas they ſtand for are in the mind of the ſpeaker.

Mixt modes have their unity from an act of the mind, combining thoſe ſeveral ſimple ideas together, and conſidering them as one complex one: the mark of this union is one name given to that combination.

This gives the reaſon, why there are words in every language, which cannot be rendered by any one ſingle word of another. For the faſhions and cuſtoms of one nation make ſeveral combinations of ideas familiar in one, which another had never any occaſion to make. Such were οστρακισμος among the Greeks, and *proſcriptio* among the Romans.

This alſo occaſions the conſtant change of languages; becauſe the change of cuſtom and opinion brings with it new combinations of ideas, which to avoid long deſcriptions, have new names annexed to them, and ſo they become new ſpecies of *mixt modes*.

Of all our ſimple ideas, thoſe which have had moſt *mixed modes* made out of them, are thinking, and motion (which comprehend in them all action), and power, from whence theſe actions are conceived to flow.

Of this kind are the *modes* of actions, diſtinguiſhed by their cauſes, means, objects, ends, inſtruments, time, place, and other circumſtances; as alſo of the powers fitted for thoſe actions. Thus *boldneſs* is the power to do or ſpeak what we intend, without fear or diſorder; and this power of doing any thing when it had been acquired by frequent doing the ſame thing, is that idea we call *habit*; and when forward and ready, upon every occaſion, to break into action, we call it *diſpoſition*: thus *teſtineſs* is a diſpoſition or aptneſs to be angry. Power being the ſource of all action, the ſubſtances, wherein thoſe powers are, when they exert this power, are called *cauſes*: and the ſubſtances thereupon produced, or the ſimple ideas introduced into any ſubject, are called *effects*. The efficacy wereby the new ſubſtance or idea is produced, is called in the ſubject exerting that power, *action*; and, in the ſubject wherein any ſimple idea is changed, or produced, *paſſion*: which efficacy, in intellectual agents, we can conceive to be nothing elſe but *modes* of thinking and willing: in corporeal agents nothing elſe but modifications of motion.

Mode, *diviſion of a.* See Diviſion.

Mode, in *Grammar.* See Mood.

Mode, in *Logic*, See Mood.

Mode is alſo uſed, in logic, for the modification of a propoſition; or that which renders it *modal* and *conditional.*

Mode, *indirect.* See Indirect.

Mode, or Mood, in *Muſic*, a particular manner of beginning, continuing and ending a ſong, wereby we are engaged to make uſe of certain notes, or cords, preferable to, or oftener than others.

Mode is defined by ſome authors, the particular manner of conſtituting the octave, or the melodious conſtitution of the octave, as it conſiſtis of ſeven eſſential or natural notes, beſides the key or fundamental.

A *mode*, then, is not any ſingle note or ſound; but the particular order of the concinnous degree of an octave; the fundamental note whereof may, in another ſenſe, be called the *key*, as it ſignifies that principal note which regulates the reſt.

The proper difference between a *mode* and Key, conſiſts in this, that an octave, with all its natural and concinnous degrees, is called a *mode* with reſpect to the conſtitution, or the manner and way of dividing it; and with reſpect to the place of it in the ſcale of muſic, that is, the degree or pitch of tune, it is called a *key*: that is, an octave of ſounds may be raiſed in the ſame order and kind of degrees which makes the ſame *mode*, and yet be begun higher or lower; that is, be taken at different degrees with reſpect to the whole, which makes different keys: and from the ſame definition it follows, that the ſame key may be found with different *modes*; that is, the extremes of two octaves may be in the ſame degree of tune and the diviſion of them different.

Now it may be farther obſerved, that of the natural notes of every *mode*, or octave, three go under the name of the eſſential notes in a peculiar manner, viz. the fundamental, the third and fifth; their octaves being reckoned the ſame, and marked with the ſame letters in the ſcale: the reſt are particularly called *dependents*. Again, the fundamental is alſo called the *final*; the fifth, the *dominante*; and the third, as being between the other two, the *mediante*.

The doctrine of the ancients, with regard to *modes*, which they ſometimes alſo call *tones*, is ſomewhat obſcure; there being an unaccountable difference among their authors as to the definitions, diviſions, and names of their *modes*. They agree, indeed, that a *mode*, is a certain ſyſtem or conſtitution of ſounds, and that an octave, with all its intermediate ſounds, is ſuch a conſtitution: but the ſpecific differences of tones, or *modes*, ſome place in the manner of diviſion, or order of their concinnous parts; and others merely in the different tenſion of the whole; i. e. as the whole ſeries of notes are acuter or graver, or as they ſtand higher or lower in the ſcale of muſic.

Boethius is very obſcure on this head, and defines a *mode* to be, as it were, an entire body of modulations, conſiſting of a conjunction of conſonances; as the diapaſon.

Ptolemy makes the *modes* the ſame with the ſpecies of the diapaſon; but at the ſame time he ſpeaks of their being at ſome diſtance from each other. Some contended for thirteen, ſome for fifteen *modes*, which they place at a ſemitone's diſtance from each other; but it is plain, theſe underſtood the differences to be only in their place, or diſtances from each other; and that there is one certain harmonious ſpecies of octave applied to them all; viz. that order which proceeds from the proſlambanomenos of the ſyſtema immutatum, or the A of the modern ſyſtem. Ptolemy argues, that if this be all, they may be infinite, though they muſt be limited for uſe and practice. But, indeed, much the greater part define them by the ſpecies of the Diapason; ſo that as there are in nature three different kinds of diateſſaron, and four different kinds of diapente; and the diapaſon is compoſed of theſe two ſyſtems: there are in nature ſeven ſpecies of diapaſon, and therefore only ſeven *modes*; but as to their uſe, we are left entirely in the dark.

If the *modes* be nothing but the ſeven ſpecies of octaves, the uſe of them can only be, that the proſlambanomenos of any *mode* being made the principal note of a ſong, there may be different ſpecies of melody anſwering to thoſe different conſtitutions. But then we are not to conceive, that the proſlambanomenos, or fundamental of any *mode*, is fixed to any particular chord of the ſyſtem, v. g. the Phrygian to *g*; ſo that we muſt always begin there, when we would have a piece of melody of that ſpecies. When we ſay, in general, that ſuch a *mode* begins in *g*, it is no more than to ſignify the ſpecies of octave as they appear in a certain fixed ſyſtem: but we may begin in any chord of the ſyſtem, and make it the proſlambanomenos of any *mode*, by adding new chords, or by altering the tuning of the old. If this were the true nature and uſe of the tones, moſt of theſe *modes* muſt have been imperfect, and incapable of good melody, as wanting ſome of thoſe which we reckon the eſſential and natural notes of a true *mode*. Again, if the eſſential difference of the *modes* conſiſt only in the gravity or acuteneſs of the whole octave, then we may ſuppoſe one ſpecies or concinnous diviſion of the octave, which, being applied to all the chords of the ſyſtem, makes them true fundamentals for a certain ſeries of ſucceſſive notes, by changing, as above, the tone of certain chords in ſome caſes, or by adding new chords to the ſyſtem. But that muſt have been a ſimple kind of melody, produced by admitting only one concinnous ſeries, and that too wanting ſome uſeful and neceſſary chords.

Sir Francis Haſkins Eyles Styles, in an elaborate eſſay on the *modes* of the ancients, Phil. Tranſ. vol. li. 695, &c, has undertaken to prove, that the two doctrines on this ſubject, which he diſtinguiſhes by the epithets of harmonic and muſical, and which have been advanced by different writers, are in reality the ſame. According to one of theſe, viz. the harmonic, the difference between one *mode* and another conſiſted in the tenſion or pitch of the ſyſtem; and, according to the other, or muſical, this difference conſiſted in the manner of dividing an octave, or in the different ſpecies of the diapaſon: but both theſe definitions of a muſical *mode* perfectly coincide. This author obſerves, that according to the harmonic doctrine, the number of the *modes* had been augmented to fifteen; but Ptolemy, who appears to have favoured the muſical, reduces them to ſeven: of theſe ſeven, according to the direction furniſhed by Bacchius, p. 12. ed. Meibom. it appears, that the Mixolydian was the moſt acute; the Lydian graver by a ſemitone; the Phrygian graver than the Lydian by a tone; the Dorian graver than the Phrygian by a tone; the Hypolidian graver than the Dorian by a ſemitone; the Hypophrygian graver than the Hypolydian by a tone; and the Hypodorian graver than the Hypophrygian by a tone. Now as the Guidonian ſcale, in uſe among the moderns, anſwers to the ſyſtem of the ancients, in its natural ſituation, which was in the Dorian *mode*, and our A la mi re, conſequently, anſwers to the pitch of the Dorian meſe: we have a plain direction for finding the abſolute pitch of the meſes, for all the ſeven in our modern notes, and they will be found to ſtand thus:

Mixolydian meſe in	*d*
Lydian in	*c ſharp*
Phrygian in	*b*
Dorian in	*a*
Hypolydian in	*g ſharp*
Hypophrygian in	*f ſharp*
Hypodorian in	*e*

But to underſtand this doctrine as delivered by the ancients, it will be neceſſary alſo to examine how the meſes of the ſeven *modes* were ſtationed upon the lyre. The lyre, after its laſt enlargements, conſiſted of fifteen ſtrings, which took in the compaſs of a diſ-diapaſon, or double octave. Theſe ſtrings were called by the ſame names as the fifteen ſounds of the ſyſtem; and, when tuned for the Dorian *mode*, correſponded exactly with them. In this mode the meſe of the ſyſtem was placed in the meſe of the lyre; but in every one of the reſt, it was applied to a different ſtring, and every ſound of the ſyſtem tranſpoſed accordingly. Hence aroſe the diſtinction between a ſound in power, and a ſound in poſition; for when the ſyſtem was tranſpoſed from the Dorian to any other *mode*, e. gr. to the Phrygian, the meſe of the lyre, though ſtill meſe in poſition, acquired in this caſe the power of the lichanos meſon; and the parameſe of the lyre, though ſtill parameſe in poſition, acquired the power of the meſe. In theſe tranſpoſitions, one or more of the ſtrings always required new tunings, to preſerve the relations of the ſyſtem; but, notwithſtanding this alteration of their pitch, they retained their old names, when ſpoken of in reſpect to their poſitions only; for the name implied not any particular pitch of the ſtring; but only its place upon the lyre, in the numerical order, reckoning the proſlambanomenos for the firſt. The places of the meſe for theſe ſeven *modes* upon the lyre, are ſettled by Ptolemy as follows:

			ſtring.
Mixolydian	Meſe in	Paranetediezeugmenon	11
Lydian		Trietediezeugmenon	10
Phrygian		Parameſe	9
Dorian		Meſe	8
Hypolydian		Lichanos Meſon	7
Hypophrygian		Parhypate Meſon	6
Hypodorian		Hypate Meſon	5

on the other hand, the muſical doctrine taught, that the difference between one *mode* and another conſiſted in the manner of dividing an octave, or in the different ſpecies of diapaſon. Theſe were, as we have already obſerved, ſeven in number; and had the denominations of Mixolydian, Lydian, Phrygian, Dorian, Hypolydian, Hypophrygian, and Hypodorian. See DIAPASON.

Theſe ſpecies, as they ſtand in the ſyſtem, are with reſpect to acuteneſs and gravity, in the inverted order of the ſeven *modes* as ſettled by the harmonic doctrine. According to the Guidonian ſcale, and preſerving the natural notes, they will ſtand in the manner repreſented under DIAPASON.

The order of the intervals of which each ſpecies is compoſed, proceeding in each from grave to acute, will be as follows:

Mixolydian. Semitone, tone, tone, ſemitone, tone, tone, tone.

Lydian. Tone, tone, ſemitone, tone, tone, tone, ſemitone

Phrygian. Tone, ſemitone, tone, tone, tone, ſemitone, tone.

Dorian. Semitone, tone, tone, tone, ſemitone, tone, tone.

Hypolydian. Tone, tone, tone, ſemitone, tone, tone, ſemitone.

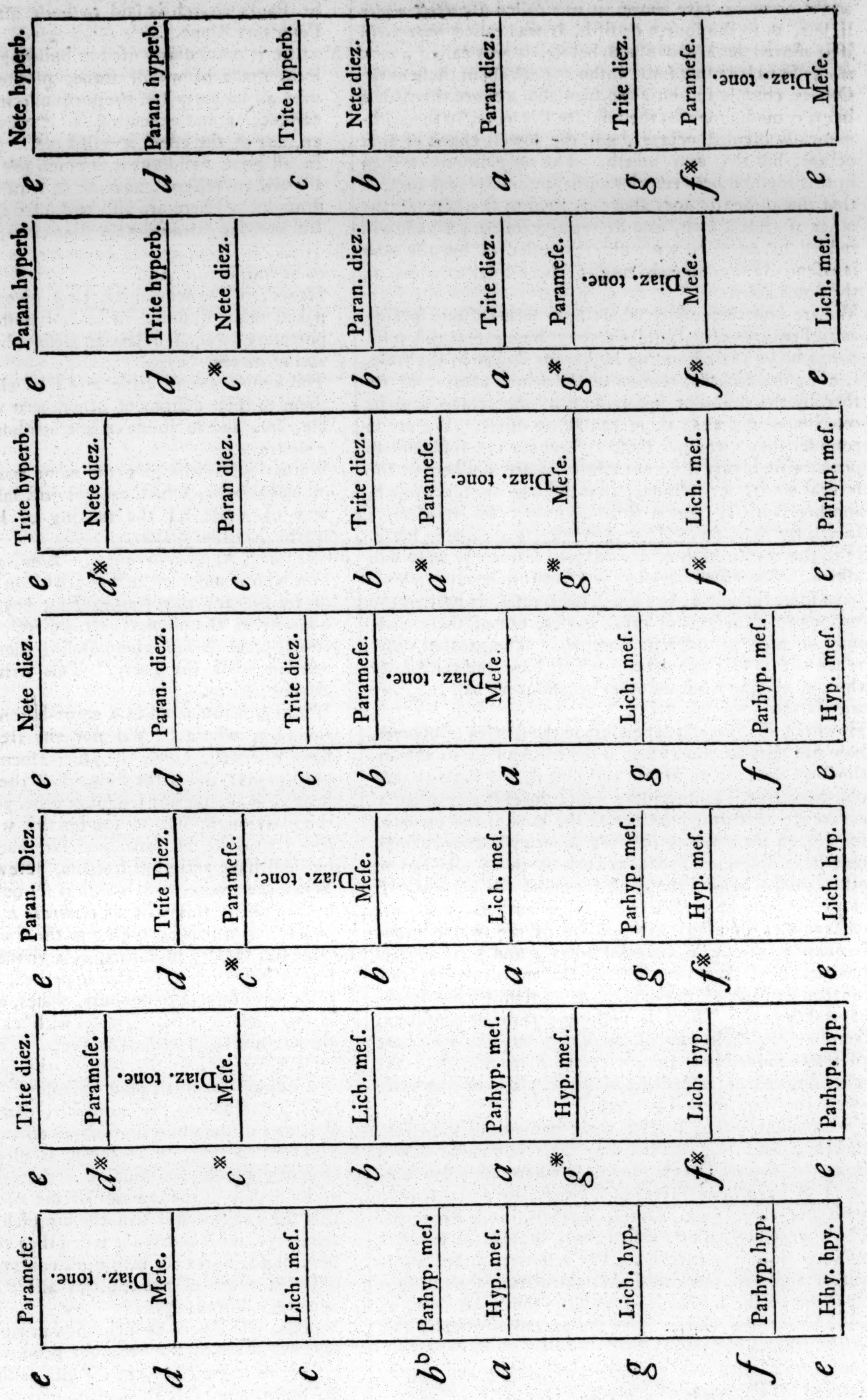
Hypophrygian. Tone, tone, ſemitone, tone, tone, ſemitone, tone.

Hypodorian. Tone, ſemitone, tone, tone, ſemitone, tone, tone.

The ancients had another method of explaining the ſpecies of diapaſon, by the poſition of the diazeuctic tone, or interval from meſe to parameſe. In the mixolydian ſpecies, the diazeuctic tone was the firſt interval rekoning from acute to grave; in the Lydian, it was the ſecond; in the Phrygian, the third; in the Dorian, the fourth; in the Hypolydian, the fifth; in the Hypophrygain, the ſixth; and in the Hypodorian, the laſt.

In order to reconcile the two doctrines already illuſtrated, it is obſerved, by ſir Francis Stiles, that the harmonic doctrine ſhews the pitch of the ſyſtem for each *mode*; and the muſical directs in what part of the ſyſtem to take the ſpecies of diapaſon; therefore, by combining theſe two directions, we obtain the following canon for obtaining any *mode* required: "firſt pitch the ſyſtem for the "*mode*, as directed by the harmonic doctrine; then ſelect "from it the diapaſon, directed by the muſical, and "we have the characteric ſpecies of the *mode* in its true "pitch." The annexed diagram of the ſeven ſpecies ſhews at what pitch of the Guidonian ſcale each ſound of the diapaſon is brought out by the canon for each of the ſeven *modes*. The reſult of the canon, ſeen in the conſtruction of the diagram, is, in all reſpects, conformable to the principles of both doctrines; e. g. in the Dorian, the meſe is placed in A la mi re, and the reſt of the ſounds exhibited, in that diapaſon, are placed at the proper diſtances, for preſerving the order of the ſyſtem, as required by the harmonic doctrine. It is alſo ſeen, that the diapaſon ſelected lies between the hypate meſon and nete diazeugmenon; that the ſemitones are the firſt interval in the grave, and the third in the acute; and that the diazeuctic tone is in the fourth interval, reckoning from the acute, &c. all which circumſtances were required by the muſical doctrine for this *mode*; and all the circumſtances required by each doctrine will be found to obtain the reſt of the *modes*.

DIAGRAM of the Species of Diapaſon in the Seven Modes admitted by Ptolemy.


Hypodorian.
Nete hyperb.
Paran. hyperb.
Trite hyperb.
Nete diez.
Paran diez.
Trite diez.
Parameſe.
Diaz. tone.
Meſe.
e
d
c
b
a
g
f*
e
Hypophrygian.
Paran. hyperb.
Trite hyperb.
Nete diez.
Paran. diez.
Trite diez.
Parameſe.
Diaz. tone.
Meſe.
Lich. meſ.
e
d
c*
b
a
g*
f*
e
Hypolydian.
Trite hyperb.
Nete diez.
Paran diez.
Trite diez.
Parameſe.
Diaz. tone.
Meſe.
Lich. meſ.
Parhyp. meſ.
e
d*
c
b
a*
g*
f*
e
Dorian.
Nete diez.
Paran. diez.
Trite diez.
Parameſe.
Diaz. tone.
Meſe.
Lich. meſ.
Parhyp. meſ.
Hyp. meſ.
e
d
c
b
a
g
f
e
Phrygian.
Paran. Diez.
Trite Diez.
Parameſe.
Diaz. tone.
Meſe.
Lich. meſ.
Parhyp. meſ.
Hyp. meſ.
Lich. hyp.
e
d
c*
b
a
g
f*
e
Lydian.
Trite diez.
Parameſe.
Diaz. tone.
Meſe.
Lich. meſ.
Parhyp. meſ.
Hyp. meſ.
Lich. hyp.
Parhyp. hyp.
e
d*
c*
b
a
g*
f*
e
Mixolydian.
Parameſe.
Diaz. tone.
Meſe.
Lich. meſ.
Parhyp. meſ.
Hyp. meſ.
Lich. hyp.
Parhyp. hyp.
Hhy. hpy.
e
d
c
b♭
a
g
f
e

See INTERVAL.

The ſame author has explained at large the eight harmonic *modes* rejected by Ptolemy, and his reaſons for excluding them. He has alſo traced the origin of the two doctrines of which a ſummary has been already given: theſe were blended by the followers of Ariſtoxenus; but the muſical doctrine appears to be the moſt ancient, and may be probably referred to the age of Pythagoras; and the harmonic to the age of Alexander the Great. See MUSIC. But for a farther view of this ſubject of ancient *modes*, we muſt refer the curious reader to the Philoſ. Tranſ. *ubi ſupra*.

Muſic was conſiderably improved in the eleventh century, by Guido Aretinus, who, among other innovations, reformed the doctrine of *modes*. It is true, they were ſtill defined by the ſpecies of the octave, in Ptolemy's manner; and their number was fixed to ſeven; but afterwards taking occaſion to conſider the harmonical and arithmetical diviſions of the octave, whereby it reſolves into a fourth above a fifth, or a fifth above a fourth, they hence conſtitute twelve *modes*, making of each octave two different *modes*, according to this different diviſion: but becauſe there are two of them that cannot be divided both ways, there are but twelve *modes*. Of theſe, ſuch as were divided harmonically, that is, with the fifths loweſt (which were ſix), were called *authentic*; and the other ſix, which had the fifths higheſt, were called *plagal mdes*. See the ſcheme annexed.

Plagal Authentic
8ve 8ve
4th 5th 4th
g—*c*—*g*—*c*
a—*d*—*a*—*d*
b—*e*—*b*—*e*
c—*f*—*c*—*f*
d—*g*—*d*—*g*
e—*a*—*e*—*a*

To theſe *modes* they gave the names of the ancient Greek tones, as Dorian, Phrygian, and Lydian: but the ſeveral authors differ in the application and order of theſe names: ſo that we are ſtill in great meaſure at a loſs to know what they meant by thoſe diſtinctions, and what their real uſe was. The beſt account we can give was this: they conſidered that an octave, which wants a fourth or fifth, is imperfect; theſe being the concords next to octave, the ſong ought to touch thoſe chords moſt frequently and remarkably; and becauſe their concord is different, which makes the melody different, they eſtabliſhed by this two *modes* in every natural octave that had a true fourth and fifth: then, if the ſong was carried as far as this octave above, it was called a *perfect mode*; if leſs, as to the fourth or fifth, it was called *imperfect*; if it moved both above and below, it was called a *mixt mode*. Thus it is that ſome authors ſpeak about theſe *modes*. Others, conſidering how indiſpenſable a chord the fifth is in every mode, took for the final, or key-note, in the arithmetically divided octaves, not the loweſt chord of that octave, but that very fourth. The only difference then in this method between the authentic and plagal *modes* is that the authentic goes above its final to the octave; the other aſcends a fifth, and deſcends a fourth; which will indeed be attended with different effects; but the *mode* is eſſentially the ſame, having the ſame final to which all the notes refer.

We are now to conſider wherein the *modes* of one ſpecies, as authentic or plagal, differ among themſelves: this muſt either be by their ſtanding higher or lower in the ſcale, i. e. by the different tenſion of the whole octave, or rather by the different ſubdiviſions of the octave into its concinnous degrees: there can be no other. We are to conſider then, whether theſe differences are ſufficient to produce ſuch very different effects as are aſcribed to the ſeveral *modes*; for inſtance, that the one produces mirth, another ſadneſs, that a third is proper for religion, a fourth for love, &c. That theſe effects are owing merely to the conſtitution of the octave, ſcarce any body will affirm. The differences in the conſtitution will, indeed, have ſome influence; but it will be ſo little, as by that the various combinations of other cauſes, one of theſe *modes* may be uſed to different purpoſes. The greateſt difference is that of thoſe octaves which have the third *l*, or third *g*, making what on other occaſions we call the *ſharp* and *flat key*.

However, if the *modes* depend upon the ſpecies of octaves, how can they be more than ſeven? And as to the diſtinction between authentic and plagal, we have already obſerved, that it is imaginary with reſpect to any eſſential difference conſtituted thereby in the kind of the melody; for though the carrying the ſong above or below the final, may have different effects, yet this is to be aſcribed to other cauſes beſides the conſtitution of the octaves. It is particularly obſervable, that thoſe authors, who give us examples in actual compoſition of the twelve *modes*, frequently take in the artificial notes ※ and b, to perfect the melody of their key; and by this means depart from the conſtitution of the octave, as it ſtands fixed in the natural ſyſtem. There is nothing certain or conſiſtent, therefore, in their way of ſpeaking; but the *modes* are all really reducible to two, viz. the ſharp and flat; the other differences reſpecting only the place of the ſcale where the fundamental is taken.

The ancient *modes*, beſides their general diviſion into authentic and plagal, had alſo their reſpective names from the ſeveral Greek provinces where they are ſuppoſed to have been invented. Originally indeed there were but three, viz. Doric, Lydian, and Phrygian: which were particularly called *tones*, becauſe at a tone's diſtance from one another. The reſt were added afterwards, and were ſome of them named from the relations they bore to the former, particularly the *Hypo-doric*, as being below the Doric. See the preceding part of this article. See SINGING.

The *Doric* MODE was a mixture of gravity and mirth, invented by Thamyras of Thrace.

The *Phrygian* MODE was adapted to the kindling of rage; and was invented by Marſyas the Phrygian.

The *Lydian* MODE was proper for amorous or funeral ſongs; and was invented, according to Pliny, by Amphion. The *Mixolydian* was invented by Sappho. The *Æolic*, *Ionic*, and *Hypo-doric* by Philoxenus. And the *Hypo-lydian* by Polymneſtes. See DORIC, &c.

Beſides theſe *modes of tune*, old authors have alſo introduced *modes of time*, or meaſures of notes. Theſe at firſt were diſtinguiſhed into greater and leſs, and each of theſe again into perfect and imperfect. But afterwards they reduced all into four *modes*, which included the whole buſineſs of time. As theſe *modes* are now diſuſed, they are hardly worth the reciting.

The common *mode* now in uſe is much more ſimple and natural than any of theſe; the proportion, which in their's varied, being in our's fixed; viz. 2 : 1. A large equal to two longs: a long to two breves; a breve to two ſemibreves, &c. proceeding in the ſame proportion to the laſt or loweſt notes. And if on ſome occaſions the proportion of 3 : 1 betwixt two ſucceſſive notes is required, it is eaſily expreſſed by annexing a point (.).

The ancients had likewiſe their *modi melipœiæ*, of which Ariſtides names theſe; *dithyrambic*, *nomic*, and *tragic*: which are called *modes*, from their expreſſing the ſeveral motions and affections of the mind.

MODEL, an original or pattern propoſed for any one to copy or imitate.

St. Paul's church is ſaid to built after the *model* of St. Peter's at Rome.

MODEL is particularly uſed in building for an artificial pattern, made of wood, ſtone, plaiſter, or other matter, with all its parts and proportions; in order for the better conducting and executing ſome great work, and to give an idea of the effect it will have in large.

In all great buildings it is much the ſureſt way to make a *model* in relievo; and not to truſt to a bare deſign, or draught. There are alſo *models* for the building of ſhips, &c. and for extraordinary ſtair-caſes, &c.

MODEL, in *Painting* and *Sculpture*, is any thing propoſed to be imitated. And

Hence, in the academies, they give the term *model* to a naked man, diſpoſed in ſeveral poſtures, to give an opportunity to the ſcholars to deſign him in various views and attitudes.

The ſculptors have little *models* of clay or wax to aſſiſt them in their deſigns of others that are larger, in marble, &c. and to judge of the attitude and correctneſs of a figure.

Statuaries likewiſe give the name *model* to certain figures of clay or wax, which are but juſt faſhioned, to ſerve by way of guide for the making of larger, whether of marble or other matter.

MODERATA, *miſericordia*, in *Law*, a writ that lies for him who is amerced in a court-baron or other court, not of record, for any tranſgreſſion beyond the quality or quantity of the offence. It is directed to the lord of the court, or his bailiff, commanding them to take a *moderate amercement* of the party. This writ is founded upon *Magna Charta*.

If a man be amerced in a court-baron on preſentment by the jury, where he did not any treſpaſs, he ſhall not have this writ, unleſs the amercement be exceſſive and outrageous: and if the ſteward of the court, of his own head, will amerce any tenant or other perſon without cauſe, the party ought not to ſue for this writ of *moderata miſericordia* if he be diſtrained for that amercement; but he ſhall have action of treſpaſs. New Nat. Br. 167.

When the amercement which is ſet on a perſon is affeered by his peers, this writ of *moderata miſericordia* doth not lie; for then it is according to the ſtatute 10 Edw. II.

MODERATION, in *Ethics*, is a virtue conſiſting in the proper government of our appetites, paſſions, and purſuits, with reſpect to honours, riches, and pleaſures; and in this ſenſe it is ſynonymous with TEMPERANCE: it is alſo often uſed to denote *candour*.

MODERATOR, in the *Schools*, the perſon who preſides at a diſpute, or in a public aſſembly.

Such a doctor was the *moderator*, that is, the preſident, at ſuch a diſputation, in ſuch an aſſembly, &c.

MODERATOR-*ring*, in *Anatomy*, is uſed by Valſalva for that ring which the muſcles of the eye make round the optic nerve, at the bottom of the orbit. He alledges, that the exterior fibres of theſe muſcles which riſe from the nerve, muſt ſhorten it when they contract, and when the interior fibres act they muſt compreſs it; ſo that theſe different fibres of the muſcles affect the nervous fluid here very differently.

Valſalva alſo deſcribes ſuch another ring made round the motory nerves of the eye; but acknowledges, that it is neither ſo remarkable nor diſtinct as the former. Med. Eſſ. Edin. Abr. vol. ii. p. 410.

MODERN, ſomething new, or of our time. In oppoſition to what is antique, or *ancient*.

Modern authors, according to Naude, are all thoſe who have written ſince Boethius: the modern philoſophy commences with Galileo: and the *modern* aſtronomy with Copernicus.

MODERN *medals* are reckoned all thoſe that have been ſtruck within theſe three hundred years. See MEDAL.

MODERN, in *Architecture*, is improperly applied to the preſent, or Italian manner of building; as being according to the rules of the antique. Nor is the term leſs abuſed when attributed to architecture purely Gothic.

Modern architecture, in propriety, is only applicable to that which partakes partly of the antique, retaining ſomewhat of its delicacy and ſolidity; and partly of the Gothic, whence it borrows members and ornaments, without proportion or judgment.

MODERN *muſic*, *muſica moderna*, may be divided into two parts: firſt, *antiquo-moderna*, which is generally a ſerious ſort of muſic, conſiſting of many parts; and which has been in uſe from Guido's time to the beginning of the laſt century. Secondly, the *modern*, which has been uſed in this and the laſt century: it is very different from the *antiqua moderna*, being briſker, lighter, gayer, and more ſprightly.

MODESTY, in *Ethics*, is ſometimes uſed to denote HU-

MILITY; and ſometimes to expreſs chaſtity or purity of ſentiment and manners.

MODIFICATION, in *Philoſophy*, that which *modifies* a thing; that is, gives it this or that manner of being.

Quantity and quality are accidents which *modify* all bodies.

According to Spinoza's ſyſtem, all the beings that compoſe the univerſe are only ſo many different *modifications* of one and the ſame ſubſtance. And the different arrangement and ſituation of their parts, make all the difference between them.

MODIFICATIVE, ſomething that *modifies*, or gives a thing a certain manner of being.

Father Buffier eſtabliſhes a new part of ſpeech which he calls *modificative.* Nouns and verbs, he obſerves, are ſuſceptible of divers circumſtances or *modifications*: in the phraſe, *zeal acts*, we have a noun and verb, without any *modification*; but in that, *zeal without diſcretion acts raſhly*, the noun and verb are each attended with a *modification* or circumſtance.

The laſt kind of words, which ſerve to *modify* nouns and verbs, ſince they have no general name in the common grammars, he chooſes to call *modificatives*: which include what grammarians commonly call *adverb*, *conjunction*, and *prepoſition*.

MODILLIONS, from the Italian *modiglione*, *a little meaſure*, in *Architecture*, ornaments in the corniche of the Ionic, Corinthian, and Compoſite columns. See *Tab. Archit. fig.* 20.

The *modillions* are little inverted conſoles, or brackets, in form of an S, under the ſoffit of the corniche ſeeming to ſupport the projecture in the larmier: though in reality they are no more than ornaments.

The *modillion* is ſometimes alſo called *mutule*; though cuſtom has introduced a little difference between the idea of a *modillion*, and a mutule; the mutule being peculiar to the Doric order, and the *modillion* to the higher orders.

The *modillions* ought always to be placed over the middle of the column. They are particularly affected in the Corinthian order, where they are uſually enriched with ſculpture. Their proportions muſt be ſo adjuſted, as to produce a regularity in the parts of the ſoffit.

The *intermodillions*, i. e. the diſtances between them, depend on the intercolumniations, which require the *modillions* to be made of a certain length and breadth, in order to render the intervals perfect ſquares, which are always found to have better effect than parallelograms. To this it muſt be added, that in adjuſting the *modillion*, care ſhould be taken, that they have ſuch a proportion, as that when the orders are placed over one another, there be the ſame number in the upper order as in the lower, and that they fall perpendicularly over each other.

Modillions are alſo uſed under the corniſhes of pediments; though Vitruvius obſerves, that they were not allowed of in his time; in regard *modillions* were intended to repreſent the ends of rafters, which could not be ſuppoſed to be found in a pediment.

Some will have the *modillions* of a pediment to repreſent purlins; and thoſe at the eaves to repreſent rafters. Daviler rather takas them for a kind of inverted conſoles or corbels.

In the Corinthian order it is uſual to have a leaf which takes up the whole breadth, and almoſt the whole length of the *modillions*; but Le Clerc is of opinion that they would be more graceful if this leaf were leſs, both in length and breadth. The leaf ought likewiſe to be of the ſame kind with thoſe which make the ornament of the capital.

MODIOLI, in *Natural Hiſtory*, a name given by ſome authors to the trochitæ or ſingle joints of the rays of the petrified magellanic ſtar-fiſh, which when connected in numbers together, form that foſſil called ENTROCHUS.

Others have alſo uſed this word *modiolus* to expreſs the compound body, or entrochus itſelf. Though the general form of the trochitæ be thin and flat, yet they are ſometimes found conſiderably thick; and though the entrochi or compound *modioli* are uſually ſo many cylinders of equal diameter in all parts, yet there are ſometimes found ſuch as are thick in the middle, and thence gradually taper to each end; ſome alſo are compoſed of joints, each of this form; theſe differ very greatly from the common kind, and inſtead of conſiſting of a number of little wheels, are made up of a ſeries of little barrels, joined, as it were, end to end.

MODIOLUS, a ſurgeon's inſtrument, the ſame with ANABAPTISTON, and TREFANUM.

MODIUS, in *Antiquity*, a kind of dry MEASURE in uſe among the Romans for ſeveral ſorts of grain.

The *modius* contained thirty-two heminæ, or ſixteen ſextaries; or $\frac{1}{3}$ of the amphora; amounting to an Engliſh peck.

MODIRA *haniram*, in *Botany*, a name given by ſome authors to the tree whoſe wood is the *lignum colubrinum*, or ſnake-wood of the ſhops.

MODO & *forma*, in *Law*, a phraſe uſed in proceſſes and pleadings, whereby the defendant abſolutely denies the thing charged on him by the plaintiff, *modo & forma declarata*, in the manner and form ſet forth.

The civilians in the like ſenſe ſay, *negat allegata, prout allegantur, eſſe vera.*

MODULATION, in *Muſic*, is the art of keeping in, and, on occaſion, changing, the mode or key; and returning to it again; without offence to the ear.

Under this term it comprehended the regular progreſſion of the ſeveral parts through the ſounds that are in the harmony of any particular key, as well as the proceeding naturally and regularly from one key to another.

The rules of *modulation* in the firſt ſenſe belong to harmony and melody. We ſhall here only add a word with regard to the rules of *modulation* in the latter ſenſe.

As every piece muſt have a principal key; and ſince the variety, ſo neceſſary in muſic to pleaſe and entertain, forbid the being confined to one key; and that therefore it is not only allowable, but neceſſary, to *modulate* into, and make cadences on ſeveral other keys, having a relation and connection with the principal key: it muſt be conſidered what it is that conſtitutes a connexion between the harmony of one key, and that of another, that it may be hence determined into what keys the harmony may be conducted with propriety.

As to the manner in which the *modulation* from one key to another is to be performed, ſo that the tranſition may be eaſy and natural, it is not eaſy to fix any preciſe rules; for though it is chiefly performed by the help of the ſeventh *g* of the key, into which the harmony is to be changed, whether it be flat or ſharp; yet the manner of doing it is ſo various and extenſive, that no rules can eaſily circumſcribe it. A general notion of it may be conceived under the following terms.

The ſeventh *g* in either flat or ſharp key is the third *g* to the fiſth *f* of the key, by which the cadence in the key is chiefly performed; and by being only a ſemitone under the key, is thereby the moſt proper note to lead into it, which it does in the moſt natural manner imaginable: inſomuch that the ſeventh *g* is never heard in any of the parts, but the ear expects the key ſhould ſucceed it: for whether it be uſed as a third, or as a ſixth, it always affects us with ſo imperfect a ſenſation, that we naturally expect ſomething more perfect to follow, which cannot be more eaſily and ſmoothly accompliſhed than by the ſmall interval of a ſemitone, to paſs into the perfect harmony of the key. Hence it is, that the tranſition into one key is the beſt effected by introducing its ſeventh *g*, which ſo naturally leads to it.

MODULE, in *Architecture*, a certain meaſure taken at pleaſure, for regulating the proportions of columns, and the ſymmetry or diſtribution of the whole building.

Architects uſually chooſe the diameter or ſemidiameter of the bottom of the column for their *module*; and this they ſubdivide into parts or minutes.

Vignola divides his *module*, which is a ſemidiameter, into twelve parts, for the Tuſcan and Doric; and into eighteen, for the other orders.

The *module* of Palladio, Scamozzi, M. Cambray, Deſgodetz, Le Clerc, &c. which is alſo the ſemidiameter, is divided into thirty parts, or minutes, in all the orders.

Some divide the whole height of the column into twenty parts for the Doric, twenty-two and a half for the Ionic, twenty five for the Roman, &c. and one of theſe parts they make a *module*, to regulate the reſt of the building by.

There are two ways of determining the meaſures or proportions of buildings: the firſt by a fixed ſtandard meaſure, which is uſually the diameter of the lower part of the column, called a *module*, ſubdivided into ſixty parts, called *minutes*. In the ſecond there are no minutes, nor any certain and ſtated diviſion of the *module*; but it is divided occaſionally into as many parts as are judged neceſſary. Thus, the height of the Attic baſe, which is half the *module*, is divided either into three, to have the height of the plinth; or into four, for that of the greater torus; or into ſix, fot that of the leſſer.

Both theſe manners have been practiſed by the ancient as well as the modern architects; but the ſecond, which was that chiefly uſed among the ancients, is in the opinion of Perrault preferable.

As Vitruvius, in the Doric order, has leſſened his *module* which in the other orders is the diameter of the lower part of the column, and has reduced that great *module* to a mean one, which is a ſemidiameter; M. Perrault reduces the *module* to a third part for the ſame reaſon, viz. to determine the ſeveral meaſures without a fraction. For in the Doric order, beſide that the height of the baſe, as in the other orders, is determined by one of theſe mean *modules*; the ſame *module* gives likewiſe the heights of the capital, architrave, triglyphs, and metopes. But our little *module*, taken from the third of the diameter of the lower part of the column, has uſes much more extenſive; for, by this, the heights of pedeſtals, of columns, and entablatures, in all orders, are determined without a fraction.

As then the great *module* or diameter of the column, has ſixty minutes; and the mean *module*, or half the diameter, thirty minutes; our little *module* has twenty. See COLUMN.

MODUS *decimandi* is when a parcel of land, a ſum of money, or a yearly penſion, belongs to the parſon, either by compoſition or cuſtom, time out of mind, in ſatisfaction for tithes in kind.

This is ſometimes a pecuniary compenſation, as two pence an acre for the tithe of land; ſometimes it is a compenſation in work and labour, as that the parſon ſhall have only the twelfth cock of hay, and not the tenth, in conſideration of the owner's making it for him: ſometimes in lieu of a large quantity of crude or imperfect tithe, the parſon ſhall have a leſs quantity, when arrived to greater maturity, as a couple of fowls inſtead of tithe eggs, &c. In ſhort, any means whereby the general law of tithing is altered, and a new method of taking tithes is introduced, is called a *modus decimandi*, or ſpecial manner of tithing. In order to make a good and ſufficient *modus* the following rules muſt be obſerved:

1. It muſt be certain and invariable. 2. The thing, given in lieu of tithes, muſt be beneficial to the parſon, and not for the emolument of third perſons only. 3. It muſt be ſomething different from the thing compounded for. 4. One cannot be diſcharged from payment of one ſpecies of tithe, by paying a *modus* for another. 5. The recompence muſt be in its own nature as durable as the tithes diſcharged by it; i. e. an inheritance certain. 6. The *modus* muſt not be too large, which in law is called a rank *modus*. In theſe caſes of preſcriptive or cuſtomary *moduſes*, the law ſuppoſes an original real compoſitin to have been regularly made, which being loſt by length of time, the immemorial uſage is admitted as evidence to ſhew that it did once exiſt, and that from thence ſuch uſage was derived. Now time of memory hath been long aſcertained by the law, to commence from the reign of Richard I. and any cuſtom may be deſtroyed by evidence of its non-exiſtence in any part of the long period from his days to the preſent. Blackſt. Com. b. ii. p. 30.

MOEDA. See MOIDORE.

MOEHRINGIA, *mountain chick-wood*, in *Botany*, the name of a genus of plants of the *octandria digynia* claſs, deſcribed by Linnæus; the characters of which are theſe: the perianthium ſtands expanded, and is compoſed of four leaves, of a lanceolated figure; the flower is compoſed of four petals of an oval figure not indented at the ends, and ſmaller than the ſegments of the cup; the ſtamina are eight capillary filaments; the antheræ are ſimple; the germen of the piſtil is globoſe; the ſtyles are two, they are erect and of the length of the ſtamina; the ſtigmata are ſimple; the fruit is a globoſe capſule, compoſed of four valves, but having only one cell in which are ſeveral ſeeds, convex on one ſide and angular on the other. There is only one ſpecies.

MOERDA. See MURDER.

MOFFAT *Waters*. See *Moffat* WATERS.

MOGORIN, in *Botany*, a name given by the Portugueſe to an Indian or Chineſe flower, growing on a ſmall ſhrub. It is of a wonderful white colour, and not unlike the *ginſeng*, only that it abounds more with leaves, and ſmells much ſweeter; one ſingle flower filling a whole houſe with its odoriferous effluvia. On this account the Chineſe put a high value upon it, and carefully defend the ſhrub it grows on from the inclemency of the winter, by covering it with vaſes provided on purpoſe.

MOHAIR, in *Commerce*, the hair of a kind of GOAT, frequent about Angora in Turkey; the inhabitants of which city are all employed in the manufacture of camblets made of this hair.

Some give the name *mohair* to the camblets or ſtuffs made of this hair: of theſe there are two kinds; the one ſmooth and plain; the other watered like tabbies: the difference between the two only conſiſts in this, that the latter is calendered, the other not. There are alſo *mohairs* both plain and watered, whoſe woof is of wool, cotton, or thread.

MOHAIR, *unwatered*, pays 6 $\frac{93}{100}$*d.* per yard on importation, and draws back, on exportation, 6 $\frac{7\frac{1}{2}}{100}$ *d.* The watered ſort pays on importation 11 $\frac{55}{100}$*d.* per yard, and draws back, on exportation 10 $\frac{12\frac{1}{2}}{100}$. And that made of half hair, half ſilk, pays on importation 2*s.* 10$\frac{35}{100}$*d.* per yard, and draws back, on expotration 2*s.* 7½*d.*

MOHAIR-*ſhell*, in *Natural Hiſtory*. See MOIRE.

MOHAWKS *corn*, in *Botany*, a name given by the Indians to a peculiar ſort of the MAIZE, or Indian corn. It is moſt frequent in the more northerly parts of America. The general time of ſowing the maize in Virginia and other places, is in the end of April; but this *mohawk* kind need not be ſown before June, and yet will come well to maturity before the winter. The ſtalks of this kind are ſhorter than thoſe of the common ſort. The ears alſo are ſhorter and grow nearer the ground, and the corn is generally of various colours. Phil. Tranſ. N° 142.

MOHAWKS. See MOCK.

MOIDORE, MOEDORE, or MOEDA, a gold coin, ſtruck and current in Portugal.

The *moidore* and its diviſions, are reckoned by the ree, and being numbered on the coin, the value of each piece is thus readily known. Thus that marked

			£.	s.	d.	
four millrees	4000	worth	1	7	0	Engliſh money.
	2000		0	13	6	
	1000		0	6	9	
	500		0	3	4½	

See REE.

The *moidore* is properly the Portugueſe *piſtole*.

There are alſo *doppio-moedas*, or double *moidores*, or piſtoles, and demi-piſtoles.

MOIETY, MEDIETAS, the *half* of any thing.

MOILON, is a name given by the French to a kind of ſtone, that forms the upper cruſt and lies round the free ſtone in moſt quarries. It is an excellent ſubſtance for forming the body of fluxes or ſoft enamel.

MOINEAU, in *Fortification*, is a flat baſtion raiſed before a curtin when it is too long, and the baſtions of the angles too remote to be able to defend one another.

Sometimes the *moineau* is joined to the curtin, and ſometimes it is divided from it by a mote. Here muſqueteers are placed, to fire each way.

MOIRE, in *Conchyliology*, the mohair-ſhell, a name given by the French virtuoſi to a peculiar ſpecies of VOLUTA, which ſeems of a cloſely and finely reticulated texture: and reſembles on the ſurface a piece of mohair, or a very cloſe ſilk-worm's web.

MOISTURE. See HUMIDITY.

The *moiſture* of the air has conſiderable effects on the human body. For the quantity and quality of the food, and the proportion of the meat to the drink, being given, the weight of a human body is leſs, and conſequently its diſcharges greater in dry weather than in wet weather; which may be thus accounted for: the *moiſture* of the air moiſtens the fibres of the ſkin, and leſſens perſpiration, by leſſening their vibratory motion. When perſpiration is thus leſſened by the *moiſture* of the air, urine, indeed, is by degrees increaſed, but not equally. See Dr. Bryan Robinſon's Diſſ. on the Food and Diſcharges of the Human Bodies, p. 68, ſeq.

Hence we learn, that to keep a body of the ſame weight in wet weather as in dry, either the quantity of food muſt be leſſened, or the proportion of the meat to the drink increaſed; and both theſe may be done by leſſening the drink, without making any change in the meat.

The inſtrument uſed for determining the degree of *moiſture* in the air, is called an HYGROMETER. Since the printing of that article, Mr. Coventry, of Southwark, has furniſhed the editor with an account of his new hygrometer, the conſtruction of which is as follows: take two ſheets of fine tiſſue paper, ſuch as is uſed by hatters and watch-makers, and ſometimes called lawn-paper, each ſheet of which generally weighs about twenty-ſeven grains. Let the moiſture be thoroughly evaporated by the fire, without ſcorching the paper; till after repeated trials it is brought to its drieſt ſtate: in this ſtate cut each ſheet till it weighs exactly twenty-five grains. Theſe ſheets, thus prepared, ſhould be kept in a box or drawer with a quantity of the ſame paper deſigned for uſe; and they will always ſerve for determining the proper weight of any quantity of paper for other hygrometers. This paper hung in any place, and kept free from duſt, and weighed with a nice pair of ſcales will ſerve to exhibit the *moiſture* of the air, by its increaſe of weight above fifty-grains. But to avoid the trouble of weighing, Mr. Coventry prepared an hygrometer of it in the following manner. A, *Tab.* III. *Pneumatics*, *fig.* 49. repreſents a pillar ſupporting the beam BB, to one end of which are ſuſpended fifty grains of paper D, cut round, and threaded on a ſilk ſtring, with a ſmall glaſs bead between the ſheets, for the freer admiſſion of the air: at the other end of the beam is a braſs weight E, to counterbalance the weight of the paper and its appendages. At the bottom there is an ivory ſcale F F, of twelve prime diviſions, anſwering to twelve grains of *moiſture*: each prime diviſion is ſubdivided into ten parts, making in the whole one hundred and twenty diviſions: on the index C is a ſliding weight G, which, with the weight E on the beam, ſerves to adjuſt the inſtrument; ſo that twelve grains ſhall make the index juſt traverſe the ſcale of the twelve diviſions. If the air was ſo dry as to leave no *moiſture* in the paper, the index would then point to 0: if it contained ſix grains of *moiſture*, the index would point to ſixty; if twelve grains were in the paper, it would point to the moiſt extreme one hundred and twenty: but the air has never yet been obſerved ſo moiſt, as to make the index point to the moiſt extreme, nor ſo dry as to allow its reaching to the drieſt extreme, even in the hotteſt part of ſummer, by nearly twenty diviſions: whence it is inferred that there is in the air a greater quantity of *moiſture* in hot weather than is generally imagined. H is an adjuſting ſcrew for fixing the ſtand upright by means of the point of a plumbet that hangs behind. This hygrometer, adjuſted, may be made to correſpond with another, aſcertained to the ſame weight at any diſtance: by which we might determine the exact difference of the ſtate of the air, with reſpect to *moiſture*, in inland, and places near the ſea-ſide. The advantages of this hygrometer are the following: as it is made of the thinneſt ſubſtance that can be procured, it is the ſooneſt affected with dryneſs or *moiſture*, and exhibits immediately the firſt change of the weather: it is not acted upon by heat or cold, or any other cauſe, as moſt other inſtruments of this kind are: it has one datum from which to reckon; viz. the dry extreme, whence all other degrees of *moiſture* may be nicely eſtimated. All hygrometers of this ſort will act nearly alike, as thermometers or barometers; and may be reduced to a regular ſtandard. Mr. Coventry found by this hygrometer, that in clear froſty weather, the air contains a very conſiderable degree of *moiſture*: for on Jan. 27, 1776, in the morning, being a very hard froſt, the thermometer in the houſe 24°, and in the open air 17°, the hygrometer ſtood at ten grains, i. e. at the diviſion 100: and on the next morning, when a thaw came on, it ſtood at 96; which ſhews that there is as much *moiſture* in the air during the froſt, as when we perceive it diſſolved in a thaw. He adds, that it is pleaſing to obſerve the conſtant motion of this hygrometer: for even in conſtant ſettled weather, it is always in motion, from moiſt towards dry, from about eight in the morning till about four in the afternoon; and from dry to moiſt, from about 4 P. M. to about 8 A. M. In hot gloomy weather, the hygrometer is moſtly found to advance with ſpeed towards moiſt, and ſhews that the air at ſuch times retains a great quantity of *moiſture*: and this always forebodes heavy ſhowers. For curious experiments ſome of theſe hygrometers are made to traverſe the whole ſcale of diviſions for every grain of *moiſture* that is imbibed by the papers.

MOISTURE *radical*. See RADICAL.

MOLA, in *Medicine*. See MOLE.

MOLA, in *Ichthyology*. See SUN-*fiſh*.

MOLA, in *Anatomy*, a bone of the knee, called alſo *patella*, *rotula*, &c. See *Tab. Anat. (Oſteol.) fig.* 23, *n.* 21. 22.

MOLAGO *codi*, in *Botany*, a name by which ſome authors have called the plant which produces the common black pepper.

MOLANGA, in *Botany*, a name given by ſome authors to the plant which produces the common black pepper.

MOLAR *glands*, or *glandulæ molares*, ſo called by Heiſter, who firſt deſcribed them, are two glands ſituated between the maſſeter and buccinator, which ſend out ſmall ducts perforating the buccinator, and opening into the cavity of the mouth, almoſt over againſt the *dentes molares*.

MOLARES, in *Anatomy*, the *grinders*; an epithet given to the large teeth; as ſerving, like mill-ſtones, to grind the food. See *Tab. Anat. (Oſteol.) fig.* 2. *lit. f.*

The number of *molares* is not always the ſame. Some perſons have twenty; and others only ſixteen, viz. four or five on each ſide of either jaw. They are very large, hard, and ſtrong; being faſtened into their aveoli or ſockets by ſeveral roots.

The *molares* have been, according to the difference in their ſize, diſtinguiſhed into ſmall grinders, large grinders, and *dentes ſapientiæ*, or the teeth of wiſdom, ſo called becauſe they ſeldom appear till people are arrived at years of diſcretion.

The bodies of the *molares* in general are very thick, ſhort, and irregularly cylindrical, or rather with four ſides, a little rounded, and terminated by a broad end, more or leſs filled with obtuſe points, cut, in ſome meaſure, like ſo many diamonds. The name of *crown* is alſo frequently given to the bodies of theſe teeth, from ſome ſort of reſemblance they are ſuppoſed to have to it. In the two ſmall *molares*, the crown is leſs than in the others, and often not ſo large as the bodies of the canini: they have uſually but two points. In the two large *molares*, the crown has a much greater extent, and the points are three, four, or five in number. The fifth grinder, or *dens ſapientiæ*, has uſually a crown much like the two former, but commonly more rounded, and with fewer points.

The roots of the *molares* are long, and more or leſs flat; in ſome ſingle, in others two, three, or four, and ſometimes, but rarely, five in number; ſometimes all theſe roots are diſtinct, ſometimes they are wholly united, and ſometimes they are united only in part; they are generally ſtrait, and at a greater diſtance from one another at their extremities than at the crown of the tooth. The roots of the ſmall grinders appear often ſingle, without being ſo in reality; for in examining them narrowly, they are found to have two roots united, or ſoldered together; and ſometimes all the diſtinction that appears, is in their having two ſeparate points. The great *molares* have commonly ſeveral roots, the firſt three, and the ſecond four; or ſometimes, the firſt four, and the ſecond five; but theſe numbers are variable. The roots are ſometimes all perfectly diſtinct, and ſometimes they are partly diſtinct, and partly united in the ſame tooth in different degrees; and in ſome ſubjects, one or more of their points are bent outward, inward, or in other directions; and it is not always that more roots are met with in the upper teeth than in the lower. The fifth grinder has often but one root, and that is ſometimes very ſhort, and ſometimes remarkably long. It is common to meet with this tooth in grown perſons almoſt wholly hid in its ſocket, and it has, in theſe caſes, but a very ſmall opening for it to appear at. In all the *molares*, near the collar, the roots, be they ever ſo many, meet and unite into one body. Winſlow's Anatomy, p. 43.

MOLARES, in the *Natural Hiſtory of the Antients*, the name for the compound mineral bodies we now call PYRITÆ, and MARCASITES.

MOLASSES. See MOLOSSES.

MOLD. See MOULD.

MOLDAVICA, in *Botany*. See DRAGON's *head*.

MOLE, *talpa*, in the Linnæan ſyſtem of *Zoology*, makes a diſtinct *genus* of animals, of the order of *feræ*, and claſs of *mammalia*: the characters of which are, that they have ſix upper fore-teeth, and eight lower; and the firſt of the laniarii is larger, and four ſmaller. Linnæus reckons two ſpecies, viz. the European, which has a tail, and five toes on its feet, and the Aſiatic or Siberian, which has no tail, and three toes on the fore-feet.

The *mole*, though a very common animal, is very little obſerved by the generality of the world. Its fur is very ſhort, ſoft, and thick; its noſe is like that of a hog; and its teeth like thoſe of the *mus araneus*, being ſingle and eminent on the ſides of the upper jaw, and thoſe farther within the mouth armed with many points; it has ſcarce any neck, its head ſeeming to be ſet between its ſhoulders; its legs are very ſhort, its claws very ſharp, and its toes five in number on each foot; the inner part or ſole of the fore-feet is very broad, and much reſembles the palm of the human hand; its claws on theſe are more robuſt and ſtrong than on any other animal of its ſize; the whole feet and toes are not placed downward but ſideways, for the ſake of the creature's continual employment in digging, it being properly a ſubterranean animal; its tail is ſhort, and hairy.

It has been ſuppoſed by many, that the *mole* had no eyes; and others have affirmed that it had eyes, but that they were covered with a membrane; but neither of theſe aſſertions are true; the eyes are ſmall, and have apertures in the ſkin, through which they may eaſily be diſcerned by a curious obſerver; and are very black, about the ſize of a millet-ſeed, and faſtened to a nerve.

The reaſon they have not been obſerved by the common people, is, that they are hid by the fur; but, on blowing that away, they always ſhew themſelves; it has no ears. Its ſkin is extremely firm and tough, ſo that it requires a ſharp knife to pierce it.

This ſeems the care of nature to defend the creature from the cold; and the fineneſs of the fur, that is the ſmallneſs of every hair, ſeems proportioned to the ſmall pores they had to grow out of.

The hair is uſually black, ſometimes ſpotted with white; and ſometimes quite white. This animal has an exquiſite ſenſe of ſmelling, which directs it to its food, viz. worms, inſects, and roots. It breeds in the ſpring, and brings forth four or five young at a time. It makes its neſt of moſs, a little beneath the ſurface of the ground, and ſcreams much when taken. Palma chriſti and white hellebore, made into a paſte, and laid in their holes, deſtroy them. There are no *moles* in Ireland. See *Tab.* III. *Quadrupeds*, N° 34. A yellowiſh kind of *mole* inhabits North America. The Siberian *mole* is of a beautiful green and gold colour, variable with the light. Ray and Pennant.

MOLE, MOLA, or MOLA *carnea*, in *Medicine*, a miſ-ſhapen maſs of hard fleſh, ſometimes generated in the wombs of women, inſtead of a fœtus; called alſo a *falſe conception*. The Latins give it the name *mola*, which literally ſignifies *mill-ſtone*, from its reſemblance to it in form.

The *mole* is the chaos of an embryo; and would have grown to an infant, had not the proceſs of conception been diſturbed. Though it be without regular bones, viſcera, &c. yet the lineaments frequently are not ſo far effaced, but that there are ſome remains of a child; ſometimes a hand, and ſometimes a foot, have been ſeen; and commonly the ſecundines.

It is rare that more than one *mole* is excluded at a time; though Sennertus obſerves there are inſtances of two, three, or even more. He adds, that though they uſually come alone, yet they have been known to come with a fœtus, ſometimes before it, and ſometimes after it.

The *mole* is diſtinguiſhed from an *embryo*, in that it has no placenta whereby to receive its nouriſhment from the mother. Inſtead of that it grows immediately to the womb, and is nouriſhed there.

It has a kind of vegetative life, and continues growing in bulk till the time of excluſion. Sometimes it has been borne in the womb for two or three years.

This production is ſuppoſed to ariſe from ſome defect or indiſpoſition of the ovum, or egg; or, perhaps, from the male's ſeed wanting force to penetrate it ſufficiently in order to open or expand the parts: or the effect may be accounted for by ſuppoſing an ovum to drop into the womb, without being impregnated by the ſeed of the male: in all which caſes, the egg continuing to grow, and yet wanting ſomething neceſſary to organize and form it into an embryo, becomes a ſhapeleſs lump.

Authors are divided whether or no women ever bring forth *moles* without any intercourſe with men? Some ſay there are *moles* which derive their origin from the menſtruous blood detained, coagulated, and hardened; through which the blood and ſpirits have made themſelves paſſages, &c.

The *mole* while in the womb, may be diſtinguiſhed from a true conception, by its tremulous palpitating motion; by its rolling from ſide to ſide; and by the belly's ſwelling equally every way. The breaſts ſwell as in caſe of a juſt embryo; but the humour generated therein is not true milk, but a crude matter, formed of the ſuppreſſed menſes. To bring the *mole* out of the womb, bleeding and violent purging are uſed, and at laſt ſtrong emmenagogue. If they fail recourſe is to be had to manual operation.

A *mole* is ſometimes produced alone in the uterus, ſometimes at the ſame time with a regular fœtus. There are many origins to be aſſigned to theſe concretions, but the moſt uſual ſeems to be the leaving behind a part of the ſecundines after abortion. In young people theſe are leſs dangerous, and ſeldom remain in the womb more than a year, but in older perſons they ſometimes remain many years, and at length often occaſion the death of the perſon. When they are produced in the womb at the ſame time with a regular fœtus, they uſually deprive it of part of its nutriment, and occaſion falſe pains, and many irregular complaints, during the time of geſtation; but theſe uſually are attended with fewer accidents at the time of delivery than when the ſame ſubſtances are produced alone in the womb. The German writers of wonders give accounts of theſe concretions being living animals, armed with claws and beaks, or wide mouths, and deſtroying the fœtus when they are in the womb at the ſame time with one; but theſe are idle reports, and are to be looked upon in the ſame light with the hiſtories of ſooterkins. Junk. Conſ. Med. p. 721.

The ſigns of a *mole* in the uterus are very dubious, and during the firſt months of geſtation it is ſcarce poſſible to diſtinguiſh it from a genuine fœtus; but after this, if the ſymptoms of pregnancy go on, and there is no motion perceived at a time when the fœtus ought to ſtir, it is ſhrewdly to be ſuſpected that this is the caſe; and this becomes the more evident, if after this time there come on irregular and uncertain diſcharges of blood from the uterus, at different times; in this caſe there is alſo uſually ſo great a flaccidity in the ligaments of the uterus, that it does not retain its place in the body; but when the perſon turns in bed, is plainly felt falling like a dead weight from one ſide of the abdomen to the other. It is alſo obſerved, that in theſe caſes, though the belly ſwells as much as when there is a genuine fœtus, yet it is not ſo regularly rounded before, but is flatter at the middle and more turgid toward the ſides, ſo that the burden ſeems carried on one or the other ſide, or partly in both, while the middle remains empty. There is always in this caſe alſo a ſenſation of a weight on the lower part of the abdomen, greater by much than in the caſe of a real child there. At the regular time of delivery, the caſe becomes much plainer than before; for then either no pains at all come on, or thoſe which come are ſlight, and inconſiderable, very regular in their periods and returns, and by no means ſufficient for the excluſion of a fœtus. When a *mole* happens at the ſame time with a fœtus, it is ſeldom to be diſcovered till the time of delivery, or if it be found out ſooner, there can be nothing done till both that and the fœtus are excluded; after this the womb is to be very carefully cleanſed, as in abortions. At other times, when the caſe is obvious, that there is a *mole* without any fœtus, the common forcing medicines are to be given for ſeveral days every month, about the time of the periodic returns of the menſes; and if thoſe do not bring it away, recourſe is to be had to the hand of the midwife.

We find a very ſingular inſtance in Kerkring, of a *mole*, in which a child was incloſed. The whole was declared a falſe conception, and might have been ſacrificed as ſuch, had not ſome perſon preſent obſerved ſomething ſtir within it, and, on the opening it, taken out the living child.

Mole, Moles, a maſſive work formed of large ſtones laid in the ſea by means of coffer-dams, extended either in a right line, or an arch of a circle, before a port; which it ſerves to cloſe; to defend the veſſels in it from the impetuoſity of the waves, and to prevent the paſſage of ſhips without leave.

Thus we ſay the *mole* of the harbour of Meſſina, &c.

Mole is ſometimes alſo uſed to ſignify the harbour itſelf.

Mole, Moles, among the Romans, was alſo uſed for a kind of mauſoleum, built in manner of a round tower on a ſquare baſe, inſulate, encompaſſed with columns, and covered with a dome.

The *mole* of the emperor Adrian, now the caſtle of St. Angelo, was the greateſt, and moſt ſtately, of all the *moles*. It was crowned with a brazen pine-apple, wherein was a golden urn containing the aſhes of the emperor.

Mole *cricket*, *gryllotalpa*, in *Zoology*. See *Mole* Cricket.

Mole-*hill*. Theſe little hillocks of earth are a very great prejudice to the paſture-lands, not only in waſting ſo much of the land as they cover, but in hindering the ſcythe in mowing. In the Weſt of England they uſe a peculiar inſtrument for the breaking up of theſe; it is a flat board, very thick, and of about eight inches in diameter, into which there is faſtened a perpendicular handle of three or four feet long. It has four broad and ſharp iron teeth at the front, which readily cut through the hill, and ſpread the earth it conſiſts of; and behind there is a large knob, proper for breaking the clods with, if there are any. Some uſe a ſpade, or other common inſtrument, in the place of this, but not ſo well. There is, however, a much better inſtrument even than this, for deſtroying theſe hills, where they are in very great numbers. This is a kind of horſe-machine; it has a ſharp iron about three feet over, and with a ſtrong back. It is about four or five inches broad, and has two long handles for a horſe to be harneſſed to, and a croſs bar of iron to ſtengthen it at the bottom of the handles, reaching from the one handle to the other. The middle of this croſs bar is furniſhed with one, two, or more ſharp pieces of iron, like ſmall plough-ſhares, to cut the *mole-hills* into two, three, or more parts. The iron behind is of a ſemicircular figure. A ſingle horſe is harnaſſed to this machine, and a boy muſt be employed to drive it, and a man to hold and guide it; the ſharp irons or ſhares are the firſt things that meet the hill, they run through it, break its texture, and cut it into ſeveral parts, and the circular iron following immediately behind them, cuts up the whole by the roots, and leaves the land level. This inſtrument will deſtroy as many *mole-hills* in one day as a common labourer can in eight, and would be of very great advantage to the kingdom, if brought into general uſe. Mortimer's Huſbandry, p. 331.

It is to be obſerved that this leaving a naked ſpace in the place of every hill, it will be neceſſary to go over the land, and ſow them with hay ſeed, otherwiſe theſe ſpots will want the produce of graſs the firſt years. The farmers in ſome parts of England are not willing to deſtroy the *mole-hills*; but let them ſtand from year to year, ſuppoſing that they get ſome ground by them; but the advantage by this means is ſo little that it does not balance the unſightlineſs and damage to the mowing.

MOLECULE, Molecula, in *Phyſics*, a little maſs or portion of any body.

The air, by reſpiration, inſinuating itſelf into the veins and arteries, endeavours by its elaſtic power to divide and break the *molecules* of the blood, which on theirpart reſiſt ſuch diviſion.

MOLES *carnea*, in *Anatomy*, a name given by Veſalius, and others, to a muſcle called by Winſlow, Albinus, and others, the complexus. Spigelius calls it the *carnea moles trigemina adjuncta*.

Moles *carnea labia formans*, in *Anatomy*, a name given by Fallopius to the muſcle called by Albinus *orbicularis oris*, and by Cowper constrictor *labiorum*.

MOLESTANDO. See Non *moleſtando*.

MOLINE', in *Heraldry*. A *Croſs* moline' is that which turns round both ways at all its extremities, though not ſo wide or ſharp as that ſaid to be *anchored*.

In Upton the the points are all cut off, which makes it very different from the croſs anchored.

MOLINISTS, in *Eccleſiaſtical Hiſtory*, a ſect in the Romiſh church who followed the doctrine and ſentiments of the Jeſuit Molina, relating to ſufficient and efficacious grace. Lewis Molina, after whoſe name this ſect was called, was a Spaniſh Jeſuit, and profeſſor of divinity in the univerſity of Ebora, in Portugal, in the year 1588, he publiſhed a book, to ſhew that the operations of divine grace were entirely conſiſtent with the freedom of human will; and he introduced a new kind of hypotheſis to remove the difficulties attending the doctrines of predeſtination and liberty, and to reconcile the jarring opinions of Auguſtinians, Thomiſts, Semi-Pelagians, and other contentious divines. Molina affirmed, that the decree of predeſtination to eternal glory was founded upon a previous knowledge and conſideration of the merits of the elect; that the grace from whoſe operation theſe merits are derived, is not efficacious by its own intrinſic power only, but alſo by the conſent of our own will, and becauſe it is adminiſtered in thoſe circumſtances, in which the Deity, by that branch of his knowledge, which is called *ſcientia media*, foreſees that it will be efficacious. The kind of preſcience, denominated in the ſchools *ſcientia media*, is that foreknowledge of future contingents, that ariſes from an acquaintance with the nature and faculties of rational beings, of the circumſtances in which they ſhall be placed, of the objects that ſhall be preſented to them, and of the influence which theſe circumſtances and objects muſt have on their actions.

The great antagoniſts of the *Moliniſts* are the JANSENISTS.

MOLINOSISTS, a ſect among the Romaniſts, who adhere to the doctrine of Molinos. Theſe are the ſame with what are otherwiſe called QUIETISTS.

MOLLE, in *Botany*. See *Indian* MASTIC.

Molle, in *Ichthyography*, the name of a ſmall ſpecies of whiting, common in the Mediterranean, and in the markets of Rome, Venice, &c. and called by authors the *aſellus omnium minimus*, and the *merlangus*. It is the ſmalleſt of all the aſellus kind, ſeldom exceeding four inches in length; it has a beard like the cod, hanging from the angle of its lower jaw; and has on each ſide nine ſpots on its noſe and gills; the back is of a pale brown, the belly white, and it has extremely ſmall and ſoft ſcales. The fleſh is very delicate.

Molle, in the *Ancient Muſic*, a name given to a ſpecies of the DIATONIC; and alſo a ſpecies of the CHROMATIC. The Greeks called it *μαλακον*, and uſed the term in oppoſition to *intenſum*, *συντονον*. As the latter was formed by increaſing the tention of the chord, and thereby making it approach nearer to the higheſt extreme of the tetrachord, ſo the *molle* was formed by remiſſion or relaxation. Hence the diviſion of the diatonic into *molle*, *μαλακον*, and *intenſum*, *συντονον*. Ariſtoxenus, p. 50, 51. edit. Meibom. See GENUS.

MOLLET. See MULLET.

MOLLIS *portio*. See PORTIO.

MOLLUGO, *African chickweed*, in *Botany*, a genus of the *triandria trigynia* claſs. Its characters are theſe: the empalement of the flower is compoſed of five oblong ſmall leaves, coloured on their inſides and permanent; the flower has five oval petals ſhorter than the empalement, and three briſtly ſtamina, which ſtand near the ſtyle, terminated by ſingle ſummits; it has an oval germen, having three furrows, ſupporting three very ſhort ſtyles; the germen becomes an oval capſule with three cells, filled with ſmall kidney-ſhaped ſeeds. There are ſeveral ſpecies, few of which are admitted into gardens. Miller reckons two, and Linnæus five ſpecies.

This plant is ſaid to have an aperitive virtue.

MOLLUSCA, in the Linnæan ſyſtem, is the denomination of the ſecond *genus* of *vermes* or worms. Theſe are ſimple naked animals, not included in a ſhell, but furniſhed with limbs, and comprehend eighteen ſubordinate genera, and one hundred and ten ſpecies.

MOLMAN, in our *Old Writers*, a man ſubject to do ſervice. It is applied to the ſervants in a monaſtery.

MOLMUTIN, or MOLMUTIAN *laws*, the laws of Dunwallo Molmutius XVI. king of the Britons, who is ſaid to have begun his reign four hundred and forty years before the incarnation.

He was the firſt who publiſhed any laws in this land; and they continued famous therein till the time of William the Conqueror.

MOLOCH, an affected term uſed by ſome chemical writers, to expreſs a leaden pot, through which mercury is made to paſs in the fire.

Moloch, in *Antiquity*, the name of the Phœnician god. See DÆMON.

MOLOCHITES, in *Natural Hiſtory*. See MALACHITES.

MOLOPS, a word uſed by ſome medical writers to expreſs the purple ſpots which appear upon the ſkin in malignant fevers.

MOLOSSES, MOLASSES, or MELASSES, that groſs, yet fluid matter remaining of ſugar, after refining, and which no boiling will bring to a conſiſtence more ſolid than that of ſyrup; hence alſo called *ſyrup of* SUGAR.

Properly, *molaſſes* are only the ſediment of one kind of ſugar called *chypre*, or brown ſugar, which is the refuſe of other ſugars not to be whitened, or reduced into loaves.

Moloſſes are much uſed in Holland among poor people, for the preparation of tobacco, and alſo inſtead of ſugar.

There is a kind of BRANDY or ſpirit made of *moloſſes*; but by ſome held exceedingly unwholeſome.

Molosses, *artificial*. There has been found a method of making *moloſſes* from apples, without the addition of ſugar. The apple that ſucceeds beſt in this operation is the ſummer-ſweeting of a middle ſize, pleaſant to the taſte, and ſo full of juice, that ſeven buſhels will yield a barrel of cyder. The manner of making it is this: the apples are to be ground and preſſed, then the juice is to be boiled in a large copper till three quarters of it be evaporated: this will be done with a moderate fire in about ſix hours, with the quantity of juice above mentioned; by this time it will be of the conſiſtence and taſte as well as the colour of *moloſſes*. This new *moloſſes* ſerves to all the purpoſes of the common kind, and is of great uſe in preſerving cyder. Two quarts of it put into a barrel of racked cyder, will preſerve it, and give it an agreeable colour.

The invention of this kind of *moloſſes* was owing to Mr. Chandler, of Woodſtock, in New England, who living at a diſtance from the ſea, and where the common *moloſſes* was very dear and ſcarce, provided this for the ſupply of his own family, and ſoon made the practice general among the people of the neighbourhood. It is to be obſerved, that this ſort of apple, the ſweeting, is of great uſe in making cyder, one of the very beſt kinds we know being made of it. The people in New England alſo feed their hogs with the fallings of their orchards of theſe apples; and the conſequence of this is, that their pork is the fineſt in the world. Phil. Tranſ. Nº 374. p. 230.

Molosses *ſpirit*, a very clean and pure ſpirit, much uſed in England, and made from *moloſſes* or common treacle diſſolved in water, and fermented in the ſame manner as malt or the common malt-ſpirit. If ſome particular art is not uſed in the making this, it will not prove ſo vinous as the malt-ſpirit, but more flat and leſs pungent and acid, though otherwiſe much cleaner taſted, as its eſſential oil is of a leſs nauſeous flavour. Whence if good freſh wine leys, abounding in tartar, be duly fermented in the ſolution made thin for that purpoſe, the ſpirit will by that means become much more vinous and briſk, and appoach more to the nature of the foreign ſpirits.

After the firſt diſtilling of *moloſſes* ſpirits from the waſh into low wines, it is to be rectified, and in the ſucceeding rectifications proper additions are to be made. Alkaline ſalts, ſo common in the rectifying the malt-ſpirits, muſt be avoided in this caſe, as not at all ſuiting this ſpirit, and the neutral ones only muſt be uſed, ſuch as ſandiver, common decrepitated ſalt, ſal enixum Paracelſi, and the like; but upon the whole nothing ſo conſiderable is to be expected from theſe ſalts, as from a careful rectification in balneo Mariæ, without any other admixture; by this alone repeated two or three times with freſh water each time, the ſpirit will at once be made fit for the niceſt uſes.

Where the *moloſſes* ſpirit is brought to the common proof-ſtrength, if it be found not to have enough of the vinoſity in it, it will be very proper to add to it ſome good ſpiritus nitri dulcis; and if the ſpirit be clean worked, it may by this addition alone be made to paſs on ordinary judgments for French brandy.

When newly diſtilled, this ſpirit, like all others, is colourleſs, and limpid as water; but our diſtillers always give it the ſame ſort of yellow tinge, which the foreign ſpirits are found to obtain from the caſks they are ſent over in. They have many ways of giving this colour extempore; but the two moſt in uſe are, either by an extract of oak-wood, or by burnt ſugar.

Moloſſes ſpirit coming dearer than that of malt, it is frequently met with baſely adulterated with a mixture of that ſpirit, and indeed ſeldom is to be bought without ſome daſh of it. Many have a way of mixing malt in the fermenting liquor, by this the yield of the whole is greatly increaſed, and the maker may aſſure the buyer that the ſpirit is pure as it ran from the worm.

England is the principal place where this ſpirit is made at this time: it was at one time prepared in great quantities in France, eſpecially on the river Loire; but it is now forbid there under a ſevere penalty. In Holland alſo they have it not, on account of the high duty laid upon treacle in favour of their own ſugar-bakers.

We meet with very little of *moloſſes* ſpirit reduced to the ſtrength of alcohol or ſpirit of wine, though, when rectified to this ſtate in a proper manner, it is very little inferior to the real alcohol of wine, the name of which is ſo well known among us, though the thing itſelf is perhaps never ſeen here. All that we call ſpirit of wine being no other than malt ſpirit reduced to an imperfect alcohol, or a ſpirit almoſt totally inflammable.

Great quantities of *moloſſes* ſpirit are uſed in the adulterating

rating of brandy, rum, and arrack; and great quantities are uſed alone in the making cherry-brandy and other drams by infuſion, in all which many prefer it even to the foreign ſpirits.

In moſt of the nice caſes of our compound diſtillery, the *moloſſes* ſpirit ſupplies the place of a pure and clean malt-ſpirit, which we have not yet the way of producing in the large way to advantage. Our cinnamon, citron, and other fine cordial waters are made with it; for the malt-ſpirit would give theſe a very diſagreeable flavour.

There is alſo another uſe to which this ſpirit ſerves extremely well, and which even a foreign ſpirit that has any remarkable flavour will not do ſo well in; this is the making the extemporaneous wine, which ſome people are ſo fond of. See *Extemporaneous* Wine.

It gives a yellow ſtain to the hands, or other ſubſtances dipped into it: and may therefore be of uſe in dying. It is poſſible alſo, that the vinegar makers may find uſe for it in their way; but the moſt advantageous of all its uſes is to the diſtiller himſelf, a quantity of it added to new treacle intended for fermentation will be of great uſe in the proceſs, and increaſe very conſiderably the quantity of ſpirit; but the proportion in regard to the new matter muſt not be too great. Shaw's Eſſay on Diſtillery.

MOLOSSUS, in the *Greek* and *Latin Poetry*, a foot conſiſting of three long ſyllables. As *audiri*, *cantabant*, *virtutem*. It takes its name either from a dance in uſe among the people called *Moloſſi* or *Epirotæ*; or from the temple of Jupiter *Moloſſus*, where odes were ſung in which this foot had a great ſhare; or elſe becauſe the march of the *Moloſſi*, when they went to the combat, was compoſed of theſe feet, or had the cadence thereof. The ſame foot was alſo called among the ancients, *Vertumnus*, *extenſipes*, *hippius*, *&* *canius*. Dion. iii. p. 475.

MOLTA, or Moltura, a duty or toll paid by vaſſals to the lord for grinding their corn at his mill.

MOLTEN *greaſe*, in the *Manege*. See Grease.

MOLTING, or Moulting, the falling off or change of hair, feathers, ſkins, horns, or other parts of animals, happening in ſome annually, in others only at certain ſtages of their life.

The generality of beaſts *molt* in the ſpring.

The *molting* of a hawk is called *mewing*.

The *molting* of a deer is the quitting of his horns in February or March.

The *molting* of a ſerpent is putting off his ſkin. See Exuviæ.

MOLUCCA *balm*, *moluccella*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs. Its characters are theſe: the flower has a large permanent empalement of one leaf, which is deeply indented at the brim, where it ſpreads open; the flower is of the lip kind, with a ſhort tube; the upper lip is erect, concave, and entire; the under lip trifid, the middle ſegment lower than the other; it has four ſtamina, ſituated under the upper lip, two of which are ſhorter than the other; and a germen with four parts, which turn to four angular convex ſeeds, ſitting in the empalement. Linnæus reckons three and Miller two ſpecies; the one a native of the *Molucca* iſlands, from whence it derives its name; the other grows in Syria.

This plant is a vulnerary, and very good in a phthiſis, being uſed as a tea; no plant is a better lithrontriptic. It has the virtues of balm, but ſmells ſomewhat ſtronger.

Molucca *bean*. See Bean.

Molucca *nuts*. See Guiladina and Bean.

MOLUTA *arma*. See Arma.

MOLY. The name of this plant is rendered famous by Homer, and has been on this occaſion much inquired into as to its true ſenſe, by the botaniſts of almoſt all times. The old interpreters of Homer all explain this word by the wild rue: and the only reaſon for this is, that at ſome time, probably long after the days of Homer, the people of Cappadocia called the wild rue *moly*. But this plant is wholly different from the *moly* of Homer, which Theophraſtus affirms grew in his time in Arcadia, in great plenty, and had a round bulbous root like an onion, and long and graſſy leaves like the ſquill. On the whole the *moly* of Homer ſeems to have been a ſpecies of allium or garlic.

MOLYBDÆNA, *leadwort*, in *Botany*, a name given by ſome authors to the great toothwort, or dentillaria of Rondeletius. See Toothwort.

Molybdæna is alſo a mineral ſubſtance called *black*-lead.

Molybdæna is alſo the name of a ſemi-metal reſembling *plumbago*; but its laminæ are larger, brighter, and when thin, ſlightly flexible. It is of a lead colour, and does not ſtrike fire with ſteel. Its ſpecific gravity is 4,569. In an open fire it is almoſt entirely volatile and unfuſible: it is acted upon with great effervefcence by mineral alkali, and forms with it a reddiſh maſs, having the ſmell of ſulphur. It is affected by no acid, but the nitrous and arſenical with the aid of heat. Mr. Scheele has found it to conſiſt of an acid of a peculiar nature united to ſulphur; 100 parts of it contain about 45 of acid, and 55 of ſulphur. It is occaſionally combined with a ſmall proportion of iron. This ſubſtance is decompoſed either by detonation with nitre or more readily by ſolution in nitrous acid. The white calx that remains is the molybdenous acid, which is ſoluble in 570 times its weight of water in the temperature of 60°. If this acid be diſtilled with three times its weight of ſulphur, it re-produces *molybdæna*. For other properties of it, ſee Kirwan's Elem. Min. p. 358, &c.

MOLLYBDIA, in *Natural Hiſtory*, the name of a genus of cryſtals. The word is derived from the Greek μολυϐδος, *lead*; and expreſſes cryſtals altered in their figure by particles of that metal. The cryſtals of this genus are of a cubic form, or compoſed of ſix ſides, at right angles, like a die. Of this genus there are three known ſpecies.

MOLYBDOMANTIA, Μολυϐδομαντεια in *Antiquity*, a ſpecies of divination, by obſerving the motions, figures, &c. of melted lead.

MOLYZA, μολυζα, a word uſed by the Greek phyſicians to expreſs a head of garlic.

MOMENT, in *time*, the moſt minute and indiviſible part of duration; or what we otherwiſe call an *inſtant*.

A *moment* ought not to be conceived as the leaſt part of time, but as a termination or limit of time. Maclaurin's Fluxions, vol. i. p. 245.

Moments, in the new doctrine of infinites, denote the infinitely ſmall parts of quantity.

Moments are the ſame with what we otherwiſe call *infiniteſimals*, and *differences*; being the *momentary* increments or decrements of quantity, conſidered as in a continual flux.

Moments are the generative principles of magnitude: they have no determined magnitude of their own; but are only inceptive thereof.

Hence, as it is the ſame thing, if in lieu of theſe *moments*, the velocities of their increaſes and decreaſes be made uſe of, or the finite quantities proportionable to ſuch velocities; the method of proceeding, which conſiders the motions, changes, or fluxions of quantities, is denominated, by ſir Iſaac Newton, the method of fluxions.

Leibnitz, and moſt foreigners, conſidering theſe infinitely ſmall parts, or infiniteſimals, as the differences of two quantities; and thereby endeavouring to find the differences of quantities, i. e. ſome *moments*, or quantities infinitely ſmall, which being taken an infinite number of times, ſhall equal given quantities; call theſe *moments*, *differences*; and the method of procedure the *differential calculus*. See Calculus *differentialis*.

Moment, Momentum, in *Mechanics*, is the ſame with *impetus*; or the quantity of motion in a moving body. See Force.

Momentum is ſometimes alſo uſed ſimply for the motion itſelf. *Moment* is frequently defined by the *vis inſita*, or the power by which moving bodies continually change place. In comparing the motions of bodies, the ratio of their *momenta* is always compounded of the quantity of matter, and the celerity of the moving body; ſo that the *moment* of any ſuch body may be conſidered as a rectangle under the quantity of matter, and the celerity.

And ſince it is certain, that all equal rectangles have their ſides reciprocally proportionable; therefore, if the *moments* of any moving bodies be equal, the quantity of matter in one to that of the other, will be reciprocally as the celerity of the latter to the celerity of the former; and, on the contrary, if the quanties of matter be reciprocally proportionable to the celerities, the *moments* or quantities in each will be equal.

The *moment*, alſo, of any moving body may be conſidered as the aggregate or ſum of all the *moments* of the parts of that body; and therefore where the magnitudes and number of particles are the ſame, and where they are moved with the ſame celerity, there will be the ſame *moments* of the wholes.

MOMENTARY *motion*. See Quantity.

MOMISCUS, a word uſed by ſome as a name of the *dentes molares*, and by others only as a name of that part of thoſe teeth which is near the gums.

MOMORDICA, in *Botany*. See *Male* Balsam *apple*.

Momordica, *ſtinking*. See *White* Bryony.

MOMOT, the name of a bird deſcribed by Nieremberg, and ſaid to be an inhabitant of the hot countries. It is of the ſize of a pigeon; its beak is black and crooked, three fingers breadth long, and ſerrated at the edge; its head is blue like the peacock's, and its feet brown; the reſt of the body is of a pleaſant green. But what is moſt ſingular in this bird, is, that it has in its tail one feather much longer than the reſt, which is naked for a great way, and is feathered only at the end. This laſt circumſtance Mr. Ray judges wholly falſe, as no birds have ſingle feathers in their tails, but all that are there grow in pairs.

MONACANTHUS, in *Ichthyology*, a name given by ſome to the alpheſtes, or cinedus, a fiſh approaching to the turdus kind; but differing, in that its back-fin is prickley all along, whereas the fore-part only is ſo in the turdus.

MONACHELLE, in *Ichthyology*, a name given by ſome to the fiſh called by the oldeſt Greek writers, the *chremps*, and by the later ones; as alſo by the Latin authors on theſe ſubjects, *chromis*. It is properly a ſpecies of the ſparus, and is diſtinguiſhed by Artedi from the others, by the length of the ſecond ray of the belly-fins.

MONAD. See LEIBNITZIAN *philoſophy*.

MONADELPHIA, in *Botany*, the ſixteenth claſs of plants whoſe ſtamina, or male parts, on account of their filaments running in among one another, are all formed into one body. See FRUCTIFICATION, and *Tab*. I. *Botany*, *Claſs* 16.

The word is formed of the Greek *μονος*, *ſingle*, and *αδελφια*, *brotherhood* or *community*: theſe coalitions of the ſtamina in flowers being underſtood in botany by that term.

This claſs includes five orders, viz. 1. *Pentandria*, comprehending ſuch plants as have five ſtamina, of which order there are four genera; *waltheria*, *lerchea*, *hermannia*, and *melochia*. 2. *Decandria*, whoſe plants have ten ſtamina; of this order there are three genera, viz. *connarus*, *hugonia*, and *geranium*. 3. *Endecandria*, with eleven ſtamina, of which order there is only one genus, viz. *brownæa*. 4. *Dodecandria*, with twelve ſtamina, containing one genus, viz. *pentapetes*. 5. *Polyandria*, with many ſtamina, including ſeventeen genera, viz. *bombax*, *ſida*, *adanſonia*, *althæa*, *alcea*, *malva*, *lavatera*, *malope*, *urena*, *goſſypium*, *hibiſcus*, *ſtewartia*, *camellia*, *moriſonia*, *meſua*, *malachra*, and *gordonia*. See *Tab*. V. *Botany*, *Claſs* 16.

This is an extremely natural claſs, and there is not one plant uſually allowed to belong to the reſt of this kind, that this character ſeparates, nor one of any other kind that it brings in among them. Tournefort has been guilty of a very great error, in regard to the flowers of the plants of this claſs; he ſays that they are monopetalous, and only divided into five ſegments; but a ſtrict obſervation will ſhew, that they really conſiſt each of five ſeparate petals, which only are joined at the baſe by certain filaments, which together make one body. Hence it follows, that they are ſtrictly and truly pentapetalous, though they fall off together, not ſeparately, on ſhaking the plant.

Though authors in general have kept this claſs of plants together, they have been much divided in their opinions, as to the characters or parts of them, by which they ſhould divide them into genera. Some have had recourſe, on this occaſion, to the ſeed-veſſel; others, finding that inſufficient, have conſulted the leaves. Linnæus uſes the cup of the flower on this occaſion, which is a very eſſential part in this claſs of plants, and ſufficiently different in the different genera.

It is obſerved, that all the plants of this claſs are mucilaginous and emollient, and have great virtues as diuretics, &c. The common marſhmallow deſervedly ſtands at the head of theſe, and is common in the preſcriptions of the phyſicians on theſe occaſions, as well as in many of the ſhop compoſitions, as the ſyrup of marſhmallows and the like.

MONANDRIA, in *Botany*, the firſt claſs of plants which have hermaphrodite flowers, with only one ſtamen each. The word is formed of the Greek *μονος*, *ſingle*, and *ανηρ*, *male*. See *Tab*. I. *of Botany*, *Claſs* 1. and FRUCTIFICATION.

The orders belonging to this claſs are two, viz. 1. *Monogynia*, comprehending ſuch plants as have only one ſtyle, of which there are eleven genera, diſtinguiſhed into trilocular, with the pericarpium divided into three loculaments; as the *canna*, *amomum*, *coſtus*, *alpinia*, *maranta*, *curcuma*, *kæmpferia*, and *thalia*; and monoſpermous, or thoſe with a ſingle ſeed, as the *boerhaavia ſalicornia*, and *hippuris*. 2. *Digynia*, with two ſtyles, of which order there are four genera, viz. *coriſpermum*, *callitriche*, *blitum*, and *cinna*. See *Tab*. III. *Botany*, *Claſs* 1.

MONARCHICI, in *Church Hiſtory*, heretics towards the end of the ſecond century, who allowed but one perſon in the Godhead, and maintained that the Father, the creator of all things, had united himſelf to the human nature of Chriſt; whence they were called *Monarchians*; and they alſo taught that the Father was crucified: on this account they were denominated *Patripaſſians*.

MONARCHY, *μοναρχια*, a large ſtate governed by one: or a ſtate where the ſupreme power is lodged in the hands of a ſingle perſon.

The word comes from the Greek *μοναρχης*, *one who governs alone*; formed of *μονος*, *ſolus*, and *αρχη*, *imperium*, *government*.

Of the three forms of government, viz. DEMOCRACY, ARISTOCRACY, and *monarchy*, the laſt is the moſt powerful, all the ſinews of government being knit together, and united in the hand of the prince; but then there is imminent danger of his employing that ſtrength to improvident or oppreſſive purpoſes. As a democracy is the beſt calculated to direct the end of a law, and an ariſtocracy to invent the means by which that end ſhall be obtained, a *monarchy* is moſt fit for carrying thoſe means into execution.

The moſt ancient *monarchy* was that of the Aſſyrians, which was founded ſoon after the deluge. We uſually reckon four grand or univerſal *monarchies*: the Aſſyrian, Perſian, Grecian, and Roman: though St. Auguſtine, makes them but two, viz. thoſe of Babylon and Rome. Belus is placed at the head of the ſeries of Aſſyrian kings who reigned at Babylon, and is by profane authors eſteemed the founder of it, and by ſome the ſame whom the ſcriptures call Nimrod. The principal Aſſyrian kings after Belus were Ninus, who built Nineveh, and removed the ſeat of empire to it; Semiramis, who, diſguiſing her ſex, took poſſeſſion of the kingdom inſtead of her ſon, and was killed and ſucceeded by her ſon Ninyas; and Sardanapalus, the laſt of the Aſſyrian monarchs, and more effeminate than a woman. After his death, the Aſſyrian empire was ſplit into three ſeparate kingdoms; viz. the Median, Aſſyrian, and Babylonian. The firſt king of the Median kingdom was Arbaces; and this kingdom laſted till the time of Aſtyages, who was ſubdued and diveſted of his kingdom by Cyrus. In the time of Cyrus there aroſe a new and ſecond *monarchy*, called the Perſian; which ſtood upwards of two hundred years, from Cyrus, whoſe reign began A. M. 3468, to Darius Codomannus, who was conquered by Alexander, and the empire tranſlated to the Greeks A. M. 3674. The firſt monarch was Cyrus, founder of the empire; the ſecond Cambyſes, the ſon of Cyrus. 3. Smerdis. 4. Darius, the ſon of Hyſtaſpis, who reigned 521 years before Chriſt. 5. Xerxes, who reigned 485 years before Chriſt. 6. Artaxerxes Longimanus, who reigned 464 years before Chriſt. 7. Xerxes the ſecond. 8. Ochus, or Darius, called Nothus, 424 years before Chriſt. 9. Artaxerxes Mnemon, 405 years before Chriſt. 10. Artaxerxes Ochus, 359 years before Chriſt. 11. Arſes, 338 years before Chriſt. 12. Darius Codomannus, 336 years before Chriſt, who was defeated by Alexander the Great, and deprived of his kingdom and life about 331 years before Chriſt: the dominion of Perſia after his death was tranſlated to the Greeks. The third *monarchy*, was the Grecian. As Alexander when he died did not declare who ſhould ſucceed him, there ſtarted up as many kings as there were commanders. At firſt they governed the provinces, that were divided among them, under the title of viceroys; but when the family of Alexander the Great was extinct, they took upon them the name of kings. Hence, in proceſs of time, the whole empire of Alexander produced four diſtinct kingdoms; viz. 1. The Macedonian, the kings of which, after Alexander, were Antipater, Caſſander, Demetrius Poliorcetes, Seleucus Nicanor, Meleager, Antigonus Doſon, Philip, and Perſeus, under whom the Macedonian kingdom was reduced to the form of a Roman province. 2. The Aſiatic kingdom, which upon the death of Alexander, fell to Antigonus, comprehending thar country now called Natolia, together with ſome other regions, beyond Mount Taurus. From this kingdom proceeded three leſſer ones; viz. that of Pergamus, whoſe laſt king, Attalus, appointed the Roman people to be his heir; Pontus, reduced by the Romans into the form of a province, when they had ſubdued the laſt king, Mithridates. 3. The Syrian, of whoſe twenty-two kings the moſt celebrated were Seleucus Nicanor, founder of the kingdom, Antiochus Deus, Antiochus the Great, Antiochus Epiphanes, and Tigranes, who was conquered by the Romans under Pompey; and Syria was reduced into the form of a Roman province. 4. The Egyptian, which was formed by the Greeks in Egypt, and flouriſhed near two hundred and forty years under twelve kings; the principal of whom were Ptolemy Lagus, its founder; Ptolemy Philadelphus, founder of the ALEXANDRIAN *library*; and queen Cleopatra, who was overcome by Auguſtus; in conſequence of which Egypt was added to the dominion of the Romans. The fourth *monarchy* was the Roman, which laſted two hundred and forty-four years, from the building of the city, until the time when the royal power was abrogated. The kings of Rome were Romulus its founder, Numa Pompilius, Tullus Hoſtilius, Ancus Martius, Tarquinius Priſcus, Servius Tullius, and Tarquin the Proud, who was baniſhed, and with whom terminated the regal power. Holberg's Introd. to Univ. Hiſt. by Dr. Sharp, p. 85, &c.

There ſeems, in reality, no neceſſity to make the Medes, Perſians, and Greeks, ſucceed to the whole power of the Aſſyrians, to multiply the number of the *monarchies*: it was the ſame empire ſtill, and the ſeveral changes that happened in it, did not conſtitute different *monarchies.* Thus the Roman empire was ſucceſſively governed by princes of different nations, yet without any new *monarchy* being formed thereby. Rome, therefore, may be ſaid to have immediately ſucceeded Babylon in the empire of the world. See EMPIRE.

Of *monarchies*, ſome are abſolute and *deſpotic*, where the will of the monarch is uncontrolable; as Denmark, &c. others are *limited*, where the prince's authority is reſtrained by laws, and part of the ſupreme power lodged in other hands; as in England. See GOVERNMENT.

Some *monarchies*, again, are *hereditary*, where the ſucceſſion devolves immediately from father to ſon; and others are *elective*, where on the death of the monarch, his ſucceſſor is appointed by election; as in Poland.

According to Hobbes, *monarchy*, as well as ariſtocracy, derives all its authority from the people, who transfer all their right, v. gr. the ſupreme power, by a plurality of ſuffrages, &c. to ſome one perſon called a *monarch*; ſo that whatever the people could have done before this tranſlation, may be now rightfully done by him to whom the tranſlation is made. This done, the people are no longer to be looked upon as a body, but a diſſolved multitude; becauſe they were only one by virtue of the ſupreme power, which they have now transferred to another.

Nor can the *monarch*, according to this author, oblige himſelf by any covenants, to any perſon, for the authority he has received; becauſe he receives the power from the people, which, as ſoon as that is done, ceaſes to be a body; and the body ceaſing, the obligation to the body ceaſes of courſe. The people, therefore, are obliged to pay obedience to the *monarch*, by virtue of thoſe covenants, whereby they mutually oblige themſelves to what the people, as a body, enjoin to be done.

He argues, farther, that as a *monarch* cannot be obliged by any covenants; ſo neither can he do any injury to his ſubjects; an injury being nothing elſe but a breach of covenant: and where there is no covenant, there can be no breach of one. De Cive, c. 8. See HOBBISM.

Fifth-MONARCHY *men*, in the *Eccleſiaſtical Hiſtory of England*, were a ſet of wrong-headed and turbulent enthuſiaſts who roſe in the time of Cromwell, and who expected Chriſt's ſudden appearance upon earth to eſtabliſh a new kingdom: and, acting in conſequence of this illuſion, aimed at the ſubverſion of all human government. Burnet's Hiſt. of his Own Times, vol. i. p. 67.

MONARDA, *Oſwego-tea* and *American field-baſil*, in *Botany*, a genus of the *diandria monogynia* claſs. Its characters are theſe: the flower has a cylindrical empalement of one leaf, cut into five equal parts at the brim; the flower has one petal, which is of the lip kind, and divided at the top into two lips; the upper lip is narrow, entire, and erect; the under lip broad, trifid, and reflexed; it has two briſtly ſtamina, the length of the upper lip; in the bottom of the tube is ſituated a four-pointed germen, ſupporting a ſlender ſtyle, involved with the ſtamina, and crowned by an acute bifid ſtigma; the germen turns to four naked ſeeds, encloſed in the empalement. Linnæus enumerates five, and Miller three ſpecies, natives of North America.

MONASTERII *proviſor*. See PROVISOR.

MONASTERY, a convent, or houſe built for the reception of religious; whether it be ABBEY, PRIORY, NUNNERY, or the like.

MONASTERY is only properly applied to the houſes of monks, mendicant friars, and nuns. The reſt are more properly called *religious houſes*.

For the origin of *monaſteries*, ſee MONASTIC and MONK.

The houſes belonging to the ſeveral religious orders, which obtained in England and Wales, were cathedrals, colleges, abbies, priories, preceptories, commandries, hoſpitals, frieries, hermitages, chantries, and free chapels. Theſe were under the direction and management of various officers. The diſſolution of houſes of this kind began ſo early as the year 1312, when the TEMPLARS were ſuppreſſed; and in 1323, their lands, churches, advowſons, and liberties, here in England, were given, by 17 Ed. II. ſtat. 3. to the prior and brethren of the hoſpital of St. John at Jeruſalem. In the years 1390, 1437, 1441, 1459, 1497, 1505, 1508, and 1515, ſeveral other houſes were diſſolved, and their revenues ſettled on different colleges in Oxford and Cambridge. Soon after the laſt period, cardinal Wolſey, by licence of the king and pope, obtained a diſſolution of above thirty religious houſes, for the founding and endowing his colleges at Oxford and Ipſwich. About the ſame time a bull was granted by the ſame pope to cardinal Wolſey, to ſuppreſs *monaſteries*, where there were not above ſix monks, to the value of eight thouſand ducats a year, for endowing Windſor, and King's College in Cambridge; and two other bulls were granted to cardinals Wolſey and Campeius where there were leſs than twelve monks, and to annex them to the greater *monaſteries*; and another bull to the ſame cardinals to enquire about abbies, to be ſuppreſſed, in order to be made cathedrals. Although nothing appears to have been done in conſequence of theſe bulls, the motive which induced Wolſey, and many others to ſuppreſs theſe houſes, was the deſire of promoting learning; and archbiſhop Cranmer engaged in it with a view of carrying on the Reformation. There were other cauſes that concurred to bring on their ruin: many of the religious were looſe and vicious: the monks were generally thought to be, in their hearts, attached to the pope's ſupremacy; their revenues were not employed according to the intent of the donors; many cheats in images, feigned miracles, and counterfeit relics, had been diſcovered, which brought the monks into diſgrace; the Obſervant friars had oppoſed the king's divorce from queen Catharine; and theſe circumſtances operated, in concurrence with the king's wanting a ſupply, and the people's deſire to ſave their money, to forward a motion in parliament, that in order to ſupport the king's ſtate, and ſupply his wants, all the religious houſes might be conferred upon the crown, which were not able to ſpend above 200*l.* a year; and an act was paſſed for that purpoſe, 27 Hen. VIII. c. 28. By this act about three hundred and eighty houſes were diſſolved, and a revenue of 30 or 32,000*l.* a year came to the crown; beſides about 100,000*l.* in plate and jewels. The ſuppreſſion of theſe houſes occaſioned diſcontent, and at length an open rebellion: when this was appeaſed, the king reſolved to ſuppreſs the reſt of the *monaſteries*, and appointed a new viſitation; which cauſed the greater abbies to be ſurrendered apace; and it was enacted by 31 Hen. VIII. c. 13. that all *monaſteries*, &c. which have been ſurrendered ſince the fourth of February, in the twenty-ſeventh year of his majeſty's reign, and which hereafter ſhall be ſurrendered, ſhall be veſted in the king. The knights of St. John of Jeruſalem were alſo ſuppreſſed by the 32 Hen. VIII. c. 24. The ſuppreſſion of theſe greater houſes by theſe two acts, produced a revenue to the king of above 100,000*l.* a year, beſides a large ſum in plate and jewels. The laſt act of diſſolution in this king's reign was the act of 37 Hen. VIII. c. 4. for diſſolving colleges, free chapels, chantries, &c. which act was farther enforced by 1 Ed. VI. c. 14. By this act were ſuppreſſed ninety colleges, a hundred and ten hoſpitals, two thouſand three hundred and ſeventy-four chanteries and free chapels. The number of houſes and places ſuppreſſed from firſt to laſt, ſo far as any calculations appear to have been made, ſeems to be as follows:

Of leſſer *monaſteries*, of which we have the valuation - - -	374
Of greater *monaſteries* - - -	186
Belonging to the Hoſpitallers - - -	48
Colleges - - - - -	90
Hoſpitals - - - - -	110
Chantries and free chapels - - -	2374
Total	3182

Beſides the friars houſes, and thoſe ſuppreſſed by Wolſey, and many ſmall houſes, of which we have no particular account.

The ſum total of the clear yearly revenue of the ſeveral houſes at the time of their diſſolution, of which we have any account, ſeems to be as follows:

	£.	s.	d.
Of the greater *monaſteries* -	104919	13	3½
Of all thoſe of the leſſer *monaſteries*, of which we have the valuation	29702	1	10½
Knights Hoſpitallers head houſe in London - -	2385	12	8
We have the valuation of only 28 of their houſes in the country	3026	9	5
Friars houſes, of which we have the valuation	751	2	0¼
Total	140784	19	3¼

If proper allowances are made for the leſſer *monaſteries*, and houſes not included in this eſtimate, and for the plate, &c. which came into the hands of the king by the diſſolution, and for the value of money at that time, which was at leaſt ſix times as much as at preſent; and we alſo conſider that the eſtimate of the lands was generally ſuppoſed to be much under the real worth, we muſt conclude their whole revenues to have been immenſe.

It doth not appear that any computation hath been made of the number of perſons contained in the religious houſes.

Thoſe of the leſſer *monaſteries* diſſolved by 27 Hen. VIII. were reckoned at at about	10000
If we ſuppoſe the colleges and hoſpitals to have contained a proportionable number, theſe will make about	5347
If we reckon the number in the greater *monaſteries*, according to the proportion of their revenues, they will be about 35000; but as probably they had larger allowances in proportion to their number than thoſe of the leſſer *monaſteries*, if we abate upon that account 5000, they will then be	30000
One for each chantry and free chapel -	2374
Total	47721

But as there were probably more than one perſon to officiate in ſeveral of the free chapels, and there were other houſes which are not included within this calculation, perhaps they may be computed in one general eſtimate at about 50,000. As there were penſions paid to almoſt all thoſe of the greater *monaſteries*, the king did not immediately come into the full enjoyment of the whole revenues: however by means of what he did receive, he founded ſix new biſhoprics, viz. thoſe of Weſtminſter (which was changed by Queen Elizabeth into a deanry, with twelve prebends and a ſchool), Peterborough, Cheſter, Glouceſter, Briſtol, and Oxford. And in eight other ſees he founded deanries and chapters, by converting the priors and monks into deans and prebandaries, viz. Canterbury, Wincheſter, Durham, Worceſter, Rocheſter, Norwich, Ely, and Carliſle. He founded alſo the colleges of Chriſt-church in Oxford, and Trinity in Cambridge, and finiſhed King's college there. He likewiſe founded profeſſorſhips of divinity, law, phyſic, and of the Hebrew and Greek tongues, in both the ſaid univerſities. He gave the houſe of Grey Friars, and St. Bartholomew's hoſpital to the city of London; and a perpetual penſion to the poor knights of Windſor, and laid out great ſums in building and fortifying many ports in the channel. It is obſervable, upon the whole, that the diſſolution of their houſes was an act, not of the church, but of the ſtate; in the period preceding the Reformation, by a king and parliament of the Roman catholic communion, in all points except the king's ſupremacy; to which the pope himſelf, by his bulls and licenſes, had led the way. See Tanner's Notitia Monaſtica; and for an abſtract, Burn's Eccl. Law, art. *Monaſteries*.

MONASTIC, ſomething belonging to monks, or the monkiſh life.

The *monaſtic* profeſſion is a kind of civil death, which in all worldly matters has the ſame effect with the natural death.

The council of Trent, &c. fix ſixteen years for the age at which a perſon may be admitted into the *monaſtical* ſtate.

St. Anthony is the perſon who, in the fourth century, firſt inſtituted the *monaſtic* life; as St. Pachomius, in the ſame century, is ſaid to have firſt ſet on foot the cœnobitic life, i. e. regular communities of religious.

In a ſhort time the deſerts of Egypt became inhabited with a ſet of ſolitaries, who took upon them the *monaſtic* profeſſion. See Anachoret, Hermit, &c. St. Baſil carried the monkiſh humour into the Eaſt, where he compoſed a rule which afterwards obtained through a great part of the Weſt.

In the eleventh century, the *monaſtic* diſcipline was grown very remiſs. St. Odo firſt began to retrieve it in the monaſtry of Cluny: that monaſtery, by the conditions of its erection, was put under the immediate protection of the holy ſee, with a prohibition to all powers, both ſecular and eccleſiaſtical, to diſturb the monks in the poſſeſſion of their effects, or the election of their abbot. In virtue hereof, they pleaded an exemption from the juriſdiction of the biſhop, and extended this privilege to all the houſes dependent on Cluny. This made the firſt congregation of ſeveral houſes under one chief immediately ſubject to the pope, ſo as to conſtitute one body, or, as they now call it, one *religious order*. Till then, each monaſtery was independent, and ſubject to the biſhop. See Monk.

MONBIN, in *Botany*. See *Jamaica* Plum.

MOND. See Mound.

MONDAY, *plough*. See Plough.

MONEDULA, in *Ornithology*. See Jackdaw.

MONEMERION, μονημεριον, among the ancient Romans, a ſhew, according to ſome, wherein none but tame beaſts were expoſed to view.

Others will have it to be a ſhew of one day's continuance.

MONETÆ *pes*. See Pes.

MONETAGIUM, Monetage, or Mintage, the right or privilege of coining money.

MONETALES *triumviri*. See Triumviri.

MONETARIUS, or Moneyer, a name which antiquaries, and medaliſts give to thoſe who ſtruck the ancient coins or monies.

Many of the old Roman, &c. coins have the name of the *monetarius*, either written at length, or at leaſt the initial letters of it. See Medal.

MONEY, or Mony, *moneta*, a piece of metal marked for coin, with the arms of a prince, or ſtate, who make it circulate or paſs, at a fixed rate, for things of different value; to facilitate the buſineſs of commerce.

Paulus the lawyer defines *money*, a thing ſtamped with a public coin, and deriving its uſe and value from its impreſſion, rather than its ſubſtance.

Monſ. Boizard defines *money*, a piece of matter to which public authority has affixed a certain value and weight; to ſerve as a medium in commerce.

Or, *money* may be defined an univerſal medium, or common ſtandard, by compariſon with which the value of all merchandize may be aſcertained; or, it is a ſign, which repreſents the reſpective value of all commodities. Metals are well calculated for this ſign, becauſe they are durable, and are capable of many ſubdiviſions; and a precious metal is ſtill better calculated for this purpoſe, becauſe it is the moſt portable. A metal is alſo the moſt proper for a common meaſure, becauſe it can eaſily be reduced to the ſame ſtandard in all nations; and every particular nation fixes on it its own impreſſion, that the weight and ſtandard, wherein conſiſts the intrinſic value, may both be known by inſpection only. And as *money* is the medium of commerce, it is the king's prerogative, as the arbiter of domeſtic commerce, to give it authority, or make it current. It is evident, that, as the quantity of precious metals increaſes, i. e. the more of them there is extracted from the mine, this univerſal medium, or common ſign, will ſink in value, and become leſs precious. Above a thouſand millions of bullion are calculated to have been imported into Europe from America within leſs than three centuries; and the quantity is daily increaſing, the conſequence is, that more *money* muſt be given now for the ſame commodity than was given a hundred years ago. And if any accident was to diminiſh the quantity of gold and ſilver, their value would proportionably riſe.

The æra of the invention of *money* is not eaſy to be ſettled. There is no room to doubt, but that, in the earlieſt ages, the ordinary way of traffic among men was, by trucking, or exchanging commodity for commodity. Thus, in Homer, Glaucus's golden armour was valued at one hundred oxen; and Diomedes's armour at ten.

But in courſe of time it was found neceſſary, in the way of commutative juſtice, to have ſome common meaſure, or ſtandard, according to which all other things ſhould be eſtimated. This, as ſome gather from Joſephus, was firſt invented by Cain; though the firſt tidings we hear of it are, in the time of Abraham, who paid four hundred ſhekels for a burying place.

The Greeks refer the invention of *money* to Hermodice, wife of king Midas; and the Latins to Janus. *Money* being a common meaſure for reducing wares to a balance, it was called, by the Greeks, *nomiſma*; not from king Numa, but from *nomos*, as being eſtabliſhed by law, by the Latins it was called *pecunia*; either becauſe the wealth of thoſe days conſiſted in their cattle; or, as Pliny will have it, becauſe their firſt coin was ſtamped with the figure of a cow: they alſo call it *moneta*, *a monendo*, as Suidas obſerves; becauſe, when the Romans were in want of *money*, Juno admoniſhed them to uſe juſtice, and there ſhould be no want of *money*: the effect whereof when they had found, ſhe was ſurnamed *Juno Moneta*, and *money* was coined in her temple. In proceſs of time, *Money* herſelf was made a goddeſs, aed inſhrined by the name of *Dea Pecunia*, under the figure of a woman holding a ballance in one hand, and a cornucopia in the other. On the foot *money* now ſtands, it may be divided into *real*, or *effective* and *imaginary*.

Money, *real*, includes all coins, or ſpecies, of gold, ſilver, copper, and the like; which have courſe in commerce, and do really exiſt. Such are *guineas*, *crowns*, *piſtoles*, *pieces of eight*, *ducats*, &c. which ſee under their proper heads: as alſo under Coin.

Real money, civilians obſerve, has three eſſential qualities; viz. *matter*, *form*, and *weight*, or *value*. For *matter*, copper is that thought to have been firſt coined; afterwards, ſilver; and, laſtly, gold, as being the moſt beautiful, ſcarce, cleanly, diviſible, and pure of all metals.

The degrees of goodneſs are expreſſed in gold for carats, and in ſilver by penny-weights, &c. for there are ſeveral reaſons for not coining them pure, and without alloy. See Coinage.

Among the ancient Britons, iron rings, or, as ſome ſay, iron plates, or tin plates and rings, were uſed for *money*. Among the Lacedæmonians, iron bars, quenched with vinegar, intended that they might not ſerve for any other uſe. Seneca obſerves, that there was anciently ſtamped *money* of leather, *coriam forma publica impreſſum*; and the ſame thing was put in practice by Frederic II. at the ſiege of Milan; to ſay nothing of an old tradition among ourſelves, that, in the confuſed time of the barons wars, the like was done in England. In 1360, king John of France, who agreed to pay our Edward III. for the ranſom of his perſon three millions of gold crowns, was reduced to the neceſſity of paying for the neceſſaries of his houſhold in leather *money*, in the middle whereof there was a little nail of ſilver. The Hollanders, we know, coined great quantities of paſteboard in the year 1574. Numa Pompilius made *money* of wood and leather; nor does it appear, that the Romans were much acquainted with the art of ſtriking *money* in metal, during the time of their kings. There is reaſon to believe, that both gold and ſilver *money* were very early in uſe in Egypt and Aſia, and thence ſoon afterwards, introduced into Carthage and Greece. From Greece it was brought to Rome, and thence gradually weſtward into all the Roman provinces. The firſt ſilver *money* coined by the Romans was in the year of Rome 484, and their firſt gold *money* in 546.

With regard to the materials of Engliſh *money*, ſir Edward Coke lays it down, that the *money* of England muſt either be of gold or ſilver: and none other was ever iſſued by the royal authority till 1672, when copper farthings and halſpence were coined by king Charles the ſecond, and ordered by proclamation to be current in all payments, under the value of ſix pence, and not otherwiſe. But this copper coin is not upon the ſame footing with the other in many reſpects, particularly with regard to the offence of counterfeiting it.

As to the *form of money*, it has been more various than the matter. Under this are comprehended the weight, figure, impreſſion, and value.

For the *impreſſion*, the Jews, though they deteſted images, yet ſtamped on the one ſide of their ſhekel, the golden pot which had the manna: and on the other, Aaron's rod; the Dardans, two cocks fighting; Alexander, as is held by ſome, his horſe Bucephalus: though this may be doubted of, becauſe the horſe is found as frequently on the coins of ſeveral of the kings of Macedon, his predeceſſors, as his. The Athenians ſtamped their coins with an owl, or an ox; whence the proverb on bribed lawyers, *bos in lingua*; the people of Ægina with a tortoiſe; whence that other ſaying, *Virtutem & ſapientiam vincunt teſtudines*. For the Romans, the monetarii ſometimes impreſſed the images of men that had been eminent in their families, on their coins; but no living man's head was ever ſtamped on the Roman coin till after the fall of the commonwealth; after that time they bore the emperor's head on one ſide; and, from this time, the practice of ſtamping the prince's image on coins has obtained among all civilized nations, the Turks and other Mahometans excepted; who, in deteſtation of images, inſcribe only the prince's name, with the year of the tranſmigration of their prophet.

As to the impreſſion of Britiſh *money*, the ſtamping thereof is the unqueſtionable prerogative of the crown; for though divers biſhops and monaſteries had formerly the privilege of coining *money*, yet, as ſir Matthew Hale obſerves, this was uſually done by ſpecial grant from the king, or by preſcription, which ſuppoſes one; and therefore, was derived from, and not in derogation of, the royal prerogative. Beſides, they had only the profit of the coinage, and not the power of inſtituting either the impreſſion or denomination; but had uſually the ſtamp ſent them from the exchequer. The denomination, or the value for which the coin is to paſs current, is likewiſe in the breaſt of the king; and if any unuſual pieces are coined, that value muſt be aſcertained by proclamation. In order to fix the value, the weight and the fineneſs of the metal are to be taken into conſideration together. When a given weight of gold or ſilver is of a given fineneſs, it is then of the true ſtandard, and called ſterling metal; and of this ſterling metal all the coin of the kingdom muſt be made, by 25 Edw. III. c. 13. ſo that the king's prerogative ſeems not to extend to the debaſing or enhancing the value of the coin, below or above the ſterling value; though ſir Matthew Hale appears to be of another opinion. The king may alſo by his proclamation, legitimate foreign coin, and make it current here; declaring at what value it ſhall be taken in payments. But this, judge Blackſtone apprehends, ought to be by compariſon with the ſtandard of our own coin; otherwiſe the conſent of parliament will be neceſſary.

There is now no legitimated *money*. The king may alſo at any time decry, or cry down any coin of the kingdom and make it no longer current.

As to the *figure of money*, it is either round, as in England; multangular, or irregular, as in Spain; ſquare, as in ſome parts of the Indies; or nearly globular, as in moſt of the reſt.

After the arrival of the Romans in this iſland, the Britons imitated them, coining both gold and ſilver with the images of their kings ſtamped on them; when the Romans had ſubdued the kings of the Britons, they alſo ſuppreſſed their coins, and brought in their own, which were current here from the time of Claudius to that of Valentinian the younger; this being about the ſpace of five hundred years.

Mr. Camden obſerves that the moſt ancient Engliſh coin he had known, was that of Ethelbert, king of Kent, the firſt Chriſtian king in the iſland; in whoſe time all *money* accounts began to paſs by the names of *pounds*, *ſhillings*, *pence*, and *mancuſes*.

The penny ſeems borrowed from the Latin *pecunia*, or rather from *pendo*, on account of its juſt weight, which till king Edward the Third's reign contained as much ſilver as about three pence of our *money*: theſe were coarſely ſtamped with the king's image on the one ſide, and either the mint maſter's name, or the city's where it was coined, on the other: five of theſe pence made their ſcilling, probably ſo called from *ſcilingus*, which the Romans uſed for the fourth part of an ounce; forty of theſe ſcillings made their pound, and four hundred of theſe pounds were a legacy, or a portion for a king's daughter; as appears by the laſt will of king Alfred.

By theſe names they tranſlated all ſums of *money* in their old Engliſh teſtament; talents by *pundes*; Judas's thirty pieces of ſilver by *thirtig ſcillinga*; tribute-*money*, by *penining*; and the mite by *feorthling*.

But, it muſt be obſerved they had no other real *money*, but pence only; the reſt being imaginary *monies*, i. e. names of numbers, or weights: thirty of theſe pence made a mancus, which ſome take to be the ſame with a mark; manca, as appears by an old MS. was *quinta pars unciæ*. Theſe mancas, or mancuſes, were reckoned both in gold and ſilver; for in the year 680, we read, that Ina, king of the Weſt Saxons, obliged the Kentiſh men to buy their peace at the price of thirty thouſand mancas of gold. In the notes on king Canute's laws, we find this diſtinction, that *mancuſa* was as much as a mark of ſilver; and *manca*, a ſquare piece of gold, valued at thirty pence. See MANCUS.

The Danes introduced a way of reckoning *money* by ores, *per oras*, mentioned in Domeſday book; but whether they were a diſtinct coin, or a certain ſum, does not plainly appear: this, however, may be gathered from the abbey-book of Burton, that twenty ores were equivalent to two marks.

They had alſo a gold coin called *byzantine*, or *bezant*, as being coined at Conſtantinople, then called *Byzantium*; the value of which coin is not only now loſt, but was ſo entirely forgotten, even in the time of king Edward III. that, whereas the biſhop of Norwich was fined a byzantine of gold, to be paid the abbot of St. Edmunſbury, for infringing his liberty (as it had been enacted by parliament in the time of the Conqueror), no man, then living, could tell how much it was; ſo that it was referred to the king to rate how much he ſhould pay; which is the more unaccountable, becauſe, but a hundred years before, two hundred thouſand bezants were exacted by the ſoldan, for the ranſom of St. Lewis of France; which were then valued at one hundred thouſand livres.

Though the coining of *money* be a ſpecial prerogative of the king, yet the ancient Saxon princes communicated it to their ſubjects; inſomuch, that in every good town there was, at leaſt, one mint, but at London eight; at Canterbury four for the king, two for the archbiſhop, one for the abbot at Wincheſter, ſix at Rocheſter, at Haſtings two, &c.

The Norman kings continued the ſame cuſtom of coining only pence, with the prince's image on one ſide, and on the other the name of the city where it was coined, with a croſs ſo deeply impreſſed that it might be eaſily parted, and broken into two halves, which, ſo broken, they call half-pence; or into four parts, which they called *furthings*, or FARTHINGS.

In the time of king John, *money*, coined in the eaſt parts of Germany, came in ſpecial requeſt in England, on account of its purity, and was called *eaſterling money*, as all the inhabitants of thoſe parts were called *Eaſterlings*; and, ſhortly after, ſome of thoſe people, ſkilled in coining, were ſent for hither, to bring the coin to perfection; which, ever ſince, has been called STERLING, from *eaſterling*.

King Edward I. who firſt adjuſted the meaſure of an ell by the length of his arm, herein imitating Charles the

Great, was the firſt, alſo, who eſtabliſhed a certain ſtandard for the coin, which is expreſſed to this effect by Greg. Rockley, mayor of London, and mint-maſter. "A pound "of *money* containeth twelve ounces: in a pound there "ought to be eleven ounces, two eaſterlings, and one "farthing; the reſt alloy: the ſaid pound ought to weigh "twenty ſhillings and three pence in acccount and weight; "the ounce ought to weigh twenty pence, and a penny "twenty-four grains and a half. Note, that eleven "ounces two pence ſterling ought to be of pure ſilver, "called *leaf-ſilver*; and the minter muſt add, of other "weight, ſeventeen pence halfpenny farthing, if the "ſilver be ſo pure."

About the year 1320, the ſtates of Europe firſt began to coin gold; and, among the reſt, our king Edward III. The firſt pieces he coined were called *Florences*, as being coined by Florentines; afterwards he coined nobles; then roſe-nobles, current at ſix ſhillings and eight pence; half-nobles, called *halfpennies*, at three ſhillings and four pence of gold; and quarters at twenty pence, called *farthings of gold*. The ſucceeding kings coined roſe-nobles, and double roſe-nobles, great ſovereigns, and half Henry nobles, angels, and ſhillings.

King James I. coined units, double crowns, Britain crowns; then crowns, half-crowns, &c.

TABLES of GOLD and SILVER, compoſed from the authority of Mr. Lowndes, who inſpected the original indentures, and from biſhop Fleetwood.

	Gold Table.								Silver Table.					
Reigns.	Specie.	Diviſion.		Tale.			Stand. fine.		Specie.	Tale.		Stand. fine.		Propor.
		s.	d.	l.	s.	d.	Car.	Gr.	d.	s.	d.	oz.	dwt.	100
28 Edw. I.										XX	III	II.	2	13 83
18 Edw. III.	Florins -	VI	-	15	00	0	23	3½	- - -	-	-	-	-	
Eodem ann.	Nobles -	VI	VIII	13	3	4	Ditto	-	- - -	-	-	-	-	
20 - -	Ditto -	Ditto	-	14	0	0	Ditto	-	- - -	XXII	VI	Ditto	-	
27 - -	Ditto -	Ditto	-	15	0	0	Ditto	-	IV II I	XXV	-	Ditto	-	
30, 37, 46 18 Ric II 3 H. IV.	Ditto -	Ditto	-	Ditto	-		Ditto	-	Ditto -	Ditto	-	Ditto	-	
9 Hen. V.	Ditto -	Ditto	-	16	13	4	Ditto	-	IV II I ½ ¼	XXX	-	Ditto	-	
1 Hen VI.	Royals - Angels -	X VI	- VIII	22	10	0	Ditto	-	Ditto -	XXXVII	VI	Ditto	-	
4 - -	Nobles -	VI	VIII	16	13	4	Ditto	-	Ditto -	XXX	-	Ditto	-	
24 - -	Ditto -	Ditto	-	Ditto	-		Ditto	-	Ditto -	Ditto	-	Ditto	-	
39 - -	Angels -	VI	VIII	22	10	0	Ditto	-	Ditto -	XXXVII	VI	Ditto	-	11 5
4 Edw. IV.	- -	-	-	20	16	0	Ditto	-	Ditto -	Ditto	-	Ditto	-	
5	Nobles -	X												
	Angels -	VI	VIII	22	10	0	Ditto	-	Ditto -	Ditto	-	Ditto	-	
8, 11, 16, 22 - - 1 Ric. III. 9 H. VII.	- -	-	-	-	-	-	-	-	- - -	-	-	Ditto	-	
1 Hen. VIII.	Sovereigns Royals - Angels - Nobles -	XXII XI VII VI	VI III VI VIII	27	00	0	Ditto	-	Ditto -	XXXV	-	Ditto	-	11 17
				Gold ſtand. lowered.										
	Crowns - ½ Ditto -	V II	- VI	25	2	6	22	0	Ditto -	-	-	Ditto	-	
										Silver ſtand.		lowered.		
34 - -	Sovereigns Angels -	XX VIII	- -	28	16	0	23	0	XII VI III ½ ¼	XLVIII	-	10	0	A ſtate of confuſion
36 - -	Crowns -	V	-	30	00	0	22	0	Ditto	Ditto	-	6	0	
37 - -	- -	-	-	30	00	0	20	0	Ditto	Ditto	-	4	0	
1 Edw. VI.	Ditto -	Ditto	-	Ditto	-		Ditto	-		Ditto	-	Ditto		
3 - -	Ditto -	Ditto	-	34	00	0	22	0	XII -	LXXII	-	6	0	
4 - -	Sovereigns Angels -	XXIV VIII	- -	28	16	0	23	3½	- - -	-	-	Ditto		
5 - -	- -	-	-	-	-	-	-	-	Ditto -	Ditto	-	3	0	
6 - -	Sovereigns Angels -	XXX X	- -	36	00	0	23	3	s. s. d. V 2 6 d. XII VI III 1½ ¼d.	LX	-	II	I	
	Sovereigns Crowns -	XX V	- -	33	00	0	22	0						
1 Mary -	- -	-	-	36	00	0	23	3½	- - -	LX	-	II	0	
2 Eliz. -	Sovereigns Royals - Angels -	XXX XV X	- - -	36	00	0	23	3½	VI IV III II ½ I ¼	Old ſtand LX	-	II	2	11 16
	Sovereigns Crowns -	XX V	- -	33	00		22	0	- - -					
19 Eliz. -	Angels -	X	-	36	00	0	23	3½	Ditto -	LX	-	II	2	
26 - -	Nobles -	XV	-	36	00	0	23	3½	- - -	-	-	-	-	
35 - -	Sovereigns Crowns -	XX V	- -	33	00	0	22	0	- - -	-	-	-	-	
43 - -	Angels -	X	-	36	10	0	23	3½	s. s. d. d. V 2 6 XII d. VI II I ½	LXII	-	II	2	
	Sovereigns Crowns -	XX V	- -	33	10	0	22	0						
2 Jac I.	Unites - Dub. crow. Britiſh crow. Thiſtl. crow	XX X V IV	- - - -	37	4	0	22	0	Ditto -	Ditto	-	II	2	
3 - -	Royals - Angels -	XXX X	- -	40	10	0	23	3½	- - -	-	-	-	-	
10 - -	Ditto -	Ditto	-	44	00	0	Ditto		- - -	-	-	-	-	
	Unites - Doub. Carolus's, &c	XXII XI	- -	40	18	4	22	0	- - -	-	-	-	-	

	Gold Table.				Silver Table.			
Reigns.	Specie.	Division. s. d.	Tale. l. s d.	Stand. fine. Car. Gr.	Specie. d.	Tale. s. d.	Stand. fine. Oz. dwt.	Propor. 100
2 Car. I.	Roſe Royals	xxx						
	Spur Royals	xv	44 10 0	23 3½	s. s. d. d.			
	Angels	x -			v 2 6 xii			
	Unites	xx			d.	LXII	11 2	
	Dub. crow.	x	40 00 0	22 0	vi ii 1½			
	Britiſh crow.	v			- - -			
12 Car. II.	- - -	- - -	The ſame of both kinds and value, gold and ſilver.					
22 - -	Guineas	xx -	44 10 0	22 0	Ditto -	LXII -	11 2	14 54
	½ Guineas	x						
	2 Guineas	xl	- - -	- - -	- - -	- - -	- - -	
	5 Guineas	c						
1 Jac. II.	Ditto -	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	
1 W. & M. Queen Anne George I. George II.	I do not find any alteration in the ſtandard of the gold or ſilver down to the preſent time. 22 Carats fine and 2 alloy is the ℔ of gold, and 11 oz. 2 dwt. fine, and 18 dwt. alloy, the ſtandard ℔ of ſilver; and the diviſion of the pound of gold continues the ſame; that is to ſay, into 44 guineas ½, and the ſilver into the uſual number of crowns, &c. But the guineas have varied in the nominal value ſeveral times, riſing up to xxxs. and declining to xxi, the preſent current value; but never have been reduced again to their intended level of xxs. nor indeed ought, when compared with the Portugal pieces of 3l. 12s. 1l. 16s. it appears to be better worth xxi s.							15 21

			To the lb. Troy.	
Portugal —	£3 12	—	13	£46 16 0
Engliſh guineas	1 1	—	44½	46 14 6
				00 1 6
And the Portugueſe ſtandard worſe ¼ grain				00 2 6
Total worſe ℔ Troy by ſtandard and tale				— 00 4 0

This with the difference in point of exactneſs in coining, wherein the Portugal is much more defective than the Engliſh coins, may be very good reaſons for their being refuſed in payments in any of the receipts of the public revenue; but anſwer very well the purpoſe of thoſe who benefit by the irreguralty, in trading with the heavier and paſſing off the lighter by tale; and which, if they can turn into guineas or heavy ſilver, make another gain.

How our ſtandard is proportioned to that of other countries, and thence what the true par of exchange is between us, ſee Coin.

A TABLE exhibiting the ſtandard, weight, value, and comparative view of Engliſh Gold Money from King William I. Ann. 1066, to King George III. Ann 1764.

Years of the kings and queens reigns, or the dates of the ſeveral mint indentures.		Standard of the gold at each period.		Value or N° of pounds, &c. the lb. Troy of ſtand. gold has been coined into.	Value or number of pounds, &c. the oz. Troy has been coined into.	Value of 20 ſhillings of coined gold at each period in our preſent money.	Proportion of the ſame 20 ſhillings to our preſent 20 ſhillings.	Proportion between the current value of the lb. Troy of ſtandard ſilver and ſtandard gold.	Proportion of fine ſilver to fine gold at each period.
		Fine gold.	Alloy						
Anni Regnorum.	A.D.	oz. dw. gr.	oz. dw. gr.	l. s. d.	l. s. d.	l. s. d.			
William I. —	1066	11 18 18	0 1 6						
William II. —	1087	11 18 18	0 1 6	9 0 0	0 15 0	5 12 8⅛	5.63414	9.0000	8.36874
18th Edw. III. VI.	1345	11 18 18	0 1 6	15 0 0	1 5 1⅝	3 7 7⅛	3.38048	14.8148	13.7754
18th ſame —	1345	11 18 18	0 1 6	13 3 4	1 2 0⅝	3 17 0¼	3.85118	15.0041	12.0917
20th ſame —	1347	11 18 18	0 1 6	14 0 0	1 3 5	3 12 5¼	3.62194	12.4444	11.5714
27, 30, 37, and 46th d° 18th Richard II. and 3d Henry IV.	1373 1395 1402	11 18 18	0 1 6	15 0 0	5 1⅛	3 7 7¼	3.38048	12.0000	11.1581
9th Henry V. —	1422	11 18 18	0 1 6	16 13 4	1 7 11⅛	3 0 10⅛	3.04243	11.1111	10.3315
1ſt and 39th Henry VI.	1422 1461	11 18 18	0 1 6	22 10 0	1 17 8⅛	2 5 0⅛	2.25365	12.0000	11.1581
4th ſame —	1426	11 18 18	0 1 6	16 13 4	1 7 11⅛	3 0 10⅛	3.04243	11.1111	10.3315
4th Edw. IV. VII. —	1465	11 18 18	0 1 6	20 16 8	1 14 10⅞	2 8 8⅛	2.43394	11.1111	10.3316
5, 8, 11, 16, and 22d d° 1ſt Richard III. — and 9th Henry VII.	1482 1483 1494	11 18 18	0 1 6	22 10 0	1 17 8⅜	2 5 0⅞	2.25365	12.0000	11.1581
1ſt and 23d Henry VIII.	1509 1532	11 18 18	0 1 6	27 0 0	2 5 2	1 17 6¾	1.87804	12.0000	11.1581
1ſt and 23d ſame	1509 1532	11 0 0	1 0 0	25 2 6	2 5 8¼	1 17 2¼	1.85971	11.1666	11.2682
34th ſame —	1543	11 10 0	0 10 0	28 16 0	2 10 1	1 13 11⅛	1.69614	12.0000	10.4348
36th ſame —	1545	11 0 0	1 0 0	30 0 0	2 14 6½	1 11 1	1.55750	12.5000	6.81818
37th ſame — 1ſt and 2d VI Edw. IX. —	1546 1549	10 0 0	2 0 0	30 0 0	3 0 0	1 8 3⅞	1.41591	12.5000	5.0000
3d ſame —	1550	11 0 0	1 0 0	34 0 0	3 1 9¾	1 7 5⅞	1.37426	9.4444	5.15151
4th ſame —	1551	11 18 18	0 1 6	28 16 0	1 8 3	1 15 2½	1.76066	8.0000	2.01048
6th ſame —	1553	11 18 18	0 1 6	36 0 0	3 0 3¾	1 8 2	1.40853	12.0000	11.1078
6th ſame —	1553	11 0 0	1 0 0	33 0 0	3 0 0	1 8 3½	1.41591	11.0000	11.0500
1ſt Mary I. — 2d Elizabeth —	1553 1560	11 18 18	0 1 6	36 0 0	3 0 1¾	1 8 2	1.40853	12.0000	11.0576
2d and 35th ſame	1560 1594	11 0 0	1 0 0	33 0 0	3 0 0	1 8 3	1.41591	11.0000	11.1000
19th and 26th ſame	1578 1585	11 18 18	0 1 6	36 0 0	3 0 3¾	1 8 2	1.40853	12.0000	11.1581
43d ſame —	1601	11 18 18	0 1 6	36 10 0	3 1 1¾	1 7 9¾	1.38924	11.7741	10.9481
43d ſame —	1601	11 0 0	1 0 0	33 10 0	3 0 10⅝	1 7 10¾	1.39477	10.8064	10.9047
1ſt James I. —	1603	11 0 0	1 0 0	37 10 0	3 8 2⅛	1 4 11	1.24600	12.0967	12.2067
2d ſame —	1604	11 0 0	1 0 0	37 4 0	3 7 7⅝	1 5 1½	1.25604	12.0000	12.1091
3d ſame —	1605	11 18 18	0 1 6	40 10 0	3 7 10¼	1 5 0¼	1.25203	13.0645	12.1479
10th ſame —	1613	11 18 18	0 1 6	44 0 0	3 13 8	1 3 0⅛	1.15243	14.1935	13.1077
10th ſame —	1613	11 0 0	1 0 0	40 18 4	3 14 4¾	1 2 10	1.14195	13.1935	13.3189
2d Charles I. — 12th Charles II. —	1627 1661	11 18 18	0 1 6	44 10 0	3 14 6⅝	1 2 9½	1.13948	14.3548	13.3478
2d Charles I. —	1627	11 0 0	1 0 0	41 0 0	3 14 6½	1 2 9½	1.13948	13.2258	13.3460
22d Charles II. — 1ſt James II. —	1671 1685	11 0 0	1 0 0	44 10 0	4 0 10	1 1 0	1.05000	14.3548	14.4853
William III.		11 0 0	1 0 0	47 15 9	4 6 11¾	0 19 6⅜	.976743	15.4314	15.5717
3d George I. — 3d George III. —	1717 1763	11 0 0	1 0 0	46 14 6	4 4 11½	1 0 0	1.00000	15.07258	15.209600

A TABLE, ſhewing the ſtandard weight, value, and comparative veiw of Engliſh ſilver *money*, from King William the Firſt, A.D. 1066, to A.D. 1765.

Dates of the ſeveral Mint indentures.	Standard of the ſilver at each period.				N° of ſhillings &c. in the pound weight, viz. in twelve ounces Troy, of ſtandard ſilver coined at each period.		Weight of twenty ſhillings in reckoning of ſtandard ſilver at each period.			Weight of fine ſilver contained in twenty ſhillings at each period.			Value of the ſame twenty ſhillings in reckoning of our preſent money.			Proportion of money at each period to that of our preſent money.	Value of the ounce of the then ſtandard ſilver to that of our preſent money.		Value of the ounce fine ſilver at each period.		Kings and Queens in theſe periods.
	Fine Silver.		Alloy.																		
A. D.	oz.	pw.	oz.	pw.	ſh.	d.	oz.	pw.	gr.	oz.	pw.	gr.	£.	s.	d.		ſh.	d.	ſh.	d.	
1066	11	2	0	18	21	4	11	5	0	10	8	3	2	18	1½	2.9062	5	2	1	11⅛	William Conq.
1087	11	2	0	18	20	0	12	0	0	11	2	0	3	2	0	3.1000	5	2	1	9⅝	William Rufus.
1300	11	2	0	18	20	3	11	17	1	10	19	6	3	1	2¾	3.0614	5	2	1	9⅞	Edward I.
1347	11	2	0	18	22	6	10	13	8	9	17	8	2	15	1⅜	2.7557	5	2	2	0⅜	Edward III.
1354 1395 1402	11	2	0	18	25	0	9	12	0	8	17	11½	2	9	7¼	2.4802	5	2	2	3	Richard II. Henry IV.
1412	11	2	0	18	32	0	7	10	0	6	18	18	1	18	9	1.9375	5	2	2	10⅝	
1422	11	2	0	18	30	0	8	0	0	7	8	0	2	1	4	2.0666	5	2	2	8½	Henry VI.
1422	11	2	0	18	37	6	6	8	0	5	18	10	1	13	0¾	1.6531	5	2	3	4½	
1426 1446	11	2	0	18	30	0	8	0	0	7	8	0	2	1	4	2.0666	5	2	2	8½	
1461 1464 1482 1483 1494	11	2	0	18	37	6	6	8	0	5	18	10	1	13	0¾	1.6531	5	2	3	4½	Edward IV. Edward V. Henry VII.
1505	11	2	0	18	40	0	6	0	0	5	11	0	1	11	0	1.5500	5	2	3	7¼	
1509 1532	11	2	0	18	45	0	5	6	16	4	18	6	1	7	6⅝	1.3776	5	2	4	0⅝	Henry VIII.
1543	10	0	2	0	48	0	5	0	0	4	3	8	1	3	3¼	1.1635	4	7⅞	4	9⅝	
1545	6	0	6	0	48	0	5	0	0	2	10	0	0	13	11⅝	0.6984	2	9½	8	0	
1546 1547 1548	4	0	8	0	48	0	5	0	0	1	13	8	0	9	3¾	0.4656	1	10⅜	1	0	
1549	6	0	6	0	72	0	3	6	16	1	13	8	0	9	3¾	0.4656	2	9½	12	0	Edward VI.
1551	3	0	9	0	72	0	3	6	16	0	16	16	0	4	7⅞	0.2328	1	4¼	24	0	
1553	11	1	0	19	60	0	4	0	0	3	13	16	1	0	6⅞	1.0286	5	1¼	5	5⅛	Mary I.
1560 1583	11	2	0	18	60	0	4	0	0	3	14	0	1	0	8	1.0333	5	2	5	4⅞	Elizabeth.
1601 1605 1627 1661 1671 1685 1720 1764	11	2	0	18	62	0	3	17	10	3	11	14¾	1	0	0	1.0000	5	2	5	7	James I. Charles I. Charles II. James II. George I. George III.

The king by proclamation, may at any time prohibit all his ſubjects, not exceeding one year, to lend or advance *money* to any foreign prince or ſtate, without licence under the great or privy ſeal; and if any perſon knowingly offend in the premiſes, he ſhall forfeit treble the value of the *money* lent, &c. two thirds to the king, and the other to the informer; but perſons may deal in foreign ſtocks, or be intereſted in any bank abroad, eſtabliſhed before iſſuing his majeſty's proclamation. Stat. 3 Geo. II. c. 5.

MONEY, *falſe*, or *baſe*, is either that ſtruck by an unqualified perſon, and of unſtatutable metals; or that which has loſt of its weight, either by being clipped on the corners, or filed on the edges; or, laſtly, by having ſome of its ſurface eaten off; if gold, by aqua regis; if ſilver by aqua fortis.

Another kind of baſe *money* is that made of pieces of iron, copper, or other metal, covered on each ſide with a thin plate or leaf of gold or ſilver, neatly ſoldered and joined round the edges, and ſtruck, like other coin, with figures, legends, &c. only to be diſtinguiſhed from them by the bulk, and weight, and ſound.

MONEY, *imaginary*, or MONEY *of account*, is that which has never exiſted, or, at leaſt, which does not exiſt in real ſpecies, but is a denomination invented, or retained to facilitate the ſtating of accounts, by keeping them ſtill on a fixed footing, not to be changed, like current coins, which the authority of the ſovereign ſometimes raiſes, or lowers, according to the exigencies of ſtate. Of which kinds are, *pounds*, *livres*, *marks*, *maravedies*, &c. See ACCOUNT.

Money of account, according to M. Boizard, is a ſum of *money*, or a certain number of ſpecies which may change in ſubſtance and quantity, but never in quality. Thus fifty pounds conſiſts of fifty pieces called *pounds*, which are not real, but may be paid in ſeveral real ſpecies, as in guineas, crowns, ſhillings, &c. which are changeable, as guineas, v. gr. which are ſometimes higher, ſometimes lower. For the *money* current and of account in different countries, ſee COIN.

MONEY-*bills*, in *Parliamentary Language*, comprehend all bills, by which *money* is directed to be raiſed upon the ſubject, for any purpoſe or in any ſhape whatſoever; either for the exigencies of government, and collected from the kingdom in general, as the LAND-*tax*; or for private benefit, and collected in any particular diſtrict, as by turnpikes, pariſh-rates, and the like. With reſpect to theſe bills the commons are ſo reaſonably jealous of their privilege of framing new taxes for the ſubject, that they will not ſuffer the other houſe to exert any other power but that of rejecting; they will not permit the leaſt alteration or amendment to be made by the lords to the mode of taxing the people by bills of this nature.

MONEY, *cert*, *chimney*, *madning*, *poll*, *preſt*, *preſtation*, *ſalvage*, *ſhip*, and *trophy*. See the ſeveral articles.

MONEY-*wort*, *nummularia*, in *Botany*, a ſpecies of the LOOSE-STRIFE. It is a perennial plant, growing in moiſt ſhady places in many parts of England, ſo is not cultivated in gardens. It flowers in May to near the end of ſummer. It is one of the principal vulneraries; and, drank in wine, cures dyſenteries, weakneſſes, fluxes, and humidities of the belly; it is alſo good for vomiting of blood, uterine fluxes, internal wounds and ulcers, eſpecially of the lungs. Boerhaave conſiders it as ſimilar to a mixture of ſcurvy-graſs with ſorrel; though Lewis ſays, it is far weaker than thoſe herbs, or than any mixture of the two.

MONEYERS, MONEYORS, or MONIERS, officers of the MINT, who work and coin gold and ſilver money; and anſwer all the waſte and charges.

MONEYERS is ſometimes alſo uſed for *bankers*; or thoſe who make a trade of turning and returning money.

MONGER, a little ſea-veſſel which fiſhermen uſe.

When a word ends with *monger*, it ſignifies *merchant*; from the Saxon *manger*, i. e. *mercator*.

MONGOOSE, or **Mongooz**, in *Zoology*, is a ſpecies of LEMUR in the Linnæan ſyſtem, the woolly *maucauco* of Pennant, and by ſome called the Macaſſar fox. The irides of this animal are orange-coloured, its ears ſhort and rounded; the end of the noſe black; the eyes lodged in a circle of black, and the ſpace between them of the ſame colour; the reſt of the noſe and ſides of the cheek white; the whole upper part of the body covered with long, ſoft, thick, fur, a little curled or waved, of a deep browniſh aſh-colour; the tail is long, covered with the ſame ſort of hair, and of the ſame colour; the breaſt and belly white; the hands and feet naked and duſky; the nails flat, except that of the inner toe of the hind feet; about the ſize of a cat: and varies ſometimes with white or yellow paws, and with a face wholly brown. It inhabits Madagaſcar and the adjacent iſles; ſleeps on trees, protects itſelf from rain by turning its tail over its head, lives on fruits, and is very ſportive and good-natured. Pennant. See *Tab.* III. *Quadrupeds*, N° 35.

MONITORY *letters*, are letters of warning and admotion, ſent from an eccleſiaſtical judge upon information of ſcandals and abuſes within the cognizance of his court.

MONK, anciently denoted a perſon who retired from the world to give himſelf up wholly to God, and to live in ſolitude and abſtinence.

The word is derived from the Latin *monachus*, and that from the Greek μοναχος, *ſolitary*, of μονος, *ſolus alone*; becauſe the ancient *monks* lived in ſolitude, as the true *monks* ſtill do.

Such were the HERMITS and ANACHORETS, who withdrew into deſerts, and lived remote from all commerce of mankind.

Some writers, as farther Helyot, Diſſert. Prelim. trace the origin of *monks* up as early as the time of the Therapeutæ; and maintain, that there had been an uninterrupted ſucceſſion of *monks* from the Theraputæ to St. Antony. Others, on the contrary, are contented with going back as far as St. Paul the Hermit.

The original of *monks* ſeems to have been this. The perſecutions, which attended the firſt ages of the Goſpel, forced ſome Chriſtians to retire from the world, and live in deſarts and places moſt private and unfrequented, in hopes of finding that peace and comfort among beaſts which were denied them among men. And this being the caſe of ſome very extraordinary perſons, their exampale gave ſo much reputation to retirement, that the practice was continued when the reaſon of its commencement ceaſed. After the empire became Chriſtian, inſtances of this kind were numerous, and thoſe, whoſe ſecurity had obliged them to live ſeparately and apart became afterwards united into ſocieties. We may alſo add, that the myſtic theology, which gained ground towards the cloſe of the third century, contributed to produce the ſame effect, and to drive men into ſolitude for the purpoſe of enthuſiaſtic devotion.

The *monks*, at leaſt the ancient ones, were diſtinguiſhed into *ſolitaries*, *cœnobites*, and *ſarabaites*.

The *ſolitary* are thoſe who live alone, in places remote from all towns and habitations of men, as do ſtill ſome of the hermits.

The *cœnobites* are thoſe who live in community with ſeveral others in the ſame houſe, and under the ſame ſuperiors.

The *ſarabaites* were ſtrolling *monks*, having no fixed rule or reſidence.

The houſes of *monks* again were of two kinds, viz. *monaſteries*, and *lauræ*. See Monastery, and Laura.

Thoſe we call *monks* now-a-days, are cœnobites, who live together in a convent or monaſtery, who make vows of living according to a certain rule eſtabliſhed by the founder, and wear a habit which diſtinguiſhes their order.

Thoſe that are endowed, or have a fixed revenue, are moſt properly called *monks*, *monachi*; as the Chartreux, Benedictines, Bernardines, &c. The Mendicants, or thoſe that beg, as the Capuchins and Franciſcans, are more properly called *religious*, and *friars*; though the names are frequently confounded.

The firſt *monks* were thoſe of St. Antony; who, towards the cloſe of the fourth century, formed them into a regular body, engaged them to live in ſociety with each other, and preſcribed to them fixed rules for the direction of their conduct. Theſe regulations, which Antony had made in Egypt, were ſoon introduced into Paleſtine and Syria by his diſciple Hilarion. Almoſt about the ſame time, Aones or Eugenius, with their companions Gaddarias and Azyzas, inſtituted the monaſtic order in Meſopotamia, and the adjacent countries; and their example was followed with ſuch rapid ſucceſs, that, in a ſhort time, the whole Eaſt was filled with a lazy ſet of mortals, who, abandoning all human connexions, advantages, pleaſures, and concerns, wore out a languiſhing and miſerable life amidſt the hardſhips of want, and various kinds of ſuffering, in order to arrive at a more cloſe and rapturous communication with God and angels. From the Eaſt this gloomy inſtitution paſſed into the Weſt, and firſt into Italy, and its neighbouring iſlands; though it is uncertain who tranſplanted it thither. St. Martin, the celebrated biſhop of Tours, erected the firſt monaſteries in Gaul, and recommended this religious ſolitude with ſuch power and efficacy, both by his inſtructions and his example, that his funeral is ſaid to have been attended by no leſs than two thouſand *monks*. From hence, the monaſtic diſcipline extended, gradually, its progreſs through the other provinces and countries of Europe. There were beſides the *monks* of St. Baſil, called in the Eaſt, *Calogeri*, from καλος γερων, *good old man*, and thoſe of St. Jerom, the hermits of St. Auguſtine, and afterwards thoſe of St. Benedict and St. Bernard, at length came thoſe of St. Francis and St. Dominic, with a legion of others; all which ſee under their proper heads, Benedictines, &c.

Towards the cloſe of the fifth century, the *monks*, who had formerly lived only for themſelves in ſolitary retreats, and had never thought of aſſuming any rank among the ſacerdotal order, were now gradually diſtinguiſhed from the populace, and endowed with ſuch opulence and honourable privileges, that they found themſelves in a condition to claim an eminent ſtation among the ſupports and pillars of the Chriſtian community. The fame of their piety and ſanctity was ſo great, that biſhops and preſbyters were often choſen out of their order; and the paſſion of erecting edifices and convents, in which the *monks* and holy virgins might ſerve God, in the moſt commodious manner, was at this time carried beyond all bounds. However, their licentiouſneſs, even in this century, was become a proverb; and they are ſaid to have excited the moſt dreadful tumults and ſeditions in various places. The monaſtic orders were at firſt under the immediate juriſdiction of the biſhops, from which they were exempted by the Roman pontiff, about the end of the ſeventh century; and the *monks*, in return, devoted themſelves wholly to advance the intereſts, and to maintain the dignity of the biſhop of Rome. This immunity which they obtained, was a fruitful ſource of licentiouſneſs and diſorder, and occaſioned the greateſt part of the vices, with which they were afterwards ſo juſtly charged. In the eighth century the monaſtic diſcipline was extremely relaxed both in the eaſtern and weſtern provinces, and all efforts to reſtore it were ineffectual. Neverthleſs, this kind of inſtitution was in the higheſt eſteem, and nothing could equal the veneration that was paid, about the cloſe of the ninth century, to ſuch as devoted themſelves to the ſacred gloom and indolence of a convent. This veneration induced ſeveral kings and emperors to call them to their courts, and to employ them in civil affairs of the greateſt moment. Their reformation was attempted by Lewis the Meek, but the effect was of ſhort duration. In the eleventh century they were exempted by the popes from the authority of their ſovereigns, and new orders of *monks* were continually eſtabliſhed; inaſmuch that in the council of Lateran, that was held in the year 1215, a decree was paſſed, by the advice of Innocent III. to prevent any new monaſtic inſtitutions, and ſeveral were entirely ſuppreſſed. In the fifteenth and ſixteenth centuries, it appears from the teſtimonies of the beſt writers, that the *monks* were generally lazy, illiterate, profligate, and licentious Epicureans, whoſe views in life were confined to opulence, idleneſs, and pleaſure. However, the Reformation had a manifeſt influence in reſtraining their exceſſes, and rendering them more circumſpect and cautious in their external conduct.

Monks are diſtinguiſhed by the colour of their habits into *black*, *white*, *grey*, &c. Among the *monks*, ſome are called *monks of the choir*, others *profeſſed monks*, and others *lay monks*; which laſt are deſtined for the ſervice of the convent, and have neither clericate nor literature.

Monks, *cloiſtered*, are thoſe who actually reſide in the houſe: in oppoſition to *extra-monks*, who have benefices depending on the monaſtery.

Monks are alſo diſtinguiſhed into *reformed*, whom the civil and eccleſiaſtical authority have made maſter of ancient convents, and put in their power to retrieve the ancient diſcipline, which had been relaxed; and *ancient*, who remain in the convent, to live in it according to its eſtabliſhment at the time when they made their vows, without obliging themſelves to any new reform.

Anciently, the *monks* were all lay-men, and were only diſtinguiſhed from the reſt of the people by a particular habit, and an extraordinary devotion. Not only the *monks* were prohibited the prieſthood, but even prieſts were expreſsly prohibited from becoming *monks*, as appears from the letters of St. Gregory. Pope Syricius was the firſt who called them to the clericate, on occaſion of ſome great ſcarcity of prieſts, that the church was then ſuppoſed to labour under: and ſince that time the prieſthood has been uſually united to the monaſtical profeſſion.

Monks, *profeſſed*. See Professed.

Monks, *proprietary*. See Proprietary.

Monk-*fiſh*, the Engliſh name of a ſpecies of the ſqualus, according to the new Artedian ſyſtem; called *rhina* and *ſquatinus* by the old authors. It is diſtinguiſhed by Artedi from the other ſquali, by the name of the *ſqualus* with no *pinna ani*, and with the mouth on the top of the head: it is of a middle ſhape, between the long and flat cartilaginous fiſhes, being much broader than the galei, and rounder than the rays; it grows to a very large ſize, ſometimes to four, five, or ſix feet long; it is covered all over with a mucous ſubſtance, but under it the ſkin is harſh, and rough enough to ſerve for the poliſhing wood and ivory; it is of a browniſh grey on the back and ſides, and white under the belly; the head is flatted and roundiſh, and the mouth large, and opening at the extremity of the ſnout, not, as in other of the fiſhes of this claſs, under the head; it has three rows of teeth, eighteen in a row; its eyes are large, and placed near its mouth; and ſeem as if meant for looking ſideway, rather than up or down; its upper pair of fins very much reſemble wings, from whence it has its name of the *angel-fiſh*, and at the extremities of theſe are a number of ſharp hooked thorns; it has alſo a row of ſhort prickles on its back. See *Tab.* III. *of Fiſh*, N° 27.

It is common in the Engliſh ſeas, and is not unfrequently caught in Cornwall.

Monk's-*hood*, a name given to ſeveral ſpecies of aconite, or wolf's-*bane*.

The flowers of this plant are in common uſe in the country, to garniſh diſhes, though generally ſuſpected of being poiſonous; but the ſtalks have been found very violently ſo, according to an account given in the Philoſophical Tranſactions. Phil. Tranſ. N° 432.

The young ſhoots of this plant have ſome reſemblance of celery, and were put into the ſallad as ſuch.

Monks *rhubarb*. See Rhubarb, and Dock.

Monks *ſeam*, among *Sailors*, is, when the ſelvedges of ſails are laid a little over one another, and ſewed on both ſides.

MONKEY, in *Zoology*, a name given by way of diſtinction to thoſe apes which have tails; the others, or thoſe without tails, being more properly called *apes*.

The ſame diſtinction holds in Latin, the tailed ones being called *cercopitheci*, and thoſe without tails *ſimiæ*. See Cercopithecus and Simia.

Mr. Pennant diſtributes *monkies* into two claſſes, viz. 1. Thoſe of the old world, or the continents of Aſia and Africa, having within each lower jaw pouches for the reception of their food, buttocks generally naked, and tails ſtrait, but not prehenſile. Under this claſs he enumerates and deſcribes the dog-faced *monkey*, or *ſimia hamadryas*, of Linnæus; the lion-tailed *monkey*, or *ſimia faunus*, of which there are ſeveral varieties; for one of which ſee *Tab.* III. *Quadrupeds*, *fig.* 36. the hair-lipped *monkey*, or *ſimia cynomolgus*; the ſpotted *monkey*, or *ſimia diana*; the green *monkey*, callitrichus, or *ſimia ſabæa*; the white-eye-lid *monkey*, or *ſimia æthiops*; the muſtache *monkey*, or *ſimia cephus*; the talapoin of Buffon; the negro *monkey*; the egret, or *ſimia aygula*; the red *monkey*; the Chineſe; the varied *monkey*; the *monkey* of Cochin-China; the tawny; the winking; the goat; the annulated *monkies*; and the Philippine, or *ſimia ſyrichta* of Linnæus. 2. *Monkies* of the new world, or the continent of America, having neither pouches in their jaws, nor naked buttocks: the tails of many are prehenſile and naked on the under ſide, for a certain ſpace next their end: of thoſe with prehenſile tails, he enumerates the preacher, guariba, or *ſimia Beelzebub*, of Linnæus; the four-fingered *monkey*, or *ſimia paniſcus*; the capuchin, or *ſimia capucina*, and *trepida*, and *apella*; the weeper; the orange *monkey*, or *ſimia ſcieurea*; the horned *monkey*, or *ſimia fatuellus*; and the Antigua *monkey*: of thoſe with ſtrait tails, not prehenſile, he reckons the fox-tailed, or *ſimia pithecia* of Linnæus; the great-eared, or *ſimia Midas*; the ſtriated, or *ſimia jacchus*; the ſilky, or *ſimia roſalia*; the red-tailed, or *ſimia œdipus*; and the fair *monkey*. See Pennant's Synopſis of Quadrupeds, p. 107, 134.

Monkey of the Weſt Indies. See Guariba.

Monkey, *green*. See Callitrichus.

Monkey, in the *Sea Language*, a block made of iron, with a catch, uſed in gins for driving piles.

MONNIERIA, in *Botany*, a genus of the *diadelphia pentandria* claſs; the characters are, that the calyx is divided into five ſegments, and the corolla ringent; the fruit is formed into five capſules, containing ſingle ſeeds. There is only one ſpecies.

MONOCEROS, *Unicorn*, in *Aſtronomy*, a ſouthern conſtellation formed by Hevelius, containing in his catalogue, nineteen ſtars, and in the Britannic Catalogue thirty-one: the ſituation, longitude, latitude, &c. are as follow:

Names and ſituations of the ſtars.	Signs.	Longitud. °	′	″	Latitude. °	′	″	Magnitude.
	♊	25	21	52	32	51	50	6
		25	22	20	33	2	10	6
		26	11	35	34	4	39	6
		28	8	39	34	36	26	6
1ſt. Between the fore-feet		29	53	14	29	42	0	4.5
5.								
	♋	0	52	14	34	7	40	6.7
		1	21	40	31	12	30	6
In the noſtrils		1	56	49	18	45	44	4
		3	17	5	27	39	50	5
2d. between the fore-feet		3	34	3	28	2	58	6
10.								
In the left fore-foot		3	56	58	30	18	27	5
At the knee		4	10	54	18	22	46	5
At the eye in the forehead		4	10	33	15	54	19	4
		4	38	51	15	38	27	5.6
At the ear		6	4	31	13	12	52	4
15.								
		7	34	46	14	25	0	6
In the nape of the neck		7	49	40	14	56	44	5
In the neck		8	27	56	20	32	18	4
		13	17	39	26	45	38	5
		15	19	3	26	32	41	6
20.								
In the lower part of the neck		15	4	9	22	35	20	5
2d.		15	13	27	22	45	40	4.5
		15	34	6	22	29	16	6.7
		16	5	34	22	19	10	6
In the ſide		22	42	31	25	20	17	6
25.								
In the belly		24	56	52	30	29	27	4.5
In the ſide under the back		28	39	8	23	47	50	5
In the back		28	29	44	21	28	42	5
	♌	0	49	33	22	37	35	6
In the left thigh at the root of the tail		5	32	22	22	28	58	6
30.								
In the tail		11	13	3	24	28	10	4

Monoceros *minor*, in *Ichthyography*, the name of a fiſh caught in the American ſeas; its uſual length is a foot and half; its height about nine inches, very flat-bodied, and high-backed like a perch, and bow-bellied; its head has ſome reſemblance to that of a baboon.

From the top of the head is prolonged a ſmooth, round, tapered ſtrait horn, two inches round about the root, and about three inches long; this ſeems to have no bone within it, nor is inſerted into any, but ſeems merely the cuticle hardened, into a ſort of horny ſubſtance; the back-fin reaches from the head to the tail; it is covered with a tough ſkin, feeling ſomewhat rough.

Monoceros *piſcis*, is alſo uſed as the name of a fiſh common in the American ſeas; and called *pira aca* by Margraave, and ſome other authors; and by the Portugueſe *piexe porco*.

It is a very ſmall fiſh, of about three fingers breadth long, and two broad where broadeſt: it is of a flatted compreſſed ſhape; the mouth is very ſmall, but of the figure of that of a hog; a little behind the eyes on the ridge of the back, it has an upright horn, a little bending backward, leſs than a finger's breadth long, of a rounded figure, and of the thickneſs of a large thread; its ſkin is very rough to the touch, and is of an obſcure yellowiſh colour. The fins and the ridge at the back are yellower than any other part of it. See *Tab.* III. *of Fiſhes*, N° 28.

MONOCHORD, a muſical inſtrument wherewith to try the variety and proportion of muſical ſounds.

The *monochord*, according to Boethius, is an inſtrument invented by Pythagoras, for meaſuring geometrically, or by lines, the quantities and proportions of ſounds.

The ancient *monochord* was compoſed of a rule divided and ſubdivided into divers parts, whereon there was a ſtring pretty well ſtretched upon two bridges, at each extreme thereof. In the middle between both was a moveable bridge, called *magas*, by means of which, in applying it to the different diviſions of the line, the ſounds were found to be in the ſame proportion to one another, as the diviſions of the line cut by the bridge were.

The *monochord* is alſo called the *harmonical canon*, or *canonical rule*; becauſe ſerving to meaſure the degrees of gravity, and acuteneſs of ſounds. Ptolemy examines his harmonical intervals by the *monochord*.

There are alſo *monochords* with divers ſtrings, and a multitude of fixed bridges; but the uſe of all theſe may be ſupplied by one ſingle moveable bridge; by only ſhifting it under a new chord or ſtring, which is placed in the middle, and repreſents the entire ſound, or open note, anſwering to all the diviſions on the other bridges.

When the chord was divided into equal parts, ſo that the terms were as 1 and 1, they called them *uniſons*: if they were as 2 to 1, *octaves*, or *diapaſons*; when they were as 8 to 2, *fifths*, or *diapentes*; if they were as 4 to 3, they called them *fourths*, or *diateſſarons*; if the terms were as 5 to 4, *diton*, or a *greater third*; if as 6 to 5, a *demi-diton*, or a *leſſer third*; laſtly, if as 24 to 25, *demi-diton*, or *dieſis*.

The *monochord*, being thus divided was properly what they call a *ſyſtem*, of which there were many kinds, according to the different diviſions of the *monochord*.

Dr. Wallis has taught the diviſion of the *monochord* in the Philoſophical Tranſactions; but that inſtrument is now diſuſed, the modern muſic not requiring ſuch diviſion.

MONOCHORD, Μονοχορδος, formed of μονος, *ſolus*, *ſingle*, and χορδη, *chord*, is alſo uſed for any muſical inſtrument, conſiſting of only one chord or ſtring. Such is the trumpet-marine.

MONOCHROMA, Μονοχρωμα, compounded of μονος, *ſingle*, and χρωμα, *colour*, a picture all of one colour.

MONOCOLI, Μονοκωλοι, a kind of fabulous men, who, as the Arabians give out, inhabit the country of Segir, in Arabia Felix; and are but half formed.

The word is Greek, compounded of μονος, *one*, and κωλον, *a member*.

MONOCULUS, in *Zoology*, the name of a genus of inſects, of the PODARIA kind, and of the order of *aptera*, in the Linnæan ſyſtem.

Its body is ſhort, of a roundiſh figure, and covered with a firm cruſtaceous ſkin: the fore-legs are ramoſe, and ſerve for leaping and ſwimming; it has but one eye, which is large, and compoſed of three ſmaller ones.

Of this genus, many of which have been reckoned among the microſcopic animals, authors enumerate a great number of ſpecies. Linnæus enumerates nine ſpecies.

MONODON, in the Linnæan ſyſtem of *Ichthyology*, the name of the monoceros, or *ſea* UNICORN, a fiſh of the whale-kind, which makes a diſtinct genus of fiſhes; the characters of which are, that it has a pipe in the forehead, and no fin on the back, and two very long ſpiral teeth in its upper jaw.

The word is Greek, compounded of μονος, *one*, and οδους, *a tooth*, and expreſſes this fiſh's having only a ſingle tooth, referring to its ſpiral horn.

Artedi makes the *monodon* a peculiar genus among the cetaceous fiſhes, or plagiuri. The NARWAL is the only known ſpecies of the genus.

MONODY, MONODIA, compounded of μονος, *ſolus*, and ωδη, *a ſong*, in the *Ancient Poetry*, a kind of mournful ſong, or ditty, ſung by a perſon all alone, to utter his grief.

MONOECIA, in *Botany*, the twenty firſt claſs of plants which have not the male and female parts, that is, the ſtamina and piſtillum in the ſame, but in different flowers; and thoſe on the ſame individual, or on the different ſtalks, growing from the ſame root; thoſe which contain the ſtamina, are called the male flowers, thoſe which contain the piſtillum, the female ones. See *Tab*. I. *of Botany*, *claſs* 21.

The word is derived from the Greek μονος, the ſame, and οικος, *habitation*.

The orders of this claſs are eleven, viz. 1. *Monandria*, comprehending ſuch plants as have their male flowers furniſhed with one ſtamen; to which belong five genera, *zanichelli*, *ceratocarpus*, *cynomorium*, *elaterium*, and *chara*. 2. *Diandria*, with two ſtamina, containing two genera, *lemna* and *anguria*. 3. *Triandria*, with three ſtamina, including twelve genera; *omphalea*, *typha*, *ſparganium*, *zea*, *coix*, *tripſarum*, *olyra*, *carex*, *axyis*, *tragia*, *hernandia*, and *phyllanthus*. 4. *Tetrandria*, with four ſtamina, comprehending eight genera, *centella*, *betula*, *buxus*, *urtica*, *morus*, *cicca*, *ſerpicula*, and *littorella*. 5. *Pentandria*, with five ſtamina, containing eight genera; *xanthium*, *ambroſia*, *parenthium*, *iva*, *leca*, *amaranthus*, *nephelium*, and *clibadium*. 6. *Hexandria*, with ſix ſtamina, to which belong two genera; *zizania* and *pharus*. 7. *Heptandria* with ſeven ſtamina, of which there is one genus, viz. *guettarda*. 8. *Polyandria*, with many ſtamina, including thirteen genera, viz. *ceratophyllum*, *myriophillum*, *ſagittaria*, *begonia*, *theligonum*, *poterium*, *quercus*, *jugulans*, *fagus*, *carpinus*, *corylus*, *platanus*, and *liquidambar*. 9. *Monadelphia*, with one ſet of united ſtamina containing fifteen genera, viz. *hura*, *perius*, *cupreſſus*, *thuja*, *acalypha*, *delechampia*, *plukenetia*, *cupania*, *croton*, *ricinus*, *jatropha*, *ſterculia*, *hippomane*, *ſtillingia*, and *gnetum*. 10. *Syngeneſia*, with the antheræ of the ſtamina united, including ſix genera, viz. *trichoſanthes*, *momordica*, *cucumis*, *cucurbita*, *ſicyos* and *bryonia*. 11. *Gynandria*, with the male flowers furniſhed with ſtamina, that grow out of a kind of ſtyle or imperfect piſtillum, the perfect one being in the female flower; containing two genera, viz. *andrachne*, and *agyneia*. See *Tab*. VI. *Botany*, *Claſs* 21.

MONOGAMY, compounded of μονος, *ſolus*, and γαμος, *marriage*, the ſtate or condition of thoſe who have only married once, or are reſtrained to a ſingle wife. See POLYGAMY.

MONAGASTRIC, in *Anatomy*, a name given by Vieuſſens, and ſome of the French writers, to one of the muſcles of the ear, called by Cowper, the *internus auris*, and more properly by Albinus, the *tenſor tympani*.

MONOGRAM, MONOGRAMMUS, a cipher, or character, compoſed of one or more letters interwoven; being a kind of abbreviation of a name; anciently much uſed as a badge, ſeal, arms, &c.

Under the eaſtern empire, it is uſual to find MIK, which are the *monogram* of Maria, Jeſus, Conſtantine.

The uſe of *monograms* is of an ancient ſtanding, as appears from Plutarch, and from ſome Greek medals of the time of Philip of Macedon, Alexander his ſon, &c.

The Roman LABARUM bore the *monogram* of Jeſus Chriſt, conſiſting of two letters, as P placed perpendicularly through the middle of an X, e. gr. ☧, as we find it in ſeveral medals of the time of Conſtantine, thoſe being the two firſt letters of the word Χριστος, *Chriſt*.

Kings formerly marked their coins with their *monograms*: of this we have inſtances in Charlemagne's coins. That prince alſo uſed the *monogram* for his ſignature. Eginhard gives us this reaſon for it, viz. That Charlemagne could not write; and that, having attempted in vain to learn in his grown age, he was reduced to the neceſſity of ſigning with a *monogram*.

The ancients alſo uſed *monograms* as notes, or abbreviations of inſcriptions; for the underſtanding whereof we have expreſs treatiſes of Valerius Probus, Sert. Urſatus, &c.

MONOGRAPHI, in *Botany*, authors who have written expreſs treatiſes on only one plant; as Douglas on the Guernſey lily, &c.

MONOLOGUE, formed of μονος, *ſolus*, and λογος, *diſcourſe*, *ſpeech*, a dramatic ſcene, wherein a perſon appears alone on the ſtage, and ſpeaks to himſelf. See SOLILOQUY.

MONOMACHIA, Μονομαχια, from μονος, *ſolus*, and μαχη, *combat*, a duel, or ſingle combat of man againſt man.

Monomachia was anciently allowed by law, for the trial or proof of crimes. It was even permitted in pecuniary cauſes, as appears by ancient records. It is now forbid both by the civil and canon laws. See COMBAT.

Alciat has written a treatiſe *De Monomachia*.

MONOMACHON, a name given by ſome to the inteſtine otherwiſe called COECUM.

MONOMERES, a word uſed by the ancients alone, but more frequently joined with the word *phorbeia*, to expreſs one ſort of the bandage uſed to confine the breath, by thoſe who played on the ancient pipe. This conſiſted only of one ſtrait, and one tranſverſe piece; and the latter came fully over the mouth, and cloſed it up, except that a hole was cut in it to receive the mouth-piece of the pipe. The *diemeres* conſiſted of ſeveral pieces, and only tied up the lower-lip.

MONOMIAL, in *Algebra*, a root or quantitity that has but one name; or conſiſts but of one part or member. Such are *a b*, *a a b*, *a a a b b*. See QUANTITY, BINOMIAL, TRINOMIAL, ROOT, &c.

Monomials may be either RATIONAL, or irrational.

MONOPAGIA, a word uſed by ſome medical writers, for that ſpecies of head-ach which affects only one point, or ſmall part of the head.

MONOPETALOUS, in *Botany*, a term applied to flowers which have only one petalum, or leaf. See theſe flowers repreſented in *Tab*. VIII. *of Botany*, *Claſs* 1. 2. 3. 4. and *Tab*. X. *Claſs* 20.

MONOPHAGI, Μονοφαγοι, in *Antiquity*, a deſignation given to thoſe who celebrated the Æginean feſtival, becauſe they feaſted or eat together without the aſſiſtance of their ſervants; none but the denizens of that iſland being allowed to be preſent.

MONOPHYSITES, from μονος, *ſolus*, and φυσις, *natura*, a general name given to all thoſe ſectaries in the Levant, who only own one nature in Jeſus Chriſt; and maintain, that the divine and human nature of Chriſt were ſo united, as to form only one nature, yet without any change, confuſion or mixture of the two natures.

The *Monophyſites*, however, properly ſo called, are the followers of Severus, a learned monk of Paleſtine, who was created patriarch of Antioch, in 513, and Petrus Fullenſis.

The *Monophyſites* were encouraged by the emperor Anaſtaſius,

ſius, but depreſſed by Juſtin and ſucceeding emperors. However this ſect was reſtored by Jacob Baradæus, an obſcure monk, inſomuch, that when he died biſhop of Edeſſa, A. D. 588, he left it in a moſt flouriſhing ſtate in Syria, Meſopotamia, Armenia, Egypt, Nubia, Abyſſinia, and other countries. The laborious efforts of Jacob were ſeconded in Egypt, and the adjacent countries, by Theodoſius, biſhop of Alexandria, and he became ſo famous that all the *Monophyſites* of the Eaſt conſidered him as their ſecond parent and founder, and are to this day called JACOBITES, in honour of their new chief. The *Monophyſites* are divided into two ſects or parties; the one African, the other Aſiatic; at the head of the latter is the patriarch of Antioch, who reſides for the moſt part in the monaſtery of St. Ananias, near the city of Merdin: the former are under the juriſdiction of the patriarch of Alexandria, who generally reſides at Grand Cairo, and are ſubdivided into COPHTS and ABYSSINIANS. From the fifteenth century downwards, all the patriarchs of the *Monophyſites* have taken the name of Ignatius, in order to ſhew that they are the lineal ſucceſſors of Ignatius, who was biſhop of Antioch in the firſt century, and conſequently the lawful patriarchs of Antioch. In the ſeventeenth century, a ſmall body of the *Monophyſites* in Aſia, abandoned, for ſome time, the doctrines and inſtitutions of their anceſtors, and embraced the communion of Rome: but the African *Monophyſites*, notwithſtanding that poverty and ignorance which expoſed them to the ſeductions of ſophiſtry and gain, ſtood firm in their principles, and made an obſtinate reſiſtance to the promiſes, preſents, and attempts employed by the papal miſſionaries, to bring them under the Roman yoke: and in the eighteenth century, thoſe of Aſia and Africa have perſiſted in their refuſal to enter into the communion of the Romiſh church, notwithſtanding the earneſt intreaties and alluring offers, that have been made from time time by the pope's legates, to conquer their inflexible conſtancy. The *Monophyſites* propagate their doctrine in Aſia with zeal and aſſiduity, and have not long ago gained over to their communion a part of the Neſtorians, who inhabit the maritime coaſts of India.

MONOPODIA, among the *Ancients*, a ſort of tables uſed in their feaſts, and diſtinguiſhed by this name from their having but one foot; the name being derived from the Greek μονος, *one*, and πȣς, *foot*.

MONOPOLY, Μονοπωλιον, formed of *μονος*, *ſolus*, and πωλεω, *vendo*, q. d. *I ſell alone*, an unlawful kind of traffic, when one or more perſons make themſelves ſole maſters of any commodity, trade, manufacture, or the like, with deſign to enhance its price; thoſe who have occaſion for it being obliged to purchaſe it at their hands, and on their own terms.

There are two kinds of *monopolies*: the one, when a merchant buys up, for inſtance, all the corn of a province, to retail it at an advanced rate to the people. The other, when a letter, or PATENT, is procured from the prince, prohibiting any other perſon to ſell a particular commodity beſide the patentee.

Monopolies are much the ſame offence in other branches of trade, that ENGROSSING is in proviſions. Theſe had been carried to an enormous height during the reign of queen Elizabeth; but were in great meaſure remedied by ſtat. 21 Jac. I. cap. 3. which declares ſuch *monopolies* to be contrary to law, and void (except as to patents, not exceeding the grant of fourteen years to the authors of new inventions:) and *monopolies* are puniſhed with the forfeiture of treble damages, and double coſts, to thoſe whom they attempt to diſturb; and if they procure any action, brought againſt them for theſe damages, to be ſtaid by any extrajudicial order, other than that of the court wherein it is brought, they incur the penalties of PRÆMUNIRE.

MONOPS, in *Natural Hiſtory*, a name given by Ælian, and ſome other of the old Greek writers, to the BONASUS. The name *monapus* was given this animal, according to Ariſtotle, by the people of the country where the creature was moſt frequent, and therefore is not to be attempted on any Greek etymology. Some of the Greeks have called the ſame creature *monepos*, and ſome *bolinthos*.

MONOPTERE, Μονοπτερος, a kind of temple among the ancients, round, and without walls; having its dome ſupported by columns.

MONOPTOTE, MONOPTOTON, in *Grammar*, a noun, which has only one caſe; as *inficias*.

MONOPYRENEOUS *fruits*, are ſuch as only contain one kernel or ſeed.

MONORCHIS. Beſide the common ſignification of this word as the name of a plant, phyſicians have alſo uſed it to expreſs a man who has but one teſticle.

MONORHYMÆ, from μονος, *ſolus*, and ρυθμος, *rhyme*, a poetical compoſition, all the verſes whereof end with the ſame rhyme.

Monorhymes are ſaid to have been invented by the old French poet Leonin, who addreſſed ſome Latin verſes of this kind to pope Alexander III. whence they they are alſo called *Leonine verſes*.

MONOSPERMALTHÆA, in *Botany*, a name given by Mr. Iſnard, in the Acta Germanica, to a genus of plants afterwards called WALTHERIA by Linnæus.

MONOSTICH, MONOSTICHON, an epigram, or poetical piece, conſiſting of one ſingle verſe.

MONOSYLLABLE, MONOSYLLABUM, a word of a ſingle ſyllable; or, that conſiſts of one or more letters which are pronounced together.

The French language abounds in *monoſyllables* more than any other. This renders it the more perplexing to foreigners, and yet the beauty of the language ſeems to conſiſt in it. One of the beſt and ſmootheſt lines in Malherbe conſiſts of twelve *monoſyllables*: ſpeaking of Caliſta, he ſays.—*Et moi je ne voi rien quand je ne la voi pas.* In this the genius of the Engliſh tongue differs very much from the French, an uninterrupted ſeries of *monoſyllables* in the former having always an ill effect. This Mr. Pope both intimates and exemplifies in the ſame verſe. *And ten low words oft creep in one dull line.* Paſquier cites an elegy of forty-two verſes, conſiſting wholly of *monoſyllables*.

MONOTHELITES, compounded of μονος, *ſingle*, and θελεμα, *will*, of θελω, *volo*, *I will*, an ancient ſect, which ſprung out of the EUTYCHIANS; thus called, as only allowing of one will in Jeſus Chriſt.

The opinion of the *Monothelites* had its riſe in 630, and had the emperor Heraclius for an adherent: it was the ſame with that of the Acephalous Severians.

They allowed of two wills in Chriſt, conſidered with regard to the two natures; but reduced them to one, by reaſon of the union of the two natures; thinking it abſurd there ſhould be two free wills in one and the ſame perſon. See ECHTHESIS and TYPE.

They were condemned by the ſixth general council, in 680, as being ſuppoſed to deſtroy the perfection of the humanity of Jeſus Chriſt, depriving it of will and operation. Their ſentiments were afterwards embraced by the MARONITES.

MONOTONIA, MONOTONY, a want of variation, or inflexion of the voice; or a fault in pronunciation, where a long ſeries of words are delivered with one unwearied tone. This is one of the principal faults of our Engliſh orators. *Monotonia* is oppoſed to chanting or ſinging in ſpeaking.

MONOTRIGLYPH, in *Architecture*, denotes the ſpace of one TRIGLIPH, between two pilaſters or two columns.

MONOTROPA, in *Botany*, the name of a genus of plants, of the *decandria monogynia* claſs; its characters are, that it has no empalement, and ten petals, the outer five of which are hollowed at their baſe, and yield a ſweet juice; the fruit is a capſule with five valves. There are two ſpecies. This is called by Tournefort, *orobanchoides*, and by Dillenius, *hypopitis*.

MONRINGION, in *Botany*, a name given by ſome authors to the tree whoſe fruit is the ben-nut, and whoſe wood is the *lignum nephriticum* of the ſhops.

MONS *lunæ*. See ABDUCTOR.

MONSEIGNEUR, compounded of *mon*, *my*, and *ſeigneur*, *lord*, in the plural MESSEIGNEURS, a title of honour and reſpect uſed by the French in writing to perſons of ſuperior rank or quality.

Dukes, peers, archbiſhops, biſhops, and preſidents *a la mortier*, are complimented with the title of *monſeigneur*. In the petitions preſented to the ſovereign courts, they uſe the term *meſſeigneurs*.

MONSEIGNEUR, abſolutely uſed, is a title now reſtrained to the dauphin of France.

This cuſtom was unknown till the times of Louis XIV. till then the dauphin was ſtyled *monſieur le dauphin*.

MONSIEUR, a compound of *mon*, *my*, and *ſieur*, *ſir*, in the plural MESSIEURS, a term or title of civility, uſed by the French, in ſpeaking to their equals, or thoſe a little below them; anſwering to Mr. or Sir, among the Engliſh.

The ſuperſcriptions of all letters begin, *A monſieur*, *monſieur* ſuch a one.

The uſe of the word *monſieur*, was formerly more extenſive than at preſent: they applied it to people who lived many ages before them. Thus *monſieur* St. Auguſtine, *monſieur* St. Ambroſe; and the vulgar ſtill ſay, *monſieur* St. Paul, *monſieur* St. Jaques, &c. The Romans, during the flouriſhing time of their liberty, were unacquainted with that term of parade and flattery, which they afterwards made uſe of in the word *dominus*. In ſpeaking or writing to each other, they only gave each other their proper names; which practice laſted even after Cæſar had brought the republic under his command: but after the Roman emperors were once well ſeated in the throne, the courtiers and minions, who by flattery ſought to procure

cure favours from them, ſtudied new honours. Suetonius obſerves, that a comedian on the theatre having called Auguſtus *dominus*, *lord*; the ſpectators all ſtared at him: ſo that the emperor forbad, for the future, the title to be attributed to him. Caligula was the firſt who expreſly commanded himſelf to be called *dominus*. Martial, entirely devoted to tyranny, calls Domitian, *dominum deumque noſtrum*. In time, the title was alſo applied to the people; and of *dominus*, at length was formed DOM.

MONSIEUR, abſolutely uſed, is a title or quality appropriated to the ſecond ſon of France, or the king's brother. In a letter of Philip De Valois, that prince, ſpeaking of his predeceſſor, calls him *monſieur le roy*, *monſieur the king*. At preſent nobody calls the king *monſieur*, but the children of France. See SIRE.

MONSONIA, in *Botany*, a genus of the *polyadelphia dodecandria* claſs: its characters are, that it has a five-leaved calyx; the corolla has five petals; the ſtamina are fifteen, and united in five filaments; the ſtyle is divided into five ſegments, and the fruit is a five-berried capſule. There is only one ſpecies.

MONSOON, a regular or periodical wind, in the Eaſt Indies, blowing conſtantly the ſame way, during ſix months of the year, and the contrary way the remaining ſix.

In the Indian ocean, the winds are partly *general*, and blow all the year round the ſame way, as in the Ethiopic ocean; and partly *periodical*, i. e. half the year blow one way, and the other half near on the oppoſite points: and thoſe points and times of ſhifting, differ in different parts of this ocean. Theſe latter are what we call *monſoons*.

The ſhifting of theſe *monſoons* is not all at once: and in ſome places the time of the change is attended with calms, in others with variable winds, and particularly thoſe of China, at ceaſing to be weſterly, are very ſubject to be tempeſtuous: and ſuch is their violence, that they ſeem to be of the nature of the Weſt India HURRICANES, and render the navigation of thoſe ſeas very unſafe at that time of the year. Theſe tempeſts the ſeamen call the *breaking up of the monſoons*.

Monſoons, then, are a ſpecies of what we otherwiſe call TRADE-*winds*.

They take the denomination *monſoon* from an ancient pilot, who firſt croſſed the Indian ſea by means hereof. Though others derive the name from a Portugueſe word, ſignifying *motion*, or change of wind, and ſea.

Lucretius and Apollonius make mention of annual winds, which ariſe every year, *eteſia ſtabria*, which ſeem to be the ſame with what in the Eaſt Indies we now call *monſoons*.

For the phyſical cauſe of theſe winds, ſee WIND.

MONSTER, MONSTRUM, a birth or production of a living thing, degenerating from the proper and uſual diſpoſition of parts, in the ſpecies it belongs to. As, when there are too many members, or too few; or ſome of them are extravagantly out of proportion, either on the ſide of defect or exceſs.

The word comes from the Latin, *monſtrum*, of *monſtrando*, *ſhewing*. Whence alſo the box wherein relics were anciently kept to be ſhewn was called *monſtrum*. Dugdale mentions an inventory of the church of York with this article, *Item unum monſtrum cum oſſibus ſancti Petri in Beryl, & crucifixo in ſummitate*.

Ariſtotle defines *monſter* to be a defect of nature, when, acting towards ſome end, it cannot attain to it, by reaſon ſome of its principles are corrupted.

Monſters do not propagate their kind; for which reaſon, ſome rank mules among the number of *monſters*, as alſo hermaphrodites.

Females, which naturally bring forth twins, are found moſt liable to produce *monſters*. The reaſon, probably, is owing to this; that though the twins are covered with one common chorion, yet they have each their ſeparate amnios, which by their contiguity, may chance to grow together, and ſo create a confuſion or blending of the parts. Hence ſo many double creatures.

F. Malebranche accounts for the production of *monſters*, in the animal world, thus. The Creator has eſtabliſhed ſuch a communication between the ſeveral parts of his creation, that we are not only naturally led to imitate one another, i. e. have a diſpoſition to do the ſame things, and aſſume the ſame manners, with thoſe with whom we converſe; but we alſo have certain natural diſpoſitions, which incline us to compaſſion, as well as imitation. Theſe things moſt men feel, and are ſenſible of; and, therefore, they need not be proved. The animal ſpirits then are not only naturally carried into the reſpective parts of the body to perform the ſame actions, and the ſame motions, which we ſee others do, but alſo to receive in ſome manner their wounds, and take part in their ſufferings.

Experience tells us, that, when we look attentively on any perſon ſeverely beaten, or that has a large wound, ulcer, or the like, the ſpirits immediately flow into thoſe parts of our body which anſwer to thoſe we ſee ſuffer in the other; unleſs their courſe be ſtopped from ſome other principle. This flux of ſpirits is very ſenſible in perſons of a delicate conſtitution, who frequently ſhudder, and find a kind of trembling in the body, on theſe occaſions; and this ſympathy in bodies produces compaſſion in the mind.

Now, it muſt be obſerved, that the view of a wound, &c. wounds the perſon who views it the more ſtrongly and ſenſibly, as the perſon is more weak and delicate; the ſpirits making a ſtronger impreſſion on the fibres of a delicate body than on thoſe of a robuſt one. Thus ſtrong vigorous men, &c. ſee an execution without much concern, while women, &c. are ſtruck with pity and horror. As to children ſtill in their mothers womb, the fibres of their fleſh being incomparably finer than thoſe in women, the courſe of the animal ſpirits muſt neceſſarily produce much greater alterations in them.

Theſe things being laid down, *monſters* are eaſily accounted for. Suppoſe, v. gr. a child born a fool, and with all its legs and arms broken in the ſame manner as thoſe of criminals in ſome countries are; which caſe we chooſe to inſtance in, becauſe we are told from Paris, that ſuch a *monſter* was actually born there, and lived in one of their hoſpitals twenty years: the cauſe of this accident, according to the principles laid down, was, that the mother ſeeing a criminal executed, every ſtroke given to the poor man, ſtruck forcibly the imagination of the woman; and, by a kind of counter-ſtroke, on the tender and delicate brain of the child. Now, though the fibres of the woman's brain were ſtrangely ſhaken by the violent flux of animal ſpirits on this occaſion, yet they had ſtrength and conſiſtence enough to prevent an entire diſorder; whereas the fibres of the child's brain, being unable to bear the ſhock of thoſe ſpirits, were quite ruined; and the ravage was great enough to deprive him of reaſon all his life-time.

Again, the view of the execution frighting the woman, the violent courſe of the animal ſpirits was directed forcibly from the brain to all thoſe parts of the body correſponding to the ſuffering parts of the criminal; and the ſame thing muſt alſo happen in the child. But in regard the bones of the mother were ſtrong enough to reſiſt the impulſe of thoſe ſpirits, they were not damaged; and yet the rapid courſe of theſe ſpirits could eaſily overpower and break the tender and delicate fibres of the bones of the child; the bones being the laſt part of the body that are formed, and having a very tender conſiſtence while the child is yet in the womb.

To which it may be here added, that had the mother determined the courſe of theſe ſpirits towards ſome other parts of her body, by tickling or ſcratching herſelf vehemently, the child would not, in all probability, have had his bones broken; but the part anſwering that, to which the motions of the ſpirits was determined, would have been the ſufferer.

Hence appears the reaſons why women, in the time of geſtation, ſeeing perſons, &c. marked in ſuch a manner in the face, impreſs the ſame mark on the ſame parts of the child; and why upon rubbing ſome hidden parts of the body, when ſtartled at the ſight of any thing, or agitated with any extraordinary paſſion, the mark of impreſſion is fixed on that hidden part rather than on the face of the child. From the principles here laid down, if the reader is diſpoſed to allow them, may moſt, if not all, the phenomena of *monſters* be eaſily accounted for.

The French Academicians have of late diſputed whether *monſters*, that is creatures born with their organs preternaturally formed or ſituated, ſupernumerary or defective, were originally ſo formed in their firſt ſtamina; or whether this deformity has been owing to ſome accidental change upon them. The arguments for theſe opinions, are remarks upon particular hiſtories of ſuch *monſters*, which we cannot abridge, and therefore muſt refer to the Memoirs de l'Acad. des Sciences, 1733, 1734, 1738, 1739.

A **MONSTER**, in *Law*, is one that hath not human ſhape, and yet is born in lawful wedlock: and ſuch may not purchaſe or retain lands: but a perſon may be an heir to an anceſtor's land, though he have ſome deformity in any part of his body. If there appears no other heir than ſuch a prodigious birth, the land ſhall eſcheat to the lord.

MONSTERS, *vegetable*. There are alſo monſtrous productions in the vegetable world: ſuch, e. gr. are what ſome botaniſts call MULES.

Floriſts alſo give the denomination *monſters*, or *monſtrous flowers*, to thoſe flowers which are not only double, but double podded; or when, inſtead of one flower, there are two or three riſing one above another from a ſingle ſtalk.

MONSTRANS *de droit*, a writ iſſuing out of chancery, for reſtoring a perſon to lands or tenements that are his in right, though on ſome occaſion found in poſſeſſion of another lately dead.

MONSTRAVERUNT, a writ which lies for a tenant who holds by free charter in ancient demeſne, upon his being diſtrained for the payment of any ſervice or impoſition contrary to the liberty he does or ought to enjoy.

MONTANISTS, ancient heretics ſo called from their leader Montanus, who acted the prophet, and had his propheteſſes.

Montanus was an obſcure man, without any capacity or ſtrength of judgment, who lived in a Phrygian village, called Pepuza, towards the cloſe of the ſecond century. This weak man gave out that he was the *paraclete*, or comforter, which the divine Saviour, at his departure from the earth, promiſed to ſend to his diſciples, to lead them to all truth. Some have aſſerted that *Montanus* pretended to be the Holy Ghoſt. But others have obſerved, with greater reaſon, that he made a diſtinction between the *paraclete*, promiſed by Chriſt to his apoſtles, and the holy ſpirit: underſtanding by the former a divine teacher, who was to perfect the Goſpel by the addition of ſome doctrines omitted by our Saviour, and to caſt a full light on others which were expreſſed in an obſcure and imperfect manner: accordingly he pretended to be this divine teacher. Under this character, he added to the laws of the Goſpel many auſtere deciſions; inculcated the neceſſity of multiplying faſts; prohibited ſecond marriages as unlawful; maintained, that the church ſhould refuſe abſolution to thoſe who had fallen into the commiſſion of enormous ſins; and condemned all care of the body, eſpecially all nicety in dreſs, and all female ornaments. He ſhewed the ſame averſion to the nobleſt employments of the mind, that he did to the innocent enjoyments of life; and gave it as his opinion, that philoſophy, arts, and whatever favoured of polite literature, ſhould be mercileſsly baniſhed from the Chriſtian church. He looked upon thoſe Chriſtians as guilty of a moſt heinous tranſgreſſion, who ſaved their lives, by flight, from the perſecuting ſword, or who ranſomed them by money, from the hands of their cruel and mercenary judges. He added many other precepts equal to theſe in ſeverity and rigour: and iſſued many predictions concerning the diſaſters that were to happen in the empire, and the approaching deſtruction of the Roman republic, which rendered him obnoxious to the governing powers. *Montanus* was, therefore, firſt by a decree of certain aſſemblies, and afterwards by the unanimous voice of the whole church, ſolemnly ſeparated from the body of the faithful. However he had many patrons and adherents, the principal of whom was Tertullian, and his cauſe ſpread abroad through Aſia, Africa, and a part of Europe. Moſh. Eccl. Hiſt. vol. i. p. 192, &c. 8vo.

The *Montaniſts* are the ſame with what were otherwiſe denominated *Phrygians*, *Cataphrygians*, and *Quintilians*, which ſee.

MONTANUM *veru*. See Veru.

MONTENSES. See Agonistici, Campitæ, and Donatists.

MONTH, in the *Computation of Time*, the twelfth part of the year.

Among the ancient Greeks, the year was divided into twelve *months*, which contained thirty and twenty-nine days alternately; but ſo as the *months* of thirty days always went before thoſe of twenty-nine; the former were termed ϖληρεις, *full*, and δεκαφθινοι, as ending on the tenth day; the latter were called κοιλοι, *hollow*, and from their ending on the ninth day, εννεαφθινοι.

In order to underſtand their method of reckoning the days of the *month*, it muſt be conſidered that every *month* was divided into τρια δεχημερα or three decads of days; the firſt decad they called the μενος αρχομενȣ or ιϛαμηνȣ; the ſecond, μενος μησȣντος; the third, μενος φινοντος, or ϖαυομηνȣ or λεγοντος. Whence the firſt day of the *month* was called νεομηνια, as falling upon the new moon, and ϖροτη αρχομενȣ or ιϛαμενȣ, as being the firſt day of the firſt decad; the ſecond day was termed, δευτηρα ιϛαμενȣ; the third, τριτη ιϛαμινȣ; and ſo on to the δεκατη ιϛαμενȣ.

The firſt day of the ſecond decad, which was the eleventh day of the *month*, was called ϖρωτη μεσȣντος or ϖρωτη επιδεκα; the ſecond of this decad, δευτηρα μησȣντος, or επιδεκα; and ſo on to εικας, the twentieth, which was the laſt of the ſecond decad.

The firſt day of tbe third decad was termed ϖρωτη επ' ικαδι; the ſecond, δευτερα επ' εικαδι, and ſo of the reſt. Sometimes they inverted the numbers of this laſt decad, the firſt being called φθινοντος δεκατη; the ſecond, φθινοντος εννατη; the third, φθινοντος ογδοη; and ſo on to the laſt day of the *month*, which was called Δημητριας, *Demetrias*, from Demetrius Poliorcetes; before whoſe time, particularly in Solon's laws, it was called ενη και νεα, *the old and new*; becauſe the new moon falling out on that day part of it belonged to the old moon, and part to the new. It was alſo called τριακος, *the thirtieth*; and that not only in the *months* which conſiſted of thirty days, but alſo in thoſe of twenty-nine; for in theſe, according to ſome accounts, the twenty-ſecond day was omitted; or, according to others, the twenty-ninth: but which day ſoever was omitted in computation, the thirtieth was conſtantly retained. Hence, according to Thales's firſt ſcheme, all the *months* were called *months* of thirty days; though, by Solon's regulation, half of them contained only twenty-nine: and the lunar year of Athens was called a year of three hundred and ſixty days; though really after Solon's time, it conſiſted of no more than three hundred and fifty-four. Vide Pott. Archæol. Gr. lib. ii. cap. 26.

The names of the *months* being various in different parts of Greece, it will be ſufficient particularly to conſider thoſe of Athens, barely mentioning thoſe of others that correſpond with them. 1. *Hecatombæon*, or Ecatombæon. 2. Metagitnion. 3. Boedromion. 4. Mæmacterion. 5. Pyanepsion. 6. Anthesterion. 7. Posidion. 8. Gamelion. 9. Elaphebolion. 10. Munychion. 11. Thargelion. 12. Scirrophorion.

As the Roman *months* were the ſame with thoſe now in uſe among the Europeans, we ſhall only refer to the article Calends, where the manner of their computation is explained.

The Hebrew *months* were originally reckoned in order as the firſt, ſecond, &c. but after the Babyloniſh captivity, the Iſraelites borrowed the names of their *months* from the Chaldeans and Perſians: and they were diſtinguiſhed in the ſacred and civil year as follows. In the ſacred year, *Niſan*, anſwering to our March, *Ijar* to April, *Sivan*, to May, *Thammuz* to June, *Ab* to July, *Elul* to Auguſt, *Tizri* to September, *Marſchevan* to October, *Caſleu* to November, *Thebet* to December, *Sebat* to January, and *Adar* to February. In the civil year, *Tizri* correſponding to September, *Marſchevan* to October, *Caſleu* to November, *Thebet* to December, *Sebat* to January, *Adar* to February, *Niſan* to March, *Ijar* to April, *Sivan* to May, *Thamuz* to June, *Ab* to July, and *Elul* to Auguſt.

Time, we have obſerved, is duration marked out for certain uſes, and meaſured by the motions of the heavenly bodies.

Hence reſult divers kinds of years, and *months*, according to the particular luminary by whole revolutions they are determined, and the particular purpoſes they are deſtined for; as *ſolar months*, *lunar months*, *civil months*, *aſtronomical months*, &c.

Month, *ſolar*, is the ſpace of time wherein the ſun moves through one entire ſign of the ecliptic.

Hence, if regard be had to the ſun's true motion, the *ſolar months* will be unequal; ſince the ſun is longer in paſſing through the ſummer ſigns, than through thoſe of the winter.

But as he conſtantly travels through all the twelve in 365 days, 5 hours, and 49 minutes, the quantity of a mean *month* will be had by dividing that number by 12. On this principle, the quantity of a *ſolar month* will be found 30 days, 10 hours, 29 minutes, 5 ſeconds.

Months, *lunar*, are either *ſynodical*, *periodical*, or *illuminative*.

Month, *lunar ſynoldical*, called alſo, abſolutely, *lunar* month, and *lunation*, is the ſpace of time between two conjunctions of the moon with the ſun; or between two new moons. See Synodical *month*, and Lunation.

The quantity of the *ſynodical month*, is 29 days, 12 hours, 44′, 3″, 11‴. See Moon.

Month, *lunar periodical*, is the ſpace of time wherein the moon makes her round through the zodiac; or wherein ſhe returns to the ſame point.

The quantity of this *month* is 27 days, 7 hours, 43′, 8″.

The ancient Romans made uſe of *lunar months*, and made them alternately 29 and 30 days: and they marked the days of each *month* by three terms, viz. *calends*, *nones*, and *ides*.

Month, *lunar illuminative*, is the ſpace from the firſt time of the moon's appearance after new moons, to her firſt appearance after the new moon following.

Hence, as the moon appears ſometimes ſooner after the new moon, and ſometimes later; the quantity of the *illuminative month* is not always the ſame. By this *month* the Turks and Arabs reckon.

Month, *aſtronomical* or *natural*, is that meaſured by ſome exact interval correſponding to the motion of the ſun, or moon.

Such are the lunar and ſolar *months* above mentioned. Where note, that theſe *months* can be of no uſe in civil life, where it is required that the *months* begin and end on ſome certain day. For this reaſon, recourſe is had to another form of *months*.

Month, *civil*, or *common*, is an interval of a certain number

ber of whole days, approaching nearly to the quantity of ſome aſtronomical, either lunar, or ſolar *month*.

Civil months are various, according to the aſtronomical *month* they are accommodated to.

Months, *civil lunar*, are to conſiſt alternately of 29 and 30 days. Thus will two *civil months* be equal to two aſtronomical ones, abating for the odd minutes; and, conſequently, the new moon will be hereby kept to the firſt day of each ſuch *civil month* for a long time together. However to make them keep conſtant pace with the *civil months*, at the end of each 948 *months*, a *month* of 29 days muſt be added; or elſe every 33d *month* muſt conſiſt of 30 days.

This was the *month* in civil or common uſe among the Jews, Greeks, and Romans, till the time of Julius Cæſar.

Months, *civil ſolar*, are to conſiſt alternately of 30 and 31 days, excepting one *month* of the twelve, which for every fourth year ſhould conſiſt of 30 days, and for the other years of 29. This form of *civil months* was introduced by Julius Cæſar.

Under Auguſtus, the ſixth *month*, till then from its place called *Sextilis*, was denominated *Auguſtus*, in honour of that prince; and, to make the compliment yet the greater, a day was added to it:- ſo that it now conſiſted of 31 days, though till then it had only contained 30; to make up for which, a day was taken from February; ſo that henceforward it only conſiſted of 28 days, and every fourth year of 29; though before it had ordinarily conſiſted of 29 days, &c. and ſuch are the *civil* or CALENDAR *months* which now obtain through Europe.

Month, *philoſophical*, among *Chemiſts*, is the ſpace of forty days and nights.

Month, *dracontic*, *emboliſmic*, *fence*, *twelve*. See the adjectives.

Month-*climate*. See CLIMATE.

MONTHLY *courſes*. See MENSES.

MONT-PAGNOTE, *the poſt of the invulnerable*, an eminence choſen without the reach of the cannon of a place beſieged: where curious perſons poſt themſelves to ſee an attack, and the manner of the ſiege, without being expoſed to danger.

MONTIA, *blinks*, in the Linnæan ſyſtem of *Botany*, the name of a diſtinct genus of plants of the *triandria trigynia* glaſs; the characters of which are theſe: the cup is a perianthium compoſed of two oval, hollow, obtuſe, and erect leaves, which remain when the flower is fallen; the flower is compoſed of one irregular petal; the ſtamina are three capillary filaments, of the length of the flower; the antheræ are ſmall; the germen of the piſtillum is of a turbinated form; the ſtyles are three, hairy and expanded; the ſtigmata are ſimple; the fruit is a capſule of a turbinated form obtuſe, of one cell, ſeparated by three valves; the ſeeds are three in number and roundiſh. There is only one ſpecies.

MONTIFRINGILLA, in *Ornithology*, the name of a bird, known in Engliſh by the name of the BRAMBLE, *brambling*, or *mountain-finch*; and called by the ancients, *oroſpiza*.

MONTROSE *Waters*. See *Montroſe* WATERS.

MONUMENT, *monumentum*, of *monere*, to *adviſe*, *advertiſe*, in *Architecture*, a building deſtined to preſerve the memory of the perſon who raiſed it, or of him for whom it was raiſed: ſuch are, a triumphal arch, a mauſoleum, a pyramid, &c.

The firſt *monuments*, which the ancients erected, were the ſtones which they laid over their tombs, whereon they wrote the names and actions of the deceaſed.

Theſe ſtones were diſtinguiſhed, by various names, according as their figures were different. The Greeks gave the name of *ſteles*, ϛελες, to ſuch as were ſquare in their baſe, and preſerved the ſame depth throughout their whole length; whence we derived our ſquare pilaſters, or Attic columns. They called thoſe *ſtyles*, ϛυλοι, which being round in their baſe, ended in a point at top, which gave occaſion to the invention of diminiſhed columns.

The ſame *pyramids* they gave to thoſe which were ſquare at the foot, and determined in a point at top, in manner of a funeral pile.

And the name *obeliſc*, to thoſe whoſe baſes were more in length than in breadth, and which roſe, ſtill leſſening, to a very great height, reſembling the figure of the ſpits or inſtruments uſed by the ancients in roaſting the fleſh of their ſacrifices, which they called *obeli*, οϐελοι.

Monument, *the*, abſolutely ſo called among us, denotes a magnificent pillar, deſigned by ſir Chriſtopher Wren, erected by order of parliament, in memory of the burning of the city of London, anno 1666, in the very place where the fire began.

This pillar was begun in 1671, and finiſhed in 1677.

It is of the Doric order, fluted, 202 feet high from the ground, and fifteen feet in diameter, of ſolid Portland ſtone, with a ſtair-caſe in the middle of black marble, containing 345 ſteps. The loweſt part of the pedeſtal is 28 feet ſquare, and its altitude 40 feet; the front being enriched with curious baſſo relievos. It has a balcony within 32 feet of the top, where is a curious and ſpacious blazing urn of gilt braſs.

MONYCHA, formed of μονος, *ſingle*, and ονυξ, *hoof*, an epithet applied by naturaliſts to thoſe animals whoſe hoofs are ſingle and undivided; ſuch are the horſe, and the like.

MOOD, or **Mode**, in *Logic*, called alſo *Syllogiſtic* MOOD, is a proper diſpoſition of the ſeveral propoſitions of a ſyllogiſm, in reſpect of quantity and quality.

By proper diſpoſition, we mean ſuch wherein the antecedent being true, the conſequent, in virtue of the form, cannot be falſe. So that all thoſe *moods* or manners of ſyllogiſms are at once excluded, where no concluſion formally follows; or where the antecedent being true, a falſe concluſion may be drawn from it.

There are two kinds of *moods*; the one *direct*, the other *indirect*.

Mood, *direct*, is that wherein the concluſion is drawn from the premiſes directly and immediately: as, every animal is a living thing; every man is an animal; therefore every man is a living thing.

Mood, *indirect*, is that wherein the concluſion is not inferred immediately from the premiſes, but follows from them by means of a converſion: as, every animal is a living thing; every man is an animal; therefore ſome living thing is a man. There are fourteen direct *moods*; whereof four belong to the firſt figure; four to the ſecond; and ſix to the third. See FIGURE.

They are denoted by ſo many artificial words framed for that purpoſe; viz. 1. *Barbara celarent*, *darii*, *ferioque*. 4. *Baralip*, *calentes*, *dibatis*, *feſpamo*, *friſiſom*. 2. *Ceſare*, *cameſtres*, *feſtino*, *baraco*. 3. *Darapti*, *felapton*, *diſamis*, *datiſi*, *bocardo*, *feriſon*.

The uſe and effect of which words lie wholly in the ſyllables, and the letters whereof the ſyllables conſiſt. Each word, e. gr. conſiſts of three ſyllables, denoting the three propoſitions of a ſyllogiſm; viz. major, minor, and concluſion. Add, that the letters of each ſyllable are either vowels or conſonants: the vowels are *A*, which denotes an univerſal affirmative propoſition; *E*, an univerſal negative; *I*, a particular affirmative; and *O*, a particular negative.

Thus, *barbara* is a ſyllogiſm or *mood* of the firſt figure, conſiſting of three univerſal affirmative propoſitions: *baralip*, of the fourth figure, conſiſting of two univerſal affirmative premiſes, and a particular affirmative concluſion. The conſonants are chiefly of uſe in the REDUCTION of ſyllogiſms.

Mood, or **Mode**, in *Grammar*, is uſed to ſignify the different manners of conjugating verbs, agreeably to the different actions or affections to be expreſſed; as ſhewing, commanding, wiſhing, &c.

Hence ariſe five *moods*; viz. the *indicative*, *imperative*, *optative*, *ſubjunctive*, and *infinitive*; which ſee.

Some grammarians reckon but four *moods*, confounding the optative with the ſubjunctive; and ſome make ſix, dividing the optative into potential and optative.

The Greeks have five *moods* of verbs different in termination; but the Latins have only four. In Engliſh the terminations are the ſame in all the *moods*.

For the origin of *moods*, it may be obſerved, that verbs are of that kind of words which ſignify the manner and form of our thought: whereof the principal is affirmation. Verbs are alſo formed to receive different inflexions, as the affirmation regards different perſons and different times: whence ariſe the tenſes and perſons of verbs.

But, beſides theſe, men have thought fit to invent other inflections, to explain what paſſes in their minds ſtill more diſtinctly: for, in the firſt place, they conſidered, that beſide the ſimple affirmations, as *he loves*, *he loved*; there were others modified and conditional, as *if he loved*, *though he ſhould love*: and the better to diſtinguiſh theſe affirmations from the others, they doubled the inflexions of thoſe tenſes or times; making ſome ſerve for ſimple affirmations, as, *I love*, *he loved*; and reſerving the reſt for affirmations that were modified, as, *if he ſhould love*, *might he have loved*. Yet they kept not ſteadily to their rules; but ſometimes made uſe of ſimple inflexions to expreſs affirmations that were modified: as, *etſi vereo*, for *etſi verear*. And it is from this kind of inflexion, that grammarians have formed the *mood* they call *ſubjunctive*.

But farther, beſides the affirmation, the action of our will may be taken for a *mood*, or manner of our thought; and men have found themſelves under a neceſſity of expreſſing what they *will*, as well as what they *think*. Now we may will a thing in ſeveral manners; whereof there are three which may be conſidered as the principal. Firſt, then, we ſometimes will things which do not depend on ourſelves; and in that caſe we only will them by a bare wiſh, which the Latins expreſs by the article *utinam*; and we by *pleaſe God*. Some languages, for inſtance the Greek, have invented particular inflexions for this end; whence the grammarians have taken occaſion to call this the *optative mood:* and there ſeems ſomething like both in the French, Italian, and Spaniſh tongues, in regard theſe have a kind of triple tenſes; but in Latin, Engliſh, &c. the ſame inflexions ſerve for the ſubjunctive, and for the optative. For this reaſon, one may very well retrench this *mood* from the Latin conjugations; it being the different inflexions that make *moods*, not the different manners of ſignifying, which may be varied to infinity.

We ſometimes will in another manner: as when we are content a thing ſhould come to paſs, though we do not abſolutely deſire it; as when Terence ſays, *profundat, perdat, pereat, let him ſpend, ſink, periſh.* Men might have invented a particular inflexion to expreſs this movement, as in Greek they have done to expreſs a ſimple deſire: but they have not done it; and, in lieu thereof, they make uſe of the ſubjunctive. In Engliſh, we add the particle *let*, let him ſpend, &c. Authors call this the POTENTIAL, or *conceſſive mood*.

The third manner of willing is, when what we deſire, depends on another perſon, of whom we can obtain it, and we ſignify our will that he do it. This is the motion we uſe, when we command or pray; and to expreſs this motion, was invented the *mood* we call *imperative*; which has no firſt perſon in the ſingular, becauſe a man, properly ſpeaking, cannot command himſelf; in ſome languages it has no third perſon, becauſe, in ſtrictneſs, a man cannot command any perſon, but him to whom he ſpeaks and addreſſes himſelf. And in regard the command or prayer always relates to what is to come, it happens that the imperative *mood*, and the future tenſe, are frequently uſed for each other (eſpecially in the Hebrew); as, *non occides, thou ſhalt not kill*, for *do not kill*. Hence ſome grammarians place the imperative among the number of futures.

Of all the *moods* we have mentioned, the oriental languages have none but the laſt, which is the imperative; and, on the contrary, the modern languages have none of them any particular inflexion for the imperative. The method we take for it in Engliſh, is either to omit the pronoun, or tranſpoſe it: thus, I love, is a ſimple affirmation; love, an imperative: we love, an affirmation: love we, an imperative.

In explaining the origin of *moods*, the ingenious Mr. Harris obſerves, that the ſoul's leading powers are thoſe of perception and volition; and that all ſpeech or diſcourſe is a publiſhing either a certain perception or volition. Hence then, according as we exhibit it either in a different part, or after a different manner, the variety of *moods*. If we ſimply declare or indicate ſomething to be, or not to be, whether a perception or volition, this conſtitutes the declarative or indicative *mood*. If we aſſert of ſomething poſſible only, and in the number of contingents, this makes the potential *mood*. When this is ſubjoined to the indicative, and uſed, as it moſtly is, to denote the end or final cauſe, it is the ſubjunctive. When we addreſs others, in order to have ſome perception informed, or ſome volition gratified, we form new modes of ſpeaking: if we interrogate, it is the interrogative *mood:* if we require, it is the requiſitive, which, with reſpect to inferiors, is imperative; and, with reſpect to equals and ſuperiors, precative or optative. The indicative, potential, interrogative, and requiſitive *moods* have their foundation in nature; and, therefore, certain marks or ſigns of them have been introduced into language, that we may be enabled by our diſcourſe to ſignify them to one another: ſo that *moods* are, in fact, no more than ſo many literal forms, intended to expreſs theſe natural diſtinctions. All theſe *moods*, with their reſpective tenſes, the verb being conſidered as denoting an attribute, have always reference to ſome perſon or ſubſtance. But there is another *mood* or form, under which verbs ſometimes appear, where they have no reference at all to perſons or ſubſtances: theſe, from their indefinite nature, are called INFINITIVES. Hermes, p. 140, &c.

MOOD, in *Philoſophy*, and *Muſic*. See MODE.

MOON, *luna*, ☾, in *Aſtronomy*, one of the heavenly bodies, uſually ranked among the planets; but with more propriety accounted a ſatellite, or ſecondary planet.

The *moon* is an attendant of our earth, which ſhe reſpects as a centre, and in whoſe neighbourhood ſhe is conſtantly found; inſomuch as, if viewed from the ſun, ſhe would never appear to depart from us by an angle greater than ten minutes.

As all the other planets move primarily round the ſun, ſo does the *moon* round the earth: her orbit is an ellipſis, in which ſhe is retained by the force of gravity; performing her revolution round the earth, from change to change, in 29 days, 12 hours, 44 minutes, and round the ſun with it every year; ſhe goes round her orbit in 27 days, 7 hours, 43 minutes, moving about 2290 miles every hour; and turns round her axis exactly in the time that ſhe goes round the earth, which is the reaſon of her keeping always the ſame ſide towards us; and that her day and night taken together are as long as our lunar month.

The mean diſtance of the *moon* from the earth is $60\frac{1}{2}$ ſemi-diameters of the earth; which is equivalent to 240,000 miles. The mean eccentricity of her orbit is $\frac{55}{1000}$ of her mean diſtance, or in miles 13,000, which makes a conſiderable variation in that mean diſtance.

The *moon*'s diameter is to that of the earth, as 100 to 365, as 11 to 40,15, or 2180 miles: its mean apparent diameter is 31 minutes $16\frac{1}{2}$, and that of the ſun is 32 minutes 12 ſeconds. Its mean diameter, as ſeen from the ſun, is 6 ſeconds.

The *moon*'s ſurface contains 14,898,750 ſquare miles, and its ſolidity 5,408,246,000 cubical ones. The denſity of the *moon*'s body is to that of the earth, as 48,911 to 39,214, to that of the ſun as 48,911 to 10,000; its quantity of matter to that of the earth, nearly as 1 to 39.15; the force of gravity on its ſurface, is to that on the ſurface of the earth as 139.2 to 407.8; and the *moon*'s bulk to that of the earth as $\frac{1}{56}$ to 1. The *moon* has ſcarce any difference of ſeaſons; becauſe her axis is almoſt perpendicular to the ecliptic.

The full moon appears to the naked eye broader than a circular object ſubtending an equal angle ſeen by perfect viſion. In a *moon* of three or four days old the illuminated part appears too broad, in proportion to the obſcure part, and likewiſe ſeems to extend more outwards, or to have a greater diameter than the obſcure part. Alſo, in an eclipſe of the ſun or *moon*, the bright part appears too broad in proportion to the dark part, and the eclipſe appears leſs than it really is.

This obſervation was made by Horrox, and is accounted for by Dr. Jurin, in his Eſſay upon diſtinct and indiſtinct Viſion.

In the Philoſophical Tranſactions, N° 473, we have a new method of computing the appulſes of the *moon* to the fixed ſtars and planets: as alſo of eclipſes of the earth, commonly called eclipſes of the ſun, by Mr. Gerſten, profeſſor of the mathematics at Gieſſen.

MOON, *phenomena of the*. The different appearances of the *moon* are very numerous; ſometimes ſhe is increaſing, then waning; ſometimes horned, then ſemicircular, ſometimes gibbous, then full and round.

Sometimes, again, ſhe illumines us the whole night; ſometimes only a part of it; ſometimes ſhe is found in the ſouthern hemiſphere, ſometimes in the northern; all which variations having been firſt obſerved by Endymion, an ancient Grecian, who watched her motions, ſhe was fabled to have fallen in love with him.

The ſource of moſt of theſe appearances is, that the *moon* is a dark, opake, and ſpherical body, and only ſhines with the light ſhe receives from the ſun; whence only that half turned towards him, at any inſtant, can be illuminated, the oppoſite half remaining in its native darkneſs. The face of the *moon* viſible on our earth, is that part of her body turned towards the earth; whence, according to the various poſitions of the *moon*, with regard to the ſun and earth, we obſerve different degrees of illumination; ſometimes a large, and ſometimes a leſs portion of the enlightened ſurface being viſible.

MOON, *phaſes of the*. To conceive the lunar phaſes, let S (*Tab. Aſtronomy, fig.* 13.) repreſent the ſun. T the earth, R T S a portion of the earth's orbit, and A B C D E F G the orbit of the *moon*, wherein ſhe revolves round the earth, in the ſpace of a month, advancing from weſt to eaſt: connect the centres of the ſun and *moon* by the right line S L, and through the centre of the *moon* imagine a plane M L N to paſs perpendicular to the line S L; the ſection of that plane, with the ſurface of the *moon*, will give the line that bounds light and darkneſs, and ſeparates the illumined face from the dark one.

Connect the centres of the earth and *moon* by T L, perpendicular to a plane P L O, paſſing through the centre of the *moon*. that plane will give on the ſurface of the *moon* the circle that diſtinguiſhes the viſible hemiſphere, or that towards us, from the inviſible one, and therefore called *the circle of viſion*. Whence it appears, that, whenever the *moon* is in A, the circle bounding light and darkneſs and the circle of viſion coincide; ſo that all the illuminated face of the *moon* will be turned towards the earth: in which caſe the *moon* is, with reſpect to us, full, and ſhines the whole night; with reſpect to the ſun, ſhe is in oppoſition; in regard the ſun and *moon* are then ſeen in oppoſite parts of the heavens, the one riſing when the other ſets. But it is to be obſerved, that the *moon*'s diſc is not perfectly round when ſhe is full, in the higheſt or loweſt part of her orbit, becauſe we have not a full view of her enlightened ſide at that time. When full, in the higheſt part of her orbit, a ſmall deficiency appears on her lower edge; and the contrary when full in the loweſt part of her orbit.

When the *moon* arrives at B, the whole illuminated diſc M P N is not turned towards the earth; ſo that the viſible illumination will be ſhort of a circle; and the *moon* will appear gibbous, as in B.

When ſhe reaches C, where the angle C T S is nearly right, there only one half of the illumined diſc is turned towards the earth, and then we obſerve a half *moon*, as in C; and ſhe is ſaid to be *dichotomized*, or *biſected*.

In this ſituation the ſun and *moon* are a fourth part of a circle removed from each other; and the *moon* is ſaid to be in a *quadrate aſpect*, or to be in her *quadrature*.

The *moon* arriving at D, only a ſmall part of the illumined face M P N is turned towards the earth; for which reaſon the ſmall part that ſhines upon us will be ſeen falcated, or bent into narrow angles, or horns as in D.

The inclination of that part of the ecliptic to the horizon, in which the *moon* is at any time when horned, may be known by the poſition of her horns; for a right line touching their points is perpendicular to the ecliptic. And as the angle, which the *moon*'s orbit makes with the ecliptic, can never raiſe her above, nor depreſs her below the ecliptic, more than two minutes of a degree, as ſeen from the ſun; it can have no ſenſible effect upon the poſition of her horns. Therefore, if a quadrant be held up, ſo as one of its edges may be ſeen to touch the *moon*'s horns, the graduated ſides being kept towards the eye, and as far from the eye as it can be conveniently held, the arc between the plumb-line and the edge of the quadrant, which ſeems to touch the *moon*'s horns, will ſhew the inclination of that part of the ecliptic to the horizon. And the arc, between the other edge of the quadrant and plumb-line, will ſhew the inclination of a line, touching the *moon*'s horns, to the horizon.

At laſt, the *moon* arriving at E, ſhews no part of her illumined face at all to the earth, as in E; this poſition we call the *new moon*, and ſhe is then ſaid to be in conjunction with the ſun; the ſun and *moon* being in the ſame point of the ecliptic.

As the *moon* advances towards F, ſhe reſumes her horns: and as before the new *moon* the horns were turned weſtward, ſo now they change their poſition, and look eaſtward: when ſhe comes to G, ſhe is again in a quadrate aſpect with the ſun; in H ſhe is gibbous; and in A ſhe is again full.

Here the arch E L, or the angle S T L, contained under lines drawn from the centres of the ſun and *moon* to that of the earth, is called *the elongation of the moon* from the ſun: and the arch M O, which is the portion of the illumined circle M O N, that is turned towards us, and which is the meaſure of the angle that the circle bounding light and darkneſs, and the circle of viſion, make with each other, is every where nearly ſimilar to the arch of elongation E L; or, which is the ſame thing, the angle S T L is nearly equal to the angle M L O: as is demonſtrated by geometers.

To delineate the MOON'*s phaſes for any time.* Let the circle C O B P (*fig.* 14.) repreſent the *moon*'s diſc turned towards the earth, and let O P be the line in which the ſemicircle O C P is projected, which ſuppoſe cut at right angles by the diameter B C; then making L P the radius, take L F equal to the co-ſine of the elongation of the *moon*; and upon B C, as the greater axis, and L F the leſs, deſcribe the ſemiellipſis B F C; this ellipſis will cut off from the *moon*'s diſc the portion B F C P, of the illumined face viſible on the earth.

As the *moon* illumines the earth by a light reflected from the ſun, ſo ſhe is reciprocally illumined by the earth, which reflects the ſun's rays to the ſurface of the *moon*, and that much more abundantly than ſhe receives them from the *moon*. For the ſurface of the earth is above 13 times greater than that of the *moon*; and, therefore, ſuppoſing the texture of each body alike, as to the power of reflecting, the earth muſt return 13 times more light to the *moon* than ſhe receives from it. In new *moons*, the illumined ſide of the earth is turned fully towards the *moon*, and will, therefore, at that time, illumine the dark ſide of the *moon*; and then the lunar inhabitants (if ſuch there be) will have a full earth, as we in a ſimilar poſition, have a full *moon*: and hence ariſes that dim light obſerved in the old and new *moons*; whereby, beſides the bright horns, we perceive ſomewhat more of her body behind them, though very obſcurely. When the *moon* comes to be in oppoſition to the ſun, the earth, ſeen from the *moon*, will appear in conjunction with him, and its dark ſide will be turned towards the *moon*; in which poſition the earth will diſappear to the *moon* as that does to us at the time of the new *moon*, or in her conjunction with the ſun. After this, the lunar inhabitants will ſee the earth in an horned figure. In fine, the earth will preſent all the ſame phaſes to the *moon*, as the *moon* does to the earth. But from one half of the *moon*, the earth is never ſeen at all; from the middle of the other half it is always ſeen over head, turning round almoſt thirty times as quick as the *moon* does. From the circle which limits our view of the *moon*, only one half of the earth's ſide next her is ſeen; the other half being hid below the horizon of all places on that circle. To her the earth ſeems to be the biggeſt body in the univerſe; for it appears thiteen times as big as ſhe does to us. As the earth turns round its axis, the ſeveral continents, ſeas, and iſlands appear to the *moon*'s inhabitants like ſo many ſpots of different forms and brightneſs, moving over its ſurface; but much fainter at ſometimes than others, as our clouds cover or leave them. By theſe ſpots, the Lunarians can determine the time of the earth's diurnal motion, juſt as we do the motion of the ſun: and perhaps they meaſure their time by the motion of the earth's ſpots; for they cannot have a truer dial.

Dr. Hook, accounting for the reaſon why the *moon*'s light affords no viſible heat, obſerves that the quantity of light, which falls on the hemiſphere of the full *moon*, is rarefied into a ſphere 288 times greater in diameter than the *moon*, before it arrives at us; and conſequently, that the *moon*'s light is 104368 times weaker than that of the ſun. It would, therefore, require 104368 full *moons* to give a light and heat equal to that of the ſun at noon.

Dr. Smith has endeavoured to ſhew, in his book on Optics, that the light of the full *moon* is but equal to a 90 thouſandth part of the common light of the day when the ſun is hidden by a cloud. See LIGHT.

MOON, *courſe and motion of the.* Though the *moon* finiſhes its courſe in 27 days 7 hours 43', which interval we call a *periodical* month, yet ſhe is longer in paſſing from one conjunction to another: which ſpace we call a *ſynodical* month, or a *lunation*. The reaſon is, that while the *moon* is performing its courſe round the earth in its own orbit, the earth and *moon* are making their progreſs round the ſun, and both are advanced almoſt a whole ſign towards the eaſt; ſo that the point of the orbit, which in the former poſition, was in a right line paſſing through the centres of the earth and ſun, is now more weſterly than the ſun: and therefore, when the *moon* is arrived again at that point, it will not yet be ſeen in conjunction with the ſun; nor will the lunation be completed in leſs than 29 days and a half.

Were the plane of the *moon*'s orbit coincident with the plane of the ecliptic, i. e. were the earth and *moon* both moved in the ſame plane, the *moon*'s way in the heavens, viewed from the earth, would appear juſt the ſame with that of the ſun; with this only difference, that the ſun would be found to deſcribe his circle in the ſpace of a year, and the *moon* her's in a month. But this is not the caſe; for the two planets cut each other in a right line, paſſing through the centre of the earth, and are inclined to each other in an angle of about five degrees eighteen minutes.

Suppoſe, e. g. A B (*fig.* 15.) a portion of the earth's orbit, T the earth, and C E D F the *moon*'s orbit, wherein is the centre of the earth; from the ſame centre T; in the plane of the ecliptic, deſcribe another circle C G D H, whoſe ſemidiameter is equal to that of the *moon*'s orbit. Now theſe two circles, being in ſeveral planes, and having the ſame centre, will interſect each other in a line D C, paſſing through the centre of the earth. Conſequently, C E D, one half of the orbit of the *moon*, will be raiſed above the plane of the circle C G H, towards the north: and D F C, the other half, will be ſunk below towards the ſouth. The right line D C, wherein the two circles interſect each other, is called *the line of the nodes*, and the points of the angles C and D, *the nodes*: whereof that where the *moon* aſcends above the plane of the ecliptic, northwards, is called, *the aſcending node*, and *the head of the dragon*; and the other D, *the deſcending node*, and *the dragon's tail*; and the interval of time between the *moon*'s going from the aſcending node, and returning to it, a *dracontic month*.

If the line of the nodes were immoveable, that is, if it had no other motion but that whereby it is carried round the ſun, it would ſtill look towards the ſame point of the ecliptic; i. e. it would always keep parallel to itſelf: but it is found by obſervation, that the line of the nodes conſtantly changes place, and ſhifts in ſituation from eaſt to weſt, contrary to the order of the ſigns; and, by a retrograde motion, finiſhes its circuit in about nineteen years; in which time each of the nodes returns to that point of the ecliptic whence it before receded.

Hence it follows, that the *moon* is never preciſely in the ecliptic, but twice each period; viz. when ſhe is in the nodes. Throughout the reſt of her courſe ſhe deviates from it, being nearer or farther from the ecliptic, as ſhe is nearer or farther from the nodes. In the points F and E ſhe is at her greateſt diſtance from the nodes; which points are therefore called her *limits of north and ſouth latitude*.

The *moon's* diſtance from the nodes, or rather from the ecliptic, is called her *latitude*, which is meaſured by an arch of a circle drawn through the *moon*, perpendicular to the ecliptic, and intercepted between the *moon* and the ecliptic. The *moon's* latitude, when at the greateſt, as in E or F, never exceeds 5 degrees and about 18 minutes; which latitude is the meaſure of the angles at the nodes.

It appears by obſervation, that the *moon's* diſtance from the earth is continually changing; and that ſhe is always either drawing nearer, or going farther from us. The reaſon is, that the *moon* does not move in a circular orbit, which has the earth for its centre; but in an elliptic orbit (as repreſented in *fig.* 16.) one of whoſe foci is the centre of the earth: A P repreſents the greater axis of the ellipſis, and the line of the apſides; and T C the eccentricity: the point A, which is the higheſt apſis, is called the *apogee* of the *moon*; and P, the lower apſis, is the *moon's perigee*, or the point wherein ſhe comes neareſt the earth.

Beſides, there is reaſon to believe that the *moon* is ſomewhat nearer the earth now than ſhe was formerly; her periodical month being ſhorter than it was in former ages. For our aſtronomical tables, which in the preſent age ſhew the time of ſolar and lunar eclipſes to great preciſion, do not anſwer ſo well for ancient eclipſes.

The ſpace of time wherein the *moon*, going from the apogee, returns to it again, is called the *anomaliſtic month*.

If the *moon's* orbit had no other motion but that wherewith it is carried round the ſun, it would ſtill retain a poſition parallel to itſelf, and always point the ſame way, and be obſerved in the ſame point of the ecliptic: but the line of the apſides is likewiſe obſerved to be moveable, and to have an angular motion round the earth, from weſt to eaſt, according to the order of the ſigns, returning to the ſame ſituation in the ſpace of about nine years.

The irregularities of the MOON'*s motion*, and that of her orbit, are very conſiderable. For, 1. when the earth is in her aphelion, the *moon* is in her aphelion likewiſe; in which caſe ſhe quickens her pace, and performs her circuit in a ſhorter time; on the contrary, when the earth is in its perihelion, the *moon* is ſo too, and then ſhe ſlackens her motion: and thus ſhe revolves round the earth, in a ſhorter ſpace when the earth is in her aphelion than when in her perihelion; ſo that the periodical months are not all equal.

2. When the *moon* is in her ſyzygies, i. e. in the line that joins the centres of the earth and ſun, which is either in her conjunction or oppoſition, ſhe moves ſwifter, *cæteris paribus*, than when in the quadratures.

3. According to the different diſtances of the *moon* from the ſyzygies, i. e. from oppoſition to conjunction, ſhe changes her motion: in the firſt quarter, that is, from the conjunction to her firſt quadrature, ſhe abates ſomewhat of her velocity; which in the ſecond quarter ſhe recovers; in the third quarter ſhe again loſes; and in the laſt ſhe again recovers. This inequality was firſt diſcovered by Tycho Brahe, who called it *the moons variation*.

4. The *moon* moves in an ellipſis, one of whoſe foci is in the centre of the earth, round which ſhe deſcribes areas proportionable to the time, as the primary planets do round the ſun; whence the motion in her perigee muſt be quickeſt, and it muſt be ſloweſt in the apogee.

5. The very orbit of the *moon* is changeable, and does not always perſevere in the ſame figure; its eccentricity being ſometimes increaſed, and ſometimes diminiſhed: it is greateſt, when the line of the apſides coincides with that of the ſyzygies; and leaſt, when the line of the apſides cuts the other at right angles.

6. Nor is the apogee of the *moon* without an irregularity; being found to move forward, when it coincides with the line of the ſyzygies; and backward, when it cuts that line at right angles. Nor is this progreſs and regreſs in any meaſure equal: in the conjunction or oppoſition, it goes briſkly forward; and in the quadratures it moves either ſlowly forward, ſtands ſtill, or goes backwards.

7. The motion of the nodes is not uniform; but when the line of the node coincides with that of the ſyzygies at right angles, they go backward, from eaſt to weſt; and this, ſir Iſaac Newton ſhews, is at the rate of $16''$, $19'''$, $24''''$, in an hour.

The only equable motion the *moon* has, is that wherewith ſhe turns round her axis exactly in the ſame ſpace of time in which ſhe revolves round us in her orbit; whence it happens, that ſhe always turns the ſome face towards us.

For as the *moon*'s motion round its axis is equal, and yet its motion, or velocity, in its orbit, is unequal, it follows, that when the *moon* is in its perigee, where it moves ſwifteſt in its orbit, that part of its ſurface, which, on account of its motion in the orbit, would be turned from the earth, is not ſo entirely; by reaſon of its motion round its axis. Thus ſome parts in the limb or margin of the *moon*, ſometimes recede from the centre of the diſc, and ſometimes approach towards it; and ſome parts, that were before inviſible, becomes conſpicuous; which is called *the moon's libration*.

Yet this equability of rotation occaſions an apparent irregularity; for the axis of the *moon* not being perpendicular to the plane of her orbit, but a little inclined to it; and this axis, maintaining its paralleliſm, in its motion round the earth; it muſt neceſſarily change its ſituation, in reſpect of an obſerver on the earth; to whom ſometimes the one, and ſometimes the other pole of the *moon* becomes viſible; whence it appears to have a kind of wavering, or vacillation.

Phyſical cauſe of the MOON'*s motions*. The *moon*, we have obſerved, moves round the earth by the ſame laws, and in the ſame manner, as the earth, and other planets, move round the ſun. The ſolution, therefore, of the lunar motions, in general, comes under thoſe of the earth and other planets.

As for the particular irregularities in the *moon's* motion, to which the earth, and other planets, are not ſubject, they ariſe from the ſun, which acts on, and diſturbs her in her ordinary courſe through her orbit; and are all mechanically deducible from the ſame great law whereby her general motion is directed; viz. the law of *gravitation* and *attraction*.

Other ſecondary planets, v. g. the ſatellites of Jupiter and Saturn, are, doubtleſs, ſubject to the like irregularities with the *moon*; as being expoſed to the ſame perturbating or diſturbing force of the ſun; but their diſtance ſecures them from our obſervation.

The laws of the ſeveral irregularities in the ſyzygies, quadratures, &c. ſee under SYZYGIES, QUADRATURES, &c.

We ſhall, however, in this place, introduce a general view of the Newtonian theory of gravity, as it is applied to the ſolution of the irregularities of the *moon*'s motion. It muſt firſt be conſidered, that if the ſun acted equally on the earth and *moon*, and always in parallel lines, this action would ſerve only to reſtrain them in their annual motions round the ſun, and no way affect their actions on each other, or their motions about their common centre of gravity. But becauſe the *moon* is nearer the ſun, in one half of her orbit, than the earth is, and farther in the other half of her orbit, and the power of gravity is always greater at a leſs diſtance, it follows, that, in one half of her orbit the *moon* is more attracted than the earth towards the ſun, and in the other half leſs attracted than the earth: and hence irregularities neceſſarily ariſe in the motions of the *moon*; the exceſs, in the firſt caſe, and the defect, in the ſecond, of the attraction, becoming a force that diſturbs her motion; and beſides, the action of the ſun, on the earth and *moon*, is not directed in parallel lines, but in lines that meet in the centre of the ſun.

In order to underſtand the effects of theſe powers, let us ſuppoſe that the projectile motions of the earth and *moon* were deſtroyed, and that they were allowed to fall freely towards the ſun. If the *moon* was in conjunction with the ſun, or in that part of her orbit which is neareſt to him, the *moon* would be more attracted than the earth, and fall with greater velocity towards the ſun; ſo that the diſtance of the *moon* from the earth would be increaſed in the fall. If the *moon* was in oppoſition, or in the part of her orbit which is fartheſt from the ſun, ſhe would be leſs attracted than the earth by the ſun, and would fall with a leſs velocity, towards the ſun than the earth, and the *moon* would be left behind by the earth; ſo that the diſtance of the *moon* from the earth would be increaſed, in this caſe alſo. If the *moon* was in one of the quarters, then the earth and *moon* being both attracted towards the centre of the ſun, they would both directly deſcend towards that centre, and, by approaching to the ſame centre, they would neceſſarily approach at the ſame time to each other, and their diſtance from one another would be diminiſhed, in this caſe. Now, wherever the action of the ſun would increaſe their diſtance, if they were allowed to fall towards the ſun, there we may be ſure of the ſun's action, by endeavouring to ſeparate them, diminiſhes their gravity to each other; wherever the action of the ſun would diminiſh their diſtance, there the ſun's action, by endeavouring to make them approach to one another, increaſes their gravity to each other: that is, in the conjunction and oppoſition, their gravity towards each other is diminiſhed by the action of the ſun; but in the two quarters it is increaſed by the action of the ſun. To prevent miſtaking this matter, it muſt be remembered, it is not the total action of the ſun on them that diſturbs their motions, it is only that part of its action, by which it tends to ſeparate them, in the firſt caſe, to a greater diſtance from each other; and that part of its action, by which it tends to bring them nearer to each other, in the ſecond caſe, that has any effect on their motions, with reſpect to each other. The other, and the far more conſiderable part has no other effect but to retain them in their annuul courſe, which they perform together about the ſun.

In conſidering, therefore, the effects of the ſun's action on the motions of the earth and *moon*, with reſpect to each other, we need only attend to the exceſs of its action on the *moon* above its action on the earth, in their conjunction; and we muſt conſider this exceſs as drawing the *moon* from the earth towards the ſun in that place. In the oppoſition, we need only conſider the exceſs of the action of the ſun, on the earth, above its action on the *moon*, and we muſt conſider this exceſs as drawing the *moon* from the earth, in this place, in a direction oppoſite to the former, that is, towards the place, oppoſite to where the ſun is; becauſe we conſider the earth as quieſcent, and refer the motion, and all its irregularities to the *moon*. In the quarters, we conſider the actions of the ſun as adding ſomething to the gravity of the *moon* towards the earth.

Suppoſe the *moon* ſetting out from the quarter the precedes the conjunction, with a velocity that would make her deſcribe an exact circle round the earth, if the ſun's action had no effect on her; and becauſe her gravity is increaſed by that action, ſhe muſt deſcend towards the earth, and move within that circle: her orbit, there, will be more curve than otherwiſe it would have been; becauſe this addition to her gravity will make her fall farther at the end of an arc below the tangent drawn at the other end of it; her motion will be accelerated by it, and will continue to be accelerated till ſhe arrives at the enſuing conjunction; becauſe the direction of the action of the ſun upon her, during that time, makes an acute angle with the direction of her motion. At the conjunction, her gravity towards the earth being diminiſhed by the action of the ſun, her orbit will be leſs curve there, for that reaſon; and ſhe will be carried farther from the earth as ſhe moves to the next quarter; and, becauſe the action of the ſun makes then an obtuſe angle with the direction of her motion, ſhe will be retarded by the ſame degrees by which ſhe was accelerated before.

Thus ſhe will deſcend a little towards the earth, as ſhe moves from the firſt quarter towards the conjunction, and aſcend from it, as ſhe moves from the conjunction to the next quarter. The action which diſturbs her motion will have a like, and almoſt equal effect upon her, while ſhe moves in the other half of her orbit, that is, that half of it which is fartheſt from the ſun: ſhe will proceed from the quarter that follows the conjunction with an accelerated motion to the oppoſition, approaching a little towards the earth, becauſe of the addition made to her gravity, at that quarter, from the action of the ſun; and receding from it again, as ſhe goes on from the oppoſition to the quarter from which we ſuppoſed her to ſet out. The areas deſcribed in equal times, by a ray drawn from the *moon* to the earth will not be equal, but will be accelerated by the conſpiring action of the ſun, as ſhe moves towards the conjunction or oppoſition from the quarters that precede them; and will be retarded by the ſame action, as ſhe moves from the conjunction or oppoſition to the quarters that ſucceed them. Newton has computed the quantities of theſe irregularities from their cauſes. He finds, that the force added to the gravity of the *moon*, in her quarters, is to the gravity with which ſhe would revolve in a circle about the earth, at her preſent mean diſtance, if the ſun had no effect on her, as 1 to $178\frac{29}{40}$. He finds the force ſubducted from her gravity, in the conjunctions and oppoſitions, to be double of this quantity, and the area deſcribed in a given time in the quarters, to be to the area deſcribed in the ſame time in the conjunctions and oppoſitions, as 10973 to 11073. He finds, that in ſuch an orbit, her diſtance from the earth in her quarters, would be to her diſtance in the conjunctions and oppoſitions, as 70 to 69.

As to the effect of the action of the ſun on the nodes, and conſequently, on the inclination of the *moon*'s orbit to the ecliptic, ſee NODES.

Moreover, the action of the ſun diminiſhes the gravity of the *moon* towards the earth, in the conjunctions and oppoſitions, more than it adds to it in the quarters, and, by diminiſhing the force which retains the *moon* in her orbit, increaſes her diſtance from the earth and her periodic time: and becauſe the earth and *moon* are nearer the ſun in their perihelion than in their aphelion, and the ſun acts with a greater force there, ſo as to ſubduct more from the *moon*'s gravity towards the earth; it follows, that the *moon* muſt revolve at a greater diſtance, and take a longer time to finiſh her revolution in the perihelion of the earth than in the aphelion; and this alſo is conformable to obſervation.

There is another remarkable irregularity in the *moon*'s motion, that alſo ariſes from the action of the ſun: which is the progreſſive motion of the apſides. The *moon* deſcribes an ellipſe about the centre of the earth, having one of the foci in that centre. Her greateſt and leaſt diſtances from the earth are in the apſides, or extremities of the longer axis of the ellipſe. This is not found to point always to the ſame place in the heavens, but to move with a progreſſive motion forwards ſo as to finiſh a revolution round the earth's centre in about nine years.

To underſtand the reaſon of this motion of the apſides, we muſt conſider, that, if the gravity of a body decreaſed leſs as the diſtance increaſes, then, according to the regular courſe of gravity, the body would deſcend ſooner from the higher to the lower apſis, than in half a revolution; and therefore the apſis would recede in that caſe, for it would move in a contrary direction to the motion of the body, meeting it in its motion. But if the gravity of the body ſhould decreaſe more as the diſtance increaſes, than according to the regular courſe of gravity, that is, in a higher proportion than as the ſquare of the diſtance increaſes, the body would take more than half a revolution to move from the higher to the lower apſis; and, therefore, in that caſe, the apſides would have a progreſſive motion in the ſame direction as the body.

In the quarters, the ſun's action adds to the gravity of the *moon*, and the force it adds is greater as the diſtance of the *moon* from the earth is greater; ſo that the action of the ſun hinders her gravity towards the earth from decreaſing as much while the diſtance increaſes, as it ought to do according to the regular courſe of gravity; and, therefore, while the *moon* is in the quarters, her apſides muſt recede. In the conjunction and oppoſition, the action of the ſun ſubducts from the gravity of the *moon* towards the earth, and ſubducts the more the greater her diſtance from the earth is, ſo as to make her gravity decreaſe more as her diſtance increaſes, than according to the regular courſe of gravity; and therefore, in this caſe, the apſides are in a progreſſive motion. Becauſe the action of the ſun ſubducts more in the conjunctions and oppoſitions from her gravity, than it adds to it in the quarters, and, in general, diminiſhes more than it augments her gravity; hence it is that the progreſſive motion of the apſides exceeds the retrograde motion; and, therefore, the apſides are carried round according to the order of the ſigns. See Maclaurin's Account of ſir Iſaac Newton's Phil. Diſc. book iv. chap. 4.

We have ſome obſervations and tables concerning the *moon's* motion, by Mr. Richard Dunthorn, in the Philoſophical Tranſactions, N° 482. ſec. 13. where he gives a hundred obſerved longitudes of the *moon* compared with the tables, viz. twenty-five eclipſes of the *moon*, taken (except the firſt) from Flamſteed's Hiſtoria Cœleſtis, the Philoſophical Tranſactions, and the Memoirs of the Royal Academy of Sciences; the two great eclipſes of the ſun in 1706, and 1715; twenty-five ſelect places of the *moon*, from Flamſteed's Hiſtoria Cœleſtis; and forty-eight of thoſe longitudes of the *moon*, computed from Flamſteed's Obſervations by Dr. Halley, and printed in the firſt edition of the Hiſtoria Cœleſtis.

Figure of the MOON'*s path with reſpect to the ſun.* The path of the *moon* is concave towards the ſun throughout.

In other ſecondary planets, as the ſatellites of the ſuperior planets, that part of the path of theſe ſatellites which is neareſt the ſun, is convex towards the ſun, and the reſt is concave. And we often find in elementary treatiſes of aſtronomy, the *moon*'s path repreſented in the ſame manner; that is, as partly convex and partly concave toward's the ſun; but this is a miſtake. For it is to be obſerved, in general, that the force which bends the courſe of the ſatellite into a curve, when the motion is referred to an immoveable plane, is, at the conjunction, the difference of its gravity towards the ſun, and of its gravity towards the primary. When the former prevails over the latter, the force that bends the courſe of the ſatellite tends towards the ſun; and, conſequently, the concavity of the path is towards the ſun; and this is the caſe of the *moon*. When the gravity towards the primary exceeds the gravity towards the ſun, at the conjunction, then the force which bends the courſe of the ſatellite tends toward the primary, and therefore towards the oppoſition of the ſun; conſequently the path is there convex toward the ſun; and this is the caſe of the ſatellites of Jupiter. When theſe two forces are equal, the path has, at the conjunction, what mathematicians call a point of rectitude; in which caſe, however, the path is concave towards the ſun throughout.

If, indeed, the earth had no annual motion, the *moon's* motion round the earth, and her track in open ſpace, would be always the ſame. But as the earth and *moon* move round the ſun, the *moon*'s real path in the heavens is very different from her viſible path round the earth; the latter being in a progreſſive circle, and the former in a curve of different degrees of concavity, which would be always the ſame in the ſame parts of the heavens, if the *moon* performed a complete number of lunations in a year, without any fractions.

Mr. Ferguſon has ſuggeſted the following familiar idea of the earth's and *moon's* path. Let a nail in the end of a chariot-wheel repreſent the earth, and a pin in the nave, the *moon*; if the body of the chariot be propped up, ſo as to keep that wheel from touching the ground, and the wheel be then turned round by hand, the pin will deſcribe a circle both round the nail, and in the ſpace it moves through. But if the props be taken away, the horſes put to, and the chariot driven over a piece of ground which is circularly convex; the nail in the axle will deſcribe a circular curve, and the pin in the nave will ſtill deſcribe a circle round the progreſſive nail in the axle, but not in the ſpace through which it moves. In this caſe, the curve deſcribed by the nail will reſemble in miniature as much of the earth's annual path round the ſun, as it deſcribes whilſt the *moon* goes as often round the earth as the pin does round the nail: and the curve deſcribed by the nail will have ſome reſemblance to the *moon*'s path during ſo many lunations.

Let us now ſuppoſe that the radius of the circular curve, deſcribed by the nail in the axle, is to the radius of the circle, which the pin in the nave deſcribes round the axle, as $337\frac{1}{2}$ to 1; which is the proportion of the radius or ſemidiameter of the earth's orbit to that of the *moon's*; or of the circular curve A 1 2 3 4 5 6 7 B, &c. (*Tab.* IV. *Aſtronomy*, *fig.* 81.) to the little circle *a*, and then whilſt the progreſſive nail deſcribes the ſaid curve from A to E, the pin will go once round the nail, with regard to the centre of its path, and, in ſo doing, will deſcribe the curve *a b c d e*. The former will be a true repreſentation of the earth's path for one lumination, and the latter of the *moon*'s for that time. Here we may ſet aſide the inequalities of the *moon*'s motion, and alſo the earth's moving round its common centre of gravity, and the *moon's*: all which, if they were truly copied in this experiment, would not ſenſibly alter the figure of the paths deſcribed by the nail and pin, even though they ſhould rub againſt a plain upright ſurface all the way, and leave their tracks viſible upon it. And if the chariot was driven forward on ſuch a convex piece of ground, ſo as to turn the wheel ſeveral times round, the track of the pin in the nave would ſtill be concave toward the centre of the circular curve deſcribed by the pin in the axle; as the *moon's* path is always concave to the ſun in the centre of the earth's annual orbit.

In this diagram, the thickeſt curve line A B C D E, with the numeral figures ſet to it, repreſents as much of the earth's annual orbit as it deſcribes in 32 days from weſt to eaſt; the little circles at *a*, *b*, *c*, *d*, *e*, ſhew the *moon*'s orbit in due proportion to the earth's; and the ſmalleſt curve *a b c d e f* repreſents the line of the *moon*'s path in the heavens for 32 days, accounted from any particular new *moon* at *a*.

The ſun is ſuppoſed to be in the centre of the curve A 1 2 3 4 5 6 7 B, &c. and the ſmall dotted circles upon it repreſent the *moon*'s orbit, of which the radius is in the ſame proportion to the earth's path in this ſcheme, that the radius of the *moon*'s orbit in the heavens, bears to the radius of the earth's annual path round the ſun; that is, as 240,000 to 81,000,000, or as 1 to $337\frac{1}{2}$.

When the earth is at A, the new *moon* is at *a*; and in the ſeven days that the earth deſcribes the curve 1 2 3 4 5 6 7, the *moon*, in accompanying the earth, deſcribes the curve *a b*; and it is in her firſt quarter at *b* when the earth is at B. As the earth deſcribes the curve B 8 9 10 11 12 13 14, the *moon* deſcribes the curve *b c*; and is at *c*, oppoſite to the ſun, when the earth is at C. Whilſt the earth deſcribes the curve C 15 16 17 18 19 20 21 22, the *moon* deſcribes the curve *c d*; and is in her third quarter at *d* when the earth is at D. And laſtly, whilſt the earth deſcribes the curve D 23 24 25 26 27 28 29, the *moon* deſcribes the curve *d e*; and is again in conjunction at *e* with the ſun, when the earth is at E, between the 29th and 30th day of the *moon's* age accounted by the numeral figures from the new *moon* at A. In deſcribing the curve *a b c d e*, the *moon* goes round the progreſſive earth as really as if ſhe had kept in the dotted circle A, and the earth continued immoveable in the centre of that circle.

And thus we ſee, that although the *moon* goes round the earth in a circle, with reſpect to the earth's centre, her real path in the heavens is not very different in appearance from the earth's path. To ſhew that the *moon*'s path is concave to the ſun, even at the time of change, it is carried on a little farther into a ſecond lunation, as to *f*.

The *moon*'s abſolute motion from her change to her firſt quarter, or from *a* to *b*, is ſo much ſlower than the earth's, that ſhe falls 240 thouſand miles (equal to the ſemidiameter of her orbit) behind the earth at her firſt quarter in *b*, when the earth is in B; that is, ſhe falls back a ſpace equal to her diſtance from the earth. From that time her motion is gradually accelerated to her oppoſition or full at *c*, and then ſhe is come up as far as the earth, having regained what ſhe loſt in her firſt quarter from *a* to *b*. From the full to the laſt quarter at *d*, her motion continues accelerated, ſo as to be juſt as far before the earth at *d*, as ſhe was behind it at her firſt quarter in *b*. But from *d* to *e* her motion is retarded ſo, that ſhe loſes as much with reſpect to the earth, as is equal to her diſtance from it, or to the ſemidiameter of her orbit; and by that means ſhe comes to *e*, and is then in conjunction with the ſun, as ſeen from the earth at E. Hence we find, that the *moon's* abſolute motion is ſlower than the earth's, from her third quarter to her firſt; and ſwifter than the earth's, from her firſt quarter to her third: her path being leſs curved than the earth's in the former caſe, and more in the latter. Yet it is ſtill bent the ſame way towards the ſun; for if we imagine the concavity of the earth's orbit to be meaſured by the length of a perpendicular line C *g*, let down from the earth's place upon the ſtraight line *b g d*, at the full of the *moon*, and connecting the places of the earth at the end of the *moon*'s firſt and third quarters, that length will be about 640 thouſand miles; and the *moon*, when new, only approaching nearer to the ſun, by 240 thouſand miles, than the earth is, the length of the perpendicular let down from her place, at that time, upon the ſame ſtraight line, and which ſhews the concavity of that part of her path, will be about 400 thouſand miles.

The gravity of the *moon* towards the ſun has been found to be greater, at her conjunction, than her gravity towards the earth, ſo that the point of equal attraction, where thoſe two powers would ſuſtain each other, falls then between the *moon* and earth: and ſince the quantity of matter in the ſun is almoſt 230 thouſand times as great as the quantity of matter in the earth, and the attraction of each body diminiſhes as the ſquare of the diſtance from it increaſes, it may be eaſily found, that this point of equal attraction between the earth and the ſun is about 70 thouſand times nearer the earth than the *moon* is at her change: whence ſome, and particularly Mr. Baxter, author of Matho, have apprehended, that either the parallax of the ſun is very different from that which is aſſigned by aſtronomers, or that the *moon* ought neceſſarily to abandon the earth; becauſe ſhe is conſiderably more attracted by the ſun than by the earth at that time. This apprehenſion may be removed eaſily, by attending to what has been ſhewn by ſir Iſaac Newton, and is illuſtrated by vulgar experiments concerning the motions of bodies about one another, that are all acted upon by a third force in the ſame direction. Their relative motions not being in the leaſt diſturbed by this third force, if it act equally upon them in parallel lines; as the relative motions of the ſhips in a fleet, carried away by a current, are no way affected by it, if it act equally upon them; or as the rotation of a bullet or bomb, about its axis, while it is projected in the air; or the figure of a drop of falling rain, are not at all affected by the gravity of the particles of which they are made up, towards the earth. The *moon* is ſo near the earth, and both of them ſo far from the ſun, that the attractive power of the ſun may be conſidered as equal on both; and, therefore, the *moon* will continue to circulate round the earth in the ſame manner as if the ſun did not attract them at all. It is to the inequality of the action of the ſun upon the earth and *moon*, and the want of paralleliſm in the directions of theſe actions, only, that we are to aſcribe the irregularities in the motions of the *moon*.

But it may contribute farther towards removing this difficulty to obſerve, that if the abſolute velocity of the *moon*, at the conjunction, was leſs than that which is requiſite to carry a body in a circle there around the ſun, ſuppoſing this body to be acted on by the ſame force which acts there on the *moon*, (i. e. by the exceſs of her gravity towards the ſun, above her gravity towards the earth) then the *moon* would, indeed, abandon the earth. For, in that caſe, the *moon* having leſs velocity than would be neceſſary to prevent her from deſcending within that circle, ſhe would approach to the ſun, and recede from the earth. But though the abſolute velocity of the *moon*, at the conjunction, be leſs than the velocity of the earth in the annual orbit, yet her gravity towards the ſun is ſo much diminiſhed, by her gravity toward the earth, that her abſolute velocity is ſtill much ſuperior to that which is requiſite to carry a body in a circle, there, about the ſun, that is acted on by the remaining force only. Therefore, from the moment of the conjunction, the *moon* is carried without ſuch a circle, receding continually from the ſun to greater and greater diſtances, till ſhe arrives at the oppoſition; where being acted on by the ſum of thoſe two gravities, and her velocity being now leſs than what is requiſite to carry a body in a circle, there, about the ſun, that is acted on by a force equal to that ſum, the *moon* thence begins to approach to the ſun again. Thus, ſhe recedes from the ſun, and approaches to it by turns, and in every month her path hath two apſides, a perihelion at the conjunction, and an aphelion at the oppoſition; between which ſhe is always carried in a manner ſimilar to that in which the primary planets revolve between their apſides. The planet recedes from the ſun at the perihelion, becauſe its velocity, there, is greater than that with which a circle could be deſcribed about the ſun, at the ſame diſtance, by the ſame centripetal force; and approaches towards the ſun from the aphelion, becauſe its velocity, there, is leſs than is requiſite to carry it in a circle, at that diſtance, about the ſun.

If we ſuppoſe the earth to revolve in a circular orbit round the ſun as its centre, and the *moon* to revolve round the earth in the ſame manner; the planes of their orbits to coincide; the diameters of their orbits to be as 340 to 1; and the *moon* to perform 13,368 revolutions to every ſingle revolution of the earth: it is eaſy to inveſtigate the nature and deſcription of the curve generated by the centre of the *moon*; and to determine whether this curve, in one lunation, be any-where convex towards the ſun.

Let S (*Tab.* III. *Analyſis*, *fig.* 69.) repreſent the ſun; E the earth; E e an arch of the orbit of the earth paſſed over by its centre, in one lunation of the *moon*; the circumference of the circle E A F = the concentric arch A α: then, (becauſe 13.368 − 1 = 12.368 = the number of lunations in the year, or one revolution of the earth, and therefore S A : E A : : 12.368 : 1,) when the *moon* is in conjunction wlth the ſun, the diſtance between the ſun and *moon* will be greater than the diſtance or radius S A. Now the curve, deſcribed by the centre of the *moon*, is the ſame as that deſcribed by a point M (E M being the ſemidiameter of the *moon's* orbit), carried round by the rotation of the circle E A F on the arch A α: it is therefore of the cycloidal kind, having a point of inflexion, if every cycloid, deſcribed by a point within the generating circle, is inflected, as well upon a circular as upon a rectilinear baſe. To determine which,

Put S *b* A or S R $= a$, E A or *e* R $= b$, E M or *em* $= c$, R *m* $= r$, R *d* $= s$; and let *m* C be the radius of curvature at any point *m*, which, it is evident, muſt paſs through the point of contact R. Suppoſe the point *n* indefinitely near to *m*: then, R *r* and R *r* being the indefinitely ſmall contemporary arches with *m n*, and, conſequently, the triangles R *m r* and R *n r* equal in all reſpects; if we conſider the ſaid little arches R *r* and R *r* as little right lines perpendicular to the radii *e r* and S *r*, we ſhall have the $\angle mRn = \angle rRr =$ (becauſe the angles *e* R *r* and S R *r*, added to either ſide of the equation, make it two right angles) $\angle Rer + \angle RSr$. Now $SR : eR :: \angle Rer : \angle RSr$, and $SR : SR + Re :: \angle Rer : Rer + \angle RSr$, that is, $a : a + b :: \angle Rer : \angle mRn = \frac{a+b}{a} \angle Rer$. Again, in any triangle, as *d m r*, if the angles *m d r*, *m r d*, and R *m r*, the complement of the obtuſe angle to two right angles, be indefinitely ſmall, they will be proportional to the oppoſite ſides *m r*, *m d*, and *d r*; that is, $dr : md :: \angle Rmr : \angle mrd$; and $dr - md : dr :: \angle Rmr - \angle mrd : \angle Rmr$, that is, $mR : dR :: \angle Rdr : \angle Rnr$, or, $r : s :: \frac{1}{2} \angle Rer : \angle Rnr = \frac{s}{2r} \angle Rer$. And again, $\angle RCn : \angle RnC :: Rn : RC$, that is, $\angle mRn - \angle Rnr : \angle Rnr :: Rm : RC$, or $\overline{\frac{a+b}{a} - \frac{s}{2r}} \angle Rer : \frac{s}{2r} \angle Rer :: r : RC = \frac{ars}{2ar + 2br - s}$. Conſequently, $mR + RC = mC = \frac{2ar^2 + 2br^2}{2ar + 2br - as} = \frac{r^2}{r - \frac{as}{2a+2b}}$ = the radius of curvature at any point *m*.

Now, it is evident, that, at the point of inflection, the radius of curvature muſt be infinite: or that, on one ſide of the ſaid point, the expreſſion for the radius of curvature muſt be affirmative, and on the other nagative; therefore, *r* muſt be more than $\frac{as}{2a+2b}$ on one ſide of the ſaid point, and on the other leſs; and, conſequently, at the point of inflection, $r = \frac{as}{2a+2b}$; which, ſubſtituted for *r*, makes $(dm \times mR =)\ rs - r^2 = \frac{2abs^2 + a^2s^2}{\overline{2a+2b}|^2} =$ (becauſe $dm \times mR = fm \times ma =$) $b^2 - c^2$; from which equation we have $s = \frac{\overline{2a+2b}\sqrt{\overline{b^2-c^2}}}{\sqrt{2ab+a^2}}$. Or, to find *r*, ſay $2ar + 2br = as$, or $s = \frac{2ar + 2br}{a}$; then $(dm \times mR =)\ rs - r^2 = \frac{ar^2 + 2br^2}{a} = (fm \times ma =)\ b^2 - c^2$; which equation gives $r = \sqrt{\frac{ab^2 - ac^2}{a + 2b}}$, when the point *m* becomes a point of inflection.

Now, as *m* R (*r*) muſt, by the nature of the circle, always be greater than *m a*; that is, as $\sqrt{\frac{ab^2 - ac^2}{a+2b}}$ muſt always be more than $b - c$; and conſequently, $\frac{ab^2 - ac^2}{a + 2b}$ be more than $\overline{b-c}|^2$, that is, $\frac{ab + ac}{a + 2b} \times \overline{b - c}$ be more than $\overline{b - c} \times \overline{b - c}$; therefore, *c* muſt always be more than $\frac{b^2}{a+b}$; that is, E M muſt be more than a third proportional to E S and E A, in order to have a point of inflection take place in the curve: but, in the preſent caſe, E S, E A, and E M, being as 13,368, 1, and $\frac{13.368}{340}$ or .039; therefore E M is leſs than the ſaid third proportional; and conſequently the curve M *m* μ, generated by the centre of the *moon*, has not a point of inflection, or is no where convex towards the ſun. See Ferguſon's Aſtronomy, p. 129, &c. Maclaurin's Account of Sir Iſaac Newton's Phil. Diſc. book iv. ch. 5. p. 336, &c. 4to. Rowe's Fluxions, p. 127, &c.

Moon, *aſtronomy of the*. 1. To determine the period of the *moon's* revolution round the earth, or the *periodical month*; and the time between one oppoſition and another, or the *ſynodical month*.

Since in the middle of a lunar eclipſe, the *moon* is oppoſite to the ſun, compute the time between two eclipſes, or oppoſitions, between which there is a great interval of time; and divide this by the number of lunations that have paſſed in the mean time; the quotient will be the quantity of the ſynodical month. Compute the ſun's mean motion, during the time of the ſynodical month, and add this to the entire circle deſcribed by the *moon*. Then, as the ſun is to 360°, ſo is the quantity of the ſynodical month to the periodical.

Thus, Copernicus, in the year 1500, November 6, at twelve at night, obſerved an eclipſe of the *moon* at Rome; and Auguſt 1, 1523, at $4^h\ 25'$, another at Cracow: hence the quantity of the ſynodical month is thus determined: Obſ. 2 An. 1523 d. 237 h. 4.25′
Obſ. 1 An. 1500 d. 310 h. 2.20′

Interval of time An. 22 d. 292 h. 2.5′
Add the intercalary days 5

Exact interval An. 22 d. 297 h. 2.5′
or 11991005′

Which divided by 282 months, elapſed in the mean time, gives the quantity of the ſynodical month 42521′ 9″ 9‴; that is, 29 days, 12 hours, 41 minutes.

From two other obſervations of eclipſes, the one at Cracow, the other at Babylon, the ſame author determines more accurately the quantity of the ſynodical month to be 42524′, 3″. 10‴. 9⁗.

That is 29 d. 11 h. 43′. 3″. 10‴.

The

The ſun's mean motion in the time	29°.	6′.	24″.	18″.
The *moon's* motion	389.	6.	24.	18
Quantity of the periodical month	27 d.	7 h.	43′	5″

Hence, 1. the quantity of the periodical month being given, by the rule of three we may find the *moon's* diurnal and horary motion, &c. And thus may tables of the mean motion of the *moon* be conſtructed.

2. If the ſun's mean diurnal motion be ſubtracted from the *moon*'s mean diurnal motion, the remainder will give the *moon*'s diurnal motion from the ſun: and thus may a table thereof be conſtructed.

3. Since, in the middle of a total ecclipſe, the moon is in the node, if the ſun's place be found for that time, and to this be added ſix ſigns, the ſum will give the *place of that node*.

4. From comparing the ancient obſervations with the modern, it appears, that the nodes have a motion, and that they proceed *in antecedentia*, i. e. from Taurus to Aries, from Aries to Piſces, &c. If, then, to the *moon*'s mean diurnal motion be added the diurnal motion of the nodes, the ſame will be the motion of the *moon* from the node; and thence, by the rule of three, may be found in what time the *moon* goes 360° from the dragon's head, or in what time ſhe goes from, and returns to it: that is the quantity of the *dracontic month*.

5. If the motion of the apogee be ſubtracted from the mean motion of the *moon*, the remainder will be the *moon*'s mean motion from the apogee; and thence, by the rule of three, is determined the quantity of the *anomaliſtic month*.

According to the obſervations of Kepler, the mean ſynodical month is 29 d. 12 h. 44′. 3″. 2 . Her periodical month 27 d. 7 h. 43′. 8″. The place of the apogee for the year 1700, January 1. old ſtyle, was 11S 8 , 57′. 1″. The place of the aſcending node 4 S 27°, 39′, 17″. Mean diurnal motion of the *moon* 13°, 10′. 35″. Diurnal motion of the apogee 6′, 41″. Diurnal motion of the nodes 3′, 11″. Laſtly, the eccentricity 4362 parts, ſuch whereof the ſemidiameter of the eccentric is 100,000: and therefore the diurnal motion of the latitude is 13°, 13′, 46″; and the diurnal motion from the apogee 13°, 3′, 54″.

To find the MOON'*s age or change.* The following canon, in which the twelve numbers anſwer to the twelve months beginning with January, will ſerve for this purpoſe.

Janus 0, 2, 1, 2, 3, 4, 5, 6,
8, 8, 10, 10, theſe to the EPACT fix,
The ſum, bate 30, to the month's day add,
Or take from 30, age or change is had.

The reaſon of adding theſe numbers to the epact in the ſeveral months, is becauſe the lunar ſynodical months fall ſhort of the calendar months; ſo that the epact, which expreſſes how much the lunar year falls ſhort of the ſolar or calendar year, muſt be conſidered as continually increaſing; and therefore to find the new *moons*, which are the beginnings of the ſynodical months, an addition muſt be made to the epact in every month, and more and more as the year advances; which additional numbers are called the menſtrual epacts. Only nothing is to be added to the epact in January, becauſe the annual epact, together with the day of the month, does then expreſs the true age of the *moon*: but as January has 31 days, which is near 2 days more than a ſynodical month, therefore the beginning of the lunar month in February will fall near 2 days ſooner than it did in January; conſequently 2 is the menſtrual epact of February; and then as February has but 28 or at moſt 29 days, which may be accounted one day leſs than a ſynodical month, the next lunar month will begin on day later in March than it did in February; conſequently the menſtrual epact of March decreaſes inſtead of increaſing, and is but 1. If from thence you reckon the lunar months to conſiſt of 30 days and 29 interchangeably, the new *moons* will fall ſo much earlier in the following months than the new *moon* did in January, as is expreſſed by the menſtrual epacts in the canon, viz. 2 days in April, 3 in May, &c. until they amount to 11 days at the end of the year, which are then added to the annual epact.

To find the time of the MOON'*s being in the meridian*, or *ſouthing*. Multiply her age by 4; and divide the product by 5; the quotient gives the hour, and the remainder multiplied by 12, the minute.

The reaſon of this rule is, that as the *moon* at the change comes to the ſouth with the ſun, or at twelve o'clock, and as there are thirty days, nearly, from one new *moon* to another, and twenty-four hours in a day; therefore ſhe loſes one day with another $\frac{24}{30}$, or $\frac{4}{5}$ of an hour in the time of her ſouthing: now the *moon's* age, a number of days from the change being multiplied by 4, the product is ſo many fifths of an hour as ſhe has loſt, which divided by 5, is reduced to hours, and the remainder, if any, multiplied by 12, will be minutes.

MOON, *for the eclipſes of the*, ſee ECLIPSES.

For the MOON's *parallax*, ſee PARALLAX.

Theory of the MOON'*s motions and irregularities.* The tables of equation, which ſerve to ſolve the irregularities of the ſun, do likewiſe ſerve for thoſe of the *moon*.

But then theſe equations muſt be corrected for the *moon*, otherwiſe they will not exhibit the true motions in the ſyzygies. The method is thus: ſuppoſe the *moon*'s place in the zodiac, required in longitude, for any given time; here, we firſt find, in the tables, the place were it would be, ſuppoſing its motion uniform, which we call *mean*, and which is ſometimes faſter, and ſometimes ſlower, than the true motion: then, to find where the *true* motion will place her, which is alſo the *apparent*, we are to find in another table at what diſtance it is from its apogee; for according to this diſtance, the difference between her true and mean motion, and the two places which correſpond thereto, is the greater. The true place thus found, is not yet the *true* place; but varies from it, as the *moon* is more or leſs remote both from the ſun, and the ſun's apogee: which variation reſpecting, at the ſame time, thoſe two different diſtances, they are to be both conſidered and combined together, as in a table apart. Which table gives the correction to be made of the true places firſt found. That place, thus corrected, is not yet the *true* place, unleſs the *moon* be either in conjunction, or oppoſition: if ſhe be out of theſe, there muſt be another correction, which depends on two things taken together, and compared, viz. the diſtance of the *moon*'s corrected place from the ſun; and of that at which ſhe is with regard to her own apogee; this laſt diſtance having been changed by the firſt correction.

By all theſe operations and corrections, we at length arrive at the *moon*'s *true place* for that inſtant. In this, it muſt be owned, there occur prodigious difficulties: the lunar inequalities are ſo many, that it was in vain the aſtronomers laboured to bring them under any rule, before the great ſir Iſaac Newton; to whom we are indebted both for the mechanical cauſes of theſe inequalities, and for the method of computing and aſcertaining them: ſo that he has given us a world, in a great meaſure, of his own diſcovering, or rather ſubduing.

From the theory of gravity he ſhews, that the larger planets, revolving round the ſun, may carry along with them ſmaller planets revolving round themſelves; and ſhews alſo, *à priori*, that theſe ſmaller muſt move in ellipſes having their umbilici in the centres of the larger; and muſt have their motion in their orbits variouſly diſturbed by the motion of the ſun; and, in a word, muſt be affected with thoſe inequalities which we actually obſerve in the *moon*. And from this theory, he argues analogous irregularities in the ſatellites of Saturn.

From the ſame theory he examines the force which the ſun has to diſturb the *moon*'s motion, determines the horary increaſe of the area which the *moon* would deſcribe in a circular orbit by radii drawn to the earth—her diſtance from the earth—the horary motion in a circular and elliptic orbit—the mean motion of the nodes—the true motion of the nodes—the horary variation of the inclination of the *moon*'s orbit to the plane of the ecliptic. Laſtly, from the ſame theory he has found the annual equation of the *moon*'s mean motion to ariſe from the various dilatation of her orbit; and that variation to ariſe from the ſun's force, which being greater in the perigee, diſtends the orbit; and, being leſs in the apogee, ſuffers it to be again contracted. In the dilating orbit ſhe moves more ſlowly; in the contracted, more ſwiftly; and the annual equation, whereby this inequality is compenſated, in the apogee and perigee, is nothing at all; at a moderate diſtance from the ſum, it amounts to 11′ 50″; and in other places it is proportional to the equation of the ſun's centre, and is added to the mean motion of the *moon*, when the earth proceeds from its aphelion to its perihelion; and ſubtracted when in the oppoſite part.

Thus, ſuppoſing the radius of the *orbis magnus* 1000, and the earth's eccentricity $16\frac{7}{8}$; this equation, when greateſt, according to the theory of gravity, comes out 11′, 49″.

He adds, that in the earth's perihelion, the nodes move ſwifter than in the aphelion, and that in a triplicate ratio of the earth's diſtance from the ſun, inverſely. Whence ariſe annual equations of their motions, proportionable to that of the centre of the ſun. Now the ſun's motion is in a duplicate ratio of the earth's diſtance from the ſun inverſely, and the greateſt equation of the centre which this inequality occaſions, is 1°, 56′, 26″, agreeable to the ſun's eccentricity $16\frac{15}{16}$. If the ſun's motion were in a triplicate ratio of its diſtance inverſely, this inequality would generate the greateſt equation 2°, 56′, 9″; and therefore the greateſt equations which the inequalities of the motions of the *moon*'s apogee and nodes occaſion, are to 2°, 56′, 9″, as the mean diurnal motion of the *moon*'s apogee, and the mean diurnal motion of her nodes, are to the mean diurnal motion of the ſun. Whence the greateſt equation of the mean motion of the apogee comes out 19′, 42″; and the greateſt equation of the mean motion of the nodes 9′, 27″. The former equation is added, and the latter ſubtracted, when the earth proceeds from its perihelion to its aphelion, and the contrary in the oppoſite part of its orbit.

From the ſame theory of gravity, it alſo appears, that the ſun's action on the *moon* muſt be ſomewhat greater when the tranſverſe diameter of the lunar orbit paſſes through the ſun, than when it is at right angles with the line that joins the earth and ſun: and, therefore, that the lunar orbit is ſomewhat greater in the firſt caſe than in the ſecond. Hence ariſes another equation of the mean lunar motion, depending on the ſituation of the *moon*'s apogee with regard to the ſun, which is greateſt when the *moon*'s apogee is in an octant with the ſun; and none, when ſhe arrives at the quadrature, or ſyzygies; and is added to the mean motion, in the paſſage of the *moon*'s apogee from the quadrature to the ſyzygies, and ſubtracted in the paſſage of the apogee from the ſyzygies to the quadrature.

This equation, which ſir Iſaac calls *ſemeſtris*, when greateſt, viz. in the octants of the apogee, ariſes to 3′, 45″, at a mean diſtance of the earth from the ſun; but it increaſes and diminiſhes in a triplicate ratio of the ſun's diſtance inverſely; and therefore, in the ſun's greateſt diſtance, is 3′, 34″; in the ſmalleſt, 3′, 56″, nearly. But when the apogee of the *moon* is without the octants, it becomes leſs, and is to the greateſt equation, as the ſine of double the diſtance of the *moon*'s apogee from the next ſyzygy, or quadrature, to the radius.

From the ſame theory of gravity it follows, that the ſun's action on the *moon* is ſomewhat greater when a right line, drawn through the *moon*'s nodes, paſſes through the ſun, than when that line is at right angles with another joining the ſun and earth: and hence ariſes another equation of the *moon*'s mean motion, which he calls *ſecunda ſemeſtris*, and which is greateſt when the nodes are in the ſun's octants, and vaniſhes when they are in the ſyzygies, or quadratures; and in other ſituations of the nodes, is proportionable to the ſine of double the diſtances of either node from the next ſyzygy, or quadrature.

It is added to the *moon*'s mean motion while the nodes are in their paſſage from the ſun's quadratures to the next ſyzygy, and ſubtracted in their paſſage from the ſyzygies to the quadratures in the octants.

When it is greateſt, it amounts to 47″, at a mean diſtance of the earth from the ſun; as it appears from the theory of gravity; at other diſtances of the ſun, this equation in the octants of the nodes is reciprocally as the cube of the ſun's diſtance from the earth; and therefore in the ſun's perigee is 45″; in his apogee nearly 49″.

By the ſame theory of gravity the *moon*'s apogee proceeds the faſteſt when either in conjunction with the ſun, or in oppoſition to it; and is retrograde when in quadrature with the ſun. In the former caſe, the eccentricity, is greateſt, and in the latter ſmalleſt. Theſe inequalities are very conſiderable, and generate the principal equation of the apogee, which he calls *ſemeſtris*, or *ſemimenſtrual*. The greateſt *ſemimenſtrual* equation is about 12°, 18′.

Horrox firſt obſerved the *moon* to revolve in an ellipſis round the earth placed in the lower umbilicus: and Halley placed the centre of the ellipſis in an epicycle, whoſe centre revolves uniformly about the earth: and from the motion in the epicycle ariſe the inequalities now obſerved in the progreſs and regreſs of the apogee, and the quantity of the eccentricity.

Suppoſe the mean diſtance of the *moon* from the earth divided into 100,000; and let T (*Tab. Aſtron. fig.* 17.) repreſented the earth, and T C the mean eccentricity of the *moon* 5505 parts; produce T C to B, that C B may be the ſine of the greateſt ſemimenſtrual equation 12°, 18′, to the radius T C; the circle B D A, deſcribed on the centre C, with the interval C B, will be the epicycle wherein the centre of the lunar orb is placed, and wherein it revolves according to the order of the letters B D A. Take the angle B C D equal to double the annual argument, or double the diſtance of the true place of the ſun from the *moon*'s apogee once equated, and C T D will be the ſemimenſtrual equation of the *moon*'s apogee; and T D the eccentricity of its orbit tending to the apogee equated a ſecond time. From hence the *moon*'s mean motion, apogee, and eccentricity, as alſo the greater axis of its orbit 200,000, the *moon*'s true place, as alſo her diſtance from the earth, are found, and that by the commoneſt methods. In the earth's perihelion, by reaſon of the greater force of the ſun, the centre of the *moon*'s orbit will move more ſwiftly about the centre C than in the aphelion, and that in a triplicate ratio of the earth's diſtance from the ſun inverſely. By reaſon of the equation of the centre of the ſun, comprehended in the annual argument, the centre of the *moon*'s orbit will move more ſwiftly in the epicycle B D A, in a duplicate ratio of the diſtance of the earth from the ſun inverſely.

That the ſame may ſtill move more ſwiftly in a ſimple ratio of the diſtance inverſely from the centre of the orbit D, draw D E towards the *moon*'s apogee, or parallel to T C; and take the angle E D C equal to the exceſs of the annual argument, above the diſtance of the *moon*'s apogee from the ſun's perigee in conſequentia; or, which is the ſame thing, take the angle C D F equal to the complement of the true anomaly of the ſun to 360°; and let D F be to D C as double the eccentricity of the *orbis magnus* to the mean diſtance of the ſun from the earth, and the mean diurnal motion of the ſun from the *moon*'s apogee, to the mean diurnal motion of the ſun from its own apogee, conjunctly, i. e. as $33\frac{7}{8}$ is to 1000, and 52′, 27″, 16, to 59′, 8″, 10‴, conjunctly; or as 3 to 100. Conceive the centre of the *moon*'s orbit placed in the point F, and to revolve in an epicycle, whoſe centre is D, and its radius D F, while the point D proceeds in the circumference of the circle D A B D: thus the velocity, wherewith the centre of the *moon*'s orbit moves in a certain curve, deſcribed about the centre C, will be reciprocally as the cube of the ſun's diſtance from the earth.

The computation of this motion is difficult; but it will be made eaſy by the following approximation: if the *moon*'s mean diſtance from the earth be 100,000 parts, and its eccentricity T C 5505 of thoſe parts, the right line C B or C D will be found $1172\frac{3}{4}$, and the right line D F $35\frac{1}{5}$. This right line, at the diſtance T C, ſubtends an angle to the earth, which the transferring of the centre of the orbit from the place D to F generates in the motion of this centre; and the ſame right line doubled, in a parallel ſituation, at the diſtance of the upper umbilicus of the *moon*'s orbit from the earth, ſubtends the ſame angle, generated by that tranſlation in the motion of the umbilicus; and at the diſtance of the *moon* from the earth ſubtends an angle which the ſame tranſlation generates in the motion of the *moon*; and which may therefore be called *the ſecond equation of the centre.*

This equation of a mean diſtance of the *moon* from the earth, is as the ſine of the angle contained between the right line D F, and a right line drawn from the point F to the *moon*, nearly; and when greateſt, amounts to 2′, 25″. Now the angle comprehended between the right line D F and a line from the point D, is found either by ſubtracting the angle E D F from the mean anomaly of the *moon*, or by adding the *moon*'s diſtance from the ſun to the diſtance of the *moon*'s apogee from the apogee of the ſun. And as radius is to the ſine of the angle thus found, ſo is 2′, 25″, to the ſecond equation of the centre; which is to be added, if that ſine be leſs than a ſemicircle; and ſubtracted, if greater: thus we have its longitude in the very ſyzygies of the luminaries.

If a more accurate computation be required, the *moon*'s place thus found muſt be corrected by a ſecond variation. The firſt and principal variation we have already conſidered, and have obſerved it to be greateſt in the octants. The ſecond is greateſt in the quadrants, and ariſes from the different action of the ſun on the *moon*'s orbit, according to the different poſition of the *moon*'s apogee to the ſun, and is thus computed; as radius is to the verſed ſine of the diſtance of the *moon*'s apogee from the ſun's perigee, in conſequentia, ſo is a certain angle P to a fourth proportional. And as radius is to the ſine of the *moon*'s diſtance from the ſun, ſo is the ſum of this fourth proportional and another angle Q to the ſecond variation; which is to be ſubtracted, if the *moon*'s light be increaſing; and added, if diminiſhing.

Thus we have the *moon*'s true place in her orbit; and by reduction of this place to the ecliptic, we have the *moon*'s longitude. The angles P and Q are to be determined by obſervation in the mean time, if for P be aſſumed 2, and for Q 1′, we ſhall be near the truth.

Moon, *nature and furniture of the.* 1. From the various phaſes of the *moon*: from her only ſhewing a little part illumined, when following the ſun ready to ſet: from that part's increaſing as ſhe recedes from the ſun, till at the diſtance of 180° ſhe ſhines with a full face; and again wanes as ſhe re-approaches that luminary, and loſes all her light when ſhe meets him: from the lucid parts being conſtantly turned towards the weſt, while the *moon* increaſes; and towards the eaſt when ſhe decreaſes: it is evident, that only that part ſhines, on which the ſun's rays fall. And from the phenomena of eclipſes, happening when the *moon* ſhould ſhine with a full face, viz. when ſhe is 180° diſtant from the ſun; and the darkened parts appearing the ſame in all places; it is evident ſhe has no light of her own, but borrows whatever light ſhe has from the ſun: for if ſhe did, being globular, we ſhould always ſee her with a round full orb like the ſun.

2. The *moon* ſometimes diſappears in a clear heaven; ſo as not to be diſcoverable by the beſt glaſſes; little ſtars of the fifth and ſixth magnitude all the time remaining viſible. This phenomenon Kepler obſerved twice, anno 1580 and 1583, and Hevelius in 1620. Ricciolus, and other Jeſuits at Bologna, and many people throughout Holland, obſerved the like April 14, 1642, yet at Venice and Vienna ſhe was all the time conſpicuous. December 23, 1703, there was another total obſcuration. At Arles ſhe firſt appeared of a yellowiſh brown; at Avignon ruddy and tranſparent, as if the ſun had ſhone through; at Marſeilles, one part was reddiſh, the other very duſky; and, at length, though in a clear ſky, ſhe wholly diſappeared. Here it is evident, that the colours appearing different at the ſame time, do not belong to the *moon*; but they are probably occaſioned by our atmoſphere, which is variouſly diſpoſed, at different times, for refracting of theſe or thoſe coloured rays.

3. The eye, either naked, or armed with a teleſcope, ſees ſome parts in the *moon*'s face darker than others, which are called *maculæ*, or *ſpots*. Through the teleſcope, while the *moon* is either increaſing or decreaſing, the illuminated parts in the maculæ appear evenly terminated; but in the bright parts the boundary of the light appears jagged and uneven, compoſed of diſſimilar arches, convex and concave. (See *Tab. Aſtron. fig.* 18.) There are alſo obſerved lucid parts diſperſed among the darker; and illumined parts are ſeen beyond the limits of illumination; other intermediate ones remaining ſtill in darkneſs; and near the maculæ, and even in them, are frequently ſeen ſuch lucid ſpecks. Beſides the maculæ obſerved by the ancients, there are other variable ones inviſible to the naked eye, called *new maculæ*, always oppoſite to the ſun; and which are hence found among thoſe parts which are the ſooneſt illumined in the increaſing *moon*, and in the decreaſing *moon* loſe their light later than the intermediate ones; running round, and appearing ſometimes longer, ſometimes ſmaller.

Hence, 1. As all parts are equally illumined by the ſun, inaſmuch as they are equally diſtant from him: if ſome appear brighter, and others darker; ſome reflect the ſun's rays more copiouſly than others; and therefore they are of different natures. And, 2. Since the boundary of the illumined part is very ſmooth and equable in the maculæ, their ſurface muſt be ſo too. 3. The parts illumined by the ſun ſooner, and deſerted later, than others that are nearer, are higher than the reſt; i. e. they ſtand up above the other ſurface of the *moon*. 4. The new maculæ anſwer perfectly to the ſhadows of terreſtrial bodies.

4. Hevelius writes, that he has ſeveral times found, in ſkies perfectly clear, when even ſtars of the ſixth and ſeventh magnitude were conſpicuous, that at the ſame altitude of the *moon*, and the ſame elongation from the earth, and with one and the ſame excellent teleſcope, the *moon* and its maculæ do not appear equally lucid, clear, and perſpicuous, at all times; but are much brighter, purer, and more diſtinct, at one time than another. From the circumſtances of the obſervation, it is evident, the reaſon of this phenomenon is not either in our air, in the tube, in the *moon*, or in the ſpectator's eye; but it muſt be looked for in ſomething exiſting about the *moon*.

5. Caſſini frequently obſerved Saturn, Jupiter, and the fixed ſtars, when hid by the *moon*, near her limb, whether the illumined or dark one, to have their circular figure changed into an oval one; and in other occultations he found no alteration of figure at all. In like manner, the ſun and *moon* riſing and ſetting in a vaporous horizon, do not appear circular, but elliptical.

Hence, as we know, by ſure experience, that the circular figure of the ſun and *moon* is only changed into a elliptical one by means of the refraction in the vapoury atmoſphere; ſome have concluded, that at the time when the circular figure of the ſtars is thus changed by the *moon*, there is a denſe matter encompaſſing the *moon*, wherein the rays, emitted from the ſtars, are refracted; and that, at other times, when there is no change of figure, this matter is wanting.

This phenomenon is well illuſtrated by the following experiment.

To the inner bottom of any veſſel, either plane, convex, or concave, with wax faſten a circle of paper; then pouring in water, that the rays, reflected from the circle in the air, may be refracted before they reach the eye; viewing the circle obliquely, the circular figure will appear changed into an ellipſis.

6. The *moon*, then, is a denſe opake body, furniſhed with mountains and valleys. That the *moon* is denſe, and impervious to the light, has been ſhewn: but ſome parts ſink below, and others riſe above the ſurface; and that conſiderably, inaſmuch as they are viſible at ſo great a diſtance as that of the earth from the *moon*: in the *moon*, therefore, are huge mountains, and very deep valleys. Ricciolus meaſured the height of one of the mountains, called St. Catharine, and found it nine miles high.

Moon, *to meaſure the heights of the mountains of the.* Suppoſe E D (*fig.* 19.) the *moon*'s diameter, E C D the boundary of light and darkneſs; and A the top of a hill in the dark part beginning to be illumined: with a teleſcope obſerve the proportion of A E, or the diſtance of A from the line where the light commences to the diameter E D: here we have two ſides of a rectangled triangle A E, C E; the ſquares of which added together give the ſquare of the third; whence the ſemi-diameter C B being ſubtracted, leaves A B, the height of the mountain.

Ricciolus, v. gr. found the top of the mount St. Catharine illumined at the diſtance of $\frac{1}{16}$ of the *moon*'s diameter from the confines of light. Suppoſing, therefore C E 8, and A E 1, the ſquares of the two will be 65, whoſe root is 8.062 the length of A C: ſubtracting therefore B C = 8, the remainder is A B = 0.062. The *moon*'s ſemidiameter, therefore, is to the mountain's height as 8 is to 0.062; i. e. as 8000 to 62. Suppoſing therefore, the ſemidiameter of the *moon* 1182 Engliſh miles, by the rule of three we find the height of the mountain 9 miles.

The heights, &c. of the lunar mountains being meaſurable, aſtronomers have taken occaſion to give each its name. Ricciolous, whom moſt others now follow, diſtinguiſhed them by the names of celebrated aſtronomers; and by theſe names they are ſtill expreſſed in obſervations of the lunar eclipſes, &c. See the figure. *Tab. Aſtron. fig.* 20. For Mr. Herſchel's obſervations on this ſubject, ſee Phil. Tranſ. vol. lxx. part ii. p. 507. &c.

Aſtronomers are now generally of opinion, that the *moon* has no atmoſphere of any viſible denſity ſurrounding her, as we have: for if ſhe had, we could never ſee her edge ſo well defined as it appears: but there would be a ſort of miſt or hazineſs around her, which would make the ſtars look fainter, when they are ſeen through it. But obſervation proves, that the ſtars which diſappear behind the *moon* retain their full luſtre until they ſeem to touch her very edge, and then they vaniſh in a moment. This has been often obſerved by aſtronomers, but particularly by Caſſini of the ſtar γ in the breaſt of Virgo, which appears ſingle and round to the bare eye; but through a refracting teleſcope of ſixteen feet, appears to be two ſtars ſo near together, that the diſtance between them ſeems to be but equal to one of their apparent diameters. The *moon* was obſerved to paſs over them on the 21ſt of April, 1720, N. S. and as her dark edge drew near to them, it cauſed no change in their colour or ſituation. At 25 min. 14 ſec. paſt twelve at night the moſt weſterly of theſe ſtars was hid by the dark edge of the *moon*; and in 30 ſeconds afterward, the moſt eaſterly ſtar was hid: each of them diſappearing behind the *moon* in an inſtant, without any preceding diminution of magnitude or brightneſs; which by no means could have been the caſe if there were an atmoſphere round the *moon*; for then, one of the ſtars falling obliquely into it before the other, ought by refraction to have ſuffered ſome change in its colour, or in its diſtance from the other ſtar which was not yet entered into the atmoſphere. But no ſuch alteration could be perceived, though the obſervation was performed with the utmoſt attention to that particular; and was very proper to have made ſuch a diſcovery. The faint light, which has been ſeen all around the *moon*, in total eclipſes of the ſun, has been obſerved during the time of darkneſs, to have its centre coincident with the centre of the ſun; and was therefore much more likely to ariſe from the atmoſphere of the ſun, than from that of the *moon*; for if it had been owing to the latter, its centre would have gone along with the *moon*'s.

If there were ſeas in the *moon*, ſhe could have no clouds, rains, nor ſtorms, as we have; becauſe ſhe has no ſuch atmoſphere to ſupport the vapours that occaſions them. And every one knows, that when the *moon* is above our horizon in the night-time, ſhe is viſible, unleſs the clouds of her atmoſphere hide her from our view; and all parts of her appear conſtantly with the ſame clear, ſerene, and calm aſpect. But thoſe dark parts of the *moon*, which were formerly thought to be ſeas, are now found to be only vaſt deep cavities, and places which reflect not the ſun's light ſo ſtrongly as others, having many caverns and pits whoſe ſhadows fall within them, and are always dark on the ſides next the ſun; which demonſtrates their being hollow: and moſt of theſe pits have little knobs like hillocks ſtanding within them, and caſting ſhadows alſo;

which cauſe theſe places to appear darker than others which have fewer, or leſs remarkable caverns. All theſe appearances ſhew that there are no ſeas in the *moon*; for if there were any, their ſurfaces would appear ſmooth and even, like thoſe on the earth.

There being no atmoſphere about the *moon*, the heavens in the day time have the appearance of night to a lunarian who turns his back towards the ſun; and when he does, the ſtars appear as bright to him as they do in the night to us. For it is entirely owing to our atmoſphere that the heavens are bright about us in the day.

MOON, *as to the influence of the*, on the changes of our weather, and the conſtitution of the human body, we ſhall obſerve that the vulgar doctrine concerning it is very ancient, and has gained credit among the learned, without ſufficient examination; but it is now generally exploded by philoſophers, as equally deſtitute of all foundation in phyſical theory, and unſupported by any plauſible analogy. The common opinion is, that the lunar influence is exerted at the ſyzygies and quadratures, and for three days before and after each of thoſe epochs. There are twenty-four days, therefore, in each ſynodic month, over which the *moon* at this rate is ſuppoſed to preſide, and as the whole conſiſts but of 29 days, 12¾ hours, only 5½ days are exempt from her pretended dominion. Hence, though the changes of the weather ſhould happen to have no connection whatever with the *moons*'s aſpects, and they ſhould be diſtributed in an equal proportion through the whole ſynodic month; yet any one who ſhall predict, that a change ſhall happen on ſome one of the twenty-four days aſſigned, rather than in any of the remaining 5½, will always have the chances 24 to 5½ in his favour. Men may, therefore, eaſily deceive themſelves, eſpecially in ſo unſettled a climate as our's. Moreover the writers who treat of the ſigns of the weather, derive their prognoſtics from circumſtances, which neither argue any real influence of the *moon* as a cauſe, or any belief of ſuch an influence, but are merely indications of the ſtate of the air at the time of obſervation: ſuch are, the ſhape of the horns, the degree and colour of the light, and the number and quality of the luminous circles which ſometimes ſurround the *moon*, and the circumſtances attending their diſappearance. See the Διοσημεια of Aratus, and the Scholia of Theon. The vulgar ſoon began to conſider thoſe things as cauſes, which had been propoſed to them only as ſigns: and the notion of the *moon*'s influence on all terreſtrial things was confirmed by her manifeſt effect upon the occean. See on this ſubject, Phil. Tranſ. vol. lxv. part ii. p. 178, &c.

The famous Dr. Mead was a believer in the influence of the ſun and *moon* on the human body, and publiſhed a book to this purpoſe, intitled, De Imperio Solis ac Lunæ in Corpore humano: but this opinion has been exploded by philoſophers, as equally unreaſoable in itſelf, and contrary to fact. As the moſt accurate and ſenſible barometer is not affected by the various poſitions of the *moon*, it is not likely that the human body ſhould be affected by them. See LUNATIC.

MOON, *harveſt*. It is remarkable, that the *moon*, during the week in which ſhe is full in harveſt, riſes ſooner after ſun-ſetting than ſhe does in any other full *moon* week in the year. By doing ſo, ſhe affords an immediate ſupply of light after ſun-ſet, which is very beneficial to the farmers for reaping and gathering in the fruits of the earth: and therefore they diſtinguiſh *this* full *moon* from all the other in the year, by calling it the *harveſt-moon*. Mr. Ferguſon has given a full account of the *harveſt-moon* in his Aſtronomy; the ſubſtance of which is as follows, in a problem on the common celeſtial globe.

Make chalk-marks all round the globe, on the ecliptic, at 12⅙ degrees from each other (beginning at Capricorn) which is equal to the *moon*'s daily mean motion from the ſun: then elevate the north pole of the globe to the latitude of any place in Europe; ſuppoſe London, whoſe latitude is 51½ degrees north.

This done, turn the ball of the globe round, weſtward, in the frame thereof; and you will ſee that different parts of the ecliptic make very different angles with the horizon, as theſe parts riſe in the eaſt: and therefore, in equal times, very unequal portions of the ecliptic will riſe. About Piſces and Aries, ſeven of theſe chalk-marks will riſe in little more than two hours, as meaſured by the motion of the index on the horary circle: but, about the oppoſite ſigns, Virgo and Libra, the index will go over eight hours in the times that ſeven marks will riſe. The intermediate ſigns will more or leſs partake of theſe differences as they are more or leſs remote from thoſe above mentioned.

Hence it is plain that when the *moon* is in Piſces and Aries, the difference of her riſing will be little more than two hours in ſeven days; but in Virgo and Libra it will be eight hours in ſeven days: and this happens every month of the year, becauſe the *moon* goes through all the ſigns of the ecliptic in a month, or rather in 27 days, 8 hours.

The *moon* is always oppoſite to the ſun when ſhe is full, and the ſun is never in Virgo and Libra but in our harveſt months; and therefore, the *moon* is never full in Piſces and Aries (which are the ſigns oppoſite to Virgo and Libra) but in our harveſt months. Conſequently, when the *moon* is about her full in harveſt, ſhe riſes with leſs difference of time, or more immediately after ſun-ſet, than when ſhe is full in any other month of the year. In our winter, the *moon* is in Piſces and Aries about the time of her firſt quarter, and riſes about noon; but her riſing is not then taken notice of, becauſe the ſun is above the horizon.

In ſpring the *moon* is in Piſces and Aries about the time of her change; and then, as ſhe gives no light, and riſes with the ſun, her riſing cannot be perceived.

In ſummer, the *moon* is in Piſces and Aries about the time of her laſt quarter; and then, as ſhe is on the decreaſe, and riſes not till midnight, her riſing generally paſſes unobſerved.

But in harveſt, the *moon* is full in Piſces and Aries (theſe ſigns being oppoſite to the ſun in our autumnal months) and riſes ſoon after ſun-ſet for ſeveral evenings ſucceſſively; which makes her regular riſing very conſpicuous at that time of the year, as it is ſo beneficial then to the farmers in affording them an immediate ſupply of light after the going down of the ſun.

This would always be the caſe if the *moon*'s orbit lay in the plane of the ecliptic. But as the *moon* moves in an orbit which makes an angle of 5 degrees 18 minutes with the ecliptic, and croſſes it only in the two oppoſite points called the nodes, her riſing when in Piſces and Aries, will ſometimes not differ above an hour and forty minutes through the whole of ſeven days; and at other times, in the ſame two ſigns, ſhe will differ three hours and a half in the time of her riſing in a week, according to the different poſitions of the nodes with reſpect to theſe ſigns; which poſitions are conſtantly changing, becauſe the nodes go backward through the whole ecliptic in 18 years and 225 days.

This revolution of the nodes will cauſe the *harveſt moons* to go through a whole courſe of the moſt and leaſt beneficial ſtates with reſpect to the farmers every nineteen years. The following table ſhews in what years the *harveſt moons* are leaſt beneficial as to the times of their riſing, and in what years moſt, from 1751 to 1861. The columns of years under the letter L, are thoſe in which the *harveſt moons* are leaſt of all beneficial, becauſe they fall about the deſcending node; and thoſe under M are the moſt of all beneficial, becauſe they fall about the aſcending node. In all the columns from N to S, the *harveſt moons* gradually deſcended in the lunar orbit, and riſe to leſs heights above the horizon. From S to N, they aſcend in the like proportion, and riſe to greater heights above the horizon. In both the columns under S, the *harveſt moons* are in the loweſt part of the *moon*'s orbit, that is, fartheſt ſouth of the ecliptic; and in the columns under N, the reverſe. And in both theſe caſes, their riſings, though not at the ſame times, are nearly the ſame with regard to the difference of time, as if the *moon*'s orbit were coincident with the ecliptic.

Years in which the *harveſt moons* are leaſt beneficial.

N				L				S	
1751	1752	1753	1754	1755	1756	1757	1758	1759	
1770	1771	1772	1773	1774	1775	1776	1777	1778	
1788	1789	1790	1791	1792	1793	1794	1795	1796	1797
1807	1808	1809	1810	1811	1812	1813	1814	1815	
1826	1827	1828	1829	1830	1831	1832	1833	1834	
1844	1845	1846	1847	1848	1849	1850	1851	1852	

Years in which they are moſt beneficial.

S				M				N	
1760	1761	1762	1763	1764	1765	1766	1767	1768	1769
1779	1780	1781	1782	1783	1784	1785	1786	1787	
1798	1799	1800	1801	1802	1803	1804	1805	1806	
1816	1817	1818	1819	1820	1821	1822	1823	1824	1825
1835	1836	1837	1838	1839	1840	1841	1842	1843	
1853	1854	1855	1856	1857	1858	1859	1860	1861	

We may obſerve farther, that in ſummer with us the full moons are low, and their ſtay is ſhort above the horizon, when the nights are ſhort and we have the leaſt occaſion for *moon*-light: in winter they go high, and ſtay long above the horizon, when the nights are long, and we want the greateſt quantity of *moon*-light. Moreover as the ſun is above the horizon of the north pole from the 20th of March till the 23d of September, it is plain that the *moon*, when full, being oppoſite to the ſun, muſt be below the horizon during that half of the year. But when the ſun is in the ſouthern half of the ecliptic, he never riſes to the north pole, during which half of the year, every full *moon* happens in ſome part of the northern half of the ecliptic, which never ſets. Conſequently as the polar inhabitants never ſee the full *moon* in ſummer, they have her always in the winter, before, at, and after the full, ſhining for fourteen of our days and nights. And when the ſun is at its greateſt depreſſion below the horizon, being then in Capricorn, the *moon* is at her firſt quarter in Aries, full in Cancer, and at her third quarter in Libra. And as the beginning of Aries is the riſing point of the ecliptic, Cancer the higheſt, and Libra the ſetting point, the *moon* riſes at her firſt quarter in Aries; is moſt elevated above the horizon, and full in Cancer; and ſets at the beginning of Libra in her third quarter, having continued viſible for fourteen diurnal rotations of the earth. Thus the poles are ſupplied one half of the winter time with conſtant *moon*-light in the ſun's abſence; and only loſe ſight of the *moon* from her third to her firſt quarter, while ſhe gives but very little light, and could be but of little, and ſometimes of no ſervice to them.

To find the true time of new and full moon. For this purpoſe Mr. Ferguſon has calculated and given us the following tables; by which the method of operation is perhaps the ſhorteſt and eaſieſt extant.

For any propoſed year within the limits of table I. write out the mean time of new or full *moon* in January with its arguments for the two eqations under A and B. With theſe arguments find the correſponding equations in table III. and IV. which add to the above mean time and you will have the true time of new or full *moon* in January.

For the time of new or full *moon* in any month after January, to the mean time in that month add as many lunations from table II. as the given month is after January; and to the arguments A and B for January, add thoſe under A and B belonging to the number of lunations taken out. With the ſum of all theſe arguments, if not more than 360, find the correſponding equations in table III. and IV. which equations being added to the mean time, will give the true time of the required new or full *moon*, near enough for any almanack. When the ſum of the arguments under A or B exceeds 360, ſubtract 360 from it; and with the remainder enter the correſponding table, and take out the equation.

N. B. If the number of months (thus taken out) after January, be equal to, or exceed the number of days counted from the beginning of January on which the new or full *moon* falls, in that month, you muſt take out one lunation more from table II. than what anſwers to the number of months after January; otherwiſe you will not have the time of the required new or full *moon*, but of that which is next before it.

Laſtly, with the number of days (ariſing from the lunations added to the time in January) enter table V. under the given month; and againſt *that* number, look in the left hand column, under *days*, and you will have the day of the month on which the required new or full *moon* falls.

N. B. In leap years, in the months of January and February, to have the new or full *moon* on the day wherein it really falls, add a day to the time found by the tables.

EXAMPLE I. *Required the true time of new* moon *in January*, 1772.

	D.H.M.	A.	B.
A.D. 1772, (tab. I. for Jan.) new *moon*	3 6 9	185	298
In tab. III. (A) againſt 185 is the equation	0 4 33		
In tab. IV. (B) againſt 298 is the equation	0 0 52		
Theſe added together give the true time, viz. January - - - - - -	3 11 34	Add day.	1

So the true time (1772 being a leap year) is January 4th, at 34 minutes paſt 11 o'clock at night; the time being always reckoned from noon.

EXAMPLE II. *Required the true time of new* moon, *in January*, 1772.

	D. H. M.	A.	B.
A. D. 1772, mean new *moon* in Jan.	3 6 9	185	298
Add 7 lunations from tab. II.	206 17 8	204	181
The ſums are	209 23 17	389	479
In tab. III. (A) againſt 29 is	2 12	360	360
In tab. IV. (B) againſt 119 is	18 3	29	119
The whole ſum amounts to	210 19 32		

Then, in table V. under July, againſt 210 is 29 in the left hand column; ſo that the true time is the 29th of July, at 19 hours 32 minutes paſt noon; which, in common reckoning, is the 30th of July, at 32 minutes paſt ſeven in the morning.

EXAMPLE III. *Required the true time of full* moon *in July*, 1770?

	D. H. M.	A.	B.
A. D. 1770, mean full *moon* in Jan.	10 18 9	192	205
Add 6 lunations from table II.	177 4 24	175	155
The ſums are	187 22 33	367	360
In table III. (A) againſt 7 is	3 42	360	
In table IV. (B) againſt 360 is	9 48	7	
The whole amounts to	188 12 3		

Then, in table V. under July, againſt 188, is 7 in the left hand column: ſo that the true time is the 7th of July, at three minutes paſt twelve o'clock at night.

The times found by theſe tables never differ above twenty minutes from the truth, and it is very ſeldom the error is half ſo much. The calculation is made in leſs than a twentieth part of the time that it could be done from Flamſteed's Tables.

TABLE I.

The mean times of new and full *moon* in January.

Years.	New *Moon*			Full *Moon*		
	D. H. M.	A.	B.	D. H. M.	A.	B.
1770	25 12 31	207	38	10 18 9	192	205
1771	14 21 20	196	348	0 2 58	181	155
L.1772	3 6 9	185	298	18 0 31	200	131
1773	22 3 41	204	273	7 9 19	189	80
1774	11 12 30	193	223	26 6 52	208	56
1775	0 21 19	182	173	17 15 41	197	6
L.1776	18 18 51	201	148	4 0 29	186	316
1777	8 3 40	190	198	22 22 2	205	191
1778	27 1 12	209	74	12 6 50	194	241
1779	16 10 1	198	24	1 15 39	183	191
L.1780	4 18 50	187	334	19 13 12	202	167
1781	23 16 22	206	309	8 22 0	191	117
1782	13 1 11	195	259	27 19 33	210	92
1783	2 10 0	184	209	17 4 22	198	42
L.1784	20 7 32	203	184	5 13 10	187	352
1785	9 16 21	192	134	24 10 43	206	327
1786	28 13 54	210	110	3 19 32	195	277
1787	17 22 42	199	59	3 4 20	184	227
L.1788	6 7 31	188	9	21 1 53	203	202
1789	25 5 3	207	345	10 10 41	192	152
1790	14 13 52	196	295	29 8 14	211	128
1791	3 22 41	185	245	18 17 3	200	78
L.1792	21 20 13	204	120	7 1 51	189	28
1793	11 5 2	193	270	25 23 24	208	3
1794	0 13 51	182	120	15 8 13	197	313
1795	19 11 23	201	95	4 17 1	186	263
L.1796	7 20 12	190	45	12 14 34	204	238
1797	26 17 44	208	21	11 23 22	193	188
1798	16 2 33	197	331	1 8 11	182	138
1799	5 11 22	186	381	20 5 44	201	114
1800	24 8 54	205	256	9 14 32	190	63

TABLE II. Mean lunations.

Lun.	D. H. M.	A.	B.	Lun	D. H. M.	A.	B.
1	29 12 44	29	26	9	265 18 30	262	232
2	59 1 28	58	52	10	295 7 20	291	258
3	88 14 12	87	77	11	324 20 5	320	284
4	118 2 56	116	103	12	354 8 49	349	310
5	147 15 40	146	129	13	383 21 33	18	336
6	177 4 24	175	151	To be added to the numbers in table I. for new and full *moons* after Jan.			
7	206 17 8	204	181				
8	236 5 52	233	207				

TABLE III. The firſt equation. (A).

A.	H.M.	A.	H.M.	A.	H.M.	A.	H.M.	A.	HM.
1	4 7	23	2 35	45	1 16	67	0 22	89	0 0
2	4 2	24	2 31	46	1 13	68	0 20	90	0 0
3	3 58	25	2 27	47	1 10	69	0 19	91	0 0
4	3 54	26	2 23	48	1 7	70	0 17	92	0 0
5	3 50	27	2 19	49	1 4	71	0 15	93	0 0
6	3 46	28	2 15	50	1 1	72	0 14	94	0 0
7	3 42	29	2 12	51	0 58	73	0 13	95	0 1
8	3 37	30	2 8	52	0 56	74	0 12	96	0 1
9	3 33	31	2 4	53	0 53	75	0 11	97	0 1
10	3 29	32	2 0	54	0 51	76	0 10	98	0 2
11	3 24	33	1 57	55	0 48	77	0 9	99	0 2
12	3 20	34	1 54	56	0 45	78	0 8	100	0 3
13	3 16	35	1 50	57	0 43	79	0 7	101	0 4
14	3 12	36	1 46	58	0 40	80	0 6	102	0 5
15	3 7	37	1 43	59	0 38	81	0 5	103	0 6
16	3 3	38	1 39	60	0 36	82	0 4	104	0 7
17	2 59	39	1 36	61	0 34	83	0 3	105	0 8
18	2 55	40	1 32	62	0 32	84	0 2	106	0 9
19	2 51	41	1 29	63	0 30	85	0 2	107	0 10
20	2 47	42	1 26	64	0 28	86	0 1	108	0 11
21	2 43	43	1 23	65	0 26	87	0 1	109	0 12
22	2 39	44	1 19	66	0 24	88	0 1	110	0 14

A.	H.M.	A.	H.M.	A.	H.M.	A.	H.M.	A.	H.M.
111	0 15	161	2 48	211	6 23	261	8 20	311	7 18
112	0 17	162	2 52	212	6 26	262	8 20	312	7 15
113	0 18	163	2 56	213	6 30	263	8 21	313	7 12
114	0 20	164	3 0	214	6 34	264	8 21	314	7 9
115	0 22	165	3 5	215	6 37	265	8 21	315	7 6
116	0 23	166	3 9	216	6 41	266	8 22	316	7 3
117	0 25	167	3 13	217	6 45	267	8 22	317	7 0
118	0 27	168	3 18	218	6 48	268	8 22	318	6 56
119	0 29	169	3 22	219	6 52	269	8 22	319	6 53
120	0 31	170	3 27	220	6 55	270	8 22	320	6 50
121	0 34	171	3 31	221	6 58	271	8 22	321	6 46
122	0 36	172	3 35	222	7 2	272	8 22	322	6 43
123	0 38	173	3 40	223	7 5	273	8 21	323	6 39
124	0 40	174	3 44	224	7 8	274	8 20	324	6 36
125	0 43	175	3 49	225	7 11	275	8 20	325	6 32
126	0 45	176	3 53	226	7 14	276	8 19	326	6 29
127	0 48	177	3 58	227	7 17	277	8 18	327	6 25
128	0 51	178	4 2	228	7 20	278	8 18	328	6 22
129	0 53	179	4 7	229	7 23	279	8 17	329	6 18
130	0 55	180	4 11	230	7 26	280	8 16	330	6 14
131	0 59	181	4 15	231	7 29	281	8 15	331	6 10
132	1 2	182	4 20	232	7 31	282	8 14	332	6 7
133	1 5	183	4 24	233	7 34	283	8 13	333	6 3
134	1 8	184	4 29	234	7 37	284	8 12	334	5 59
135	1 11	185	4 33	235	7 39	285	8 11	335	5 55
136	1 14	186	4 38	236	7 41	286	8 10	336	5 51
137	1 17	187	4 42	237	7 44	287	8 9	337	5 47
138	1 20	188	4 47	238	7 46	288	8 8	338	5 43
139	1 24	189	4 51	239	7 48	289	8 7	339	5 39
140	1 27	190	4 55	240	7 50	290	8 5	340	5 35
141	1 30	191	5 0	241	7 53	291	8 3	341	5 31
142	1 34	192	5 4	242	7 55	292	8 2	342	5 27
143	1 37	193	5 9	243	7 57	293	8 0	343	5 22
144	1 41	194	5 13	244	7 59	294	7 58	344	5 19
145	1 45	195	5 17	245	8 0	295	7 56	345	5 15
146	1 48	196	5 22	246	8 2	296	7 54	346	5 10
147	1 52	197	5 26	247	8 4	297	7 52	347	5 6
148	1 56	198	5 30	248	8 6	298	7 50	348	5 2
149	1 59	199	5 34	249	8 7	299	7 48	349	4 58
150	2 3	200	5 39	250	8 9	300	7 46	350	4 54
151	2 7	201	5 43	251	8 10	301	7 44	351	4 49
152	2 11	202	5 47	252	8 11	302	7 41	352	4 45
153	2 15	203	5 51	253	8 12	303	7 39	353	4 41
154	2 19	204	5 55	254	8 13	304	7 37	354	4 37
155	2 23	205	5 59	255	8 14	305	7 34	355	4 34
156	2 27	206	6 3	256	8 15	306	7 31	356	4 28
157	2 31	207	6 7	257	8 16	307	7 29	357	4 24
158	2 35	208	6 11	258	8 17	308	7 26	358	4 20
159	2 39	209	6 15	259	8 18	309	7 23	359	4 15
160	2 43	210	6 19	260	8 19	310	7 21	360	4 11

TABLE IV. The ſecond equation. (B.)

B.	H. M.	B.	H. M.	B.	H. M.	B.	H. M.	B.	H. M.
1	9 59	45	17 5	89	19 35	133	16 35	177	10 17
2	10 10	46	17 12	90	19 35	134	16 28	178	10 7
3	10 21	47	17 19	91	19 34	135	16 21	179	9 58
4	10 32	48	17 26	92	19 33	136	16 14	180	9 48
5	10 43	49	17 33	93	19 32	137	16 6	181	9 38
6	10 54	50	17 39	94	19 31	138	15 59	182	9 29
7	11 5	51	17 46	95	19 30	139	15 51	183	9 19
8	11 16	52	17 52	96	19 28	140	15 44	184	9 10
9	11 27	53	17 58	97	19 26	141	15 36	185	9 0
10	11 38	54	18 4	98	19 24	142	15 28	186	8 51
11	11 49	55	18 9	99	19 22	143	15 20	187	8 41
12	11 59	56	18 15	100	19 20	144	15 12	188	8 32
13	12 10	57	18 20	101	19 18	145	15 4	189	8 22
14	12 20	58	18 25	102	19 15	146	14 56	190	8 13
15	12 31	59	18 30	103	19 12	147	14 48	191	8 4
16	12 42	60	18 35	104	19 9	148	14 39	192	7 55
17	12 52	61	18 40	105	19 6	149	14 31	193	7 45
18	13 2	62	18 44	106	19 2	150	14 23	194	7 36
19	13 13	63	18 48	107	18 59	151	14 14	195	7 27
20	13 23	64	18 52	108	18 55	152	14 5	196	7 18
21	13 33	65	18 56	109	18 51	153	13 57	197	7 8
22	13 43	66	19 0	110	18 47	154	13 48	198	6 59
23	13 53	67	19 4	111	18 43	155	13 39	199	6 50
24	14 3	68	19 7	112	18 38	156	13 31	200	6 41
25	14 13	69	19 10	113	18 34	157	13 22	201	6 32
26	14 23	70	19 13	114	18 29	158	13 13	202	6 23
27	14 32	71	19 16	115	18 24	159	13 4	203	6 14
28	14 42	72	19 19	116	18 19	160	12 55	204	6 5
29	14 52	73	19 21	117	18 14	161	12 46	205	5 57
30	15 1	74	19 23	118	18 8	162	12 37	206	5 48
31	15 10	75	19 25	119	18 3	163	12 28	207	5 39
32	15 19	76	19 27	120	17 57	164	12 18	208	5 31
33	15 28	77	19 29	121	17 51	165	12 9	209	5 22
34	15 37	78	19 30	122	17 45	166	12 0	210	5 13
35	15 45	79	19 32	123	17 40	167	11 51	211	5 5
36	15 54	80	19 33	124	17 34	168	11 41	212	4 57
37	16 2	81	19 34	125	17 28	169	11 32	213	4 49
38	16 11	82	19 35	126	17 22	170	11 23	214	4 40
39	16 19	83	19 35	127	17 15	171	11 14	215	4 32
40	16 27	84	19 36	128	17 9	172	11 4	216	4 24
41	16 35	85	19 36	129	17 2	173	10 55	217	4 16
42	16 43	82	19 36	130	16 56	174	10 45	218	4 8
43	16 50	87	19 36	131	16 49	175	10 36	219	4 0
44	16 58	88	19 36	132	16 42	176	10 26	220	3 52

B.	H.M.	B.	H.M.	B.	H.M.	B.	H.M.	B.	H.M.
221	3 45	249	0 53	277	0 1	305	1 27	333	5 2
222	3 37	250	0 49	278	0 2	306	1 32	334	5 13
223	3 30	251	0 46	279	0 3	307	1 38	335	5 23
224	3 22	252	0 42	280	0 4	308	1 44	336	5 33
225	3 15	253	0 38	281	0 6	309	1 50	337	5 43
226	3 8	254	0 35	282	0 7	310	1 57	338	5 53
227	3 1	255	0 31	283	0 9	311	2 3	339	6 3
228	2 54	256	0 27	284	0 11	312	2 10	340	6 13
229	2 47	257	0 24	285	0 13	313	2 17	341	6 23
230	2 40	258	0 21	286	0 14	314	2 24	342	6 34
231	2 34	269	0 19	287	0 16	315	2 31	343	6 44
232	2 27	260	0 16	288	0 17	316	2 38	344	6 54
233	2 21	261	0 14	289	0 20	317	2 46	345	7 5
234	2 14	262	0 12	290	0 23	318	2 53	346	7 16
235	2 8	263	0 10	291	0 26	319	3 1	347	7 26
236	2 2	264	0 8	292	0 29	320	3 9	348	7 37
237	1 56	265	0 6	293	0 32	321	3 17	349	7 48
238	1 51	266	0 5	294	0 36	322	3 25	350	7 58
239	1 45	267	0 4	295	0 40	323	3 34	351	8 2
240	1 39	268	0 3	296	0 44	324	3 42	352	8 20
241	1 33	269	0 2	297	0 48	325	3 51	353	8 31
242	1 28	270	0 1	298	0 52	326	3 59	354	8 42
243	1 22	271	0 1	299	0 56	327	4 8	355	8 53
244	1 17	272	0 1	300	1 1	328	4 17	356	9 4
245	1 12	273	0 0	301	1 6	329	4 28	357	9 15
246	1 7	274	0 0	302	1 11	330	4 35	358	9 26
247	1 2	275	0 0	303	1 16	331	4 44	359	9 37
248	0 58	276	0 1	304	1 22	332	4 54	360	9 48

TABLE V.

The days in a common year, reckoned from the beginning of January, and ſerving (with the foregoing tables) to find the days of new and full *moons* in all the other months.

Days.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1	32	60	91	121	152	182	213	244	274	305	335
2	2	33	61	92	122	153	183	214	245	275	306	336
3	3	34	62	93	123	154	184	215	246	276	307	337
4	4	35	63	94	124	155	185	216	247	277	308	338
5	5	36	64	95	125	156	186	217	248	278	309	339
6	6	37	65	96	126	157	187	218	249	279	310	340
7	7	38	66	97	127	158	188	219	250	280	311	341
8	8	39	67	98	128	159	189	220	251	281	312	342
9	9	40	68	99	129	160	190	221	252	282	313	343
10	10	41	69	90	130	161	191	222	253	283	314	344
11	11	42	70	101	131	162	192	223	254	284	315	345
12	12	43	71	102	132	163	193	224	255	285	316	346
13	13	44	72	103	133	164	194	225	256	286	317	347
14	14	45	73	104	134	165	195	226	257	287	318	348
15	15	46	74	105	135	166	196	227	258	288	319	349
16	16	47	75	106	136	167	197	228	259	289	320	350
17	17	48	76	107	137	168	198	229	260	290	321	351
18	18	49	77	108	138	169	199	230	261	291	322	352
19	19	50	78	109	139	170	200	231	262	292	323	353
20	20	51	79	110	140	171	201	232	263	293	324	354
21	21	52	80	111	141	172	202	233	264	294	325	355
22	22	53	81	112	142	173	203	234	265	295	326	356
23	23	54	82	113	143	174	204	235	266	296	327	357
24	24	55	83	114	144	175	205	236	267	297	328	358
25	25	56	84	115	145	176	206	237	268	298	329	359
26	26	57	85	116	146	177	207	238	269	299	330	360
27	27	58	86	117	147	178	208	239	270	300	331	361
28	28	59	87	118	148	179	209	240	271	301	332	362
29	29		88	119	149	180	210	241	272	302	333	363
30	30		89	120	150	181	211	242	273	303	334	364
31	31		90		151		212	243		304		365

MOON, *acceleration of the.* See ACCELERATION.

MOON-*dial.* See DIAL.

MOON, *horizontal.* See *Apparent* MAGNITUDE.

MOON, *prime of the.* See PRIME.

MOON-*eyes*, in the *Manege.* A horſe is ſaid to have *moon-eyes* when the weakneſs of his eyes increaſes or decreaſes according to the courſe of the *moon*; ſo that in the wane of the *moon* his eyes are muddy and troubled, and at new *moon* they clear up; but ſtill he is in dangrr of loſing his eye-ſight quite.

MOON-*fiſh*, a name given to the fiſh called by authors ORBIS.

MOON-*ſeed*, *meniſpermum*, in *Botany*, a genus of the *dioecia dodecandria* claſs. Its characters are theſe: they are male and female in different plants; the male flowers have four exterior and eight interior petals, and ſixteen ſtamina; the female have eight barren ſtamina, and double ſingle-ſeeded berries. Linnæus reckons eight ſpecies.

MOON-*trefoil*, in *Botany.* See *Snail* TREFOIL.

MOON-*wort*, in *Botany.* See HONESTY.

MOOR, *mora*, a word ſometimes uſed to expreſs a heath, or barren tract of ground.

The word is ſometimes alſo uſed for a *moraſs*, *moſs*, or *fen.*

Mora muſſa, in *Ancient Writings*, particularly denotes a moſs, or peat moſs.

Moor-*berry*, in *Botany*. See Whortle-*berry*.

Moor *buzzard*. See Buzzard.

Moor-*cock*, an Engliſh name for the red game, or our lagopus, more commonly called the gor-cock. It is a very delicate bird, larger than a partridge, and common on the hills in Derbyſhire and Yorkſhire. See Gor-*cock*.

Moor-*hen*, in *Ornithology*, is, according to ſome authors, the name of a genus of water-birds. See Gallinula.

The common *moor-hen*, called *gallinula chloropus* by authors, and by Linnæus *fulica chloropus*, is a very well known bird, ſomewhat like the coot in ſhape, but ſmaller and very much flatted in the body; the crown of the head, hind part of the neck, the back, and coverts of the wings, are of a fine, but very deep olive green; its feet are greeniſh, and its breaſt a lead-coloured blue; its belly greyiſh; the colours of the plumage in the female are much leſs brilliant than thoſe of the male; and it is inferior in ſize. This bird is common about our rivers, breeds twice or thrice in the ſummer, ſtrikes with the bill like a hen, and in the ſpring has a ſhrill call; and is a very well-taſted bird.

Moor-*land*, or Moory-*land*, in *Agriculture*, is a black, light and ſoft earth, very looſe, and without any admixture of ſtones; and with very little clay, or ſand.

The uppermoſt ſtratum of the fen-lands is uſually of this earth, and it commonly conſtitutes a moderately thick or deep bed. Intermixed with water it cannot eaſily be worked up into a paſte; and when with labour worked up into ſomewhat of a firm maſs, its ſurface appears ſpongy and porous; and as ſoon as dry, it eaſily moulders away to powder.

It is uſually ſoft to the touch, unleſs it be worked very cloſely between the fingers, then it ſhews a mixture of a ſmall quantity of ſand both to the touch and to the eye. It ſeems indeed to conſiſt almoſt entirely of pure vegetable matter, and this lying in ſuch plenty on the ſurface of the fen-lands is the cauſe of their being ſo very fertile.

The great diſadvantage of the places which have this ſoil, is their being liable to be glutted with wet; and to remedy the inconveniencies ariſing from thence, the farmers who rent theſe lands have a cuſtom of burning the ſoil at proper ſeaſons. It burns very freely and eaſily, the ſurface readily catching flame, and a ſubſtance ſomewhat bituminous, uſually contained among the ſoil, helps the burning.

Moor-*ſtone*, the name of a very remarkable ſtone found in Cornwall, and ſome other parts of England, and uſed in the coarſer works of the preſent builders.

This is truly a white granite, and is a very valuable ſtone. It is a very coarſe and rude, but beautiful congeries of variouſly conſtructed and differently figured particles, not diffuſed among or running one into one another, but each pure and diſtinct, though firmly cohering with whatever it comes in contact with. Its colours are principally black and white; the white are of a ſoft, marbly texture, and opake, formed into large congeries, and emulating a ſort of tabulated ſtructure; among theſe there are many of a pure cryſtalline ſplendor and tranſparence; and in ſome are lodged in different directions many ſmall flaky maſſes of pure talcs of ſeveral colours; ſome are wholly pellucid, others of an opake white, others of the colour of brown cryſtal, and a vaſt number perfectly black.

It is found in immenſe ſtrata in ſome parts of Ireland, but is diſregarded there.

It is found with us in Devonſhire, Cornwall, and ſome other counties; and brought thence in vaſt quantities to London. It never forms any whole ſtrata there, but is found on the ſurface of the earth in immenſe and unmanageable maſſes; and to ſeparate theſe into portable ones, they dig a hole with a wedge in ſome part of them and ſurrounding it with a ridge of clay they fill it up with water; this by degrees ſoaks in, and finding its way into the imperceptible cracks, ſo far looſens the coheſions of the particles there, that the day after they drive a larger wedge into the hole, and the ſtone breaks into two or more pieces. It is uſed in London for the ſteps of public buildings; and on other occaſions, where great ſtrength and hardneſs are required.

The people of Cornwall, who have this ſtone in great plenty, uſe it in their tin-works, and particularly in their tin-kiln, on the good effect of which a great deal depends. This kiln is four-ſquare, and at its top is placed a large block of *moor-ſtone*; the uſual ſize of this block is ſix feet in length and four in breadth; in the middle of this block there is made a hole of about ſix inches in diameter. This ſtone ſerves as a head to cover another like ſtone placed beneath it; but this under one is not ſo long as the upper by ſix inches. The reaſon of this is, that it muſt not reach the innermoſt or back part of the wall which is the open place through which the flame aſcends from another place below that, where a very ſtrong fire of furze is conſtantly kept up; and there is another little hole alſo on the outſide. The fore-part is like a common oven, and has ſuch a ſort of chimney.

The tin-ore is roaſted in this kiln, to burn away the mundic, in this manner: the ore is brought in powder, and poured out in heaps on the ſurface of the top-ſtone; a man ſtands there and thruſts it down through the hole in this ſtone into the kiln, that is, to the ſurface of the under-ſtone; a perſon who ſtands below ſpreads this as it falls with an iron rake, and gives notice to the perſon above when there is enough down, that is when the ſurface of the lower ſtone is covered three or four inches thick. When this is done, the hole at the top is covered with green turfs, that the flame may reverberate the ſtronger; and the heat that the *moor-ſtone* acquires helps to roaſt the ore: while the flame that comes up from the ore is blue, there yet remains mundic among it; but when this is burnt off, the flame is yellow. Phil. Tranſ. N° 69.

The miners in ſome parts of Cornwall uſe the name *moor-ſtone* for a ſort of coarſe free-ſtone, which lies very often over the tin-ore; this of a greyiſh colour, and is ſomewhat ſofter than that uſually employed in building. See Growan.

Moor-*titling*, a common Engliſh name for the œnanthe, more frequently called the stone-*chatter*.

MOORING, at *Sea*, is the act of confining and ſecuring a ſhip in a particular ſtation, by chains or cables, which, are either faſtened to the adjacent ſhore, or to anchors in the bottom.

To Moor *acroſs*, is to lay out one of the anchors on one ſide.

To Moor *alongſt*, is to have an anchor in a river, and a hawſer on ſhore.

To Moor *quarter-ſhot*, is to moor quartering, between the two firſt ways.

Mooring *for eaſt*, *weſt*, &c. is when they obſerve which way, and on what point of the compaſs the wind or ſea is moſt likely to endanger the ſhip, and there lay out an anchor.

Mooring *a fair birth*, at *Sea*, is *mooring* in a place free from any annoyance.

Mooring *a proviſo*, at *Sea*, is to have an anchor out, and a hawſer aſhore; then the ſhip is *moored* with her head aſhore: and two cables are the leaſt, and four the beſt to *moor* by. See Anchor.

Mooring *water-ſhot*, is to *moor* neither alongſt nor athwart the tide, but quartering between both.

Moorings, in *Sea-Language*, are uſually an aſſemblage of anchors, chains, and bridles laid athwart the bottom of a river, or haven, to ride the ſhipping contained therein. The anchors, employed on this occaſion, have rarely more than one fluke, which is ſunk in the river near low-water mark. Two anchors, being fixed in this manner, in the oppoſite ſide of the river, are furniſhed with a chain extending acroſs from one to the other. In the middle of the chain is a large ſquare link, whoſe lower end terminates in a ſwivel, which turns round in the chain as about an axis, whenever the ſhip veers about with the change of the tide. To this ſwivel-link are attached the bridles, which are ſhort pieces of cable, well ſerved, whoſe upper ends are drawn into the ſhip, at the *mooring* ports, and afterwards faſtened to the maſts, or cable bolts. A great number of *moorings* of this ſort are fixed in the harbours adjacent to the king's dock-yards, as Deptford, Chatham, Portſmouth, Plymouth, &c. Falconer.

MOORS, in the Iſle of Man, thoſe who ſummon the courts for the ſeveral *ſheadings*; ſuch are the lord's bailiffs. Every *moor* has the like office with our bailiff of the hundred.

Moors-*head*, in *Chemiſtry*, a copper cap made in form of a head, to be ſet over any veſſel, or over a reverberating furnace.

Moors-*head*, alſo denotes the head of a copper or glaſs ſtill or alembic, which is luted on to the body or cucurbit, and hath a beak or pipe to let the ſpirit run down into the receiver.

Moors-*head*, in the *Manege*. See More's *head*.

MOOSE-*deer*. The firſt mention we find of this remarkable animal, is in a tract of Mr. Joſſelyn's, entitled, New England Rarities. That author ſays, it is very fine creature, growing to twelve feet high; the horns are extremely beautiful, with broad palms, ſome of thoſe full grown being two fathom from the tip of one horn to the tip of the other. The ſame author, in another work, entitled, Two Voyages to New England, calls this creature a monſter of ſuperfluity; and ſays, that when full grown, it is many times larger than an ox. What Neal ſays of this animal ſeems copied from Joſſelyn. But the beſt account we have of it, is from Mr. Paul Dudley. This gentleman ſays, that they are of two kinds; the common light-grey *mooſe-deer*, called by the Indians *wampooſe*, and the larger black *mooſe*. The grey *mooſe* is the ſame animal which Mr. Clayton, in his account of the Virginian quadrupeds, publiſhed in the Philoſophical Tranſactions, calls the elk; and this is the creature deſcribed in the Anatomical Diſcoveries of the Paris Academy, under the name of the ſtag of Canada. Horns of this creature have been ſent from Virginia, and called elks horns: they are wholly the ſame with thoſe of our red deer, except in ſize; weighing about twelve pounds. and meaſuring from the burr to the tip about ſix feet long. Phil. Tranſ. N° 444. p. 386. Abr. vol. vii. p. 447. See Elk.

Mr. Dudley ſays, that the grey *mooſe* is like the Engliſh deer; and that theſe creatures herd together thirty or more in a company. The black or large *mooſe* has been taken, he ſays, meaſuring fourteen ſpans in height from the withers, which allowing nine inches to the ſpan, is ten feet and a half.

The ſtag or male of this kind has a palmed horn, not like that of our common or fallow deer, but the palm is much longer and more like to that of the German elk; but it differs from that in having a branched brow-antler between the burr and the palm, which the German elk hath not.

The large horns found foſſile in Ireland, have from their vaſt dimenſions, been ſuppoſed to have originally belonged to the black *mooſe-deer*; but they, as likewiſe moſt other of the large horns found in this part of the world, muſt be referred to the elk kind, but of a ſpecies different from the European, being provided with brow antlers, which that wants. Some of theſe horns are near twelve feet between tip and tip, and ſix feet four inches long; and may probably be ranked among thoſe remains which foſſiliſts diſtinguiſh by the title of diluvian. The largeſt horns of the American *mooſe* ever brought over are only thirty-two inches long, and thirty-four between tip and tip.

Mr. Ray mentions, in his Synopſis of Animals, a pair of extremely large foſſile horns, which he ſaw in a muſæum in Suſſex; but he mentions no brow-antlers in theſe, and therefore probably they, as well as ſome others preſerved in muſæums, were the horns of the German elk.

It is not agreed by authors what number of young the *mooſe* brings forth at a time; Mr. Dudley ſays but two; but Joſſelyn, and from him Neal, ſay three: and theſe authors add, that they do not go ſo long with young as ours does, by two months.

There is, beſide the *mooſe*, another animal of the deer-kind, very common in Virginia, and other of the northern provinces of America. This creature has round horns, not ſpreading out as in the ſtag or red deer, but meeting nearer together at the tips, and bending forwards over the creature's head; and the brow-antlers are not crooked and ſtanding forward, but ſtraight and upright. The ſkin of this deer is of a ſandy colour with ſome black hairs, and is ſpotted all over while young with white ſpots, as ſome of our fallow deer are, and it is about the bigneſs of our fallow deer when full grown.

The *dama Virginiana* of Mr. Ray was different from this, if the deſcription be exact, and the horns of the palmated kind. This *dama* of Mr. Ray ſeems to be what Joſſelyn, in his Voyages, calls the *maurouſe*; but his deſcription is too ſhort to form any regular judgment from; he only ſays, that the *maurouſe* is like the *mooſe*, but that its horns are ſmall, and the creature about the bigneſs of a ſtag. Phil. Tranſ. N° 444. p. 388.

Joſſelyn mentions alſo the buck, the ſtag, and the reindeer; but it is very much to be doubted whether they are the ſame animals that we mean by thoſe names. He mentions alſo another ſort of American deer, an animal called a *macarib*, a *caribo*, or a *pohano*; but this ſeems a mere fiction, no ſuch animal exiſting in nature.

MOOT, formed either from the Saxon *metan*, *gemetan*, *meeting*; or from the French *mot*, *word*, a difficult caſe or queſtion, argued by the ſtudents of inns of court, by way of exerciſe.

MOOTER, in the *Dock-Yards*, the perſon who forms and ſmooths the tree-nails for uſe.

MOOTING, the chief exerciſe of the ſtudents in the inns of court; being the arguing of caſes, which young utter barriſters, &c. perform at appointed times, the better to enable them for practice, and the defence of their clients cauſes.

Such as, from their learning and ſtanding, are called by the benchers to argue *moot-caſes*, are ſometimes called *utter barriſters*; the reſt, who, for want of experience, &c. are not admitted, are by ſome called *inner barriſters*. The place where the *moot caſes* were argued, was anciently called a *moot-hall*.

In the inns of court there is a *baliff* or *ſurveyor of the moots*, yearly choſen by the bench to appoint the *moot-men* for the inns of chancery, and to keep account of performance of exerciſes, both there and in the houſe.

MOOT-MEN, are thoſe who argue *moot-caſes*.

Out of theſe *moot-men* are choſen readers for the inns of chancery: where, in term-time and in vacations, they argue caſes in the preſence of attornies and clerks.

MOP, in ſome counties, in England, is the term for what is called the ſtatute in other places; being the time that young perſons who intend themſelves for ſervants, meet at ſome certain place, in order to be hired into ſervices.

MORAI, is the name given at Otaheite, in the South Sea, to their burying grounds, which are alſo places of worſhip. This is a pile of ſtone raiſed pyramidically upon an oblong baſe or ſquare, two hundred and ſixty-ſeven feet long, and eighty-ſeven wide. On each ſide is a flight of ſteps; thoſe at the ſides being broader than thoſe at the ends; ſo that it terminated not in a ſquare of the ſame figure with the baſe, but in a ridge, like the roof of a houſe. There were eleven of theſe ſteps to one of theſe *morais*, each of which was four feet high, ſo that the height of the pile was forty-four feet; each ſtep was formed of one courſe of white coral ſtone, which was neatly ſquared and poliſhed; the reſt of the maſs, for there was no hollow within, conſiſted of round pebbles, which, from the regularity of their figure, ſeemed to have been wrought. The foundation was of rock ſtones, which were alſo ſquared. In the middle of the top ſtood an image of a bird, carved in wood, and near it lay the broken one of a fiſh, carved in ſtone. The whole of this pyramid made part of one ſide of a ſpacious area or ſquare, 360 feet by 354, which was walled in with ſtone, and paved with flat ſtones in its whole extent. About a hundred yards to the weſt of this building was another paved area or court, in which were ſeveral ſmall ſtages raiſed on wooden pillars, about ſeven feet high, which are called by the Indians *ewattas*, and ſeem to be a kind of altars, as upon theſe are placed proviſions of all kinds, as offerings to their gods. On ſome of them were ſeen whole hogs and on others the ſculls of above fifty, beſides the ſculls of many dogs. The principal object of ambition among the natives is to have a magnificent *morai*. The male deities, for they have them of both ſexes, are worſhipped by the men; and the female by the women; and each have *morais* to which the other ſex is not admitted, though they have alſo *morais* common to both. Hawkeſworth's Voyages, vol. ii. p. 166—239.

MORALS, any thing relating to the manners or conduct of life.

Beſides the theological virtues, as *faith*, *hope*, *charity*, &c. there are alſo *moral* virtues; as *juſtice*, *temperance*, &c.

Moral *actions*, or *acts*, are ſuch as render the agent *good*, or *evil*; and conſequently, rewardable, or puniſhable, becauſe he does them. See Action.

Moral *cauſe*. See Cause.

Moral *certainty*, or *aſſurance*, is uſed to ſignify a very ſtrong probability; in contradiſtinction to a mathematical demonſtration. See Certitude.

Moral, *evidence*, *evil*, *fables*, *good*. See the ſeveral ſubſtantives.

Moral *impoſſibility*, is what we otherwiſe call a *very great*, and almoſt *inſuperable difficulty*; in oppoſition to a phyſical, or natural impoſſibility. See Impossible.

Moral *liberty*, *neceſſity*, and *perfection*. See the ſubſtantives.

Moral *philoſophy*, a ſcience whoſe object is, to direct and form men's manners; to explain the nature and reaſon of actions; and to teach and inſtruct us how to accquire that felicity which is agreeable to human nature.

Moral philoſophy is the ſame with what we otherwiſe call ethics, ſometimes morality.

Moral *quantity*. See Quantity.

Moral *ſenſe*, the faculty whereby we diſcern or perceive what is good, virtuous, beautiful, &c. in actions, manners, characters, &c.

A late author has endeavoured to prove, that it is a peculiar ſenſe whereby we get the ideas of theſe things; and denominates it a *moral ſenſe*. See Sense.

Moral *theology* is that which treats of caſes of conſcience; called alſo *caſuiſtry*, or *caſuiſtical divinity*.

Moral *univerſality*. See Universality.

Moral *of a fable* is the inſtruction drawn from it.

Thus when Phædrus at the end of a fable adds *Hoc illis dictum qui*, &c. this makes what we call the *moral*: the Greeks called it επιμυθιον, when at the end of the fable and ϖρομυθιον, when at the beginning. Among the Latins it was called *affabulatio*.

MORALITIES, in *Engliſh Antiquity*. See Mystry.

MORALITY denotes a conformity, in things and actions, to thoſe unalterable obligations which reſult from the nature of our exiſtence, and the neceſſary relations of liſe ; whether to God as our Creator, or to mankind as our fellow-creatures.

For other definitions of *morality* or virtue, given by ſome celebrated writers, as well as different hypotheſes relating to its foundation, ſee *Moral* VIRTUE.

MORALITY is alſo uſed for the ſcience or doctrine of morals, or the art of living well and happily: deduced from reaſon, and the nature, relation, and fitneſs of things. In this ſenſe, it amounts to the ſame with what we otherwiſe call *ethics*, *moral philoſophy*, or the *doctrine of offices*.

Notwithſtanding the great obſcurity and uncertainties in the moral ſcience, Mr. Locke is of opinion, that the doctrine of manners is equally capable of being brought to demonſtration with the doctrine of quantity and number ; that is, with the pureſt parts of mathematics.

According to this author, the idea of a Supreme Being, infinite in power, goodneſs, and wiſdom, whoſe workmanſhip we are, and on whom we depend ; and the idea of ourſelves, as underſtanding, rational creatures ; would if duly conſidered, afford ſuch foundations of our duty, and rules of action, as might place *morality* among the ſciences capable of demonſtration ; wherein we need not doubt but that, from principles as inconteſtible as thoſe of the mathematics, by neceſſary conſequences, the meaſure of right and wrong might be made out to any one, who will apply himſelf, with the ſame indifferency and attention to the one, as he doth to the other of theſe ſciences : for the relations of other modes may certainly be perceived, as well as thoſe of number and extenſion. E. gr. that *where there is no property, there can be no injuſtice*, is a propoſition as certain as any in Euclid : for the idea of property being a right to any thing, and the idea of injuſtice being the invaſion or violation of that right, it is evident, that theſe ideas being thus eſtabliſhed, and theſe names annexed to them, we can as certainly know this propoſition to be true, as that a triangle has three angles equal to two right ones. Again, *no government allows abſolute liberty* : the idea of government being the eſtabliſhment of ſociety, upon certain rules or laws, which require conformity to them ; and the idea of abſolute liberty being for any one to do whatever he pleaſes, I am as capable of being certain of the truth of this propoſition, as of any in mathematics.

What has given the advantage to the ideas of quantity, and made them thought more capable of certainty and demonſtration than the ideas of good and evil, right and wrong, &c. is,

1. That the former can be repreſented by ſenſible marks, which have a nearer correſpondence with them than any words or ſounds. Diagrams drawn on paper are copies of the ideas, and are not liable to the uncertainty that words carry in their ſignification ; but we have no ſenſible marks that reſemble our moral ideas, and nothing but words to expreſs them by ; which, though, when written, they remain the ſame, yet the ideas they ſtand for may change in the ſame man, and it is very ſeldom that they are not different in different perſons.

2. Moral ideas are commonly more complex than figures ; whence theſe two inconveniences follow : 1. That their names are of more uncertain ſignification ; the preciſe collection of ſimple ideas they ſtand for, not being ſo eaſily agreed on ; and ſo the ſign that is uſed for them in communication always, and in thinking often, does not readily carry with it the ſame idea.

3. The mind cannot eaſily retain thoſe preciſe combinations ſo exactly and perfectly, as is neceſſary in the examination of the habitudes and correſpondences, agreements or diſagreements, of ſeveral of them one with another, eſpecially where it is to be judged of by long deductions, and the intervention of ſeveral other complex ideas, to ſhew the agreement or diſagreement of two remote ones.

One part of theſe diſadvantages in moral ideas, which has made them be thought not capable of demonſtration, may in a good meaſure be remedied by definitions, ſetting down that collection of ſimple ideas which every term ſhall ſtand for, and then uſing the term ſteadily and conſtantly for that preciſe collection.

The mathematician conſiders the truth and properties belonging to a rectangle or circle, only as they have ideas in his own mind, which poſſibly he never found actually exiſted mathematically, that is preciſely, true : yet his knowledge is not only certain but real ; becauſe real things are no farther, nor intended to be, meant by any ſuch propoſitions, than as things really agree to thoſe archetypes in the mind. It is true of the idea of a triangle, that its three angles are equal to two right ones ; it is true alſo of a triangle, wherever it exiſts : what is true of thoſe figures that have barely an ideal exiſtence in the mind, will hold true of them alſo, when they come to have a real exiſtence in matter. Hence it follows, that moral knowledge is as capable of real certainty as mathematics : for certainty being nothing but the perception of ſuch agreement, by the intervention of other ideas ; our moral ideas, as well as mathematical, being archetypes themſelves, and ſo adequate or complete ideas, all the agreement or diſagreement we ſhall find in them will produce real knowledge, as well as in mathematical figures. That which is requiſite to make our knowledge certain, is the clearneſs of our ideas ; and that which is required to make it real, is that they anſwer their archetypes.

But it will here be ſaid, that if moral knowledge be placed in the contemplation of our own moral ideas, and thoſe are of our own making, what ſtrange notions will there be of juſtice and temperance ! what confuſion of virtues and vices, if every man may make what ideas of them he pleaſes ? It is anſwered, no confuſion or diſorder at all in the things themſelves, nor the reaſonings about them, no more than there would be a change in the properties of figures, and their relations one to another, if a man ſhould make a triangle with four corners, or a trapezium with four right angles ; that is, in plain Engliſh, change the names of the figures, and call that by one name which is called ordinarily by another. The change of name will indeed at firſt diſturb him who knows not what idea it ſtands for ; but as ſoon as the figure is drawn, the conſequences and demonſtration are plain and clear.

Juſt the ſame is it in moral knowledge ; let a man have the idea of taking from others, without their conſent, what they are juſtly poſſeſſed of, and call this *juſtice*, if he pleaſeth ; he that takes the name there, without the idea put to it, will be miſtaken, by joining another idea or his own to that name ; but ſtrip the idea of that name, or take it, ſuch as it is in the ſpeaker's mind, and the ſame things will agree to it, as if you called it *injuſtice*.

One thing we are to take notice of, that where God, or any other law-maker, has defined any moral names, there they have made the eſſence of that ſpecies to which that name belongs ; and there it is not ſafe to apply or uſe them otherwiſe ; but in other caſes it is bare impropriety of ſpeech to apply them contrary to the common uſage of the country they are uſed in.

MORASS, a marſh, fen, or low moiſt ground, which receives the waters from above, without having any deſcent to carry them off again.

Somner derives the word from the Saxon *merſc*, *lake* ; Salmaſius from *mare*, a *collection of waters* ; others from the German *maraſt*, a *muddy place* ; and others from *mareſc*, of *maricetum*, a *mariſcis*, i. e. *ruſhes*. See BOG, FEN, MARSH, &c.

In Scotland, Ireland, and the north of England, they have a peculiar kind of *moraſſes*, called *moſſes*, or *peat-moſſes*, whence the country-people dig their peat or turf for firing.

The earl of Cromertie gives a particular account of theſe moſſes in the Philoſophical Tranſactions. They are covered with a heathy ſcurf, under which is a black, moiſt ſpongy earth, in ſome places ſhallower, in others deeper, ordinarily from three or four, to ſeven or eight feet depth, though in ſome few places twice or thrice as much.

This black ſpongy earth they cut into oblong ſquares, with iron ſpades made for that purpoſe, eight or nine inches long, and four or five broad : as the men cut them up, they are carried and ſpread on a dry ground, to be dried in the wind and ſun. Some of theſe become harder, ſome ſofter, according to the nature of the mould or earth : the more black and ſolid they are, the better fire they make ; and thoſe are the leaſt eſteemed which are greyeſt, lighteſt, and moſt ſpongy.

When they have cut off one ſurface of four or five inches deep, they proceed downwards to another, and ſo to a third and a fourth, till they come to the hard ſtrata ; unleſs they be ſtopped with water, which they alſo ordinarily remove by making a channel, if they can ; but where they cannot, there the water ſtagnates. In ſuch waſted pits, or *peat-dykes*, as they call them, where water hinders the cutting the ſpongy earth to the bottom, the pits will be filled up again, in ſome years, with a new ſpongy earth ; which, in proceſs of time, comes to the conſiſtence of peat-moſs as at firſt, and a ſcurfy heathy turf grows over the top of it. When the dykes are dug down to the hard channel, the moſſes do not renew, as in the other caſe : though it has been obſerved, that if they be cut down to the channel, provided the heathy turf cut off from the top be but laid on the channel, in courſe of time the moſs grows again. Theſe moſſes are always level ; though they are frequently found on hills, and near the tops of them too ; yet, as that curious nobleman obſerves, the moſſes have always a deſcent to them, and generally from them; inſomuch that he never knew any where the water might ſtagnate. It is the water draining from above, that ſeems to be the parent of the peat. In many of theſe moſſes are found quantities of fir and oak-wood, uſually in whole trees; but the ſmaller branches are ſeldom found unconſumed. The wood is as good for uſe as any old wood is; only that, having imbibed a deal of moiſture, it takes ſome time to dry, in order to fit it for burning.

There are many places where wood will not grow, where yet the moſſes are well ſtocked with this under-ground timber; but yet it appears there muſt have been woods formerly there; elſe how came they in the moſſes? To prove this, that noble lord gives us the hiſtory and origin of a moſs, in great meaſure from his own experience. In the pariſh of Lochburn, in the year 1651, he ſaw near the top of a very high hill, a plain about a mile over, then covered with a firm ſtanding wood, but which was ſo very old, that not only the trees had no leaves or bark on, but the outſide, for the ſpace of an inch inwards, was dead white timber, though within they were firm. Coming by the place fifteen years after, he could not diſcover the leaſt appearance of a tree; but, inſtead thereof, there was a plain green ground covered with a moſs; the trees being all fallen, and having lain ſo thick over one another, that the green had over-run the whole timber, by means of the moiſture draining from the hill above it, and ſtagnating on the plain. He adds, that none could paſs over it; the ſcurf not being firm enough to ſupport them. In thirty years more he found this whole piece of ground turned into a common peat-moſs and the country people digging turf and peat there. This accounts for the generation of moſſes, and whence it is that many of them are furniſhed with timber.

It appears from the whole, that all the trees which we find in this foſſile ſtate, originally grew in the very places where we now find them, and have only been thrown down and buried there, not brought from elſewhere. It may appear indeed an objection to this opinion, that moſt of theſe foſſile trees are of the fir kind; and that Cæſar ſays expreſly that no firs grew in Britain in his time; but this is eaſily anſwered by obſerving, that theſe trees, though of the fir-kind, yet are not the ſpecies uſually called the fir, but pitch-tree; and Cæſar has no where ſaid that pitch-trees did not grow in England. Norway and Sweden yet abound with theſe trees, and there are at this time whole foreſts of them in many parts of Scotland, and a large number of them wild upon a hill at Wareton in Staffordſhire to this day.

In Hatfield-marſh, where ſuch vaſt numbers of the foſſile trees are now found, there has evidently once been a whole foreſt of them growing. The laſt of theſe was found alive, and growing in that place within a hundred years laſt paſt, and cut down for ſome common uſe. See *Bog*-Wood.

The Roman Hiſtorians tell us, that when their armies purſued the wild Britons, theſe people always ſheltered themſelves in the miry woods, and low watery foreſts. Cæſar expreſly ſays this, and obſerves, that Caſſibelan and his Britons, after their defeat, paſſed the Thames, and fled into ſuch low *moraſſes* and woods, that there was no purſuing them; and we find that the Silures ſecured themſelves in the ſame manner when attacked by Oſtorius and Agricola. The ſame thing is recorded of Venutius, king of the Brigantines, who fled to ſecure himſelf in the boggy foreſts in the midland part of this kingdom; and Herodian expreſly ſays, that, in the time of the Romans puſhing their conqueſts in theſe iſlands, it was the cuſtom of the Britons to ſecure themſelves in the thick foreſts which grew in their boggy and wet places, and when opportunity offered, to iſſue out thence and fall upon the Romans. The conſequence of all this was, the deſtroying all theſe foreſts, the Romans finding themſelves ſo plagued with parties of the natives iſſuing out upon them at times from theſe foreſts, that they gave orders for the cutting down and deſtroying all the foreſts in Britain which grew on boggy and wet grounds. Theſe orders were punctually executed; and to this it is owing that at this day we can hardly be brought to believe that ſuch foreſts ever grew with us as are now found buried.

The Roman hiſtories all join in telling us, that when Suetonius Paulinus conquered Angleſea, he ordered all the woods to be cut down there, in the manner of the Roman generals in England; and Galen tells us, that the Romans, after their conqueſt in Britain, kept their ſoldiers conſtantly employed in cutting down foreſts, draining of marſhes, and paving of bogs. Not only the Roman ſoldiers were employed in this manner, but all the native Britons made captives in the wars, were obliged to aſſiſt in it: and Dion Caſſius tells us, that the emperor Severus loſt no leſs than fifty thouſand men in a few years time, in cutting down the woods and draining the bogs of this iſland. It is not to be wondered at, that ſuch numbers executed the immenſe deſtruction which we find in theſe buried foreſts. One of the greateſt ſubterranean treaſures of wood is that near Hatfield; and it is eaſy to prove that theſe people, to whom this havock is thus attributed, were upon the ſpot where theſe trees now lie buried. The common road of the Romans out of the ſouth into the north, was formerly from Lindum (Lincoln) to Segelochum (Little-Burrow upon Trent), and from thence to Danum (Doncaſter), where they kept a ſtanding garriſon of Criſpinian horſe. A little off on the eaſt, and north-eaſt of their road, between the two laſt named towns, lay the borders of the greateſt foreſt, which ſwarmed with wild Britons, who were continually making their ſallies out, and their retreats into it again, intercepting their proviſions, taking and deſtroying their carriages, killing their allies and paſſengers, and diſturbing their garriſons. This at length ſo exaſperated the Romans, that they were determined to deſtroy it; and to do this ſafely and effectually, they marched againſt it with a great army, and encamped on a great moor not far from Finningly: this is evident from their fortifications, yet remaining.

There is a ſmall town in the neighbourhood called Oſterfield, and as the termination *field* ſeems to have been given only in remembrance of battles fought near the towns whoſe names ended with it, it is not improbable that a battle was fought here, between all the Britons who inhabited this foreſt, and the Roman troops under Oſtorius. The Romans ſlew many of the Britons, and drove the reſt back into this foreſt, which at that time overſpread all this low country. On this the conquerors taking advantage of a ſtrong ſouth-weſt wind ſet fire to the pitch trees, of which this foreſt was principally compoſed; and when the greater part of the trees were thus deſtroyed, the Roman ſoldiers and captive Britons cut down the remainder, except a few large ones, which they left ſtanding, as remembrances of the deſtruction of the reſt. Theſe ſingle trees however could not ſtand long againſt the winds; and theſe falling into the rivers which ran through the country, interrupted their currents, and the water then overſpreading the level country, made one great lake, and gave origin to the *moſſes* or moory bogs, which were afterwards formed there, by the workings of the waters, the precipitation of earthy matter from them, and the putrefaction of rotten boughs and branches of trees, and the vaſt increaſe of water-moſs, and other ſuch plants which grow in prodigious abundance in all theſe ſorts of places. Thus were theſe burnt and felled trees buried under a new-formed ſpongy and watery earth; and afterwards found, on the draining and digging through this earth again.

Hence it is not ſtrange, that Roman weapons and Roman coins are found among theſe buried trees; and hence it is that among the buried trees ſome are found burnt, ſome chopped and hewn; and hence it is that the bodies of the trees all lie by their proper roots, and with their tops lying north-eaſt, that is, in the direction in which a ſouth-weſt wind would have blown them down. Hence alſo it is, that ſome of the trees are found with their roots lying flat, theſe being not cut or burned down, but blown up by the roots afterwards when left ſingle; and it is not wonderful that ſuch trees as theſe ſhould have continued to grow even after their fall, and ſhoot up branches from their ſides, which might eaſily grow into high trees. Phil. Tranſ. N° 275.

By this ſyſtem it is alſo eaſily explained why the moor-ſoil in the country is in ſome places two or three yards thicker than in others, or higher than it was formerly, ſince the growing up of peat-earth or bog-ground is well known, and the ſoil added by overflowing of waters is not a little.

As the Romans were the deſtroyers of this great and noble foreſt, ſo they probably were alſo of the ſeveral other ancient foreſts; the ruins of which furniſh us with the bog-wood of Staffordſhire, Lancaſhire, Yorkſhire, and other counties. But as the Romans were not much in Wales, in the Iſle of Man, or in Ireland, it is not to be ſuppoſed, that foreſts cut down by theſe people gave origin to the foſſile wood found there; but though they did not cut down theſe foreſts, others did; and the origin of the bog-wood is the ſame with them and with us.

Hollingſhed informs us, that Edward the Firſt being not able to get at the Welſh, becauſe of their hiding themſelves in boggy woods, gave orders at length that they ſhould be deſtroyed by fire and by the ax; and doubtleſs the roots and bodies of trees found in Pembrokeſhire under ground, are the remains of the execution of this order. The foſſile wood in the bogs of the Iſles of Man and Angleſea, is doubtleſs of the ſame origin; though we have not any accounts extant of the time or occaſion of the foreſts there being deſtroyed; but as to the foſſile trees of the bogs of Ireland, we are expreſly told, that Henry the Second, when he conquered that country, ordered all the woods to be cut down that grew in the low parts of it, to ſecure his conqueſts by cutting away the places of reſort of rebels.

We have an account in the Philoſophical Tranſactions of a moving moſs, near Church-town in Lancaſhire, which greatly alarmed the neighbourhood as miraculous. The moſs was obſerved to riſe to a ſurpriſing height, and ſoon after ſunk as much below the level, and moved ſlowly towards the ſouth. See *Moving* BOG.

MORAVIAN, or BOHEMIAN *brethren*, in *Eccleſiaſtical Hiſtory*, were proteſtants of Bohemia, who, in the fifteenth century, threw off the deſpotic yoke of Rome, animated by the zealous exhortations and heroic example of John Huſs. Theſe *Moravian* brethren were diſtinguiſhed by ſeveral religious inſtitutions of a ſingular nature, and well adapted to guard their community againſt the reigning vices and corruptions of the times. In 1552 they united themſelves to the Lutheran churches in Saxony; but after the death of Luther, and their expulſion from their country in 1547, many of them, who retired into Poland, embraced the religious ſentiments and diſcipline of the reformed; and by degrees they all entered into the comuion of the Swiſs church. This union was, at firſt, formed on the expreſs condition, that the two churches ſhould continue to be governed by their reſpective laws and inſtitutions, and ſhould have ſeparate places of public worſhip: but, in the following century, all remains of diſſenſion were removed in the ſynods held at Aſtrog in 1620 and 1627, and the two congregations were formed into one, under the title of the *Church of the United Brethren*. From this honourable origin the modern *Moravians* pretend to derive their deſcent. See HERRNHUTERS and UNITAS *fratrum*.

MORATUR, or DEMORATUR, in *Law*, ſignifies as much as, *he demurs*; that is, the party here goes not forward, but reſts or abides by the judgment of the court, who take time to deliberate, argue, and adviſe thereon.

When the counſel of the party are of opinion, that the count or plea of the adverſe party is inſufficient in law; then he *demurs*, or abides in law, and refers the ſame to the judgment of the court. See DEMURRER.

MORBID, *morbidus*, in *Medicine*, is applied to thoſe parts, humours, &c. wherein a diſeaſe lies.

Morbid, in *Painting*, is particularly applied to fat fleſh very ſtrongly expreſſed.

MORBILLI, in *Medicine*, a diſeaſe popularly called MEASLES.

MORBUS, a term purely Latin, ſignifying DISEASE.

Morbus *comitialis*, denotes the EPILEPSY.

Morbus *Gallicus*. See VENEREAL *diſeaſe*.

Morbus *Hungaricus*. See HUNGARICUS *morbus*.

Morbus *prodromus*. See PRODROMUS.

Morbus *pedicularis*. See PEDICULARIS.

Morbus *regius*. See JAUNDICE.

Morbus *virgineus*. See CHLOROSIS.

Morbus *cholera*. See CHOLERA.

MORDEHI, an Eaſt Indian name for a diſeaſe, to which the people of that country are ſubject. It conſiſts in a violent diſorder of the ſtomach. The great heats, copious ſweats, and ſupervening cold of that country, all naturally tend to weaken the ſtomach. Now if the inhabitants eat or drink immoderately at night, the concoction of their aliments can be but very unduly performed. Hence, beſides this diſtemperature of the ſtomach, they are ſubject to others of the bowels; and diarrhœas are very common among them, and with difficulty cured.

MORDELLA, a name given by ſome writers to the EAR*wig*.

Mordella, in *Zoology*, the name of a genus of four-winged flies, of the *coleoptera* order of inſects: the characters of which are, that the antennæ are filiform and ſerrated; the head deflexed under the neck; that the palpi are compreſſed, elevated, and obliquely truncated: that the elytra are bent downwards towards the apex; and that the fore-thighs are broad at the baſe of the abdomen. Linnæus enumerates ſix ſpecies. See INSECT.

Dr. Hill diſtinguiſhes this genus by ſlender antennæ, the laſt joint being globoſe, and by moſt of the ſpecies having legs, which ſerve them for leaping. Hiſt. Anim. p. 49.

MORDEXYN, or MORDOXI, a name given to a diſeaſe very frequent among the inhabitants of Goa, which conſiſts in a nauſea, and continued vomiting, and uſually ſeizes the patient ſuddenly and unexpectedly, and often proves fatal.

MORDILAPIS, a name given by ſome writers to loaches, a ſmall fiſh, often found under ſtones in ſhallow waters.

MORE's *head*, in the *Manege*, implies the colour of a *roan-horſe*, who, beſides the mixture or blending of a grey and a bay, has a black head, and black extremities, the main and tail. See ROAN.

MOREA, in *Botany*, a genus of the *triandria monogynia* claſs. Its characters are theſe: the flower is very like thoſe of the iris, but it has ſix ſpear-ſhaped petals, which ſpread open horizontally; three of which are alternately longer than the other; and it has three erect ſtandards, which have no falls as the iriſes have; the ſpatha, number of ſtamina, and ſeed-veſſels, agree very nearly with the iris. Linnæus reckons five, and Miller three ſpecies, natives of the Cape of Good Hope.

MORELLA, in *Botany*, a name uſed by ſome as a common term for all the night-ſhades; others have appropriated it to the *lycoperſicon*, or love-apple only. Æmilius Macer tells us, that in his time all the plants called by the Greeks *ſtrychna*, were called by the Latins *morella*.

The eſculent *morella* is a ſpecies of PHALLUS.

MORESK, or MORISKO, a kind of painting, carving, &c. done after the manner of the Moors: conſiſting of ſeveral groteſque pieces and compartiments promiſcuouſly intermingled, not containing any perfect figure of a man, or other animal, but a wild reſemblance of birds, beaſts, trees, &c.

Theſe are alſo called *arabeſques*, and are particularly uſed in embroideries, damaſk-work, &c.

Moreſque dances, vulgarly called *morrice-dances*, are thoſe altogether in imitation of the Moors; as ſarabands, chacons, &c. and are uſually performed with caſtanets, tambours, &c.

There are few country places in this kingdom where the *morrice-dance* is not known. It was probably introduced into this country about, or a little before, the reign of Henry VIII. and is a dance of young men in their ſhirts, with bells at their feet, and ribbands of various colours tied round their arms, and flung acroſs their ſhoulders.

MORETUM, among the Romans, a kind of ſalad, compoſed of the eight following ingredients, viz. garlic, parſley, rue, coriander, onions, cheeſe, oil, and vinegar.

MORGANATIC *marriage*. See MARRIAGE.

MORGAY, an Engliſh name for the ſea-fiſh, called alſo the *rough hound-fiſh*, one of the galeus kind; the *catulus minor* of Salvian, and *muſtelus ſtellaris tertius* of Bellonius. It is of a pale, and ſomewhat reddiſh grey, and is ſpotted, with brown and whitiſh ſpots; the belly is ſilver white, and the body long and round; its ſkin is very rough, and its fleſh very firm, and finely flavoured; ſome ſay it taſtes of muſk, or ſome ſuch perfume. It is the ſmalleſt of all this genus of fiſhes, and ſeldom weighs above a pound and a half. It is common in the Mediterranean, and is frequent in the markets in Italy.

MORGII, among the *Mahometans*, a ſect who lay much ſtreſs upon belief, and ſtand oppoſed to the ALWAIDII.

MORHUA, in *Ichthyology*, a name uſed by ſome authors for for the common cod-fiſh.

MORIAM, in our *Old Writers*, a head-piece called a pot, ſtat. 4 and 5 P. & M. c. 2.

The word comes from the French *morion*, or Italian *morione*, i. e. *caſſis*.

MORILLES, a kind of muſhroom, about the bigneſs of a walnut, pierced with holes like a honey-comb, and ſaid to be good for creating an appetite. They are alſo accounted reſtorative, and frequently uſed in ſauces and ragouts.

MORILLON, in *Ornithology*, the name of a ſpecies of duck, ſeeming the ſame with the *capo roſſo*, a ſmall red-headed wild duck. See DUCK.

MORINA, in *Botany*, a genus of the *diandria digynia* claſs. Its characters are theſe: it has a double empalement, which is tubulous, bifid, of one leaf, and permanent; the flower hath one petal, with a long tube a little incurved; the top is divided into two lips; the upper lip is ſmall and bifid; the under-lip is cut into three equal obtuſe ſegments, the middle one being extended beyond the other; it hath two briſtly ſtamina; the globular germen is ſituated under the flower, ſupporting a ſlender ſtyle, which is longer than the ſtamina, and crowned by a target-ſhaped ſtigma; the germen afterward becomes a ſingle ſeed, crowned by the empalement of the flower. There is but one ſpecies of this genus known at preſent, which grows naturally near Erzeron in Perſia. It is cordial, cephalic, and ſtomachic; good for reſiſting the influence of a bad air, and to excite the tranſpiration of peccant humours, being taken in infuſion or conſerve.

MORINDA, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the flowers are aggregate and monopetalous; the ſtigma divided into two ſegments, and the fruit aggregate drupes. There are three ſpecies.

MORINELLUS, in *Zoology*. See DOTTEREL, and TURNSTONE.

MORINGA, in *Botany*, the name by which ſome authors call the tree which produces the ben-nut, or *glans unguentaria*, and whoſe wood is the *lignum nephriticum*, or nephritic wood of the ſhops.

MORION, in *Botany*, a name given by the ancients to a kind of nightſhade. The ancient Greeks, Theophraſtus and others, called all the nightſhades in general by the name *ſtrychnos*. Some of theſe they ſaid were poiſonous, and others eſculent. The poiſonous were of two kinds, ſome bringing on ſleepy diſorders, and others making the patient mad.

The eſculent kind was the *pomum amoris*, or love-apple, eaten at this time by the Portugueſe and many other nations, and by ſome in England. Some after-writers uſe the word *morion* as a diſtinctive name for thoſe kinds of nightſhade which cauſed ſleepy diſorders; and after theſe ſome uſed it as the peculiar name of one ſpecies, and others as the name of the male mandrake of Dioſcorides, whoſe fruit, according to that author, was commonly eaten by the ſhepherds; but when taken too largely, threw them into ſleepy diſorders. From this word *morion* has come, in all probability, the Latin name *morella*, given at firſt to the *pomum amoris*, or love-apple; and afterwards, according to Æmilius Macer, to all the nightſhades; for he expreſly ſays, that thoſe plants which the Greeks called *ſtrychna*, the Latins called *morella*; and we find that the old Greeks called all the nightſhades *ſtrychna*.

Morion, in the *Natural Hiſtory of the Ancients*, a name given to one of the ſemi-pellucid gems, more commonly called PRAMNION. It is a ſtone appearing externally only of a fine deep black; but when held up againſt a candle, or againſt the ſun-ſhine, giving a very beautiful red, in different degrees, from that of the hyacinth to that of the amethyſt or carbuncle.

MORISONIA, in *Botany*, the name of a genus of plants of the *monadelphia polyandria* claſs; the characters of which are theſe: the perianthium is one-leaved, inflated, and divided at the top into two lips; theſe ſtand open; but the neck is contracted, and the whole ſoon withers; the flower conſiſts of four oblong obtuſe petals, which are expanded when they are out of the cup; the ſtamina are numerous filaments; the antheræ are ſimple; the ſtyle is capillary and erect, and is longer than the tube of the flower; the germen of the piſtil is oval; the ſtigma is capitated, and of a plano-convex figure; the fruit is a globoſe berry, with a hard ſmooth rind; it has only one cell, and is ſupported by the ſtyle by way of pedicle; the ſeeeds are numerous, and are of the ſhape of the common kidney-beans, but ſmall. Linnæi Gen. Plant. p. 230.

MORLING, or Mortling, in our *Old Writers*, the wool which is taken from the ſkin of dead ſheep, whether killed, or dying of the rot. See Shorling.

MORMYLUS, in *Ichthyology*, the name of a ſpecies of SPARUS, with the upper jaw longeſt, and with twelve parallel, tranſverſe black lines on each ſide.

MORMYRUS, in *Ichthyology*, a genus of abdominal fiſh, with a ſmooth head, ſeveral emarginated teeth, a linear aperture in the gills, without a cover, and ſquamoſe body. There are two ſpecies, inhabitants of the Nile.

MORNING, the beginning of the day; or the time of the ſun-riſing.

The aſtronomers reckon *morning*, *mane*, from the time of midnight, to that of mid-day. Thus an eclipſe is ſaid to begin at eleven o'clock in the *morning*, &c.

Morning-*ſtar* is the planet Venus, when a little to the weſtward of the ſun; that is, when ſhe riſes a little before him. In this ſituation ſhe called, by the Greeks, *Phoſphorus*; by the Latins, *Lucifer*, &c.

Morning-*twilight*. See Crepusculum.

MOROCCO, or Marroquin, the ſkin of a goat, or ſome other animal reſembling it, dreſſed in ſumach or galls, and coloured of any colour at pleaſure; much uſed in bookbinding, &c.

The name is ordinarily derived from the kingdom of *Morocco*, whence it is ſuppoſed the manner of preparing theſe ſkins was firſt borrowed.

We have *Morocco* ſkins brought from the Levant, Barbary, Spain, Flanders, and France; red, black, yellow, blue, &c. The various manners of preparing *Morocco*, both black and in colour, are ſo curious, and withal ſo little known among us, that the public will not be diſpleaſed to find them here.

Morocco, *manner of preparing black*. The ſkins having been dried in the hair, are ſteeped in clear water three days and nights; then they are ſtretched on a wooden horſe or leg, like that uſed by tanners; then beaten with a large knife for the purpoſe, and ſteeped afreſh in water, changed daily till they be well come again. In this ſtate they are thrown into a large vat in the ground, full of water, wherein quick-lime has been ſlaked, where they lie fifteen days; whence, however, they are taken, and again returned every night and morning; they are thrown into a freſh vat of lime and water, and ſhifted night and morning, as before, for fifteen days longer; then rinſed in clear water: and the hair is then taken off, on the leg, with the knife; the ſkins are then returned into a third vat and ſhifted, as before, for about eighteen days; then ſteeped twelve hours in a river; then taken out, rinſed, put in pails, where they are pounded with wooden peſtles, changing the water twice; then laid on the horſe, and the fleſh taken off, returned into pails of new water, taken out, and the hair-ſide ſcraped; then returned into freſh pails; taken out, and thrown into a pail of a particular form, having holes at bottom; here they are beaten the ſpace of an hour, and freſh water poured on from time to time; ſtretched on the leg, and ſcraped on either ſide; returned into pails of freſh water; taken out, ſtretched, and ſewed up all around in manner of bags, leaving out the hind legs, which ſerve to make an aperture for the conveyance of a mixture mentioned hereafter.

The ſkins, thus ſewed, are put into lukewarm water, where dogs' excrement has been diſſolved. Here they are ſtirred with long poles half an hour, left at reſt a dozen, taken out, rinſed in freſh water, and filled by a tunnel with a preparation of water and ſumach, mixed and heated over the fire till ready to boil; and as they are filled, the hind legs are ſewed up to ſtop the paſſage. In this ſtate they are let down into the veſſel of water and ſumach, and kept ſtirring four hours ſucceſſively; they are then taken out, and heaped on one another; after a little time, their ſides are changed; and thus they continue an hour and a half, till drained. This done, they are looſened, and filled a ſecond time with the ſame preparation, ſewed up again, and kept ſtirred two hours, piled up, and drained as before. This is again repeated a third time, with this difference, that they are now only ſtirred a quarter of an hour; after which, they are left till the morrow morning, when they are taken out, drained on a rack, unſewed, the ſumach taken out, folded in two from head to tail, the hair-ſide outwards, laid over each other on the leg, to perfect their draining, ſtretched out, and dried; then trampled under foot by two and two, ſtretched on a wooden table, what fleſh and ſumach remains ſcraped off, and the hair-ſide rubbed over with oil, and that again with water.

Having thus received their oil and water, they are wrung in the hands, then ſtretched and preſſed tight on the table with an iron inſtrument like that of the curriers, the fleſh-ſide uppermoſt; then turned, and the hair-ſide rubbed ſtrongly over with a handful of ruſhes, to ſqueeze out as much of the oil remaining within as poſſible. The firſt courſe of black is now laid on the hair-ſide, by means of a lock of hair twiſted and ſteeped in a kind of black dye, prepared of ſour beer, wherein pieces of old ruſty iron have been thrown. When half dry, by hanging in the air, they are ſtretched on a table and rubbed over every way with a paumelle, or wooden-toothed inſtrument, to raiſe the grain, over which is paſſed a light couche of water, then ſleeked by rubbing them with ruſhes prepared for that purpoſe. Thus ſleeked, they have a ſecond couche of black; they are then dried, laid on the table, rubbed over with a paumelle of cork, to raiſe the grain again; and, after a light couche of water, ſleeked over anew; and, to raiſe the grain a third time, a paumelle of wood is uſed.

After the hair-ſide has thus received all its preparations, the fleſh-ſide is pared with a ſharp knife for the purpoſe, and the hair-ſide rubbed ſtrongly over with a woollen cap, having firſt given it a luſtre with barberries, citron, or orange. The whole is finiſhed by raiſing the grain lightly, for the laſt time, with the paumelle of cork, which leaves them in a condition for ſale and uſe.

Morocco, *manner of prepariug red*. The ſkins are ſteeped twenty-four hours in a river, taken out, ſtretched on the leg, beaten with the knife, returned into the water for twenty-four hours, re-beaten on the leg, re-ſteeped; thrown into a vat, and for three weeks taken out, and turned every morning, to diſpoſe them to peel. Being taken out for the laſt time, they are ſcraped with the knife, and when the hair is quite off, thrown into pails of freſh water, where they are rinſed; then the fleſh-ſide ſcraped, thrown into the pails, and thus alternately from the leg to the pails, till they leave the water quite clean; then they are put in luke-warm water, with the ſumach as before; and, after twelve hours, they are rinſed in clear water, and ſcraped on the leg on both ſides, pounded in pails, and the water changed three times; then wrung and ſtretched on the leg, and paſſed after each other into water, with alum diſſolved in it. Thus alumed, they are left to drain till the morning, then wrung out, pulled on the leg, and folded from head to tail, the fleſh inwards.

In this ſtate they receive their firſt dye, by paſſing them one after another into a red liquor, prepared with lacca, and ſome other ingredients, kept ſecret among the *maroquineers*. This they repeat again and again, till the ſkins have got their firſt colour. They are then rinſed in clear water, ſtretched on the leg, and left to drain twelve hours; then thrown into water, into which white galls pulverized have been paſſed through a ſieve, and ſtirred inceſſantly for a whole day with long poles, taken out, hung on a bar acroſs the water all night, white againſt red, and red againſt white; and in the morning the water is ſtirred up, and the ſkins are returned into it for twenty-four hours. See DYING *of leather*.

MOROCHITES, in *Natural Hiſtory*, a name by which ſome of the old authors have called the *morochthus*, or French chalk.

MOROCHTHUS, in the *Hiſtory of Foſſils*, a name of an indurated clay, commonly known among us by the name French chalk, or marking-ſtone; and its principal uſe with us is the taking of ſpots out of cloaths, and the ſerving taylors to mark with, as it makes a much more determinate and a neater line than chalk. The ancients, however, had it much in eſteem in medicine, and uſed it as an aſtringent, and in colics and hæmorrhages, and externally in diſorders of the eyes.

It is diſtinguiſhed from all other earths, by being the hardeſt of all, conſiderably heavy, ſemi-tranſparent, of a very ſmooth, unctuous, gloſſy ſurface, and of a greyiſh white colour, with a conſiderable admixture of green; it is of a diſagreeable brackiſh taſte, and does not ferment with acids; it does not colour the hands, nor adhere to the tongue, nor melt in the mouth, and it is not diffuſable in water. It burns to a great hardneſs, and a white colour. It is dug in Germany, the iſland of Sardinia, and many other places; but no where ſo plentifully as about Briançon in France, whence it is there commonly called *Briançon chalk*.

MOROCTES, one of the names by which Pliny, and ſome other of the older authors, called the *morochthus*, or French chalk.

MORONA, a name uſed by ſome for the HUSO, or iſinglaſs-fiſh.

MORPHASMUS, μορφασμος, among the *Ancients*, a kind of dance, wherein, by a great many figures, they imitated the transformations of Proteus.

MORPHEW, *morphæa*, a leprous ſort of freckle or ſcurf, which breaks out ſometimes upon the ſkin, particularly about the forehead; called alſo *alphus*.

MORRHA, in *Natural Hiſtory*, a name given by ſome to the ſubſtance more properly called *murra* or *myrrha*, of which the cups called MURRHINA and *myrrhina*, were made.

MORRHINA *vaſa*, in the *Writings of the Ancients*. See MURRHINA.

MORRICE-*dance*. See MORESK.

MORSE, in *Zoology*, the name of a monſtrous ſea animal, called by ſome the *roſmarus* and *walrus*, and by others, very improperly, the *hippopotamus* and *equus marinus*.

The *morſe*, or TRICHECUS *roſmarus* of Linnæus, is an ill-ſhaped amphibious animal, of the ſize of a large ox, covered with a ſkin like that of the ſeal, and ſomewhat reſembling an ox in the head; for which reaſon ſome have called it the ſea-cow, or *vacca marina*; whence it has been erroneouſly confounded by ſome with the *manati*.

It has two large prominent and crooked tuſks in the upper jaw, which are as fine as ivory, and are uſed by artificers for the ſame purpoſes; and four grinders on both ſides above and below, but no cutting teeth; the teeth have been ſometimes found of the weight of twenty pounds each: it brings forth uſually but one young at a time, never more than two. It is a very ſtrong and vigorous animal, and difficultly taken; when it is caught, it is uſually at land, ſeldom at ſea. See *Tab.* III. *Quadrupeds*, N° 37.

Vorſtius, who met with a young one of this creature, has very accurately deſcribed it; whence we have the beſt deſcription extant of the nature of the animal. This young one was of the ſize of a large dog, and in ſhape much reſembled the phoca, or ſea-calf. Its head was round; its eyes large, and like thoſe of an ox; its noſtrils depreſſed and wide, and opening, and drawing together as the creature pleaſed; it had apertures on the ſides of the head for ears; its mouth opened round, and not very large; and on the upper lip it had a ſort of whiſkers, compoſed of thick cartilaginous briſtles; the lower jaw was of a trigonal form; the tongue ſhort and thick, and the mouth well furniſhed with broad and flatted teeth; its fore-feet, as well as the hinder ones, were very broad; and the hinder extremity of its body very much reſembled that of the *phoca* or ſea-calf; when it walked, the fore-feet were directed forwards, the others turned backward; the toes were five on each foot, and theſe were joined by a membrane, which was remarkably thick; the hinder feet had claws, the fore-ones had not; and the creature had no tail, and crept rather than walked on the hinder parts: its ſkin was thick and tough, and covered with a few ſhort grey hairs: it made a noiſe like the grunting of a hog.

Theſe animals inhabit the coaſt of Spitzbergen, Nova Zembla, Hudſon's Bay, and the Gulph of St. Laurence, and the icy ſea, as far as Cape Tſchuktſchi: they are gregarious; in ſome places appear in herds of hundreds; are ſhy animals, and avoid places that are much haunted by mankind. The method of killing them on the Magdalene iſles is ſaid to be as follows: the hunters watch their landing, and as ſoon as they find a ſufficient number for what they call a *cut*, go on ſhore, each armed with a ſpear, ſharp on one ſide like a knife, with which they cut their throats; taking care not to ſtand in the way of thoſe which attempt to get again to ſea, which they do with great agility, by tumbling headlong: for they would cruſh any body to death by their vaſt weight. They are killed for the ſake of their oil, one *walrus* producing about half a tun. The knowledge of this chace is of great antiquity: Octher, the Norwegian, about the year 890, made a report of it to king Alfred, having, as he ſays, made the voyage beyond Norway, for the convenience of fiſhing for *horſe-whales*, which have in their teeth bones of great value, of which he brought ſome at his return to the king. Pennant.

MORSELLI, or MORSULI, are denominations given to thoſe forms of medicine intended to be ſucked in the mouth, as a *lozenge*; the word ſignifying a little mouthful.

MORSUS *diaboli*, *devil's bit*, a plant of the ſcabious kind, which ſeems to have a fringe around the bottom of its root; otherwiſe called *ſucciſa*. See SCABIOUS.

It has its denomination from its roots, which appear as if bitten off at the bottom; which ſuperſtitious people attributed to the devil, as done out of envy, leſt we ſhould have too much of ſo ſalutary a root. It was formerly looked on as a good alexipharmic: but is now much out of uſe.

From a likeneſs to this plant, the edge or ſelvedge of the tubæ Fallopianæ has obtained the ſame appellation.

MORSUS *canis rabidi*. See HYDROPHOBIA.

MORSUS *runæ*. See HYDROCHARIS.

MORSUS *viperæ*. See VIPER.

MORT *d'anceſtre*, in *Law*. See ASSIZE *of mort d'anceſtre*.

MORT, among the fiſhermen of ſome parts of England, a name given to the SALMON while in its third year's growth.

MORTALITY, a term frequently uſed to ſignify a contagious diſeaſe, which deſtroys great numbers of either men, or beaſts.

MORTALITY, *bills of*, are accounts or regiſters ſpecifying the numbers born, married, and buried in any pariſh, town, or diſtrict. In general, they contain only theſe numbers; and, even when thus limited, are of great uſe, by ſhewing the degrees of healthineſs and prolifickneſs, and the progreſs of population in the places where they are kept. It is therefore much to be wiſhed, that ſuch accounts had been always correctly kept in every kingdom, and regularly publiſhed at the end of every year. We ſhould then have had under our inſpection the comparative ſtrength of every kingdom, as far as it depends on the number of inhabitants, and its increaſe or decreaſe at different periods.

But ſuch accounts are rendered more uſeful, when they include the ages of the dead, and the diſtempers of which they have died. In this caſe they convey ſome of the moſt important inſtruction, by furniſhing us with the means of aſcertaining the law which governs the waſte of human life, the values of annuities dependent on the continuance of any lives, or any ſurvivorſhip between them, and the favourableneſs or unfavourableneſs of different ſituations to the duration of human life. There are but few regiſters of this kind; nor has this ſubject, though ſo intereſting to mankind, ever engaged much attention till lately. The firſt bills containing the ages of the dead were thoſe for the town of Breſlaw in Sileſia. It is well known what uſe has been made of theſe by Dr. Halley, and after him by De Moivre. A table of the probabilities of the duration of human life at every age, deduced from them by Dr. Halley, has been publiſhed in the Philoſophical Tranſactions (ſee the Abridgement, vol. iii. p. 669.) and has been inſerted under the article LIEE-*Annuities* in this work; and this is the firſt table of this ſort that has been ever publiſhed. Since the publication of this table, ſimilar bills have been eſtabliſhed in a few towns of this kingdom; and particularly in London (in the year 1728), and at Northampton, in 1735.

Two improvements of theſe regiſters have been propoſed; the firſt is, that the ſexes of all that die in every period of life ſhould be ſpecified in them, under the denominations of *boys*, *married men*, *widowers*, and *bachelors*; and of *girls*, *married women*, *widows*, and *virgins*. The ſecond is, that they ſhould ſpecify the numbers of both ſexes dying of every diſtemper in every month, and at every age. See the end of the fourth eſſay in Dr. Price's Treatiſe on Reverſionary Payments. Regiſters of *mortality* thus improved, when compared with records of the ſeaſons, and with the circumſtances that diſcriminate different ſituations, might contribute greatly to the increaſe of medical knowledge; and they would afford the neceſſary *data* for determining the difference between the duration of human life among males and females; for ſuch a difference there certainly is, much in favour of females, as will appear from the following facts: in addition to thoſe which have been already recited under the article MARRIAGE, which the reader is deſired to conſult.

At Northampton, though more males are born than females, and nearly the ſame number die; yet the number of living *females* appeared, by an account taken in 1746, to be greater than the number of males, in the proportion of 2301 to 1770, or 39 to 30.

At Berlin it appeared, from an accurate account which was taken of the inhabitants in 1747, that the number of *female* citizens exceed the number of *male* citizens in the proportion of 459 to 391. And yet out of this ſmaller number of males, more had died for twenty years preceding 1751, in the proportion of 19 to 17.

At Edinburgh, in 1743, the number of *females* was to the number of *males*, as 4 to 3. (See Maitland's Hiſtory of Edinburgh, p. 220.) But the females that died annually from 1749 to 1758, were to the males in no higher proportion than $3\frac{1}{5}$ to 3.

He that will take the pains to examine the accounts of Phil. Tranſ. abr. vol. vii. part iv. p. 46, &c. referred to under MARRIAGE, will find, that though in the towns there enumerated, the proportion of males and females born is no higher than 19 to 18, yet the proportion of boys and girls that die is 8 to 7; and that, in particular, the *ſtill-born* and *chryſom* males are to the ſtill-born and chryſom females as 3 to 2. See MARRIAGE.

In thirty-nine pariſhes of the diſtrict of Vaud in Switzerland, the number of *males* that died during ten years before 1766, was 8170: of females 8167; of whom the numbers that died under one year of age were 1817 *males*, and 1305 *females*; and under ten years of age 3099 *males*, and 2598 *females*. In the beginning of life, therefore, and before any emigrations can take place, the rate of mortality among males appears to be greater than among females. And this is rendered yet more certain by the following accounts. At Vevey, in the diſtrict of Vaud, juſt mentioned, there died in the courſe of twenty years, ended at 1764, in the firſt month after birth of males 135 to 89 females; and in the firſt year 225 to 162. To the ſame effect, it appears from a table given by Suſmilch, in his Gottliche Ordnung, vol. ii. p. 317. that in Berlin 203 males die in the firſt month, and but 168 females; and in the firſt year, 489 to 395, and alſo, from a table of Struyck's, that in Holland 396 *males* die in the firſt year to 306 *females*.

The authorities for the facts here mentioned, and much more on this ſubject, may be found in the fourth eſſay in Dr. Price's Treatiſe on Reverſionary Payments, and in the ſupplement, at the end of that treatiſe.

We ſhall here only add the following table, taken from a memoir of Mr. Wargentin's, publiſhed in the collection of the Memoirs of the Royal Academy of Sciences at Stockholm, printed in Paris in 1772.

In all Sweden for nine years, ended in 1763, the proportion of females to males that died out of a given number living, was

Under the age of one year	--	1000 to	1099
From 1 to 3 years of age	—	1000	1022
3 5	——	——	1042
5 10	——	——	1074
10 15	——	——	1080
15 20	——	——	1097
20 25	——	——	1283
25 30	——	——	1161
30 35	——	——	993
35 40	——	——	1159
40 45	——	——	1115
45 50	——	——	1340
50 55	——	——	1339
55 60	——	——	1292
60 65	——	——	1115
65 70	——	——	1080
70 80	——	——	1022
80 90	——	——	1046
Above 90	——	——	1044

Regiſters of *mortality* on the improved plan before mentioned, were eſtabliſhed in 1772 at Cheſter, and alſo in 1773 at Warrington in Lancaſhire; and they are ſo comprehenſive and correct, that there is reaſon to expect they will afford much inſtruction on the ſubject of human *mortality*, and the values of lives.

But the country moſt diſtinguiſhed in this reſpect is Sweden; for in that kingdom exact accounts are taken of the births, marriages, and burials, and of the numbers of both ſexes that die at all ages in every town and diſtrict; and alſo, at the end of every period of five years, of the numbers living at every age; and at Stockholm a ſociety is eſtabliſhed, whoſe buſineſs it is to ſuperintend and regulate the enumerations, and to collect from the different parts of the kingdom the regiſters, in order to digeſt them into tables of obſervation. Theſe regulations were begun in Sweden in 1755; and tables, containing the reſult of them from 1755 to 1763, have been publiſhed in Mr. Wargentin's memoir juſt referred to, and the moſt material parts of them may be found in an eſſay by Dr. Price on the Difference between the Duration of Human Life in Town and in Country Pariſhes, printed in the ſixty-fifth volume of the Philoſophical Tranſactions, part ii.

In the fourth eſſay in Dr. Price's Treatiſe on Reverſionary Payments and Life-Annuities, the following account is given of the principles on which tables of obſervation are formed from regiſters of *mortality*; and of the proper method of forming them, ſo as to render them juſt repreſentations of the number of inhabitants, and the probabilities of the duration of human life in a town or country.

In every place which juſt ſupports itſelf in the number of its inhabitants, without any recruits from other places or where, for a courſe of years, there has been no increaſe or decreaſe, the number of perſons dying every year at any particular age, and above it, muſt be equal to the number of the living at that age. The number, for example, dying every year, at all ages, from the *beginning* to the utmoſt *extremity* of life, muſt in ſuch a ſituation, be juſt equal to the whole number *born* every year. And for the ſame reaſon, the number dying every year at *one* year of age and upwards; at *two* years of age and upwards; at *three* and upwards, and ſo on, muſt be equal to the numbers that attain to thoſe ages every year; or, which is the ſame to the numbers of the living at thoſe ages. It is obvious that unleſs this happens, the number of inhabitants cannot remain the ſame. If the former number is greater than the latter, the inhabitants muſt *decreaſe*; if leſs, they muſt *increaſe*. From this obſervation it follows, that in a town or country, where there is no increaſe or decreaſe, bills of *mortality* which give the ages at which all die, will ſhew the exact number of inhabitants; and alſo the exact law, according to which human life waſtes in that town or country.

In order to find the number of inhabitants; the mean numbers dying annually, at every particular age and upwards, muſt be taken as given by the bills, and placed under one another in the order of the ſecond column of the following tables. Theſe numbers will, it has appeared, be the numbers of the living at 1, 2, 3, &c. years of age; and conſequently, the ſum, diminiſhed by half the number born annually, will be the whole number of inhabitants.

This ſubtraction is neceſſary for the following reaſon. In a table formed in the manner here directed, it is ſuppoſed, that the numbers in the ſecond column are all living together at the beginning of every year. Thus: the number in the *ſecond* column oppoſite to 0 in the *firſt* column, the table ſuppoſes to be all juſt born together on the firſt day of the year. The number, likewiſe, oppoſite to 1, it ſuppoſes to attain to one year of age juſt at the ſame time that the former number is born. And the like is true of every number in the ſecond column. During the courſe of the year, as many will die at all ages as were born at the beginning of the year; and, conſequently, there will be an exceſs of the number alive at the beginning of the year, above the number alive at the end of the year, equal to the whole number of the annual births; and the true number conſtantly alive together, is the arithmetical mean between theſe two numbers; or, agreeably to the rule here given, the *ſum* of the numbers in the ſecond column of the table, leſſened by *half* the number of annual births.

In ſuch a ſeries of numbers, the exceſs of each number above that which immediately follows it, will be the number dying every year, out of the particular number alive at the beginning of the year; and theſe exceſſes ſet down regularly as in the third column of the table to which we have referred, will ſhew the different rates at which human life waſtes through all its different periods, and the different probabilities of life at all particular ages.

It muſt be remembered, that what has been now ſaid goes on the ſuppoſition, that the place whoſe bills of *mortality* are given, ſupports itſelf by procreation only, in the number of its inhabitants. In towns this very ſeldom happens, on account of the luxury and debauchery which generally prevail in them. They are, therefore, commonly kept up by a conſtant acceſſion of ſtrangers, who remove to them from country pariſhes and villages. In theſe circumſtances, in order to find the true number of inhabitants, and probabilities of life, from bills of *mortality* containing an account of the ages at which all die; it is neceſſary, that the proportion of the annual births to the annual ſettlers ſhould be known, and alſo the period of life at which the latter remove. Both theſe particulars may be diſcovered in the following method.

If for a courſe of years there has been no ſenſible increaſe or decreaſe in a place, the number of annual ſettlers will be equal to the exceſs of the annual burials above the annual births. If there is an *increaſe*, it will be *greater* than this exceſs. If there is a *decreaſe*, it will be *leſs*.

The period of life at which theſe ſettlers remove, will appear in the bills by an increaſe in the number of deaths at that period and beyond it. Thus, in the London bills, the number of deaths, between 20 and 30, is generally above double; and between 30 and 40, near triple the number of deaths between 10 and 20; and the true account of this is, that from the age of 18 or 20, to 35 or 40, there is an afflux of people every year to London from the country, which occaſions a great increaſe in the number of inhabitants of theſe ages; and, conſequently, raiſes the deaths for all ages *above* 20, conſiderably above their due proportion, when compared with the number of deaths *before* 20. This is obſervable in all the bills of *mortality* for towns with which we are acquainted, not excepting even the Breſlaw bills. Dr. Halley takes notice, that theſe bills gave the number of deaths, between 10 and 20, too ſmall. This he conſidered as an irregularity in them, owing to chance; and, therefore, in forming his table of obſervations, he took the liberty ſo far to correct it, as to render the proportion of thoſe who die to the living in this diviſion of life, nearly the ſame with the proportion which, he ſays, he had been *informed* die annually of the young lads in Chriſt-Church hoſpital. But the truth is, that this irregularity in the bills was derived from the cauſe we have juſt aſſigned. During the five years for which the Breſlaw bills are given by Dr. Halley, the births did, indeed, a little exceed the burials; but it appears, that this was the effect of ſome peculiar cauſes that happened to operate juſt at that time; for, during a complete century, from 1633 to 1734, the annual medium of *births* was 1089 (ſee Dr. Short's Comparative Hiſtory, p. 63.) and of burials 1256. This town, therefore muſt have been all along kept up by a number of yearly recruits from other places, equal to about a *ſeventh* part of the yearly births.

It appears from the account in the Philoſophical Tranſactions (Abridgement, vol. vii. N° 380. p. 46, &c.) that from 1717 to 1725, the annual medium of births at Breſlaw was 1252, of burials 1507; and alſo, that much the greateſt part of the births died under ten years of age. From a table in Suſmilch's Works, vol. i. p. 38. it appears, that, in reality, the greater part of all that die in this town are children under five years of age.

What has been now obſerved, concerning the period of life at which people remove from the country to ſettle in towns, would appear ſufficiently probable, were there no ſuch evidence for it as has been mentioned; for it might be well reckoned, that theſe people in general muſt be ſingle perſons in the beginning of mature life, who, not having yet obtained ſettlements in the places where they were born, migrate to towns in queſt of employments.

Having premiſed theſe obſervations, it will be proper next to endeavour to explain diſtinctly the effect which theſe acceſſions to towns muſt have on tables of obſervation formed from their bills of *mortality*. This is a ſubject proper to be inſiſted on, becauſe miſtakes have been committed about it; and becauſe alſo the diſcuſſion of it is neceſſary to ſhew, how near to truth the values of lives come as deduced from ſuch tables.

The following general rule may be given on this ſubject. If a place has, for a courſe of years, been maintained in a ſtate nearly ſtationary, as to number of inhabitants, by recruits coming in every year, to prevent the decreaſe that would ariſe from the exceſs of the burials above the births; a table formed on the principle, "That the number dying annually, after every particular age, is equal to the number living at that age," will give the number of inhabitants, and the probabilities of life, too *great*, for all ages preceding that at which the recruits ceaſe; and after this it will give them *right*. If the acceſſions are ſo great, as to cauſe an *increaſe* in the place, ſuch a table will give the number of inhabitants, and the probabilities of life, too *little*, after the age at which the acceſſions ceaſe: and too great, if there is a decreaſe. *Before* that age it will in *both* caſes give them too great; but moſt conſiderably ſo in the former caſe, or when there is an increaſe.

Agreeably to theſe obſervations, if a place increaſes, not in conſequence of acceſſions from other places, but of a conſtant exceſs of the births above the deaths; a table conſtructed on the principle that has been mentioned, will give the probabilities of life too low through the *whole extent* of life; becauſe, in ſuch circumſtances, the number of *deaths* in the *firſt* ſtages of life, muſt be too great, in compariſon of the number of deaths in the *latter* ſtages; and more or leſs ſo, as the *increaſe* is more or leſs rapid. The contrary, in all reſpects, takes place where there is a decreaſe, ariſing from the exceſs of the *deaths* above the *births*.

For example. Let us ſuppoſe, that 244 of thoſe born in a town, attain annually to 20 years of age; and that 250 more, all likewiſe twenty years of age, come into it annually from other places; in conſequence of which, it has, for a courſe of years, been juſt maintained in the number of its inhabitants, without any ſenſible increaſe or decreaſe. In theſe circumſtances, the number of the living in the town of the age of 20. will be always 244 *natives* and 250 *ſettlers*, or 494 in all; and, ſince theſe are ſuppoſed all to die in the town, and no more recruits are ſuppoſed to come in, 494 will be likewiſe the number dying annually at 20 and upwards. In the ſame manner it will appear, on theſe ſuppoſitions, that the number of the living, at every age, ſubſequent to 20, will be equal to the number dying annually at that age and above it; and, conſequently, that the number of inhabitants and the decrements of life, for every ſuch age, will be given exactly by the table. But for all ages *before* 20, they will be given much too great. For let 280 of all born in the town, reach 10; in this caſe, 280 will be the true number of the living in the town at the age of 10; and therecruits not coming in till 20, the number given by the bills, as dying between 10 and 20, will be the true number dying annually of the livlng in this diviſion of life. Let this number be 36; and it will follow, that the table ought to make the numbers of the living at the ages between 10 and 20, a ſeries of decreaſing means between 280 and (280 diminiſhed by 36, or) 244. But in forming the table on the principle juſt mentioned, 250 (the number above 20 dying annually in the town who were not born in it) will be added to each number in this ſeries; and, therefore, the table will give the numbers of the living, and the probabilities of life in this diviſion of life, almoſt twice as great as they really are. This obſervation, it is manifeſt, may be applied to *all* the ages under 20.

It is neceſſary to add, that ſuch a table will give the number of inhabitants, and the probabilities of life equally wrong before 20, whether the recruits all come in at 20, agreeable to the ſuppoſition juſt made, or only *begin* then to come in. In this laſt caſe, the table will give the number of inhabitants, and probabilities of life, too great throughout the whole extent of life, if the recruits come in at all ages above 20. But if they ceaſe at any particular age, it will give them right only from that age; and before, it will err all along on the ſide of exceſs; but leſs conſiderably between 20 and that age, than before 20. For example: if, of the 250 ſuppoſed to come in at 20, only 150 then come in, and the reſt at 30; the number of the living will be given 100 too high, at every age between 20 and 30; but, as juſt ſhewn, they will be given 250 too high at every age before 20. In general, therefore, the number of the living *at* any particular age, muſt be given by the ſuppoſed table, as many too great as there are annual ſettlers *after* that age; and, if theſe ſettlers come in at all ages indiſcriminately, during any certain interval of life, the number of inhabitants and the probabilities of life will be contiually growing leſs and leſs wrong, the nearer any age is to the end of that interval. Theſe obſervations prove, that tables of obſervation, formed in the common way, from bills of *mortality*, for places where there is an exceſs of the burials above the births, muſt be erroneous, for a great part of the duration of life, in proportion to the degree of that exceſs. They ſhew likewiſe at what parts of life the errors in ſuch tables are moſt conſiderable, and how they may be in a great meaſure corrected.

All this ſhall be exemplified in the particular caſe of London.

The number of deaths between the ages of 10 and 20, is always ſo ſmall in the London bills, that it ſeems certain few recruits come to London under 20; or, at leaſt, not ſo many as before this age are ſent out for education to ſchools and univerſities. After 20, great numbers come in till 30, and ſome, perhaps, till 40 or 50. But at every age after 50, it is probable that more retire from London than come to it. The London tables of obſervation, therefore, being formed on the principle already mentioned, cannot give the probabilities of life right till 40. Between 30 and 40 they muſt be a little too high; but more ſo between 20 and 30, and moſt of all ſo before 20. It follows alſo, that theſe tables muſt give the number of inhabitants in London much too great.

The firſt of the following tables is formed in the manner here explained, from the London bills for ten years, from 1759 to 1768; and adapted to a 1000 born as a *radix*. The ſum of the numbers in the ſecond column, diminiſhed by half the number born, 25,757. According to this table, then, for every 1000 deaths in London. there are 25¾ as many inhabitants; or, in other words, the expectation of a child juſt born, is 25¾; and the inhabitants are to the annual burials as 25¾ to 1. But it has appeared, that the numbers in the ſecond column, being given on the ſuppoſition, that all thoſe who die in London, were born there, muſt be too great; and we have from hence a demonſtration, that the probabilities of life are given in the common tables, of London obſervations, too high, for at leaſt, the firſt 30 years of life; and alſo that the number of inhabitants in London muſt be *leſs* than 25¾, multiplied by the annual burials. The common tables, therefore, of London obſervations undoubtedly need correction, as Mr. Simpſon ſuggeſted, and in ſome meaſure performed; though too imperfectly, and without going upon any fixed principles, or ſhewing particularly, how tables of obſervation ought to be formed, and how far in different circumſtances, and at different ages, they are to be depended on. The way of doing this, and, in general, the right method of forming genuine tables of obſervation for towns, may be learnt from the following rule.

> “From the ſum of all that die annually, *after* any given age, ſubtract the number of annual ſettlers *after* that age; and the remainder will be the number of the living *at* the given age.”

This rule can want no explication or proof, after what has been already ſaid.

If, therefore, the number of annual ſettlers in a town at every age could be aſcertained, a perfect table of obſervations might be formed for that town, from bills of *mortality*, containing an account of the ages at which all die in it. But no more can be learnt in this inſtance, from any bills, than the whole number of annual *ſettlers*, and the general diviſion of life in which they enter. This, however, may be ſufficient to enable us to form tables that ſhall be tolerably exact. For inſtance; ſuppoſe the *annual deaths* in a town which has not increaſed or decreaſed, to have been for many years in the proportion of 4 to 3, to the *annual births*. It will hence follow, that ¼ of the perſons who die in ſuch a town, are *ſettlers*, or *emigrants* from other places, and not *natives*: and the ſudden increaſe in the deaths after 20, will alſo ſhew, agreeably to what was before obſerved, that they enter after this age. In forming, therefore, a table for ſuch a town, a *quarter* of all that die at all ages throughout the whole extent of life, muſt be deducted from the ſum of all that die after every given age before 20; and the remainder will be the true number living at that given age. And if, at 20, and every age above it, this deduction is omitted, and the number of the living at every ſuch age is taken the ſame with the ſum of all that die after it, the reſult will be (ſuppoſing *moſt* of the ſettlers to come in before 30, and *all* before 40) a table exact till 20; too high between 20 and 30; but nearly right for ſome years before 40; and after 40 exact again. Such a table, it is evident, will be the ſame with the table laſt deſcribed at all ages above 20, and different from it only under 20. It is evident alſo that, on account of its giving the probabilities of life too great for ſome years after 20, the number of inhabitants deduced from it may be depended on as ſomewhat greater than the truth; and more or leſs ſo, as the annual recruits enter in general later or ſooner after 20.

Let us now conſider, what the reſult of theſe remarks will be, when applied particularly to the London bills.

It muſt be here firſt obſerved, that, at leaſt one *quarter* of all that die in London, are ſupplies or *ſettlers* from the country, and not *natives*. The medium of annual burials from ten years, from 1759 to 1768, was 22,956; of births, 15,710. The exceſs is 7246, or near a *third* of the burials. The ſame exceſs, during ten years, before 1750, was 10,500, or near *half* the burials. London was then *decreaſing*. For the laſt 12 or 15 years, it has been *increaſing*. This exceſs, therefore, agreeably to the foregoing obſervations, was then *greater* than the number of annual ſettlers, and it is now *leſs*. It is, however, here ſuppoſed, that the number of annual ſettlers is now no more than a *quarter* of the annual burials, in order to allow for more omiſſions in the births than the burials; and alſo in order to be more ſure of obtaining reſults that ſhall not exceed the truth.

Of every thouſand then who die in London, only 750 are *natives*, and 250 are recruits, who come to it after 18 or 20 years of age; and, conſequently in order to obtain from the bills a more correct table than the firſt of the following tables, 250 muſt be ſubtracted from every one of the numbers in the ſecond column till 20; and the numbers in the third column muſt be kept the ſame, the bills always giving theſe right. After 20, the table is to be continued unaltered; and the reſult will be, a table which will give the numbers of the living at all ages in London much nearer the truth, but ſtill ſomewhat too high. Such is the ſecond of the following tables. The ſum of all the numbers in the ſecond column of this table, diminiſhed by 500, is 20,750. For every 1000 deaths, therefore, in London, there are, according to this table, 20,750 living perſons in it; and for every ſingle death, 20¾ inhabitants. It was before ſhewn, that the number of inhabitants in London could not be ſo great as 25 times ¾ of the deaths. It now appears (ſince the numbers in the ſecond column of this table are too high) that the number of inhabitants in London cannot be ſo great as even 20 times ¾ the deaths. And this is a concluſion which every one, who will beſtow due attention on what has been ſaid, will find himſelf forced to receive. It will not be amiſs, however, to confirm it by the following fact, the knowledge of which is derived from the particular enquiry and information of Mr. Harris, the late ingenious maſter of the Royal Mathematical School in Chriſt-Church hoſpital. The average of lads in this ſchool has, for thirty years paſt, been 831. They are admitted at all ages between ſeven and eleven; and few ſtay beyond ſixteen: they are, therefore, in general, lads between the ages of eight and ſixteen. They have better accommodations than it can be ſuppoſed children commonly have; and about three hundred of them have the particular advantage of being educated in the country. In ſuch circumſtances it may be well reckoned, that the proportion of children dying annually, muſt be leſs than the general proportion of children dying annually at the ſame ages in London. The fact is, that for the laſt thirty years, 11⅘ have died annually, or *one* in 70⅖.

According to Table II. *one* in 73 dies between 10 and 20, and *one* in 70 between 8 and 16. That table, therefore, probably gives the decrements of life in London, at theſe ages, too little, and the numbers of the living too great: and, if this is true of theſe ages, it muſt be true of all other ages *under* 20; and it follows demonſtrably, in conformity to what was before ſhewn, that more people ſettle in London after 20, than the ¼ above ſuppoſed; and that from 20 to at leaſt 30 or 35, the numbers of the living are given too great, in proportion to the decrements of life.

In this table the numbers in the ſecond column are doubled at 20, agreeably to what really happens in London; and the ſum of the numbers in this column diminiſhed by half the whole number of deaths, gives the *expectation* of life, not of a child juſt born, as in other tables, but of all the inhabitants of London at the time they enter it, whether that be at birth, or at 20 years of age. The *expectations*, therefore, and the *values* of London lives under 20, cannot be calculated from this table. But it may be very eaſily fitted for this purpoſe, by finding the number of births which, according to the given decrements of life, will leave 499 alive at 20; and then adapting the intermediate numbers in ſuch a manner, to this radix, as to preſerve all along the number of the living, in the ſame proportion to the numbers of the dead. This is done in the third of the following tables; and this table may be recommended as better adapted to the preſent ſtate of London than any other table. The values of lives, however, deduced from it, are in general nearly the ſame with thoſe deduced by Mr. Simpſon from the London bills, as they ſtood forty years ago: the main difference is, that after 52, and in old age, this table gives them ſomewhat lower than Mr. Simpſon's table.

For the method of applying theſe obſervations in determining the number of inhabitants in London, &c. ſee EXPECTATION *of life*.

Under the article EXPECTATION, an account has been given of the difference between the rate of human *mortality* in great towns and in country pariſhes and villages. The fourth and fifth of the following tables, compared with the two laſt, will give a more diſtinct and full view of this difference.

TABLE I.

Shewing the Probabilities of Life in London, on the ſuppoſition that all who die in London were born there. Formed from the Bills, for 10 years, from 1759 to 1768.

Ages	Perſons living.	Decr. of Life	Ages	Perſons living	Decr. of Life	Ages	Perſons living	Decr. Life.
0	000	240	31	404	9	62	132	7
1	760	99	32	395	9	63	125	7
2	661	42	33	386	9	64	118	7
3	619	29	34	377	9	65	111	7
4	590	21	35	368	9	66	104	7
5	569	11	36	359	9	67	97	7
6	558	10	37	350	9	68	90	7
7	548	7	38	341	9	69	83	7
8	541	6	39	332	10	70	76	6
9	535	5	40	322	10	71	70	6
10	530	4	41	312	10	72	64	6
11	526	4	42	302	10	73	58	5
12	522	4	43	292	10	74	53	5
13	518	3	44	282	10	75	48	5
14	515	3	45	272	10	76	43	5
15	512	3	46	262	10	77	38	5
16	509	3	47	252	10	78	33	4
17	506	3	48	242	9	79	29	4
18	503	4	49	233	9	80	25	3
19	499	5	50	224	9	81	22	3
20	494	7	51	215	9	82	19	3
21	487	8	52	206	8	83	16	3
22	479	8	53	198	8	84	13	2
23	471	8	54	190	7	85	11	2
24	463	8	55	183	7	86	9	2
25	455	8	56	176	7	87	7	2
26	447	8	57	169	7	88	5	1
27	439	8	58	162	7	89	4	1
28	431	9	59	155	8	90	3	1
29	422	9	60	147	8			
30	413	9	61	139	7			

TABLE II.

Shewing the *true* Probabilities of Life in London till the the age of 19.

Ages	Perſons living.	Decr. of Life.	Ages	Perſons living.	Decr. of Life.
0	750	240	12	272	4
1	510	99	13	268	3
2	411	42	14	265	3
3	369	29	15	262	3
4	340	21	16	259	3
5	319	11	17	256	3
6	308	10	18	253	4
7	298	7	19	249	
8	291	6	20	494	
9	285	5	21	487	
10	280	4	&c.	&c.	
11	276	4			

The numbers in the ſecond column to be continued as in the laſt table.

TABLE III.

Shewing the *true* Probabilities of Life in London for all Ages. Formed from the Bills for 10 years, from 1759 to 1768.

Ages	Perſons living.	Decr. of Life.	Ages	Perſons living.	Decr. of Life.	Ages	Perſons living.	Decr. Life.
0	1518	486	31	404	9	62	132	7
1	1032	200	32	395	9	63	125	7
2	832	85	33	386	9	64	118	7
3	747	59	34	377	9	65	111	7
4	688	42	35	368	9	66	104	7
5	646	23	36	359	9	67	97	7
6	623	20	37	350	9	68	90	7
7	603	14	38	341	9	69	83	7
8	589	12	39	332	10	70	76	6
9	577	10	40	322	10	71	70	6
10	567	9	41	312	10	72	64	6
11	558	9	42	302	10	73	58	5
12	549	8	43	292	10	74	53	5
13	541	7	44	282	10	75	48	5
14	534	6	45	272	10	76	43	5
15	528	6	46	262	10	77	38	5
16	522	7	47	252	10	78	33	4
17	515	7	48	242	9	79	29	4
18	508	7	49	233	9	80	25	3
19	501	7	50	224	9	81	22	3
20	494	7	51	215	9	82	19	3
21	487	8	52	206	8	83	16	3
22	479	8	53	198	8	84	13	2
23	471	8	54	190	7	85	11	2
24	463	8	55	183	7	86	9	2
25	455	8	56	176	7	87	7	2
26	447	8	57	169	7	88	5	1
27	439	8	58	162	7	89	4	1
28	431	9	59	155	8	90	3	1
29	422	9	60	147	8			
30	413	9	61	139	7			

TABLE IV.

Shewing the Probabilities of Life in the Diſtrict of Vaud Switzerland, formed from the Regiſters of 43 Pariſhes, given by Mr. Muret, in the firſt Part of the Bern Memoirs for the year 1766.

Ages	Living	Decr.	Ages	Living	Decr.	Ages	Living	Decr.
0	1000	189	31	558	5	62	286	12
1	811	46	32	553	5	63	274	12
2	765	30	33	548	4	64	262	12
3	735	20	34	544	5	65	250	14
4	715	14	35	539	6	66	236	16
5	701	13	36	533	6	67	220	18
6	688	11	37	527	7	68	202	18
7	677	10	38	520	7	69	184	16
8	667	8	39	513	7	70	168	15
9	659	6	40	506	6	71	153	13
10	653	5	41	500	6	72	140	11
11	648	5	42	494	6	73	129	10
12	643	4	43	488	6	74	119	10
13	639	4	44	482	6	75	109	11
14	635	4	45	476	7	76	98	13
15	631	5	46	469	8	77	85	14
16	626	4	47	461	10	78	71	13
17	622	4	48	451	10	79	58	12
18	618	4	49	441	10	80	46	10
19	614	4	50	431	9	81	36	7
20	610	4	51	422	8	82	29	5
21	606	4	52	414	8	83	24	4
22	602	5	53	406	9	84	20	3
23	597	5	54	397	9	85	17	3
24	592	5	55	388	11	86	14	3
25	587	5	56	377	13	87	11	2
26	582	5	57	364	16	88	9	2
27	577	5	58	348	17	89	7	2
28	572	5	59	331	17	90	5	1
29	567	4	60	314	15			
30	563	5	61	299	13			

All the bills, from which this and the following tables are formed, give the numbers dying under 1 as well as under 2 years; and, in the numbers dying under 1, are included, in the country pariſh in Brandenburg, and at Berlin, all the ſtill-borns. All the bills alſo give the numbers dying in every period of five years.

TABLE V.

Shewing the Probabilities of Life in a country Pariſh in Brandenburg, formed from the Bills for 50 Years, from 1710 to 1759, as given by Mr. Suſmilch, in his Gottliche Ordnung.

Age	Living	Decr.	Age	Living	Decr.	Age	Living	Decr.
0	1000	225	31	482	5	62	260	12
1	775	57	32	477	5	63	248	12
2	718	31	33	472	5	64	236	12
3	687	23	34	467	5	65	224	11
4	664	22	35	462	6	66	213	11
5	642	20	36	456	6	67	202	12
6	622	15	37	450	6	68	190	12
7	607	12	38	444	6	69	178	12
8	595	10	39	438	6	70	166	13
9	585	8	40	432	5	71	153	15
10	577	7	41	427	5	72	138	16
11	570	6	42	422	5	73	112	15
12	564	5	43	417	5	74	107	14
13	559	5	44	412	6	75	93	13
14	554	5	45	407	6	76	80	12
15	549	5	46	400	6	77	68	9
16	544	5	47	394	6	78	59	8
17	539	4	48	388	7	79	51	7
18	535	4	49	381	7	80	44	6
19	531	4	50	374	7	81	38	6
20	527	5	51	367	8	82	32	6
21	522	5	52	359	8	83	25	6
22	517	5	53	351	8	84	21	5
23	512	5	54	343	9	85	15	4
24	507	5	55	334	10	86	11	3
25	502	4	56	324	10	87	8	2
26	498	3	57	314	10	88	6	2
27	495	3	58	304	11	89	4	1
28	492	3	59	293	11	90	3	1
29	489	3	60	282	11	91	2	1
30	486	4	61	271	11	92	1	1

TABLE VI.

Shewing the Probabilities of Life at Vienna, formed from the Bills for Eight Years, as given by Mr. Suſmilch, in his Gottliche Ordnung, p. 32. Tables.

Age.	Living	Decr.	Age	Living	Decr.	Age	Living	Deer.
0	1495	682	31	364	6	62	129	6
1	813	107	32	358	5	63	123	7
2	706	61	33	353	6	64	116	7
3	645	46	34	347	7	65	109	8
4	599	33	35	340	8	66	101	8
5	566	30	36	332	8	67	93	8
6	536	20	37	324	8	68	85	7
7	516	11	38	316	9	69	78	7
8	505	9	39	307	9	70	71	6
9	496	7	30	298	8	71	65	5
10	489	6	41	290	7	72	60	5
11	483	5	42	283	6	73	55	4
12	478	5	43	277	6	74	51	4
13	473	6	44	271	7	75	47	5
14	467	6	45	264	8	76	42	5
15	461	6	46	256	9	77	37	5
16	455	7	47	247	9	78	32	5
17	448	6	48	238	9	79	27	4
18	442	6	49	229	9	80	23	3
19	436	6	50	220	8	81	20	2
20	430	5	51	212	7	82	19	2
21	425	5	52	205	7	83	16	2
22	420	5	53	198	7	84	14	2
23	415	6	54	191	7	85	12	2
24	409	6	55	184	8	86	10	2
25	403	6	56	176	8	87	8	2
26	397	6	57	168	9	88	6	2
27	391	7	58	159	7	89	4	1
28	381	7	59	151	8	90	3	1
29	377	7	60	143	7	91	2	1
30	370	6	61	136	7	92	1	1

TABLE VII.

Shewing the Probabilities of Life at Berlin, formed from the bills for four years, from 1752 to 1755, given by Mr. Suſmilch, in his Gottliche Ordnung, vol. ii. page 37. Tables.

Age	Living	Decr.	Age	Living	Decr.	Age	Living	Decr.
0	1427	524	33	361	7	65	112	6
1	993	151	34	354	7	66	106	7
2	752	61	35	347	8	67	99	7
3	691	73	36	339	9	68	92	6
4	618	45	37	330	10	69	86	6
5	573	21	38	320	10	70	80	6
6	552	15	39	310	10	71	74	6
7	536	13	40	300	10	72	68	6
8	523	9	41	290	9	73	62	5
9	514	7	42	281	8	74	57	5
10	507	5	43	274	7	75	52	5
11	502	4	44	266	7	76	47	5
12	498	4	45	259	7	77	42	5
13	494	4	46	252	7	78	37	5
14	490	4	47	245	7	79	32	4
15	486	4	48	238	7	80	28	4
16	482	5	49	231	7	81	24	3
17	477	5	50	224	7	82	21	2
18	472	5	51	217	7	83	19	2
19	467	6	52	210	7	84	17	2
20	461	6	53	203	8	85	15	2
21	455	6	54	195	8	86	13	2
22	449	6	55	187	8	87	11	2
23	443	7	56	179	8	88	9	2
24	436	8	57	171	8	89	7	1
25	428	9	58	163	9	90	6	1
26	421	9	59	154	9	91	5	1
22	412	9	60	145	8	92	4	1
28	403	9	61	137	7	93	3	1
29	394	9	62	130	6	94	2	1
30	385		63	124	6			
31	376	8	64	118	6			
32	368	7						

This writer has alſo given the bills of the pariſh of St. Peters, at Berlin, for 24 years; and a table formed from them agrees nearly with this.

MORTAR, or **Morter**, in *Architecture*, a compoſition of lime, ſand, &c. mixed up with water; ſerving, as a cement to bind the ſtones, &c. of a building.

The ancients had a kind of *mortar* ſo very hard and binding, that, after ſo long a duration as to this time, it is next to impoſſible to ſeparate the parts of ſome of their buildings; though there are ſome who aſcribe that exceſſive ſtrength to time, and the influence of certain properties in the air, which is, indeed, found to harden ſome bodies very ſurpriſingly.

The lime uſed in the ancient *mortar*, is ſaid to have been burnt from the hardeſt ſtones, or often from fragments of marble.

De Lorme obſerves, that the beſt *mortar* is that made of pozzolana for ſand; adding, that this penetrates black flints, and turns them white. See Pozzolana, and *Puteolanus* Pulvis.

Mr. Worledge obſerves, that fine ſand makes weak *mortar*, and that the larger the ſand the ſtronger the *mortar*. He therefore adviſes, that the ſand be waſhed before it is mixed; and adds, that dirty water weakens the *mortar* conſiderably.

Wolfius obſerves, that the ſand ſhould be dry and ſharp, ſo as to prick the hands when rubbed; yet not earthy, ſo as to foul the water it is waſhed in.

Vitruvius obſerves, that foſſile ſands dry ſooner than thoſe taken out of rivers. Whence he adds, the latter is fitted for the inſides, the former for the outſides of a building. He ſubjoins, that foſſile ſand, lying long in the air, becomes earthy. Palladio takes notice, that of all ſands white ones are the worſt; and the reaſon is owing to their want of aſperity.

The proportion of lime and ſand in our common *mortar*, is extremely variable: Vitruvius preſcribes three parts of pit-ſand, and two of river-ſand, to one of lime; but the quantity of ſand here ſeems to be too great.

The proportion moſt commonly uſed in the mixing of lime and ſand is, to a buſhel of lime a buſhel and a half of ſand, i. e. two parts of lime and three of ſand; though the common *mortar*, in and about London, has more ſand in it than according to this proportion. The improvement of *mortar* is certainly an object of great importance: and different ſchemes have been ſuggeſted for giving it that degree of durability for which the *mortar* uſed by the ancients is ſo juſtly celebrated.

Mr. Doſſie, in the ſecond volume of the Memoirs of Agriculture, p. 20, &c. gives the following method of making *mortar* impenetrable to moiſture, acquiring great hardneſs, and exceedingly durable, ſimilar to that uſed by the ancients, which was diſcovered by a gentleman at Neufchatel: take of unſlaked lime and of fine ſand, in the proportion of one part of the lime to three parts of the ſand, as much as a labourer can well manage at once; and then adding water gradually, mix the whole well together, with a trowel, till it be reduced to the conſiſtence of *mortar*. Apply it immediately, while it it is hot, to the purpoſe, either of *mortar*, as a cement to brick or ſtone, or of plaſter to the ſurface of any building. It will then ferment for ſome days in drier places, and afterwards gradually concrete, or ſet, and become hard: but in a moiſt place it will continue ſoft for three weeks or more; though it will, at length, attain a firm conſiſtence, even if water have ſuch acceſs to it ſo as to keep the ſurface wet the whole time. After this, it will acquire a ſtone-like hardneſs, and reſiſt all moiſture. The perfection of this *mortar* depends on the ingredients being thoroughly blended together; and the mixtures being applied immediately after to the place where it is wanted. The lime for this *mortar* muſt be made of lime-ſtone, ſhells, or marle; and the ſtronger it is, the better the *mortar* will be: beſides, the lime ſhould be carefully kept from the acceſs of air or wet; otherwiſe, by attracting moiſture, it will loſe proportionably that power of acting on the ſand, by which the incorporation is produced. It is proper alſo to exclude the ſun and wind from the *mortar*, for ſome days after it is applied; that the drying too faſt may not prevent the due continuance of the fermentation, which is neceſſary for the action of the lime on the ſand. When a very great hardneſs and firmneſs are required in this *mortar*, the uſing of ſkimmed milk inſtead of water, either wholly or in part, will produce the deſired effect, and render the *mortar* extremely tenacious and durable.

Mr. Loriot's *mortar*, the method of making which was announced by order of his majeſty, at Paris, in 1774, is made in the following manner: take one part of brick-duſt finely ſifted, two parts of fine river-ſand ſkreened, and as much old ſlaked lime as may be ſufficient to form *mortar* with water, in the uſual method, but ſo wet as to ſerve for the ſlaking of as much powdered quick-lime as amounts to one-fourth of the whole quantity of brick-duſt and ſand. When the materials are well mixed, employ the compoſition quickly, as the leaſt delay may render the application of it imperfect or impoſſible. Another method of making this compoſition is to make a mixture of the dry materials; i. e. of the ſand, brick-duſt, and powered quick-lime, in the preſcribed proportion; which mixture may be put in ſacks, each containing a quantity ſufficient for one or two troughs of *mortar*. The above mentioned old ſlacked lime and water being prepared apart, the mixture is to be made, in the manner of plaſter, at the inſtant when it is wanted, and is to be well chafed with the trowel. With reſpect to this method, Dr. Higgins obſerves, that M. Loriot corrects the bad quality of the old and effete lime, which conſtitutes the baſis of his *mortar*, and which has regained a part of the fixed air, that had been expelled from it, by the addition of freſh and non-efferveſcent lime, haſtily added to it, at the time of uſing the compoſition which muſt undoubtedly improve the imperfect maſs. And he adds, that when an ignorant artiſt makes *mortar* with whiting inſtead of lime, he can mend it conſiderably by adding lime to it; but his *mortar* will ſtill be defective, in compariſon with the beſt that may be made, by reaſon of the old ſlacked lime or whiting; this on repeated trials he has found to be the true ſtate of the caſe.

Dr. Higgins has made a variety of experiments in conſequence of the modern diſcoveries relating to fixed air, for the purpoſe of improving the *mortar* uſed in our buildings. According to this author, the perfection of lime, prepared for the purpoſe of making *mortar*, conſiſts chiefly in its being totally deprived of its fixed air. On examining ſeveral ſpecimens of the lime commonly uſed in building, he found that it is ſeldom or never ſufficiently burned; for they all effervеſced, and yielded more or leſs fixed air, on the addition of an acid, and ſlaked ſlowly, in compariſon with well burned lime. Dr. Higgins alſo relates ſome experiments, which ſhew how very quickly lime imbibes fixed air from the atmoſphere; on its expoſure to which, it by degrees ſoon loſes thoſe characters which chiefly diſtinguiſh it from mere lime-ſtone or powdered chalk: by ſoon attracting from thence that very principle, to the abſence of which it owes its uſeful quality as a cement, and which had before been expelled from it in the burning. Hence he concludes, that, as lime owes its excellence to the expulſion of fixed air from it in the burning, it ſhould be uſed as ſoon as poſſible after it is made, and guarded from expoſure to the air, as much as poſſible, before it is uſed. It is no wonder, therefore, he ſays, that the London *mortar* is bad, if the imperfection of it depended ſolely on the badneſs of the lime; ſince the lime employed in it is not only bad when it comes freſh from the kiln, becauſe it is inſufficiently burned and the air has acceſs to it, but becomes worſe before it is uſed, by the diſtance and mode of its conveyance, and when ſlaked is as widely different from good lime, as it is from powdered chalk. For a ſimilar reaſon, every other cauſe which tends to reſtore to the lime the fixed air, of which it had been deprived in the burning, muſt deprave it. It muſt receive this kind of injury, for inſtance, from the water, ſo largely uſed, firſt in ſlaking the lime, and afterwards in making it into *mortar*; if that water contains fixed air, from which few waters are perfectly free and which will greedily be attracted by the lime. The injury ariſing from this cauſe is prevented by the ſubſtitution of lime-water, ſo far as may be practicable or convenient.

From other experiments, made with a view of aſcertaining the beſt relative proportions of lime, ſand, and water, in the making of *mortar*, it appeared that thoſe ſpecimens were the beſt which contained one part of lime in ſeven of the ſand; for thoſe which contained leſs lime, and were too ſhort whilſt freſh, were more eaſily cut and broke, and were pervious to water; and thoſe which contained more lime, although they were cloſer in grain, did not harden ſo ſoon or to ſo great a degree. even when they eſcaped cracking by lying in the ſhade to dry ſlowly. It appeared farther, that *mortar*, which is to be uſed where it muſt dry quickly, ought to be made as ſtiff as the purpoſe will admit, or, with the ſmalleſt practicable quantity of water, and that *mortar* will not crack, although the lime be uſed in exceſſive quantity, provided it be made ſtiffer, or to a thicker conſiſtence than *mortar* uſually is.

Dr. Higgins has alſo ſhewn, that though the ſetting of *mortar*, as it is called by the workmen, chiefly depends on the exſiccation of it, yet its induration, or its acquiring a ſtony hardneſs, is not cauſed by its drying, as has been ſuppoſed, but is principally owing to its abſorption of fixed air from the atmoſphere, and is promoted in proportion as it acquires this principle; the acceſſion of which is indiſpenſibly neceſſary to the induration of calcareous cements. In order to the greateſt induration of *mortar*, therefore it muſt be ſuffered to dry gently and ſet; the exſiccation muſt be effected by temperate air, and not accelerated by the heat of the ſun or fire; it muſt not be wetted ſoon after it ſets; and afterwards it ought to be protected from wet as much as poſſible, until it is completely indurated; the entry of acidulous gas muſt be prevented as much poſſible until the *mortar* is finally placed and quieſcent; and then it muſt be as freely expoſed to the open air, as the work will admit, in order to ſupply acidulous gas, and enable it ſooner to ſuſtain the trials to which *mortar* is expoſed in cementitious buildings, and incruſtations.

Dr. Higgins has alſo inquired into the nature of the beſt ſand or gravel for *mortar*, and into the effects produced by bone-aſhes, plaſter powder, charcoal, ſulphur, &c. and he deduces great advantages from the addition of bone-aſhes, in various proportions, according to the nature of the work for which the compoſition is intended.

This author deſcribes a water cement or ſtucco, of his own invention, for incruſtations internal or external, exceeding, as he ſays, Portland ſtone in hardneſs, for which he obtained his majeſty's letters patent in 1779. As for the materials of which this is made; drift ſand, or quarry ſand, or, as it is commonly called, pit ſand, conſiſting chiefly of hard quartoſe flat-faced grains, with ſharp angles, the moſt free from clay, ſalts, and calcareous, gypſeous, or other grains, leſs durable than quartz, containing the ſmalleſt quantity of pyrites, or heavy metallic matter, inſeparable by waſhing, and admitting the leaſt diminution in bulk by waſhing, is to be preferred to any other. The ſand is to be ſifted in ſtreaming clear water, through a ſieve which ſhall give paſſage to all ſuch grains as do not exceed one ſixteenth of an inch in diameter: and the ſtream of water and ſifting are to be ſo regulated, that all the ſand, which is much finer than the Lynn ſand, together with clay and other matter, ſpecifically lighter than ſand, may be waſhed away with the ſtream; whilſt the purer and coarſer ſand, which paſſes through the ſieve, ſubſides in a convenient receptacle; and whilſt the coarſe rubbiſh and ſhingle remain on the ſieve to be rejected. The ſubſiding ſand is then waſhed in clean ſtreaming water, through a finer ſieve, ſo as to be farther cleanſed and ſorted into two parcels, a coarſer, which will remain in the ſieve which is to give paſſage to ſuch grains of ſand only as are leſs than one thirtieth of an inch in diameter, and which is to be ſaved apart under the name of coarſe ſand; and a finer, which will paſs through the ſieve and ſubſide in the water, and which is to be ſaved apart under the name of fine ſand. Theſe are to be dried ſeparately, either in the ſun, or on a clean iron plate ſet on a convenient ſurface, in the manner of a ſand-heat. Let the lime be choſen, which is ſtone-lime, which heats the moſt in ſlaking, and ſlakes the quickeſt when duly watered; which is the freſheſt made and moſt cloſely kept; which diſſolves in diſtilled vinegar with the leaſt efferveſcence, and leaves the ſmalleſt reſidue inſoluble, and in this reſidue the ſmalleſt quantity of clay, gypſum, or martial matter. Let this lime be put in a braſs-wired fine ſieve, to the quantity of fourteen pounds. Let the lime be ſlaked by plunging it in a butt, filled with ſoft water, and raiſing it out quickly and ſuffering it to heat and fume, and by repeating this plunging and raiſing alternately, and agitating the lime, until it be made to paſs through the ſieve into the water: reject the part of the lime that does not eaſily paſs through the ſieve; and uſe freſh portions of lime, till as many ounces of lime have paſſed through the ſieve as there are quarts of water in the butt. Let the water, thus impregnated, ſtand in the butt, cloſe covered, until it becomes clear; and, through wooden cocks placed at different heights in the butt, draw off the clear liquor, as faſt and as low as the lime ſubſides, for uſe. This clear liquor is called the cementing liquor. Let fifty-ſix pounds of the foreſaid choſen lime be ſlaked, by gradually ſprinkling on it, and eſpecially on the unſlaked pieces, the cementing liquor, in a cloſe clean place. Let the ſlaked part be immediately ſifted through the fine braſs-wired ſieve. Let the lime which paſſes be uſed inſtantly, or kept in air-tight veſſels, and let the part of the lime which does not paſs through the ſieve be rejected: the other part is called purified lime. Let bone-aſh be prepared in the uſual manner by grinding the whiteſt burnt bones; but let it be ſifted to be much finer than the bone-aſh commonly ſold for making cupels. Having thus prepared the materials, take fifty-ſix pounds of the coarſe ſand, and forty-two pounds of the fine ſand; mix them on a large plank of hard wood placed horizontally: then ſpread the ſand ſo that it may ſtand to the height of ſix inches, with a flat ſurface on the plank; wet it with the cementing liquor; to the wetted ſand add fourteen pounds of the purified lime, in ſeveral ſucceſceſſively portions, mixing and beating them up together; then add fourteen pounds of the bone-aſh in ſucceſſive portions, mixing and beating all together. This Dr. Higgins calls the water-cement coarſe-grained, which is to be applied in building, pointing, plaiſtering, ſtuccoing, &c. obſerving to work it expeditiouſly in all caſes, and in ſtuccoing to lay it on by ſliding the trowel upwards upon it; to well wet the materials uſed with it, or the ground on which it is laid, with the cementing liquor, at the time of laying it on; and to uſe the cementing liquor for moiſtening the cement and facilitating the floating of it.

If a cement of a finer texture be required, take ninety-eight pounds of the fine ſand, wet it with the cementing liquor, and mix it with the purified lime and the bone-aſh as above, with this difference, that fifteen pounds of lime are to be uſed inſtead of fourteen pounds, if the greater part of the ſand be as fine as Lynn ſand. This is called water-cement fine-grained; and is uſed in giving the laſt coating or the finiſh to any work, intended to imitate the finer grained ſtones or ſtucco. For a cheaper and coarſer cement, take of coarſe ſand or ſhingle fifty-ſix pounds, of the foregoing coarſe ſand twenty-eight pounds, and of the finer ſand fourteen pounds; and after mixing and wetting theſe with the cementing liquor, add fourteen pounds, or ſomewhat leſs, of the purified lime, and then as much of the bone-aſh, mixing them together. When the cement is required to be white, white ſand, white lime, and the whiteſt bone-aſh are to be choſen. Grey ſand, and grey bone-aſh, formed of half-burnt bones, are to be choſen to make the cement grey; and any other colour is obtained, either by chuſing coloured ſand, or by the admixture of the neceſſary quantity of coloured talc in powder, or of coloured vitreous or metallic powders, or other durable colouring ingredients, commonly uſed in paint. The water-cement above deſcribed is applicable to forming artificial ſtone; by making alternate layers of the cement and of flint, hard ſtone, or brick, in moulds of the figure of the intended ſtone, and by expoſing the maſſes ſo formed to the open air to harden. When it is required for water fences, two thirds of the bone-aſhes are to be omitted, and in its ſtead an equal meaſure of powdered terras is to be uſed. When the cement is required of the fineſt grain, or in a fluid form, ſo that it may be applied with a bruſh, flint powder, or the powder of any quartoſe or hard earthy ſubſtance, may be uſed in the place of ſand, ſo that the powder ſhall not be more than ſix times the weight of the lime, nor leſs than four times its weight. For inſide work, the admixture of hair with the cement is uſeful. Higgins's Exp. and Obſ. on Calcareous Cements, &c. 8vo. 1780, paſſim. See Stucco.

Mortar, *mixing and blending of.* M. Felibien obſerves, that the ancient maſons were ſo very ſcrupulous herein, that the Greeks kept ten men conſtantly employed, for a long ſpace of time to each baſon; this rendered the *mortar* of ſuch prodigious hardneſs, that Vitruvius tells us the pieces of plaſter falling off from old walls ſerved to make tables. The ſame Felibien adds, it is a maxim among old maſons to their labourers, that they ſhould dilute with the ſweat of their brow, i. e. labour it a long time, inſtead of drowning it with water to have done the ſooner.

Beſides the common *mortar* uſed in laying of ſtones, bricks, &c. there are ſeveral other kinds: as,

Mortar, *white*, uſed in plaiſtering the walls and ceilings: made of ox or cow's hair mixed with lime and water, without any ſand. The common method of making this *mortar* is one buſhel of hair to ſix buſhels of lime.

Mortar *uſed in making water courſes*, *ciſterns*, *&c.* is very hard and durable, being made of lime and hogs-greaſe, ſometimes mixed with the juice of figs, and ſometimes with liquid pitch: and, after application, is waſhed over with linſeed-oil. See Beton.

For this purpoſe, *mortar* made of terras, pozzolana, tile-duſt, or cinders, is mixed and prepared in the ſame manner as common *mortar*: only that theſe ingredients are mixed with lime, inſtead of ſand, in a due proportion which is about half and half. The lime ſhould be made of ſhells or *marble*; and in works which are ſometimes dry and ſometimes wet, inſtead of terras, which is very dear, tile-duſt or cinder-duſt may be uſed.

Mortar *for furnaces*, *&c.* See Lute.

Mortar *for ſun-dials* on walls may be made of lime and ſand, tempered with linſeed-oil; or, for want of that, with ſkimmed milk. This will grow to the hardneſs of a ſtone.

For buildings, one part of waſhed ſoap-aſhes, mixed with another of lime and ſand, make a very durable *mortar*. See Cæment.

The ſalt-petre workers in France uſing the *mortar* of old buildings for extracting that ſalt, Mr. Petit has thought it worthy a peculiar attention, and has made ſeveral trials, by way of analyſis of *mortar*, to determine whether it really and eſſentially, contains nitre in it, or whether it be only ſerviceable in that mixture of ſalts from which nitre is produced.

The common managers of the ſalt-petre works are of opinion, that *mortar* contains in it all the ſalt-petre they procure from it, and that the wood-aſhes, and other ſubſtances they uſe with it, only ſerve to abſorb the fat or oily parts, and to ſet the ſalt-petre at liberty to ſhoot. This they pretend to affirm upon experience; but they do not conſider that though they can procure ſalt-petre from the rubbiſh or *mortar* without the addition of wood aſhes, yet it is not pure *mortar* that they make their experiments upon, but ſuch as is taken from their own heaps, upon which they always throw all the reſiduum of their former works, and all that liquor which will ſhoot no more cryſtals, but which they call the mother-water of ſalt-petre.

This gentleman, therefore, very properly judged, that to make a regular trial of the *mortar* or rubbiſh alone, he muſt not take it from their ſtores, uſed in the ſalt-petre works, but pick it himſelf from the ruins of old buildings.

The mark the ſalt-petre workers have to know good *mortar* for their purpoſe, is, that it taſtes acrid and ſalt when applied to the tongue; but to this it may be alſo added that it ought to be of a greyiſh colour, and ſuch as when powdered and ſprinkled upon burning charcoal yields ſome ſparks of fire; and the more ſparks it gives, the better it is for the purpoſe: and another character of the goodneſs is, that theſe well impregnated mortars have a certain unctuoſity or fattineſs to the touch, which other kinds have not.

The fineſt of all kinds of *mortar* for ſalt-petre work, is ſuch as is had from the ruins of old buildings in a low ſituation, and out of the way of much ſunſhine; where there has been no great quantity of fire kept, and eſpecially ſuch as has ſerved for the cements of the walls of ſtables, or the like.

Mr. Petit choſe from ſuch a wall twelve pounds of old *mortar*; this he had beat to powder, and poured upon it eighteen pints of water; the whole was then ſet over the fire, and ſtirred from time to time for three or four hours, that the water might be well tinctured from the *mortar*; after this the water was filtered through paper, and was then found to be tinctured to a pale, yellow, tranſparent bitter, and ſomewhat acrid to the taſte.

The impregnation may be made without heat, by only ſtirring the *mortar* about for nine or ten days in cold water, and a quantity of the ſalt taken up will be according to the goodneſs of the *mortar* and the quantity of water employed. The common ſpecific gravity of this liquor to water, is as 32 to 31, or thereabouts. Mr. Petit having procured the tincture of fifty pounds of *mortar*, by ſeveral impregnations, in ſeventy-two French pints of water, evaporated it ſo far till it appeared highly charged with ſaline particles, taſting very acrid and bitter, and being of a browniſh red colour; and its ſpecific gravity was in this ſtate to water as 4 to 3, there being more in quantity than about four pints. This was ſtill limpid and of a duſky colour, and was afterwards evaporated over a gentle fire, to the conſiſtence of an extract, which as it cooled became much thicker and firmer, reſembling butter. This being left open to the air, ſoon relented into a liquor of the conſiſtence of a ſyrup: its ſpecific gravity was now to water as 5 to 3; but in leaving it open to the air, it continually attracted freſh humidity, and became leſs ſpecifically heavy. Experiments made with this extract ſucceeded in the following manner.

1. It turned the common blue paper to a fine deep red. The impregnations in water uninſpiſſated do this alſo in different degrees according to their ſtrength.

2. Mixed in equal quantities with ſpirit of nitre and with ſpirit of ſea-ſalt, it made no efferveſcence or alteration in either.

3. A leaf of gold being put into the mixture of this impregnation with ſpirit of nitre was immediately diſſolved and in an hour or two afterwards the liquor was much clearer than before.

A leaf of gold being put into the mixture of this impregnation and ſpirit of ſea-ſalt, was in the ſame manner diſſolved in a few minutes. It is generally ſuppoſed indeed that the ſpirit of ſalt alone will diſſolve gold, but there ſeems an error in this founded on the inaccuracy of the preparation of ſuch ſpirit of ſalt; for Meſſrs. Geoffroy and Boulduc have at different times produced before the French Academy ſpirit of ſalt carefully prepared by themſelves, which would not at all diſſolve gold, not even with the aſſiſtance of heat; even ſuch ſpirit of ſalt would however be made to diſſolve gold, by mixing this impregnation with it; ſo that it has the power of diſſolving gold in a great degree.

4. A leaf of ſilver being diſſolved in ſpirit of nitre, and this impregnation of *mortar* added to the ſolution, the whole became turbid, and a precipitation happened, part of the matter being thrown to the bottom, and part remaining ſuſpended in form of a white cloud, which kept its place without falling.

5. The impregnation being mixed in equal quantities with oil of vitriol formed a coagulum, and made a great effervеſcence, with copious red vapours, and a ſtrong ſmell of aqua fortis; and theſe vapours appeared at any time, on ſtirring the mixture, for ſeveral days together. If a larger quantity of oil of vitriol be added to this coagulum, it all becomes fluid, but ferments violently; and finally there will be a white matter precipitated to the bottom of the clear liquor; and if a leaf of gold be brought near this mixture it will be diſſolved even by the vapour which exhales from it. Spirit of nitre has no effect upon this mixture, either in its ſtate of coagulum, or when reduced by more oil of vitriol into a clear liquor; but the volatile ſpirit of urine ferments violently, without the leaſt heat with it.

6. Oil of tartar *per deliquium* being added to the impregnation, the liquors would not readily mix, but remained ſeparate, the impregnation ſinking to the bottom; but on ſtirring them thoroughly together, they finally were made to unite into a white ſubſtance like butter, with a ſtrong urinous ſmell. If a ſmall quantity of corroſive ſublimate be added to this mixture, the urinous ſmell ceaſes; and if oil of vitriol be added, there is a violent fermentation occaſioned; and, in fine, a large quantity of precipitate.

7. This impregnation of *mortar* being mixed with an equal quantity of a ſolution of corroſive ſublimate, there is nothing remarkable produced, though the mixture be ever ſo much ſhaken; but if a little oil of tartar *per deliquium* be added to this, the mixture becomes turbid, and, on ſtirring all together for ſome time, it becomes white and thick like butter. If to this, more corroſive ſublimate be added in ſolution, it becomes orange-coloured: and, on more ſtirring, this becomes again white; and finally gives a white precipitate at the bottom of a tranſparent liquor.

8. If inſtead of oil of tartar an equal quantity of lime-water be added, this in the ſame manner gives an urinous ſmell, and the whole difference is, that the mixture will not become thick with this, as it will with oil of tartar.

9. The impregnation of *mortar* produced the ſame coagulum in mixing with ſpirit of urine, that it did with oil of tartar *per deliquium*; but it made no coagulation with ſpirit of ſal ammoniac with lime; the occaſion of this difference is, that the ſpirit of urine contains a great deal of volatile ſalt, and the other but little. It is a common error to ſuppoſe that the ſpirit of ſal ammoniac, which is moſt pungent, contains the greateſt quantity of ſalt; but this is not the caſe, for the ſpirit made with lime is much more pungent than that with ſalt of tartar, though the laſt is well known to contain a much larger portion of ſaline particles.

10. If a piece of paper or linen be wetted in this impregnation, and afterwards dried, it takes fire very violently, and ſparkles with the ſame violence as if it was impregnated with ſalt-petre.

From theſe experiments it is abundantly proved, that the impregnation of *mortar* contains a large quantity of a ſaline and nitrous ammoniac ſalt; for a diſſolution of ſal ammoniac and ſpirit of nitre mixed together are found to produce all the changes in the different bodies before named, that the impregnation does. On the whole, though it has been ſuppoſed by Mr. Tournefort, and others, that *mortar* contained ſalt-petre, ſea-ſalt, and a fixed alkali; yet there does not appear any proof of its containing any of theſe ſalts; no fixed alkali can ever be ſeparated from the impregnation of it; and though the linen or paper wetted in the impregnation of it ſparkled when on fire, yet it is not nitre, but merely a nitrous ſal ammoniac, which occaſions that phenomenon. The ſame effect is produced if the linen or paper be wetted with a mixture of ſpirit of urine and ſpirit of nitre. And the ſeveral experiments before recited prove, that there is in *mortar* a ſpirit of nitre and a ſpirit of ſea-ſalt, which with the volatile urinous ſalts, from a nitrous or a ſaline ammoniac. Mem. Acad. Scienc. Par. 1734.

Mortar, in *Chemiſtry*, is an inſtrument very uſeful for the diviſion of bodies, partly by percuſſion, and partly by grinding. They have the form of an inverted bell, and are made of all ſizes and materials, as marble, copper, glaſs, iron, grit-ſtone, and agate. The matter intended to be pounded is to be put into them, and there ſtruck and bruiſed by a long inſtrument called a *peſtle*. This when large and heavy, ought to be ſuſpended by a chord, or chain fixed to a moveable pole, placed horizontally above the *mortar*, which conſiderably relieves the operator, becauſe its elaſticity aſſiſts the raiſing of the peſtle.

MORTAR-PIECE, in the *Military Art*, a ſhort piece of ordnance, thick and wide, proper for throwing bombs, carcaſes, ſhells, ſtones, bags filled with grape ſhot, &c. The uſe of mortars is thought to be older than that of CANNON: for they were employed in the wars of Italy, to throw balls of red-hot iron and ſtones, long before the invention of ſhells. It is generally believed that the Germans were the firſt inventors. See BOMB.

The method of throwing red-hot balls out of *mortars* was firſt put in practice at the ſiege of Stralſund in 1675, by the elector of Brandenburgh; though ſome ſay, in 1653, at the ſiege of Bremen.

With us, *mortars*, which are made either of braſs or iron, are chiefly diſtinguiſhed by the diameter of the bore; e. g. a 13 inch *mortar* is that the diameter of whoſe bore is 13 inches. There are ſome of 10 and 8 inch diameters; and ſome of a ſmaller ſort, as coehorns of 4.6 inches, and royals of 5.8 inches. The principal parts of a *mortar* (*Tab.* II. *Gunnery*, *fig.* 12.) are, on the outſide, the chaſe A, the reinforce B, the breech C, and the trunnions D: in the inſide, the part where the ſhell is lodged, which is the bore, and the part where the powder is lodged, called the chamber. This is uſually made cylindrical, all but the baſe, which they make hemiſpherical; though ſome of the later engineers prefer ſpherical chambers; as the ſurfaces of thoſe being leſs, under equal capacities, make leſs reſiſtance to the gunpowder. Hiſt. Acad Scienc. 1740.

But this propoſition ſeems doubtful. By ſome experiments made before the Royal Society, in 1742, it appeared that the longeſt cylindrical chambers of the ſame capacity threw the ball fartheſt; which may give ground to ſuſpect that a long cylinder might be a better figure for the chamber of a *mortar* than a ſphere of equal capacity. See GUNNERY.

The figure of the chamber is made variouſly by different nations; the Spaniards uſe chiefly the ſpherical; the French, Germans, and Dutch, the conic, cylindric, and the concave or bottled; the Portugueſe, the parabolic, invented by count de Lippe Buckeburg; and the Engliſh make them in the form of a fruſtum of a cone. However the concave or cylindric chambers are reckoned the beſt. See CHAMBER.

The thickneſs of the *mortar* about the chamber is to be much greater than about the chaſe; by reaſon the gunpowder makes a much greater effort about the chamber than elſewhere: the diameter of the chamber is alſo to be much leſs than that of the bore; by reaſon bombs, ſhells, &c. are much lighter than the bullets of equal diameters; and, conſequently, leſs powder ſuffices.

Mortar, *coehorn*, a ſmall kind of *mortar*, invented by the famous engineer baron Coehorn, to throw ſmall ſhells or grenades. Theſe *mortars* are commonly fixed, to the number of a dozen, to a block of oak, at the elevation of 45°.

Mortars, *fire-lock*, or *bombards*, are ſmall *mortars*, fixed at the end of a fire-lock: they are loaded as all common firelocks are; and the grenade, placed in the *mortar* at the end of the barrel, is diſcharged by a flint lock; and to prevent the recoil from hurting the bombardier, the bombard reſts on a kind of halberd made for that purpoſe. They were firſt invented by major-general Siebach, a German, about the year 1740.

Mortars *hand*, were frequently uſed before the invention of coehorns. They were fixed at the end of a ſtaff of 4½ feet long, the other end being ſhod with iron to ſtick in the ground; while the bombardier with one hand elevates it at pleaſure, he with the other hand fires.

Mortars, *land*, are thoſe uſed in ſieges, and of late in battles, mounted in beds, made of ſolid timber, conſiſting generally of four pieces, thoſe of the royal and coehorns excepted, which are but one ſingle block; and both *mortar* and BED are tranſported on block-carriages. There is likewiſe a kind of land-*mortars*, mounted on travelling carriages, invented by count Buckeburg, which may be elevated to any degree; whereas ours are fixed to an angle of 45 degrees, and firmly laſhed with ropes. The following table ſhews the weight of land-*mortars* and ſhells; together with the quantity of powder the chambers hold when full; the weight of the ſhells, and powder for loading them.

Diameter of *mortars*.	13-inch.	10-inch.	8-inch.	5.8-inch. royal.	4.6-inch coehorn.
	C. qr. lb.	C. qr. lb.	C. qr. lb.	C. qr. lb.	C. qr. lb.
Mortar's weight.	25 0 0	10 2 18	4 0 20	1 1 0	0 3 0
Shell's weight.	1 2 15	0 2 25	0 1 15	0 0 12	0 0 7
	lb. oz. gr.	lb. oz. gr.	lb. oz. gr.	lb. oz. gr.	lb. oz. gr.
Shell's cont. of powder.	9 4 8	4 14 22	2 3 8	1 1 8	0 8 0
Chamber's cont. of pow.	9 1 8	4 0 0	2 0 10	1 0 0	0 8 0

Mortar, *partridge*, is a common *mortar* ſurrounded by thirteen other little *mortars*, bored round its circumference, in the body of its metal. The central *mortar* is loaded with a ſhell, and the other with grenades. The vent of the large *mortar* being fired, communicates its fire to the ſmall ones; ſo that both ſhell and grenades go off at once. The French uſed them in the war of 1701; and more eſpecially at the ſiege of Liſle, in 1708, and at the defence of Bouchain, in 1702.

Mortars, *ſea*, are thoſe which are fixed in the bomb-veſſels, for bombarding of places by ſea; and as they are generally fired at a much greater diſtance than that which is required by land, they are made ſomewhat longer and much heavier than the land-*mortars*.

The following table exhibits the weight of the ſea-*mortars* and ſhells, and alſo of their full charges.

Nature of the *mortar*.	Powder contained in the chamber, when full.		Weight of the *mortar*.			Wt. of the ſhell, when fixed.	Wt. of powder contained in the ſhell.	
	lb.	oz.	C.	qr.	lb.	lb.	lb.	oz.
10-inch HOWITZER.	12	0	31	2	26			
13-inch *mortar*.	30	0	81	2	1	198	7	0
10-inch *mortar*.	12	0	34	2	11	93		

Mr. Muller very juſtly obſerves, that the breech of our 13-inch ſea-*mortars* is loaded with an unneceſſary weight of metal. The chamber thereof contains 32 pounds of powder, and, at the ſame time, they are never charged with more than 12 or 15 pounds, becauſe the bomb-veſſel is unable to bear the violent ſhock of their full charge. Thus the action of powder is diminiſhed by the vacancy left in the chamber, which is never above half filled. As a charge of 12 or 15 pounds of powder at moſt is therefore ſufficient, it is evidently proved, by the theory of powder, that this will produce the greateſt effect when diſcharged from a *mortar* with a cylindrical chamber. He alſo proves by a variety of experiments, made by captain Deſaguliers and himſelf, that the conical chamber, now uſed, is conſiderably inferior to the cylindrical one, with the leaſt charge of powder. To facilitate the uſe of the *mortar*, it is placed in a ſolid carriage of timber, called the BED, whoſe different parts are ſtrongly bolted together. By means of this it is firmly ſecured in its ſituation, ſo that the exploſion of the powder may not alter its direction. In the middle of the upper ſide of this carriage are two ſemicircular notches, to receive the TRUNNIONS; over theſe are fixed two very ſtrong bands of iron, called the CAP-*ſquares*, the middle of which is bent into a ſemicircle, to embrace the trunnions, and keep them faſt in the *mortar*-bed. The cap-ſquares are confined to the timber-work by ſtrong pins of iron, called the eye-bolts, into whoſe upper ends are driven the keys, chained beneath them. On the fore part of the bed a piece of timber is placed tranſverſely, upon which reſts the belly of the *mortar*, or that part which contains the chamber. Theſe beds are placed upon very ſtrong frames of timber, which are fixed in the bomb-ketch. They are ſecurely attatched to the frames, by means of a ſtrong bolt of iron called the PINTLE, paſſing perpendicularly through both, and afterwards through one of the beams of the veſſel. Thus the pintle, which paſſes through the hole in the centre, ſerves as an axis to the bed; ſo that the *mortar* may be turned about horizontally as occaſion requires.

Mortars, *ſtone*, ſerve to throw ſtones into the enemy's works, when near at hand; ſuch as from the town into the trenches in the covert way, or upon the glacis; and from theſe trenches into the town. The bore is terminated by two quadrants of a circle, terminated by the reinforce and lines drawn from the ends of the cylinder, made to lodge the tompions parallel to the axis of the *mortar*. The bottom of the conic chamber is terminated by an arc of 60 degrees, and the round part of the outſide is a ſemicircle. The weight of a 13-inch ſtone-*mortar* is 10 C. 3 qr. 4 lb. and the chamber contains three pounds of powder. Muller's Artillery, part iii. p. 116, &c.

Mortar, *to charge*, or *load a*, the proper quantity of gunpowder is put into the chamber; and, if there be any vacant ſpace, they fill it up with hay; ſome chuſe a wooden plug; over this they lay a turf, ſome a wooden tompion, fitted to the bore of the piece; and laſtly the bomb, taking care that the fuſe be in the axis thereof, and the orifice be turned from the muzzle of the piece; what ſpace remains, is to be filled up with hay, ſtraw, turf, &c. ſo as the load may not be exploded without the utmoſt violence.

The quantity of gunpowder to be uſed, is found by dividing the weight of the bomb by 30: though this rule is not always to be ſtrictly obſerved.

When the proper quantity of powder, neceſſary to charge a ſea-*mortar* is put into the chamber, it is covered with a wad, well beat down with the rammer. After this the fixed ſhell is placed upon the wad, as near the middle of the *mortar* as poſſible, with the fuſe-hole uppermoſt, and another wad preſſed down cloſe upon it, ſo as to keep the ſhell firm in its poſition. The officer then points the *mortar*, according to the propoſed inclination.—When the *mortar* is thus fixed the fuſe is opened; the priming-iron is alſo thruſt into the touch-hole of the *mortar* to clear it, after which it is primed with the fineſt powder. This done, two of the matroſſes, or ſailors, taking each one of the matches, the firſt lights the fuſe, and the other fires the *mortar*. The bomb, thrown out by the exploſion of the powder, is carried to the place intended: and the fuſe, which ought to be exhauſted at the inſtant of the ſhell's falling, inflames the powder contained in it, and burſts the ſhell in ſplinters: which, flying off circularly, occaſion incredible miſchief whereſoever they reach.

If the ſervice of *mortars* ſhould render it neceſſary to uſe pound-ſhots, 200 of them, with a wooden bottom, are to be put into the 13-inch *mortar*, and a quantity of powder, not exceeding five pounds; and 100 of the above ſhot with 2½ pounds of powder, for the 10-inch *mortar*, or three pounds at moſt.

Mortar, *to elevate the*, ſo as its axis may make any given angle with the horizon, they apply the artillery-level, or gunner's quadrant: the uſe whereof ſee under the articles LEVEL, and QUADRANT.

An elevation of 70 or 80 degrees is what is commonly choſen for rendering *mortars* moſt ſerviceable in caſting ſhells into towns, forts, &c. though the greateſt range be at 45 degrees.

All the Engliſh *mortars* are fixed at an angle of 45 degrees, and laſhed ſtrongly with ropes at that elevation. Although, in a ſiege, there is only one caſe, in which ſhells ſhould be thrown with an angle of 45 degrees; that is, when the battery is ſo far off that they cannot otherwiſe reach the works: for when ſhells are thrown out of the trenches into the works of a fortification, or from the town into the trenches, they ſhould have as little elevation as poſſible, in order to roll along, and not bury themſelves; whereby the damage they do, and the terror they occaſion, are much greater than if they ſink into the ground. On the contrary, when ſhells are thrown upon magazines, or any other buildings, with an intention to deſtroy them, the mortars ſhould be elevated as high as poſſible, that the ſhells may aquire a greater force in their fall, and conſequently do greater execution.

If all *mortar-pieces* were, as they ought to be, exactly ſimilar, and their requiſites of powder as the cubes of the diameters of their ſeveral bores; and if their ſhells, bombs, carcaſes, &c. were alſo ſimilar; then, comparing like with like, their ranges on the plane of the horizon under the ſame degree of elevation, would be equal; and conſequently one piece being well proved, i. e. the range of the grenado, bomb, carcaſe, &c. being found to any degree of elevation, the whole work of the *mortar-piece* would become very eaſy and exact.

But ſince *mortars* are not thus ſimilar, it is required, that the range of the piece, at ſome known degree of elevation, be accurately found by meaſuring; and from hence all the other ranges may be determined.

Thus, to find the range of the piece at any other elevation required; ſay, as the ſine of double the angle under which the experiment was made, is to the ſine of double the angle propoſed, ſo is the range known to the range required.

Suppoſe, for inſtance, it be found, that the range of a piece, elevated to 30°, is 2000 yards: to find the range of the ſame piece with the ſame charge, when elevated to 45°: take the ſine of 60°; the double of 30°, and make it the firſt term of the rule of three; the ſecond term muſt be the ſine of 90°, the double of 45°; and the third the given range 2000; the fourth term will be 2310, the range of the piece at 45°. If the elevation be greater than 45°, inſtead of doubling it, take the ſine of double its complement to 90°. As ſuppoſe the elevation of a piece be 50°, take the ſine of 80°, the double of 40°. Again, if a determined diſtance to which a ſhot is to be caſt, is given, and the angle of elevation to produce that effect be required; the range known muſt be the firſt term in the rule of three, which ſuppoſe 2000 yards;

the range propoſed, which we ſuppoſe 1600 yards, the ſecond term; and the ſine of 60 double of the elevation for the range of 2000 yards, the third term. The fourth term will be found the ſine of 43° 52′, whoſe half 21° 56′, is the angle of the elevation the piece muſt have to produce the deſired effect. And if 21° 56′, be taken from 90°, you will have 68° 4′ for the other elevation of the piece, with which the ſame effect will likewiſe be produced.

Note, to avoid the trouble of finding ſines of double the angles of propoſed elevations, Galileo and Torricelli give us the following table, wherein the ſines of the angles ſought are had by inſpection.

Degrees.	Degrees.	Ranges.	Degrees.	Degrees.	Ranges.
90	0	0	0	0	0
89	1	349	66	24	7431
88	2	698	65	25	7660
87	3	1045	64	26	7880
86	4	1392	63	27	8090
85	5	1736	62	28	8290
84	6	2709	61	29	8480
83	7	2419	60	30	8660
82	8	2556	59	31	8829
81	9	3090	58	32	8988
80	10	3420	57	33	9135
79	11	3746	56	34	9272
78	12	4067	55	35	9397
77	13	4384	54	36	9511
76	14	4695	53	37	9613
75	15	5000	52	38	9703
74	16	5209	51	39	9781
73	17	5592	50	40	9841
72	18	5870	49	41	9903
71	19	6157	48	42	9945
70	20	6428	47	43	9976
69	21	6691	46	44	9994
68	22	6947	45	45	10000
67	23	7193			

The uſe of the table is obvious. Suppoſe, for inſtance, it be known by experiment, that a *mortar* elevated 15°, charged with three pounds of powder, will throw a bomb to the diſtance of 350 fathom: and it be required, with the ſame charge, to throw a bomb 100 fathom farther: ſeek in the table the number anſwering to 15 degrees, and you will find it 5000. Then as 350 is to 450, ſo is 5000 to a fourth number, which is 6428. Find this number, or the neareſt to it, in the table; and againſt it you will find 20°, or 70°; the proper angles of elevation. See RANGE.

For the weight, dimenſions, &c. of the bombs, &c. to be caſt out of *mortars*, and the lines of their projection, ſee BOMB and PROJECTILE.

MORTARIOLUM, a word applied by different writers to different things, from their reſemblance to a mortar in ſhape. The chemiſts expreſs by this name a ſmall mould made for faſhioning their copels; and anatomiſts call the ſockets of the teeth, the *mortariola* of the jaws.

MORTERE, in *Engliſh Antiquity*, *a mortarium*, a light or taper ſet in churches, to burn over the graves or ſhrines of the dead.

MORTGAGE, in *Law*, an obligation, whereby lands or tenements of a debtor are pawned or bound over to the creditor for money, or other effects, borrowed; peremptorily to be the creditor's for ever, if the money be not repaid at the day agreed on.

In this ſenſe, *mortgage*, in the common law, amounts to much the ſame with HYPOTHECA, in the civil law.

The creditor holding ſuch land on ſuch agreement, is in the mean time called *tenant in mortgage*. He who lays the pawn or gage, is called the *mortgager*; and he that takes it, the *mortgagee*. If a *mortgage* includes exceſſive uſury, it is prohibited by a ſtatute 37 Hen. VIII.

The French ſometimes uſe the word *mortgage* in the ſame ſenſe in their language, where it ſtands in contradiſtinction to a ſimple contract, which does not carry with it the mean profits, and which they call *vif-gage*, *life-pledge*.

Granville defines *mortgage*, *mortuum vadium*, to be that *cujus fructus vel reditus interim percepti in nullo ſe acquietant*. Thus, it is called *mortgage*, i. e. *dead gage*, of *mort*, *death*, and *gage*, *pledge*; becauſe whatever profit it yields, yet it redeems not itſelf by yielding ſuch profit, except the whole ſum borrowed be likewiſe paid at the day; the *mortgager* being by covenant to receive the profits till default of payment. Others hold it called *mortgage*, becauſe, if the money be not paid at the day, the land *moritur*, *dies*, to the debtor, and is forfeited to the creditor.

Thus if a man borrows of another a ſpecific ſum (e. g. 200*l.*) and grants him an eſtate in fee, on condition that if he, the mortgager, ſhall repay the mortgagee the ſaid ſum of 200*l.* on a certain day, mentioned in the deed, that then the mortgager may re-enter on the eſtate ſo granted in pledge; or, as is now the more uſual way, that the mortgagee ſhall re-convey the eſtate to the mortgager; in this caſe the land, which is ſo put in pledge, is by law, in caſe of non-payment at the time limited, for ever dead and gone from the mortgager; and the mortgagee's eſtate in the lands is then no longer conditional, but abſolute. But as it was formerly a doubt, whether, by taking ſuch eſtate in fee, it did not become liable to the wife's dower, and other incumbrances of the mortgage (though that doubt has been long ago over-ruled by our courts of equity) it, therefore, became uſual to grant only a long term of years, by way of *mortgage*; with condition to be void on repayment of the *mortgage*-money: which courſe has been ſince continued, principally becauſe, on the death of the mortgagee, ſuch term becomes veſted in his perſonal repreſentatives, who alone are intitled in equity to receive the money lent, of whatever nature the *mortgage* may happen to be. As ſoon as the eſtate is created, the mortgagee may immediately enter on the lands; but is liable to be diſpoſſeſſed, upon performance of the condition by payment of the *mortgage*-money at the day limited. And, therefore, the uſual way is to agree that the mortgager ſhall hold the land till the day aſſigned for payment; when, in caſe of failure, whereby the eſtate becomes abſolute, the mortgagee may enter upon it and take poſſeſſion, without any poſſibility, at *law*, of being afterwards evicted by the mortgager, to whom the land is now for ever dead. But here again the courts of equity interpoſe: and, though a *mortgage* be thus forfeited, and the eſtate abſolutely veſted in the mortgagee, at the common law, yet they will conſider the real value of the tenements compared with the ſum borrowed. And, if the eſtate be of greater value than the ſum lent thereon, they will allow the mortgager at any reaſonable time to recall and redeem his eſtate; paying to the mortgagee his principal, intereſt, and expences: for, otherwiſe, in ſtrictneſs of law, an eſtate worth 1000 *l.* might be forfeited for non-payment of 100 *l.* or a leſs ſum. This reaſonable advantage, allowed to mortgagers, is called the *equity* of REDEMPTION. And this enables a mortgager to call on the mortgagee, who has poſſeſſion of his eſtate, to deliver it back and account for the rents and profits received, on payment of his whole debt and intereſt; thereby turning the *mortuum* into a kind of *vivum vadium*. But, on the other hand, the mortgagee may either compel the ſale of the eſtate, in order to get the whole of his money immediately, or elſe call upon the mortgager to redeem his eſtate preſently, or in default thereof to be for ever FORECLOSED from redeeming the ſame, i. e. to loſe his equity of redemption without poſſibility of recall. And alſo in ſome caſes of fraudulent *mortgages*, ſpecified in 4 and 5 W. & M. cap. 16. the fraudulent mortgager forfeits all equity of redemption whatſoever. It is not, however uſual for mortgagees to take poſſeſſion of the mortgaged eſtate, unleſs where the ſecurity is precarious or ſmall; or where the mortgager neglects even the payment of intereſt. When the mortgagee is frequently obliged to bring an ejectment, and take the land into his own hands, it is in the nature of a pledge, or the *pignus* of the Roman law: whereas, while it remains in the hands of the mortgager, it more reſembles their HYPOTHECA, which was, where the poſſeſſion of the thing pledged remained with the debtor. But, by 7 Geo. II. cap. 20. after payment or tender by the mortgager of principal, intereſt, and coſts, the mortgagee can obtain no ejectment; but may be compelled to reaſſign his ſecurities. Blackſt. Com. book ii. cap. 10.

The civil lawyers diſtinguiſh twenty-ſix different kinds of *tacit mortgages*.

MORTIER, a badge or enſign of dignity, borne by the chancellors and great preſidents, of the parliaments of Paris. That born by the chancellor is a piece of cloth of gold, lined and turned up with ermin; that of the firſt preſident is a piece of velvet edged with a gold lace; that of the other preſidents is only a piece of gold lace.

They formerly bore it on their head, but now in their hands; except in grand ceremonies, as at the entry of a king. Hence the denomination, *preſidents à mortier*. See CAP.

MORTIFCATION, *necroſis*, in *Medicine*, a total extinction of the natural heat of the body, or a part thereof. Some define *mortification* a diſeaſe, wherein the natural juices of any part quite loſe their proper motion; and by that means fall into a fermentative one, and corrupt and deſtroy the texture of the part.

The indications of cure are, to confirm the ſtrength or to raiſe and maintain the vital heat a little above the natural healthy degree, to prevent the ingreſs of the putrid matter into the veins, and to check and remove the puterfaction that is formed. The bark is the only known ſpecific; however, the uſe of it is not to be indiſcriminately admitted in every caſe: in habits that are lax and feeble, no objections can occur to prohibit it; but in inflammatory habits, nitre or mineral acids ſhould accompany it if given, and great caution is neceſſary before it is preſcribed. If the inflammation is conſiderable, the mineral acids are more proper than the bark. If the pulſe is ſtrong, large, and hard, and the extremities of the body are warm, the urine red and high-coloured, the circulation is ſufficiently ſtrong, and need not be increaſed: but if the pulſe is weak, and the ſymptoms indicate a defective vital heat, cordials will be neceſſary. Mr. Potts obſerves, that a *mortification* proceeds from a circulation that is too rapid or too languid: in the firſt caſe, bleeding and diluters, and in the ſecond, cordials and invigorating medicines muſt be preſcribed. If a putrid SCURVY affects the patient, adminiſter ſuch medicines as will oppoſe it: or if any other diſorder attends, the proper means muſt be made uſe of by which it may ſpeedily be removed.

There are two ſpecies, or rather degrees of *mortification:* the one called a GANGRENE, which is a *mortification* in its firſt or beginning ſtate: the other, a *ſphacelus*, which is a perfect or finiſhed *mortification.*

In caſes of a perfect *ſphacelus*, or *mortification*, where the parts are become abſolutely dead, and wholly without ſenſe, and ſoft, ſo as to retain the impreſſions of one's fingers ends, and are plainly fetid and corrupted, all the medicines in the world will be ineffectual to reſtore the part to its life and ſenſe again; and all that remains to be done, is the one miſerable remedy of preſerving the reſt of the body, by cutting off that part, to prevent the *mortification* from ſpreading farther. A different method is to be taken, however, in this operation, according to the degree of the ſymptoms, and the nature of the part affected.

If only ſome extremity of the foot, tarſus, metatarſus, or inſtep, or only the bare ſkin and fat are *ſphacelated*, which is ſometimes the caſe, the whole foot is not to be amputated in that caſe, but preſerving the limb entire, the ſurgeon is only to remove that part which is vitiated; and that is frequently beſt of all done by ſuppuration, or if not to be effected by that means, may be attempted by the cauſtic. When it is to be done by ſuppuration, that is to be brought on as faſt as poſſible, and when it is done, the cruſt or eſchar of the ulcer is to be ſeparated from the ſound part with proper caution.

To haſten effectually a ſuppuration in theſe caſes, nothing is ſo ſerviceable as the making numerous long and deep ſcarifications near the ſound parts: and afterwards the inciſed parts are to be well anointed with the common digeſtive ointment, and after that treated with the balſamic cataplaſms and fomentations, in common uſe on the like occaſions.

A fomentation, alſo very ſerviceable in theſe caſes, is made by mixing, in a quart of a decoction of ſcordium, or of barley-water, vinegar of rue ſix ounces, ſpirit of wine with Venice treacle four ounces, and an ounce, or two ounces of common ſalt: this is to be applied hot with compreſſes to the part, and frequently repeated, till it is ſeen that the diſorder ſpreads no farther; which is known to be the caſe, when we ſee the tumor of the vitiated parts ſubſide, and the edges of the ſound parts become tumid all round; and on the ſecond or third day after this a ſuppuration is uſually formed, and the ſound parts gradually become ſeparated from the vitiated. After this, to ſoften and promote a ſpeedy ſeparation of the eſchar, the following cataplaſm is always found highly ſerviceable. Take of ſcordium two handfuls, mallows, marſhmallows, and henbane, of each one handful; lavender-flowers, half a handful; let theſe be boiled to the conſiſtence of a cataplaſm in vinegar, or oxycrate, and when in that ſtate add to them three ounces of flour of linſeed, one ounce of linſeed oil, and two ounces of ſal ammoniac. This is to be applied warm over the whole, and retained in a proper degree of heat as long as ſhall be found neceſſary, by means of a brick boiled in water, and applied wrapped in a linen cloth, or ſome other like means. After theſe methods have been uſed and the whole ſurrounding ſkin is gently tumified with redneſs, a cruſt, or eſchar, is then formed by degrees, and the ſound fleſh begins to ſeparate from the reſt: by this we know that the diſorder has done ſpreading, and that an entire ſeparation of the vitiated parts will very ſhortly follow.

When this ſeparation ſhews itſelf beginning, it muſt be promoted as much as poſſible, by dreſſing the part with the common digeſtive, either alone, or mixed with Venice treacle, which muſt be retained on between the ſound and dead parts. To make way for this, it is ſometimes neceſſary to divide them by the lancet; and when that is done, and the dreſſing has been applied, the before deſcribed cataplaſm ſhould be again laid on warm; and in all the ſucceeding dreſſings, whatever is found looſe of the dead part muſt be carefully removed. And if it be neceſſary, from the adheſion of the vitiated parts to the ſound, to uſe the ſciſſars, or ſcalpel, to divide them, this is always to be done with very little, either of pain or of danger; it will then be proper to dreſs the part with the digeſtive, and a plaſter of diachylon, or the like, over it, till the corrupted parts are entirely caſt off, and the ulcer appears perfectly well cleanſed, and then the cure is eaſily perfected in the common way.

This is the gentler, and more common method; ſome ſurgeons, however, from the tediouſneſs of it, have recourſe directly, in theſe caſes, to the cauſtic. They anoint either the edges only, or elſe the whole of the corrupted part, every day, with butter of antimony, or the cauſtic ſtone liquified, till the living parts are ſurrounded by a ſort of eſchar, applying afterwards the cataplaſms before deſcribed, or others of the ſame kind, to prevent the diſorder from ſpreading; and to make the corrupted parts ſeparate from the ſound, the corroſive lixivium of Boerhaave is greatly in repute, and much uſed on theſe occaſions. It is made of three ounces of very ſtrong quick-lime, mixed with nine ounces of pot-aſhes, firſt ground ſeparately to powder, and afterwards mixed, adding a little water; they are then to be put into a glaſs veſſel, and ſet in a cellar to run per deliquium.

As ſoon as they are found to become fluid, the matter muſt be put into a filtre of coarſe paper, and the clear liquor that runs through muſt be kept for uſe. It is to be uſed by dipping a bruſh or feather into it, and rubbing it over the part affected once or twice a day; or fine linen rags may be wetted with it, and applied all over the part; not forgetting, however, at the ſame time, the uſe of the before ordered cataplaſm; this application is to be continued till the corrupted part begins to caſt off in cruſts or ſcales; and when this is the caſe it muſt be dreſſed with the common digeſtive, and when perfectly cleanſed, healed with a vulnerary balſam.

Another cauſtic, highly commended by Belloſte in theſe caſes, it made by diſſolving one part of crude mercury in two parts, either of ſpirit of nitre, or of aqua fortis. This is to be rubbed over the parts as the former, and will occaſion a ſpeedy ſeparation. Several great authors, however, adviſe the uſing the knife and actual cautery in theſe caſes, dividing and burning down to the ſound parts; but the cruelty of this method, and the pain, and ſometimes danger that attend it, make the methods of cure by ſuppuratives, and mild cauſtics, much to be preferred: indeed, the ſurgeons in general are not now ſo fond of calling in the actual cautery as formerly.

Finally, when the *ſphacelus* is ſo deeply affixed in any part of the upper or lower extremity, that it has penetrated through the muſcles, as far as the bone, and has either reſiſted the force of all medicines, or the proper time for the applying them has been neglected; in this caſe, to preſerve the reſt of the body, the injured part muſt be amputated. Heiſter's Surgery, p. 217.

MORTIFICATION, in *Religion*, any ſevere penance obſerved on a religious account. How ancient and how univerſal the practice of it has been, and for what reaſons obſerved, ſee FAST.

MORTIS, *cauſa donatio.* See DONATION.

MORTISE, or MORTOISE, in *Carpentery*, &c. a kind of joint, wherein a hole or inciſion, of a certain depth, is made in the thickneſs of a piece of wood, which is to receive another piece called a *tenon.*

The word is originally French, *mortoiſe*, which ſignifies the ſame; and which Borel farther derives from *mordere*, *to bite.*

MORTMAIN, in *Law*, the alienation of lands and tenements to an yguild, corporation, or fraternity, ſole or aggregate, eccleſiaſtical or temporal, and their ſucceſſors; as biſhops, parſons, vicars, &c. which may not be done without the king's licenſe, and that of the lord of the manor; or that of the king alone, if it be immediately holden of him. Stat. 7 & 8 W. III. cap. 37. And by ſtat. 9 Geo. II. cap. 36. no manors, lands, or money to be laid out in lands, are to be given for charitable uſes, unleſs by deed executed twelve months before the death of the donor.

The word literally denotes *dead-hand*; being a compound of *mort*, *dead*, and *main*, *hand.* Accordingly Hottoman defines *mortmain* to be the poſſeſſion of thoſe who are, as it were, immortal, becauſe they never ceaſe to have heirs; ſo that the eſtate never reverts to its firſt lord: *main*, *hand*, being uſed for poſſeſſion; and *mort*, *dead*, by antiphraſis, for immortal. Others aſſign the reaſon of the name thus: that the ſervices and other profits due for ſuch lands, ſhould not, without ſuch licence, come into a dead hand (*mainmort*) i. e. into a hand as it were dead, that is, ſo dedicated to God, or pious uſes, as to be different from other lands, tenements, or hereditaments, and never to revert to the donor, or any temporal or common uſe.

Purchaſes in *mortmain* were uſually made by eccleſiaſtical bodies, the member of which (being profeſſed) were reckoned dead perſons in law; and, therefore, the land holden by them might, with great propriety, be ſaid to be held in *mortua manu*. See AMORTIZATION.

In order to underſtand the riſe and progreſs of the ſtatute of *mortmain*, it is neceſſary to obſerve, that by the common law, any man may diſpoſe of his lands to any other private man, at his own diſcretion, eſpecially when the feodal reſtraints of alienation were worn away Yet in conſequence of theſe, it was always, and is ſtill, neceſſary for corporations to have a licence of *mortain* from the crown, to enable them to purchaſe lands; and ſuch licences of *mortmain* ſeem to have been neceſſary among the Saxons, above ſixty years before the Norman Conqueſt. But, beſides this general licence from the king, as lord paramount of the kingdom, it was alſo requiſite, whenever there was a meſne, or intermediate lord between the king and the alienor, to obtain his licence alſo, upon the ſame feodal principles, for the alienation of the ſpecific land. And if no ſuch licence was obtained, the king, or other lord, might reſpectively enter on the lands ſo aliened in *mortmain* as a forfeiture.

However, ſuch were the influence and ingenuity of the clergy, that, notwithſtanding this fundamental principle, the largeſt, and moſt conſiderable donations of religious houſes happened within leſs than two centuries after the Conqueſt: and they formed contrivances for evading the neceſſity of obtaining licences. In proceſs of time, it was obſerved, that the feodal ſervices, ordained for the defence of the kingdom, were every day viſibly withdrawn; that the circulation of landed property from man to man began to ſtagnate; and that the lords were curtailed of the fruits of their ſeignories, their eſcheats, wardſhips, reliefs, and the like: and, therefore, in order to prevent this, it was ordained by the ſecond of king Henry III.'s great charters, A.D. 1217, cap. 43. ed. Oxon. and afterwards by that printed in our common ſtatute books, that all ſuch attempts ſhould be void, and the land forfeited to the lord of the fee. Mag. Cart. 9 Hen. III. cap. 36. This was afterwards ſucceeded by the ſtatute *de religioſis*, 7 Edw. I. which provided that no perſon, religious or other whatſoever, ſhall buy or ſell, or receive under pretence of a gift, or term of years, or any other title whatſoever, nor ſhould by any act or ingenuity appropriate to himſelf, any lands or tenements in *mortmain*; upon pain that the immediate lord of the fee, or, on his default for one year, the lords paramount, and, in default of all of them, the king might enter thereon as a forfeiture.

Farther, the ſtatute of Weſtminſter the ſecond, 13 Edw. I. cap. 32. enacted, that in caſes now known under the name of common recoveries, a jury ſhould try the true right of the demandants or plaintiffs to the land; and if a religious houſe or corporation be found to have it, they ſhould ſtill recover ſeiſin; otherwiſe it ſhould be forfeited to the immediate lord of the fee, or elſe to the next lord, and finally to the king, upon the immediate or other lord's default. And to prevent any future evaſion, when the ſtatute of *quia emptores*, 18 Edw. I. aboliſhed all ſubinfeudations, and gave liberty for all men to alienate their lands to be holden of the next immediate lord, a proviſo was inſerted, cap. 3. that this ſhould not extend to authorize any kind of alienation in *mortmain*. And when afterwards the method of obtaining the king's licence by writ of *ad quod damnum*, was marked out by 27 Edw. I. ſtat. 2. it was farther provided by 34 Edw. I. ſtat. 3. that no ſuch licence ſhould be effectual, without the conſent of the meſne, or intermediate lords. It was afterwards enacted by 15 Rich. II. cap. 5. that lands which had been purchaſed to uſes (another method of evaſion, to which eccleſiaſtical ingenuity recurred) ſhould be amortiſed by licence from the crown, or elſe be ſold to private perſons: and that, for the future, uſes ſhould be ſubject to the ſtatutes of *mortmain*, and forfeitable like the lands themſelves: and large tracts of land adjoining to churches, and conſecrated by the name of church-yards, were declared to be within the compaſs of the ſtatutes of *mortmain*. And civil or lay corporations, as well as eccleſiaſtical, are alſo declared to be within the miſchief, and the remedy provided by thoſe ſalutary laws. Moreover it was declared, by 23 Hen. VIII. cap. 10. that all grants of lands to ſuperſtitious uſes, ſuch as obits, chanteries, &c. if granted for any longer term than twenty years, ſhould be void. However, during all this time, it was in the power of the crown, by granting a licence of *mortmain*, to remit the forfeiture, ſo far as related to its own rights; and to enable any ſpiritual or other corporation to purchaſe and hold any lands or tenements in perpetuity; which prerogative is declared and confirmed by 18 Edw. III. ſtat. 3. cap. 3. And it was farther provided, by 7 and 8 W. III. cap. 37. that the crown, for the future, at its own diſcretion, may grant licences to alien or take in *mortmain*, of whomſoever the tenements may be holden.

The ſtatutes of *mortmain* were ſuſpended for twenty years by 1 and 2 P. and M. cap. 8. and during that time, any lands or tenements were allowed to be granted to any ſpiritual corporation, without any licence whatſoever. And, for the augmentation of poor livings, it was enacted by 17 Car. II. cap. 3 that appropriators may annex the great tithes to the vicarages, and that all benefices under 100*l.* *per annum* may be augmented by the purchaſe of lands without licence of *mortmain* in either caſe; and the like proviſion hath been ſince made in favour of the governors of queen Anne's bounty, 2 and 3 Anne, cap. 11. It hath alſo been held, that, notwithſtanding the ſtatute 23 Hen. VIII. a man may give lands for the maintenance of a ſchool, an HOSPITAL, or any other charitable uſes. But as it was apprehended from recent experience, that perſons on their death-beds might make large and improvident diſpoſitions, even for theſe good purpoſes, and defeat the political ends of the ſtatutes of *mortmain*; it is therefore enacted, by 9 Geo. II. cap. 36. that no lands or tenements, or money to be laid out thereon, ſhall be given for, or charged with any charitable uſes whatſoever, unleſs by deed indented, executed in the preſence of two witneſſes, twelve calender months before the death of the donor, and enrolled in the court of chancery within ſix months after its execution (except ſtocks in the public funds, which may be transferred within ſix months previous to the donor's death), and unleſs ſuch gift be made to take place immediately, and be without power of revocation; and that all other gifts ſhall be void. The two univerſities, their colleges, and the ſcholars upon the foundation of the colleges at Eton, Wincheſter, and Weſtminſter, are excepted out of this act. Blackſt. Com. book ii. chap. 18.

MORTUARY is a gift left by a man at his death to his pariſh church, for a recompence of perſonal tithes and offerings, not duly paid in his life-time.

Mortuary is alſo the fee paid to an incumbent, for carrying a corpſe out of his pariſh to be buried in another.

A *mortuary* is not properly and originally due to an incumbent from any but thoſe of his own pariſh: but, by cuſtom, in ſome places of the kingdom, it is paid to the parſons of other pariſhes, as the corpſe paſſes through them.

They ſeem originally to have been, like lay HERIOTS, only a voluntary bequeſt to the church, and it was anciently brought to the church with the corpſe, when it came to be buried; and called a CORSE *preſent*: but ſo early as the time of Hen. III. it was rivetted into an eſtabliſhed cuſtom; inſomuch that the bequeſts or heriots and *mortuaries* were held to be neceſſary ingredients in every teſtament of chattels.

Mortuaries are taken away in Wales, Berwick, and Cheſter, by 21 Hen. VIII. cap. 6. ſect. 6. 12 Anne, ſtat. 2. cap. 6. 18 Geo. II. cap. 6.

It is enacted by 21 Hen. VIII. cap 6. that all *mortuaries* or corſe preſents to parſons of any pariſh ſhall be taken in the following manner, unleſs where by cuſtom leſs or none at all is due: viz. for every perſon who does not leave goods to the value of ten marks, nothing; for every perſon who leaves goods to the value of ten marks, and under 30*l.* 3*s.* 4*d.* if above 30*l.* and under 40*l.* 6*s.* 8*d.* if above 40*l.* of what value ſoever they be 10*s.* and no more. And no *mortuary* ſhall throughout the kingdom be paid for the death of any feme-covert; nor for any child; nor for any one of full age that is not a houſekeeper; nor for any way-faring men; but ſuch way-faring man's *mortuary* ſhall be paid in the pariſh to which he belongs. And upon this ſtatute ſtands the law of *mortuaries* to this day.

MORTUUM *caput*. See CAPUT.

MORUS, in *Botany*. See MULBERRY.

MORXI, the Indian name of a peſtilential diſtemper, very common in Malabar, and in ſome other parts of the Eaſt Indies, frequently carrying off great numbers of people.

MOSAIC, MOSAIC *work*, or, as ſome chooſe to call it, MUSAIC, an aſſemblage of little pieces of glaſs, marble, ſhells, precious ſtones, woods, or the like, of various colours, cut ſquare, and cemented on a ground of ſtucco, &c. imitating the natural colours and degradations of painting. In this ſenſe, *moſaic work* includes *marquetry*, or *inlaid work*, *veneering*, &c.

The critics are divided as to the origin and reaſon of the name: ſome derive it from *moſaicum*, a corruption of *muſaicum*, as that is of *muſivum*, as it was called among the Romans. Scaliger derives it from the Greek μυσα, and imagines the name was given to this ſort of work, as being very fine and ingenious. Nebricenſis is of opinion it was ſo called, becauſe *ex illis picturis ornabantur muſca*.

But, in its more proper and reſtrained ſenſe, *moſaic* only takes in works of ſtone, metals, and glaſs; thoſe of wood being diſtinguiſhed by the name of MARQUETRY, or *inlaying*.

Others diſtinguiſh otherwiſe between *moſaic* and *marquetry*. In that properly called *moſaic*, they ſay the ſeveral ſtones are all of the ſame colour; and the changes and diminutions of colours, and ſhades are made by applying different ſtones, one on another, but all of the ſame colour. *Marquetry*, on the contrary, conſiſts of ſtones of different colours; and by theſe the ſeveral colours, ſhades, degradations, &c. are expreſſed.

Moſaic ſeems to have taken its origin from *paving*: the fine effect and uſe of pavements compoſed of pieces of marble of different colours, ſo well joined together, as that, when dried, they might be poliſhed, and the whole make a very beautiful and ſolid body, which, continually trodden upon, and waſhed with water, was not at all damaged, gave the painter the hint, who ſoon carried the art to a much greater perfection, ſo as to repreſent foliages, maſques, and other groteſque pieces of various colours, on a ground of black or white marble. In fine, obſerving the good effect which this kind of work had in pavements, and finding that it reſiſted water, they proceeded to line walls therewith, and to take various figures by it, for the ornament of their temples and public buildings. But nature not producing variety of colours enough for them in marbles, to paint all kinds of objects, they bethought of counterfeiting them with glaſs and metal colours; which ſucceeded ſo well with them, that having given all manner of teints to an infinite number of little pieces of theſe two matters, to counterfeit ſtones of various colours, in order to get more colours, the workmen arranged them with ſo much art, that their *moſaic* ſeemed almoſt to diſpute with painting; this way of repreſenting objects having this advantage, that it reſiſts the injuries of the air, as well as marble itſelf; and even grows more beautiful with time, which effaces all other kinds of painting.

But the moderns have gone yet farther; and, ſetting aſide glaſs and metals, as too mean materials, have introduced, along with the fineſt marbles, the richeſt of precious ſtones, as lapis lazuli, agat, cornelians, emeralds, turquoiſes, &c.

Of theſe three kinds of *moſaic* work, that of coloured glaſs and metals are now little in uſe; though of a ſurpriſing luſtre and durableneſs: of the other two, that of marbles alone is in common uſe; the *moſaic* in precious ſtones being ſo very dear, that few workmen who apply themſelves to it, make little elſe but petty works, as ornaments for alter-pieces, tables for rich cabinets, &c. Though out of theſe muſt be excepted that ſumptuous chapel of the dukes of Tuſcany, which will be a noble monument of the magnificence and piety of thoſe princes, as well as of the patience and addreſs of the workmen employed therein.

We ſhall, however, enter into ſome detail of the manner of working in thoſe three kiuds of *moſaic*; to which we ſhall add a fourth much newer, yet equally ingenious with any of the reſt, made with a kind of gypſum or talc, found in the ſtone quarries about Paris.

MOSAIC *work of glaſs*. This kind they begin with little pieces of glaſs, which they provide of as many different colours as poſſible. To this end the glaſſman's furnaces being diſpoſed, and their pots or crucibles full of the matter of which glaſs is made, or rather of glaſs already made, they put what metalline colour or dye they think fit in each crucible, always beginning with the weakeſt, and augmenting the ſtrength of the colours from crucible to crucible, till they come to the deepeſt dye, as in mixing of colours on a pallet to paint in oil. When the glaſs has had ſufficient coction, and all the colours are in their perfection, they take out the glaſs hot, as it is, a laying it on a ſmooth marble, flatting it down with another marble, and then cut it into ſlices of equal bigneſs, and about the thickneſs of an inch and a half. They then with an inſtrument, which the Italians call *bocca di-cane*, make ſome pieces ſquare, and others of different figures and ſizes, as occaſion requires; theſe they diſpoſe orderly in caſes; as in painting in freſco, it is uſual to range all the different teints in ſhells, according to their colour. If it be deſired to have gold, either in the ground of the painting, or in the ornaments, or the draperies, they take ſome of the pieces of glaſs, formed and cut in the manner juſt mentioned: theſe they moiſten on one ſide with gum water, and afterwards lay them over with gold-leaf. They then put this piece, or ſeveral pieces at a time, on a fire-ſhovel, which they place in the mouth of the furnace, after having firſt covered them with another hollow piece of glaſs. Here they continue till ſuch time as they become red-hot; after which the ſhovel is drawn out, all at once; and the gold becomes ſo firmly bound to the glaſs, that it will never afterwards leave it.

Now, to apply theſe ſeveral pieces, and out of them to form a picture, they firſt make a cartoon, or deſign; this they transfer on the ground or plaiſter, by calquing, as in painting in freſco.

As this plaiſter is to be laid thick on the wall, it will continue freſh and ſoft a conſiderable time, ſo that there may be enough prepared at once to ſerve three or four days. This plaiſter is compoſed of lime made of hard ſtone, with brick-duſt, ground very fine, gum tragacanth, and whites of eggs: when it is thus prepared, and laid on the wall, and the deſign finiſhed of what is to be repreſented; with plyers they take out the little pieces of glaſs, ranging them one after another, and ſtill keeping ſtrictly to the light, ſhadow, and different teints and colours repreſented in the deſign: preſſing or flattening them down with a ruler, which ſerves both to ſink them within the ground, and to render the ſurface even.

Thus, in a long time, and with an infinite deal of trouble, they finiſh the work; which is ſtill the more beautiful, as the pieces of glaſs are more uniform, and ranged at more equal heights. Some of theſe are executed with ſo much juſtneſs, that they appear as ſmooth as a table of marble, and as finiſhed and maſterly as a painting in freſco; with this advantage, that they have a fine luſtre, and will hold almoſt for ever.

The fineſt works of this kind, that have deſcended to us, and thoſe from which the moderns have retrieved the art, almoſt loſt, are thoſe of the church of St. Agnes, formerly the temple of Bacchus, at Rome; beſides ſome at Piſa, Florence, and other cities of Italy. The moſt eſteemed among the works of the moderns are thoſe of Joſeph Pine, and the chevalier Lanfranc, in the church of St. Peter at Rome. There are ſome very good ones likewiſe at Venice.

MOSAIC *work of marble, and precious ſtones*. Theſe two kinds bear ſo near a relation to each other, as to the manner of working, that, to avoid repetition, we ſhall give them both under one; obſerving, by the way, wherein the one differs from the other, either in the ſawing or ranging of the ſtones.

Moſaic of marble is uſed in large works as in pavements of churches, baſilics, and palaces; and in the incruſtation and veneering of the walls of the ſame edifices. As to that of ſtones, eſpecially *precious ſtones*, it is only uſed in ſmall works as before obſerved.

The ground of *moſaic* works, wholly marble, is ordinarily a maſs of marble, either white or black. On this ground, the deſign is cut with a chiſſel, having been firſt calqued. When it is dug of a ſufficient depth, i. e. an inch or more, it is filled up with marble of a proper colour, firſt contoured, or faſhioned to the deſign, and reduced to the thickneſs of the cavities, with various inſtruments. To make the pieces, thus inſerted into the cavities hold, whoſe ſeveral colours are to imitate thoſe of the deſign, they uſe a ſtucco, compoſed of lime and marble duſt; or a maſtic, which each workman prepares differently: after which, the work is half poliſhed with a ſoft kind of ſtone.

The figures thus marked out, the painter or ſculptor himſelf draws with a pencil, the colours of the figures, not determined by the ground, and in the ſame manner makes ſtrokes or hatchings, in the places where ſhadows are to be; and when he has engraved, with a chiſſel, all the ſtrokes thus drawn, he fills them up with a black maſtic, compoſed chiefly of Burgundy pitch, poured on hot; taking off, afterwards, what is ſuperfluous, with a piece of ſoft ſtone or brick, which with water and beaten cement, takes away the maſtic, poliſhes the marble, and renders the whole ſo even, that one would imagine it only conſiſted of a ſingle piece; it is this kind of *moſaic* we ſee in the pompous church of the invalids at Paris, and the fine chapel of Verſailles; and wherewith ſome entire apartments of that palace are incruſted

For moſaic work of precious ſtones; there are required other and more delicate inſtruments than thoſe uſed in marble; as wheels, drils, tin-plates, &c. uſed by lapidaries, and carvers in ſtone. As none but the richeſt marbles and ſtones enter this work, to make them go the farther, they are ſawn into the thinneſt leaves imaginable, ſcarce exceeding half a line in thickneſs: the block to be ſawed, is faſtened firmly with cords, on the bench, only raiſed a little on a piece of wood, one or two inches high. Two iron pins, which are on one ſide the block, and which ſerve to faſten it, ſerve alſo to direct the ſaw. The pieces to be ſawed are put into a vice contrived for the purpoſe: in which ſtate, with a kind of ſaw or bow made of a fine braſs wire, bent on a piece of ſpringy wood, together with emery moiſtened with water, the leaf is gradually faſhioned by following the ſtrokes of the deſign made on the paper, and then glued to the piece.

When there are pieces enough faſhioned to form an entire flower, or ſome other part of the deſign, they are applied. The ground, that ſuſtains this *moſaic*, is uſually of ſtone. The matter, wherewith the ſtones are joined together, is a ſtucco, or maſtic, laid very thin on the leaves as they are faſhioned; and the leaves in this ſtate are applied with plyers. If any contour, or ſide of a leaf, be not either rounded enough, or ſquared enough, to fit the place where it is to be uſed, when it is too large, it is brought down with a braſs file or raſp; and when too ſmall, is managed with a drill, and other lapidary inſtruments.

Manner of making MOSAIC *work of gypſum*. This is a kind of coarſe talc, or ſhining tranſparent ſtone, found in the quarries of Montmartre near Paris, among the ſtones thence dug to make the plaiſter of Paris. It is different from the plaiſter; but retains the name which the Romans gave the plaiſter, viz. GYPSUM.

Of this ſtone, calcined in a kiln, beaten in a mortar, and paſſed through a ſieve, they make a kind of artificial marbles, imitating precious ſtones; and of theſe they compoſe a kind of *moſaic* work which comes little ſhort either of the durableneſs or vivacity of the natural ſtones: and which has this advantage, that it admits of continued pieces, or paintings, of entire compartiments, without any joining viſible.

Some make the ground of plaiſter of Paris, others of freeſtone: if the former, it is ſpread in a wooden frame, of the length and breadth of the intended work, and about an inch and a half thick. This frame is ſo contrived, as that the tenons being only joined to the mortiſes by ſingle pins, they may be taken aſunder, and the frame be diſmounted when the plaſter is dry; this frame they cover on one ſide by a ſtrong linen cloth, nailed all round; and being placed horizontally, with the linen at bottom, it is filled with plaſter, paſſed through a wide ſieve: the plaſter being half dry, the frame is ſet perpendicular, and left till it be quite dry, and then taken out, by diſmounting the frame. In this *moſaic*, the ground is the moſt important part. Now, to prepare the ſifted gypſum to be applied on this ground, they diſſolve and boil it in the beſt Engliſh glue; and, after mixing with it the colour it is to bear, the whole is worked up together into the ordinary conſiſtence of plaiſter; and then taken and ſpread on the ground, five or ſix inches thick. It muſt be obſerved, that if the work be ſuch, as that mouldings are required, they are formed with gouges, and other inſtruments.

It is on this plaſter thus coloured like marble, or precious ſtone, and which is to ſerve as a ground to a work either of lapis lazuli, agat, alabaſter, or the like, that the deſign to be repreſented is drawn; having been firſt pounced, or calqued. To hollow or impreſs the deſign, they uſe the ſame inſtruments with the ſculptors; the ground, whereon they are to work, not being much leſs hard than marble itſelf. The cavities, thus made in the ground, are filled up with the ſame gypſum boiled in glue, only differently coloured; and thus are the ſeveral colours of the original repreſented. To have the neceſſary colours and teints at hand, they temper quantities of the gypſum with the ſeveral colours, in little pots. When the deſign is thus filled, and rendered viſible, by half-poliſhing it with brick, or ſoft ſtone; they go over it again, cutting ſuch places as are either to be weaker, or more ſtrongly ſhadowed, and filling them with gypſum; which is repeated till all the colours, added one after another, repreſent the original to the life. The work being finiſhed, is ſcoured with ſoft ſtone, ſand, and water; then with pumice-ſtone; and, laſtly, poliſhed with a wooden rubber, and fine emery: then a luſtre is given it, by ſmearing it over with oil, and rubbing it a long time with the palm of the hand; which gives it a gloſs nothing inferior to that of natural marble.

If it be only required to make a variegated table, or other work of ſeveral colours, without *moſaic* figures; the proceſs is ſomewhat different. To this end, they only prepare ſeparately, in large bowls, as many different colours as nature ſhews in the marble to be imitated; and, after incorporating them with the gypſum and glue-water, they take a trowel full of each, and diſpoſe them in a trough, without any order; then, without mingling them, and only by cutting or croſſing the gypſum of each trowel once or twice with each of the reſt, they give them that beautiful confuſion, for which natural marbles are ſo much valued: of theſe they then make their tables, or lay a mould, according to the work to be done.

As to MOSAIC *work of wood*, more properly called MARQUETRY, or *inlaid work*, the ancients were well acquainted with it, and uſed it for the adorning of their beds, tables, and other moveables: employing, for this purpoſe, ivory, beſides the richeſt woods.

There are, beſide theſe, two other branches of *moſaic* work; the one called DAMASKEENING, or *damaſk work*, conſiſting in an aſſemblage of gold or ſilver threads, of which are ſometimes formed flat works, and ſometimes baſſo relievos.

The other is called *ſhell-work*: conſiſting of ſhells, artificial congelations, petrifications, &c. uſed in grottos.

MOSCH, a name of a ſort of roriferous veſſels, ſaid to have been diſcovered by Bilſius, in the kidneys.

MOSCHELÆUM, a name given by authors to a compound, fragrant, and aromatic oil, in which muſk is a predominating ingredient.

MOSCHATELLINA, *hollow root*, or *tuberoſe moſchatel*, in *Botany*, the name of a little plant common under our hedges, in ſpring, which conſtitutes a peculiar genus, under the title of ADOXA: the characters of which are theſe: the empalement of the flower is bifid and permanent; the flower conſiſts of one leaf, and is rotated and divided into four ſegments at the edge; from the cup of this riſes a piſtil, which is fixed in the manner of a nail to the middle of the flower; and finally becomes a ſoft ſucculent berry, which hath four cells, containing flatted ſeeds; the leaves and flowers ſmell like muſk, whence it has been called by ſome *muſk-crowfoot*.

MOSCHELAPHUS, in *Natural Hiſtory*, a name given by ſome writers to a creature of a mixed nature, produced by the copulation of a ſtag with a cow. Wagner tells us, that theſe creatures are ſometimes ſeen in the mountainous parts of Swiſſerland; as are alſo the hippotauri, generated between a bull and a mare; but neither of theſe ever propagate their ſpecies. See BUCEPHALUS.

MOSCHIFERUM *animal*, or *moſchus moſchiferus* of Linnæus, *muſk*, in *Natural Hiſtory*, the name of the creature which affords us the perfume called MUSK.

This creature ſeems to be neither of the goat nor deer-kind, and it is doubtful whether or not it chews the cud; it has however no *dentes inciſores* in the upper-jaw, which ſeems a mark that it does; but it has, according to the obſervation of Ariſtotle, two exerted teeth or tuſks there, in the manner of the boar; his noſe is ſharp like that of a grey-hound; his ears like a rabbit's, about three inches long, and erect; and his tail, or ſcut, about two inches; his foot is deeply cloven; the hair on the body is about half an inch long, and very thick, and of a brown and white colour. *Tab.* III. *Quadrupeds*, N° 38. The female is leſs than the male; the noſe ſharper; wants the two tuſks, and has two ſmall teats.

The *muſk* bladder or bag is about thre inches long, and two over, ſwelling out an inch and half from the belly of the male, and ſtanding as much before the groin. It has no horns and its tuſks by their figure ſeem intended equally for feeding and fighting.

MOSCHUS, in *Zoology*, a genus of the *pecora*; the characters of which are, that it has no horns, and two long tuſks in the upper jaw. Linnæus enumerates three ſpecies, one of which is the MOSCHIFERUM *animal*.

MOSES, in *Sea Language*, is a very flat broad boat, uſed by merchant ſhips, amongſt the Caribbee iſlands, to bring hogſheads of ſugar off from the ſea-beach to the ſhipping, which are anchored in the roads.

MOSQUE, or MOSK, among the *Mahometans*, is a temple ſet apart for the exerciſes of their religion.

The word comes from the Turkiſh *meſgid*, or *meſchit*, which properly ſignifies a temple built of wood, ſuch as the Turks firſt uſed. Hence the Spaniards derive their *meſcheta*, and the Italians *moſcheta*, and the French and Engliſh *moſque* and *moſk*. Borel derives the word from the Greek μοσχος, *calf*, becauſe of the frequent mention of a cow in the Alcoran: but others, with the greateſt appearance of reaſon, derive it from the Arabic *maſgiad*, a place of worſhip.

There are royal *moſques* founded by the emperors, as the Solimania, and Velidea, at Conſtantinople; and private *moſques* founded by mufties, viziers, baſſas, &c.

Moſques are built like large halls, with iſles, galleries, and domes; and are adorned on the inſide with compartiments, and pieces of *Arabeſque* work. On one ſide is always found a pool with ſeveral cocks; and on the top is placed a creſcent.

The women are not allowed to enter the *moſques*, but ſtay in the porches without.

Moſt of the *moſques* have a kind of hoſpital belonging to them, in which travellers of any religion are entertained during three days.

The Turks have converted moſt of the Chriſtian churches into *moſques*.

MOSS, MUSCUS, in *Botany*, an order of plants, belonging to the *cryptogamia* claſs, containing in the Linnæan ſyſtem eleven genera: viz. *lycopodium*, *porella*, *ſpagnum*, *phaſcum*, *ſplachnum*, *polytricum*, *mnium*, *hypnum*, *bryum*, *fontinalis*, and *buxbaumia*. Theſe are found growing on the barks of trees as well as on the ground. See *Tab. Moſſes.* The moſt eſteemed and odoriferous *moſs* is that of the cedar.

It is of ſome medicinal uſe; being aſtringent, and proper to ſtop hæmorrhages and dyſenteries.

The ancients took the *moſs* of trees to be the effect of a diſorder or diſcompoſure of the texture of the bark; or at moſt, a kind of little filaments ariſing from the bark: but the moderns find, by ſeveral obſervations, that *moſſes* are all real diſtinct plants, whoſe ſeed, being extremely ſmall is incloſed in little capſulæ; which burſting of themſelves, the ſeed is carried off by the winds, till falling into the inequalities of the bark of trees, it is there ſtopped, takes root, and feeds at the expence of the tree, as mouldineſs does on bread, &c.

What the botanical writers ſtrictly underſtand by the word *moſs*, is a claſs of plants appearing of an inferior rank, to the common vegetables; the leſs perfect genera of which have been ſuppoſed to be wholly deſtitute of flower or ſeed, or any thing analogous to either, and to conſiſt of ſimple, ſimilar, and uniform parts; the genera a little above theſe have ſome diverſity of parts, and carry ſomething that looks analogous to vegetation in the common way, having a reſemblance of thoſe parts which ſerve other plants for their fructification. The more perfect genera of the *moſſes* not only conſiſt of different parts, but alſo have their appropriated organs containing a pulpy matter which finally becomes dry, and aſſumes the form of a fine and ſubtle powder, compoſed of granules, each of which is either a ſeed or a granule of farina, ſerving for the propagation of the ſpecies.

The more imperfect *moſſes* are diſtinguiſhed from the other by their appearance to the naked eye: they are either in form of a fine lanugo, or down, covering the ſurface of different bodies; or elſe they appear as ſlender filaments, or foliacious bodies, floating about in the water; or as filaments of a tougher texture, hanging down from the branches of trees; or as little ſhrubs, or ſingle horns, growing erect on the parched earth of mountains and heathy places; or finally, as broad and foliaceous bodies ſpreading themſelves over the dry barks of trees or rocks, without any pedicle or other ſupport.

The more perfect kinds of *moſſes* are found in the ſhape of ſmall but regular plants, divided into ſeveral branches, and clothed with leaves; theſe are of various forms and ſtructures, ſome being broad and thin, others ſlender as hairs; ſome pellucid, others opake; ſome ſmooth, others hairy. From the alæ of theſe leaves in ſome kinds, and from the ſummit of the ſtalks in others, there ariſe heads or capſules of various figure and ſtructure, but all unicapſular; ſome of theſe are naked, and others covered with a calyptra or hood; ſome ſtand on long pedicles, and others are placed cloſe to the ſtalks. Thoſe heads are uſually called *capſulæ*, which contain their ſeed or farina, and their pedicles *ſetæ*, in the *mnia*, *hypna*, *brya*, and *polytrica*, &c.

Theſe capſules, in ſome are covered with a calyptra, or hood; in others they are naked. Of the firſt kind are the *ſplachnum*, *polytricum*, *mnium*, *bryum*, *hypnum*, *fontinalis*, and *buxbaumia*, and of the latter ſort, the *lycopodium*, *porella*, *ſphagnum*, and *phaſcum*.

The ſubſtance with which the heads or capſules of all the *moſſes* are filled, reſembles either ſeeds, or the ſmall globules of the farinæ of flowers, which all reſemble ſeeds of particular figures in miniature. The fructifications of theſe minute plants ſeem to be either from theſe as ſeeds falling to the earth; or according to the opinion of ſome, they ſeem to contain only farinæ in the capſules, which impregnating certain bulbs or nodules in the alæ of the leaves, cauſe them to grow and vegetate, as is ſeen in ſome of the larger plants, as in the bulbs produced in the alæ of the leaves of the dentaria, and of the lilies, and ſome others. The former opinion, of the powder in the heads or capſules being actually perfect ſeeds, is the more probable, as the bulks in the alæ of the leaves are found only in ſome of the hypna, and others of a few other genera; whereas the propagation is as quick and certain in thoſe which have none of them, as in thoſe which have: and the want of female parts of fructification, which makes ſo many deſiderata in the Linnæan ſyſtem of botany, is eaſily made up, and the whole explained according to the uſual courſe of nature in other vegetables, by allowing the powder in the capſules to be real ſeeds, and the ſmall globules on the pointals ſurrounding the aperture of the capſule, the farina.

The opinion of the *moſſes* growing only from theſe nodules in the alæ of the leaves, or from the impregnated ends of the branches which had received the powder from the capſules, was originally founded on the obſerving that the trailing or branched hypnums annually grew out into length, from the extremities of all their branches, and annually loſt as much of the old ſtalk at the root, as they gained of the new at the ſummit; but it appears from farther obſervations, that they are real ſeeds which are contained in form of powder in the capſules; ſince the bryums, and many others, are found growing from ſmall points or ſpots, which are aſſemblages of their minute leaves, propagated on the ground, under the old ones juſt where the powder of the capſules has fallen; and though it be allowed that the hypnums, and other trailing *moſſes* do grow from the ends of the branches, yet they may alſo be produced in form of new plants, from regular and perfect ſeeds ſhed from the capſules. It is certain that the bryums are by this means propagated and ſpread into large tufts, and the other genera may alſo be ſo propagated, though they have beſide a property of increaſing by growth of the ſtalk; which ſeems no other than the property of many of the large plants to creep at the root, and ſhoot out in length greatly from the extremities of their horizontal branches, lying on or under the ground, as thoſe ſpreading parts may more properly be ſo called than roots, the fibres puſhed out from them perpendicularly into the earth being properly the roots; and it is well known that theſe plants, though they propagate themſelves thus by the root, produce ſeeds alſo like the others, by which they may be equally propagated: and this analogy is to be carried yet farther: for as thoſe plants which creep by the roots produce fewer ſeeds than thoſe which are propagated only by ſeeds; ſo the hypnums, which are the genus of *moſſes* in which this growth by the ſtalk is principally obſerved, are very thinly beſet with capſules of ſeed, and many of them produce but very few in a ſeaſon; whereas the brya, and other *moſſes*, which have not this advantage of growing from the ends of the ſtalks, are found every year profuſely covered with capſules from every tuft; nay, there is ſcarce any branch which does not produce its capſule. Now if theſe capſules contained only a farina capable of impregnating the nodules, or the ends of the branches, it is obvious there would be as much of it required for the hypna as for any other kinds of *moſſes*; but if they are real and perfect ſeeds, it is no wonder that nature has given them profuſely to ſuch kinds as are to be propagated only by ſeeds, and more ſparingly to thoſe which are propagated alſo by the increaſe of the branches.

To this it may finally be added, that the ferns and other epiphylloſpermous plants approach moſt of all others to the nature of the *moſſes*; and though it has been ſuſpected by many, that the fine powder at the back of their leaves was not ſeeds, but only a farina; yet it is now well known that it is true and perfect ſeed, ſince, under many ſpecies of them, there are conſtantly found new and ſelfſown plants ariſing in their firſt rudiments of leaves and figure, which have plainly grown from the duſt or powder fallen from the old plants; and as this is now found to be the caſe in regard to the ferns, probably it will alſo appear the ſame in regard to *moſſes*, when they have been yet farther examined than at preſent. But whether theſe grains of powder have the lobes and radicles by which the ſeeds of larger plants propagate themſelves, or whether they grow into plants like the parent ones in the manner of the lichens, by mere expanſion, is a thing that requires farther obſervation to determine.

Some of the *moſſes*, it is evident, approach to the nature of the plants, which have their male and female parts in the ſame flower, and others to thoſe which have them in different ones.

The manner of feeding of *moſſes* in general may be in ſome degree gueſſed at by that of one genus of them, which has been traced through all its ſtages, and to which moſt of the others, though every genus has its diſtinct fructification in ſome reſpects, yet bear a very great general analogy.

The genus already obſerved, is that called by Dr. Dillenius, the HYPNUM. The ſpecies of this are very numerous and common; but that particular one which was the ſubject of theſe obſervations, is the ſhort-branched ſilky kind, common on old walls; and called by that author in his hiſtory, *hypnum vulgare, ſericum, recurvum, capſulis erectis cuſpidatis*.

The head of this *moſs* appears to the naked eye a ſmall, ſmooth, browniſh-yellow, oblong body, of about a ninth of an inch long; this is covered at its upper end with a membranaceous calyptra or hood, in ſhape reſembling an extinguiſher, or a funnel inverted. When this calyptra is taken off, and the head viewed with a microſcope, the ſurface of it is ſeen to be ridged with longitudinal ſtriæ. The baſis of the head is of a deep orange-colour, and more opake than the reſt; and the top is bounded by an orange-coloured ring ſwelling out ſomething beyond the ſurface of the contiguous parts of the head. Good glaſſes ſhew that in this head there are not wanting the parts eſſential to the fructification of what are uſually called the more perfect plants. This ring is truly a monophyllous undulated calyx, within which ariſe ſixteen pyramidal fimbriated ſtamina; theſe are of a pale greeniſh colour, and are loaded with a whitiſh oval farina. The ſtamina all bend toward each other from their baſes, and almoſt meet in a point at the tops. This is their appearance when the head is nearly ripe; and immediately under the arch formed by theſe ſtamina, is a cylindric hollow piſtillum, through which the farina makes its way, and is diſperſed among the ſeeds in the head; the fruit is a large capſule, filling every part of the membrane which ſhews itſelf on the outſide of the head, and in moſt places is contiguous to it; this capſule is filled with perfect and very beautiful ſeeds; they are round, tranſparent when unripe, but afterwards opake, and of a very beautiful green, which colour they retain even when dried. Phil. Tranſ. N° 478. ſect. 12.

When this head is firſt produced from the plant, the ſtamina are very ſlender, and ſtand erect; the head is ſcarce any thicker than the ſtalk, and the calyptra covers it all over, to ſhield the tender ſubſtance of the farina from external injuries. As the farina afterwards ſwells in the ſtamina, the ſeeds in the head increaſe alſo in bulk, and by their increaſe the head is more extended in thickneſs; and the ſtamina are by this means ſeparated farther and farther from each other at their baſes, but bend inwards toward their points, ſo as to form a kind of arched covering over the ſtigma of the piſtillum, which is ſingle; and from hence the farina falls, as it ripens, into the head, and impregnates the ſeeds. Id. ibid.

All the *moſſes*, liverworts, and the other plants of the ſame character, poſſeſs the ſame general virtues of drying and aſtringency.

The *moſſes* of Virginia, Pennſylvania, and other parts of North America, are in part the ſame with our's, and in part different; about two thirds of the number of *moſſes* of theſe countries hitherto obſerved being common to our own country alſo, the reſt peculiar to that part of the world. Thoſe of South America are almoſt all wholly different from our's. The *moſſes* of Greenland and Lapland are moſtly of the ſame kind with thoſe of our Welſh mountains. And in the mountainous parts of the world between the tropics, there are many extremely beautiful fern-like *moſſes*, unknown in all other places.

It cannot but be acknowledged, that the diſtinctions of theſe little vegetables are ſo minute, and their appearance ſo various in their different ſtates, that very probably ſucceeding obſervations will much retrench the number deſcribed by Dillenius; but as the ſame obſervers will probably add as many new and truly diſtinct ſpecies, as they find occaſion to ſtrike off from the old liſt, there is no doubt but that the number will be found at leaſt as great as it ſtands at preſent with that author.

Moss *on trees*, in *Gardening*. The growth of large quantities of *moſs* on any kind of tree is a diſtemper of very bad conſequence to its increaſe, and much damages the fruit of the trees of our orchards.

The preſent remedy is the ſcraping it off from the body and large branches, by means of a kind of wooden knife that will not hurt the bark, or with a piece of rough haircloth, which does very well after a ſoaking rain. But the moſt effectual cure is the taking away the cauſe. This is to be done by draining off all the ſuperfluous moiſture, from about the roots of the trees, and may greatly be guarded againſt in the firſt planting of the trees, by not ſetting them too deep.

If trees ſtand too thick in a cold ground, they will always be covered with *moſs*; and the beſt way to remedy the fault is to thin them. When the young branches of trees are covered with a long and ſhaggy *moſs*, it will utterly ruin them; and there is no way to prevent it, but to cut off the branches near the trunk, and even to take off the head of the tree, if neceſſary; for it will ſprout again; and if the cauſe be in the mean time removed by thinning the plantation, or draining the land, and ſtirring the ground well, the young ſhoots will continue clear after this.

If the trees are covered with *moſs*, in conſequence of the ground's being too dry, as this will happen from either extreme in the ſoil, then the proper remedy is the laying mud, from the bottom of a pond or river, pretty thick about the root, opening the ground to ſome diſtance and depth to let it in; this will not only cool it, and prevent its giving growth to any great quantity of *moſs*, but it will alſo prevent the other great miſchief which fruit-trees are liable to in dry grounds, which is the falling off of the fruit too early.

The *moſſes* which cover the trunks of trees, as they always are freſheſt and moſt vigorous on the ſide which points to the north, if only produced on that, ſerve to preſerve the trunk of the tree from the ſeverity of the north-winds, and direct the traveller in his way, by always plainly pointing out that part of the compaſs.

Moſſes make an article of commerce; there being ſeveral kinds uſed in medicine, in perfuming, &c. among others, the *ſea-moſs*, called *coralline*; and the *moſs* of cedar and fir, which enter the compoſition of Cyprus powder.

The *moſs* of common trees, as oak, aſh, poplar, &c. is uſed for caulking of veſſels: it is alſo uſed by bird-merchants, to prepare cages for certain kinds of birds to hatch in.

The ſoft marſh and bog *moſſes* ſerve the poor in many places for ſtuffing their beds; and in the buſineſs of tranſporting plants from other countries, nothing is of ſo great uſe as the ſtalks and leaves of theſe little vegetables: the ſucculent plants coming over in great beauty and vigour, when rolled up in dry *moſs*; and the trees and ſhrubs, by having their roots covered with ſuch as is ſomewhat moiſt.

The great quality of the *moſſes*, which makes them ſo ſerviceable in this caſe, is, that they do not heat and ferment on being moiſtened, as hay and ſtraw would.

Several ſpecies of the *moſſes* and algæ have been applied to medicinal uſe. Thus ſeveral of the *moſſes* are great and valuable medicines, uſed as deſiccatives and aſtringents; that the common cup-*moſs* is one of the greateſt remedies in the convulſive coughs of children, called the chin-cough, is known to every one; and Dr. Mead has ennobled the grey ground-lichen, by publiſhing its virtues in one of the moſt terrible of all diſeaſes, the bite of a mad dog. The common green liverworts are known medicines in diſorders of the breaſt, as are alſo all the ſpecies of polytricha. The ſeeds of our lycopodium are given with ſucceſs in nephritic caſes; and the Indians give one of their ſpecies in many diſtempers, and, as they ſay, with great benefit. The common white ground coralloides ſerves the rein-deer of Lapland for food, when all other herbage is loſt; and the confervæ ſerve for food to many of the fiſh both of the ſea and rivers, and to ſeveral water-fowl. And theſe, as well as the land *moſſes*, afford ſhelter and habitation to many inſects, and their young. Many of the ſpecies of coralloides and lichenoides are found of great uſe in that profitable branch of commerce the art of dying; and doubtleſs many others have alſo the ſame qualities, though not yet diſcovered; and we may be guided in ſearches of this kind by obſerving that many of them tinge the papers between which they are dried, with very beautiful and laſting colours.

Moss, *heath*, *coralloides*, in *Botany*, the name, according to Dillenius, of a genus of the *moſſes*; the characters of which are theſe: they are compoſed of ſtalks often branched in the manner of corals, and compoſed of parts of a different figure and appearance, not ſimple and uniform as the byſſi and confervæ. On the ſummits of the branches there grow a ſort of fleſhy tubercles, which Micheli calls the receptacles of flowers; and the little atoms which are ſeen adhering to the different parts of the ſtalks, he calls the ſeeds. Dillenius is rather for thinking them the farina; and the tubercles, either the capſules of ſeeds, or the young plants, ready to fall off from the parent ſtem, and ſhoot for themſelves like the bulbs of the dentaria, biſtort, and the like. However this be, theſe are parts too minute to found generical diſtinctions on, which may be better deduced from a groſſer conſideration of the ſtalk, and the figure of the tubercles. Theſe have no rim or margin, and are uſually larger in the leſs branched kinds, and ſmaller in the more ramoſe. This being a very numerous genus of *moſſes*, it is divided into ſeveral orders: 1. The fungiform. 2. The cup-like. 3. The ramoſe or corniculate ones. Dillen. Hiſt. Muſc. p. 76. See Coralloides.

Moss, *ſilk*, in *Natural Hiſtory*, a name given by count Marſigli to a ſpecies of ſea-*moſs*, or CORALLINE, of a very remarkable fineneſs and ſoftneſs, much more reſembling ſilk than any other of the marine productions. It is wholly compoſed of a ſort of tuft of fine hairs or filaments, and is of a bluiſh green colour, and almoſt tranſparent. It grows on rocks, ſtones, ſhells, or any thing elſe that lies in its way, and is found uſually at ſmall depths; it is not ſo tough and flexible as many other of the ſea-plants, but is eaſily rubbed to powder between the fingers. When examined by the microſcope, the ſingle filaments do not appear of the ſame equable ſurface and uniform texture; but they are ſeen to be jointed and made up as it were of a great number of pieces faſtened end by end to one another, in the manner of the beads of a lady's necklace. It is of a fine bluiſh green, and perfectly tranſparent before the microſcope, and reſembles a ſtring of gems, ſuch as the aqua marina, or ſome other like ſtone.

Mosses, *ſea*. Theſe marine ſubſtances are very beautiful when viewed by the naked eye; but when examined with the microſcope, they afford a very pleaſing variety of ſtructure and conformation.

The common kinds afford a great variety of colouring, the different parts of the ſame ſubſtance often appearing, ſome brown, ſome yellow, ſome red, and ſome grey. On drying, theſe colours become leſs elegant; but on putting the dried ſubſtance again to ſoak in water, they are in ſome degree recovered, and the variations are uſually found to be owing to the joints and knots in the ſtalks, which interrupt the courſe of the general colour, and are often themſelves either black, or of a dark and deep brown. See CORALLINE.

MOSS-*tree*. See LIVERWORT.

MOSS, *upright fir*. See LYCOPODIUM.

MOSS, *wall*, *bryum*, in *Botany*, the name of a genus of *moſſes*, the characters of which are theſe: they produce membranaceous capſules, covered with a calyptra or hood, and ſtanding on pedicles more or leſs long. In all this they agree with the hypnums, but they differ from them in that this pedicle has no covering round its baſe, but in the place of it has a node or tubercle. Theſe pedicles alſo uſually ariſe from the tops of the branches, or from thoſe of the laſt years, which were then the talleſt, though now nearer the roots. To this it is to be added, that the ſtalks are uſually erect, leſs branched than in the hypnums, and not creeping. The calyptra in ſome ſpecies ſtand ſtrait, in others obliquely on the capſules; and the opercula, when the duſty matter within the head has arrived at its maturity, fall off tranſverſely, ſometimes with a ſmooth, ſometimes with a jagged eye.

The characters of this genus, according to Linnæus, are that the anthera is operculated; the calyptra ſmooth: and the filament ariſes out of the tubercle. He enumerates thirty-one ſpecies.

The family of the *bryums* being very numerous, they are divided into ſeveral orders and ſeries by Dellenius, Hiſt. Muſc. The firſt order comprehends thoſe which have erect heads; and of theſe, thoſe of the firſt ſeries have rounded, bellied, and turbinated heads.

The ſecond ſeries of this order of *bryums* contains thoſe which have oblong oval, and rounded heads.

The ſecond ſubdiviſion of the narrow-leaved *bryums* ontains thoſe of the ſhort-leaved kind.

The third diviſion of the firſt order of *bryums* comprehends thoſe with extremely narrow, or capillaceous leaves. Of theſe ſome reſemble the hypnums, and many of theſe have their leaves terminated by long hairs.

The ſecond ſubdiviſion of theſe *bryums* contains ſuch as are hairy, and have capillaceous leaves; but differ from the hypnums in their proper figure, and general appearance.

The third ſubdiviſion comprehends ſuch of theſe *bryums* as have curled leaves, or leaves that become variouſly undulated as they dry.

The fourth ſubdiviſion of theſe *bryums* comprehends thoſe which have roſtrated calyptra and pointed capſules, afterwards becoming of the ſhape of bottles, from the rim of which there grow up ſeveral oblong bodies, in form of a beard.

The fifth ſubdiviſion of theſe *bryums* comprehends thoſe which have a ſhorter operculum, and whoſe capſules appear ſtriated when fully ripe.

The ſixth ſubdiviſion of theſe *bryums* takes in thoſe which have either no ſtalks, or at the utmoſt only very ſhort ones.

The ſecond order of the *bryums*, comprehends thoſe which have capſules hanging downward from the bending of the pedicles. The calyptra in theſe ſpecies quickly fall off; and the opercula are uſually obtuſe.

The firſt ſeries of theſe comprehends thoſe which have extremely narrow leaves.

The ſecond ſeries of theſe *bryums* contains thoſe which have leaves a little broader, and, though narrow, not capillaceous.

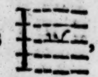
The firſt diviſion of theſe contains thoſe which have equal and cylindric branches. Dillen. Hiſt. Muſc.

The third ſeries of theſe *bryums* comprehends ſuch as have broad leaves.

MOSS is alſo a name given in many parts of England to the ground called a BOG, FEN, MARSH, or MORASS in other places.

MOSS-*berries*. See WHORTLE-*berry*.

MOSS-*troopers*, a rebellious ſort of people in the North of England, that lived by robbery and rapine, not unlike the tories of Ireland, the buccaneers in Jamaica, or banditti in Italy: the counties of Northumberland and Cumberland were charged with a yearly ſum, and a command of men, to be appointed by the juſtices of peace, to apprehend and ſuppreſs them. Stat. 4 Jac. I. cap. 1. 13 and 14 Car. II. cap. 22. 30 Car. II. cap. 2. See 6 Geo. II. cap. 37.

MOSTRA, in the *Italian Muſic*, a little mark ſet at the end of each line of a tune, thus , to ſhew that the firſt note of the next line is in that place.

If this firſt note be accompanied with a * or b, it is right to place thoſe characters with a *moſtra*. Alſo if in a thorough baſe this firſt note have any cyphers, it would be of uſe to put the ſame cyphers with the character, at the end of the preceding ſtaff. Again, if the part change its cleff with the firſt note, the cleff ought to be marked with the *moſtra* in the ſame manner. The *moſtra* is of great uſe, eſpecially in quick motions, as it prepares the player for what is to come. Vide Broſſ. Muſ. Dict. in voc.

MOSYNÆCUM, *æs*, in *Metallurgy*, a name given by the ancients to a white metal made of copper, in great eſteem among them.

Ariſtotle tells us, that it was extremely bright and of a perfect fine white colour: and adds that it was made of copper by melting it with an admixture of a peculiar kind of earth. Strabo alſo mentions this; and Theopompus tells us, that it was made of copper and an earth, and that it looked ſo like ſilver, that it was called *pſeudoargyron*.

Virgil mentions it under the name of *aurichalcum album*, and ſeems to give it great praiſes. We are not able at preſent to ſay what it was they uſed in making it. We know ſeveral things that will render copper white, as arſenic, and the like; but none of theſe can well be ſuppoſed to be the thing. For arſenic, and all the things we uſe to make our factitious metal, debaſe the copper, and render it brittle; whereas by the accounts of Strabo, and others, their white metal ſeems to have been better for all uſes than the copper itſelf. As to their telling us that it was a ſort of earth which they uſed on this occaſion, very little regard is to be paid to the terms; for they had an inaccuracy in ſpeaking that leaves us much in the dark, in many other things beſides this. They called the *calaminaris* ſtone, which is an ore of zinc, by the name of *Cadmian* earth, in their deſcription of the manner of making braſs.

It has ſeemed abſurd to ſome to call this white metal *aurichalcum album*, becauſe they ſuppoſed the word *aurichalcum* to ſignify gold-coloured copper; but this is an error. The *aurichalcum* is but a falſe ſpelling of ORICHALCUM.

MOTACILLA, in *Ornithology*. See WATER-*wag-tail*.

MOTALAZITES. See MOATALAZITES.

MOTE, MOTA, frequently occurs, in our ancient cuſtoms for a meeting, court, or plea.

Of *motes*, by the Saxons alſo called *gemotes*, conſidered in the ſenſe of aſſemblies, or courts, there were divers kinds; as *wittenagemote*, *folkegemote*, *ſchiregemote*, *hundred gemote*, *burgemote*, *wardegemote*, *haligemote*, *ſwainegemote*, &c. See each under its proper article, WITTENAGEMOTE, FOLKEGEMOTE, &c.

MOTE, *mota*, was alſo uſed for a fortreſs or caſtle; as *mota de Windſor*, &c.

MOTE alſo denoted a ſtanding water to keep fiſh in; and ſometimes a large ditch encompaſſing a caſtle, or dwelling houſe.

MOTECTICO, *ſtylo*. See STYLE.

MOTETTO, in the *Italian Muſic*, a kind of church-muſic, compoſed with much art and ingenuity from one to eight parts, with or without inſtruments, uſually accompanied with a thorough baſs. When the compoſer gives a looſe to his fancy, without confining himſelf to any rules, ſubjects or paſſions, it is called FANTASIA or RICERCATA.

The word is ſometimes uſed for pieces made to hymns to ſaints, &c. and whole pſalms are often thus called; and was probably derived from *motus*, *motion*, becauſe the church ſongs were deſigned to move the hearts of the hearers; or becauſe this kind of compoſition was originally of a very gay and lively nature. Broſſard and Du-Cange.

MOTH, in *Zoology*. See PAPILIO and PHALÆNA.

MOTH, *field*, *tinea campeſtris*, in *Natural Hiſtory*, the name given by Mr. de Reaumur to a ſpecies of inſect, which in all reſpects reſembles the *moth* ſo deſtructive of cloaths except in its food; as that feeds upon woollen, and makes its neſt or covering of that ſubſtance; this eats the leaves of trees, and in the ſame manner makes itſelf a covering from the fibres and integuments of them.

Their changes are the ſame with thoſe of the common *moth*, and performed in the ſame manner; they only ſeem to differ in having a more moiſt food.

Mr. Reaumur firſt obſerved theſe on the leaves of the aſh. This creature for a great part of its life wants no covering, but like the aſcarides making its way through the upper integument of the leaf, it feeds on the parenchyma and juices; at length when it has eat away all the ſubſtance of the leaf, it bites out a piece from each integument of it, over and under its body, and faſtens the edges all round with threads of its own ſpinning; thus making a complete caſe or covering, enabling it to bear the open air. This done, it marches from its place to find another leaf fit to ſupply it with more nouriſhment: thus it changes place ſeveral times during its life, and as often changes its covering, which requires but a very little time to make anew.

Theſe are ſmall animals of this genus; but there are others which are conſiderably larger, and which make their coverings of various matters and of different ſtructure; they are uſually very rough and rugged, and ſeem made of any matter that happens to be in the way; ſome ſpecies uſually make them of pieces of ſtraw and particles of chaff, others of ſmall twigs of buſhes, others of the dry leaves of the oak, broom, and other plants.

All theſe animals might have been deſcribed as the dependents on the beetle and fly kinds; but as they have this remarkable quality of feeding in the ſame manner, and making themſelves caſes of different materials in the manner of the *tinea*, or cloaths *moth*, while in the worm-ſtate, and in this ſtate they are much more obvious to the eye than the flies, beetles, &c. produced of them, many of which are ſo ſmall as to eſcape obſervation; this accurate author has choſen to deſcribe them together, and in this their imperfect ſtate. He adds an acconnt of another ſet of animals ſomewhat allied to them, which he therefore calls the *pſeudo-tinea*, or falſe *moth*. See PSEUDO-*tinea*.

MOTH *mullein*. See MULLEIN.

MOTHER, *mater*, a female, who hath borne, and ſtands in the relation of parent to another.

Thus Eve is called our common *mother*; Cybele, among the ancients, was the *mother* of the gods.

MOTHER, *queen*, ſignifies the ſame with what we otherwiſe call *queen dowager*.

We meet with empreſſes on medals and inſcriptions, with the title of *mother* of the camp, *mother* of the ſenate, *mother* of the country; *mater ſenatus, mater caſtrorum, mater patriæ*, &c.

MOTHER *of God*, is an attribute commonly given to the bleſſed Virgin. It had its origin from the Greeks, who firſt called her Θεοτοκος; in imitation of whom, ſome Latins began to call her *Deipara, Dei genitrix*. The council of Epheſus firſt gave a ſanction to the appellation; but the fifth of Conſtantinople decreed, that the Virgin ſhould always be thus called. This gave riſe to terrible diſputes: Anaſtaſius, a preſbyter of Neſtorius, patriarch of Conſtantinople, firſt aſſerted, in a ſermon, that the Virgin was by no means to be called Θεοτοκος; upon which words, a great tumult ariſing, Neſtorius took his preſbyter's part, and taught the ſame doctrine.

MOTHER-*tongue*, is properly an original language, from which others are formed.

Of *mother-tongues*, Scaliger reckons ten in Europe; viz. the *Greek*, *Latin*, *Teutonic* or *German*, *Sclavonic*, *Epirotic*, *Scythian* or *European Tartar*, *Hungarian*, *Cantabrian*, *Iriſh*, and *Britiſh*.

MOTHER-*churches*, are thoſe which have founded or erected others. See PARISH.

In beneficiary matters they ſay, it is not lawful for a man to enjoy, at the ſame time, both the *mother* and the daughter: meaning, that the canon-law does not allow an abbey, and the benefices depending thereon, to be held by the ſame perſon.

MOTHER, *fits of the*. See HYSTERIC *affections*.

MOTHER, *water*. See WATER.

MOTHER *of nitre*. See NITRE.

MOTHER *thyme*. See THYME.

MOTHER *wort*, *cardiaca*, in *Botany*. Its characters are theſe: it hath a cylindrical five-cornered empalement of one leaf, which is permanent, and divided into five parts at the top; the flower is of the lip kind, of one leaf, with a narrow tube ſpreading at the brim; it has four ſtamina faſtened to the upper lip, two of which are longer than the other; it has four germina, which afterwards become four naked oblong ſeeds, incloſed in the empalement.

There are three ſpecies; the common ſort uſed in medicine, growing naturally on the ſides of banks in many parts of England, and flowering in July.

Linnæus has changed the title of this genus to *leonurus*. See LION's *tail*.

It is only uſed in the ſhops as an ingredient in ſome of the compound waters, intended againſt hyſteric complaints; and the country people frequently make an infuſion of it in the manner of tea, for the ſame purpoſe. It is alſo ſaid to be good in flatulencies, and colics, to give great relief in epileptic caſes, and to deſtroy worms. It promotes urine, and the menſes; but its power this way is greatly inferior to that of PENNY-*royal*.

The name *cardiaca*, improperly given to this plant, has led many into an opinion of its being a cordial; but experience does not ſhew any ſuch thing.

MOTHER *of vitriol*. See VITRIOL.

MOTHER *Carey's chickens*, a name given by the Engliſh ſailors, to birds which they ſuppoſe to be the forerunners of a ſtorm.

MOTION, primarily ſo called, or *local* MOTION, is a continued and ſucceſſive change of place; or that ſtate of a body, whereby it correſponds ſucceſſively to ſeveral different places; or is preſent ſucceſſively in different parts of ſpace.

In this ſenſe the doctrine and laws of *motion* make the ſubject of mechanics, or ſtatics.

The ancient philoſophers conſidered *motion* in a more general and extenſive manner: they defined it, a paſſage out of one ſtate into another; and thus made ſix kinds of *motion*, viz. *creation*, *generation corruption*, *augmentation*, *diminution*, and *lation*, or *local motion*.

Some of the later ſchoolmen reduce theſe ſix kinds of *motion* to four: the firſt is general, including any paſſage from one ſtate to another; under which kind come *creation*, *production*, and *mutation*. The ſecond is a paſſage of ſomething already exiſting from one ſtate to another; and thus *generation* is a *motion*. The third is a ſucceſſive paſſage of ſomething already exiſting from one term to another; and thus *alteration*, and *accretion*, are ſpecies of *motion*. The laſt is *lation*, or *local motion*; and thus *walking* is *motion*.

But the lateſt philoſophers deny any other ſpecies beſide *local motion*; and reduce all the ſorts above mentioned to this one. So that we have here only to do with *lation*, or *local motion*; whereof the reſt are only ſo many different determinations, or effects.

Phyſical writers, both ancient and modern, have ever been perplexed about the nature and definition of *local motion*. The Peripatetics define it by, *Actus entis in potentia, prout in potentia*, Ariſt. 3. Phyſ. cap. 2. but this notion ſeems too abſtract and metaphyſical for our days, and is of no uſe in explaining the properties of *motion*.

The Epicureans explain *motion*, by the migration of a body, or a part of a body from one place to another; on which definition the later Epicureans refine, and call it, the migration or paſſage of a body from ſpace to ſpace; thus ſubſtituting the word *ſpace*, for that of *place*.

The Carteſians define *motion*, a paſſage or removal of one part of matter out of the neighbourhood of thoſe parts immediately contiguous thereto, into the neighbourhood of others.

Which definition agrees, in effect, with that of the Epicureans: all the difference between them conſiſting in this; that what the one call *body* and *place*, the other call *matter* and *contiguous parts*.

Borelli, and other late writers after him, define *motion*, more accurately and fully, the ſucceſſive paſſage of a body from one place to another, in a determinate time, by becoming ſucceſſively contiguous to all the parts of the intermediate ſpace.

Motion, then, is agreed to be the tranſlation of a body from place to place; but authors differ much when they come to explain wherein this tranſlation conſiſts. And hence their diviſions of *motion* become exceedingly precarious.

Ariſtotle, and the Peripatetics, divide all *motion* into *natural* and *violent*.

MOTION, *natural*, is that which has its principle, or moving force, within the moving body. Such is that of a ſtone falling towards the centre of the earth.

MOTION, *violent*, is that whoſe principle is without, and againſt which the moving body makes a reſiſtance. Such is that of a ſtone thrown upwards.

The modern generally divide *motion* into abſolute and *relative*.

MOTION, *abſolute*, is the change of abſolute place, in any moving body; whoſe celerity, therefore, will be meaſured by the quantity of abſolute ſpace which the moveable body runs through.

MOTION, *relative*, it a mutation of the relative or vulgar place of the moving body; and has its celerity eſtimated by the quantity of relative ſpace run through.

Others divide *motion* into *proper*, and *improper*, or *foreign*.

MOTION, *proper*, is a removal out of one proper place into another, which hereby becomes proper, as being poſſeſſed by this body alone, in excluſion of all others. Such is the *motion* of a wheel in a clock.

MOTION, *improper*, *extraneous*, *foreign*, or *common*, is the paſſage of a body out of one common place into another common place. Such is that of a clock when moving in a ſhip, &c.

The reaſon of all this denſity ſeems to ariſe from the not attending to the different meanings of the words, but comprizing all in one definition and diviſion; which they ſhould rather have diſtinguiſhed into ſeveral parts.

Some, e. gr. in their definitions of *motion*, conſider the moving body, not as it regards the adjacent bodies, but as it regards immoveable and infinite ſpace. Others, again, conſider the moving body, not as it regards infinite ſpace, but as it regards other bodies vaſtly remote. And others, laſtly, conſider the moving body, not as it regards remote bodies, but that ſurface only to which it is contiguous.

But theſe various meanings being once ſettled, the diſpute clears up. For as every thing that moves may be conſidered in theſe three ſeveral manners; there hence ariſe three ſeveral kinds of *motions*: whereof that which regards the parts of infinite immoveable ſpace, without conſideration of the circumambient bodies, may be called *abſolutely and truly proper motion*.

That which regards circumambient bodies vaſtly remote, which may themſelves poſſibly be removed, we call *relatively common motion*.

The laſt which regards the ſurfaces of the next contiguous bodies, inaſmuch as it may want all both abſolute and common *motion*, we call *relatively proper motion*.

Motion, *abſolutely and truly proper*, then, is the application of a body to different parts of infinite and immoveable ſpace.

This alone is *proper and abſolute* motion, being always generated and changed by forces impreſſed on the moving body itſelf, and by thoſe only; and being that to which the real forces of all bodies to put others in *motion* by impulſe, are owing, and to which thoſe *motions* are proportioned. But this *motion* we cannot inveſtigate or determine accurately; nor can we diſtinguiſh, when two bodies are impelled on each other, in which of the two (v. gr. that which appears to move the more ſwiftly, or the other, which appears to move more ſlowly, and perhaps even to be at reſt) the real *motion*, and conſequently, the real force whence the impulſe aroſe, is placed; not being able to determine whether the centre of gravity of the whole ſyſtem (which is but a point in infinite ſpace) is itſelf at reſt, or in *motion*.

Motion *relatively common*, is a change of the ſituation of a body with reſpect to the other remote circumambient bodies: and this is the *motion* we ſpeak of, when we ſay, that men, cities, and the earth itſelf move round the ſun. This is alſo the *motion* we mean, when we eſtimate the quantity of *motion*, and the FORCE any body has to impel another. For inſtance, if a wooden ſphere, filled with lead, to make it the heavier, be dropped from the hand; we uſe to eſtimate the quantity of *motion*, and the force which the ſphere has to impel another, by the celerity of the ſphere, and the weight of the included lead; and that truly with regard to the force itſelf, and the effect thereof, as it falls under our ſenſes. But whether the real power or *motion* be in the ſphere which appears to ſtrike, or in the earth which appears to be ſtruck; that as has been obſerved above, we cannot determine.

Motion, *relatively proper*, is the ſucceſſive application of a body to the different parts of the contiguous bodies.

And this is the *motion* uſually underſtood in phyſical diſputes about the natures of particular things; as when we ſay, that heat, ſound, fluidity, &c. conſiſt in *motion*. This muſt be added, however, that by ſucceſſive application of a body, its whole ſurface, taken together, muſt be conceived ſucceſſively applied to different parts of the contiguous bodies.

From theſe ſeveral definitions of *motion* ariſe as many definitions of place: for when we ſpeak of *motion* (or reſt) *truly and abſolutely proper*; then place is that part of infinite and immoveable ſpace which the body fills. When of *motion relatively common*; then place is a part of any ſpace or moveable dimenſion. When of *motion relatively proper* (which is really very improper); place is then the ſurface of the next adjacent bodies, or ſenſible ſpaces.

The definition of reſt is pretty well agreed on; but whether reſt be a mere privation of *motion*, or any thing poſitive, is warmly diſputed. Malebranche, and others, maintain the former ſide of the queſtion; Cartes, and others, the latter. Theſe laſt contend, that a body at reſt has no power to perſevere in that reſt, nor to reſiſt any bodies that would deſtroy it; and that *motion* may as well be called a ceſſation of reſt, as reſt of *motion*.

The main argument urged by the former is this: ſuppoſe a globe at reſt, and ſuppoſe God ceaſe to will its reſt; what will be the conſequence? it will reſt ſtill. Let it be in *motion*, and let God ceaſe to will its *motion*; what will be the conſequence? it will ceaſe to move; that is, it will be at reſt: becauſe the power whereby a body in *motion* perſeveres in that ſtate, is the poſitive will of God; that whereby the quieſcent body perſeveres is only his privative will.

But this is a *petitio principii*: for the force or conatus whereby bodies, whether moving or quieſcent, perſevere in thoſe ſtates, is the mere inactivity of matter; and therefore, were it poſſible for God not to will any thing, a body already in *motion* would move for ever; as a body at reſt would reſt for ever. To this inactivity of matter it is owing, that all bodies reſiſt according to their quantities of matter; and that any body ſtriking another with any given velocity, will move it in the ſame proportion which its denſity, or quantity of matter, has to the denſity, or quantity of matter, of the other.

Motion has ever been eſteemed a ſpecies of quantity; and its *quantum*, or greatneſs, which we otherwiſe call its *momentum* is eſtimated partly from the length of the line which the moving body deſcribes (as if a body paſs over a line of a hundred feet, the quantity of its *motion* is greater than if it paſſed over only ten feet), and partly from the quantity of the matter moved together, or at the ſame time; i. e. not from the bulk or extenſion of the body, but from its maſs or weight; the air and other ſubtile matters wherewith the pores are filled, not entering into the account: as if a body of two cubic feet run over a line of a hundred feet, the quantity of its *motion* is greater than that of a body of one cubic foot deſcribing the ſame line: for whatever *motion* one whole has, that is had in one half of the other; and the *motion* of the whole is the ſum of the *motion* of all its parts. See FORCE.

Hence it follows, that for two unequal bodies to have equal *motions* or momentums, the lines which they paſs over muſt be in a reciprocal proportion of their maſſes or weights; i. e. if any body have three times the quantity of matter that another has, the line that it runs over muſt be one third of the line run over by the other. If two bodies, then, faſtened to the two extremities of a balance or lever, have their maſſes in reciprocal ratio of their diſtances from the fixed point, whence theſe are moved, they muſt deſcribe lines in a reciprocal ratio of theſe maſſes.

For inſtance, if the body A, (*Tab.* V. *Mechanics*, *fig.* 73.) have three times the maſs or weight of B, and each be faſtened to the extremes of the lever AB, whoſe fulcrum or fixed point is C, in ſuch manner as that the diſtance BC is thrice the diſtance CA, the lever cannot incline either way, but the ſpace which the leſs body moves, BE, will be thrice the ſpace AD, which the greater moves: ſo that their motions will be equal. Nor is there any reaſon why the body A, tending downwards, v. gr. with four degrees of *motion*, ſhould raiſe the body B, rather than B, tending downwards likewiſe, with the ſame four degrees of *motion*, ſhould raiſe the body A: they will therefore be in equilibrio. On which foundation depends the whole doctrine of MECHANICS.

Hence that great proverb of Archimedes, with any given power, how ſmall ſoever, to raiſe any weight given, how great ſoever. For by increaſing the diſtance CB infinitely, the power of the body B will be increaſed infinitely.

It is allowed on all hands, that *motion* is no eſſential attribute of matter: and hence ariſes a diſpute about its production, and to what cauſe its continuation is owing.

Motion, *for the general laws of*, ſee *Laws of* NATURE.

Motion, *quantity of*, *whether always the ſame?* The CARTESIANS maintain, that the Creator at the beginning impreſſed a certain quantity of *motion* on bodies; and that under ſuch laws, as that no part of it ſhould be loſt, but the ſame portion of *motion* ſhould be conſtantly preſerved in matter: and hence they conclude, that if any moving body ſtrike on any other body, the former loſes no more of its *motion* than it communicates to the latter.

This principle ſir Iſaac Newton overturns in the following words: “From the various compoſitions of two *motions*, it is manifeſt there is not always the ſame quantity of *motion* in the world; for if two balls, joined together by a ſlender wire, revolve with an uniform *motion* about their common centre of gravity, and at the ſame time that centre be carried uniformly in a right line drawn in the plane of their circular *motion*, the ſum of the *motions* of the two balls as often they are in a right line, drawn from their common centre of gravity, will be greater than the ſum of their *motions* when they are in a line perpendicular to that other. Whence it appears, that *motion* may be both generated and loſt. But by reaſon of the tenacity of fluid bodies, and the friction of their parts, with the weakneſs of the elaſtic power in ſolid bodies, nature ſeems to incline much rather to the deſtruction than the production of *motion*; and in reality, *motion* becomes continually leſs and leſs. For bodies which are either ſo perfectly hard, or ſo ſoft, as to have no elaſtic power, will not rebound from each other: their impenetrability will only ſtop their *motion*. And if two ſuch bodies, equal to each other, be carried with equal, but oppoſite *motions*, ſo as to meet in a void ſpace, by the laws of *motion* they muſt ſtop in the very place of concourſe, loſe all their *motion*, and be at reſt for ever; unleſs they have an elaſtic power to give them a new *motion*. If they have elaſticity enough to enable them to rebound with $\frac{1}{4}$, or $\frac{1}{2}$, or $\frac{3}{4}$, of the force wherewith they meet, they will loſe $\frac{3}{4}$, or $\frac{1}{2}$, or

$\frac{1}{4}$, of their *motion*. And this is confirmed by experiments: for if two equal pendulums be let fall from equal heights, ſo as to ſtrike full on each other; if thoſe pendulums be of lead, or ſoft clay, they will loſe all, or almoſt all their *motion*; and if they be of any elaſtic matter, they will only retain ſo much *motion* as they receive from their elaſtic power." If it be aſked, how it happens, that *motion* being thus continually loſt, ſhould be continually renewed again: the ſame author adds, that it is renewed from ſome active principles, "Such as the cauſe of gravity, whereby the planets and comets preſerve their *motions* in their orbits, and all bodies acquire a great degree of *motion* in falling; and the cauſe of fermentation, whereby the heart and blood of animals preſerve a perpetual warmth and *motion*; the inner parts of the earth are kept continually warmed; many bodies burn and ſhine; and the ſun himſelf burns and ſhines, and with his light warms and chears all things:" (as alſo from the cauſe of elaſticity, by which bodies reſtore themſelves into their former figures), "for we find but little *motion* in the world, except what plainly flows, either from theſe active principles, or from the command of the willer."

The preſervation of the ſame quantity of *motion* in the univerſe, was a principle laid down univerſally by Des Cartes; but has been found falſe, and holds true only in the ſame direction, which is thus expreſſed by ſir Iſaac Newton: "The quantity of *motion*, which is collected by taking the ſum of the *motions* directed towards the ſame parts, and the difference of thoſe that are directed to contrary parts, ſuffer no change from the action of bodies among themſelves." Newt. Princip. lib. i. See ante.

Some philoſophers, after Des Cartes, have ſuppoſed the preſervation of the ſame force or *vis viva*. See the articles Force and Vis *viva*.

But this holds only in elaſtic bodies, when there is a ſhock; and hence thoſe philoſophers have been led to maintain, that all bodies were elaſtic, at leaſt in their elements, and that an inflexible body was impoſſible, being repugnant to the law of continuity. See Continuity.

Motion, *as to the continuation of*, or the cauſe why a body once in *motion* comes to perſevere in it: this has been extremely controverted among phyſical writers: and yet it follows very evidently, from one of the grand *laws of* Nature; viz. that all bodies perſevere in their preſent ſtate, whether of reſt or *motion*, unleſs diſturbed by ſome foreign powers. *Motion*, therefore, once begun, would be continued *in infinitum*, were it to meet with no interruption from external cauſes; as the power of gravity, the reſiſtance of the medium, &c. So that Ariſtotle's principle, every thing in *motion* affects reſt, is groundleſs. Nor has the communication *of motion*, or the manner how a moving body comes to affect another at reſt, or how much of its *motion* is communicated by the firſt to the laſt, been leſs diſputed. See the laws thereof under the word Percussion.

Motion, we have obſerved, is the ſubject of mechanics: and mechanics is the baſis of all natural philoſophy, which hence becomes denominated *mechanical*.

In effect, all the phenomena of nature, all the changes that happen in the ſyſtem of bodies, are owing to *motion*; and are directed according to the laws thereof.

Hence, the modern philoſophers have applied themſelves with peculiar ardour to conſider the doctrine of *motion*; to inveſtigate the properties, laws, &c. thereof; by obſervation, experiment, and the uſe of geometry. And to this we owe the great advantages of the modern philoſophy above that of the ancients; who were extremely diſregardful of *motion*; notwithſtanding that they ſeemed ſo ſenſible of its importance, that they defined nature by the firſt principle of *motion*; and reſt of the ſubſtance wherein it is.

Among all the ancients there is nothing extant on *motion*, excepting ſome things in Archimedes's books, De Æquiponderantibus. To Galileo a great part of the doctrine of *motion* is owing; he firſt diſcovered the general laws of *motion*, and particularly of the deſcent of heavy bodies, both at liberty and on inclined planes; the laws of the *motion* of projectiles; the vibrations of pendulums, and ſtretched chords, with the theory of reſiſtances, &c. which were things the ancients had little notion of.

His diſciple, Torricelli, poliſhed and improved the diſcoveries of his maſter; and added to them divers experiments concerning the force of percuſſion, and the equilibrium of fluids. M. Huygens improved very conſiderably on the doctrine of the pendulum; and both he and Borelli on the force of percuſſion. Laſtly, Newton, Leibnitz, Varignon, Mariotte, &c. have brought the doctrine of *motion* ſtill much nearer to perfection.

The general laws of *motion* were firſt brought into a ſyſtem, and analytically demonſtrated together, by Dr. Wallis, ſir Chriſtopher Wren, and Mr. Huygens, all much about the ſame time: the firſt in bodies not elaſtic, and the two laſt in elaſtic bodies. Laſtly, the whole doctrine of *motion*, including all the diſcoveries both of the ancients and moderns on that head, was given by Dr. Wallis in his Mechanica, ſive de Motu, publiſhed in 1670.

Motion may be conſidered either as *equable*, and *uniform*; or as *accelerated*, and *retarded*. *Equable motion*, again, may be conſidered either as *ſimple*, or as *compound*; and *compound motion* either as *rectilinear*, or as *curvilinear*.

And all theſe, again, may be conſidered either with regard to themſelves, or with regard to the manner of their production, and communication, by percuſſion, &c.

Motion, *equable*, is that wherein the moving body proceeds with the ſame unintermitting velocity.

The laws of *equable motion* are as follow: the reader being only to obſerve, by the way, that *maſs*, or quantity of matter, is expreſſed by M; *momentum*, or the quantity of *motion* or impetus, by I; *time*, or the duration of *motion*, by T; *velocity*, or its ſwitneſs, by V; and *ſpace*, or the line it deſcribes, by S.

Thus, if the ſpace be $= s$, and the time $= t$; the velocity will be expreſſed by $\frac{s}{t}$. And if the velocity $= v$, and the maſs $= m$; the momentum will likewiſe be $= vm$.

Motion, *laws of uniform or equable*. 1. The velocities V and v of two bodies, moving equably, are in a ratio compounded of the direct ratio of the ſpaces S and s and the reciprocal ratio of the times T and t.

$$\text{For } V = \frac{S}{T}, \text{ and } v = \frac{s}{t}:$$

$$\text{Therefore, } V : v :: \frac{S}{T} : \frac{s}{t}.$$

And $V : v :: St : sT$: conſequently $VsT = vSt$.

This, and the following theorems, may be illuſtrated in numbers, thus: ſuppoſe a body A, whoſe maſs is as 7, that is 7 pounds, in the time of 3 ſeconds, paſſes over a ſpace of 12 feet; and another body B, whoſe maſs is as 5, in the time of 8 ſeconds, paſſes over a ſpace of 16 feet: we ſhall then have $M = 7$, $T = 3$, $S = 12$, $m = 5$, $t = 8$, $s = 16$. And therefore $V = 4$, $v = 2$. The caſe then will ſtand thus:

$$V : v :: St : sT.$$
$$4 : 2 :: 12 \times 8 : 16 \times 3 :: 4 : 2.$$

Hence, if $V = v$, then will $St = sT$; therefore $S : s :: T : t$. That is, if two bodies move equably, and with the ſame velocities, their ſpaces are as the times.

The corollaries may be illuſtrated by numbers, in like like manner as the theorems. Thus, ſuppoſe $S = 12$, $T = 6$, $s = 8$, $t = 4$. Then will $V = \frac{12}{6} = 2$, and $v = \frac{8}{4} = 2$.

$$\text{Conſequently } V \text{ being } = v$$
$$S : s :: T : t$$
$$12 : 8 :: 6 : 4.$$

If $T = t$, $S : s :: V : v$: i. e. the ſpaces will be as the velocities.

If $V = v$, and alſo $t = T$, then will $S = s$; and ſo the bodies, moving equably, will deſcribe equal ſpaces in equal times.

2. The ſpaces S and s, over which two bodies paſs, are in a ratio compounded of the ratio of the times T and t, and of the velocities V and v.

$$\text{For } V : v :: St : sT$$
$$\text{Therefore } VsT = vSt$$
$$\text{And } S : s :: VT : vt.$$

In numbers, $12 : 16 :: 4 \times 3 : 2 \times 8 :: 12 : 16$.

Hence, if $S = s$, $VT = vt$, ſo that $V : v :: t : T$. That is, if two bodies, moving equably, deſcribe equal ſpaces; their velocities will be in a reciprocal ratio of their times. In numbers, if we ſuppoſe $S = 12$, and $s = 12$. Becauſe $S = VT$ and $s = vt$; if $V = 2$ and $v = 3$, $T = 6$ and $t = 4$.

$$\text{So that we have } V : v :: t : T$$
$$2 : 3 :: 4 : 6.$$

Farther, if $t = T$, then will $V = v$; and therefore bodies which move equably, deſcribe equal ſpaces in equal times, and have their velocities equal.

If $V : v :: T : t$; then $Vt = vT$; and multiplying the equal quantities VsT and vSt, by Tt, and dividing the products by Vt and vT, we ſhall have $sTT = Stt$: and $S : s :: TT : tt$, or the ſpaces as the ſquares of the times.

3. The momenta, or quantities of *motion*, of two bodies, moving equably, I and i, are in a ratio compounded of the velocities V and v, and the maſſes or quantities of matter M and m.

For $I = VM$, and $i = vm$; therefore $I : i :: VM : vm$: that is, the ratio I to i is compounded of the ratio of V to v, and of M to m.

If $I = i$, then will $VM = vm$; and therefore $V : v :: m : M$. That is, if the momenta of two bodies, moving equably, be equal; the velocities will be in a reciprocal ratio of their maſſes.

And therefore if $M = m$, $V = v$; that is, if the momenta and maſſes of two moving bodies be equal; their velocities are alſo equal.

4. The velocities V and v of two bodies, moving equably, are in a ratio compounded of the direct ratio of their momenta I and i, and the reciprocal one of their maſſes M and m.

$$\begin{array}{c} \text{Since } I : i :: VM : vm \\ I\,vm = i\,VM \\ \text{Therefore } V : v = Im : iM. \end{array}$$

In numbers, $4 : 2 :: 28 \times 5 : 10 \times 7 :: 4 \times 1 : 2 \times 1 :: 4 : 2$.

Hence, if $V = v$, then $Im = iM$; and therefore $I : i = M : m$; that is, if two bodies move equably, and with the ſame velocity, their momenta will be in the ſame ratio with their maſſes. If $M = m$, $I = i$; and therefore if two bodies that have the ſame maſſes, move equably, and with equal velocity, their momenta are equal.

5. In an equable *motion*, the maſſes of the bodies M and m are in a ratio compounded of the direct ratio of their momenta, and the reciprocal ratio of their velocities V and v.

$$\begin{array}{c} \text{For, ſince } I : i :: VM : vm \\ I\,vm = i\,VM \\ \hline \text{Therefore } M : m = Iv : iV. \end{array}$$

In numbers, $7 : 5 :: 28 \times 2 : 10 \times 4 :: 7 \times 1 : 5 \times 1 :: 7 : 5$.

If $M = m$, then will $Iv = iV$; and therefore $I : i = V : v$. That is, if two bodies, moving equably, have their maſſes equal, their momenta will be as their velocities.

In numbers, ſuppoſe $I = 12$, $i = 8$, $M = 4$, $m = 4$; then will $V = \frac{12}{4} = 3$, and $v = \frac{8}{4} = 2$

$$\begin{array}{c} \text{Therefore } I : i :: V : v. \\ 12 : 8 :: 3 : 2. \end{array}$$

6. In an equable *motion*, the momenta I and i are in a ratio compounded of the direct ratios of the maſſes M and m, and the ſpaces S and s, and the reciprocal ratio of the times T and t.

$$\begin{array}{c} \text{For becauſe } V : v :: St : sT \\ \text{And } I : i :: VM : vm \\ \hline \text{Therefore } VI : vi :: VMSt : vmsT \\ \hline \text{And } I : i :: MSt : msT. \end{array}$$

Hence, if $I = i$, then will $MSt = msT$; and therefore $M : m :: sT : St$, $S : s :: mT : Mt$, and $T : t :: MS : ms$; that is, if two bodies, moving equably, have their momenta equal, 1. Their maſſes are in a ratio compounded of the direct ratios of the times, and the reciprocal one of their ſpaces. 2. Their ſpaces are in a ratio compounded of the direct ratio of the times, and the reciprocal one of their maſſes. 3. Their times are in a ratio compounded of their maſſes, and their ſpaces.

Farther, if $M = m$; then will $sT = St$; and therefore $S : s = T : t$; that is, if two bodies, moving equably, have their momenta and their maſſes equal, their ſpaces are as their times.

Again, if $T = t$, then will $S = s$. The two moving bodies therefore, whoſe maſſes and momenta are equal, deſcribe equal ſpaces in equal times.

If beſides $I = i$, $S = s$, then will $mT = Mt$; and therefore $M : m :: T : t$; that is, if two moving bodies, whoſe momenta are equal, paſs over equal ſpaces, their maſſes are proportionable to their times.

Farther, if $T = t$, then will $M = m$; and therefore bodies, whoſe momenta are equal, and which, moving equably, deſcribe equal ſpaces in equal times, have their maſſes equal.

If beſides $I = i$, $T = t$; then will $MS = ms$; and therefore $S : s :: m : M$; that is, the ſpaces paſſed over in the ſame time, by two moving bodies, whoſe momenta are equal, are in a reciprocal ratio of their maſſes.

7. In an equable *motion*, the ſpaces S and s are in a ratio compounded of the direct ratios of the momenta I and i, and times T and t; and the reciprocal one of the maſſes M and m.

$$\begin{array}{c} \text{For becauſe } I : i :: MSt : msT, \\ \hline ImsT = iMSt. \\ \text{Wherefore } S : s :: ITm : itM. \end{array}$$

In numbers, $12 : 16 :: 3 \times 28 \times 5 : 8 \times 10 \times 7 :: 3 \times 4 \times 1 : 8 \times 2 \times 1 :: 12 : 16$.

Hence, if $S = s$, $ITm = itM$; and therefore $I : i :: tM : Tm$, $M : m :: IT : it$, $T : t :: iM : Im$. If two bodies therefore move equably over equal ſpaces, 1. Their momenta will be in a ratio compounded of the direct ratio of the maſſes, and the reciprocal one of the times. 2. Their maſſes will be in a ratio compounded of the momenta, and the times. 3. The times will be in a ratio compounded of the direct ratio of the maſſes, and the reciprocal one of the momenta.

If beſide $S = s$, $M = m$; then will $IT = it$; and therefore $I : i :: t : T$. That is, bodies whoſe maſſes are equal, have their momenta reciprocally proportionable to the times in which they move over equal ſpaces.

If beſides $S = s$, $T = t$; then will $iM = Im$; and $I : i :: M : m$; and therefore two bodies moving equably, and through equal ſpaces in equal times, have their momenta proportionable to their maſſes.

8. Two bodies, moving equably, have their maſſes M and m, in a ratio compounded of the direct ratios of the momenta I and i, and the times T and t, and the reciprocal one of the ſpaces s and S.

$$\begin{array}{l} \text{For becauſe } I : i :: MSt : msT,\ ImsT = iMSt. \\ \text{Wherefore } M : m :: ITs : itS. \end{array}$$

In numbers, $7 : 5 :: 3 \times 28 \times 16 : 8 \times 10 \times 12 :: 3 \times 7 \times 2 : 1 \times 10 \times 3 :: 7 : 5$.

Hence, if $M = m$, then will $ITs = itS$; and therefore, $I : i :: tS : Ts$, $S : s :: IT : it$, and $T : t :: iS : Is$. That is, in two moving bodies, whoſe maſſes are equal; 1. The momenta are in a ratio compounded of the direct ratio of the ſpaces, and the reciprocal one of the times. 2. The ſpaces are in a ratio compounded of the momenta and the times. 3. The times are in a ratio compounded of the direct ratio of the ſpaces, and the reciprocal one of the momenta. If beſide $M = m$, $T = t$, then will $iS = Is$; and therefore $I : i :: S : s$. That is, the momenta of two bodies, whoſe maſſes are equal, are proportional to the ſpaces paſſed over in equal times.

9. In equable *motions*, the times T and t are in a ratio compounded of the direct ratios of the maſſes M and m, and the ſpaces S and s, and the reciprocal one of the momenta I and i.

$$\begin{array}{l} \text{For becauſe } I : i :: MSt : msT,\ ImsT = iMSt. \\ \text{Wherefore } T : t :: iMS : Ims. \end{array}$$

Hence, if $T = t$, $iMS = Ims$, and therefore $I : i :: MS : ms$, $M : m :: Is : iS$; and $S : s :: Im : iM$. That is, if two bodies, moving equably, deſcribe equal ſpaces in equal times; 1. Their momenta will be in a ratio compounded of the maſſes, and the ſpaces. 2. Their maſſes will be in a ratio compounded of the direct ratio of the momenta, and the reciprocal one of the ſpaces. 3. The ſpaces will he in a ratio compounded of the direct ratio of the momenta, and the reciprocal one of the maſſes.

Motion, *accelerated*, is that which continually receives freſh acceſſions of velocity. It is ſaid to be *uniformly accelerated*, when in equal times its acceſſions of velocity are equal.

Motion, *retarded*, is that whoſe velocity continually decreaſes. It is ſaid to be *uniformly retarded*, when its decreaſe is continually proportional to the time.

Motion, *laws of*, *uniformly accelerated and retarded*. It is an axiom, that a body once at reſt will never move, unleſs ſome other body put it in *motion*: and when once in *motion*, it will continue for ever to move with the ſame velocity, and in the ſame direction, unleſs it be forced from its ſtate by ſome other cauſe. This is evident from that fundamental axiom in philoſophy, that nothing happens without a ſufficient cauſe.

It follows, that a body, moved by one only impulſe, muſt proceed in a right line. If then it be carried in a curve, it muſt be acted on by a double power; one, whereby it would proceed in a right line; another, whereby it is continually drawn out of it.

If the action and re-action of two *(unelaſtic)* bodies be equal, there will no *motion* enſue; but the bodies, after colliſon, will remain at reſt, by each other.

If a moving body be impelled in the direction of its *motion*, it will be accelerated; if by a reſiſting force, it will be retarded. Heavy bodies deſcend with an accelerated *motion*.

10. If a body move with an uniform accelerated velocity, the ſpaces will be in a duplicate ratio of the times.

For, let the velocity acquired in the time t be $= v$, then will the velocity acquired in the time $2t = 2v$, in the time $3t = 3v$, &c. and the ſpaces correſponding to thoſe times, t, $2t$, $3t$, &c. will be as vt, $4vt$, $9tv$, &c. The ſpaces therefore are as 1. 4. 9. &c. and the times as 1. 2. 3. &c. that is, the ſpaces are in a duplicate ratio of the times. Hence, in a *motion* uniformly accelerated, the times are in a ſubduplicate ratio of the ſpaces.

11. The ſpaces paſſed over by a body uniformly accelerated, increaſe, in equal times, according to the unequal numbers 1. 3. 5. 7. &c.

For, if the times wherein a moving body, equably accelerated, proceeds, be as 1. 2. 3. 4. 5. &c. the ſpace paſſed over in one moment, will be as 1, in 2 moments as 4, in 3 as 9, in 4 as 16, in 5 as 25, &c. *(Law* 10). If therefore you ſubtract the ſpace paſſed over in one moment, viz. 1. from that paſſed over in two moments, 4. there will remain the ſpace correſponding to the ſecond moment, viz. 3. In the ſame manner may be found the ſpace paſſed over in the third moment, $9-4=5$. The ſpace correſponding to the fourth moment, $16-9=7$; and ſo of the reſt. The ſpace of the firſt moment, therefore, is as 1, that of the ſecond as 3, that of the third as 5, of the fourth as 7, of the fifth as 9, &c. Therefore the ſpaces paſſed over by a body, moving with an uniformly accelerated *motion* in equal times, increaſe according to the unequal numbers, 1, 3, 5, 7, 9, &c.

12. The ſpaces paſſed over by a body equably accelerated are in a duplicate ratio of the velocities.

For, ſuppoſing the velocities to be V and v, the times T and t, and the ſpaces S and s; then will $V : v :: T : t$. Wherefore, ſince $S : s :: T^2 : t^2$, (*Law* 10.) $S : s :: V^2 : v^2$.

Wherefore, in a *motion* uniformly accelerated, the velocities are in a ſubduplicate ratio of the ſpaces.

13. Heavy bodies deſcend with an uniformly accelerated *motion*, in a medium void of reſiſtance, if the ſpaces be not very great. For, ſince heavy bodies deſcend with an accelerated velocity, the power of gravity muſt continually impel them. But the power of gravity is found the ſame at all diſtances from the earth where the experiment can be made. Therefore heavy bodies muſt be driven downwards in the ſame manner in equal times. If then, in the firſt moment of time, they be impelled with the velocity v, they will be impelled with the ſame velocity v in the ſecond moment, and with the ſame in the third, fourth, &c. moments. Now the medium being ſuppoſed void of all reſiſtance (by *Hypoth.*) they will ſtill retain the velocity they acquire; and by reaſon of their equal freſh acquiſitions every minute, they will deſcend with a *motion* uniformly accelerated.

Hence, the ſpaces of deſcent are in a duplicate ratio of their times, and alſo of their velocities, and the increaſe according to the uneven numbers 1, 3, 5, 7, 9, &c.

The times, and likewiſe the velocities, are in a ſubduplicate ratio of the ſpaces. See the laws of accelerated *motion*, otherwiſe illuſtrated and evinced under ACCELERATION, and *Laws of the* DESCENT *of bodies*.

14. If a heavy body fall through a medium void of reſiſtance, and from a height not very great; the ſpace it paſſes over is the ſubduple of that which it would paſs over by an uniform *motion* in the ſame time, with the velocity it has acquired at the end of its fall.

For, let the right line AB (*Tab.* V. *Mechanics*, *fig.* 74.) repreſent the whole time of a heavy body's deſcent; and let this be divided into any number of equal parts; to the abſciſſes AP, AQ, AS, AB, draw the right lines PM, QI, SH, BC, which may be as the velocities acquired, in thoſe times, in the deſcent. Since then $AP : AQ :: PM : QI$, $AP : AS :: PM : SH$, &c. (Eucl. VI. 2.) If then the altitude of the triangle ABC be conceived to be divided into equal parts infinitely ſmall; the *motion* being uniform in a moment of time infinitely ſmall; the little area $PpMm = Pp \times PM$ may be conſidered as the ſpace paſſed over in the little moment of time Pp. Therefore the ſpace paſſed over in the time AB, will be as the ſum of all the little areas, i. e. as the triangle ABC. But the ſpace that would he deſcribed in the ſame time AB with the uniform velocity BC, being as the rectangle ABCD, it will be to the other ſpace as 2 to 1. (Eucl. I. 41).

Hence the ſpace paſſed over in half the time AB, with the velocity BC, is equal to the ſpace which the heavy body paſſes over from a ſtate of reſt in the whole time AB.

Hence, alſo, the time wherein a heavy body falls from any given altitude being given; it is eaſy to determine the ſpaces it paſſes over in each part of that time. For the method of doing this, ſee *Laws of the* DESCENT *of bodies*.

15. If a body proceed with a *motion* uniformly retarded, it will paſs over half the ſpace which it would deſcribe in the ſame time by an equable *motion*.

For, ſuppoſe the given time divided into any number of equal parts; and draw the right lines BC, SH, QI, PM, thereto, which are to be as the velocities correſponding to the parts of time, BS, BQ, BP, BA; ſo as letting fall the perpendiculars HE, IF, MG, the right lines CE, CF, CG, CB, may be as the velocities loſt in the times, HE, FI, GM, AB; that is, BS, BQ, BF, BA. Since $CE : CF :: EH : FI$, $CG : CB :: GM : BA$, ABC will be a triangle (Eucl. III. 17). If Bb, therefore, be a moment of time infinitely ſmall, its *motion* will be uniform; and therefore the ſpace deſcribed by the moving body will be as the little area $BbcC$. The ſpace, therefore, deſcribed in the time AB is as the triangle ABC: viz. as the ſum of all the little areas $BbcC$. Now the ſpace deſcribed by the body moving uniformly with the velocity BC in the time AB, is as the rectangle ABCD: therefore the former is half of this (Eucl. I. 41.)

16. The ſpaces deſcribed by a *motion* uniformly retarded, in equal times, decreaſe according to the unequal numbers 7, 5, 3, 1.

For, ſuppoſing the moving body in the firſt inſtant of time to paſs over ſeven feet; I ſay, that in the ſecond, if it be equally retarded, it will paſs over 5; in the third, 3; and in the fourth, 1. For, let the equal parts of the axis of the triangle BS, SQ, QP, PA, be as the times; the ſemi-ordinates BC, SH, QI, PM, as the velocities at the beginning of any time; the trapezia BSHC, SQIH, QPMI, and the triangle PAM, as the ſpaces deſcribed in thoſe times. Let then $BC=4$, and $BS=SQ=QP=PA=1$. Then will $SH=3$, $QI=2$, $PM=1$, (*Law* 13.) $BSHC=(4+3)\,1:2=\frac{7}{2}$. $SQIH=(3+2)\,1:2=\frac{5}{2}$. $QPMI=(2+1)\,1:2=\frac{3}{2}$ $PAM=\frac{1}{2}$. Conſequently the ſpaces deſcribed in equal times are as $\frac{7}{2}$. $\frac{5}{2}$. $\frac{3}{2}$, $\frac{1}{2}$, that is as 7, 5, 3, 1.

For the cauſe, &c. of the acceleration of MOTION, ſee GRAVITY, and ACCELERATION.

For the cauſe, &c. of the retardation, ſee RESISTANCE, and RETARDATION.

The laws wherein MOTION *is communicated* by the colliſion and percuſſion of bodies, are very different, as the bodies are either *elaſtic* or *unelaſtic*, and as the direction of the ſtroke is either *oblique* or *direct*. See PERCUSSION.

MOTION, *ſimple*, is that produced by ſome one power.

MOTION, *compound*, is that produced by ſeveral conſpiring powers. See COMPOUND, and COMPOSITION *of motion*. Powers are ſaid to *conſpire*, when the direction of the one is not oppoſite to that of the other; as when the radius of a circle is imagined to whirl round on its centre, and a point in the ſame radius is at the ſame time ſuppoſed impelled ſtraight along it.

All *curvilinear motion* is compound; as all ſimple *motion* is rectilinear.

17. If a moving body (*Tab. Mechanics*, *fig.* 26.) be acted on by a double power; the one according to the direction AB, the other according to AC; with the *motion* compounded thereof, it will deſcribe the diagonal of a parallelogram AD; whoſe ſides AB and AC it would have deſcribed in the ſame time with each of the reſpective powers apart.

For, if the body A were only acted on by the force impreſſed along AB; in the firſt inſtant of time it would be in ſome point of the right line AB, as in H, and ſo in the line HL parallel to AC; if it were only acted on by the power impreſſed in the direction AC, it would in the ſame inſtant of time be in ſome point of the line AC, as in I, and ſo in the line IL parallel to AB. But ſince the directions of the powers are not oppoſite to each other, neither of them can impede the other; and therefore the body in the ſame inſtant of time will arrive both at the lines HL and IL; and will conſequently be in the point L, where the two meet. In the ſame manner it appears, that if KM and MG be drawn parallel to AB and AC, the body in the ſecond inſtant of time will be in M, and at length in D. Q. E. D.

This important law of *motion* may be further illuſtrated by ſuppoſing the ſpace EFGH, *Tab.* V. *Mechanics*, *fig.* 75. to be carried uniformly forward in the direction AB, and with a velocity repreſented by AB. Let a *motion* in the direction AD, and meaſured by the right line AD, be impreſſed upon the body A in the ſpace EFGH. To thoſe who are in this ſpace, the body A will appear to move in the right line AD; but its real or abſolute *motion* will be in the diagonal AC of the parallelogram ABCD; and it will deſcribe AC in the ſame time that the ſpace by its uniform *motion*, or any point of it, is carried over a right line equal to AB, or that the body A, by its *motion* acroſs the ſpace, deſcribes AD. For it is manifeſt, that the line AD, in conſequence of the *motion* of the ſpace, is carried into the ſituation BC, and the point D to C; ſo that the body A really moves in the diagonal AC. This law may alſo be confirmed by an experiment in the following manner: let there be a wooden ſquare ABCD, *fig.* 76. ſo contrived, as to have the part BEFC made to draw out or puſh into the ſquare at pleaſure. To this part let the pulley H be joined, ſo as to turn freely on an axis, which will be at H when the piece is puſhed in, and at *h* when it is drawn out. To this part let the ends of a ſtraight wire *k* be fixed, ſo as to move along with it, under the pulley; and let the ball G be made to ſlide eaſily on the wire. A thread *m* is fixed to this ball, and goes over the pulley to I: by this thread the ball may be drawn up on the wire, parallel to the ſide AD, when the part BEFC is puſhed as far as it will go into the ſquare. But, if this part be drawn out, it will carry the ball along with it, parallel to the bottom of the ſquare DC. By this means, the ball G may either be drawn perpendicularly upward by pulling the thread *m*, or moved horizontally along by pulling out the part BEFC, in equal times, and through equal ſpaces: each power acting equably and ſeparately upon it. But if, when the ball is at G, the upper end of the thread be tied to the pin I, in the corner A of the fixed ſquare, and the moveable part BEFG be drawn out, the ball will then be acted upon by both the powers together: for it will be drawn up by the thread towards the top of the ſquare, and, at the ſame time carried with its wire *k* towards its right hand B C, moving all the while in the diagonal line L; and will be found at *g* when the ſliding part is drawn out as far as it was before; which then will have cauſed the thread to draw up the ball to the top of the inſide of the ſquare, juſt as high as it was before, when drawn up ſingly by the thread without moving the ſliding part.

The converſe of this law is, that the *motion* in the diagonal A C, *fig.* 75. may be reſolved into the *motions* in the ſides of the parallelogram A B and A D. For it is manifeſt that if A K, *fig.* 77. be taken equal to A D with an oppoſite direction, and the parallelogram A K B C be completed, the right line A B ſhall be the diagonal of this parallelogram; conſequently, the *motion* A C compounded with the *motion* A K equal and oppoſite to the *motion* A D, produces the *motion* A B; that is, if from the *motion* A C, in the diagonal, you ſubduct the *motion* A D in one of the ſides, there will remain the *motion* A B in the other ſide of the parallelogram A B C D.

This doctrine will receive farther illuſtration by reſolving each of the *motions* A B and A D into two *motions*, one in the direction of the diagonal A C, and the other in the direction perpendicular to it; that is by reſolving (*Tab.* III. *Mechanics*, *fig.* 39.) the *motion* A B into the *motions* A M and A N, and *motion* A D into the *motions* A K and A L. For the triangles A D K and B C M being equal and ſimilar, D K is equal to B M, or A L to A N; ſo that the *motions* A L and A N, being equal and oppoſite, deſtroy each other's effect: and it being an obvious and general principle, that the *motion* of a body in a right line is no way affected by any two equal powers or *motions* that act in directions perpendicular to that line, and oppoſite to each other, it thus appears how the body A is determined to move in the diagonal A C; and becauſe A K is equal to M C, it appears how the remaining *motions* A M and A K are accumulated in the direction A C, ſo as to produce a *motion* meaſured by A C. It appears likewiſe how abſolute *motion* is loſt in the compoſition of *motion*; for the parts of the *motions* A B and A D that are repreſented by A N and A L, being equal and oppoſite, deſtroy each other's effect, and the other parts A M and A K, only, remain in the direction of the compounded *motion* A C: while, on the contrary, in the reſolution of *motion*, the quantity of abſolute *motion* is increaſed, the ſum of the *motions* A B and A D, or B C, being greater than the *motion* A C. But the ſum of the *motions*, eſtimated in a given direction, is no way affected by the compoſition or reſolution of *motion*, or indeed by any actions or influences of bodies upon each other, that are equal and mutual and have oppoſite directions.

For ſuppoſe that (*Tab.* V. *Mechanics*, *fig.* 78.) the *motions* are to be eſtimated in the direction A P; let C P, B R, D Q, be perpendicular to this direction in the points P, R, and Q; then the *motions* A C, A B, A D, reduced to the direction A P, are to be eſtimated by A P, A R, and A Q reſpectively, the parts which are perpendicular to A P having no effect in that direction. Let A P meet B C in S; then becauſe R P is to S P, as B C (or A D) to C S, that is, as A Q to S P, it follows that A Q is equal to R P, and that A R + A Q is equal to A P; that is, that the ſum of the *motions* A B and A D, reduced to any given direction A P, is equal to the compounded *motion* A C reduced to the ſame direction. From which it is obvious, that, in general, when any number of *motions* are compounded together, or are reſolved, the ſum of their *motions* continues invariably the ſame, till ſome foreign influence affects them.

From the above reaſoning it is plain that ſince about every right line, as A D, (*Tab. Mechan. fig.* 26.) a parallelogram, as A B C D, may be conſtructed, by making two equal triangles A C D and A B D, on one common baſe A D; every *rectilinear motion*, when it may be of ſervice for the demonſtration, may be conſidered as a *compound* one. But as the proportion of the ſides A C and C D may be various, ſo alſo may the right line A D be deſcribed by a *motion* compounded various ways; and therefore the ſame rectilinear *motion* may be reduced to various compound *motions*.

Hence, if a moveable body be drawn by three ſeveral powers, according to the directions B A, A D, and A C, (*Tab.* V. *Mechanics*, *fig.* 79.) two of which taken together are equivalent to the third; they will be to each other as the right lines D C, D A, D B, parallel to their directions; that is, reciprocally as the ſines of the angles included beween the lines of their directions, and the line of direction of the third: D B being to A D as the ſine of the angle B A D to the ſine of the angle A B D.

19. In an equable compound *motion*, the velocity produced by the conſpiring powers is, to the velocity of each of the two apart, as the diagonal A D (*fig.* 26.) of the parallelogram A B D C, in the direction of whoſe ſides they act, to either of thoſe ſides A B or A C.

For in the ſame time that one of the powers will carry it over the ſide of the parallelogram A B, and the other over A C ſeparately, joined together they carry it over the diagonal A D. The diagonal A D, therefore, is the ſpace deſcribed by the conſpiring powers in the ſame time: but in an equable *motion* the velocities in the ſame time are as the ſpaces: the velocities therefore ariſing from the conſpiring forces are to the velocity ariſing from either force, as A D to A B or A C.

Hence the conſpiring forces thereof being given; i. e. the ratio of the velocities being given by the lines A B and A C given in magnitude, and the direction through thoſe lines being given in poſition, or by the angle of direction; the celerity and direction of the oblique *motion* is given; becauſe the diagonal is given both in magnitude and poſition.

The oblique *motion* however being given, the ſimple ones are not, *vice verſa*, given; becauſe the ſame oblique *motion* may be compouuded of various ſimple ones.

20. In a compound *motion* produced by the ſame forces, the velocity is greater, if the angle of direction be leſs; and leſs, if this be greater.

For let the greater angle of direction be B A C (*Tab.* V. *Mechanics*, *fig.* 80.) the leſs F A C; ſince the powers are ſuppoſed the ſame, A C will be common to each parallelogram A F C E and B A C D, and beſides A B = A F. Now it is evident, that, in the caſe of the greater angle, the diagonal A D is deſcribed; and, in the caſe of the leſs angle, A E: and both in the ſame time, becauſe A B = A F. The velocities, therefore, are as A D to A E: wherefore ſince A D is leſs then A E, the velocity in the caſe of the greater angle is leſs than that of the leſs angle.

Hence, ſince the legs A C and C E, with the included angle, being given, the angle C E A, and thence, alſo, A E, is found; the velocity of the conſpiring powers, and the angle of direction, in any particular caſe, being given, the velocity of the compound *motion*, and conſequently the ratio of the velocities produced by the ſame powers under different angles of directions, may be determined.

For the partitular laws of MOTION, *ariſing from the colliſion of bodies both* elaſtic *and* unelaſtic, *and that where the directions are both* perpendicular *and* oblique, ſee PERCUSSION.

For circular MOTION, *and the laws of* projectiles, ſee PROJECTILE.

For the MOTION *of pendulums, and the laws of* oſcillation, ſee PENDULUM.

MOTION, *altitude of*. See ALTITUDE.

MOTION, *longitude of*. See LONGITUDE.

MOTION, *perpetual*, in *Mechanics*, a *motion* which is ſupplied and renewed from itſelf without the intervention of any external cauſe; or it is an uninterrupted communication of the ſame degree of *motion* from one part of matter to another, in a circle or other curve returning into itſelf, ſo that the ſame momentum ſtill returns undiminiſhed upon the firſt mover.

This celebrated problem of a *perpetual motion* conſiſts in the inventing a machine, which has the principle of its *motion* within itſelf. M. de la Hire has demonſtrated the impoſſibility of any ſuch machine, and finds that it amounts to this; viz. to find a body which is both heavier and lighter at the ſame time; or to find a body, which is heavier than itſelf.

To find a *perpetual motion*, or to conſtruct an engine, &c. which ſhall have ſuch a *motion*, is a famous problem that has employed the mathematicians of two thouſand years; though none perhaps have proſecuted it with attention and earneſtneſs equal to thoſe of the preſent age.

Infinite are the ſchemes, deſigns, plans, engines, wheels, &c. to which this longed-for perpetual *motion* has given birth: it were as endleſs as impertinent to give a detail of them all.

In effect, there ſeems but little in nature to countenance all this aſſiduity and expectation: among all the laws of matter and *motion*, we know of none yet, which ſeem to furniſh any principle or foundation for ſuch an effect.

Action and re-action are allowed to be ever equal; and a body which gives any quantity of *motion* to another, always loſes juſt ſo much of its own; but under the preſent ſtate of things, the reſiſtance of the air, the friction of the parts of machines, &c. do neceſſarily retard every *motion*.

To keep the *motion* on foot, therefore, either, firſt, there muſt be a ſupply from ſome foreign cauſe; which in a perpetual *motion* is excluded.

Or, ſecondly, all reſiſtance from the friction of the parts of matter muſt be removed; which neceſſarily implies a change in the nature of things.

For, by the ſecond *law of* NATURE, the changes made in the *motions* of bodies, are always proportional to the impreſſed moving force, and are produced in the ſame direction with it; no *motion* then can be communicated to any engine, greater than that of the firſt force impreſſed.

But, on our earth, all *motion* is performed in a reſiſting medium, and muſt therefore of neceſſity be retarded; conſequently, a conſiderable quantity of its *motion* will be ſpent on the medium.

Nor is there any engine or machine wherein all friction can be avoided; there being in nature no ſuch thing as exact ſmoothneſs, or perfect congruity; the manner of the coheſion of the parts of bodies, the ſmall proportion the ſolid matter bears to the vacuities between them, and the nature of thoſe conſtituent particles not admitting it. This friction, therefore, will alſo in time ſenſibly diminiſh the impreſſed, or communicated force; ſo that a perpetual *motion* can never follow, unleſs the communicated force be ſo much greater than the generating force, as to recommence the diminution made therein by all theſe cauſes: but *nil dat quod non habet*, and the generating force cannot communicate a greater degree of *motion* than it hath itſelf.

Or, thirdly and laſtly, there muſt be ſome method of gaining a force equivalent to what is loſt, by the artful diſpoſition and combination of mechanic powers; to which laſt point, then, all endeavours are to be directed: but how, or by what means ſuch force ſhould be gained, is ſtill a myſtery!

The multiplication of powers or forces, it is certain, avails nought: for what is gained in power is ſtill loſt in time, ſo that the quantity of *motion* ſtill remains the ſame.

This is an inviolable law of nature; by which nothing is left to art, but the choice of the ſeveral combinations that may produce the ſame effect.

Although it is allowed, that, by the reſolution of force, there is a gain or increaſe of the abſolute quantity of force, as the two forces in the ſides of the parallelogram taken together exceed the force in the diagonal which is reſolved into them, yet you cannot proceed reſolving *motion* in infinitum by any machine whatſoever; but thoſe you have reſolved muſt be again compounded, in order to make a continual movement, and the gain obtained by the reſolution will be loſt again by the compoſition. In like manner, if you ſuppoſe two bodies to be perfectly elaſtic, and that the leſſer bodies ſtrikes the other at reſt, there will be an increaſe of the abſolute quantity of force, becauſe the ſtriking body will be reflected; but if you ſuppoſe them both to turn round any centre, after the ſtroke, ſo as to meet again, this increaſe of force will be loſt, and their *motion* will be reduced to its firſt quantity. Such a gain, therefore, of force, as muſt be afterwards loſt in the actions of the bodies, can never produce a perpetual movement. There are various ways, beſides theſe, by which abſolute force may be gained; but ſince there is always an equal gain in oppoſite directions, and no increaſe obtained in the ſame direction; in the circle of actions neceſſary to make a perpetual movement, this gain muſt be preſently loſt, and will not ſerve for the neceſſary expence of force employed in overcoming friction, and the reſiſtance of the medium. We may obſerve, therefore, that though it could be ſhewn, that in an infinite number of bodies, or in an infinite machine, there could be a gain of force for ever, and a *motion* continued to infinity, it does not follow that a perpetual movement can be made. That which was propoſed by M. Leibnitz in Auguſt, 1690, in the Leipſick acts, as a conſequence of the common eſtimation of the forces of bodies in *motion* is of this kind, and for this and other reaſons ought to be rejected.

The poſſibility of a perpetual *motion* has been urged from the following ſpecious argument. Let the height AB (*Tab.* V. *Mechanics*, *fig.* 81.) be divided into four equal parts A C, C D, D E, E B: ſuppoſe the body A to acquire by the deſcent A C, a velocity as 1; and this *motion*, by any contrivance, to be tranſmitted to an equal body B: then let the body A, by an equal deſcent C D, acquire another degree of motion as 1, to be tranſmitted likewiſe to the ſame body B, which in this manner is ſuppoſed to acquire a *motion* as 2, that is ſufficient to carry it upwards from B to A; and becauſe there yet remain the motions which A acquires by the deſcents D E and E B, that may be ſufficient to keep an engine in *motion*, while B and A aſcend and deſcend by turns, it is hence concluded, that a ſufficient gain of force may be obtained in this manner, ſo as to produce a perpetual movement. But it ſhould be conſidered, that two equal ſucceſſive impulſes, acting upon the ſame body, will not produce a *motion* in it double of that which would be generated by the firſt impulſe; becauſe the ſecond impulſe has neceſſarily a leſs effect upon the body, which is already in *motion*, than the firſt impulſe which acted upon it while at reſt. In like manner, if there is a third and fourth impulſe, the third will have leſs effect than the ſecond, and the fourth leſs than the third. Hence it appears, that a *motion* as 2, in the preceding caſe, cannot be produced in B, by the two ſucceſſive impulſes tranſmitted from A, each of which is as 1. Maclaurin's View, &c. book ii. c. 3. See ORFFYREUS's *wheel*.

MOTION, *animal*, is that whereby the ſituation, figure, magnitude, &c. of the parts, members, &c. of animals are changed.

Under theſe *motions* come all the animal functions; as *reſpiration*, *circulation of the blood*, *excretion*, *walking*, &c. *Animal motions* are uſually divided into two ſpecies; viz. *ſpontaneous*, and *natural*.

MOTION, *ſpontaneous*, or *muſcular*, is that performed by means of the muſcles, at the command of the will; hence alſo called *voluntary motion*. See MUSCULAR *motion*.

MOTION, *natural*, or *involuntary*, is that effected without ſuch command of the will; by the mere mechaniſm of the parts.

Such is the *motion* of the heart and pulſe; the PERISTALTIC *motion* of the inteſtines, &c.

MOTION, *inteſtine*, denotes an agitation of the particles whereof a body conſiſts.

Some philoſophers will have every body, and every particle of a body, in continual *motion*. As for fluids it is the definition they give of them, that their parts are in continual *motion*.

And as to ſolids, they infer the like *motion* from the effluvia continually emitted through their pores.

Hence *inteſtine motion* is repreſented to be a *motion* of the internal and ſmaller parts of matter, continually excited by ſome external, latent agent, which of itſelf is inſenſible, and only diſcovers itſelf by its effects; appointed by nature to be the great inſtrument of the changes in bodies.

MOTION, in *Aſtronomy*, is peculiarly applied to the orderly courſes of the heavenly bodies.

The *motion* of the earth, from weſt to eaſt, is now generally granted among aſtronomers: ſee it proved under the article EARTH.

MOTION, *mean*. See MEAN.

The *motions* of the celeſtial luminaries are of two kinds: *diurnal*, or *common*; and *ſecondary*, or *proper*.

MOTION, *diurnal*, or *primary*, is that wherewith all the heavenly bodies, and the whole mundane ſphere, appear to revolve every day round the earth, from eaſt to weſt. This is alſo called the *motion of the primum mobile*, and the *common motion*; to diſtinguiſh it from that rotation which is peculiar to each planet, &c. It is about the various phenomena reſulting from this *motion*, that aſtronomy is chiefly employed. See DIURNAL.

MOTION, *ſecondary*, or *proper*, is that wherewith a ſtar, planet, or the like, advances a certain ſpace every day from weſt towards eaſt.

See the ſeveral *motions* of each luminary, with the irregularities, &c. thereof, under the proper articles, EARTH, MOON, STAR, &c.

MOTION, *angular*. See ANGULAR.

Horary **MOTION** *of the earth*. See HORARY.

Paracentric **MOTION** *of impetus*. See PARACENTRIC.

MOTION *of trepidation*, &c. See TREPIDATION, and LIBRATION.

MOTION, in *Muſic*, denotes the manner of beating the meaſure, to haſten or ſlacken the time of the words, or notes. See TIME.

The *motion*, in ſongs compoſed in double time, differs from that in thoſe in triple time. It is the *motion* that diſtinguiſhes courants and ſarabands from gavots, borees, chacones, &c.

MOTION, *moto*, or *movimento*, in the *Italian Muſic*, has many ſignifications; ſometimes it means only a *motion* or paſſage from one note to another, at whatſoever diſtance, as a ſecond, third, or any other interval; and is the ſame whether the intermediate degrees (if there are any) be ſounded, or only the extremes of them, as the firſt and laſt ſound of any given interval. Sometimes it regards the quickneſs and ſlowneſs of ſuch *motions*, as a briſk, ſlow, lively, or languid *motion*; and in this ſenſe it is uſed with regard to minuets, gavots, ſarabands, &c. See each article in its proper place.

But the moſt common, and indeed the moſt important acceptation of the word, is with reſpect to HARMONY; thoſe above deſcribed only regarding MELODY.

With regard to harmony, it is the comparing the manner wherein an upper or treble part moves from one ſound to another, with that wherein a lower or baſs-part moves; this is to be done three ways. The firſt is when the upper and lower parts both move the ſame way, either upwards or downwards, and is called *moto retto*. The ſecond is when in comparing the upper with the lower part the one aſcends while the other deſcends, or *è contra*, and hence called *moto contrario*. The laſt is when one of the parts holds out, or continues a ſound, while the other riſes or falls on any note whatſoever; and this is called *moto obliquo*.

Motion, in the *Ancient Muſic*, was uſed to ſignify the tranſition of the voice, from an acute to a grave ſound; or the contrary. This they expreſſed by *κατα τοπον κινεισθαι*. See Locus.

Meibomius tranſlates it, *moveri in loco*.

Motion, is alſo uſed, among *Mechanics*, for the inſide of a watch, &c. more commonly called movement.

Motions, in *War*, denote the marches, countermarches, &c. which an army makes in changing its poſt.

The great ſkill of a general conſiſts in diſcovering the enemies *motions*, and concealing his own. Nothing is more dangerous than to make great *motions* before a powerful enemy, ready to come to blows. See March.

Motion, in the *Manege*. A horſe is ſaid to have a pretty *motion*, when he moves and bends his fore-legs with great eaſe and freedom upon the manege. But if a horſe trots right out and keeps his body ſtraight, and his head high, and bends his fore-legs handſomely, then to ſay he has a pretty *motion* with him, implies the liberty of action of the forehead.

Motion, or Emotion, in *Rhetoric*. See Passion.

Motions, *rhythmical*, a phraſe uſed by Voſſius, and other writers on the ancient rhythm, to expreſs thoſe *motions* which were made uſe of in the Greek and Roman entertainments to convey the ideas of the poet, or to aſſiſt muſic in rouſing the paſſions. Theſe not only had great force when joined with ſounds, but even without any voice or ſound they could move the paſſions in the ſpectator more than many of the beſt orators of the times could do with their moſt laboured diſcourſes.

Roſcius, the ſtage-player ſo famous in their pantomimes, which were all dumb-ſhew, was ſo excellent at expreſſion by theſe *rhythmical motions*, or geſtures, that Cicero and he being cotemporaries, there were many diſputes between them, which could vary the ſame ſentence moſt; the one uſing all the power of words, the other being confined to geſtures alone.

Motion *in court*. In the courts of chancery, king's bench, &c. *motions* are made by barriſters and counſellors at law, for what concerns their clients cauſes; and where any *motion* is made in chancery, that is not of courſe, generally an affidavit of the facts alledged muſt be read in court; and if *motions* are founded on the general rules or uſuage of the court, and are not of courſe, but granted or denied as the court thinks fit, on hearing counſel on both ſides, notice is to be given in writing to the ſolicitor of the other party, or his clerk in court, expreſſing every thing to be moved for, which muſt be ſerved two days at leaſt before the day on which the *motion* is to be made; whereof affidavit muſt alſo be made.

MOTIVE is ſometimes applied to that faculty of the human mind, by which we purſue good and avoid evil. Thus Hobbes diſtinguiſhes the faculties of the mind into two ſorts, the cognitive, and *motive*.

MOTORII, Motory *nerves*, the third pair of nerves; ſerving for the motion of the eye.

This pair is united into one near their inſertion into the brain; by which means, when one eye is moved toward any object, the other is naturally directed towards the ſame. See Nerves, and Eye.

MOTOS, *μοτος*, a piece of lint, or linen cloth, opened like wool, to be put into ulcers, to ſtop the flux of blood, &c.

Motos, in the *Meteria Medica of the Ancients*, was a name given by Galen and others to a kind of caſſia bark, the beſt and fineſt that has been uſed at any time. The ancients where very fond of this drug, and ranged it, according to its different goodneſs, into ſeveral ſorts.

MOTRIX, ſomething that has the power or faculty of *moving*.

Motrix, *vis*. See Vis *motrix*, and Motion.

MOTTO, an Italian term, literally ſignifying *word*, or *ſaying*; uſed in arms, devices, &c.

Motto *of an armoury*, is a ſhort ſentence or phraſe carried in a ſcroll generally over, ſometimes under the arms; ſometimes alluding to the name of the bearer, ſometimes to the bearing, and ſometimes to ſome remarkable atchievement of the bearer.

The *motto*, or word, ſays Guillim, is an external ornament annexed to coat-armour; being the invention or conceit of the bearer, ſuccinctly and ſignificantly expreſſed, uſually in three or four words, which are ſet in ſome ſcroll or compartiment, placed at the foot of the eſcutcheon.

As the *motto* holds the loweſt place in arms, ſo it is the laſt in blazoning. In ſtrictneſs, it ſhould expreſs ſomething intended in the atchievement; but cuſtom has now received whatſover be the fancy of the deviſer.

The uſe of *mottos* is very antient; hiſtory, both ſacred and profane, funiſhing inſtances thereof. Our anceſtors made choice of *mottos* to expreſs their predominant paſſions; as of piety, love, war, &c. or ſome extraordinary adventure befallen them; moſt of which, from ſome ſuch original, have become hereditary in divers families.

The *motto* of the royal family of England is *Dieu & mon droit*; of the royal family of Bourbon, *Eſperance*; of the order of the Garter, *Honi ſoit qui mal y penſe*, &c.

The *motto of a device* is alſo called the *ſoul of the* device.

MOTU.—*Ex mero* Motu. See Ex.

MOUCHEROLLE, in *Ornithology*, the name of a ſmall bird of the ſize of the ſparrow, and of the ſame colour, but longer bodied; its wings are of a duſkier colour than the reſt of its body, and its head is variegated with very ſmall blackiſh ſpots; its throat and belly are white, but the throat and the ſides of the breaſt and belly have a faint reddiſhneſs; the beak is black, ſtraight and ridged, ſo as to appear triangular; it feeds on flies and other inſects, and is common in gardens and orchards in many parts of England, though it has no Engliſh name. It is confounded by the common people with the common white-throat, but differs from it in that its tail is all of one colour, whereas the white-throat's is variegated. It ſomewhat reſembles alſo the beccifago, or petty-chaps, but differs from it in having no greeniſh colour, and in its bill being ridged and triangular.

MOVE *in arreſt of judgment*. See Arrest.

MOVEABLE, ſomething ſuſceptible of Motion, or that is diſpoſed to be moved. See Motion.

A ſphere is the moſt *moveable* of all bodies, i. e. it is the eaſieſt to move; a door is *moveable* on its hinges, the magnetical needle on a pin, or pivot, &c.

Moveable is frequently uſed in contradiſtinction to *fixt*.

Moveable *feaſts* are ſuch as are not always held on the ſame day of the year, or month; though they be on the ſame day of the week. See Feasts.

Thus Eaſter is a *moveable* feaſt; being always held on the Sunday which falls upon or next after the firſt full moon following the 21ſt of March. Vide Phil. Tranſ. N° 140. p. 185.

All the other *moveable* feaſts follow Easter, i. e. they keep their diſtance from it: ſo that they are fixed with reſpect thereto.

Such are Septuageſima, Sexageſima, Aſh-Wedneſday, Aſcenſion-day, Pentecoſt, Trinity-Sunday, &c. which ſee under their proper articles, Septuagesima, &c.

MOVEABLES, or Moveable *goods*, by civilians called *bona mobilia*, are thoſe which are capable of being removed from one place to another; or which may be concealed or perverted; as not being fixed to the ground, &c. See Goods and Chattels.

In England, we have two kinds of effects, *moveable* and *immoveable*: the *moveable* are, ready money, merchandizes, bonds, book-debts, cattle, and houſhold furniture, not faſtened either with iron or nail, nor ſealed in the plaſter, but which may be tranſported without either fraction or deterioration.

In the cuſtomary laws, they ſay, *moveables* follow the perſon, and his proper habitation; *moveables* follow the body, &c. which words have different meanings in different countries.

Sometimes they ſignify, that *movables* go according to the cuſtom of the place where is the habitation of the deceaſed, though he die in another place; and ſometimes they ſignify that *moveables* follow the cuſtom of the place where the defunct died.

MOVEMENT, *motion*, a term frequently uſed in the ſame ſenſe with automaton.

The moſt uſual *movements* for keeping time are *watches* and *clocks*: the firſt are ſuch as ſhew the parts of time, and are portable in the pocket; the ſecond ſuch as publiſh it by ſounds, and are fixed as furniture. See Horology.

Movement, in its popular uſe among us, ſignifies all the inner work of a watch, clock, or other engine, which move, and, by that motion, carry on the deſign of the inſtrument.

The *movement* of a clock, or watch, is the inſide; or that part which meaſures the time, ſtrikes, &c. excluſive of the frame, caſe, dial-plate, &c.

The parts common to both of theſe *movements* are, the *main-ſpring*, with its appurtenances; lying in the ſpring-box, and in the middle thereof lapping about the ſpring-arbor, to which one end of it is faſtened. A-top of the ſpring-arbor is the *endleſs ſcrew*, and its wheel; but in ſpring-clocks, this is a ratchet-wheel with its click, that ſtops it. That which the main-ſpring draws, and round which the chain or ſtring is wrapped, is called the *fuſy*: this is ordinarily taper; in large works, going with weights, it is cylindrical, and called the *barrel*. The ſmall teeth at the bottom of the fuſy or barrel, which ſtop it in winding up, is called the *ratchet*; and that which ſtops it when wound up, and is for that end driven up by the ſpring, the *garde-gut*. The wheels are various: the parts of a wheel are, the *hoop* or *rim*; the *teeth*, the *croſs*, and the *collet*, or piece of braſs ſoldered on the arbor or ſpindle whereon the wheel is rivetted. The little wheels playing in the teeth of the larger, are called *pinions*, and their teeth, which are 4, 5, 6, 8, &c. are called *leves*; the ends of the ſpindle are called *pivots*; and the guttered wheel, with iron ſpikes at bottom, wherein the line of ordinary clocks runs, the *pulley*. We need not ſay any thing of the *hand*, *ſcrews*, *wedges*, *ſtops*, &c. See **Wheel**, **Fusy**, &c.

Movements, *theory of calculating the numbers for*. 1. It is to be obſerved, that a wheel, divided by its pinion, ſhews how many turns the pinion has to one turn of the wheel.

2. That, from the fuſy to the balance, the wheels drive the pinions; conſequently, the pinions run faſter, or make more revolutions than the wheel; but it is the contrary from the great-wheel to the dial-wheel.

3. That the wheels and pinions we write down either as vulgar fractions, or in the way of diviſion in common arithmetic: v. gr. a wheel of 60, moving a pinion of 5, is written either $\frac{60}{5}$, or better, 5)60. And the number of turns the pinion has in one turn of the wheel, as a quotient, thus, 5)60(12. A whole *movement* may be written as in the adjoining ſcheme; where the uppermoſt number expreſſes the pinion of report 4, the dial-wheel 36, and the turns of the pin 9; the ſecond, the pinion, and great wheel; the third, the ſecond wheel, &c. the fourth, the contrat wheel; and the laſt, 17, the crown-wheel.

4)36(9
———
5)55(11
5)45(9
5)40(8
———
17

Hence, 4. From the number of turns any pinion makes in one turn of the wheel it works in, may be determined the number of turns a wheel or pinion has at any greater diſtance, viz. by multiplying together the quotients; the produce whereof is the number of turns. Thus,

Suppoſe the wheels and pinions as in the caſe adjoining; 11 multiplied by 9, gives 99, the number of turns in the ſecond pinion 5, in one turn of the wheel 55, which runs concentrical, or on the ſame ſpindle with the pinion 5.

5)55(11
5)45(9
5)40(8

Again, 99 multiplied by 8 gives 792, the number of turns the laſt pinion has in one turn of the firſt wheel 5. Hence we proceed to find, not only the turns, but the number of beats of the balance in the time of thoſe turns. For having found the number of turns the crown-wheel has in one turn of the wheel ſought, thoſe turns multiplied by its notches give half the number of beats in that one turn of the wheel. Suppoſe v. gr. the crown-wheel to have 720 turns, to one of the firſt wheel, this number multiplied by 15, the notches in the crown-wheel, produces 10,800; half the number of ſtrokes of the balance in one turn of the firſt wheel of 80 teeth.

The general diviſion of a *movement* is, into the clock and watch-parts. See **Clock**-*work*, and **Watch**-*work*. See alſo **Time**-*keeper*.

Movement, in *Architecture*, is a term uſed by ſome writes to expreſs the riſe and fall, the advance and receſs, with other diverſity of form, in the different parts of a building, ſo as to add greatly to the picturesque of the compoſition. For the riſing and falling, advancing and receding, with the convexity and concavity, and other forms of the great parts, have the ſame effect in architecture, that hill and dale, fore ground and diſtance, ſwelling and ſinking, have in landſcape; that is, they ſerve to produce an agreeable and diverſified contour, that groups and contracts like a picture, and creates a variety of light and ſhade, which give great ſpirit, beauty, and effect, to the compoſition.

MOVER, or *firſt* **Mover**. See **Mobile**.

Mover *perpetual*. See *Perpetual* **Motion**.

MOULD, or **Mold**, in the *Mechanic Arts*, &c. a cavity artfully cut, with deſign to give its form, or impreſſion to ſome ſofter matter applied therein.

Moulds are implements of great uſe in ſculpture, foundery, &c.

The workmen employed in melting the mineral or metallic glebe dug out of mines, have each their ſeveral *moulds*, to receive the melted metal as it comes out of the furnace; but theſe are different, according to the diverſity of metals and works. In gold mines, they have *moulds* for ingots; in ſilver mines, for bars; in copper and lead mines, for pigs or ſalmons; in tin mines, for pigs and ingots; and in iron mines, for ſows, chimney-backs, anvils, caldrons, pots, and other large utenſils and merchandizes of iron; which are here caſt, as it were at firſt hand.

The **Moulds** *of founders of large works*, as ſtatues, bells, guns, and other brazen works, are of wax, ſupported within-ſide by what they call a *core*, and covered without ſide with a cap or caſe. It is in the ſpace which the wax took up, which is afterwards melted away to leave it free, that the liquid metal runs, and the work is formed; being carried thither through a great number of little canals, which cover the whole *mould*. See **Foundery**.

The **Moulds** *of moneyers* are frames full of ſand, wherein the plates of metal are caſt that are to ſerve for the ſtriking of ſpecies of gold and ſilver. See **Coining**.

A ſort of concave *moulds* made of clay, having within them the figures and inſcriptions of ancient Roman coins, are found in many parts of England, and ſuppoſed to have been uſed for the caſting of money.

Mr. Baker having been favoured with a ſight of ſome of theſe *moulds* found in Shropſhire, bearing the ſame types and inſcriptions with ſome of the Roman coins, gave an account of them to the Royal Society.

They were found in digging of ſand, at a place called Ryton in Shropſhire, about a mile from the great Watling-ſtreet road. They are all of the ſize of the Roman denarius, and of a little more than the thickneſs of our halfpenny. They are made of a ſmooth pot or brick clay, which ſeems to have been firſt well cleanſed from dirt and ſand, and well beat or kneaded, to render it fit for taking a fair impreſſion. There were a great many of them found together, and there are of them not unfrequently found in Yorkſhire; but they do not ſeem to have been met with in any other kingdom, except that ſome have been ſaid to be once found at Lyons. They have been ſometimes found in great numbers joined together ſide by ſide, on one flat piece of clay, as if intended for the caſting a great number of coins at once; and both theſe, and all the others that have been found, ſeem to have been of the emperor Severus. They are ſometimes found impreſſed on both ſides; and ſome have the head of Severus on one ſide, and ſome well known reverſe of his on the other. They ſeem plainly to have been intended for the coinage of money, though it is not eaſy to ſay in what manner they can have been employed to that purpoſe, eſpecially thoſe which have impreſſions on both ſides, unleſs it may be ſuppoſed that they coined two pieces at the ſame time by the help of three *moulds*, of which this was to be the middle one.

If by diſpoſing theſe into ſome ſort of iron frame or caſe, as our letter-founders do the braſs *moulds* for caſting their types, the melted metal could be eaſily poured into them, it would certainly be a very eaſy method of coining; as ſuch *moulds* require little time or expence to make, and therefore might be ſupplied with new ones as often as they happen to break.

Theſe *moulds* ſeem to have been burnt or baked ſufficiently to make them hard; but not ſo as to render them porous like our bricks, whereby they would have loſt their ſmooth and even ſurface, which in theſe is plainly ſo cloſe that whatever metal ſhould be formed in them would have no appearance like the ſand-holes by which the counterfeit coins and medals are uſually detected.

Moulds *of founders of ſmall works* are like the frames of coiners: it is in theſe frames, which are likewiſe filled with ſand, that their ſeveral works are faſhioned; into which when the two frames, whereof the *mould* is compoſed, are rejoined, the melted braſs is run.

Moulds *of letter-founders* are partly of ſteel, and partly wood: the wood, properly ſpeaking, ſerves only to cover the real *mould* which is within, and to prevent the workman, who holds it in his hand, from being incommoded by the heat of the melted metal. Only one letter or type can be formed at once in each *mould*. See *Letter*-**Foundery**.

Moulds, in the *Manufacture of Paper*, are little frames compoſed of ſeveral braſs or iron wires, faſtened together by another wire ſtill finer. Each *mould* is of the bigneſs of the ſheet of paper to be made, and has a rim or ledge of wood to which the wires are faſtened. Theſe *moulds* are more uſually called *frames* or *forms*.

Moulds, *furnace and crucible makers*, are made of wood, of the ſame form with the crucibles; that is, in form of a truncated cone; they have handles of wood to hold and turn them with, when, being covered with the earth, the workman has a mind to round or flatten his veſſel.

Moulds *for leaden bullets* are little iron pincers, each of whoſe branches terminates in a hemiſpherical concave, which, when ſhut, form an entire ſphere. In the lips or ſides, where the branches meet, is a little jet or hole, through which the melted lead is conveyed.

Moulds, *laboratory*, are made of wood, for filling and driving all ſorts of rockets and cartridges, &c.

Moulds, *glaziers*. The glaziers have two kinds of *moulds* both ſerving to caſt their lead: in one they caſt the lead into long rods or canes fit to be drawn through the vice, and the grooves formed therein; this they ſometimes call *ingot-mould*. In the other they *mould* thoſe little pieces of lead a line thick, and two lines broad, faſtened to the iron bars. Theſe may be alſo caſt in the vice.

Moulds, *goldſmiths*. The goldſmiths uſe the bones of the cuttle-fiſh to make *moulds* for their ſmall works; which they do by preſſing the pattern between two bones, and leaving a jet or hole to convey the ſilver through, after the pattern has been taken out.

Mould, among *Maſons*, is a piece of hard wood or iron, hollowed within-ſide, anſwerable to the contours of the mouldings or cornices, &c. to be formed. This is otherwiſe called *caliber*.

Moulds, among *Plumbers*, are the tables whereon they caſt their ſheets of lead. Theſe they ſomtimes call ſimply *tables*. Beſides which they have other real *moulds*, wherewith they caſt pipes without ſoldering. See each deſcribed under Plumbery.

Moulds, among the *Glaſs-Grinders*, are wooden frames, whereon they make the tubes wherewith they fit their perſpectives, teleſcopes, and other optic machines.

Theſe *moulds* are cylinders, of a length and diameter according to the uſe they are to be applied to, but always thicker at one end than the other, to facilitate the ſliding. The tubes made on theſe *moulds* are of two kinds; the one ſimply of paſteboard and paper; the other of thin leaves of wood joined to the paſteboard. To make theſe tubes to draw out, only the laſt or innermoſt is formed on the *mould*; each tube made afterwards ſerving as a *mould* to that which is to go over it, but without taking out the *mould* from the firſt. See Grinding.

Moulds uſed in baſket-making are very ſimple, conſiſting ordinarily of a willow or oſier turned or bent into an oval, circle, ſquare, or other figure, according to the baſkets, panniers, hampers, and other utenſils intended. On theſe *moulds* they make, or, more properly meaſure, all their work; and, accordingly, they have them of all ſizes, ſhapes, &c.

Mould, in *Ship-Building*, a thin flexible piece of timber, uſed by ſhipwrights, as a pattern whereby to form the different curves of the timbers, and other compaſſing pieces in a ſhip's frame. There are two ſorts of theſe viz. the *bend-mould* and *hollow-mould*: the former of theſe determines the convexity of the timbers, and the latter their concavity on the outſide, where they approach the heel, particularly towards the extremities of the veſſel. The figure given to the timbers by this pattern is called their bevelling.

Moulds, among *Tallow Chandlers*, are of two kinds: the firſt for the common dipped candles, being the veſſel wherein the melted tallow is diſpoſed, and the wick dipped.

This is of wood, of a triangular form, and ſupported on one of its angles, ſo that it has an opening of near a foot a-top: the other uſed in the fabric of *mould* candles, is of braſs, pewter, or tin. Here each candle has its ſeveral *mould*. See each under Candle.

Mould, among *Gold Beaters*, a certain number of leaves of vellum, or pieces of guts, cut ſquare, of a certain ſize, and laid over one another, between which they put the leaves of gold and ſilver which they beat on the marble with the hammer. See Gold-*leaf*.

They have four kinds of *moulds*; two whereof are of vellum, and two of gut: the ſmalleſt of thoſe of vellum conſiſts of forty or fifty leaves; the largeſt contains a hundred: for the others, each contain five hundred leaves.

The *moulds* have all their ſeveral caſes, conſiſting of two pieces of parchment, ſerving to keep the leaves of the *mould* in their place, and prevent their being diſordered in beating.

Mould or **Mold**, in *Natural Hiſtory*, that kind of earth every where obvious to the ſurface of the ground; called alſo natural or mother earth. See Earth and Loam.

Moulds are defined by Dr. Hill to be earths compoſed of diſſimilar particles of a looſe ſoft texture, ſomewhat ductile while moiſt, compoſed of argillaceous particles ſeparated by ſand or the grit of ſtone, and uſually found mixed with the putrefied remains of vegetable and animal ſubſtances.

Of this claſs of bodies there are two genera: 1. The thrauſtomicthes, or *moulds* of a lax friable texture; and, 2. The gliſchromicthes, which are of a more tough and viſcid texture. Of theſe there are ſeveral ſpecies; viz. the red and friable brown of the firſt, and the greyiſh brown and heavy yellowiſh-brown of the ſecond.

Moulds, according to Mr. Da Coſta, are compound earths, of a looſe ſoft texture, ſomewhat ductile while moiſt, and compoſed of earthy particles, mixed with the putrefied remains of animal and vegetable bodies. He diſtinguiſhes them by their colours into the black, not acted upon by acids, to which belongs the common vegetable *mould*, or garden earth; the red, which is alkaline; and the brown, ſome of which are not acted upon by acids, and others alkaline.

The goodneſs of *mould*, for the gardener's purpoſes, is known by the ſight, ſmell, and touch.

Thoſe *moulds* are accounted beſt which are of a bright brown, or hazel colour. This is always the colour of the beſt loams, and other natural earths; and this is judged the better, if the earth cuts tolerably eaſy, and does not ſtick and cling to the ſpade, but is light, friable, and falls into ſmall clods; and is ſuch as naturally neither chaps and cracks in dry weather, nor turns to mortar in wet. Next to theſe the dark grey and ruſſet *moulds* are accounted beſt; and the worſt of all are the light and dark aſh-colour; theſe are uſually found on heaths and commons. The clear tawny *mould* is not by any means to be preferred; but that of a yellowiſh red is accounted the worſt of all: this is commonly found in wild and waſte places, and ſeldom produces any thing naturally but furz and fern.

All that lands give us to judge of them by from the ſmell is, that the beſt after rain, and after digging up, emit a good and pleaſing ſcent. But by the touch they may be judged of with conſiderable accuracy; for by this may be known whether they are too ſandy or too clayey; and whether they be tender, fatty, deterſive, and ſlippery; or more harſh, gritty, porous, and friable. What we are to judge beſt by the touch, is the middle nature between the extremes on either ſide, ſuch as will eaſily diſſolve and break, and being made of a juſt proportion of ſand and clay, will not ſtick to the ſpade or fingers after every light ſhower of rain. Miller.

To analyſe *mould* by means of water, waſh it throughly in warm water in large quantities, and filtrate the liquor. Evaporate this to a conſiderable degree of concentration, and it is manifeſtly of a ſaline taſte, but making no alteration in ſyrup of violets; therefore the ſalt it contains is neither acid nor alkaline, but neutral. This analyſis purſued farther, the particles may be diſunited and kept ſeparate, and will be found to be a large proportion of ſand, a quantity of a ſight mud, capable of remaining a long time ſuſpended in water, and a heavier mud ſinking immediately in water. By an analyſis of any particular *mould* by this means, we may find its true conſtituent particles, and be able to mix up and compound a ſimilar one for the growth of any peculiar plant it produces. But plants have the aſſiſtance of heat as well as moiſture, in the draining their juices from the earth; therefore it may not be improper to try the effect of fire on the ſame ſubject. The common garden *mould* diſtilled in a retort in a naked fire, managed in its various degrees, affords a water, an oil and ſpirit like thoſe yielded by animal ſubjects, and poſſibly ariſing from ſome extraneous particles mixed with the earth, and a dry *caput mortuum*, or indolent earth, remains in the retort.

The particles of animal, vegetable, and mineral ſubſtances, floating in the atmoſphere, and thence precipitated on the earth, may give ſome of the properties to garden *mould*, and thoſe different in different places; as is evident about London, where the *mould* is ſo impregnated with ſmoke, precipitated on it from the atmoſphere, that it differs much from that of open countries. Shaw's Lectures, p. 64.

Mould, *hip*. See Hip-*mould*.

Mould, *iron*. See Iron-*mould*.

MOULDINESS, a term applied to bodies which corrupt in the air, from ſome hidden principle of humidity therein; and whoſe corruption ſhews itſelf by a certain white down, or lanugo, on their ſurface.

This *mouldineſs*, when viewed with a microſcope, affords a curious ſpectacle: being a kind of meadow, out of which ariſe herbs and flowers; ſome only in the bud, others full blown, and others decayed; each having its little root, ſtalk, and other parts; the figure whereof may be ſee in Hook's Micrographia. The ſame may be obſerved of the *mouldineſs* which gathers on the ſurface of liquid bodies.

Mr. Bradley obſerved this *mouldineſs* in a melon very accurately, and found the vegetation of theſe little plants to be exceedingly quick. Each plant had its ſeeds in great abundance, which did not ſeem to be three hours before they began to ſhoot up; and in ſix hours more the new plant was complete and mature, and the ſeed ready to fall. When the fruit had been covered with a mould for ſix days, its vegetative quality began to abate; and it was entirely gone in two days more; then came on a putrefaction, and the fleſhy parts of the melon yielding nothing but a ſtinking water, which began to have a gentle motion on its ſurface; and in two days time maggots appeared, which in ſix more laid themſelves up in their bags, where they continued four days, and then came out flies. Theſe maggots were owing to the eggs of flies depoſited in the putrefaction.

MOULDING, any thing caſt in a mould, or that ſeems to have been ſo, though in reality it were cut with a chiſſel, or the ax.

Mouldings, in *Architecture*, are jettings, or projectures beyond the naked of a wall, column, or wainſcot, &c. the aſſemblage whereof form cornices, door-caſes, and other decorations of architecture. See *Tab. Archit. fig.* 1. to 12.

Some *mouldings* are ſquare, others round; ſome are ſtrait, others curved, &c. and ſome are plain, others carved, or adorned with ſculpture, either hollowed or in relievo.

Some *mouldings*, again, are crowned with a fillet; others are without, as the doucine, talon, ovolo, torus, plinth, ſcotia, aſtragal, gula, corona, and cavetto. See each under its proper article.

Mouldings are in architecture what letters are in writing. By the various diſpoſitions and combinations of *mouldings*, may be made an infinite number of different profiles for all ſorts of orders and compoſitions, regular and irregular; and yet all the kinds of mouldings may be reduced to three: viz. ſquare, round, and mixt, i. e. compoſed of the two.

For this reaſon, thoſe who invented the Gothic architecture, reſolving to recede from theſe perfect figures, and affecting to uſe others leſs perfect, to diſtinguiſh their architecture from the antique, introduced a new ſet of whimſical *mouldings* and ornaments.

Regular *mouldings* are either *large*; as doucines, ovolos, gulas, talons, toruſes, ſcotias, &c. or *ſmall*, as fillets, aſtragals, conges, &c. which ſee in their places.

Mouldings, in *Gunnery*, are annexed to guns by way of ornament, and depend chiefly on the maker's fancy.

It may be obſerved in general, that they ſhould be plain and ſimple, and the metal ſhould be projected as little as poſſible, ſo that the piece may lie cloſe on the carriage. See Gun, and *Tab. Gunnery*, *fig.* 1. *n.* and *A i.*

Moulding, *bed.* See Bed-*moulding.*

Moulding, *plane.* See Plane.

MOUL-ELAVOU, *ſive arbor lanigera ſpinoſa*, H. M. *Goſſipium arboreum caule ſpinoſa.* C. B. is a fine, tall, lanigerous or cotton-bearing tree, ſometimes no leſs than fifty feet in height, and eighteen in compaſs in the ſtern or trunk. The down, or cotton, ſerves to ſtuff beds and pillows: the bark of the tree pulveriſed, and with the juice of lemons reduced into the form of a liniment, mitigates all kinds of inflammations, and conſolidates fractures of the bones; mixed with burnt wine of the Indian nut, or cocoa, it makes a liniment for the herpes: of the bark of the root is prepared an excellent emetic: the ſweet liquor collected in the boſom of the flower, exhibited with the leaves of the tamarind, potently evacuates watery humours by ſtool and urine. Ray.

MOULIN. *Fer de* Moulin. See Fer.

MOULINET, a French term properly ſignifying a little mill, being the diminutive of *moulin*, *mill.*

It is uſed in mechanics, to ſignify a roller, which, being croſſed with two levers, is uſually applied to cranes, capſtans, and other ſorts of engines of the like nature, to draw ropes, and heave up ſtones, timber, &c.

Moulinet is alſo a kind of turn-ſtile, or wooden croſs, which turns horizontally upon a ſtake fixed in the ground; uſually placed in the paſſages to keep out horſes, and to oblige paſſengers to go and come one by one.

Theſe *moulinets* are often ſet near the outworks of fortified places, at the ſides of the barriers, through which people paſs on foot.

MOULLAVA, H. M. in *Botany*, a ſiliquous Indian plant, with a yellow, pentapetalous flower, and a ſmooth pod, containing generally four ſeeds. It grows to the height of eight or nine feet, and delights in ſandy places; it is an evergreen, flouriſhes moſt in a wintery ſeaſon, and the fruit is ripe in November and December. It is of no medicinal uſe, but only to the pollias (ſo they call the poor in thoſe countries), who receive the ſmoke of the leaves up their noſtrils, and ſo cure themſelves of the headache and vertigo. Ray.

MOULTING, in *Natural Hiſtory*. See Molting.

MOUND, a term uſed for a bank, rampart, or other fence, particularly of earth.

Mound, or **Mond**, in *Heraldry*, is a ball or globe with a croſs upon it; ſuch as our kings are uſually drawn with, holding it in their left hand, as they do the ſceptre in the right.

MOUNT, an elevation of earth, called alſo *mountain.*

The words *mount* and *mountain* are ſynonymous; but the former is ſcarce ever uſed in proſe, unleſs when accompanied with ſome proper name; as *mount* Ætna, *mount* Gibel, *mount* Lebanon, *mount* Sinai, *mount* Atlas, *mount* Parnaſſus, &c.

Mount *Sinai*, *St. Catharine of.* See Catharine.

Mount *Carmel*, *knights of.* See Carmel.

Mounted, in *Sea Language*, the ſtate of being armed or equipped with a certain number of cannon; expreſſed of a veſſel of war.

Mount-*egg*. In the tin-works, after that tin from the burnt ore is melted down, and re-melted, there will ſometimes remain a different ſlug in the bottom of the float; this they call *mount-egg*; and though of a tin-colour, yet it is of an iron nature, as hath been found by applying a magnet to it.

Mount *guard.* See Guard.

Mounts *of piety*, are certain funds, or eſtabliſhments, in Italy, where money is lent out on ſome ſmall ſecurity. We had alſo *mounts of piety* in England, raiſed by contributions for the benefit of people ruined by the extortions of the Jews.

MOUNTAIN, Mons, a part of the earth riſing to a conſiderable height above the level of the ſurrounding ſurface.

The origin of *mountains* is variouſly aſſigned by philoſophers; ſome will have them coeval with the world, and created along with it.

Others, among whom is Dr. Burnet, will have them to take their riſe from the deluge; urging, that the extreme irregularity and diſorder viſible in them, plainly ſhew, they do not come immediately out of the hand of God, but are the wrecks of the old world broken into the abyſs.

Others, again, alledge from hiſtory, that the foundations of many hills being gradually deſtroyed, the hills themſelves have ſubſided, and ſunk into plains: whence they conclude, that where the corruption is natural, the generation is ſo too.

It appears to many, that ſome *mountains* muſt have been generated gradually, and have grown up in proceſs of time, from the ſea-ſhells, &c. found in many of them; which they ſuppoſe may be accounted for from a violent wind blowing the ſand, &c. into huge heaps, which are afterwards made into a maſs by the rain, &c. Some among the divines tell us, that the earth was created perfectly even; and that when God ſeparated the water from the land, he dug channels in the earth; and the earth ſcooped out he threw up in *mountains*: but whether all the *mountains* be ſufficient to fill all the channels of the ocean, they muſt decide.

The origin of *mountains*, according to Mr. Ray, ſeems to have been exploſions by means of ſubterraneous fires; and it is very probable that they have all vaſt hollows beneath them; that this might have been the means uſed at the creation, to make the dry land appear, is no way diſſonant to reaſon, ſince hiſtory proves, that fires have raged in ſubterraneous caverns under the ſeas, and there is no natural impoſſibility in fire's ſubſiſting in ſuch caverns, even when the earth was all over covered with water, as at the firſt creation.

Mr. Le Cat, in his Memoirs, read in 1744, before the academy of Rouen, has delivered a new ſyſtem of the formation of *mountains*. He ſuppoſes, that in the beginning the ſubſtances of which metals, ſtones, earth, &c. were to be formed, were ſoft maſſes of a kind of mud; that theſe arranged themſelves according to their ſpecific gravity, forming regular ſtrata of a ſpherical or ſpheroidical figure, and covered with water: ſo that the ſurface of the earth was originally regular, or without the inequalities of hills and vallies. But afterwards, by reaſon of the action of the ſun and moon, theſe ſoft maſſes were variouſly driven into enormous maſſes or *mountains* of mud, which left in their interſtices vallies, whoſe capacities receiving vaſt quantities of water, left part of the earth expoſed and dry, and contributed to form a continent, which has gradually increaſed by the ſame alternate motions. By the continuance of this excavation of the earth, by means of the flux and reflux of the ſea, and the augmentation of the land thrown up by them, all the vaſt tracts of Europe, Aſia, &c. which were originally covered with water, became ſucceſſively expoſed and habitable. Theſe waters have left on the ſurface of the earth, ſkeletons, both of thoſe animals which lived in them, and thoſe terreſtrial animals which may be ſuppoſed to have periſhed in theſe fluctuations. What the flux and reflux of the ſea has performed from the beginning, is ſtill continued, though in a leſs ſenſible manner. The materials of the earth, being more compact and ſolid, the ſea is continually excavating its bed, and throws upon the banks the ſtones and earth which it forces away from its bottom. At length by this continued retreat of the ſea and excavation of the earth, he ſuppoſed that this globe will be ſo undermined as to produce a confluence of the ſeas from hemiſphere to hemiſphere; in conſequence of which a new chaos will take place: and a new world will be formed out of the ruins of the old.

Mountains appear, to many, defects and blemiſhes in the earth; but they are truly of the utmoſt uſe and neceſſity to the well-being both of man and other animals. Many creatures cannot live but in particular ſituations, and even the tops of the higheſt and the coldeſt *mountains* are the only places wherein ſome creatures, as well birds as quadrupeds, will live: of this kind are the ibex and chamois among beaſts, and the lagopus among birds.

They ſerve as ſkreens to keep off the cold and nipping blaſts of the northern and eaſtern winds; they alſo ſerve for the production of a great number of vegetables and minerals, which are not found in any other ſoil; they enable us to keep thoſe mines dry, which furniſh the moſt uſeful metals; beſides, the long ridges and chains of lofty and topping *mountains*, being generally found to run from eaſt to weſt, ſerve to ſtop the evagation of the vapours towards the poles, without which they would all run from the hot countries, and leave them deſtitute of rain.

Mr. Ray adds, that they condenſe thoſe vapours, like alembic heads, into clouds; and ſo by a kind of external diſtillation, give origin to ſprings and rivers; and, by amaſſing, cooling, and condenſing them, turn them into rain; and, by that means, render the fervid regions of the torring zone habitable. Thus the more we conſider nature, the more we muſt admire her works; and what ſeems to be a defect or blemiſh in them, on a ſlight view, often proves, on more juſt obſervation, a great benefit and beauty.

In hiſtory we have inſtances of *mountains* travelling conſiderable diſtances.

To meaſure the height of a *mountain*, ſee ALTITUDE, &c. Though there is another way uſed by Dr. Halley, in the meaſure of Snowdon hill in Wales, by means of a BAROMETER, the different height of whoſe mercury at the top and bottom of the *mountain* gives its perpendicular altitude; accounting eighty-two feet perpendicular aſcent for every inch varied in the height of the mercury.

The method often uſed for meaſuring the heights of *mountains*, by the ſinking of the mercury in the barometer, is very far from being accurate in practice. That the mercury generally falls, when the barometer is carried up to a higher ground is true, and has been known ever ſince the time of Paſcal. The only queſtion is, in what proportion? and this queſtion is not yet determined with ſufficient accuracy. The rule followed by the generality of authors, is, that the heights of *mountains*, or other riſing grounds, are as the logarithms correſponding to the heights of the mercury in the barometer. And the foundation of this rule is, that the denſity of the air is every where proportional to the weight of the ſuperincumbent air. But the application of this principle is improper in the preſent caſe, becauſe it can hold true only when the air is of the ſame degree of heat, which it ſeldom is, on the different parts of high *mountains*, in the valleys, and at the ſurface of the ſea. In aſcending the Cordelleras of Peru, for inſtance, the air is found to be of all temperatures, from the hotteſt ſummer to the coldeſt winter. And experiments are directly contrary to the rule. For by father Feuille's obſervations on the Pic of Teneriffe, the mercury in the barometer ſtood at 17 inches 5 lines Paris meaſure, at the height of 13158 Paris feet above the ſurface of the ſea, when the barometer at that ſurface ſtood at 27 inches 10 lines. But, according to the rule above mentioned, the barometer on the Pic ought to have been above 2 inches 2 lines lower than what it was found to be by the experiment.

A difference may alſo be perceived between the computed and obſerved heights of the barometer, at much ſmaller elevations; ſuch as 1542 feet; where the obſerved height of the mercury exceeded that found by computation above a line and a half; which would make a very conſiderable error in the height of the place.

From whence it follows, that the elaſticity or ſpring of the air at different heights, is not proportional to its denſity, or, which amounts to the ſame thing, that the mean degree of heat is different at different heights from the ſurface of the earth; for it is well known, that a difference of heat will make a difference of elaſticity in the air, its denſity remaining the ſame. See Daniel Bernoulli Hydrodynamic, p. 213.

This learned author obſerves, that father Feuille's experiment on the Pic of Teneriffe overturns all the rules and hypotheſes hitherto contrived for diſcovering the heights of places, from the fall of mercury in the barometer. Mr. Bernoulli has given a new hypotheſis of his own, and has founded ſome computations on it, which agree pretty well with the experiments he mentions; but it were to be wiſhed that this ſubject were re-examined with more care by a greater variety of experiments than has been done hitherto. Dr. Heberden (Phil. Tranſ. vol. xlvii. p. 353—356.) makes the height of the Pic of Teneriffe to be 2566 fathoms, or 15,396 Engliſh feet; and ſays, that this was confirmed by two ſubſequent obſervations by himſelf, and another made by Mr. Croſſe the conſul. But chevalier de Borda, who meaſured the height of the mountain in Auguſt 1776, makes it to be only 1931 French toiſes, or 12,340 Engliſh feet. See Forſter's Obſervation during a Voyage round the World, p. 32.

Monſ. Caſſini de Thuri has given us a detail of ſeveral obſervations made with care on two high *mountains* of Auvergne, and upon the *mountain* Canigou, one of the higheſt of the Pyrenees. From theſe obſervations it appears, that the variations of the heights of the mercury in the barometer, correſponding to the elevation of places above the level of the ſea, follow no regular progreſſion; there having been found ſometimes an inch of difference between the height of the mercury found by obſervation on the *mountain* Canigou, from the height that reſulted from the progreſſion eſtabliſhed in the Memoirs of the Royal Academy in 1703. This progreſſion, being deduced from obſervations made at ſmall elevations, proved erroneous; nor have any of the hypotheſes made ſince been ſufficient to reconcile the irregularities in obſervations, the exactitude of which admits of no doubt. Mem. Acad. Scienc. 1740. p. 94.

On this ſubject, ſee M. de Luc's elaborate and excellent work, entitled Recherches ſur les Modifications de l'Atmoſphere, in two volumes, 4to. Geneva, 1772: and Phil. Tranſ. vol. lxvii. part ii. art. 29. vol. lxviii. part ii. art. 32. See the ADDENDA.

The difficulty of breathing at the tops of high *mountains* is a thing ſo plainly felt, that there are none who have ever been in the way of making the experiment, who are not well convinced of the certainty of the fact. Acoſta deſcribes what he felt on the tops of the high *mountains* of Pariacaca very judiciouſly. See AIR.

The *mountains* of Armenia, and that particularly that on which Noah's ark is ſuppoſed to have reſted, have been alſo made famous on the like accounts; though the ſnows that lie on the tops of theſe *mountains* make it impracticable to aſcend their tops; the people who climb as high as they can, always find that they breathe with more difficulty, and are compelled to fetch their breath oftener than when on the plains; and on travellers complaining of this, their guides always tell them, that is a known thing, and is what every body ſuffers there.

The *mountains* in Languedoc and the Pyreneans have the ſame effect. People of curioſity have ſometimes remained hours on the ſummit of theſe *mountains*, and always found the ſame ſort of difficulty in breathing; but it is poſſible that this may be owing to the exhalations of certain ſteams from the earth in theſe places, leſs loaded with a weight of air than below; and this appears the more probable, as in going up the *mountain* Teneriffe, if many people are in company, and aſcend different ways, ſome uſually bear it better than others; and the very complexions of ſome are turned yellow by the exhalations, which are very plainly perceived by their ſmell and ſharpneſs, while others, who aſcend to the ſame height by different tracts, eſcape.

The moſt remarkable *mountain* in the world, in ſhape, is that called the *needle mountain*, or the *inacceſſible mountain*, in Dauphiny.

This is a vaſt hill, placed as it were bottom upwards, or ſet on its ſummit on the earth with its broad baſe elevated in the air; it is about a thouſand paces in circumference at the bottom, and is above two thouſand at the top. On the centre of the plain at the top there ſtands another ſmall and very narrow, but very high hill.

It obtained the name of the *needle*, as it got the other, by its being ſuppoſed impracticable to the aſcent of any one, by reaſon of its projecting ſo greatly outwards. Some hardy perſons, however, once ventured to climb it, and found at the top a number of the chamois, animals by no means qualified for climbing, and which doubtleſs had never either aſcended or deſcended the *mountain*, and which muſt be ſuppoſed to have bred there for many ages, though it is very difficult to account for their firſt getting to the place. Hiſt. Acad. Par. 1700.

MOUNTAINS, *attraction of*. See ATTRACTION.

MOUNTAINS, *chains of*, a term uſed by geographers to expreſs thoſe continuations of *mountains* which run in ridges along whole countries, and appear diſpoſed in uninterrupted orders wherever they are found. Kircher, in his *Mundus Subterraneus*, labours to prove, that theſe chains are annular, and reach abſolutely round the globe of the earth, encompaſſing it from north to ſouth, and thence to the north again; and in the ſame manner from eaſt to weſt, and from thence to the eaſt again; their courſe only diſappearing, by the wiſe providence of nature in the bottoms of the ſea, that the immenſe body of waters treaſured there might have its motion free and unimpeded in its channel, but appearing again in the ſame line, in every the ſmalleſt iſland that ſhews itſelf in the way of their ſtraight courſe, from the country where the laſt link of the chain was ſeen, to that where their firſt link appears again. He ſays, that theſe vaſt hills of earth and ſtone ſerve not only to ſtrengthen and ſupport the fabric of this vaſt globe of earth, but they have another very great uſe, not only to man, but to all animals, and even vegetables; which is, that they are the ſtorehouſes, where the grand reſervoirs of freſh water, ſo neceſſary to all life are treaſured up, and from whence it is eaſily poured down upon the lower parts of the globe. In Europe, the great reſervoirs of water, that ſupply whole countries of immenſe extent, are placed in that vaſt chain of *mountains* called the Alps, from which, as from an inexhauſtible ſtore, the vaſt tracts of fruitful land that lie below them are ſufficiently watered.

The *mountains* which compoſed this part of the great annular chain running north and ſouth round the globe, are called by three different names: the *Cottiæ*, the *Rhætian hills* with the *Vogeſus*, and the *Appennines*. From theſe are poured out the immenſe rivers which water this fruitful part of the world, the Danube, the Rhine, the Rhone, the Moſelle, and an almoſt infinite number of others, every one of which, after it has ſupplied the inhabitants of a whole tract of vaſt extent, diſcharges ſo much water hourly into the ſea, that the mind is aſtoniſhed at the account, and would wonder whence only one of them could be ſupplied. Theſe rivers, and a multitude of other ſmall ones, and beſides theſe a great number of lakes of vaſt extent, are all ſupplied by the hydrophylacia or reſervoirs of water treaſured up in the boſoms of theſe hills, and could not have performed their office of watering theſe extenſive countries, had thoſe reſervoirs been placed any where except in ſuch a lofty ſituation in theſe *mountains*.

The Alps, though they all ſupply more or leſs of this profuſion of water, yet are not equally hollowed for the reception of it, and conſequently do not all contain ſupplies for an equal tract of land: this is provided for by nature by a vaſt number of other ſmaller *mountains*, which in ſeveral parts of the countries through which this chain paſſes, run from its ſides like leſſer knots, and extend over ſome ſmaller or greater part of the country.

Theſe are a ſort of auxiliary ſupplies, and ſerve for many countries in the place of the original heads; but the rivers propagated from theſe, though ſufficient for the occaſions of the inhabitants of the lower country, yet do not diſcharge thoſe vaſt quantities of waſte water into the ſea, that thoſe which derive their origin from the greater *mountains* do. The Noric *mountains* in Germany, the Vogeſus, many *mountains* in Dauphiny, and thoſe in Italy, which run from the ſides of that long chain, which reaches like a ſpine all along that country, are all of this kind, and all convey this benefit to the lower countries. The Pyrenean and Carpathian *mountains* alſo yield a vaſt number of rivers from their ſides; and the rivers of Spain, of Poland, and of Hungary, all have evidently the ſame origin from theſe high-ſeated reſervoirs, in the chains of *mountains* which paſs through them. The countries where extended plains are found for vaſt tracts, uninterrupted by any of the links or knots of theſe vaſt chains of *mountains*, are the only places where thirſt and drought are the deſtruction both of animals and plants; and, in general, that country which has moſt and higheſt *mountains*, is the moſt plentifully, moſt regularly, and moſt conſtantly watered by ſmaller as well as larger ſtreams.

The diſpoſition of *mountains* on the ſurface of the globe, ſeems more regular than is generally ſuppoſed by thoſe who ſee but few of them in particular countries at a time; they are diſpoſed in reality in ranges or chains, reaching to vaſt extents, and in ſome from pole to pole, from north to ſouth.

One grand chain of *mountains* reaches from Iceland through Scotland, England, and Germany, with a ſtraight courſe to the Alps, which are as it were a vaſt knot in this chain, more cloſely diſpoſed, and more eminent than the others.

Theſe are ſucceeded in the ſame ſeries by the Appennines, which run through the whole kingdom of Italy, in the manner of the ſpine in the back in animals, and are continued on in the ſame ſeries by thoſe of Sicily; and from theſe the ſaid chain is carried on to Africa, and continues in what are called the *mountains of the moon*. From hence another vaſt knot or llnk of this extenſive chain is carried on to the utmoſt part of Africa, and terminates, as to our view, at the Cape of Good Hope; and there is no reaſon to doubt but that the chain is continued in the oppoſite land, and ſo on to the utmoſt limits of the ſouthern pole. From hence the ſame ſeries makes its way again, and beginning anew as it were from the ſouth pole, is carried on through the little known ſouthern regions to the Magellanic Streights. Here the famous Andes, *mountains* of South America, take it up, and along this vaſt tract is carried through this part of the new world into North America, and thence to the northern pole again, terminating where it began, or joining the other part of the chain where we took up the beginning of our account; ſo that the whole ſeries, making a vaſt belt or circle round the globe, has no beginning nor end, but in our imagination, or in our ignorance of the parts of the world through which it is carried in the ſame regularity as in thoſe countries whither commerce has led us, and where maps have ſhewn them.

Another vaſt chain of *mountains*, running with the ſame regularity, and in the ſame manner forming a belt round the whole globe of the earth, cuts this at right angles, and is continued in its courſe. This goes through Tartary, from a beginning far beyond our reſearches up behind that vaſt country, and continuing itſelf through the middle of Scythia, forms a ſeries that appears in the Eaſt Indies, running along the middle of that vaſt region to Cape Comorin; here the chain dips into the ſea; but if its courſe is exactly marked, it will be found to be continued in the ſame route through the iſland of Ceylon; hence it is carried under water to its oppoſite point on the limits of the earth, and hence through ſeas and lands not yet known to us, is carried on to the place in the back of Tartary, and from which we have begun the account. We have but very ſmall proofs indeed of its continuation through a vaſt tract of this its courſe; but we are to accuſe for this defect not nature in her diſpoſal, but our own ignorance, whatever little we do know plainly pointing out, that this chain is continued in the ſame regular manner as the other, and placed exactly at right an-angles with it.

As the continual flux and reflux of that vaſt body of ſeas from the eaſt weſtward, might by its force do ſome miſchief to the compages of the earth, provident nature has provided, for the ſtrengthening the great frame of this globe, certain tranſverſe chains or belts of *mountains*, which are ſo diſpoſed as to ſtrengthen and keep together the whole machine in the moſt ſtrong and laſting manner.

One ſeries of theſe runs directly from the eaſt weſtward from the utmoſt limits of the Chineſe empire, through that whole vaſt country; and where theſe are ſtopped by the boundaries of that country, they are continued through the weſt of Scythia, India, and the Caſpian ſea, America, Aſia Minor, Macedonia, and to the Rhætian *mountains*, which carry on the chain to the *mountains* of Narbonne Gaul, and theſe to the Pyreneans; and theſe are carried on weſtward in the ſame direct chain, ſo far as we are able to trace them, and apparently run on toward the point from which the acoount began, ſo as to form as regular a circle as the others, were every link of it expoſed to our ſight, by our knowledge of the regions through which it paſſes, and many of which are yet left to future diſcoveries.

Thoſe who haſtily judge of this ſyſtem may ſuppoſe, that it wants due weight, becauſe the chains of *mountains* here deſcribed do not appear to be regularly carried on through the bottom of the ſea from the firſt link on one land to the firſt on the oppoſite land to it; but the whole chain ſeems broken abruptly at either promontory, and only to be renewed, not continued, at the other; but it is very probable, that, though not ſo evident to our eyes, theſe chains of *mountains* are continued under the bottoms of the deepeſt ſeas in the ſame regular manner as on the openeſt land, though their heads do not appear above the ſurface of the water, but are only ſeen at thoſe places where the ſcattered iſlands happen in their courſe till they arrive at the main land again. This diſpoſition is not to be ſuppoſed owing to chance or irregularity, but appears contrived by the wiſdom of the great Creator.

The vaſt body of ſeas, that ſurrounds the globe with its neceſſary and perpetual flux, required a clear and free bed to roll its immenſe congeries of water in; and the tops of the *mountains* appear to have been diſcontinued in the courſe of this fluid, that it might have a free channel, and no ſtops or hindrances in its courſe, to ſpread its waters over the whole earth.

MOUNTAIN, *cock of the*, *urogallus*, in *Ornithology*. See COCK and GROUSE.

MOUNTAIN-*green*. See GREEN.

MOUNTAIN-*heath*, the name by which ſome call the SAXIFRAGE of botanical writers.

MOUNTAINS, *burning*. See VOLCANO.

MOUNTAINS *in the moon*. See MOON.

MOUNTEBANKS, derived from the Italian *montare in banco*, are quack doctors or jugglers, who vend their boaſted medicines, and exhibit their tricks on a public ſtage. See NUSANCE.

MOUNTING *the guard*, *trenches*, *breach*, *&c.* denotes the going upon duty, being upon guard in the trenches, running to the breach, &c.

MOUNTING *a cannon*, *mortar*, *&c.* is the ſetting it on its carriage, or the raiſing its mouth.

MOUNTING, in the *Manufactories*, ſomething that ſerves to raiſe or ſet off a work. Thus the frame or border, and its dependencies, make the *mounting* of a looking-glaſs: the fuſt, or but, the *mounting* of a muſquet, carbine, &c. and the hilt, &c. the *mounting* of a ſword.

MOUNTING *of a fan*, the ſticks which ſerve to open and ſhut it, whether they be of wood, ivory, tortoiſe-ſhell, whalebone, Indian-cane, or the like. See FAN.

MOURAILLE, in *Farriery*. See BARNACLES.

MOURNING, a particular dreſs or habit, worn to ſignify grief, on ſome melancholy occaſion.

The modes of *mourning* are various in various countries; as alſo are the colours that obtain for that end. In Europe, the ordinary colour for *mourning* is black; in China, it is white; in Turkey, blue or violet; in Egypt, yellow; in Ethiopia, brown. The ancient Spartan and Roman ladies mourned in white: and the ſame colour obtained formerly in Caſtile, on the death of their princes. Herrera obſerves, that the laſt time it was uſed was in 1498, at the the death of prince John. Kings and cardinals always mourn in purple.

Each people pretend to have their reaſons for the particular colour of their *mourning*: white is ſuppoſed to denote purity; yellow, that death is the end of human hopes, in regard to leaves when they fall, and flowers when they fade, become yellow; brown denotes the earth, whither the dead return; black, the privation of life, as being the privation of light; blue expreſſes the happineſs which it is hoped the deceaſed does enjoy; and purple or violet, ſorrow on the one ſide, and hope on the other, as being a mixture of black and blue.

Mourning, among the ancients, was expreſſed various ways, as by tearing their cloaths, by wearing ſackcloth, laying aſide crowns, and every other mark of joy. Plutarch, in his Life of Cato, relates, that from the time of his leaving the city with Pompey, he neither ſhaved his head, nor, as uſual, wore the crown or garland.—Sometimes public grief was teſtified by a general FAST.

Among the Romans a year of *mourning* was ordained, by law, for women who loſt their huſbands.

In public *mournings* at Rome, the ſhops were ſhut up, the women laid aſide all their ornaments, the ſenators their laticlavian robes, and the conſuls ſat in a lower ſeat than uſual.

The ancients had a remarkable way of *mourning* for ſoldiers ſlain in battle. The whole army attended the funeral ſolemnities, with their arms reverſed, it being cuſtomary for mourners, in moſt of their actions, to behave themſelves in a manner contrary to what was uſual at other times. In thoſe places where it was the faſhion to wear long hair, mourners were ſhaved; and where others ſhaved, mourners wore long hair. The conjecture of thoſe, therefore, is frivolous, who imagine that the ſoldiers turned the heads of their ſhields downwards, leſt the gods, whoſe images were engraved upon them, ſhould be polluted with the ſight of a corpſe; ſince not the gods only, but any other figures, were frequently repreſented on ſhields; nor did the few only near the corpſe, but the whole company, held their ſhields in the ſame poſition: not to mention that other arms were alſo pointed downwards. Potter, Archæol. Græc. tom. ii. p. 103.

The *mournings* of the Eaſtern nations of Indians are much more cloſely followed, though of much ſhorter duration than our's. After the death of a near relation, they mourn fifteen days, during which time they eat nothing but rice and water: they are not to chew betel, or to uſe the common waſhings in this time; but they are to do acts of charity, ſuch as diſtributing food to the poor; and prayers are ſaid, intreating the Almighty to forgive the ſins of the dead perſon, and aſſign him a good place in the other world. On the ſixteenth day, that is, the day after the finiſhing of the time of *mourning*, they make a ſolemn feaſt according to their abilities, and invite to it all their friends and neighbours. After this, they annually, on this day, give food to the poor, and renew their prayers for the happineſs of the dead perſon. Phil. Tranſ. N° 243.

MOUSE, *mus*, in *Zoology*. See MUS.

MOUSE, in the *Sea Language*, is a ſort of knob, uſually in the ſhape of a pear, wrought on the outſide of a rope, by means of ſpun yarn, parſling, &c. and uſed to confine ſome other ſecurely to the former, and prevent it from ſliding along its ſurface. Theſe *mouſes* are particularly uſed on the ſtays of the lower maſt, to prevent the eye from ſlipping up to the maſt.

MOUSE, *dor*. See DORMOUSE.

MOUSE, *ſable*, called alſo *lemner*, or *lemming*, in *Natural Hiſtory*, the name of an animal found in Lapland, and in other cold countries: many extraordinary things are related of the manner of living of theſe creatures.

This is the MUS *lemnus* of Linnæus, with a ſhort tail, five toes on the feet, very ſhort legs, large whiſkers, ſmall eyes, long ſharp teeth, and a yellow body varied with black. See *Norway* RAT.

They are of the bigneſs of a ſquirrel, and their ſkin is ſtreaked with brown and black; there are alſo ſome ſpots beſide the ſtreaks; the black is a very fine deep colour, the brown is pale; they have two very ſharp teeth above, and two below of the ſame kind: their feet are like a ſquirrel's; they are uſually very fat and fleſhy, and are ſo quarrelſome and fierce, that if a ſtick be held out to them, they will bite at it, and will hold it ſo faſt, that they may be toſſed and ſwung about in the air by it, without letting it go. In their march, they uſually keep a direct line from north-eaſt to ſouth-weſt, and always travel in thouſands in the ſame troop. The whole number forms a ſquare body, and they march only from the time of the twilight till the morning, lying ſtill all the day.

They march in lines, which are ſome ells diſtant, but always exactly parallel to each other, ſo that the places they have gone over, look like the furrows of a ploughed field. If they meet with any thing in their way that might deter another animal, it never ſtops them; but though it be fire, a deep well, a pond, a torrent, or a bog, they, without heſitation venture through, and by that means many thouſands of them are deſtroyed, and are found dead in the morning, in the waters or otherwiſe.

They never come into a houſe, nor meddle with any thing that we eat; if they chance to come to a houſe in their way, there they ſtop till they die; but if they come to a ſtack of hay or corn, they eat their way through.

When they march over a meadow, they do it great damage, by eating the roots of the graſs; but if they encamp there, they wholly deſtroy the produce; the land looks like a place where there had been a fire, and the whole ſurface looks as if ſtrewed with aſhes.

The Laplanders are always glad to ſee theſe creatures on their march, for it always foretels plenty of more valuable creatures among them: the ſame cold that ſends theſe out, ſending alſo a number of fowl, ſquirrels, foxes, and other animals the ſame way. Wormius has written a complete treatiſe on this animal, calling it *mus Norwegius:* this is re-printed at large in his Muſeum. Phil. Tranſ. N° 251. p. 112.

They commonly viſit the country once or twice in twenty years: Linnæus ſuppoſes that they come from the Norwegian Lapland Alps; but Pontoppidan thinks that Kolan's rock, which divides Nordland from Sweden, is their native place. After ravaging the country, deſtroying the graſs, and infecting the very ground, they at length periſh, either through want of food, deſtroying one another, or in ſome great water, or the ſea.

MOUSE, *ſea*. See APHRODITA.

MOUSE, *ear*, in *Botany*. See HAWKWEED.

MOUSE-*ear chickweed*, in *Botany*, *ceraſtium*, a genus of the *decandria pentagynia* claſs. Its characters are theſe: it has a permanent five-leaved empalement, which ſpreads open; the flower has five bifid petals, and ten ſlender ſtamina; in the centre is ſituated an oval germen, with five ſtyles; the empalement afterwards becomes an oval cylindrical or globular capſule, with one cell, containing many roundiſh ſeeds. Miller enumerates five, and Linnæus ſixteen ſpecies.

MOUSE-*ear*, *ſcorpion-graſs*, *myoſotis*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the corolla is hypocrateriform, marginated, and divided into five ſegments. There are four ſpecies.

MOUSE-*tail*, *myoſurus*, in *Botany*, a genus of the *pentandria polygynia* claſs. Its characters are, that the five-leaved empalement is joined to the baſe: it has five awl-ſhaped petaliform nectaria, and many ſeeds. There is only one ſpecies.

This plant is very near akin to the ranunculus, under which genus it is ranged by ſome botaniſts: the flowers are extremely ſmall, and are ſucceeded by long ſlender ſpikes of ſeeds, reſembling the tail of a mouſe, whence it obtained its name: it grows wild upon moiſt ground in divers parts of England. The whole plant is uſed, and by ſome thought to poſſeſs the ſame virtues with plantain, and the coronopus.

MOUSING *a hook*, in *Sea Language*, the operation of faſtening a ſmall cord or line acroſs the upper part from the point to the back thereof, in order to prevent it from unhooking, by the motion of the veſſel, or otherwiſe.

MOUTH, in *Anatomy*, a part of the human face, conſiſting of the lips, the gums, the inſide of the cheeks, and the palate.

All theſe parts are lined with a glandulous coat, which is continued over the whole inner ſurface of the *mouth*, and all its parts, the teeth excepted.

From the glands of this coat, through innumerable little excretory ducts, is ſeparated a kind of ſalival juice, which ſerves to keep the *mouth* and all its parts moiſt, ſmooth, and ſlippery.

On the hind part of the palate, perpendicularly over the rima of the larynx, hangs a round, ſoft, ſmooth body, like the end of a child's finger, formed by the duplicature of the membrane of the palate, and called the *uvula*, which is moved by two muſcles, called *ſphenoſtaphilinus*, and *pterygoſtaphylinus*; and is ſuſpended by as many ligaments.

Under the membrane of the palate are a great number of glands, pretty conſpicuous in the fore-part, like grains of millet; whoſe excretory ducts, piercing the membrane, open into the *mouth*; but towards the hinder part they lie much thicker, and about the root of the uvula they are gathered ſo cloſe to one another, that they ſeem to form one large conglomerate gland; which is, therefore, by Verheyen, called *glandula conglomerata palatina*. See PALATE. The gums are, as it were, the ſockets and ligaments of the teeth.

Beſides the proper parts of the *mouth*, there are in and about it others highly ſerviceable and neceſſary thereto: among which are the glands; the moſt conſiderable whereof are, the parotides, the glandulæ maxillares, the ſublinguales, and the tonſils or amygdalæ; which ſee in their reſpective places.

Theſe are the ſalival organs, whence ſprings all that liquor we call the *ſpittle*, which flows into the *mouth* by the reſpective ducts, after its ſeparation from the blood in the bodies of the glands: as the demand of ſpittle is greater in actions of the lower jaw, i. e. in maſtication, deglutition, much talking, &c. ſo does the diſpoſition of theſe ſalival ducts favour that diſchaage on thoſe occaſions.

Whether the *mouth* of a fœtus be neceſſary for its nutrition, has been controverted. The learned Mr. Monro is of opinion it is not: ſee his reaſons, and his anſwers to what has been obſerved by many learned men in favour of the contrary opinion, in the Med. Eſſ. Edinb. vol. ii. art. 9. or the Abridgment, vol. i. p. 305.

Mr. Monro obſerves farther, that the opening of the *mouth* does not only depend on the motion of the lower jaw downwards, but alſo on the ſuperior jaw being raiſed up by the muſcles, which extend the head back. He ſays, any one may convince himſelf of the truth of this, by putting the blade of a knife oppoſite to the conjoined edges of the teeth, when the *mouth* is ſhut; and the knife being held unmoved while the *mouth* is opened, he may, by the help of a mirror, ſee the upper teeth raiſed remarkably at every aperture he performs. Med. Eſſ. Edin. vol. i. art. 11.

Dr. Derham obſerves, that the *mouth*, in the ſeveral ſpecies of animals, is nicely adapted to the uſes of ſuch a part; and well ſized and ſhaped for the catching of prey, for the gathering and receiving food, the formation of ſpeech, &c.

In ſome creatures it is wide and large, in others little and narrow; in ſome it is formed with a deep inciſure up into the head, for the better catching and holding of prey, and more eaſy comminution of hard, large, and troubleſome food; in others with a ſhort inciſure, for the gathering and holding of herbaceous food.

In the fiſh-kinds the *mouth* is very different in the ſeveral genera and ſpecies in its ſituation, figure, and proportion, and is by the beſt naturaliſts made a mark of diſtinction among them. In regard to ſituation, it is, 1. In ſome placed in the front or tip of the head; and in this caſe both jaws are ſometimes of the ſame length; but ſometimes the one is conſiderably longer than the other. 2. In ſome the *mouth* is placed in the lower or under part of the head, under the front. 3. In ſome it is placed tranſverſely in the body; i. e. the opening of the *mouth* cuts the ſide of the back and belly at right angles. 4. In others it is oblique. As to figure, there are alſo many differences. When the *mouth* is opened; in ſome, it is, 1. of an oblong, round, or roundiſh ſquare ſhape. 2. In others it is oblong and wide. 3. It is alſo ſpherical. The proportion of the *mouth* to the head is alſo various. 1. In ſome it is much ſmaller than the breadth of the head; and, 2. In ſome it is equal, or nearly equal to the width of the head. Artedi.

In INSECTS it is very variable: in ſome it is forcipated, to catch, hold, and tear the prey; in others aculeated, to pierce and wound animals, and ſuck their blood; in others ſtrongly ridged with jaws and teeth, to gnaw and ſcrape out their food, carry burdens, perforate the earth, nay, and the hardeſt wood, and even ſtones themſelves, for houſes and neſts for their young.

Nor is the *mouth* leſs remarkable in birds, being neatly ſhaped for piercing the air, hard and horny, to ſupply the want of teeth; hooked, in the rapacious kind, to catch and hold their prey; long and ſlender in thoſe who have their food to grope for in mooriſh places; and broad and long, in thoſe that ſearch it in muddy places.

MOUTH is alſo uſed, in the courts of princes, for what relates to their eating and drinking. Hence, *officers of the mouth*, *yeomen of the mouth*, &c.

Daviler defines *mouth*, an apartment compoſed of ſeveral rooms, as offices, kitchens, &c. where the meat intended for the firſt tables is dreſſed by itſelf. At court, this is called the *king's mouth*.

MOUTH, in the *Manege*, denotes a horſe's feeling or ſenſibility in that part where the bits are applied. See HORSE.

MOUTH, *ridges of a horſe's*. See RIDGE.

MOUTH, *opening*, or *ſhutting the*, of a cardinal, is a ceremony uſed in the conſiſtory of Rome; wherein the pope ſhuts a new-elected cardinal's *mouth*, ſo that he may not ſpeak at all, even though the pope ſhould ſpeak to him; and remains, in the mean time, deprived of all voice, both active and paſſive, till the calling of another conſiſtory, when the pope opens his *mouth* again, making a little harrangue, to teach him how to ſpeak, and comport himſelf in the conſiſtory.

MOUTON *d'or*, an old French coin. See ANGEL.

MOXA, a ſort of cotton, or downy ſubſtance, brought from China, and by authors ſaid to grow on the lower part of the mugwort-leaf.

It is not much known among us for any medicinal efficacy: however celebrated in the Indies for curing the gout, by being burnt upon the part, people here have not faith enough to try it in this way; and ſome think if they had, in all likelihood, any other cauſtic would do as well.

The ancient phyſicians uſed flax, as the people of the eaſtern nations now do their *moxa*, for cauterizing in certain parts of the body. The method of uſing the *moxa* is this: a ſmall cone of the down, or *moxa*, is to be made up of about a thumb's breadth long, much after the manner they are for a ſuffitus. The baſis of this cone is to be ſtuck upon the part with a mucilage of gum arabic, and its top is then to be ſet on fire by a candle or burning coal: by this means the whole cone will be gradually conſumed, and the part by degrees cauterized.

This is uſed in caſes of the GOUT; and if the pain does not ceaſe on the firſt operation, it is to be repeated till it does. Heiſter's Surgery, p. 319.

MOYNOU, in *Fortification*. See MOINEAU.

MUCILAGE, *mucilago*, in *Pharmacy*, &c. a thick viſcous juice, of a white tranſparent colour; ſo called as reſembling the MUCUS of the noſe.

Mucilages are prepared chiefly from roots and ſeeds, pounded in a mortar, and infuſed in hot water, and ſtrained through a cloth: and they are the moſt relaxing, emollient, and ſoftening remedies in medicine.

The roots principally uſed for this purpoſe are thoſe of althæa, mallows, ſymphytum, &c. the ſeeds are thoſe of quinces, fleawort, &c.

Mucilages enter the compoſition of ſeveral plaſters. They are ſometimes alſo made of gums and fruits; as figs, quinces, iſinglaſs, tragacanth, &c.

MUCILAGE alſo denotes a thick pituitous matter, evacuated with the urine, in the gravel and dyſuria.

MUCILAGINOUS *glands*, a very numerous ſet of glands in the joints, firſt deſcribed by Dr. Havers.

There are two ſorts of *mucilaginous* glands, ſome ſmall, next a-kin to miliary glands, being glandules placed all along the ſurface of the membranes which lie over the articulations. See MUCUS and ARTICULATION.

The other ſort are conglomerated, and are many glandules collected, and planted one upon another, ſo as to make a bulk, and appear conſpicuouſly. In ſome of the joints there are ſeveral of them; in others there is a ſingle one.

As to the ſtructure of theſe large glands, they conſiſt of ſmall veſicles, which are not gathered together into ſeveral lobes, or bags of glandules, but are diſpoſed upon ſeveral membranes lying over one another; of which membranes there are ſeveral in every one of theſe glands, which appear evidently in thoſe who are hydropical.— They have their blood-veſſels, as other glands; but their veins have a particular texture, in their courſe, for retarding the return of the blood from the glands, that the *mucilaginous* liquor, which is not ſeparated with the greateſt expedition, may have time for ſeparation; which is a contrivance obſerved wherever a thick fluid is to be ſecerned.

The large *mucilaginous* glands are variouſly ſituated; ſome in a ſinus formed in the joint; others ſtand near or overagainſt the interſtice between the articulated bones: but in general they are ſo placed, as to be ſqueezed gently, and lightly preſſed, in the inflexion or extenſion of the joint, in order to yield a quantity of mucilage proportionate to the motion of the part, and the preſent occaſion, without any injury.

The deſign of all theſe glands is to ſeparate a *a mucilaginous* kind of liquor, which ſerves principally to lubricate the joints, or to make them ſlippery: it ſerves likewiſe to preſerve the ends of the articulated bones from attrition and heating: but all this it does in conjunction with the medullary oil; with which, together, is made a compoſition admirably well fitted for thoſe ends; for the mucilage adds to the lubricity of the oil, and the oil preſerves the mucilage from growing too thick and viſcous. Dr. Havers obſerves the ſame glands to lie between the muſcles and tendons; and ſuppoſes that there is the ſame mixture there of an oily and *mucilaginous* ſubſtance: the one being that fat, which is found between the muſcles, and is ſupplied by the glandulæ adipoſæ: and the other ſeparated by the *mucilaginous* glandules, of which the common membrane of the muſcles is every where full. This mixture in the interſtices of the muſcles lubricates them, and their tendons; and preſerves them from ſhrinking, and growing rigid and dry.

The rough unequal depreſſion at the bottom of the cotyloide cavity of the oſſa innominata is filled by a broad, flat, *mucilaginous* gland, bordered with a fatty ſubſtance, and covered with a fine membrane. The *mucilaginous* glands of the bones of the leg lie in ſmall ſpaces, depreſſions, and ſuperficial notches, near the edges of the cartilages of each joint, and are all covered by the capſular ligaments. In the bones of the foot theſe glands anſwer in number and figure to the depreſſions between the *cartilaginous* edges and ligaments.

In the articulations of the ſternum, vertebræ, and ribs, the *mucilaginous* glands are very ſmall; but they are accompanied by many fatty moleculæ lying round each joint. The inner ſurface of the ligamentary tube which lines the bony canal of the ſpine, is lubricated alſo by an oily or adipoſe ſubſtance. And the true *mucilaginous* glands of the occipital and maxillary articulations in the bones of the head, are all proportioned to the joints to which they belong, and lie between the capſular ligaments and the circumferences of the cartilages. Winſlow.

MUCILAGO, in *Botany*, a name under which Micheli has compriſed ſome ſpecies of that kind of fungus called MUCOR, conſiſting of ſmall bladders or veſicles, with ſeeds affixed to filaments on the inner part.

MUCK. See MOCK.

MUCOCARNEOUS, an epithet uſed by authors for a ſort of abſceſſes, which are partly made up of fleſh, and partly of a thick mucous matter.

MUCOR, in *Botany*, a name given by Micheli, and continued by Linnæus, to a genus of muſhrooms, often compriſed by authors among the moſſes, and called by the ſame Micheli, under the ſmall varieties of ſome of the ſpecies, *mucilago* and *lycogala*. Their characters are theſe: they are funguſes, conſiſting of roundiſh little bladders, in which are found numerous ſeeds affixed to hair-like receptacles, placed all over the inſide of the bladders. Linnæus enumerates twelve ſpecies.

MUCOSA, in *Ichthyology*, a name given by the Italians to a ſpecies of the ray-fiſh, called by the old authors, *leioraia*, and *bos marinus*; and by the later authors, *raja*, *oxyrynchus*, and *læviraia*. It is diſtinguiſhed by Artedi by the name of the variegated ray, with ten prickly tubercles on the middle of the back. See RAJA.

MUCOUS *fevers*, a term uſed by medical writers to expreſs thoſe fevers in which nature is endeavouring to rid herſelf of an abundance of pituitous, mucous, and ſerous matter. The catarrhal fevers of all ſorts are expreſſed under this denomination. See FEVER.

MUCOUS *glands*, are three glands which empty themſelves into the urethra; ſo called by the firſt diſcoverer, Mr. Cowper, from the tenacity of the liquor which they ſeparate. See *Tab. Anat. (Splanch.) fig.* 8. *lit. w.*

The two firſt diſcovered of theſe are about the bigneſs of a French bean, of a depreſſed oval figure, and a yellowiſh colour, like the proſtates; being on each ſide the bulb of the cavernous body of the urethra, a little above it.

Their excretory ducts ſpring from the internal ſurface, next the inner membrane of the urethra; into which they open a little lower, by two diſtinct orifices, juſt below its bending under the oſſa pubis, in perinæo, where they diſcharge a tranſparent viſcous liquor.

The third *mucous* gland is a ſmall, conglobate, yellowiſh gland, like the former, but ſomewhat leſs, ſituate above the angle of flexure of the urethra, under the oſſa pubis in the perinæum, near the anus. It has two excretory ducts, which enter the urethra obliquely, a quarter of an inch below the two former; and diſcharges liquor like the former, both in colour and conſiſtence.

MUCRO *cordis*, in *Anatomy*, the lower or pointed end of the heart.

The word is Latin, *mucro*, where it properly ſignifies *the point of a ſpear*.

Hence, MUCRONATED is applied to whatever tends to or terminates in a point, like that of a ſpear; as *mucronata cartilago*, &c.

MUCU, in *Ichthyology*, the name of a Braſilian fiſh of the lamprey kind; the TRICHURUS of Linnæus. It is long and ſlender; its head is pointed; its eyes black and ſmall; and its mouth very ſmall; and it has no fins; it is brown all over, only of a duſkier colour on the back than on the belly, and has a number of obliquely tranſverſe lines on the ſides, which are black. It is an eatable fiſh, and is caught in lakes in Brazil.—Margrave.

MUCUNA *guacu*, the largeſt and moſt beautiful ſpecies of phaſeolus growing in Braſil: it grows on a tree of the ſame name: the pod has a black ſhell, almoſt as hard as a ſtone, and covered with ſoft yellow hair, is a hand's breadth long, and three fingers breadth wide. When broke open, it diſcovers three or four very beautiful globular beans, divided by interſtices of a ſcarlet or red colour, round, ſmooth, and with a large eye, which being macerated in water, are deprived of ſome part of their noxious qualities; and being prepared with *tipioca de mandihoca*, are eaten by the natives; ſo that their poiſonous quality does not ſeem ſo deeply implanted in them by nature, as not to admit of proper correctives; for though the interior ſubſtance of the bean, by its acrimony and biting property vellicating the viſcera, excites great perturbations in the body, and purges violently by ſtool and vomiting, the cooling and demulcent medicinal aliment, prepared of the tipioca, ſerves as an antidote, and is therefore preferable to other things employed to correct it. Ray.

MUCUS *of the joints*, is a mucilaginous liquor, ſeparated by its proper glands, conveniently placed in the interſtices of the bones, where thoſe glands are gently preſſed by the motion of the parts: it ſerves to make the extremities of the bones or joints ſlip more eaſily.

MUCUS *of the urethra*, a viſcous tranſparent liquor, ſerving to line and lubricate the part; that the ſeed and the urine may ſlip more freely, without either adhering to or lacerating the part.

It comes from glands lately diſcovered by Mr. Cowper, about the penis; and is that, which in women is often miſtaken for ſemen.

MUCUS *of the noſtrils*, is a viſcid excrementitious humour, ſeparated by its proper glands placed in the internal membrane of thoſe parts. It ſerves to moiſten, lubricate, and defend the olfactory nerves; which, being extremely ſoft and naked, would, without ſuch proviſion, be ſoon ſpoiled. See NOSE.

MUCUS *of fiſh*. The bodies of moſt of the fiſhes called *alepidotes* by authors, from their having either no ſcales at all, or only a few ſmall ones, are covered in the place of ſcales with this *mucus*. It has a tough and thick viſcous liquor, and ſticks firmly to the body, defending the ſkin from injuries from ſtones, and the like: it is ſecreted from certain glands placed about the head, and on moſt parts of the body, but particularly in the linea lateralis. Artedi.

MUD-*walls*. See WALL.

MUDD, in *Ichthyology*, a name given by the Swedes to the fiſh called by Schonefeldt and others *aphua* or *aphya*.

It is a ſpecies of the CYPRINUS, according to Artedi, and is diſtinguiſhed by that author by the name of the *red-eyed two-inch cyprinus*, with nine bones in the pinna ani.

MUERDUM, among the Turks, an officer belonging to their moſques, who with his voice calls the people to prayers; thereby ſupplying the want of bells, which the Mahometans will not uſe. See BELL and MOSQUE.

MUFFLE, in *Metallurgy*, is an arched cover, reſiſting the ſtrongeſt fire, and made to be placed over copels and teſts in the operation of aſſaying, to preſerve them from the falling of coals or aſhes into them; though at the ſame time of ſuch a form, as not to hinder the action of the air and fire on the metal, nor prevent the inſpection of the aſſayer.

The *muffles* may be made of any form, ſo that they have theſe conditions; but thoſe uſed with coppels are commonly made ſemi-cylindrical, or when greater veſſels are employed, in form of a hollow hemiſphere.

The *muffle* muſt have apertures, that the aſſayer may look in, and the fore-part of it muſt always be quite open that the air may act better in conjunction with the fire, and be inceſſantly renewed; for without this, ſcarce any fumes are to be produced, and without theſe, the vitrification of lead is ſcarce practicable; for when the air is once filled with a certain quantity of vapours, it ſcarce admits any more afterwards; and for this reaſon a conſtant ſucceſſion of freſh air is neceſſary. The apertures in the *muffle* ſerve alſo for the regimen of the fire; for the cold air ruſhing into the larger opening before, cools the bodies in the veſſel; but if ſome coals are put in it and its aperture before be then ſhut with a door fixed to it, the fire will be increaſed to the higheſt degree, much more quickly than it can be by the breathing-holes of the furnace. Another uſe of theſe apertures is alſo, that the arſenical vapours of lead and antimony, paſſing through the holes in the back part of the *muffle*, may not be offenſive to the aſſayer, who ſtands before it.

As to the height, length, and depth of the *muffles*, theſe muſt be proportioned to the ſize and number of the veſſels they are intended to cover; and care muſt be taken in this, that all parts of the inner ſurface of thoſe veſſels muſt be in the reach of the aſſayer's eye. The moſt frequent ſize of the *muffle*, however, is four inches high, ſix or eight inches long, and four or ſix inches broad. The ſegments cut off at the baſes, for the leſſer holes, muſt be of ſuch a proportioned height, that the leaſt veſſels put under it, may not be in the way of coals or aſhes falling into them, for that always hinders the vitrification of lead, and the deſtruction of the other metals and ſemi-metals, and will ſometimes entirely reduce them again when already deſtroyed; and the ſcoriæ, ſoftened by aſhes, ſoften and retard the operation.

Wooden moulds of a proper ſhape, are moſt convenient for the making theſe *muffles* in, and the matter for making them of is the ſame with that of the German clay-teſts; this is, either a pure native clay, of a condition to bear the fire, which will be known upon the trial; or ſuch clay hardened by a mixture of the powder of ſtones: and in order to the forming of theſe, the maſs muſt be made tolerably ſoft and pliant. Knead a ſufficient quantity of this maſs with your hands upon a flat ſtone; ſpread it out evenly into a thin cake or plate, ſomewhat longer and broader than you intend the *muffle* to be made; and ſo thick, that two or more thin plates or lamina, of about two lines thick each, may be cut off from it. This is eaſily done by rolling the maſs on the ſtone with a rolling-pin, ſtrewed over lightly with aſhes, or powder of chalk.

When the cake is thus rolled out, with a thin, fine, and perfectly ſtraight braſs-wire cut off from the cake one thin plate; this muſt be done with great caution leſt it ſhould break: take this up, and rubbing it over with oil or fat, lay it over the mould; then cut out a ſemicircular piece from the maſs, of the ſame thickneſs with the former, and with this cover the back plane, or farther end of the mould, joining the edges of this plate to thoſe of the former, cloſely and perfectly, by wetting them well with water.

Next cut off from the cake another thin plate, to be the bottom of the *muffle*; this may be either left looſe for the *muffle* to be placed on it occaſionally, or the bottom edges of the already formed *muffle* may be joined to it all round by means of water, as the back was before jointed to the arched part of the *muffle*. But whether it be intended that the bottom ſhould be thus fixed on, or left looſe, it muſt be half an inch broader every way than the bottom of the *muffle*, that this may ſtand the more ſure and firm upon its baſis.

When the *muffle* is thus made, wet your hand, and rub it carefully all over, that the ſmall and perhaps inviſible cracks and chinks in the plates may be cloſely joined, and the whole matter of it applied perfectly cloſely to the ſurface of the mould.

When the *muffle* has been ſome time expoſed to the air, and is ſomewhat dried, and hardened on the mould, cut out two or three hemiſpherical pieces on each ſide, to make the holes before deſcribed, at the baſis and back, and then draw away the mould from within it; for if the *muffle* is ſuffered to dry perfectly on the mould, it always cracks. When the whole is perfectly dry, let it be baked in a potter's kiln, or in the aſſayer's oven; but without great care in the latter method, and lighting the fire at top at firſt, it is apt to crack; ſo that the potter's kiln, where at hand, is much the better way of baking it. See *Tab.* II. *of Chemiſtry*, N° 35, 36.

If there be adapted to the formerly deſcribed convex mould, another concave one nearly fitting it, only leaving room for the thickneſs of the *muffle* between, and the clay be placed between them, and formed by this means into its exact ſhape, by a ſtrong and every way equal preſſure, this will make *muffles* not only with much leſs trouble, but they will be much ſtronger, leſs apt to crack, and more capable of reſiſting the fire, than thoſe made by the hand in the other way.

The only cautions neceſſary for making theſe, are, that the clay be a little drier than when it is to be worked by the hand; that the ſides, both of the inner and convex mould, and of the outer concave one, be thoroughly oiled or greaſed, and the preſſure on the ſurface of the outer or concave mould, be as ſtrong and equal as may be. There is no clay better for making theſe *muffles* than the *Windſor-loam* an earth well know among the chemiſts and glaſſmen, and always to be ſold in London; and rubbing the inſide of the mould with black lead in fine powder very well ſupplies the place of greaſing them, to prevent the matter from ſticking to them.

Theſe are the *muffles* ordinarily uſed in aſſaying; but when very large teſts are to be covered, they uſe large ſpheroidal *muffles*, made of caſt iron, or ſometimes of the ſame clay, and wrought in the ſame manner, only made upon proportionably larger moulds. The clay is uſually, for theſe large ones, only laid in a lump on the top of the mould, and with wet hands ſpread all over it to the bottom, and by this means a *muffle* is made with little trouble. Cramer.

MUFTI. See MUPHTI.

MUGGENT, in *Ornithology*, the name of a ſpecies of freſh water wild DUCK, called by many authors the *muſcaria*, from its catching flies that play on the ſurface of the water.

It is about the ſize of the common tame duck; the beak is ſhort and broad, and is of a ſaffron-colour: it is all over of a mottled colour, like that of the partridge, made up of black, white, brown, and grey, ſo oddly mixed together, as to ſhew neither ſeparate; the crown of the head is black, and the feet are yellow.

Mr. Ray ſuſpects this not to be different from our common wild duck.

MUGGLETONIANS, a religious ſect, which aroſe in England about the year 1657, ſo denominated from their leader Lodowick Muggleton, a journeyman taylor.

Muggleton, with his aſſociate Reeves, ſet up for great prophets; and, it is ſaid pretended to an abſolute power of ſaving and damning whom they pleaſed; giving out that they were the two laſt witneſſes of God, that ſhould appear before the end of the world.

MUGIL, in *Ichthyology*. See MULLET.

MUG-WEED, in *Botany*. See CROSS-*wort*.

MUGWORT, *artemiſia*, in *Botany*, a genus of the *polygamia ſuperflua* claſs. Its characters are theſe: the flower is compoſed of hermaphrodite and female florets; the hermaphrodite flowers compoſe the diſk or middle; in the centre is placed the germen, which is accompanied by five hairy ſtamina; the germen becomes a ſingle naked ſeed, ſitting upon a naked placenta. Linnæus enumerates twenty-two ſpecies, joining to this genus the *abrotanum* and *abſynthium*; but Miller only reckons two ſpecies; of which the common ſort grows naturally on banks and the ſides of footpaths, in moſt parts of England. The moxa, ſo famous in the eaſtern countries, for curing the gout, by burning the part affected, is the lunago or down which is on the under part of the leaves of *mugwort*. *Mugwort* has long been famous as an uterine and antiſpaſmodic, and a medicine of great efficacy in all diſeaſes of the nerves. It is evidently aperient and abſtergent, it promotes the menſes, and cleanſes the womb. It is given in decoction, or much more agreeably in a light infuſion, in the manner of tea. The midwives uſe it alſo externally, boiling it, and applying it to the belly, to promote the menſtrual diſcharges, or the expulſion of the ſecundines. It is by ſome much recommended as a cure for the *ſciatica*; and is to be taken for this purpoſe, either in powder, two drams for a doſe, or the expreſſed juice, drank an ounce or two twice a day for ſome months.

There uſed to be a diſtilled water, a ſyrup, a conſerve, and an extract of *mugwort* in the ſhops, and the ſalt was made as that of wormwood; but at preſent theſe are diſuſed, and the dried herb only is kept there, as an ingredient in ſome of the compound waters.

MUID, a large meaſure, in uſe among the French, for dry commodities: as corn, pulſe, ſalt, lime, coals, &c.

The *muid* is no real veſſel uſed as a meaſure; but an eſtimation of ſeveral other meaſures, as the ſeptier, mine, minot, buſhel, &c.

At Paris, the *muid* of wheat, pulſe, and the like, is compoſed of twelve ſeptiers, each ſeptier making two mines, the mine two minots, the minot three buſhels, the buſhel four quarts, or ſixteen litrons, each litron 36 cubic inches, exceeding our pint by 1 $\frac{1}{2}$ $\frac{3}{2}$ cubic inch. The *muid* of oats is double that of wheat, though compoſed like that, of twelve ſeptiers: but each ſeptier contains twenty-four buſhels. The *muid* of charcoal contains twenty mines, ſacks, or loads, each mine two minots, each minot eight buſhels, and each buſhel four quarts, &c.

MUID is alſo one of the nine caſks, or regular veſſels uſed in France, to put wine and other liquors in. The *muid* of wine divided into two *demi-muids*, four *quarter-muids*, and eight *half quarter-muids*, contains thirty-ſix ſeptiers, each ſeptier eight pints, Paris meaſure; ſo that the *muid* contains two hundred and eighty-eight pints.

MULÆ, a word uſed by ſome medical writers to expreſs puſtules on the ſkin, which are owing to extreme heats, or to cold.

MULA *herba*, in *Botany*, a name uſed by ſome for the ceterach, or ſmooth ſpleenwort.

MULATTO, a name, given in the Indies, to thoſe who are begotten by a Negro man on a Indian woman; or an Indian man on a Negro woman.

The word is originally Spaniſh, *mulata*, formed of *mula*, *a mule*, as being begotten of two different ſpecies.

Thoſe begotten of a Spaniſh woman and an Indian man, are called *metis*; and thoſe begotten of a ſavage by a *metis* are called *jambos*. Theſe are all very different in colour, and in their hair.

MULBERRY-*tree*, *morus*, in *Botany*, a genus of the *monoecia tetrandria* claſs. Its characters are theſe: it hath male flowers growing at ſeparate diſtances from the female on the ſame tree; the male flowers are collected in long taper ropes or katkins; theſe have no petals, but have four long, awl-ſhaped, erect ſtamina; the female flowers are collected into roundiſh heads; theſe have no petals, but a heart-ſhaped germen, ſupporting two long, rough, reflexed ſtyles, crowned by ſingle ſtigmas; the empalement of theſe afterwards becomes large, fleſhy ſucculent fruit, compoſed of ſeveral protuberances, in each of which is lodged one oval ſeed. Linnæus enumerates ſeven, and Miller eight ſpecies.

The common *mulberry*-tree, which grows naturally in Perſia, from whence it was firſt brought to the ſouthern parts of Europe, is to be propagated either by cuttings, or by laying down the tender branches, which in one year will be well rooted, and may be cut off from the tree, and tranſplanted into the places were they are to remain. But the better way is to propagate them by cuttings, which, if rightly choſen, and ſkilfully managed, will take root very well: theſe cuttings ſhould be the ſhoots of the former year, with one joint of the two year's wood to the bottom; and they ſhould be planted their whole length, leaving two or three buds above ground. The beſt ſeaſon for planting them is in March, after the danger of hard froſt is over: they ſhould be planted in light rich earth, preſſing the ground pretty cloſe about them; and if they are covered with glaſſes, it will forward their putting our roots: but in the want of glaſſes, the ground about them ſhould be covered with moſs, which will render leſs watering needful. They may be tranſplanted the following ſpring into a nurſery, where they ſhould be trained to ſtems, by fixing down ſtakes by each, to which the principal ſhoots ſhould be faſtened; and moſt of the lateral branches ſhould be cloſely pruned off, leaving only two or three of the weakeſt to detain the ſap, for the augmentaion of the ſtem. After about four years growth in the nurſery, they will be fit to tranſplant where they are to remain.

The *mulberry*-tree thrives beſt in a light ſoil, which ſhould not be too wet, nor over dry; and it ſhould always have an open expoſure; for if planted too near the trees or buildings, ſo as to be ſhaded thereby, fruit ſeldom ripens well; though it will be to great advantage to have them defended from the weſt and ſouth-weſt winds, by trees or buildings at a diſtance.

The ſoil under the *mulberry*-tree ſhould always be well dug up every year, and manured, which proves of very great ſervice to the fruit.

The white *mulberry* is cultivated in France and Italy for the ſake of its leaves, as there is an opinion, that the ſilk-worms ſhould be fed only with theſe; but it is affirmed by perſons who ſeem to know beſt, that the Perſians feed their worms only with the leaves of the black kind.

The trees intended for feeding ſilk-worms ſhould not be ſuffered to grow tall, but kept in a ſort of hedge; and inſtead of pulling of the leaves ſingly, they ſhould be cut off with ſheers together with the young branches; this is not only much ſooner and more eaſily done, but it is leſs injurious to the trees. The white ſort is propagated either by ſeeds or layers as the black, and is equally hardy. Miller.

The fruit of this tree, while unripe, is very aſtringent; but when thoroughly ripe, it is of a contrary quality, rather purgative, cooling, very pleaſant, and quenching thirſt. Its ſyrup, which is very pleaſant, is the only uſe made of it in the ſhops.

The more general cultivating *mulberry*-trees in England might be of greater uſe than is at preſent ſuppoſed in many reſpects. In Devonſhire they have a way of mixing *mulberry*-juice with their cyder in the making, and this makes the very beſt of all Engliſh vinous liquors.

And as to the great article of breeding ſilk-worms, though a recommendation from the crown could not bring about the planting theſe trees in ſufficient number for it in James the Firſt's time, yet the trees have been found to flouriſh every where with us when properly planted, and the worms feed very kindly and work very well with us. When this manufacture was firſt attempted, the people of many parts of England, nay, and in ſome parts of the dampeſt places in Ireland, tried it, and always with ſucceſs. The only thing that ſtopped the progreſs of ſo valuable a thing at that time, was the want of a ſufficient quantity of *mulberry*-trees, and the ſcheme has been neglected ever ſince. Phil. Tranſ. N° 133.

The tree was always eſteemed by the ancients for its delicious fruit, before the uſe of its leaves was ever found out. The Romans, in the height of their luxury, preferred it before all the foreign fruits; and Columella and the other ancients are very expreſs in the methods of propagating it.

The FUSTICK *wood*, which grows plentifully at Campeachy, and exported from Jamacia, is a ſpecies of the *mulberry*: as is alſo the China and Japan *mulberry*-tree, of the bark of which the inhabitants make paper.

MULBERRY-*blite*. See *Strawberry* BLITE.

MULBERRY-*cyder*, a name given by the people of Devonſhire, and ſome other parts of England, to a ſort of cyder rendered very palatable by an admixture of *mulberry* juice in the making: they chooſe for this purpoſe the ripeſt and blackeſt *mulberries*, and preſſing out their juice and mixing it with a full-bodied cyder at the time of the grinding and preſſing, give juſt ſo much of it as adds a perceptible flavour. It is very worthy the attention of people who live in other counties, where ſtrong and good cyder is made, that this renders it a ſort of wine much more agreeable than any other Engliſh liquor, and might be brought into general uſe, to the great advantage of the dealer. The colour of this liquor reſembles that of the brighteſt red wine, and the flavour of the *mulberry* never goes off. Phil. Tranſ. N° 133.

MULBERRY-*ſhell*, a ſpecies of DOLIUM.

MULCH, a term uſed by gardeners for rotten dung, or the like, thrown upon beds of young plants, to preſerve them from the bad effects of cold or drought.

MULCT, MULCTA, a penalty, or fine of money, impoſed for a fault or miſdemeanour.

MULE, *equus mulus*, in *Natural Hiſtory*, a mongrel kind of quadruped uſually generated between an aſs and a mare; ſometimes alſo between a horſe and a ſhe-aſs: thoſe of the firſt kind are reckoned the beſt.

Mules are a ſort of monſters; and, therefore, they do not propagate their kind.

And yet the ancients mention a ſort of *mules*, that were prolific in Phrygia, Syria, Cappadocia, and Africa. Witneſs Ariſtotle, Hiſt. Animal. lib. vi. cap. 36. Varro de Re Ruſtica, lib. ii. cap. 1. Columella, lib. vii. cap. 36. Theophraſtus, and, after him, Pliny, lib. viii. cap. 44.

Steno, examining the teſticles of a *mule*, found *ova* therein, with a ſort of placenta about them; which perſuaded him, that *mules* might ingender without any miracle. But the obſervation is fanciful, and the concluſion unworthy ſo able a naturaliſt.

The Roman ladies had equipages drawn by *mules*; as appears from the medals of Julia and Agrippina. And at this day, in Spain, the coaches of the nobility, and even of princes, are uſually drawn by no other than *mules*.

We are aſſured, that M. de Thou, firſt preſident of the parliament, had the fourth coach in France, in 1585, till which time every body road to court, parliament, &c. on *mules*.

Theſe animals are very hardy. Savoy produces very large ones, but the fineſt are bred in Spain.

Mules are chiefly uſed in countries where there are rocky and ſtony ways, as about the Alps and Pyrenees, &c. Great numbers of them are kept in theſe places; they are uſually black, and are ſtrong, well-limbed, and large, being moſtly bred out of fine Spaniſh mares.

The *mules* are ſometimes fifteen or ſixteen hands high, and the beſt of them are worth forty or fifty pounds a-piece. No creatures are ſo proper for large burdens, and none ſo ſure-footed. They are much ſtronger for draught than our horſes, and are often as thick ſet as our dray horſes, and will travel ſeveral months together, with ſix or eight hundred weight upon their backs. It is a wonder that theſe creatures are not more propagated in England, as they are ſo much hardier and ſtronger than horſes, and are leſs ſubject to diſeaſes, and will live and work to twice the age of a horſe.

Thoſe that are bred in cold countries are more hardy and fit for labour than thoſe bred in hot; and thoſe which are light made are fitter for riding than horſes, as to the walk and trot; but they are apt to gallop rough, though theſe do it much leſs than the ſhort-made ones.

They take ſo much after the mare they are bred from, that they may be procured of any kind, light, or ſtrong, as the owner pleaſes. The general complaint we make againſt them, is, that they kick, and are ſtubborn: but this is only owing to our neglect in the breeding them, for they are as gentle as our horſes in countries where they are bred with more care.

Mules generated between the horſe and a ſhe-aſs, are the leaſt valuable. The are commonly very dull, and take after the aſs, and are not large; the other breed between an aſs and a mare is therefore what is propagated chiefly in all countries where *mules* are uſed.

he-aſs muſt be procured for this breed; and in Spain, where *mules* are greatly eſteemed, they will give fifty or ſixty pounds for a fine he-aſs, only to be kept as a ſtallion. They breed with this creature out of the fineſt and largeſt mares they have, giving the aſs an advantage of height of ground, and putting the mare into a narrow pit, railed on each ſide.

The *mule* ſeems to be the only animal which the confuſion of ſpecies has rendered barren; and if ſo, there muſt neceſſarily be ſomething particular in thoſe animals that have engendered it, which is not found in others; and that is, perhaps, as Ariſtotle thinks, the hardneſs of the matrix in mares and aſſes, which, like an earth, is rendered ſteril by dryneſs; whereas that reaſon has no place in leopards, foxes, and the like, which animals are fruitful enough to tranſmit to their poſterity the ſtrong diſpoſitions they have for generation, notwithſtanding the reſiſtance which the mixtures of the ſpecies may bring with it.

If the aſs deſigned to be bred on is ſuckled by a mare, or the mare ſuckled by an aſs, it makes them much more familiar than they would otherwiſe be; and this may always be done, by taking away the colt that belongs to the dam, and putting the other in its place, keeping them in the dark ten days or a fortnight.

Mules, among *Farriers*. See SCRATCHES.

Mule, *Fairchild's*, in *Botany*. See DIANTHUS and MULES, below.

Mules's *fern*. See HEMIONITIS.

Mules, among *Gardeners*, denote a ſort of vegetable monſters produced by putting the farina fœcundans of one ſpecies of plant into the piſtil, or utricle of another.

The carnation and ſweet-william being ſomewhat alike in their parts, particularly their flowers; the *farina* of the one will impregnate the other: and the ſeed ſo enlivened will produce a plant differing from either. An inſtance of this we firſt had in Mr. Fairchild's garden at Hoxton; where a plant is ſeen neither ſweet-william, nor carnation, but reſembling both equally: this was raiſed from the ſeed of a carnation that had been impregnated by the farina of the ſweet-william. Theſe couplings being not unlike thoſe of the mare with the aſs, which produce the *mule*, the ſame name is given them: and they are, like the others, incapable of multiplying their ſpecies.

This gives us a hint for altering the property and taſte of any fruit, by impregnating one tree with the *farina* of another of the ſame claſs; e. gr. a codlin with a pearmain, which will occaſion the codlin ſo impregnated, to laſt a longer time than uſual, and to be of a ſharper taſte. Or if the winter fruits be fecundated with the duſt of the ſummer kinds, they will ripen before their uſual time. And from this accidental coupling of the *farina* of one with another, it may poſſibly be, that in an orchard where there is variety of apples, even the fruit gathered from the ſame tree differ in their flavour, and in the ſeaſon of maturity. It is alſo from the ſame accidental coupling that the numberleſs varieties of fruits and flowers raiſed every day from ſeed proceed.

MULGRANOC, an Engliſh name for a ſmall ſea-fiſh caught on the Corniſh and other ſhores, the *alauda non criſtata* of Rondeletius, the *blennius pholis* of Linnæus, and the GALEETTO of other authors.

MULIEBRIA, a term ſometimes uſed to ſignify the privities of a woman; or ſo much as is otherwiſe called *cunnus*. See *Tab. Anat.* (*Splanch.*) *fig.* 9.

MULIER, in *Law*, ſignifies lawful iſſue born in wedlock, but begot before.

If a man have a ſon by a woman before marriage, which is a baſtard and illegitimate; and he afterwards marries the mother of the baſtard, while with child of another, and they have another ſon; this ſecond ſon is called *mulier*, and is lawful, and ſhall be heir to his father. Theſe we ſometimes alſo find with the additions *baſtard eigne*, and *mulier puiſne*.

Some derive the word from the Latin *melior*, or French *meilleur*, *better*; in regard the condition of a ſon born thus is better than that of an elder brother born before wedlock. Though, according to Glanvil, the lawful iſſue is rather called *mulier* than *melior*, becauſe begotten on *mulieres* and not on *concubinæ*: for he calls ſuch iſſue *filios mulieratos*; oppoſing them to baſtards. Agreeable to which, Briton has *frere muliere*, i. e. the brother begotten of the wife; in oppoſition to *frere baſtard*.

The like ſeems to obtain in Scotland, where, according to Skene, *mulieratus filius* is a lawful ſon, begot of a lawful wife.

Mulier was alſo anciently uſed as an addition for a wife; ſometimes alſo for a widow. According to Coke, virgin is alſo included under the name *mulier*.

MULIERTY, the being or condition of a *mulier*, or lawful iſſue. Co. Litt. 352.

MULLEIN, *verbaſcum*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower has a ſmall permanent empalement of one leaf, cut into five parts; it hath one wheel-ſhaped petal, with a very ſhort cylindrical tube; the brim cut into five oval obtuſe ſegments; and five awl-ſhaped ſtamina, which are ſhorter than the petal, terminated by roundiſh, compreſſed, erect ſummits; with a roundiſh germen, ſupporting a ſlender ſtyle inclining to the ſtamina; crowned by a thick, obtuſe ſtigma; the germen afterwards becomes a roundiſh capſule, with two cells, opening at the top, having an half oval receptacle fixed to the partition, filled with angular ſeeds. There are thirteen ſpecies; the common ſort uſed in medicine, grows naturally on banks and highways.

Mullein is accounted pectoral, being good for coughs, ſpitting of blood, and other affections of the breaſt: it is likewiſe good for griping and colic pains, ariſing from ſharp humours. Outwardly uſed in fomentations and fumigations, it is reckoned a ſpecific againſt pains and ſwellings of the hæmorrhoids, or piles.

The leaves of *mullein*, ſays Dr. Lewis, recommended as mild aſtringents, have a roughiſh drying kind of taſte, and very little ſmell; the flowers have alſo a ſlight roughiſhneſs with a conſiderable ſweetneſs.

MULLER, or **Mullar**, denotes a ſtone flat and even at bottom, but round a-top; uſed for grinding of matters on a marble.

The apothecaries uſe *mullers* to prepare many of their teſtaceous powders; and painters for their colours, either dry or in oil.

Muller is an inſtrument uſed by the glaſs-grinders: being a piece of wood, to one end whereof is cemented the glaſs to be ground, whether convex, in a baſon; or concave, in a ſphere or bowl.

The *muller* is ordinarily about ſix inches long, turned round: the cement they uſe is compoſed of aſhes and pitch. See GRINDING.

Muller, in *Ichthyology*, a name uſed by ſome for the fiſh called in Latin the CATAPHRACTUS, and in Engliſh the mailed fiſh, or pogge.

MULLET, in *Ornithology*, a name by which the people in ſome counties of England called the *anas arctica Cluſii*. See DUCK.

Mullet, in *Ichthyology*, a name given in England, indeterminately to ſeveral kinds of fiſh, of different genera; but the proper ſenſe of the word is the ſame with that of the *mugil* or cephalus, of the generality of authors; the cephalus of Ariſtotle and the Greeks; and the ceſtreus or ceſtrea of Oppian and others.

In the Artedian ſyſtem of ichthyology, the characters of the *mugil* are theſe: the branchioſtege membrane on each ſide contains ſix crooked bones; the upper one being the broadeſt, and being hid under the covering of the gills, ſo that only five are diſcernible; the ſcales are large, and they cover the head and the opercula of the gills, as well as the body of the fiſh; the head is of a depreſſed figure in its anterior part; and the body is oblong and compreſſed. According to theſe diſtinctions, there is only one known ſpecies of *mugil*; this is the *mugil* of Ovid and the ancients. It reſembles the thymallus in its external figure. Its jaws are tender and thin, and have no teeth in them; the tail is forked.

In the Linnæan ſyſtem the *mugil* is a genus of the *abdominales*: and he reckons two ſpecies, viz. the *cephalus* and *albula*.

Rondeletius, and other authors, have deſcribed three or four different ſpecies of *mugil*: but they ſeem rather varieties of the ſame fiſh, owing to age, place, and other accidents.

This fiſh in ſome degree reſembles the dace or dare in ſhape. The noſe is ſharp; the belly a little bowed; the head plain and flatted; its ſcales are very large and cover not only the body, but the membranes of the gills, and a great part of the head; the back is of a duſky bluiſh or greeniſh brown; the belly white, and the ſides are variegated with longitudinal black and white lines running from the head to the tail; it has no teeth; but the tongue is ſomewhat rough. Its is ſuppoſed to feed wholly on weeds and the like; and ſeems indeed to eat no fiſh. It is moſt frequently caught at ſea; but at times comes up into rivers.

The *mullet* is a very well taſted fiſh; and of its ſpawn is made what we call BOTARGO.

Mullets are found in great plenty on ſeveral of the ſandy coaſts of our iſland, and haunt in particular thoſe ſmall bays that have influxes of freſh water. They come in great ſhoals, and keep rooting like hogs in the ſand or mud, leaving their traces in form of large round holes. They are very cunning; and when ſurrounded with a net, the whole ſhoal frequently eſcapes by leaping over it; for when one takes the lead, the others are ſure to follow. This fiſh was ſometimes made the inſtrument of a horrible puniſhment for unfortunate gallants; aud was in uſe both at Athens and Rome. *Legibus Athenienſium adulteri* εν εργω *deprehenſi pœna fuit* ῥαφανοδωσις. *Raphani loco utebantur nonnunquam mugile piſce, interdum ſcorpione.* Cauſabon. Animadv. in Athenæum. lib. i. Juvenal Satire x. v. 316. and Horace Satire ii. lib. i. v. 132. refer to this puniſhment. Pennant.

Mullet *black*, *mugil niger*, a name given by authors to a fiſh of the *mullet* kind, but all over black, more uſually known by the name of the *portius piſcis*.

Mullet, *winged*, *mugil alatus*, a name given by ſome authors to the *hirundo piſcis*, or ſwallow-fiſh, as, excepting its wing-fins, it very much reſembles the *mullet* in ſhape. See Flying-*fiſh*.

Mullet, or **Mollet**, in *Heraldry*, a bearing in form of a ſtar, or rather of the rowel of a ſpur, which it originally repreſented.

The *mullet* has but five points; when there are ſix, it is called a *ſtar*. Though others make this difference, that the *mullet* is, or ought to be, always pierced, which a ſtar is not. *Tab.* II. *Heraldry*, *fig.* 73.

The *mullet* is uſually the difference, or diſtinguiſhing mark for the fourth ſon, or third brother, or houſe.

Though it is often alſo borne alone, as coat-armour: thus, Ruby on a chief pearl, two *mullets* diamond, was the coat of the famous lord Verulam, firſt ſir Francis Bacon.

MULLUS, in *Ichthyology*, the name of a fiſh properly of the cuculus kind, of which there are two ſpecies; the one called *mullus imberbis*, the other *mullus aſper*. Linnæus makes the *mullus* a diſtinct genus of the thoracic fiſhes, the characters of which are, that the head is compreſſed, declining, and covered with ſcales: the branchioſtege membrane contains three bones; and the body is covered with large ſcales, which eaſily fall off. He enumerates three ſpecies.

The *mullus imberbis* is a very ſcarce ſea-fiſh, with a large head, ornamented with ſeveral ſmall figures of ſtars, large eyes, a ſmall mouth of a fine bright red within, and without teeth; the covering of the gills has ſeveral prickles pointing towards the tail; the whole body is of a reddiſh colour, and the gill-fins have near their end ſome filamentous fingered appendages; its belly is white; and there are two rows of pointed bones running from the head to the tail, all along the back.

The other, or *mullus aſper*, is a ſmall fiſh, about the length and thickneſs of a finger, and of a beautiful red or ſomewhat purpliſh colour; and is covered with ſcales ſerrated at their extremities, and placed obliquely. Rondelet. de Piſc. p. 640.

Mullus *barbatus*, in *Ichthyology*, the name of a fiſh of the cuculus or the gurnard kind, and in the Linnæan ſyſtem a ſpecies of the *mullus*, caught in the Mediterranean, and reckoned an extremely delicate fiſh for the table. Its uſual ſize is about ſix or ſeven inches in length; its head is flatted, and its body conſiderably thick; and the back flat, not ridged; from the head all the way to the tail, it becomes gradually ſmaller, ſo as to reſemble an obeliſk in figure; its ſcales are ſerrated at the edges, and are eaſily rubbed off; they are of a browniſh olive colour; but the ſides, when they are off, look as if tinged with red lead; the eyes ſtand very high in the head, and it has two very long beards under its chin; and has no teeth in the jaws, and its tail is very forked.

Mullus *imberbis*, in *Ichthyology*, the name of a ſmall fiſh of the *mullus* kind, according to Linnæus, caught in the Mediterranean and Archipelago, and called by many *rex mullorum*, and *re de triglia*. Its uſual ſize is about four or five inches in length; it is all over of a reddiſh hue, and is covered with very large ſcales; its belly is alſo ſomewhat prominent, by which it is diſtinguiſhed from all the other mullets; its eyes are large, its mouth very wide, and its jaws rough like a file; its tail is forked, and it has no beards.

MULSUM, **Mulse**, a liquor made of wine and honey; or even of honey and water. See Hydromel.

MULTA, **Multura**, *epiſcopi*, a fine or final ſatisfaction, anciently given the king by the biſhops, that they might have power to make their laſt wills; and that they might have the probate of other men's, and the granting of adminiſtrations.

MULTANGULAR, a figure or body, which has many angles.

MULTIBONA, in *Botany*, a name given by ſome authors to parſley.

MULTIFIDUS *ſpinæ*, in *Anatomy*, a name given by Albinus to a *muſcle*, the ſeveral parts of which he ſays have been called by ſeveral different names by the generality of anatomical writers.

That part of it which is ſituated in the region of the loins, is called by Veſalius, the *decimus tertius* and *decimus quartus dorſum moventium*, and by ſome the *tertius dorſi muſculus*.

That which is ſituated in the back is called by Veſalius, *decimus quintus* and *decimus ſextum dorſum moventium*, and by others, *quintus dorſi muſculus*.

That part which is in the neck, is called by Veſalius, the *ſeptimus* and *octavus dorſum moventium*, and by many the *quartus cervicis muſculus*; and by Fallopius, *pars tertii paris muſculorum dorſi*. That part of it which is in the loins and back, is called by Fallopius the *quartum par muſculorum dorſi*, and ſeems to be the *ſacer* of Riolanus.

That part which is in the neck is called by Riolanus alſo a part of the ſpinatus, and by ſome the *tranſverſalis colli*: and its diſtinct portions in the neck are called by Douglas the *intervertebrales*.

MULTILATERAL, in *Geometry*, is applied to thoſe figures which have more than four ſides or angles, more uſually called polygons.

MULTINOMIAL, or **Multinominal** *roots*, in *Mathematics*, are ſuch as are compoſed of many names, parts, or members; as, $a+b+c+d$, &c.

For raiſing an infinite *multinominal* to any given power, or extracting any given root out of ſuch a power, ſee a method of M. de Moivre, in Phil. Tranſ. N° 230.

MULTIPLE, **Multiplex**, in *Arithmetic*, a number which comprehends ſome other ſeveral times.

Thus 6 is a *multiple* of 2, or, which is the ſame, 2 is a quota part of 6; 2 being contained in 6 three times. And thus 12 is a *multiple* of 6, 4, 3, and comprehends the firſt twice, the ſecond thrice, the third four times, &c.

Multiple *ratio*, or *proportion*, is that which is between *multiple* numbers.

If the leſſer term of a ratio be an aliquot part of the greater, the ratio of the greater to the leſs is called *multiple*; and that of the leſs to the greater, *ſub-multiple*.

A *ſub-multiple* number is that contained in the *multiple*.

Thus, the numbers 1, 2, and 3, are *ſub-multiples* of 6 and 9.

Duple, triple, &c. ratios; as alſo ſub-duples, ſub-triples, &c. are ſo many ſpecies of *multiple*, and *ſub-multiple* ratios.

Multiple *ſuperparticular proportion*, is when one number or quantity contains another more than once, and a certain aliquot part; as $3\frac{1}{3}$ to one.

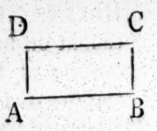
Multiple *ſuperpartient proportion*, is when one number or quantity contains another diverſe times, and ſome parts beſids; as $4\frac{5}{6}$ to 1.

Multiple *echo*. See Echo.

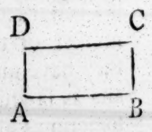
MULTIPLICAND, in *Arithmetic*, is one of the factors in the rule of multiplication, being that number which is given to be multiplied by another called the *multiplicator*, or *multiplier*.

MULTIPLICATION, the act of *multiplying*, or increaſing the number of any thing.

Accurately ſpeaking, in every *multiplication*, the multiplicator muſt always be conſidered as a number; and it is eaſy to conceive a quantity of any kind multiplied by a number. But to talk of a pound multiplied by a pound, a debt by a debt, and a line by a line, &c. is unintelligible. However, by analogy, in the application of algebra to geometry, we meet with ſuch expreſſions, and nothing is more common than to find AB × BC, to denote the rectangle ABCD, the length of which is AB, and the the breadth BC. But this is only to be underſtood by analogy; becauſe, if the number expreſſing the meaſure of the ſide AB was multiplied by the number expreſſing the meaſure of BC, the product would expreſs the meaſure of ABCD.



The ſign of *multiplication* moſt commonly uſed among algebraiſts, is ×. But the Germans, after Leibnitz, only make uſe of a point placed between the quantities multiplying each other, thus: $a \cdot b$ is the ſame as $a \times b$ and AB·BC, the ſame as AB × BC, or the rectangle of AB into BC, that is the rectangle ABCD.



When the quantities to be multiplied are complex, they place them between a parentheſis inſtead of drawing a line over them, as we commonly do.

Thus they write $(a+b)\cdot(c+d)$ inſtead of $\overline{a+b}\times\overline{c+d}$, for the product of $a+b$ into $c+d$. Sometimes the point is omitted, thus: $(a+b)\,(c+d)=\overline{a+b}\times\overline{c+d}$.

An old ſtatute ſays, it is ordained and eſtabliſhed, that none from henceforth ſhall uſe to *multiply* gold or ſilver, nor uſe the craft of *multiplication*; and if any the ſame do, he ſhall incur the pain of felony. Stat. 5 Hen. IV. cap. 4.

The ſtatute was made on preſumption that ſome perſons, ſkilful in chemiſtry, could *multiply* or augment thoſe metals by elixirs, or other ingedients; and change other metals into very gold and ſilver. Under Henry VI. letters patent were granted to certain perſons (who undertook to perform the ſame, and to find the philoſopher's ſtone),

ſtone), to free them from the penalty in the ſaid ſtatute. But the ſtatute has been ſince repealed. 1 Will. and Mar. cap. 30.

Multiplication, in *Arithmetic*, the act, or art of *multiplying* one number by another to find the product.

Multiplication, which is the third rule in arithmetic, conſiſts of finding ſome third number, out of two others given; wherein one of the given numbers is contained as often as unity is contained in the other.

Or, *multiplication* is the finding what will be the ſum of any number added to itſelf, or repeated, as often as there are units in another. So that the *multiplication* of numbers is a compendious kind of addition.

Thus the *multiplcation* of 4 by 5 makes 20. i. e. four times five amounts to twenty; which algebraiſts expreſs thus, $4 \times 5 = 20$.

In *multiplication*, the firſt factor, i. e. the number to be multiplied, or the multiplicand, is placed over that whereby it is to be multiplied; and the factum or product under both.

An example or two will make the proceſs of *multiplication* eaſy. Suppoſe I would known the product of 269 multiplied by 8, or 8 times 269.

Multiplicand	—	—	269
Multiplier	—	—	8
Factum, or product		—	2152

The factors being thus diſpoſed, and a line drawn underneath (as in the example), I begin with the multiplicator thus: 8 times 9 makes 72, ſet down 2, and carry 7 tens, as in addition: then 8 times 6 make 48, and 7 I carried, 55; ſet down 5, and carry 5; laſtly, 8 times 2 make 16, and with 5 I carried 21, which I put down: ſo that coming to number the ſeveral figures placed in order, 2, 1, 5, 2, I find the product to be 2152.

Now ſuppoſe the factors to expreſs things of different ſpecies, viz. the multiplicand men, or yards, and the multiplier pounds; the product will be of the ſame ſpecies with the multiplicator. Thus the product of 269 men or yards, multiplied by 8 pounds or pence, is 2152 pounds or pence; ſo many of theſe going to the 269, at the rate of 8 a-piece. Hence the vaſt uſe of *multiplication* in commerce, &c.

If the multiplicator conſiſts of more than one figure, the whole multiplicand is to be added to itſelf; firſt, as often as the right-hand figure of the multiplicator ſhews, then as often as the next figure of the multiplicator ſhews, and ſo on. Thus 421 × 23 is equal to 421 × 3, and alſo 421 × 20. The product ariſing from each figure of the multiplicator, multiplied into the whole multiplicand, is to be placed by itſelf in ſuch a manner, that the firſt or right-figure thereof, may ſtand under that figure of the multiplicator from which the ſaid product ariſes. For inſtance:

Multiplicand	—	—	421
Multiplicator	—	—	23
Particular product of 421 × 3		—	1263
Particular product of 421 × 20		—	842
The total product		—	9683

This diſpoſition of the right-hand figure of each product follows from the firſt general rule: the right-hand figure of each product being always of the ſame denomination with that figure of the multiplicator from which it ariſes.

Thus, in the example, the figure 2 in the product 842 is of the denomination of tens, as well as the figure 2 in the multiplicator. For 1 × 20 (that is, the 2 of 23) = 20 or 2 put in the place of tens, or ſecond place.

Hence, if either of the factors have one or more cyphers on the right-hand, the *multiplication* may be performed without regarding the cyphers, till the product of the other figures be found; to which they are to be then affixed on the right. And if the multiplicator have cyphers intermixed, they need not be regarded at all. Inſtances of each follow:

12|	358|	1|0	24|00	8013
1|0	6|000	1|0	3| 0	5006
12 0	214 8000	10 0	72 000	48078
				40065
				40113078

Thus much for an idea of *multiplication*, where the multiplicator conſiſts wholly of integers; in the praxis whereof, it is ſuppoſed, the learner is appriſed of the product of any of the nine digits multiplied by one another, eaſily learnt from the common table, or otherwiſe.

There are alſo ſome abbreviations of this art. Thus to multiply a number by 5, you need only add a cypher to it, and then halve it. To multiply by 15 do the ſame, then add both together. The ſum is the product.

Expedients for the more eaſy and expeditious multiplying large ſums are ſliding rules, and Neper's bones. The want of which may be ſupplied by tabulating the multiplicand.

Where the multiplicator is not compoſed wholly of integers, as it frequently happens in buſineſs, where pounds are accompanied with ſhillings and pence; yards with feet and inches; the method of procedure, if you multiply by a ſingle digit, is the ſame as in ſimple numbers, only carry from one denomination to another, as the nature of each ſpecies requires. E. gr. to multiply 123*l.* 14*s.* 9*d.* 3*q.* by five: ſay, 5 × 3*q.* = 15*q.* that is, 3*d.* 3*q.* write down the 3*q.* and proceed, ſaying 5 × 9 = 45*d.* that is, 3*s.* 9*d.* to which add 3*d.* ſet down 0, and proceed in the ſame manner through the reſt.

If you multiply by two or more digits, the methods of procedure are as follow: ſuppoſe I have bought 37 ells of cloth at 13*l.* 16*s.* 6*d.* per ell, and would know the amount of the whole. I firſt multiply 37 ells by 13*l.* in the common method of *multiplication* by integers, leaving the two products without adding them; then multiply the ſame 37 ells by 16*s.* leaving, in the like manner, the two products without addding them. Laſtly, I multiply the ſame 37 by the 6*d.* the product whereof is 222*d.* which divided by 12 (ſee Division), gives 18*s.* 6*d.* and this added to the products of the 16*s.* the ſum will be 610*s.* 6*d.* the amount of 37 ells at 16*s.* 6*d.* the ell. Laſtly, the 610*s.* 6*d.* are reduced into pounds by dividing them by 20 (ſee Reduction): upon adding the whole, the amount of 37 ells at 13*l.* 16*s.* 6*d.* will be found as is the following:

	37 ells At 13 pounds.	37 ells At 16 ſhillings.	37 ells. At 6 pence.
	111	222	222
	37	37	
	30 10 6	18 6	
Product	511 10 6	610 6	

Or thus: ſuppoſe the ſame queſtion; reduce the 13*l.* 16*s.* into ſhillings, the amount will be 276*s.* reduce 276*s.* into pence, adding 6, the amount will be 3318*d.* Multiply the 37 ells by 3318, the amount will be 122766*d.* which divided by 12, and the quotient 10230*s.* 6*d.* reduced into pounds, by cutting off the laſt figure on the right, and taking half of thoſe on the left, yields 511*l.* 10*s.* 6*d.* the price of the 37 ells, as before.

Though by theſe two methods any *multiplication* of this kind may be effected, yet the operations being long, we ſhall add a third much ſhorter. Suppoſe the ſame queſtion: multiply the price by the factors of the multiplicator, if reſolveable into factors: if not, by thoſe that come neareſt it: adding the price for the odd one, or multiplying it by what the factors want of the multiplier. So the work will ſtand thus: 37 ells at 13*l.* 16*s.* 6*d.* $6 \times 6 = 36 + 1 = 37$.

Therefore —

82	19	0
497	14	0
13	16	6
511	10	6

The price of 37 ells.

But the moſt commodious is the fourth method, which is performed by aliquot and aliquant parts—where you are to obſerve by the way, that *aliquot parts* of any thing are thoſe contained ſeveral times therein, and which divide without any remainder; and that *aliquant parts* are other parts of the ſame thing compoſed of ſeveral aliquot parts.

To **Multiply** *by aliquot parts*, is, in effect, only to divide a number by 3, 4, 5, &c. which is done by taking a 3d, 4th, 5th, &c. from the number to be multiplied. Example: To multiply, v. gr. by 6*d.* 8*d.* Suppoſe I have 347 ells of ribband at 6*s.* 8*d.* per ell.

Multiplicand	—	347 ells.
Multiplicator	—	6*s.* 8*d.*
Product	—	115*l.* 13*s.* 4*d.*

The queſtion being ſtated, take the multiplicator, which, according to the table of aliquot parts, is the third; and ſay the third of three is 1, ſet down 1; the third of 4 is 1, ſet down 1, remains 1, that is 1 ten, which added to 7 makes 17; the third of 17 is 5, remain 2 units, i. e. two-thirds, or 13*s.* 4*d.* which place after the pounds. Upon numbering the figures 1, 1, and 5, integers, and

13*s*. 4*d*. the aliquot part remaining, I find the ſum 115*l*. 13*s*. 4*d*.

For **MULTIPLICATION** by *aliquant parts*: ſuppoſe I would multiply by the aliquant part 19*s*. I firſt take for 10*s*. half the multiplicand; then for 5, which is the fourth, and laſtly for 4, which is the 5th. The products of the three aliquot parts that compoſe the aliquant part, being added together, the ſum will be the total product of the *multiplication*, as in the following example; which may ſerve as a model for *multiplication* by any aliquant part that may occur.

Multiplicand	——	356 ells.
Multiplier	——	19*s*.
		178*l*. for 10*s*.
		89*l*. for 5*s*.
		71*l*. 4*s*. for 4*s*.
Product	——	338*l*. 4*s*.

MULTIPLICATION, *for the proof of*. The operation is right when the product divided by the multiplier quotes the multiplicand; or divided by the multiplicand, quotes the multiplier. A readier way, though not abſolutely to be depended on (ſee ADDITION), is thus: add up the figures of the factors, caſting out the nines; and ſetting down the remainder of each; theſe multiplied together, out of the factum caſt away the nines, and ſet down the remainder: if this remainder agree with the remainder of the factors of the ſum, after the nines are caſt out, the work is right.

MULTIPLICATION, *croſs*, otherwiſe called *duodecimal arithmetic*, is an expeditious method of multiplying things of ſeveral ſpecies, or denominations, by others likewiſe of different ſpecies, &c. e. gr. ſhillings and pence by ſhillings and pence; feet and inches by feet and inches. This is much uſed in meaſuring, &c. The method is thus, Suppoſe 5 feet 3 inches to be multiplied by 2 feet 4 inches: ſay, 2 times 5 feet is 10 feet, and 2 times 3 is 6 inches: again, 4 times 5 is 20 inches, or 1 foot 8 inches; and 4 times 3 is 12 parts, or 1 inch: the whole ſum makes 12 feet 3 inches. In the ſame manner you may manage ſhillings and pence, &c.

F.	I.
5	3
2	4
10	6
1	8
	1
12	3

MULTIPLICATION, in *Algebra*. To multiply algebraic quantities, we muſt attend not only to the quantities themſelves, but alſo to their ſigns.

The general rule for the ſigns is, that when the ſigns of the factors are like, (i. e. both + or both —) the ſign of the product is +; but when the ſigns of the factors are unlike, the ſign of the product is —.

Then if the quantities to be multiplied be ſimple quantities, find the ſign of the product by the laſt rule; after it place the product of the coefficients, and then ſet down all the letters after one another, as in one word.

If the factors be compounded quantities, multiply every part of the multiplicand by all the parts of the multiplier taken one after another, and then collect all the products into one ſum; which will be the product required. See Maclaurin, Saunderſon, Hammond, or any other elementary writers.

The reaſon of the rule here given for the ſigns of the product, viz. that + by +, or − by − give +, and that + by −, or − by + give −, is apt to perplex beginners. But if it be conſidered, that in all *multiplication* the multiplicator is, ſtrictly ſpeaking, a number, the difficulty ſoon vaniſhes; for, 1. When any poſitive quantity $+a$ is multiplied by any poſitive number $+n$, the meaning is, that $+a$ is to be taken as many times as there are units in n, and therefore the product is evidently $+na$ or na, the poſitive ſign being omitted.

2. When $-a$ is multiplied by n, then $-a$ is taken as often as there are units in n, and the product muſt be $-na$.

3. As *multiplication* by a poſitive number implies a repeated addition, *multiplication* by a negative implies a repeated ſubtraction: ſo that when $+a$ is to be multiplied by $-n$, the meaning is, that $+a$ is to be ſubtracted as often as there are units in n; therefore the product muſt be negative, being $-na$.

4. When $-a$ is to be multiplied by $-n$, then $-a$ is to be ſubtracted as often as there are units in n; but by the rules of ſubtraction, to ſubtract $-a$ is equivalent to adding $+a$, and conſequently the product is $+na$.

The ſecond and fourth caſes may be thus illuſtrated, by the import and meaning of the ſigns + and —, $+a-a$ muſt be $=0$. Therefore if we multiply $+a-a$ by n, the product muſt vaniſh, or be nothing; becauſe the factor $a-a=0$. The firſt term of the product is $+na$ by caſe 1. Therefore the ſecond term of the product muſt be $-na$, which deſtroys $+na$; ſo that the whole product muſt be $+na-na=0$. Therefore $-a$ multiplied by $+n$, gives $-na$.

In like manner, if we multiply $+a-a$ by $-n$, the firſt term of the product being $-na$, the latter term of the product muſt be $+na$, becauſe the two together muſt deſtroy each other, or their amount be 0, ſince one of the factors $a-a=0$. Therefore $-a$ multiplied by $-n$, muſt give $+na$. See Maclaurin's Algebra, part i. chap. 4. Saunderſon's Algebra, vol. i. p. 57. And Barrow's Eucl. Schol. Prop. i. Elem. 2.

EXAMPLES.

Mul.	$+a$	$-2a$	$+6x$	$-8x$	$+3ab$
By	$+b$	$+4b$	$-5a$	$-4a$	$-5ac$
Products	$+ab$	$-8ab$	$-30ax$	$+32ax$	$-15a^2bc$

$$\begin{array}{l} a+b \\ a+b \\ \hline a^2+ab \\ \quad +ab+b^2 \\ \hline a^2+2ab+b^2 \\ \hline \end{array} \qquad \begin{array}{l} 2a-3b \\ 4a+5b \\ \hline 8a^2-12ab \\ \quad +10ab-15b^2 \\ \hline 8a^2-2ab-15b^2 \\ \hline \end{array} \qquad \begin{array}{l} 2a-4b \\ 2a+4b \\ \hline 4a^2-8ab \\ \quad +8ab-16b^2 \\ \hline 4a^2-16b^2 \\ \hline \end{array}$$

$$\begin{array}{l} x^2-ax \\ x+a \\ \hline x^3-ax^2 \\ \quad +ax^2-a^2x \\ \hline x^3-a^2x \\ \hline \end{array} \qquad \begin{array}{l} a^2+ab+b^2 \\ a-b \\ \hline a^3+a^2b+ab^2 \\ \quad -a^2b-ab^2-ab^3 \\ \hline a^3-b^3 \\ \hline \end{array}$$

See EXPONENT.

MULTIPLICATION, in *Geometry*, or in lines, is effected by ſuppoſing a line *ab* (*Tab.* III. *Geometry*, *fig.* 61.) called the *deſcribent*, moving perpendicular along another *bc*, called the dirigent.

For, by this means, the deſcribent forms the rectangle *adcb*; and if it be divided, together with the dirigent, into any number of equal parts, it will, by its motion, deſcribe as many little rectangles as the units in the deſcribent and dirigent will produce, when multiplied into one another, viz. 21. For when the line *ab* hath moved over one part of *ad*, it will, by its three parts, have deſcribed the three little rectangles in the firſt column; when it comes to 2, it will have deſcribed three more: and this is the reaſon why *multiplication*, in the Latin tongue, is uſually expreſſed by the word *ducta*, *drawn*; (and from hence alſo comes *product*) as if *ab* were multiplied by *bc*, they ſay, *ab ducta in bc*; becauſe the deſcribent is led, as it were, or carried along in an exact poſture upon the dirigent, and by that means deſcribes the rectangle; ſo that the rectangle and product are the ſame in geometry.

Now, as in all *multiplication* unity is to one factor as the other is to the product, *multiplication* in lines may be performed thus. Let *ab* (*fig.* 60.) be to be multiplied by *ad*. Make any angle at pleaſure; on one of the legs ſet off $au =$ to unity, and on the ſame leg ſet off *ud*, the multiplicator (3); then ſet the multiplicand *ab* (2) from *a* on the other leg of the angle; draw *ub*, and parallel to it, through *d*, draw *dc* (6), I ſay, *dc*, or 6, is the product: for $au : ad :: ab : dc$.

MULTIPLICATION *of plants*. See FECUNDITY, and PLANTS.

MULTIPLICATIVES. See NUMERALS.

MULTIPLIER, in *Arithmetic*, the number multiplying, or MULTIPLICATOR.

MULTIPLICATOR, in *Arithmetic*, a number multiplying another called the *multiplicand*.

The largeſt number is ordinarily made the multiplicand, and placed above the ſmaller, or *multiplicator*; but the reſult is the ſame, whichſoever of the numbers be made multiplicand or *multiplicator*; 4 times 5, and 5 times 4, making the ſame ſum.

MULTIPLYING, in the *Ancient Oeconomy*, the producing of one's like.

Mankind *multiplied* at a prodigious rate before the flood. Rabbits, fiſh, and moſt inſects *multiply* incredibly; the ſingle milt of a cod, examined with M. Leewenhoeck's microſcope, was found to contain more ova than there are animals on the face of the earth. See *Fecundity of* FISH.

M. Dodart has ſeveral diſcourſes on the multiplication of plants, in the Memoirs of the Royal Academy of Sciences. He has examined the beech-tree, particularly, with this view, and found its increaſe to ſurpaſs all imagination.

MULTIPLYING, in *Arithmetic*, is the finding a number which contains the multiplicand as often as there are units in the multiplier.

The rule of three conſiſts in *multiplying* the third term by the ſecond, and dividing the product by the firſt. See RULE *of Three*.

Multiplying-*glaſs*, a lens or glaſs, in which objects appear increaſed in number.

A *multiplying-glaſs*, called alſo a *polyhedron*, is a glaſs formed or ground into ſeveral planes, or faces, making angles with one another; through which the rays of light, iſſuing from the ſame point, undergo different refractions, ſo as to enter the eye from every ſurface in a different direction; as if they came from ſeveral points.

And thus the ſame point is ſeen in ſeveral imaginary foci; and therefore appears *multiplied*. For the phenomena and laws of *multiplying-glaſſes*, ſee Polyhedron.

MULTISILIQUOUS *plants* are the ſame with *corniculate plants*; viz. thoſe which, after each flower, have divers diſtinct, ſlender, and frequently crooked, ſiliquæ, or pods, wherein their ſeed is contained; and which, when they ripen, open of themſelves, and let the ſeeds drop.

MULTITUDE, *multitude*, an aſſemblage, or collection, of a great number of things, or perſons.

Multitude is properly the abſtract whereby things are ſaid to be *many*.

In which ſenſe, *multitude* may be conſidered as *number*; and ſtands oppoſed to *unity*.

In law, ſome will have *multitude* to imply at leaſt ten perſons; but ſir Edward Coke ſays, he could never find it reſtrained, by the common law, to any certain number, but always left to the diſcretion of the judges.

MULTIVALVES, in *Natural Hiſtory*, the name of a general claſs of ſhell-fiſh, diſtinguiſhed from the univalves, which conſiſt of only one ſhell, and the bivalves, which conſiſt of two, by their conſiſting of three or more ſhells.

Of theſe there are much fewer ſpecies than either of the univalve or bivalve claſs. A late accurate French author has ranked all the ſpecies under ſix genera, which are theſe. 1. The *echini*, or ſea-eggs. 2. The *vermiculi*, or ſea-worms. 3. *Balani*, or centre-ſhells. 4. The *pollicipides*, or thumb-ſhells. 5. The *conchæ anatiferæ*, or gooſe-ſhells. And, 6. The *pholades*. Hiſt. Nat. Eclaire. part ii. p. 235. All theſe ſee under their ſeveral heads.

A **MULTO** *fortiori*, or *à minore ad majus*, is a way of argumentation often uſed by Lyttleton; whoſe force is thus: if it be ſo in a feoffment paſſing a new right; much more is it for the reſtitution of an ancient right.

MULTONES *auri*, in our *Ancient Writers*, an old coin of gold, having an *Agnus Dei*, ſheep, or lamb, on the one ſide, and from that impreſſion called *multones*. This coin was moſt common in France, and ſometimes current in England. Patent 33 Edw. I. cited by the learned Spelman.

MULTUM, in *Arithmetic*. If A be one, B one, C one, D one, &c. and B, C, and D, be not the ſame with A; A, B, C, and D, are *multa*, or *plura*, *many*. Wolfius.

MULTURA *epiſcopi*. See Multa.

MULUD, in the *Materia Medica*, a word uſed by Avicenna and Serapion to expreſs a ſort of litharge, called by the Greeks *molybdites*, as ſeeming to partake of the nature of lead alone, not of gold or ſilver, or any other metal, as they thought the argyrites and chryſites did. This *mulud*, or molybdites, was the leaſt in eſteem of all the kinds of litharge, and was of a duſky greyiſh white colour. It ſeems to be the ſame that Dioſcorides means by *pelia* and *polia*, and ſometimes by *lithargyrus Sicilicus*, from the place whence it was brought.

MUM, a wholeſome kind of malt liquor chiefly prepared in Germany.

The proceſs of making *mum*, as recorded in the town-houſe of Brunſwick, the place of moſt note for this liquor, is as follows.

Take ſixty-three gallons of water that has been boiled to the conſumption of a third part; brew it with ſeven buſhels of wheaten malt, one buſhel of oat malt, and one buſhel of ground beans: when it is tunned, let not the hogſhead be too full at firſt; and as ſoon as it begins to work, put into it of the inner rind of fir three pounds, tops of fir and birch each one pound, carduus benedictus three handfuls, flowers of roſa ſolis one handful or two; burnet, betony, marjoram, avens, pennyroyal, wild thyme, of each a handful and a half; of elder-flowers two handfuls, or more; ſeeds of cardamom bruiſed thirty ounces, barberries bruiſed one ounce: put the herbs and ſeeds into the veſſel when the liquor has worked a while; and, after they are added, let the liquor work over the veſſel as little as may be; then fill it up. Laſtly, when it is ſtopped, put into the hogſhead ten new-laid eggs unbroken or cracked, ſtop it up cloſe, and drink it at two years end.

Our Engliſh brewers uſe cardamom, ginger, and ſaſſafras, inſtead of the inner rind of fir; and add alſo walnut-rinds, madder, red ſanders, and elecampane.

Every barrel of *mum* imported pays a duty of 25s. and by 12 Ann. ſtat. 1. c. 2. and 13 Geo. c. 7. every barrel of *mum* made or imported is liable to an additional duty of 10*s*.

MUMMING, from the Teutonic *mummen*, *to mimic*; antic diverſions in the Chriſtmas holidays, to get money or good cheer.

MUMMY, *mumia*, a carcaſe, or body, embalmed or dried in the manner of the ancient Egyptians.

Menage, after Bochart, derives the word *mummy* from the Arabic *mumia*; of *mum*, *wax*: Salmaſius from *amomum*, a kind of perfume; though others hold, that, in the Arabic tongue, the word *mumia* ſignifies a body embalmed, or aromatized.

Properly ſpeaking, *mummy* is not the fleſh of the deceaſed, but the compoſition wherewith it is embalmed; but, in common acceptation, *mummy* is alſo uſed for the body.

The preparation of *mummy* is of ſo old a ſtanding, that it was in uſe in Egypt before the time of Moſes. The coffin in which the *mummy* is contained was to be of ſycamore wood, which is found to keep ſound for the ſpace of three thouſand years; but the tree, properly thus called, was very different from our ſycamore.

Mummy is ſaid to have been firſt brought into uſe in medicine by a Jewiſh phyſician, who wrote, that fleſh thus embalmed was good for the cure of divers diſeaſes, and particularly for bruiſes, to prevent the blood's gathering and coagulating. The Turks prevent the exportation of *mummy* into Europe, as much as poſſible.

There are two kinds of bodies denominated *mummies*. The firſt are only carcaſes, dried by the heat of the ſun, and by that means kept from putrefaction: theſe are frequently found in the dry ſands of Lybia. Some ſay, they are the bodies of deceaſed people buried there on purpoſe to keep them entire without embalming; others, that they are the carcaſes of travellers, &c. who have been overwhelmed with clouds of ſand raiſed by the hurricanes frequent in thoſe deſarts. Be that as it will, theſe *mummies* are of no uſe in medicine, and are only preſerved as curioſities.

The ſecond kind of *mummies* are bodies taken out of the pits or catacombs near Cairo, wherein the Egyptians depoſited their dead after Embalming. Theſe conſtitute the *mummy* once ſo much valued, and to which ſuch extraordinary virtues are aſcribed.

It is ſaid, that all the *mummy* ſold in the ſhops, whether brought from Venice or Lyons, or even directly from the Levant by Alexandria, is factitious, and the work of certain Jews, who knowing the value the Europeans ſet on the Egyptian *mummy*, counterfeit it by drying carcaſes in ovens, after having prepared them with powder of myrrh, caballin, aloes, Jews pitch, black pitch, and other coarſe or unwholeſome drugs.

The French charletans, it ſeems, have likewiſe got the art of preparing *mummies*. Their method is ſimple enough: out of the carcaſe of a perſon hanged, they take the brain and entrails, and dry the reſt in an oven, ſteeping it in pitch and other drugs; and this they ſell for right Egyptian *mummy*.

There are found at this time in Poland a kind of natural *mummies*, or human bodies, preſerved without the aſſiſtance of art. Theſe lie in conſiderable numbers in ſome of the vaſt caverns in that country. They are dried, with the fleſh and ſkin ſhrunk up almoſt cloſe to the bones, and are of a blackiſh colour. In the wars which ſeveral ages ago laid waſte that country, it was common for parties of the weaker ſide to retire into theſe caves, where their enemies, if they found it out, ſuffocated them by burning ſtraw, &c. at the mouth of the cavern, and then left the bodies; which, being out of the way of injuries from common accidents, have lain there ever ſince.

Paræus has a very curious treatiſe of *mummies*, wherein he ſhews the abuſes thereof; and makes it appear, that they can never be of any real medicinal uſe.

Matthiolus is of the ſame opinion, after Serapion. Both theſe authors take even the Egyptian *mummies* to be no more than bodies embalmed with piſſaſphaltum.

Mummy, *mumia*, is more particularly uſed for the liquor or juice ouſing from human bodies aromatized and embalmed, gathered in the ſepulchres. This is the *mummy* chiefly ſpoken of among the ancient writers.

Mummy alſo denotes a medicinal drug, or a viſcous compoſition, partaking of bitumen and pitch, found in the mountains and foreſts of Arabia, and other hot countries in the Eaſt; much uſed in embalming of dead bodies.

Dioſcorides ſpeaks of *mummy* found on the ſea-coaſt near Epidaurus, brought thither by the torrents from the Ceraunian mountains, and there dried by the ſun into huge maſſes.

It ſmells like bitumen mixed with pitch. The people thereabouts call it *mineral wax*. In Latin, or rather Greek, it is called Pissasphaltus.

Mummy, *mumia*, is alſo uſed, by ſome phyſicians, for a ſuppoſed implanted ſpirit, found chiefly in carcaſes, when the infuſed ſpirit is fled.

The infuſed ſpirit is ſometimes alſo called *mummy* in living ſubjects; and both the one and the other are ſuppoſed to ſerve in TRANSPLANTATION.

A plant, for inſtance, bringing this *mumia* from one ſubject to another, the *mumia* joins and unites itſelf immediately with the *mumia* or ſpirit of the new ſubject; and from this union ariſes a natural and common inclination between the two ſubjects. And on this principle they account for ſympathetic or magnetic cures. But this whole doctrine is now deſervedly ridiculed and exploded.

MUMMY is alſo uſed, among *Gardeners*, for a ſort of wax uſed in the planting and grafting of trees.

Agricola directs the preparation thereof as follows: take one pound of common black pitch, and a quarter of a pound of common turpentine; put them together in an earthen pot, and ſet them on fire in the open air, having a cover ready to quench the mixture in time: the matter is to be thus alternately lighted and quenched, till all the nitrous and volatile parts be evaporated. To this a little common wax is to be added; and the compoſition is then to be ſet by for uſe.

To apply it in the dreſſing of roots of trees, melt it, and dip in the two ends of the pieces of root, one after another; then put them in water, and plant them in the earth, the ſmall end downward, ſo that the larger may appear a little way out of the earth, and ſo may have the benefit of the air; then preſs the earth hard down upon them, that they may not receive too much wet. Miller.

MUNDANDIS *vicis & venellis*. See VICIS.

MUNDIBURDUS. See ADVOCATE.

MUNDIC, a name for marcaſite; a kind of mineral glebe, found in the tin-mines, and elſewhere; ſometimes white, yellow, or green; and ſometimes of a dark brown colour. It is of an arſenical nature. See Geoffroy, in Mem. Acad. Scienc. 1738, p. 107. edit. Par. It is frequently called *maxy*.

The *mundic ore* is eaſily diſtinguiſhed by its glittering, and ſometimes by its diſcolouring the fingers. Some ſay, it feeds the tin; and yet they allow, that where there is much *mundic* there is little or no tin.

What is called *mundic* in Cornwall, frequently contains a large portion of copper.

The ſteams of the *mundic* are very troubleſome to the miners; yet it is found a good vulnerary; and the miners uſe no other remedy for wounds, but waſhing them in water that runs from the *mundic ore*. See MARCASITE.

MUNDIFICATIVES, or MUNDIFIERS, in *Medicine*, denote *cleanſers*, *purifiers*, or *detergents*.

Mundificative plaſters, or unguents, are ſuch as deterge and dry, and thus cleanſe ulcers of two kinds of matter, viz. *pus* and *ſanies*.

The chief ingredients in *mundificative* unguents are, gentian, ariſtolochia, enula, campana, and the vulnerary herbs.

MUNDUS, *world*. See WORLD.

MUNDI, *anima*. See ANIMA.

MUNDUS *patens*, among the Romans, a ſolemnity performed in a little temple of a round form; and dedicated to Dis, and the infernal gods.

It was opened only three times in a year, viz. on the day after the VULCANALIA, the fourth of October, and the ſeventh of the ides of November, during which days the Romans believed that hell was open; and therefore they never offered battle on thoſe days, liſted no ſoldiers, never put to ſea, nor married.

MUNDUYGUACU, in *Botany*, a name of the *nux cathartica* of the Weſt Indies, a kind of great ricinus, or palma Chriſti.

MUNERARIUS. See DESIGNATOR.

MUNGATHIA, in *Zoology*, the name given by ſome to a ſpecies of Indian ferret, of a reddiſh grey colour, called alſo *mungo*.

MUNGO, in *Zoology*, the name of an American animal, of the ferret kind, called by authors *viverra Indica griſeo-rufeſcens*, or the reddiſh grey Indian ferret. Some call it alſo *mungathia*.

MUNICIPAL, MUNICIPALIS, or MUNICEPS, compounded of *munus*, *office*, and *capio*, *I take*, or *hold*, an appellation given to the inhabitants of the municipia, or municipal cities.

In the Roman law, *municipal* denotes a perſon veſted with the rights and privileges of a Roman citizen.

This title the Romans frequently beſtowed on foreign cities and people; and, in effect, it was little more than a title.

MUNICIPAL *cities*, *municipia*, were thoſe whoſe inhabitants were capable of civil offices in the city of Rome.

Theſe, however, according to Mariana, came ſomewhat ſhort of the privileges of the colonies. They were towns or cities, which had the citizenſhip of Rome beſtowed upon them, and yet ſtill lived according to their own laws and conſtitutions; whereas the colonies were governed by the Roman laws.

They had no ſuffrages, or votes, at Rome, but were left to be governed by their own laws and magiſtrates. It is true, ſome few *municipal* cities, by particular merit, &c. obtained the liberty of votes; which occaſioned that received diſtinction of *municipium ſine ſuffragio*, & *municipium cum ſuffragio*.

They were ſo called, becauſe *muneris hujus honorarii participes*; but by *munus honorarium* was meant no more than the bare appellation of a Roman, whereby they were privileged to fight in a legion, as denizens; and not in auxiliary bands, as aſſociates. The firſt who had this honour were the Cærites.

MUNICIPAL, among us, is now applied to the cuſtomary laws, that obtain in any particular city or province, and which have no authority in the neighbouring places. See LAW.

MUNICIPAL *officers* are thoſe elected to defend the intereſts of cities, their rights and privileges, and to maintain order and good policy: as mayors, ſheriffs, conſuls, bailiffs, &c.

In Spain, the *municipal* offices are bought; in England, they are obtained by election.

MUNIMENTS, or MINIMENTS, the evidences, or writings, whereby a man is enabled to defend the title of his eſtate.

Wrangford ſays, the word *muniment* includes all manner of evidence, deeds, charters, &c.

MUNIMENT-*houſe*, a little ſtrong apartment in cathedral and collegiate churches, caſtles, colleges, or the like, deſtined for keeping the ſeal, evidences, charters, &c. of ſuch church, colleges, &c. called *muniments*, or *miniments*.

MUNIMINA, formed of the Latin *munio*, *I defend* or *ſtrengthen*, the grants or charters of kings and princes to churches: ſo called, becauſe *cum eis muniuntur* againſt all thoſe who would deprive them of thoſe privileges.

MUNIONS, in *Architecture*, the ſhort upright poſts, or bars, which divide the ſeveral lights in a window-frame.

MUNITION, or AMMUNITION, the proviſions wherewith any place is furniſhed, in order for defence, or wherewith a veſſel is ſtocked for a voyage: or thoſe that follow a camp for its ſubſiſtence. See AMMUNITION.

MUNITION-*bread* is the proportion of bread diſtributed every day to the ſoldiers of a garriſon, or army. Each officer is allowed ſo many rations of *munition-bread*.

MUNITION-*ſhips*, in the *Navy*, thoſe which have ſtores on board, to ſupply the neceſſaries to a fleet of men of war at ſea.

In the time of an engagement, all the *munition-ſhips* and victuallers attending the fleet are to take their places and proper ſtations in the rear of all the reſt, and not engage in the fight, but attend ſuch directions as ſhall be ſent unto them, at all times, by the admiral.

MUNNY-*ſheller*, in *Natural Hiſtory*, a name given by the natives of the Eaſt Indies to a ſpecies of red orpiment, which they have plentifully there. It is of a glowing colour, and has a great many ſhining ſpangles in it. They give this in fevers, after it has been calcined: it firſt melts in the fire, and then emits copious white fumes, ſmelling like thoſe of arſenic. Theſe are ſuppoſed to contain the poiſonous parts of it, and it then becomes a ſafe internal medicine, and is given with great ſucceſs.

MUNTINGIA, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the empalement of the flower is cut into five ſegments; the flower has five heart-ſhaped petals inſerted in the empalement, which ſpread open like a roſe, and it has a great number of ſtamina; in the centre is ſituated a roundiſh germen, having no ſtyle, but is crowned by a ſtigma, divided into many parts; the germen turns to a berry with five cells, filled with many ſeeds. Miller enumerates three ſpecies, natives of the Weſt Indies; but Linnæus mentions only one.

MUNYCHIA, Μȣνυχια, in *Antiquity*, an anniverſary ſolemnity at Athens, upon the ſixteenth of the month *Munychion*, in honour of Diana, ſurnamed *Munychia*.

MUNYCHION, Μȣνυχιων, in *Chronology*, the tenth month of the Athenian year. It contained twenty-nine days, and anſwered to the latter part of our March and beginning of April. See MONTH.

It had its name from the feſtival *Munychia*, kept in it.

MUPHTI, or MUFTI, the chief or patriarch of the Mahometan religion, reſiding at Conſtantinople.

The *muphti* is the ſovereign interpreter of the Alcoran, and decides all queſtions of the law.

He takes place of the baſhaws; and his authority is often terrible to the grand ſignior himſelf. It is he who girds on the ſword to the grand ſignior's ſide; which ceremony anſwers to the coronation of our kings.

MURÆNA, in the Artedian ſyſtem of *Ichthyology*, the name of a genus of fiſhes, the characters of which are theſe: they are of the malacopterygious or ſoft-finned kind; the branchioſtege membrane on each ſide contains ten ſlender and curved bones; but the ſkin is ſo thick, that theſe are not eaſily diſtinguiſhed before that is pulled off; the foramina of the noſtrils are two, and are placed in the very ſummit of the ſnout, one on each ſide; the body is long and cylindric; in ſome ſpecies there are three fins, in others two, and in others only one.

The ſpecies of *muræna* enumerated by Artedi, are ſix. See **Eel.**

The *muræna* in the Linnæan ſyſtem is a genus of the *apodes*, diſtinguiſhed by a ſmooth body, tubulous noſtrils, ten bones in the branchioſtege membrane, eyes covered with a ſkin, a roundiſh body, and ſpiracles near the head or pectoral fins, comprehending ſeven ſpecies.

It is to be obſerved, that the dictionaries uſually give us the word lamprey, as the Engliſh of *muræna*: but the *muræna* and lamprey called by the Latin authors *lampetra*, are two very different fiſhes. See **Lamprey.**

Muræna is originally Greek, and is derived from the verb μυρειν, *to flow*, or be ſlippery, and expreſſes the manner in which its ſlipperineſs makes it roll about, and eſcape the catcher, by ſlipping through his fingers.

Muræna is uſed by Albertus for the common ſmall lampern, the *lampetra parva fluviatilis* of authors. This is one of the petromyza of Artedi, and is diſtinguiſhed by the having only one row of very ſmall teeth in the verge of the mouth, beſides the larger lower ones.

MURAGE, *muragium*, in our *Cuſtoms*, a reaſonable toll to be taken of every cart or horſe coming laden into a city or town, for the building or repairing the walls thereof.

MURAL, ſomething belonging to a *wall*; which the Latins call *murus*.

Mural *crown*, among the ancient Romans. See **Crown.**

Mural *arch* is a wall, or walled arch, placed exactly in the plane of the meridian, i. e. upon the **meridian** *line*, for the fixing of a large quadrant, ſextant, or other inſtrument, to obſerve the meridian altitudes, &c. of the heavenly bodies.

Tycho Brahe was the firſt who uſed a *mural arch* in his obſervations; after him Hevelius, Mr. Flamſteed, De la Hire, &c. uſed the ſame means. See a deſcription of the *mural arch* at Greenwich, conſtructed by Mr. Graham, in Smith's Optics, book iii. c. 7. with the improvements of Mr. Bird, in the Method of conſtructing *Mural* Quadrants, publiſhed by the commiſſioners of longitude, 1768.

MURDER. See **Murther.**

MURDERING-*battery*. See **Battery.**

MURE, *counter*. See **Counter**-*mure*.

MURENGERS, two officers of great antiquity in the city of Cheſter; being two of the principal aldermen choſen yearly to ſee the walls kept in good repair, and to receive a certain toll and cuſtom for the maintenance thereof.

MUREX, in *Natural Hiſtory*, the name of a genus of ſhell-fiſh, of the *teſtacea* order of worms in the Linnæan ſyſtem, the characters of which are theſe: it is an univalve ſpiral ſhell, beſet with ſharp ſpines and tubercles, with a rough clavicle exerted near the ſummit in moſt ſpecies, but in ſome depreſſed: the mouth is always expanded, and ſometimes has teeth, ſometimes not; the lip is ſometimes digitated, ſometimes elated or folded, or jagged; and the columella is ſometimes rough, ſometimes ſmooth. The animal inhabiting this ſhell is the limax. See *Tab. of Shells*, N° 13.

Notwithſtanding that this is the general character of the *murex*, and that all the ſpecies have an oblong mouth, and the body covered with tubercles, there are, under this extenſive character, four ſpecific variations of figure, which are very obſervable. The firſt is ſeen in the elated *murex*, which has no ſpines; the ſecond is in the ſpider-ſhell, which has very remarkable ſeries of fingers or hooks; the third is the helmet-ſhell, which is a true triangular *murex*; the laſt is a furrowed *murex*, which has no wings, nor protuberances, nor ſpines, but has a flat head, and an oblong dentated mouth. Hiſt. Nat. Eclairc. p. 290. Aldrovand. Rondelet. Rumphius.

On the firſt examination of ſeveral of the ſpecies of helmet-ſhell, the outer coat of which is ſmooth, it would be natural to refuſe them any place among the *murex* claſs; but when we ſee the oblong ſhape of the mouth, and find that it is furniſhed with teeth, and afterwards obſerve the rudiments of tubercles which are to be ſeen on the mouth ſide, we ſhall perceive that they are all true *murices*, though leſs prickly than the others.

The ancients were furniſhed with their fineſt purple dye from a fiſh of the *murex* kind, and therefore expreſſed the purple colour by the word *murex*.

The family of the *murex* being very extenſive, it may be proper to divide them into ſome ſeparate ſeries from the general common marks of certain numbers of the ſpecies. 1. Some have remarkably eminent tubercles and ſpines. 2. Some are nearly ſmooth, but have a rough clavicle, and a crooked beak. 3. Some have digitated lips. And, 4. Some have alated and laciniated lips. Linnæus enumerates no leſs than ſixty-one ſpecies of the *murex*.

Murex, among the ancient Romans, a caltrap, or iron inſtrument, with ſharp points every way, uſed as a defence againſt the enemies horſe.

Murex *mutiani*, a name given by ſome authors to the genus of ſhells, known at this time under the name of *porcelains* and *conchæ venereæ*. See **Porcelain**-*ſhell*.

MURINA, or **Murines**, μυρινης οινος, in *Antiquity*, a delicious ſweet wine, medicated with ſpices. It was a kind of **hippocras**, and the uſual drink of the ladies.

MURING, the walling, or raiſing the wall of a building. See **Wall.**

MURORUM *domeſticus*. See **Domesticus.**

MURRA, among the *Ancients*, a foſſile ſubſtance, found in Parthia and Carmania, of a fine ſmell, and beautiful variety of colours.

It was thought to be ſome humour condenſed in the earth by the heat of the ſun. See **Murrhine.**

Murra was likewiſe a dry perfume, made of the *murra* reduced to powder.

MURRAIN, *gargle*, a mortality, or contagious diſeaſe among cattle.

Murrains are occaſioned various ways, but principally by a hot, dry ſeaſon; or rather by a general putrefaction of the air, which begets an inflammation in the blood, and a ſwelling in the throat, with other ſymptoms: the diſeaſe ſoon proves mortal, and is communicated from one to another.

The ſymptoms are, generally, a hanging down, or ſwelling, of the head, rattling in the throat, ſhort breath, palpitation of the heart, ſtaggering, abundance of gum in the eyes, &c. breath hot, and tongue ſhining.

The moſt remarkable *murrain* we hear of, is that mentioned in the Philoſophical Tranſactions; which ſpread itſelf through Switzerland and Germany, into Poland, &c.

The contagion ſeemed to propagate itſelf in form of a blue miſt, which fell on the graſs where the cattle grazed, inſomuch that whole herds returned home ſick; and being very dull, and forbearing their food, moſt of them died away in twenty-four hours time. On diſſection, there were found large corrupted ſpleens, ſphacelous and corroded tongues, &c. Thoſe people who managed them, without a due regard to their own health, were infected by them, and died like the beaſts.

Some imagine it had its riſe from noxious vapour's thrown out of the earth in three diſtinct earthquakes, perceived in the neighbourhood of the place where it began; though Dr. Slare rather thinks it owing to ſwarms of volatile inſects. The antidote for the ſound, and the medicine for the ſick, were the ſame; viz. equal parts of ſoot, gunpowder, brimſtone, and ſalt, with as much water as would waſh it down: a ſpoonful was a doſe. See **Oxen.**

MURRE, in *Ornithology*, a name given in ſome parts of England to the razor-bill. See **Alka.**

MURREY, in *Heraldry*, a kind of purple-colour; called alſo *ſanguine*.

MURRHINA, in *Antiquity*, a kind of ſweet medicated wine.

MURRHINE, **Murrhinus**, Μοῤῥινος, in *Antiquity*, an appellation given to a delicate ſort of ware, brought from the Eaſt, whereof cups and vaſes were made, which added not a little to the ſplendor of the Roman banquets.

Critics are divided concerning the matter of the *pocula*, or *vaſa murrhina*, *murrina*, or *murrea*. Some will have them to have been the ſame with our porcelain, or china-ware.

The generality hold them to have been made of ſome precious kind of ſtone; which was found chiefly, as Pliny tells us, in Parthia, but more eſpecially in Carmania. Arrian tells us, that there was a great quantity of them made at Dioſpolis in Egypt. This he calls another ſort of *murrhina* work; and it is evident, from all accounts, that the *murhina* of Dioſpolis was a ſort of glaſs-ware, made in imitation of the porcelain or *murrha* of India. There is ſome difference in the account given by Pliny and Martial of the *murrhina vaſa*. The firſt author ſays, that they would not bear hot liquors, but that only cold ones were drank out of them. The latter, on the other hand, tells us, that they bore hot liquors very well. If we credit Pliny's account, their porcelain was much inferior to our's in this particular. Some conjecture them to have been of agate, others onyx, others of coral. Baronius, doubtleſs, was fartheſt out of the way, when he took them to be made of myrrh, congealed and hardened. Some have ſuppoſed theſe veſſels to be made of cryſtal, but this is contrary to the account of all the ancients.

The Greeks had the words κρυϛαλλος for cryſtal, and σμυρνη for myrrh, very common among them, and thered fore if theſe veſſels had been made of either of theſe ſubſtances, they would in ſome places have called them *ſmyrnina* or *cryſtallina*. On the contrary, the moſt correct among them call them *murrhina* or *morrina*. The cups made of cryſtal, which were alſo in uſe at thoſe times, were called *cryſtallina*, and theſe *murrhina* or *murrhæa*, by way of keeping up the diſtinction; and Martial tells us, that the ſtone they were made of was ſpotted or variegated, calling them *pocula maculoſæ murræ*. And Statius mentions the cryſtalline and *murrhine* cups in the ſame ſentence, but as different things, not the ſame. Arrian mentions alſo the λιθος μοῤῥια, which his interpreters cenſure as an error of the copies, and would alter into *myrrha*, the name of the gum *myrrh*.

Pompey is recorded as the firſt who brought theſe *murrhine* veſſels out of the Eaſt, which he exhibited in his triumph, and dedicated to Jupiter Capitolinus. But private perſons were not long without them. So fond, in effect, did the Roman gentry grow of them, that a cup which held three ſextaries was ſold for ſeventy talents. T. Petronius, before his death, to ſpite Nero (or as Pliny expreſſes it, *ut menſam ejus exhæredaret*, to diſinherit his table), broke a baſon, *trulla murrhina*, valued at three hundred talents, on which that emperor had ſet his heart.

MURROBATHRARII, among the Romans, a kind of perfumers. See MURRA.

MURTHER, or MURDER, the act of killing another with violence and injuſtice.

The word comes from the Saxon *morth*, *death*; which ſome will have to ſignify a violent death; whence the barbarous Latin *murdrum*, and *mordrum*.

Among the number of popular errors, is the notion which has obtained, that the dead body would bleed in the preſence, or upon the touch of the *murderer*.

The crime of *murder* is puniſhed with death in almoſt all nations.

MURTHER, in our *Law*, is that ſpecies of criminal HOMICIDE, which denotes a wilful and felonious killing another upon prepenſed malice, whether ſecretly or openly, and whether Engliſhman or foreigner living under the king's protection.

In order to conſtitute the crime of *murder*, it muſt be committed by a perſon of ſound memory and diſcretion: for a lunatic and infant are incapable of committing any crime: beſides, the unlawfulneſs of this crime ariſes from the killing without warrant or excuſe; and there muſt be alſo an actual killing to conſtitute *murder*; and this may be by poiſoning, ſtriking, ſtarving, drowning, and a thouſand other forms of death; the moſt deteſtable of which is POISON, becauſe it is the leaſt capable of being prevented either by manhood or forethought. There was alſo, by the ancient common law, one ſpecies of killing held to be *murder*, which is hardly ſo at this day, nor has there been any inſtance wherein it has been held to be *murder* for many ages paſt, i. e. by bearing falſe witneſs againſt another, with an expreſs premeditated deſign to take away his life, ſo as the innocent perſon be condemned and executed. The Gothic laws puniſhed in this caſe the judge, the witneſſes, and the proſecutor; and, among the Romans, the *lex Cornelia, de Sicariis*, puniſhed the falſe witneſs with death, as being guilty of a ſpecies of aſſaſſination. If a man does ſuch an act, of which the probable conſequence may be, and eventually is death; ſuch killing may be *murder*, although no ſtroke be ſtruck by himſelf. In order to make the killing *murder*, it is requiſite that the party die within a year and a day after the ſtroke received, or cauſe of death adminiſtered; in the computation of which the whole day upon which the hurt was done ſhall be reckoned the firſt. Farther, the perſon killed muſt be a reaſonable creature in being, and under the king's peace, at the time of the killing; and, therefore, to kill an alien, a Jew, or an outlaw, who are all under the king's peace or protection, is as much *murder* as to kill the moſt regular born Engliſhman, except he be an alien-enemy, in time of war. To kill a child in its mother's womb, is now no *murder*, but a great miſpriſion; but if the child be born alive, and dieth by reaſon of the potion or bruiſes it received in the womb, it is *murder* in ſuch as adminiſtered or gave them. But as there is one caſe where it is difficult to prove the child's being born alive, namely, in the caſe of the *murder* of baſtard children by the unnatural mother, it is enacted by 21 Jac. I. c. 27. that if any woman be delivered of a child, which if born alive ſhould by law be a baſtard, and endeavours privately to conceal its death, by burying the child, or the like, the mother ſo offending, ſhall ſuffer death, as in the caſe of *murder*, unleſs ſhe can prove by one witneſs at leaſt, that the child was actually born dead. But it has been uſual, upon trials for this offence, to require ſome ſort of preſumptive evidence, that the child was born alive, before the other conſtrained preſumption, that the child, whoſe death is concealed, was therefore killed by its parent, is admitted to convict the priſoner. Moreover, the killing muſt be committed with malice aforethought, to make it the crime of *murder*; and this malice prepenſe may be either expreſs or implied in law. Expreſs malice is, when one, with a ſedate, deliberate mind, and formed deſign, doth kill another; which formed deſign is evidenced by external circumſtances diſcovering that inward intention; as lying in wait, antecedent menaces, former grudges, and concerted ſchemes, to do him ſome bodily harm. This takes in the caſe of deliberate DUELLING. Alſo, if upon a ſudden provocation one beats another in a cruel and unuſual manner, ſo that he dies, though he did not intend his death, yet he is guilty of *murder* by expreſs malice. Such is alſo a perſon going deliberately with a horſe uſed to ſtrike, or diſcharging a gun, among a multitude of people. So if a man reſolves to kill the next man he meets, and does kill him, it is *murder*, although he knew him not; for this is univerſal malice. And if two or more come together to do an unlawful act againſt the king's peace, of which the probable conſequence might be bloodſhed; as to beat a man, commit a riot, or to rob a park, and one of them kills a man, it is *murder* in them all, becauſe of the unlawful act, the *malitia præcogitata*, or evil intended beforehand. Farther, the law will imply malice in many caſes where none is expreſſed; as, where a man wilfully poiſons another, though no particular enmity can be proved; and in the caſe of a man's killing another ſuddenly, without any, or without a conſiderable provocation. Thus alſo if one kills an officer of juſtice, in the execution of his duty, or any of his aſſiſtants, knowing his authority, and the intention with which he interpoſes, the law will imply malice, and the killer ſhall be guilty of *murder*. And if one intends to do another felony, and undeſignedly kills a man, this is alſo *murder*. In a word, we may take it for a general rule, that all HOMICIDE is malicious and amounts to *murder*, unleſs where juſtified by the command or proviſion of the law; excuſed on a principle of accident or ſelf-preſervation; or alleviated into manſlaughter, by being either the involuntary conſequence of ſome act, not ſtrictly lawful, or (if voluntary) occaſioned by ſome ſudden and ſufficiently violent provocation.

Formerly, *murder* was reſtrained to a clandeſtine and treacherous killing. Thus, *Murdritus homo antiquitus dicebatur, cujus interfector neſciebatur ubicumque, vel quomodocumque eſſet inventus. Nunc adjunctum eſt, licet ſciatur quis* murdrum *fecerit, homocidium per proditionem.* Leges Hen. I. *Arthurum nepotem propriis manibus per proditionem interfecit, peſſimo mortis genere, quod Angli* murdrum *appellant.* Matth. Paris, an. 1216.

The puniſhment of *murder*, and that of MANSLAUGHTER, were formerly one and the ſame, both having the benefit of clergy; ſo that none but unlearned perſons, who leaſt knew the guilt of it, were put to death for this enormous crime. But now, by 23 Hen. VIII. c. 1. & 1 Edw. VI. c. 12. the benefit of clergy is taken away from *murder* through malice prepenſe. See *Hanging in* CHAINS. Blackſt. Comm. book iv. p. 194, &c.

MURTHER, *appeal of*. See APPEAL.

MURTHER, *ſelf*, is otherwiſe called *ſuicide*. See FELO *de ſe*.

MURTHERERS, or MURTHERING-*pieces*, are ſmall pieces of ordnance, either of braſs or iron, having chambers put in at their breeches.

They are moſtly uſed at ſea, at the bulk he[illegible] fore-caſtle, half-deck, &c. in order to clear the decks when an enemy boards the ſhip.

MURUCUJA, in *Botany*. See PASSION-*flower*.

MURZAROLT, in *Falconry*. See FALCON.

MUS, the *mouſe*, in the Linnæan ſyſtem of *Zoology*, makes a diſtinct genus of animals, of the order of the glires, and taking in the whole family of the mouſe and rat-kind. The generical characters are, that the lower fore-teeth are awl-ſhaped; of which Linnæus enumerates twenty-one ſpecies.

Of this genus there are ſeveral diſtinct kinds. 1. The *common rat*, or *mus rattus* of Linnæus. This is a too well known animal; its colour is a duſky browniſh grey; its tail is compoſed of a multitude of rings, not leſs than a hundred and ſixty. Rats deſtroy and devour one another; but their greateſt enemy is the weaſel.

2. The *water-rat*, or *mus amphibius* of Linnæus. This is much larger than the common *rat*, and is ſomewhat of a reddiſh brown colour; its feet have each five toes, but not webbed, as Ray and Linnæus imagined; its tail alſo is much ſhorter, and all the way of the ſame thickneſs, not tapering off, but ſeeming as if cut off in the middle, covered with ſhort black hairs, and the tip whitiſh; its teeth are alſo much longer, and of a pale yellowiſh colour; it has a thick blunt noſe, ears hid in its fur, and ſmall eyes; it burrows on the banks of rivers and ponds,

and wet ditches; and feeds on ſmall fiſh, and the fry of greater, on frogs, inſects and roots; and is itſelf the prey of the pike.

3. The *muſk rat*. This, which is the *caſtor zibethicus* of Linnæus, is about the ſize of our common *rat*; its hair is long, and very thick ſet; its back black, and its ſides and belly grey; the head is ſmall, and the noſe long and ſharp, as if intended, like that of the hog, for digging up the earth; its mouth does not open very wide; its eyes are extremely ſmall, and its jaws adorned with a number of long grey hairs all along the opening of the mouth; its tail is as long as its body, and is flatted and beſet with a few ſcattered hairs; its feet are divided into five toes, the larger ones connected by a membrane to aſſiſt the creature in ſwimming, and the hinder legs are ſomewhat longer than the ſore ones. This creature is common in Ruſſia, and has a very ſtrongly perfumed ſmell like that of muſk. Ray's Syn. Quad. p. 217.

4. The common *mouſe*, or *mus muſculus* of Linnæus. This is too well known to need any deſcription; but it is diſtinguiſhed from the reſt of the genus by its ſmallneſs, and its prominent large eyes. Its colour is a duſky grey on the back, and a whiter grey on the belly. This animal, when found white, is very beautiful; its full bright eye appearing to great advantage amidſt the ſnowy fur.

5. The *larger mouſe*. This is of twice the ſize of the common *mouſe*, and is uſually found in caverns of the earth in the fields, though ſometimes alſo in houſes; its back is of a mixed colour of black and tawny; its belly very white; and there is an even line drawn along each ſide, which ſeparates the two colours; the head is longer than that of the common *mouſe*, and the eyes larger and more prominent; the ears are rounder and wider; and the tail very long, and covered with ſhort hairs, black on the upper part, and white underneath; the legs alſo are longer than the common *mouſe*; and there are ſix tubercles in the bottom of the foot.

6. The *great headed field-mouſe*, or *mus terreſtris* of Linnæus. This is larger than the common *mouſe*, and its head is remarkably large in proportion to its ſize; its noſe is ſhort and blunt; its eyes ſmall, and not prominent; and its ears ſhort, broad, and roundiſh, and almoſt entirely hid in the fur, which is much deeper than that of the common *mouſe*. This has alſo a much longer body, and its tail is remarkably ſhort, and is thinly covered with hairs; its legs alſo are very ſhort; its back is of a very deep and duſky brown, with a mixture of yellow; and its belly is of a ſort of lead colour, the points of all the hairs being white, and their bottoms black. It is common in dry paſtures, and is abundantly diſtinguiſhed from all the other kinds by the thickneſs of its neck and ſhoulders, and the ſhortneſs of its tail.

7. The *great long-tailed field-mouſe*, or *mus ſylvaticus* of Linnæus. This is very nearly of the ſize of a rat; its tail is very long, and its ears ſhort and round; its head is thick, and the noſe not ſharp, as in moſt of theſe creatures, but ſhort and rounded, and is of a deep brown, with ſome mixture of red at the ſides; and it has a ſort of beard of long hairs between the mouth and the eyes.

8. The *dormouſe*, or ſleeper, called *mus avellanorum* by many authors, and *ſorex* by Pliny. Of this there are two diſtinct kinds, a greater and a ſmaller. See Dormouse.

The other kinds are, 9. Citellus. 10. The Cricetus. 11. The Marmotta. 12. The Guinea *pig*. 13. The Aguti. 14. Paca. 15. The *leming*, *ſable* MOUSE, or Norway rat. 16. The Glis. 17. The *Javan* HARE, 18. The *monax*, or American *marmotta*. 19. The *mus jaculus*, or JERBOA and KANGUROO. 20. The *mus gregarius*. 21. The *mus volans*, or SCIURUS. Beſide theſe there is alſo another variegated kind, known by the name of the *ſtriated Indian tree-mouſe*, which is very rare, but is ſometimes found in the cabinets of the curious.

Mus *Alpinus*, in *Zoology*, a name given by many authors to the mountain-rat, more commonly known by the name of the Marmotte.

Mus *araneus*. See Shrew.

Mus *marinus*. See Aphrodita.

Mus *Norwegicus*, in *Zoology*, the name given by authors to the Norway rat, commonly called the *leming*. See *Sable*-Mouse, and *Norway* Rat.

Mus *Pharaonis*, *Pharaoh's rat*, a name given by the people of Egypt to the ICHNEUMON, a creature of the weaſel kind, which they are very fond of for its deſtroying ſerpents, and kept tame about their houſe, as we do cats.

Mus *terræ*, in *Botany*, a name given by ſome authors to the roots of the *bulbocaſtanum*, or earth-nut; it was probably at firſt *muris terræ radix*, the *earth-mouſe's root*, and ſo called from the *earth-mice* or *field-mice* being very fond of them; but the word *radix* being left out, it ſtands only *mus terræ*.

MUSA, in *Botany*. See Plantain-*tree*.

MUSADA, a name given by ſome chemical writers to SAL *ammoaiaca*.

MUSCA, the *fly*, in the *Hiſtory of Inſects*. See Fly.

Musca, *crabroniformis* and *rapax*, names ſometimes uſed for the hornet-fly. See Asilus.

Musca *veſpiformis*, the waſp-fly. See Asilus.

Musca, in *Aſtronomy*. See Apis.

Musca, in *Antiquity*, a deſignation given to paraſites, buffoons, &c. who intruded themſelves into the company of thoſe that deſpiſed them, or found means to be admitted to entertainments where they were not welcome.

MUSCADINE, a rich wine, of the growth of Provence, Languedoc, Cividad, &c.

The word, as well as the liquor, is French: ſome fetch its original from *muſk*, the wine being ſuppoſed ſo have a little of the ſmell of that perfume: others from *muſca*, a *fly*, becauſe the flies are extremely fond of its grapes; as the Latins had their *vinum apinum*, ſo called, *ab apibus*, from the bees which fed on the grapes it was made of.

The way of making *muſcadine* at Frontignac is as follows: they let the *muſcadine* grapes grow half dry on the vine, and, as ſoon as they are gathered, they tread and preſs them immediately, and tun up the liquor, without letting it ſtand and work in the vat; the lee occaſioning its goodneſs. Phil. Tranſ. abr. vol. ii. p. 657.

MUSCÆ is uſed for officers of the popiſh inquiſition, who feign themſelves of the ſect of the priſoners, in order to draw a confeſſion of their opinion from them, and thereby betray them; there being perſons placed to overhear their converſation. See Musca.

Muscæ *volitantes*, in *Optics*, dark irregular veins and ſpots, ſeeming to fly before the eyes of many people, eſpecially on looking at bright objects, ſuch as white paper, the ſky-light, the candle, &c. Theſe have only the appearance of cobwebs, ſometimes that of ſmoke, duſt, &c. The reſemblance of many of theſe ſpots to flies has given them the name of *muſcæ volitantes*, q. d. *flies flying about*.

This phenomenon is not eaſy to account for. Some will have its cauſe to lie in the aqueous humour; others in the retina. Monſ. de la Hire's acccount of them is this: they are of two ſorts; ſome permanent, which, in fixing the eye upon a point of an object, appear always fixed in the ſame ſituation to that point; others ſeem to fly about, and to change their ſituation, though the eye be fixed. The ſhapes of both ſorts are changeable: the firſt ſort are commonly like a dark ſpot upon a white ground; the ſecond ſort appear like the knots of a deal board; ſome parts of them being very clear, and ſurrounded with dark threads, they are alſo attended with long fillets of irregular ſhapes, which are bright in the middle, and terminated on each ſide by parallel black threads. On fixing the eye upon an object, they appear to deſcend gradually, eſpecially after ſhaking the head ſuddenly.

The ſpots that appear fixed in reſpect to the axis of the eye, muſt, for that reaſon, be cauſed by ſome diſorder in a correſponding part of the retina, or in ſome part of the vitreous humour lying pretty cloſe to the retina. For an opacity of the coats or humours in any part remoter from the retina, by intercepting ſome part of the rays of every pencil, could only cauſe an uniform obſcurity or faintneſs of light in every place of the retina, and not a total defect of it in any particular place. Hence M. de la Hire attributes the cauſe of theſe permanent ſpots to ſmall drops of extravaſated blood upon the retina.

But he finds it more difficult to account for the moving ſpots. When the rays of the ſun are tranſmitted through a piece of bad glaſs, and fall upon white paper, the ſhadows of the little ſands, veins, and irregularities in it, appear not unlike thoſe ſpots. He therefore imagines the aqueous humour is ſometimes troubled with ſome little mothery, ropy ſubſtance; ſome parts of which, by the figures of their little ſurfaces, or by refractive powers, different from the humour itſelf, may caſt their diſtinct images upon the retina. He ſuppoſed them in the aqueous humour rather than the vitreous; becauſe of its greater fluidity for a freedom of deſcent, and becauſe they will then appear to deſcend, as being ſituated before the pupil, or at leaſt before the place of the interſection of the pencil. But if this heterogeneous mother be in the vitreous humour, it muſt be lighter than this humour, ſo that after a ſudden ſhake of the head, it may firſt deſcend a little, and then aſcend gradually, to cauſe the gradual apparent deſcent above mentioned.

Theſe ſpots are obſerved to change their figures, ſometimes in two or three hours, at other times not in two or three days; and to appear more numerous at one time than another. Dr. Smith's Optics, in the Remarks, art. 27, ſeq.

We have an inſtance in the Philoſophical Tranſactions, N° 384. of thoſe fixed ſpots above mentioned. A woman, who, in looking with the left eye only, at three ſhort words in print, could ſee the extremes, but not the middlemoſt; and, in looking with the right eye only, at the middle between four ſhort words, could ſee but three of them; one of the two middlemoſt being covered with a dark round ſpot; but in looking with both eyes ſhe could ſee them all.

Pitcairn denies the cauſe of the *muſcæ volitantes* to lie in the aqueous humour, and ſays it is owing to, and a ſign of, an internal inflammation of the veſſels of the retina. Heiſter thinks them owing to ſome obſtruction of thoſe veſſels; and both theſe authors, and many others, think them foſerunners of a gutta ſerena, or a cataract; and propoſe a cure by mercurials and decoctions of guaiacum. See Pitcairn's Elem. Medic. & Heiſter's Compend. Medic. Practic. Plempius has given a deſcription of the *muſcæ volitantes*, in his Ophthalmographia.

Dr. Porterfield in the Medical Eſſays of Edinburgh, obſerves that theſe ſpots may proceed from ſome little extravaſations, various ſwellings, or other defects in the retina, which, by intercepting the rays, will occaſion a defect in the picture; and by conſequence a ſimilar and correſponding defect or ſpot in the object. He obſerves alſo, that theſe ſpots commonly vaniſh, or at leaſt become leſs ſenſible, when the object is brought nearer the eye, and within the limits of diſtinct viſion. For the rays which are now exactly united upon the retina, by being more crowded, have their force augmented; by which means a ſenſible impreſſion is made upon the retina through theſe extravaſations. Hence theſe ſpots are moſt ſenſible to thoſe who have a ſmall pupil, aud eſpecially to thoſe who are ſhort or long-ſighted. Hence alſo, in a preſoytical eye, the ſpots which were formerly very ſenſible, become faint when the object is viewed through a convex glaſs; for by means of this glaſs more rays enter the eye, which being united exactly at its bottom, muſt ſtrike the retina ſtrongly enough to make a ſenſible impreſſion through theſe extravaſations, which will render the ſpots obſcure.

The learned doctor farther obſerves, that what has been ſaid with reſpect to theſe ſpots, when occaſioned by extravaſations, or defects in the retina, will alſo hold when they are occaſioned by a calloſity, or any degree of paralyſis or inſenſibility in ſome parts of the retina, by which the impulſe received from the rays is made leſs ſenſible.

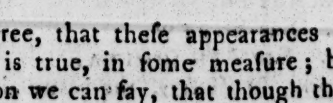
But, beſide theſe defects in the retina, there is another cauſe which may give occaſion to theſe ſpots, both in the *myopia* and *viſus ſenilis*; and that is certain ſmall opaque marks in the cornea itſelf, or any where within the eye, which, by intercepting ſome of the rays, muſt occaſion a defect in the picture, from which defect a kind of dark ſpot will be ſeen in the object. Thus, in the eye of a myops, if there be any opacity in the cornea, or within the eye which intercepts the rays B *b e*, C *c d*, and V L *a*, (*Tab*. V. *Optics*, *fig*. 81.) there will be a defect in the picture at *e*, *d*, and *a*; from whence alſo the external appearance will be deficient at the correſponding points E, D, and A; where by conſequence, dark ſpots will be ſeen. For it is to be obſerved, that there is not one point in the picture which is formed by a plurality of rays which meet at the point, but every ray goes to a different point of the picture, both in myopical and preſbytical eyes; and therefore, when any of the rays are intercepted, that part of the picture to which ſuch rays belong will not be illuminated, which muſt occaſion a correſponding defect in the appearance of the object. But in the perfect ſight, where the rays which come from the ſeveral points of the object, are ſo refracted as to meet again at ſo many correſponding points in the retina, every point of the picture is formed by a cone of rays, whoſe baſe is the pupil; and therefore, though ſome of thoſe rays be intercepted, yet no part of the picture will be darkened, and conſequently no defect will be ſeen in the object from any ſuch opacity in the cornea; or humours of the eye, unleſs this opacity be in the back part of the vitreous humour, where the pencil is narrow, and intercepts the whole pencil. This may be proved from the camera obſcura, by ſticking ſome ſmall patches on the glaſs. Theſe will not be perceived if the paper is placed at the due focal diſtance; but if the diſtance be greater or ſmaller, the ſpots will appear.

The doctor alſo obſerves, that theſe ſpots are not all of the ſame kind. He thinks that thoſe whioh change not their place with reſpect to the axis of viſion, proceed from ſome defect either in the retina or cornea, or in the vitreous and cryſtalline humours. As for thoſe which are in conſtant motion, he ſuppoſes them to ariſe from ſome corpuſcles floating in the aqueous humour.

Beſides theſe dark ſpots, there is another kind often met with, more bright and luminous than the object itſelf before which they appear. Theſe ſpots appear beſt by looking at diſtant bright objects, and are always of the ſame colour with the object. In the middle their colour is clear and ſtrong, ſurrounded by a dark ſhady border. They are commonly accompanied with certain irregular veins, which proceed from each ſpot, and which, as well as the ſpots themſelves, change their order and diſpoſition. Theſe veins are alſo of the ſame colour with the object, and being bright and luminous in the middle, are likewiſe terminated by a dark and obſcure edge. Theſe ſpots change their poſition with reſpect to the axis of viſion, according as the eye is differently moved, being ſometimes in the axis of viſion itſelf, and at other times to the right or left of this ſame axis; but when the eye is kept fixed in the ſame direction, they, as well as the dark kind of ſpots firſt mentioned, commonly deſcend gradually.

As to the cauſe of theſe brighter ſpots and veins, it ſeems that, firſt, they muſt proceed from ſome corpuſcles within the eye, which are at liberty to change their place, and which therefore muſt be ſuppoſed to float in the aqueous humour. Secondly, ſeeing theſe ſpots always deſcend when the eye is kept fixed, the corpuſcles from which they ariſe muſt aſcend; and are conſequently lighter than the aqueous humour in which they ſwim. Thirdly, theſe ſpots being more bright and luminous than the object, they cannot be occaſioned by any opaque corpuſcles, which by intercepting the rays would caſt a ſhade upon the retina. What therefore bids faireſt for producing theſe brighter ſpots and veins, is ſome ſmall, oily, diaphanous particles and filaments, which ſwim in the aqueous humour before the cryſtalline; for ſuch, by their lightneſs, will aſcend, when left to themſelves; and, by their greater refractive power, produce theſe luminous ſpots terminated by dark lines. That oily and ſulphureous ſubſtances, though leſs denſe than water, have a ſtronger refractive power, is evident from the obſervations of ſir Iſaac Newton. From which it follows, that the rays of light, which paſs through theſe oily particles, will meet ſooner behind the cryſtalline than the other rays; whence in a preſbytical eye, the rays of light which come from the ſeveral points of the object will not converge to ſo many other points in the retina, but behind it, by which the picture in the retina will be rendered more dark and obſcure; but the rays which paſs through theſe oily grains, by having their refraction increaſed, will meet nearly at the retina, where they will form ſmall luminous ſpots, ſurrounded with dark borders.

But we muſt here obſerve, that the ſame appearances happen to myopes; and this ſeems difficult to account for from this theory of the learned doctor.

Many medical authors have locked on the *muſcæ volitantes* as forerunners of a cataract, or gutta ſerena. And we ſuppoſe it cannot be denied, that many who have fallen into thoſe terrible diſorders have had thoſe appearances before their eyes; and hence they might have been taken for prognoſtics. But as it is no leſs certain, that many thouſands have the ſame appearances, and yet preſerve their ſight very well to the laſt, there ſeems to be no great reaſon to be alarmed about them; and far leſs ſhould people be running to quacks, and injuring their ſtomachs and conſtitutions by ill-judged phyſic on ſuch occaſions. St. Yves denies theſe appearances to be at all dangerous, and he thinks them owing to the ſeparation of ſome parts of the retina from the choroid. However, as the diſorder is troubleſome and alarming to the patient, he adviſes purgatives from time to time, and mellipedes. We can ſay, from experience, that neither mercurials, nor ſea-water, nor other purgatives, nor mellipedes, nor again Tunbridge or other chalybeate waters, have had any effect towards removing or diminiſhing theſe diſorders. A greater doſe of wine than uſual has been known to increaſe it for a little time; and Plempius has made the like obſervation. We ſhall only add, that ſeveral of theſe flying appearances reſemble little globules joined by threads, thus  ; and theſe globules appear in different numbers, and at different diſtances.

All authors agree, that theſe appearances change their figure, which is true, in ſome meaſure; but from our own obſervation we can ſay, that though they ſeem on a ſudden looking to the ſky, or other bright object, to vary in their figures; yet when they begin to deſcend, they return in one conſtant figure before we loſe ſight of them. On the whole it ſeems this phenomenon is not yet fully accounted for. The vaſcular form of moſt of theſe appearances, their reſemblances to ſmall veins or arteries, make it difficult to conceive them floating in the humours of the eye; and, on the other hand, their ſeeming contortions, and change of figure, on ſuddenly looking up, or ſhaking the head, make it no leſs difficult to conceive them fixed and obſtructed capillaries, as many authors ſuppoſe.

MUSCARI, in *Botany*. See *Muſk*, or *Grape* HYACINTH.

MUSCERDA, a name by which ſome authors have called mouſe-dung, a thing recommended by many as a purge for infants, and ſaid to be good in alopecias. Given in clyſters; it is ſaid to be of ſervice in many diſorders of the bowels, and externally applied, to be of great uſe in condylomata of the anus.

MUSCICAPA, in *Ornithology*, a name by which Aldrovand and ſome others have called the STONE-*chatter*, making that bird, which is properly an œnanthe, one of the ſpecies of that genus of the fly-catcher.

MUSCICAPA. See FLY-*catcher*.

MUSCLE, *muſculus*, in *Anatomy*, a fleſhy fibrous part of the body of an animal, deſtined to be the organ or inſtrument of motion.

The word is derived from the Greek *μυς*, or the Latin *mus*, or *mouſe*, on account of the reſemblance it is ſuppoſed to bear to a ſkinned mouſe. Dr. Douglas will have it from *μυειν*, to *ſhut*, or *contract*, that being the proper office of a *muſcle*.

The *muſcle* is a number of thin parallel plates; and is divided into a great number of faſciculi, or little *muſcles*, each incloſed in its proper membrane; from the internal ſurface whereof paſs an infinite number of tranſverſe filaments, which interſect the *muſcle* into ſeveral diſtinct areas, filled with their reſpective faſciculi or fibres. See *Tab. Anat.* (*Myol.*) *fig.* 1, 2, 3, 5, 7, &c.

A *muſcle* was uſually divided by the ancients into three parts, the *head*, the *tail*, and the *belly*. The *head* and *tail*, which are alſo called *tendons*, are the two extremes of the *muſcle*; whereof the firſt is fixed to the ſtable part, and the latter to the part intended to be moved. The *venter* or *belly*, is the body of the *muſcle*, being a thick, fleſhy part, into which are inſerted arteries and nerves, and out of which iſſue veins and lympheducts. However, the moderns, inſtead of the head and tail of a *muſcle* uſe the terms of beginning or origin, and inſertion. Some of the lateſt authors think it proper to call one end of the *muſcle* the fixed point or fulcrum, and the other the moveable point. But Mr. Winſlow obſerves, that the beſt and moſt ſimple diviſion of a *muſcle* is into the body or fleſhy portion, which in ſome *muſcles* may be termed the belly, and the extremities, whether tendinous, aponeurotic, or fleſhy.

Theſe ſeveral parts of a *muſcle*, the *belly* and the tendons, are compoſed of the ſame fibres: their only difference conſiſts in this, that the fibres of the tendons are more cloſely and firmly bound together than thoſe of the belly, which are more looſe. Hence in the belly there is room for a ſufficient quantity of blood to give them an appearance of redneſs; and the whiteneſs of the tendons only proceeds from the blood's being in ſome meaſure excluded by the tightneſs of their contexture. The difference, then, between the belly and the tendons, ſeems to be the ſame as between a ſkein of thread and a cord made of the ſame thread.

All the *muſcles* act by having their bellies inflated, or ſwelled; for by that means they are ſhortened; ſo as to draw, or preſs, the ſolid bodies to which they are ſo faſtened, according to the direction of their fibres. All the difficulty, then, in MUSCULAR *motion* is, to aſſign their fabric, and the cauſe of their ſwelling.

Every ſimple *muſcle*, then, conſiſts of one fleſhy belly, and two tendons; but it may be again divided into others, ſimilar, though leſs; and thoſe, again, into others, ſtill leſs, yet ſtill ſimilar to the great one; which diviſion may be carried on to a degree of ſubtility that exceeds all imagination; though it is reaſonable to think it muſt have an end. That laſt, therefore, being ſimilar to the firſt, muſt, in like manner, have its belly and tendons; and this is what we ordinarily call a *muſcular fibre*; in an aſſemblage, or union, of ſeveral whereof, a *muſcle*, properly ſo called, conſiſts.

Some take the *muſcular fibres* to be productions of the arteries and veins, or the capillaries of thoſe veſſels inoſculated with, and continued to, each other; by the intumeſcence of whoſe contents, the extremities are drawn nearer each other, and, by conſequence, the bone to which the moveable part is fixed, approximated to the other. But that they are, in truth, neither venous nor arterious, nor lymphatic veſſels, is evident from the laſt obſervation. Whether they are veſicular, or whether they only conſiſt of ſingle threads, may be ſtill a queſtion.

Dr. Boerhaave, from a conſideration that the nerves enter every *muſcle* along with its veins and arteries, and that there laying aſide their outer integument, they are ſo diſtributed through the whole body of the *muſcle*, as that no one point can be aſſigned wherein a part of them is not found; that thoſe nerves terminated here; and that in other parts of the body the extremities of the nerves are expanded, as it were into membranes; concludes, that the *muſcular fibres* are nothing elſe but extremely ſlender expanſions of the nerves, ſtript of their integument, hollow within, and of the figure of a *muſcle*, and full of a ſpirit communicated by the nerve from its origin in the brain, or cerebellum, by the continual action of the heart. Of theſe fibres united are formed faſciculi or bundles; which, again, have each their ſeveral membrane, wherein they are involved and kept diſtinct from others. This membrane is extremely ſlender and porous within, and is full of oil (which is accumulated in time of reſt, and ſpent in motion), furniſhed by the arteries; and this oil, in conjunction with a ſmooth mucous juice, ſecreted by ſmall mucilaginous glands, interſperſed among theſe faſciculi, ſerves to lubricate the parts, and to preſerve the faſciculi from fretting on each other. Now, beſides the nerves, there are arteries alſo carried into the *muſcles*, and thoſe in ſuch abundance, and of ſuch contexture, that a man might be inclined to think the whole body of the *muſcle* compoſed of them. Theſe are principally diſtributed among the faſciculi, and the membranes that ſeparate them, and, perhaps, alſo in the external ſurface of each fibrilla, where they terminate in reticular plexuſes, in little oily ſecretories, ſmall lymphatics, and, perhaps, in hollow fibrillæ, like nerves; which fibrillæ may again either terminate in the cavity of the nervous muſcular fibres, or make others like them. This, at leaſt, is clear, that every branch of an artery in the *muſcles* has its correſponding little vein, which united to the other, increaſes its bulk; whence the blood-veſſels or the *muſcles* are alſo lymphatics.

Of two ſuch *muſcles* as have been deſcribed, faſtened in oppoſite ſituations to each other, moſt of the *muſcles*, or pairs of *muſcles*, we know of, conſiſt.

It has been already obſerved that the tendons of a *muſcle* conſiſts of the ſame number of fibres with the *muſcle* itſelf; with this difference, that the cavities of the muſcular fibres diminiſhing, and loſing of their former diameter, they form one compact, hard, rough, dry, narrow body, which is but little vaſcular. From what has been ſaid, then, it appears, that the redneſs of a *muſcle* is owing to the blood; and its bulk to the fulneſs of the arteries, veins, oily cells, and lymphatics. Hence we ſee, why in old age, leanneſs, conſumptions, atrophies, conſtant heat, and hard labour, their redneſs, as well as bulk, are ſo diminiſhed; and yet in old age, leanneſs, &c. the motion remains. This may be effected when the *muſcles* have no redneſs, left; as appears in inſects, whoſe fleſh is not perceiveable.

The fibres, faſciculi, arteries, and nerves, may be ſeparated from each other in a living or dead body, without breaking: they are always in a degree of tenſion, and are endued with a contractive force, ſo that when cut aſunder, the ends fly back from each other, and then they become ſhorter, their bulk is leſſened, and they contract themſelves into an undular kind of ſurface, and throw off their proper juices. Hence it appears, that they are always in a ſtate of violence, and ever oppoſing their elongation, and ever endeavouring to ſhorten themſelves, but more in a living body than in a dead one; and therefore they require antagoniſts.

If the brain be ſtrongly compreſſed, or have any violent contuſion; if it be ſuppurated, obſtructed, or torn, the voluntary action of all the *muſcles* immediately ceaſes, as well as all ſenſe and memory: however, the ſpontaneous action of the *muſcles* in the heart, lungs, viſcera, and vital parts, remains. The ſame alterations being made in the cerebellum, the action of the heart, lungs, and life itſelf, ceaſes; when yet the vermicular motion continues a long time after in the ſtomach and inteſtines.

The nerve of any *muſcle* being compreſſed, tied up, corrupted, or cut, all the motion of that *muſcle*, both vital and voluntary, immediately ceaſes; and if a nervous trunk, ſending branches to ſeveral *muſcles*, be thus bound up, cut, &c. they are all affected in the ſame manner. The ſame things being done in any part of the ſpinal marrow, the action of all the *muſcles* whoſe nerves ariſe from the part affected, is deſtroyed, and the ſame thing being done to the artery which carries blood to one or more veſſels, the effect is the ſame.

The tendon of a *muſcle* in action does not undergo any ſenſible alteration; but the belly ſhortens, and becomes hard, pale, ſwoln, and protuberant: the tendons are approached nearer, and the more moveable part, faſtened to the tendon, is drawn towards the other leſs moveable; which action of a *muſcle* is called its *contraction*, which is much greater and ſtronger than that inherent contraction obſerved under the firſt phenomenon; and therefore is not natural, but ſuperadded. The tendon of a *muſcle* not in action is ſtill the ſame; but the belly is ſofter, redder, laxer, longer, and flatter; and this ſtate of a *muſcle* is called its *reſtitution*, though it is uſually owing to the contrary action of its antagoniſt; for that being fruſtrated, the contraction of the other continues, as not being ballanced by the action of an antagoniſt.

If one antagoniſt remain at reſt while the other is in action,

tion, the member, in that caſe, will be bent; if both act at the ſame time, it will be fixed and immoveable; if neither act, it will be indifferent, and ready to be moved whither the leaſt exceſs ſhall carry it.

All which changes are performed in the ſmalleſt moment of time, and in the whole *muſcle* at once; ſo that they can paſs and repaſs reciprocally, without leaving any trace in the body behind them.

By injecting warm water into the artery of a quieſcent *muſcle*, even that of a dead carcaſe, its contraction is reſtored, and that long after death. The bulk of a *muſcle* is increaſed rather than diminiſhed by every experiment of its contraction. A limb being bent by ſome external force, againſt the will, the flexor *muſcle* of that limb aſſumes the ſtate of contraction, as if acted by its proper motion, though not altogether ſo ſtrenuouſly.—The will remaining indifferent, all the voluntary *muſcles*, and all their veſſels, are equably full, and moved by the blood and ſpirits, equally conveyed to them, and that throughout the whole body at once.

For the application of this ſtructure of the *muſcles*, in accounting for the great phenomenon of *muſcular* motion, ſee MUSCULAR *motion*.

Mr. Winſlow, in his treatiſe on the *muſcles*, in his Expoſition anatomatique de la Structure du Corps humain, ſhews prodigious varieties in the actions of theſe organs of motion, which were never ſo much as hinted at before.

Dr. Waltherus, after comparing the *muſcles* of the human body with the deſcriptions of them publiſhed by ſeveral authors, particularly by Mr. Winſlow, has made ſeveral accurate remarks on them, which may ſerve as a ſupplement to his Anatome teneriorum *Muſculorum* repetita. Nov. Act. Erud. June 1733.

As to the muſcular fibres, or, which comes to the ſame, the faſciculi of muſcular fibres, they have not always the ſame ſituation with regard to each other, nor run in the ſame direction; but they ſometimes run parallel to themſelves and their tendons; and are ſometimes diſpoſed obliquely, both to their tendons, and to each other; hence there ariſe two different kinds of *muſcles*; the one direct and parallel, which ſome call *ſimple muſcles*; the other inclined or oblique, called *compound muſcles*.

Under the firſt of theſe kinds are included ſeveral other ſpecies: for, firſt, either the fleſhy fibres run ſtrait from one extreme to the other, as in the *ſartorius*, &c. or they are turned into a circle, as in the *ſphincters* of the bladder and anus; or twiſted into a ſpiral, as in the *œſophagus*: and hence they come to be called *recti*, *orbiculares*, and *ſpirales*.

The ſecond kind alſo includes various ſpecies, according to the various angles which the oblique fibres make with the tendons; ſome inclining equally to each tendon, ſo as to form a rhombus, or acute-angled parallelogram, with them: whence the *muſcles* are called *rhomboidales*; others, ariſing from two parallel tendons, are inſerted obliquely into one common tendon, as in the biceps of the hand; laſtly, others, ariſing from the periphery of the circle concur in a centre, and form *muſcles* called *radiæi*.

There are divers other ſpecies and diviſions of *muſcles*. Some authors diſtinguiſh them into *muſcles of voluntary*, and of *involuntary* or *neceſſary motion*.

MUSCLES *of involuntary* or *neceſſary motion* have their contracting or extending powers within themſelves, and have no antagoniſt: ſuch are the heart and lungs ſuppoſed to be.

MUSCLES *of voluntary motion*, which we more peculiarly denominate *muſcles*, and which are thoſe we have here chiefly regard to, have each of them their antagoniſt *muſcles*, which act alternately in a contrary direction; the one being ſtretched and extended while the other is contracted at the inſtance of the will.

The *muſcles* alſo have different names from their different actions, ſituations, forms, &c. Thoſe which ſerve to move the ſame members contrary ways, are called *antagoniſts*; and thoſe that concur to the ſame action, *fellows* or *pairs*.

MUSCLES, *acceleratory*. See ACCELERATOR.

MUSCLES, *digraſtic*, are thoſe which have two bellies. *Trigaſtrics*, thoſe with three.

MUSCLES, *ſphincter*, are thoſe deſtined to ſhut ſeveral apertures and paſſages of the body, as the *muſcles* at the neck of the bladder, and that of the anus; which have the ſame effect with the ſtring of a purſe, to cloſe thoſe parts.

Some *muſcles* have two or three heads, called *bicepes* and *tricepes*.

We call *elevators* thoſe which lift up or raiſe the parts; and *depreſſors*, thoſe which move them downwards. *Flexors*, thoſe which bend them; *extenſors*, thoſe which ſtretch them out; *adductors*, thoſe which move the parts inwards: *abductors*, thoſe which move them outwards; and *rotators*, thoſe which move them round.

Muſcles have alſo different names, from their different figure; ſome reſemble a bat, and ſome a lizard: ſome are triangular, others ſquare, others ſcalenous, others pentagonal, others pyramid, round, &c. whence the names of *deltoides*, *rhomboides*, *ſcalenus*, *trapezius*, &c.

Anatomiſts are not agreed on the number of *muſcles* in the human body: ſome reckon five hundred and twenty-nine; ſome four hundred and forty-ſix; and others only four hundred and thirty-five. The calculus, according to theſe laſt: is as follows: two of the forehead, two of the occiput, ſix of the eye-lids, twelve of the eyes, ſeven of the noſe, eight of the external ear, four of the internal ear, thirteen of the lips, eight of the tongue, four of the palate, fourteen of the larynx, ſeven of the pharynx, ten of the os hyoides, twelve of the under-jaw, fourteen of the head, eight of the neck, eight of the omoplates, eighteen of the arms, twelve of the elbows, eight of the radii, twelve of the carpi, forty-eight of the fingers, fifty-ſeven of uſe in reſpiration, ſix of the loins, ten of the abdomen, two of the teſticles, one of the bladder, four of the penis, four of the anus, thirty of the thighs, twenty-two of the legs, eighteen of the feet, forty-four of the toes.

The following tables of the names and offices of the ſeveral *muſcles* in the body, is taken from Dr. Keil.

Frontales ſerve to pull the ſkin of the forehead upwards.
Occipitales pull the ſkin of the hind-head upwards.
Attollens
Deprimens } *articulorum.*
Internus malleoli diſtends the tympanum.
Externus malleoli relaxes the tympanum.
Obliquus malleoli.
Muſculus ſtapedis moves the ſtirrup.
Corrugator ſupercilii.
Rectus palpebræ ſuperioris lifts up the upper eye-lid.
Orbicularis palpebrarum ſhuts both the eye-lids.
Attollens
Deprimens } *oculorum.*
Abductor
Adductor
Obliquus major pulls the eye forwards, and obliquely downwards.
Obliquus minor pulls the eye forwards, and obliquely upwards.
Attollens
Dilatans } *nares.*
Deprimens
Inciſivus pulls the upper lip upwards.
Triangularis pulls it downwards.
Caninus
Elevator labii inferioris } pull the lower lip upwards.
Quadratus pulls it downwards.
Zygomaticus draws both lips obliquely to either ſide.
Orbicularis draws both lips together.
Buccinator thruſts the meat between our teeth.
Temporalis
Maſſeter } pull the jaw upwards.
Pterygoidæus internus draws the jaw to either ſide.
Pterygoidæus externus draws the jaw forwards.
Quadratus pulls the jaw and the cheek downwards.
Digaſtricus pulls the jaw downwards.
Periſtaphylinus internus pulls the uvula forwards.
Periſtaphilinus externus pulls the uvula backwards.
Styloglоſſus draws the tongue upwards.
Genioglоſſus thruſts it out of the mouth.
Ceratoglоſſus pulls it into the mouth.
Geniohyoidæus pulls the os hyoides and tongue upwards and forwards.
Sternohyoidæus pulls the os hyoides downwards.
Mylohyoidæus pulls it obliquely upwards.
Coracohoidæus pulls it obliquely downwards.
Stylohyoidæus pulls it to either ſide, and ſomewhat upwards.
Stylopharingæus pulleth up and dilateth the pharynx.
Oeſophagæus ſtraitens the pharynx.
Sternothyroidæus pulls the thyroides downwards.
Hyothyroidæus pulls the the thyroides upwards.
Crycothyroidæus.
Cricoarytænoidæus poſticus.
Cricoarytænoidæus lateralis.
Thyroarytænoidæus dilates the glottis.
Arytænoidæus contracts the glottis.
Splenius
Complexus } move the head backwards.
Rectus major
Rectus minor } nod the head backwards.
Obliquus inferior
Obliquus ſuperior } perform the ſemicircular motion of the head.
Maſtoidaus

Rectus internus major
Rectus internus minor } nod the head forwards.
Rectus lateralis nods the head on one ſide.
Intercoſtales interni & externi
Subclavius
Serratus anticus major
Serratus poſticus ſuperior
Triangularis } pull the ribs upwards in inſpiration.
Serratus poſticus inferior
Sacrolumbaris } make the motion of the ribs downwards, in expiration, the ſwifter.
Diaphragma, uſed in inſpiration and expiration.
Obliquus externus
Obliquus internus
Tranſverſalis
Rectus
Pyramidalis } compreſs the parts contained in the lower belly, aſſiſt the motion of the ribs downwards in expiration, and help to bend the vertebræ of the loins forwards.
Longiſſimus dorſi moves the body erect.
Tranſverſalis dorſi moves the body obliquely backwards.
Interſpinalis draws the acute proceſſes near one another.
Quadratus lumborum draws the vertebræ of the loins to one ſide.
Longus
Scalenus } bend the vertebræ of the neck.
Pſoas parvus helps to bend the vertebræ of the loins.
Cremaſter draws up the teſticles in the act of generation.
Erectores penis.
Tranſverſales penis.
Acceleratores urinæ.
Erectores clitoridis.
Sphincter veſicæ contracts the neck of the bladder, that the urine may not run continually.
Levatores ani draw up the anus.
Sphincter ani ſhuts the anus.
Serratus anticus minor draws the ſhoulder-blade forwards.
Trapezius moves it upwards, backwards, and downwards.
Rhomboides pulls it backwards.
Levator ſcapulæ pulls the ſhoulder-blade upwards.
Deltoides
Supra-Spinatus
Coracobrachialii } lift the arm upwards.
Teres major
Latiſſimus dorſi } pull the arm downwards.
Pectoralis moves the arm forwards.
Infra-ſpinatus
Tranſverſalis
Subſcapularis } draw the arm backwards.
Biceps
Brachiæus internus } bend the fore-arm.
Longus
Brevis
Brachiæus externus
Anconæus } extend the fore-arm.
Rotundus
Quadratus } perform the motion of pronation, or turn the palm of the hand downwards.
Longus
Brevis } perform the motion of ſupination, or turn the palm of the hand upwards.
Cubitæus internus
Radiæus internus } bend the wriſt.
Cubitæus externus
Radiæus externus } extend the wriſt.
Palmaris helps the hand to graſp any thing cloſely.
Palmaris brevis makes the palm of the hand concave.
Sublimis
Profundus } bend the fingers.
Extenſor digitorum communis.
Lubricales aſſiſt in bending the firſt joint of the fingers.
Interoſſei interni draw the fingers to the thumb.
Interoſſei externi draw the fingers from the thumb.
Flexor pollicis longus.
Flexor pollicis brevis.
Extenſor primi
——— *ſecundi*
——— *tertii* } *internodii pollicis.*
Thenar draws the thumb from the fingers.
Antithenar draws the thumb to the fingers.
Abductor indicis.
Extenſor indicis.
Hypothenar draws the little finger from the reſt.
Extenſor auricularis.
Pſoas
Iliacus
Pectinæus } bend the thigh.
Glutæus major
Glutæus medius
Glutæus minor } extend the thigh.
Triceps pulls the thigh inwards.
Pyriformis
Gemini
Quadratus } move the the thigh outwards.

Obturator internus
Obturator externus } help to move the thigh obliquely and circularly.
Seminervoſus
Semimembranoſus
Biceps
Gracilis } bend the leg.
Rectus
Vaſtus externus
Vaſtus internus
Cruræus } extend the leg.
Sartorius makes the legs croſs one another.
Poplitæus turns the legs ſomewhat inwards.
Membranoſus turns it a little outwards.
Tibialis anticus
Peronæus anticus } bend the foot.
Gaſtrocnemii
Solæus
Plantaris } extend the foot.
Tibialis poſticus moves the foot inwards.
Peronæus poſticus moves the foot outwards
Profundus
Sublimis
Lumbricalis } bend the four leſſer toes.
Longus
Brevis } extend the four leſſer toes.
Flexor pollicis.
Extenſor pollicis.
Thenar draws the great toe from the reſt.
Antithenar draws it to the reſt.
Flexor pollicis longus.
——— ——— *brevis.*
Abductor minimi digiti
Interoſſei interni. } draw the toes towards the great toe.
Interoſſei externi draw them from the great toe.
Tranſverſalis brings all the toes cloſe to one another.

MUSCLES, *inſertion and force of the.* The all-wiſe Author of nature has furniſhed animals with limbs, moveable about the joints by means of muſcular chords, inſerted near the joint or centre of motion; the great wiſdom of which contrivance will appear from ſuppoſing the inſertion to be at E (*Tab.* V. *Mechanics, fig.* 82.) near the wriſt B, the *muſcle* D E being either looſe and ſeparate from the bones D A B, or bound down to it by ſome ligament or faſcia R; in either of which caſes the bone A B cannot be turned up quite to the ſituation A H, unleſs the *muſcle* D E be contracted or ſhortened to D M, which would not only be troubleſome but even impoſſible. It would be troubleſome becauſe the breadth and thickneſs of the arm would be vaſtly increaſed, ſo as to become as big as the belly of an animal. On the other hand, the ſtructure of a *muſcle* being ſuch that it cannot be contracted but a little, ſeldom above two or three fingers-breadth; ſuch an inſertion as that at E, which requires a contraction of above a foot and a half, would be altogether impoſſible. Therefore, in fact, we find, the *muſcle* inſerted near the centre of motion, as at I, *fig.* 83.

In order to calculate the force of any *muſcle*, we are to conſider the bones as levers; and then the power or force of the *muſcle* will be always to the reſiſtance or weight it is capable of raiſing, as the greater diſtance of the weight from the centre of motion is to the leſſer diſtance of the power. Hence, it being found by experiments, that a robuſt young man is able to ſuſpend a weight R (*ibid. fig.* 83.) equal to twenty-eight pounds, when the arm is extended in a ſupine and horizontal ſituation, we have this proportion, viz. the force of the *muſcle* I D is to the weight R, $= 28$ ℔, as the diſtance B C is to the diſtance I C. But it is found, that B C, the length of the cubit and hand, is more than twenty times greater than I C, the diſtance of the *muſcle* from the centre of motion. Therefore the force of the *muſcle* I D muſt be more than twenty times greater than the weight R, or more than $28 \times 20 = 560$ ℔.

Again to find the force which the biceps and brachiæus *muſcles* exert, when the humerus E A (*ibid. fig.* 84) is perpendicular to the horizon, we are firſt to conſider what weight a man is capable of ſuſtaining in this poſture, viz. $R = 35$ ℔, and next the quantity of the diſtances C B, C I, which in this caſe are as 16 to one. Therefore the force of theſe *muſcles* is to the weight $R = 35$ ℔, as the diſtance $CB = 16$ is to the diſtance $IC = 1$; or the force is equal to 560, as before.

But what appears moſt wonderful, is the force of the *muſcles* that move the lower jaw; which, when taken altogether, do not in a man exceed the weight of 1 ℔, and yet exert a force equal to 534 ℔; and in maſtiff dogs, wolves, bears, lions, &c. their force is vaſtly ſuperior, ſo as to break large bones, as they practiſe daily in their feeding. See Borelli de Motu Animalium; and for an abſtract, Deſaguliers's Exp. Phil. vol. i. p. 153, &c. See MECHANICS.

The *muſcles* in fiſhes are not placed lancellatim, or one upon another in a longitudinal direction: but they are generally laid either tranſverſely or ſomewhat obliquely one behind another, from the anterior part of the body to the origin of the tail. This ſtructure is beſt ſeen in the ſpinoſe fiſhes.

Theſe *muſcles* of the ſpinoſe fiſhes may be conveniently divided, according to their ſituation, into the dorſal, pectoral, and neutral. After theſe, the inferior ones of that part of the body near the tail are to have their place; and, finally, the cephalic, or thoſe of the parts about the head.

The dorſal *muſcles* have an interſtice in the middle of the length of the back, or are ſeparated longitudinally from one another, and are terminated in the ſides over-againſt the ſpina dorſalis. The pectoral and ventral *muſcles* take their origin from the baſis of the ribs, and they meet in the middle of the breaſt and belly. The *muſcles* of the lower part of the body ariſe along the ſpina dorſi, and meet one another in the bottom of the belly. The cephalic *muſcles* ſerve to the moving the eyes and the jaws, and are principally four: one is placed on each ſide under the eyes, and one on each ſide in the lower jaw. The two former are called the hypophthalmic *muſcles*, and the two others the maxillary *muſcles*; they are moſt evident in the gadi, &c.

Muscles *of vegetables.* The *muſcles* in animal bodies have been the ſubject of numerous diſſertations; but thoſe in vegetables have been leſs regarded. Mr. Tournefort, however, has plainly proved, that many of the veſſels of plants become in the drying fibres capable of tenſion; that in many plants there are great numbers of theſe fibres which have all the ſame direction, and always act all together, and can only ſhorten or contract themſelves in one particular direction; wherefore the parts compoſed of theſe fibres are very properly compared to the *muſcles* of animals. By the word *muſcle* we underſtand a part compoſed of fibres ſo determinately arranged, that by their contraction they can only move the part in ſome certain and determinate manner; and in this, which ſeems the received ſenſe of the word, there are many inſtances in which it may be applied to parts of plants, with the ſtricteſt juſtice.

All the pods of the leguminous plants, as peaſe, &c. are compoſed each of two valves, more or leſs convex on the outſide; theſe are placed evenly upon one another, and faſtened together by means of a great number of very fine veſſels; they are faſtened much more firmly together at the back than at the fore-rim; and the large veſſels which carry nouriſhment both to the valves and ſeeds, are lodged there, and ſend many ramifications to one and the other of the valves of the pod.

Each valve is formed of two ranges of fibres; the exterior arrangement is formed into a ſort of net-work, and the threads which compoſe it iſſue from the back of the pod, and are propagated longitudinally and ſome what obliquely through the ſurface of the valves, and finally terminate at the edge of the fore-rim of the pod, after they have entered into the fleſhy part, with the net like plexus of veſſels, of which they make frequent anaſtomoſes.

The interior plan or arrangement of fibres croſſes the exterior, in the ſame manner as the interior intercoſtal *muſcles* in the human body croſs the exterior; and theſe form the inner membrane of the pod: theſe fibres ariſe like the others from the back of the pod, and run obliquely to the edge. A neceſſary conſequence of this ſtructure is, that the arrangement of exterior fibres muſt become dry before the others, as muſt alſo the fleſhy ſubſtance in which they lie; and the conſequence of this is, that they muſt contract and draw the edge of the valve to which they belong at once upward and outward, and endeavour to ſeparate it from the edge of the other valve, drawing with it the anterior arrangement of fibres; this therefore pulls open the pod, and the air, which is very hot at the ſeaſon when the ſeeds of theſe plants ripen, inſinuating itſelf into the interſtices of the internal arrangement of fibres which are expoſed to it by the opening of the pod, ſoon acts upon them, and they begin to contract in their turn. Theſe fibres were once the veſſels which conveyed the nutritive juices to the pods and ſeeds; but when that uſe is no longer neceſſary for them, and when no more juices aſcend, after the ſeeds have arrived at their deſtined ſize, they then ſhrink up, and no more perform the office of veſſels, but become mere fibres. As theſe do not all dry up, and ſuffer this change together, but neceſſarily it happens firſt to thoſe which are ſituated at the greateſt diſtance from the pedicle, and conſequently thoſe are the firſt of the interior fibres which act by ſhortening themſelves; this therefore begins at the extremity of the pod, and is continued up to the pedicle, and the effect is, that as theſe interior fibres are ſtronger and more numerous than the exterior, which are at this time as far ſhortened as they are capable of, they now draw backwards and inwards the lips of the edge of the pod towards the back. When the warm air acts upon theſe fibres to dry and contract them, it draws nearly equally at both their ends; and therefore, if the two arrangements of fibres were regularly tranſverſe, each valve of the pod muſt be drawn by this action into a ſort of tube, or pipe; but as they are placed in an oblique direction, and parallel to one another, the natural effect of their contraction muſt be the drawing the valve into a ſpiral form, which we ſee is exactly the caſe. The lines which form the rim of each valve can make no reſiſtance to this contraction, becauſe they are ſo dried up by the warm air and want of juices, that they may be crumbled to powder between the fingers, and eaſily break in any part with the ſmalleſt force. This claſs of plants gives numerous inſtances of this ſort of *muſcles* in vegetables, and they are more obvious than moſt others, being not only common in the hedges, but cultivated in gardens for the uſe of the kitchen, &c.—The ingenius author of the ſyſtem gives many other inſtances in other plants. Mem. Acad. Par. 1693.

Muscle, in *Ichthyology*, the Engliſh name of the *mytulus*, or *mytilus*, a genus of ſhell-fiſh, or, in the Linnæan ſyſtem, of the *teſtacea* claſs of worms; the characters of which are theſe: it is a bivalve ſhell, of an oblong form, ending in a point, and having its two extremities equal. It is ſometimes ſmooth, ſometimes rough; in ſome ſpecies flat, in others elate; and in ſome has the beak elate. The *tellina* and *pinna marina*, of each of which there are ſeveral ſpecies, are properly of this genus.

The characters of the *mytilus*, according to Linnæus, are theſe; that its animal is an *aſcidia*; that it is bivalve, and often affixed to ſome ſubſtance by a beard; and that its hinge is without a tooth, marked by a longitudinal hollow line. He reckons twenty different ſpecies.

The three words of *mytulus*, *muſculus*, and *tellina*, may however be made of great uſe in the ſubdiſtinctions of the genus into certain ſeries.

In this ſenſe, the word *mytulus* may expreſs all the large *muſcles*, ſuch as the *pinna marina*, and other *muſcles*, which are remarkably much elevated in their ſhape, and have pointed beaks. The word *muſculus* may be uſed to ſignify ſuch *muſcles* as are ſmaller and more flat; and *tellina* to expreſs, as it uſually does with authors, a bivalve ſhell of the *muſcle* kind, but thinner and tenderer, and of an oblong figure, but not pointed.

The hinge of theſe ſhells is not in the centre of the ſhells, but towards one end, and they have uſually a kind of little beak at that part.

The *tellinæ* are attached to the ſhell by two ligaments; the *muſcles* only by one.

The largeſt kind of *mytulus*, we know, is the pinna *marina*, made a diſtinct genus by Linnæus; of which ſhell we have three kinds; one larger than the reſt, which is red within; this often produces pearls, but they are nearly of the ſame reddiſh colour with the lining of the ſhell. There have been found ſhells of this ſpecies ſo large as that the pair have weighed fifteen pounds. The ſmall *pinna*, and the rough echinated *pinna*, have their ſhells thicker near the edge where they open, than at the cardo. Theſe *pinnæ marinæ* have a ſort of filaments iſſuing from the body of the fiſh, and faſtening it to ſtones, or any other ſubſtances. This the ancients called *byſſus*, and wrought it into gloves and other things of that kind, and in ſome places it is to this day put to the ſame uſe. The common *muſcles* have the ſame property of forming theſe threads; and Liſter has hence called them *ſetiferæ*. The ſilk of theſe common *muſcles* is greatly inferior to that of the *pinna marina* in firmneſs and beauty. The *muſcles* hold themſelves in the ſame place by means of their threads. The *pinna marina* ſticks its ſharp end into the mud or ſand, and all the reſt of the ſhell remains at liberty to open in the water. Its filaments, which are propagated from the middle of its body, ſerve to draw up the mud and ſand about it, on occaſion to defend it againſt the motion of the water in tempeſts.

The ſpecies of *muſcles*, moſt known at preſent, are thirteen: of thoſe known in cabinets under the name of *pinnæ marinæ*, we have eight: of thoſe *mytuli*, which have a more elate figure, and equilateral, we have ſix. See *Tab. Shells*, N° 19. Of the *tellinæ*, which are oblong and flat ſhells, with equal extremities, we have ten: but of thoſe which have the two ends unlike we have fourteen. Hiſt. Nat. Eclair. p. 326.

The common ſea *muſcle*, or *mytilus edulis* of Linnæus, diſtinguiſhed by a ſtrong ſhell, ſlightly incurvated on one ſide, and angulated on the other; the end near the hinge being pointed, the other rounded, is of a deep blue colour when the epidermis is taken off. Theſe are found in immenſe beds both in deep water and above low-water mark. They afford a rich food, but noxious to many conſtitutions.

Thoſe who have eat *muſcles* have ſometimes, but very rarely, been affected with eryſipelatous inflammations, cutaneous eruptions, inſupportable iching all over the body, great reſtleſſneſs and agitation; and though theſe complaints are eaſily removed, by oil, milk, and emetics, and have ſeldom or never proved mortal, yet they have an alarming aſpect, and make the patient ſuffer grievouſly. Some authors have pretended, that theſe noxious effects never have place but between the vernal and autumnal equinox: and M. Beunie, phyſician at Antwerp, in a memoir on this ſubject, ſeems inclined to adopt this opinion; for he recommends abſtinence from *muſcles* during the months of May, June, July, and Auguſt. The cauſe of theſe noxious effects in the *muſcles* is, according to this author, altogether accidental. They are occaſioned, he ſays, by a kind of *ſtella marina*, a little ſea inſect, pretty common about the mouth of the Scheld, which ſometimes lodges itſelf in the *muſcle*, in queſt of food, and whoſe ſpawn is ſo cauſtic and inflammatory, that even when applied outwardly to the ſkin, it produces itchings and ſwellings that are painful and diſagreeable in a high degree. The itching occaſioned by touching the ſpawn of the *ſtella marina* is removed by vinegar; and this known fact induced Dr. Beunie to preſcribe the internal uſe of vinegar, after bleeding, evacuations, and emetics. His method conſiſts in recommending a large quantity of refreſhing beverage, and, every hour, three ounces of vinegar diluted in water. This remedy, however, ſeems rather to confirm the opinion of thoſe who impute the diſorder in queſtion to an unperceived commencement of putrefaction in the *muſcle*; as vinegar is known to be a powerful antiſeptic, and there is no ſort of putrefaction more noxious and offenſive than that of fiſh. Mem. de l'Academie Imp. & Roy. des Scienc. & Belles Lettres de Bruxelles, &c. vol. i. mem. 8.

The common ſea *muſcle* has, from its being always found faſtened to the rocks, been ſuppoſed by many wholly incapable of progreſſive motion; but this is an erroneous opinion. It is a common practice in France at ſuch ſeaſons of the year as do not afford ſun enough to make ſalt, to throw the common ſea *muſcles*, which the fiſhermen catch about the coaſts, into the brine pits. They have an opinion that this renders their fleſh the more tender and delicate, as the rain which falls at theſe ſeaſons makes the water of the pits much leſs ſalt than the common ſea-water. The *muſcles* are on this occaſion thrown careleſly into ſeveral different parts of the pits; yet, at whatever diſtances they have been thrown in, the fiſhermen, when they go to take them out, always find them in a cluſter together; and as there is no current of water in theſe parts, nor any other power of motion which can have brought the *muſcles* together, it ſeems very evident that they muſt have moved from the places where they were at firſt, to have met thus together. This progreſſive motion is wholly performed by means of what we call the tongue of the *muſcle* from its ſhape; but, from its uſe in this caſe, appears rather to merit the name of a leg, or an arm, as by laying hold of any diſtant ſubſtance, and then forcibly contracting itſelf again, it draws along the whole body of the fiſh; the ſame part, when it has moved the animal to a proper place, ſerves alſo to fix it there, being the organ by which it ſpins the thread which we call its beard, by which it is held to a rock, or to any other *muſcle*. The motion of the *muſcle* by means of this part, is juſt the ſame with that of a man laid flat on his belly, who would draw himſelf along by laying hold of any thing with one hand, and then drawing himſelf to it. Mem. Acad. Par. 1701.

Muſcles are well known to have a power of faſtening themſelves very firmly either to ſtones, or to one another's ſhells, in a very ſtrong and firm manner; but the method of doing this was not well underſtood, till the obſervations of the accurate Mr. Reaumur explained it.

Every one who opens and examines a common *muſcle* will find, that in the middle of the fiſh there is placed a little blackiſh or browniſh body reſembling a tongue; this in large *muſcles* is near half an inch long, and a little more than a ſixth of an inch in breadth, and is narrower at the origin than at the extremity; from the root of this tongue, or that part of it which is faſtened to the body of the fiſh, there are produced a great number of threads, which when fixed to any ſolid ſubſtance hold the *muſcle* firmly in its place: theſe threads are uſually from an inch to two inches in length, and in thickneſs from that of a hair to that of a hog's briſtle. They iſſue out of the ſhell in that part where it naturally opens, and fix themſelves to any thing that lies in their way, to ſtones, to fragments of ſhells, or, which is the moſt common caſe, to the ſhells of other *muſcles*; whence it happens, that there are uſually ſuch large parcels of *muſcles* found together. Theſe threads are expanded on every ſide, and are uſually very numerous, ſo that a hundred and fifty have been found iſſuing from one ſhell; they ſerve the office of ſo many cables, and each pulling in its proper direction, they keep the *muſcles* fixed againſt any force that can be offered, from whatever part it come. The filaments are well known to all who eat *muſcles*, who ever carefully ſeparate them under the name of the beard; and Mr. Reaumur has found, that while the animal is living in the ſea, if they are all torn away by any accident, the creature has a power of ſubſtituting others in their room; he found that if a quantity of *muſcles* were detached from one another, and put into a veſſel of any kind, and in that plunged into the ſea, they in a little time there faſtened themſelves both to the ſides of the veſſel and to one another's ſhells; the extremity of each thread ſeemed in this caſe to ſerve in the manner of a hand to ſeize upon any thing that it would fix to, and the other part, which was ſlenderer and ſmaller, to do the office of an arm in conducting it.

To know the manner of the *muſcle's* performing this operation, this diligent obſerver put ſome *muſcles* into a veſſel in his chamber, and covered them with ſea-water; he there ſaw that they ſoon began to open their ſhells, and each put forth that little body before deſcribed by its reſemblance to a tongue, and at the root of which theſe threads grow; they extended and ſhortened this part ſeveral times, and thruſt it out every way, often giving it not leſs than two inches in length, and trying before, behind, and on every ſide with it, what were the proper places to fix their threads at: at the end of theſe trials they let it remain fixed for ſome time on the ſpot which they choſe for that purpoſe, and then drawing it back into the ſhell with great quickneſs, it was eaſy to ſee that they were then faſtened by one of theſe threads to the ſpot where it had before touched and remained fixed for a few minutes; and in repeating this workmanſhip the threads are increaſed in number one at every time, and being fixed in different places, they ſuſtain the fiſh at reſt againſt any common force.

The ſeveral threads were found to be very different from one another; the new-formed ones being ever whiter, more gloſſy, and more tranſparent than the others; and it appeared on a cloſe examination, that it was not, as might have been moſt naturally ſuppoſed, the office of the tongue to convey the old threads one by one to the new places where they were now to be fixed, but that theſe in reality were now become uſeleſs; and that every thread we ſee now formed is a new one made at this time; and, in fine, that nature has given to ſome ſea-fiſhes, as well as to many land inſects, a power of ſpinning theſe threads for their neceſſary uſes: and that *muſcles* and the like fiſh are under water, what caterpillars and ſpiders are at land. To be well aſſured of this, however, Mr. Reaumur cut off all the beard or old threads of a *muſcle* as cloſe as he could, without injuring the part, and a proof of the opinion of their ſpinning new ones at pleaſure was now brought to this eaſy trial, whether theſe *muſcles*, ſo deprived of their old ones, could fix themſelves as ſoon as others which were poſſeſſed of their's, and could throw out their threads to as conſiderable diſtances. The experiment proved the truth of the conjecture, for thoſe whoſe beards or old threads were cut off, fixed themſelves as ſoon as thoſe in which they were left, and ſpread their threads to as great a diſtance every way.

When the mechaniſm of this manufacture was thus far underſtood, it became a natural deſire to enquire into the nature of the part by which it was performed: this has hitherto been mentioned under the name of the tongue, from its ſhape; but it is truly the arm of the fiſh, and whenever it happens to be looſened from its company, or fixed in a wrong place, it ſerves the animal to drag its whole body ſhell and all along, and to perform its ſeveral motions. It fixes itſelf to ſome ſolid body, and then ſtrongly contracting its length, the whole fiſh muſt neceſſarily follow it, and be pulled towards the place where it is fixed. This is an uſe, however, that this part is ſo rarely put to, that it is not properly to be eſteemed a leg or an arm, for this, according to its more frequent employment, may much better be denominated the organ by which the threads are ſpun.

Though this body is flat in the manner of a tongue for the greater part of its length, it is, however, rounded or cylindric about the baſe of the inſertion, and it is much ſmaller there than in any other part; there are ſeveral muſcular ligaments faſtened to it about the root or baſe, which hold it firmly againſt the middle of the back of the ſhell; of theſe ligaments there are four, which are particularly obſervable, and which ſerve to move the body in any direction. There runs all along this body a ſlit or crack, which pierces very deeply into its ſubſtance, and divides it as it were into two longitudinal ſections: this is properly a canal, and along this is thrown the liquor which ſerves to form the threads; and it is in this canal or ſlit that theſe threads are moulded into their form. Externally, this appears only a ſmall crack or ſlit, becauſe the two fleſhy ſections of the parts almoſt meet and cover it, but it is rounded and deep within, and is ſurrounded with circular fibres. This canal is carried regularly on from the tip of the tongue, as it is called, to its baſe, where it becomes cylindric; the cylinder in this part being no other than a cloſe tube or pipe, in which this open canal terminates. The cylindric tube contains a round oblong body, of the nature of the threads, except that it is much larger; and from the extremity of this all the threads are produced, this ſerving as a great cable to which all the other little cordages diſperſed towards different parts are fixed. The tube or pipe in which this large thread is lodged, ſeems the reſervoir of the liquor of which the other threads are formed; all its internal ſurface being furniſhed with glands for its ſecretion. Mem. Acad. Par. 1711.

The *muſcle*, like many other ſea-fiſhes, abounds in this liquor; and if at any time a finger touches the baſe of this ſpinning organ, it draws away with it a viſcous liquor in form of ſeveral threads, like thoſe of the caterpillar, ſpider, and other ſpinning land-animals. The threads fix themſelves with equal eaſe to the moſt ſmooth and gloſſy, as to rougher bodies; if the *muſcles* are kept in glaſs jars of ſea-water, they as firmly faſten themſelves to the glaſs as to any other body.

Muſcles, be they ever ſo young, have this property of ſpinning; and by this means they faſten themſelves in vaſt numbers to any thing which they find in the ſea. Mr. Reaumur has ſeen them when as ſmall as millet-ſeeds, ſpin plentifully, though their threads, proportioned to their own weight, are much finer and ſmaller than thoſe of larger *muſcles*.

It is a queſtion yet undetermined whether the *muſcle* has a power of breaking, or otherwiſe getting rid of its threads, in order to its removing from the place where it is once fixed; but it appears probable that they have not, and that they muſt remain where they have once faſtened themſelves, though their deſtruction be the conſequence of it. Mr. Reamur tried this experiment in his jars; when they had well fixed themſelves to the ſides of them, he poured off part of the ſalt water, ſo that it became the intereſt of the fiſh to leave their hold and go lower down, but they ſeemed to have no power to effect this. Mem. Acad. Par. 1711.

The common *muſcle* affords the curious obſerver a very pleaſing object of examination by the microſcope. The tranſparent membrane, which immediately appears on opening the ſhell, ſhews the circulation of the blood for a long time together through an amazing number of veſſels, and Mr. Leewenhoeck, in ſeveral which he diſſected, diſcovered numbers of eggs and embryo *muſcles* in the ovarium, appearing as plainly as if he had ſeen them by the naked eye, and all lying with their ſharp ends faſtened to the ſtring of veſſels by which they received nouriſhment. The minute eggs, or embryos, are by the parent placed in due order, and in a very cloſe arrangement on the outſide of the ſhell, where by means of a gluey matter, they adhere very faſt, and continually increaſe in ſize and ſtrength, till becoming perfect *muſcles* they fall off and ſhift for themſelves, leaving the holes where they were placed behind them. Baker's Microſcope, p. 242.

This abundance of *muſcle* ſhells very plainly ſhew, when examined by the microſcope, and ſometimes they are to to the number of two or three thouſand on one ſhell; but it is not certain that theſe have been all fixed there by the *muſcle* within; for theſe fiſh uſually lying in great numbers near one another, the embryos of one are often affixed to the ſhell of another. The fringed edge of the *muſcle*, which Mr. Leewenhoeck calls the beard, has in every the minuteſt part of it ſuch variety of motions as is inconceivable; for being compoſed of longiſh fibres, each fibre has on both ſides a vaſt many moving particles.

MUSCLE, *horſe*, a common Engliſh name for the freſh-water *muſcle*, a large ſpecies of ſhell-fiſh, very common in our fiſh-ponds. Mr. Mery, of the Paris Academy, has been at the pains of making a number of curious obſervations on this animal. He obſerves that they are all hermaphrodites, and that, by a ſtrange and before unheard-of method of generation, each individual is of itſelf capable of propagating its ſpecies, and annually does it without the intercourſe of any other. This is extremely ſingular, becauſe though we know many animals which are hermaphrodites, or in which each individual contains the parts of both ſexes, yet in ſnails, earth-worms, and all the reſt of theſe kinds, there is always a congreſs of two animals for the propagation of the ſpecies.

The ſhell of the freſh water *muſcle* is compoſed of ſeveral laminæ or beds of matter, in the manner of many of the ſea-ſhells, and it is lined within with an extremely delicate and thin membrane, which is not eaſily diſtinguiſhed while the ſhell is recent, but when it becomes dry it uſually ſeparates from it, and peels wholly off. This fiſh opens and ſhuts its ſhell by a very ſtrong hinge, aſſiſted by two ſtrong muſcles; the contraction of theſe ſhuts the ſhells firmly together, and a powerful ſpring or force in the animal opens them at pleaſure. The part which performs this office is diſtinctly ſeen on the back of the fiſh, and is an inch and half long, and about a ſixth of an inch broad. Mem. Acad. Par. 1710.

MUSCOVITE *Bible*. See BIBLE.

MUSCOVITE *coinage*. See COINAGE.

MUSCOVITE *coins*. See COINS.

MUSCOVITE *glaſs*. See MICA.

MUSCOVITE *meaſures*. See MEASURE.

MUSCULAR, or MUSCULOUS, ſomething that relates to the muſcles, or that partakes of the nature thereof. See MUSCLE.

In which ſenſe we ſay, *muſcular fibre*, *muſcular coat*, *muſcular fleſh*, *muſcular veins*, *muſcular arteries*, &c.

MUSCULAR *arteries*, two *arteries* proceeding from the ſubclavian, and diſtributed among the hind-muſcles of the neck. The ſame denomination is alſo given by ſome to certain arteries of the loins: theſe are divided into *upper* and *under*. *Muſculares ſuperiores*, the *upper muſculars*, proceed from the large artery, and loſe themſelves in the fleſh.

The *under muſculars*, *muſculares inferiores*, are branches of the inner iliac arteries.

MUSCULAR, *muſcularis*, is alſo a name given to two arteries of the thigh, the one called the *internal muſcular*, as being diſtributed among the inner muſcles of the thigh; the other the *external muſcular*, becauſe it proceeds to the outer part.

MUSCULAR *fibres* are the fine threads, or fibres, whereof the body of muſcles is compoſed. See FIBRES.

MUSCULAR *fleſh*. See *Muſcular* FLESH.

MUSCULAR *membrane*, *membrana* MUSCOLOSA, is a MEMBRANE, by ſome ſuppoſed to inveſt the whole body, immediately under the adipoſe membrane; called alſo PANNICULUS *carnoſus*, and *membrana muſculorum communis*.

MUSCULAR *motion*, is uſed for voluntary or ſpontaneous motion; thus called, becauſe effected by means of the contraction and dilatation of the *muſcle*.

The mechaniſm of a *muſcle* we have delivered at large; but how this mechaniſm is employed to produce motion in animals, is matter of endleſs doubt. The generality of writers ſuppoſe the belly of the *muſcle* to be ſwelled, and thus its extremes brought nearer; and conſequently the part it is fixed to, moved.

The ſtructure of a *muſcle* we have ſhewn to be ſuch as renders it capable of being ſwelled and contracted, and by that means of having its extremities brought nearer each other, which is its proper action; but how the contraction is effected is the point in diſpute.

The generality account for it from the influx of ſome fluid into the *muſcular* fibres. Others ſolve it from the natural elaſticity of thoſe fibres. And the retainers to a fluid are ſubdivided as to the particular fluid employed for this purpoſe.

From the ſtructure and phenomena of the *muſcles* above laid down, we may gather the property of the hidden cauſe that moves the *muſcles*, viz. 1ſt. that it may either be preſent or abſent in a *muſcle*; and therefore, 2dly, may enter into it, and go out again: i. e. 3dly, it is derived to it from ſome other place, and paſſes from it elſewhere: and, 4thly, all this, by an inſtantaneous direction of the will: 5thly, and in the ſame moment of time, wherein the *muſcle* is contracted, it muſt paſs from within outwards to every point of the ſurface of the *muſcle*; that is, 6thly, it muſt be at once equally diſtributed throughout the whole belly of the *muſcle*; and therefore, 7thly, it muſt fill and dilate the membranes of the fibres, change them from an oblong into a more ſpherical figure, lengthen their leſs diameter, and diminiſh their longer, and ſo draw the tendons nearer to each other: laſtly, that it muſt have its riſe from the cerebrum and cerebellum, the origin of the nerves, and be powerful enough to overcome thoſe obſtacles which here ſtrongly reſiſt it. On the whole, then, it muſt be a moſt fluid, ſubtle, active body; and muſt be applied with ſome energy within the *muſcle*. Now all the fluids in the body that have any pretenſions to theſe properties, that are any way qualified to produce the phenomena above, or that have been alledged as the cauſe of *muſcular motion*, are the *animal ſpirits* (or, as our later writers call it, the *nervous juice*,) and the *blood*: but as each of theſe ſingly ſcarce appears adequate to the effect, our authors have ſuppoſed them to mix in the *muſcles*, and each to contribute to the action of the other. But the animal ſpirits ſeem to have the greateſt number of advocates, though their exiſtence was never yet fully proved; beſides that the manner of their action as aſſigned by authors, ſeems to be arbitrary and precarious. Some, with the learned Dr. Willis, make the tendons a receptacle for the ſpirits, which are raiſed at the inſtigation of the will, and ſent thence into the belly of the *muſcle*; where meeting with the active particles of the blood, they ferment, and cauſe an intumeſcence, and ſo contract the *muſcle*.

Others, among whom are Des Cartes and his followers, allow no receptacle for them but the brain, and ſend them thence through the nerves like lightning at every ſummons of the will; becauſe they cannot allow the tendons to be a proper lodgment, on account of the cloſeneſs of their contexture; nor can believe that the animal ſpirits ſhould remain there inactive. Others, among whom is M. du Verney, imagine this intumeſcence may be without fermentation, by the animal ſpirits, and a juice from the arteries running into the tendons and fleſhy fibres, and extending them; as ropes, &c. ſwell in moiſt weather. Dr. Chirac, and others, maintain, that every *muſcular* fibre, beſides its vein, artery, and nerve, has alſo, from ſpace to ſpace, ſeveral little cavities, or pores of an oblong figure, when the *muſcle* is ſlack or flaccid; and that the blood, circulating through the *muſcle*, is continually depoſiting into thoſe pores a ſulphureous recrement abounding with alkaline ſalts; which meeting with the ſpirits that flow by the nerves into thoſe ſame oval pores, their nitro-aerial particles ferment with the ſaline ones of the ſuphureous recrement, and, by a kind of exploſion, ſo diſtend the pores, as to change the long oval figure into a round one: and thus the *muſcle* is contracted.

Borelli takes the fibres of a *muſcle* to conſiſt of a chain of rhombuſes or lozenges, whoſe areas are inlarged or contracted as the nervous juice, with the lympha and blood, is let into, or forced out of them, at the inſtance of the ſoul.

Dr. Croon ſuppoſes every fleſhy fibre to conſiſt of a chain of little bladders, or globules, communicating with each other; into which the nutritious juice, and one or two more liquors entering, do, by means of the natural heat, make an efferveſcence; by which the body of the *muſcle* is extended, &c.

Dr. Cheyne takes the ſmall fibrillæ of the *muſcles* to be ſo many ſlender elaſtic canals, bound about by ſmall tranſverſe parallel threads, which divide the hollow fibrillæ into ſo many elaſtic cyſtes or veſiculæ, which are orbicular, being formed of two concave ſegments of a ſphere; into every one of which veſiculæ, an artery, vein, and nerve enter; the two firſt to carry and bring back the blood, the laſt to carry thither the liquidum nervoſum, or nervous juice, which, mingling in the veſiculæ with the blood, does, by its acid pointed particles, prick and break the globules of the blood, ſo as to let out the impriſoned elaſtic air (contained in the globules) in thoſe little veſiculæ; whereby the elaſtic cells of the fibres will be blown up, and thereby their longitudinal diameters from cell to cell ſtraitened: and this muſt contract the length of the whole fibres, and ſo move that organ to which one of the tendons is fixed.

Dr. Keil, not contented with this theory, ſets up another, wherein the ſame ſtructure of the *muſcle* is ſuppoſed; and the ſame fluids, viz. the blood and nervous juice, are allowed the agents or inſtruments of contraction: but inſtead of the pungent particles of the nervous juice piercing the globules of blood, and ſetting at liberty the impriſoned elaſtic aura, he reſolves the whole into the power of attraction.

According to this author, the diſtenſion of the veſicles of the fibres is not owing to their being filled with a greater quantity of blood and animal ſpirits than before their contraction; but to a rarefaction ariſing from the mixture of thoſe two fluids, by means whereof they come to poſſeſs a greater ſpace.

To account for this rarefaction of the blood and ſpirits in the veſicles of the muſcular fibres, he ſuppoſes a ſmall globule of air between the particles of a fluid, which particles have a ſtrong attractive force, whereby they endeavour to come together: by preſſing every way equally on the globule of air, they will hinder its eſcape from between them. But the force whereby they endeavour to come together, being vaſtly greater than that of gravity, the globule of air muſt be conſiderably condenſed; but the force of elaſticity being proportional to that of its condenſation, the force wherewith the airy globule endeavours to expand itſelf, will likewiſe be vaſtly great: ſo that if the niſus of the particles of the fluid to come together ſhould be taken off, the air between them would expand itſelf with a conſiderable force. Now, if, upon the mixing of another fluid, the particles of the firſt fluid be more ſtrongly attracted to the particles of this other fluid than they were before to one another, their niſus to one another will then ceaſe, and give the incloſed globule of air liberty to expand itſelf; ſo that the whole fluid will take up a greater ſpace that it did before; but when the particles of the globules come to be united together, they will again incloſe the globule of air that lies between them; and by their mutual attraction, ſoon bring it to its former ſtate of condenſation. Now, that the blood contains a great number of globules of air, is evident from the great quantity that it yields in the air-pump; and that the particles of the blood have a ſtrong attractive force, cannot well be denied. Upon the meeting then, of theſe two fluids in the veſicles of the fibres, the nervous juice, conſiſting of ſmaller particles than the blood, muſt, from what ſir Iſaac Newton has proved of the rays of light, attract the particles whereof they are compoſed more ſtrongly than thoſe do each other; and, conſequently, the niſus of thoſe particles to each other ceaſing, the condenſed globule of air will expand itſelf with a conſiderable force; whereby each veſſel of the fibre will be diſtended, and conſequently ſhortened; i. e. the whole *muſcle* will be contracted: but when the particles of the blood are well mixed with a nervous fluid, they will both together incloſe the globule of air again, and compreſs it into as ſmall a ſpace as it was before: and the contraction of the *muſcle* muſt immediately ceaſe, till freſh blood and ſpirits, ſtill ſucceeding each other, continue the inflation of the veſicles. But, when a *muſcle* has been ſtrongly attracted for ſome time, the quantity of ſpirits ſpent being more than can be prepared in the ſpace of time by the glands which ſupply its nerves, the inflation of the veſicles muſt fail, and the *muſcle* grow feeble and weak. And thus that ingenious author conceives the veſicles to be diſtended, without any ebullition or efferveſcene; and their diſtenſion to ceaſe, without any precipitation or flying off of the aerial globules through the pores of the *muſcles*.

He proceeds to ſhew how artfully the mechaniſm of the fibres is contrived for the neceſſary contraction. It is a known experiment, that a bladder blown up, and diſtended as to its capacity, but contracted as to length, will raiſe a weight to ſome determined height: two bladders, therefore, thus blown up, and communicating with each other, he argues, will raiſe the weight double the height, and three bladders thrice the height, &c. ſo that, if there were a ſtring of bladders joined together, of equal bulk, and like figures, the ſpace through which the weight would riſe, would be proportionable to the number of bladders, i. e. to the length of the ſtring. Now, each fibre of a *muſcle*, conſiſting of an infinite number of ſmall veſicles, reſembles a chain or ſtring of bladders; ſo that the contraction of the *muſcle* is always proportionable to the length of its fibres. Farther, the veſicles, whereof the fibres conſiſt, being very ſmall, though one large bladder might raiſe a weight as high as ſeveral ſmall ones, yet the quantity of elaſtic fluid uſed in the inflation, would, in that caſe, be much greater than where the weight is raiſed by a ſtring of ſmall ones.

For, ſuppoſing two bladders of ſimilar figures, but the diameter of the one to be triple that of the other; then will the one require twenty-ſeven times the quantity of elaſtic fluid to expand it that the other does, and will alſo expand to twenty-ſeven times the ſpace; and yet three of the leſs bladders joined together (he goes on) will raiſe the weight to the ſame height that the bigger one does; but with nine times leſs expence of elaſtic fluid, and take up but a ninth part of the ſpace. By diminiſhing, therefore, the bigneſs of the veſicles, and increaſing their number, the force required to diſtend them, and the diſtention itſelf, may be diminiſhed in any given proportion, and may come at laſt to be inſenſible. Suppoſe a bladder, e. gr. of a determinate bigneſs, can raiſe a weight a foot; a hundred bladders, whoſe diameters are each a hundred part of the former, being blown up, will raiſe the weight to the ſame height; but the force required to inflate them, and the ſwelling of all put together, will be ten thouſand times leſs than that of the large one.

Again, if a weight, of a determined bigneſs, can be raiſed to a certain height by a bladder, or one ſtring of bladders, to which the weight is tied; twice that weight may be raiſed by two ſuch bladders, or ſtrings; thrice by three, &c. and conſequently, the weight a *muſcle* can raiſe will be always as the number of its fibres, i. e. as its thickneſs, ſuppoſing the diſtenſion of the veſicles equal, and the abſolute ſtrength of one *muſcle* to that of another, as their bulks. Thus much for the once flouriſhing ſyſtem of the chain of bladders; which being liable to very great difficulties as to the geometricity of it, has of late given way to others.

Dr. Boerhaave, finding all the requiſites before laid down for the action of the *muſcles* in the nervous juice, or animal ſpirits, and in no other fluid in the body, thinks it needleſs to have recourſe to a mixture of ſeveral liquors where one will do; and therefore makes no ſcruple to attribute the whole buſineſs to it alone. The manner of action he conceives thus:

Suppoſe the ſpirit, from any cauſe, to be moved more ſwiftly from the origin of ſome one nerve than through the reſt; the influx will here be greater into the *muſcular* fibre open to this nerve than into another: this will therefore be more dilated, and the other phenomena, mentioned above, will ſucceed: the ſame cauſe continuing, the effect will be increaſed: ſo that in a moment of time, the whole will be ſwelled up, and while the ſame determination laſts, will remain contracted: and this obtaining in an infinite number of fibrillæ at once, the whole *muſcle* will be inflated.

Hence it neceſſarily follows, that as the celerity is increaſed in one nerve, the motion will be leſs in another; this, therefore, being relaxed, the effort in contraction will be the ſtronger: for this reaſon all the turgid fibres of a *muſcle* will compreſs the intermediate ſpaces and blood with a great force; whence the veins will be emptied, and the arteries, being compreſſed, will repel the groſſer, that is, the red parts of the blood, but will drive the more ſubtile parts, by the force of the heart, and their own, into the moſt mitute canals; and thus the cruor being expelled, the whole body of the *muſcle* will be found to act by a ſubtile humour concurring from the nerves and arteries.

Thus are all the phenomena accounted for, without any other aſſumption than an accelerating force in the origin of the nerves; which is common to all hypotheſes, and which cannot be traced any farther.

All other ſyſtems, therefore, Boerhaave abſolutely rejects; nor makes the leaſt account of Galen's incorporeal power inflating the *muſcles*; the nitrous ſpirit of the nerves mixing with the oil of the blood, and ſo rarefying it; the acid parts of the nervous juice mixing with the alkalious ones of the blood, the ebullition of the air, and the arterious juice; and the increaſe or diminution of attractive force of the minute corpuſcles of the humours as repugnant to ſenſe, experience, the laws of matter, and of mixture, and to the phenomena of the *muſcles*.

Dr. Aſtruc has gone a good way towards proving the nervous juice alone concerned in *muſcular motion*; and that the blood has no ſhare at all in it; by the following experiment, which he tried ſeveral times with the ſame ſucceſs.

Cutting open the abdomen of a live dog, and removing the inteſtines out of the way, he bound up the aorta, where it divaricates into the iliac arteries, with a thread, ſo as to conſtringe each iliac and the hypogaſtric artery very cloſely; then, ſewing up the epigaſtric *muſcles*, he found the ſenſation and motion ſtill as briſk and vivid in the dog's poſteriors, as before: ſo that, when once ſet at liberty, he ſtood on all four, and walked with his uſual eaſe and firmneſs; though, it is certain, there could not be one drop of blood conveyed to thoſe hind parts.

Aſtruc, however, differs from Boerhaave in the manner wherein this nervous juice acts: nor will he allow that celerity, wherewith the *muſcles* act at the command of the will, to be owing to the velocity of the juice ſent through the nerve; but to an impreſſion given to one extremity of the thread, and communicated through all the intermediate parts to the other extremity; ſuppoſing the nerves, in their natural ſtate, to be turgid, and full of ſpirits: ſo that, if the extremity in the ſenſory be ever ſo little preſſed by the acceſſion of any new ſpirit, as much will be inſtantly expelled at the other extreme; and *vice verſa*, a ſmall impreſſion given to the outer extremity of the nerve, will immediately move the other extreme open to the ſenſory; ſo that part of it will drop out: which accounts for ſenſation, as well as *muſcular motion*. See SENSATION.

Laſtly, Dr. Lower, and Mr. Cowper, and after them Dr. Morgan, and others of the lateſt writers on that ſubject, ſetting aſide all adventitious fluids, account for *muſcular motion* from the intrinſic elaſticity of the nervous fibrillæ contracting and reſtoring themſelves, againſt the ſtretching force of the circulating blood.

This ſyſtem Morgan endeavours to evince from the following conſiderations: 1. All the veſſels in an animal, conſiſting of flexible, diſtractile fibres, are in a ſtate of tenſion, i. e. are both ſtretched tranſverſely and longitudinally by their contained fluids: thus, e. gr. let a vein or artery be cut, and the oppoſite ſides of the veſſel will contract, and come nearly to a contact about the axis; while the two ends, receding both ways, leave a chaſm: which ſhews, that the veſſel, while in its natural ſtate, was diſtended both ways; and, conſequently, that contraction, in all their dimenſions, is the natural intrinſic action of the veſſels or fibres. And the ſame might be deduced, *a priori*, from the growth of animals; for, by the increaſed quantity of the accumulated blood, the veſſels muſt neceſſarily be enlarged every way. Now, againſt this diſtended power of the fluids, the ſolid *muſcular* fibrillæ will continually exert a contractive or reſtitutive force, by which they are kept in their proper ſtate of tenſion.

2. That this contractive power of the *muſcular* fibres is a natural intrinſic property of the fibres themſelves, and does not depend on any mixture, or mutual action of fluids, is evident from hence, that theſe fibres retain the ſame property, after they are taken out of the body, and dried, as we ſee in thongs, cat-gut, and other ſuch like cords or ſtrings cut out of the *muſcular* coats and ſkins of animals, which may be ſtretched out to a conſiderable length beyond their natural ſtate; and when the ſtretching force or weight is taken off, they will immediately contract again by their native ſpring.

3. When a *muſcle* contracts, the blood is ſqueezed out; and, during its ſtate of eontraction, it is more hard and ſolid than before; that is, it contains leſs blood when contracted than when ſtretched; which ſhews, that the contraction cannot be by the addition of another fluid from the nerves, mixing with the blood in the *muſcles*.

4. No ſuch fluid in the nerves could ever be found, as, being mixed with the blood, would occaſion ſuch fermentation or expanſion: but, ſuppoſing the *muſcular* cells thus inflated, no ſuch effect could follow, as ſhortening the *muſcle* in length, and ſwelling it in thickneſs; but the conſquence muſt be, that the *muſcle* would be lengthened, as well as thickened; that is, it muſt increaſe its dimenſions proprortionably every way; which is the proper action of fluids on the ſolids.

If, then, it be ſaid, that theſe bladders, when the *muſcle* is ſtretched, are drawn into oblong ſpheroids; and when inflated by the mixture of the nervous fluid, reduced to a ſpherical figure, by which means their axes are ſhortened, and their conjugate diameters enlarged; it is anſwered, that thoſe ſmall veſicles are ſoft, flexible, diſtractile, and equally yielding every way: and, ſince an included expanſive fluid muſt preſs its containing veſſels equally yielding every way, and equally expanſive, a veſſel, notwithſtanding ſuch diſtenſion, muſt retain its natural figure, and be equally ſtretched in all directions.

Again, ſince the blood circulates freely through theſe *muſcular* cells, it is plain, that, as ſoon as they begin to inflate, it muſt be immediately puſhed forward with an increaſed velocity in the courſe of its circulation, which muſt prevent any ſuch inflation in the *muſcle*. Before theſe veſicles, therefore, can be diſtended in the manner ſuppoſed, the exit of the fluid muſt be hindered; that is, the circulation muſt be ſtopped. If any one doubt of this, let him try whether he can blow up a bladder, or other veſſel, that is open at both ends, and where the expanſive fluid has as free an egreſs as ingreſs.

Thus much premiſed, the natural action of a *muſcle* will be eaſily explained. From its ſtructure it follows, that, on the contraction of its tranſverſe and ſpiral fibres, which are the ramifications of the nerves, the longitudinal, red, and fleſhy fibres, or blood-veſſels, which conſtitute the body of the *muſcle*, muſt neceſſarily be ſqueezed and drawn together, as being compelled to follow the motion of theſe elaſtic cords; by which means the blood, being compreſſed, muſt be forced, with ſome impetuoſity, through the *muſcle*, and propelled forward in the courſe of its circulation.

Now, if the blood ſhould hereupon ſtop, and return no more to the *muſcle*, it is plain, the *muſcle* muſt for ever remain in this contracted ſtate, as its proper and natural ſtate of quieſcence, to which it tends, and where it would reſt: but the blood, having received a freſh impetus by the contraction, and returning upon the *muſcle*, in the courſe of its circulation, again ruſhes into the blood-veſſels; which being inlarged in all their dimenſions by the force of the returning blood, the tranſverſe and ſpiral nervous fibres muſt be hereby ſtretched, and the *muſcle* extended, till by this means, the blood-veſſels being brought to their natural extent, and conſequently the diſtending force of the blood ceaſing, the contracting power of the nerves begins to act again, and reſtore them, with the ſame force by which they were extended, till the returning blood re-enters the *muſcle*, and ſtretches it again.

Dr. Morton, in an inquiry into the cauſe of *muſcular* motion, obſerves, that in every *muſcle* there are numerous arteries, veins, and nerves; which are generally diſtributed together, or in the ſame courſe, by means of the connecting cellular ſubſtance, into every point of the fleſhy fibres; that there is a circulation of blood, through the whole fleſhy ſubſtance, of a *muſcle*; and that the *muſcle* feels in every part. In order, therefore, to the performance of voluntary *muſcular* motion, beſides the particular ſtructure, there is required an abſolute freedom of the blood-veſſels and nerves. He farther obſerves, that *muſcular* motion is voluntary and involuntary: to the former ſubſerve almoſt all the *muſcles* of an animal body; the only complete inſtance of the latter is afforded by the heart. The contraction of the heart, he ſays, in its natural ſtate, in a living animal body, proceeds ſolely from, or is mechanically cauſed by, the warm blood, flowing into, and filling its fleſhy ſubſtance in every part: and its ſubſequent relaxation is occaſioned by the removal of the blood. He farther ſhews, that a *muſcle* of voluntary motion, in its natural ſtate, in a living animal body, is contracted by the introduction of a warm mild fluid into its fleſhy ſubſtance in every part. He adds, that the nerves are the immediate inſtruments of ſenſation; and that the will hath a direct power of rendering more acute the ſenſations of the nerves univerſally: whence he infers, that the blood, which is preſent in every part of the contracting ſubſtance of a *muſcle*, and which aſſumes an increaſed heat, and again parts with it at the command of the will, is the immediate mechanical cauſe by which the *muſcle* does inſtantly contract, and is again relaxed. Phil. Tranſ. vol. xlvii. art. 47. p. 305, &c.

Dr. Brown Langriſh endeavours to prove that the blood has no immediate effect in *muſcular motion*, by experiments of tying the crural and carotid arteries of dogs, who thereby did not loſe the action of any muſcles. He grants, however, that when all the blood is intercepted, *muſcular motion* ceaſes in a few minutes. The chief uſe of the blood towards *muſcular motion*, is to keep the fibres warm, ſupple, diſtended, and ready for the influx of animal ſpirits into them, and by its motion to aſſiſt theirs. The *muſcular* fibres are little hollow cylinders, not divided into cells; the animal ſpirits are near a-kin, or analogous to ſpirit of ſal ammoniac, &c. and therefore, whenever they fly from the nerves into the *muſcular* fibres, they will increaſe the attractive quality of their component particles towards each other, ſo as to make them run nearer together, which will occaſion the coats of the fibres to be both thicker and ſhorter, and the muſcle will be contracted in all its dimenſions. The animal ſpirits are too ſubtile to be fixed, and therefore immediately make their eſcape through the fibres, and leave them in the ſame ſtate they found them in, as ſoon as the ſupply by the nerves is diſcontinued. There is a difference in the mechaniſm of the nerves ſent to the *muſcles*, which act by the influence of the mind, from thoſe of the *muſcles*, which are ſaid to perform involuntary motions; the latter having no hindrance to the courſe of the animal ſpirits, unleſs ſometimes the parts through which they paſs have influence on them; whereas the nerves, which ſerve the *muſcles* of voluntary motion, have ſome little conſtrictions at their extremities, or elſewhere, which hinder the courſe of their fluids, except when their reſiſtance is overcome by the momentum of the ſpirits being increaſed by the will. The uſe of the ganglions is to prevent any communication of motion from one nerve to another, whereby in a ſtate of health, ſenſation is always performed diſtinctly. Eſſ. on Muſc. Motion.

Dr. Stuart having cut off the head of a frog, obſerved, that upon thruſting a probe into the *medulla ſpinalis*, the *muſcles* of the body were brought into convulſive contractions. And that the ſame happened to the *muſcles* of the head when the probe was thruſt into the brain. From which he concludes, that the brain and nerves contribute to *muſcular motion* in a high degree. Next he laid bare the crural artery, vein, and nerve of a dog, and placing a thread parallel to them, made two ligatures on them, at four inches diſtance from each other; then cutting the veſſels through beyond the ligatures, he took them out, and obſerved that the nerve did not contract, though the blood-veſſels loſt three eighth parts of their length. From whence he infers, that what the nerves contribute in *muſcular motion*, cannot ariſe from, or be owing to elaſticity, but to the fluid they contain, which can be no other than a pure elementary water. Phil. Tranſ. Nº 424. ſect. 5.

Dr. Prieſtley conjectures, that the ſource of *muſcular motion* is the electric matter, conſidered as a modification of PHLOGISTON: in ſupport of which he alledges, that the electric matter directed through the body of any *muſcle* forces it to contract; that the proper nouriſhment of an animal body, from which the ſource and materials of all *muſcular motion* muſt be derived, is probably ſome modification of phlogiſton; that vinous and ſpirituous liquors, which conſiſt very much of phlogiſton, inſtantly brace and ſtrengthen the whole nervous and *muſcular* ſyſtem, the phlogiſton in this caſe being, perhaps, more eaſily extricated, and by a leſs tedious animal proceſs than in the uſual method of extracting it from mild aliments; and that reſpiration and putrefaction affect common air in the ſame manner, and juſt as all other proceſſes diminiſh air and make it noxious, and which agree in nothing but the emiſſion of phlogiſton. Hence he infers, that animals have a power of converting phlogiſton, from the ſtate in which they receive it in their nutriment, into that ſtate in which it is called the electrical fluid; that the brain, beſides its other purpoſes, is the great laboratory and repoſitory for this purpoſe; that by means of the nerves, this great principle, thus extracted, is directed into the *muſcles*, and forces them to act in the ſame manner as they are forced into action, when the electric fluid is thrown into them *ab extra*. As to the manner in which the electric matter makes a *muſcle* contract, he only imagines that whatever can make the *muſcular* fibres recede from one another farther than the parts of which they conſiſt, muſt have this effect. Prieſtley on Air, vol. i. p. 176, &c.

MUSCULAR *conſumption*. See CONSUMPTION.

MUSCULAR is alſo an appellation given to ſeveral veins; two whereof come from the ſkin and the hind-muſcles of the thigh, and terminate in the ſubclavians.

There are three others in the loins alſo, called *muſculares*, and diſtinguiſhed into *upper*, *middle*, and *under*: the firſt terminates in the trunk of the vena cava, and the two others open into the external iliac vein.

MUSCULI *aliformes*. See ALIFORMES.

MUSCULI *amatorii*. See AMATORII.

MUSCULI *annuentes*. See ANNUENTES.

MUSCULI *capitis acceſſorii*. There is ſometimes found a ſmall *muſcle* fixed by one end to the extremity of the firſt tranſverſe apophyſis of the neck, near the inſertions of the two obliqui, from whence running up obliquely, it is again inſerted behind the maſtoide apophyſis. This *muſcle* is commonly thought to be a third ſmall tranſverſalis, on that ſide where it is found; but it ſeems rather to be an additional *muſcle* to the obliquus ſuperior. The recti, and other obliqui, are alſo found ſometimes double. Winſlow.

MUSCULI *vermiformes*, &c. See VERMIFORMES, &c.

MUSCULOUS. See MUSCULAR.

MUSCULUS *faſciæ latæ*. See MEMBRANOSUS and FASCIA *lata*.

MUSCULUS *latus*. See LATUS *muſculus*.

MUSCULUS is alſo a name by which ſome call the common ſea MUSCLE, more properly called *mytulus*.

MUSCULUS *myſticatus*, in *Ichthyology*, a name given by Geſner, and ſome other writers, to the common whale, or *balæna edentula* of authors. This is diſtinguiſhed from all the other cetaceous fiſhes, by Artedi, by the name of the whale with the fiſtule in the middle of the head, and with the back ſharp toward the tail. See WHALE.

MUSCULUS, among the Romans, a military machine, under cover of which the ſoldiers approached and undermined the walls of places beſieged, or filled the ditches.

MUSCUS, in *Botany*. See MOSS.

MUSCUS *arboreſcens marinus*, in *Natural Hiſtory*, a name given by count Marſigli to a very elegant ſpecies of marine ſubſtance, deſcribed by him as a ſea-plant. See CORALLINE.

It grows to the rocks at conſiderable depths under water, and is uſually about three inches high; and is compoſed of ſeveral thick branches, furniſhed toward the tops with tranſparent leaves; the ſtalks are hollow, and it is all ſoft while in the ſea, but grows ſomewhat rigid when dried.

When examined by the microſcope, its ſurface appears to be granulated or covered with a ſort of ſmall glandules, which ſtand very near one another, and on cutting it tranſverſely the whole ſubſtance is ſeen to be hollow, and that general hollow to communicate with all theſe glandules, ſo that their office plainly is ſeverally to receive the ſea-water, and convey it into this general cavity, where it is diſtributed throughout the whole plant for its nouriſhment and ſupport. The leaves of this plant being rubbed on blue paper, give it a yellowiſh-green colour.

Count Marſigli has gone through the analyſis of this, and as by it we may be informed of the principles and properties of many other ſea-plants of the ſame genus, it may not be improper to give an abſtract of his obſervations.

Four and twenty ounces of this plant being put into a retort there came over five ounces of phlegm of a ſweetiſh taſte, and of the colour of oil of almonds. The ſpirit was of a duſky earth-colour, of a fixed nature, of an unctuous, yet ſomewhat acrid taſte, and leaving a bitterneſs behind it; of this there were twelve ounces, and the remainder in the retort was ſix ounces and three drams. So that the whole produce being twenty-three ounces and three drams, there were only five drams of the whole loſt in the operation. The water does not alter the colour of blue paper, on ſteeping in it; being mixed with the decoction of mallow-flowers it turns it to an aſh-colour. The decoction of galls becomes of a bluiſh colour, and a ſolution of copperas of a greeniſh aſh-colour with it:

the tincture of turnſol becomes of a bluiſh colour tending to white. Spirit of nitre being added to it, cauſes a ſlight fume, and the decoction of mallow-flowers being after this added, a fine red colour is produced. Spirit of vinegar turns this green; and no change at all is produced by any of the following liquors, ſpirit of ſalt, ſpirit of ſal ammoniac, lime-water, alum-water, oil of tartar: a ſolution of corroſive ſublimate collects a quantity of white and groſs particles, and precipitates them to the bottom. Marſigli, Hiſt. de la Mer, p. 73.

The ſpirit being examined with blue paper, makes no change in its colour on being ſteeped in it; the decoction of mallow-flowers mixed with it becomes of a pale yellowiſh green; the decoction of galls changes with it to a duſky red; a ſolution of copperas becomes of a dirty yellow, and thick; the tincture of turnſol changes to an aſh-colour. Spirit of nitre being mixed with it, cauſes a moderate fume without any ebullition, and the colour of the mixture is a reddiſh grey; on mixing the decoction of mallow-flowers with this, it becomes of a yellowiſh red. Spirit of vinegar added renders it more fluid, and of a leſs duſky colour. Spirit of ſalt changes it to a reddiſh colour. Spirit of ſal ammoniac and oil of tartar make no change at all; but lime-water renders it more clear and fluid. Alum-water collects a quantity of white matter, and precipitates it; and a ſolution of corroſive ſublimate, in like manner turns it white, and precipitates the groſs parts. The *caput mortuum* yielded one dram and ten grains of fixed lixivial ſalt; the taſte of this is but moderately acrid, and its colour a greyiſh white; being rubbed on blue paper it changes its colour to its own. The decoction of mallows on mixing this ſalt with it loſes its blue colour, and becomes grey; and on frequently ſhaking the veſſel, it finally becomes yellow. Spirit of nitre mixed with this ſalt does not ſo readily or violently effervesce with it, as with moſt other lixivial ſalts; and if a little turnſol be added to this, it becomes of the colour of red wine. Spirit of vinegar diſſolves it very quickly, and becomes thick and turbid with it. Spirit of ſalt diſſolves it very readily, but makes no fume, though a very conſiderable ebullition. Lime-water diſſolves it ſlowly, and carries it to the ſurface; and alum-water, in like manner, on diſſolving it, is covered with a thick ſcum at the top; corroſive ſublimate added to this, precipitates the ſalt again, without altering its colour. Spirit of ſal ammoniac, and oil of tartar, make no change upon it. It is remarkable that this plant contains no volatile ſalt.

MUSCUS *marinus latus*, the broad and flat ſea-*moſs*, a ſea-plant deſcribed by count Marſigli. It is found in ſeveral places at different depths, growing to the rocks and ſtones. Its upper ſurface is compoſed of a ſeries of leaves of an auriculated figure, amaſſed together in an irregular manner; but its under-ſide is ſmooth and even, except that it is beſet with a number of ſoft points or eminences, which are not eaſily diſtinguiſhed by the naked eye. Theſe, when a microſcope is uſed, are found to be ſo many little white tubes of a cylindric figure; theſe are evidently the apertures by which the plant receives its nouriſhment; for in this, as in the other ſea-plants in general, when the root faſtens upon a rock or ſtone, it is not to extract nouriſhment from it, but only to fix itſelf firm in its place by it; for the whole ſurface of the plant takes in nouriſhment from the circumambient water, and every part acts as a root receiving ſupplies for the whole. See MOSS.

MUSEAU, in *Natural Hiſtory*, a term applied by Mr. de Reaumur to a ſort of bladder, which the inſects of the fly claſs are provided with, to make their way out of the ſhell, after their laſt transformation into the nymph ſtate.

The word is French, and literally ſignifies a *ſnout* or *muzzle*.

The flies to whom nature has given this inſtrument, have it only during that ſhort ſtage of their lives which is between their being incloſed in the membrane which covers them in the nymph ſtate, and their firſt flying about at liberty. At this time, in order to their getting out of their ſhell, nature gives them a power of inflating and ſwelling out their head to a great ſize, and throwing out this ſort of bladder to its anterior part, by which means the cap of the caſe or ſhell is thrown off, and the end of it opened by the two longitudinal lines giving way. The creature, after this, as it has no uſe for this ſingular piece of mechaniſm, ſo it has no power to exert it during the remainder of its life. Reaumur, Hiſt. Inſ. vol. iv. p. 340. See TRANSFORMATION.

MUSEBYTER, in *Ichthyology*, a name given by ſome to the fiſh called by authors *dobula*, a German fiſh, found in ſeveral parts of Germany, much approaching to our common dace.

MUSEIA, Μουσεια, in *Antiquity*, feſtivals in honour of the Muſes at ſeveral places of Greece, eſpecially among the Theſpians, where ſolemn games were celebrated every fifth year.

The Macedonians had alſo a feſtival in honour of Jupiter and the Muſes, which was celebrated with ſtage-plays and games, and laſted nine days, according to the number of the Muſes.

MUSEUM, Μουσειον, was originally uſed to ſignify a place in the palace of Alexandria, which took up, at leaſt, a fourth part of the city; ſo called, as being deſtined and ſet apart to the *Muſes* and the ſciences.

Here were lodged and entertained a great number of learned men, who were divided into companies or colleges, according to the ſciences or ſects whereof they were profeſſors. And to each houſe or college was allotted a handſome revenue. This eſtabliſhment is attributed to Ptolemy Philadelphus, who here fixed his library.

MUSEUM has hence paſſed into a general denomination, and is now applied to any place ſet apart as a repoſitory for things that have ſome immediate relation to the arts, or to the Muſes. See REPOSITORY and CABINET.

MUSEUM, *Britiſh*, the *muſeum* of the late ſir Hans Sloane, containing a great variety of the productions of nature and art, was purchaſed by the public at 20,000 *l.* for the national uſe, and depoſited in Montague-houſe; where it may be rendered of no leſs general benefit to trade than to the advancement of natural knowledge and experimental philoſophy.

For the purchaſe of this *muſeum*, as well as the HARLEIAN collection of manuſcripts, and the COTTONIAN *library*, an act of parliament paſſed in the twenty-ſixth year of George II. which incorporates the truſtees into a body politic, with a common ſeal, and empowers them to manage the concerns of this *Muſeum*.

The MUSEUM *at Oxford*, called the *Aſhmolean Muſeum*, is a noble pile, erected at the expence of the univerſity, for the promoting and carrying on ſeveral parts of curious and uſeful learning. It was begun in 1679, and finiſhed in 1683, at which time a valuable collection of curioſities was preſented to the univerſity by Elias Aſhmole, eſq. and the ſame day there repoſited, and afterwards digeſted and put in a juſt order by Dr. Plott, who was conſtituted firſt keeper of the *Muſeum*.

Divers conſiderable acceſſions have been ſince made to the *Muſeum*; as of hieroglyphics, and other Egyptian antiquities, by Dr. Huntingdon; and of an entire mummy, by Mr. Goodyear; of a cabinet of natural curioſities, by Dr. Liſter; alſo of divers Roman antiquities, altars, medals, lamps, &c.

Over the entrance of the *muſeum* is this inſcription; MUSEUM ASHMOLEANUM, SCHOLA NATURALIS HISTORIÆ, OFFICINA CHYMICA.

MUSES, MUSÆ, Μουσαι, fabulous divinities of the ancient heathens, who were ſuppoſed to preſide over the arts and ſciences.

The word, according to Phornutus, is derived from the Greek, μωσθαι, which ſignifies the ſame with ζητειν, *to ſearch*: others derive it from ομοιωσιος, *ſimiliar*, or *alike*; all the ſciences being bound and united together. Euſebius derives it from μυεω, *to initiate, to inſtruct*; Plato and Scaliger from μαιωσθαι, *obſtetricare*, becauſe to them is attributed the invention of arts; and by them arts were produced. Laſtly, Heinſius and Voſſius derive it from the Hebrew מושר, *muſchar*, *ſcience*, *diſciplina*.

The *Muſes* are called by various names; *Camænæ*, *Heliconiades*, *Parnaſſides*, *Aonides*, *Pierides*, *Pegaſides*, *Aganippides*, *Theſpiades*, *Libethrides*, and *Caſtalides*.

The ancients admitted nine *Muſes*, and made them the daughters of Jupiter and Mnemoſyne, or Memory. At firſt, indeed, their number was but three; viz. Melete, Mneme, and Aœde: Greek words, ſignifying *meditation*, *memory*, and *ſinging*: but a certain ſculptor of Sicyon, having orders to make three ſtatues of the three *Muſes* for the temple of Apollo, and miſtaking his inſtructions, made three ſeveral ſtatues of each *Muſe*: theſe, however, were found ſo beautiful, that they were all ſet up in the temple; and from that time they began to reckon nine *Muſes*; to whom Heſiod afterward gave names; viz. *Calliope*, *Clio*, *Erato*, *Thalia*, *Melpomene*, *Terpſichore*, *Euterpe*, *Polyhymnia*, and *Urania*.

Each of theſe were ſuppoſed to preſide over their reſpective art: CALLIOPE over heroic poetry; CLIO over hiſtory; MELPOMENE over tragedy; THALIA over comedy; EUTERPE over wind-muſic; URANIA over aſtronomy; TERPSICHORE over the harp; ERATO the lute; POLYHYMNIA rhetoric.

They are painted as young, handſome, and modeſt; agreeably dreſſed, and crowned with flowers. Their uſual abodes were about mount Helicon in Bœotia, and mount Parnaſſus in Phocis. Their buſineſs was to celebrate the victories of the gods, and to inſpire and aſſiſt the poets; and hence the cuſtom of invoking their aid at the beginning of a poem.

It muſt not, however, be imagined, that the deities, thus invoked, are conſidered, even by the ancient poets themſelves, as divine perſons, from whom they expect any real help. Under the name of *Muſe* they pray for the genius of poetry, and all the talents and circumſtances neceſſary for a happy execution of their undertaking.

Their addreſſes to the *Muſes* are mere allegories, and manners of expreſſing themſelves poetically: as when they make gods of ſleep, of fame, of revenge, and other natural and moral things.

Accordingly, the *Muſes* are of all ages, countries, and even of all religions: there are Chriſtian as well as heathen *Muſes*; Latin, Greek, Engliſh, and French, *Muſes*. There are alſo *new Muſes*, who appear every day in favour of thoſe, who, diſdaining things too trite and common, chooſe to ſtrike out of the road.

When Virgil wrote his Eclogues, he invoked the Sicilian *Muſes*, becauſe he imitated Theocritus: and the Sicilian poet having ſucceeded, the Roman begged for a genius as happy as that of this iſlander.

The *Muſes* of the poet Lucretius had never inſpired any perſon before him. It is plain, from the doctrine of his book, what kind of divinity it was he invoked. He addreſſes himſelf to Venus; but, at the ſame time, tells us, that none of the deities trouble themſelves with human affairs. His *Muſes*, therefore, muſt of neceſſity be mere allegories.

MUSHROOM, *fungus*, in *Botany*, the name of a genus of plants, the characters of which are theſe: it is a headed vegetable, compoſed of a pedicle crowned with a broad head, which is convex and ſmooth at the top, and hollow, foliated, lamelled or fiſtulous on the other ſide. See *Tab.* II. and VII. *of Botany*, *Claſs* 24. N° 4.

The ſpecies of *fungus* enumerated by Mr. Tournefort, are ſeventy-three.

Linnæus has claſſed the *funguſes* in general, the ſeveral ſpecies of the ferns, the moſſes, and algæ, under the character of *cryptogamia*; that is, ſuch plants as perform the great work of their fructification in ſecret, or at leaſt whoſe flowering and ſeeding are not obſerved ſo eaſily, as in thoſe plants which we uſually call the more perfect ones. In ſome of theſe the beſt microſcopes have not yet been able to inform us of the true manner in which this is performed, and many of the *funguſes* or *muſhrooms* are of this number.

Under this order of *fungus* he enumerates four ſpecies, which are hairy, viz. *agaricus*, *boletus*, *hydnum*, and *phalus*; and ſix which are deſtitute of hair, viz. *clathrus*, *helvella*, *peziza*, *clavaria*, *lycoperdon*, and *mucor*.

Muſhrooms are plants more perfect than many people imagine; they have a regular root, a ſtalk conſiſting of ſeveral arrangements of fibres, the interſtices of which are filled up with a parenchymatous ſubſtance, leading from the root to the head or umbel; the under-ſide of this umbel is full of lamellæ or chives, every one of which is a regular pod or ſeed-veſſel. If theſe lamella are examined in their ſeveral ſtates, the ſeeds in them may be eaſily diſcovered, and are always found to be of a ſize and degree of maturity proportioned to the ſtate of the plant at that time; they have each of them alſo a ſiliquaceous aperture lengthwiſe, the ſeeds lying in rows ready to fall through it. The plant is eaſily and regularly propagated through theſe, and not only may be raiſed from ſeed, but, like many other plants, may be propagated by roots: the ſeveral filaments at the root producing tubercles, in the manner of the potatoe; from each of which there will ariſe new roots, and a new plant. The periods of vegetation in this plant are alſo ſufficiently regular; and the common opinion of its ſpringing up in a night, and periſhing in a day, has no foundation in reality. For, in the common way of raiſing them on hot beds, it is eaſy to find, that they often ſtand a fortnight or longer from their firſt appearance, before they are fit for the table. Phil. Tranſ. N° 472. p. 164.

Notwithſtanding that the ſeeds of ſome ſpecies of *muſhrooms* have been diſcovered, the accurate Buxbaum is of opinion, that very many plants of this genus propagate themſelves greatly by root, and are truly perennial; and this he ſupports by many ſolid arguments, drawn from obſervations of the ſeveral ſpecies of *muſhroom*, or *fungus*, which are obvious, and under the eye of every obſerver, at many times of the year. Acta Petrop. vol. iii. p. 265.

In ſeveral ſpecies of theſe plants there is placed round the ſtalk, at a ſmall diſtance from the head, a ſort of ring of a tough matter, reſembling the outer covering of the whole *fungus*; this uſually catches many of the ſeeds of the plant in their fall from the head when ripe, in order to the re-producing the ſpecies; and hence ſome have been of opinion, that it was placed there by the Author of Nature, in order to break the fall of the ſeeds, and preſerve them from the fury of the winds, in their falling from too great a height, in reſpect to their extreme lightneſs; but it rather appears, that the ſeeds often found on this ring, fall there only by accident, and are there detained by a viſcoſity with which that part of the plant abounds; and that the uſe of this ring is very different.

Almoſt all the *muſhrooms* which have thick and fleſhy umbels, and fleſhy ſtems, have this ſort of ring round their ſtalk, from which, when the plant is young, and not yet in a flowering ſtate, there ariſes a membrane which connects the rim of the umbel to the ſtem, and preſerves the under part while in this ſtate; but when this time is over, the umbel, which was before an hemiſpherical figure, growing larger, and the membrane not giving way, it is torn from off the rim of the umbel, and adheres only to the ſtem. Soon after this the ſeeds ripen, and the umbel then loſing its former figure, commences almoſt a plane. This is the ſtate in which the plant is ſold in our markets under the name of *flaps*.

When the umbel is of this figure, the ſeeds, being perfectly ripe, muſt fall upon the whole ſpace covered by the umbel, and as a part of this ſpace the ring muſt receive its ſhare of them; but there is no reaſon to believe that it receives more than are allotted to ſuch a part of the determined ſpace on which they are to fall.

As to thoſe ſpecies of *muſhrooms* whoſe ſtems are ſlender, and their umbels thin, ſoft, and ductile, they never have this ring at all, and yet their ſeeds have often farther to fall than thoſe of the other kinds which have it, as they are uſually taller plants. The rims of the tender umbels in theſe kinds clap themſelves quite cloſe to the ſtalks, in the form of a contracted umbrella, and expand as the others do when the ſeeds are ripe; and the ſpecies of *funguſes* of this kind are much more numerous than thoſe of the former, and propagate themſelves full as regularly.

Mr. Bradley mentions a hundred kinds of *muſhrooms* which he has ſeen in England, beſides thoſe very numerous ſmall ones which conſtitute the mouldineſs of liquors, fruits, &c. which laſt are ſuch quick growers, that they arrive at perfection in leſs than twelve hours.

The fungoides only differs from the *fungus* in its external form; the coralloides are alſo of the ſame ſpecies, though of a different name, as being branched like coral; and truffles come alſo under the ſame kind.

Matthiolus mentions *muſhrooms* which weighed thirty pounds each, and were as yellow as gold; Fer. Imperatus tells us, he ſaw ſome which weighed above a hundred pounds a-piece; and, to add no more, the Journal des Sçavans furniſhes us with an account of ſome, growing on the frontiers of Hungary, which made a full cart-load.

The poiſon of *muſhrooms* has been much talked of by ſeveral perſons; but there ſeems to be no certain account of any body's ever having been injured by eating the common *muſhroom*, unleſs by accident, as from the eating too many at once, and thereby over-loading the ſtomach; or by their being eaten by perſons who had a particular diſlike to them, as ſome perſons have to the moſt innocent aliments, particularly to cheeſe. If theſe *muſhrooms* had any poiſonous quality, it muſt have been often found out by the phyſicians in ſuch a place as London, where there are annually ſuch vaſt quantities of them conſumed, yet nothing of this kind is obſerved; and there ſeems, upon the whole, to be nothing hurtful in this ſpecies; though there may be many others which are truly poiſonous. Nor is it any more wonderful, that the different ſubjects of this claſs of vegetables ſhould differ in their virtues, than that thoſe of other kinds ſhould. The roots of carrots and parſnips are daily found a very wholſome food, while thoſe of other plants of the ſame claſs, ſuch as the water-hemlock, the dropwort, and others of the umbelliferæ, are known to be poiſonous.

The ancients have taken great pains to diſtinguiſh the ſeveral kinds of *muſhrooms*, that the world might know the hurtful from the ſafe. The boletos mentioned by Juvenal, on account of the death of the emperor Claudius, is ſufficiently deſcribed by Pliny. Cluſius, among the moderns, has deſcribed a vaſt number of different ſpecies, every where diſtinguiſhing the eſculent and wholeſome from the poiſonous or pernicious kinds. The ſeveral authors who have treated of them ſince the time of Cluſius, have all mentioned the effects of ſome or other of the poiſonous kinds; and there are numerous inſtances of the miſchief done by them at one time or other. Some have been willing to aſcribe this miſchief to animalcules inhabiting the plant; but this ſeems erroneous, and particularly from the following inſtance: we have one kind of *muſhroom* growing in England, called the white acrid *fungus*. This is ſo extremely ſharp, that it ſtimulates the tongue, as if it had been touched with ſpirit of nitre: and Tournefort obſerves, that if rubbed on blue paper, it turns it red in the ſame manner as that liquor, or any other of the violent acid ſpirits would: this cauſtic quality remains in the plant even after drying; and it is very evident, that we need look no farther than this for the origin of the poiſonous quality in this ſpecies. There is another kind which is obſerved to kill the very flies as they ſettle upon it. It is not probable that ſuch plants as theſe ſhould be inhabited by any kind of animalcules, nor is it neceſſary to have recourſe to ſuch cauſes of the miſchief which enſues from the eating them, when their own juices ſeem ſo very able to have occaſioned it. Philoſ. Tranſ. N° 473. p. 54.

Mr. Miller ſays, that the true eatable *muſhroom* is diſtinguiſhed from the poiſonous and unpleaſant kinds by theſe marks; when young it appears of a roundiſh form like a button, the ſtalk as well as the button being white, and the fleſhy part very white, when broken, the gills within being livid. As they grow larger they expand their heads by degrees into a flat form, and the gills underneath are at firſt of a pale fleſh-colour; but as they ſtand long, become blackiſh.

In order to propagate *muſhrooms*, the meadows and paſtures ſhould be ſearched for them in Auguſt and September; and wherever they are found, the ground ſhould be opened all about the roots, where there will be found abundance of ſmall white knobs. Theſe are to be taken up with lumps of earth about them. The *muſhroom* beds ſhould be made of dung, in which there is good ſtore of litter; but this ſhould not be thrown in a heap to ferment, that dung which hath lain ſpread abroad for a month or longer is the beſt. Theſe beds ſhould be made on dry ground, and the dung laid upon the ſurface: their width at bottom ſhould be about two one-half or three feet, and length in proportion to the quantity of *muſhrooms* deſired; then lay the dung about a foot thick, covering it about four inches with ſtrong earth; upon this lay more dung about ten inches thick; then another layer of earth, ſtill drawing in the ſides of the bed, ſo as to form it like the ridge of a houſe, which may be done by three layers of dung and as many of earth; when the bed is finiſhed it ſhould be covered with litter or old thatch, to keep out the wet and prevent its drying: in this ſituation it may remain eight or ten days, by which time the bed will be in a proper degree of warmth to receive the ſpawn; the litter ſhould then be taken off, the ſides of the bed ſmoothed, and a covering of light rich earth, about an inch thick, ſhould be laid over the bed; upon this the ſpawn ſhould be put, laying the lumps two or three inches aſunder; then gently cover them about half an inch thick with the ſame light earth; and again put on the covering of litter. When theſe beds are made in the ſpring or autumn, as the weather is in thoſe ſeaſons temperate, the ſpawn will take much ſooner, and the *muſhrooms* will appear perhaps in a month after they are made; but thoſe beds which are made in ſummer when the ſeaſon is hot, or in winter, when the weather is cold, are much longer before they produce. The great ſkill in managing theſe beds is to keep them in a proper temperature of moiſture: during the ſummer ſeaſon, the beds may be uncovered to receive gentle ſhowers of rain at proper times; and in long dry ſeaſons, they ſhould be now and then gently watered: during the winter ſeaſon they muſt be kept as dry as poſſible, and ſo cloſely covered as to keep out cold. In froſty, or very cold weather, the growth of the *muſhrooms* will be promoted by laying over them ſome warm litter ſhaken out of a dung heap, interpoſing a covering of dry litter between the bed and this warm litter: and as often as the litter is found to decay, it ſhould be renewed with freſh; and as the cold increaſes, the covering ſhould be laid ſo much thicker. In this way plenty of *muſhrooms* will be produced all the year; and thoſe raiſed in beds will be much better for the table than any which are gathered in the fields. A bed thus managed, if the ſpawn takes kindly, will continue good for ſeveral months, and produce great quantities of *muſhrooms*; from theſe beds when they are deſtroyed, you ſhould take the ſpawn for a freſh ſupply, which may be laid up in a dry place until the proper ſeaſon of uſing it, which ſhould not be ſooner than five or ſix weeks, that the ſpawn may have time to dry.

The vaſt variety of known *funguſes*, which are found regularly every ſeaſon in their proper ſoils, are not all that the naturaliſt has to enquire into the nature of; there are others whoſe productions are much more ſurpriſing. Theſe are ſuch as are only ſeen once or twice in an age, and that in places where it is very difficult to account for the manner of their production. One of theſe we had ſome years ago, which appeared upon an old piece of wood in a blackſmith's cellar in the Hay-market, and grew to twelve inches or more in height; and when cut down, appeared again at the ſame time the next year, and ſo on for ſeveral ſucceeding years, as if, contrary to the nature of the generality of theſe plants, it had a perennial root, and grew regularly from the old ſtock. This appeared to us a ſingular production, and a wholly new ſpecies; but ſo long ago as in the year 1692, Mr. Tournefort found ſuch a one growing on an old beam in the abbey at St. Germains. His deſcription of it is very accurate; and its reſemblance with our's as great as could be expected, in ſo looſe a growing plant as an irregular *fungus*. The beam on which this *muſhroom* grew was very firm and ſound in all other places, but juſt where it was rooted there was a crack, out of which moiſture ouzed; and probably the beam was in that part rotten, or worm eaten within. The ſmell of the plant was like that of others of the ſame kind, and an infuſion of a piece of it turned an infuſion of turnſol to a bright red; ſo that it manifeſtly abounded in acids.

It is not eaſy to account for the appearance of theſe plants which are ſeen ſo rarely, and that in places where no plant could be expected to grow; the only probable ſolution of the point ſeems this, that as the ſeeds of the *muſhroom* kind are all very minute, and generally in theſe ſpecies which have no lamellated heads, cover the whole ſurface of the leaves, the number of ſeeds produced by one ſuch plant muſt be numerous beyond all account, and at the ſame time light enough to float about in the air. Theſe muſt be at times thrown againſt a thouſand different bodies where there is no proper nouriſhment for them, and muſt therefore periſh; whereas, if any accidents are required to concur, to make a ſoil proper for it to grow in, wherever ſuch ſoil happens to be produced, as the air has free acceſs every where, it is not impoſſible but that, at one time or other, one of theſe ſmall ſeeds may happen to be properly depoſited. Mem. Acad. Par. 1692.

The Laplanders have a way of uſing *funguſes*, or common toadſtools, as we call them, as the Chineſe and Japoneſe do the moxa, to cure pains. They collect the large *funguſes* which they find on the bark of beech and other large trees, and dry them for uſe. Whenever they have pains in their limbs, they bruiſe ſome of this dried matter, and pulling it to pieces with their fingers, they lay a ſmall heap of it on the part neareſt to where the pain is ſituated, and ſet it on fire. In burning away, it bliſters up the part, and the water diſcharged by this means, generally carries off the pain. It is a coarſe and rough method, but generally a very ſucceſsful one, eſpecially when the patient has prudence enough to apply it it time, and reſolution enough to bear the burning to a neceſſary degree.

Mushrooms *growing out of flints.* Naturaliſts have of long time obſerved, that there are ſea *funguſes* of a very different ſubſtance and ſtructure from any of the common kinds, growing on rocks, ſtones, and corals, or other marine ſubſtances, which ſeem wholly incapable of ſupplying them with any vegetable nouriſhment. Theſe have been ſuppoſed to be as it were all root; and to take in their nouriſhment at every part of their ſurface from the circumambient water: but in the year 1739, Mr. Alefeld obſerved a like ſort of *funguſes* growing in places where they had no ambient fluid to afford them nouriſhment, except the air, and yet were fixed upon as unpromiſing a baſis for the ſupplying them with any, as thoſe of the ſea. Theſe were found on common flints on the ſurface of the earth. This gentleman obſerved, that a great many various ſpecies of flints which lay in part buried in the earth, and in part lying above its ſurface, were on this open part covered with a ſort of white duſt. This was in July, and in hot dry weather. Having the curioſity to examine this duſt with a microſcope, every particle of it was found to be a complete and perfect *fungus*, all of the ſame determinate figure, and much reſembling the common earth *muſhrooms*. They were white in colour, and had each a very ſhort pedicle, in many, ſcarce to be ſeen at all; their head was round and umbilicated, and very elegantly and evenly ſtriated on the upper part, the ſtriæ or furrows all running from the centre to the circumference; and the rim of each head being a little elevated. Upon the whole, they not unaptly reſembled in miniature a common tea-cup inverted, and the ſaucer inverted alſo, and placed upon it. The ſubſtance of theſe *funguſes* was of two kinds, the one furniſhed a cortical part or covering, and the other filled up the whole internal ſpace

The internal part was ſoft and ſpongy, and much like what the inſide of the common *muſhroom* is: this was white. The outer or cortical part was reddiſh, and rather repreſented a congeries of ſmall grains of ſand, collected into that form by ſome glutinous matter, than any ſolid or continuous body. The thin external coat of this being removed, there were ſeen within it a multitude of ſmall round globules of gloſſy ſurfaces, reflecting the light in manner of ſome of the ripe ſmooth ſummer fruits, ſuch as the cherry, and the like. This was their appearance when freſhly uncovered; but after they had been expoſed ſome time to the air, they become flaccid, fell almoſt flat together, and were umbilicated and marked with rays from the centre like thoſe of a ſtar.

Theſe *funguſes*, if not injured by accidents, remain in their perfect ſtate a long time upon the ſtones. Five months keeping produces no alteration in them; but at length they become flaccid, and wither, and in this ſtate are not to be recovered by water, as many of the common land *funguſes* will, which ſwell, and for a time appear plump, on being wetted.

They grate harſhly, like ſtony matter between the teeth, and reſiſt the force of acid menſtruums; they bear the great degrees of heat or cold without any injury; but if they are expoſed to a flame, the outer covering of the head burſts and flies off, and theſe red globules come in full ſight, while the reſt of the fungus remains unaltered. The ſame effect is produced by plunging them into hot water; and if they be boiled in water, over a ſtrong fire, the globules are diſlodged and loſt in it. If the flints, on which they are produced, are heated red-hot, the *funguſes* are deſtroyed, and wholly diſappear in the places where they were; only the fragments of the outer covering of the head remaining ſcattered, on different parts of the ſtone, like pieces of broken pots or glaſſes: theſe fragments loſe their red colour, and are found grey. On the whole, it appears from theſe experiments, that the cortical part of this *fungus* is not of the nature of common vegetable matter, but is truly ſtony; ſo that the plant may be properly arranged among a ſet of *lithophyta*, or ſtone plants, properly ſo called. The author of this curious diſcovery obſerves, that he uſually found many ſmall red inſects running about upon theſe ſtones, and among the cluſters of *funguſes*. Theſe afforded at leaſt a proper retreat or nidus for them, if not food; for it is poſſible the internal part of the *funguſes* might be eaten by them. Act. Eruditor. ann. 1739.

Dr. Wolckamerus, in the Ephemerides of the Curious, has deſcribed a ſtone, taken out of a mountain in Italy, which produced real muſhrooms in the form of a bonnet, and called by the natives *fungus lyncurius*. This ſtone is of the bigneſs of an ox's head, rough and uneven on its ſurface, and on which alſo are perceived ſome clefts and crevices. It is black in ſome parts, and in others of a lighter and greyiſh colour. Internally it is porous, and nearly of the nature of the pumice-ſtone, but much heavier, and it contains a ſmall piece of flint, which is ſo incorporated with it as to appear to have been formed at the ſame time the ſtone itſelf received its form. This gives room to judge that thoſe ſtones have been produced by a fat and vicid juice, which has the property of indurating whatſoever matter it filtrates into. The ſtone here ſpoken of, when it has been lightly covered with earth, and ſprinkled with warm water, produces *muſhrooms* of an exquiſite flavour, which are uſually round, ſometimes oval, and whoſe borders, by their inflexions and different curvities, repreſent, in ſome meaſure, human ears. The principal colour of theſe *muſhrooms* is ſometimes yellowiſh, and ſometimes of a bright purple; but they are always diſſeminated with different ſpots, of a deep orange-colour, or red-brown; and when theſe ſpots are recent, and ſtill in full bloom, they produce a very agreeable effect to the ſight. But what appears admirable, is, that the part of the ſtalk which remains adhering to the ſtone, when the *muſhroom* has been ſeparated from it, grows gradually hard, and petrifies in time, ſo that it ſeems that this fungites reſtores to the ſtone the nutritive juice it received from it, and that it thus contributes to its increaſe.

As to the forms of theſe *muſhrooms*, their root is ſtony, uneven, divided according to its longitudinal direction, and compoſed of fibres as fine as hairs, interwoven one with another. Their form in firſt ſhooting out reſembles a ſmall bladder, ſcarce then larger than the bud of a vine; and, if in this ſtate they are ſqueezed between the fingers, an aqueous ſubacid liquor iſſues out. When they are at their full growth, their pedicle is of a finger's length, larger at top than at bottom, and becomes inſenſibly ſlenderer in proportion as it is nearer the earth. Theſe *muſhrooms* are alſo formed in an umbella, and variegated with an infinity of little ſpecks ſituate very near one another. They are ſmooth and even on the upper part, but underneath leafy like the common *muſhrooms*. Their taſte is likewiſe very agreeable, and the ſick are not debarred eating of them, when they have been dreſſed in a proper manner.

Upon a chemical analyſis of this ſtone, it yielded by diſtillation, firſt an inſipid water, and afterwards a ſpirituous liquor. When the retort was heated to a certain point, there aroſe an oil, reſembling in ſmell and taſte that of guaiacum; and a very acrid ſalt was extracted from the aſhes. Dr. Hill has alſo publiſhed an account of a ſimilar ſtone, which, on being watered, produced excellent *muſhrooms*.

MUSHROOM, *baſtard*. See FUNGOIDES.

MUSHROOM, *pepper*. See PEPPER.

MUSHROOM *galls*, in *Natural Hiſtory*, a name given by authors to a ſmall ſpecies of galls very common on the leaves of the oak in September and October, and reſembling the common eſculent *muſhroom*. They are placed on the upper ſurface of the leaf, and are often in great numbers on it. The leaves which have conſiderable numbers upon them make a very beautiful figure, and appear as if ornamented by art with a number of elegant figures. Theſe galls are uſually about a ſixteenth, though ſometimes a tenth of an inch in the diameter; they are compoſed of an orbicular head, which adheres to the leaf by a very ſhort pedicle, ſo that its edges which droop a little in the manner of thoſe of the common *muſhroom*, uſually touch the ſurface of the leaf all round. Theſe little galls are of various colours, according to their different degrees of maturity; they are of a greeniſh white at firſt, after that they become of a yellowiſh tinge, from which they paſs through all the ſhades of orange and flame-colour to a very beautiful red, which is always their colour when perfectly mature. When they are obſerved by the microſcope, their ſurface appears hairy, and the ſeveral hairs all ſtand near one another at their baſes, and diverge at their points, as is the natural conſequence of their ſtanding on a convex body. Reaumur, Hiſt. Inſects, vol. vi. p. 194.

The uſe, as well as the figure, of this gall is very ſingular. Malpighi and Mr. Reaumur have both deſcribed it, and the former of theſe authors deſcribes a cavity in the centre of the head; but this ſeems to have been done at random, and rather ſuppoſed from analogy, than ſeen in fact; for the latter author, who is perhaps one of the moſt accurate obſervers that ever wrote, could never find any cavity in any one of the great numbers he diſſected; but he obſerved what was an uſe of the ſame kind with that of the other galls, in this, though performed in a different manner: they are plainly all deſtined for the lodgment and ſecurity of ſmall animals; not to be diſtinctly ſeen without the help of glaſſes; but they are of the nature of thoſe worms which turn into two-winged flies.

The flies into which theſe worms are finally transformed, have not yet been diſcovered; but this is no wonder, ſince the animals themſelves are ſo minute as to require glaſſes to view them. It is probable that they undergo their change in the chryſalis ſtate in ſome other place, for they are never found in it under the galls; but this is common alſo to many other ſpecies.

MUSHROOM *worms*. The various ſpecies of *muſhrooms* are ſubject to be eaten and deſtroyed by a great variety of inſects. There is, however, one ſpecies which is more frequent than all the reſt, and which has therefore obtained, among authors, the name of the *muſhroom worm*. This is a white worm, with a hard ſcaly black head; it has ſome fleſhy tubercles, which it throws out at pleaſure from the under part of its ſeveral rings, and which ſerve it as legs. This is found indifferently in almoſt all the ſpecies of *muſhrooms*; but in none ſo frequently as in the great wood-*fungus*, which is porous and greeniſh underneath. It is found to change to a tipula or long-legs of no great beauty, being of a duſky brown colour, and middling ſize.

The other ſpecies of *funguſes* have alſo their worms; but there is one of a very ſingular nature which is found frequently on the agaric which grows on the ſtumps of oak trees eſpecially near the roots. This is a long and ſlender worm, ſomewhat flatted, and reſembling a ſmall leech, but that it has a hard and ſcaly head of a blackiſh colour. The body is compoſed of many rings, in the manner of the earth-worm, and looks very bright and gloſſy, being always covered with a viſcous liquor. This creature is eaſily found, for it never eats into the ſubſtance of the *fungus*, but only crawls about its ſurface; the traces, wherever it has been, are marked with a coat of a ſhining varniſh, and reſemble the places over which ſnails have crept.

This worm makes a very beautiful object for a microſcope. When young it is as tranſparent as glaſs, and the motion of its internal parts is very eaſily diſtinguiſhed. When this creature is to paſs into the chryſalis ſtate, it does not remove from the *fungus*, but ſpins itſelf a web, and remains upon it. This web is compoſed of the ſame matter with the covering or habitation under which it uſually reſides, but it is thicker, more opake, and of a coarſer ſtructure.

The creature remains about a fortnight under this covering, and then comes forth in the form of a fly, which is evidently a ſpecies of tipula. It has very long legs, and a long and ſlender body; the body is brown, and the breaſt yellowiſh; the wings are long and ſlender, and the antennæ are of a very ſingular and remarkable figure; they are broad and flat, and yet terminate in a point. Theſe are compoſed of ſeveral articulations, and make a very beautiful figure when examined by the microſcope.

Beſides theſe, this fly has, in the manner of the other tipulæ, a pair of beards placed on the anterior part of the head, which it at pleaſure bends down over the face, and completely covers with them the longitudinal fiſſure, which is the mouth, ſituated in this as in the other tipulæ. Reaumur, Hiſt. Inſ. vol. ix. p. 23, ſeq.

MUSIC, Μουσικη the ſcience of ſound, conſidered as capable of producing melody, or harmony; or the art of diſpoſing and conducting ſounds, conſidered as grave and acute; and of portioning them among themſelves, and ſeparating them by juſt intervals, pleaſing to the ſenſe.

The word is ſuppoſed originally formed from *muſa*, *muſe*; the Muſes being ſuppoſed to be the inventors thereof. Kircher, however, will have it take its name from an Egyptian word, as ſuppoſing its reſtoration after the flood to have begun there, by reaſon of the reeds, &c. on the banks of the Nile. Heſychius tells us, the Athenians gave the name *muſic*, μυσικη, to every art.

Mr. Malcolm defines *muſic* a ſcience, that teaches how ſounds, under certain meaſures of tune and time, may be produced, and ſo ordered or diſpoſed, as that either in conſonance, or ſucceſſion, or both, they may raiſe agreeable ſenſations.

Muſic, among the ancients, was taken in a much more extenſive ſenſe than among the moderns. What we call the ſcience of *muſic*, was, by the ancients, rather called HARMONICA.

Music, *modern*, *muſica moderna*, may be divided into two parts: firſt *antiquo-moderna*, which is generally a ſerious ſort of *muſic*, conſiſting of many parts; and which has been in uſe from Guido's time, in the beginning of the laſt century. Secondly, the *modern* which has been uſed in this and the laſt century: it is very different from the *antiquo-moderna*, being briſker, lighter, gayer, and more ſprightly.

Muſic naturally divides itſelf into *ſpeculative* and *practical*.

Music, *ſpeculative*, is the knowledge of the *materia muſica*, or how to produce ſounds in ſuch relations of tune and time, as ſhall be agreeable in conſonance, or ſucceſſion, or both.

By which we do not mean the actual production of theſe ſounds by an inſtrument or voice, which in merely the mechanical or effective part; but the knowledge of the various relations of tune and time, which are the principles, out of which the pleaſure ſought is derived.

Music, *practical*, is that, which ſhews how theſe principles are to be applied; or how ſounds, in the relations they bear to *muſic* (as thoſe are determined in the ſpeculative part) may be ordered, and variouſly put together in ſucceſſion and conſonance, ſo as to anſwer the end.

And this we call the art of *compoſition*, which is properly the practical part of *muſic*.

Some add a third branch, viz. *inſtrumental muſic*, or the knowledge of inſtruments; but, as this depends altogether on the firſt, and is only an application or expreſſion of it, it cannot come regularly under the definition, and conſequently is no part of the diviſion of the ſcience.

The firſt branch, which is the contemplative part, divides itſelf into theſe two; viz. the knowledge of the *relations and meaſures of tune*, and the *doctrine of time*.

The former is properly what the ancients call *harmonica*, or the doctrine of harmony in ſounds, as containing an explication of the grounds, with the various meaſures and degrees of the agreement of ſounds in reſpect of their tune.

The latter is what they call *rythmica*, becauſe it treats of the number of ſounds or notes, with reſpect of time; containing an explication of the meaſures of long and ſhort, or ſwift and ſlow, in the ſucceſſion of ſounds.

The *ſecond* branch, or the practical part of *muſic*, as naturally divides into two parts, anſwering to the parts of the firſt.

That correſponding to the harmonica, the ancients called *melopæia*, becauſe it contains the rules of making ſongs, with reſpect to tune, and harmony of ſounds: though we have no reaſon to think the ancients had any thing like compoſition in parts.

That which anſwers to the rhythmica, they call *rhythmopæia*; containing rules for the application of their numbers and time.

We find a ſtrange diverſity in the ancient writers, as to the nature, office, extent, diviſion, &c. of *muſic*.

Hermes Triſmegiſtus defines *muſic* to be the knowledge of the order of all things; which is alſo the doctrine of the Pythagorean ſchool, and of the Platoniſts, who teach, that every thing in the univerſe is *muſic*. Agreeable to which wide ſenſe, ſome divide *muſic* into *divine* and *mundane*.

Music, *divine*, is that reſpecting the order and harmony, which obtains among the celeſtial minds.

Music, *mundane*, is that which reſpects the relations and order of every thing elſe in the univerſe.

Though Plato, by *divine muſic*, underſtands that which exiſts in the divine mind, viz. thoſe archetypal ideas of order and ſymmetry, according to which God formed all things. And, as this order exiſts in the mundane creatures, he calls it *mundane muſic*.

This laſt ſpecies the ancients again ſubdivide into four, viz.

Music, *elementary*, or the harmony of the elements of things.

Music, *celeſtial*, or the *muſic of the ſpheres*; comprehending the order and proportions, in the magnitudes, diſtances, and motions, of the heavenly bodies, and the harmony of the ſounds reſulting from thoſe motions.

Music, *human*, which conſiſts chiefly in the harmony of the faculties of the human ſoul, and its various paſſions; and is alſo conſidered in the proportion, temperament, and mutual dependence, of the parts of the body. Laſtly,

Music, properly ſo called, which has for its object motion, conſidered as under certain regular meaſures and proportions, by which it affects the ſenſes in an agreeable manner.

Now, as motion belongs to bodies, and as ſound is the effect of motion, and cannot be without it, but all motion does not produce ſound; hence this laſt branch of *muſic* became farther ſubdivided.

Where the motion is without ſound, or as it is only the object of ſight, it was either called *muſica orcheſtrica*, or *ſaltatoria*, which contains the rules for the regular motions of dancing: or *muſica hypocritica*, which reſpects the motions and geſtures of the pantomimes.

When the motion is perceived only by the ear, i. e. when ſound is the object of *muſic*, there were three ſpecies; viz. *Harmonica*, which conſiders the differences and proportions with reſpect to grave and acute. *Rhythmica*, which reſpects the proportion of the ſounds as to time, or the ſwiftneſs and ſlowneſs of their ſucceſſions. And *metrica* which belongs properly to the poets, and reſpects the art of making verſes..

Ariſtides, Quinctilianus, Bacchius, and ſome other ancient writers, define *muſic* the knowledge of ſinging, and of the things belonging thereto; which they explain by the motions of the voice and body: as if the ſinging conſiſted only in the different tones of the voice.

The ſame Ariſtides, conſidering *muſic* in the largeſt ſenſe of the word, divides it into *contemplative* and *active*. The firſt, he ſays, is either *natural* or *artificial*. The *natural* is either *arithmetical*, which conſiders the proportion of numbers; or *phyſical*, which examines the order of the things of nature.

The *artificial* he divides as above, into *harmonica*, *rhythmica*, and *metrica*.

The *active*, which is the application of the *artificial*, as either *enuntiative* (as in oratory); *organical* (or inſtrumental performance); *odical* (for voice and ſinging); *hypocritical* (in the motions of the pantomimes.) To which ſome add *hydraulical*, though, in reality, no more than a ſpecies of the organical; in which water is uſed, for the producing or modifying of ſound.

Porphyry makes another diviſion of *muſic*, taking it in the limited ſenſe, as having motion both dumb and ſonorous, for its object; and, without diſtinguiſhing the ſpeculative and practical, he makes its parts theſe ſix; viz. *rhythmica*, for the motions of dancing; *metrica*, for the cadence and recitation; *organica*, for the practice of inſtruments; *poetica*, for the numbers and feet of verſes; *hypocritica*, for the geſtures of the pantomimes; and *harmonica*, for ſinging.

Alypius alſo and Voſius make the *harmonica*, *rhythmica*, and *metrica*, to be ſo many parts of *muſic*. Ariſtoxenus adds the *organica*. Voſſius alſo, to the three ſpecies of practical *muſic*, *harmonica*, *organica*, and *hydraulica*, adds a fourth, *orcheſtria*, or dancing.

The *muſical faculties*, as they call them, are *melopæia*, which gives rules for the tones of the voice or inſtrument; *rhythmopæia*, for motions; and *poeſis*, for making verſes. See Poetry.

Muſic appears to have been one of the moſt ancient of arts; and, of all others, *vocal muſic* moſt undoubtedly have been the firſt kind. For man had not only the various tones of his own voice to make his obſervations on, before any other art or inſtrument was found out, but had the various natural ſtrains of birds to give him occaſion to improve his own voice, and the modulations of ſounds it was capable of.

Of many ancient authors, who agree in this conjecture, we ſhall only mention Lucretius, who ſays,

> *At liquidas avium voces imitarier ore*
> *Ante fuit multo, quam levia carmina cantu*
> *Concelebrare homines poſſent, aureiſque juvare.*

The firſt invention of ſtringed inſtruments, the ſame poet aſcribed to the obſervation of the winds whiſtling in the hollow reeds.

As for other kinds of inſtruments, there were ſo many occaſions for cords or ſtrings, that men could not be long in obſerving their various ſounds; which might give riſe to ſtringed inſtruments.

And for the pulſatile inſtruments, as drums and cymbals, they might riſe from the obſervation of the naturally hollow noiſe of concave bodies.

Plutarch, in one place, aſcribes the firſt invention of *muſic* to the god Apollo; and in another to Amphion, the ſon of Jupiter and Antiope. This laſt, however, is pretty generally allowed to have been the firſt who brought *muſic* into Greece, and to have been the inventor of the lyre. The time he lived in is not agreed upon.

To him ſucceeded Chiron, the demigod; Demodocus; Hermes Triſmegiſtus; Olympus; Orpheus, whom ſome make the firſt introducer of *muſic* into Greece, and the inventor of the lyra; to whom add Phemius, and Terpander, who was contemporary with Lycurgus, and ſet his laws to *muſic*. To him ſome attribute the firſt inſtitution of *muſical* modes, and the invention of the lyre. Laſtly, Thales, and Thamyris, who is ſaid to have been the firſt inventor of inſtrumental *muſic* without ſinging.

Theſe were the eminent muſicians before Homer's time: others, of a later date, were, Laſus Hermionenſis, Melanippides, Philoxenus, Timotheus, Phrynnis, Epigonius, Lyſander, Simmicus, and Diodorus; who were all conſiderable improvers of *muſic*. Laſus is ſaid to have been the firſt author who wrote on *muſic*, in the time of Darius Hyſtaſpis; Epigonius invented an inſtrument of forty ſtrings, called the *epigonum*; Simmicus alſo invented an inſtrument, called *ſimmicium*; of thirty-five ſtrings; Diodorus improved the *tibia*, by adding new holes; and Timotheus the *lyre*, by adding a new ſtring; for which he was fined by the Lacedæmonians.

As the accounts we have of the inventors of *muſical* inſtruments among the ancients are very obſcure; ſo are alſo the accounts what thoſe inſtruments were; we ſcarce know any thing of moſt of them, beſides the bare name.

The general diviſion of inſtruments is, into *ſtringed inſtruments*, *wind inſtruments*, and thoſe of the *pulſatile* kind. Of *ſtringed inſtruments*, we hear of the *lyra*, or *cithara*, the *pſalterium*, *trigonum*, *ſambuca*, *pectis*, *magas*, *barbiton*, *teſtudo*, *epigonum*, *ſimmicium*, and *pandoron*; which were all ſtruck with the hand, or a *plectrum*; and which ſee in their places.

Of *wind inſtruments*, we hear of the *tibia*, *fiſtula*, *hydraulic organs*, *tubæ*, *cornua*, and *lituus*.

The *pulſatile inſtruments* were, the *tympanum*, *cymbalum*, *crepitaculum*, *tintinnabulum*, *crotalum*, and *ſiſtrum*.

Muſic has ever been in the higheſt eſteem in all ages, and among all people; nor could authors expreſs their opinion of it ſtrongly enough, but by inculcating, that it was uſed in heaven, and was one of the principal entertainments of the gods, and the ſouls of the bleſſed.

The effects aſcribed to it, by the ancients, are almoſt miraculous: by means hereof, diſeaſes are ſaid to have been cured, unchaſtity corrected, ſeditions quelled, paſſions raiſed and calmed, and even madneſs occaſioned. Athenæus aſſures us, that anciently all laws, divine and civil, exhortations to virtue, the knowledge of divine and human things, lives and actions of illuſtrious men, were written in verſe, and publicly ſung by a chorus to the ſound of inſtruments; which was found the moſt effectual means to impreſs mortality, and a right ſenſe of duty, on the mind.

Muſic made a very conſiderable part of the diſcipline of the ancient Pythagoreans, and was uſed by them to draw over the mind to laudable actions, and ſettle it in a paſſionate love of virtue. It was their doctrine, that the ſoul itſelf conſiſts of harmony; and therefore, by *muſic*, they pretended to revive the primitive harmony of its faculties. By this primitive harmony, they meant that, which, according to their dogma, was in the ſoul in its pre-exiſtent ſtate in heaven.

Dr. Wallis has endeavoured to account for the ſurpriſing effects aſcribed to the ancient *muſic*; and charges them principally on the novelty of the art, and the hyperboles of the ancient writers; nor does he doubt, but the modern *muſic* cæteris paribus, would produce effects at leaſt as conſiderable as the ancient. The truth is, we can match moſt of the ancient ſtories of this kind in the modern hiſtories. If Timotheus could excite Alexander's fury with the Phrygian mode, and ſooth him into indolence with the Lydian; a more modern muſician is ſaid to have driven Eric, king of Denmark, into ſuch a rage, as to kill his beſt ſervants. Dr. Niewentyt tells us of an Italian, who, by varying his *muſic* from briſk to ſolemn, and ſo *vice verſâ*, could move the ſoul ſo as to cauſe diſtraction and madneſs; and Dr. South has founded his poem, called Muſica Incantans, on an inſtance he knew of the ſame thing.

Muſic, however, is not only found to exert its force on the affections, but on the parts of the body alſo: witneſs the Gaſcon knight, mentioned by Mr. Boyle, who could not contain his water at the playing of a bag-pipe; the woman, mentioned by the ſame author, who would burſt out in tears at the hearing of a certain tune, with which other people were but a little affected. To ſay nothing of the trite ſtory of the TARANTULA, we have an inſtance, in the Hiſtory of the Academy of Sciences of a muſician's being cured of a violent fever, by a little concert occaſionally played in his room.

Nor are our minds and bodies alone affected with ſounds, but even inanimate bodies are ſo. Kircher tells us of a large ſtone, that would tremble at the ſound of one particular organ-pipe; and Morhoff mentions one Petter, a Dutchman, who could break rummer-glaſſes with the tone of his voice. Merſenne alſo tells us of a particular part of a pavement, that would ſhake and tremble, as if the earth would open, when the organs played. Mr. Boyle adds, that ſeats will tremble at the ſound of organs; that he has felt his hat do ſo under his hand, at certain notes both of organs and diſcourſe; and that he was well informed, every well-built vault would thus anſwer to ſome determinate note.

There is a great diſpute among the learned, whether the ancients, or moderns, beſt underſtood and practiſed *muſic*? Some maintain, that the ancient art of *muſic*, by which ſuch wonderful effects were performed, is quite loſt; and others, that the true ſcience of harmony is now arrived to much greater perfection than was known or practiſed among the ancients.

This point ſeems no other way to be determinable but by comparing the principles and practice of the one with thoſe of the other. As to the theory or principles of harmonics, it is certain we underſtand it better than the ancients; becauſe we know all that they knew, and have improved conſiderably on their foundations. The great diſpute then lies on the practice; with regard to which it may be obſerved, that among the ancients, *muſic*, in the moſt limited ſenſe of the word, included *harmony*, *rhythmus*, and *verſe*; and conſiſted of verſes ſung by one or more voices alternately, or in choirs, ſometimes with the ſound of inſtruments, and ſomtimes by voices only. Their muſical faculties, we have already obſerved, were *melopœia*, *rhythmopœia*, and *poeſis*; the firſt whereof may be conſidered under two heads, viz. *melody*, and *ſymphony*.

As to the latter, it ſeems to contain nothing but what relates to the conduct of a ſingle voice, or making what we call *melody*. The ancients do not appear to have ever thought of the concert, or harmony of parts; which is a modern invention, for which we are beholden to Guido Aretine, a Benedictine friar.

We would not, however, be here underſtood to mean, that the ancients never joined more voices or inſtruments than one together in the ſame ſympothy; but that they never joined ſeveral voices ſo as that each had a diſtinct and proper melody, which made among them a ſucceſſion of various concords, and were not in every note uniſons, or at the ſame diſtance from each other as octaves. This laſt indeed agrees to the general definition of the word *ſymphonia*; yet it is plain, that in ſuch caſes there is but one ſong, and all the voices perform the ſame individual melody. But when the parts differ, not by the tenſion of the whole, but by the different relations of the ſucceſſive notes, this is the modern art, which requires ſo peculiar a genius, and on which account the modern *muſic*, ſeems to have much the advantage of the ancient. For farther ſatisfaction on the ſubject, ſee Kircher, Perrault, Dr. Wallis, Mr. Malcolm, the Jeſuit Cerceau, and others; who unanimouſly agree, that after all the pains they have taken to know the true ſtate of the ancient *muſic*, they could not find the leaſt reaſon to think there was any ſuch thing in their days as *muſic* in parts.

The ancient muſical notes are very myſterious and perplexed: Boethius and Gregory the Great firſt put them into a more eaſy and obvious method. In the year 1204, Guido Aretine, a Benedictine of Arezzo in Tuſcauy, firſt introduced the uſe of a ſtaff with five lines, on which, with the ſpaces, he marked his notes by ſetting a point up and down upon them, to denote the riſe and fall of the voice; though Kircher mentions this artifice to have been in uſe before Guidos time.

Another contrivance of Guido's was to apply the ſix muſical ſyllables, *ut*, *re*, *mi*, *fa*, *ſol*, *la*, which he took out of the Latin hymn.

UT *queant laxis* RE*ſonare fibris*
MI*ra geſtorum* FA*muli tuorum*,
SOL*ve polluti* LA*bii reatum*,
O Pater Alme.

We find another application of them in the following lines:

UT RE*levit* MI*ſerum* FA*tum*, SOL*itoſque* LA*bores*
Aevi ſit dulcis muſica, noſter amor.

Beſides his notes of *muſic*, by which, according to Kircher, he diſtinguiſhed the tones, or modes, and the ſeats of the ſemitones, he alſo invented the ſcale, and ſeveral muſical inſtruments, called *polyplectra*, as ſpinets and harpſichords.

The next conſiderable improvement was in 1330, when Joannes Muria, or de Muris, doctor at Paris (or as Bayle and Geſner make him, an Engliſhman), invented the different figures of notes, which expreſs the time or length of every note, at leaſt their true relative proportion to one another, now called *longs*, *breves*, *ſemi breves*, *crotchets*, *quavers*, &c.

The moſt ancient writer of *muſic*, we have already obſerved, was Laſus Hermionenſis; but his works, as well as thoſe of many others, both Greek and Roman, are loſt. Ariſtoxenus, diſciple of Ariſtotle, is the eldeſt author extant on the ſubject: after him came Euclid, author of the Elements; Ariſtides Quintilianus wrote after Cicero's time. Alypius ſtands next; after him Gaudentius the philoſopher, and Nicomachus the Pythagorean, and Bacchius. Of which ſeven Greek authors we have a fair copy, with a tranſlation and notes, by Meibomius.

Ptolemy, the celebrated mathematician, wrote in Greek of the principles of harmonics about the time of the emperor Antoninus Pius. This author keeps a medium between the Pythagoreans and Ariſtoxenians. He was ſucceeded at a conſiderable diſtance by Manuel Bryennius.

Of the Latins we have Boethius, who wrote in the time of Theodoric the Goth; and one Caſſiodorus, about the ſame time; Martianus, and St. Auguſtine, not far remote.

Of the moderns, are Zarlin, Salinas, Vincenzo Galileo, Doni, Kircher, Merſenne, Paran, De Caux, Perrault, Wallis, Des Cartes, Holder, Malcolm, &c.

Music, *chromatic*, *muſica chromatica*, among the Italians, is uſed to expreſs that kind of *muſic* in which there are many chromatic ſigns, as flats or ſharps, and intervals, &c. See Chromatic.

Music, *diatonic*. See Diatonic.

Music, *didactic*, *muſica didactica*, that part of ſpeculative *muſic* which only conſiders the quantity, proportions, and different qualities of ſounds.

Music, *dramatic*, *muſica dramatica*, *ſcenica*, *theatrale*, among the Italians, is uſed to denote ſuch compoſitions of *muſic* as are particularly made and fitted for theatres. See Recitativo.

Music, *enharmonic*. See Enharmonic.

Musica *enunciativa*, or *enarrativa*, is uſed in much the ſame ſenſe as *muſica ſignatoria*.

Music, *figurate*, *muſica figuralis*, *figurata*, or *colorata*. *Figurate muſic*, that wherein the notes are of different values, and the motions various, now ſlow, then quick, &c.

Music, *harmonic*, *muſica harmonica*, among the Italians, is uſed for pieces conſiſting of many parts, which, though very different, yet, when played together, make an agreeable whole. This we call *muſic* in parts.

Music, *hiſtorical*. See Historical.

Music, *hyperchematic*, or *choraic*, is uſed by ſome authors for a ſort of *muſic* fit for ballads and dancing.

Music, *inſtrumental*, is uſed to denote muſical compoſitions, made to be executed by inſtruments.

Music, *meliſmatic*, or *melodic*, is uſed to denote a ſong, or ſingle part, merely for a voice or for an inſtrument. Broſſard. See Melody.

Music, *melopoetic*, is the ſcience or art of ranging and diſpoſing ſounds in ſucceſſion in an agreeable manner; or the art of making melody. See Melody and Melopoeia.

Music, *meaſured*, *muſica miſurata*, among the Italian authors, a kind of *muſic*, the notes of which are unequal. It is contrary to *muſica piena*, or *chorale*.

Music, *metrbolic*, *muſica metabolica*, among the Italians, is properly *muſic* tranſpoſed, as when the piece goes out of its natural mode into a tranſpoſed one, the better to expreſs the words, or to diſtinguiſh ſome change in the action, paſſion, motion, &c.

Music, *metric*, *muſica meterica*, is uſed, by Italian authors, to denote the harmonious cadence of the voice, heard when any one declaims, or repeats verſes; or it is an air compoſed to verſes.

Music, *modern*. See ante.

Music, *modulatory*, *muſica modulatoria*, among the Italians, that part of *muſic* which teaches to compoſe or modulate, i. e. that fixes rules for the uſe of modes, and teaches either to ſing or play well. See Mode, and Modulation.

Music, *odic*, *muſica odica*, among the Italians, is the ſame with *hyperchematic*, or *choraic*.

Music, *organic*, *muſica organica*, among the Italians, is uſed to denote muſical compoſitions deſigned to be performed by inſtruments only.

Music, *pathetic*, *muſica pathetica*, is a moving and affecting kind of *muſic*, that cauſes emotions in the mind, either of love, grief, or pity.

Music, *poetic*, *muſica poetica*, is ſometimes uſed for the art of inventing ſongs, of modulating concords and diſcords together agreeably, and making what we call compoſitions, &c.

Music, *recitative*, *muſica recitativa*, *ſcenica*, or *dramatica*, a ſort of *muſic* uſed in operas, &c. irregular as to time, being a declamation in ſigning, to expreſs the paſſions. From its being thus irregular in its time, the Italians often place the phraſe *a tempo giuſto*, when the recitative ends, and an air, be it minuet, jigg, or any other, follows, to ſhew that the time is then ſtrictly to be obſerved. See Recitativo.

Music, *rhythmic*, *muſica rhythmica*, is uſed for the harmony or cadence of the words in proſe; or a ſong compoſed to words in proſe.

Music, *ſcenic*, the ſame with *recitative*.

Music, *ſignatory*, *muſica ſignatoria*, is uſed for that part of *muſic* which teaches the knowledge of the characters, notes, figures, pauſes, and all other ſigns and marks whatſver, uſed in *muſic*.

Music, *vocal*, *muſica vocalis*, or that compoſed for the voice, in oppoſition to organical or inſtrumenal, which is intended to be played on inſtruments only.

Music-*ſhell*, in *Natural Hiſtory*, the name of a ſpecies of ſhell-fiſh of the murex-kind, remarkable for its variegations, which conſiſt of ſeveral ſeries of ſpots placed in rows of lines, like the notes of *muſic*.

Music, *academy of*. See Academy.

Music, *characters in*. See Characters.

MUSICAL *accent*. See Accent.

Musical *faculties*. See Music.

Musical *glaſſes*. See Armonica.

Musical *modes*. See Mode.

Musical *notes*. See Note.

Musical *numbers*, are 2, 3, and 5, together with their compoſites. They are ſo called, becauſe all the intervals of muſic may be expreſſed by ſuch numbers. See Interval.

This is now generally admitted by *muſical* theoriſts. Mr. Euler ſeems to ſuppoſe, that 7 or other primes might be introduced; but he ſpeaks of this as a matter doubtful and difficult. It is to obſerved, that 2 correſponds to the octave, 3 to the fifth, or rather to the twelfth, and 5 to the third major, or rather the ſeventeenth. From theſe three may all other intervals be found.

A table of *muſical* numbers within any propoſed limit may be thus expeditiouſly formed.

Place the terms of the progreſſion 1, 5, 25, 125, &c. in a column under each other; and multiply every term of this progreſſion by 3, continually, till you foreſee that the products will exceed the propoſed limit. Then if all the numbers thus found be doubled continually, till it be foreſeen that the doubled numbers would exceed the propoſed limit; all theſe products together, with the powers of 2, will give the *muſical* numbers required.

Thus if it were required to find all the *muſical* numbers within the compaſs of eleven octaves; that is, between 1 and 2048; form the column 1, 5, 25, &c. and multiply every term by 3 continually, as in the annexed example:

1.	3.	9.	27.	81.	243.	729, &c.
5.	15.	45.	135.	405.	1215, &c.	
25.	75.	225.	675.	2025, &c.		
125.	375.	1125, &c.				
625.	1875.	&c.				
&c.						

The numbers of which being doubled as often as poſſible within the limit 2048, and collected and ranged in order with the powers of 2, will give the following numbers, 1. 2. 3. 4. 5. 6. 8. 9. 10. 12. 15. 16. 18. 20. 24. 25. 27. 30, &c. as in the following table.

TABLE of *muſical* numbers, contained in eleven octaves.

Num.	Chord Aſc.	Chor Deſc.	Num.	Chord Aſc.	Chord Deſc.	Num.	Chord Aſc.	Chord Deſc.
1	F	B	144	G	A	750	B※	F^{b}
2	F^{1}	B^{1}	150	G※	A^{b}	768	B	E
3	C	E	160	A	G	800	C※	E^{b}
4	F^{2}	B^{2}	162	$\dot{\mathrm{A}}$	G	810	$\dot{\mathrm{C}}$※	E^{b}
5	A	G	180	B	$\dot{\mathrm{F}}$	864	D	$\dot{D}$
6	C	E	192	C	E	900	D※	D^{b}
8	F^{3}	B^{3}	200	C※	E^{b}	960	E	C
9	G	A	216	D	*D*	972	$\dot{\mathrm{E}}$	C
10	A	G	225	D※	D^{b}	1000	E※	$\dot{\mathrm{C}}^{b}$
12	C	E	240	E	C	1024	F^{10}	B^{10}
15	E	C	243	$\dot{\mathrm{E}}$	C	1080	$\dot{\mathrm{F}}$※	B^{b}
16	F^{4}	B^{4}	250	E※	$\dot{\mathrm{C}}^{b}$	1125	$\dot{\mathrm{F}}$※※	$\dot{\mathrm{B}}^{bb}$
18	G	A	256	F^{8}	B^{8}	1152	G	$\dot{\mathrm{A}}$
20	A	G	270	$\dot{\mathrm{F}}$※	B^{b}	1200	G※	A^{b}
24	C	E	288	G	$\dot{\mathrm{A}}$	1215	$\dot{\mathrm{G}}$※	A^{b}
25	C※	E^{b}	300	G※	A^{b}	1250	G※※	$\dot{\mathrm{A}}^{b}$
27	D	*D*	320	A	G	1280	A	$\dot{\mathrm{A}}^{bb}$
30	E	C	324	$\dot{\mathrm{A}}$	G	1296	$\dot{\mathrm{A}}$	G
32	F^{5}	B^{5}	360	B	$\dot{\mathrm{F}}$	1350	$\dot{\mathrm{A}}$※	G
36	G	A	375	B※	F^{b}	1440	B	$\dot{\mathrm{G}}^{b}$
40	A	G	384	C	E	1458	$\dot{\mathrm{B}}$	$\dot{\mathrm{F}}$
45	B	F	400	C※	E^{b}	1500	B※	F
48	C	E	405	$\dot{\mathrm{C}}$※	E^{b}	1536	C	F^{b}
50	C※	E^{b}	432	D	$\dot{D}$	1600	C※	E
54	D	*D*	450	D※	D^{b}	1620	$\dot{\mathrm{C}}$※	E^{b} E^{b}
60	E	C	480	E	C	1728	D	$\dot{D}$
64	F^{6}	B^{6}	486	$\dot{\mathrm{E}}$	C	1800	$\dot{\mathrm{D}}$※	D^{b}
72	G	A	500	E※	$\dot{\mathrm{C}}^{b}$	1875	D※※	D^{bb}
75	G※	A^{b}	512	F^{9}	B^{9}	1920	E	C
80	A	G	540	$\dot{\mathrm{F}}$※	B^{b}	1944	$\dot{\mathrm{E}}$	C
81	$\dot{\mathrm{A}}$	G	576	G	$\dot{\mathrm{A}}$	2000	E※	$\dot{\mathrm{C}}^{b}$
90	B	$\dot{\mathrm{F}}$	600	G※	A^{b}	2025	$\dot{\mathrm{E}}$※	C^{b}
96	C	E	625	G※※	A^{bb}	2048	F^{11}	$\dot{\mathrm{B}}^{11}$
100	C※	E^{b}	640	A	G			
108	D	*D*	648	$\dot{\mathrm{A}}$	G			
120	E	C	675	$\dot{\mathrm{A}}$※	$\dot{\mathrm{G}}^{b}$			
125	E※	C^{b}	720	B	$\dot{\mathrm{F}}$			
128	F^{7}	B^{7}	729	$\dot{\mathrm{B}}$	$\underset{\cdot}{\mathrm{F}}$			
135	$\dot{\mathrm{F}}$※	$\underset{\cdot}{\mathrm{B}^{b}}$						

To underſtand this table it is to be obſerved, that by dividing a given ſtretched ſtring or chord, by means of a moveable bridge, the ſounds produced by its parts will be higher in pitch than thoſe produced by the given chord. And on the contrary, if we multiply a chord, that is, by a moveable bridge lengthen the ſounding part of a chord, we ſhall have ſounds lower in pitch than the given chord. Hence we have the foundation of an aſcending, and of a deſcending ſcale of *muſical* ſounds. The firſt column of each diviſion of the table, marked *Num.* expreſſes the muſical numbers; the ſecond column, marked *Aſc.* the names of the notes in the aſcending ſcale; and the third column, marked *Deſc.* the names of the notes of the deſcending ſcale. Thus if the given chord be unity, and called F, then will 15 be E in the fourth octave, aſcending of F; 45 will be B in the ſixth octave of F, &c. In the deſcending ſcale unity will be B; 15 will be C in the fourth octave deſcending from B; and 45 will be F of the ſixth octave, &c.

The reaſon why unity is marked F in the aſcending ſcale, and B in the deſcending ſcale, is, becauſe, according to the received notation of what is called the natural ſcale among muſicians, F has no fourth in aſcending, nor B a fourth in deſcending. Now it is plain that no aliquot diviſion of a ſtring can give a fourth, or any of its octaves aſcending; nor can any multiple of a ſtring give the fourth, or any of its octaves, in deſcending. For the fourth being expreſſed by $\frac{4}{3}$ in aſcending, and by $\frac{3}{4}$ in deſcending, its octaves will be $\frac{8}{3}$, $\frac{16}{3}$, $\frac{32}{3}$, &c. in the firſt caſe, and $\frac{3}{8}$, $\frac{3}{16}$, $\frac{3}{32}$, &c. in the ſecond caſe, none of which numbers can be multiples, or ſubmultiples of a given ſtring.

F and B being the given ſounds, their octaves will be expreſſed by F^{1}, F^{2}, F^{3}, &c. and B^{1}, B^{2}, B^{3}, &c. which are reſpectively, the firſt, ſecond, and third octaves, above the F, and below B.

A dot marked over a letter ſhews that it ſignifies a ſound higher by a comma that the ſound expreſſed by the letter itſelf. And a dot placed below, denotes the ſound to be lowered by a comma. Thus, in the table I find 81 to be $\dot{\mathrm{A}} \mid \underset{\cdot}{\mathrm{G}}$, which denotes that A, or the ſharp in the ſeventh octave of F, aſcending, is raiſed a comma; and that G, or the ſharp third from B, deſcending, is lowered by the ſame interval.

If B in the deſcending ſcale be ſuppoſed to be a tritonus, that is, two tones major and one tone minor above F of the aſcending ſcale, then will A in one of theſe ſcales correſpond or be denoted by the ſame numbers with G in the other ſcale, and C will correſpond to E, but D in the aſcending ſcale will not be expreſſed by the ſame numbers as in the deſcending ſcale: for in the former D will be a tone major above C, whereas in the latter, D muſt by analogy be a tone major below E, and therefore only a tone minor above C, which is the reaſon why *D* is in *Italics* in the deſcending ſcale.

Mr. Henſling has mentioned the diſtinction between an aſcending and a deſcending ſcale in the Miſcel. Berolinenſ. He places unity in the aſcending ſcale in F, as it ought: but in the deſcending ſcale he places unity in E, which diſturbs the analogy of the two ſcales.

The trumpet and French horn, not having (commonly) a compaſs beyond four octaves; and their ſounds being formed in a manner analogous to thoſe produced by the diviſion of a ſtring, it follows, that all the true notes of theſe inſtruments will be repreſented by the muſical numbers 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, &c. This is a fact well known; and a confirmation of the truth of that theory which derives all muſical proportions from the elements 2, 3, and 5. Phil. Tranſ. Nº 195, and Nº 481. See TRUMPET.

MUSICAL *proportion*. See PROPORTION.

MUSICAL *ſound*. See SOUND.

MUSICAL *ſtring*. See STRING.

MUSIMON, in *Natural Hiſtory*, the name of an animal eſteemed a ſpecies of ſheep, deſcribed by the ancients as common in Corſica, Sardinia, Barbary, and the north-eaſt parts of Aſia. It has been ſuſpected, whether the animal deſcribed under this name is now any where to be found in the world; not that it is to be ſuppoſed that any ſpecies of animal once created is become extinct, but that this probably was a ſpurious breed between two animals of different ſpecies, perhaps the ſheep and goat, which, like the mule, not being able to propagate its ſpecies, the production of them may have been diſcontinued.

Belon ſtyles this ſpecies of GOAT, which has large horns bending back, cloſe at their baſe, diſtant at their points, with circular rugæ, the TRAGELAPHUS, from the mixture it ſeems to have of the goat and deer. Buffon ſuppoſes it to be the ſheep in a wild ſtate; and as ſuch, deſcribed by Mr. Pennant. Theſe animals live in the mountains, and run with great ſwiftneſs among the rocks. Thoſe of Kamtſchatka are ſo ſtrong that ten men can ſcarce hold one; and the horns are ſo large as ſometimes to weigh thirty pounds, and ſo capacious that young foxes often ſhelter themſelves in the hollow of ſuch as by accident fall off in the deſerts.

MUSIVUM *argentum*. See ARGENTUM.

MUSK, *moſchus*, derived from the Arabic *moſcha*, *muſk*, whence was formed the common Greek μοσχος, *muſk*, a kind of perfume of a very ſtrong ſcent; only agreeable when moderated by the mixture of ſome other perfume.

Muſk is found in a kind of bag, or tumor, growing about the bigneſs of a hen's egg under the belly, towards the genital parts of a wild beaſt of the ſame name; and appears to be nothing elſe but a kind of bilious blood there congealed, and almoſt corrupted.

The animal which produces it is pretty common in the kingdom of Bantam, Tonquin, and ſome others, as Cochin-China, &c. But the moſt eſteemed are thoſe in the kingdom of Thibet. See MOSCHIFERUM *animal*.

They inhabit the woods and foreſts where the natives hunt them down: when the beaſt is killed, they cut out the bladder under the belly, ſeparate the coagulated blood, and dry it in the ſun, where it is reduced into a light friable ſubſtance almoſt of the nature of a powder, and of a duſky reddiſh colour, and acquires a very ſtrong and diſagreeable ſmell. It is then tied up again in bladders, and exported to other countries; and this is the *muſk* which we uſe.

The *muſk* itſelf is dry, with a kind of unctuoſity; of a dark reddiſh brown, or ruſty blackiſh colour; in ſmall round grains, with a very few hard black clots; perfectly free from any ſandy, or other viſible foreign matter. Chewed, and rubbed on paper, it looks bright, yellowiſh, ſmooth, and free from grittineſs. Laid on a red-hot iron it catches flame, and burns almoſt entirely away, leaving only an exceeding ſmall quantity of light greyiſh aſhes: if any earthy ſubſtances have been mixed with the *muſk*, the quantity of the reſiduum will diſcover them. From thirty grains of *muſk*, water extracts twelve grains, and ſpirit of wine ten grains. Spirit of nitre and oil of vitriol totally diſſolve it: the former deſtroys the whole of its ſmell and the latter the greateſt part of it. Spirit of ſalt, diluted ſpirit of vitriol, and vinegar, have no effect upon it. Spirit of ſal ammoniac diſſolves a little of it. Oil of tartar ſcarce acquires any tinge from *muſk*, but extricates from it a vitriolic urinous ſmell. *Muſk* is not ſoluble in oils expreſſed or diſtilled. By diſtillation in a retort, it yields the animal principles, empyreumatic oil, volatile ſpirit, and ſalt. In the diſtillation of odoriferous waters and ſpirit, a ſmall portion of *muſk*, included in a linen cloth, is generally hung in a ſtill-head, the vapour of both liquors extracting its ſcent. Spirit, diſtilled with *muſk* immerſed in it, acquires little of its ſmell; but water by this method acquires both the ſmell and taſte. A minute portion of *muſk* greatly improves the fragrance of the diſtilled odoriferous waters, as thoſe of lavender and roſemary, and heightens the ſmell of other odoriferous ingredients, without communicating any of its own peculiar ſmell. The quantity of liquor, which may be flavoured by macerating a certain known proportion of *muſk* for a ſew days in rectified ſpirit of wine, appears to be the beſt critireon of the genuineneſs and goodneſs of this commodity; a commodity, which is not only ſaid to vary according to the ſeaſon of its being taken from the animal, but which is ſometimes ſo artfully ſophiſticated, that the abuſes cannot be diſcovered by any external characters, or by any other means than the degree of its ſpecific ſmell and taſte, which the above experiment affords the beſt method of eſtimating. Neumann and Lewis.

What the ancients have written of *muſk* is fabulous, viz, that it comes from the teſticles of a caſtor, which, to ſtop the purſuit of the hunter, caſtrates itſelf. The occaſion of their error may be owing to this, that among the Indians the *muſk* animal goes by the name of *caſtor*.

Muſk is in conſiderable uſe among the perfumers and confectioners, though much leſs now than it was formerly. It is ſuppoſed to fortify the heart and brain, and is good againſt deafneſs, and is now received in general practice in different convulſive diſorders; and its doſe has been increaſed with advantage to a ſcruple and half a dram, every four or ſix hours.

Muſk, and other perfumes of the ſame tribe, have been long celebrated as antiſpaſmodics, but were formerly ordered in ſuch ſmall quantities as to have little effect. Practitioners thought four or five grains a large doſe. But the Chineſe have taught us to be more bold; the tenth part of an ounce is a uſual doſe among them. The remedy in the Eaſt for the bite of the mad dog contains ſixteen grains of *muſk*, and this they repeat frequently. See MADNESS.

The effects of *muſk* are, eaſe from pain, quiet ſleep, and a copious diaphoreſis. Hence it has been found of great uſe in ſpaſmodic diſorders, petechial, malignant, putrid fevers, the goal diſtemper, hiccoughs, *ſubſultus tendinum*, &c. For the particular caſes, we refer to the Philoſophical Tranſactions, N° 474. § 18. and vol. xliv. p. 75, &c. Inſtances occur in which it has been of very great benefit in convulſive diſorders, in the London Med. Obſ. &c. vol. iii. art. 21. 31.

It has alſo been found uſeful in ſpaſmodic diſorders given by way of clyſter, as Dr. Wall obſerves, in that Tranſaction. The operation of *muſk*, in ſome reſpects, reſembles that of opium; but is in this much preferable that it does not leave behind it any ſtupor or languidneſs, which the latter often does. *Muſk* therefore ſeems likely to anſwer in thoſe low caſes where ſleep is much wanted, and opiates are improper.

It is ſaid to be beſt given in a bolus, and that thoſe who are moſt averſe to perfumes may take it in that form without inconvenience. For, as Etmuller and others, have long ago obſerved, the ſmell of the perfume is often found to be of diſſervice, where the ſubſtance inwardly taken produces good effects.

It is pity that a medicine of this conſequence ſhould be ſo liable to adulterations, and that the criteria of its genuineneſs are ill ſettled.

In a paper read before the Royal Society, March 17, 1747-8, ſeveral cures performed by *muſk*, on diſtempered cows, were mentioned.

When *muſk* begins to decay, it is a practice uſed in the Eaſt Indies to put it into a bladder or bag, wherein many ſmall holes are made with a needle, and hang it in a neceſſary-houſe, but not low enough to touch the filth. Others keep it wrapped up in linen, well moiſtened with rank urine.

Mr. Boyle ſays, of his own knowledge, that *muſk* has greatly contributed to the preſervation of fleſh. Works abr. vol. i. p. 30.

MUSK-*ant*. See ANT.

MUSK-*boar*, in *Zoology*. See TAJACU.

MUSK-*hyacinth*. See HYACINTH.

MUSK-*inſect*. See INSECT.

MUSK-*julep*. See JULEP.

MUSK-*rat*. See RAT.

MUSK-*ſeed*, in the *Materia Medica*, the name of the ſeed of the *alcea Ægyptiaca villoſa*, or hoary Egyptian vervain mallow. See *Syrian* MALLOW.

It is a ſmall ſeed of about the bigneſs of a pin's head, of a greyiſh brown in colour, and of the ſhape of a kidney, and when freſh it has a perfumed ſmell. It is brought into Europe from Egypt, and from Martinico. The Egyptians uſe it internally as a cordial and provocative; but in Europe it is of very little uſe, being wholly neglected in medicine; but the perfumers in France and Italy uſe it among their compoſitions.

MUSKET, or MUSQUET, properly a fire-arm borne on the ſhoulder, and uſed in war; to be fired by the application of a lighted match.

The length of the *muſket* is fixed to three feet eight inches from the muzzle to the touch-pan, and its bore is to be ſuch as may receive a bullet of fourteen in a pound, and its diameter differs not above one fiftieth part from that of the BULLET.

Muſkets were anciently borne in the field by the infantry, and were uſed in England ſo lately as the beginning of the civil wars. They are ſaid to have been firſt invented in the year 1521. At preſent they are little uſed, except in the defence of places; fuſees, and FIRE-*locks*, having taken their place and name.

MUSKET-*baſkets*, in *Fortification*. See BASKETS.

MUSKETEERS, ſoldiers armed with muſkets.

MUSKETOON, a muſket ſhorter, though thicker, than the ordinary muſket. It is fired by the colliſion of a ſteel and flint in the lock: whereas the muſket is fired by a match. Its bore is a thirty-eight part of its length, and carries five ounces of iron, or ſeven and a half of lead, with an equal quantity of powder. This is the ſhorteſt ſort of blunderbuſſes. See FIRE-*lock*.

MUSLIN, or MUSSLIN, a fine ſort of cloth, wholly cotton; ſo called as not being bare, but having a downy knap on its ſurface reſembling moſs, which the French called *mouſſe*.

There are various kinds of *muſlins* brought from the Eaſt Indies, chiefly from Bengal; betelles, tarnatans, mulmuls, tanjeebs, terrindams, doreas, &c.

Muſlins, on their importation, pay a duty of 2*s*. $10\frac{20}{100}$*d*. the piece, which is drawn back on exportation; and beſides this a duty of 15*l*. *per cent*. to be computed according to the groſs price at which they are publicly ſold by auction; but if they are exported, all drawn back is for 20*s*. value.

MUSQUETEERS, *mouſquetaires*, in France, are troopers who fight ſometimes on foot, ſometimes on horſeback: they are gentlemen of good families, and are divided into two troops, the one called the grey *muſqueteers*, the other the black *muſqueteers*, from the colour of their horſes.

MUSSA, *mora*. See MOOR.

MUSSAHIR, in *Ornithology*, a bird mentioned by Arabian writers. It is ſaid that this creature, after having employed the day in ſeeking its food, ſpends the whole night in ſinging; its notes are ſaid to be ſo melodious as to baniſh all thoughts of ſleep from thoſe that hear them.

MUSSLIN. See MUSLIN.

MUSSULMAN, or MUSULMAN, written in Arabic *moſlem*, *moſleman*, or *moſolman*, a title by which the Mahometans diſtinguiſh themſelves; ſignifying, in the Turkiſh language, *true believer*, or *orthodox*.

The appellation was firſt given to the Saracens; as is obſerved by Leunclavius. There are two kinds of *muſſulmans*, very averſe to each other; the one called *Sonnites*, and the other *Shiites*. The Sonnites follow the interpretation of the Koran given by Omar; the Shiites are the followers of Ali. The ſubjects of the king of Perſia are Shiites; and thoſe of the grand ſignior, Sonnites. See SONNA, and ALCORAN.

Some authors will have it, that the word *muſſulman* ſignifies *ſaved*, that is predeſtinated; and that the Mahometans give themſelves the appellation, as believing they are all predeſtinated to ſalvation. Martinius is more particular as to the origin of the name; which he derives from the Arabic מסלם *muſalam*, *ſaved*, *ſnatched out of danger*: the Mahometans, he obſerves, eſtabliſhing their religion by fire and ſword, maſſacred all thoſe who would not embrace it, and granted life to all that did, calling them *muſſulmans*; q. d. *erepti e periculo*; whence the word, in courſe of time, became the diſtinguiſhing title of all thoſe of that ſect, who have affixed to it the ſignification of *true believer*.

MUST, *muſtum*, ſweet wine newly preſſed from the grape; or the new liquor preſſed from the fruit before it has worked or fomented.

MUST *of Rheniſh wine*. This is a liquor that, though drank by ſome, is found extremely to affect the brain; for not having paſſed the natural efferveſcence which it would have been ſubject to, in the making of wine, its ſalts are locked up till the heat of the ſtomach ſetting them to work, they raiſe their effervеſcence there, and ſend up abundance of ſubtle vapours to the brain. The Rheniſh *muſt* is of two kinds, being made either with or without boiling. That made without boiling is only put up ſo cloſe in the veſſel, that it cannot work; this is called ſtumm-wine. That by boiling is thus prepared: they take ſtrong veſſels not quite filled, and putting them into a cellar, they make a fire mild at firſt, but increaſed by degrees, and afterwards they graduallly leſſen it again, that the boiling may ceaſe of itſelf. This operation is finiſhed in thirty-ſix or forty hours, according to the ſize of the veſſel; and the wine-boilers, inſtead of common candles, which would melt by the heat, uſe thin pieces of ſplit beech wood. Theſe alſo ſerve for a double purpoſe, not only lighting them, but giving them notice of the boiling being enough; before that time, the quantity of vapours thrown up with them burn dim; but as ſoon as it is finiſhed the vapours aſcend in leſs quantity, and the lights burn briſk and clear. About ſeven or eight days after this boiling, the *muſt* begins to work, and after this working it is called wine. They have alſo another kind of Rheniſh *muſt*, which is thus prepared: they boil the liquor to half the quantity, and put into it the medicinal ingredients they are moſt fond of; ſuch as orange-peel, elecampane-root, and juniper-berries, or the like; being thus medicated, the whole works much more ſlowly than it otherwiſe would. If the boiled *muſt*, by too violent an effervеſcence, caſt out its lees, it will on this become vapid and dead, unleſs this ſeparation is ſtopped by ſome fatty ſubſtance, ſuch as freſh butter or the like: they put this in upon a vine-leaf or elſe apply lard to the mouth of the veſſel.

A Must *for artificial wine* may be thus made: take twenty pounds of fine ſugar, five gallons of water, four ounces of white tartar finely pulverized, or cream of tartar, and boil them in a large veſſel over a gentle fire.

MUSTACEUM, among the ancient Romans, a kind of cheeſe-cake. It was compoſed of cheeſe, anniſeed, cummin, and ſuet added to flour, moiſtened with *muſtum*, or new wine.

MUSTARD, *ſinapi*, in *Botany*, a genus of the *tetradynamia ſiliquoſa* claſs. Its characters are theſe: the empalement of the flower is compoſed of four narrow leaves, placed in form of a croſs, which fall off: the flower has four roundiſh petals in form of a croſs, and four oval nectariums, one on each ſide of the ſtamina and the pointal; it has ſix-awl ſhaped erect ſtamina, two of which are oppoſite and as long as the empalement, the other four are longer; in the centre is placed a taper germen, with a ſtyle the length of it, crowned by a headed ſtigma; the germen afterwards turns to an oblong pod, which is very rough at bottom, having two cells, opening with two valves whoſe intermediate partition is large, compreſſed, and almoſt twice the length of the valves: the ſeeds are globular. Miller reckons ſix, and Linnæus twelve ſpecies.

The firſt ſort is the common white *muſtard*, which is generally cultivated as a ſallad herb for winter and ſpring uſe. The ſeeds of this are commonly thrown very thick in drills, either upon a warm border, or, in very cold weather, upon a moderate hot-bed, with creſſes and other ſmall ſallad-herbs, which are commonly fit for uſe in ten days or a fortnight from the time of ſowing; for if they are large, and have rough leaves, they are too ſtrong to put into ſallads.

The ſecond ſort is the common *muſtard*, which is frequently found growing naturally in many parts of England, but is alſo cultivated in fields, for the ſeed, of which the ſauce called *muſtard* is made. This ſort is cultivated only for the ſeeds; theſe ſhould be ſown in the ſame way as thoſe of the firſt, and the plants treated in the ſame manner; with this difference, of allowing the plants twice as much room, becauſe they grow much larger: ſo theſe ſhould be hoed out to the diſtance of eighteen inches; and as the ſeeds will not ripen ſo ſoon as the other, ſo the ground may require to be hoed three times over, but that may be eaſily ſeen by the growth of the weeds. The ſeeds of theſe two firſt ſpecies are ordered for medicinal uſe.

Muſtard ſeed is one of the ſtrongeſt of the pungent, ſtimulating, diuretic medicines, that operate without exciting much heat. It is ſometimes taken unbruiſed, to the quantity of a ſpoonful at a time, in paralytic, cachectic, and ſerous diſorders. It is applied alſo as an external ſtimulant, to benumbed and paralytic limbs; to parts affected with fixed rheumatic pains; and to the ſoles of the feet, in the low ſtage of acute diſeaſes for raiſing the pulſe: in this intention, a mixture of equal parts of the powdered ſeed and crumb of bread, with the addition, ſometimes, of a little bruiſed garlic, are made into a cataplaſm, with a ſufficient quantity of Vinegar.. See Sinapism.

Muſtard ſeed yields upon expreſſion a conſiderable quantity of oil, which is by ſome recommended externally againſt rheumatiſms and palſies, though it has nothing of that quality by which the ſeeds themſelves prove uſeful in thoſe diſorders; the oil being mild and inſipid as that of olives, and the pungency of the ſeed remaining entire in the cake left after expreſſion; nor is any conſiderable part of the pungent matter extracted by rectified ſpirit. The bruiſed ſeeds give out readily to water nearly the whole of their active matter: added to boiling milk, they curdle it, and communicate their pungency to the whey. The powder of *muſtard* ſeed may be made into the conſiſtence of a loch with warm water, in which a little ſea-ſalt has been diſſolved. Of this a common ſpoonful, ſometimes two, diluted with tepid water, are given on an empty ſtomach; it operates well as an emetic, and proves an excellent remedy in moſt nervous diſorders, according to Mr. Monro, in Med. Eſſ. Edinb. vol. ii. art 19. p. 303. not.

The third ſort grows naturally on arable land, in many parts of England. The ſeed of this is commonly ſold under the title of Durham *muſtard* ſeed. This is a common weed in moſt parts of England; and comes up early in the ſpring amongſt the corn, ſo flowers and ſeeds in May; therefore where it is not weeded out, the ſeeds will ſcatter long before the corn is ripe, and the ground will be ſtocked with the weed. The other three ſorts are preſerved in botanic gardens for variety, but are never cultivated for uſe; theſe may be treated in the ſame way as the two firſt ſpecies. Miller and Lewis.

Mustard, *Baſtard*, in *Botany*. See Cleome.

Mustard, *buckler*, or *baſtard mithridate muſtard*, *biſcutella*, in *Botany*, a genus of the *tetradynamia ſiliculoſa* claſs of plants. Its characters are theſe: the empalement of the flower is compoſed of four leaves, which are pointed; the flower hath four petals, placed in form of a croſs, which are obtuſe and ſpread open: it hath ſix ſtamina, four long and two ſhort; in the centre is ſituated an orbicular compreſſed germen, which afterwards becomes a plain, compreſſed, erect, capſule, with two convex lobes, having two cells terminated by the rigid ſtyle, which is joined to the ſide of the partition.—Linnæus reckons two, and Miller four ſpecies.

Mustard, *hedge*, *eryſimum*, in *Botany*, a genes of the *tetradynamia ſiliquoſa* claſs. Its characters are theſe: the empalement of the flower is compoſed of four oblong, oval, coloured leaves; the flower hath four petals placed in form of a croſs, and two nectarious glands ſituated betwixt ſix ſtamina, four of which are the length of the empalement, the other two ſhorter; it hath a narrow four-cornered germen, which afterwards becomes a long, narrow, four-cornered pod, with two cells, filled with ſmall ſeeds. Linnæus reckons ſix, and Miller ſeven ſpecies.

The firſt ſort is uſed in medicine; it grows naturally on the ſide of foot-paths, and upon old walls in moſt parts of England, ſo is rarely cultivated in gardens; where, if it is once admitted, it would become a troubleſome weed. The ſecond and third ſorts alſo grow naturally on banks in many parts of England; they were formerly eaten in winter ſallads, before the Engliſh gardens were furniſhed with better plants; ſince which time they have been rejected, for they have a rank ſmell, and are diſagreeable to the palate. The ſixth ſort grows naturally on the ſides of banks in many parts of England, ſo it is not ſuffered to have a place in gardens. This was formerly eaten as a ſallad herb by the poorer ſort of people, who gave it the title of ſauce alone. It has a rank ſmell, and taſte of garlic, is very biting and hot on the palate; it is frequently preſcribed in medicine. The ſeventh ſort, called gilliflower with a dame's violet leaf, is ſometimes found growing naturally on old walls, in ſome parts of England, particularly about Cambridge and Ely. The other ſorts are kept in botanic gardens for variety.

Hedge muſtard is hot and dry, opening and attenuating, and by its warming quality is good to diſſolve thick, groſs, ſlimy humours of the lungs, to help a cough, and ſhortneſs of breath, and is particularly recommended againſt an habitual hoarſeneſs, to recover a voice. Riverius praiſes a decoction of it in wine againſt the colic.

The only officinal preparation of this plant is the *ſyrupus de eryſimo*. It is recommended by Dr. Stahl, for ſcirrho-cancrous tumors, taken internally, and alſo applied externally to the tumor. We have an account of its good effects, by Monſ. Bingert, in Act. Med. Berol. Dec. 3. vol. i. p. 59.

The ſeeds are conſiderably pungent, and appear to be of the ſame quality with thoſe of *muſtard*, but weaker.

Mustard, *mithridate*. See Treacle *muſtard*.

Mustard, *rough podded*. See Sysimbrium.

Mustard, *tower*, *turritis*, in *Botany*, a genus of the *tetradynamia ſiliquoſa* claſs. Its characters are theſe: the empalement

palement of the flower is compoſed of four oblong oval leaves, which cloſe together; the flower has four oblong, oval, entire petals, in form of a croſs, and ſix erect awl-ſhaped ſtamina, the length of the tube, two of which are ſhorter than the other, terminated by ſingle ſummits, and a taper germen, a little compreſſed, having no ſtyle, but crowned by an obtuſe ſtigma; the germen afterward becomes a long four-cornered pod, with two cells, which are divided by an intermediate partition, opening with two valves, and filled with ſmall, roundiſh, indented ſeed. Miller enumerates two, and Linnæus three ſpecies.

Theſe plants are kept in botanic gardens for variety; but if their ſeeds are ſcattered upon an old wall or building, in autumn, ſoon after they are ripe, the plants will come up, and thrive without farther care, and their ſeeds will ſcatter on the wall and ſpread, ſo there will be no danger of the plants maintaining their ſituation, if they are not purpoſely deſtroyed.

The juice of this plant is recommended by ſome for curing ulcers in the mouth, and for killing worms.

MUSTARD, *baſtard tower, arabis*, in *Botany*, a genus of the *tetradynamia ſiliquoſa* claſs. Its characters are theſe: the flower, which hath a four-leaved empalement, hath four petals in form of a croſs; at the bottom of each is ſituated a reflected nectarium fixed to the empalement, and between theſe ariſe ſix upright ſtamina, two of which are no longer than the flower-cup, the other four are much longer; in the centre is ſituated a taper germen, as long as the ſtamina, which becomes a narrow, long, compreſſed pod, opening length-ways, having two valves and a thin partition, between which is lodged a row of flat ſeeds. Miller reckons four, and Linnæus nine ſpecies.

MUSTARD, *treacle*. See TREACLE *muſtard*, and CLYPEOLA.

MUSTELA, the *weazel*, in the Linnean ſyſtem of *Zoology*, is a diſtinct genus of quadrupeds, of the order of *feræ*, in the claſs of *mammalia*, comprehending eleven ſpecies; viz. the ferret, polecat, ermin, otter, glutton, martin, &c. The characters of this genus are, that it has ſix cutting teeth in each jaw; the upper are erect, acute, and ſeparate; the lower are more obtuſe, and the tongue is ſmooth. See *Tab.* III. *Quadrupeds*, N° 39. See WEASEL.

MUSTELA *Africana*, in *Zoology*, a name by which Cluſius has called an animal, properly of the ſquirrel kind, and known among others by the name of the Barbary ſquirrel.

MUSTELA, in *Ichthyology*, the name of a genus of fiſhes, of which there are ſeveral ſpecies; the moſt common of which is that called the *ſea-loch*, or whiſtle-fiſh. This reſembles the common eel, in figure, colour, and ſlipperyneſs to the touch; but is not half ſo long, in proportion to its thickneſs; and is ſomewhat flatter, and has a turgid belly. It is covered with extremely minute ſcales, and its mouth is large, and furniſhed with ſharp teeth, and has ſeveral ſeries of very ſmall teeth in many parts of its mouth; at the angle of the lower jaw it has one beard, and at the upper part of the noſtrils in the upper jaw it has two; it has two pair of fins under its belly, and on the back, beſide the common fin reaching half the length and almoſt to the tail; it has at ſome ſmall diſtance from the head a cavity, in which is a membrane, edged with filaments.

The different ſpecies of this fiſh are of three colours; one is not ſpotted, and of the colour of a tench; another is ſpotted with white; and the third with reddiſh black ſpots; and beſides theſe, there are the *muſtela vivipara* of Schonefeldt, commonly known by the name of *aelquappe*, and the *muſtela foſſilis*, called *peiſker*, and the *eel-pout*. All which ſee under their ſeveral heads.

MUSTELA *fluviatilis*, in *Ichthyology*, a name by which ſeveral authors have called the common *lampetra* or *lamprey*.

MUSTELA *lumpen*, in *Ichthyology*, a name given by Artedi, from Ray and others, to that ſpecies of blennus, called ſimply *lumpen* at Antwerp, and by Geſner *galea*.

It is diſtinguiſhed, by Artedi, from the other blenni, by a ſpecific name, expreſſing that it has four bifid cirri or beards, growing under the throat, and tranſverſe areolæ or ſtreaks on the back. See BLENNUS.

MUSTELA *marina*, in *Ichthyology*, a name given by Bellonius and others to that fiſh which we call in Engliſh the *ſheat-fiſh*, the *glanus* and *glanis* of Pliny and the old authors.

It is diſtinguiſhed, by Artedi, by the name of the *ſilurus*, with four beards near the mouth. By this character it is evidently diſtinguiſhed from the fiſh called the *lake*, which, though a genuine ſpecies of ſilurus, has only one beard.

MUSTELINUM *genus*, in *Zoology*, the name of a claſs of animals, ſo called from their general likeneſs to the weaſel in ſhape: they are all carnivorous animals, and are diſtinguiſhed from the other quadrupeds of that ſort by their ſmallneſs, the length of their bodies, and the ſmallneſs and narrowneſs of their heads. Their feet are ſmall, and their legs ſhort, whence they are formed for running into holes or crannies; their teeth are leſs numerous than in many quadrupeds; in the dog-kind there are forty, and in theſe but thirty-two. Their inteſtines are ſhort and ſimple; they have no colon nor cœcum, or any diſtinction of great and ſmall guts. Ray.

MUSTELUS, in *Ichthyology*, a name given by Gaza, and ſome other writers, to the fiſh called GALEUS *aſterias*, and *ſtellatus* by modern authors. This only accidentally differs from the common *galeus lævis*, the ſmooth or unprickly hound. Both are accounted the ſame ſpecies, by Artedi, and are expreſſed by the ſame name, the SQUALUS with obtuſe or glandulous teeth.

MUSTELUS *lævis*, a name by which Aldrovandus, and ſome others have called the fiſh diſtinguiſhed by others by the name of GALEUS *lævis*, the ſmooth hound-fiſh.

MUSTELUS *lævis*, in *Ichthyology*, a name of a kind of ſhark, called alſo the CANIS *galeus*, and *canoſa*.

MUSTER, a review of a body of military forces under arms, in order to take account of the numbers, condition, accoutrements, arms, &c.

The word is formed of the French, *mouſtre*, *ſpecimen*. See REVIEW.

MUSTER, *falſe*. See FALSE.

MUSTER-*maſter-general*, or *Commiſſary-general of* MUSTERS, is an officer in the army, who takes account of every regiment their number, horſes, arms, &c. See COMMISSARY.

MUSTER *rolls* are liſts of the ſoldiers in every troop, company, regiment, &c. delivered by the captains to the commiſſary: by which they are paid, and the ſtrength of the regiment known.

MUSTERED *of record* (ſtat. 18 Hen. VI.) denotes a being inrolled in the number of the king's ſoldiers.

MUSTERING, in *Sea Language*, is the act of calling over a liſt of the whole ſhip's company, or any particular detachment thereof who are accordingly ſummoned to anſwer by their names on the occaſion.

MUSTUS *fluviatilis*, in *Ichthyology*, a name given by Bellonius to that ſpecies of CYPRINUS, which we know by the name of the barbel.

MUSTUS is alſo a word uſed by ſome authors ſo expreſs the white calx of urine.

MUTABILIS *lapis*, in *Natural Hiſtory*, a name given by ſome to the ſemi-pellucid gem, more commonly called OCULUS *mundi*

MUTABILITY is oppoſed to IMMUTABILITY.

MUTARE *arma*. See ARMA.

MUTATION, the act of changing, or ſometimes the change itſelf

It is one of the laws of nature, that the *mutation* of motion is ever proportional to the moving force impreſſed. See NATURE, and MOTION.

MUTATION, in the *Ancient Muſic*, is applied to the changes or alterations that happen in the order of the ſounds which compoſe the melody.

Ariſtoxenus repreſents *mutation* as a kind of paſſion in the order of the melody.

The changes are, 1. in the genera; when the ſong begins in one, as the chromatic, and paſſes into another, as the diatonic. 2. In the ſyſtem; as when the ſong paſſes out of one tetrachord, as meſon, into another, as diezeugmenon; or more generally, when it paſſes from a high place of the ſcale to a lower, or contrarily, i. e. part of it is ſung high, and part low. 3. In the mode or tone, as when the ſong begins in one, as the Doric, and paſſes into another, as the Lydian. 4. In the melopœia, that is, when the ſong changes the very air, ſo as from gay and ſprightly to become ſoft and languiſhing, or from a manner that expreſſes one paſſion or ſubject to the expreſſion of ſome other.

MUTATIONES, among the Romans, poſt ſtages, or places where the public couriers were ſupplied with freſh horſes.

The *mutationes* were wholly deſigned for the uſe of theſe couriers, or meſſengers of ſtate; in which reſpect they differed from *manſiones*.

MUTCHKIN, a liquid meaſure uſed in Scotland; it contains four gills, and is the fourth part of a Scotch pint. See PINT, MEASURE, &c.

MUTE, *dumb*, denotes a perſon that cannot ſpeak, or has not the uſe of ſpeech.

Mutes and dwarfs make their fortune in the grand ſignor's ſeraglio. The *mutes* ſerve as executioners to take off perſons of the firſt rank.

MUTE, in *Law*, a perſon that ſtands dumb or ſpeechleſs, when he ought to anſwer or plead.

A priſoner may ſtand *mute*, two ways. 1. When he ſpeaks not at all: in which caſe it is inquired, whether he ſtand *mute* of malice, or by the act of God; if by the latter, then the judge, *ex officio*, ought to inquire whether he be the ſame perſon; and of all other pleas, which he might have pleaded if he had not ſtood *mute*. 2. When he pleads not directly, or will not put himſelf upon the inqueſt to be tried. If he be found to be obſtinately *mute*, then, if it be on an indictment of high treaſon, it is clearly ſettled that ſtanding *mute* is equivalent to a conviction, and he ſhall receive the ſame judgment and execution. So likewiſe, in petty larceny, and in all miſdemeanors, ſtanding *mute* is equivalent to conviction. But in appeals or indictments for other felonies, or petit treaſon, it was the cuſtom till of late not to conſider him as convicted, ſo as to paſs judgment for the felony; but for his obſtinacy he was to receive the terrible ſentence of penance, or PAINE *forte et dure*. Before this was pronounced, the priſoner was allowed not only *trina admonitio*, but alſo a convenient reſpite for a few hours, and the ſentence was diſtinctly read to him, that he might know his danger; and, after all, if he continued obſtinate, and his offence was clergyable, he was allowed the benefit of his clergy, even though he was too ſtubborn to pray it. But in this reſpect the law is now altered; for by 12 Geo. III. cap. 20. ſtanding *mute* in felony or piracy is made a conviction.

To adviſe a priſoner to ſtand *mute* is an high miſpriſion, a contempt of the king's court, and puniſhable by fine and impriſonment.

MUTE, in *Grammar*, a letter which is not ſounded, or heard in the pronunciation; or a letter which yields no ſound of itſelf, and without a vowel.

The conſonants are ordinarily diſtinguiſhed into *mutes*, and *liquids* or ſemi-vowels. See CONSONANT, LIQUID, &c.

The *mutes* in the Engliſh alphabet are eleven; viz. B, C, D, F, G, J, K, P, Q, T, V. They are called *mutes*, becauſe a liquid cannot be ſounded in the ſame ſyllable before them, as *rpo*; but a *mute* may be pronounced in the ſame ſyllable before a liquid, as *pro*.

MUTEFERRIRA, a body of horſe kept up in Egypt, in the ſervice of the grand ſignor; theſe, with the chaouſes, were originally the guards of the ſultans of Egypt. This is a body of the greateſt dignity, and is expreſſed by the word which ſignifies a choſen people.

MUTILATED *corniche*. See CORNICHE.

MUTILATED *medals*. See MEDAL.

MUTILATED *roof*. See ROOF.

MUTILATION, the retrenching, or cutting away, any member of the body. See MAHEM.

The uſe of the word is alſo extended to ſtatues, and buildings, where any part is wanting, or the projecture of any member, as a corniche, or an impoſt, is broken off.

MUTILATION is ſometimes alſo uſed in a more immediate manner, for CASTRATION.

MUTILLA, in the Linnæan ſyſtem of *Natural Hiſtory*, a genus of inſects of the order of *hymenoptera*: the characters of which are, that in moſt there are no wings, that the body is covered with ſhort hair or down, that the hinder part of the thorax is obtuſe, and that the ſting is hidden and pointed. Of this genus there are ten ſpecies.

MUTILUS, in *Natural Hiſtory*, the name given by ſome to the common MUSCLE.

MUTINY, in a *Military Senſe*, denotes an inſurrection againſt authority.

An act is annually paſſed by parliament, called the *mutiny* act, to puniſh *mutiny* and deſertion, and for the better payment of the army and their quarters.

This regulates the manner in which they are to be diſperſed among the ſeveral inn-keepers and victuallers through the kingdom, and eſtabliſhes a law martial for their government. By this, beſides other things, it is enacted, that if any officer or ſoldier ſhall excite, or join any *mutiny*, or, knowing of it, ſhall not give notice to the commanding officer; or ſhall deſert, or liſt in any other regiment, or ſleep upon his poſt, or leave it before he is relieved, or hold correſpondence with a rebel or an enemy, or ſtrike or uſe violence to his ſuperior officer, or ſhall diſobey his lawful commands; ſuch offender ſhall ſuffer ſuch puniſhment as a court martial ſhall inflict, though it extend to death itſelf.

MUTU, in *Ornithology*, a name by which ſome call a large Braſilian bird, of the gallinaceous kind, more uſually called MITU.

MUTUAL, a relative term, denoting ſomething that is reciprocal between two or more perſons.

Thus we ſay, *mutual aſſiſtance*, *mutual averſion*, *&c.*—There are *mutual* or reciprocal duties, offices, &c. between ſuperiors and inferiors; as the king and his ſubjects, the maſter and his ſervants, &c.

Vaugelas makes a diſtinction between *mutual* and *reciprocal*: *mutual*, according to him, is underſtood of what is between two only; and *reciprocal* of what is between more than two: but this diſtinction is little regarded in common uſe.

MUTUAL *teſtament* is that made by two perſons who leave their effects reciprocally to the ſurvivor.

MUTULE, *mutulus*, in *Architecture*, a kind of ſquare modilion in the Doric frieze.

The chief difference between *mutule* and modilion conſiſts in this, that the former is uſed in ſpeaking of the Doric order, and the latter in the Corinthian, &c. See DORIC, &c.

The *mutules* in the Doric anſwer to the triglyphs, which are under them; whence ſome make *guttæ* or drops to hang.

Le Clerc makes *mutules* in the entablature of the Doric order, not only to diſtinguiſh it the more from other entablature, but alſo becauſe they agree very well with the nobleneſs of this order, and add ſomething of a maſculine beauty to it.

Mutules are commonly made of the ſame breadth with the triglyphs; but the ſame author thinks it would be much better if they were made of the ſame breadth with the capitals of the triglyphs. Nor does he run his *mutules* ſo near the extremity of the larmier or drip, as is uſually done; leaving a ſpace of three or four minutes between the two, that the profile may appear the more diſtinctly.

MUTUUM, in the *Civil Law*, denotes a loan ſimply ſo called; or a contract introduced by the law of nations, whereby a thing conſiſting in weight, as ſuppoſe bullion; in number, as money; or in meaſure, as corn, timber, wine, &c. is given to another, upon condition that he ſhall return another thing of the ſame quantity, nature, and value, on demand.

This, therefore, is a contract without reward: ſo that where uſe or intereſt ariſes, there muſt be ſome particular article in the contract whereon it is founded.

MUZZLE *of a gun* or *mortar*, the extremity of the cylinder, where the powder and ball is put in. The metal which ſurrounds the extremity of the cylinder, is likewiſe called the *muzzle*.

MY.—*Per* MY *&* *per tout*. See PER *my*.

MYA, in *Natural Hiſtory*, a genus of the *teſtacea* claſs of worms. Its characters are, that its animal is an *aſcidia*, that it is a bivalve ſhell gaping at one end, and that the hinge for the moſt part is furniſhed with a thick, ſtrong, and broad tooth, not inſerted in the oppoſite valve.—Linnæus enumerates ſeven ſpecies. One of theſe is noted for producing great quantities of pearl: it is found in great rivers, eſpecially in thoſe which water the mountainous parts of Great Britain; and there have been regular fiſheries for this ſhell in ſeveral of our rivers: ſixteen have been found within one ſhell. They are ſaid to be the diſeaſe of the fiſh, analogous to the ſtone in the human body. On being ſqueezed, they will eject the pearl, and often caſt it ſpontaneouſly in the ſand of the ſtream. The Conway was noted for them in the days of Camden: the Irt, in Cumberland, alſo produced them.

In the laſt century, ſeveral of great ſize were procured in the rivers of the counties of Tyrone and Donegal, in Ireland. Suetonius, Vit. Jul. Cæſ. cap. 44. reports that Cæſar was induced to undertake his Britiſh expedition for the ſake of our pearls: and we are told by Pliny and Tacitus, that he carried home a buckler made with Britiſh pearl, which he dedicated to, and hung up in the temple of Venus Genetrix.

MYAGRUM, in *Botany*. See GOLD *of pleaſure*.

MYCETITES, in *Natural Hiſtory*, the name of a ſpecies of ſea coral, which is uſually of a conic ſhape and ſtriated texture; always ſmall, and uſually found adhering to ſea-ſhells, or large corals. See FUNGITÆ.

MYCETITES *diſcoides*, in *Natural Hiſtory*, a name given by Dr. Woodward to thoſe kinds of foſſile coralloide bodies which the generality of writers had called, after Dr. Plott, *porpitæ*. Theſe are uſually ſmall, and of a roundiſh, but flatted figure; they are hollowed on one ſide with a ſort of umbilicus, and ſtriated on the other; they are found on the ploughed lands in Oxfordſhire, and ſome other of our midland counties, and in other places, buried in the ſolid ſtrata of ſtone; they are ſometimes yellowiſh, ſometimes browniſh, and are from the breadth of an inch to a fourth part or leſs of that ſize; when broken, they are uſually found to conſiſt of a kind of ſpar, not unlike that of which the ſhelly coats of the echinitæ, or the lapides indici, and other ſpines of echini conſiſt in their foſſile ſtate; and in ſome of them the ridges and ſtriæ are thick ſet with little knobs and tubercles. The baſis in ſome of theſe is flat, as it is in others riſing in form of a circular elevation from the umbilicus, and others have a circular cavity in the ſame place. See *Tab. of Foſſils, Claſs.* 7.

MYCONOIDE, an epithet uſed by ſome chirurgical writers for ſome ulcers which are found continually filled with a thick mucous matter.

MYCTERIA, in *Ornithology*, a genus of the *grallæ*, of which there is one ſpecies, called by Marcgrave JABIRUGUACU.

MYDESIS, a word uſed by the ancient phyſicians to expreſs a general corruption of any part from a great redundance of moiſture. Galen has appropriated it to the eye-lids.

MYDRIASIS, a name uſed by authors to expreſs a diſeaſe of the eye, conſiſting in a dilatation of the pupil, and a conſequent dimneſs of ſight.

MYDROS, a word uſed by Hippocrates to expreſs a ball of iron or ſtone, which was uſed to be heated in the fire, and thrown into urine, intended as a fomentation.

MYGBAOTH, in the *Jewiſh Antiquities*, a kind of mitre worn by the prieſts. See CIDARIS.

MYGDONIUM *marmor*, a name given by the ancients to a ſpecies of marble much uſed in their larger buildings. It was white variegated with black; but that black rather diſpoſed in clouds and ſpots than veins. It is confounded with the *docimenum marmor*, by ſome writers; but that was always of a pure white, without the leaſt variegation.

MYIAGRUS *Deus*, in the *Heathen Mythology*, a name given ſometimes to Jupiter, and ſometimes to Hercules, on occaſion of their being ſacrificed to for the driving away the vaſt numbers of flies which infeſted the ſacrifices on certain public occaſions. The word is uſually ſpelt *Myagrus*; but this muſt be an error, as this word does not expreſs the *fly-deſtroyer*; but the *mouſe-deſtroyer*; and we have it ſufficiently teſtified by the ancients, that flies were the only creatures againſt whom this deity was invoked. Pliny calls this deity alſo *Myiodes*, and tells us, that the flies which uſed to peſter the Olympic rites went away in whole clouds, on the ſacrificing a bull to this god. We find in Athenæus alſo, that this ſacrificing to the god of flies, at the Olympic games, was a conſtant cuſtom. Some diſtinguiſh theſe two deities, and tell us, that the latter, or MYIODES, uſed to viſit the nations in vengeance, with a vaſt multitude of flies; and that, on paying him the due honours of a ſacrifice, they all went away again; and this ſeems to agree with what Pliny tells us in ſome places.

At the time of the Olympic games, Jupiter was worſhipped under the name of the *Apomyos*, or *Myiagrus Deus*, to ſupplicate the deſtruction of thoſe troubleſome creatures. This happened only once in many years, when the ſacrifices were performed there; but the Elians worſhipped him continually under this name, to deprecate the vengeance of heaven, which uſually ſent, as they expreſſed it, an army of flies, and other inſects, toward the latter end of the ſummer, that infeſted the whole country with ſickneſs and peſtilence.

MYIODES *Deus*, in the *Heathen Mythology*, a name given ſometimes to Hercules, but more frequently to Jupiter, to whom a bull was ſacrificed, in order to make him propitious in driving away the flies that infeſted the Olympic games.

MYLASSENSE *marmor*, in the works of the ancients, a name uſed for a ſpecies of marble, dug near a city of that name in Caria. It was of a black colour, but with an admixture of purple; the purple not diſpoſed in veins, but diffuſed through the whole maſs: it was much uſed in building among the Romans.

MYLE, a word uſed by ſome authors as a name for the *patella* or *limpet*, and by others to expreſs what we call a mole, or falſe conception in the uterus.

MYLOGLOSSI, in *Anatomy*, a pair of muſcles, thus called becauſe ariſing about the backſide of the molares, or grinding-teeth, and inſerted into the ligament of the tongue: helping to pull it upwards.

Theſe are the ſame with what Mr. Cowper calls STYLOGLOSSI

MYLOHYOIDEUS, in *Anatomy*, a broad, but ſhort muſcle, lying immediately under the biventer muſcle of the jaw, and which, ſpringing from the lower margin on each ſide the under jaw, is inſerted into the baſis of the OS HYOIDES.

It is made up of two equal fleſhy portions, one lying on the right ſide, the other on the left, both on the ſame plane, and joined to a ſmall middle tendon, which is inſerted anteriorly in the middle of the baſis of the os hyoides, and from thence runs directly forward, diminiſhing gradually in its courſe. This is therefore a true digaſtric muſcle, and cannot be divided into two. Each portion is fixed by fleſhy fibres to the internal lateral part of the lower jaw, between the oblique prominent line and the baſis under the firſt four *dentes molares* and the *caninus*; the anterior and greateſt part of the other fibres of each portion run obliquely from before, backward to the middle tendon, in which they are regularly fixed, the anterior fibres being the ſhorteſt, and a ſmall triangular void ſpace being formed between them and the ſymphyſis of the chin. The poſterior fibres of each portion, which make about a fourth part of the whole, run likewiſe on each ſide of the os hyoides, and are inſerted along the lower edge of its anterior or convex ſide, and from thence a little upward. Winſlow's Anatomy, p. 254.

It has its name from the os hyoides, and the Greek μυλοι, the *dentes molares*.

Beſides the common uſe aſcribed to this muſcle, which is to move the hyoides, the tongue, and the larynx, both upwards, inwards, and ſideways, its ſeries of tranſverſe fibres have a farther uſe when it is at reſt; and that is, to compreſs the glands under the tongue, and by this means promote the diſcharge of ſaliva into the mouth from the lower ſalival ducts: whence it is we uſe this muſcle when we want ſaliva in the mouth.

MYLON, in *Surgery*, is uſed for the largeſt tumors of the ſtaphylomatous kind in the corner and uvea of the eyes. See STAPHYLOMA.

MYOCEPHALON, μυοκεφαλον, formed of μυια, *fly*, and κεφαλη, *head*, in *Medicine*, a little part of the tunica uvea, protended over the ſight of the eye; occaſioned by an ulceration of the part: ſo called, as reſembling the head of a fly.

MYOCEPHALUS, a name given by ſome authors to the diſtemperature of the eyes, commonly known by the name of a STAPHYLOMA.

MYOCTONUM. See ACONITE.

MYODES, *platiſma*, a name given by ſome anatomical writers to what is called by others the quadratus genæ; it is a muſcular expanſion in the neck.

MYOLOGY, formed of μυς, μυος, *a muſcle*, and λογος, *diſcourſe*, in *Anatomy*, a deſcription of the muſcles; or the knowledge of what relates to the muſcles of the human body. See *Tab. Anat. (Myol.)* See alſo MUSCLE.

MYOMANCY, a kind of divination, or method of foretelling future events by means of mice.

Some authors hold *myomancy* to be one of the moſt ancient kinds of divination; and think it is on this account that Iſaiah, lxvi. 17. reckons mice among the abominable things of the idolaters. But, beſide that it is not certain, that the Hebrew word עכבר uſed by the prophet, ſignifies *a mouſe*, it is evident it is not the divination by that animal, be it what it will, that is here ſpoken of; but the eating it.

MYOPARO, among the Romans, a kind of ſhip, which parly reſembled a merchant-ſhip, and partly a ſhip of war, and was that which pirates moſtly uſed.

MYOPIA, or MIOPIAS. See SHORT-*ſightedneſs*.

MYOPS, *myopis*, a perſon who is ſhort-ſighted; or, as we popularly call it, *purblind*.

The word is Greek, μυωψ, compounded of μυς, *mouſe*, and ωψ, *eye*; becauſe, we ſuppoſe, the ſame conformation of the eye is obſerved in mice.

Myopes are properly ſuch as ſee remote objects confuſedly, and near ones diſtinctly. Thoſe who labour under the oppoſite defect are called *preſbytæ*.

The defect of *myopes* is not in the optic nerve, the pupil, or the like; but in the form of the cornea or cryſtalline, or the diſtance of the retina from the ſame. The cryſtalline or cornea being rounder or more convex than ordinary, the rays will be rendered more convergent than ordinary, in paſſing through the ſame. See REFRACTION. By this means they will be brought to meet or concur at a leſs diſtance from the cryſtalline; ſo that if the retina be at its uſual diſtance, they will concur before they reach it. It is the too great nearneſs, then, of the retina to the cryſtalline, that conſtitutes the *myopia*.

MYOPS, in *Natural Hiſtory*, the *ox-fly*, an inſect uſually confounded with the breeze-fly, but really differing very much from it. This is common in woods and about path-ways, and never fixes on any other creatures except oxen. It has a long and ſomewhat flat body, and is of a blackiſh grey colour.

MYOSOTIS, in *Botany*. See MOUSE-*ear*.

MYOSURUS, in *Botany*. See MOUSE-*tail*.

MYOTOMY, *myotamia*, an anatomical diſſection, or demonſtration of the muſcles. See MUSCLE.

MYRACOPON, a name uſed by ſome authors for an ointment intended to be uſed to the whole body to prevent laſſitude. It is deſcribed by Galen.

MYRIAD, the number of ten thouſand. Whence *myriarcha*, a captain or commander of ten thouſand men.

MYRICA, in *Botany*. See CANDLE-*berry tree*.

MYRINX, a word uſed by ſome to expreſs the membrane of the tympanum in the ear.

MYRIOPHYLLUM, in *Botany*, the name of a genus of plants of the *monoecia polyandria* claſs; called by others *pentapterophyllum*. The characters are theſe: it produces both male and female flowers diſtinct on the ſame plant; in the male flower the perianthium is compoſed of four oblong and erect leaves, the exterior one being large, the interior one much ſmaller; there is no corolla; the ſtamina are eight capillary filaments, which are longer than the cup, theſe are of a looſe flaccid ſtructure; the antheræ are oblong; the female flowers always ſtand below the male; the perianthium is divided into a number of ſegments; the piſtil has four germina of an oblong figure; there are no ſtyles, but the ſtigmata are hoary; the ſeeds are placed four together, and are of an oblong figure. There are two ſpecies.

MYRMECIA, in *Medicine*, a kind of wart, by Latin writers called FORMICA.

MYRMECIAS *lapis*, the *wart-ſtone*, in *Natural Hiſtory*, a name given by ſome authors to a ſtone covered on the ſurface with wart-like excreſcences: it is a name of a very vague ſignification, ſome of the ſtones called by it being mere flints, and others owing their protuberances to coralloide bodies, the wires of aſteriæ, or other of the extraneous foſſils contained in them, and ſo lodged, that their ends juſt ſtand out.

MYRMECITES, in *Natural Hiſtory*, a name given by ſome authors to a ſmall ſtone, with ſome imaginary reſemblance of an ant in its ſhape. Others have alſo made it the name of ſuch pieces of amber as contain an aut; or the legs, wings, or other fragment or remains of that little animal.

MYRMECOPHAGA. See ANT-*eater*, FOURMILLIER, and TAMANDUA.

MYRMELION, in *Natural Hiſtory*, a genus of the *neuroptera* INSECTS; the characters of which are, that the mouth is formed with jaws and furniſhed with two teeth; the palpi are four, and elongated; there are no ſtemmata; the tail of the male is a forceps, conſiſting of two ſtrait filaments; the antennæ are elevated, and of the length of the thorax; and the wings deflexed. Linnæus enumerates five ſpecies.

MYRMIDONS, *Myrmidones*, in *Antiquity*, a people of Theſſaly, fabled to have ariſen from ants, or piſmires, upon a prayer put up for that purpoſe by king Æacus, to Jupiter, after his kingdom had been diſpeopled by a ſevere peſtilence. In Homer and Virgil the *Myrmidons* are Achilles's ſoldiers.

MYRMILLO, among the Romans, a kind of Gallic armour uſed in theatrical ſhews: but ſome will have it to be the ſame that Achilles's *Myrmidons* wore; whence it had this name.

MYRMILLONES, a kind of gladiators in ancient Rome; called alſo *murmuliones*, ſuppoſed by Lipſius to be an order that fought completely armed. See GLADIATOR.

Turnebus derives the name from the Myrmidons.

MYROBALANS, *myrobalani*, a kind of medicinal fruit, brought from the Indies, much more uſed in the Arabic than the Greek pharmacy, and more among the ancients than the moderns, and ſtill more abroad than in England.

The word comes from the Greek μυρον, *medicament*, and βαλανος, *acorn*, as being ſomewhat in form of acorns, and uſed in medicine.

It is very evident from the writings of the ancient Greeks, that what we at this time call the *myrobalan* was not known to them under that name, and perhaps what they called ſo is not known to us at this time; our *myrobalans* being a ſort of plums, and their's being a dry fruit, rather of the nut-kind, and uſed in perfumed unguents, and other compoſitions of that kind to give them a ſcent.—This variation from the original ſenſe of the word is not new, however; and the authors who began it are ſo far back, that it ſeems to have been an error of as old a date as any of this kind.

There are five ſorts of *myrobalans*, or *purging Indian plums*: the firſt called *citrini*, of a yellowiſh red, hard, oblong, and the ſize of an olive. The ſecond called *black* or *Indian myrobalans*, of the bigneſs of an acorn, wrinkled, without ſtone. The third, *chebulic myrobalans*, the ſize of a date, of a yellowiſh brown, pointed at the end. The fourth *emblici*, round, rough, the ſize of a gall, of a dark brown. The laſt called *bellerici*, hard, yellow, round, the ſize of an ordinary prune, leſs augular than the reſt.

All the *myrobalans* have an unpleaſant, bitteriſh, auſtere taſte; and ſtrike an inky blackneſs with ſolution of chalybeate vitriol: they are ſaid to have a gently purgative, as well as an aſtringent and corroborating virtue; and are directed to be given in ſubſtance from half a dram to four drams, and in infuſion or ſlight decoction from four to twelve drams; but they have long been diſcarded from practice in this country.

MYROBATINDUM, in *Botany*, a name given by Vaillant to a genus of plants, which, with the *camara* of Plumier, and the *pſeudoviburnum* of Rivinus, is included by Linnæus under one general character, by the name LANTANA.

MYRRH, *myrrh*, from μυῤῥα, of μυρω, *I run* or *trickle*, a kind of gum reſin, iſſuing by inciſion, and ſometimes ſpontaneouſly, from the trunk and larger branches of a tree growing in Arabia, Egypt, and eſpecially in Abyſſinia.

Authors are not agreed about the tree which produces this gum: it is true they all make it ſmall and thorny; but they diſagree about the form of its leaves. In ſeveral reſpects it reſembles the *acacia vera*.

The inciſions are made twice a year, and the *myrrh*, ouſing out, is received on ruſh-mats, diſpoſed underneath.

The druggiſts ſell two kinds of *myrrh*, viz. *myrrh in tears*, which they call *ſtacte*; the other *ungulata*, or in nails.

Of the firſt kind, the beſt is bright, yellow, and in tranſparent drops, friable, light, of a ſtrong diſagreeable ſmell: but this is very rare, and moſt of that in uſe is the *ungulated myrrh*, ſo called from little white ſpots obſerved thereon, much like thoſe on the nails of the fingers.

The beſt is in little maſſes, or tears, reddiſh and tranſparent: the fineſt pieces of *myrrh*, when broken, are ſometimes found to contain a kind of unctuous liquor, the moſt precious part of the *myrrh*, and the real *ſtacte* of the ancients.

But though Pliny and Dioſcorides ſpeak of *ſtacte* as if it was freſh or liquid *myrrh*, it is ſaid by a late traveller into Abyſſinia, that they could never ſee *myrrh* in that ſtate; becauſe it is ſaid by the natives to harden on the tree inſtantly as ſoon as it is expoſed to the air; and therefore, the *ſtacte*, he ſuppoſes, muſt have been a compoſition of *myrrh* and ſome other ingredient. The quality of *myrrh* depends on the age and health of the tree, the manner of making the inciſion in it, the time of gathering the *myrrh*, and the circumſtances of the climate where it was gathered.

In order to have *myrrh* of the firſt or moſt perfect ſort, the ſavages chuſe a young vigorous tree, whoſe bark is without moſs, or any paraſite plant; and, above the firſt large branches, they give the tree a deep wound with an axe. The *myrrh*, which flows the firſt year, through this wound, is *myrrh* of the firſt growth, and never in very great quantity. This operation is performed ſome time after the rains have ceaſed, or from April to June; and the *myrrh* is produced in July and Auguſt. The ſap, once accuſtomed to iſſue through this gaſh, continues ſo to do ſpontaneouſly, at the return of every ſeaſon; but on account of the tropical rains, which lodge water and dirt in the gaſh, the tree has begun to rot, and become foul in the wounded part, and the *myrrh*, iſſuing in the ſecond year, is of a ſecond quality; and ſells at Cairo about a third cheaper than the firſt. The *myrrh*, alſo, produced from the gaſhes near the roots, and in the trunks of old trees, is of the ſecond growth and quality, and ſometimes worſe. this is, however, the good *myrrh* of the Italian ſhops, every where but in Venice: it is of a blackiſh red, foul colour, ſolid and heavy, loſing little of its weight by being long kept; and it is not eaſily diſtinguiſhed from that of Arabia Felix. The third and worſt kind is gathered from old wounds or gaſhes, formerly made in old trees; or *myrrh*, that, paſſing unnoticed, has hung upon the tree ungathered for a whole year; black, and earth-like in colour, and heavy, with little ſmell and bitterneſs; and is apparently the *caucalis* of the ancients. Mr. Bruce farther obſerves, that the greaſineſs of *myrrh* is owing to the ſavages uſing goat-ſkins, anointed with butter, for ſuppling them, in which they put their *myrrh* when gathered; in which ſkins it remains, and is brought to market; ſo that this is a mark that *myrrh* is freſh gathered, which is the beſt quality that *myrrh* of the firſt ſort can have. Phil. Tranſ. vol. lxv. pt. ii. art. 40. p. 408.

Myrrh diſſolves almoſt totally in boiling water, but as the liquor cools a portion of reſinous matter ſubſides.

By evaporating the aqueous infuſion, an extract is obtained; and by diſtillation, with a boiling heat, the whole of its flavour ariſes, partly impregnating the diſtilled water, and partly collected and concentrated in the form of an eſſential oil; which is in ſmell extremely fragrant, in taſte remarkably mild, and ſo ponderous as to ſink in the aqueous fluid; whereas the oils of moſt, perhaps of all, of the other gummy reſins ſwim. If ſome powdered *myrrh* be incloſed in the white of a hard boiled egg

egg, and ſet in a moiſt cellar, the liquor, into which the egg will be gradually reſolved, will extract nearly all the ſmell and taſte of the *myrrh*. This liquor which is commonly called *oil of myrrh, per deliquium*, may be precipitated and coagulated by ſpirit of wine: and this coagulum is ſoluble by water. Rectified ſpirit diſſolves leſs of this concrete than water, but extracts more perfectly that part in which its bitterneſs, flavour, and virtues reſide.

Tinctures of *myrrh*, made by digeſting three ounces of the concrete in a quart of rectified or proof ſpirit, are kept in the ſhops, and given ſometimes internally from fifteen drops to a tea-ſpoonful; but oftener uſed among us externally for cleanſing ulcers, and promoting the exfoliation of carious bones. The extract, obtained by inſpiſſating the tincture, is a fragrant, bitter, very tenacious reſin, amounting to one third or more of the weight of the *myrrh*.

This bitter, aromatic, gummy reſin enters a great number of medicinal compoſitions; it is a warm corroborant, deobſtruent, and antiſeptic: it is given from a few grains to a ſcruple and upwards, in uterine obſtructions, cachexies, putrid fevers, &c. and often employed alſo as an external antiſeptic and vulnerary. Lewis.

Its bitterneſs renders it good for the ſtomach, and againſt worms; and it is chewed to prevent infection from contagious diſeaſes. Dr. Quincy ſays, it is excellent to cleanſe and ſtrengthen the womb, and againſt tickling rheums; a good detergent; and, as ſuch, much uſed externally in unguents for the healing of wounds: it makes the principal ingredient in embalming.

It is an apophthegm of chemiſts, derived from Van Helmont, that whoever can make *myrrh* ſoluble by the human body, has the ſecret of prolonging his days. And Boerhaave owns there ſeems to be truth in this from its reſiſting putrefaction. He himſelf, and other chemiſts before him, have given methods for making ſolutions of *myrrh*, but only by means of alcohol. It ſeems not a little ſurpriſing that ſuch great chemiſts ſhould never find out that *myrrh* is ſoluble in common water.

MYRRHIN, in *Antiquity*. See MURRINE.

MYRRHIS, in *Botany*. See CHERVIL.

MYRRHITES *lapis*, in *Natural Hiſtory*, a name uſed by many of the ancient authors for a ſemi-pellucid ſtone of the nature of the agates; and ſeeming to have been the yellow cornelian of the moderns.

MYRSINE, in *Botany*. See *African* BOX-*tree*.

MYRTIDANON, a word uſed by the old Greek writers on medicine, but in a different ſenſe by different authors. Hippocrates calls it a round fruit, which the Perſians in his time called pepper, and which probably had all the heating qualities of that fruit. Dioſcorides expreſſes it by an excreſcence common on the trunk of the myrtle, and which, as he obſerves, is more aſtringent than the myrtle itſelf. *Myrtidanum vinum* alſo ſignified wine impregnated with myrtle.

MYRTIFORM *glands*. See GLAND.

MYRTIFORMES *carunculæ*, in *Anatomy*. See CARUNCULÆ, and *Tab. Anat. (Splanch.) fig.* 9. *lit. ſ. ſ.*

MYRTIFORMIS *naſi*, in *Anatomy*, a name given by Santorini, and ſome others, to one of the muſcles of the face, called by Albinus, *depreſſor alæ naſi*, and by Cowper and others, *depreſſor labii ſuperioris, conſtrictor alæ naſi*.

MYRTILLUS, in *Botany*, a name by which ſome authors have called the black whortle-berries: the *vitis idæa anguloſa* of other authors.

MYRTITES, the name of a compoſition in the ancient pharmacy, made of fine honey, and the depurated juice of myrtle-berries boiled up together to a conſiſtence.

MYRTLE, *myrtus*, in *Botany*, a genus of the *icoſandria monogynia* claſs. Its characters are theſe: the empalement of the flower is of one leaf cut into five points; the flower has five large oval petals, which are inſerted in the empalement, and a great number of ſmall ſtamina, which are alſo inſerted in the empalement, terminated by ſmall ſummits; the germen is ſituated under the flower, ſupporting a ſlender ſtyle, crowned by an obtuſe ſtigma, and turns to an oval berry, with three cells crowned by the empalement, each cell containing two or three kidney-ſhaped ſeeds. Miller reckons nine, and Linnæus thirteen ſpecies.

There are ſeveral ſpecies of this plant preſerved in our gardens; they are all eaſily propagated from cuttings. The beſt ſeaſon for this is July; and the ſtraiteſt and moſt vigorous young ſhoots are to be choſen. Theſe ſhould be cut off about ſix or eight inches long, and the leaves of the lower part ſtripped off to two inches high, and that part of the ſtalk twiſted which is to be placed in the ground; they are to be planted in pots of light rich earth, at about two inches diſtance from each other, obſerving to cloſe the earth very well about them, and give them a gentle watering: they are then to be removed under a common hot-bed frame, plunging them either into ſome old dung or tanners bark, and ſhaded, and watered once in two or three days, till they have taken root: in about ſix weeks time, they will be rooted, and will begin to ſhoot, and muſt then be inured by degrees to the air; and in Auguſt, or the beginning of September, they ſhould be removed into the open air, but placed in a warm ſituation, and ſheltered from the winds; they ſhould ſtand here till the middle of October, and then be removed into a green-houſe, where they ſhould be placed ſo as to have as much air as poſſible. During the winter ſeaſon, they muſt be frequently but gently watered, and if any decayed leaves appear, they ſhould be conſtantly plucked off. In the ſpring following, they ſhould be removed into ſeparate pots of rich earth, preſerving a ball of earth to the roots of each of them, watering them to ſettle the earth to their roots, and placing them under a frame, till they have taken root; and in May ſet out to the open air, in a warm and well defended place, they will require, in the ſummer, frequent waterings, and the dead leaves ſhould be carefully picked off: they ſhould be placed where they may have the benefit of the morning ſun. As they advance in growth, they are to be ſhifted annually into pots of a larger ſize; and this ſhould be done either in April or in Auguſt; and towards the end of October they ſhould always be removed into the greeen houſe. Miller's Gard. Dict.

In Cornwall and Devonſhire, where the winters are more favourable than in moſt other parts of England, there are large hedges of *myrtle*, which have been planted for ſeveral years, and are very thriving and vigorous; ſome of which are upwards of ſix feet high.

MYRTLE, *candle-berry*. See CANDLE-*berry tree*.

The common *Dutch myrtle* grows wild in waſte watery places, and abounds in the iſle of Ely: the leaves, flowers, and ſeeds of this plant have a ſtrong fragrant ſmell, and a bitter taſte. They are ſaid to be uſed among the common people for deſtroying moths, and cutaneous inſects; internally, in infuſion, as a ſtomachic and vermifuge: and as a ſubſtitute for hops, for preſerving malt liquors, which they render more inebriating, and conſequently leſs ſalubrious; which quality is ſaid to be deſtroyed by boiling. Lewis.

MYTTLE-*berries, myrtilli*, the fruit of the *myrtle*, with which we are ſupplied from the ſouthern parts of Europe. The fruit is at firſt green, but becomes black gradually: within it is a white ſeed, in form of a creſcent, ſolid, hard, and of an aſtringent taſte; while the fruit continues on the trees, it is ſucculent and ſmooth, and only becomes hard and wrinkled, becauſe dried in the ſun for the convenience of carriage.

Myrtle-berries are rough and aſtringent, and are chiefly recommended in alvine and uterine fluxes, and other diſorders from relaxation and debility; and appear to be among the milder reſtringents and corroborants, in the way of ſyrup, as a ſtrengthener againſt fluxes and abortion.

The perfumers likewiſe uſe them in their perfumes, and draw an eſſence from them. The German dyers make a blue colour from them. In ſome places the leaves and branches are alſo uſed in the tanning of leather.

A *myrtle* crown was worn by the general to whom an OVATION was decreed, the reaſon of which, according to Plutarch, in his life of Marcellus, was, that as an ovation was decreed for ſome remarkable ſucceſs obtained by treaty, or without much bloodſhed, it was proper that the general, at his public appearance, ſhould be crowned with the tree ſacred to Venus, who, of all the deities, was ſuppoſed to be moſt averſe to the horrors of war.

MYRTLE *ſumach*. See SUMACH.

MYRTOCHEILIDES, a name given by ſome authors to the nymphæ in the female pudenda.

MYRTUS, the *myrtle*, in *Botany*. See MYRTLE.

MYRTUS *ſylveſtris*, the *wild myrtle*, in *Botany*, a name given by ſome authors to *ruſcus*, or BUTCHER's *broom*, from ſome feint reſemblance of its leaves to thoſe of the *myrtle*.

MYRUS, in *Zoology*, a kind of ſea-ſerpent, a fiſh of the eel claſs, ſuppoſed by ſome to be the male muræna, but erroneouſly. Its ſnout is very long and ſharp-pointed; its body black, ſlender, and round, without ſcales, and free from ſpots; the cavity for the gills is only one on each ſide; near the neck there are ſome ſmall yellow dots to be ſeen, while the creature is alive; but theſe are ſcarce viſible after it is dead; its fleſh is tender and delicate.

MYS, in *Ichthyology*, a name given by Ælian, Appian, and many others, to the fiſh called *capriſcus* by the later writers; the *capros* and *charus* of others of the ancients. See GOAT-*fiſh*.

MYSIA, *μυσια*, in *Antiquity*, a feſtival in honour of Ceres For the origin and ceremonies obſerved in it, ſee Potter, Archæol. Græc. lib. ii. cap. 20. tom. i. p. 415.

MYSTERY, *myſterium*, ſomething ſecret or hidden; impoſſible or difficult to be comprehended.

The word comes from the Greek *μυϛηριον*; and that according to ſome etymologiſts, from *μυω*, *claudo*, *taceo*, *I ſhut*, *I am ſilent*, and *ϛομα*, *mouth*; but then whence comes the *r*? Muſt the *m* in *ϛομα* be controverted into an *r*? The word ſeems derived, with more propriety, from the Hebrew סתר *ſator*, *to hide*; whence is formed מסתר *miſtar*, *a hidden thing*.

Myſtery is primarily uſed in ſpeaking of certain truths revealed in Scipture, into the full underſtanding whereof human reaſon cannot penetrate. Such are ſaid to be the doctrines of the *Trinity*, the *Incarnation*, &c.

We have an epitome of the *myſteries of faith*, or the *myſteries of Chriſtianity*, in the ſymbols or creeds, compiled by the apoſtles, the council of Nice, and St. Athanaſius. See Creed.

In ſome of theſe, mention is made of the *myſtery* of the Trinity; the *myſteries* of the incarnation of the Son of God, his death and paſſion, and his deſcent into hell, for the redemption of mankind; of his reſurrection the third day, his aſcenſion into heaven, his ſitting on the right hand of God, and his coming again to judge the world; of the divinity and coequality of the Holy Ghoſt with the Father and the Son; of the unity of the church; of the communion of ſaints; the participation of the ſacraments; and the general reſurrection. Such are the principal *myſteries* of faith; which the church declares neceſſary to be known and believed, in order to ſalvation.

From the earlieſt ages there have been particular feſtivals inſtituted in honour of theſe *myſteries*; to return thanks to God for having revealed them, and to oblige the miniſters and paſtors to inſtruct the people therein.

Such are the feaſts of the *myſtery of the Incarnation*, called alſo *Chriſtmas*; thoſe of the *Circumciſion*, *Paſſion*, *Reſurrection*, &c. See Incarnation, Circumcision, Easter, and Epiphany.

The heathens alſo had their *myſteries*, particularly thoſe of Ceres (ſee Eleusinia), the *Bona Dea*, &c. The Egyptian prieſts concealed the *myſteries* of their religion and philoſophy under hieroglyphics. Thoſe who revealed the *myſteries* of the *Bona Dea* were ſeverely puniſhed; and none were truſted with them but thoſe ſolemnly initiated, and ſworn to ſecrecy.

But theſe were not called *myſteries*, as being incomprehenſible, or raiſed above the power of reaſon; but becauſe they were covered and diſguiſed under types and figures, to raiſe the greater veneration in the people.— The *myſteries* of paganiſm were uſually celebrated in caves and grottos, fitter to conceal crimes than to celebrate *myſteries* in.

Each of the pagan gods had, ſays biſhop Warburton, beſides the public and open, a ſecret worſhip paid them; into which none were admitted but thoſe who had been ſelected by preparatory ceremonies, called initiation. This ſecret worſhip was termed the *myſteries*. The firſt and original *myſteries* of which we have any account, were thoſe of Iſis and Oſiris in Egypt; from whence they were derived to the Greeks, under the preſidency of various gods, as the inſtitutor thought moſt for his purpoſe. He obſerves that the nature and end of all theſe *myſteries* were the ſame, viz. to teach the doctrine of a future ſtate. And he repreſents the deſign of them in general to have been, to engage men to a holy and virtuous practice, to give them juſt notions of religion, and to detect the error of the vulgar polytheiſm. And he concludes his account of the *myſteries* with obſerving, that there were three things about which they were principally concerned: viz. 1. The riſe and eſtabliſhment of civil ſociety. 2. The doctrine of a future ſtate of rewards and puniſhments. 3. The error of polytheiſm, or the principle of the unity. Which latter was the object of the greater *myſteries*, in which the whole deluſion of paganiſm was diſcloſed, and the initiated were inſtructed, that Jupiter, Mercury, Venus, Mars, and the whole rabble of licentious deities, were only deified mortals; and that God alone was the creator of the univerſe, who pervaded all things by his virtue, and governed all by his providence: whereas in the leſſer *myſteries*, which were preparatory to the other, the general belief of a providence and future ſtate, and its conſequent engagements to a virtuous life were inculcated. But as theſe *myſteries*, according to the biſhop's hypotheſis, were an inſtitution of the ſtate for the benefit of the people, it is natural to inquire into the reaſons of their being kept ſecret, which, he ſays, were the following; nothing ſtimulates curioſity like that which retires from obſervation, and ſeems to forbid ſearch; and yet there was a neceſſity of teaching ſome things to the initiated, not expedient for others to know; hence he obſerves, that the ſecret in the leſſer *myſteries* was ſome hidden rites and ſhews, to be kept from the people, only to invite their curioſity; and that the ſecret in the greater was ſome hidden doctrines to be kept from the people for the contrary purpoſe. Beſides, as the legiſlators had been principally concerned in the riſe of the vulgar polytheiſm, this circumſtance furniſhed another reaſon for the ſecreſy attending theſe *myſteries*. And that theſe *myſteries* were invented, eſtabliſhed, and ſupported by the legiſlature, he argues from the place of their origin, which was Egypt, where all religious worſhip was formed and propagated by ſtateſmen, and directed to political ends, becauſe the ſages who brought them out of Egypt, and propagated them in Aſia, Greece, and Britain, were all kings or legiſlators: becauſe the ſtate preſided in the *myſteries*; becauſe, according to their original inſtitution, neither ſlaves nor foreigners, who had no concern, no property, and no country, were to be admitted into them; becauſe an inſtitution which taught the neceſſity of a ſtrict and holy life, muſt be the invention of legiſlators, to whoſe ſcheme virtue and the proſpect of immortality were ſo neceſſary; and hence they were actually of infinite uſe to the ſtate; and finally, from the expreſs teſtimony of Plutarch, who, in his Treatiſe of Iſis and Oſiris, aſcribes them to this original. However, theſe *myſteries*, in proceſs of time, greatly degenerated; one cauſe of their corruption ſeems to have been the ſeaſon in which they were performed, and the profound ſecrecy obſerved in them; for the night gave opportunity to wicked men to attempt evil actions; and the ſecrecy, encouragement to perpetrate them. Another cauſe of their depravation was their being ſometimes under the patronage of thoſe deities, who were ſuppoſed to inſpire and preſide over irregular paſſions, ſuch as Bacchus, Venus, and Cupid; to which the biſhop adds the hierophant's withdrawing himſelf from the care and inſpection of the civil magiſtrate.

Such is the ingenious and plauſible ſcheme largely diſcuſſed and maintained by Dr. Warburton, in his Divine Legation, &c. book ii. ſec. 4.

However, other learned writers have advanced a very different opinion on this ſubject. Dr. Leland, in particular, has very accurately examined the origin and ends of the inſtitution of *myſteries*. According to this writer they ſeem to have been originally deſigned to tame and civilize the rude and barbarous people, to form and poliſh their manners, and by ſhews and repreſentations, which were fitted to ſtrike the imagination, to bring them to a greater awe and veneration for the laws and religion of their country; which, among the pagans, was always regarded as a neceſſary ingredient in a virtuous character. On this account they are highly commended by Cicero, de Leg. lib. ii. cap. 14. as they tended to reclaim men from a rude and ſavage life; and they were called *initia*, becauſe they furniſhed the firſt principles of a human and civilized life. But whatever was the original intention of theſe *myſteries*, there is great reaſon to apprehend, that upon the whole, they proved rather detrimental than advantageous to the cauſe of virtue; and the conception of them ſeems to have been owing to a fundemental defect in their original conſtitution.— Dr. Leland farther examines whether, and how far the *myſteries* were deſigned to detect the error of polytheiſm, and to inſtruct the initiated in the knowledge of the one true God. With reſpect to this point, he maintains, that the whole evidence, produced by the biſhop, amounts only to this; that in the *myſteries* the initiated were inſtructed that the popular deities had been once men; but no proof is brought, that the *απορρητα* overthrew the vulgar polytheiſm, the worſhip of dead men: nay, the inſtitutors of the *myſteries*, whilſt they taught the initiated, that the gods, commonly received, had been once men, took care that the public religion ſhould not ſuffer by it, by letting them know, that, notwithſtanding this, they ought to be regarded as gods, and to have that divine worſhip and honour rendered to them, which ancient tradition and the laws required. The Chriſtians, indeed, argued from the hiſtory of the heathen gods to diſprove their divinity: and this was probably the reaſon why the myſtagogues were very careful in their entrance on the celebration of the *myſteries*, that no Chriſtian ſhould be preſent at them.

Dr. Leland farther contends, that the doctrine of the unity was not taught in the *myſteries*. With this view he examines the teſtimonies adduced by the biſhop, which, he ſays, afford no ſufficient evidence that they taught the doctrine of the unity. Beſides, there is great reaſon to think, that the notion given of the Deity in the *myſteries* was not very right and juſt: and moreover, if they had taught juſt notions of God, theſe could be of no great uſe, becauſe they taught this part of the ſecret doctrine of the *myſteries* to very few perſons. It is farther urged, that the legiſlators and civil magiſtrates, who firſt inſtituted the *myſteries*, and who regarded not truth but utility, could never in good earneſt attempt to draw the people off from that polytheiſm, which they themſelves had encouraged for the eſtabliſhment and welfare of the ſtate, and to keep the people under a greater veneration for the laws. And the *myſteries* ſeem to have been deſigned, not to diſcard the worſhip of the deities, to whom they were appropriated, but to add a greater ſolemnity to it. To which it may be added, from fact and experience, that, though the *myſteries* were generally celebrated in almoſt all the heathen nations, and eſpecially throughout the whole Roman empire, no effect of them appears in turning any of the people from their polytheiſm or idolatry: nor is it conceivable, if the deſign of the *myſteries* were as laudable as Dr. Warburton repreſents, that the ancient Chriſtian writers ſhould have ſo univerſally exclaimed againſt them. See Leland's Advantage and Neceſſity of the Chriſtian Revelation, vol. ii. pt. i. chap. 9.

Mystery, in *Scripture Language*, is uſed with ſome latitude. Sometimes it denotes any thing not to be known without divine revelation.

Mystery is alſo uſed to denote the ſecret things which God has diſcovered by his miniſters, the prophets, Jeſus Chriſt, and the apoſtles.

Mathematicians have been accuſed of introducing *myſteries* in geometry, which ought to have none. See the Annaliſt; and Mr. Maclaurin's Fluxions, in the Introduction and other places. See alſo Paradox.

Mystery, in *Engliſh Antiquity*, is a term formerly applied to our dramatic exhibitions. It is well known, ſays Mr. Percy, in his Reliques of Ancient Engliſh Poetry, that dramatic poetry in this and moſt other nations of Europe owes its origin, or at leaſt its revival, to thoſe religious ſhews, which in the dark ages were uſually exhibited on the more ſolemn feſtivals. At thoſe times they were wont to repreſent in the churches, the lives and miracles of the ſaints, or ſome of the more important ſtories of Scripture. And as the moſt myſterious ſubjects were frequently choſen, ſuch as the incarnation, paſſion, and reſurrection of Chriſt, &c. theſe exhibitions acquired the name of *myſteries*. At firſt they were probably a kind of dumb ſhews, intermingled, perhaps, with a few ſhort ſpeeches: at length they grew into a regular ſeries of connected dialogues, formally divided into acts and ſcenes. Specimens of theſe, in their moſt improved ſtate, may be ſeen in Dodſley's Old Plays, and in Oſborne's Harleian Miſcellany. As the old *myſteries* frequently required the repreſentation of ſome allegorical perſonage, ſuch as Death, Sin, Charity, Faith, and the like, by degrees the rude poets of theſe unlettered ages, towards the fifteenth century, began to form complete dramatic pieces, conſiſting entirely of ſuch perſonifications. Theſe they intitled moral plays, or moralities. The *myſteries* were very inartificial, repreſenting the ſcripture ſtories ſingly according to the letter. But the moralities are not devoid of invention; they exhibit outlines of the dramatic art; containing ſomething of a fable or plot, and even attempting to delineate characters and manners.

Mystery, *additions of*. See Addition.

MYSTES. See Hydromystes.

MYSTICAL, μυστικος, Mystic, ſomething *myſterious*, or allegorical. See Mystery, Allegory, &c.

The commentators on the Scripture, beſides a literal, find alſo a *myſtical*, and a moral meaning. The Bible, they contend, is a book written both within-ſide, and without-ſide: within-ſide, in reſpect to the *myſtical*, internal, ſublime, and hidden ſenſe; and without-ſide, in reſpect to the literal and grammatical ſenſe immediately expreſſed by the words.

In effect, ſeveral of the ancient fathers, and doctors of the church, underſtand the books mentioned in Ezek. ii. 10. and in the Apocalypſe, v. i. *which were written both within-ſide and without*, of the Scriptures; and take the literal and *myſtical* ſenſe to be here fairly intimated.

The ſenſe of Scripture, ſay they, is either that immediately ſignified by the words and expreſſions in the common uſe of language: or it is mediate, ſublime, typical, and *myſtical*; wherein the things themſelves ſignified are made to ſignify ſtill other and farther things, according to the particular deſign and intention of God, and of the prophets and apoſtles inſpired by him.

The literal ſenſe they again divide into *proper* literal, which is contained in the words taken ſimply and properly: and *metaphorical* literal, where the words are to be underſtood in a figurative and metaphorical ſenſe; as, *where the right eye is commanded to be plucked out*, &c.

Wherever the proper literal ſenſe contains any thing abſurd or indecent, there recourſe muſt be had to the metaphorical literal ſenſe.

All Scripture has a true literal ſenſe, but it has not always a *myſtical* one. We muſt ever underſtand it in the literal ſenſe, when it ſpeaks immediately of any of the laws of nature, of charity, of doing good; when it gives us inſtructions for the conduct of life, for regulating our manners; and when it relates any matter of fact, or point of hiſtory.

The ſame paſſage of Scripture has ſometimes ſeveral ſenſes, expreſſed and ſignified immediately by the words taken in their proper, and their figurative ſenſe, and which appear to have been all intended, by the inſpired perſon who ſpoke them, as having been ſo underſtood by others likewiſe inſpired. As thoſe words in Pſalm ii. *Thou art my ſon, this day have I begotten thee*; which St. Paul underſtands, according to the ſtrict letter, in Heb. i. 5. of the generation of Jeſus Chriſt in time; and in Acts xiii. 33. he takes them in a metaphorical ſenſe, and applies them to our Saviour's reſurrection. Thus, in Hoſea xi. 1. the words of the prophecy, *I have called my Son out of Egypt*, are underſtood literally of the children of Iſrael, whom God brought out of Egypt, under the conduct of Moſes; and yet in Matt. ii. 15. they are underſtood metaphorically of Jeſus Chriſt.

The *myſtical ſenſe* of Scripture is that which the things expreſſed by the words do farther ſignify; or it is a ſecond ſignification held forth and ſignified by the firſt: this ſecond being expreſſed immediately by the firſt: and mediately by the words themſelves.

Writers allow of three kinds of *myſtical* ſenſes in the Word of God: the firſt correſponding to faith, and called *allegorical*; the ſecond to hope, called *anagogical*; and the third to charity, called the *tropological ſenſe*.

The four ſenſes, and their applications, are included in the Latin diſtich.

> *Litera geſta docet, quid credas allegoria,*
> *Moralis quid agas, quo tendas anagogia.*

Sometimes the ſame word in Scripture is to be taken in all the four ſenſes. Thus the word *Jeruſalem* literally ſignifies the capital of Judea; allegorically, the church militant; tropologically and morally, a believer; and anagogically, heaven.

So, that paſſage in Geneſis, *Let there be light, and there was light*, ſignifies, according to the letter, corporeal light; by the allegory, the Meſſiah; in the tropological ſenſe, grace; and anagogically, beatitude, or the light of glory.

MYSTIC *theology* denotes a refined and ſublime kind of divinity, profeſſed by the *myſtics*.

It conſiſts in a knowledge of God, and divine things, not acquired in the common way, but infuſed immediately by God, and which has the power to move the ſoul in an eaſy, calm, devout, affective manner; to unite it ultimately to God; to illumine the underſtanding, and to warm and enliven the will, in an extraordinary manner.

Among the writings attributed to Dionyſius the Areopagite, is a diſcourſe of *myſtic theology*. Several others have written on the ſame ſubject, both ancient and moderns.

MYSTICS, *myſtici*, a kind of religious ſect, diſtinguiſhed by their profeſſing pure, ſublime, and perfect devotion, with an entire diſintereſted love of God, free from all ſelfiſh conſiderations.

The *Myſtics*, to excuſe their fanatic extacies, and amorous extravagancies, alledge that paſſage of St. Paul; *The Spirit prays in us by ſighs and groans that are unutterable.* Now, if the Spirit, ſay they, pray in us, we muſt reſign ourſelves to its motions, and be ſwayed and guided by its impulſe, by remaining in a ſtate of mere inaction.

Paſſive contemplation is that ſtate of perfection to which the *Myſtics* all aſpire.

The authors of this *myſtic* ſcience, which ſprung up towards the cloſe of the third century, are not known; but the principles from which it was formed are manifeſt.—Its firſt promoters proceeded from the known doctrine of the Platonic ſchool, which was alſo adopted by Origen and his diſciples, that the divine nature was diffuſed through all human ſouls, or that the faculty of reaſon, from which proceed the health and vigour of the mind, was an emanation from God into the human ſoul, and comprehended in it the principles and elements of all truth, human and divine. They denied that men could by labour or ſtudy excite this celeſtial flame in their breaſts, and, therefore, they diſapproved highly of the attempts of thoſe, who by definitions, abſtract theorems and profound ſpeculations endeavoured to form diſtinct notions of truth, and to diſcover its hidden nature. On the contrary, they maintained that ſilence, tranquillity, repoſe, and ſolitude, accompanied with ſuch acts as might tend to extenuate and exhauſt the body, were the means by which the hidden and internal word was excited to produce its latent virtues, and to inſtruct men in the knowledge of divine things. For thus they reaſoned;

thoſe who behold with a noble contempt all human affairs, who turn away their eyes from terreſtrial vanities, and ſhut all the avenues of the outward ſenſes againſt the contagious influences of a material world, muſt neceſſarily return to God, when the ſpirit is thus diſengaged from the impediments that prevented that happy union. And in this bleſſed frame, they not only enjoy inexpreſſible raptures from their communion with the Supreme Being, but alſo are inveſted with the ineſtimable privilege of contemplating truth undiſguiſed and uncorrupted, in its native purity, while others behold it in a vitiated and deluſive form.

The number of the *myſtics* increaſed in the fourth century, under the influence of the Grecian fanatic, who gave himſelf out for Dionyſius the Areopagite, diſciple of St. Paul, and probably lived about this period: and by pretending to higher degrees of perfection than other Chriſtians, and practiſing greater auſterity, their cauſe gained ground, eſpecially in the Eaſtern provinces, in the fifth century. A copy of the pretended works of Dionyſius was ſent by Balbus to Lewis the Meek, in the year 824, which kindled the holy flame of myſticiſm in the Weſtern provinces, and filled the Latins with the moſt enthuſiaſtic admiration of this new religion.

In the twelfth century, theſe *myſtics* took the lead in their method of expounding Scripture; and, by ſearching for myſteries and hidden meaning in the plaineſt expreſſions, forced the word of God into a conformity with their viſionary doctrines, their enthuſiaſtic feelings, and the ſyſtem of diſcipline, which they had drawn from the excurſions of their irregular fancies. In the thirteenth century, they were the moſt formidable antagoniſts of the ſchoolmen; and towards the cloſe of the fourteenth, many of them reſided and propagated their tenets almoſt in every part of Europe. They had, in the fifteenth century, many perſons of diſtinguiſhed merit in their number: and in the ſixteenth century, previous to the Reformation, if any ſparks of real piety ſubſiſted under the deſpotic empire of ſuperſtition, they were only to be found among the *myſtics*.

The principles of this ſect were adopted by thoſe called QUIETISTS in the ſeventeenth century: and, under different modifications, by the QUAKERS and METHODISTS.

MYSTOCEROS, in *Ichthyology*, a name given by Geſner and ſome others to that ſpecies of the ſilurus which we call the ſheat-fiſh. It is the glanus of Pliny, and the reſt of the old authors; the ſilurus of Rondeletius and others. It is diſtinguiſhed by Artedi by the name of the ſilurus with four beards under the chin. It is plainly to be known from the fiſh called the *lake*, by this character, that having only one beard; it is a genuine ſpecies of SILURUS.

MYSTRUM, among the *Ancients*, a liquid meaſure, which was the fourth part of the cyathus.

It weighed about two drams and a half of oil; and of water or wine, two drams two ſcruples. It was much about our ſmall ſpoonful.

MYSTUS *fluviatilis*, in *Ichthyology*, a name by which ſome writers, particularly Bellonius, have called the common *barbel*. See BARBUS.

MYSTUS *marinus*, the *ſea-barbel*, the name of a fiſh caught in the Adriatic, and common in the markets of Venice. It is of an oblong figure, and in colour of a ſilvery white, variegated on each ſide with ten obliquely tranſverſe black lines; its belly is very white; its tail is forked, and its head long; its back fin has part of its rays prickly, part ſoft to the touch; its eyes are not large, and their iriſes are yellow; its lips are prominent, thick, and ſoft, and only ſerrated in the place of teeth; but in the hinder part of its mouth it has ſeveral rows of ſhort and large *molares* or grinders; its ſcales are large, and adhere firmly to the fleſh. It is a very well taſted fiſh.

MYSTUS *Niloticus*, in *Ichthyology*, a name given by Bellonius to a fiſh of the barbel kind, caught in the Nile. Its body is thick and ſhort, and its belly very broad; it grows to ſo large a ſize as to weigh twenty pounds. Probably this may be no other than the common barbel growing to a larger ſize, as we ſee many fiſh will in ſome places more than others.

MYTACISM, Μυτακισμος, in *Rhetoric*, the too frequent repetition of the letter M, thus *mammam ipſam amo quaſi meam animam*.

MYTHOLOGY, μυθολογια, ſignifying a diſcourſe or deſcription of fables, from μυθος, *fabula*, and λογος, *ſermo*, *diſcourſe*, the hiſtory of the fabulous gods and heroes of antiquity; with the explanation of the myſteries or allegories couched therein.

Lord Bacon thinks that a great deal of concealed inſtruction and allegory was originally intended in moſt parts of the ancient *mythology*; he obſerves that ſome fables diſcover a great and evident ſimilitude, relation, and connection with the thing they ſignify, as well in the ſtructure of the fable as in the meaning of the names, whereby the perſons or actors are characteriſed.

The ſame writer thinks it may paſs for a farther indication of a concealed and ſecret meaning, that ſome of theſe fables are ſo abſurd and idle in their narration, as to ſhew an allegory even afar off: but the argument of moſt weight upon this ſubject, he takes to be this, that many of theſe fables appear by no means to have been invented by the perſons who relate them: he looks on them not as the product of the age, nor the invention of the poets, but as ſacred relics as he terms them, gentle whiſpers, and the breath of better times, that from the tradition of more ancient nations, came at length into the flutes and trumpets of the Greeks. He concludes, that the knowledge of the early ages was either great or happy: great, if they by deſign made this uſe of trope and figure; or happy, if, whilſt they had other views, they afforded matter and occaſion to ſuch noble contemplations. See THEOLOGY.

MYTILUS, in *Natural Hiſtory*. See MUSCLE.

MYTIS, a name uſed by ſome writers to expreſs the black juice found in the mouth of the ſepia or cuttle-fiſh, with which it colours the water when in danger of being taken, and by this means often makes its eſcape. It is alſo uſed by Hippocrates as the name of a ſea-fiſh different from the ſepia.

MYTTOTON, a word uſed by the ancients to expreſs a mixt ſort of country food, made of garlic, onions, eggs, cheeſe, oil, and vinegar. It was much eaten by the labouring people among the ancients, and accounted a very wholeſome diſh.

MYURUS, μυουρος, in *Medicine*, denotes a pulſe which is continually weakening by inſenſible degrees, ſo that the ſecond beat is fainter than the firſt, the third than the ſecond, &c. See PULSE.

The word is compounded of μυς, *mouſe*, and ουρα, *tail*; the diminution of the pulſe being ſuppoſed like that of the thickneſs of the tail of that animal, which grows leſs from the root to the tip.

MYUTES *lapis*, in *Natural Hiſtory*, a name given by ſome authors to a foſſile body, part of an ASTEROPODIUM, which they have thought in ſingle joints ſomewhat reſembled the ears of a mouſe.

MYXA, or MYXARIA, in the *Materia Medica*, a name uſed by ſome authors for the SEBESTENS, a ſort of plum of Ægypt and Aſia.

MYXINE, in *Natural Hiſtory*, a genus of the *inteſtina* claſs of worms; the characters are, that the body is round and carinated in the lower part; the mouth is cirrhous; the jaws are pinnated, and furniſhed with many ſharp teeth; and it hath no eyes. There is only one ſpecies, called by Linnæus the glutinous *myxine*.

MYXOLYDIAN, in *Ancient Muſic*, the firſt ſpecies of the DIAPASON.

MYXON, in *Ichthyology*, the name of a fiſh of the mullet-kind, called by others BACCHUS.

It much reſembles the common MULLET; but its head is leſs pointed, and its body is covered, beſide the ſcales, with a mucous matter: it has a remarkable irregularity in the manner of its ſwimming, and looks red about the lips and covering of the gills.

N.

N, A liquid conſonant, or ſemi-vowel, and the thirteenth letter of the Greek, Latin, Engliſh, &c. alphabets.

The *N* is a naſal conſonant; its ſound is that of a d, paſſed through the noſe: ſo that when the noſe is ſtopped by a cold, or the like, it is uſual to pronounce d for *n*. M. l'Abbé de Dangeau obſerves, that in the French the *n* is frequently a mere naſal vowel, without any thing of the ſound of a conſonant in it. He calls it the Sclavonic vowel. The Hebrews call their *N*, *Nun*, which ſignifies *child*, as being ſuppoſed the offspring of M; partly on account of the reſemblance of ſound, and partly on that of the figure. Thus from the m, by omitting the laſt column, is formed *n*: and thus from the capital *N*, by omitting the firſt column, is formed the Greek minuſcule *ν*. Hence, for Biennius, &c. the Latins frequently uſe Bimus, &c. and the ſame people convert the Greek *ν* at the end of a word into an m; as, *φαρμακον*, *pharmacum*, &c. See M.

N before p, b, and m, the Latins change into m, and frequently into l and r, as in ludo, illudo; in rigo, irrigo, &c. in which they agree with the Hebrews, who, in lieu of nun, frequently double the following conſonant; and the Greeks do the ſame, as when for Manlius, they write Μαλλιος, &c.

The Greeks, alſo, before *κ*, *γ*, *χ*, *ν*, changed the *ν* into *γ*: in which they were followed by the ancient Romans, who for Angulus wrote Aggulus; for anceps, agceps, &c. The Latins retrench the *n* from Greek nouns ending in *ων*; as λεων, *leo*, δρακων, *draco*. On the contrary, the Greeks add it to the Latin ones ending in *o*: as Κατων, Νερων, for *Cato*, *Nero*.

In Engliſh, *N* has an invariable ſound: as *no*, *name*, &c. After m it is ſometimes almoſt loſt, as *condemn*, &c.

N, among the *Ancients*, was a numeral letter, ſignifying 900; according to the verſe in Baronius,

N quoque nongentos numero deſignat habendos.

And when a line was ſtruck over it $\overline{\text{N}}$, nine thouſand. Among the ancient lawyers, *N. L.* ſtood for not liquet, i. e. the cauſe is not clear enough to paſs ſentence upon. *N. P.* was uſed among the Romans for notarius publicus; *N. C.* for Nero Cæſar, or Nero Claudius. *N. B.* is uſed for Nota bene. In marine language, *N* ſtands for North.

N, or N°, in *Commerce*, &c. is uſed as an abbreviation of numero, number. Thus alſo, in *Medicine*, carryophyllorum, N° vi. ſignifies ſix cloves. N on the French coins, denotes thoſe ſtruck at Montpelier.

NAAM, or NAM, NAMIUM, in *Law*, the taking or diſtraining another man's moveable goods.

This is either *lawful*, or *unlawful* and prohibited.

NAAM, *lawful*, is a reaſonable diſtreſs, proportionable to the value of the thing diſtrained for; and anciently called either *vif* or *mort*, as it was made of quick, or dead chattel.

Lawful *Naam* is ſo either by the common law; as when a man takes another's beaſts doing damage in his ground; or by a man's particular fact, as on account of ſome contract, &c.

NAAM, *unlawful*, *vetitum namium*. See NAMIUM.

NABATHÆA *ſiliqua*, in the *Materia Medica*, a name given by the interpreters of Avicenna, and other of the Arabian phyſicians, to the *jembut*, or *aljembut*, of thoſe authors.

It appears, from the accounts they have given us of this drug, that it was a long and ſlender pod, produced on a thorny tree. It has been generally ſuppoſed to be the ſame with the *carob*, or *ſiliqua dulcis*, but very erroneouſly. The ſame authors who mention this *aljembut*, or *nabathæ ſiliqua*, mention that alſo under the name of the *alnabati*, or *Syrian ſiliqua*, as it is interpreted.

The *Syrian ſiliqua*, they ſay, purges, and is good in colics. The *nabathæan* they recommend to us, as an inſtringent in hæmorrhages. It is plainly to be inferred from this, that the *nabathæa ſiliqua* is different, in the greateſt degree from the Syrian pod, or *carob* fruit; and by its virtues, and the deſcription they give us of the thorny tree which produces it, it ſeems very probable that it was the pod of ſome ſpecies of the *acacia*.

NABCA, in *Botany*, a name by which ſome authors have called the tree more uſually deſcribed under the name of *œnoplia*, or the great jujube tree.

NABECH, in *Botany*, the name given by the Arabian writers to the fruit of the tree SADAR, which is the *lotus* of Dioſcorides, and the *acanthus* of Virgil. The fruit of this, which is round, and like a cherry, only ſmaller, was firſt called by this name *nabech*, or *nabac*, but afterwards the tree was alſo called by it.

NABLUM, in Hebrew, *nebel*, an inſtrument of muſic among the Hebrews. The Seventy, and the Vulgate, tranſlate it ſometimes by *nablum*, and at other times by *pſalterion*, or *lyra*, or even *cithara*.

The *nablum* was a ſtringed inſtrument, very near of the form of a Δ, which was played upon by both hands, and with a kind of bow. See Calmet's Diſſertation concerning the inſtruments of Muſic of the ancient Hebrews, prefixed to the ſecond volume of his Commentary upon the Pſalms.

Kircher ſuppoſes that it was the ſame with the PSALTERY. See *Tab. Muſic*, *fig.* 7.

NABO, or NEBO, in *Mythology*, a deity of the Babylonians, who poſſeſſed the next rank to Bel. It is mentioned by Iſaiah, ch. xlviii. Voſſius apprehends that *Nabo* was the moon, and Bel the ſun; but Grotius ſuppoſes that *Nabo* was ſome celebrated prophet of the country, which opinion is confirmed by the etymology of the name, ſignifying, according to Jerom, one that preſides over propheſy.

NABOB, the name of a viceroy or governor of one of the provinces of the Mogul's empire in India.

NABONASSAR. The æra of NABONASSAR is famous: we know but little of the hiſtory of that prince; only that he was king of Babylon, and was alſo called Beleſus; though ſome will have him the Baladan mentioned in Iſaiah xxxix. 1. and 2 Kings xx. 12. Some even conjecture that he was a Mede; and that he was ſet on the throne by the Babylonians, upon their ſhaking off the government of the Medes.

The beginning of this prince's reign is of great importance in chronology; becauſe Ptolemy aſſures us, there were aſtronomical obſervations made by the Chaldæans from *Nabonaſſar* to his time; and Ptolemy, and the other aſtronomers, account their years from that epocha. See ASTRONOMY.

From the obſervations quoted by Ptolemy, it follows, that the firſt year of this æra is the 747th year before Jeſus Chriſt; and the 3967th of the Julian period. See EPOCHA.

The years of this epocha are Egyptian years, of three hundred and ſixty-five days each; commencing on the 29th of February, and reckoned, according to the computation of aſtronomers, from noon.

NABOTH, *egg of*, in *Anatomy*, a kind of ovary near the neck of the womb, diſcovered by *Naboth*, profeſſor of medicine in the univerſity of Leipſick.

NACRE, in *Natural Hiſtory*. See PINNA.

NADAB, the ſovereign pontiff, or high prieſt of the Perſians, whoſe dignity is the ſame as that of the mufti among the Turks; with this difference only, that the *nadab* may diveſt himſelf of his eccleſiaſtical office, and paſs to civil employment, which the mufti is not allowed to do. See MUPHTI.

The *nadab* takes place next after the atmath dulet, or prime miniſter; he has two judges under him, called the ſceik and the caſi, who decide all religious matters, grant divorces, and are preſent at contracts and public acts, and theſe have deputies in all the cities of the kingdom.

NADIR, in *Aſtronomy*, a point in the heavens diametrically oppoſite to the ZENITH.

The word is pure Arabic, where it ſignifies the ſame.

The *nadir* is that point directly under our feet; or a point in a right line drawn from our feet through the centre of the earth, and terminating in the under-hemiſphere.

The zenith and *nadir* are the two poles of the horizon, each being 90° diſtant from it, conſequently each in the meridian.

NADIR, *ſun's*, is the axis of the cone projected by the ſhadow of the earth; thus called, becauſe that axis being prolonged, gives a point in the ecliptic diametrically oppoſite to the ſun.

NADIR-*il-kiſne*, in the *Turkiſh Offices*, the ſuperintendant over the wardrobe.

NÆNIA, in *Mythology*, a goddeſs who preſided over lamentations and funerals; and who had a temple near Rome.

Nænia is alſo uſed for a funeral dirge or ſong, ſung on funeral occaſions.

NÆVUS, or NEVUS, in the *Animal Oeconomy*, denotes an excreſcence of fleſh in various parts of the bodies of children, ſuppoſed to have been occaſioned by frights, diſappointments, &c. of the mother, while the infant was in the womb. Theſe tumors ariſe in all parts of the body; they are of all figures and of all ſizes, and are ſometimes of the common colour of the ſkin, ſometimes black, red, &c. Many of them, both in ſhape and colour, reſemble fruit of ſeveral kinds, as mulberries, ſtrawberries, and the like; or animals, as mice, or ſpiders. They are to be removed as warts, by ligature, cautery, or extirpation with the knife. But if they have large veſſels near their roots, if they are ſtrongly fixed to the bone, or if they ſeem to have a cancerous diſpoſition, it is much beſt for the ſurgeon to let them wholly alone; and where they are ſeated in the neighbourhood of arteries, or large veins, if preſſed to extirpate them, he ſhould never be without cauteries, ſtypics, bandages, and other neceſſary appartus, in caſe of hæmorrhages. Heiſter's Surgery, p. 323.

See theſe accounted for under MONSTER. See alſo FOETUS, and IMAGINATION.

NAG. See HOBBY.

NAGEMULUS, in *Ichthyology*, a name given by ſome of the German authors to the fiſh called by Willughby and others, the *lucioperca*, or *pike-pearch*. It is truly a ſpecies of PEARCH, and is diſtinguiſhed from the common pearch, principally by having two long teeth on each ſide of the mouth.

NAHUM, or, *the Prophecy of* NAHUM, a canonical book of the Old Teſtament. *Nahum*, the ſeventh of the twelve leſſer prophets, was a native of Elkoſhai, a little village of Galilee. The ſubject of this prophecy is the deſtruction of Nineveh, which he deſcribes in the moſt lively and pathetic manner: his ſtyle is bold and figurative, and can hardly be exceeded by the moſt perfect maſters of oratory. This prophecy was verified at the ſiege of that city, by Aſtyages, in the year of the world 4378, ſix hundred and twenty-two years before Chriſt.

The time of *Nahum's* death is unknown; the Greek menologies, and the Latin martyrologies place his feſtival on the firſt day of December.

NAIA, in *Zoology*, the name of a ſpecies of COLUBER, the ſcuta of whoſe abdomen are one hundred and ninety in number, and the ſquamæ of the tail ſixty.

NAJAS, in *Botany*, the name given by Linnæus to a genus of plants of the *dioecia monandria* claſs; called by Vaillant and Micheli *fluvialis*. The characters are theſe: it produces male and female flowers diſtinct; in the male flowers, the perianthium is compoſed of one leaf of a cylindric figure, and truncated at the baſe, growing ſmaller at the top, and having at the mouth two oppoſite ſegments which bend backwards; the flower is compoſed of only one petal and in a tube of the length of the cup; its verge is divided into four ſegments, which are rolled backwards; there are no ſtamina, but the middle of the flower produces one oblong erect anthera; in the female flower there is no cup, nor any petal, but a piſtil whoſe germen is of an oval figure, and terminates in a ſlender ſtyle; the ſtigmata are ſimple; the fruit is an oval capſule, containing one oblong oval ſeed. There is only one ſpecies.

NAIADS, or NAIDS, NAIADES, derived from ναω, *I flow*, or from ναιω, *I inhabit*, in *Mythology*, a ſort of nymphs, or heathen divinities, ſuppoſe to preſided over fountains and rivers.

Strabo ſays, the *Naiades* were prieſteſſes of Bacchus. What we learn of them in general is, that they were ſuppoſed to live in the palaces of the preſiding deities of fountains, lakes, and rivers. We have the names of no leſs than ſixteen of theſe deities, given us by Virgil, Georg. iv. ver. 336 to 340; and 343 to 345, in his account of Cirene's apartment only, in the watery palace of Peneus: and Ovid, lib. iii. el. 6. ver. 64. ſpeaks of a hundred, at leaſt, in the river Anio. They had often a name from the particular river they inhabited. They are deſcribed with long, bright hair, flowing down their ſhoulders; their faces ſhould have a ſhining, humid look, not unlike the Venus Anaduomené, of Apelles: their ſhape ſhould be fine, and their limbs well turned. Their robes, when they wear any, for they are moſt commonly quite naked, ſhould be of a greeniſh caſt; varied at pleaſure, ſome into lighter, and ſome into darker ſhades; and ſo thin, that you might diſcover all the turn of their limbs, and the fineneſs of their ſkin through them. They have ſometimes little flying veils, in gems of the ancients, over their heads; like thoſe goddeſſes of the air, which the Romans call Auræ, and which we call Sylphs. It was the uſual employment of the *Naiads* to attend at feaſts, and they ſeem to have been little better than ſo many domeſtics to the preſiding water-deities. Spence.

NAIANT, or NATANT, q. d. ſwimming; a term in *Heraldry*, uſed in the blazoning of fiſhes, when drawn in a horizonal poſture; feſs-wiſe, or tranſverſely, acroſs the eſcutcheon; that being their natural ſwimming poſture.

NAILING *of cannon*, the driving of a nail, or iron ſpike, by force into the touch-hole of a piece of artillery; ſo as to render it for ſome time uſeleſs to the enemy.

NAILS, in *Anatomy*, a kind of horny excreſcences, growing over the ends of the fingers and toes of men, and ſeveral other animals; much of the ſame nature with the hoofs of others.

Hoofs are nothing elſe but a number of ſmall huſks, anſwering to ſo many papillæ of the ſkin; and it may be concluded, that *nails* are no more than the covers or ſheaths of the papillæ pyramidales of the ſkin, on the extremities of the fingers and toes, which dry, harden, and lie upon one another.

Their uſe is to ſtrengthen and defend the ends of the fingers in handling any hard and rugged bodies; that part being exceedingly ſenſible, by reaſon of the great number of nerves which terminate here for the ſenſation of feeling.

The *nails* are formed, and grow, after the ſame manner as the reſt of the body; their nouriſhment they receive from their roots, as is eaſily obſervable from the white ſpecks ſometimes ſeen on them, and which conſtantly recede from the root.

Dr. Pozzi endeavours to prove, that the *nails* grow out of the tendons, which are ſpread upon the laſt phalanx of the fingers and toes.

The Romans were very curious in the cutting and forming the *nails*, and had it done by artiſts, who made an employment of it.

The Chineſe doctors and literati pique themſelves on the exceſſive length of their *nails*. F. le Compte ſays, ſome of them wear *nails* near as long as their fingers.

NAILS, in *Building*, &c. are little metalline members, ſerving to bind or faſten the parts together, &c.

The ſeveral kinds of *nails* are very numerous. As *back nails*, made with flat ſhanks to hold faſt, and not open the wood. *Clamp nails*, thoſe proper to faſten the clamps in buildings, &c. *Claſp nails*, whoſe heads are flatted, and claſping and ſticking into the wood, render the work ſmooth, ſo as to admit a plane over it: the moſt common in building are diſtinguiſhed by 10*d*. 20*d*. 2*s*. &c. *Clench nails*, thoſe uſed by boat, barge, &c. builders, with boves or nuts, and often without: for fine work, they are made with claſp heads, or with the head beat flat on two ſides. *Clout nails*, thoſe ordinarily uſed for nailing on of clouts to axle-trees; they are flat headed *nails*, and iron work is uſually fixed with theſe *nails*. *Deck nails*, thoſe proper for faſtening of decks in ſhips, doubling of ſhipping, and floors laid with planks. *Dog nails*, or *jobent nails*, proper for faſtening of hinges to doors, &c. *Flat points* are of two kinds; viz. *long*, much uſed in ſhipping, and proper where there is occaſion to draw and hold faſt, yet no neceſſity of clenching; and *ſhort*, which are fortified with points, to drive into oak or other hard wood. *Lead nails*, uſed to nail lead, leather, and canvas, to hard wood: theſe are *clout nails* dipped in lead or ſolder. *Port nails*, commonly uſed to nail hinges to the ports of ſhips. *Ribbing nails*, uſed to faſten the ribbing, to keep the ribs of ſhips in their place in building. *Roſe nails* are drawn four-ſquare in the ſhank, and commonly in a round tool. *Rother-nails*, chiefly uſed to faſten rother-irons to ſhips. *Scupper nails*, much uſed to faſten leather and canvas to wood. *Sharp nails*, much uſed, eſpecially in the Weſt-Indies, made with ſharp points and flat ſhanks. *Sheathing nails*, uſed to faſten ſheathing-boards to ſhips: the rule for their length is, to have them full three times as long as the board is thick. *Square nails*, of the ſame ſhape as *ſharp nails*; chiefly uſed for hard woods. Brads, long and ſlender, without heads, chiefly uſed for thin deal work, to prevent ſplitting. To which may be added *tacks*; the ſmalleſt ſerving to faſten paper to wood; middling, for wool-cards and oars; and larger, for upholſterers and pumps. They are diſtinguiſhed by the names of white *tacks*, 2 *d*. 3 *d*. and 4 *d*. *tacks*.

Nails are ſaid to be toughened, when too brittle, by heating them in a fire-ſhovel, and putting ſome tallow or greaſe among them.

Nails are ſold ſix ſcore to the hundred.

Nail, in the *Manege*. The different poſition of the *nails* of the bridle, or left hand of the horſeman, gives the horſe a facility of changing hands, and forming his departure and ſtop; by reaſon that the motion of the bridle follows ſuch a poſition of the *nails*. To give a horſe head, you muſt turn the *nails* downwards. To turn the horſe to the right, you muſt turn them upwards, moving your hand to the right. To change to the left you muſt turn the *nails* down, and bear to the left. To ſtop the horſe you moſt turn them upwards, and lift up, or raiſe your hand.

Nail is alſo a ſort of long meaſure, chiefly uſed in the commerce of cloths; containing the ſixteenth part of a yard.

NAIRANGIA, formed from the Arabic *nairan*, the plural of *nair*, *light*, a kind of divination, in uſe among the Arabs, drawn from the ſeveral phenomena of the ſun and moon.

NAIRES, Nahers, or Nayers, in *Modern Hiſtory*, a name which is given by the Malabarians to the military of their country, who form a very numerous claſs or tribe, out of which the ſovereigns of Malabar chooſe their body-guard.

NAISSANT, in *Heraldry*, is applied to a lion, or other animal, ſhewing only the head, ſhoulders, fore-feet, and legs, with the tip of the tail; the reſt of the body lying hid under the ſhield, or ſome charge, or ordinary thereon; from which it appears to be iſſuing or ariſing. See *Tab. Heraldry*, *fig*. 28.

Naiſſant differs from ISSUANT, as the animal in the former caſe iſſues out at the middle, and in the latter at the bottom of the field or charge.

F. Meneſtrier ſays, *naiſſant* is only uſed for animals, which ſhew the bare head as ariſing out of the extremity of the chief, or from above the feſſe.

NAKED, in *Architecture*. Naked of a wall, &c. is the ſurface of a plane, from whence the projectures ariſe; or which ſerves as a ground to the projectures. See *Tab. Architect*. *fig*. 24.

Thus, we ſay, a pilaſter ought to exceed the *naked* of the wall by ſo many inches; and that the foliages of a capital ought to anſwer to the *naked* of the COLUMN.

A flooring is ſaid to be *naked*, before the boards are laid over the joiſts: the *naked* roofing or carcaſing is applied to the roof before the tiles are laid on the rafters.

Naked *fire*, is a term uſed by chemiſts for an open fire; or one where the containing veſſel is immediately expoſed to the FIRE.

Naked *ſeeds*, in *Botany*, are ſuch ſeeds of plants as are not incloſed in any pod, or caſe.

Naked *ſtalk*, or *leaf*, among *Botaniſts*. See Stalk and Leaf.

NAKIB, in the *Oriental Dignities*, the name of an officer who is a deputy to the cadiliſkier, or, as he may be called, the lord high chancellor of Egypt, appointed by the grand ſignior. His office is to carry the ſtandard of Mahomet.

NAKIR, a word uſed by ſome medical writers to expreſs a violent flatulence which paſſes from one limb to another, and is always attended with pain.

NAKOUS, an Egyptian muſical inſtrument, made like two plates of braſs, and of all ſizes, from two inches to a foot in diameter; they hold them by ſtrings faſtened to their middles, and ſtrike them together ſo as to beat time. They are uſed in the Cophtic churches, and in the Mahometan proceſſions.

NAL *la appella*, in *Botany*, a name uſed in the Hortus Malabaricus to expreſs an Indian ſhrub, or tree, from the roots of which they obtain an oil of a gold-yellow colour, and very agreeable ſmell, called *appel* oil. It is of a bitteriſh and ſharp taſte, and is in great eſteem among them in pains of the head.

NAM. See Naam.

NAMA, in *Botany*, a genus of the *pentantria digynia* claſs: the characters of which are, that the calyx is compoſed of five leaves; the corolla is divided into five ſegments; and the fruit is a ſingle-celled capſule, with two valves. There are two ſpecies.

NAMAMTIA, in *Ichthyology*, a name given by the French to the *manati*, or SEA *cow*.

NAMATION, Namatio, in *Law*, the act of diſtraining or taking a DISTRES. See Naam.

In Scotland the word is particularly uſed for impounding. See Pound.

NAME, denotes a word whereby men have agreed to expreſs ſome idea; or which ſerves to denote or ſignify a thing or ſubject ſpoken of.

This the grammarians uſually call a NOUN, *nomen*, though their *noun* is not of quite ſo much extent as our *name*.

Seneca, lib. ii. de Beneficiis, obſerves that there are a great number of things which have no *name*; and which therefore, we are forced to call by other borrowed *names*. *Ingens eſt*, ſays he, *rerum copia ſine nomine, quas cum propriis appellationibus ſignare non poſſumus, alienis accommodatis utimur*: which may ſhew why, in the courſe of this Dictionary, we frequently give divers ſenſes to the ſame word.

It was Adam that firſt gave things their *names*, Geneſis, ii. 19.

Names are diſtinguiſhed into *proper* and *appellative*.

Names, *proper*, are thoſe which repreſent ſome individual thing or perſon; ſo as to diſtinguiſh it from all other things of the ſame ſpecies. As Socrates, which repreſents a certain philoſopher.

Names, *appellative*, or *general*, are thoſe which ſignify common ideas; or which are common to ſeveral individuals of the ſame ſpecies,—as, horſe, animal, man, oak, &c.

Proper names are either called *Chriſtian*, as being given by us at baptiſm; or *ſurnames*: the firſt, impoſed for diſtinction of perſons; anſwering to the Roman prenomen.

The ſecond, for the diſtinction of families, anſwering to the nomen of the Romans, and the patronymicum of the Greeks.

Originally every perſon had but one *name*; as among the Jews, Adam, &c. among the Egyptians, Buſiris; among the Chaldees, Ninus; the Medes, Aſtyages; the Greeks, Diomedes; the Romans, Romulus; the Gauls, Divitiacus; the Germans, Arioviſtus; the Britons, Caſſibelan; the Engliſh, Hengiſt, &c. and thus of other nations, except the ſavages of mount Atlas, whom Pliny and Marcellinus repreſent as anonymi, *nameleſs*.

The Jews gave the *name* at the circumciſion, viz. eight days after the birth: the Romans to females the ſame day, and to males on the ninth; at which time they held a feaſt, called *nominalia*.

Since Chriſtianity has obtained, moſt nations have followed the Jews, baptizing and giving the *name*, on the eighth day after the birth, though this is far from being an uniform practice; our Engliſh anceſtors generally baptized, and gave the *name*, on the birth-day.

The firſt impoſition of *names* was founded on different views, among different people; the moſt uſual was to mark the good wiſhes of the parents, or to entitle the children to the good fortune a happy *name* ſeemed to promiſe. Hence, Victor, Caſtor, Fauſtus, Statorius. Probus, &c.

Accordingly we find ſuch *names*, by Cicero called *bona nomina*, and by Tacitus *fauſta nomina*, were ſtill firſt inrolled, and ranged in the Roman muſters; firſt called to ſerve at the firſt ſacrifices in the foundation of colonies, &c. And on the contrary, Livy calls Atrius Umber, *abominandi ominis nomen*: and Plautus, on occaſion of a perſon named Lyco, i. e. greedy wolf, ſays;

> *Voſmet nunc facite conjecturam, cæterum*
> *Quid id ſit hominis, cui* Lyco *nomen ſiet.*

Hence, Plato recommends it men to be careful in giving happy *names*; and the Pythagoreans taught expreſly, that the minds, actions, and ſucceſſes of men, were according to their *names*, genius, and fate. Thus, Panormitan, *Ex bono* nomine *oritur bona præſumptio*; and thus the common proverb, *Bonum* nomen *bonum omen*: and hence the foundation of the Onomantia.

Hence Camden take it for granted, that the *names*, in all nations and languages, are ſignificative, and not ſimple ſounds, for mere diſtinction ſake. This holds not only among the Jews, Greeks, Latins, &c. but even the Turks; among whom Abdallah ſignifies God's ſervant; Soliman, peaceable; Mahomet, glorified, &c. And the ſavages of Hiſpaniola, and throughout America, who, in their languages, *name* their children, Gliſtering Light, Sun-bright, Fine Gold, &c. And they of Congo, by the *names* of precious ſtones, flowers, &c.

To ſuppoſe *names* given without any meaning, however by the alteration of languages their ſignification may be loſt, that learned author thinks, is to reproach our anceſtors; and that contrary to the ſenſe of all ancient writers. Porphyry notes, that the barbarous names, as he calls them, were very emphatical, and very conciſe: and accordingly, it was eſteemed a duty to be φερωνυμοι, or *ſui nominis homines:* as Severus, Probus, and Aurelius are called *ſui nominis imperatores.*

And it was the uſual way of giving *names*, to wiſh the children might diſcharge their *names*. Thus when Gunthram, king of France, named Clotharius at the font, he ſaid *Creſcat puer & hujus ſit nominis executor.*

The ancient Britons, Camden adds, generally took their *names* from colours; becauſe they painted themſelves; but theſe names are now loſt, or remain hid among the Welſh. When they were ſubdued by the Romans, they took Roman *names*, ſome of which ſtill remain corrupted; though the greateſt part are become extinct, upon the admiſſion of the Engliſh Saxons, who introduced the German *names*, as Cridda, Penda, Oſwald, Edward, &c. The Danes, too, brought with them their *names*; as Swayne, Harold, Knute, &c.

The Normans, at the Conqueſt, brought in other German *names*, as originally uſing the German tongue; ſuch as Robert, William, Richard, Henry, Hugh, &c. after the ſame manner as the Greek *names*, Aſphaſius, Boethius, Symmachus, &c. were introduced into Italy, upon the diviſion of the empire. After the Conqueſt, our nation which had been averſe to foreign *names*, as deeming them unlucky, began to take Hebrew *names*, as Mathew, David, Samſon, &c.

The various *names* anciently, or at preſent, obtaining among us, from what language or people ſoever borrowed, are explained by Camden in his Remains.

Of late years it has obtained among us to give *ſurnames* for *Chriſtian names*; which ſome diſlike, on account of the confuſion it may introduce. Camden relates it as an opinion, that the practice firſt began in the time of Edward VI. by ſuch as would be godfathers, when they were more than half fathers. Upon which ſome were perſuaded to change their *names* at confirmation; which, it ſeems, is uſual in other countries. Thus, two ſons of Henry II. of France, chriſtened Alexander and Hercules, changed them at confirmation into Henry and Francis.

In monaſteries, the religious aſſume new *names* at their admittance; to ſhew they are about to lead a new life, and have renounced the world, their family, and even their *name*: v. g. Siſter Mary of the Incarnation, Brother Henry of the Holy Sacrament, &c.

The popes alſo change their *name* at their exaltation to the pontificate; a cuſtom firſt introduced by pope Sergius whoſe *name*, till then, as Platina informs us, was Swineſnout. But Baronius refers it to pope Sergius I. and Onuphrius to John XII. or XIII. and at the ſame time adds a different reaſon for it from that of Platina, viz. that it was done in imitation of St. Peter and St. Paul, who were firſt called Simon and Saul. Indeed pope Marcellus, of late, refuſed to change his *name*.

In Italy, it is frequent to join the *name* of ſome ſaint, in a kind of devotion to the Chriſtian *name*; as Joannes Baptiſta Spinoſa, &c.

Among the ancients, thoſe deified by the heathen conſecrations had new *names* given them, as Romulus was called Quirinus; Melicertes, Portunus, or Portumnus, &c. New *names* were alſo given in adoptions, and ſometimes by teſtament: thus L. Æmilius, adopted by Scipio, took the *name* of Scipio Africanus; and thus Auguſtus, who at firſt was called C. Octavius Thurinus, being adopted by the teſtament of Julius Cæſar into his *name* and family, took the *name* of Caius Julius Cæſar Octavianus. *Names* were alſo changed at enfranchiſements into new cities. Thus Lucumo, at his firſt being made free of Rome, took the *name* Lucius Tarquinius Priſcus, &c. and ſlaves, when made free, uſually aſſumed their maſters *names*.

Thoſe called to the equeſtrian order, if they had baſe *names*, were always new-named, *nomine ingenuorum veterumque Romanorum*. And among the primitive Chriſtians, it was the practice to change the *names* of the catechumens: thus the renegado Lucianus, till his baptiſm, was called Lucius.

NAME, *generical*. See GENERICAL.

NAME, *ſpecific*. See SPECIFIC.

NAME, *of the*, is a phraſe, frequent among *Hiſtorians* and *Genealogiſts*, to denote perſons of the ſame quality, and *name*. It is near nine hundred years ſince the emperors of the Weſt firſt began to diſtinguiſh themſelves in this manner by their number; and in the Italia Sacra of Ughellus, we meet with a charter of the emperor Louis le Debonnaire, ann. 818, wherein that prince ſtyles himſelf the firſt *of the name*. Le Blanc mentions a charter of the year 1084, wherein the emperor Henry III. ſtyles himſelf King of Italy, the fourth *of the name*; and emperor the third *of the name*.

Some French writers obſerve, that in a manuſcript preſerved in the king's library, their Lewis XI. is only ſtyled the ninth *of the name*; Louis the Debonnaire, and Louis the Stammerer, not being then reckoned in the number, becauſe they were emperors, as well as kings of France: on which footing, the preſent king, inſtead of the ſeventeenth, ſhould only be the fifteenth *of the name*.

NAMIUM, NAAM, in *Law*. See NAAM.

NAMIUM *vetitum*, or *prohibited* NAAM, is an unjuſt taking the cattle of another, or driving them to an unlawful place, pretending damages done by them.

Such, e. g. is that when the bailiff of a lord diſtrains beaſts or goods, and the lord forbids his bailiff to deliver them, when the ſheriff comes to replevy them; and to that end, drives them to places unknown. Or when, without any words, they are ſo eſſoined, as that they cannot be replevied. Divers lords of hundreds, and courts-baron, have power to hold plea *de vetito namio*.

In ſuch caſe, the owner of the cattle may demand ſatisfaction for the injury, which is called *placitum de namio vetito*.

NAMUR *marble*. See LUCULLEUM *marmor*.

NANDI *ervatam*, in *Botany*, the name of a ſmall ſhrub which grows in the Eaſt Indies, the whole of which is lacteſcent. The juice expreſſed from it, mixed with oil, eaſes pains of the eyes, if the head is anointed therewith; the root maſticated, and held in the mouth, eaſes the tooth-ach; and the ſame boiled in oil, makes a good ointment for all indiſpoſitions of the head, eſpecially pain; bruiſed, and taken in water, it kills worms; bruiſed with the juice of lemon, and put into the eyes, it removes films.

NANTES, or *ſwimming*, in the Linnæan ſyſtem, is the name of an order of animals under the claſs of AMPHIBIA; the characters of which are, that they are pinnated, and breathe by lateral branchiæ or gills. This order comprehends fourteen genera, and ſeventy-ſix ſpecies. To this order belong the PETROMYZON, RAJA, SQUALUS, &c.

NANTES, *edict of*, in *Eccleſiaſtical Hiſtory*, a famous edict drawn up at *Nantes* in the year 1598, by which Henry IV. granted to the profeſſors of the reformed or proteſtant religion, the liberty of ſerving God according to their conſciences, and a full ſecurity for the enjoyment of their civil rights and privileges, without perſecution or moleſtation from any quarter. This edict reſtored and confirmed, in the fulleſt terms, all the favours that had ever been granted to the proteſtants by other princes, and particularly by Henry III. To theſe privileges others alſo were added, which had never been granted, nor even demanded before: ſuch as free admiſſion to all employments of truſt, honour, and profit, the eſtabliſhment of courts and chambers, in which the profeſſors of the two religions were equal in number; and the permitting the children of proteſtants to be educated, without any moleſtation or conſtraint, in the public univerſities. This edict was revoked by Lewis XIV. at the inſtigation of the biſhops and Jeſuits, in the year 1685, the conſequence of which event was very beneficial to almoſt all the proteſtant countries of Europe; and more eſpecially to the commerce of Holland and England. The number of refugees, who on this occaſion fled from France, and carried their ſkill and induſtry in various manufactures to other countries, was, at a moderate computation, more than half a million.

NAPÆA, in *Botany*, a genus of the *monadelphia polyandria* claſs. Its characters are theſe: it hath male and hermaphrodite flowers on diſtinct plants; the male flowers have pitcher ſhaped empalements of one leaf; the flowers have five oblong petals, which are connected at their baſe; and have many hairy ſtamina, which are joined at the bottom into a ſort of cylindrical column; the hermaphrodite flowers have the like empalement, petals and ſtamina, as the male; and have a conical germen, ſupporting a cylindrical ſtyle, divided at the top into ten parts crowned by ſtigmas; the germen turns to an oval fruit, incloſed in the empalement, divided into ten cells, each containing one kidney-ſhaped ſeed. There are two ſpecies, natives of North America.

NAPE is uſed for the hind-part of the neck; by reaſon, perhaps, of the ſoft ſhort hair growing thereon, like the knap of cloth.

NAPELLUS. See ACONITE.

This plant is poiſonous in ſome places, and innocent in others. Its mortal quality increaſes with the heat of the climate, and goes off where that is ſmall. In the ſouth of France, it is a fatal poiſon; in Bretagne, they find the roots inoffenſive to the moſt tender conſtitutions; and farther north, they eat the leaves among their ſallad herbs, to get them an appetite, and find them a ſafe and wholeſome food.

It is ſaid the *napellus* may be ſo corrected by volatile ſalt of tartar, as to become innocent. See WOLF's-*bane*.

NAPESCA, a name given by ſome to a ſpecies of *jujube*.

NAPHA, a name given by many of the writers in pharmacy to *orange-flower water*.

NAPHTHA, in *Natural Hiſtory*, the name of a genus of fluid foſſils, the characters of which are, that they are of a thin conſiſtence, bright and pellucid, of a ſtrong ſmell, very readily inflammable, and, when pure, burning away, without leaving any reſiduum.

The word in the original Chaldee ſignifies *ſtillare, to ooze*, or *drop*; *naphtha*, according to Pliny, running like a kind of bitumen.

Of this genus there are only two ſpecies, the one commonly known by the name of *naphtha*, the other by that of PETROLEUM. The firſt is a pure and clear mineral fluid, of a much thinner conſiſtence than any of the expreſſed oils of vegetables, and ſomething thicker than the finer of the diſtilled ones; it is of a pale yellow, with a faint caſt of brown among it, and is, indeed, of the very colour of the common brown amber uſed by the apothecaries. It is of a briſk, penetrating ſmell, ſomething like that of the chemical oil of amber, but not ſo offenſive; it is extremely inflammable, and is found floating on the waters of certain ſprings which break out at the ſides of hills in Perſia, Tartary, China, and other parts of the Eaſt, as in Chaldæa, particularly the place where ſtood the ancient Babylon; and found alſo in ſome provinces of Italy and France, particularly Auvergne, and near Raguſa.

Naphtha is found ſwimming on the ſurface of the water of ſome ſprings. It is uſually of a black colour; though that found in certain ſprings about Babylon is ſaid to be whitiſh.

That of France is ſoft and black, like liquid pitch, and of a ſetid ſmell; that of Italy is a kind of petrol, or a clear oil of various colours, oozing out of a rock, ſituate on a mountain in the duchy of Modena.

It ſeems very practicable, by means of this mineral fluid and a proper acid, to make a ſort of artificial amber, this being only a kind of fluid amber.

The ſecond kind, commonly known by the name of *petroleum*, is a thin, ſubtle, and penetrating fluid, much thinner than the yellow *naphtha*, and as fine as the cleareſt diſtilled oils of vegetables. It is of a very ſtrong and penetrating ſmell, and is of various colours; it is naturally of a clear, fine, and bright white, and nearly as pellucid as the pureſt ſpring-water; but it is more frequently found brown, reddiſh, or blackiſh. It is produced in almoſt all parts of the world; England, France, and Germany, afford it in many places, but it is moſt plentifully found in Italy.

Naphtha is eſteemed penetrating, reſolutive, and vulnerary; but its virtues are but little known in medicine: its chief uſe is in lamps, &c. on account of its inflammability.

The Turks call the *naphtha*, *carah ſakiz*, *black maſtic*, to diſtinguiſh it from pitch. Voſſius has an expreſs treatiſe on *naphtha*, ancient and modern: he ſays it is a flour of bitumen, and of more virtue than any other bitumen.

Naphtha has much the ſame medical virtues with PETROLEUM, only in a more remiſs degree. In Perſia, it is uſed externally on many occaſions and alſo given inwardly in colics, a few drops being the doſe.

NAPIER'S or NEPER's *bones*. See NEPER's *bones*.

NAPLES *yellow*, the common name in the colour-ſhops of London, and among our painters, for the ſubſtance called GIALLOLINO.

NAPUS, *navew*, in *Botany*, a ſpecies of the *braſſica*, or CABBAGE, of which there are two varieties, viz. the garden, or ſweet *navew*, and the wild *navew*, or rape.

The roots of the garden *navew* are warmer and more grateful than thoſe of the common turnep, and are ſaid to afford, in their decoction, a liquor beneficial in diſorders of the breaſt; as coughs, aſthmas, and conſumptions.

The ſeeds are roundiſh, of a reddiſh colour, and of an acrid and biting taſte. They are counted deterſive, inciſive, aperitive, and digeſtive, and ſaid to be good in malignant fevers, and the ſmall-pox, and are an ingredient in the Venice treacle. In their quality they nearly reſemble muſtard-ſeed, to which they are inferior. See COLE-*ſeed*.

Nape, or *rape-oil*, is made from the ſeed of the *napus ſylveſtris lobelli*, which grows on dry banks, among corn, often called NAVETTE, and the oil *navetta oil*.

NAPUS, in *Natural Hiſtory*, a name given to the ſpecies of *voluta*, approaching to the nature of the famous admiral-ſhell, and more commonly known by the name of the *falſe admiral*, or *baſtard* ADMIRAL.

NAPUT, in *Botany*, the name given by the Norwegians to a plant whoſe root is an excellent remedy for the colic. It grows plentifully in the northern parts of Norway, and is the conſtant remedy uſed by the miners for their colics, which are particularly ſevere. The taſte is ſaid to be agreeable, being at firſt chewing ſomewhat like a raddiſh, but afterwards having the flavour of the garden angelica. Phil. Tranſ. N° 114.

MARCAPHTHON, in the *Materia Medica*, the name given by many to the bark called CASCARILLA.

MARCE, ναρκη, atorpor, ſtupor, or dullneſs of ſenſation uſed either for a natural ſtupidity, or for that ſtupefaction of the ſenſes brought on by medicines, to alleviate the violence of pains.

MARCISSITES, in *Natural Hiſtory*, a name given by ſome authors to a ſpecies ASTEROPODIUM, from its ſuppoſed reſemblance to the flowers of the narciſſus; others have called ſome of the coralloide funguſes by that name, and others a ſpecies of echinites of the pileated kind.

It is, however, a name that none of them have any title to, ſince the reſemblance will appear very ſmall when nicely conſidered.

NARCISSOLEUCOIUM, in *Botany*. See SNOW-*drop*.

NARCISSUS, the *daffodil*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flowers are included in an oblong compreſſed ſpatha, or ſheath, which tears open on the ſide, and withers; the flowers have a cylindrical funnel ſhaped empalement of one leaf, which is ſpread open at the brim; they have ſix oval petals on the outſide of the nectarium, which are inſerted above their baſe, and ſix awl-ſhaped ſtamina fixed to the tube of the nectarium, terminated by oblong ſummits; they have a three-cornered, roundiſh, obtuſe germen, ſituated below the flower, which afterwards turns to an obtuſe, roundiſh, three-cornered capſule, with three cells filled with globular ſeeds.

Linnæus reckons thirteen ſpecies, and Miller nine, comprehending a great number of varieties, which are much eſteemed for their ſtrong ſweet ſcent; though it often proves too ſtrong for ſome conſtitutions, and ſhould not therefore be planted too cloſe to habitations, nor the flowers be placed in rooms where company is entertained.

The common ſorts of daffodil are generally placed in borders, where they afford an agreeable variety with other bulbous-rooted flowers. They are hardy, and will thrive in almoſt any ſoil or ſituation.

NARCOS, in *Ichthyology*, a name given by Joannes Cuba, and other writers, to the TORPEDO, or cramp-fiſh; a ſpecies of raia, diſtinguiſhed by Artedi by the name of the *raia tota lævis*, the wholly ſmooth raia.

NARCOSIS, a ſtupefaction or inſenſible ſtate, whether brought on by medicines, or happening from natural cauſes.

NARCOTICS, from the Greek ναρκωτικος, of ναρκωσις, *drowſineſs*, in *Medicine*, opiates, or medicines that excite drowſineſs and ſleep. See OPIATE.

Narcotics, called alſo *hypnotics*, and *ſoporifics*, act by calming and diminiſhing the motion of the blood and ſpirits.

Authors are of various opinions as to the manner wherein *narcotics* operate: the ancients tell us, it is by their being cold in nature, whereby they ſtupify and deaden the ſenſe. Etmuller, after Wallis, takes the animal ſpirits to be compoſed of a fluid, volatile ſalt; and thinks they are diſſolved by the mixture of ſulphurs and oils, wherewith *narcotics* abound. Mr. Andry's opinion is, that the ſalt of *narcotics* diſſolves in any liquor whatever; and that their ramous branches, becoming thus diſengaged from the ſalts, are embarraſſed among one another, and thus ſtop the courſe of the blood and ſpirits. Others think, that *narcotics* cloſe the orifices of the nerves, and thus block up the paſſage of the ſpirits. Laſtly, Linden, in his treatiſe de Venenis, thinks, that the operation of *narcotics* is not the ſame in all; drowſineſs being producible from a great variety of different cauſes. See SLEEP.

In diſorders of the ſtomach and inteſtines, all things which induce a ſtupor are very cautiouſly, or never at all, to be exhibited; becauſe no kind of medicines is ſo pernicious and injurious to the tone and motion of the nervous parts. To preſerve health, and prevent diſeaſes, nothing is ſo effectual as to maintain the tone, ſtrength, and motion of what they call the *primæ viæ*, or firſt paſſages, becauſe that moſt ſalutary excretion which is performed by ſtool and diſcharges the ſordes, which are the recrements remaining after digeſtion, or are collected from all parts of the body, depends chiefly thereon. Where this evacuation is ſuppreſſed, or elſe performed after a ſlow and remiſs manner, a deluge of vicious humours is ſoon collected, and becomes the cauſe, as well as fomenter, of diſeaſes. Now there is nothing which ſo effectually diminiſhes the periſtaltic motion of the inteſtines, and ſuppreſſes inteſtinal excretion, as ſedatives and anodynes, the truth of which is atteſted by experience; for as all remedies, ſo eſpecially thoſe which are of a draſtic quality, exert their efficacy firſt and principally upon the ſtomach and inteſtines.

NARDINUM *unguentum, ointment of ſpikenard,* an ointment greatly celebrated among the ancient writers in medicine. It ſeems to have been variouſly prepared, but always with a great number of aromatic ingredients, and always with *ſpikenard* for the baſis.

Dioſcorides ſays, that the *malabathrum,* or Indian leaf, was ſometimes an ingredient in it, but that it was alſo ſometimes made without it. It was generally, however, mixed with the *olium balaninum,* or *amphacinum,* inſpiſſated with an addition of ſchænanth; and to increaſe its fragrancy there were added, coſtus, amomum, myrrh, and balm of Gilead.

The fineſt was accounted that which was of a thin conſiſtence, and very fragrant ſmell. It was ſaid to be attenuating and deterſive, but ſomewhat acrimonious; and was ſometimes, for particular uſes, reduced to a ſolid conſiſtence with reſin.

NARDUS, in *Botany.* See SPIKENARD.

NARDUS *ruſtica,* in *Botany,* a name attributed by ſome authors to the *aſarabacca,* and by others to the *baccharis Monſpelienſium.*

NARES *piſcium.* The noſtrils in fiſh are placed ſo very variouſly, and have ſo many differences in number, figure, ſituation and proportion, that they make a very eſſential ſeries of characters, for diſtinguiſhing the genera and ſpecies one from another. In regard to number: 1 Some fiſh have them not at all, as the petromyzum. 2. Many fiſh have one *noſtril* on each ſide, placed in the manner of thoſe of birds and of quadrupeds, as the chonepterus, &c. 3. Many have them placed two on each ſide, as the cyprini, percæ, &c.

In regard to figure, they are, 1. In ſome round, as all four are in the gadi, and the two anterior ones in the conger, mackrel, &c. 2. Some are oval as the poſterior pair in the conger, &c. And, 3. Many are oblong.

As to their ſituation, they alſo differ much. 1. Some are placed very near the ſnout or roſtrum, as the clupeæ; and the anterior tubuloſe foramina, in the conger or ſea-eel are alſo of this kind. 2. In many kinds of fiſh they are placed near the eyes, as in the pike, the pearch, and the like. And, 3. In ſome they are placed as it were at a middle diſtance between the eyes and the end of the ſnout, as in the ammodytæ, or ſand-eels, &c.

The *nares* of fiſh differ alſo in proportion: in thoſe fiſhes which have two pairs of theſe holes, they are, 1. In ſome very near one another, ſo as almoſt to touch: they are thus placed in the cyprinus and clupeæ, &c. 2. They are placed at great diſtances, which is the caſe in the conger, the pearch, and many others. According to theſe variations, the *noſtrils,* though a part in general very little attended to, yet become of notable uſe in diſtinguiſhing the ſpecies. Artedi.

NARIFUSORIA, a name given by authors to ſuch medicines as were meant to be inſtilled into the noſtrils, for diſorders of the head and eyes.

NARINARI, the Braſilian name of a fiſh of the *aquila marina* kind, called by the Dutch *piiſtert* and *ſcicle.*

It is very large and flat, and the figure of its body is nearly triangular, its ſides or wings being very broad, and large; the head is very large, and has a furrow down its middle; the mouth is ſomewhat triangular, but rounded at the corners; it has no teeth; but in the place of them has a bone in the under part of its mouth in the ſhape of a tongue, of four fingers long, and a finger and a half broad, and a ſmaller bone of the ſame ſhape in the upper part; between theſe it cruſhes its prey; the body is uſually a foot and a half long, and the tail four feet; its fleſh is finely flavoured.

The bones of this and the like fiſhes mouths, are the foſſile *ſiliqueſtra.*

NARIS *externus alius,* in *Anatomy,* a name given by Riolanus to one of the muſcles of the noſe, the uſe of which, he ſays, is to dilate the ala of the noſe, without any elevation of the noſe itſelf. It is called by Albinus the *compreſſor naris,* and by Winſlow the *tranſverſalis,* or *inferior naſi.* Cowper calls it the *elevator alæ naſi,* and Santorini the *tranverſus naſi.*

NARONICÆ *radix,* in the *Materia Medica,* a name given by ſome authors to the IRIS root.

NARRATION, in *Oratory* and *Hiſtory,* a recital, or rehearſal of a fact as it happened, or as it is ſuppoſed to have happened.

Narration is of two kinds: either *ſimple,* and *hiſtorical;* as where the auditor or reader is ſuppoſed to hear or read of a tranſaction at ſecond-hand: or *artificial* and *fabulous;* as where their imaginations are raiſed, and the action is, as it were, re-acted before them.

The *narration,* according to the writers of rhetoric, makes the ſecond part of a juſt ſpeech, or harangue; viz. that immediately following the exordium. It makes the whole of a hiſtory; abating for the occaſional reflections, epiſodes, and digreſſions.

Cicero, Orat. Part. c. 9. requires four properties in a good *narration;* viz. perſpicuity, probability, brevity, and ſweetneſs.

The *narration* is rendered perſpicuous, by obſerving the order of time, by uſing none but proper and known terms, with ſhort, though full and explicit ſentences, joined by proper particles, ſhewing their connection and dependence, and by reciting the action uninterruptedly, and with ſuitable tranſitions.

It is rendered probable by the credibility of the narrator, by the ſimplicity and openneſs of the *narration,* by avoiding every thing far remote from the common ſenſe and opinion of mankind, and by a preciſe detail of circumſtances.

It is rendered brief, by taking it up no higher than is juſt neceſſary; nor fetching it back, as that impertinent author in Horace, *Qui gemino bellum Trojanum orditur ab ovo;* and by avoiding trivial circumſtances.

Laſtly, it is rendered ſweet, pleaſant, or entertaining, by uſing ſmooth, numerous, and well-ſounding words; by arranging them ſo as to avoid any hiatus, or claſhing; by the greatneſs, novelty, and unexpectedneſs of the things related; and by enriching it with tropes and figures; as, frequent admirations, exclamations, interrogations, expectations, ſuſpenſes, ſurpriſing events, by grief, joy, fear, &c. See NUMBERS, CADENCE, and TROPE.

NARRATION, in *Poetry,* is uſed more particularly for the action, or event, that makes the ſubject of an epic poem.

F. Boſſu obſerves, that the actions in poetry are equally ſuſceptible of the two kinds of oratorial *narration,* and that each conſtitutes a particular ſpecies of poetry.

Thoſe under the artificial or active form, are now called *dramatic.*

And thoſe only related by the poet, who here perſonates an hiſtorian, are called *epic.*

In the drama, the *narration* is the whole of the piece; in the epopœa, it is only a part, though in effect it is the principal part, and the main body of the poem. It is preceded by the propoſition and invocation, which Boſſu calls the preludes; and is frequently interrupted by the poet's ſpeaking in perſon, demanding pardon, favour, &c.

The *narration* includes the whole action, epiſodiſed, with all its circumſtances and its ornaments.

It is in this part that the action is to be begun, carried on, and ended. It is this, which is to ſhew the cauſes of all that is related: in this the difficulties are to be propoſed and reſolved, and the perſons, both human and divine, are here to ſhew their intereſts, their manners, and their qualities, by their actions, and their diſcourſe; and all this is to be deſcribed with the beauty, the majeſty, and force of verſe, ſtyle, ſentiments, compariſon, and other ornaments proper to the ſubject in general, and to each thing in particular.

The qualities of the epic *narration* are, that it be agreeable, probable, moving, ſurpriſing, and active.

Horace ſpeaks of the utile and dulce as on the ſame footing.

Boſſu looks on the utile as an eſſential property; and the dulce as no more than an additional quality.

NARROW, in the *Manege.* A horſe is ſaid to *narrow,* when he does not take ground enough, or does not bear far enough out to one hand or to the other. If your horſe *narrows,* you muſt aſſiſt him with the inſide rein, that is, you muſt carry your hand to the outſide, and preſs him forward upon ſtraight lines with the calves of your legs.

NARROW is alſo a term among bowlers. See BOWLING.

NARWAL, a name given to a fiſh of the whale kind, more frequently called the *ſea-*UNICORN.

NASAL, ſomething belonging to the noſe, *naſus.* As, the noſe-piece of a helmet, anciently called the *naſale.*

NASAL, in *Grammar,* &c. is applied to thoſe ſounds, or letters, in whoſe formation the noſe is the principal organ; and particularly where the ſound formed is paſſed through the noſe.

In moſt Engliſh words, the ſounds expreſſed by the characters *an, en, in, on, un,* are ſimple ſounds, and proper *naſal* vowels. See M, N, &c.

NASALIA, in *Medicine,* a ſort of remedies to be taken by the noſe; called alſo ERRHINES.

NASAMMONITES, in *Natural Hiſtory,* a name given by the ancients to a ſtone, which Pliny deſcribes to have been of a blood-colour variegated with veins of black. We know no ſtone which anſwers to this character at preſent, unleſs it be ſome of the agates, in a variegated ſtate.

NASCALE, a ſort of peſſary, made of wool, cotton, or the like, and introduced into the vagina, after being impregnated with proper ingredients.

NASDA, a word uſed by ſome medical writers for *naphtha*, and ſeemingly a corruption of that word.

NASEBERRY-*tree*, in *Botany*. See *Star*-APPLE.

NASI *os*, in *Anatomy*, a thin bone, making the upper part of the NOSE.

NASITAS, a word uſed by ſome authors to expreſs a ſpeaking through the noſe.

NASTOS, in *Botany*, a name by which Cluſius and ſome other authors have called the reed, of which the common walking canes are made, which is the *arundo farcta* of other writers.

NASTURTIUM, in *Botany*. See CRESSES.

NASTURTIUM *aquaticum*. See MINT.

NASTURTIUM *Indicum*. See *Indian* CRESSES.

NASUS, in *Ichthyology*, the name of a freſh-water fiſh, common in the Rhine, the Danube, and moſt of the large rivers in Germany, though unknown in England, and called by different authors the *ſimus*, *ſavetta*, and *platyrynchos*. Its general ſize is between ſix and twelve inches in length; in ſhape and colour it much reſembles our chub. It is a looſe and inſipid taſted fiſh, and very full of bones: they ſpawn in May, at which time the males are rougher than at any other ſeaſon, and have their heads ſpeckled with white ſpots, like the Engliſh rudd. At this time alſo they ſwim together in immenſe ſhoals, and the fiſhermen have ſometimes caught two or three thouſand of them in one night.

NATALIS, NATALIS *dies*, or NATALITIUM, properly ſignifies a man's birth-day. See NATIVITY.

The word was firſt uſed among the heathens, to ſignify the feaſt held on the anniverſary of the birth-day of an emperor; whence it came, in time, to ſignify any ſort of feaſt. And accordingly, in the Faſti, we meet with *natalis ſolis*, *natalis invicti*, &c.

The primitive Chriſtians, finding the word thus eſtabliſhed, uſed it in the ſame manner; and hence we meet in the ancient martyrologiſts with *natalis calycis*, for the feaſt of the ſupper, or Maundy-Thurſday; *natalis cathedræ*, for the pontificate of St. Peter; *natalis* or *natalitium*, of ſuch a church, for the feaſt of the dedication.

The word *genethlion* is uſed by the Greeks in the ſame ſenſe as *natalis*, or *natalitium*, among the Latins.

NATALITII, *ludi*, NATAL *games*, were games introduced on the aniverſaries of the birth-days of great men.

NATAL *ring*, *annulus* NATALITIUS, was a ring only worn on the birth-day.

NATANT *leaf*, in *Botany*. See LEAF.

NATES, in *Anatomy*, a term expreſſing thoſe two fleſhy poſterior parts of the body, popularly called the *buttocks*; by the Latins *clunes*, or *nates*.

NATES *cerebri*, are two circular protuberances of the BRAIN, ſituate on the back-ſide of the MEDULLA *oblongata*, near the cerebellum.

NATION, a collective term, uſed for a conſiderable people, inhabiting a certain extent of ground, incloſed within fixed limits, and under the ſame government.

Each *nation* has its peculiar character; and it is proverbially ſaid, *Light as a Frenchman*, *Waggiſh as an Italian*, *Grave as a Spaniard*, *Serious as an Engliſhman*, *Fierce as a Scotchman*, *Drunken as a German*, *Idle as an Iriſhman*, *Deceitful as a Greek*, &c.

NATION is alſo uſed, in ſome univerſities, for a diſtinction of the ſcholars, and profeſſors of colleges.

The faculty of Paris conſiſts of four *nations*; viz. that of France, that of Normandy, that of Picardy, and that of Germany; which are again, excepting that of Normandy, diſtinguiſhed into tribes; and each tribe has its deacon. The German *nation* comprehends all foreign *nations*, Engliſh, Italian, &c.

When the procureur of the French *nation* ſpeaks in public, his ſtyle is, *Honoranda Gallorum natio*; he of Picardy ſays, *Fideliſſima Pacardorum natio*; he of Normandy, *Veneranda Normannorum natio*; he of the *nation* of Germany, *Conſtantiſſima Germanorum natio*.

NATIONS, *law of*. See LAW.

NATIONAL *debt*, is the debt due by the ſtate to the public, on account of monies borrowed and funded for defraying the charges of government.

In order to trace the origin of this debt, it is proper to be conſidered, that after the Revolution, when our connections with Europe introduced a new ſyſtem of foreign politics, the expences of the nation, not only in ſettling the new eſtabliſhment, but in maintaining long wars, as principals on the continent, for the ſecurity of the Dutch barrier, reducing the Erench monarchy, ſettling the Spaniſh ſucceſſion, ſupporting the houſe of Auſtria, maintaining the liberties of the Germanic body, and other purpoſes, increaſed to an unuſual degree; inſomuch that it was not thought adviſeable to raiſe all the expences of any one year by taxes to be levied within that year, leſt the unaccuſtomed weight of them ſhould create murmurs among the people. It was, therefore, the policy of the times to anticipate the revenues of their poſterity, by borrowing immenſe ſums for the current ſervice of the ſtate, and to lay no more taxes upon the ſubject than would ſuffice to pay the annual intereſt of the ſums ſo borrowed; by this means converting the principal debt into a new ſpecies of property, transferable from one man to another at any time, and in any quantity; a ſyſtem which ſeems to have had its origin in the ſtate of Florence, A. D. 1344. which government then owed about 60,000*l.* ſterling; and being unable to pay it, formed the principal into an aggregate ſum, called metaphorically a mount or bank, the ſhares whereof were transferable like our ſtocks, with intereſt at 5 *per cent.* the prices varying according to the exigencies of the ſtate. This laid the foundation of what is called the *national debt*; for a few long annuities created in the reign of Charles II. will hardly deſerve that name. And the example then ſet has been ſo cloſely followed during the long wars in the reign of queen Anne, and ſince, that the capital of the *national debt* (including a valuation of the long and ſhort and life-annuities, and the unfunded debt) amounted in 1781, to at leaſt two hundred and eighteen millions, to pay the intereſt of which, and the charges for management, amounting annually to upwards of ſeven millions and a half, the extraordinary revenues mentioned under the article REVENUE (excepting only the land-tax, and annual malt-tax) are in the firſt place mortgaged, and made perpetual by parliament; but ſtill redeemable by the ſame authority that impoſed them; which, if it at any time can pay off the capital, will aboliſh thoſe taxes, which are raiſed to diſcharge the intereſt. See FUND. Blackſt. Comm. book i. p. 326.

NATIONAL *ſynod*. See SYNOD, and COUNCIL.

NATIVE is applied to a perſon conſidered as born in a certain place, or deriving his origin from it.

The more accurate writers diſtinguiſh between a native of a place and one born there. Born ſignifies no more than the having been there produced, or brought into the world, whether that were the proper country or habitation of the parents, or whether they were there only by accident, as ſtrangers, &c. Whereas *native* refers to the proper manſion or reſidence of the parents, and the family, and where the perſon has his education.

And hence a perſon may be a *native* of one place, and born at another: Thus Jeſus Chriſt is called a Nazarite, and Galilæan, as a *native*, though he was born at Bethlehem in Judah.

NATIVE, *nativus*, in our *Ancient Law Books*, ſignified a perſon who was born a ſlave or villain.

By which he differed from one who had ſold himſelf, or became a ſlave by his own deed, who was called a *bondman*. See VILLAIN.

NATIVI *tenentes*, in our *Old Law Books*, are thoſe freemen who hold *native* land; i. e. land ſubject to the ſervices of *natives*. Spelm.

NATIVI *de ſtirpite*, were villains or bond-men by birth or family. There were alſo *nativi conventionarii*, who were villains by contract or covenant. *Servi enim alii natura*, *alii facti*, *alii emptione*, *alii redemptione*, *alii ſua vel alterius datione*. LL. Hen. I. cap. 76.

In Cornwall it was a cuſtom, that if a freeman married *nativam* (that is, a neif) and brought her *ad liberum tenementum*, *&* *liberum thorum*, and had two daughters, one of them was free, and the other a villain. Bract. lib. iv. cap. 21. See NEIF.

NATIVITY, *nativitas*, or *natal day*; the day of one's birth.

The term is chiefly uſed in ſpeaking of ſaints, &c. The *Nativity* of St. John Baptiſt, celebrated in the Romiſh church with great ſolemnity on the twenty-fourth of June; the *Nativity* of the Holy Virgin, a feaſt eſtabliſhed by pope Sergius I. who was advanced to the ſee of Rome in 687, and obſerved on the eighth of September, &c. When we ſay abſolutely the *Nativity*, it is underſtood of that of Jeſus Chriſt, or the feaſt of Chriſtmas. See FEAST, CHRISTMAS, &c.

NATIVITY, *nativitas*, in *Ancient Law Books*, ſignifies bondage, or ſervitude.

NATIVITY, in *Aſtrology*, the theme or figure of the heavens, and particularly of the twelve houſes, at the moment when a perſon was born; called alſo the HOROSCOPE.

Caſting the *nativity*, or by calculation ſeeking to know how long the queen ſhould live, &c. was made felony, anno 23 Eliz. c. 2.

NATIVO *habendo*, in *Law*, a writ directed to the ſheriff, for a lord who claimed inheritance in any villain, when his villain was run away from him, for the apprehending and reſtoring him to the lord.

NATIX, in *Natural Hiſtory*, a name given by ſome old writers to the *nerita*.

NATRIX, in *Botany*, the name given by Rivinus to a genus of plants, nearly allied to the anonis, and comprehended with it in one genus by Linnæus, under the name of anonis. See REST-*harrow*.

NATRIX, in *Zoology*, the name of the common or water-ſnake, called alſo *torquata*, from the ring about its neck.

It is much longer and larger than the viper, and is no water-animal, properly ſpeaking, but a land one, which being able to ſwim very well, often takes the water to hunt about for frogs, which are its principal food. It grows to be much longer and larger than the viper, and does not bring forth live young ones, but great numbers of eggs, which it lays in dunghills to be hatched by the warmth of the place, or by the heat of the ſun.

It is very common in buſhy places, and near waters, and in winter finds holes in the banks of ditches, or about the roots of trees, where it lies torpid the whole winter. It has no poiſon, and may be ſafely taken up and played with, never ſo much as attempting to bite. It feeds on many ſmall inſects, ſometimes on vegetable ſubſtances, and oftener on frogs, mice, &c.

Its back is of a ſort of duſky earth-colour, and its belly variegated with a black and a bluiſh white, but near the head almoſt wholly white, having only a few ſmall ſpots of black at the ſides, the colour growing darker toward the end of the tail; and near the end, the middle part of all the ſcales is black, and their extremities only of a bluiſh white; the whole belly is covered with long parallel ſcales, placed tranſverſely. The back and ſides are covered with ſmall ſcales, and are variegated with ſeveral ſtreaks and ſpots of black; there are more than eighty tranſverſe black lines running from the back to the ſides, and beſide theſe, two other rows of ſmaller, in form of ſpots, near the middle of the back; the head is covered with large ſcales of a duſkier colour than thoſe of the reſt of the body, and the upper jaw is white on each ſide, with four or five ſlight lines of black running acroſs it; its chain is yellow, and is compoſed of two large ſpots of that colour, placed one on each ſide of the neck, or at each angle of the jaws, between which is placed a large triangular ſpot of a deep black, with its top directed toward the tail; it has none of thoſe long canine teeth of the viper and other poiſonous ſerpents, by means of which the poiſon is conveyed into the wound, but only two rows of ſmall ſerrated teeth, deſtined by nature for no other uſe than eating its food.

It may not be judged improper to have been thus particular in the deſcription of this ſpecies, as it is well to know what of the ſnake kind are, and what are not to be feared; and as the apothecaries and others, for want of theſe characters, often buy this common ſnake under the name of the viper. Ray.

NATRON, or **ANATRON**, in *Natural Hiſtory*, a browniſh kind of ſalt, taken out of a lake of ſtagnant water, in the deſert of Nitria, in Egypt.

It is much of the nature of nitre; whence it is by many called *Egyptian nitre*, and is ſuppoſed to be the proper nitre of the ancients.

The lake whence it is obtained, is ſix or ſeven acres in extent, and lies about thirty miles weſt-and-by-ſouth from Terana, and about the ſame diſtance north from the pyramids: from the bottom of this lake the ſalt called *natrum* ariſes to the ſurface of the water, and is there condenſed, by the heat of the ſun, into the hard and dry form in which it is ſold.

If four ounces of the water of the *natron* be examined by evaporation in a glaſs veſſel, placed in a ſand-heat, there will ariſe, as ſoon as it becomes warm, a ſort of ſcum to the top; this being taken off, another inſtantly ſucceeds, and ſo on, ſo long as any water remains in the glaſs.

The ſalt, thus ſcummed off, is the ſame in all reſpects with the *natrum*, or the Smyrna ſoap earth; being a fixed alkali, fermenting with acids, and boiling into ſoap with oil. This icy ſcum is the ſame as that called by Pliny *flos ſalis*, and ſeems to be the ſame with that which Herodotus ſays the Egyptians made uſe of in the preparations of their mummies. The ancients have attributed great virtues to the ſalt of this lake; and this being called *nitrum*, as a ſhort name for *nitrium ſal*, we have had ſome who have ſuppoſed the ſalt which we call *nitre*, to be the ſame, and theſe people have wondered that they did not find the ſame virtues in our *nitre*.

The mineral waters of all parts of the world ſeem to contain more or leſs of this ſalt, and to owe their virtues in a great degree to it; and, probably, it might be no ſmall improvement to phyſic, to bring it more into the preſent practice. Molenbroch recommends it greatly in the ſtone; and it may be the more probably uſed, as all alkali ſalts are known to be good in that diſtemper. Some add to this, that it ſeems qualified to diſſolve ſtony ſubſtances, it being of ſo piercing and penetrating a ſpirit, that no rock, or ſtone, is found about the lake from the waters of which it is procured. Phil Tranſ. N° 160.

We learn from the account of the Voyages to the South Seas, publiſhed by Dr. Hawkeſworth, that this ſalt, which is thought to be the true *natrum*, or nitrum of the ancients, is found in large quantities on the top of the mountain Teneriffe.

It is uſed in the whitening of linen; but it burns them, if not corrected by a mixture of aſhes.

The *natron* of Egypt, as deſcribed by Pliny, Matthiolus, and Agricola, is an alkali ſalt perforated in manner of a ſponge, and of a lixivial taſte.

Its principles Dr. Leigh takes to be chiefly two; viz. a ſea-ſalt, and an urinous ſalt.

The firſt, he takes it for granted, it receives from the earth; the ſecond, from air.

Dr. Huntington, who was on the ſpot, ſays the *natron* is thought to riſe from the bottom of the lake; where, by the heat of the ſun, it is condenſed, and hardened into the form we ſee it in; but his opinion is, that it is rather ſeparated by the ſun from the water.

M. de la Chambre adds, that three or four days before the Nile begins to overflow, there falls a certain dew, of a fermentative virtue, inſomuch as to leaven a paſte expoſed to it; and that at the ſame time the *natron* riſes.

Hippocrates, Galen, Matthiolus, Dioſcorides, &c. mention it as of uſe in phyſic; and M. de Clos is even of opinion, all the mineral waters of France are impregnated with this kind of nitre; and that it is hence they derive their medicinal virtues.

It is of ſingular efficacy in fertilizing of ground; which Dr. Leigh accounts for, by ſuppoſing its volatile particles heated by ſome ſubterraneous fire, or by the warmth of the ſun; and thus readily made to aſcend up the minute tubes of plants, and carry with them the juices of the earth.

This nitre is diſtinguiſhed from the common nitre, or ſaltpetre, by its fermenting with acids, which ſaltpetre will not do; by its volatile ſpirit, by its lixivial ſmell, and the clammy inſipid ſubſtance it yields, &c. It agrees with ſaltpetre, in that, by dropping ſpirit of ſulphur upon it, it ſhoots into pyramidal cryſtals. Dr. Leigh thinks it comes nearer ſal ammoniac than ſaltpetre.

It is naturally of a duſky white; but is ſometimes found of a brown colour, and ſometimes of a fine deep red. This is its pureſt ſtate; but beſides this, it is frequently found in form of powder mixed with dirt, and ariſing in little hillocks on the ſurface of the ground. It is of an acrimonious pungent taſte, and is more like the alkaline ſalts produced by burning vegetables than any of the native ſalts. It diſſolves in a very ſmall quantity of water, and ferments violently with aqua fortis, or any other weaker acid menſtruum.

It is found in great plenty in Sindy, a province in the inner part of Aſia, and in many other parts of the Eaſt, and might be had in any quantities. Perhaps it would be worth conſidering as a branch of commerce, as it would ſupply the place of pot-aſhes in the making ſoap and glaſs, as the ſame author has tried.

The characters recorded of the *nitre* of the ancients are, 1. That it would ferment with vinegar; and, 2. That it had an abſterſive quality. Theſe we have from the ſcriptures, and the reſt were, that it was of an acid taſte; that it was found native in the eaſtern part of the world; that it ſerved in the place of ſoap; and that with ſand it would make glaſs. All theſe properties this ſalt has; and it may be added, that no other native ſalt has them. Hill's Hiſt. of Foſſ. p 386 to 389.

It is a very remarkable property of this ſalt, that though in itſelf an alkali, and fermenting very violently with acids in its native dry ſtate, yet in ſolution it does not ferment with them at all. If indeed oil of vitriol, or ſome other acid, be added to the ſolution of *natrum* while turbid, that is, while ſome of the particles of the ſalt remain yet whole in it, the two liquors will ferment violently; but if the ſolution be ſet by till wholly clear, the ſame acid will cauſe no efferveſcence in it; but the ſame ſolution, evaporated to a third part will again ferment with that or any other acid, the particles of the ſalt at that time being got together again, and meeting the acid as in their ſolid form.

This ſalt contains a volatile alkali, abſorbed from the air, and embodied in it. Its other principle ſeems a marine ſalt, which it may receive either from the earth, or from ſalt ſprings, or ſea water, according to the different places where it is found.

NATTA, or **NATA**, alſo written *naſa*, *naſda*, and *napta*, in *Surgery*, a large fleſhy excreſcence or tumor ariſing in ſeveral parts of the body.

Blancard defines it, a large, ſoft, painleſs, colourleſs tumor, ariſing uſually on the back, ſometimes on the ſhoulders and other parts. Its root is very ſmall; yet it grows ſo prodigiouſly, that it ſometimes equals a melon, or gourd.

Nattæ ofteneſt appear on the neck, much after the manner of talpæ.

They are of the œdematous kind, and are to be extirpated by inciſion, and their return prevented by red precipitate vitriol, or burnt alum, ſtrewed on the place.

Bartholine mentions a lady, who cured herſelf of a *natta* by biting it off.

NATTER *jack*, RANA *rubeta* of Linnæus, in *Zoology*. See TOAD.

NATURAL, ſomething that relates to nature; that ariſes from a principle of nature; or is conformable to the ordinary courſe and order of nature.

When a ſtone falls downwards, we vulgarly ſay it does it by a *natural* motion; but if it be thrown upwards, its motion is ſaid to be violent.

Water ſuſpended in a ſucking pump is ſaid to be out of its *natural* place: cures wrought by medicines, are *natural* operations; but the miraculous ones wrought by Chriſt, *ſupernatural*. See MIRACLE, &c.

NATURAL *cauſe*. See CAUSE.

NATURAL *children*, are thoſe born out of lawful wedlock. See BASTARD.

NATURAL *day*. See DAY.

NATURAL *year*. See YEAR.

NATURAL *faculty*. See FACULTY.

Quincy defines *natural faculty* to be that power ariſing from the blood's circulation, which is conſpicuous in all the ſecretions performed within the body; that ſecretion alone excepted, which is made at the origin of the nerves.

NATURAL *functions*, in the *Animal Oeconomy*. See FUNCTIONS.

NATURAL *hiſtory*, a deſcription of the natural products of the earth, water, or air; v. gr. beaſts, birds, fiſh, metals, minerals, and foſſils; together with ſuch extraordinary phenomena as at any time appear in the material world; as meteors, monſters, &c.

Beſides *General Natural Hiſtories*, as thoſe of Pliny, &c. there are *particular* ones: and thoſe of two kinds. The firſt, thoſe which only conſider one kind of things; ſuch as the Hiſtory of Shells, by Dr. Liſter; of Fiſhes, by Willughby; that of Birds, by the ſame; that of Plants, by Ray; thoſe of Inſects, by Swammerdam, and Mouffet; that of Animals, by Geſner; that of Foſſils, by Agricola, Mercatus, &c.

The ſecond, thoſe which conſider the ſeveral kinds of natural things found in particular countries, or provinces: as the *Natural Hiſtory* of Dauphiné, by Chorier; the *Natural Hiſtory* of the Antilles, by F. Du Tertre, and M. Lonvillers De Poincy; thoſe of Oxfordſhire, and Staffordſhire, by Dr. Plott; that of Lancaſhire, by Leigh; of Northamptonſhire, by Morton; that of the Weſtern Iſlands, by Martin, &c.

The *natural hiſtory* only of one particular place, is a ſubject very extenſive in its materials, and not to be ſet about without great care and circumſpection. Mr. Boyle has favoured the world with a liſt of the heads under which to arrange things, and what to enquire after on ſuch an occaſion.

The general heads under which he comprehends the articles of this hiſtory are four; the things which regard the heavens, the air, the waters, and the earth.

Of the firſt claſs are the longitude and latitude of the place; the length of the longeſt and ſhorteſt days and nights; the climates, parallels, &c. what fixed ſtars are ſeen, and what are not ſeen there.

About the air may be obſerved, its temperature, as to the firſt four qualities, and the meaſure of them; its weight, clearneſs, refractive power; its ſubtlety or coarſeneſs; its abounding with or wanting an eſurine ſalt: its variations according to the ſeaſons of the year, and the times of the day: what duration the ſeveral kinds of weather uſually have: what meteors it is moſt or leaſt apt to breed; and in what order they are generated, and how long they generally laſt: what winds it is moſt ſubject to; whether any of them ſtated or ordinary: what diſeaſes are ſaid to be epidemical, or depending on the ſtate and condition of the air: what other diſeaſe it is ſubject to, wherein the air may be ſuppoſed to have ſome ſhare: what is the uſual ſalubrity and inſalubrity of it, and what ſorts of conſtitutions it agrees with, what it does not.

About the waters, it may be proper to obſerve the ſea, its depth, tides, currents, ſaltneſs, and other qualities: next, the rivers will come under conſideration, their depth, length, courſe, inundation, and the goodneſs or badneſs of their waters, with their gravity, and other peculiar qualities. After theſe, the lakes, ſprings, ponds, &c. are to be conſidered, eſpecially the mineral waters, their kinds, qualities, and virtues, and the manner of trying them. The inhabitants of the waters may follow here; and the particular kinds of fiſh that are found there, whether of the ſea or rivers, are to be mentioned, with an account of their ſtores, bigneſs, goodneſs, ſeaſons of perfection, haunts, peculiarities of any kind relating to them, and the manner of taking them, eſpecially when there is any thing ſingular in it.

The things relating to the earth, are laſt to be examined: theſe are, firſt the earth itſelf, then its inhabitants and its various productions, whether external or internal. In the earth itſelf may be obſerved, its dimenſions, ſituation eaſt, weſt, north, and ſouth: its figure; its plains and valleys, their extent; its hills and mountains and the height of the talleſt, both in reference to the neighbouring valleys and plains, and to the level of the ſea; as alſo whether the mountains lie ſcattered, or are diſpoſed in ridges; and if, of the latter kind, whether they run eaſt, weſt, north, or ſouth. What promontories alſo, and what fiery or ſmoking hills it has, if any: whether the country be coherent, or much broken into iſlands; what the magnetical declination is in ſeveral places, and the variation of that declination in the ſame place; and if thoſe be conſiderable, what may be conjectured as the occaſions of them, whether the vicinity of iron-mines, of ſubterraneous fires, or what elſe. What the nature of the ſoil is, whether clayey, ſandy, or of good mould; and what vegetables, plants, and trees beſt agree with it and ſucceed in it, what worſt. By what particular contrivances the inhabitants improve the advantages, or remedy the diſadvantages of the ſoil; and what hidden qualities the ſoil may have. The inhabitants of the earth are then to be conſidered, both natives, and ſtrangers that have been long ſettled there; and in particular, their ſtature, colour, features, ſtrength, agility, or defects of theſe; and their complexions, hair, beauty, and the like; their diet, inclinations, and cuſtoms, ſo far as they are not owing to education: the fruitfulneſs or barrenneſs of the women; their hard or eaſy labours: the diſeaſes they are moſt ſubject to, and any remarkable ſymptoms attending them.

As to the external productions of the earth, the enquiries are to be theſe: what graſſes, grains, and fruit it beſt produces: the herbs, flowers, and timber trees; and the coppices, groves, foreſts, and woods the country has, or wants: what peculiarities are obſervable in any of them; what ſoils they moſt like or diſlike, and with what culture they thrive beſt. Then what animals the country has or wants; both as to wild beaſts and birds of prey, and as to poultry and cattle of all ſorts; and particularly, if they have any animals that are not common, or any thing particular in thoſe they have. After thoſe, the ſubterranean ſtores are to be examined; what minerals the earth affords, and what it wants: then what quarries of ſtone, and in what manner they lie: what clays and earths are found there; as clays, marles, fuller's earths, earths for tobacco-pipes, earth for potter's wares, medicinal earths: what other mineral productions it yields, whether coals, ſalt mines, or ſalt ſprings, alum, vitriol, ſulphur, &c. What metals the country yields, with a deſcription of the mines of them; their depths, numbers, ſituations, ſigns, waters, damps, quantities of ores, goodneſs of the ores, and the ways in uſe for reducing them to metals.

To theſe general heads ſhould be added, inquiries into traditions in the country, of any thing relating to it, whether peculiar to it, or only more common there than elſewhere; and where theſe require learning or ſkill in the anſwerer, the utmoſt care is to be taken to put the people in a way to give their accounts in a ſatisfactory manner; for a falſe or bad account of any thing is always much worſe than no account at all. Phil. Tranſ. Nº 11.

NATURAL *horizon*, is the ſenſible or phyſical HORIZON.

NATURAL *inclinations*, are thoſe tendencies or motions of the mind, towards things ſeemingly good, which are common in a greater or leſs degree, to all mankind. See APPETITE.

Natural inclination, according to F. Malebranche, is the ſame thing, with regard to minds, that motion is with regard to bodies: and as all the varieties in the material world ariſe from the ſeveral motions of bodies; ſo do all thoſe of the intellectual world from inclinations: and as all motions are the reſult of impreſſions immediately communicated by the finger of the Creator; ſo all inclinations are certainly nothing elſe but continual impreſſions of the will of the Creator on that of the creature; and muſt therefore, of neceſſity, be agreeable to his; and therefore can naturally have no principal end but his glory; nor any ſecondary one but their own preſervation, and that of others, both ſtill with regard to his will, who gave them being.

Now as, properly ſpeaking, there is but one love in God; viz. that of himſelf; ſo he only impreſſes one love or deſire in us; which is of that good in the general. It is this general love, or deſire, is the principle of all our particular ones; as, in effect, it is the will itſelf; the will being defined to be a continual impreſſion of the Author of nature, which carries the mind of man to good in general.

But the impreſſion towards good in the general doth not only proceed from God; but alſo all our inclinations to particular goods; as, v. gr. ſelf-preſervation, &c.

NATURAL *law*. See *Law of* NATURE.

NATURAL *liberty*. See *Civil* LIBERTY.

NATURAL *magic* is that which only makes uſe of natural cauſes. See MAGIC.

NATURAL *philoſophy*, that ſcience which conſiders the powers of nature, the properties of *natural* bodies, and their mutual action on one another: this is otherwiſe called *phyſics*.

NATURAL, in *Heraldry*, is uſed where animals, fruits, flowers, &c. are blazoned with the colours they naturally have, though different from the common colours of heraldry: and this is to prevent the armory's being accuſed of falſity, when blazoned with the names of colours unknown in heraldry.

NATURAL, in *Muſic*, is ſometimes uſed for DIATONIC.

It is alſo applied to a ſong, the notes whereof move eaſily and gracefully, giving the performer as little trouble as poſſible; and when it is not carried too high, or ſunk too low, whereby the voice or inſtrument is in no wiſe forced or ſtrained.

NATURAL is alſo ſometimes uſed for phyſical. In which latter ſenſe, *natural muſic* is that performed by *natural* organs, i. e. vocal muſic; in contradiſtinction to artificial, or inſtrumental. See MUSIC.

Natural muſic is more peculiarly uſed to denote a ſong that proceeds in the *natural* order of the notes, without flats or ſharps.

NATURAL *harmony* is that produced by the natural and eſſential chords of the mode. See HARMONY.

NATURAL *note* is uſed in oppoſition to flat and ſharp notes, which are called *artificial notes*. See NOTE, SCALE, &c. The *natural note* ♮, is uſed to contradict thoſe flats and ſharps that are ſet at the beginning of a ſtaff; and, in ſuch caſe, you muſt take the *natural note* as it is in the gamut.

NATURAL is alſo uſed for ſomething coming immediately out of the hands of nature. In which ſenſe it ſtands oppoſed to factitious or artificial, which ſignifies ſomething wrought by art.

Biſhop Wilkins obſerves, that there appears a world of difference between *natural* and artificial things, when viewed with microſcopes: the firſt ever appear adorned with all imaginable elegance and beauty; the latter, though the moſt curious in their kind, infinitely rude and unhewn. The fineſt needle appears a rough bar of iron, and the moſt accurate engraving, or imboſſment, as if done with a mattock, or trowel.

NATURALIST, a perſon who has ſtudied nature, and is well verſed in natural bodies, eſpecially in what relates to metals, minerals, ſtones, vegetables, and animals.

Ariſtotle, Ælian, Pliny, Solinus, and Theophraſtus, were the greateſt *naturaliſts* among the ancients; but they fell into abundance of errors, which have been corrected by the happy induſtry of the moderns. Aldrovandus is the moſt copious, but not the moſt accurate, of the modern *naturaliſts*: his work is in thirteen volumes in folio. The characters and works of Linnæus are well known.

NATURALIZATION, in *Law*, the act of naturalizing an alien, or putting him into the condition of a natural-born ſubject, and intitling him to the rights and privileges thereof.

In France, *naturalization* is the king's prerogative: in England, it is only done by act of parliament.

But none can be *naturalized*, unleſs they have received the ſacrament within one month before the bringing in of the bill, and taken the oaths of allegiance and ſupremacy in the preſence of the parliament. A perſon who is *naturalized* may have lands by deſcent, as heir at law, as well as obtain them by purchaſe; but he is diſabled from being a member of the privy council, or parliament; or from holding offices, 7 Jac. I. cap. 2. 12 Will. III. cap. 2. All children born out of the king's dominions, whoſe fathers were or are ſubjects of this kingdom at the time of their birth, are adjudged to be natural-born ſubjects of this realm, except children of parents attainted of treaſon, or that are in the actual ſervice of a foreign prince at enmity with us. 4 Geo. II. cap. 21. Every foreign ſeaman who, in time of war, ſerves two years on board an Engliſh ſhip, is, *ipſo facto*, *naturalized*, 13 Geo. II. cap 3. And all foreign Proteſtants and Jews, upon their reſiding ſeven years in any of the American colonies, without being abſent above two months at a time, or ſerving two years in a military capacity there, are, upon the taking the oaths, *naturalized* to all intents and purpoſes, as if they had been born in this kingdom; and therefore are admiſſable to all ſuch privileges, and no other, as Proteſtants or Jews born in this kingdom are intitled to.

In France, Swiſs, Savoyards, and Scots, need not any *naturalization*; being reputed regnicoles, or natives.

NATURALS, *res* NATURALES, in *Medicine*. In every animal, howſoever ſick and diſeaſed, there is ſtill remaining ſome degree of life and ſtrength; and the cauſes and effects of each. Theſe are called *naturals*, natural things, or things according to nature; and ſometimes barely nature; in contradiſtinction to NON-*naturals*

NATURE, NATURA, is a term variouſly uſed. Ariſtotle has a whole chapter wrote expreſly to enumerate the various acceptations of the Greek word φυσις rendered, in Engliſh, *nature*: and among Latin writers, the different, acceptations are ſo many, that a certain author reckons up fourteen or fifteen. Mr. Boyle in a preciſe treatiſe of the vulgarly received notion of *nature*, gives us eight principal ones.

NATURE, then, is ſometimes uſed for the ſyſtem of the world; the machine of the univerſe; or the aſſemblage of all created beings.

In which ſenſe we ſay, the Author of *nature*: the ſun is called the eye of *nature*, becauſe he illuminates the univerſe; and the father of *nature*, becauſe he warms the earth, and make it fruitful. And thus we ſay of the phœnix, or a chimera, that there is no ſuch thing in *nature*.

Inſtead of the word *nature* in this ſenſe, Mr. Boyle, to avoid ambiguity, and abuſe of the word, wiſhes to have WORLD, or *univerſe*, ſubſtituted.

NATURE, in a more confined ſenſe, is applied to each of the ſeveral kind of beings, created and uncreated; ſpiritual and corporeal.

In which ſenſe, we ſay, human *nature*, meaning all men together who poſſeſs the ſame ſpiritual, reaſonable ſoul; angelical *nature*; the divine *nature*, &c.

In this ſenſe, the ſchool-divines ſay, *natura naturans*, & *natura naturata*, ſpeaking of God, who is the *natura naturans*, as giving being and *nature* to all others; in oppoſition to the creatures, who are the *natura naturata*, as receiving their *nature* from the hands of another.

NATURE, in a ſtill more reſtrained ſenſe, is uſed for the eſſence of a thing; or that which ſchoolmen call the quiddity thereof, that is, the attribute which makes it what it is.

In which ſenſe, the Carteſians ſay, it is the *nature* of the ſoul to think; and that the *nature* of matter conſiſts in extenſion.

And here the word *eſſence* Mr. Boyle would have obtain, in lieu of *nature*.

NATURE is more particularly uſed for the eſtabliſhed order, and courſe of material things; the ſeries of ſecond cauſes; or the laws which God has impoſed on the motions impreſſed by him.

In which ſenſe it is we ſay, phyſics is the ſtudy of *nature*; *nature* makes the night ſucceed the day; *nature* has rendered reſpiration neceſſary to life, &c.

Thus St. Thomas defines *nature* a kind of divine art, communicated to beings, which carry them to the end they are determined for. In which ſenſe, *nature* is nothing elſe but that concatenation of cauſes and effects, or that order and œconomy which God has eſtabliſhed in the parts of his creation.

In this ſenſe, too, we ſay, miracles are effects above the powers of *nature*: art is ſaid to force or ſurpaſs *nature*, by means of machines, in regard theſe produce effects which exceed what we find in the common courſe of things.

NATURE, again, is taken for an aggregate of powers belonging to any body, eſpecially a living one.

In which ſenſe phyſicians ſay, *nature* is ſtrong, weak, or ſpent; or that, in ſuch a diſeaſe, *nature* left to herſelf will perform the cure.

NATURE is ſtill more ſtrictly uſed for the action of providence, the principle of all things; or that ſpiritual power, or being, which is diffuſed throughout the creation, and moves and acts in all bodies, and gives them certain properties, and produces certain effects.

In this, which Mr. Boyle conſiders as the moſt uſual ſenſe, *nature* is nothing elſe but God, acting himſelf, and according to certain laws he himſelf has fixed.

This ſeems pretty agreeable to the opinion of many of the ancients, who made *nature* the god of the univerſe, Το Παν, who preſides over, and governs all things; though others owned this an imaginary being, and by *nature* meant no more than the qualities, or virtues, which God has given his creatures, and which their poets and orators took occaſion of perſonifying.

F. Malebranche ſays, that the *nature* ſo much talked of in the ſchools is fit for nothing but to lead us back to idolatry; the ancient heathens hereby underſtanding ſomething, which, without being God, acts continually throughout the univerſe.

Thus the idol *nature* muſt be an actual principle, which, in concurrence with God, is the next and immediate cauſe of all the changes which befal matter. Which ſeems to fall in with the opinion of the *anima mundi*; as if *nature* were a ſubſtitute of God, or a collateral cauſe with God, or a middle being between God and created things. See PLASTIC.

Ariſtotle defines *nature*, *principium & cauſa motus & ejus in quo eſt primo per ſe, & non per accidens*: a definition ſo obſcure, that none of his commentators, with all their gloſſes, have been able to render it intelligible.

This principle which the Peripatetics call *nature*, they ſuppoſed to act neceſſarily; and to be therefore deſtitute of knowledge, or liberty. See NECESSITY.

Thus, alſo, the Stoics conceived *nature* as a certain ſpirit or virtue diffuſed throughout the univerſe, which gave every thing its motion; ſo that all muſt be dragged away by the invariable order of a blind *nature*, and an inevitable neceſſity.

In ſpeaking of the action of nature no more is to be underſtood, but that bodies act on one another, in a manner agreeable to the general laws of *motion* which the Creator has eſtabliſhed.

In this lies the myſtery of that great word, which is only a compendious way of expreſſing the action of all bodies: but the mechaniſm of bodies would, perhaps, better expreſs what is here meant by *nature*.

Some, Mr. Boyle obſerves, will have the *nature* of a thing to be only the law that it receives from the Creator, and according to which it acts on all occaſions. But this is an improper and figurative expreſſion.

The ſame author propoſes a notion of *nature* as more fit than any yet given, to paſs from the principal one of *nature*; with regard to which many axioms and expreſſions relating to that word may be conveniently underſtood. In order to this, he diſtinguiſhes between *general* and *particular nature*.

NATURE, *general*, he defines the aggregate of the bodies which make up the world in its preſent ſtate, conſidered as a principle by virtue whereof they act and ſuffer, according to the laws of motion preſcribed by the Author of all things.

NATURE, *particular*, of any ſubordinate, or individual, conſiſts in the general *nature* applied to a diſtinct portion of the univerſe. Or, it is a convention of the mechanical properties (as magnitude, figure, order, ſituation, and local motion) of parts convenient and ſufficient to conſtitute, or intitle to its particular ſpecies or denomination, the particular body they make up; the concourſe of all theſe being conſidered as the principle of motion, reſt, &c.

NATURE, *law of*. See LAW.

NATURE, *laws of*, are axioms, or general rules, of motion, and reſt, obſerved by natural bodies in their actions on one another; and in all the changes which befal them in their natural ſtate.

The *laws of nature*, and *of motion*, are, in effect, the ſame: cuſtom, indeed, has made ſome difference; and we find authors call the particular caſes of motion, laws of motion: which ſee under MOTION. The more general, and comprehenſive ones, and thoſe from which, as from axioms, the others are deduced, they call *laws of nature*.

Of theſe, ſir Iſaac Newton has eſtabliſhed three:

1. That every body perſeveres in the ſame ſtate, either of reſt, or uniform rectilinear motion; except ſo far as it is forced to change that ſtate by ſome foreign force.

Thus projectiles perſevere in their motions, except ſo far as they are retarded by the reſiſtance of the air, and gravity: and thus a top, whoſe parts, by their coheſion, are continually drawing one another out of their rectilinear motion, only ceaſes to run round becauſe reſiſted by the air, and the friction of the plane on which it moves. And thus the larger bodies of the planets and comets preſerve their progreſſive and circular motions a long time undiminiſhed, in regions void of all ſenſible reſiſtance.

As body is paſſive in receiving its motion, and the direction of its motion, ſo it retains them or perſeveres in them, without any change, till it be acted upon by ſomething external. See VIS *Inertiæ*, RESISTANCE, and MEDIUM.

2. The change of motion is ever proportional to the moving force whereby it is effected, and in the direction of the right line wherein that force is impreſſed.

If a certain force produce a certain motion, a double force will produce double the motion; a triple force triple the motion; whether it be impreſſed all at once, or ſucceſſively, and by degrees. And this motion (ſince it is ever directed to the ſame point with the generating force), if the body were in motion before, is either to be added to it, as where the motions conſpire: or ſubtracted from it, as where contrary; or added obliquely, as where oblique: and is compounded with it, according to the determinations of each.

3. Re-action is always contrary and equal to action; or the actions of two bodies upon one another are always mutually equal, and directed contrary ways: and are to be eſtimated always in the ſame right line.

Whatever preſſes or pulls another, is equally preſſed or pulled thereby. Thus, if I preſs a ſtone with my finger, the finger is equally preſſed by the ſtone: if a horſe draw a weight by a rope, the horſe is equally drawn back towards the weight: for the rope being equally ſtretched each way, will, with an equal endeavour to relax itſelf, drive the horſe toward the ſtone, and the ſtone toward the horſe; and will hinder the progreſs of the one, as much as it promotes that of the other.

Again, if any body, by ſtriking on another, do in any manner change its motion, it will, itſelf, by means of the other, undergo alſo an equal change in its own motion, by reaſon of the equality of the preſſure.

When two bodies meet, each endeavours to perſevere in its ſtate, and reſiſt any change: and becauſe the change which is produced in either may be equally meaſured by the action which it excites upon the other, or by the reſiſtance which it meets with from it, it follows that the changes produced in the motions of each are equal, but are made in contrary directions. The one acquires no new force but what the other loſes in the ſame direction; nor does this laſt loſe any force but what the other acquires; and hence, though by their colliſions, motion paſſes from the one to the other, yet the ſum of their motions, eſtimated in a given direction, is preſerved the ſame, and is unalterable by their mutual actions upon each other.

In theſe actions the changes are equal; not thoſe, we mean, of the velocities, but thoſe of the motions, the bodies being ſuppoſed free from any other impediments. For the changes of velocities, which are likewiſe made contrary ways, inaſmuch as the motions are equally changed, are reciprocally proportional to the bodies.

This law alſo obtains in attractions. See ATTRACTION.

NATURE, in *Mythology*, is uſed by the poets ſometimes for the mother, ſometimes for the daughter, and at other times for the companion of Jupiter. She is deſcribed by the ſymbols of the DIANA of Epheſus.

NATURE, in *Proſody*. A ſyllable is ſaid to be long or ſhort by *nature*, to ſignify that it is ſo originally, and independently of any rule of grammar, which might render it ſo by poſition or otherwiſe.

NAVAGIUM, in our *Old Writers*, a duty incumbent on tenants to carry their lord's goods in a ſhip. *Liberi ſint ab omni carriagia*, navagio, &c.

NAVAL, ſomething relating to SHIPS, or NAVIGATION. In this ſenſe we ſometimes ſay, *naval* ſtrength, a *naval* combat, &c.

NAVAL *crown*, *corona navalis*, among the ancient Romans, a crown adorned with figures of prows of ſhips, conferred on perſons who, in ſea engagements, firſt boarded the enemy's veſſel.

Though A. Gellius ſeems to ſpeak in the general, where he ſays the *naval crown* was adorned with prows of ſhips. Lipſius diſtinguiſhes two kinds of *naval crowns*; the one he calls *ſimple*, the other *roſtrated*.

The firſt he ſuppoſes plain, and given to the common ſoldiers, &c. The latter, much more glorious, adorned with prows of ſhips, and only given to generals, or admirals, who had gained ſome important victory at ſea. See CROWN.

NAVAL *ſtores*, comprehend all thoſe particulars made uſe of, not only in the royal navy, but in every other kind of navigation: as timber and iron for ſhipping, pitch, tar, hemp, cordage, ſail-cloth, gun-powder, ordnance, and fire arms of every ſort, ſhip-chandlery-wares, &c.

Perſons ſtealing or embezzling any of the king's *naval ſtores* to the value of 20*s*. are guilty of felony, without benefit of clergy. 22 Car. II. cap. 5. And the treaſurer and commiſſioners of the navy are impowered to inquire of *naval ſtores* embezzled, and appoint perſons to ſearch for them, &c. who may go on board ſhips, and ſeize ſuch *ſtores*; and the commiſſioners, &c. may impriſon the offenders, and fine them double value, the *ſtores* being under the value of 20*s*. 1 Geo. I. cap. 25.

None but the contractors with the commiſſioners of the navy, ſhall make any *ſtores* of war, *naval ſtores*, &c. with the marks commonly uſed to his majeſty's *ſtores* upon pain of forfeiting 200*l*. And perſons in whoſe cuſtody ſuch ſtores ſhall be found concealed, are liable to the ſame penalty, 9 & 10 Will. III. cap. 41. There have been ſeveral ſtatutes ſucceſſively enacted for regulating the purchaſe and conveyance, and encouraging the importation of *naval* ſtores from America and North Britain; the recital of which is neither expedient nor neceſſary in this work. See *Act of* NAVIGATION.

NAVALIA, among the Romans, were docks or ports where ſhips uſed to be laid up after building.

NAVALIA, likewiſe ſignified the wharfs or keys at Rome, where the ſhips uſed to load and unload their goods, all which were near the Sublician bridge.

NAUCLEA, in *Botany*, a genus of the *pentandria monogynia*, claſs; the characters of which are, that the corolla is funnel-ſhaped; that it has a ſingle bilocular ſeed; and that the common receptacle is globoſe. There is only one ſpecies.

NAUCRARI, Ναυκραροι, among the Athenians, a deſignation given to the chief magiſtrates of the *δημοι*, boroughs or townſhips, which were likewiſe called *ναυκραριαι*, becauſe each of them were obliged, beſides two horſemen, to furniſh out one ſhip for the public ſervice.

NAVE, in *Architecture*, NAVIS *eccleſiæ*, denotes the body of a church; or the place where the people are ſeated; reaching from the rail, or baluſter, of the choir, to the chief door.

Balus derives the word from the Greek *ναος*, *temple*; which Salmaſius brings farther from *ναυς*, *ſhip*; by reaſon the vault or roof of a church bears reſemblance to a ſhip. The ancient Greeks called the *nave*, *pronaos*; the Latins frequently call it *cella*.

The *nave* of the church belongs to the pariſhioners: it belongs to them to repair it, &c.

NAVE *of a wheel*, is that ſhort thick piece in the centre of the wheel, which receives the end of the axle-tree, and in which the ends of the ſpokes are fixed; it is bound at each end with hoops of iron, called the *nave-bands*: it has likewiſe in each end of the hole, through which the end of the axle-tree goes, a ring of iron called the *wiſher*, which ſaves the hole of the *nave* from wearing.

NAVE-*line*, in *Sea-Language*, is a ſort of ſmall tackle, depending from the head of the main-maſt and fore-maſt, and faſtened to the middle of the parrel, immediately behind the maſt, and communicating with the gears. It is uſed to keep the parrel directly oppoſite to the yard, and particularly whilſt hoiſting or lowering, as it would otherwiſe hang under the yard, and prevent it from being ſufficiently braced.

NAVEL, a part in the middle of the belly, by anatomiſts called UMBILICUS. See *Tab. Anat.* (*Splanch.*) *fig.* 3. *lit. c. fig.* 16. *lit. e.*

NAVEL-*ſtring* by anatomiſts is called *funiculus* UMBILICALIS.

It is a method univerſally received by prudent ſurgeons and midwives, to make an exact ligature upon the umbilical cord or *naval-ſtring* of the new-born infant, leſt it ſhould bleed to death through the veſſels which compoſe it. This ligature is to be made, as ſoon as the infant and after-burden are delivered, with a ſtrong thread of about an ell long, folded together four times; and having made a knot at one end, it is then to be paſſed twice round the *navel-ſtring*, at about two or three fingers breadth from the abdomen, and afterwards tied with a double knot: this done, the cord leading to the placenta may be divided with a pair of ſciſſars below the ligature and the wounded part belonging to the infant, dreſſed with lint, after which it may be left with the nurſe till it becomes dry, and falls off of itſelf.

There have been inſtances of ſome children receiving no harm from cutting the *navel-ſtring*, without the ceremony of the ligature; but as there have alſo been too many inſtances of their dying by the omiſſion, and as the operation is ſo eaſy, the midwife is unpardonable who omits it. Heiſter.

Dr. Schulze contradicts the common opinion concerning the umbilical veſſels: he endeavours to prove, that the *navel* is not formed by the ligature which the midwives make, or by animals gnawing the *navel-ſtring* of their young with their teeth, but by nature; and that the umbilical veſſels ſeparate ſpontaneouſly, or with very little force, from the interior ſurface of the ſkin; after which the umbilical veſſels within the young creature's body contract and ſhrivel, their extremity by which they adhered to the *navel* becoming black and pointed, as if they had been burnt, and at laſt diſappearing altogether; for, ſays he, what are commonly deſcribed, as theſe veſſels changed into ligaments, are no other than the ſheaths in which they were formerly contained. From this doctrine he concludes, that it is unneceſſary to make any ligature upon the *navel-ſtring* after birth. In confirmation of this, Dr. Eller relates ſeveral inſtances of the *navel-ſtrings* of children being left untied after they were cut, without being attended with any hæmorrhage, or other bad conſequence. Commerc. Norimb. 1733. Hebd. 48. ſect. 2.

Mr. Monro is of opinion, that the fœtus in viviparous animals receives its nutrition from the umbilical veſſels alone. See FOETUS.

It has been obſerved, that in blowing into the placenta by the umbilical veſſels, the air and the blood were eaſily forced out of it, by that ſurface of the placenta which is affixed to the uterus; but that they could by no means be driven out of the other ſurface which is towards the fœtus. Hence it is to be obſerved, that the uterus appears not to be covered by any membrane within, and that the placenta alſo has none on that ſide where it adheres to the womb, ſo that there is nothing to prevent the blood from readily flowing from the uterus into the placenta, and thence to the child. What we uſually underſtand by the word membrane is a covering of ſo cloſe a texture, as to keep out air, or fluids; and it is very evident to reaſon, that the placenta ought to have no ſuch on that part where it is to communicate with the uterus; neither can the eye diſcover any ſuch there, though on the other ſide it is eaſy to diſtinguiſh one.

The *navel-ſtring*, beſide its vein, and its two arteries, is compoſed of a ſpongy ſubſtance, in which theſe blood-veſſels are lodged; this ſpongy ſubſtance is compoſed of a number of cellules which communicate with one another, and contain a glutinous liquor, which is uſually found in them in great abundance: if we conſider the *navel-ſtring* as a cylinder, the blood-veſſels run in a ſpiral round its axis, and are laid one over another, but that differently in different ſubjects; hence it is that the *navel-ſtring* is tortuous.

When the veſſels have run through the whole length of the *navel-ſtring*, in the ſame diameter, they break into a number of branches, and enter the placenta, where they afterwards divide themſelves into capillary ramifications. The diameter of the vein is all the way double to that of both the arteries; ſo that it contains twice as much blood as the two arteries together. If the *navel-ſtring* were only compoſed of theſe three veſſels, the fœtus, in moving, might eaſily compreſs them in ſuch a manner as to ſtop the current of the blood, and its inevitable death muſt be the conſequence of this; but nature having provided this ſpongy, or cellular ſubſtance for their lodgement, this is able to give way to them, when preſſed in any direction, and enables them, therefore, to bear a conſiderable force, without the current of the blood being ſtopped by them in it; nor is the glutinous liquor, of which thoſe cells are full, of little uſe in lubricating theſe veſſels. Mem. Acad. Par. 1714.

NAVEL-*hoods*, in *Ship-Building*, large pieces of ſtuff fitted into the hawſe-holes, to keep the cables from wearing them.

NAVEL-*wort*, *cotyledon*, in *Botany*, a genus of the *decandria pentagynia* claſs. Its characters are theſe: the flower, which hath a ſmall empalement of one leaf, divided into five parts at the top, has one petal, which is funnel-ſhaped, cut into five parts at the brim; and five germina, which have each a ſquamous concave nectarium at the baſe, and ten erect ſtamina; the germina afterwards become ſo many oblong ſwelling capſules, opening longitudinally with one valve, and filled with ſmall ſeeds. Miller enumerates ten, and Linnæus eight ſpecies.

The *cotyledons*, when not in flower, may uſually be known by having thick, tuberoſe roots, and thick or fatty roundiſh leaves. Theſe, however, are found to be no certain characters, as there are plants truly of this genus, which have long leaves and fibroſe roots.

The greater *navel-wort*, with hooded leaves, ſharply indented and growing alternate, and a branching ſtalk, with erect flowers, uſed in medicine, grows upon old walls and buildings in many parts of England, particularly in Shropſhire and Somerſetſhire, and is reckoned gently cooling and moiſtening, refrigerating and aſtringent; uſeful in hot diſtempers of the liver: it provokes urine, and takes off the heat and ſharpneſs of it. The juice of it outwardly applied, helps the ſhingles, St. Anthony's fire, the pain and inflammation of the piles; and is uſeful againſt kibes and chilblains: it is an ingredient in the *unguentum populeon*.

NAVEL-*wort*, *baſtard*. See CRASSULA.

NAVEL-*wort*, *Venus's*, the name of a genus of plants, called by authors, *omphalodes*. See HOUND's *Tongue*.

NAVEL-*wort*, *water*, a name ſometimes given to the *hydrocotyle* of botaniſts. See *Marſh* PENNY-*wort*.

NAVETTE, the name by which moſt of the European nations call the *napus*, or *bunias ſylveſtris* of Lobel, the plant from the ſeeds of which the oil which we call rape oil, and the French and others *navette* oil, is expreſſed. The plant is cultivated in many parts of England, and in other countries, for the ſake of the ſeed; the oil drawn from this is uſed by many artificers, and is of a fine yellow colour, and the ſmell is not offenſive. The cake, remaining after the expreſſion of the oil, retains, like that of muſtard, the acrimony of the ſeeds.

NAVEW, in *Botany*. See NAPUS.

NAVICULA, in *Natural Hiſtory*, a name given by a late French author to the claſs of ſhells called by us the *nautili*. See NAUTILUS.

NAVICULARE *os*, in *Anatomy*, the third bone in the foot, between the aſtragalus, and the oſſa cuneiformia.

It is thus called from *navis*, *a ſhip*, to which it bears ſome reſemblance; for which reaſon, likewiſe, it is ſometime called *cymbiforme*, from *cymba*, *a boat*; and *ſchaphoides*, from a Greek word of the like import.

The *os naviculare* has behind it a large ſinus, which receives the anterior convex head of the firſt bone; and before it is convex. It is divided into three heads, which are received into the ſinuſes of the oſſa cuneiformia, See SCAPHOIDES.

NAVIGATION, the art or act of ſailing, or of conducting a veſſel from one place to another, in the ſafeſt, ſhorteſt, and moſt commodious way.

This art, in the full latitude of the word, comprehends three parts: 1. The art of conſtructing and building ſhips. 2. The loading of ſhips. And, 3. The conducting and guiding of ſhips through the ſea; which is in a peculiar ſenſe, called *navigation*, or SAILING.

In this reſtrained ſenſe of the word, *navigation*, is either *common*, or *proper*.

NAVIGATION, *common*, uſually called COASTING, is where the ports are on the ſame, or very neighbouring coaſts; and where the veſſel is ſeldom out of ſight of land, or out of reach of ſounding.

In this, little elſe is required but an acquaintance with the lands, the compaſs, and ſounding line; each of which ſee in its place, COMPASS, and SOUNDING.

NAVIGATION, *proper*, is where the voyage is long, and purſued through the main ocean.

In this, beſides the requiſites in the former, are likewiſe required the uſe of Mercator's chart, azimuth, and amplitude compaſſes, log-line, and other inſtruments for celeſtial obſervations; as quadrants, foreſtaffs, &c. See each inſtrument, &c. in its place.

Navigation turns principally on four things; two whereof being known, the reſt are eaſily found from them by the table, ſcales, and charts.

Theſe four things are, the difference of latitude, difference of longitude, the reckoning or diſtance run, and the courſe or rhumb ſailed on.

The latitudes are eaſily found, and that with ſufficient accuracy. See LATITUDE.

The courſe and diſtance are had by the log-line, or dead reckoning, and the compaſs. See LOG, COMPASS, COURSE, and DISTANCE.

Nor is there any thing wanting to the perfection of *navigation*, but to determine the longitude. The mathematicians of many ages have applied themſelves, with the utmoſt aſſiduity, to ſupply this grand deſideratum, but not with the ſucceſs that was deſireable, conſidering the importance of the object, and the magnificent rewards of ſeveral princes and ſtates to the diſcoverer.

For the various methods that now occaſionally obtain at ſea, for this purpoſe, and an account of the diſcoveries that have been made, ſee LONGITUDE.

The poets refer the invention of the art of *navigation* to Neptune, ſome of the ancients to Bacchus, others to Hercules, others to Jaſon, others to Janus, who is ſaid to have made the firſt ſhip. Hiſtorians aſcribe it to the Æginetes, the Phœnicians, Tyrians, and the ancient inhabitants of Britain. Some will have it, the firſt hint was taken from the flight of the kite; others, as Oppian de Piſcibus, lib. i. from the fiſh called nautilus: others aſcribe it to accident.

Scripture refers the origin of ſo uſeful an invention to God himſelf, who gave the firſt ſpecimen thereof in the ark built by Noah. For the raillery the good man underwent on account of his enterprize, ſhews evidently enough, the world was then ignorant of any thing like *navigation*: and that they even thought it impoſſible.

However, hiſtory repreſents the Phœnicians, eſpecially thoſe of their capital, Tyre, as the firſt *navigators*; being urged to ſeek a foreign commerce by the narrowneſs and poverty of a ſlip of ground they poſſeſſed along the coaſts; as well as by the conveniency of two or three good ports; and by their natural genius for traffic.

Accordingly, Lebanon, and the other neighbouring mountains, furniſhing them with excellent wood for ſhip-building, in a ſhort time they were maſters of a numerous fleet; with which conſtantly hazarding new *navigations*, and ſettling new trades, they ſoon arrived at an incredible pitch of opulency and populouſneſs; having rendered themſelves maſters of ſeveral commodious harbours toward the bottom of the Arabian gulf, and after the example of the Egyptians, eſtabliſhed a regular intercourſe with Arabia and the continent of India on the one hand, and with the eaſtern coaſt of Africa on the other: ſo that they were in a condition to ſend out colonies, the principal of which was that of Carthage, which, keeping up their Phœnician ſpirit of commerce, in time not only equalled Tyre itſelf, but vaſtly ſurpaſſed it; purſuing the courſe which the Phœnicians had opened, and ſending its merchant-fleets through Hercules's Pillars, now the Streights of Gibraltar, along the weſtern coaſt of Africa, to the ſouth, almoſt to the tropic of Cancer, having diſcovered the Fortunate Iſlands, now known by the name of the Canaries, which were the utmoſt boundary of ancient *navigation* in the weſtern ocean; and to the north along the coaſt of Europe, viſiting particularly Spain, Gaul, and Britain: and even, if we believe ſome authors, to America itſelf; the diſcovery, whereof, ſo many ages afterwards, has been ſo glorious to the Spaniards.

The progreſs of the Phœnicians and Carthaginians was not owing merely to the deſire of extending their trade from one country to another: voyages were undertaken, the ſole object of which was to diſcover new countries, and to explore unknown ſeas. Such during the proſperous ages of the Carthaginian republic, were the famous *navigations* of Hanno and Himilco. Both their fleets were equipped by authority of the ſenate, and at the public expence. Hanno was directed to ſteer towards the ſouth, along the coaſt of Africa, and he ſeems to have advanced much nearer the equinoctial line than any former navigator. Himilco had it in charge to proceed towards the north, and to examine the weſtern coaſts of the European continent. Of the ſame nature was the extraordinary *navigation* of the Phœnicians round Africa. A Phœnician fleet, we are told (Herod. lib. iv. cap. 42. fitted out by Necho king of Egypt, took its departure, about 604 years before the Chriſtian æra, from a port in the Red Sea, doubled the Southern promontory of Africa, and after a voyage of three years, returned by the ſtreights Gades, to the mouth of the Nile. Eudoxus of Cyzicus, is ſaid (Plin. Nat. Hiſt. lib. ii cap. 67.) to have held the ſame courſe, and to have accompliſhed the ſame arduous undertaking. However, long after this *navigation* of the Phœnicians and of Eudoxus round Africa, Polybius, the moſt intelligent and beſt informed hiſtorian of antiquity, affirms, that it was not known, in his time, whether Africa was a continued continent, ſtretching to the ſouth, or whether it was encompaſſed by the ſea. Polyb. Hiſt. lib. iii. And it appears from the teſtimony of Pliny, (Hiſt. Nat. lib. ii. cap. 68.) Strabo, (lib. ii. p. 155. lib. xvii. p. 1180.) Ptolemy (Geogr. lib. iv. cap. 9.) that the accounts of thoſe voyages were not fully credited. Robertſon's Hiſt. America, vol. i. p. 13. p. 354. ed. 8vo.

Tyre, whoſe immenſe riches and power are repreſented in ſuch lofty terms, both in ſacred and profane authors, being deſtroyed by Alexander the Great, its *navigation* and commerce were transferred by the Conqueror to Alexandria, a new city, admirably ſituated for thoſe purpoſes, propoſed for the capital of the empire of Aſia, which Alexander then meditated. And thus aroſe the *navigation* of the Egyptians, which was afterwards ſo cultivated by the Ptolemies, that Tyre and Carthage (which laſt, after having a long time diſputed empire with the Romans, was at length ſubdued) were quite forgot.

Egypt being reduced into a Roman province after the battle of Actium, its trade and *navigation* fell into the hands of Auguſtus; in whoſe time Alexandria was only inferior to Rome: and the magazines of the capital of the world were wholly ſupplied with merchandizes from the capital of Egypt.

At length, Alexandria itſelf underwent the fate of Tyre and Carthage, being ſurpriſed by the Saracens; who, in ſpite of the emperor Heraclius, overſpread the northern coaſts of Africa, &c. whence the merchants being driven, Alexandria has ever ſince been in a languiſhing ſtate, though ſtill it enjoys a conſiderable part of the commerce of the Chriſtian merchants trading to the Levant.

The fall of Rome, and its empire, drew along with it not only that learning, and the polite arts, but that of *navigation*; the Barbarians, into whoſe hands it fell, contented themſelves with the ſpoils of the induſtry of their predeceſſors.

However, one circumſtance prevented commercial intercourſe with diſtant nations from ceaſing altogether. Conſtantinople, though often threatened by the fierce invaders, who ſpread deſolation over the reſt of Europe, was ſo fortunate as to eſcape their deſtructive rage. In the city, the knowledge of ancient arts and diſcoveries was preſerved; and commerce continued to flouriſh there, with the taſte for elegance, and the luxuries of foreign countries, when it was almoſt extinct in every other part of Europe. The citizens of Conſtantinople did not confine their trade to the iſlands of the Archipelago, or to the adjacent coaſts of Aſia: they took a wider range, and following the courſe which the ancients had marked out, imported the commodities of the Eaſt Indies from Alexandria. When Egypt was torn from the Roman empire by the Arabians, the induſtry of the Greeks diſcovered a new channel, by which the productions of India might be conveyed to Conſtantinople. They were carried up the Indus, as far as that great river is navigable; there they were tranſported by land to the banks of the river Oxus, and proceeded down its ſtream to the Caſpain ſea. There they entered the Volga, and ſailing up it, were carried by land to the Tanais, which conducted them into the Euxine ſea, where veſſels from Conſtantinople waited their arrival.

But no ſooner were the more brave among thoſe nations well ſettled in their new provinces; ſome in Gaul, as the Franks; others in Spain, as the Goths; and others in Italy, as the Lombards; but they began to learn the advantages of *navigation* and commerce, and the proper methods of managing them, from the people they ſubdued; and this with ſo much ſucceſs, that in a little time ſome of them became able to give new leſſons, aud ſet on foot new inſtitutions, for its advantage.

Thus it is to the Lombards we uſually aſcribe the invention and uſe of banks, book-keeping, exchanges, rechanges, &c.

It does not appear which of the European people, after the ſettlement of their new maſters, firſt betook themſelves to *navigation* and commerce. Some think, it began with the French; though the Italians ſeem to have the juſteſt title to it, and are accordingly ordinarily looked on as the reſtorers hereof as well as the polite arts, which had been baniſhed together, from the time the empire was torn aſunder.

The people of Italy, then, and particularly thoſe of Venice and Genoa, have the glory of this reſtoration; and it is to their advantageous ſituation for *navigation*, they in a great meaſure owe their glory.

In the bottom of the Adriatic were a great number of marſhy iſlands, only ſeparated by narrow channels, but thoſe well ſcreened, and almoſt inacceſſible, the reſidence of ſome fiſhermen, who here ſupported themſelves by a little trade of fiſh and ſalt, which they found in ſome of theſe iſlands. Thither, then, the Veneti, a people inhabiting that part of Italy along the coaſts of the gulf, retired, when Alaric, king of the Goths, and afterwards Artila, king of the Huns, ravaged Italy.

Theſe new iſlanders, little imagining that this was to be their fixed reſidence, did not think of compoſing any body politic; but each of the ſeventy-two iſlands of this little Archipelago continued a long time under its ſeveral diſtinct maſters, and each made a diſtinct commonwealth. When their commerce was become conſiderable enough to give jealouſy to their neighbours, they began to think of uniting into a body; and it was this union, firſt begun in the ſixth century, but not completed till the eighth, that laid the ſure foundation of the future grandeur of the ſtate of Venice.

From the time of this union, their fleets of merchantmen were ſent to all the ports of the Mediterranean; and at laſt to thoſe of Egypt, particularly Cairo, a new city, built by the Saracen princes on the eaſtern bank of the Nile, where they traded for their ſpices, and other products of the Indies.

Thus they flouriſhed, increaſed their commerce, their *navigation* and their conqueſts on the terra firma, till the famous league of Cambray, in 1508, when a number of jealous princes conſpired to their ruin; which was the more eaſily effected, by the diminution of their Eaſt India commerce, of which the Portugueſe had got one part, and the French another.

Genoa, which had applied itſelf to *navigation* at the ſame time with Venice, and that with equal ſucceſs, was a long time its dangerous rival, diſputed with it the empire of the ſea, and ſhared with it the trade of Egypt, and other parts both of the Eaſt and Weſt.

Jealouſy ſoon began to break out; and the two republics coming to blows, it was three centuries almoſt continual war, before the ſuperiority was aſcertained; when, towards the end of the fourteenth century, the fatal battle of Chioza ended the noble ſtrife; the Genoeſe, who till then had uſually the advantage, having now loſt all; and the Venetians, almoſt become deſperate, at one happy blow, beyond all expectation, ſecured to themſelves the empire of the ſea, and ſuperiority in commerce.

The CRUSADES contributed in a great meaſure to the revival, or at leaſt to the more rapid progreſs of commerce and *navigation*; for the Genoeſe, the Piſans, and Venetians furniſhed the tranſports, which carried thoſe vaſt armies, compoſed of all the nations in Europe, into Aſia upon this wild enterprize; and likewiſe ſupplied them with proviſions and military ſtores.

Others travellers, beſides thoſe whom religious zeal ſent forth to viſit Aſia, ventured into remote countries, from the proſpect of commercial advantage, or from motives of mere curioſity. The firſt and moſt eminent of theſe was Marco Polo, a Venetian of a noble family, about the year 1269: he was ſucceeded about half a century after by ſir John Mandeville, an Engliſhman. But the preſent art of *navigation* owed its riſe to the invention of the mariner's COMPASS, in the beginning of the fourteenth century; and made conſiderable progreſs during the voyages that were begun in the year 1418, by Henry, duke of Viſco. This learned prince, brother to Edward, king of Portugal, was particularly ſkilled in coſmography, and employed a perſon from the iſland of Majorca, to teach navigation; and to make inſtruments and charts for the ſea. Theſe voyages, being greatly extended after the diſcovery of Porto Santo and Maderia, the art was improved under the ſucceeding monarchs of that nation: inſomuch that Roderic and Joſeph, phyſicians to king John II. together with one Martin de Bohemia, a Portugueſe native of the iſland of Fayal, ſcholar to Regiomontanus, about the year 1485, calculated for the uſe of the ſailors, tables for the ſun's declination, and recommended the aſtrolable, for taking obſervations at ſea. About this time, Columbus, a native of Genoa, having thoroughly acquainted himſelf with the diſcoveries and obſervations of the Portugueſe, and having alſo acquired conſiderable experience in the art of *navigation*, made a propoſal to king John II. of exploring a paſſage to India, by ſailing directly towards the weſt, acroſs the Atlantic ocean. John rejected this propoſal in a very diſhonourable manner: and Columbus inſtantly quitted the kingdom, and landing in Spain towards the cloſe of the year 1484, he reſolved to propoſe his plan to Ferdinand and Iſabella, with whom, after repeated application and long delay, he ultimately ſucceeded. In Auguſt, 1492, Columbus, furniſhed with a ſmall armament of three ſhips, ſet ſail, and ſteered directly for the Canary Iſlands; from thence holding his courſe due weſt, he ſtretched away into unfrequented and unknown ſeas. After many difficulties, he at length arrived at Guanahani, one of the large cluſter of iſlands, called the Lucaya, or Bahama Iſles. He alſo diſcovered Cuba, Hiſpaniola, and ſeveral other ſmall iſlands, and having left a ſmall colony in a fort at Hiſpaniola, returned to Spain, in March 1493. In September following, he ſet out on his ſecond voyage, and ſailed by the Leeward Iſlands to Hiſpaniola: in a third voyage, undertaken in the year 1498, he diſcovered the continent of America. In the ſame year, Vaſco de Gama returned to Liſbon, from a voyage to the Eaſt Indies by the Cape of Good Hope. Columbus, it is ſaid, before he attempted the diſcovery of America, conſulted Martin de Bohemia, as well as others, and during the courſe of his voyage, inſtructed the Spaniards in *navigation*; for the improvement of which art, the emperor Charles V. afterwards founded a lecture at Seville. This art was conſiderably improved by the diſcovery of the VARIATION of the compaſs, and by the uſe of the CROSS-*ſtaff*. At length there were publiſhed in Spaniſh, two treatiſes, containing a ſyſtem of the art, which were in great eſteem: the firſt by Pedro de Medina, at Valladolid in 1545, called Arte de Navegar; the other at Seville, in 1556, by Martin Cortes, under the title of Breve Compendio de la Sphera, y de la Arte de Navegar, con neuos Inſtrumentos y Reglas. This is ſaid to have been compoſed at Cadiz, in 1545; and a tranſlation of it was publiſhed in London, in 1561, which paſſed through ſeveral impreſſions. Beſides the improvement which the art of *navigation* received from the propoſals of Werner, and Gemma Friſius, for finding the LONGITUDE, it was much promoted by Pedro Nunez, or Nonius, who compoſe a treatiſe on this ſubject, ſo early as 1537, in the Portugueſe language, which thirty years after was printed at Baſil in Latin, with additions, under the title of De Arte et Ratione Navigandi. In this work, the errors of the plane chart are expoſed, and the problem of determining the latitude, from two obſervations of the ſun's altitude, and the intermediate azimuth, is reſolved. In 1577, Mr. William Bourne publiſhed his treatiſe, intitled A Regiment for the ſea, and intended as a ſupplement to that of Cortes. See LOG.

The miſtakes of Medina were well expoſed by Michael Coignet, a native of Antwerp, who, in 1581, publiſhed a ſmall treatiſe, intitled, Inſtruction Nouvelle des Points plus excellents & neceſſaires touchant l'Arte de Naviger. In the ſame year Mr. Robert Norman publiſhed his diſcovery of the DIPPING-*needle*, in a pamphlet called the New Attractive; to which is always ſubjoioed Mr. William Burrough's Diſcourſe of the Variation of the Compaſs. In 1594, captain John Davis publiſhed a ſmall treatiſe, intited the Seaman's Secrets, which was much eſteemed in its time. The writers of this period complained much of the errors of the plane chart, which continued ſtill in uſe, though they were unable to diſcover a proper remedy: till Gerrard Mercator contrived his univerſal map (ſee *Mercator*'s CHART), which he publiſhed in 1569, without clearly underſtanding the principles of its conſtruction: theſe were firſt diſcovered by Mr. Edward Wright, who ſent an account of the true method of dividing the meridian from Cambridge, where he was a fellow, to Mr. Blundeville, with a ſhort table for that purpoſe, and a ſpecimen of a chart ſo divided. Theſe were publiſhed by Blundeville in 1594, among his Exerciſes; to the later editions of which was added his Diſcourſe of Univerſal Maps, firſt printed in 1589. However, in 1599, Mr. Wright printed his Correction of certain Errors in *Navigation*, in which work he ſhews the reaſon of this diviſion, the manner of conſtructing his table, and its in uſes in *navigation*. A ſecond edition of this treatiſe, with farther improvements, was printed in 1610, and a third edition by Mr. Moxon, in 1657. The method of approximation, by what is called the middle latitude, now uſed by our ſailors, occurs in Gunter's works, firſt printed in 1623. About this time LOGARITHMS began to be introduced, which were applied to *navigation* in a variety of ways by Mr. Edmund Gunter; though the firſt author who applied the logarithmic tables to the caſes of ſailing, was Mr. Thomas Addiſon, in his Arithmetical *Navigation*, printed in 1625. In 1635, Mr. Henry Gellibrand printed a Diſcourſe Mathematical on the Variation of the Magnetical Needle, containing his diſcovery of the changes to which the VARIATION is ſubject. In 1631 Mr. Richard Norwood publiſhed an excellent Treatiſe of Trigonometry, adapted to the invention of logarithms, particularly in applying Napier's general canons; and for the farther improvement of *navigation*, he undertook the laborious work of meaſuring a DEGREE of the meridian, for examining the diviſions of the LOG-*line*. Of this affair he has given a full and clear account in his Seaman's Practice, firſt publiſhed in 1637; where he alſo deſcribes his own excellent method of ſetting down and perfecting a ſea-reckoning, &c. This treatiſe, and that of trigonometry, were continually reprinted, as the principal books for learning ſcientifically the art of *navigation*. What he had delivered, eſpecially in the latter of them, concerning this ſubject, was contracted as a manual for ſailors in a very ſmall piece, called his Epitome, which has gone through innumerable editions. About the year 1645, Mr. Bond publiſhed, in Norwood's Epitome, a very great improvement in Wright's method, by a property in his meridian line, whereby its diviſions are more ſcientifically aſſigned than the author himſelf was able to effect; which he deduced from this theorem, that theſe diviſions are analogous to the exceſſes of the logarithmic tangents of half the reſpective latitudes augmented by forty-five degrees above the logarithm of the radius: this he afterwards explained more fully in the third edition of Gunter's Works, printed in 1653; and the demonſtration of the general theorem was ſupplied by Mr. James Gregory of Aberdeen, in his Exercitationes Geometriæ, printed at London in 1668, and afterwards by Dr. Halley, in Phil. Tranſ. N° 219. and by Mr. Cotes, Phil. Tranſ. N° 388. In 1700, Mr. Bond, who imagined that he had diſcovered the longitude, by having found out the true theory of the magnetic variation, publiſhed a general map, on which were delineated curve lines, expreſſing the paths where the magnetic needle had the ſame variation. The poſitions of theſe curves will indeed continually ſuffer alterations; but they ſhould be corrected from time to time, as they have already been for the year 1744 and 1756, by M. William Mountaine, and Mr. James Dodſon. The allowances proper to be made for LEE-*way* are very particularly ſet down by Mr. John Buckler, and publiſhed in a ſmall tract firſt printed in 1702, intitled a New Compendium of the whole Art of *Navigation*, written by Mr. William Jones.

As it is now generally agreed that the earth is a ſpheroid, whoſe diameter at the poles is ſhorter than the other, Dr. Murdoch publiſhed a tract in 1741, wherein he accommodated Wright's ſailing to ſuch a figure; and Mr. Maclaurin in the ſame year gave a rule, in the Phil. Tranſ. N° 461. for determining the meridional parts of a ſpheroid, which ſpeculation he has farther proſecuted in his Fluxions, printed at Edinburgh in 1742.

The principal foreign writers on *navigation* are Bartolomew Creſcenti, of Rome, in 1607; father George Fournier, at Paris, in 1633; John Baptiſt Riccioli, at Bologna, in 1661; father Millet Dechales, in 1674 and 1677; the ſieur Blondel St. Aubin, in 1671 and 1673; M. Daſſier, in 1683; M. Sauveur, in 1692; Mr. John Bouguer, in 1698; father Pezenas, in 1733 and 1741; and M. Peter Bouguer, who, in 1753, publiſhed a very elaborate treatiſe on this ſubject, intitled, Nouveau Traite de *Navigation*; in which he gives a variation-compaſs of his own invention, and attempts to reform the LOG, as he had done in the Memoirs of the Academy of Sciences for 1747. He is alſo very particular in determining the lunations more accurately than by the common methods, and in deſcribing the corrections of the dead reckonings. This book was abridged and improved by M. de la Caille, in 1760: to theſe we may add Don George Juan of Spain, in 1757. For an account of the ſeveral ſteps that have been purſued for the diſcovery of the longitude, ſee LONGITUDE. For an account of Hadley's quadrant, and its uſe in nautical obſervations, ſee QUADRANT. For the method of making artificial magnets, and their uſe, ſee MAGNET, COMPASS, and NEEDLE.

Thoſe who are deſirous of peruſing a fuller account of the progreſs of *navigation*, may conſult Dr. James Wilſon's preface to Dr. Robertſon's Elements of *Navigation*, in two volumes, octavo, 1772: a work deſervedly held in the higheſt eſtimation.

But to return to the hiſtory of *navigation* in its connection with commerce. About the ſame time that *navigation* was retrieved in the ſouthern parts of Europe, a new ſociety of merchants were formed in the North; which not only carried commerce to the greateſt perfection it was capable of, till the diſcovery of the Eaſt and Weſt Indies, but alſo formed a new ſcheme of laws for the regulation thereof, which ſtill obtain, under the name of USES *and cuſtoms of the ſea*.

This ſociety is that famous league of the HANS-*towns*, commonly ſuppoſed to have begun about the year 1164.

For the modern ſtate of *navigation* in England, Holland, France, Spain, Portugal, &c. ſee COMMERCE, COMPANY, &c.

We ſhall only add, that in examining the reaſons of commerce's paſſing ſucceſſively from the Venetians, Genoeſe, and Hans-towns, to the Portugueſe and Spaniards, and from thoſe again to the Engliſh and Dutch, it may be eſtabliſhed as a maxim, that the relation between commerce and *navigation*, or, if we may be allowed to ſay it, their union, is ſo intimate, that the fall of the one inevitably draws after it the other: and that they will always either flouriſh or decline together.

Hence ſo many laws, ordinances, ſtatutes, &c. for its regulation; and hence, particularly, that celebrated act of *navigation*, which an eminent foreign author calls the Palladium, or tutelar deity, of the commerce of England; which is too important not to be here mentioned; as it is the ſtanding rule, not only of the Engliſh among themſelves, but alſo of other nations with whom they traffic.

NAVIGATION, *act of Engliſh*, is a ſtatute whereby the parliament of England have ſettled divers matters relating to the *navigation* and commerce of this kingdom.

Till this act, all nations were at liberty to import into England all kinds of merchandizes, whether of their own growth, or laden elſewhere, and that on board their own veſſels. For though by the ſtatute, 5 Ric. II. cap. 3. for augmenting the navy of England, then greatly diminiſhed, it was ordained, that none of the king's liege people ſhould ſhip any merchandize out of or into the realm, but only in ſhips of the king's ligeance, on pain of forfeiture; yet in the next year, by 6 Ric. II. cap. 8. this wiſe proviſion was enervated, by only obliging the merchants to give Engliſh ſhips (if able and ſufficient) the preference. And though, by 4 Hen. 7 cap 10. it was enacted, that no Gaſcoign or Guienne wines, &c. ſhould be imported into this realm, except in Engliſh veſſels, and that none ſhould freight any merchandize in any ſtranger's ſhip, if he could have ſufficient freight in a denizen's ſhip, under the penalty of forfeiting all merchandize not thus ſhipped, to be divided between the king and the ſeizer; yet this act, ſo far as it related to the above wines, was repealed by the ſtatute 32 Hen. VIII. cap. 14. and a rate was ordered of what ſhould be paid for the freight of the ſeveral ſorts of merchandize in ſhips, from the port of London to other places, and from thence to London, By 1 Eliz. cap. 13. it was enacted, that if the owner of any merchandize ſhould, in the time of peace, embark or unload any part thereof (maſts, pitch, tar, and corn only excepted) out of, or into any foreign ſhip, he ſhould pay cuſtom as an alien.

Cromwell, firſt, perceiving the prejudice the liberty above mentioned did to the Engliſh commerce, which was now almoſt wholly in the hands of foreigners, chiefly the Dutch, whom he hated, animated the Engliſh, by ſeveral acts of parliament, to reſume their trade into their own hands; and, particularly, paſſed an act, prohibiting the Dutch from importing any merchandizes, except thoſe of their own growth, or manufacture, which were very few.

This act, framed in 1650, and intended to mortify the ſugar iſlands, which were diſaffected to the parliament, and held out for Charles II. forbid all ſhips of foreign nations from trading with any Engliſh plantations, without licence from the council of ſtate. In 1651, the prohibition was extended alſo to the mother-country; and no goods were ſuffered to be imported into England, or any of its dependencies, in any other than Engliſh bottoms; or in the ſhips of that European nation of which the merchandize imported was the genuine growth or manufacture.

Upon the Reſtoration, the firſt parliament Charles II. called, diſtinguiſhing in Cromwell the politician from the uſurper, condemned the memory of the one, and followed the plan of the other with regard to *navigation* and commerce, by paſſing that celebrated bill, or act, for the encouraging and increaſing of ſhipping, and of *navigation*, which ſtill ſubſiſts in its full latitude, and its ancient vigour. Its date is from the firſt of December, 1660, 12 Car. II. cap. 18. Its chief articles follow.

1. That no goods or commodities ſhall be imported or exported to or from any of the Engliſh colonies in Aſia, Africa, or America, but on veſſels built within the dominions of England, or really belonging to Engliſhmen, and whoſe maſters, and at leaſt three-fourths of the crew, are Engliſh, on pain of forfeiture of the goods and veſſel.

Under the name *Engliſh* here, are comprehended all the king's ſubjects of England, Ireland, and the plantations; as was explained in a ſubſequent act, 13 and 14 Car. II. cap. 11.

2. That no perſon born out of the ſubjection of England, or not naturalized, ſhall exerciſe any commerce in thoſe colonies for himſelf, or others.

3. That no merchandizes of the growth of Aſia or America ſhall be imported into any of the dominions of England, in any other than Engliſh veſſels.

4. That no goods of foreign growth or manufacture that ſhall be brought into England, Wales, Ireland, iſlands of Jerſey or Guernſey, or town of Berwick on Tweed, in Engliſh-built ſhipping, or other ſhipping belonging to the foreſaid places, and *navigated* by Engliſh mariners, as aforeſaid, ſhall be ſhipped or brought from any other place or country, but only from thoſe of the growth or manufacture thereof.

5. That all kinds of dried and ſalted ſea-fiſh, train-oils, blubber, and whale-fins, not caught by Engliſh veſſels, imported into England, ſhall pay double duties.

6. That the commerce from port to port in England and Ireland ſhall be carried on wholly by Engliſh veſſels, and Engliſh merchants; the crew to be always three-fourths Engliſh.

7. That none but Engliſh veſſels ſhall reap the benefit of the diminutions made, or abatements to be henceforth made, in the cuſtoms.

8. All veſſels are prohibited importing into England and Ireland any of the commodities of Muſcovy, or even any maſts, or other timber, foreign ſalt, pitch, reſin, hemp, raiſins, prunes, oil of olive, any kind of corn or grain, ſugars, aſhes, and ſoap, wine, vinegar, or brandy, except veſſels whereof Engliſh are owners or part-owners, and where the maſter and three-fourths of the mariners are Engliſh. And that no currants, or other commodities, the growth or manufacture of the Turkiſh empire, ſhall be imported, but in veſſels of Engliſh build, and *navigated* as aforeſaid; except only ſuch veſſels as are of the build of the country or place whereof ſuch commodities are the growth or manufacture, or of ſuch part where ſuch goods are uſually ſhipped for tranſportation, and unleſs the maſter and three-fourths of the crew be natives of the country where they are laden.

9. All timber, maſts, boards, ſalt, pitch, tar, reſin, hemp, flax, raiſins, figs, prunes, olive-oils, corn or grain of any kind, ſugar, pot-aſhes, brandies, and wines, and all goods of the growth and manufacture of Muſcovy, all currants and Turkiſh goods imported into England, &c. in other than ſuch ſhipping, and ſo *navigated*, ſhall be deemed aliens goods, and ſhall pay accordingly.

10. That, to prevent frauds in buying and diſguiſing foreign veſſels, the proprietors ſhall take an oath, that they really belong to them, and that no alien has any part in them.

11. That Engliſh veſſels, and *navigated* by Engliſh, may import into the dominions of England any merchandizes of the Levant, though not taken up in the places where they grow, or are manufactured; provided it be in ſome part of the Mediterranean beyond the Streights of Gibraltar. And the ſame is underſtood of commodities brought from the Eaſt Indies, provided they be taken up in ſome part beyond the Cape of Good Hope; and thoſe from the Canaries, and other colonies of Spain; and the Azores, and other colonies of Portugal, which are allowed to be ſhipped, the one in Spaniſh ports, the other in Portugueſe.

12. Theſe penalties, prohibitions, and confiſcations, not to extend to goods taken, by way of repriſal, from the enemies of England; nor to fiſh caught by the Scots, or their corn, and ſalt, which may be imported into England by the Scotch-built ſhips.

13. Five ſhillings per ton duty is impoſed on every French veſſel arriving in any port of England, ſo long (and even three months longer) as fifty ſols per ton lies on the Engliſh veſſels in France.

Laſtly, that ſugars, tobacco, and other commodities of the growth of the Engliſh colonies, ſhall not be imported into any other part of Europe, but the dominions of England; and that veſſels going out of the ports of the ſame crown for the Engliſh colonies, ſhall give 1000*l.* ſecurity, if under one hundred tons, and 2000*l.* if above, before they depart, that they will import their cargo into ſome port in the ſaid dominions; and the like, before they quit thoſe colonies, that they will land their whole cargo in England.

The 22 and 23 Car. II. cap. 11. alſo ordains, that where any goods ſhall be laden on board any Engliſh ſhip of the burden of two hundred tons, or upwards, and mounted with ſixteen guns, or more, if the maſter yields up ſuch ſhip or goods to any Turkiſh veſſel, or any pirate, without fighting, upon proof thereof in the admiralty, he ſhall be incapable of taking charge of any Engliſh veſſel; and maſters of Engliſh ſhips, though not of that burden, nor mounted as aforeſaid, that ſhall yield without fighting to a Turkiſh ſhip or pirate, that has not at leaſt double the number of guns, ſhall be liable to the penalties of this act. If any inferior officers or mariners of a ſhip, ſhall refuſe to fight when commanded, or utter words to diſcourage others, they ſhall loſe all their wages due, and be impriſoned not exceeding ſix months; and mariners laying violent hands on their commanders, to hinder them from fighting in defence of their ſhips, ſhall ſuffer death as felons. When any Engliſh ſhip ſhall have been defended by fight, and brought to her port, in which fighting any of her men have been wounded or ſlain, the judge of the admiralty, or his ſurrogate, &c. where ſhe ſhall arrive, upon the petition of the maſter and ſeamen, may call ſo many as he ſhall be informed are the adventurers and owners, and by adviſing with them, levy upon the reſpective owners ſuch ſums as he himſelf, and the major part of them preſent, ſhall judge reaſonable, not exceeding two *per cent.* of the ſhip and goods; which money ſhall be diſtributed among the maſter, officers, and ſeamen, or the widows and children of the ſlain, according to the direction of the judge, with the approbation of three or more of the adventurers.

By the 5th and 6th of William and Mary, cap. 24. every perſon who ſhall build, or cauſe to be built, any ſhip of three decks, containing 450 tons, and mounted with thirty-two pieces of ordnance, having ammunition, &c. proportionable, ſhall for the firſt three voyages which the ſaid ſhip ſhall make to any foreign parts, receive a tenth of the cuſtoms called the ſubſidy of tonnage and poundage, payable for merchandize exported and imported in ſuch ſhips: but if after the end of the three firſt voyages, ſhips ſo built ſhall be altered ſo as to become leſs defenſible than they were at firſt, then they ſhall be forfeited and loſt.

By 2 Ann. cap. 9. owners of ſhips might navigate during the war with France, with maſters and only one half of the mariners Engliſh; and by 3 and 4 Ann. cap. 13. any ſhips might be navigated by foreign ſeamen; and foreigners ſerving on board any Engliſh ſhip for two years, were to be deemed natural born ſubjects, &c.

By 4 Geo. I. cap. 12. and 11 Geo. I. cap. 29. if any officer or mariner belonging to any ſhip or veſſel, ſhall wilfully caſt away, burn, or deſtroy the ſhip to which he belongeth, or in any-wiſe direct or procure the ſame to be done, with intent to prejudice a perſon that ſhall have granted any inſurance thereon, or any merchant who ſhall load goods therein, or any owner of ſuch veſſel, the perſon offending ſhall on conviction be adjudged guilty of felony without benefit of clergy.

The 5th of Geo. II. cap. 20. enacts, that no commander of any ſhip outward-bound ſhall receive on board any gunpowder, either as merchandize or ſtores for the voyage, except for his majeſty's ſervice, before ſuch ſhip ſhall be at Blackwall, in the river Thames; and all maſters of ſhips coming into the river, ſhall put on ſhore all powder either before the arrival of the ſhips at the ſaid place, or within twenty-four hours after they come to anchor there, upon pain of forfeiting 5*l.* for every fifty pounds weight of gunpowder on board, and in the like proportion for a leſs quantity. And no guns ſhall be kept loaded with ſhot in merchant-ſhips between London-bridge and Blackwall, or fired before the riſing, or after the ſetting of the ſun, under the penalty of 5*l.* and for every gun ſo fired, 10*s.* And if any pitch, tar, roſin, or other combuſtible matter, ſhall be heated or melted by fire in any ſhips, every perſon ſo offending, ſhall, for every offence, forfeit 5*l.* And ſhips are liable to be ſearched by an elder brother, appointed by the maſter, wardens, and aſſiſtants of the Trinity-houſe at Deptford. In caſe any ſhip ſhall be moored in the mouth or any other part of St. Saviour's dock, except ſuch ſhips as ſhall be loaded or delivering their cargoes, and others, not exceeding two at a time, that ſhall lie at Shipwright-yard, at the north-weſt corner of the ſaid dock, during the time they ſhall be repairing, the maſter of ſuch ſhip ſhall forfeit 20*s.* for every day ſhe ſhall continue to be laid up and moored.

By 6 Geo. II. cap. 29. maſters of ſhips lying in the river Thames, who have occaſion for ballaſt, ſhall pay 1*s.* per ton colliers, other ſhips 1*s.* 3*d.* and foreign ſhips 1*s.* 7*d.* per ton, to the corporation of the Trinity-houſe at Deptford; who ſhall pay ballaſt-men 9*d.* a ton, for raiſing and carrying it, &c. and it ſhall be lawful for any maſter of a ſhip to appoint two perſons to go on board any lighter bringing ballaſt to ſuch ſhip, to inſpect the marks thereof; and every ballaſt-man ſhall immediately before the delivery of ballaſt to any ſhip, trim ſuch lighter, ſo as to make it ſwim at equal marks at the ſtem and ſtern, and pump all the water out, &c. and the maſter, wardens, and aſſiſtants of the Trinity-houſe, are to make good to the maſter the quantity or value of the ballaſt which ſhall be found deficient, or forfeit 50*l.* one moiety to the poor, and the other to the perſon ſuing for it.

The 7th of Geo. II. cap. 15. ordains, that no owners of ſhips ſhall be liable to any loſs by reaſon of embezzlement by the maſter or mariners, of any goods or merchandize ſhipped on board, or for any act done by them without the privity or knowledge of ſuch owners, farther than the value of the ſhip, and amount of the freight during the voyage, in which ſuch embezzlement of the maſter or mariners ſhall be committed; and if ſeveral perſons ſhall ſuffer damage by the means aforeſaid, and the value of the ſhip and cargo ſhould not be ſufficient to make compenſation; then the freighters ſhall receive ſatisfaction in average, in proportion to their reſpective loſſes, to be aſcertained on a bill in equity, exhibited for a diſcovery thereof, and of the value of ſuch ſhip and freight. But nothing in this act ſhall diſcharge any remedy, which any perſon may have againſt the maſter and mariners, in reſpect of an embezzlement.

NAVIGATION, *ſub-marine*, or the art of ſailing under water, is mentioned by Mr. Boyle as the deſideratum of the art of *navigation.* This was attempted, and ſucceſsfully, according to him, by Cornelius Drebbel; ſeveral perſons who were in the boat breathing freely all the time. See DIVING-*bell.*

NAVIGATION, *inland.* See CANAL.

NAVIGATOR, in the *Sea-Language*, uſually denotes a perſon capable of carrying or guiding a ſhip to any place deſired.

NAVIS, *Argo* NAVIS, or the ſhip *Argo*, in *Aſtronomy*, a conſtellation of the ſouthern hemiſphere. See ARGO.

NAULIUM, in *Antiquity*, a muſical inſtrument otherwiſe called NABLUM.

NAULUM, among the Romans, properly ſignified *freight*, whence it is uſed to denote a piece of money put into the mouth of a perſon deceaſed, to pay Charon the ferryman for his paſſage: this piece was to be of the current coin of the emperor then reigning; ſo that from it the time of the perſon's death may be known.

NAUMACHIA, *naumachy*, from ναυς, *ſhip*, and μαχη, *fight*, a ſpectacle, or ſhew, among the ancient Romans, repreſenting a ſea-fight.

NAUMACHIA is alſo uſed, by ſome, for a circus encompaſſed with ſeats and porticos; the pit whereof, ſerving as an arena, was filled with water, by means of pipes, for the exhibiting of ſea-fights.

There were ſeveral of theſe *naumachias* at Rome: three built by Auguſtus, one by Claudius, and another by Domitian. Nero's *naumachia* ſerved for the reverſe of his medals.

NAUPLIUS, in *Natural Hiſtory*, a name by which ſome authors have called the NAUTILUS, as well the papyraceous as the chambered kind.

NAUSEA, ναυτια, in *Medicine*, a reaching or propenſity and endeavour to vomit; ariſing from a loathing of food, excited by ſome viſcous humour that irritates the ſtomach, and urges it to diſcharge itſelf; and accompanied with anxiety about the præcordia, and ſalivation of the mouth.

The word is formed from the Greek ναυτια, of ναυς, *navis*, *ſhip*; becauſe people, at the beginning of their voyages, are uſually liable to this diſorder.

A *nauſea* is, when the thoughts or ſight of proper food create a ſickneſs in the ſtomach, and a tendency to vomit. *Nauſea* and vomiting only differ from one another, as more or leſs violent. The *nauſea* is properly the effort the ſtomach makes to vomit, which has not always the effect.

Boerhaave defines a *nauſea*, anatomically, to be a retrograde ſpaſmodic motion of the muſcular fibres of the œſophagus, ſtomach, and inteſtines; attended with convulſions of the abdominal muſcles, and the ſeptum tranſverſum.

The uſual cauſes of a *nauſea* and anorexia, are, hard drinking, great heat, a fever, conſumption, laxneſs of the ſtomach occaſioned by tea, &c. alſo narcotics; as tobacco, paſſions of the mind, ſuppreſſion of evacuations inducing a plethora, foul ſtomach, tenacious humours lodged therein, and certain ſwimming or undulatory motions.

NAUTICAL *planiſphere*, a deſcription of the terreſtrial globe upon a plane, for the uſe of mariners. See PLANISPHERE, and *Sea*-CHART.

NAUTICAL *chart.* See *Sea*-CHART.

NAUTICAL *compaſs.* See COMPASS.

NAUTICUS, in *Anatomy*, a muſcle, called alſo TIBIALIS *poſticus.*

NAUTILUS, in *Natural Hiſtory*, the name of a genus of ſhell-fiſh, the characters of which are theſe: it expreſſes, in general, in every ſpecies, the figure of a boat, or veſſel, made for ſwimming on the water; but in the different ſpecies it is of very different figures, roundiſh or oblong, thin or thick, furrowed or ſmooth, and ſometimes is auriculated, ſometimes not. Bonani obſerves, that this genus of ſhell-fiſh is very well named from the Greek ναυτιλος, which ſignifies both a *fiſh*, and a *ſailor*, for that the ſhells of all the *nautili* carry the appearance of a boat, or ſhip, with a very high poop.

Different authors, among the ancients and moderns, have called the *nautilus* by the names of *pompilus*, *nauplius*, *nauticus*, *ovum polypi*, *polypus teſtaceus*, and the French call it *le voilier.* It is ſuppoſed that men firſt learned the method of ſailing in veſſels, from what they ſaw practiſed by this creature.

We at preſent know two diſtinct genera of *nautilus*, the thin and the thick-ſhelled *nautilus.* The firſt is called *nautilus papyraceus*, and its ſhell ſeems indeed no thicker, or ſtronger, than a piece of paper, when out of the water. This ſpecies is not at all faſtened to its ſhell; but there is an opinion as old as the days of Pliny, that this creature creeps out of its ſhell, and goes on ſhore to feed. When this ſpecies is to ſail, it extends two of its arms on high, and between theſe ſupports a membrane, which it throws out on this occaſion; this ſerves for its ſail, and the two other arms it hangs out of the ſhell, to ſerve occaſionally either as oars, or as as a ſteerage; but this laſt office is generally ſerved by the tail. When the ſea is calm, it is frequent to ſee numbers of theſe creatures diverting themſelves with ſailing about in this manner; but as ſoon as a ſtorm ariſes, or any thing gives them diſturbance, they draw in their legs, and take in as much water as makes them ſomewhat heavier than the ſea-water in which they ſwim, and they then ſink to the bottom. The manner of their voiding this abundant water when they they would riſe again, is by a number of holes, of which their legs are full.

The other *nautilus*, whoſe ſhell is thick, never quits that habitation. This ſhell is divided into forty or more partitions, which grow ſmaller and ſmaller as they approach the extremity, or centre of the ſhell: between every one of theſe cells, and the adjoining ones, there is a communication, by means of a hole in the centre of every one of the partitions. Through this hole there runs a pipe, which is of the whole length of the ſhell. It is ſuppoſed by many that the fiſh occaſionally changes the place of its reſidence, by moving from one to another of theſe cells, through this pipe in the little hole; but this is by no means probable, as the body of the fiſh muſt neceſſarily be cruſhed to death, if it were poſſible to make it paſs through ſuch a hole. It ſeems, therefore, much more probable, that the fiſh occupies always the largeſt chamber in its ſhell, that is, it lives in the cavity between the mouth and the firſt partition; and that it never removes out of this, but that all the apparatus of cells, and a pipe of communication, which we ſo much admire, ſerve only to admit occaſionally air, or water, into the ſhell, in ſuch proportion as may ſerve the creature in its intentions of ſinking or ſwimming.

Some authors call this ſhell *concha margaritifera*; but this can be only on occaſion of the fine colour of its inſide, which is more beautiful than any other mother of pearl; for it has not been obſerved that this ſpecies of fiſh ever produced pearls.

It muſt be obſerved that the polypus is by no means to be confounded with the paper-ſhelled *nautilus*, notwithſtanding the great reſemblance in the arms and body of the incloſed fiſh; nor is the cornu ammonis, ſo frequently found foſſile, to be confounded with the thick-ſhelled *nautilus*, though the concamerations, and general ſtructure of the ſhell, are alike in both; for there are great and eſſential differences between all theſe genera. See Cornu *ammonis*, &c.

The three principal differences of the *nautilus* claſs are, that ſome are papyraceous, ſome are auriculated, and ſome are umbilicated

The ſeveral known ſpecies of *nautilus* are theſe: 1. The great, ſmooth, and thick *nautilus*. 2. The little *nautilus*, with a ſmooth and thick ſhell. 3. The ſmooth, and thick, umbilicated *nautilus*. 4. The common, concamerated *nautilus*. 5. The furrowed, and empty *nautilus* with no diaphragms, or ſeparation within. 6. The thin, and flatted, papyraceous *nautilus*. 7. The auriculated *nautilus*, with a wider ſhell. 8. The undulated and furrowed *nautilus*, with dents on each ſide the edge. 9. The *nautilus*, with a ridged and ſerrated back. This laſt ſpecies is often found in the cabinets without its outer coat, and the ſhell then looks all over like the moſt beautiful mother of pearl. Hiſt. Natur. Eclair. part ii. p. 249. See *Tab.* III. *of Foſſils, Claſs* 9. and *Tab. of Shells*, N° 8.

NAVY, the fleet or ſhipping of a prince or ſtate. See Fleet.

Several articles and orders for the government of the *navy* are eſtabliſhed by 13 Car. II. c. 9. and 22 Geo. II. c. 33. which are as follow:

1. Officers are to cauſe public worſhip, according to the liturgy of the Church of England, to be ſolemnly, performed in their ſhips, and take care that prayers and preaching by the chaplains be performed diligently, and that the Lord's day be obſerved. 2. Perſons guilty of profane oaths, curſing, drunkenneſs, uncleanneſs, &c. to be puniſhed as a court martial ſhall think fit. 3. If any perſon ſhall *give* or *hold intelligence to* or with an enemy *without leave*, he ſhall ſuffer *death*. 4. If any letter or meſſage from an enemy be conveyed to any in the fleet, and he ſhall not in *twelve hours* acquaint his ſuperior officer with it, or if the ſuperior officer, being acquainted therewith, ſhall not reveal it to the commander in chief, the offender ſhall ſuffer *death*, or ſuch puniſhment as a court martial ſhall impoſe. 5. Spies and perſons *endeavouring to corrupt any one in the fleet*, ſhall ſuffer *death*, or ſuch puniſhment as a court martial ſhall impoſe. 6. No perſon ſhall relieve an enemy with money, victuals, or ammunition, on like penalty. 7. All papers taken on board a prize ſhall be ſent to the court of admiralty, &c. on penalty of forfeiting the ſhare of the prize, and ſuch puniſhment as a court martial ſhall impoſe. 8. No perſon ſhall take out of any prize any money or goods, unleſs for better ſecuring the ſame, or for the neceſſary uſe of any of his majeſty's ſhips, before the prize ſhall be condemned; upon penalty of forfeiting his ſhare, and ſuch puniſhment as ſhall be impoſed by a court martial. 9. No perſon on board a prize ſhall be *ſtripped* of his cloaths, *pillaged*, *beaten*, or *ill-treated*, upon pain of ſuch puniſhment as a court martial ſhall impoſe. 10. Every commander, who, upon ſignal or order of fight, or ſight of any ſhip which it may be his duty to engage, or who, upon likelihood of engagement, ſhall *not make neceſſary preparations* for fight, and *encourage the inferior officers and men to fight*, ſhall ſuffer *death*, or ſuch puniſhment as a court martial ſhall deem him to deſerve. And if any perſon ſhall *treacherouſly* or *cowardly* yield or cry for quarter, he ſhall ſuffer *death*. 11. Every perſon who ſhall *not obey the orders* of his ſuperior officer, *in time of action*, to the beſt of his power, ſhall ſuffer *death*, or ſuch puniſhment as a court martial ſhall deem him to deſerve. 12. Every perſon, who, in time of action, ſhall *withdraw* or *keep back*, or *not come into the fight*, or do his utmoſt to take or deſtroy any ſhip which it ſhall be his duty to engage, and to aſſiſt every ſhip of his majeſty or his allies, which it ſhall be his duty to aſſiſt, ſhall ſuffer *death*. 13. Every perſon, who through cowardice, &c. ſhall forbear to purſue the chace of an enemy, &c. or ſhall not aſſiſt or relieve *a known friend in view*, to the utmoſt of his power, ſhall ſuffer *death*. 14. If any perſoon ſhall delay or diſcourage any action or ſervice commanded, upon pretence of arrears of wages, or otherwiſe, he ſhall ſuffer *death*, or ſuch puniſhment as a court martial ſhall deem him to deſerve. 15. Every perſon who ſhall *deſert to the enemy*, or *run away with any ſhip, ordnance*, &c. to the weakening of the ſervice, or yield up the ſame cowardly or treacherouſly to the enemy, ſhall ſuffer *death*. 16. Every perſon who ſhall *deſert*, or *entice others* ſo to do, will ſuffer *death*, or ſuch puniſhment as a court martial ſhall think fit. If any commanding officer ſhall receive a deſerter, after diſcovering him to be ſuch, and ſhall not with ſpeed give notice to the captain of the ſhip to which he belongs, or if the ſhip is at a conſiderable diſtance, to the ſecretary of the admiralty, or commander in chief, he ſhall be caſhiered. 17. Officers and ſeamen of ſhips appointed for convoy of merchant ſhips, or of any other, ſhall diligently attend upon that charge according to their inſtructions; and whoſoever ſhall not faithfully perform their duty, and defend the ſhips in their convoy, or refuſe to fight in their defence, or run away cowardly, and ſubmit the ſhips in their convoy to hazard, or exact any reward for convoying any ſhip, or miſuſe the maſter or mariners, ſhall make reparation of damages, as the court of admiralty ſhall adjudge, and be puniſhed criminally by death, or other puniſhment, as ſhall be adjudged by a court martial. 18. If any officer ſhall receive or permit to be received on board any goods or merchandiſe, other than for the ſole uſe of the ſhip, except gold, ſilver, or jewels, and except goods belonging to any ſhip which may be ſhipwrecked, or in danger thereof, in order to the preſerving them for the owners, and except goods ordered to be received by the lord high admiral, &c. he ſhall be caſhiered, and rendered incapable of farther ſervice. 19. Any perſon making or endeavouring to make any mutinous aſſembly, ſhall ſuffer *death*. Any perſon uttering words of ſedition or mutiny ſhall ſuffer *death*, or ſuch puniſhment as a court martial ſhall deem him to deſerve. If any officer, mariner, or ſoldier, in or belonging to the fleet ſhall behave himſelf with contempt to his ſuperior officer, *being in the execution of his office*, he ſhall be puniſhed according to the nature of his offence by the judgment of a court martial. 20. Any perſon concealing any traiterous or mutinous practice or deſign, ſhall ſuffer *death*, or ſuch puniſhment as a court martial ſhall think fit. Any perſon concealing any traiterous or mutinous words, or any words, practice, or deſign, tending to the *hindrance of the ſervice*, and not forthwith revealing the ſame to the commanding officer; or being preſent at any mutiny or ſedition, ſhall not uſe his utmoſt endeavours to ſuppreſs the ſame, ſhall be puniſhed as a court martial ſhall think he deſerves. 21. Any perſon finding cauſe of complaint of the unwholeſomeneſs of victuals, or upon other juſt ground, he ſhall *quietly* make the ſame known to his ſuperior, who, as far as he is able, ſhall cauſe the ſame to be preſently remedied; and no perſon upon any ſuch or other pretence ſhall attempt to ſtir up any diſturbance, upon pain of ſuch puniſhment as a court martial ſhall think fit to inflict. 22. Any perſon ſtriking any his ſuperior officer, or drawing or offering to draw or lift up any weapon againſt him, *being in the execution of his office*, ſhall ſuffer death. And any perſon preſuming to quarrel with any his ſuperior officer, *being in the execution of his office*, or diſobeying any lawful command of any his ſuperior officer, ſhall ſuffer *death*, or ſuch other puniſhment as ſhall be inflicted upon him by a court martial. 23. Any perſon quarrelling or fighting with any other perſon in the fleet, or uſing reproachful or provoking ſpeeches or geſtures, ſhall ſuffer ſuch puniſhment as a court martial ſhall impoſe. 24. There ſhall be no waſteful expence or embezzlement of any powder, ſhot, &c. upon penalty of ſuch puniſhment as by a court martial ſhall be found juſt. 25. Every perſon burning or ſetting fire to any magazine, or ſtore of powder, ſhip, &c. or furniture thereunto belonging, not then appertaining to an enemy, ſhall ſuffer *death*. 26. Care is to be taken that through wilfulneſs or negligence no ſhip be ſtranded, run upon rocks or ſands, or ſplit or hazarded; upon pain of *death*, or ſuch puniſhment as a court martial ſhall deem the offence to deſerve. 27. No perſon ſhall ſleep upon his watch, or negligently perform his duty, or forſake his ſtation, *upon pain of death*, or ſuch puniſhment as, &c. 28. Murder; 29. And buggery or ſodomy ſhall be puniſhed with *death*. 30. Robbery ſhall be puniſhed with *death*, or otherwiſe, as a court martial ſhall find meet. 31. Every perſon *knowingly* making or ſigning, or commanding, counſelling, or procuring the making or ſigning any falſe muſter, ſhall be caſhiered, and rendered incapable of farther employment. 32. Provoſt martial refuſing to apprehend or receive any criminal, or ſuffering him to eſcape, ſhall ſuffer ſuch puniſhment as a court-martial ſhall deem him to deſerve. And all others ſhall do their endeavours to detect and apprehend all offenders, upon pain of being puniſhed by a court martial. 33. If any flag-officer, captain, commander, or lieutenant, ſhall behave in a ſcandalous, infamous, cruel, oppreſſive, or fraudulent manner, *unbecoming his character*, he ſhall be diſmiſſed. 34. Every perſon in actual ſervice and full pay, guilty of mutiny, deſertion, or diſobedience, in any part of his majeſty's dominions on ſhore, when in actual ſervice, relative to the fleet, ſhall be liable to be tried by a court martial, and ſuffer the like puniſhment as if the offence had been committed at ſea. 35. Every perſon in actual ſervice and full pay, committing upon ſhore, in any place out of his majeſty's dominions, any crime puniſhable

able by theſe articles, ſhall be liable to be tried and puniſhed as if the crime had been committed at ſea. 36. All other crimes not capital, not mentioned in this act, ſhall be puniſhed according to the laws and cuſtoms uſed at ſea. No perſon to be impriſoned for longer than two years. Court martial not to try any offence (except the 5th, 34th, and 35th, articles) not committed upon the main ſea, or in great rivers beneath the bridges, or in any haven, &c. within the juriſdiction of the admiralty, or by perſons in actual ſervice and full pay, except ſuch perſons and offences, as in 5th article; nor to try a land-officer or ſoldier on board a tranſport ſhip. The lord high admiral, &c. may grant commiſſions to any officer commanding in chief any fleet, &c. to call courts martial, conſiſting of commanders and captains. And if the commander in chief ſhall die or be removed, the officer next in command may call courts martial. No commander in chief of a fleet, &c. of more than five ſhips, ſhall preſide at any court martial in foreign parts, but the officer next in command ſhall preſide. If a commander in chief ſhall detach any part of his fleet, &c. he may impower the chief commander of the detachment to hold courts martial during the ſeparate ſervice. If five or more ſhips ſhall meet in foreign parts, the ſenior officer may hold courts martial and preſide thereat. Where it is improper for the officer next to the commander in chief to hold or preſide at a court martial, the third officer in command may be empowered to preſide at or hold a court martial. No court martial ſhall conſiſt of more than *thirteen*, or leſs than *five* perſons. Where there ſhall not be leſs than three, and yet not ſo many as five of the degree of a poſt captain, or ſuperior rank, the officer who is to preſide may call to his aſſiſtance as many commanders under the degree of a poſt captain, as together with the poſt captains, ſhall make up the number five, to hold the court martial. After trial begun, no member of a court martial ſhall go on ſhore, until ſentence, except in caſe of ſickneſs, upon pain of being caſhiered. Proceedings ſhall not be delayed, if a ſufficient number remain to compoſe the court, which ſhall ſit from day to day (except Sunday), till ſentence be given. The judge advocate, and all officers conſtituting a court martial, *ſhall be upon oath.* Perſons refuſing to give evidence may be impriſoned. Sentence of death within the Narrow Seas (except in caſe of mutiny) ſhall not be put in execution till a report be made to the lord high admiral, &c. Sentence of death beyond the Narrow Seas, ſhall not be put in execution but by order of the commander in chief of the fleet, &c. Sentence of death in any ſquadron, detached from the fleet, ſhall not be put in execution (except in caſe of mutiny) but by order of the commander of the fleet, or lord high admiral, &c. And ſentence of death paſſed in a court martial, held by the ſenior officer of five or more ſhips met in foreign parts (except in caſe of mutiny) ſhall not be put in execution but by order of the lord high admiral, &c.

The powers given by the ſaid articles ſhall remain in force with reſpect to crews of ſhips wrecked, loſt, or deſtroyed until they be diſcharged or removed into another ſhip, or a court martial ſhall be held to inquire of the cauſes of the loſs of the ſhip. And if upon inquiry it ſhall appear, that all or any of the officers and ſeamen did their utmoſt to ſave the ſhip, and behaved obediently to their ſuperior officers, their pay ſhall go on: as alſo ſhall the pay of officers and ſeamen taken by the enemy, having done their beſt to defend the ſhip, and behaved obediently. If any officer ſhall receive any goods on board, contrary to the 18th article, he ſhall farther forfeit the value of ſuch goods, or 500*l.* at the election of the informer; one moiety, to the informer, the other to Greenwich hoſpital. For other regulations relating to the *navy*, ſee MARINERS.

For the method of ſupplying the *navy*, ſee MANNING *the fleet*.

The royal *navy* of Great Britain is conducted, under the direction of the lords of the admiralty, by the following principal officers, who are commiſſioners and compoſe the board for managing the buſineſs thereof. 1. *Comptroller* of the *navy*, who attends and comptrols the payment of all wages, is to know the rates of ſtores, &c. 2. *Surveyor* of the *navy*, who is to know the ſtate of all ſtores, to ſupply what is wanting, to eſtimate repairs, charge boatſwains, &c. with the ſtores they receive, &c. There have been generally two joint-ſurveyors. 3. *Clerk of the acts*, whoſe buſineſs is to record all orders, contracts, bills, warrants, &c. 4. *Comptroller* of the treaſurer's accounts. 5. *Comptroller* of the victualling accounts. 6. *Comptroller* of the ſtore-keeper's accounts. 7. One extra commiſſioner. The annual appointment of each commiſſioner is 500*l.* In time of war, or great naval exertion, there are other additional extra commiſſioners; and now, viz. in 1781, there are two, excluſive of thoſe above enumerated. There are alſo three commiſſioners for the out-ports, reſiding at Portſmouth, Plymouth, and Chatham; and in time of war commiſſioners are appointed to reſide at ſome of the principal yards abroad. The *treaſurer* of the *navy*, who has an appointment of 2000*l.* a year, and whoſe buſineſs is to receive money out of the exchequer, and to pay all the charges of the *navy*, by warrant from the principal officers. Each of theſe commiſſioners and officers have a number of ſubordinate clerks, with various ſalaries.

The *navy* was anciently victualled by contract; but the victualling is now under commiſſioners, who keep their office in Somerſet-houſe. See VICTUALLING-*office*

For the ſeveral yards belonging to his majeſty's *navy*, ſee DOCK-*yards*.

NAVY, or *victualling bills*, are bills or orders for the payment of money, iſſued by the commiſſioners of the *navy*, and other boards in that department, on the treaſurer of the *navy*, for ſtores purchaſed, &c. Theſe bills are not payable at any fixed time, but bear intereſt at the rate of 4 *per cent.* after ſix months, from the date of their being regiſtered at the reſpective offices; and they have generally been paid off within eighteen months, or two years, From the time of their being iſſued.

The NAVY-*office* is the place where the chief buſineſs of the *navy* is tranſacted by the officers and commiſſioners.

NAVY denotes alſo the collective body of officers employed in his majeſty's ſervice.

NAZAREATE, or NAZARITESHIP, the ſtate and condition of a Nazarite or Nazarean among the Jews. See NAZARITE.

The *Nazareate* was a ſtate of ſeparation from the reſt of mankind; particularly in three things. 1. In that the perſon devoted hereto drank no wine. 2. In that they did not ſhave their heads, but let the hair grow. 3. In avoiding the touch of dead people, which they held a defilement.

The *Nazareate* was of two kinds; the one temporary, or for a certain number of days; the other for life. The rabbins inquire what the term of the temporary *Nazareate* was, and determine it by the Cabbala: for ſince in Scripture, Numbers vi. 5. where it is ſaid, *Domino ſanctus erit*, the Hebrew verb יהיה *erit*, conſiſts of four letters; the firſt and third whereof, taken as numeral letters, do each make 10, and the reſt each 5, all together 30; the term of the *Nazareate*, ſay they, was 30 days.

NAZARITE, or NAZARENE, in the *Old Teſtament*, is uſed for a perſon diſtinguiſhed and ſeparated from the reſt, by ſomething extraordinary, either his ſanctity, dignity, or vows.

The word comes from the Hebrew נזר *nazar*, *to diſtinguiſh*, *ſeparate*; in which it differs from Nazarean, an inhabitant of the country called *Nazareth*, which comes from נצר *natzar*, or *netzer*, *to ſave*, *preſerve*.

In the book of Numbers, chap. vi. we find the vow of a *Nazarite* deſcribed, i. e. the vow whereby a man or woman ſeparated themſelves to the Lord; and the conditions or effects thereof as to abſtinence, &c.

NAZARITES, NAZARENES, or NAZAREANS, were likewiſe a kind of ſectaries in the church, in the firſt ages thereof.

St. Epiphanius tells us, the *Nazareans* were the ſame with the Jews in every thing relating to the doctrine and ceremonies of the Old Teſtament; and only differed from them in this, that they added Chriſtianity to thoſe; profeſſing to believe, that Jeſus Chriſt was the Meſſiah.

There were two kinds of *Nazareans*; the one *pure*, who kept the law of Moſes and Chriſtianity together, and who were not placed by the ancient Chriſtians in the regiſter of heretics, but firſt ranked in this claſs by Epiphanius, in the fourth century; the other, real EBIONITES.

Eccleſiaſtical writers tells us, that St. Matthew preached the Goſpel to the Jews at Jeruſalem, and the reſt of Paleſtine, in their own language; and that accordingly they had his Goſpel written in the Hebrew of that time. And St. Epiphanius adds, that this Goſpel was preſerved entire among the *Nazareans*; only he doubts whether they might not have retrenched the genealogy of Jeſus Chriſt, which was not in the copy of the Ebionites. St. Jerom, who tranſlated it out of Hebrew into Greek and Latin, ſays, a great many people took the Hebrew Goſpel, uſed by the *Nazareans* and Ebionites, to be the original of St. MATTHEW.

Hence Baronius, in his Annals, ſays, if the Vulgate Latin verſion were to be reformed, it ſhould rather be done by the Hebrew original, than by the Greek, which is but a copy. Caſaubon treats this opinion of Baronius as highly impious; as not being able to conceive how the authority of the Greek verſion ſhould depend on a text quite loſt. He adds, that it was never uſed by any but the *Nazareans*, Ebionites, and ſome other heretics; and that it was full of fables, as having been altered and corrupted by thoſe heretics.

The reader will find an accurate and ſatisfactory account of this Goſpel in Mr. Jones's Method of ſettling the canonical authority of the New Teſtament.

Moſheim obſerves, that the term *Nazarenes* was not originally the name of a ſect, but that which diſtinguiſhed the diſciples of Jeſus in general. Nevertheleſs, thoſe who, after their ſeparation from their brethren, retained the title of *Nazarenes*, differed much from the true diſciples of Chriſt, to whom that name had been originally given. They held that Chriſt was born of a virgin, and was alſo in a certain manner united to the divine nature; they refuſed to abandon the ceremonies preſcribed by the law of Moſes, but were far from attempting to impoſe the obſervance of theſe ceremonies upon the Gentile Chriſtians; they rejected alſo thoſe additions that were made to the Moſaic inſtitutions by the Phariſees, and the doctors of the law; and from hence we ſee the reaſon why the greateſt part of the Chriſtians treated the *Nazarenes* with a more than ordinary degree of gentleneſs and forbearance. Moſheim's Eccl. Hiſt. vol. i. p. 173. 8vo edit.

NE ADMITTAS, a writ directed to the biſhop, in behalf of the plaintiff, or defendant, in a cauſe where a quare impedit, or aſſize of darrein preſentment, its depending; when either party fears, that the biſhop will admit the other's clerk during the ſuit between them.

This writ ſhould be brought within ſix months after the church becomes void, before the biſhop may preſent by lapſe; and upon granting it, another writ is iſſued to the chief juſtice of the common pleas, to certify the king in chancery, whether there be any plea before him and the other juſtices, between the parties, &c.

NEALED, at *Sea*, is uſed when the ſounding is deep water cloſe to the ſhore: it is then ſaid to be *nealed to*; as alſo when the ſhore is ſandy, clayey, ooſy, or foul and rocky.

NEALING, or rather ANNEALING, a term uſed for the preparing of ſeveral matters, by heating or baking them in an oven, or the like.

NEALING *of glaſs* is the baking of glaſs, to dry, harden, and give it the due conſiſtence, after it has been blown, and faſhioned into the proper works.

This is uſually performed in a kind of tower, called the *leer*, built over the melting furnace. See GLASS.

NEALING *of glaſs* is alſo uſed for the art of ſtaining of glaſs with metalline colours.

One fine uſe of ſilver, ſays Mr. Boyle, was only diſcovered ſince the art of *annealing* upon glaſs came to be practiſed. For prepared ſilver, or even the crude metal, being burnt on a glaſs plate, will tinge it of a fine yellow, or golden colour. And there are ſeveral mineral earths, and other coarſe matters, of uſe in this art, which, by means of fire, impart tranſparent colours to glaſs, and ſometimes very different ones from thoſe of the bodies themſelves.

NEALING *of ſteel*, is the heating it in the fire to a blood-red heat; and then taking it out, and letting it cool gently of itſelf.

This is done to make it ſofter, in order to engrave or punch upon it. See TEMPERING, and ENGRAVING.

NEALING is alſo uſed for the art or act of burning or baking earthen or other ware in an oven.

The miners at Mendip, when they meet with a rock they cannot cut through, *anneal* it, by laying on wood and coal, and contriving the fire ſo that they quit the mine before the operation begins, it being dangerous to enter it again before it be quite cleared of the ſmoke. Phil. Tranſ. N° 39. p. 769.

NEALING *of tile* is uſed in ancient ſtatutes, for the burning of tile.

The word is formed of the Saxon *onælan*, *accendere*, *to light*, *burn*.

NEAP, or NEEP-*tides*, are thoſe tides which happen when the moon is in the middle of the ſecond and fourth quarters.

The *neap-tides* are low tides, in reſpect to their oppoſites, the ſpring-tides.

As the higheſt of the ſpring tides is three days after the full or change, ſo the loweſt of the *neap* is four days before the full or change. On which occaſion the ſeamen ſay, that it is *deep neap*. See TIDE.

NEAPED, when a ſhip wants water, ſo that ſhe cannot get out of the harbour, off the ground, or out of the dock; the ſeamen ſay, *She is neaped*, or *beneaped*.

NEAPOLITAN *diſeaſe*, a name given by many authors to the venereal diſeaſe; and from hence came the name of the *Neapolitan* ointment, which is a mixture of quickſilver, and other things, into an ointment intended as a cure fore it.

NEAR, or *No* NEAR, at *Sea*, a word of command from him that conds the ſhip, to the man at the helm, requiring him to let her fall to leeward. See No *nearer*.

NEAT, or NET-*weight*, the weight of a commodity alone, clear of the caſk, bag, caſe, and even filth. See NET, and WEIGHT.

NEBEL, or NEVEL, in the *Jewiſh Antiquities*, a kind of muſical inſtrument. See *Tab. Muſic, fig.* 7. See NABLUM.

NEBRITES, in *Natural Hiſtory*, a name given by the ancients to a ſtone held ſacred to Bacchus. It was of the browniſh yellow colour of the ſkin of the young fawn, with ſome variegations, and was ſemi-pellucid: it ſeems to have been the ſame with ſome of our agates, with a yellow ground; the ancients, however, do not appear to have been very determinate in the accounts of it; for Pliny mentions another kind of it, which was black.

NEBRUS, in *Natural Hiſtory*, a name given by the ancients to the *hinnuleus*, a deer of one year old. In the next year it is called *pattalia*; in the third *dicrota*; and in the fourth *cladii*; the word *ceraſtæ* was uſed as the name of this animal when of a greater age than this.

NEBULGEN, a word uſed by ſome of the chemical writers, to expreſs what they call a ſalt generated by the moiſture of the air falling upon the ſtones in the fields, and there indurated by the heat of the ſun into the form of a dry ſalt.

NEBULOUS, *cloudy*, in *Aſtronomy*, a term applied to certain of the fixed ſtars, which ſhew a dim, hazy light; being leſs than thoſe of the ſixth magnitude, and therefore ſcarce viſible to the naked eye, to which at beſt, they only appear like little duſky ſpecks or louds.

Through a moderate teleſcope, theſe *nebulous* ſtars plainly appear to be congeries or cluſters of ſeveral little ſtars.

In the *nebulous* ſtar, called *Præſepe*, in the breaſt of Cancer, there are reckoned thirty-ſix little ſtars, three of which Mr. Flamſteed gives us in his Catalogue.

In the *nebulous* ſtar of Orion are reckoned 21. F. le Compte adds, that in the Pleiades are 40; 12 in the ſtar in the middle of Orion's ſword; in the extent of two degrees of the ſame conſtellation, 500; and 2500 in the whole conſtellation. See ORION, &c.

NEBULY, *nebulée*, in *Heraldry*, when a coat is charged with ſeveral little figures, in form of clouds, running within one another; or when the outline of a bordure, ordinary, &c. is indented, or waved; as repreſented in *Tab. Herald. fig.* 32. See NEBULOSA *linea*.

NECESSARIANS denote thoſe who are advocates for the doctrine of *philoſophical* NECESSITY.

NECESSARIO, in the *Italian Muſic*. The word is prefixed to certain parts in muſic, as *a doi violini neceſſario*, i. e. *that muſt be played by two violins*; *canto neceſſario* is uſed to ſignify much the ſame as CONCERTANTE.

Every mode has certain chords, which may be called its neceſſary, or eſſential chords.

NECESSARY, in a philoſophical ſenſe, that which cannot but be, or cannot be otherwiſe.

The ſchoolmen make a great many kinds or diviſions hereof: as, *neceſſary in cauſing*; when their is a cauſe from which an effect muſt neceſſarily follow: *neceſſary in predicating*; *neceſſary in being*, &c.

There is alſo a *logical neceſſary*; *phyſical neceſſary*; and there are *metaphyſical* and *moral neceſſaries*.

NECESSITY, what is done by a neceſſary cauſe, or a power that is irreſiſtible.

In this ſenſe *neceſſity* ſtands oppoſed to LIBERTY.

Neceſſity is uſually confounded with conſtraint; yet, in effect, *neceſſity*, according to Rochefoucault, differs from conſtraint in this, that the former is joined with the pleaſure and inclination of the will, to which conſtraint is contrary.

Simplicius, after Plato and Epictetus, diſtinguiſhes two kinds of *neceſſity*; the one *violent* or *coactive*, which is oppoſite to liberty; the other *ſpontaneous* or *voluntary*, very conſiſtent with it: this latter adds he, is that which neceſſitates all things conſiſtent with their nature, as being connatural to them; ſince αυτοκινητον, a thing that is ſelf-moved, muſt of *neceſſity* be moved according to its own nature, i. e. ſpontaneouſly. This diſtinction is admitted by many of the divines, particularly by St. Auguſtine, who urges it againſt the Pelagians, as is ſhewn by Janſenius.

The ſchools diſtinguiſhes a *phyſical neceſſity*, and a *moral neceſſity*; and a *ſimple abſolute neceſſity*, and a *relative* one.

NECESSITY, *phyſical*, is the want of a principle, or of a natural means neceſſary to act; which is otherwiſe called a *phyſical* or *natural impotence*.

NECESSITY, *moral*, is only a great difficulty; ſuch as that ariſing from a long habit, a ſtrong inclination, or violent paſſion.

NECESSITY, *ſimple*, or *abſolute*, is that which has no dependence on any ſtate or conjuncture, or any particular ſituation of things, but is found every where, and in all the circumſtances in which the agent can be ſuppoſed.

Such is in a blind man the *neceſſity* he is under of not diſtinguiſhing colours.

NECESSITY, *relative*, is that which places a man in a real incapacity of acting, or not acting, in thoſe circumſtances, and that ſituation he is found in; though in other circumſtances, and another ſtate of things, he might act, or not act.

Such, in the opinion of the Janſeniſts, is the *neceſſity* of doing evil in a man, who, with a violent paſſion, has only a feeble grace to reſiſt it; or the *neceſſity* of doing well in a man, who, having grace of ſeven or eight degrees of ſtrength, has only concupiſcence of two or three degrees to withſtand.

All theſe kinds of *neceſſity* are oppoſite to liberty; ſince, even in the laſt, it is as impoſſible for a man to act, or not act, as if he were in a ſtate of *abſolute*, *ſimple*, and *phyſical neceſſity*.

The ſchoolmen admit other ſpecies of *neceſſity*; *antecedent*, *concomitant*, *conſequent*, &c.

NECESSITY, *antecedent*, is that ariſing from an antecedent cauſe, neceſſarily operating. Such is the *neceſſity* of the ſun's riſing to-morrow morning.

NECESSITY, *concomitant*, ariſes from an antecedent and neceſſary cauſe, but depends on the circumſtances of the effect; the effect all the while being free. Thus it is neceſſary Peter ſit, ſuppoſing he his ſitting.

NECESSITY, *metaphyſical* or *philoſophical*, is a term that has been much uſed by modern writers; and which ſome have defined to be, that by which a thing cannot but be, or whereby it cannot be otherwiſe. But a much approved author on this ſubject objects againſt this definition, and obſerves, that *philoſophical neceſſity* is really nothing elſe than the full and fixed connexion between the things ſignified by the ſubject and predicate of a propoſition, which affirms ſomething to be true; ſo that it is in no reſpect different from their certainty. When there is ſuch a connection, then the thing affirmed in the propoſition is neceſſary in a philoſophical ſenſe; whether any oppoſition or contrary effort be ſuppoſed or ſuppoſable in the caſe, or no. When the ſubject and predicate of the propoſition, which affirms the exiſtence of any thing, either ſubſtance, quality, act, or circumſtance, have a full and certain connexion, then the exiſtence of that thing is ſaid to be neceſſary in a metaphyſical ſenſe.

Thoſe that are commonly called *Neceſſarians* allow no other liberty to man, that is not reſtained by this kind of *neceſſity:* and when they conſider intelligent beings as the ſubjects of it, ſome of them diſtinguiſh it into *moral* and *natural neceſſity*. *Moral neceſſity* is uſed in a variety of ſenſes: ſometimes for a *neceſſity* of moral obligation; and often for great obligation in point of intereſt: ſometimes by *moral neceſſity* is meant that apparent conection of things, which is the ground of moral EVIDENCE; and ſo it is diſtinguiſhed from *abſolute neceſſity*, or that ſure connection of things, that is a foundation for infallible certainty: and ſometimes by *moral neceſſity* is meant that *neceſſity* of connection and conſequence, which ariſes from ſuch moral cauſes as the ſtrength of inclination or motives, and the connection, ſubſiſting in many caſes, between theſe and certain volitions and actions. By *natural neceſſity*, as applied to men, they underſtand ſuch *neceſſity* as men are under, through the force of natural cauſes; in contradiſtinction to thoſe that are called moral cauſes, ſuch as habits and diſpoſitions of the heart, and moral inducements and motives.

Mr. Hobbes, who is ſaid to have been the firſt who underſtood and maintained the proper doctrine of *philoſophical neceſſity*, gives the following account of it, in his Leviathan, p. 108. Liberty and *neceſſity* are conſiſtent: as in the water, that hath not the liberty, but a *neceſſity* of deſcending in the channel; ſo likewiſe in the actions which men voluntary do, which, becauſe they proceed from their will, proceed from liberty; and yet, becauſe every act of man's will, and every deſire and inclination, proceedeth from ſome cauſe, and that from another cauſe, in a continual chain (whoſe firſt link is in the hand of God, the firſt of all cauſes), proceed from *neceſſity:* ſo that to him, who could ſee the connections of thoſe cauſes, the *neceſſity* of all men's voluntary actions would appear manifeſt: and, therefore, God, that ſeeth and diſpoſeth all things, ſeeth alſo, that the liberty of man, in doing what he will, is accompanied with the *neceſſity* of doing that which God will, and no more or leſs; for though men may do many things, which God does not command, nor is, therefore, the author of them, yet they can have no paſſion, will, or appetite to any thing, of which appetite God's will is not the cauſe: and did not his will aſſure the *neceſſity* of man's will, and conſequently of all that on man's will dependeth, the liberty of men would be a contradiction and impediment to the omnipotence and liberty of God.

Mr. Collins, one of the moſt admired writers on the ſubject of *neceſſity*, has ſtated the queſtion concerning human liberty in the following manner: man, he ſays, is a neceſſary agent, if all his actions are ſo determined by the cauſes preceding each action, that not one paſt action could poſſibly not have come to paſs, or have been otherwiſe than it hath been; nor one future action can poſſibly not come to paſs, or be otherwiſe than it ſhall be. But he is a free agent, if he is able, at any time, under the circumſtances and cauſes he then is, to do different things; or, in other words, if he is not unavoidably determined, in every point of time, by the circumſtances he is in, and cauſes he is under, to do that one thing he does, and not poſſibly to do any other. According to this ſtate of the queſtion, he undertakes to prove, that man is a neceſſary agent; and that there neither is nor can be ſuch thing as liberty. 1. He appeals to experience; alledging, that, though the vulgar urge this in proof of liberty, it is not a proof of it: that many celebrated philoſophers and theologers, both ancient and modern, have given definitions of liberty, that are conſiſtent with fate or *neceſſity:* that ſome great patrons of liberty do, by their conceſſions in this matter, deſtroy all arguments from experience: that all the actions of men may be ranked under the four heads of perception, judging, willing, and doing as we will; and that experience does not prove any of theſe to be free; and that experience not only does not prove liberty, but, on the contrary, men may ſee by experience, that they are neceſſary agents. It is, ſays he, matter of experience, that man is ever determined in his willing; we experience perfect *neceſſity*; and they, who think liberty a matter of experience, yet allow that the will follows the judgment of the underſtanding, and that when two objects are preſented to a man's choice, one whereof appears better than the other, he cannot chuſe the worſt. 2. Man is a neceſſary agent, becauſe all his actions have a beginning; for whatever has a beginning muſt have a cauſe, and every cauſe is a neceſſary cauſe: and if any action whatſoever can be done without a cauſe, then effects and cauſes have no neceſſary relation; and, conſequently, we ſhould not be neceſſarily determined in any caſe at all. 3. Liberty would not be a perfection, but an imperfection; whereas, on the contrary, *neceſſity* is an advantage and a perfection. 4. Liberty is inconſiſtent with the Divine preſcience; for if God foreknows the exiſtence of any thing, as it depends on its own cauſes, that exiſtence is no leſs neceſſary than if it were the effect of his decree: for it no leſs implies a contradiction, that cauſes ſhould not produce their effects, than that an event ſhould not come to paſs that is decreed by God.

This argument for *neceſſity* has been urged by a variety of writers; and the advocates for liberty have felt its force, and endeavoured to obviate it. Some have actually given up the Divine preſcience; ſome have allowed the ſeeming contradiction, implied in the foreknowledge of a contingent event, and have acknowledged themſelves incapable of removing it: others have endeavoured to reconcile the foreknowledge of God and the liberty of man, by alledging, that there is a great difference between God's foreknowledge and his decrees, with regard to the *neceſſity* of future events; for God's preſcience has no influence at all on our actions: his infallible judgment, concerning contingent truths, does no more alter the nature of the things, and cauſe them to be neceſſary, than our judging right, at any time, concerning a contingent truth, makes it ceaſe to be contingent; or, than our ſenſe of a preſent truth is any cauſe of its being true or preſent.

In the argument, ſays Dr. Clark, drawn againſt liberty from the divine preſcience, it muſt not firſt be ſuppoſed that things are in their own nature neceſſary; but from the divine preſcience or power of judging infallibly (which power is as much more extenſive and infallible than in man, as the divine nature and underſtanding are ſuperior to ours), concerning free events, it muſt be proved, that things otherwiſe ſuppoſed free, will, therefore, unavoidably become neceſſary, which can no more be proved, than it can be proved that an action, ſuppoſed at this preſent time to be free, is yet (contrary to the ſuppoſition) at the ſame time neceſſary; becauſe, in all paſt time, whether foreknown or not foreknown, it could not, upon that very ſuppoſition of its being now freely done, but be future.

In another place he acknowledges, that, though it is impoſſible for us to explain diſtinctly the manner how God can foreſee future events, without a chain of neceſſary cauſes, yet we may form ſome general notion of it. For, as a man, who has no influence over another perſon's actions, and yet often perceives before hand what that other will do; and a wiſer and more experienced man will ſtill, with greater probability, foreſee what another, whoſe diſpoſition he is perfectly acquainted with, will, in certain circumſtances do; and an angel, with ſtill much leſs degree of error, may have a farther proſpect into men's future actions: ſo it is very reaſonable to apprehend, that God, without influencing men's wills, by his power, yet by his foreſight cannot but have as much more certain a knowledge of future free events than either men or angels can poſſibly have, as the perfection of this nature is greater than that of theirs. The certainty of foreknowledge, ſays this excellent writer, does not cauſe the certainty of things, but is itſelf founded on the reality of their exiſtence; nor does it imply any other certainty than ſuch as would be equally in things, though there was no foreknowledge; nor again does this certainty of event, in any ſort, imply *neceſſity*. To the ſame purpoſe, Origen has long ago obſerved, that preſcience is not the cauſe of things future, but their being future is the cauſe of God's preſcience that they will be.

It cannot reaſonably be diſputed, that there is an eſſential difference between the foreknowledge and permiſſion of events, and the preordination and production of them; and the ſcheme of *neceſſity* ſeems directly to charge God with being the efficient cauſe or author of thoſe vices and evils, which ariſe from circumſtances and connections of his previous and abſolute appointment. Indeed, many of the advocates of this ſcheme will not admit the conſequence that ſeems to be fairly deducible from their opinion: however, Dr. Prieſtley very candidly allows it. It certainly, (ſays he) ſounds harſh to vulgar ears to ſay, that in all thoſe crimes that men charge themſelves with, and reproach themſelves for, God is the agent: and that, in ſuch caſes, they are in reality no more agents than a ſword is an agent when employed to commit a murder. It does require ſtrength of mind not to ſtartle at ſuch a concluſion; but then it requires nothing but ſtrength of mind; i. e. ſuch a view of things as ſhall carry us beyond falſe and fallacious appearances.

5. Another argument in favour of *neceſſity* is the following: if a man was not a neceſſary agent, determined by pleaſure and pain, there would be no foundation of rewards and puniſhments, which are the eſſential ſupports of ſociety. Theſe would be uſeleſs, becauſe if men were free or indifferent to pleaſure and pain, they could be no motives to a man to do or forbear any action.

6. Another argument of this ſame kind is deduced from the nature of morality: for if a man was not a neceſſary agent, determined by pleaſure and pain, he would have no notion of morality, or motive to practice it; and if he were indifferent to pleaſure and pain, he would have no rule to go by, and might never judge, will, and practiſe right. Every act of the will, it is ſaid, is excited by ſome motive, which motive is the cauſe of that act: and if volitions are properly the effect of motives: then they are neceſſarily connected with their motives: whence it is inferred, that volition is neceſſary, and doth not proceed from any ſelf-determining power in the will. This argument has been illuſtrated and urged in all its force by many modern writers, from M. Leibnitz to Dr. Prieſtley, the laſt and moſt zealous advocate for *neceſſity*: and it has often been anſwered by Dr. Clarke and others, who have ſtrenuouſly maintained, that liberty is perfectly conſiſtent with men's acting from a regard to motives.

Suppoſing, ſays Dr. Price, a power of ſelf-determination to exiſt, it is by no means neceſſary that it ſhould be exerted without a regard to any end or rule: on the contrary, it can never be exerted without ſome view or deſign. Whoever acts, means to do ſomewhat. The power determining ourſelves by the very nature of it, wants an end to rule or guide it; and no probability or certainty of its being exerted agreeably to a rule, can have the leaſt tendency to infringe or diminiſh it. All that ſhould be avoided here, is the intolerable abſurdity of making our reaſons and ends, in acting, the phyſical cauſes or efficients of action. This is the ſame with aſcribing the action of walking, not to the feet, or the power which moves the feet, but to the eye, which only ſees the way. The perception of a reaſon for acting, or the judgment of the underſtanding, is no more than ſeeing the way: it is the eye of the mind, which informs and directs; and whatever certainty there may be, that a particular determination will follow, ſuch determination will be the ſelf-determination of the mind; and not any change of its ſtate ſtamped upon it, over which it has no power, and in receiving which, inſtead of being an agent, it is merely a paſſive ſubject of agency. Although the views and ideas of beings may be the occaſion of their acting; yet it is a contradiction to make them the mechanical efficients of their actions: ſo neceſſary and important is the diſtinction inſiſted upon by Dr. Clarke, between the operation of phyſical cauſes and the influence of moral reaſons.

Upon the whole, the queſtion concerning liberty is not, whether the views or ideas of beings influence their actions, but what is the nature of that influence. If we ſay, that it is ſome kind of mechanical or phyſical efficiency; or, with Dr. Prieſtley, after Hobbes and Leibnitz, that man has no other liberty, in following motives, than water has in running down hill, or than the arms of a ſcale, preſſed by weights, have in riſing and falling; then it muſt follow, that man never acts; and it muſt be folly to applaud or reproach ourſelves for our conduct; and there is an end of all moral obligation and accountableneſs.

However the Neceſſarians do not allow theſe conſequences; but, on the contrary, maintain, that the doctrine of the neceſſary influence of motives upon the mind of man, makes him the proper ſubject of diſcipline, reward and puniſhment, praiſe and blame, both in the common and philoſophical uſe of the words; and that the doctrine of ſelf-determination, independently of the influence of motives, entirely diſqualifies a man from being the proper ſubject of them.

Mr. Edwards, an acute writer on this ſubject, has endeavoured to prove, that liberty of indifference is not only not neceſſary to virtue, but utterly inconſiſtent with it; and that all habits and inclinations, whether virtuous or vicious, are inconſiſtent with the Arminian notions of liberty and moral agency. And Dr. Prieſtly obſerves, that the ſenſe of ſelf-reproach and ſhame is excited by our finding that we have a diſpoſition of mind leading to vice, and on which motives to virtue, in particular caſes, have had no influence. If we aſk, whence proceeds that diſpoſition, and how it comes to paſs, that motives to virtue had not a greater influence, we muſt ultimately aſcribe the inefficacy of the one, and the evil tendency of the other, to God, who made us what we are, and placed us in the ſituation which we occupy. Dr. Prieſtley overcomes this difficulty by alledging, that the diſtinction between things natural and moral entirely ceaſes in the ſcheme of *neceſſity*; that the vices of men come under the claſs of common evils, producing miſery for a time, but, like all other evils, in the ſame great ſyſtem, ultimately ſubſervient to greater good. In this light, he ſays, every thing without diſtinction may be aſcribed to God. However, he acknowledges, that this is a view of moral evil, which, though innocent and even uſeful in ſpeculation, no wiſe man can or would chuſe to act upon himſelf, becauſe our underſtandings are too limited for the application of ſuch a means of good; though a being of infinite knowledge may introduce it with the greateſt advantage. If there be any foundation for the doctrine of *neceſſity*, i. e. if all events ariſe from preceding ſituations, and the original ſituations of all things, together with the laws by which all changes of ſituation take place, were fixed by the Divine Being, there can be no difference whatever, with reſpect to his cauſation of one thing more than another, and even whatever takes place in conſequence of his withholding his ſpecial and extraordinary influence, is as much agreeable to his will as what comes to paſs in conſequence of the general laws of nature. But our ſuppoſing that God is the author of ſin (as by the ſcheme of *neceſſity* he muſt in fact be the author of all things), by no means implies, that he is a ſinful being; for it is the diſpoſition of mind, and the deſign, which conſtitute the ſinfulneſs of an action. If, therefore, his diſpoſition and deſign be good, what he does is morally good. To the ſame purpoſe he obſerves, that the proper foundation, or rather the ultimate object of virtue is general utility; ſince it conſiſts of ſuch conduct as tends to make intelligent creatures the moſt truly happy in the whole of their exiſtence; though, with reſpect to the agent, no action is denominated virtuous, that is not voluntary, or that does not proceed from ſome good motive. And this reaſoning he applies to the Deity, who purſues the happineſs of his creatures by ſuch means as are beſt calculated to ſecure that end, and which are ſanctified by it. And he farther adds, that the Deity may adopt ſome things, which he would not have choſen on their own account, but for the ſake of other things, with which they were neceſſarily connected.

The ſcriptures, according to this laſt writer, are favourable to the doctrine of *neceſſity*; though he does not think that the ſacred writers were, ſtrictly ſpeaking, Neceſſarians, for they were not philoſophers: but their habitual devotion led them to refer all things to God, without reflecting to the rigorous meaning of their language; and very probably, had they been interrogated on the ſubject, they would have appeared not to be apprized of the proper extent of the Neceſſarian ſcheme, and would have anſwered in a manner unfavourable to it.

The reader who is deſirous of being farther acquainted with the reaſoning of different writers on this ſubject, may conſult the Collection of Papers between Leibnitz and Clarke, 1717. Collins's Philoſophical Inquiry concerning human Liberty, 1735, 3d. ed. with Clarke's Anſwer. Edwards on the Freedom of the Will, 8vo. 1775, 4th ed. Prieſtley's Doctrine of Philoſophical Neceſſity, 8vo. 1777. Correſpendence between Dr. Price and Dr. Prieſtley, 8vo. 1778. Hartley's Obſervations on Man, 8vo. 1749. See Leibnitzian *philoſophy*, and Liberty.

NECK, a part in the human body, and in that of ſeveral other animals, between the head and the thorax, or trunk of the body. See *Tab. Anat.* (*Oſteol.*) *fig.* 3. *n.* 1. 1. *fig.* 7. *n.* 14. 14.

All animals have *necks*, which have lungs and voice, excepting frogs, and one claſs of fiſhes, whoſe characteriſtic it is, vocem aliquam emittere.

The upper part before it is called the *throat*; and the lower part the *pomum Adami*. The hole between the two clavicles is called the *jugulum*, by the Greeks σφαγη, *murder*; it being very eaſy to kill in this part. The hind part of the *neck* is called *cervix*; and the hole between the firſt and ſecond vertebra, the *nape*; and that underneath, *epomis*.

Its natural parts commence from the bottom of the ears, and are called *parotides*.

The inner parts of the *neck* are ſeven vertebræ, the trachea, larynx, pharynx, part of the œſophagus, jugular, cervical, and vertebral viens, carotid, vertebral, and cervical arteries, the intercoſtal nerve, the eighth, ninth, and tenth pair, the ſeven cervical pairs, the greater ſympathetic nerves, the portio dura of the auditory nerves, and ſeveral muſcles. See each part under its proper article.

Neck, *Derby*. See Bronchocele.

Neck, *fracture of the*. The proceſſus dentatus of the ſecond vertebra is tied to the ſkull by a ligament, and kept cloſe to the fore part of the firſt vertebra by another in that vertebra, that it may not bruiſe the ſpinal marrow: when either this ligament or proceſs is broken, it makes that ſort of fractured *neck*, whoſe conſequence is ſudden death.

Neck, *luxation of the*. A luxation between the head and upper vertebra is immediate death, on account of the preſſure on the medulla oblongta, or medulla ſpinalis. But the *neck* is generally diſlocated partially, in which caſe it ſwells, the countenance is bloated, the chin lies upon the breaſt, and the face is uſually turned towards one ſide. To reduce this luxation, the patient is to be immediately laid flat on the ground or floor, then the ſurgeon, laying hold of his head, is to extend it ſtrongly, gently moving it from ſide to ſide, till he finds that the *neck* is reſtored to its natural poſture. Mr. Petit mentions another method by means of ſlings; but Heiſter gives the preference to the former method, both as being more ſimple, and becauſe the patient can be relieved much ſooner.

Neck, *wry*, a deformity, uſually brought into the world with people; but ſometimes occaſioned by accidents afterwards. When it is from the birth, there is very little reaſon to expect relief, becauſe the vertebræ of the *neck* are rendered crooked by that poſture, while the bones are in a ſoft and pliable ſtate. There are, however, in the writings of ſurgeons, ſome inſtances of this diſorder, even in theſe circumſtances, being cured after twelve, ſixteen, or eighteen years.

When this diſorder comes on adults, it is occaſioned generally either by the contraction of the ſkin from a burn on one ſide, or from a ſtrong ſpaſmodic contraction of one of the maſtoide muſcles, which will at length become ſhorter and indurated, by continuing in that poſture; or it may proceed from a relaxation of one or more of thoſe muſcles, in conſequence of which the *neck* will be contracted by the ſtronger antagoniſt muſcle, on the oppoſite ſide; or laſtly, it may proceed from a preternatural ligament drawing down the head. And when either of theſe is the occaſion of the diſorder, there is hope of a cure; eſpecially if the patient be young, and if this diſorder be not of long ſtanding.

If this diſorder be recent, and cauſed by a defluxion of humours, evacuating medicines, with mild ſudorifics, and heat may be of ſervice; but when it ariſes from a contraction of the ſkin or muſcles, by burning, the repeated uſe of oils, ointment, and fomentations, may relax ſo far as to make a cure; a proper firm bandage muſt likewiſe be applied to pull the head toward the natural poſture, and a ſteel collar may be contrived, by which the patient may be ſuſpended very frequently till the *neck* recover its proper poſition: but when all theſe fail, the manual aſſiſtance of the ſurgeon is to be called in. If the ſkin is contracted by a burn, it muſt be carefully incided tranſverſely in ſeveral places, and the inciſions dreſſed ſo as to keep them open and dilated, and the head pulled to its proper poſition by a bandage, till the new fleſh, filling up theſe inciſions, gives room for the head to ſtand even; but if the *wry neck* proceeds from a contraction of one of the maſtoide muſcles, or from ſome ligament, they are to be divided by a tranſverſe inciſion in their lower part, near the clavicle or ſternum.

Neck, *wounds of the*. There are ſeverally ſorts of wounds in the *neck*; ſometimes the ſeat of the wound is only in the common integuments, and muſcular fleſh; this is attended with very little danger: but the moſt dangerous, and, indeed, generally incurable wounds, are thoſe of the larger blood-veſſels in theſe parts: ſuch are thoſe of the jugular veins, and carotid and vertebral arteries; or where the aſpera arteria is wounded, or the gula, the medulla ſpinalis, the nerves that deſcend by the *neck*, or when ſeveral of theſe parts are wounded at the ſame time.

Wounds of the arteries of the *neck* are ſcarce ever to be remedied. The patient uſually bleeds to death, before a ſurgeon can be had in theſe caſes; but even if a ſurgeon were preſent at the inſtant the wound was inflicted, the largeneſs of the arteries, their vicinity to the heart, and the impoſſibility of making a ſufficient preſſure upon the wounded veſſel, in this part, give but little hope of relief.

Wounds in the external jugular veins are not of great danger, if a ſurgeon be applied to in time; but wounds in the internal jugulars are very dangerous, partly from their ſize, which is of the thickneſs of one's finger, and partly from their ſituation, which is ſo deep, that no proper application can reach them to any advantage.— Wounds in this vein are uſually eſteemed mortal, but it is ſometimes poſſible to ſave life in this caſe.

Wounds of the aſpera arteria, or windpipe, are uſually deemed mortal, where the windpipe is entirely divided, or is wounded in its lower part, within the cavity of the thorax, or joined with a wound of the carotid arteries, or internal jugulars, which is frequently the caſe; but if the windpipe is only wounded in its fore-part, and the neighbouring veſſels remain unhurt, it is uſually found curable.

Wounds of the gula, or œſophagus, afford very little hopes of recovery where it is much wounded, or entirely divided, becauſe, in this caſe, not only the office of deglutition is cut off, but the part is ſo ſituated, that it is impoſſible almoſt to wound it, without injuring, at the ſame time, ſome of the neighbouring nerves, and blood-veſſels: but when the gula only is wounded, and the wound ſmall, there is ſome hope of recovery.

Wounds in the medulla ſpinalis, in one part, are very dangerous, but more particularly ſo when inflicted on that part of it which preſſes through the *neck*. It is no wonder, therefore, that ſcarce any recover after a conſiderable wound of this kind; which it is impoſſible ſhould happen without wounding the vertebral veins and arteries at the ſame time; and the ſituation of the part is ſuch, that it is impoſſible to convey proper remedies to them. Nor are wounds of the large nerves of the *neck* leſs dangerous than theſe; for, if they were divided, the parts of the thorax and abdomen, to which nature has determined them, immediately loſe their aſſiſtance, and of conſequence become unequal to the offices for which they were intended.

For the cure of wounds in the *neck*, the method is as different as the nature of thoſe wounds. Where integuments and muſcular fleſh alone are wounded, the common method of curing ſlight wounds takes place. Where the external jugular is hurt, the ſame methods uſed after bleeding in that vein prove ſufficient. When the internal jugular has received a ſmall wound, the hæmorrhage will be eaſily ſtopped by filling the wound well with dry lint; or with the puft ball, or duſty muſhroom, lodging, over theſe applications, ſquare bolſters, and ſecuring all with a bandage, drawn as tight as the nature of the part will admit: where this method does not take place, the ſurgeon ſhould make a proper preſſure on the wounded part with his finger, till the hæmorrhage is entirely ſtopped. The ſame methods muſt be uſed to the wounds of the vertebral veins; and when the hæmorrhage is once ſtopped, the dreſſings applied are not to be removed for three days, and then a vulnerary balſam and plaſter applied to heal the wound. In large wounds, or an entire diviſion of the internal jugular, the ſurgeon, if preſent in time, ſhould make a firm preſſure with his finger, on the wounded part, and make inciſions lengthways, above the wound, till he can get at the veſſel, and then make a firm ligature upon it, by means of a crooked needle.

In caſe of a wound of the carotid artery, a ſurgeon, if preſent in time, ſhould uſe the ſame method as in thoſe of the internal jugular vein. This method is more likely to have ſucceſs in wounds on the upper and middle part of that veſſel, than in thoſe of the lower part of it; and where the wound is not in the trunk of the artery, but in one of its branches near the head, you ſhould fill up the wound with lint dipt in ſome ſtyptic liquor, and then cover it up with thick compreſſes, ſecuring all with a tight bandage, and ordering an aſſiſtant to make a preſſure upon the part with his hand, for ſome time after; and in theſe caſes, the dreſſings are not to be removed till the third or fourth day.

In curing the wounds of the aſperia arteria, the ſurgeon ought to clean the wound, and then endeavour to unite the parts by the help of ſticking plaſters; or, where the wound is large, by making two ſtitches with a crooked needle, drawing up the wound afterwards in the uſual manner, and enjoining the patient to keep his head in a proper ſituation, that is, ſomewhat bending downwards. The wound thus treated, if it has been made either by puncture, or by the cutting of a ſharp inſtrument, will eaſily heal; but if it has been made by a bullet, and any part of the aſpera arteria is carried away, the ſuture is to no purpoſe; wounds of this kind are only to be dreſſed with the vulnerary balſams. If the aſpera arteria is entirely divided, and the lower end of it has ſhrunk into the cavity of the thorax, ſo that it cannot be laid hold on, there can be no remedy.

When the œſophagus is wounded, what is taken in at the mouth comes out through the wound, and the patient is uſually affected with hiccoughs and vomitings. Where this is entirely divided, there is no remedy; but where it is only perforated, or wounded in part, the cure may be attempted by dreſſing it with the vulnerary balſams, endeavouring to unite it by means of ſticking plaſters, and enjoining the patient a ſtrict abſtinence for ſome days, and giving nouriſhing glyſters of broth, milk, &c. If nouriſhment muſt be taken at length by the mouth, the wound muſt be perfectly cleaned every time afterwards, and be dreſſed daily till it heals. Wounds of the medulla ſpinalis are beſt dreſſed with balſam of Peru, or medicines of a like nature, mixed with a ſmall quantity of honey of roſes, and ſpread upon pledgits, and applied moderately warm. Slight wounds of this kind are ſometimes healed by this means; but large ones in this part always bring on certain death. Heiſter's Surg. p. 84.

In the Memoirs de l'Acad. Royale des Sciences, ann. 1730. we have ſome curious obſervations, by Mr. Winſlow, on the motions of the *neck*, and alſo on thoſe of the head and ſpine.

Necks, *the, of quadrupeds*, Dr. Derham obſerves, are always equal to the length of their legs: this is contrived by nature, to enable them to reach the ground for their food without ſtooping the body.

Indeed the elephant is an exception from the rule; its *neck* is very ſhort; but then it has a peculiar proviſion by a proboſcis or trunk.

Another thing remarkable in the *necks* of graminivorous quadrupeds is a ſtrong, tendinous, and inſenſible aponeuroſis, or ligament, braced from the head to the middle of the back; by means whereof they are enabled conſtantly to hold down the head, though very heavy, to gather their food without pain or labour.

Necks, *the, of birds*, are longer than thoſe of any other animal; and longer in ſuch as have long legs than in thoſe that have ſhort, either for gathering up their meat from the ground, or ſtriking their prey in the water, except in web-footed fowl, which are, by reverſing their bodies, deſtined to ſearch for food, at the bottom of waters: birds, and eſpecially thoſe that have long *necks* have the power of retracting, bending, or ſtretching them out in order to change their centre of gravity, from their legs to their wings.

Neck *verſe*, the Latin ſentence, *Miſerere mei Deus*, was thus called, becauſe the reading of it was made a teſt, by which to diſtinguiſh thoſe who, in preſumption of law, were qualified in point of learning, and admiſſible to benefit of clergy: but this ground of diſtinction was ſet aſide by 5 Ann. cap. 6. See Clergy.

Neck, in the *Manege*. See Carrying.

Neck, *of the caſcabel*, in *Artillery*, is that part betwixt the breech mouldings and the *caſcabel*.

Neck *of a gun* is that part between the muzzle mouldings and the cornice-ring.

NECKIB-*el-eſheraf*, in Egypt, the head of the ſherif, or relations of Mahomet, who has the great cognizance of their actions, and the power of inflicting puniſhments upon them.

NECKLACE *ſnake*. See Snake.

NECOPHORON, in *Botany*, a name uſed by Pliny, and other authors, for the *ſmilax aſpera*, or *rough bindweed*.

NECROLIUM, a word uſed by ſome of the alchemical writers to expreſs a remedy almoſt always capable of averting death, and continuing life to its utmoſt period.

NECROLOGY, *necrologium*, formed of νεκρος, *dead*, and λογος, *diſcourſe*, or *enumeration*, a book anciently kept in churches and monaſteries; wherein were regiſtered the benefactors to the ſame, the time of their deaths, and the days of their commemoration; as alſo the deaths of the priors, abbots, religious, canons, &c.

This was otherwiſe called *calendar* and *obituary*.

NECROMANCY, formed from νεκρος, *dead*, and μαντεια, *inchantment* or *divination*, the art, or act of communicating with devils, and doing ſurpriſing feats by their aſſiſtance; particularly of calling up the dead, and extorting anſwers from them. See Magic.

NECROSIS, νεκροσις, in *Medicine*, a complete mortification of any part; called alſo *ſideratio*, and SPHACELUS.

NECTAR, νεκταρ, among the *Ancient Poets*, the drink of the fabulous deities of the heathens. See Ambrosia.

Nectar, is alſo uſed, by ſome of the ancients, to expreſs HONEY: this ſignification of the word was owing to the ſuppoſition that honey was the drink of the bees, as they eſteemed the yellow matter collected on their thighs to be their food. They called the latter ambroſia. It ſeems that the ancients have been more in the right as to their opinion of the ambroſia than other authors, who have uſually eſteemed that yellow ſubſtance to be true wax: but it appears from experiments, that it is not really ſo; nor can wax be ſeparated from it by any of the known proceſſes of chemiſtry. It ſeems rather that the bees eat it, agreeably to the opinion of the ancients, and that after having ſerved them as nouriſhment, it is converted in the bowels into the ſubſtance we call wax.

NECTARINE, a fruit greatly eſteemed for its delicious flavour, and ſuppoſed to have its name from the nectar of the Gods, in heathen ſtories.

It differs in nothing from the peach, but in having a ſmoother ſkin and a firmer pulp.

We have ten kinds of *nectarine* cultivated by the curious in gardening; viz. Fairchild's early *nectarine*, ripening in the end of July; the Ebruge, Newington, ſcarlet, Brugnon or Stalian, and Roman, which ripen in Auguſt; the murry, golden, and Temple's, which ripen in September; and the Peterborough, or late green *nectarine*, which ripens about the middle of October.

The inſects in *nectarines* may be deſtroyed in the ſame manner as thoſe of PEACH *trees*.

The pruning, planting, and whole culture of this plant, are the ſame with that of the PEACH.

NECTARIUM, among *Botaniſts*, expreſſes what is only a part of the corolla, ſometimes, though more rarely the whole. It is a part deſtined for the reception of the honey juice of the plant; and very various in its figure. Sometimes, it is only a hollow in a petal; ſometimes it is a little ſquamma; ſometimes a tubercle; and ſometimes a plain tube.

NECUIA, in *Botany*, a name given by the ancient Greeks to a ſpecies of MULLEIN.

The Greeks and Romans both uſed the ſtalks of a peculiar kind of *mullein*, called *thryallis* by Nicander. For the making of wicks of lamps, we have a kind of *mullein*, called *lychnites*, and candlewick *mullein*, from the λυχνιτης of Dioſcorides; but it is not certain that our's is the ſame plant.

The ancients uſed the ſtalks of many different plants for the wicks of their candles and lamps. The ruſh, ſtripped of its bark, was as commonly in uſe with them as with us for this purpoſe; and they alſo uſed the nettle, this *mullein*, and many other plants, whoſe ſtalks were compoſed of tough filaments, for the ſame purpoſe; beating them out like hemp, and when dry, dipping them in melted reſin, and other ſuch inflammable ſubſtances. When thus prepared, they are readily inflammable, like our flambeaux, and this *mullein*, having ſtalks more long and large, and more firm than all the others, was uſed to make thoſe lights with which they ſet fire to the funeral pile for conſuming the aſhes of their dead friends.

NECYDALIS, in the *Linnæan Syſtem*, is a genus of the *coleoptera* order of inſects, diſtinguiſhed by having the antennæ ſetaceous, the exterior wings, ſmaller, ſhorter, and narrower than the interior, and a ſimple tail. There are eleven ſpecies.

NEEDLE, a very common, little inſtrument, or utenſil, made of ſteel, pointed at one end, and pierced at the other; uſed in ſewing, embroidery, tapeſtry-work, &c.

Needles make a very conſiderable article in commerce; and the conſumption thereof is almoſt incredible. The ſizes are from N° 1, the largeſt, to N° 25, the ſmalleſt. There is ſcarce any commodity cheaper than *needles*;

which will appear ſomething extraordinary to the reader, after he has been ſhewn the great number of operations they undergo, before they are brought to perfection.

NEEDLES, *manufacture of*. German and Hungarian ſteel s of moſt repute for *needles*. The firſt thing is to paſs t through a coal fire, and under a hammer, and to bring t out of its ſquare figure into a cylindrical one: this done, it is drawn through a large hole of a wire-drawing iron, returned into the fire, and drawn through a ſecond hole of the iron, ſmaller than the firſt; and thus ſucceſſively from hole to hole, till it has acquired the degree of fineneſs required for that ſpecies of *needles*; obſerving every time it is to be drawn, that it be greaſed over with lard to render it the more manageable. The ſteel, thus reduced into a fine wire, is cut in pieces of the length of the *needles* intended. Theſe pieces are flatted at one end, on the anvil, in order to form the head and eye: they are then put into the fire, to ſoften them farther; and thence taken out and pierced at each extreme of the flat part, on the anvil, by the force of a puncheon of well tempered ſteel, and laid on a leaden block, to bring out, with another puncheon, the little piece of ſteel remaining in the eye.

The corners are then filed off the ſquare of the heads, and a little cavity filed on each ſide the flat of the head. This done, the point is formed with a file; and the whole filed over.

They are then laid to heat red-hot, on a long, flat, narrow iron, crooked at one end, in a charcoal fire; and, when taken out thence, are thrown into a baſon of cold water to harden. On this operation a good deal depends; too much heat burns them, and too little leaves them ſoft; the medium is only to be learnt by experience.

When they are thus hardened, they are laid in an iron ſhovel, on a fire, more or leſs briſk, in proportion to the thickneſs of the *needles*; taking care to move them from time to time. This ſerves to temper them, and take off their brittleneſs; great care, here too, muſt be taken of the degree of heat. They are then ſtraitened, one after another, with the hammer; the coldneſs of the water, uſed in hardening them, having twiſted the greateſt part of them.

The next proceſs is the poliſhing. To do this, they take twelve or fifteen thouſand *needles*, and range them in little heaps againſt each other, on a piece of new buckram, ſprinkled with emery duſt. The *needles*, thus diſpoſed, emery-duſt is thrown over them, which is again ſprinkled with oil of olives: at laſt, the whole is made up into a roll, well bound at both ends.

The roll is then laid on a poliſhing-table, and over it a thick plank, loaded with ſtones, which two men work backwards and forwards, a day and an half, or two days ſucceſſively; by which means, the roll, thus continually agitated by the weight and motion of the plank over it, the *needles* within ſide, being rubbed againſt each other with oil and emery, are inſenſibly poliſhed.

In Germany, inſtead of hands, they poliſh with water-mills.

After poliſhing, they are taken out, and the filth waſhed off them, with hot water and ſoap: they are then wiped in hot bran, a little moiſtened, placed with the *needles*, in a round box, ſuſpended in the air by a cord, which is kept ſtirring till the bran and *needles* be dry.

The *needles*, thus wiped in two or three different brans, are taken out, and put in wooden veſſels, to have the good ſeparated from thoſe, whoſe points or eyes have been broken, either in poliſhing or wiping: the points are then all turned the ſame way, and ſmoothed with an emery-ſtone, turned with a wheel.

This operation finiſhes them; and there remains nothing but to make them into packets of two hundred and fifty each.

NEEDLES, *ſurgeons*, are generally made crooked, and their points triangular: however they are of different forms and ſizes, and bear different names, according to the purpoſes they are uſed for.

The largeſt are *needles for amputation*; the next, *needles for wounds*; the fineſt, *needles for ſutures*. They have others very ſhort and flat, for tendons; others, ſtill ſhorter, and the eye placed in the middle, for tying together of veſſels, &c. See *Tab. Surgery, fig.* 11 and 12.

Needles for couching CATARACTS are of various kinds; all of which have a ſmall, broad, and ſharp point or tongue: and ſome with the ſulcus at the point. Surgeons have ſometimes uſed two *needles* in this operation, one with a ſharp point for perforating the coats of the eye, and another with a more obtuſe point for depreſſing or couching the opake cryſtalline lens: but care ſhould be taken in the uſe of any of theſe, that they be firſt well poliſhed, with cloth or leather, before they are applied to the eye.

Mr. Warner obſerves, that the blade of the couching *needle* ſhould be at leaſt a third part larger than thoſe generally uſed upon this occaſion, as great advantages will be found in the depreſſing of the cataract, by the increaſed breadth of the blade of that inſtrument. The handle, alſo, if made ſomewhat ſhorter than uſual, will enable the operator to perform with greater ſteadineſs than he can do with a larger handled inſtrument. See *Tab.* II. *Surgery*, *fig.* 23.

It is to be obſerved, that *needles* of ſilver pierce more eaſily in ſtitching arteries after an amputation, than thoſe made of ſteel. Monro, in Med. Eſſ. Edinb. vol. v. art. 41.

NEEDLE, *Magnetical*, in *Navigation*, denotes a *needle* touched with a loadſtone, or ſuſtained on a pivot or centre, on which, playing at liberty, it directs itſelf to certain points in or under the horizon. See MAGNET.

Magnetical *needles* are of two kinds; viz. *horizontal* and *inclinatory*.

NEEDLES, *horizontal*, are thoſe equally balanced on each ſide the pivot which ſuſtains them; and which, playing horizontally, with their two extremes, point out the north and ſouth points, of the horizon. For their application and uſe, ſee COMPASS.

NEEDLE, *conſtruction of an horizontal*. A piece of pure ſteel is procured, of a length not exceeding ſix inches, leſt its weight impede its volubility; very thin, to take its verticity the better; and not pierced with any holes, or the like, for ornament ſake, which prevent the equable diffuſion of the magnetic virtue.

A perforation is then made in the middle of its length, and a braſs cap or head ſoldered on, whoſe inner cavity is conical, ſo as to play freely on the ſtyle or pivot, headed with a fine ſteel point.

The north point of the *needle*, in our hemiſphere, is made a little lighter than the ſouthern, the touch always deſtroying the balance, if well adjuſted before; and rendering the north end heavier than the ſouth, and thus occaſioning the *needle* to dip.

Now to give the *needle* its verticity, or directive faculty, it is to be rubbed leiſurely on each pole of a magnet, from the ſouth pole towards the north; firſt beginning with the northern end, and going back at each repeated rub toward the ſouth. A rub in a contrary direction takes away the power communicated by the former.

Compaſs *needles* may acquire the magnetic virtue by means of magnetic bars in the following manner: lay two *needles* of equal length, about an inch aſunder, with the north end of one, and the ſouth end of the other pointing the ſame way, and applying two conductors in contact with their ends: then, with two magnetic hard bars, one in each hand, and held as nearly horizontal as can be, with the upper ends, of contrary names, turned outwards to the right and left, let a *needle* be ſtroked or rubbed from the middle to both ends at the ſame time, for ten or twelve times, a north end of a bar going over the ſouth end of the *needle*, and the ſouth end of a bar going over the north end of a *needle*: then, without moving from the place, change hands with the bars, or, in the ſame hands, turn the other ends downwards, and ſtroke the other *needle* in like manner, and they will both be magnetical: but to make them ſtill ſtronger, repeat the operation three or four times from *needle* to *needle*; and at laſt turn the lower ſide of each *needle* upwards, and repeat the operations of rubbing them, as on the other ſides.

In the rubbings or touchings to procure magnetiſm, the hand ſhould not return directly back the way it came, but ſhould return in a kind of oval figure, carrying the hand about ſix or eight inches beyond the point, where the touch ended; but not beyond, on the ſide where the touch begins.

If, after touching, the *needle* be out of its equilibrium, ſomething muſt be filed off from the heavier ſide, till it balance evenly.

The *needles* that were formerly applied to compaſſes, on board our merchant ſhips, were formed of two pieces of ſteel wire; each of which was bent in the middle, ſo as to make an obtuſe angle; and their ends being applied together made an acute one; ſo that the whole repreſents the form of a lozenge. Dr. Knight, to whom we are indebted for the improvement of the compaſs, found, by repeated experiments, that theſe *needles* not only varied from the true direction, but from one another, and from themſelves: and he has ſhewn that theſe irregularities were owing to their ſtructure: for the wires of which the *needle* was compoſed were hardened only at their ends; now if thoſe ends are not equally hard, or if one end be hardened higher up than the other, when they come to be put together, in fixing them to the card, that end which is hardeſt will deſtroy much of the virtue of the other; by which means the hardeſt end will have the greateſt power in directing the card, and conſequently make it vary towards its own direction: and as the wires are diſpoſed in the form of a lozenge, theſe cards can have but little force; ſo that they will often, when drawn aſide, ſtand at the diſtance of ſeveral degrees on either ſide the point from whence they are drawn; for all magnetical bodies receive an additional ſtrength by being placed in the direction of the earth's magnetiſm, and act proportionably with leſs vigour when turned out of it. Therefore, when *needles* of this kind are drawn aſide from their true point, two of the parallel ſides of the lozenge will conſpire more directly than before with the earth's magnetiſm, and the other two leſs in that direction: by this means the two former ſides will very much impede its return, and the two latter will have that impediment to overcome, as well as the friction, by their own force alone.

The *needles* formerly uſed on board the men of war, and ſome of the larger trading ſhips, were made of one piece of ſteel, of a ſpring temper, and broad towards the ends, but tapering towards the middle. Every *needle* of this form is found to have ſix poles inſtead of two; one at each end, two where it becomes tapering, and two at the hole in the middle. This inconvenience is owing to their ſhape; for the middle part, being very ſlender, has not ſubſtance enough to conduct the magnetic ſtream quite through from one end to the other. In order to avoid theſe inconveniences, and errors, the *needle*, contrived by Dr. Knight, for his compaſs, is quite ſtraight and ſquare at the ends, and conſequently has only two poles, although the curves are a little confuſed about the hole in the middle. *Needles* of this conſtruction, after vibrating a long time, will always point exactly in the ſame direction; and if drawn ever ſo little on one ſide, will return to it again, without any ſenſible difference. Hence Dr. Knight concludes, that a regular parallelepiped is the beſt ſhape for a *needle*, as well as the ſimpleſt; with the holes for the caps as ſmall as can be well contrived; or if it can be made to anſwer the purpoſe, without any hole at all, it will be ſtill more perfect.—There is a peculiar advantage attending Dr. Knight's *needles*; for as they are tempered much higher than uſual, they are able to contain a much greater quantity of the magnetic force. See Compass.

Mr. Michell ſuggeſts, that it would not be amiſs to cover the *needles* made uſe of in the ſea-ſervice, with a very thin coat of linſeed oil, or ſome kind of varniſh, that may keep them from ruſting, which is generally reckoned to injure all magnetical bodies, that are liable to it. *Needles* may be touched through ſuch a coat, by applying a great number of bars, if not according to the common method of making MAGNETS. He alſo apprehends, that coated *needles* may retain a greater degree of magnetiſm, than they otherwiſe would do.

Mr. Michell alſo propoſes to increaſe the weight and length of mariners *needles*; and he obſerves, that long *needles*, properly hung, traverſing to a greater degree of exactneſs than the ſhort ones, may be of conſiderable ſervice on many occaſions: particularly in mines for diſcovering the bearing of one place from another, that they may be able to ſink a ſhaft from above, over any place at pleaſure. In many ſorts of mines, eſpecially thoſe of coal, there are often ſmall quantities of magnetical iron ore, which draw the *needle* out of its proper direction: now the long *needles* are leſs liable to be diſturbed by any ſmall things, already magnetical, than ſhorter ones. Michell on Magnets, p. 42, &c.

A *needle*, on occaſion, may be prepared without touching it on a loadſtone: for a fine ſteel *needle*, gently laid on the water, or delicately ſuſpended in the air, will direct itſelf to the north and ſouth.

Thus alſo a *needle*, heated in the fire, and cooled again in the direction of the meridian, or even only in an erect ſituation, acquires the ſame faculty.

The *needle* is not found to point preciſely to the north, except in very few places; but deviates from it, more or leſs, in different places, and that too at different times; which deviation is called the *declination*.

Needle, *declination of the*, is the VARIATION of the horizontal *needle* from the meridian; or the angle it makes with the meridian, when freely ſuſpended in a horizontal plane.

Needles, *Cleopatra's*. See Porphyry.

Needles, *inclinatory*, or *dipping*. See Dipping *needle*.

Needle *fiſh*, the Engliſh name of the SYNGNATHUS, with the middle of the body hexangular, and the tail pinnated.

It is the ſame fiſh with the ACUS *Ariſtotelis ſpecies altera major*.

Needle *ſhell*, the Engliſh name of a ſpecies of CENTRONIA, or ECHINODERMA.

Needle *ſhell* is alſo the Engliſh name of a ſpecies of TURBO, which is ſlender, and has ventricoſe ſpires, and a ſmall mouth.

Needles, *touch*. See Touch *needles*.

Needle, *ſhepherd's*, the name by which ſome writers call the *ſcandix*, or *Venus's comb*. See Shepherd's *needle*.

NE EXEAT REGNO, in *Law*, is a writ to reſtrain a perſon from going out of the kingdom, without the king's licence. F. N. B. 85. It may be directed to the ſheriff, to make the party find ſurety that he will not depart the realm: and on refuſal, to commit him to priſon: or it may be directed to the party himſelf; and if he then goes, he may be fined. 3 Inſt. 178. And this writ is granted on a ſuit being commenced againſt a man in the chancery, when the plaintiff fears the defendant will fly to ſome other country; and thereby avoid the juſtice and equity of the court; which hath been ſometimes practiſed: and when thus granted, the party muſt give bonds to the maſter of the rolls, in the penalty of 1000l. or ſome other large ſum, for yielding obedience to it; or ſatisfy the court, by anſwer, affidavit or otherwiſe, that he hath no deſign of leaving the kingdom, and give ſecurity.

NEEP *tides*. See Neap *tides*.

NEFASTUS, a Latin term. The Romans uſed the appellation *dies nefaſti*, for thoſe days wherein it was not allowed to adminiſter juſtice, or hold courts; nor for the prætor to pronounce the three ſolemn words or formulas of the law, *Do*, *dico*, *addico*, *I give*, *I appoint*, *I adjudge*. See Fasti.

Theſe days were diſtinguiſhed in the calendar by the letter, N. or N. P. *nefaſtus primo*, as when the day was only *nefaſtus* for the firſt part thereof.

NEGATION, in *Logic*, an act whereby the mind ſeparates one idea from another; or affirms the one to be different from the other; as the ſoul is not matter.

Negation is alſo applied by logicians to not-being, as it has relation to modes, and denotes the abſence of that which does not naturally belong to the thing ſpoken of, or which has no right, obligation, or neceſſity to be preſent with it. In this ſenſe it is oppoſed to PRIVATION, and was denominated in the ſchools *abſentia habitus*.

NEGATIVE, a term that denies, or implies a denial of any thing.

Logicians, &c. ſay a *negative* cannot be proved but by converting it into an affirmative.

Negative *heretics*, in the language of the inquiſition, are thoſe, who, being accuſed of hereſy, by witneſſes whoſe evidence they do not deny, ſtill keep on the *negative*, make open profeſſion of the catholic doctrine, and declare their abhorrence of hereſy.

There are alſo *negative ſchiſms*, as well as poſitive ones.—In the *negative*, it is ſufficient to reject the errors of a church without ſeparating from it, or ſetting up a diſtinct ſociety.

Negative *penalties*, the laws whereby certain perſons are excluded from honours, dignities, &c. without inflicting any direct and poſitive pains on them.

Negative *power*, in *Algebra*. See Power.

Negative *pregnant*, in *Law*, a *negative* which implies or brings forth an affirmative.

As if a man, being impleaded to have done a thing on ſuch a day, in ſuch a place, denies he did it, *modo & forma declarata*; which implies nevertheleſs, that he did it in ſome ſort.

Negative *quantity*, in *Algebra*. See Quantity.

Negative *ſign*. The uſe of the *negative ſign*, in *Algebra*, is attended with ſeveral conſequences that at firſt ſight are admitted with difficulty, and has ſometimes given occaſion to notions that ſeem to have no real foundation. This ſign implies that the real value of the quantity repreſented by the letter to which it is prefixed, is to be ſubtracted: and it ſerves, with the poſitive ſign, to keep in view what elements or parts enter into the compoſition of quantities, and in what manner, whether as increments or decrements (that is, whether by addition or ſubtraction), which is of the greateſt uſe in this art.

In conſequence of this, it ſerves to expreſs a quantity of an oppoſite quality to the poſitive, as a line in a contrary poſition; a motion with an oppoſite direction; or a centrifugal force in oppoſition to gravity, and thus often ſaves the trouble of diſtinguiſhing, and demonſtrating ſeparately, the various caſes of proportions, and preſerves their analogy in view. But as the proportions of lines depend on their magnitude only, without regard to their poſition; and motions and forces are ſaid to be equal or unequal, in any given ratio, without regard to their directions; and, in general, the proportion of quantity relates to their magnitude only, without determining whether they are to be conſidered as increments or decrements; ſo there is no ground to imagine any other proportion of $-b$ and $+a$ (or of -1 and 1) than that of the real magnitudes of the quantities repreſented by b and a, whether theſe quantities are, in any particular caſe, to be added or ſubtracted. It is the ſame thing to ſubtract a decrement as to add an equal increment,

ment, or to ſubtract $-b$ from $a-b$, as to add $+b$ to it: and becauſe multiplying a quantity by a *negative* number implies only a repeated ſubtraction of it, the multiplying $-b$ by $-n$, is ſubtracting $-b$ as often as there are units in n; and is therefore equivalent to adding $+b$ ſo many times, or the ſame as adding $+nb$. But if we infer from this, that 1 is to $-n$ as $-b$ to nb, according to the rule, that unit is to one of the factors as the other factor is to the product, there is no ground to imagine that there is any myſtery in this, or any other meaning than that the real magnitudes repreſented by 1, n, b, and nb, are proportional. For that rule relates only to the magnitude of the factors and product, without determining whether any factor, or the product, is to be added, or ſubtracted. But this likewiſe muſt be determined in algebraic computations; and this is the proper uſe of the rules concerning the ſigns, without which the operation could not proceed. Becauſe a quantity to be ſubtracted is never produced in compoſition, by any repeated addition of a poſitive, or repeated ſubtraction of a *negative*, a *negative* ſquare number is never produced by compoſition from the root. Hence $\sqrt{-1}$, or the ſquare root of a *negative*, implies an imaginary quantity; and, in reſolution, is a mark or character of the impoſſible caſes of a problem, unleſs it is compenſated by another imaginery ſymbol, or ſuppoſition, when the whole expreſſion may have a real ſignification. Thus $1+\sqrt{-1}$, and $1-\sqrt{-1}$ taken ſeparately, are imaginary, but their ſum is 2; as the conditions that ſeparately would render the ſolution of a problem impoſſible, in ſome caſes deſtroy each other's effect, when conjoined. In the purſuit of general concluſions, and of ſimple forms repreſenting them, expreſſions of this kind muſt ſometimes ariſe where the imaginary ſymbol is compenſated in a manner that is not always ſo obvious.

By proper ſubſtitutions, however, the expreſſion may be transformed into another, wherein each particular term may have a real ſignification as well as the whole expreſſion. The theorems that are ſometimes briefly diſcovered by the uſe of this ſymbol, may be demonſtrated without it, by the inverſe operation, or ſome other way; and though ſuch ſymbols are of ſome uſe in the computations by the method of fluxions, its evidence cannot be ſaid to depend upon arts of this kind. See Maclaurin's Fluxions, book ii. chap 1.

NEGATIVELY, Negative, in the ſchool philoſophy, is variouſly uſed, in contradiſtinction to poſitive. See Positive.

NEGROES, a kind of black ſlaves, which make a conſiderable article in the modern commerce.

The *Negroes*, alſo called *Blacks* and *Moors*, are a people of Africa, whoſe country extends on each ſide of the river *Niger*, and is called *Nigritia*, though, whether the people communicated their name to the river, &c. or received it therefrom, is not eaſily determined.

The origin of *Negroes*, and the cauſe of that remarkable difference in complection from the reſt of mankind, has much perplexed the naturaliſts; nor has any thing ſatisfactory been yet offered on that head.

Mr. Boyle has obſerved, that the heat of the climates cannot be the true cauſe of the colour of *Negroes*: for though the heat of the ſun may darken the colour of the ſkin, yet experience does not ſhew that heat is ſufficient to produce a true blackneſs, like that of *Negroes*. In Africa itſelf, many nations of Æthiopia are not *Negroes*, nor were there any blacks originally in the Weſt Indies.

In many parts of Aſia, under the ſame parallel with the African regions, inhabited by blacks, the people are but tawny. He adds, that there are *Negroes* in Africa, beyond the ſouthern tropic, and that a river ſometimes parts nations, one of which is black, and the other but tawny. Boyle's Works Abr. vol. ii. p. 42. 44.

Dr. Barrere alledges, that the gall of *Negroes* is black, and being mixed with their blood, is depoſited between their ſkin and ſcarff-ſkin. Diſſ. on the Phyſ. Cauſe of the Colour of *Negroes*.

We have a diſſertation on this head by Dr. John Mitchell, of Virginia, in the Philoſophical Tranſactions, N° 476. ſect. 4. where he advances theſe propoſitions, and enters into a learned detail to ſupport them.

1. The colour of white people proceeds from the colour which the epidermis tranſmits; that is, from the colour of the parts under the epidermis, rather than from any colour of its own.
2. The ſkins of *Negroes* are of a thicker ſubſtance, and denſer texture, than thoſe of white people, and tranſmit no colour through them.
3. The part of the ſkin which appears black in *Negroes*, is the *corpus reticulare cutis*, and external lamella of the epidermis: all other parts are the ſame colour in them with thoſe of other people, except the fibres which paſs between thoſe two parts.
4. The colour of *Negroes* does not proceed from any black humour, or fluid parts contained in their ſkins; there being none ſuch in any part of their bodies, more than in white people.
5. The epidermis, eſpecially its external lamella, is divided into two parts by its pores and ſcales, two hundred times leſs than the particles of bodies on which their colours depend.

This is founded on Leeuwenhoeck's obſervation, that a portion of the epidermis no bigger than what can be diſcerned by the naked eye, is divided into 125000 pores, and theſe pores muſt divide ſuch a portion of the ſkin into as many particles. But the particles of bodies on which their colours depend, are, by ſir Iſaac Newton's Optics, lib. ii. p. 3. prop. 7. 600 times leſs than thoſe which can be diſcerned by the naked eye. Therefore, the particles of the ſkin muſt be about 200 times leſs than theſe; ſince $\frac{125000}{600}=208\frac{1}{3}$. It may alſo be obſerved, that ſuch a ſmall portion of the epidermis is diviſible into 250 ſcales, which muſt increaſe the number of its parts.

6. From theſe propoſitions, and from ſir Iſaac Newton's theory of light and colours, the doctor thinks he may conclude, that the proximate cauſe of the colour of *Negroes* is threefold; viz. the opacity of their ſkin, proceeding from the thickneſs and denſity of its texture, which obſtructs the tranſmiſſion of the rays of light, from the white and red parts under the ſkin, together with its greater refractive power, which abſorbs theſe rays; and the ſmallneſs of the particles of this ſkin, which hinders it from reflecting any light.
7. The influence of the ſun in hot countries, and the manner of life of their inhabitants, are the remote cauſes of the colour of *Negroes*, Indians, &c. And the ways of living in uſe amongſt moſt nations of white people, make their colours whiter than they were originally, or would be naturally.

In ſupport of this propoſition, the doctor obſerves, that the ſkin is deprived of its white colour, by the force and influence of the ſun, four ways. 1ſt. By being rendered opaque, from a diſſipation of its more aqueous, and pellucid juices. 2dly. By a concretion of its veſſels and glandules, from this diſſipation of its more aqueous contents, which renders the ſkin both thicker and denſer, or more callous and rigid. 3dly. By a new accretion of many new membranes, which render it thick and opaque. 4thly. By increaſing thoſe parts or principles, in the compoſition of the epidermis, which have the greateſt refractive power; as the terreſtrial and fixed ſaline; but eſpecially the tenaceous ſulphureous, which refract and abſorb light more ſtrongly than any other ſubſtances; while the more tranſparent and pellucid principles, as the aqueous, ſpirituous, and volatile ſaline, are evaporated by the heat, which cauſes the other more fixed principles to be accumulated; and theſe particles being likewiſe more comminuted by the ſun, will, on this account, be black; as happens to oil when well boiled. Theſe cauſes, with thoſe firſt mentioned, may, the doctor thinks, by conſpiring, make the ſkin quite black; eſpecially if we add another effect of the ſun's power, a peculiar necroſis of the epidermis, occaſioned by the forcible vibrations, contractions, and exſiccations of its fibres by the ſun-beams, which cauſe it to turn black, as theſe, or other parts do, by the heat of an inflammation, or a fever, in gangrenes, black tongues, &c.

We cannot pretend to follow the author in all the detail of his obſervations on this ſubject, nor of his anſwer to a material objection already mentioned from Mr. Boyle, that the ſun cannot be the cauſe of the colour of *Negroes*, becauſe ſeveral nations, in the ſame latitude with thoſe *Negroes*, are not made black by it. He ſeems to think the heat of Africa greater than that of other parts of the world. Whether it be ſo, or not, is, we apprehend, not eaſy to determine; but it would be a ſtrong confirmation of his doctrine, if we could ſee any people, originally white, become black and woolly by tranſplantation, or vice verſa.

Negroes are brought from Guinea, and other coaſts of Africa, and ſent into the colonies in America, to cultivate ſugar, tobacco, indigo, &c. and Peru and Mexico, to dig in the mines.

This commerce, which is ſcarce defenſible on the principles either of religion or humanity, is now carried on by all the nations that have ſettlements in the Weſt Indies; particularly by the Engliſh, Dutch, Spaniards, and Portugueſe. See Assiento.

The Spaniards, indeed, have few *Negroes* at firſt hand; but have treated with other nations to furniſh them therewith: thus they were formerly furniſhed by the company of the Grilles, eſtabliſhed at Genoa; ſince, by the Aſſiento in France; and after the peace of Utrecht, by the Engliſh South-Sea company.

By the peace of Aix-la-Chapelle, in 1748, the Aſſiento treaty between the Engliſh and Spaniards, was aboliſhed; but during its continuance, the South Sea Company furniſhed the American dominions of Spain with four thouſand eight hundered *Negroes*, who, on their arrival, were ſeparated into four claſſes: the firſt claſs conſiſted of all in perfect health, from fifteen to thirty years of age, who were charged with a duty of $33\frac{1}{2}$ piaſtres each, or per head; the ſecond claſs was compoſed of the old and ſick, each of whom was rated at $\frac{3}{4}$ of a head; the children from ten to fifteen years old, formed the third claſs, and were reckoned at three for two heads; and thoſe from five to ten compoſed the fourth claſs, and were rated at two for one head; and the duty was paid accordingly.

There are various ways of procuring theſe *Negroes*: ſome, to avoid famine, ſell themſelves, their wives, and children to their princes, or great men, who have wherewithal to ſubſiſt them. Others are made priſoners in war; and great numbers ſeized in excurſions made for that very purpoſe by the petty princes upon one another's territories; in which it is uſual to ſweep away all both old and young, male and female.

The *Negroes* make a frequent practice of ſurpriſing one another while the European veſſels are at anchor, and dragging thoſe they have caught to them, and ſelling them in ſpite of themſelves; and it is no extraordinary thing to ſee the ſon ſell, after this manner, his father or mother, and the father his own children, for a few bottles of brandy, or a bar of iron.

As ſoon as the ſhip has its complement, it immediately makes off; the poor wretches, while yet in ſight of their country, falling into ſuch deep grief and deſpair in the paſſage, that a great part of them languiſh, fall into ſickneſs, and die: while others of them diſpatch themſelves. The only ſure means to preſerve them, is to have ſome muſical inſtrument play to them, be it ever ſo mean. But this exceſſive love for their country abates as they get farther off.

It has been calculated that upwards of one hundred thouſand ſlaves have for many years been exported by the Europeans from the coaſt of Africa.

By the laws of Virginia, *Negro* ſervants are ſaleable; and where the *Negro* is ſold here, in action *indebitat aſſumpſit*, for the money, the declaration ought to be, that the defendant was indebted to the plaintiff for the *Negro* ſold here at London, but the ſaid *Negro* at the time of the ſale was in Virginia, and that by the laws and ſtatutes of Virginia, *Negroes* are ſaleable as chattels. Per Holt. C. J. 2. Salk. Rep. 666. In action of trover for a *Negro*, and verdict and damages for the plaintiff, it was moved in arreſt of judgment, that trover lay not for a *Negro*, for the owner had not an abſolute property in him; but the court ſeemed to think, that in treſpaſs, *quare captivum ſuum cepit*, the plaintiff might give in evidence that the party was his *Negro*, and he bought him. Ibid. ſee ſtat. 13 Geo. I. cap. 9.

It is now laid down, that a ſlave or *Negro*, the inſtant he lands in England, becomes a free man; that is, ſo far as that the law would protect him in the enjoyment of his perſon and property. But with regard to any right which the maſter may have acquired to the perpetual ſervice of John or Thomas, this will remain exactly in the ſame ſtate as before. Hence alſo it follows, that the infamous and unchriſtian practice of with-holding baptiſm from *Negro* ſervants, leſt they ſhould thereby gain their liberty, is totally without foundation, as well as without excuſe; for the ſlave is intitled to the ſame protection in England before, as after baptiſm, and whatever ſervice the heathen *Negro* owed to his American maſter, the ſame he is bound to render, when brought to England and made a Chriſtian. Blackſt. Com. book i. p. 424.

NEGRO, in *Ornithology*, the name of a large bird, approaching to the crane kind, and more uſually known among authors by its Braſilian name JABIRU.

NEGRO *oil*, in *Botany*. See PALM-*tree*.

NEHEMIAH, a canonical Book of the Old Teſtament, ſo called from the name of its author. *Nehemiah* was born at Babylon, during the captivity, and ſucceeded Ezra in the government of Judah and Jeruſalem. He was a Jew, and was promoted to the office of cup-bearer to Artaxerxes Longimanus, king of Perſia; when the opportunities he had of being daily in the king's preſence, together with the favour of Eſther, the queen, procured him liberty to repair and fortify the city of Jeruſalem, in the ſame manner as it was before its deſtruction by the Babylonians. On his going to Jeruſalem, he finiſhed the rebuilding of the walls in fifty-two days, and dedicated the gates of the city with great ſolemnity. He then reformed ſome abuſes which had crept in among his countrymen. The hiſtory of theſe tranſactions is the ſubject of this book.

NEIF, *nativa*, in our *Ancient Cuſtoms*, a bond woman, or ſhe villain, born in one's houſe. 9 Rich. II. cap. 2. Anciently, lords of manors, ſold, gave, or aſſigned their *neifs*, and natives. See SLAVE, VILLAIN, &c.

NEIFTY, *writ of*, is an ancient writ, whereby the lord claimed ſuch a woman for his *neif*.

NE INJUSTE *vexes*, a writ founded on *Magna Charta*, cap. 10. which lies for a tenant in fee ſimple againſt the lord forbidding him to diſtrain on the tenant, for more ſervice than he ought to perform; particularly when he has formerly prejudiced himſelf by doing or paying more than he needed.

NELANJENUM, in *Natural Hiſtory*, the name of a curious and peculiar foſſile ſubſtance, found in the Eaſt Indies.

It has much the appearance of ſome of our ſteel-grained lead ores, and is very ponderous, but it does not contain any lead; in this it approaches to the nature of that ſubſtance common in Europe, and called blende, or mock lead; but this laſt is foliated, and reſembles the plated lead ores, whereas this reſembles the cloſe ground ores. It is found in the beds of rivers in many places; they calcine it, and, reducing it to powder, mix it with the juice of herbs, and uſe it in ulcers.

NELLA *corvindum*, in *Natural Hiſtory*, a name given by the people of the Eaſt Indies to a very hard ſtone which they uſe as we do emery.

It is of a talcky nature, being compoſed of flaky ſpangles, and a coarſer matter intermixed. They dig it at the foot of ſome mountains, and in ſome other places. It lies ſo near the ſurface that the rice fields abound with it; and it is ſeen on ſtirring the ground. It is always found in nodules, or detached maſſes, and is uſually of a ſort of iron colour, though ſubject to ſome variations. It is uſed by the common people to ſcour arms, and other iron works; and by the lapidaries, among them, to poliſh rubies and other ſtones. For this laſt purpoſe they grind it with ſtick lac, and make it into a ſort of cement, with which they daub over the face of the poliſhing machine.

NELLON, in *Botany*, a name given by ſome to rice. It is an Indian word, and properly ſignifies the grain of rice taken off from the ſtalks, but covered with its proper pellicle. The firſt operation to be performed upon this, is the beating it with large ſtones, or other more manageable tools, till this ſkin flies off. Then it is to be dried in the ſun, and, after that beat a ſecond time, to get off its thin, internal, reddiſh coat: when this is done it is in a ſtate to be uſed, and it is then only that the Indians call it *ariſi*, the word from which we formed our word rice.

NELUMBO, in *Botany*, the name of a genus of plants, uſually confounded with the nymphæa.

The characters of the *nelumbo* are theſe: the flower is like that of the nymphæa, but the fruit wholly different, not only in ſhape but in ſtructure, being not divided into ſeveral cells, but having the ſeeds placed irregularly, at diſtances from one another in it.

There is only one known ſpecies of this genus, which is the *nelumbo* of the Ceyloneſe, called by others the *Indian nymphæa*, and *faba Ægyptiaca*, the *Ægyptian bean*.

NEMÆAN, or NEMEAN *games*, one of the four great kinds of games, or combats, celebrated among the ancient Greeks.

Some ſay, they were inſtituted by Hercules, on occaſion of his killing the *Nemæan* lion; and that it was hence they took their name, as alſo the place of celebration, the foreſt of *Nemæa*.

Others relate, that the ſeven chiefs ſent to Thebes, under the conduct of Polynices, being extremely oppreſſed in their journey with thirſt, met with Hypſipyle of Lemnos, who had in her arms Opheltes, ſon of Lycurgus, prieſt of Jupiter, and Eurydice. They begging her to ſhew them ſome water, ſhe laid the child down on the graſs, and conducted them to a well. In her abſence, a venomous ſerpent killed the child; upon which the nurſe, out of an exceſs of grief, grew deſperate. The chiefs, at their return with her, killed the ſerpent, buried the young Opheltes, and, to divert Hypſipyle, inſtituted the *Nemæan games*.

Ælian ſays, they were indeed the ſeven chiefs going to the ſiege of Thebes, that inſtituted them; but he adds, that it was in favour of Pronax.

Pauſanias refers the inſtitution of them to Adraſtus; and their reſtoration to his deſcendants.

Laſtly, Hercules, on his victory over the *Nemæan* lion, augmented the games, and conſecrated them to Jupiter Nemæus.

The games were opened with ſacrificing to *Nemæan* Jove, appointing him a prieſt, and propoſing a reward for ſuch as ſhould be victors in the games.

They were held every three years, in the month called *Panemos* by the Corinthians, and *Boedromion* by the Athenians.

The Argians were the judges, and ſat clothed in black, to expreſs the origin of the games. As they were inſtituted by warriors, none at firſt were admitted to them but military men, and the games themſelves were only equeſtrian and gymnic; at length they were open to the people, and other kinds of ſports were introduced.

The conquerors were crowned with olive, till the time of the war with the Medes; when a blow they received in that war, occaſioned them to change the olive for the ſmallage, a funeral plant: though others maintain, that the crown was originally ſmallage, on account of the death of Opheltes, otherwiſe called Archemorus; this plant being ſuppoſed to have received the blood, which ran from the wound made by the ſerpent.

NEMESIA, in *Antiquity*, a religious ſolemnity in memory of deceaſed perſons, ſo called from the goddeſs *Nemeſis*, who was thought to defend the relics and memories of the dead from injuries.

NEMINE *contradicente*, i. e. none contradicting it; a term chiefly uſed in parliament, or any public aſſembly, when any matter is carried with the conſent of all the members.

NENIA, or NÆNIA, in the *Ancient Poetry*, a kind of funeral ſong, ſung to the muſic of flutes, at the obſequies of the dead.

The word comes from the Greek νηνιατο, on which Scaliger obſerves, that it ſhould be written in Latin *Nenia*, not *Nænia*.

Authors repreſent them as bad compoſitions, ſung by hired women-mourners, called *præficia*. the firſt riſe of theſe *neniæ* is aſcribed to the Phrygians.

Guichart notes, that *nenia* was anciently the name of a ſong, ſung by nurſes, to lull children aſleep; and conjectures it to come from the Hebrew נין, *nin*, *child*.

In the heathen antiquity, the goddeſs of tears and funerals was called *Nenia*, whom ſome ſuppoſe to have given that name to the funeral ſong; and others to have taken her name from it. Some will have the one, and ſome the other, formed by onomatopœia, from the ſound or voice of thoſe that weep.

NENUPHAR. The ancient writers on the materia medica have all mentioned a peculiar ſpecies of this plant, under the name of *nenuphar indicum*. The roots of this they call FEL, and Avicenna ſays, that they have the ſame virtues with the mandrake.

NENUPHAR, in *Botany*, is alſo a name uſed by ſome authors for the *water*-LILY.

NENUPHARINI, a name given by the adepts to a kind of imaginary ſpirits which they ſuppoſe to inhabit the air, and to direct and govern many things on earth.

NEOCORI, Νεοκοροι, among the *Ancients*, perſons whoſe buſineſs it was to take care of temples, and other conſecrated places. They were otherwiſe called ÆDITUI.

NEŒNIA, Νεοινια, in *Antiquity*, a feſtival celebrated in honour of Bacchus, when the new wine was firſt taſted.

NEOMENIA, Νεομενια, in *Antiquity*. See NUMENIA.

NEOMENIA, in *Chronology*, &c. a term uſed for the new moon.

Some ſay, the Jews reckoned two kinds of *neomenia*, or new moons; the firſt on the day of her conjunction with the ſun; the ſecond on that of her apparition or phaſis; and add that they celebrated two paſſovers, on account of the uncertainty which of theſe days it ſhould be held on.

F. Hardouin, on the contrary, maintains, they had no other *neomenia* but that of the moon's conjunction with the ſun; which it was eaſy to aſcertain by aſtronomical calculation; whereas the other was liable to miſtakes; the moon ſometimes not ſhewing herſelf till four or five days after conjunction.

NEOPHYTES, Νεοφυτοι, in the *Primitive Church*, were new Chriſtians; or the heathens newly converted to the faith.

The word ſignifies *a new plant*; being formed of the Greek νεος, *new*; and φυω, *I produce*; q. d. *newly-born*; baptiſm, whereby they commenced *Neophytes*, being a kind of new birth.

The fathers never diſcovered the myſteries of their religion to the *Neophytes*.

The term *Neophyte* is ſtill applied to the converts which the miſſionaries frequently make among the infidels. The Japoneſe *Neophytes*, in the latter end of the ſixteenth and beginning of the ſeventeenth century, are ſaid to have ſhewn prodigies of courage and faith, equal to any known in the primitive church. See CATECHUMEN.

NEOPHYTES has formerly likewiſe been uſed to denote new prieſts, or thoſe firſt admitted into orders; and ſometimes, the novices in monaſteries.

NEOPTOLEMIA, Νεοπτολεμεια, in *Antiquity*, a feſtival celebrated by the Delphians with much pomp and ſplendor, in memory of Neoptolemus, the ſon of Achilles, who was ſlain in an attempt to ſack Apollo's temple, which he undertook in revenge of his father's death, to which that god was acceſſary.

NEOTTIA, in *Botany*, the name given by ſome to the plant called by Tournefort and others NIDUS *avis*, and by Ruppius *corallorhiza*. Linnæus makes both the *nidus avis* and *corallorhiza*, diſtinct ſpecies of the OPHRYS.

NEP, NEPETA, in *Botany*. See CATMINT.

NEPA, a word uſed by naturaliſts ſometimes to expreſs a *crab*, ſometimes for a *ſcorpion*, and ſometimes for a plant, called by the botaniſts *geniſta Spartium*.

NEPA, in the Linnæan ſyſtem of *Zoology*, is a genus of the *hemiptera* claſs of inſects; diſtinguiſhed by an inflated back; four wings that are complicated in form of a croſs, and in the fore part coriaceous; and the anterior feet are cheliform; and the other four ambulatory. There are ſeven ſpecies.

NEPENTHE, or NEPENTHES, Νηπενθης formed of the privative, νη, *non*, or *abſque*, and πενθος, *luctus*, *ſorrow*, in *Antiquity*, a kind of magic portion, which made perſons forget all their pains and misfortunes.

The *nepenthe*, mentioned in ancient authors, was the juice or infuſion of a plant, now unknown: Homer ſays it was a plant of Egypt; and adds that Helena made uſe of it to charm her hoſts, and make them forget their pains.

Some authors ſay it was the plant we call *helenium*; others *bugloſs*, whoſe juice infuſed in wine has this effect. M. Petit has a diſſertation on the ancient *nepenthe*.

NEPENTHE, in *Pharmacy*, is a name given to a kind of opiate, contrived by Theo. Zwingerus, from the great opinion he had of its giving eaſe in all manner of pain.

NEPENTHES, in *Botany*, the name given by Linnæus to a genus of plants of the *gynandria tetrandria* claſs, the characters of which are theſe: the perianthium is divided into four roundiſh ſegments; there are no petals, and ſcarce any ſtamina; but four antheræ are affixed to the ſtylus near its top; the piſtil has an extremely ſlender germen; the ſtyle is pointed and of the length of the cup; and the ſtigma is obtuſe; the fruit is an oblong, columnar, truncated capſule, faintly quadrangular, conſiſting of four cells, and made up of four valves. The ſeeds are numerous, pointed, and of a chaffy ſtructure, and are ſhorter than the capſule.

NEPER's, NAIPER's, or NAPIER's, *bones*, an inſtrument, whereby multiplication and diviſion of large numbers are much facilitated and expedited; ſo called from its inventor J. Neper, baron of Merchiſton, in Scotland.

Conſtruction of NEPER's *bones*. Five rods, plates, or lamellæ, are provided of wood, metal, horn, paſteboard, or other matter (*Tab. Algebra*, *fig.* 11.) of an oblong form, and divided each into nine little ſquares; each of which is reſolved into two triangles by diagonals.

In theſe little ſquares are written the numbers of the multiplication-table; in ſuch manner as that the units, or right-hand figures, are found in the right-hand triangle; and the tens or the left-hand figures, in the left-hand triangle; as in the figure.

Uſe of NEPER's *bones in multiplication*. To multiply any given number by another; diſpoſe the lamellæ in ſuch manner, as that the top figures may exhibit the multiplicand; and to theſe, on the left-hand, join the lamella of units; in which ſeek the right-hand figure of the multiplicator: and the numbers correſponding thereto, in the ſquares of the other lamellæ, write out by adding the ſeveral numbers, occurring in the ſame rhomb together, and their ſums. After the ſame manner write out the numbers correſponding to the other figures of the multiplicator; let them be diſpoſed under one another, as in the common multiplication, and laſtly, add the ſeveral numbers into one ſum.

For example; ſuppoſe the multiplicand 5978, and the multiplicator 937. From the outermoſt triangle on the right-hand (*Tab. Algebra*, *fig.* 12.) which correſponds to the right-hand figure of the multiplicator 7, write out the figure 6, placing it under the line. In the next rhomb, towards the left, add 9 and 5; their ſum being 14, write the right-hand figure, viz. 4, againſt 6; carrying the left-hand figure, 1, to 4 and 3, which are found in the next rhomb. The ſum 8, join to 46, already put down; after the ſame manner in the laſt rhomb, add 6 and 5, the latter figure of the ſum 11, put down as before, and carry 1 to the 3 found in the left-hand triangle; the ſum 4 join as before, on the left of 1846: thus you will have the factum of 7 into 5978; and after the ſame manner will you have the factum of the multiplicand, into the other figures of the multiplicator: the whole added together gives the whole product.

```
   5978
    937
  -----
  41846
 17934
53802
-------
5601386
```

Uſe of NEPER's *bones in diviſion*. Diſpoſe the lamellæ ſo, as that the uppermoſt figures may exhibit the diviſor; to theſe on the left-hand, join the lamella of units. Deſcend under the diviſor, till you meet thoſe figures of the dividend, wherein it is firſt required, how oft the diviſor is found, or at leaſt the next leſs number, which is to be ſubtracted from the dividend; the number correſponding to this, in the place of units, write down for a quotient. By determining the other parts of the quotient after the ſame manner, the diviſions will be completed.

For example; ſuppoſe the dividend 5601386, and the diviſor 5978; ſince it is firſt aſked how often 5978 is found in 569013, deſcend under the diviſor (*Tab. Algeb. fig.* 12.) till in the loweſt ſeries you find the number 53802, approaching neareſt to 56013; the former whereof is to be ſubtracted out of the latter, and the figure 9 correſponding thereto in the lamella of units write down for the quotient. To the remainder 2211, join the following figure of the diviſor 8; and the number 17934 being found, as before, to be the next leſs number thereto, the correſponding number in the lamella of units, 3, is to be written down for the quotient; and the ſubtraction to be continued as before. After the ſame manner the third and laſt figure of the quotient will be found to be 7; and the whole 937.

5978)5601386(937
53802
———
22118
17934
———
41846
41846
———
00000

NEPETA, in *Botany*. See Catmint.

NEPHALIA, among the Greeks, a feſtival called the feaſt of ſober men, at which the Athenians offered to the ſun and moon, to Aurora and Venus, a drink made of water and honey. They burnt all ſorts of wood on the occaſion, except the vine and fig-tree.

NEPHEW, a term relative to uncle and aunt; ſignifying a brother's or ſiſter's ſon, who according to the civil law is in the third degree of conſanguinity; but, according to the canon law, in the ſecond.

The word is formed from the Latin *nepos*; which in the corrupt ages of that language ſignified the ſame: though anciently and properly it denoted a grandſon.

NEPHRITIC, Nephriticus, *νεφριτικος*, formed of *νεφρος*, *rein*, *kidney*, ſomething that relates to the kidneys. See Kidney.

Nephritic *colic*. See Colic.

Nephritic *ſtone*, *lapis* Nephriticus, a ſort of precious ſtone; ſo called from its extraordinary virtues againſt the ſtone and gravel in the kidneys.

It is a ſpecies of jasper, commonly of an uniform duſky green colour; but ſometimes variegated with white, black, or yellow. It ſeems only to differ from jaſper in its being harder, and always without any thing of red.

It is brought chiefly from New Spain, where it is ſometimes found in pieces large enough to make moderate cups. There is ſome, likewiſe, found in Old Spain, and Bohemia.

This ſtone was once very dear, by reaſon of the wonderful virtues aſcribed to it. A cup made of it was ſold for 1600 crowns, in the time of the emperor Rudolphus II. The beſt for medicinal uſe is of a greyiſh green, fat and unctuous, like talc of Venice.

The Indians of New Spain, who firſt diſcovered its uſe, and taught it the Europeans, wear it hung about their necks, after having cut it in various figures, chiefly of the beaks of birds: whence ſome charletans take occaſion to counterfeit it, by cutting other green ſtones into like figures; and ſell them at great prices, to thoſe who have an opinion of their *nephritic faculty*.

Nephritic *wood*, *lignum* Nephriticum, a kind of medicinal wood growing in New Spain, chiefly in the kingdom of Mexico; called by the Indians *coult* and *tlapalcypatly*, as being reputed ſovereign againſt *nephritic* pains.

Dr. Lewis ſays, he has never known its being given medicinally, and that it is not received in practice.

It muſt be choſen well cleared of its bark and rind; it is of a bitter taſte, and a duſky yellow colour; but when infuſed with cold water, gives it a ſky-blue tincture, when viewed by a falſe-light, and a gold colour by a true one: a little of any acid being mixed with the tincture, both theſe colours diſappear; but a little oil of tartar reſtores its ſky-blue.

Some ſubſtitute ebony, and others red Braſil wood, for *lignum nephriticum*; but the deceit becomes apparent by infuſing it in water. See Transmutation *of Colours*.

NEPHRITICS, Νεφριτικα, medicines proper for diſeaſes of the kidneys, particularly the ſtone.

Such, particularly, are the roots of althæa, dogs-graſs, aſparagus, ſago, pellitory of the wall, mallows, pimpinella, red chick-peas, peach-kernels, turpentine, lapis nephriticus, and lignum nephriticum, which ſee.

NEPHRITIS, or Nephriticus *dolor*, νεφριτις, q. d. *diſeaſe of the reins*, formed from νεφρος, *rein*, in *Medicine*, a name given to a painful diſeaſe, occaſioned by the ſtone or gravel in the kidneys.

Nephritis, in *Medicine*, is likewiſe uſed for an inflammatory affection of the kidneys, owing its origin to a ſtagnatory congeſtion of blood in them, which nature ſeems to have intended to direct to the internal hæmorrhoidal veſſels, thence to be diſcharged to eaſe her of the load of a plethora.

The ſimple *nephritis* is thus carefully to be diſtinguiſhed from the calculoſe one; for the former may, for a long time, affect a patient without any thing of a ſtone being in the caſe; and on the contrary a ſtone may be long lodged in the kidneys, without its bringing on any ſuch complaint as the *nephritis*.

In the ſimple *nephritis* there is always a ſenſation of pain and heat about the loins, which is plainly perceived to lie deep within the fleſh, but is never very acute. On the contrary, in the calculoſe *nephritis*, the pain is violently ſharp. In the ſimple *nephritis*, the urine, after it has ſtood ſome time, ſhoots to the ſides of the pot pellucid cryſtals of a reddiſh colour. But in the calculoſe, the heavy matter immediately precipitates itſelf to the bottom, and is ſabulous and gritty; and the ſimple *nephritis* is always greatly relieved by a gentle motion of the body, as walking, or the like; whereas all motion of the body exaſperates the calculoſe *nephritis*.

The *nephritis* is diſtinguiſhed alſo from the iſchiatic pains, which ſometimes run up to the ſame parts, by its being evidently perceived to lie deep within the fleſh, whereas thoſe pains affect the external muſcles; yet there is ſuch a connection and conſent of parts in theſe caſes, that not unfrequently the one is taken for the other.

Signs of it. The inflammation begins with a pain in the region of the loins, which does not uſually affect both, but only, or at leaſt principally, one ſide, uſually the left; often ſhooting down by the ureters to the bladder, and by the ſpermatic cord to the teſticle. The pain is at firſt tenſive and dull, but afterwards becomes more acute; in the beginning it is often attended with a chillneſs, and general trembling, which is ſucceeded by a heat, and acrid gnawing, ſcarce to be ſupported; and this is uſually attended with a want of appetite, and loſs of ſtrength, and a continual, though not violent thirſt. The ſleep is unſound, and there uſually is either a dull pain in the head, or a vertiginous complaint, more or leſs violent; and very frequently nauſeas, and reachings to vomit, attend the fits, or prognoſticate the acceſs of them. The patient lies moſt eaſily on the affected ſide, and feels great uneaſineſs when he endeavours to walk or ſit upright.

The pain never extends itſelf down the whole thigh, nor is that ever wholly numbed or rendered torpid by it; and the diſorder does not ſeem continual, but attacks the patient at different times, and theſe after conſiderably long intervals, if he live regularly. The bowels are uſually coſtive at the time of the fits, and there is a frequent want of making water, though very little is voided at a time, and that thin, when the pain is violent; when it is more obtuſe, the urine is commonly thick, and has, as it were, threads in it, of a ſort of mucilaginous matter; and to this it is to be added, that ſometimes the ſpermatic veſſels which run to the teſtes become hard and tumid.

Men are more ſubject to this diſeaſe than women, and of thoſe, ſuch principally as are plethoric; and people in the middle and latter periods of life, are in general, more ſubject to it than thoſe who are younger. In general young people are not ſubject to this diſeaſe, unleſs it be from an hereditary diſpoſition, or ſome very powerful external cauſes.

None ſo often fall into it as thoſe who have omitted the uſual evacuations, and afterwards fall into violent exerciſes; and finally people, who have the gout and the ſciatica, are uſually alſo *nephritic*.

Cauſes of it. Theſe are principally the ſuppreſſion of natural evacuations; or the omiſſion of habitual artificial ones; the abuſe of hot medicines of the diuretic kind, ſuch as the oils of turpentine, and juniper, and the balſam of ſulphur; as alſo the two frequent uſe of venery, and the taking medicines to provoke to it: violent paſſions, or fatiguing exerciſes; external injuries by blows, falls, or the like; and the uſe of a too hot diet, and too much of ſtrong liquors.

It may likewiſe proceed from lying too ſoft, too much on the back, involuntary contractions or ſpaſms in the urinary veſſels, &c. and from of any of thoſe cauſes that produce an inflammatory fever.

Prognoſtics. The ſimple *nephritis* may uſually be cured, if properly treated, but the calculous one ſcarce ever can; and though all inflammations of the internal parts are juſtly accounted very dangerous, yet this is the leaſt ſo of all others, becauſe the urine continually paſſing through the part, abſterges and cleanſes it, and prevents corruption, or gatherings of matter. The greateſt danger is in ſuch as have a diſpoſition to generate calculous matter, and to hectics. In theſe caſes the diſeaſe is apt ſoon to change from its ſimple nature.

It is very rare that both kidneys are ſeized with this diſtemper, but uſually the left alone ſuffers by it: the more inflammatory the ſtate of the body is, the worſe it is with perſons afflicted with this diſeaſe, and the more they are ſubject to it; thus young people who have often a turgeſcence of blood are more frequently ſubject to this diſeaſe than old perſons, and are with more difficulty cured of it: and it is an obſervation as old as Hippocrates, that the coming on of hæmorrhages from the internal hæmorrhoids cures this diſeaſe.

If the diſeaſe is protracted beyond the ſeventh or eighth day, and there is a ſtupor or heavineſs of the part, with frequent returns of chillneſs and ſhiverings, &c. there is reaſon to ſuſpect that matter is forming in the kidneys, and that an abceſs will enſue.

Method of cure. In the time of the fit, the firſt thing to be done is to bleed; and if the pain and inflammation continue, the operation may be repeated. The belly ſhould be opened by a clyſter of the emollient kind, prepared of milk or broth, to which, if neceſſary, may be added a little ſalt and honey, or manna. Simon Pauli expreſsly directs, from repeated experience of its good effects, a decoction of the herb veronica, or ſpeedwell, with ſome oil, and a little ſalt. After this powders of nitre, cinnabar, and tartarum vitriolatum ſhould be taken every three hours; and, towards the evening there ſhould be mixed with one of theſe doſes, eight grains of diaphoretic antimony, and four of crab's eyes. Emulſions of the cold ſeeds in the cooling ſimple waters, are alſo of great uſe; and to the common ſeeds uſed on this occaſion, may be added thoſe of poppies, and of carduus Mariæ. In the mean time external applications may alſo be uſed with ſome ſucceſs; ſuch as cloths dipped in warm water, or bladders filled with it; or with a decoction of chamomile flowers, adding a little ſaffron, and mixed with about a third part of new milk; or bags of chamomile, melilot, and fenugreek ſeed dry, and heated at the fire; as alſo the ſpirits of ſerpyllum, and the like, and the ſoap plaſter: to all theſe may be added the uſe of leeches, applied to the hæmorrhoidal veins, which are, indeed, a great relief in all the diſtemperatures of the urinary part; and, finally, during the whole courſe of the cure, refrigerating and diluting liquors are to be drank in large quantities, as clear whey, or baum-tea ſweetened with honey, decoction of marſhmallow-roots, with barley and liquorice, &c. And the food muſt be thin and light, as panada, ſmall broths, with mild vegetables, and the like.

The ſame general courſe is to be followed, when gravel or a ſtone is lodged in the kidney: but when they are lodged in the ureter, it will be proper, beſide the fomentations, to rub the part with a little ſweet oil, and to give gentle diuretics; as juniper-water, ſweetened with the ſyrup of marſhmallow; a tea-ſpoonful of the ſweet ſpirits of nitre, with a few drops of laudanum, may be occaſionally mixed with the patient's drink. He ſhould alſo take exerciſe on horſeback, or in a coach, if he be able to bear it.

After the fit, the neceſſary treatment to prevent a return, is to bleed regularly, ſpring and autumn; to take, at times, gentle purges of rhubarb, ſena, and the like; to keep the hæmorrhoidal diſcharges in their proper ſtate; and the habitual coſtiveneſs which uſually attends people in this diſeaſe is to be taken off by a moiſt and lubricating diet; and wine and ſtrong liquors are to be avoided.

Thoſe who are ſubject to this diſorder, ſhould uſe moderate exerciſe, and neither lie too hot, nor too much on their back.

When matter in the urine ſhews that an ulcer is formed in the kidneys, the patient muſt carefully abſtain from all acrid, ſour, and ſalted proviſions; and live chiefly on mild mucilaginous herbs and fruits, and broth of young animals. His drink may be whey, and buttermilk that is not ſour; which ſome have reckoned a ſpecific remedy in ulcers of the kidney: chalybeate waters have been likewiſe found beneficial. Junker Conſp. Med. p. 216, &c. Buchan's Dom. Med. p. 328, &c.

The Greeks alſo gave the name νεφριτις, to the firſt vertebra of the loins from its neighbourhood to the kidneys.

NEPHROMETRÆ, a name given by ſome authors to the muſcles of the loins, called by the generality of medical authors *pſoæ*.

NEPHROTOMY, formed of νεφρος, *kidney*, and τομη, *ſection*, in *Surgery*, the cutting into the kidneys, in caſe of the ſtone being lodged there, and taking it out in the ſame way as from the bladder.

This is an operation which has been very little practiſed, and uſually ſuppoſed to be attended with great danger; few authors who have treated of theſe diſeaſes have ſo much as mentioned this operation, and the few that have named it, have generally condemned it. Sinibaldus fancying that it was an operation anciently practiſed, ſtrove very earneſtly, indeed, to have it revived. He has called in the opinion of Hippocrates to ſupport his account of its having been done with ſafety, and adviſes the ſurgeons to try their hands on brutes, firſt, and accuſtom themſelves to the operation, and then not to fear it in regard to men.

It is certain that a ſtone in the kidney is ſo terrible a diſeaſe, that it is very much to be wiſhed that ſome ſafe operation could be invented to cure it; but it is making too free with Hippocrates, to ſay that he countenances or directs ſuch an operation in general. His words ſeem to expreſs only the making an inciſion near the kidney; but even if they are to be underſtood as directing the cutting into it, it is under ſuch reſtrictions, that opportunities will very ſeldom offer; and when they do, a common ſurgeon would not ſcruple performing allthat is directed, without either conſulting Hippocrates or trying his ſkill upon brutes. Hippocrates only adviſes it in caſe of a ſwelling and impoſthumation, where there is matter formed, and the tumor manifeſts itſelf upon the ſurface. In this caſe every ſurgeon would know it was his buſineſs to make an inciſion. Phil. Tranſ. N° 223. p. 234.

Caſes requiring this are frequent, and not even without a ſtone.

The general opinion of authors is againſt the operation; and the moſt famed among thoſe who have treated of wounds of the kidneys ſay, that any wound which enters into the pelvis is mortal. Yet this opinion, though general, is not certain or determinate; and we have an account in the Philoſophical Tranſactions, of the operation of *nephrotomy* being performed with ſucceſs, by Merchetti, of Padua, on Mr. Hobſon, the Engliſh conſul at Venice. Phil. Tranſ. N° 223. p. 337.

NEPOTISM, a term uſed in Italy, in ſpeaking of the authority which the pope's nephews and relations have in the adminſtration of affairs; and of the care the popes take to raiſe and enrich them.

Many of the popes have endeavoured to reform the abuſes of *nepotiſm*: at preſent, *nepotiſm* is ſaid to be aboliſhed. Leti has wrote expreſly on this ſubject, *Il Nepotiſmo.*

NEPTA, a name uſed by ſome authors for the *aſphaltum.* It ſeems a corruption of *naphtha.*

NEPTUNALIA, feaſts held among the ancients, in honour of Neptune.

The *Neptunalia* differed from the *Conſualia*, in that the latter were feaſts of Neptune, conſidered particularly as preſiding over horſes, and the manege. Whereas the *Neptunalia* were feaſts of Neptune in general, and not conſidered under any particular quality. They were celebrated on the 10th of the calends of Auguſt.

NEPTUNE, in *Mythology*, the ſon of Saturn and Rhea, and brother of Jupiter and Pluto. He is commonly repreſented ſtanding with his trident in his right hand, which was his peculiar ſceptre, as lord of the Mediterranean ſeas, and ſeems to have been uſed by him chiefly to rouſe up the waters; for we find ſometimes that he lays it aſide, when he is to appeaſe them; but he reſumes it, when there is any occaſion for violence. Virgil, Æn. ii. v. 612. makes him ſhake Troy from its foundations with it; and in Ovid, Met. i. v. 284. it is with the ſtroke of this that the waters are let looſe for the general deluge. The dolphin is in his left hand, and he treads on the beak of a ſhip; to ſhew that he preſided over the ſeas, or more particularly, over the Mediterranean ſea; which was the great, and almoſt the only ſcene for navigation, among the old Greeks and Romans. The poets have deſcribed this god, as paſſing over the calm ſurface of the waters, in his chariot drawn by ſea-horſes. The fine original deſcription of this is in Homer; from whom Virgil, Æn. i. v. 155. and Statius Achil. i. v. 60. have copied it. A triton is ſometimes repreſented on each ſide, as guiding thoſe that draw the chariot of *Neptune*. His aſpect in all the beſt figures of him is majeſtic and ſerene. The lower ſort of artiſts exhibit him ſometimes with an angry and diſturbed air; and one may obſerve the ſame difference in this particular, between the great and inferior poets, as there is between the good and bad artiſts. Thus Ovid. Met. ii. v. 271. deſcribes *Neptune* with a ſullen look; whereas Virgil, Æn. i. v. 127. expreſly tells us, that he has a mild face, even when he is repreſenting him in a paſſion. *Neptune* had a great number of temples erected to his honour, as well as feaſts and games eſtabliſhed in token of reſpect, both in Greece and Italy. Spence's Polymetis, p. 65. p. 215, &c.

NEPTUNE's *cap*, a name given by naturaliſts to a remarkable ſpecies of marine fungus, which is never found affixed to any ſolid body, but always looſe, and rolling about at the bottom of the ſea. Its uſual ſize is about five inches in height, and ſix or ſeven in diameter at the baſe. It gradually becomes narrower from the baſe to the ſummit, where it terminates in a round end, ornamented with cluſters of a foliaceous ſort of ſubſtances, reſembling a cock's comb, but of the ſame matter with the reſt of the plant.

Its internal ſurface is very different from this: it is lightly furrowed down the ſides, and beſet with a number of ſmall protuberances, with obtuſe points. Some of theſe, when ſmall, are found with a pedicle growing to them. This is always of a very brittle ſubſtance, and it is probable that all thoſe found looſe had originally ſuch pedicles, by which they adhered to ſome ſolid body, in the manner of the corals; and other marine ſubſtances; but that its extreme brittleneſs occaſions it to be ſoon broken off, by the motion of the water, after which the plant rolls looſe about, and takes in its nouriſhment at its ſeveral pores, by means of the water which every way ſurrounds it.

It is not probable that theſe and the like marine ſubſtances are nouriſhed only by ſea-water; but that there is in the ſea a ſort of mud continually formed out of the decayed particles of animals, and the ſofter vegetables, which may be ſuppoſed much to reſemble the common vegetable mold in its uſes, as it has much the ſame origin; and this, or at leaſt its finer and lighter parts may be conveyed by water into the pores of theſe ſuppoſed plants, and nouriſh them. Mem. Acad. Par. 1700.

NEPTUNINS, in *Mythology*, were ſea-nymphs, ſo called, becauſe they were the deſcendants of NEPTUNE.

NERANTZIUM, in *Botany*, a name given by ſome of the Greek writers to the citron-tree. The ancient Greeks were not acquainted with the word, and it ſeems to have been formed in the barbarous ages from the word *narange*, the name by which the Arabian phyſicians called the ſame fruit.

NEREIDS, NEREIDES, ſea-nymphs, or fabulous deities of the ancients, ſuppoſed to inhabit the ſea.

The *Nereids* were fifty in number, all the daughters of Nereus, by the nymph Doris. Their names and genealogies are deſcribed in Heſiod. See NYMPH.

NEREIS, in *Zoology*, a genus of inſects of the *gymnarthria* kind, the body of which is of a cylindric figure; the tentacula are four in number, but two of them are uſually very ſhort. Hill, Hiſt. Anim. p. 92.

Authors have deſcribed this genus under the name of SCOLOPENDRA *marina*.

NEREIS, in the Linnæan ſyſtem of *Zoology*, is a genus of the *molluſca* order of worms, the body of which is creeping, oblong, and linear, the lateral tentacula are pencilled, the mouth is ungulicate, and above it there are plumoſe tentacula. There are eleven ſpecies.

NERFLING, in *Ichthyology*, the name of a freſh water fiſh of the leather mouthed kind, common in ſome of the lakes in Germany, and there called alſo the *orff* or *oorve*, and ſeeming to be the ſame with the common Engliſh RUDD.

There are two kinds of this fiſh, the fleſh of the one of which, when dreſſed, is white, and that of the other yellowiſh or reddiſh. The latter kind is moſt valued.

NERION, in *Botany*. See OLEANDER.

NERITA, a genus of ſhell fiſh, of the nature of the ſemicircular-mouthed cochleæ, and comprehended under the general term *cochleæ* SEMILUNARES. See *Tab.* III. *of Foſſils, claſs* 9.

NEROPHIDION, in *Ichthyology*, a name given by Schoneveldt, and ſome others, to that ſpecies of the *acus* or *ſyngnathus* of Artedi, which is called by that author the hexagonal-bodied *ſyngnathus* with the pinnated tail; and by others, the *acus Ariſtotelis*, and *acus ſecunda ſpecies*, and *typhle*; by ſome alſo, *blennus*.

NERVE, NERVUS, in *Anatomy*, a round, white long body, like a cord, compoſed of ſeveral threads, or fibres, deriving its origin from the brain, or the ſpinal marrow, and diſtributed throughout all parts of the body; ſerving for the conveyance of a peculiar juice, by ſome called *animal ſpirits*, for the performance of ſenſation, and motion.

NERVES, *origin of the*. From every point of the cortex of the brain there ariſe minute medullary fibres; which, in their progreſs, uniting together, at length become ſenſible; and thus conſtitute the medulla of the brain, and the ſpine.

Hence they are continued, and, in their farther progreſs, become diſtinguiſhed, or ſeparated, by coats which are detached to them from the dura and pia mater, into ſeveral diſtinct faſciculi, or *nerves*, reſembling in the poſition of their component fibrillæ, ſo many horſes tails, wrapped up in a double tunic.

It is probable, that the medullary fibres of the cerebellum, riſing up toward the fore-parts of the medulla oblongata, do part of them join the *nerves* ariſing thence, but ſo as ſtill to retain their ſeparate origin, progreſs and functions: the reſt of the fibres of the cerebellum are ſo mixed with thoſe of the brain, as that there is, perhaps, no part of the whole medulla oblongata, or ſpinalis, where there are not found the fibres of each kind; and thus, to conſtitute the body of each *nerve*, both kinds of fibres contribute, though the end and effect of each be quite different.

The *nerve* thus formed, and ſent from the medulla oblongata, and ſpinalis, while within the cranium, are ten pair, though very improperly ſo accounted; inaſmuch as moſt of them do, in reality, conſiſt of ſeveral diſtinct very large *nerves*: from the ſpinal marrow continued without the cranium there ariſe after the like manner, thirty pair; to which may be added another pair, ſent from the vertebræ of the neck, augmented in its progreſs by branches from the ſecond and third pair, and at laſt joined to the eighth pair.

All theſe, while within the medulla, are pulpous; as ſoon as they quit it, they acquire a ſheath, or caſe, wherewith being defended they proceed to the dura mater, which is perforated into an open vagina, reaching as far as the foramina of the cranium, deſtined for the tranſmiſſion of the *nerves*; where the nine firſt pair, and the acceſſory pair, aſſuming this vagina, or caſe, paſs ſafely out of the cranium.

The other thirty and one pair deſcend through ſpaces between the commiſſures of the apophyſes of the vertebræ; whence, firm, hard, and well cloathed as they are, they are diſperſed through all, even the ſmalleſt points of the ſolid parts of the body yet known.

The coats, or covers, of theſe *nerves*, are every where inveſted with blood-veſſels, lymphatics, and other veſicles of a very tight texture, which ſerve to collect, ſtrengthen, and contract the fibrillæ; and from which many of the phenomena of the *nerves*, and of diſeaſes, are accountable.

As ſoon as the laſt extremities of the *nerves* are about to enter the parts to which they belong, they again lay aſide their coats, and become expanded, either into a kind of thin membranula, or into a ſoft pulp.

Now upon conſidering, firſt, that the whole vaſcular medulla of the brain goes to the conſtituting of the fibrillæ of the nerves; nay, is wholly continued into, and ends in them: ſecondly, that, upon compreſſion, tearing, diſperſion, putrefaction, &c. of the medulla of the brain, all the actions uſed to be performed by the *nerves* ariſing thence, are immediately aboliſhed, even though the *nerves* continue entire, and untouched; thirdly, that the *nerves* themſelves are every where found lax, pendulous, crooked, retrograde, and oblique, yet affect motion and ſenſation almoſt inſtantaneouſly; fourthly, that, when cloſe bound or compreſſed, though in all other reſpects entire, they loſe all their faculty in thoſe parts between the ligature and the extremes to which they tend, without loſing any in thoſe parts between the ligature and the medulla of the brain, or cerebellum; it evidently appears, that the nervous fibrillæ do continually take up an humour, or juice from the medulla of the brain, and tranſmit it, by ſo many diſtinct canals, to every point of the whole body; and by means thereof alone, perform all their functions in ſenſation, muſcular motion, &c. which humour is what we popularly call ANIMAL *ſpirits*, or the *nervous juice*.

Nor does there appear any probability in that opinion maintained by ſome; viz. that the *nerves* perform all their action by the vibration of a tenſe fibrilla; which is inconſiſtent with the nature of a ſoft, pulpous, flaccid, crooked, wavy *nerve*, and with that nice diſtinctneſs wherewith the objects of our ſenſes are repreſented, and muſcular motions performed.

Now after the ſame manner as the arterial blood is perpetually carried into all the parts of the body furniſhed with thoſe veſſels, ſo we conceive a juice prepard in the cortex of the brain and cerebellum, conveyed thence every moment through the *nerves* to every point of the ſolid body. The ſmallneſs of the veſſels in the cortex, as exhibited in Ruyſch's injections, which yet are only arterious, and therefore incredibly thicker than the laſt emiſſary derived thence, ſhews how ſlender theſe hollow nervous ſtamina muſt be; but the great bulk of the brain, compared with the exceeding ſmallneſs of each fibrilla, ſhews that their number muſt be great beyond the limits of all imagination.

And again the great quantity of juice conſtantly brought hither, and violently agitated, will occaſion a conſtant plenitude, openneſs, and action of theſe little canals.

But as freſh juice is every moment prepared, and the laſt is continually protruding the former, as ſoon as it has done its laſt office, it ſeems to be driven out of the laſt filament into the ſmalleſt lymphatic venulæ, both about the glands, and elſewhere: thence into the lymphatics ſomewhat larger; and again, from theſe to the common lymphatic veſſels with the valves of veins, and, at length into the veins, and the heart: and thus like the other juices of the body, does it make its circuit round the body.

Upon the whole, if we conſider the great bulk of the brain, cerebellum, medulla oblongata, and medulla ſpinalis, with regard to the bulk of the reſt of the ſolids of the body; the great number of *nerves* diſtributed hence throughout the whole body; that the brain and carina, that is, the ſpinal marrow, are the baſis of an embryo, whence, according to the great Malpighi, the other parts are afterwards formed; and, laſtly, that there is ſcarce any part of the body but what feels or moves; it will appear very probable, that all the ſolid parts of the body are woven out of nervous fibres, and conſiſt wholly of them.

The ancients only allowed of ſeven pairs or conjugations, of *nerves*, proceeding from the brain; which, with their functions, they compriſed in theſe two Latin verſes.

> *Optica prima, oculos movet altera, tertia guſtat*
> *Quartaque; quinta audit, vaga ſexta eſt, ſeptima linguæ.*

But the moderns, as before obſerved, reckon ten, which are as follow:

NERVES *of the brain*, or *cerebrum*, are, the

NERVES, *auditory, ſeventh pair.* See AUDITORY *nerves*, and *Seventh pair of* NERVES.

NERVES *olfactory, par olfactorium*, or *firſt pair.* See OLFACTORY *nerves*.

NERVES *optic* or *ſecond pair.* See OPTIC *nerves*.

NERVES *which move the eyes, oculorum motorii*, or *third pair*, ariſe from the crura of the medulla oblongata, near the annular protuberance; whence they proceed between two branches of the cervical artery; and, paſſing out of the ſkull at an irregular oblong hole, immediately under the former, are ſpent on thoſe muſcles of the eyes called *attollent, depriment, adducent*, and *obliquus inferior*; except ſome ſmall fibres, ſpent in the muſcles of the upper palpebra. See *Tab. Anat. (Oſteol.) fig.* 5. *lit.* k k.

NERVES, *pathetic*, or *fourth pair.* See PATHETICI.

NERVES, *fifth pair of*, called *nervi innominati trigemini*, the largeſt of all thoſe coming from the brain, have their uſe as well as diſtribution, nore extenſive; ſerving both for ſenſe and motion, for touch and taſte. They ſend branches not only to the eyes, noſe, palate, tougue, teeth, and moſt parts of the mouth and face, but alſo to the breaſt, lower venter, præcordia, &c. by means of the intercoſtals, which are partly compoſed of branches of theſe *nerves*; whence ariſes a conſent, or ſympathy, between thoſe ſeveral parts of the body. See *Tab. Anat. (Oſteol.) fig.* 5. *lit.* n n.

The *nerves* of this pair ariſe anteriorly from the lateral parts of the tranſverſe protuberance of the medulla oblongata, by a great number of filaments cloſely united together, which afterwards form two large flat trunks, one on each ſide. Each trunk runs towards the apex of the neighbouring os petroſum, where it perforates the dura mater, a little below the edge of the extremity of the anterior portion of the ſeptum tranſverſum of the brain. Having detached ſome filaments to the apex of the apophyſis petroſa, it enters the ſinus cavernoſus; and having ſent ſome other filaments to the dura mater, it expands in the ſinus, and forms a kind of plexus, or flat irregular ganglion. The trunk is afterwards divided into three large branches, more or leſs flatted, which run through the cavernus ſinus, and are diſpoſed laterally on one vertical plane. The *firſt branch*, commonly called *nervus ophthalmicus Williſii*, is the ſmalleſt and longeſt of the three, and enters the orbit through the ſphenoidal fiſſure, on which account Winſlow has called it *nervus orbitarius.* This branch is then divided into three ſubordinate rami, or branches, one ſuperior or frontal, one internal or naſal, and one external or lachrymal; and communicates by a filament or two with the *nerve* of the ſixth pair, and with the intercoſtal *nerve.* The *ramus ſuperior* is the moſt conſiderable, and runs along the ſuperior part of the orbit, cloſe to the membrane which lines it, ſending filaments to the flat which ſurrounds the globe of the eye, to the neighbouring membranes, and to the muſculus levator palpebræ. Afterwards it paſſes through the foramen ſuperciliare, and being divided towards each ſide, is ſpent on the neighbouring portions of the muſculus frontalis, orbicularis, and integuments; communicating with a neighbouring ramus of the portio dura of the auditory *nerve.* The *ramus naſalis* runs towards the noſe; firſt of all obliquely over the optic *nerve*, and under the two muſculi levatores; then between the muſculus rectus internus and obliquus major, along the inſide of the orbit, ſending filaments in its paſſage to the ganglion above mentioned, to the muſculi levatores, and through the internal orbitary hole. It afterwards paſſes over the muſculus rectus internus to the great angle of the eye, where it is diſtributed to the caruncula and ſacculus lacrymalis, to the neareſt portions of the muſculus orbicularis, ſuperciliaris, pyramidalis naſi, and to the integuments. The *ramus lacrymalis* goes chiefly to the glandula lacrymalis, upon which it is diſtributed, and from whence it has its name. Before it reaches the gland, it ſends a ſmall branch to the external lateral part of the orbit.

The *ſecond branch* of the fifth pair, called *nervus maxillaris ſuperior*, goes out of the cranium between the foramen ovale and fiſſure of the os ſphenoidale, paſſing through the foramen rotundum, or maxillare ſuperius of the ſame bone. Immediately after its paſſage, it ſends a filament to the outſide of the orbit, which, having perforated the os malæ, is diſtributed to the parts which cover that bone; communicates with a neighbouring branch of the portio dura of the auditory nerve; and ſends ſmall filaments to the fat in the lower part of the orbit, ſoon afterwards, it is divided into three rami; the firſt of which, called by Winſlow *ſuborbitarius*, is the moſt conſiderable. This runs in the canal of the inferior portion of the orbit, and goes out by the exterior orbitary hole. In its paſſage it ſends ſmall filaments, which, entering the ſinus maxillaris, are diſtributed to the membrana pituitaria in that ſinus to the ſubſtance of the bone, to the alveoli, to the anterior dentes molares, and to the dentes canini and inciſores. It alſo gives a filament to the poſterior molares, and one, which runs along the upper ſide of the arch of the palate, to the union of the oſſa maxillaria. When this ramus has paſſed out of the bony canal, through the foramen ſub-orbitarium anterius, it is diſtributed to the muſculus orbicularis palpebrarum, to the neighbouring muſcles of the noſe and lips, and to the integuments, communicating with a ramus of the portio dura of the auditory *nerve.* The ſecond ramus of the ſuperior maxillary *nerve*, called *palatinus*, runs down before the pterygoide apophyſes of the os ſphenoides, in the canal formed by the os maxillare and os palati; and having paſſed out of that canal, through the foramen palatinum poſterius, it is diſtributed by ſeveral filaments to the glandular coat of the palate, to the ſeptum palati, and muſcles belonging to that part. It alſo ſends filaments to the muſculus pterygoidæus externus, to the peri-ſtaphylini, and to the arch of the pharynx: and others through the ſmall holes in the poſterior part of, or tubercle of the os maxillare, to the ſinus maxillaris, and poſterior dentes molares. The third ramus, called ſpheno-palatinus, paſſes through the bony hole of the ſame name, and is diſtributed to the muſculus pterygoidæus internus, to the poſterior parts of the nares, to the neighbouring ſinus ſphenoidalis, and to the tuba Euſtachiana. It alſo ſends a filament through the foramen pterygoides, which joins the inferior maxillary *nerve.*

The third branch of the fifth pair, called *nervus maxillaris inferior*, is larger at its origin than the other two: it goes out of the cranium by the foramen ovale of the ſphenoidal bone, and runs between the two muſculi pterygoidæi, below the great ſinus of the lower jaw, where it enters the bony canal of that jaw. As ſoon as it leaves the cranium, it ſends off four principal branches, and before it enters the canal of the lower jaw, it gives off another to the tongue. The firſt branch runs up to the temporal muſcle, on the inſide of which, and between its fibres it is diſtributed. The ſecond branch runs behind the condyle of the lower jaw, where it divides into two filaments, which communicate with the neighbouring ramus of the portio dura of the auditory *nerve*, behind the outſide of the condyle. At the origin of theſe filaments, it ſends off a ſmall ramus, which runs up before the external ear towards the temples, giving filaments to the concha of the ear in its paſſage. The third branch paſſes between the two apophyſes of the lower jaw, perforates the lower part of the temporal muſcle, and gives it ſeveral filaments Afterwards it bends downwards upon the muſculus maſſeter, to which it is chiefly diſtributed, giving filaments to the neighbouring integuments, and communicating with the portio dura of the auditory *nerve*, on the ſide of the os malæ. It terminates by filaments, which go to the muſculus buccinator, to the muſcles of the under lip, and to the integuments of theſe parts. The fourth branch is often no more than a ramus of the third branch, which goes off near its origin. It paſſes over the muſculus pterygoidæus internus, to which it gives filaments, and is diſtributed to the pterygoidæus internus, and to the neareſt portion of the temporalis. It is likewiſe diſtributed to the muſculus buccinator, to the glands of the mouth and muſcles of the lips; and ſometimes ſends off a filament which runs up upon the concha of the external ear. The branch that goes to the tongue, which may be called nervus lingualis, or hypogloſſus minor, is detatched from the maxillaris inferior, as it paſſes between the

the muſculi-pterygoidæi, and ſometimes a little ſooner. This conſiderable branch leaves the trunk a little above the canal of the lower jaw, runs over the pterygoidæus internus, and gives it ſome filaments. Near its origin, it communicates with the trunk by a ſhort collateral branch, which is ſometimes plexiform: here it ſuſtains a particular filament, which, according to the common opinion, ariſes from it, and goes to the internal ear. This filament has been ſuppoſed to be a recurrent, running up backward through the tympanum, and joining the portio dura of the auditory *nerve*. But Winſlow thinks it comes from the internal ear to that nerve. This lingual ramus paſſes under the lateral part of the tongue, and over the glandula ſublingualis, giving filaments to the neighbouring portions of the muſcles of the tongue, and to thoſe of the os hyoides and pharynx. Having communicated by ſeveral filaments with the extremities of the nerve of the ninth pair, it enters the ſubſtance of the tongue, and terminates near its apex. The inferior maxillary *nerve*, before it enters the canal of the lower jaw, ſends filaments to the neighbouring portions of the muſculus pterygoidæus, internus, digaſtricus, &c. It likewiſe detaches a filament or two along the perioſteum, to be diſtributed to the muſculus mylo-hyoidæus, and glandula ſublingualis. After it has entered the canal of the lower jaw, it runs under the alveoli, and diſtributes filaments to each tooth, all the way to the hole near the chin, where it ſends another ramus forward into the diploe, which is diſtributed to the other teeth that lie between that hole and the ſymphyſis of the chin. Winſlow.

NERVES, *ſixth pair of*, the *guſtatorii*, or *motores externi*, are ſmall, but yet a little larger than thoſe of the fourth pair, called the PATHETICI. They ariſe from the union of the medulla oblongata, between the great tranſverſe protuberance and the corpora olivaria; whence they advance to the dura mater, and enter it on the extremity of the production of the os occipitis behind, and a little on one ſide of the ſymphyſis of that bone with the os ſphenoides. Each of theſe *nerves* runs afterwards in the cavernous duplicature of the dura mater, on one ſide of the bottom of the ſella ſphenoidalis, and of the carotid artery, to which it adheres very cloſely, and it there communicates with a branch of the fifth pair, by one or two ſhort filaments. Immediately after, and behind this communication, the motor externus ſends down a filament, which at firſt appears to run from before backward like a recurrent, and preſently enters the large bony canal of the apophyſis petroſa, on one ſide of the internal carotid artery. This nervous filament, which is ſometimes double, is commonly taken for the root or origin of the intercoſtal *nerve*; but Winſlow obſerves, that, as it makes an acute angle, in an oppoſite direction with the *nerve* of the ſixth pair, it ſeems rather to run up with the carotid artery, and to join that *nerve*, than to ariſe from it. The *nerve* of the ſixth pair, which is ſometimes double, or ſplit into two parts, before it enters the dura matter, paſſes afterwards through the ſphenoidal, or ſuperior orbitary fiſſure, to the muſculus rectus externus of the eye. See *Tab. Anat. (Oſteol.) fig.* 5. *lit.* o o. Winſlow.

NERVES, *the ſeventh pair*, or *auditory*, ariſing from the lateral and poſterior part of the great tranſverſe protuberance of the medulla oblongata, and paſſing out of the ſkull, through a hole of the os petroſum, ſeparate into two branches, or portions, a hard, and a ſoft one.

The hard portion, entering a little ſinus in the upper part of the bone that conſtitutes the barrel of the ear, ſends off a twig, which diſtributes itſelf into the dura mater, except ſome ſmall twigs which go to the membrane that lines the ear, to the internal muſcles that line the ear, and the fine membrane that clothes the inſide of the cavity of the apophyſis mammillaris: after this, the hard branch ſends off two other twigs, one to the eighth pair, the other to the tympanum, whoſe cord it forms; whence, creeping over the malleolus, it goes out of the ear, and ſends a ramification to the tongue. See *Tab. Anat. (Oſteol.) fig.* 5. *lit.* p p.

The ſame hard branch, coming out of the proceſſus mammillaris, ſends ſome twigs to the maſſeter, and others to the glands about the ear, where it divides into two other ramifications; the interior beſtowed on the glands, the cheek, and the upper lips; the reſt on the lower palpebra, and the external part of the face. The exterior ramification, beſtowing ſome fibrillæ on the glands, out of which it iſſues, divides into two; the upper diſtributed into the quadratus, and outer parts of the under jaw; the lower ſpent on the integuments of the fore and lateral part of the neck, ſome muſcles of the lower jaw, and the maſtoidal muſcle. This portion of the auditory *nerve* is denominated by Winſlow *nervus ſympatheticus minor*.

The ſoft and larger portion of this pair divides into three ramifications; the upper whereof paſſes through a ſmall foramen into the concha, where, expanding, it forms a fine membrane, which lines its inner ſurface: the ſecond and third ramifications are alſo ſpent on the inner parts of the concha, and ſemicircular ducts, which they furniſh with membranes, the immediate organs of hearing. See AUDITORY *nerves*.

NERVES, *eighth pair of*, or the *par vagum*, denominated by Winſlow *nervi ſympathetici medii*, ariſe from the poſterior part of the medulla oblongata, from the great tranſverſe protuberance, and from the anterior part of the corpora olivaria, by ſeveral ſeparate filaments, which are afterwards collected in a faſciculus, that runs towards the anterior part of the foramen lacerum of the baſis cranii, where it perforates the dura mater, immediately before the extremity of the great lateral ſinus. See *Tab. Anat. (Oſteol) fig* 5. *lit.* q q.

This, in its progreſs, is joined by the par acceſſorium, and, a little farther, by a twig of the hard part of the ſeventh pair; and at the ſecond vertebra of the neck, by the *nerves* that iſſue from the cervical marrow; and detaches ſeveral twigs to the muſcles of the larynx, gula, neck, &c. particularly from the gangliform plexus, formed by its union with a branch of the intercoſtal. Hence deſcending to the thorax, it makes another plexus under the clavicle, whence ariſes the recurrent *nerve* on the right ſide, as on the left it has its riſe from the trunk of the *nerve* itſelf. The right recurrent is reflected at the axillary artery; the left at the deſcending branch of the aorta; each, running aſide the trachea, impart ſome twigs to it, and terminate in the muſcles of the larynx. Their uſe is in the formation and modulation of the voice. Againſt the origin of the aorta it ſends off a branch towards the heart, which dividing into two, the leſſer twiſts about the pulmonary vein; the bigger proceeds to the pericardium, and heart, after having ſent off a twig, which with others from the intercoſtals, makes the plexus cardiacus ſuperior: proceeding ſtill farther, it ſends out ſeveral ramifications, which, meeting together, make the plexus pneumonicus, whence ariſe fibres that conſtringe the veſſels and veſicles of the lungs. In its paſſage downwards it diſtributes ſeveral branches to the œſophagus, along which it runs.

About the lower vertebræ of the neck the trunk divides into two branches, the external and internal, communicating all along by ſeveral ramifications, and at length reuniting. The reſt of this pair joins with the intercoſtals in the formation of the ſeveral plexuſes in the lower venter, and in them ſeems to terminate.

Along with theſe, and wrapped up in the ſame coat from the dura mater, paſs the

NERVE, *acceſſory*, *par acceſſorium*, which has its origin from the medulla contained in the vertebræ of the neck. Soon after its return out of the ſkull, it leaves the par vagum again, and is diſtributed into the muſcles of the neck and ſhoulders. See *Tab. Anat. (Oſteol.) fig.* 5. *lit.* r r.

NERVES, *intercoſtal*, called by Winſlow *ſympathetici majores*, or *maximi*, conſiſt of nervous filaments, derived partly from the brain; viz. the branches of the fifth and ſixth pair; and partly from the ſpinal marrow, by thoſe branches they receive from the vertebral *nerves*.

It has been the common opinion, that theſe *nerves* begin by a filament from the ſixth pair belonging to the medulla oblongata, and by two filaments from the fifth pair; and that theſe filaments do at firſt compoſe a very ſmall *nerve*, which runs backward, to go out of the cranium, through the bony canal of the apophyſis petroſa, and increaſes gradually in its courſe downward. But Mr. Winſlow is of opinion, that theſe filaments aſcend from the baſis of the cranium with the internal carotid, and run from behind forward to join the fifth and ſixth pairs; and he has found the angle formed by this union to be turned forward, and ſo very acute, that theſe *nerves* cannot be looked upon as recurrents. The ſituation of theſe *nerves*, in general, is on the lateral parts of the whole twenty-four vertebræ, immediately before the roots of the tranſverſe apophyſes, and likewiſe on the lateral parts of the inſide of the os ſacrum. Through this large extent, they appear like two ropes divided, and in a manner intercepted at different diſtances, by many gangliform tubercles, by means of which they communicate backward with the ganglions of the medulla ſpinalis, by ſhort collateral filaments; and produce forward all their particular ramifications.

In each trunk of theſe *nerves*, before it arrives at the thorax, are two cervical plexuſes, the upper whereof receives a branch from each trunk of the par vagum; the other ſends out ſeveral ramifications to the œſophagus, and aſpera arteria, and particularly a large one to the recurrent *nerve*. From the ſame plexus deſcend two other ramifications to the cardiac plexus, which are joined a little lower by a third, from which the intercoſtal *nerve* deſcending to the clavicles, divides into two, and embraces and conſtringes the ſubclavian artery; thence entering the thorax, it receives three or four twigs from the upper vertebral *nerve*, together with which it conſtitutes the intercoſtal plexus; and thence deſcending along the ſides of the vertebræ, and receiving a nervous twig from each of them, to the os ſacrum, and entering the abdomen it forms ſeveral conſiderable plexuſes; viz. the lienaris, hepaticus, the two renales, meſentericus magnus, and two little ones in the pelvis. See INTERCOSTAL.

NERVES, *ninth pair of*, *motorii linguæ*, *par linguale*, or *nervi hypogloſſi externi ſive majores*, ariſe from the middle of the centrum ovale, by three or four ſmall twigs, and go out of the ſkull near the proceſs of the occiput, and ſend their branches to the tongue. See *Tab. Anat.* (*Oſteol.*) *fig.* 5. *lit.* ſ. ſ.

They may be likewiſe called *guſtatorii*, as they contribute, together with the branches of the fifth and ſixth pair, to the ſenſation of taſting.

NERVES, *tenth pair of*, or *ſub-occipital nerves*, ariſe by two or three branches from the medulla oblongata, juſt below the corpora pyramidalia and olivaria, or rather at the beginning of the medulla ſpinalis; whence reflecting a little backwards, they go out of the ſkull between the firſt vertebra of the neck, and the proceſs of the occiput. See *Tab. Anat.* (*Oſteol.*) *fig* 3. *lit.* t t.

Theſe are ſpent on the external muſcles of the head and ears.

NERVES, *from the ſpinal marrow.* The *ſpinal nerves* (i. e. thoſe ſpringing from the medulla after its egreſs out of the ſkull, where it lays aſide the name *oblongata*, and aſſumes that of *ſpinalis*) are thirty pair; of which, ſeven are reckoned as belonging to the neck, as having their origin thence, and called *cervical nerves*; twelve to the dorſum, or back, and called *dorſal*, or *coſtal nerves*; five to the loins, called *lumbal nerves*, and five or ſix that paſs out through the os ſacrum. See *Tab. Anat.* (*Oſteol.*) *fig.* 6. *lit.* b. b.

NERVES, *cervical.* See CERVICAL.

NERVES, *dorſal*, are in number twelve: theſe, excepting what the two upper pair contributed to the *brachial nerves*, are generally diſtributed into the intercoſtal and abdominal muſcles, the pleura, and external parts of the thorax. See *Tab. Anat.* (*Oſteol.*) *fig.* 6. *lit.* f f.

NERVES, *lumbal*, are five pair: the firſt of which ſends two branches to the lower ſide of the diaphragm: the ſecond, ſome twigs to the genital parts, and others, as well as the three following, give the firſt roots to the *crural nerves*; the reſt of the branch of the *lumbal nerves* are diſtributed into the muſcles of the loins, and adjacent parts. See *Tab. Anat.* (*Oſteol.*) *fig.* 6. *lit.* g g.

NERVES *of the os ſacrum* are ſix pair; the firſt three or four pair whereof are beſtowed wholly on the *crural nerves*, the reſt on the muſcles of the anus, veſica, and genital parts.

NERVES, *brachial*, are the offspring, partly of the cervicals, and partly of the dorſals: theſe, after the ſeveral branches whereof they are compoſed have been variouſly complicated and united, run but a little way in a trunk before they divide again into ſeveral branches, variouſly diſtributed into the muſcles of the ſkin and arms. See *Tab. Anat.* (*Oſteol.*) *fig.* 6. *lit.* e e.

NERVES, *diaphragmatic*, are likewiſe the offspring of the cervicals: theſe two, after joining in a trunk, run through the mediaſtinum undivided, till they arrive near the diaphragm, into which they ſend off ſeveral branches; ſome into the muſcular, others into the tendinous part of it.

NERVES, *crural*, conſiſt of an union of ſix or ſeven pair; viz. the three laſt of the lumbal, and three or four firſt of the os ſacrum: theſe after having ſpent their upper branches on the muſcles of the thigh and ſkin, as far as the knee, proceed in a trunk downwards, which ſends its branches to the extremities of the toes, ſupplying, as it goes, the muſcles and ſkin of the leg and foot: this is the largeſt and firmeſt nervous trunk in the body.

NERVE, *ſciatic*, is formed of the laſt two pair of the lumbar, and the firſt three pair of the *nerves* of the os ſacrum, and runs obliquely backward under the great ſinus of the os ilium, and under the muſculus pyriformis. As it goes out of the pelvis, it gives a branch to the anus, perinæum, genital parts, &c. Below the trochanter, it is ſometimes called *nervus ſciatico-cruralis*, and when it has reached the ham, *nervus popliteus*. In the courſe of its paſſage along the leg and foot, to the various parts of which it ſends ſeveral branches, it acquires the appellation of *ſciatico-tibialis*, *ſciatico-perinæus*, *plantaris internus*, and *externus*.

The ancients found, that by cutting, tying, or compreſſing any *nerve*, or any other way intercepting its communication with the brain, the parts to which it belonged were immediately deprived of all ſenſe and motion. One remarkable inſtance of this is, the making an animal dumb by tying the *nerves* near the wind-pipe. We read in Galen of a boy who became quite dumb by having both the recurrent *nerves* divided.

The experiment of cutting theſe *nerves* in brute animals, was repeated and confirmed by Veſalius; and Dr. Martin aſſures us, he tried it ſucceſsfully on a pig; nor did the animal recover its voice, as ſome have ſuſpected it might. As the voice depends on a proper aperture of the glottis, it ſeems likely that when the recurrent *nerves* are cut, the glottis will always ſtand open, and be incapacitated from being ſhut at the will of the animal. See Med. Eſſ. Edinb. vol. ii. art. 8.

An anonymous phyſician offers what he calls an *experimentum crucis*, in proof of the *nerves* being compoſed of cylindrical canals, containing a fluid: it is the demonſtration of the optic *nerve* inflated and dried, which appears canicular to the naked eye.

NERVES, *ganglion of the.* See GANGLION.

NERVES, *wounds of the.* Upon the diviſion of a *nerve*, the limb to which that *nerve* was extended becomes inſtantly rigid, void of ſenſation, and withers; ſo that it is no wonder that a man inſtantly expires, upon the diviſion of thoſe *nerves* which are ſent to the heart or diaphragm: a wound alſo is attended with great danger where the *nerve* is only partially wounded, and not entirely divided; for the wounded fibres contract themſelves, and thoſe which remain undivided ſuffer too great extenſion, which will bring on moſt violent pain, ſpaſms, convulſions, inflammations, and gangrenes, and ſometimes death itſelf. Heiſter's Surg. p. 27.

NERVES *microſcopically examined.* Mr. Leeuwenhoeck endeavoured by his microſcope to diſcover the ſtructure of the *nerves* in the ſpinal marrow of an ox: he ſaw there with great delight, minute hollow veſſels of an inconceiveable firmneſs, inveſted with their proper membrane, and running out in length parallel to one another, and making up their compoſition; and though ſome hundreds of their veſſels go to the formation of the leaſt *nerve* that can be examined, he not only diſcerned the cavities in them, which he computed to be three times leſs than their diameters, but in ſome perceived the orifices as plainly as the holes in a pricked paper are to be ſeen when looked at againſt the ſun. It requires, however, great dexterity and expedition to make this examination with ſucceſs; for after a thin ſlice of the ſpinal marrow is placed before the microſcope, in leſs than a minute's time it becomes dry, and the whole appearance vaniſhes. Baker's Microſcope, p. 145.

NERVES, *capillaments of the.* See CAPILLAMENT.

NERVES, in *Architecture*, denote the mouldings of projecting arches of vaults, or thoſe ariſing from the branches of ogives, and croſſing each other diagonally in Gothic vaults; ſerving to ſeparate the pendentives.

NERVES, in *Botany*, are long, tough ſtrings, running either acroſs, or lengthwiſe of the leaves of plants.

NERVINES. See NEURITICS.

NERVOSA *corpora*, in *Anatomy.* See CAVERNOSA *corpora.*

NERVOSE *leaf.* See LEAF.

NERVOUS *colic.* See COLIC.

NERVOUS *fever.* See FEVER.

NERVOUS *diſorders* compoſe a very numerous claſs of the diſeaſes incident to mankind. Theſe, whilſt under various forms and modes of attack, they exhauſt the ſtrength of the body, impair the vigour of the mind, and its power of ſelf-enjoyment. Diſorders of this kind proceed from any cauſe that contributes to relax the body, or depreſs the ſpirits; ſuch are exceſs of ſtudy, and want of proper exerciſe, drinking weak watery liquors, frequent bleeding, purging, vomiting, immoderate venery, great fatigue, want of ſleep, anxiety and grief, unwholeſome air, &c.

Nervous diſeaſes commonly begin with windy inflations of the ſtomach and inteſtines, bad appetite and digeſtion, vomiting, excruciating pains about the navel, with a rumbling noiſe in the bowels, coſtiveneſs, very unequal diſcharges of urine, difficulty of breathing, palpitations of the heart, ſudden fluſhings of heat, and at other times ſenſation of cold flying pains in the arms and limbs, pains in the back and belly, variable pulſe, yawning, ſighing, unſound ſleep, &c. As the diſorder increaſes, the patient is troubled with head-achs, cramps, and fixed pains in various parts of the body; the eyes are clouded, and often painful; the ears are dull of hearing, and the mind is ſubject to inquietude, and diſtreſſing apprehenſions, on the moſt trivial occaſions. But it is obſerved, that nothing is more characteriſtic of this diſeaſe than a dread of death. As to the regimen which perſons labouring under this diſorder ſhould uſe, though they ought never to faſt long, they ſhould be careful to avoid all exceſs both in eating and drinking ; their food ſhould be ſolid and nouriſhing, but of eaſy digeſtion ; wine and brandy mixed with water may be drank with ſafety, and even with advantage, but all weak and warm liquors, as tea, coffee, punch, &c. are hurtful ; becauſe they weaken the ſtomach and hurt digeſtion, and thus increaſe the malady. Exerciſe by walking or riding, long ſea-voyages, change of place and company, are of principal importance and uſe in *nervous* complaints ; rubbing the body often with a fleſh-bruſh, or a coarſe linen cloth, is likewiſe beneficial, as it promotes the circulation and perſpiration. Perſons of weak nerves ſhould riſe early, and uſe exerciſe before breakfaſt ; they ſhould as much as poſſible, breathe a cool and dry air, and be kept eaſy and chearful. They ſhould avoid a coſtive habit, by the occaſional uſe of a little rhubarb, or ſome other mild purgative : an infuſion of ſena and rhubarb in brandy will ſerve for this purpoſe ; and if the digeſtion is bad, and the ſtomach relaxed, the following infuſion will give relief: take of Peruvian bark, an ounce ; gentian root, orange-peel, and coriander-ſeed, of each half an ounce ; bruiſe theſe ingredients in a mortar, and infuſe them in a bottle of brandy five or ſix days. A table ſpoonful of the ſtrained liquor may be taken in half a glaſs of water, an hour before breakfaſt, dinner, and ſupper. Cold bathing is very ſerviceable in ſtrengthening the *nervous* ſyſtem, unleſs there are particular ſymptoms which forbid the uſe of it. Dr. Buchan ſtrongly recommends to patients afflicted with wind the acid elixir of vitriol ; which, he ſays, taken in the quantity of fifteen, twenty, or thirty drops, twice or thrice a day, in a glaſs of water will expel wind, ſtrengthen the ſtomach, and promote digeſtion. Upon the whole, the ſtricteſt attention ſhould be paid to diet, air, exerciſe, and amuſements, and the medicines ſhould be adapted to the nature and degree of the diſeaſe under which the patient labours. Buchan's Dom. Med. chap. 43. See HYPOCHONDARIAC and HYSTERIC *affection*.

NERVOUS *ſpirit*, or *juice*, denotes a pure, ſubtile, volatile, humour, better known by the name of *animal ſpirits* ; ſecreted from the arterious blood in the cortical part of the brain, collected in the medulla oblongata, and thence driven by the force of the heart, into the cavities of the nerves ; to be conveyed by them throughout the body, for the purpoſes of ſenſation, and animal motion.

Gliſſon, Wharton, and Willis, firſt mentioned the *nervous* juice ; but many of our modern phyſicians deny the exiſtence of this juice See ANIMAL *ſpirits*.

NERVOUS *parts, conſent of the*. See CONSENT.

NEST. See NIDUS.

NESTLINGS, a name given to Canary birds brought up by hand. See CANARY-*bird*.

NESTORIANS, a ſect of ancient Chriſtians, ſtill ſaid to be ſubſiſting in ſome part of the Levant ; whoſe diſtinguiſhing tenet is, that Mary is not the mother of God. They take their name from Neſtorius, a Syrian, who, of a monk, became a prieſt, and a celebrated preacher ; and was at length, after the death of Siſinnius in 428, raiſed by Theodoſius to the ſee of Conſtantinople.

At firſt he ſhewed a great deal of zeal againſt hereſy, in his ſermons before the emperor ; but, at length, taking the liberty to ſay, that he found in Scripture, that Mary was the mother of Jeſus, but that he no-where found that Mary was the mother of God ; his auditory was ſhocked, and a great part of them retired from his communion.

His writings were ſoon ſpread through Syria, Egypt, and Perſia, where he made many converts, notwithſtanding the vigorous oppoſition of St. Cyril.

But nothing tended ſo much to propagate with rapidity the doctrine of Neſtorius, as its being received in the famous ſchool which had for a long time flouriſhed at Edeſſa. For the doctors of this celebrated academy not only inſtructed the youth in the *Neſtorian* tenets, but tranſlated from the Greek into the Syriac language the books of Neſtorius, of his maſter Theodorus of Mopſueſtia, and the writings alſo of Diodorus of Tarſus, and ſpread them abroad throughout Aſſyria and Perſia.

One of the chief promoters of the *Neſtorian* cauſe was Barſumas, created biſhop of Niſibis A. D. 435. Such were his zeal and ſucceſs, that the *Neſtorians*, who ſtill remain in Chaldæa, Perſia, Aſſyria, and the adjacent countries, conſider him alone as their parent and founder, By him, Pherozes, the Perſian monarch, was perſuaded to expel thoſe Chriſtians who adopted the opinions of the Greeks, and to admit the *Neſtorians* in their place, putting them in poſſeſſion of the principal ſeat of eccleſiaſtical authority in Perſia, the ſee of Seleucia, which the patriarch of the *Neſtorians* has always filled even down to our time. Barſumas alſo erected a ſchool at Niſibis, from which proceeded thoſe *Neſtorian* doctors, who, in the fifth and ſixth centuries, ſpread abroad their tenets through Egypt, Syria, Arabia, India, Tartary, and China.

His capital tenet was, that there are two perſons in Jeſus Chriſt ; and that the virgin was not his mother, as God, but only as man.

This doctrine was condemned in the council of Epheſus ſummoned by Theodoſius the younger, A. D. 431. at which above two hundred biſhops aſſiſted, and Cyril preſided ; and Neſtorius was anathematized, without being heard, and depoſed from his ſee.

Neſtorius was not the author of this opinion, but borrowed it at Antioch, where he had ſtudied ; and though he was the ſuffering and perſecuted party from the beginning of the controverſy to his death, the flame was firſt kindled by the preſbyter Anaſtaſius. Theodorus Mopſueſtanus, whoſe diſciple he was, had taught the ſame before him.

The abettors of this doctrine refuſe the title *Neſtorians* ; alledging, that it had been handed down from the earlieſt times of the Chriſtian church.

In the tenth century the *Neſtorians* in Chaldæa, whence they are ſometimes called Chaldæans, extended their ſpiritual conqueſt beyond mount Imaus, and introduced the Chriſtian religion into Tartary, properly ſo called, and eſpecially into that country called Karit, and bordering on the northern part of China. The prince of that country, whom the *Neſtorians* converted to the Chriſtian faith, aſſumed, according to the vulgar tradition, the name of John, after his baptiſm, to which he added the ſurname of Preſbyter, from a principle of modeſty ; whence it is ſaid, his ſucceſſors were each of them called Preſter John, until the time of Gengis Khan. But Moſheim obſerves, that the famous Preſter John did not begin to reign in that part of Aſia befors the concluſion of the eleventh century. The *Neſtorians* formed ſo conſiderable a body of Chriſtians, that the miſſionaries of Rome were induſtrious in their endeavours to reduce them under the papal yoke. Innocent IV. in 1246, and Nicolas IV. in 1278, uſed their utmoſt efforts for this purpoſe, but without ſucceſs. Till the time of pope Julius III. the *Neſtorians* acknowledged but one patriarch who reſided firſt at Bagdat, and afterwards at Mouſul ; but a diviſion ariſing among them, in 1551, the patriarchate became divided, at leaſt for a time, and a new patriarch was conſecrated by that pope, whoſe ſucceſſors fixed their reſidence in the city of Ormus, in the mountainous part of Perſia, where they ſtill continue diſtinguiſhed by the name of Simeon ; and ſo far down as the laſt century, theſe patriarchs perſevered in their communion with the church of Rome, but ſeem at preſent to have withdrawn themſelves from it. The great *Neſtorian* pontiffs, who form the oppoſite party, and look with a hoſtile eye on this little patriarch, have, ſince the year 1559, been diſtinguiſhed by the general denomination of Elias, and reſide conſtantly in the city of Mouſul. Their ſpiritual dominion is very extenſive, takes in a great part of Aſia, and comprehends alſo within its circuit the Arabian *Neſtorians*, and alſo the CHRISTIANS *of St. Thomas*, who dwell along the coaſt of Malabar. It is obſerved, to the laſting honour of the *Neſtorians*, thar of all the Chriſtian ſocieties eſtabliſhed in the Eaſt, they have been the moſt careful and ſucceſsful in avoiding a multitude of ſuperſtitious opinions and practices that have infected the Greek and Latin churches. About the middle of the ſeventeenth century the Romiſh miſſionaries gained over to their communion a ſmall number of *Neſtorians*, whom they formed into a congregation or church, the patriarchs or biſhops of which reſide in the city of Amida, or Diarbeker, and all aſſume the denomination of Joſeph. Nevertheleſs, the *Neſtorians*, in general, perſevere, to our own times, in their refuſal to enter into the communion of the Romiſh church, notwithſtanding the earneſt entreaties and alluring offers that have been made by the pope's legate to conquer their inflexible conſtancy. Moſheim.

NET, in *Fiſhing* and *Fowling*, a contrivance by which to catch fiſh or fowl. See FISHING.

The taking fowls by *nets* is the readieſt and moſt advantageous of all others, where numbers are to be taken.

The making the *nets* is very eaſy, and what every true ſportſman ought to be able to do for himſelf. All the tools neceſſary to it are wooden needles, of which there ſhould be ſeveral of different ſizes, ſome round, and others flat ; a pair of round-pointed flat ſciſſars, and a wheel to wind off the thread. The packthread is to be of different ſtrength and thickneſs, according ſo the ſort of birds that are to be taken, and the general ſize of the meſhes, if not for very ſmall birds, is two inches from point to point.

The *nets* ſhould be made neither too deep nor too long, for they are then difficult to manage : and they muſt be verged on each ſide with twiſted thread. The natural colour of the thread is too bright and pale, and is therefore to be altered in many caſes, according to the occaſion.

The moſt uſual colour is the ruſſet: this is to be obtained by plunging the *net*, after it is made, into a tanner's pit, and letting it lie there till it be ſufficiently tinged; this is of a double ſervice to the *net*, preſerving the thread very greatly, as well as altering the colour. The green colour is given by chopping ſome green wheat, and boiling it in water, then ſoaking the *net* in this green tincture till it have ſufficient colour. The yellow colour is given in the ſame manner, with the decoction of celandine: this gives a pale and faint ſtraw-colour; which is the colour of ſtubble in the harveſt time, and is juſt what is wanted. The brown *nets* are intended to be uſed on ploughed fields; the green on graſs grounds, and the yellow on ſtubble lands.

Great care is neceſſary in the preſerving of *nets*; and the principal thing to be conſidered in regard to this is, that all wet rots the threads; whenever they have been uſed in dew or rain, they muſt be hung up to dry in the ſun; and if there is any rent or breach made, it muſt be mended as ſoon as it is diſcovered. In the drying, they muſt be hung as far as may be from the walls, that they may be out of the way of mice and rats, which are very apt to deſtroy them. The utmoſt depth that ſhould be allowed to a *net* for fowl, is two fathom, and the utmoſt length ſix fathom.

The places for uſing fowling *nets* to moſt advantage, are the morning and evening haunts, where the birds come to feed. The ſportſman is to be at the place at leaſt two hours before the time of their coming, and the *nets* muſt immediately be ſpread flat and even upon the grouud, and the two ends faſtened down with ſtakes. At the lower part there is to be a long cord fixed to the upper edge of the *net*, by means of which it may be immediately raiſed, and pulled over. The ſportſman is to hide himſelf behind ſome natural or artificial ſhelter, at the extremity of this line, and ſome cut graſs muſt be ſtrewed all over the *net*, as it lies on the ground, to hide it from the fowl; and ſome live bird, that has been taken before, ſhould be ſtaked down before the *net*, by way of a ſtall, to draw in the others.

As ſoon as a ſufficient number of birds are within the compaſs of the *net*, it is to be pulled ſwiftly over them, and the fowler having taken thoſe that are under it, may ſtake down two or three more live ones, and ſpread the *net*, covering it with graſs as before. This ſort of ſport may be continued from as ſoon as it is light in the morning till an hour after ſun-riſe; but after that time, the birds have done feeding ravenouſly, and the ſport is over for that day.

NET, *cinque-port*, in *Fiſhery*, a name given to a ſort of ſquare net, reſembling a cage, and having five entrances into it, from whence it has the name.

It is a very ſerviceable *net* in any pond or river, and is equally good in ſwift or ſtanding water. In order to make this *net*, there muſt be provided four large and ſtraight poles, anſwerable in length to the depth of the water. The ends of theſe muſt be ſharpened in the manner of ſtakes, and there muſt be notches within a foot of the ſharp part to faſten the *net* to; and at a convenient diſtance, on the poles, there muſt be another ſet of notches, for the faſtening the other ends of the *net*.

The bottom of this *net* is four-ſquare, without any entrance. A boat muſt be taken out with this *net*, to place it properly. The four poles muſt be fixed in the bottom in ſuch a manner, that each may anſwer to the other in a direct line; and they muſt ſtand at ſuch diſtances, that the *net* may be drawn out as ſtiff as poſſible between them. If the net is to be fixed in a ſtanding water, this method alone will do very well; but if it be a ſmooth ſtream, ſomething more is neceſſary, otherwiſe the motion of the water will keep the *net* playing about, and this will frighten away the fiſh. To prevent this, four ſtrong ſticks are in this caſe to be faſtened along the tops of the others, ſo as to make a ſort of frame, to ſtreighten and ſtrengthen the others, and keep all tight.

When the *net* is perfectly fixed, it repreſents a cage, and the ſides, top, and bottom are kept ſo firm, that the fiſh do not regard them, but ſeem to take them for weeds; but going in at the entrances, there is no returning, and in rich places great numbers are taken.

NET, *clap*. See CLAP-*net*, and DORING.

NET, *crow*, in *Birding*, a name given to a ſort of *net* contrived for the catching of wild fowl in the winter ſeaſon. This *net* may be uſed in the day-time, and is to be made of double thread, or of fine packthread, and the meſhes are to be two inches wide. The length of the whole ſhould be about ten yards, and the depth about three; it ſhould be verged on the ſides with a ſtrong cord, and ſtretched out in length very ſtiff upon long poles, prepared for that purpoſe. When this *net* is brought to the place where it is to be uſed, it muſt be opened, and ſpread at full length and breadth; then its lower end is to be faſtened all along the whole length to the ground, ſo that it only can be moved up and down; the upper end of the *net* muſt ſtand extended on the long cord, the farther end of it being firſt ſtaked to the earth by a ſtrong cord, above five yards diſtant from the *net*, and ſtanding in an even line with the bottom of the net; the other end of the cord muſt reach at leaſt five and twenty yards, to ſome natural or artificial ſhelter, by means of which the ſportſman is to lie concealed from his prey. The *net* muſt be placed in ſuch exact order, that it will play upon the leaſt jerk of the cord, and that muſt always be given ſuddenly, leſt the prey eſcape. This net is principally uſed for crows and pigeons, on new-ſown corn-fields, and it may alſo be uſed in ſtubble-fields, where the ſtubble will hide the *net* from the fowl. If the meſhes are made ſmaller, it may be uſed at barn-doors and the like for ſmall birds, and a bait of chaff will bring them together under it. But the great uſe of the *crow-net*, is to ſpread it in mornings and evenings where the haunts of wild fowl are, which in hard weather fly in great flocks to and from land, with and againſt the wind, and then fly cloſe to the ground, in open countries and low lands, where there are few hedges. When a whole covey of theſe are within the reach of the *net*, it is to be let go over them, and they will be taken in great numbers at one caſt.

NET, *fold*. See FOLD.

NET, *tramel*. See TRAMEL.

NET, *tunnel*. See TUNNEL.

NET, *water-fowl*. See *Water*-FOWL.

NET, *wolf*. See WOLF.

NET, NEAT, in *Commerce*, ſomething pure, and unadulterated with any foreign mixture.

Thus, wine is ſaid to be *net*, when not falſified or ſophiſticated; and coffee, rice, pepper, &c. are *net*, when the filth and impurities are ſeparated from them.

A diamond is ſaid to be *net*, when it has no ſtains or flaws; a cryſtal, when tranſparent throughout.

NET is alſo uſed for what remains after the tare has been taken out of the weight of any merchandize; i. e. when it is weighed clear of all package.

Thus we ſay, a barrel of cochineal weighs 450 pounds; the tare is 50 pounds, and there remains *net* 400 pounds.

NET-*meaſure*, in *Buildings*, is when no allowance is made for finiſhing; and in artificers work, when no allowance is made for waſte of materials.

NET-*produce*, a term uſed to expreſs what any commodity has yielded, all tare and charges deducted.

The merchants ſometimes uſe the Italian words *netto proceduto*, for *net produce*.

NET-*maſonry*. See MASONRY.

NETE, in the *Ancient Muſic*, was a general name for one of the extreme chords of a tetrachord. Some ſay it was the higheſt, and others the loweſt ſound. But perhaps the truth of the matter is that it was the higheſt or loweſt ſound, according as the aſcending or deſcending ſcales were conſidered. Vide Phil. Tranſ. Nº 481. p. 269. See HYPATE.

When the *nete* is ſaid to be one of the extremes of a tetrachord, it is to be underſtood of a tetrachord conſidered by itſelf; for, when tetrachords were combined, the *nete* ſometimes took another name, as appears from the Greek ſcale inſerted under DIAGRAM.

NETE *hyperboleon*, in the *Ancient Muſic*, the name of the higheſt and moſt acute of the chords of the lyre, or the ancient ſcale, or diagramma.

The word is compoſed of νητη, and ὑπερϐολεων, q. d. *the laſt of the higheſt*; where is underſtood the word *chords*.

It anſwered to the A, mi, la, of the third octave of the organ, or modern ſyſtem.

NETE, *diazeugmemnon*, in the *Ancient Muſic*, was one of the chords of the lyre, or ſyſtem of the ancients.

The word comes from νητη, and διαζευγμενων, *laſt of the ſeparate*; where is underſtood the word *chords*.

It anſwers to the E, ſi, mi, of the third octave of the organ, or modern ſyſtem.

NETE *ſynemmenon*, in the *Ancient Muſic*, the name of the higheſt chord of a tetrachord of the Greek ſyſtem; added to make the b mollis fall between the meſe and parameſe, i. e. between the la and ſi.

The word comes from νητη, and συνημμενων, *the laſt of the added*; where is underſtood the word *chords*.

The chord had the ſame ſound with the *paranete diazeugmenon*, or our la by b mollis.

NETHER *vert*. See VERT.

NETHINIMS, among the *Jews*, the poſterity of the Gibeonites, who were condemned by Joſhua to be hewers of wood and drawers of water for the houſe of God.

NETOPION, Νετοπιον, a name given by the ancients to a very fragrant and coſtly ointment, conſiſting of a great number of the fineſt ſpicy ingredients. Hippocrates, in his Treatiſe of the Diſeaſes of Women, frequently preſcribes the *netopion* in diſeaſes of the uterus; and in other places he ſpeaks of its being poured into the ear as a remedy for deafneſs; theſe compoſitions, by their attenuating qualities, dividing the viſcous and thick humours. The word *netopion* is alſo ſometimes uſed to expreſs the *unguentum Ægyptiacum*, and ſometimes ſimply for oil of almonds.

NETTINGS, in a *Ship*, are a ſort of grates made with ſmall ropes, and ſeized together with rope-yarn, and are laid in the waſte of a ſhip, ſometimes, to ſerve inſtead of GRATINGS.

NETTING-*ſail*, in a *Ship*. See SAIL.

NETTLE, *urtica*, in *Botany*, a genus of the *monoecia tetrandria* claſs. Its characters are theſe: it has male and female flowers at remote diſtances, ſometimes on the ſame, and at other times on different plants; the male flowers have empalements compoſed of four roundiſh concave leaves, and have a pitcher-ſhaped nectarium in the centre of the flower, and four awl-ſhaped ſpreading ſtamina, terminated by ſummits, with two cells; the female flowers have an oval permanent empalement with two valves, without either petals or ſtamina, but have an oval germen without any ſtyle, crowned by a hairy ſtigma; the germen afterwards turns to an oval compreſſed ſeed, which ripens in the empalement. Miller enumerates nine, and Linnæus nineteen ſpecies.

The roots of the common *nettle* are much recommended in medicine: they are powerful diuretics, and are ſaid to have great virtues againſt the ſtone and gravel, and looſen the belly; they cleanſe the blood, and are ſaid to be of great ſervice in hæmorrhages of all kinds, particularly in ſpittings of blood, and overflowings of the menſes. Authors add to this, that they are ſpecifics, by way of antedote, againſt the poiſon of henbane and hemlock; but this we are not ſo well aſſured of. The young ſhoots of the plant are eaten in the ſpring, as good againſt ſcorbutic complaints.

The ancients ſeem to have deſpiſed this plant, from its being common, and though poſſeſſed of great virtues in medicine, neither the Greeks nor Latins have ſaid much about it; nor have the Arabians, who abound in the imaginary virtues of plants, thought the real ones of this herb worth their conſideration.

It has, however, been more honoured lately, and notwithſtanding its being now the moſt vile and abject plant among us, as well as the leaſt regarded by the ancients, Johannes Francus, an author of conſiderable fame, has publiſhed a treatiſe ſolely upon it; in this he has treated at large on its hiſtory and virtues. He deſcribes its ſtings in a very judicious manner, according to the preſent doctrine of the microſcope, and gives the hiſtory of certain worms of ſingular kinds which feed upon it; and adds its uſe in our own foods as an wholeſome and agreeable pot-herb; in our drink as a ſubſtitute for hops, being as well capable of preſerving it as thoſe, and in its great ſervice to the farmer in fattening hens.

John Melchiore Dreſchler, in the year 1717, ſuſtained alſo a theſis on the virtues and uſes of this plant, which has been ſince printed, ornamented with ſeveral cuts. In theſe two authors we find the whole account of the ſeveral uſes this common plant has been put to, and may be put to in our manufactures, our domeſtie and medicinal uſes; and, if what they ſay be true, we muſt wonder to ſee ſo much value overlooked in a herb, only becauſe it is common.

An ingenious manufacturer at Leipſic has lately contrived to make ropes and cloth of *nettle*. The ſpecies he uſes for this purpoſe is the *urtica urens maxima*, or great ſtinging *nettle*; and the proceſs of preparing it as follows: having gathered a quantity of the ſtalks ſtill green, though half withered, he dried them over his ſtove; and when the moiſture was entirely exhauſted, bruiſed them ſo as to be able to ſeparate the wood from the bark; by this operation he procured a kind of green hards, which was rubbed and prepared like flax. This new matter being ſpun, he obtained a greeniſh brown thread, very uniform and clear, ſomewhat reſembling worſted. The manufacturer afterwards boiled this thread, when it yielded a greeniſh juice, and became more white, uniform, and ſtrong; ſo that by continuing the preparation, there is reaſon to hope that an excellent thread may be made, and conſequently a ſtrong and laſting cloth; and that it may be employed with advantage, not only by ropemakers, but even by weavers, in making fine ſtuffs.

NETTLE, *dead*, *lamium*, in *Botany*. See ARCHANGEL.

NETTLE, *ſea*. See MEDUSA, ACTINIA, ANIMAL *flower*, and URTICA *marina*.

NETTLE, *hedge*. See *Stinking Dead* NETTLE.

NETTLE, *ſhrubby hedge*, *praſium*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs. Its characters are theſe: the flower hath a bell-ſhaped empalement of one leaf, divided into two lips; the upper lip ends in three acute points; the lower lip is cut into two parts; the flower it of the lip-kind; it hath one petal; the upper lip is oval, erect, and indented at the end; the lower lip is reflexed, and ends in three points, the middle one being broadeſt; it has four awl-ſhaped ſtamina under the upper lip, two of which are ſhorter than the other, having oblong ſummits on their ſides, and a four-pointed germen, ſuſtaining a ſlender ſtyle, the length of the ſtamina, crowned by a bifid ſtigma; the germen afterward becomes four berries, each containing a ſingle roundiſh ſeed. There are two ſpecies.

A plant or two of each of theſe ſpecies may be allowed to have a place where there are collections of the different ſorts of evergreen ſhrubs, for the ſake of variety, eſpecially where the different ſorts of ciſtus, phlomis, tree-wormwood, and medicago, are admitted, becauſe they are equally hardy. Miller.

NETTLE, *ſtinking dead*, *galeopſis*, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs. Its characters are theſe: the flower is of the lip-kind, the chaps broad, and from the baſe to the under lip it is on both ſides ſharply indented; the upper lip is concave, and ſawed at the top; the under lip trifid, the middle ſegment being the largeſt, which is crenated; it has four ſtamina, two being ſhorter than the other; in the centre is ſituated a quadrifid germen, which becomes four naked ſeeds, ſitting in the rigid empalement. Miller reckons ſix ſpecies, all of them common weeds. Linnæus deſcribes only three ſpecies.

NETTLE-*tree*, *celtis*, in *Botany*, a genus of the *polygamia moncecia* claſs. Its characters are theſe: it has male and hermaphrodite flowers on the ſame tree; the hermaphrodite flowers, whoſe empalement is divided into five parts, are ſingle, and ſituated above the male, which have no petals, but five ſhort ſtamina; in the centre is ſituated an oval germen, which becomes a round berry with one cell, incloſing a roundiſh nut; the male flowers have their empalements divided into ſix parts, and have no germen or ſtyle, but in other parts are like the hermaphrodite. Miller reckons four, and Linnæus three ſpecies.

The *celtis* with black fruit grows in France and Italy; the fruit, which is uſed in medicine, is aſtringent, and binds the belly, but has leaſt of theſe qualities when ripe; the decoction thereof is good for a dyſentery, and for women labouring under an immoderate flux of the menſes.

NEVIL-*Holt Waters*. See *Nevil Holt* WATER.

NEVILLI *teſta*. See TESTA.

NEURADA, in *Botaoy*, a name given by Linnæus to a genus of plants of the *decandria decagynia* claſs, called by Juſſieu *tribulaſtrum*. The characters are theſe: the perianthum is very ſmall, and ſtands upon the germen of the piſtil; it is compoſed of one leaf, divided into five ſegments; the flower conſiſts of five equal petals, larger than the leaves of the cup; the ſtamina are ten filaments, of the length of the cup; the antheræ are ſimple; the germen of the piſtil ſtands under the cup, and is of a gibbous figure; the ſtyles are ten in number, and are of the length of the ſtigmata; the ſtigmata are ſimple; the fruit is an orbicular capſule, of a depreſſed figure on the ſurface and convex underneath, and is every way ſurrounded with prickles; the inner part is divided into ten cells, in every one of which is lodged a ſingle ſeed. There is only one ſpecies.

NEURIS, in the *Writings of the Ancients*, the name given to a ſpecies of marble, otherwiſe called *elaphoneſum*, and *proconneſium*. It was much uſed by the Roman ſtatuaries, and was dug in a ſmall iſland that lay between Paros and Cyzicus. It was of a duſky or blueiſh white, and was variegated with fine and ſlender veins of black, often beautifully diſpoſed, and in the bodies of the naked ſtatues reſembling the courſe of the veins.

NEURITICS, or NERVINES, formed from νευρον, *nervus*, in *Medicine*, remedies proper for diſeaſes of the nerves, and nervous parts; as the membranes, ligaments, &c.

Such are betony, lavender, roſemary, ſage, laurel, marjoram, and others among the CEPHALICS.

NEUROBATES, in *Antiquity*, a rope-dancer. See DANCER.

NEUROGRAPHIA, in *Anatomy*, a deſcription of the nerves.

Raim. Vieuſſens, a phyſician of Montpelier, has an excellent treatiſe in Latin, under the title of *Neurographia* Univerſalis; where he ſhews, that there are more ramifications of the nerves in the ſkin than in the muſcles and all the other parts.

Duncan, another phyſician of the ſame place, has alſo a treatiſe called *Neurographia* Rationalis.

NEUROLOGY, Νευρολογια, a diſcourſe of the nerves.

Neurology ſeems to be of leſs extent than *neurograpby*, inaſmuch as the latter may be underſtood not only of diſcourſes on the nerves, but alſo of figures and engravings, repreſenting them; whereas the former is reſtrained to diſcourſing alone. Willis has given a fine *neurology*, in his Anatome Cerebri.

NEUROPHYLLON, in *Natural Hiſtory*, a name given by Mr. Lhuyd to a ſpecies of *foſſile* PLANT, remarkable for the ridges on the leaf.

NEUROPTERA, in *Zoology*, the name by which Linnæus and Dr. Hill call a claſs of four-winged inſects, from their wings being membranaceous with nerves, and being diſpoſed in a reticulated form. In the Linnæan ſyſtem there are ſeven genera comprehended under this claſs.

NEUTER, a perſon indifferent, who has eſpouſed neither party, and is neither friend nor foe.

NEUTER, in *Grammar*, denotes a ſort of GENDER in nouns which are neither maſculine nor feminine.

NEUTER *verb*. See VERB.

NEUTHA, a name given by authors to a pellicle covering the eyes or the ears of a child in the birth, and ſometimes the whole face.

NEUTRAL *ſalts*, among *Chemiſts*, are a ſort of intermediate ſalts between acids and alkalis; partaking of the nature of both.

Formerly thoſe only were called *neutral* ſalts, which were compoſed of acids and alkalis united together to the point of ſaturation, ſo that they had no acid nor alkaline property, and thence they were called *neutral*. But now this name is commonly extended to combinations of acids with all ſubſtances, with which they can ſo unite, that they loſe entirely or moſtly their acid qualities; as, for inſtance, when they are united with earthy or metallic ſubſtances.

Mr. Boyle alſo gives the appellation *neutral* to a ſort of ſpirits, differing, in divers qualities, both from vinous, acid, and urinous ſpirits. Theſe he alſo calls *anonymous* and *adiaphorous* ſpirits.

NEUTRALITY, the ſtate of a perſon or thing that is *neutral*.

NEW *moon*, *neomenia*, that ſtate of the moon a little before, and a little after, her conjunction with the ſun.

NEWEL, in *Architecture*, the upright poſt which ſtairs turn about; being that part of the ſtaircaſe which ſuſtains the ſteps.

The *newel* is, properly, a cylinder of ſtone, which bears on the ground, and is formed by the ends of the ſteps of the winding-ſtairs.

There are alſo *newels* of wood, which are pieces of timber placed perpendicularly, receiving the tenons of the ſteps of wooden ſtairs into their mortiſes, and wherein are fitted the ſhafts and reſts of the ſtaircaſe, and the flights of each ſtory.

NEWS *falſe*. See FALSE *news*.

NEWT, in *Zoology*. See EFT, and LACERTA *aquatica*.

NEWTONIAN *philoſophy*, the doctrine of the univerſe, and, particularly, of the heavenly bodies; their laws, affections, &c. as delivered by ſir Iſaac Newton.

The term *Newtonian philoſophy* is applied very differently; whence have ſprung divers confuſed notions relating to it.

Some authors, under this *philoſophy*, include all the corpuſcular philoſophy conſidered as it now ſtands corrected and reformed by the diſcoveries and improvements made in ſeveral parts thereof by ſir Iſaac Newton, in which ſenſe it is that s'Graveſande calls his Elements of Phyſics, Introductio ad Philoſophiam Newtonianam. And in this ſenſe the *Newtonian* is the ſame with the new philoſophy, and ſtands contradiſtinguiſhed to the Carteſian, the Peripatetic, and the ancient corpuſcular.

Others, by *Newtonian philoſophy*, mean the method or order which ſir Iſaac Newton obſerves in philoſophizing, viz. the reaſoning and drawing of concluſions directly from phenomena, excluſive of all previous hypotheſes; the beginning from ſimple principles; deducing the firſt powers and laws of nature from a few ſelect phenomena, and then applying thoſe laws &c. to account for other things. See *Law of* NATURE. And, in this ſenſe, the *Newtonian philoſophy* is the ſame with the experimental philoſophy; and ſtands oppoſed to the ancient corpuſcular.

Others, by *Newtonian philoſophy*, mean that wherein phyſical bodies are conſidered mathematically; and where geometry and mechanics are applied to the ſolution of phenomena. In which ſenſe, the *Newtonian* is the ſame with the mechanical and mathematical philoſophy.

Others, again, by *Newtonian philoſophy*, underſtand that part of phyſical knowledge which ſir Iſaac Newton has handled, improved, and demonſtrated, in his Principia.

Others, laſtly, by *Newtonian philoſophy*, mean the new principles which ſir Iſaac Newton has brought into philoſophy; the new ſyſtem founded thereon; and the new ſolutions of phenomena thence deduced; or that which characteriſes and diſtinguiſhes his philoſophy from all others; which is the ſenſe wherein we ſhall chiefly conſider it.

As to the hiſtory of this philoſophy, we have but little to ſay: it was firſt made public in the year 1686, by the author, then a fellow of Trinity college, Cambridge; and in the year 1713, republiſhed, with conſiderable improvements. Several other authors have ſince attempted to make it plainer; by ſetting aſide many of the more ſublime mathematical reſearches, and ſubſtituting either more obvious reaſoning, or experiments, in lieu thereof; particularly Whiſton, in his Prælect. Phyſ. Mathemat. s'Graveſande in Element. & Inſtit. and Dr. Pemberton in his View; and Maclaurin, in his excellent work, intitled, An Account of ſir Iſaac Newton's Philoſophical Diſcoveries.

Notwithſtanding the great merit of this philoſophy, and the univerſal reception it has met with at home, it gained ground at its firſt publication but ſlowly abroad; *Newtonianiſm* had ſcarce two or three adherents in a nation; but Carteſianiſm, Huygenianiſm, and Leibneitzianiſm, maintained their ground, till the force of truth prevailed. And it is now held in the utmoſt veneration both at home and abroad.

The *philoſophy* itſelf is laid down principally in the third book of the Principia. The two preceding books are taken up in preparing the way for it, and laying down ſuch principles of mathematics as have the neareſt relation to philoſophy: ſuch are the laws and conditions of powers. And theſe, to render them leſs dry and geometrical, the author illuſtrates by ſcholia in philoſophy, relating chiefly to the denſity and reſiſtance of bodies, the motion of light and ſounds, a vacuum, &c.

In the third book he proceeds to the *philoſophy* itſelf; and from the ſame principles deduces the ſtructure of the univerſe, and the powers of gravity, whereby bodies tend towards the ſun and planets; and from theſe powers, the motions of planets and comets, the theory of the moon, and the tides.

This book, which he calls De Mundi Syſtemate, he tells us, was firſt written in the popular way; but conſidering, that ſuch as are unacquainted with the ſaid principles, would not conceive the force of the conſequences, nor be induced to lay aſide their ancient prejudices; for this reaſon, and to prevent the thing from being in continual diſpute, he afterwards digeſted the ſum of that book into propoſitions, in the mathematical manner; ſo as it might only come to be read by ſuch as had firſt conſidered the principles; not that it is neceſſary a man ſhould maſter them all; many of them, even the firſt-rate mathematicians, would find a difficulty in getting over. It is enough to have read the definitions, laws of motion, and the three firſt ſections of the firſt book; after which the author himſelf directs us to paſs on to the book de Syſtemate Mundi.

The ſeveral articles of this *philoſophy* are delivered under their reſpective heads: as SUN, MOON, PLANET, COMET, EARTH, AIR, CENTREFUGAL *force*, RESISTANCE, MEDIUM, MATTER, SPACE, ELASTICITY, GRAVITY, &c. A general idea, or abſtract of the whole, we ſhall hear lay before the reader, to ſhew in what relation the ſeveral parts ſtand to each other.

The great principle on which the whole philoſophy is founded, is the power of gravity. This principle is not new: Kepler, long ago, hinted it in his Introduct. ad Mot. Martis. He even diſcovered ſome of the properties thereof, and their effects in the primary planets; but the glory of bringing it to a phyſical demonſtration was reſerved to the Engliſh philoſopher. See GRAVITY.

His proof of the principle from phenomena, together with the application of the ſame principle to the various other appearances of nature, or the deducing thoſe appearances from that principle, conſtitute the *Newtonian* ſyſtem; which, drawn in miniature, will ſtand thus:

I. The phenomena are, 1. That the ſatellites of Jupiter do, by radii drawn to the centre of the planet, deſcribe areas proportionable to their times; and that their periodical times are in a ſeſquiplicate ratio of their diſtances from its centre; in which the obſervations of all aſtronomers agree. 2. The ſame phenomenon holds of the ſatellites of Saturn with regard to Saturn; and of the moon with regard to the earth. 3. The periodical times of the primary planets about the ſun are in a ſeſquiplicate ratio of their mean diſtances from the ſun. But, 4. The primary planets do not deſcribe areas any way proportional to their periodical times, about the earth; as being ſometimes ſeen ſtationary, and ſometimes retrograde with regard to it.

II. 1. The powers whereby the ſatellites of Jupiter are conſtantly drawn out of their rectilinear courſe, and retained in their orbits, do reſpect the centre of Jupiter, and are reciprocally as the ſquares of their diſtances from the ſame centre. 2. The ſame holds of the ſatellites of

Saturn with regard to Saturn; of the moon with regard to the earth; and of the primary planets with regard to the ſun.

III. The moon gravitates towards the earth, and by the power of that gravity is retained in her orbit; and the ſame holds of the other ſatellites with reſpect to their primary planets; and of the primaries with reſpect to the ſun. See Gravity, and Moon.

As to the other ſecondary planets, their phenomena, with reſpect to their primary ones, being of the ſame kind with thoſe of the moon about the earth, it is argued by analogy, that they depend on the ſame cauſes; it being a rule or axiom which all philoſophers agree to, that effects of the ſame kind have the ſame cauſes. Again, attraction is always mutual, i. e. the reaction is equal to the action: conſequently, the primary planets gravitate towards their ſecondary ones; the earth towards the moon, and the ſun towards them all. And this gravity, with regard to each ſeveral planet, is reciprocally as the ſquare of its diſtance from its centre of gravity.

IV. All bodies gravitate towards all the planets; and their weights towards any one planet, at equal diſtances from the centre of the planet, are proportional to the quantity of matter in each.

For the law of the deſcent of heavy bodies towards the earth, ſetting aſide their unequal retardation from the reſiſtance of the air, is this, that all bodies fall equally in equal times; but the nature of gravity or weight, no doubt, is the ſame on the other planets as on the earth. Suppoſe, e. gr ſuch bodies raiſed to the ſurface of the moon, and together with the moon deprived at once of all progreſſive motion, and dropped towards the earth; it is ſhewn, that in equal times they would deſcribe equal ſpaces with the moon; and, therefore, that their quantity of matter is to that of the moon, as their weights to its weight. Add, that ſince Jupiter's ſatellites revolve in times that are in a ſeſquiplicate ratio of their diſtances from the centre of Jupiter, and conſequently at equal diſtances from Jupiter, their accelerating gravities are equal; therefore, falling equal altitudes in equal times, they will deſcribe equal ſpaces, juſt as heavy bodies do on our earth. And the ſame argument will hold of the primary planets with regard to the ſun. And the powers whereby unequal bodies are equally accelerated, are as the bodies; i. e. the weights are as the quantities of matter in the planets. And the weights of the primary and ſecondary planets towards the ſun are as the quantities of matter in the planets and ſatellites. And hence are ſeveral corollaries drawn relating to the weights of bodies on the ſurface of the earth, magnetiſm, and the exiſtence of a vacuum; which ſee under Vacuum, Weight, and Magnetism.

V. Gravity extends itſelf towards all bodies, and is in proportion to the quantity of matter in each.

That all the planets gravitate towards each other, has been already ſhewn; likewiſe, that the gravity towards any one, conſidered apart, is reciprocally as the ſquare of its diſtance from the centre of the planet; conſequently, gravity is proportional to the matter therein. Farther, as all the parts of any planet, A, gravitate towards another planet, B; and the gravity of any part is to the gravity of the whole, as the matter of the part to the matter of the whole; and reaction equal to action; the planet B will gravitate towards all the parts of the planet A; and its gravity towards any part will be to its gravity towards the whole, as the matter of the part to the matter of the whole.

Hence we derive methods of finding and comparing the gravities of bodies towards different planets; of finding the quantities of matter in the ſeveral planets, and their denſities; ſince the weights of equal bodies revolving about planets are as the diameters of their orbits, directly; and as the ſquares of the periodical times, inverſly; and the weights at any diſtance from the centre of the planet are greater or leſs in a duplicate ratio of their diſtances, inverſly; and ſince the quantities of matter in the planets are as their powers at equal diſtances from their centres: and, laſtly, ſince the weights of equal and homogeneous bodies towards homogeneous ſpheres are, at the ſurface of the ſpheres, as the diameters of thoſe ſpheres; and conſequently, the denſities of heterogeneous bodies are as the weights at the diſtances of the diameters of the ſpheres.

VI. The common centre of gravity of the ſun, and all the planets, is at reſt; and the ſun, though always in motion, yet never recedes far from the common centre of all the planets.

For the matter in the ſun being to that in Jupiter as 1033 to 1; and Jupiter's diſtance from the ſun to the ſemidiameter of the ſun in a ratio ſomewhat bigger; the common centre of gravity of Jupiter and the ſun will be found a point a little without the ſun's ſurface. And, by the ſame means, the common centre of Saturn and the ſun will be found a point a little within the ſun's ſurface; and the common centre of the ſun, and all the planets, will be ſcarce one diameter of the ſun diſtant from the centre thereof. But the centre is always at reſt therefore, though the ſun will have a motion this and that way, according to the various ſituations of the planets, yet it can never recede far from the centre. So that the common centre of gravity of the earth, ſun, and planets, may be eſteemed the centre of the whole world.

VII. The planets move in eclipſes that have their foci in the centre of the ſun, and deſcribe areas proportional to their times.

This we have already laid down *à poſteriori*, as a phenomenon; and now, that the principle of the heavenly motions is ſhewn, we deduce it therefrom *à priori*. Thus, ſince the weights of the planets towards the ſun are reciprocally as the ſquares of the diſtances from the centre of the ſun; if the ſun were at reſt, and the other planets did not act on each other, their orbits would be elliptical, having the ſun in their common umbilicus, and they would deſcribe areas proportional to the times; but the mutual actions of the planets are very ſmall, and may be well thrown aſide. Therefore, &c.

Indeed, the action of Jupiter on Saturn is of ſome conſequence; and hence, according to the different ſituations and diſtances of thoſe two planets, their orbits will be a little diſturbed.

The ſun's orbit too is ſenſibly diſturbed by the action of the moon; and the common centre of the two deſcribes an ellipſis round the ſun placed in the umbilicus; and with a radius drawn to the centre of the ſun, deſcribes areas proportional to the times.

VIII. The aphelia and nodes of the planets are at reſt; excepting for ſome inconſiderable irregularities ariſing from the actions of the revolving planets and comets. Conſequently, as the fixed ſtars retain their poſition to the aphelia and nodes, they too are at reſt.

IX. The axis, or polar diameter, of the planets is leſs than the equatorial diameter.

The planets, had they no diurnal rotation, would be ſpheres, as having an equal gravity on every ſide; but, by this rotation, the parts receding from the axis endeavour to riſe towards the equator, which, if the matter they conſiſt of be fluid, will be affected very ſenſibly. Accordingly Jupiter, whoſe denſity is found not much to exceed that of water on our globe, is obſerved by the aſtronomers to be conſiderably leſs between the poles, than from eaſt to weſt. And on the ſame principle, unleſs our earth were higher at the equator than towards the poles, the ſea would riſe under the equator, and overflow all near it.

But this figure of the earth ſir Iſaac Newton proves likewiſe *à poſteriori*; from the oſcillations of pendulums being ſlower and ſmaller in the equatorial than the polar parts of the globe.

X. All the moon's motions, and all the inequalities in thoſe motions, follow from theſe principles: e. gr. her unequal velocity, and that of her nodes, and apogee in the ſyzygies and quadratures; the differences in her eccentricity, and her variation, &c. See Moon, Quadrature, Syzygy, &c.

XI. From the inequalities in the lunar motions, we can deduce the ſeveral inequalities in the motions of the ſatellites.

XII. From theſe principles, particularly the action of the ſun and moon upon the earth, it follows, that we muſt have Tides; or that the ſea muſt ſwell and ſubſide twice every day.

XIII. Hence likewiſe follow the whole theory of Comets; as, that they are above the region of the moon, and in the planetary ſpaces; that they ſhine by the ſun's light reflected from them; that they move in conic ſections, whoſe umbilici are in the centre of the ſun; and by radii drawn to the ſun, deſcribe areas proportional to the times; that their orbits, or trajectories, are very near parabolas; that their bodies are ſolid, compact, &c. like thoſe of the planets, and muſt therefore acquire an immenſe heat in their perihelia; that their tails are exhalations ariſing from them, and encompaſſing them like atmoſpheres.

The objections raiſed againſt this philoſophy are chiefly aimed at the principle, gravity; which ſome condemn as an *occult quality*; and others as a *miraculous* and preternatural cauſe; neither of which have any longer room in ſound philoſophy. Others, again, ſet it aſide, as deſtroying the notion of vortices; and others, as ſuppoſing a vacuum. But theſe are all abundantly obviated under Gravity, Attraction, Vortex, Vacuum, and Quality.

NEXI, among the Romans, perſons free-born, who, for debt, were delivered bound to their creditor, and obliged to ſerve him, till they could pay the debt.

NEXT *taker*, among *Miners*, is he that hath the next meer in poſſeſſion.

NEXUS *of matter*. See Coheſion.

NHAMBUGUACU, in *Botany*, a name of the great American *ricinus*, or *palma Chriſti*.

NHAMDIA, in *Ichthyology*, the name of a fiſh caught in rivers of many parts of America, and of a fine taſte. It is of the anguilliform kind, and has a long and fat body, becoming ſmaller toward the tail; its belly is ſoft; its head flat; and its mouth of a parabolic figure, and armed with ſmall teeth; it is uſually of about eight or ten inches long; its tail is forked, and its head is covered with a ſtrong ſhelly coat; this is of a duſky brown; its back and ſides are of a bluiſh grey; the larger back-fin is of the ſame colour; all the reſt are black; and on each ſide there is a red line reaching lengthways from the gills to the tail.

NHANDIROBA, in *Botany*, a name given by Plumier to a genus of plants, the ſame with the FEVILLEA of Linnæus.

NHANDUAPOA, the name of a Braſilian bird, called alſo *jabiruguacu*, but more frequently known by its Dutch name SCURVOGEL.

NHANDUGUACU, in *Ornithology*, the name of a Braſilian bird of the emeu, or caſſowary kind, a ſpecies of the *ſtruthia*, or OSTRICH, in the Linnæan ſyſtem, but ſmaller than the common or African caſſowary. Its body is conſiderably large; its neck long and ſtrong; its legs very long and thick; its wings extremely ſhort, and unfit for flying, but aſſiſting it in running; its feathers are grey, and, on the back, are conſiderably long; it commonly carries its neck bent like a ſwan; its head is ſhaped like that of a gooſe; its back-feathers cover the rump, and make a ſort of tail; its runs as ſwift as a greyhound, and feeds on fleſh and fruits.

NHAQUUNDA, in *Ichthyology*, the name of a ſmall fiſh caught in the American rivers. Its body is oblong, and every where nearly of the ſame thickneſs; its head and mouth are like thoſe of the pike; and its uſual length is about four inches; it can extend its upper lip, and round the opening of its mouth; it has no regular teeth, but its jaws are rough like a file; its tail is covered with a hard ſhelly cruſt; its body is covered with moderately large ſcales, and its back and ſides are of a ſilvery grey; its belly white; it has on each ſide a ſingle row of round black ſpots, of the bigneſs of a pea, and among theſe a number of ſmall blue ones.

NIAGARA, in *Geography*, a prodigious cataract in Canada, in North America, between the lakes Erie and Ontario, where the water falls from high rocks a hundred and thirty-ſeven feet high, and half a league broad; the water runs to it with ſuch violence, that all the beaſts that attempt to croſs it a quarter of a league above, are ſwallowed up; and it tumbles off the precipice with ſuch fury, that it makes an arch under which three men may paſs abreaſt without danger or damage, except a few drops of water falling upon them. The miſt which this fall occaſions may be ſeen at fifteen miles diſtance, ariſing as high as the clouds, and forming a beautiful rainbow. See Cataract.

NICENE *creed*. See Creed.

NICETERIA *Athenas*, Νικητηρια Αθηνας, in *Antiquity*, an Athenian ſolemnity in memory of Minerva's victory over Neptune, when they contended which of them ſhould have the honour of giving a name to the city afterwards called Athens.

NICHE, in *Architecture*, a cavity, or hollow place, in the thickneſs of a wall, to place a figure or ſtatue in.

The word comes from the Italian *nicchia*, *ſhell*; becauſe the ſtatue is here incloſed in a ſhell; or, perhaps by reaſon of the ſhell wherewith the tops of ſome of them are adorned. See *Tab. Architecture*, *fig.* 40. *lit.* Z.

Niches are made to partake of all the ſegments under a ſemicircle. They are ſometimes at an equal diſtance from the front, and are parallel or ſquare on the back with the front-line; in which caſe they are called ſquare receſſes, or ſquare *nithes*.

The larger *niches* ſerve for groups of figures; the ſmall ones for ſingle ſtatues, and ſometimes only for buſts.

Great care muſt be taken to proportion the *niches* to the figures; and that the pedeſtal of the figures be proportioned to the *niches*.

Niches are ſometimes made with ruſtic-work.

Niche, *round*, is that whoſe plan and circumference are circular.

Niche, *ſquare*, that where they are ſquare.

Niche, *angular*, that formed in the corner of the building.

Niche, *ground*, that which, inſtead of bearing on a maſſive, has its riſe from the ground; as the *niches* of the portico of the Pantheon at Rome. Their ordinary proportion is to be two diameters in height, and one in width.

Niche, *capital of a*. See Capital.

Niche, *cul de four of a*. See Cul.

NICHED *column*. See Column.

NICHILIANISTÆ, in *Church Hiſtory*, heretics who maintained that Chriſt had no being.

NICHILS. See Nihils.

Nichils, *clerk of the*. See Clerk.

NICKAR-*tree*, in *Botany*. See Guilandina.

NICKEL, in *Natural Hiſtory*, is a ſemi-metal, firſt deſcribed by Mr. Cronſtedt, in the Swediſh Memoirs for the years 1751 and 1754. The properties there attributed to it are, 1. That it is of a white colour, inclining to red. 2. Its texture is ſolid, and ſhining in its fractures. 3. Its ſpecific gravity is to that of water as 8500 to 1000. This varies according to its purity from 7,421 to 9,000; the pureſt being the heavieſt. 4. It is conſiderably fixed in the fire. 5. It is calcinable, and its calx is green. 6. This calx is not very fuſible, but it nevertheleſs tinges glaſs of a tranſparent reddiſh brown, or jacinth colour. 7. It diſſolves in aqua fortis, aqua regia, and marine acid, but with difficulty in vitriolic acid: all theſe ſolutions have a deep green colour; the vitriol formed of it is alſo of the ſame colour; and the colcothar of this vitriol, and alſo the precipitates from the ſolutions, are rendered by calcination of a light green colour. 8. Theſe precipitates are ſoluble by ſpirit of ſal ammoniac, and the ſolution has a blue colour; but no copper can be produced by a reduction of the precipitates. 9. It ſtrongly attracts ſulphur. 10. It unites with all metallic ſubſtances excepting ſilver, quickſilver, and zinc. 11. Its attraction to regulus of cobalt is the ſtrongeſt, next to which is that to iron, and then to arſenic. 12. It retains its phlogiſton a long time in the fire, and its calx is reducible by a very ſmall quantity of inflammable matter. It requires, however, a ſtrong red-heat before it can be fuſed, and melts a little ſooner, or as ſoon as gold or copper. *Nickel* is contained in the mineral, called *Kupfer*, or Kupper-*nickle*. When very pure, it is in ſome degree malleable, and always magnetic, and hence it is deemed to contain iron. *Nickel*, according to Mr. Rinman, has been lately foundnative in a mine of cobalt in Heſſe. Kirwan's El. Min. p. 341, &c.

NICOL, in *Natural Hiſtory*, a word uſed by the miners in Germany to expreſs a greeniſh cruſt, covering ſeveral of the ſpecies of marcaſites and cobalt; it emits fumes that ſmell of garlic in the calcination, and is very injurious to the workmen, cauſing contractions of their limbs, and other diſorders. It is ſometimes found in maſſes alone, but that more rarely.

NICOLAI *Catholicon*. See Catholicon.

NICOLAS, *Saint*, *Argonauts of* See Argonauts.

NICOLAITANS, or Nicolaites, one of the moſt ancient ſects in the Chriſtian church; thus denominated from Nicolas, a perſon ordained a deacon of the church of Jeruſalem, together with St. Stephen.

The diſtinguiſhing tenet of the *Nieolaitans*, as repreſented by eccleſiaſtical hiſtorians, is, that all married women ſhould be common; to take away all occaſion of jealouſy.

Other authors tax Nicholas with other impurities; but Clemens Alexandrinus imputes them all to his diſciples, who, he ſays, abuſed their maſter's words.

In the charge urged againſt the *Nicolaitans* (Rev. ii. 6, 14, 15.) they are not reproached with erroneous opinions concerning the Deity, but with the licentiouſneſs of their practice, and the contempt of that ſolemn law, which the apoſtles had enacted, (Acts xv. 29.) againſt fornication, and the uſe of meats offered to idols. It is, however, certain, that the writers of the ſecond and the following centuries, Irenæus, Tertullian, Clemens, and others, affirm, that the *Nicolaitans* adopted the ſentiments of the Gnostics, concerning the two principles of all things, the æons, and the origin of this terreſtrial globe. The authority of theſe writers, ſays Moſheim, would be entirely ſatisfactory in this matter, were there not ſome reaſon to imagine, that they confounded, in their narrations, two ſects very different from each other, viz. that of the *Nicolaitans*, mentioned in the Revelations; and another, founded by a perſon named Nicolaus, in the ſecond century, upon the principles of the Gnoſtics.

Cocceius, Hoffman, Vitringa, and Maius, take the name *Nicolaitan* to be coined, to ſignify a man addicted to pleaſure and debauchery; adding, that it has nothing to do with Nicolas, one of the ſeven deacons.

NICOMIA, in *Natural Hiſtory*. See Chert.

NICOTIANA, or *herba Nicotiana*, a name given to TOBACCO; from Nicot, the French ambaſſador, at the court of Portugal, who ſent it into France, in 1560, and gave it his own name, as he himſelf tells us in his dictionary.

NICTITATING *membrane*, in *Anatomy*, a thin membrane, which covers the eyes of ſeveral creatures, and ſhelters them from duſt, or too much light; yet is ſo thin, that they can ſee indifferently well through it.

This *nictating membrane* is chiefly found in the bird and fiſh kind.

This membrane, in the eagle's eye, is remarkably cloſe and firm, inſomuch as to be accounted as a ſecond eye-lid; and hence that remarkable firmneſs of the eagle's ſight in viewing the ſun.

NIDDUI, in the *Jewiſh Cuſtoms*, is uſed to ſignify ſeparated or excommunicated. This, according to ſome, was to be underſtood of the leſſer ſort of excommunication in uſe among the Hebrews. He that had incurred it was to withdraw himſelf from his relations, at leaſt to the diſtance of four cubits: it commonly continued a month. If it was not taken off in that time, it might be prolonged for ſixty, or even ninety days: but if, within this term, the excommunicated perſon did not give ſatisfaction, he fell into the *cherem*, which was a ſecond ſort of excommunication; and thence into the third ſort called *ſhammatha*, or *ſhematta*, the moſt terrible of all. But Selden has proved that there were only two kinds of excommunication, viz. the greater and leſs; and that theſe three terms were uſed indifferently.

NIDUS, *neſt*, a repoſitory, wherein certain animals, particularly fowls, inſects, and reptiles, lodge their eggs, for incubation; and wherein, when hatched, they nurſe their young, till they become able to ſhift for themſelves.

The word is Latin, and is ſuppoſed to be derived from *nidor*, *a rank or ill ſmell*: in regard the neſts of animals uſually ſtink.

Dr. Derham ſays, he has often wondered how waſps, hornets, and other inſects, that gather dry materials (as the duſt of wood ſcraped for that purpoſe), ſhould find a proper glutinous matter to cement and glue their combs, and line their cells: but he adds, that, in all probability, it is in their own bodies; as in the tinea veſtivora, the cad-worm, &c.

Goedart obſerves of his erucas, that fed on leaves, that they made their cells of leaves glued together with their own ſpittle.

Nidus *avis*, in the Linnæn ſyſtem of *Botany*, the name of a ſpecies of Ophrys.

NIECE, a term relative to uncle and aunt, ſignifying a brother's or ſiſter's daughter; which, in the civil law, is the third degree of conſanguinity; and, in the common law, the ſecond.

NIEKE *coronde*, in the language of the Ceyloneſe, the name of a ſpecies of cinnamon. The tree which produces it reſembles the *nieke*, another tree very common there. This is a very bad kind of cinnamon, and has very little taſte or ſmell. It is very ſeldom ſold as cinnamon, but is much in eſteem among the natives for its medicinal virtues. They obtain a water, and an oil from it, by roaſting, which they anoint themſelves with, to preſerve them from noxious fumes, and infections of any kind; and uſe the expreſſed juice of the leaves to cool the head, and ſtrengthen the brain, rubbing it on externally. Phil. Tranſ. N° 409.

NIENT *compriſe*, in *Law*, an exception taken to a petition, as unjuſt; becauſe the thing deſired is not in that act or deed whereon the petition is grounded.

Thus a perſon deſiring of the court to be put in poſſeſſion of a houſe formerly adjudged to him among other lands; the adverſe party pleads, that the petition is not to be granted; by reaſon though the petitioner had a judgment for certain lands and houſes, yet this houſe is *nient compriſe*, not compriſed therein.

NIGELLA, in *Botany*. See Fennel *flower*.

NIGHT, that part of the natural day, during which the ſun is underneath the horizon: or, *night* is that ſpace of time wherein the ſun is out of our hemiſphere.

Under the equator, the *nights* are always equal to the days. Under the poles, the *night* continues half a year.

The ancient Gauls and Germans divided their time not by days, but *nights*; as appears from Tacitus and Cæſar; and the people of Iceland, and the Arabs, do the ſame at this day. See Day, Hour, &c.

The ſame is alſo obſerved of our Saxon anceſtors.

Thus in the council of Cloveſhoe, anno 824, we read, *Ibi finita & proſcripta contentione coram epiſcopo poſt* 30 noctes, *illum juramentum ad Weſtminſter deductum eſt.*—Whence our cuſtom of ſaying, *ſevenight*, *fortnight*, &c.

Night, *ſignals by*. See Signals.

Night-*awn-hynd, third*. See Third.

Night-*mare*. See Incubus.

NIGHTSHADE, *ſolanum*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters ars theſe: the empalement of the flower is permanent, of one leaf, cut half through into five acute ſegments; the flower has one wheel-ſhaped petal, having a very ſhort tube; the brim is large, ſpreading, and five-pointed; it has five awl-ſhaped ſtamina, terminated by oblong ſummits, which ſtand together: and a roundiſh germen ſupporting a ſlender ſtyle, longer than the ſtamina, and crowned by an obtuſe ſtigma; the germen afterwards turns to a roundiſh berry, with two cells, having a convex fleſhy receptacle, filled with roundiſh compreſſed ſeeds. There are thirty-ſix ſpecies. Miller. See Mad-*apple*.

The garden *nightſhade* of the ſhops, with black berries, is annual, grows ſpontaneouſly in cultivated grounds, and flowers in Auguſt. The leaves are uſed in external applications, and are ſaid to act as refrigerants, reſolvents, and diſcutients; taken internally in the quantity of not many grains, they are highly deleterious; in very ſmall doſes, as an infuſion in boiling water of half a grain or a grain of the dried leaves, they occaſion a warmth over the whole body, which is often followed by a ſweat, or an increaſe of the urinary diſcharge, or ſome looſe ſtools, or a ſickneſs and vomiting, and often by a head-ach, giddineſs, dimneſs of the ſight, and other paralytic ſymptoms. In ſome cancerous, ulcerous, and hydropic caſes, theſe infuſions have been repeated at bed-time, every two or three nights, or oftener, and the quantity of the leaves in each doſe increaſed gradually to five or ſix grains or more, with apparent benefit; but their operation is ſo irregular, and their effects on the nervous ſyſtem ſo alarming, that the uſe of them is juſtly laid aſide. It is obſerved, that their beneficial effects depend on the evacuations, they produce: and that, when they do not act as evacuants, they generally aggravate the complaints. The roots and berries are much of the ſame nature with the leaves; though Geſner reports, that the expreſſed juice of the latter, boiled with ſugar, to the conſiſtence of a ſyrup, proves, in doſes of a tea-ſpoonful, an effectual and ſafe anodyne; but he cautions againſt exceeding this doſe. Lewis.

Nigtshade, *American*, *phytolacca*, in *Botany*, a genus of the *decandria pentagynia* claſs. Its characters are theſe: the flower hath no empalement, according to ſome, and no petals, though the cover of the parts of generation being coloured, is by ſome termed petals: there are five of theſe, which are concave, open, and permanent; it has for the moſt part ten ſtamina, which are of the ſame length of the petals, terminated by roundiſh ſummits, and ten compreſſed, orbicular germina, joined together on their inſide, but divided on their outſide; upon which ſit ten very ſhort ſtyles, which are reflexed; the germina afterward turn to an orbicular depreſſed berry, with ten longitudinal deep furrows, having ten cells, each containing a ſingle ſmooth ſeed. Miller reckons three, and Linnæus four ſpecies.

Parkinſon ſays, that the inhabitants of North America make uſe of the juice of the root of American *nightſhade*, with large fruit, commonly called Virginian poke, as a familiar purge; two ſpoonfuls of the juice will work ſtrongly. Of late there have been ſome quacks, who pretend to cure cancers with this herb; but no inſtance is known of its having been ſerviceable in that diſorder. The inhabitants of North America boil the young ſhoots of this plant, and eat it like ſpinach. The juice of the berries ſtains paper and linen of a beautiful purple colour, but it will not laſt long: if there could be a method of fixing the dye it might be very uſeful. Miller.

Nightshade, *baſtard*. See Rivina.

Nightshade, *climbing*, or *Malabar*. See Basella.

Nightshade, *deadly*, *atropa*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower is bell-ſhaped, hath a permanent empalement of one leaf, cut into five parts, and is divided into five equal parts; it hath five ſtamina riſing from the baſe of the petal; in the centre is ſituated an oval germen which becomes a globular berry, having two cells ſitting on the empalement, and filled with kidney-ſhaped ſeeds. Miller reckons two and Linnæus five ſpecies.

This plant ſhould not be ſuffered to grow in any places where children reſort, for it is a ſtrong poiſon; ſeveral inſtances having happened where children have been killed by eating the berries.

There is a remarkable inſtance of the direful effects of this plant, recorded in Buchannan's Hiſtory of Scotland; wherein he gives an account of the deſtruction of the army of Sweno, when he invaded Scotland, by mixing a quantity of the juice of theſe berries with the drink, which the Scots, by their truce, were to ſupply them with: this ſo intoxicated the Danes, that the Scots fell upon them, in their ſleep, and killed the greateſt part of them; ſo that there was ſcarcely men enough left to carry off their king. See, on this article, Phil. Tranſ. vol. lx. part i. p. 62.

Nightshade, *enchanters*, *circæa*, in *Botany*, a genus of the *diandria monogynia* claſs. Its characters are theſe: the flower hath a doubled-leaved empalement and two heart-ſhaped petals, and has two erect hairy ſtamina; the germen is ſituated under the flower, and the empalement becomes an oval capſule, with two cells opening lengthways, each containing a ſingle oblong ſeed. There are two ſpecies.

Nightshade, *three-leaved*. See *Herb* Paris *of Canada*.

NIGHTSHADE, *Virginian.* See *American* NIGHTSHADE.

NIGHTSHADE, *woody*, called *bitter-ſweet*, *dulcamara*, and *amara dulcis*, is a ſpecies of *ſolanum*, which grows by the ſide of hedges, and in moiſt ditches, climbing upon the buſhes with winding, woody, but brittle ſtalks. It is perennial, and flowers in June and July. The roots and ſtalks of this ſpecies, which, on firſt chewing them, yield a conſiderable bitterneſs, that is ſoon followed by an almoſt honey-like ſweetneſs, have been commended in different diſorders, as high reſolvents and deobſtruents. Their ſenſible operation is by ſweat, urine, and ſtool: the doſe from four to ſix ounces of a tincture made by digeſting four ounces of the twigs, in a quart of white wine.

Experience, ſays Dr. Lewis, has ſhewn that they are by no means equally deleterious with deadly *nightſhade*; that they act more regularly and uniformly; and that, without producing nervous complaints, they produce more conſiderable evacuations, eſpecially by ſtool: but, he adds, that their virtues, in particular caſes, have not yet been ſufficiently aſcertained. Mat. Med.

NIGHTINGALE, *luſcinia* or *philolema*, in *Ornithology*, the browniſh grey *motacilla*, with the annules of the knees grey.

The *nightingale* derives its name from *night* and the Saxon word *galan*, *to ſing*. It is in ſize equal to the red-ſtart; but longer bodied and more elegantly made. The head and back are a pale tawny, daſhed with olive; the tail is of a deep tawny red; the throat, breaſt, and upper part of the belly of a light gloſſy aſh-colour; the lower belly almoſt white; the exterior webs of the quill-feathers are of a dull reddiſh-brown; the interior of a browniſh aſh-colour; the inſides are hazel; the eyes remarkably large and piercing; and the legs and feet of a deep aſh-colour.

Mr. Hunter found, by diſſection, that the muſcles of the larynx are ſtronger in the *nightingale* than in any other bird of the ſame ſize.

This bird, the moſt famed of the feathered tribe, for the variety, length, and ſweetneſs of its notes, viſits England in the beginning of April, and leaves us in Auguſt; and during its continuance with us, its range is confined to a part of this iſland: it is not found in Scotland, Ireland, or North-Wales, nor in any of the northern countries, except Yorkſhire; and it does not migrate ſo far to the Weſt as Devonſhire and Cornwall. *Nightingales* form their neſts of oak leaves, a few bents, and reeds. The eggs are of a deep brown. They begin their ſong in the evening and continue it the whole night. Pennant.

NIGHTINGALE, *Virginian*, in *Ornithology*, the common, but improper name of a bird of the groſs-beaked kind, called by authors the *coccothrauſtes Indica criſtata*.

It is a little ſmaller than our blackbird; it has a black ring, ſurrounding the eyes and noſtrils; the beak is very large and thick, but not altogether ſo large as in the common groſs-beak; and its head is ornamented with a very high and beautiful creſt, which it moves about very frequently; it is all over of a very fine, and lively red, but paler on the head and tail than elſewhere: it is brought to us from Virginia, and is much valued in England, for its beauty, and delicate manner of ſinging; it is very fond of almonds and the like fruits.

NIGHTINGALE, *mock*. See BLACK-CAP.

NIGHTWALKERS, in a legal ſenſe, are ſuch perſons as ſleep by day and walk by night, being oftentimes pilferers or diſturbers of the peace.

5 Ed. III. cap. 14. Conſtables are authorized by the common law, to arreſt *nightwalkers*, and ſuſpicious perſons, &c. Watchmen may alſo arreſt *nightwalkers*, and hold them until morning: and, it is ſaid, that a private perſon may arreſt any ſuſpicious *nightwalker*, and detain him till he give a good account of himſelf. 2 Hawk. P. C. 61. 80. One may be bound to the good behaviour for being a *nightwalker*; and common *nightwalkers* and haunters of bawdy-houſes are to be indicted before juſtices of peace, &c. But it is held not lawful for conſtable, &c. to take up any woman, as a *nightwalker*, on bare ſuſpicion only of being of ill fame, unleſs ſhe be guilty of a breach of the peace, or ſome other unlawful act.

NIGHTWALKERS, in a phyſical ſenſe. See NOCTAMBULATIO.

NIGRINA, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are that the flower is funnel-ſhaped, the empalement is inflated, the ſtigma is obtuſe, and the fruit is a doubled celled capſule. There is only one ſpecies.

NIGRITIES *oſſium*, among the ancients. See CARIES.

NIHIL, *nihilum*, *nothing*, among the ſchool philoſophers, is what has no real eſſe, and which is only conceived negatively, and denominated by a negative.

NIHIL *capiat per billam*, or *per breve*, in *Law*, is a form uſed when judgment is given againſt the plaintiff, ſo as to bar his action, or overthrow his writ or bill.

NIHIL or NIL *debet*, is the uſual plea in an action of debt; but it is no plea in an action of covenant, or breach aſſigned for non-payment of rent, &c.

NIHIL *dicit* is a failing of a defendant to put in an anſwer to the plaintiff's plea by the day aſſigned; on which omiſſion judgment is given againſt him of courſe, *quod nihil dicit*, becauſe he alledges nothing to the contrary.

NIHIL or NIHILI *album*. See POMPHOLYX.

NIHILS, or NICHILS, iſſues which the ſheriff, that is appoſed in the exchequer, ſays are nothing worth, and illeviable; from the inſufficiency of the parties that ſhould pay them.

NIHILS, *clerk of the*, *nihilorum clericus*. See CLERK and EXCHEQUER.

NIL, in *Botany*, a name given by the Arabians to two very different ſeeds, which are often, by this means, miſtaken in their writings one for another. Avicenna tells us firſt that *nil* is the ſeed of a creeping plant, of the bindweed kind, and that this plant had blue flowers, like the campanulus, or bell-flowers: but, in another place, he tells us, that *nil* is the name of a plant uſed in dying, which ſeems to be the ſame with our *iſatis*, or woad.

It is probable, that the convolvulus, or bindweed, called *nil*, obtained this name only from its flower being of the ſame colour with the fine blue pigment obtained from the other *nil*, or woad.

NIL *habuit in tenementis*, in *Law*, a plea to be brought in an action of debt only, brought by a leſſor againſt a leſſee, for years, or at will, without deed.

NILACUNDI, in *Natural Hiſtory*, a name given to a ſtone of the gem kind, which is half a SAPPHIRE and half a RUBY.

The word *nilaa* is the Indian name for the ſapphire, derived from the word *nil*, the name of indigo, and given to this gem becauſe of its fine blue colour, which approaches to the tinge of the pigment. The latter part of the word is not eaſily accounted for, without making a little variation in the ſpelling, but with that, is very clear and eaſy. *Jacut*, or *jacuti*, and, as ſome ſpeak it, *jacunti*, is the name given by the Indians to the ruby, and it is only ſuppoſing the word to be properly *niljacunti*, and it expreſſes, in their own language, exactly what we underſtand by it, a ſtone part ſapphire and part ruby.

NILAHUMATU, in *Botany*, a name given by ſeveral authors to the ſmooth-fruited STRAMONIUM of Malabar.

NILIACUM *mel*, a name by which the ancients expreſſed the very fineſt honey.

NILICANARAM, in *Botany*, the name by which ſome authors call the tree whoſe fruit is the myrobolan uſed in medicine.

NILOMETER, or NILOSCOPE, an inſtrument uſed among the ancients to meaſure the height of the water of the river Nile, in its overflowings.

The word comes from Νειλος, *Nile* (and that from νεα ἰλυς, *new mud*, or, as ſome others will have it, from νεω, *I flow*, and ιλυς, *mud*), and μετρον, *meaſure*. The Greeks more ordinarily call it Νειλοσκοπιον.

The *nilometer* is ſaid, by ſeveral Arabian writers, to have been firſt ſet up, for this purpoſe, by Joſeph, during his regency in Egypt: the meaſure of it was ſixteen cubits, this being the height of the increaſe of the Nile, which was neceſſary to the fruitfulneſs of Egypt.

From the meaſure of this column, Dr. Cumberland deduces an argument, in order to prove that the Jewiſh and Egyptian cubit were of the ſame length. Scripture Weights and Meaſures, p. 18.

In the French king's library is an Arabic treatiſe on *Nilometers*, intitled, Neil fi alnal al Nil; wherein are deſcribed all the overflowings of the Nile, from the firſt year of the Hegira to the 875th.

Herodotus mentions a column erected in a point of the iſland Delta, to ſerve as a *Nilometer*; and there is ſtill one of the ſame kind in a moſque of the ſame place.

As all the riches of Egypt ariſe from the inundations of the Nile, the Egyptians uſed to ſupplicate them at the hands of their Serapis; and committed the moſt execrable crimes, as actions forſooth of religion, to obtain the favour. This occaſioned Conſtantine expreſly to prohibit theſe ſacrifices, &c. and to order the *Nilometer* to be removed into the church; whereas, till that time, it had been in the temple of Serapis. Julian the Apoſtate had it replaced in the temple, where it continued till the time of the great Theodoſius. See, on the ſubject of *Nilometers*, the Acta Eruditorum Lipſ. anno 1686 p. 147.

NILUFAR, in *Botany*, a name given by the ancient writers to the common *water*-LILY. They diſtinguiſhed this plant by that name from the Indian *nymphæa*, whoſe root was of a cold and ſoporific virtue, like that of the mandrake. This they call always *nenufar*.

NIMBUS, among the Romans, a ſcarf embroidered with gold, which women wore on their foreheads.

NIMBUS was likewiſe uſed for the money thrown among the people, on any public occaſion.

Nimbus, in *Antiquity*, a circle obſerved on certain medals, around the heads of ſome emperors; anſwering to the areolæ, or circles of light, drawn around the images of ſaints.

The *nimbus* is ſeen on the medals of Maurice, Phocas, and others even of the upper empire.

NIMETULAHITES, a kind of religious among the Turks, ſo called from *Nimetulahi*, their inſtitutor.

When a Turk would be admitted into the order, he is to ſhut himſelf up cloſe in a chamber forty days, reſtricted to four ounces of food per day. The term expired, the *Nimetulahites* take him by the hand, and lead him a Mooriſh dance, accompanied with an infinity of ridiculous geſticulations, till the violence of the exerciſe, with his former regimen, throw him down on the ground. This fall is conſtrued an extacy, during which he is ſuppoſed to have a viſion.

The *Nimetulahites* meet every Monday in the night-time, and ſing hymns to God, &c.

NIN-O, in *Chronology*, is the name of the æra moſt commonly uſed among the Japaneſe. It commences with the reign of Sin-ma, the founder of their monarchy, 660 years before the Chriſtian æra.

NINSI, in *Botany*. See Gin-seng.

NINTH, in *Muſic*, one of the diſſonant intervals in muſic. It is properly the ſecond doubled; but it is differently uſed. When an upper part ſyncopates, the ſecond is accented, and treated as a *ninth*; i. e. it is reſolved by an eighth, and accompanied by a third and fifth, and often a ſyncopated ſeventh: but when the lower part ſyncopates, the ſecond is not thus uſed, but is accompanied by the fourth and ſixth. In thorough baſs, the *ninth* has always, or at leaſt commonly, an eight placed after it thus, 98, to ſhew that is reſolved by deſcending to the octave.

Ninth *pair of nerves*. See Nerves.

NINTIPOLONG, in *Zoology*, the Ceyloneſe name of a ſpecies of ſerpent called alſo *ſerpens hypnoticus*. It is a very poiſonous ſpecies, and its bite brings a ſleep upon the perſon, which terminates in death. It is of a deep, blackiſh brown, variegated with ſmall ſpecks of white.

NINZIN, in the *Materia Medica*, a name uſed by ſome authors for the famous Chineſe root, commonly called ginseng.

NIPPERS, in the *Manege*, are four teeth in the forepart of a horſe's mouth, two in the upper, and two in the lower jaw. A horſe puts them forth between the ſecond and third year.

Nippers is alſo an inſtrument in uſe among ſmiths, and farriers, being a kind of pincers, wherewith, in ſhoeing a horſe, they cut the nails before they rivet them. It is alſo uſed in taking off a ſhoe.

Nippers, in a ſhip, are pieces of flat braided cordage, uſed to faſten the cable to the voyal, in a ſhip of war, when the former is drawn into the ſhip, by mechanical powers applied to the latter. Theſe *nippers* are uſually ſix or eight feet in length, according to the ſize of the cable: and five or ſix of them are commonly faſtened about the cable and voyal at once, in order to be heaved in by the capſtern. Thoſe which are fartheſt aft are always taken off, as the cable approaches the main hatchway; and others are at the ſame time faſtened on, in the fore part of the ſhip, to ſupply their place. The perſons, employed to bind the *nippers* about the cable and voyal, are called *nipper*-men: they are aſſiſted, at this office, by the boys of the ſhip, who always ſupply them with *nippers*, and receive the ends of thoſe which are faſtened, to walk aft with them, and take them off at the proper place, in order to return them to the *nipper*-men. Falconer.

NIPPLE, *papilla*, in *Anatomy*, a prominence ariſing from the middle of the breaſt or mamma. See Breast.

The colour of the *nipple* is various; in different ſtates, and ſtages of life it is reddiſh, blueiſh, and blackiſh; it is encompaſſed with a pale browniſh or reddiſh circle, called *areola*.

The lacteal tubes, coming from the ſeveral parts of the breaſts, terminate in the papillæ, with ſeveral nervous, or ſpongious emiſſaries which communicate with each other by anaſtomoſes, through which, in ſucking, the milk is drawn.

The *nipples* of women, in their firſt lying in, are frequently ſo ſmall, and ſunk into their breaſts, that the infant cannot get at them to ſuck its nouriſhment. The readieſt method, in this caſe, is to apply an infant ſomewhat older, and which can draw ſtronger; or, if this does not ſucceed, to let a woman, who has been practiſed in the art, attempt to ſuck.

When theſe do not ſucceed, it is common to have recourſe to a glaſs pipe, and the poorer people in ſome places uſually make a tobacco-pipe ſerve the turn. Others apply a ſmall cucurbite, made of ivory, in the form of a hat, which they ſuck ſtrongly in their mouth. The common ſucking-glaſs is alſo, when properly applied, of very ſignal ſervice. To do this, the ſmall hole at the ſide is to be ſtopped with wax, and the glaſs heated with warm water; or, by holding it before the fire, ſo as to rarefy, and in part expel the air: it is then to be applied to the *nipple*, which, in this caſe, will not only be pulled out, but will diſcharge a large quantity of milk, ſo as to take down the inflammation and tumor in the breaſt. When the ſucking power of the glaſs is grown weak, the hole at the ſide is to be opened, and the milk poured out; the glaſs is then to be heated again, and the hole being ſtopped again, is to be a ſecond time applied, and ſo on, till the intention is fully anſwered. Heiſter's Surgery, part ii. p. 11.

Nipple *wort*, *lapſana*, in *Botany*, a genus of the *ſyngeneſia polygamia æqualis* claſs. Its characters are theſe: the flower is compoſed of ſeveral hermaphrodite florets, included in one common imbricated empalement; the florets have one tubulous petal, ſtretched out at the top, in ſhape of a tongue; theſe have each five ſhort hairy ſtamina; the germen is ſituated at the bottom of the floret, which afterward becomes an oblong three-cornered ſeed, ſituated in the ſcale of the empalement. There are four ſpecies. Miller.

The common *nipple-wort*, which is a weed, growing by the ſide of foot-paths and hedges, is eſteemed excellent for curing ulcerated nipples, whence it obtained its name. It is ſaid to be drying, detergent, and digeſtive. The leaves and ſtalks may be boiled and eaten. James.

NIQUI, in *Ichthyology*, the name of a fiſh of the cucullus kind, approaching to the figure of that ſpecies commonly called *draco* and *araneus marinus*, and in Engliſh the *weaver*. It is common about the American ſhores, and is eatable when the liver and gall are taken out, otherwiſe it is ſaid to be poiſonous. See *Tab.* III. *of Fiſhes* N° 29.

NIR, in the *Materia Medica*, a name given by the Arabian phyſicians to the pigment or colour, made from the *iſatis*, or woad.

NISAN, a month of the Hebrews, anſwering to our March, and which ſometimes takes from February, or April, according to the courſe of the moon. It was made the firſt month of the ſacred year, at the coming out of Egypt. *This month ſhall be unto you the beginning of months, it ſhall be the firſt month of the year to you.* Exod. xii. 2. It was the ſeventh month of the civil year. Moſes calls it *Abib*. The name *Niſan* is only ſince the time of Ezra, and the return from the captivity of Babylon.

NISI PRIUS, in *Law*, a judicial writ which lieth in caſes where the jury being impanelled and returned before the juſtices of the bench, one of the parties requeſts to have ſuch writ, for the eaſe of the county, whereby to will the ſheriff to cauſe the inqueſt to come before the juſtices in the ſame county, at their coming thither.

It is called a writ of *niſi prius*: and its effect is, that the ſheriff is hereby commanded to bring to Weſtminſter the men impanelled, at a certain day, before the juſtices, *niſi prius juſticiarii domini regis ad aſſiſas capiendas venerint*; that is, unleſs the juſtices go, before that day, into ſuch county to take aſſiſes. This they are ſure to do, in the vacations preceding each Eaſter and Michaelmas terms, and there diſpoſe of the cauſe; which ſaves much expence and trouble to the parties, the jury, and the witneſſes.

Nisi Prius and *aſſiſe*, *courts of*, are compoſed of two or more commiſſioners, who are twice in every year ſent by the king's ſpecial commiſſion, all round the kingdom (except only London and Middleſex, where courts of *niſi prius* are holden in and after every term, before the chief or other judge of the ſeveral ſuperior courts), to try, by a jury of the reſpective counties, the truth of ſuch matters of fact as are then under diſpute in the courts of Weſtminſter-hall.

Nisi Prius, *juſtices of*. See Justices.

NISSOLIA, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are, that the calyx is divided into five ſegments, and that the fruit is a monoſpermous capſule. There are two ſpecies.

NISUS, in *Ornithology*, a name by which many authors call the *accipiter fringillarius*, or *ſparrow*-hawk.

Nisus is alſo a name uſed by ſome old naturaliſts for the haliaetus, or *aquila marina*, called in Engliſh the *ſea*-eagle, or *oſprey*.

Nisus is likewiſe a name given by the barbarous writers of the middle ages to *alabaſter*.

NITEDULA, in *Zoology*, the field-mouſe. See Mus.

NITIDUM *folium*, among *Botaniſts*. See Leaf.

NITRARIA, in *Botany*, a genus of the *dodecandria monogynia* claſs. Its characters are, that the flower has five petals; the empalement is divided into five ſegments, the ſtamina are fifteen; and the fruit is a monoſpermous drupe. There is only one ſpecies.

NITRE, νιτρον, in *Natural Hiſtory*, a bitter ſort of ſalt, thus called by the ancients; by the moderns, more uſually, *ſaltpetre*.

Naturaliſts differ as to the point, whether our ſaltpetre be the *nitre* of the ancients; but it certainly is not.—G. C. Schelhammer has a particular treatiſe on this ſubject, De *Nitro*, tum veterum, tum noſtro Commentarius. See Natron.

Nitre, or **Saltpetre**, is a neutral ſalt, compoſed of nitrous acid, ſaturated with fixed vegetable alkali. It is found immerſed in imperceptible particles, in earthy ſubſtances, as the particles of metals in their ores, and is diſcoverable in theſe bodies by an acrid and pungent taſte, and a ſenſation of coldneſs with which it affects the tongue: ſometimes alſo it is found native and pure, in form of an effloreſcence, or ſhapeleſs ſalt, either in its ore, or on old walls, and yields after ſolution hexaedral priſmatic cryſtals.

Nitre is found naturally cryſtallized in India, and as it is ſwept from earths or ſtones with brooms, it is called the ſweepings of *nitre*, or of ſaltpetre. A *nitre* may alſo be obtained from ſeveral plants: and theſe are the two kinds of natural *nitre*. All other *nitre* is begun by nature, but art is required to extract and purify it.

Many have been of opinion, that *nitre* was, in part at leaſt, an animal ſalt, and that where it was found on old walls, it was owing to the effluvia of animal bodies once inhabiting the place; but we find it now in vaſt quantities in ſeveral of the marly earths of the Eaſt Indies, and ſome other places, which, however, though they abound with it, when they are in the naked cliffs, expoſed to the air, in a proper ſituation, yet when dug up from any depths in the earth, the ſame ſubſtances are not found to contain any of this ſalt.

This marly earth is frequent in China, Perſia, and many parts of the Eaſt, and is choſen for working from places where it ſtands in barren cliffs, on hills facing the northern or eaſtern winds. The manner of their ſeparating *nitre* from this earth, is as follows: they dig large pits, which they coat over on the inſide with a ſtiff and firm clay; this they fill half full of water, and into it throw the earth. When the water has ſtood ſome days to imbibe the ſalt, they draw it off into other pits, defended by ſlight walls on all but the north-eaſt ſide. Here the ſun exhaling the water, the ſalt which it had imbibed affixes itſelf to the ſides of the pit in ſmall, browniſh, white, hexaedral, but very imperfect cryſtals, which are what we receive from the Eaſt Indies, under the name of rough *nitre*.

This is the way the greateſt quantity of this ſalt is made; but it is alſo procured from divers other materials, and by many other methods.

The method of manufacturing ſaltpetre in Podolia, related by Dr. Wolf, is as follows: the earth or mould, which they make uſe of for this purpoſe, is of a deep black; and they make choice of a place for their operation not far from a ſpot rich enough in *nitre* to keep them conſtantly at work, at leaſt during a whole ſummer, and ſuch as can ſupply them with water and wood at an eaſy expence. The utenſils, uſed in this manufacture, are a large copper boiler, containing about 60 amphors of 6 gallons, or about 54 ℔ of water each, which is fixed in the ground, with its brim level with the ſurface; 100 wooden tubs, with a hole bored near the bottom, each of which holds a car of earth, or about 4 or 5 amphors; 2 very large caſks of about 100 amphors each; about 32 wide troughs or coolers, holding about an amphor each; and a ſufficient number of amphors for fetching water.

In the manufacture, the firſt operation is to beat the nitrous earth to a coarſe powder with iron ſpades, and to clear it of all hard ſubſtances. If it be very rich in *nitre* (indicated either by its fatneſs or its downy effloreſcence), they mix with it ſome of a poorer ſort, in equal quantity, but very black and old: and, laſtly, they add aſhes, commonly thoſe of the aſh, which moſt abounds, to the amount of about a fifth part of the whole, and mix them well together. If they have a quantity of urine at hand, they throw it in, but never any quicklime: they then put one car of the prepared nitrous earth into one of the tubs, fill up the veſſel with cold water, and ſtir the whole well with a wooden ſtaff; and after it has ſtood twenty-four hours, with occaſional ſtirring, they ſuffer the ley to run out at the hole near the bottom, and put it into large caſks. In this decoction of the *nitre*, what they call the *mother of nitre* is abſolutely neceſſary. This is the inſpiſſated lixivium remaining after the cryſtallization of *nitre*, which cannot itſelf be made to cryſtallize, and they keep it from one year to another. Of this mother of *nitre*, they pour one or two tubs into the boiler, to which they add the new ley, collected in the great caſks, till the boiler is full, and keep the contents boiling near twenty-four hours. As ſoon as they perceive any marks or cryſtallization on the ſurface, they remove the ley, thus decocted and inſpiſſated, into the thirty-two wooden coolers, and let it remain there twenty-four hours; in which time the cryſtallization being completed, they drain off the mother of *nitre*, and return it into the boiler. The cryſtals are taken out and dried; but as they never prove clean, they are again diſſolved in clean water, filtered through a flannel bag, and boiled up again, in a leſs boiler, to a requiſite thickneſs, and then cryſtallized again, which brings them to be fit for ſale. In this manner, the proceſs is repeated through the ſummer, till the winter's froſt puts a ſtop to it.

A ſingle pound of ſaltpetre is ſold, in time of war, on the ſpot where it is made, for four rubles, or ſeventeen ſhillings; but, in time of peace, it is much cheaper.

The earth thus cleared of its *nitre*, is caſt out in heaps about four feet high, and thus left for four years, and the ſame quantity of *nitre* is got out of this earth as before. Upon a third working, after ſeven years more, it will yield ſome *nitre*, but ſcarce enough to defray the charges. This method of making ſaltpetre, ſays Dr. Wolf, came hither from the Eaſt; and there, Dr. Wolf apprehends, it is performed by a ſimilar proceſs.

In many of the eaſtern nations, the ruins of old buildings expoſed to the north-eaſt winds, and ſheltered from rain, have their walls covered with the effloreſcences of a nitrous ſalt, which is uſually thrown with the earth into the *nitre* pit. Earths moiſtened with the excrements of animals, as the earths of pigeon-houſes, and the like, all afford more or leſs *nitre*, and, in France, vaſt quantities are annually made from lime rubbiſh, and the ruins of old buildings.

In Virginia, they prepare the floors of their tobacco-houſes, for attracting *nitre*; the method of making it, in this way, by Mr. Jeremiah Brown, has been publiſhed, in Virginia, by order of the truſtees for the improvement of arts and manufactures, and, in England, by order of the ſociety for the encouragement of arts, manufactures, and commerce. See an account of this method in the Annual Regiſter, for 1763, vol. vi. p. 121.

At Paris, where they have ſeventeen ſaltpetre works, there is a company of perſons employed in making ſaltpetre, in number about twenty. They were incorporated ſo long ago as the reign of Charles IX. and are regulated by ſeveral ſtatutes. The quantity made annually is from 6 to 700,000 ℔. They are obliged to deliver it in rough to the royal arſenal, where they receive for it ſeven ſous, or about 3½*d*. per ℔. It is there purified, undergoing three lixiviations, and is then ſold at ten, fifteen, and eighteen ſols per pound.

The method uſed in a conſiderable manufacture is as follows: M. Bouret, who makes every year from 35 to 36,000 ℔. employs 6 men night and day, 2 rooms, 20 large caſks, and 3 horſes. The caſks are half filled with old plaiſter, which is changed every time of pouring on water. and the lower half with wood aſhes, which are changed but once in five lixiviations. The water poured on ſoaks through both the plaiſter and aſhes, and is five times paſſed through freſh plaiſter. It is then boiled down in a copper pan, ſo placed that the flame paſſes quite round its ſides. The fire is made of wood. The lixivium, when properly evaporated, is ſet to cryſtallize, and the cryſtals to drain. The ſcum taken off in the boiling is thrown upon the plaiſter, which the longer it lies in heaps (wetted from time to time) becomes the ſtronger; and likewiſe in proportion to the putrid matter thrown upon it. The plaiſter uſed in the buildings, at Paris, is made of that gypſeous earth, called plaiſter of Paris, and found in the neighbourhood of that city. In general, no lime is mixed with it; and if this be caſe, the *nitre* is neither ſo good, nor produced in ſo great a quantity. It is known, when the old plaiſter is worth being collected and employed, by the ſaltiſh taſte of it. *Nitre* is alſo made in other great towns of France.

The moſt favourable places (ſays the author of the Chemical Dictionary) for the production of *nitre* are the habitations of men and animals, and particularly ſuch as are low and moiſt, as cellars, kitchens, ſtables, houſes of office, and others of that kind, which are apt to be impregnated with vegetable and animal matters, and alſo to have an habitual moiſture, which is favourable to putrefaction; and, laſtly, which are ſheltered from rain, which might otherwiſe diſſolve and carry off the *nitre*, as ſoon as it is formed.

Theſe buildings are true *nitre*-beds. When they are old, their rubbiſh and plaiſter are full of *nitre*: but this *nitre* is only a *nitre* with an earthy baſis, which is not ſuſceptible of cryſtallization or detonation, which are the two eſſential qualities in *nitre* for the principal uſes to which it is applicable, and which it cannot poſſeſs but by being joined to a baſis of fixed alkali. Beſides, the *nitre* of rubbiſh is mixed with much common ſalt, which comes alſo from the vegetable and animal matters, and from ſome heterogeneous ſubſtances, which alter its purity. The chief intention, therefore, of the operation upon rubbiſh, to obtain a perfect *nitre*, is to furniſh this ſalt with a baſis of fixed alkali, and to diſengage it from the heterogeneous matters which alter its purity. Theſe views are accompliſhed in the following manner.

The rubbiſh containing *nitre* is to be broken to ſmall pieces, and mixed with nearly an equal quantity of wood-aſhes. This mixture is to be put into caſks ranged along each other, placed vertically on one of their ends, and ſupported to the height of two feet above the ground. At the bottom of each caſk is a hole filled with ſtraw. Water is to be poured into the firſt caſk; and this water, when impregnated with all the ſaline matter in the mixture, flows into a bucket placed under tha caſk for its reception. The ſame water is poured ſucceſſively into the other caſks, and thus becomes impregnated with more and more ſaline matter. The makers of ſalpetre obſerve always to paſs the ſtrongeſt lixiviums through caſks filled with new matter; and before they throw away the matter of a caſk when almoſt exhauſted, they paſs through it the firſt water yet unimpregnated. By theſe operations, which are well contrived, they obtain a lixivium as much impregnated as it can be, and they at length entirely exhauſt the rubbiſh of all the *nitre* it contained.

The lixivium of *nitre*, thus prepared, is carried to great copper cauldrons, in which it is boiled and evaporated, till it is ſufficiently ſtrong for the cryſtillization of the ſalts. As the two cryſtallizable ſalts contained in this lixivium are *nitre* and common ſalt, and as the latter of theſe ſalts is cryſtallizable by evaporation only, and the ſecond by cold only; the common ſalt cryſtalizes firſt during the evaporation, and forms ſmall cubical cryſtals which ſubſide to the bottom of the cauldron. The ſaltpetre-makers call it the *grain*. They take it out with large ladles, and put it in a baſket hung over the cauldron to drain. This evaporation is continued, and the grain is to be taken away as faſt as it is formed, till the liquor be ſo much evaporated, that when it is cold, much *nitre* will be cryſtallized in it; and in order to diſcover when it is ſufficiently evaporated for that purpoſe, a ſmall quantity of it is to be taken out from time to time. When they perceive, upon cooling the liquor, that a ſufficient quantity of *nitre* is formed in it, they remove the liquor from the cauldron into large copper baſons, which they carry to a place deſigned for the cryaſtllization,

As this liquor contains much *nitre*, and as it is quickly cooled, the greateſt part of the ſalt is coagulated at the bottom of the baſons in unſhapely maſſes, compoſed of many ſmall needle-like cryſtals of *nitre*, and ſometimes of large regular cryſtals upon their ſurfaces. Theſe are called *ſticks of nitre*.

In the baſons remains a large quantity of liquor, the *nitre* contained in which cannot be cryſtallized but by a ſecond evaporation, which is therefore performed in the ſame manner as at firſt, and more *nitre* is obtained. This operation is repeated till no more *nitre* can be formed by cooling the evaporated liquor, which then becomes very red and acrid, and ii called the *mother-water of nitre*.

This mother-water is compoſed almoſt entirely of *nitre* and common ſalt with earthy baſes which certainly proceed from too ſmall a quantity of aſhes having been mixed with the lixivium of the nitrous rubbiſh. This mother-water may therefore be avoided, by mixing a ſufficient quantity of aſhes with the nitrous rubbiſh, to decompoſe all the ſalts with earthy baſes which it contains; and thus, after the ſeveral evaporations and cryſtallizations, nothing would remain but a ſmall quantity of red liquor impregnated with unctuous matter.

When only the uſual quantity of aſhes is employed, the baſis of the earthy ſalts contained in the mother of *nitre* may be precipitated by adding an alkaline lixivinm. This precipitate is white, and is called the *magneſia of nitre*; and, at the ſame time, the *nitre* with earthy baſis in the mother-water, being changed into a *nitre* with baſis of fixed alkali, is eaſily obtainable by cryſtallization: but the ſaltpetre-makers do not employ any of theſe methods with their mother-water, which they throw upon the nitrous rubbiſh after it has been exhauſted of its ſalt by lixiviation. Some time afterwards, they lixiviate this rubbiſh in the ſame manner as they did at firſt, that is, with the addition of aſhes, and obtain from it more *nitre*.—We may eaſily perceive that this operation is preciſely upon the ſame principles as one of thoſe we have propoſed.

The *nitre* obtained by theſe cryſtallizations is red, and ſoiled by the liquor in which it was diſſolved, which has alſo that colour. Farther, although common ſalt does not cryſtallize by cold alone, yet a certain quantity of it always cryſtallizes along with the *nitre*; both becauſe the evaporation continues while the liquor cools, and becauſe the *nitre*, during its cryſtallization, always takes with it a portion of common ſalt. This *nitre*, which the manufacturers call *nitre of the firſt boiling*, is therefore impure, and mixed with common ſalt, and with ſalts with earthy baſes, by which it is rendered unfit for many of the uſes to which *nitre* is applied; as we ſhall afterwards ſee. It is purified by diſſolving it in pure water, and by proceeding to a ſecond cryſtallization by cold; and as in this ſecond cryſtallization, the proportion of *nitre* to common ſalt, and to ſalts with earthy baſes, is infinitely greater than at firſt; ſo that when the liquor is at the point of the cryſtallization of the *nitre*, it is very far from being ſo much evaporated that the common ſalt can cryſtallize at that time; and therefore the *nitre* obtained in this ſecond operation is infinitely purer than that of the former. It is alſo white, and is called by the manufacturers *nitre of the ſecond boiling*. This is the *nitre* employed by diſtillers of aqua-fortis for the ordinary aqua-fortis.

But this *nitre* is not yet ſufficiently pure for the preparation of good gun-powder; and it muſt therefore be purified by a third boiling or cryſtallization. This is the pureſt *nitre* that is ſold, or that is kept in arſenals. It is very beautiful and white; but it is not yet ſufficiently pure for certain delicate operations in chemiſtry, and muſt therefore undergo a fourth purification.

By which ever of theſe methods *nitre* is procured, it is ever in all reſpects the ſame ſalt. Its cryſtals are of a hexaedral priſmatic form, terminated by hexaedral pyramids. It diſſolves in a moderate heat even much leſs than what is neceſſary to make it red, and does not flame, unleſs a cool or ſome other ſulphureous body fall in. If *nirte* thus melted be left to cool and fix, it coagulates into a ſolid, ſonorous, ſemitranſparent maſs, and is then called mineral cryſtal. It is ſoluble in eight times its weight of very cold water; in leſs than thrice its weight of water temperately warm, and, as it is ſaid, in one third its weight of boiling water. The origin of *nitre*, or of that acid which forms its characteriſtic part, has been the ſubject of controverſy among chemiſts and naturaliſts. Some have imagined, that as *nitre* is commonly obtained from ſubſtances long expoſed to the air, the nitrous acid exiſted ready formed, like the other two mineral acids, and that it is ſucceſſively depoſited in the matters proper for its reception. But this opinion is now generally rejected; becauſe it its not found in fact, that *nitre* is ever obtained by a long expoſure of the moſt proper ſubſtances for the reception and retention of the nitrous acid, as fixed alkali, to the air; and that *nitre* is never found except in ſubſtances capable of being impregnated with vegetable or animal juices.

Mr. Lemery the younger, having obtained perfect *nitre* by analyſing many vegetable and animal ſubſtances concludes from thence, that this ſalt exiſts naturally ready formed in the individuals of theſe two kingdoms, which, according to him, are the only ſource of it. To this opinion it is objected, that the peculiar ſubſtances of which vegetables and animals are compoſed, conſiſt of principles extracted from the air and the earth, whence, it may be alledged, that the *nitre* found in them originally proceeds.

Another more probable opinion, concerning the origin of *nitre*, is that of Stahl. This chemiſt apprehends, that the nitrous acid is only the vitriolic acid metamorphoſed by the union it contracts with phlogiſton; and that putrefaction is the means employed by nature to combine this acid with the inflammable matter of putrefying ſubſtances, in the proportion and manner proper for giving it the ſpecific character of nitrous acid. See Dictionary of Chemiſtry, art. NITRE.

This ſalt gives the greateſt of all proofs of the effects of ſynthetical, or recompoſing chemiſtry. It is firſt ſeparated, or analyſed, in the following manner: take two pounds of refined ſaltpetre in fine powder; pour upon it one third of its weight of oil of viriol, diſtil it in a glaſs retort, in a ſtrong ſand heat, and there will be produced a ſtrong acid ſpirit of *nitre*, which cannot, by any experiment, be found to participate at all of the nature of the oil of vitriol uſed in its preparation. Then take a pound of freſh *nitre*, melt it in a crucible, and throw into it, at times, pieces of charcoal, till it will no longer keep in fuſion with the ſame degree of fire; then increaſe the fire and melt it, and then pour it into a proper veſſel; leave it to cool of itſelf: this is fixed *nitre*, and is an alkali. Now diſſolve this fixed *nitre* in water, and exactly ſaturate that water with the acid ſpirit of *nitre* before diſtilled; this compound liquor will, by ſtanding, ſhoot into true and perfect cryſtals of *nitre*. And the experiment ſucceeds as well, if a ſolution of pot-aſhes, or any other fixed alkali, be uſed inſtead of that of fixed *nitre*. Shaw's Lectures, p. 170.

Of all the ſalts which afford us thoſe ſtrong liquors commonly known by the name of the mineral diſſolvents, ſaltpetre, or *nitre*, is the only one which yields red vapours, or whoſe ſpirit riſes in form of red vapours, as ſoon as it is ſeparated by means of fire; but the reaſon of this fact has never been accounted for, till Mr. Hellot explained it to the Academy at Paris, in one of his memoirs.

Of the chemiſts who have before treated of it, ſome imagined that the redneſs of the vapours was owing to ſome part of the ſulphureous ſubſtances which the ſalt had imbibed from the urine and dung of animals, where it was formed: others, that this colour was owing to particles of fire carried up with the vapours in their aſcent. But theſe are weak conjectures; ſince, if the firſt were the caſe, the mixtures of ſal ammoniac with common ſalt of vitriol, ought to yield red vapours in diſtillation, which never is the caſe; and if the latter be ſuppoſed, it is not eaſy to ſay, why oil of vitriol does not ariſe in the ſame coloured vapours; ſince it requires a more violent, and longer continued fire to raiſe it.

Vitriol is added to *nitre* in the diſtillations which yield theſe red vapours, and it is the firſt point to be determined in inveſtigating this phænomenon, whether the vapours owe their colours truly to the *nitre*, or whether they borrow it from the additional vitriol. Baldwin, Stahl, and many others, are of opinion, indeed, that the red vapours are owing to the vitriol, and eſſential to it, and call them the *anima nitri*; and they prove the aſſertion by the known obſervation that *nitre*, melted with a tender white glaſs, turns into purple, or ſome ſhade of red; whereas neither allum, common ſalt, nor the fixed alkalis give this colour; and it is probably ſome portion of an ammoniacal urinous ſalt, mixed in the *nitre*, which gives the colour, ſince ſal ammoniac will give the ſame colour when fuſed with glaſs. What is it, however, in the ſal ammoniac which has this effect? not its volatile alkali, for that is diſſipated in the mixture by the firſt efforts of the fire; neither can it be the acid ſpirit of ſea-ſalt, ſince experiment proves that it can have no ſuch effect when employed alone.

A little crocus martis, or any calx of iron, does the ſame thing to glaſs, and ſometimes even the ſmoke of the furnace will do it, when woods of too reſinous a kind are employed as fuel; many large quantities of what was meant for pure cryſtalline glaſs having been tinged red, or purple, in this manner, and wholly ſpoiled: and all that we can judge on the whole, as to *nitre*, or ſal ammoniac tinging them, is, that it is a fatty, or unctuous matter in thoſe ſalts which produces the colour: and, in all probability, *nitre* contains, beſides a quantity of urinous or ammonical ſalt, a ſmall quantity of a ferrugineous matter, in extremely minute and imperceptible particles. Mr. Lemery has proved that all the ſaltpetre made in Europe, has been originally an ammoniacal ſalt; and, indeed, if *nitre* be rubbed for a conſiderable time in a glaſs mortar made warm, with a quantity of fixed alkali ſalt, it will afford an urinous ſmell. It is not eaſy to prove that all ſal ammoniac contains ferrugineous matter; but when we conſider that iron is always found in the aſhes of vegetables, and that it, therefore, evidently aſcends in extremely minute particles, with the juices of plants: and that ſal ammoniac is prepared from a ſoot made of the excrements of thoſe animals which feed on plants, we ſhall find it no impoſſibility that iron ſhould be there; and we ſhall know that iron, in any ſtate, cannot but give that colour to glaſs, which *nitre*, in a ſmaller quantity, and ſal ammoniac, in a larger, are able alſo to give. Memoirs Acad. Scienc. Paris, 1736.

All obſervations and experiments would ſeem to prove that the red colour given to glaſs by *nitre*, can only be owing to ferrugineous, or ammoniacal matter contained in it; and it is no very raſh conjecture, to ſuppoſe that the ammoniacal matter contained in the ſaltpetre, rarefying, and extremely dividing the ferrugineous matter, during the time of the diſtillation, may diſtribute it, in its disjunct moleculæ, to all that matter, or thoſe particles, which form thoſe vapours, and tinge them red by its diſtribution of them.

It is to be obſerved, however, that the vapours of ſpirit of *nitre*, or of aqua-fortis, are not always red, but only are ſo when the fire is great enough to raiſe with the vapours the matter which colours them: for if ſpirit of *nitre* be made with the addition of alum calcined, with dry ſaltpetre, and with filings of zine, mixed together, there will be obtained, with a ſmall degree of fire, a ſpirit of *nitre*, which does not come over in red fumes.

If the fire be raiſed to a greater degree of violence, there will afterwards be obtained a ſecond ſpirit of *nitre*, which will come over in red fumes; but the firſt of theſe will ſhew the great experiment of taking fire on mixture with oil of turpentine, or the European oils of vegetables, better and more readily than the other.

It is therefore no eſſential character of ſpirit of *nitre* to riſe in red vapours, ſince the firſt riſes without; and this is truly the pure ſpirit of *nitre*; while the ſecond, which riſes in red fumes, is impure, being coloured by ferrugineous or other foreign matter, raiſed in vapour with the reſt, by the great violence of the heat.

It is obſervable, that if vitriol, calcined to a redneſs, be uſed with the *nitre*, for drawing the ſpirit, the vapours riſe of a perfect blood-red. In the common way of diſtilling what is called ſimply ſpirit of *nitre*, the cuſtom is to put into the retort, with the ſaltpetre, a very large quantity of a vitriolic earth: and in the making that ſpirit called aqua-fortis, green vitriol or Engliſh copperas is mixed with the *nitre*. This is abundantly known to contain a great deal of iron. Here, therefore, is in each caſe a quantity of ferrugineous matter added; and we well know that this can give a red colour to the vapours, with which it is compelled by violence of fire to riſe.—

Repeated trials of ſpirit of *nitre*, with mercurial preparations alſo prove, beyond contradiction, that their is ferrugineous matter in that ſpirit. Many of the common mercurial percipitates, when made with aqua fortis, or with plain ſpirit of *nitre*, may have evidently iron ſeparated from them; and the chemiſts know well that this is not to be ſuppoſed to have been lodged in the mercury, ſince it is very difficult to conceive how that metal ſhould become amalgamated with it; but there can be no difficulty of ſuppoſing it ſeparated from the menſtruum, ſince it is evident, that there is iron contained in the matters uſed in the diſtillation of it, and even in the ſalt itſelf from which it is originally drawn.

It would be very natural to ſuppoſe, that the ferrugineous matter was raiſed only from the additions of pure vitriol, or a vitriolic earth; but it is evident, from the experiment of *nitre* alone turning glaſs red, that there is certainly alſo ferrugineous matter in that ſalt itſelf; nor is it at all difficult to conceive how iron comes to enter the body of that ſalt; ſince, if we conſider it as made in Europe, from the rubbiſh of old buildings, and the cleanſings of ſtables, &c. it is eaſy to conceive that pieces of iron of ſeveral kinds may have been ruſted away, and conſumed there, and ſo mixed among the matter from which the ſalt was afterwards made. The addition of wood aſhes alſo uſed in the making of it, may have alſo lodged ferrugineous matter among it, ſince it has been often proved that the aſhes of all vegetables contain true iron. Memoirs Acad. Scienc. Par. 1736.

It may ſeem a difficult thing to conceive, however, in what manner ſo ſmall a quantity of iron, as there can be ſuppoſed to be in *nitre*, is able to colour ſo large a body of vapours as are ſeen to riſe in the diſtillation. But if we conſider the extreme diviſibility of the particles of metals into colouring matter, and the vaſt quantity of water that a ſingle grain of copper is capable of tinging blue, when diſſolved in an alkali, we ſhall be the leſs ſurpriſed at it: eſpecially if it be conſidered alſo that it has been proved already, that there is true ſal ammoniac ln all *nitre*; and it is well known, that this ſalt is capable of rarefying and extremely dividing the particles of that or any other metal; and if as much ſal ammoniac as can be diſſolved in aqua-fortis be added to that ſpirit, it is well known, alſo that it will make it ſend up vapours much redder than before, which can only be owing to the ſal ammoniac raiſing a larger quantity than ordinary of the ferrugineous matter contained in the aqua-fortis than would naturally have been raiſed from it.

The moſt ready way of reducing *nitre* to powder is to diſſolve a quantity of it in as little water as may be, and evaporate the water over a gentle fire, continually ſtirring it till dry, by which means the *nitre* will be found in form of a very dry white powder. This is the method uſed by the gunpowder-makers.

The curious, in the hiſtory of *nitre*, and irs preparation from vegetables, &c. and the purifying it for gunpowder, and other uſes, may conſult the works of Glauber, Stahl, and Clark on the ſubject of this ſalt, and compare them with the diſcourſe of the younger Lemery, on the origin of *nitre*.

The uſe of *nitre* is very extenſive in medicine, in the arts, and in chemiſtry.

Dr. Shaw, on this occaſion, obſerves, that if the medicinal virtues of *nitre* were to be enumerated, as they ſtand confirmed by ſufficient experience, perhaps they would prove more numerous than thoſe of any one known medicine beſides. It is ſervicable in the ſtone and ſtoppages of urine, in deliriums, malignant fevers, diarrhœas, the ſmall pox of the confluent kind, &c. ſo as to prove almoſt a general remedy. And all theſe excellent qualities are in this ſalt joined to that deſirable property of being innocent, or ſcarce any way prejudicial to the body. The uſual doſe of *nitre*, among us, is from two to three grains to a ſcruple; though, in many caſes it may be given with ſafety, and to better advantage, in larger quantities. From ſome experiments on the effects of *nitre* taken internally, related in Mr. Alexander's Experimental Eſſays, it appears, that *nitre* has a power of almoſt inſtantly retarding the velocity of the circulation of the blood, and of ſurpriſingly diminiſhing the number of arterial pulſations; and that its effects are much more powerful when newly diſſolved in water than when it has remained diſſolved during ſome hours. As this difference muſt have proceeded from the cold which is produced by *nitre* during its ſolution, probably a much greater effect would be produced by procuring that ſolution in the ſtomach. For the various medicinal preparations of *nitre*, ſee the following articles and references.

In chemiſtry, beſides the nitrous acid obtained from *nitre*, which is one of its moſt powerful agents, *nitre* itſelf is alſo uſed in many chemical operations. And in the arts, its properties of detonating with bodies containing phlogiſton, of accelerating their calcination, and eſpecially the calcination of the imperfect metals, render it uſeful for the purification of gold and ſilver, when they are allayed with other metals. As *nitre* is quickly and eaſily alkaliſed, it enters into the compoſition of reducing fluxes, or of ſimple fluxes, to aſſiſt fuſion and vitrification. It may alſo be employed by its detonation to diſcover the preſence of the inflammable principle in ſubſtances. But the moſt conſiderable uſe of *nitre* is for the preparation of GUN-*powder*. See alſo AQUA *fortis*, AQUA *regia*, ÆTHER, CRYSTAL *mineral*, SAL-*polychreſt*, &c.

NITRE *alkaliſed*, is the fixed alkali remaining after the nitrous acid has been deſtroyed by its detonation with any inflammable matter. This alkali is generally called FIXED NITRE.

NITRE, *ammoniacal*, is a neutral ſalt reſulting from the combination of the nitrous acid, to the point of ſaturation, with volatile alkali. The acid, in the moſt concentrated ſtate in which it is commonly met with, ſaturates about five-ſixths its weight of vegetable fixed alkali.

NITRE, *antimoniated*. See *Diaphoretic Nitre of* ANTIMONY.

NITRE, *calcareous*, is a neutral ſalt, compounded of the nitrous acid combined to ſaturation with a calcareous earth; and generally called *nitre with an earthy baſis*. This ſalt is very deliqueſcent, but incapable of a true cryſtalization. It has a poignant, acrid, and bitter taſte. See NITRUM *Calcarium*.

NITRE, *clyſſus of*. See CLYSSUS.

NITRE, *cubic*, or *quadrangular*, is a neutral ſalt, formed by the nitrous acid when ſaturated with mineral alkali. This cryſtallizes not into a priſmatic but a cubical figure, and ſometimes into parallelepipedons, with rhomboidal faces. It is inferior to ordinary *nitre*, and never uſed.

NITRE, *decoction of*, is prepared by boiling half an ounce of *nitre*, and two ounces of fine ſugar, with a ſcruple of cochineal as a colouring material, in 2½ pints of water, till half a pint is waſted, and after ſtanding to ſettle, the clear purpliſh red liquor is poured off for uſe.

NITRE, *detonation of*. See DETONATION; under which article, the reader will find Mr. Macquer's hypotheſis, that has been thought to be the moſt ſatisfactory; with a hint of another ſolution of the phenomenon by Dr. Prieſtley. In a work ſince publiſhed, he has applied the doctrine of dephlogiſticated air more particularly to the explication of this proceſs. It appears, he ſays, that the nitrous acid cannot be heated to a certain degree, in contact with any earthy matter, without producing dephlogiſticated air; by the help of which all conbuſtible ſubſtances burn with the greateſt violence, much more than they can be made to burn with in common air. Here then he ſuppoſes that the moment the acid of *nitre*, contained in the *nitre*, and the earth of the coal, for example, thrown into it become red hot, in contact with each other, dephlogiſticated air is produced; and in this air the remainder of the charcoal, being likewiſe red-hot, burns with the violence that is obſervable in the experiment; while, at the ſame time, other portions of the nitrous acid are forming, with other parts of the ſame decompoſed charcoal, the union that conſtitutes more dephlogiſticated air; and thus the detonation continues, till all the charcoal, or all the *nitre*, is conſumed; the acid not being *loſt*, as ſome chemiſts expreſs it, but entering into the compoſition either of the dephlogiſticated air, or of ſome other kind of air, that may be generated in the proceſs.

NITRE, *diaphoretic, of antimony*. See ANTIMONY.

NITRE, *fixed by arſenic*, is the alkali of *nitre*, the acid of which has been expelled in an open fire by means of arſenic, of which ſome portion is retained by the alkali. This may be employed as a flux, as it greatly aſſiſts vitrification.

NITRE, *fixed by coals*. See FIXED *Nitre*.

NITRE, *fixed by metals*, is the alkali of *nitre* ſeparated from its acid, and mixed with the earth of the calcined metals.

NITRE, *fixed by tartar*, is the alkali of *nitre* and that of tartar mixed together by means of detonation. This is called the *white flux*.

NITRE, *Glauber's ſpirit of*. See SPIRIT.

NITRES, *metallic*, a general denomination that comprehends all neutral ſalts compoſed of the nitrous acid united with a metallic ſubſtance; the ſeveral kinds of which may be thus diſtinguiſhed, viz. *nitre* of SILVER, called *lunar* CRYSTALS, *nitre* of LEAD, *nitre* of MERCURY, &c. The acid acts in general powerfully upon all metallic ſubſtances, but with remarkable differences, depending on the peculiar natures of the metals. It diſſolves zinc, iron, copper, biſmuth, lead, mercury, and ſilver, the moſt readily of all the acids; tin it diſſolves imperfectly; regulus of antimony it only corrodes: gold and plantina cannot be diſſolved by nitrous acid alone, without the concurrence of marine acid.

NITRE, *nitred*. See NITRUM *nitratum*.

NITRE, *purified*. See NITRUM *purificatum*.

NITRE, *ſpirit of*. See SPIRIT.

NITRE, *torches of*, are made by grinding one part of the purified ſalt with three parts of fine ſugar, and making up the mixture with mucilage of gum tragacanth.

NITRE, *vegetating*. See NITRUM *Vegetans*.

NITRE, *vitriolated*. See NITRUM *Vitriolatum*.

NITRO AERIAL *ſpirit*, a term invented by Mayow, and ſince uſed by many others, to expreſs a very active principle in the air, cauſing great changes in the bodies abſording it, and expoſed to it.

The acid ſpirit of nitre is produced, according to Mr. Boyle, partly by the air, and partly by a terreſtrial matter making up the reſt of the body of that ſalt. And he farther ſuppoſes, that igneous particles of the air reſide in nitre, and conſtitute its moſt active part, and that by theſe the flame of kindled nitre is produced.

Hence it is inferred, that the aerial particles of nitre are truly no other than the igneo-aerial matter of it, and that this aerial matrer is evidently lodged in the acid ſpirit of it, not in the fixed ſalt. This acid ſpirit is, according to Mayow, compoſed of a terrene matter, which is flexible and humid, and of etherial particles, which are rigid and dry, active and igneous, and proceeding from the air. Theſe igneous particles are common to nitre and to air, and are therefore called *nitro-aerial*; and the ſpirit of nitre derives, according to this ſyſtem, from theſe particles its active and corroſive quality, which makes it a ſort of potential fire; and on this the form of nitre chiefly, if not only, depends.

Now as this *nitro-aereal* or igneous ſpirit reſides in the acid ſpirit of nitre, it is thence inferred, that the *nitro-aerial* ſpirit is of a nitro-ſaline nature, obtaining rather the nature of an acid than a fixed ſalt; conſidering alſo, that the effects of fire in general anſwer to thoſe of a very ſubtile and corroſive ſalt. Fire in general, on theſe principles, is eaſily proved to depend principally upon the ſaid *nitro-aerial* principle put into motion.

This *nitro-aerial* ſpirit makes the moſt active, and, indeed, the principal part of the ſalt which we call *nitre*. Its terreſtrial and acid parts make up the reſt of the maſs; and theſe are rather of uſe to form the whole into a body, and give it form and conſiſtence, than to add to any of its fat.

NITROUS *acid*. See ACID and NITRE, *ſupra*.

NITRUM, is uſed by the poet Martial to expreſs that ſort of foulneſs in cryſtal, which Pliny, and other of the ancient Roman authors, diſtinguiſh by the name of SAL.

NITRUM *calcarium*, in *Natural Hiſtory*, a name given by Dr. Liſter to a peculiar ſpecies of neutral ſalt, which he firſt publicly deſcribed in his book on the medicinal waters of England. He very improperly calls it *nitre*; becauſe it has none of the properties or qualities of *nitre*, but only a ſort of general reſemblance in its external form. He obſerves that this ſalt, though very little known, was abundantly the moſt copious of all the ſorts afforded by the mineral waters in general; and ſays its cryſtals were long and ſlender, and conſiſted of four ſides, and were terminated by a point compoſed of two triangular planes. He adds, that this ſalt doubtleſs had its origin from a mixture of the acid of ſulphur and a calcareous earth of an alkaline nature.

This ſalt is found in almoſt all the mineral waters of Germany, and is very juſtly obſerved by Hoffman to be of the nature of Glauber's ſalt: that it is not *nitre* is evident from this, that it is not inflammable, nor will yield aqua fortis by diſtillation. It ſeems, indeed, true Glauber's ſalt, compoſed of the acid of vitriol, or ſulphur, for this is in both the ſame, and of that alkaline earth which is the baſis of ſea-ſalt: this is its origin, in the veſſels of the chemiſt, as well as in the bowels of the earth, and probably the figure of the cryſtals of that obſerved by Dr. Liſter, was the ſame in the point, as well as in the body, both being quadrilateral columns terminated by pyramids compoſed of a number of triangular planes. Hoffman Opera, tom. v. p. 139.

The medicinal waters in the neighbourhood of Paris contain it alſo in a very conſiderable quantity, though leſs than this. It is the opinion of Hoffman, that when any water before impregnated with a vitriolic acid, in its current under ground, paſſes over this calcareous earth, it as readily joins a part of it with it, as the vitriolic acid does with the ſea ſalt, for its baſis, in making the common Glauber's ſalt, and thence produces a bitter purging ſalt, of the ſame nature with that; and, indeed, if the acid of ſulphur be mixed with any alkaline ſubſtance, a bitter neutral ſalt is produced, ſomewhat analogous to this, and to the Glauber's ſalt.

Nitrum *nitratum*, in *Chemiſtry*, the name of a preparation of *nitre*, made by adding a ſufficient quantity of ſpirit of *nitre* to a lixivium of pure *nitre*, and afterwards evaporating it to a pellicle, and ſetting it by to ſhoot. The cryſtals formed by this liquor are perfectly nitrous in their figure, but they will be of an acid taſte.

We ſee, by this, that it is poſſible to alter a ſalt, and to reduce it into the appearance of a different body, by means of ſubſtances before ſeparated from itſelf; and, in this caſe, the alteration is made, in almoſt any degree, at pleaſure; the ſalt produced being more or leſs acid, as more or leſs of the acid ſpirit is uſed: but it is to be obſerved, that the more acid there is uſed, the more difficultly the ſalt dries, and the more difficult it is kept dry, it being always ſubject to run in the air. This preparation of *nitre* is a good medicine in burning fevers.

Nitrum *purificatum, purified nitre*, is thus prepared: take *nitre*, or common ſaltpetre, one pound; pure water three quarts and a pint, ſet them on the fire together, and diſſolve the ſalt perfectly by boiling: then ſtrain the hot lixivium through a double flannel, and ſet it over the fire again in an earthen veſſel. Evaporate it gently, till on taking out a little of the liquor in a ſpoon as it cools, there are ſeen threads as it were ſhooting in it; in this ſtate the ſalt is ready to concrete. Set it in a cool place, putting clean ſticks acroſs the veſſel, and the ſalt will form itſelf into extremely pure and beautiful cryſtals on the ſide of the veſſel, but principally on the ſticks. Theſe dried in a colander are fit for uſe. See Nitre, *ſupra*.

This is the beſt of all the preparations of *nitre*, for medicinal uſe, in its native form. It diſſolves immediately on entering the body, where it wonderfully cools, and thins the blood, giving it a fine florid colour. In all inflammatory diſeaſes attended with condenſations of the blood, this ſalt proves excellently cooling and attenuating. It is given from four or five grains to ten, twelve, or fifteen at a doſe. Some give more at a time, but it is more adviſeable to have the doſes ſmaller, and oftener repeated. It is alſo good in the ſmall-pox, and ſuppreſſions of urine. It is alſo ſaid to be given by many in hæmorrhages with ſucceſs. If there be any caſe in which caution is required, it is in a conſumption where the lungs are ulcerated. Of this purified *nitre*, a ſafe and powerful alterant is readily and eaſily prepared in the following manner: take an ounce of the *nitre*, and two ſcruples of cochineal, in fine powder; boil theſe in five or ſix ounces of water; filter the liquor, and afterwards evaporate it to a dryneſs, ſtirring it continually, as it thickens, and a fine purple powder will be then produced, fit to be given in the form of bolus, pills, powder, &c.

Nitrum *vegetans*, a name given by the chemiſts to a preparation of *nitre*, which very readily ſhoots out into beautiful cryſtallizations. If, in making Glauber's ſpirit of *nitre*, there are uſed four parts of *nitre*, and one of oil of vitriol, and the ſpirit be entirely driven off, the white ſalt remaining dry in the retort, on being expoſed to the open air, will ſoon be covered with a thick and long down, as if it grew; but if this ſalt be diſſolved in water, and then ſtrained, and evaporated to a dryneſs, in a cylindrical glaſs, and kept expoſed to the open air, its upper ſurface will often appear covered with beautiful branching little plants, all which will diſſolve away upon the application of heat, and leave the ſurface even; but upon expoſing the veſſel again to the open air, in a quiet place, they will grow again as before, thus ſeveral times exhibiting the reſuſcitation of plants, as it were, from their own aſhes.

Some chemiſts have formed ſeveral fables upon ſome ſuch baſis as this; and very probably the whole ſecret of their operations was no more than a concealed fraud of this kind, this having nothing to do with vegetation.

Nitrum *vitriolatum*, a preparation of *nitre* made as follows: diſſolve the maſs left in the retort after diſtillation of a ſpirit of *nitre*, in about eight times its weight of water; filtrate the ſolution, and, when perfectly clear, evaporate the liquor to ſuch a ſtandard, that the ſalt will no longer be ſuſtained in it; then ſet it in a cool place, and collect the ſalt as it ſhoots, laying it in an earthen colander to dry. This is of much the ſame virtues with Tartar *vitriolated*, and is frequently ſold under its name.

NITTLES, in *Sea-Language*. See Knittle.

NIVALIS *avis*, or *emberiza nivalis* of Linnæus. See Snow-*bird*.

NIURI, in *Botany*, the name of a genus of plants, called by Linnæus Phyllanthus.

NOAH's *ark ſhell*, in *Natural Hiſtory*, the name of a kind of ſea ſhell, which authors were always puzzled about referring to any genus, till a late French author has referred it to a new genus he had made under the title *cordiformis*, taking in the bucardia, and triangular heart-ſhells. The cabinets of the curious afford us three ſpecies of this ſhell; the common kind, a yellow and white kind with broad irregular lines, and a variegated kind.

We have another ſhell of this genus, which no one ever doubted to belong to it, which yet is of an oblong figure, and ſo much reſembles the *Noah's ark*, as to plainly ſhew they ought both to be reckoned ſpecies of the ſame genus. This is the oblong bucardium, or ox-heart ſhell, commonly called the *baſtard Noah's ark*.

NOACHI *columba*, in *Aſtronomy*. See Columba.

NOBILIARY, a collection, or hiſtorical account, of the noble families of a province, or nation.

Chorier has publiſhed a *nobiliary* of Dauphiné; and Caumartin, another of Provence. The Germans are particulary careful of their *nobiliaries*, to keep up the purity of their families.

NOBILISSIMUS, in *Antiquity*, a title, or quality, given to the princes of the imperial family.

F. Doucine advances, that the title *nobiliſſimus* was firſt given under the emperor Juſtin; others find the title *nobilis Cæſar*, or *N. C.* that is, *Nobiliſſimus Cæſar*, on medals long before that time, even as early as Trajan. Spanheim and Joubert, indeed, ſet this title on medals no higher than the time of Philip the Younger; though it appears earlier in ſome inſcriptions; ſo that even Mr. Tillemont is miſtaken, where he ſays, the quality of *nobiliſſimus* is not to be found in hiſtory before the time of Conſtantine the Great, who firſt gave it to his two brothers; after which it was attributed to ſuch of the emperors children as were not Cæſars. See Cæsar.

Triſtan adds, that the Cæſars bore the title of *nobiliſſimi* in all ages; but that the *nobiliſſimate* firſt became a diſtinct independent dignity in the time of Conſtantine the Great.

NOBILITY, a quality that dignifies, or renders a thing noble; particularly, that raiſes a perſon poſſeſſed thereof above the rank of a peaſant or commoner.

In England, indeed, the term *nobility* is reſtrained to degrees of dignity above knighthood. Every where elſe *nobility* and gentility, or gentry, are the ſame. See Gentleman.

Some refer the origon of *nobility* in Europe to the Goths: who, after they had ſeized a part of Europe, rewarded their captains with titles of honour, and called them *nobles*, *nobiles*, to diſtinguiſh them from the common people.

Nobility, in England, is only conferred by the king, and that by writ of patent, in virtue whereof it becomes hereditary. In other countries there are other ways of acquiring it.

Thus, in France, v. gr. there are ſeveral offices which convey perfect *nobility*, and ſuch as deſcends to poſterity. Such are all offices of the crown, thoſe of counſellors of ſtate, &c. others they have which only communicate an acceſſary, or perſonal *nobility*, which dies with the perſon. Thus, a counſellor in parliament enjoys all the rights and exemptions of *nobility*; yet his ſon is never reputed noble: unleſs there have been a ſucceſſion of them, and both father and grandfather have been noble; which they call *patre & avo conſulibus*.

They have a third kind of *nobility*, called *nobility of the bell*, *de la cloche*; which is what the mayors and ſheriffs of certain cities, as Lyons, Bourges, Rochelle, Poitiers, &c. acquire in virtue of their magiſtracy.

The *nobility* of England is called the *peerage of England*. Its degrees are only five; viz. that of a duke, a marquis, earl or count, viſcount, and baron. See under Duke, Marquis, &c.

The privileges of the Engliſh *nobility* are very conſiderable: they are all eſteemed as the king's hereditary counſellors, and are privileged from all arreſts, unleſs for treaſon, felony, breach of peace, condemnation in Parliament, and contempt of the king. No ſupplicavit can be granted againſt them; no capias, or exigent, ſued againſt them for action of debt, or treſpaſs; and no eſſoign lies againſt them: in criminal caſes, they are only to be tried by a jury of peers, who are not put to their oath; but their verdict upon their honour ſuffices. They alſo anſwer to bills in chancery upon their honour, and not upon their oath; but when they are examined as witneſſes either in civil or criminal caſes, they muſt be ſworn. In their abſence from parliament, they are allowed a proxy to vote for them; and in all places of truſt they are allowed to conſtitute deputies, by reaſon of the neceſſity the law ſuppoſes them under of attending the king's perſon. See Peers and Parliament.

Guillim obſerves, that if an APPEAL of murder, or felony, be ſued by a commoner againſt a peer, he ſhall be tried by commoners, not peers.

No peer may go out of the kingdom without the king's leave: if any have leave, he is to return upon the king's writ, or to forfeit goods and chattels.

Anton. Matthæus obſerves, that *nobility*, among the Romans, was a quite different thing from what it is among us. The nobles, among the Romans, were either thoſe raiſed to the magiſtrature, or deſcended from magiſtrates: there was no ſuch thing as *nobility* by patent.

Bartoli ſays, that doctors after they have held a profeſſor's chair in an univerſity for twenty years, become *noble*; and are entitled to all the rights of counts.

But this claim is not admitted at court, &c. though Bartoli's ſentiments be backed with thoſe of ſeveral other authors, particularly Chaſſanæus in his Conſuetudin. Burgundiæ; Boyer ſur la Coutume de Berry; Faber C. de Dig. Def. 9. &c. which laſt, however, reſtrains Bartoli's rule to doctors in law, and prince's phyſicians.

By an edict of the French king, in 1669, it is declared, that trade ſhall not derogate from *nobility*, provided the perſon do not ſell by retail.

In Bretagne, by ancient cuſtom, a nobleman loſes nothing by trading even in retail: but he reaſſumes all his rights as ſoon as he ceaſes traffic, his *nobility* having ſlept all the time. In Germany, a woman, not *noble* by birth, doth not become, v. gr. a counteſs, or baroneſs, by marrying a count, or baron: a lady of the higher degree, indeed, becomes a princeſs by marrying a prince; but this doth not hold of a lady of the lower *nobility*.

On the coaſt of Malabar, children are only capable of being *noble* by the mother's ſide; it being allowed them to take as many huſbands as they pleaſe, and to quit them whenever they think good.

NOBLE, Nobilis, a perſon who has a privilege which raiſes him above a commoner, or peaſant, either by birth, by office, or by patent from his prince.

The word comes from the Latin *nobilis*; formed from the ancient *noſcibilis*, *diſtinguiſhable*, *remarkable*.

In England, the word *noble* is of a narrower import than in other countries; being confined to perſons above the degree of knights; whereas, abroad, it comprehends not only knights, but what we ſimply call *gentlemen*.

The *nobles* of England are alſo called *pares regni*, as being *nobilitatis pares*, though *gradu impares*.

The Venetian *nobleſſe* is famous: it is in this that the ſovereignty of the ſtate reſides. It is divided into three claſſes.

The firſt only comprehends twenty-four families.

The ſecond includes the deſcendants of all thoſe who were entered into the golden book, in 1289, and deſtined to govern the ſtate, which then began to be ariſtocratic.

The third conſiſts of ſuch as have bought the dignity of *noble* Venetians.

This laſt claſs is only admitted to the inferior employs; the two former, to all indifferently.

The title of *noble* Venetians is ſometimes alſo given to foreign kings, princes, &c.

Noble alſo denotes a money of account, containing ſix ſhillings and eight pence.

The *noble* was anciently a real coin, under the denomination of Rose-*noble*.

Authors obſerve, that there has not been any piece of gold and ſilver of this name, coined with us ſince 9 Hen. V. They were firſt coined by Edw. III. in 1334. See Gold *coin*.

The *noble* contained 80*d*. the ſame with the preſent money of account. Its half was called *obolus*, containing 40*d*. its fourth part the quadrans, or farthing in thoſe days, 20*d*.

NOCERIANA *terra*, *earth of Nocera*, in the *Materia Medica*, a white earth, being a ſpecies of bole, uſed in medicine in Germany, Italy, and ſome other parts of the world, but not known in the Engliſh ſhops. It is found at *Nocera*, in Umbria, whence its name. It is now dug principally about Macerata, a city in the marquiſate of Ancona, in the pope's territories, and is in great eſteem in malignant fevers, and againſt the bites of venomous animals.

It is a denſe earth, of a greyiſh white, very hard, and of an inſiped taſte, and does not effervеſce with acid menſtruums.

NOCTAMBULATIO, compounded of *nox*, *night*, and *ambulo*, *I walk*, *walking in the ſleep*. This is a very remarkable diſtemperature of the imagination, and, in different perſons, differs greatly in degree. Thoſe who are but moderately affected with it, only repeat their actions of the day, and getting out of the bed, go quietly to the places they frequent at other times; but thoſe who are afflicted with it in the moſt violent degree, go up to dangerous places, and do things that would terrify them to think of, when awake: theſe are by ſome called lunatic *night-walkers*, becauſe, as ſome have imagined, fits are obſerved to return with moſt frequency, and violence, at the changes of the moon.

Cauſes of it. The only material cauſe that can be aſſigned in this caſe is a plethora, or over-fullneſs of blood; but this is influenced by an immaterial one, that is, by the fancy, which is buſily employed in dreams about particular objects.

Method of cure. The primæ viæ are firſt to be cleared of all their foulneſſes by a ſtrong purge; after this it is proper to bleed in the foot, taking away eight or ten ounces; then powders compoſed of nitre, cinnabar, and crab's eyes, ſhould be taken three or four times a day, and particular regard, is is ſaid, ſhould be had to the changes of the moon. It will be proper to ſet a veſſel of water by the bed-ſide, in ſuch a manner that the perſon will naturally ſtep into it on getting out, and be awaked by that means; and if theſe things fail, a perſon ſhould be ſet up to watch him, and beat him every time it happens. Junker's Conſp. Med. p. 698.

NOCTANTER, in *Law*, is the name of a writ iſſuing out of the Chancery, and returnable in the King's Bench; given by the ſtatute of Weſt. 2. 13 Ed. I. cap. 46. by virtue of which ſtatute, where any one having right to approve waſte ground, &c. makes and erects a ditch or a hedge, and it is thrown down in the night-time, and it cannot be known by a verdict of aſſize or jury, by whom; if the neighbouring vills will not indict ſuch as are guilty, they ſhall be deſtrained to make again the hedge or ditch at their own coſts, and to anſwer damages. The word *noctanter* is ſo neceſſary in an indictment of BURGLARY, that it hath been adjudged inſufficient without it.

NOCTIBO, in *Ornithology*, the name given by the Portugueſe to a ſmall Braſilian bird, a ſpecies of the *goat-ſucker*, or *churn-owl*, more known among naturaliſts by its Braſilian name IBIJAU.

NOCTILUCA, among *Naturariſts*, a ſpecies of phoſphorus, ſo called, becauſes it ſhines in the night, without any light being thrown on it: ſuch is the phoſphorus made of urine.

By which it ſtands diſtinguiſhed from ſome other ſpecies of phoſphorus, which before they ſhine, muſt be expoſed to the ſun-beams; ſuch is the Bononian-*ſtone*, &c. Mr. Boyle, in a particular treatiſe on the ſubject, gives an account of three *noctilucæ*. The firſt, invented by Krafft, he calls the *conſiſtent*, or *gummous noctiluca*, as being of a texture not unlike that of a cherry-gum. This, on account of its uninterrupted action, was, by the Germans, called the *conſtant noctiluca*; among us it is now known under the denomination of the *ſolid phoſphorus*. The ſecond is liquid, invented by the ſaid Krafft: this is only a diſſolution of the former in a convenient liquor. The third kind was prepared by Mr. Boyle himſelf; and was of a different nature from both the others; for it would not ſhine of itſelf like either of them, but required the contact of the air (though not any external rays or heat) to make it produce light, which would be very durable, in a well ſtopped veſſel. Add, that it was not the body that ſhone, but an exhalation, or effluvium, mixed with the air; on which accounts the inventor gives it the denomination of the *aerial noctiluca*.

The ſame Mr. Boyle, afterwards, prepared another ſort; which from the little pellucid fragments or cryſtals therein, he denominated the *icy noctiluca*. See Phosphorus.

NOCTUA *aurita*, in *Ornithology*, a name by which ſome have called the ſmaller ſpecies of the *horn*-OWL, more uſually diſtinguiſhed by the name OTUS.

Noctua *canora*, in *Ornithology*, a name given by Nieremberg to a bird of the Spaniſh Weſt Indies, called by the natives CHICUATLI, and ſometimes kept by the Spaniards in cages.

Noctua *minor*, in *Ornithology*, a name given by Mr. Ray to the *keutzlin*, or, as others call it, the SCHAFFILT, a very beautiful bird of the owl kind, and not exceeding the ſize of the common thruſh.

NOCTUINI *oculi*, a name given by ſome to grey eyes, from their reſembling thoſe of the *noctua*, or *owl*.

NOCTUOLENT, among *Botaniſts*, a name given to ſuch plants as ſmell ſtrongeſt in the night-time. See Dog-*roſe*.

NOCTURNAL, ſomething that relates to night, *nox*; in contradiſtinction to diurnal. In this ſenſe we ſay, *nocturnal* aſſemblies; *nocturnal* walks; *nocturnal* pollutions, &c.

Nocturnal *pains* are a frequent commitant of venereal diſorders, which can only be palliated with narcotics: nothing but a mercurial courſe, or a long-continued uſe of diet-drinks, can entirely remove them.

Nocturnal *arch*, in *Aſtronomy*, the arch of a circle deſcribed by the ſun, or a ſtar, in the night.

Semi-Nocturnal *arch of the ſun* is that portion of a circle he paſſes over between the lower part of our meredian, and the point of the horizon wherein he ariſes; or between the point of the horizon wherein he ſets, and the lower part of our meridian.

NOCTURNAL, or NOCTURLABIUM, is more particularly uſed for an inſtrument, chiefly uſed at ſea, to take the altitude or depreſſion of ſome of the ſtars about the pole, in order to find the latitude, and the hour of the night.

There are *nocturnals* of various contrivances, ſome of them projections of the ſphere; ſuch as the hemiſpheres, or planiſpheres, on the plane of the equinoctial: thoſe ordinarily uſed by the ſeamen are two; the one adapted to the polar ſtar, and the firſt of the guards of the Little Bear; the other to the pole-ſtar, and the pointers of the Great Bear.

NOCTURNAL, *conſtruction of the.* The inſtrument conſiſts of two circular plates (*Tab. Navigation, fig.* 15.) applied on each other. The greater, which has a handle to hold the inſtrument, is about 2½ inches diameter, and is divided into twelve parts, agreeing to the twelve months; and each month ſubdivided into every fifth day: and ſo, as that the middle of the handle correſponds to that day of the year, wherein the ſtar here regarded has the ſame right aſcenſion with the ſun.

If the inſtrument be fitted for two ſtars, the handle is made moveable. The upper left circle is divided into twenty-four equal parts, for the twenty-four hours of the day, and each hour ſubdived into quarters, as in the figure. Theſe twenty-four hours are noted by twenty-four teeth; to be told in the night. Thoſe at the hours twelve are diſtinguiſhed by their length. In the centre of the two circular plates, is adjuſted a long index, A, moveable upon the upper plate. And the three pieces, viz. the two circles and index, are joined by a rivet which is pierced through the centre, with a hole two inches in diameter for the ſtar to be obſerved through.

NOCTURNAL, *uſe of the.* Turn the upper plate till the longeſt tooth, marked 12, be againſt the day of the month on the under plate; then, bringing the inſtrument near the eye, ſuſpend it by the handle, with the plane nearly parallel to the equinoctial; and viewing the pole-ſtar through the hole of the centre, turn the index about, till, by the edge coming from the centre, you ſee the bright ſtar or guard of the Little Bear (if the inſtrument be fitted to that ſtar): then that tooth of the upper circle, under the edge of the index, it at the hour of the night, on the edge of the hour-circle: which may be known without a light, by accounting the teeth from the longeſt, which is for the hour 12.

NOCTURNAL *pollution.* See POLLUTION.

NOCUMENTI *aſſiſa.* See ASSISA.

NODATED *hyperbola*, a kind of hyperbola, which, in turning round, decuſſates or croſſes itſelf.

NODE, NODUS, in *Surgery*, denotes a tumor ariſing on the bones; and uſually proceeding from ſome venereal cauſe. *Node* amounts to the ſame with what is otherwiſe called *exoſtoſis.*

It ſeems generated of a thick, cold, viſcid humour, which is often found very difficult to reſolve. They frequently apply to it a leaden plate, covered with mercury.

The cure is frequently alſo attempted by *emplaſt. de ranis cum mercurio*; which failing, ſome mercurial unguent is now and then rubbed on them; and afterwards mercurial plaſters made of cinnabar, &c. are applied.

Some give the denomination *nodes* to all tumors formed by a coagulation of viſcous matter in the external parts of the body.

NODE is more particularly applied to the tumors or protuberances ariſing on the joints of old gouty people; called alſo *tophi.*

They are ſuppoſed to be formed of a thick, crude, heavy, viſcid, indigeſted matter, mixed with a hot, ſharp, bilious juice, the groſſer and more terreſtrial part whereof being detained, grows into a ſtony ſort of concretion.

NODES, in *Aſtronomy*, the two points wherein the orbit of a planet interſects the ecliptic.

Such are the two points C and D (*Tab. Aſtron. fig.* 33.) whereof the *node* C, where the planet aſcends northwards above the plane of the ecliptic, is called the *aſſending node*, the *northward node*, and the *head of the dragon*; and is thus marked, ☊.

The other *node* D, where the planet deſcends to the ſouth, is called the *deſcending node*, the *ſouthward node*, or the *dragon's tail*; thus marked, ☋. See DRAGON's *head* and *tail.*

The right line D C, wherein the two circles interſect, is called *the line of the nodes.*

It appears from obſervation, that the line of the *nodes* of all the planets conſtantly changes its place, and ſhifts its ſituation *in antecedentia*; i. e. from eaſt to weſt, contrary to the order of the ſigns.

Thus, by a retrograde motion, the line of the moon's *nodes* finiſhes its circuit in eighteen years two hundred and twenty-five days; in which time, after having receded from any point of the ecliptic, it returns to the ſame.

Sir Iſaac Newton has not only ſhewn, that this motion ariſes from the action of the ſun, but has calculated, with great ſkill, all the elements and varieties in this motion, from its cauſe.

In order to underſtand the action of the ſun in this caſe, we muſt conceive the plane of the moon's motion to paſs always through the centre of the earth and the centre of the moon, and to be a plane in which the right line joining their centres, and the right line that is the direction of the moon's motion, or the tangent of her orbit, are always found. It is certain, that if the earth and moon were always acted on equally by the ſun, they would deſcend equally towards the ſun; the plane determined always by theſe two lines, would deſcend with them, keeping always parallel to itſelf, ſo that the moon would appear to us to revolve in the ſame plane conſtantly, with reſpect to the earth. But the inequalities in the action of the ſun (ſee MOON) will bring the moon out of this plane to that ſide of the plane on which the ſun is, in the half of her orbit that is neareſt the ſun, and towards the other ſide, in the half of her orbit that is fartheſt from the ſun. Whence we ſhall have this general rule for judging of the effect of the ſun on the *nodes*: that while the moon is in the half of her orbit that is neareſt the ſun, the *node* towards which ſhe is moving, is made to move towards the conjunction with the ſun; and while the moon is in the half of her orbit which is fartheſt from the ſun, the *node* towards which ſhe is moving is made to move towards the oppoſition; but when the *nodes* are in conjunction with the ſun, its action has no effect upon them. In the firſt caſe, the moon is brought into a direction which is on the ſame ſide as the ſun is, of that direction which ſhe would follow of herſelf; and the interſection of a plane paſſing through this direction and through the centre of the earth, will cut the ecliptic, on that ſide towards which the moon moves, in a point nearer the conjunction than if there was no action of the ſun to diſturb her motion. In the other caſe, the action of the ſun has a contrary direction, and for the ſame reaſon makes the enſuing *node* move towards the oppoſition. When the line of the *nodes* produced paſſes through the ſun, then the ſun, being in the plane of the moon's motion, has no effect to bring her to either ſide; and therefore, in that caſe, the *nodes* have no motion at all. By applying this reaſoning, it appears, that in every revolution of the moon, the retrograde motion of the *nodes* exceeds the direct motion, excepting only when the line of the *nodes* paſſes through the ſun, when there is no motion of the *nodes* at all. Sir Iſaac Newton finds from the theory of gravity, that the *nodes* ought to move backward about 19° 18′ 1″ in the ſpace of a year, and the aſtronomical tables make this motion 19° 21′ 21″, whoſe difference is not $\frac{1}{300}$ of the whole motion of the *nodes* in a year. By a more correct computation of this motion from its cauſe, the theory and obſervation agree within a few ſeconds. The inclination of the moon's orbit to the ecliptic is alſo ſubject to many variations. When the *nodes* are in the quarters, while the moon moves from one quarter to the conjunction, the action of the ſun diminiſhes the inclination of the plane of her orbit; the inclination of this plane is leaſt of all when the moon is in the conjunction; it increaſes again as ſhe moves from the conjunction to the next quarter, and is there reſtored nearly to its firſt quantity. When the line of the *nodes* paſſes through the ſun, the inclination of the moon's orbit is not affected by the action of the ſun; becauſe, in that caſe, the plane of her orbit produced, paſſes through the ſun, and, therefore, the action of the ſun can have no effect to bring the moon out of this plane to either ſide. In this laſt caſe the inclination of the moon's orbit is greateſt; it increaſes as the *nodes* move towards the quarters; and it is leaſt of all when the *nodes* are in the quarters, and the moon either in the conjunction or oppoſition. Newton has calculated theſe irregularities from their cauſes, and finds his concluſions agree very well with the obſervations of aſtronomers.

When the moon is in the *node*, ſhe is alſo in the ecliptic, viz. twice in each period; when ſhe is at her greateſt diſtance from the *nodes*, viz. in the points E, F, ſhe is ſaid to be in her greateſt north or ſouth latitude, according as ſhe is then on the north or ſouth ſide of the ecliptic.

The moon muſt be in or near one of the *nodes* when there is an eclipſe, either of the ſun or moon.

NODULE, NODULUS, in *Pharmacy*, a bag of medicinal ingredients put into beer, or wine, to give its tincture thereto. *Nodules* are ſometimes alſo parcels of odoriferous ſimples, tied up in a piece of ſilk, for the patient to be frequently ſmelling to.

NODUS, KNOT. See KNOT.

NODUS, in *Poetry*, &c. See INTRIGUE and PLOT.

NODUS, or NODE, in *Dialling*, denotes a point or hole in the gnomon of a dial, by the ſhadow or light whereof, either the hour of the day in dails without furniture, or the parallels of the ſun's declination, and his place in the ecliptic, &c. in dials with furniture, are ſhewn.

NODUS is alſo uſed for a hole in the cieling of a room, or in the window, for the making of a dial on the floor, wall, or the like.

NOERA, a word uſed by ſome chemiſts for the head of an alembic, or the cover of a cucurbit, or any other veſſel uſed in diſtillation.

NOETIANS, diſciples of Noetus, an Epheſian, the maſter of Sabellius.

They only allowed of one perſon in the godhead; viz. the Father; and accordingly taught, that it was God the Father that ſuffered on the croſs. An error, ſays Epiphanius, who wrote a hundred years after Noetus, never heard of before; though it is certain there had been other PATRIPASSIANS in the church before him.

Being reprehended by his ſuperiors, Noetus made them this anſwer: "What harm have I done? I adore only one God; I own none but him. He was born, ſuffered, and is dead."

NOFESCH, in *Natural Hiſtory*, a word of Hebrew origin, uſed as the name of a precious ſtone. There has been much diſpute among the commentators on the Old Teſtament, what ſtone it was. It ſeems derived from the root *fuch*, which ſignifies the ruby or carbuncle, and as a derivative of that word, it muſt be ſuppoſed to expreſs a red ſtone, not one of any other colour. As the ruby is ſignified by *fuch*, this cannot mean the ſame ſtone, and therefore probably meant the garnet, they having no other name, that we know of, for that ſtone, and it being very like the ruby.

NOCHELTZLINOPALLI, or NOCHEZNOPATLI, in *Botany*, a name by which ſome authors have called the OPUNTIA, on which the cochineal inſect loves to feed.

NOISETIER, in *Botany*, the name by which the French call the ſeveral ſpecies of HAZLE, and filberd-trees.

NOLA, in *Botany*, a name uſed by ſome authors for the ANEMONE.

NOLANA, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the flower is campanulated; the ſtyle is between the germina; and it has five ſeeds like berries, which are bilocular. There is only one ſpecies.

NOLI *me tangere*, q. d. *touch me not*, a malignant eruption in the face; occaſioned by an extremely ſharp corroſive humour: thus called, either becauſe it infects thoſe who touch it, or becauſe the more it is touched, the worſe it grows, and the farther it ſpreads.

The *noli me tangere* is a ſpecies of HERPES *exedens*; by ſome referred to the CANCER, by others to the LEPROSY.

NOLI *me tangere* is chiefly uſed among us for an external ULCER in the alæ of the noſe; proceeding often from a venereal cauſe, though ſometimes the effect of a ſcrophulous conſtitution.

It does not always confine itſelf to the alæ, but will ſpread and corrode the very ſubſtance of the noſe. The cure is difficult, eſpecially when it ariſes from a bad conſtitution. Mr. Daviel, late oculiſt to the French king, obſerves, that cancers of the eye-lids, noſe, and adjacent parts, have all their ſeat in the perioſteum and perichondrium, and that we cannot hope for a thorough cure, without taking them entirely off. In this way he has ſucceeded in ſeveral inſtances, which are related in the Phil. Tranſ. vol. xlix. p. 186, &c.

NOLI *me tangere*, among *Botaniſts*, is a name of a plant ſo denominated rom a ſingular property it has of darting out its ſeed when ripe, upon the firſt approach, of the hand to touch its pods. See BALSAMINE.

NOLI *me tangere*, is alſo a name given to the MOMORDICA.

NOLLE *proſequi*, is uſed in *Law*, where a plaintiff in any action will proceed no farther, and may be before or after a verdict, though it is uſually before ; and it is then ſtronger againſt the plaintiff than a nonſuit, which is only a default in appearance; but this is a voluntary acknowledgment that he hath no cauſe of action.

NOMADES, Νομαδες, from νεμω, *I feed*, a name given in *Antiquity*, to ſeveral nations, or people, whoſe whole occupation was to feed and tend their flocks; and who had no fixed place of abode, but were conſtantly ſhifting according to the conveniences of paſturage.

The moſt celebrated among the *Nomades* were thoſe of Africa, who inhabited between Africa, properly ſo called, to the eaſt, and Mauritania to the weſt. They are alſo called *Numidæ*, or *Numidians*. Salluſt ſays, they were a colony of Perſians, brought into Africa with Hercules.

The *Nomades* of Aſia inhabited the coaſts of the Caſpian ſea.

The *Nomades* of Scythia were the inhabitants of Little Tartary; who ſtill retain the ancient manner of living.

NO *man's land*, in *Sea-Language*, is a ſpace between the after-part and belfrey, and the fore-part of a ſhip's-boat, when the ſaid boat is ſtowed upon the booms, as in a deep waiſted veſſel. Theſe booms are laid from the forecaſtle nearly to the quarter-deck, where their after-ends are uſually ſuſtained by a frame called the gallows, which conſiſts of two ſtrong poſts, about ſix feet high, with a croſs-piece, reaching from one to the other, athwart ſhips, and ſerving to ſupport the ends of thoſe booms, maſts, and yards, which lie in reſerve to ſupply the place of others carried away, &c. The ſpace called *no man's land* is uſed to contain any blocks, ropes, &c. which may be neceſſary on the forecaſtle. It probably derives this name from its ſituation, as being neither on the ſtarboard nor larboard ſide of the ſhip, nor on the waiſte or forecaſtle; but being ſituated in the middle, partakes equally of all thoſe places. Falconer.

NOMANCY, compounded of *nomen*, *name*, and μαντεια, *divination*, a name given to the art of divining the fates of perſons by means of the letters that form their names. *Nomancy*, or, as it ſhould rather be called, *nominomancy*, or *onomatomancy*, ſeems to be nothing elſe but the cabbaliſtic gematria.

NOMARCHA, in *Antiquity*, the governor or commander of a nome, or nomos.

Egypt was anciently divided into ſeveral regions, or quarters, called *nomes*, from the Greek νομος, taken in the ſenſe of a diviſion; and the officer who had the adminiſtration of each *nome*, or *nomos*, from the king, was called *nomarcha*, from νομος, and αρχη, *command*.

NOMBRIL *point*, in *Heraldry*, is the next below the feſs-point; or the very centre of the eſcutcheon.

Suppoſing the eſcutcheon divided into two equal parts below the feſs: the firſt of theſe diviſions is the *nombril*; and the lower the baſe.

NOME, or NAME, in *Algebra*, denotes any quantity with a ſign prefixed, or added to it, whereby it is connected with ſome other quantity; upon which the whole becomes a binomial, trinomial, or the like.

Thus $a+b$ is a BINOMIAL, whoſe *names*, or *nomes*, are a and b, and $a+b+c$ a TRINOMIAL, whoſe *names* are a, b, and c, &c.

NOME, Νομη, in *Medical Writers*, is uſed for an eating, or corroding ulcer, and is much the ſame with PHAGEDÆNA: it occurs in Galen. Some later writers, as Foreſtus, call it *ulcus obambulans*, and *obambulativum*.

NOME, among the ancient Egyptians, a diviſion, or province, into which the whole kingdom is divided. The origin of the *nomes*, according to Diodorus Siculus, was this: the inhabitants being refractory, and much inclined to inſurrections, in order to prevent theſe, the kings divided the whole country into different provinces, or *nomes*, and eſtabliſhed the worſhip of ſome particular animal in each of them, prohibiting, at the ſame time, ſuch animal to be eaten within the bounds where it was worſhipped. Hence, as every province was intoxicated with its own particular form, and object of worſhip, it entertained the higheſt contempt for that of its neighbours, and took a pleaſure in profaning the animal, which among them had divine honours paid it. This religious oppoſition had the deſired effect; for all mutual confidence being thereby cut off, there were no more inſurrections againſt the government. Mem. Acad. Inſcrip. vol. xiii. p. 52.

NOME is alſo uſed for a kind of ſong, or hymn, in honour of the gods, ſaid to have been invented by Terpander.

NOMEN. See PRÆNOMEN, NAME, and AGNOMEN.

NOMENCLATOR, or NOMENCULATOR, among the Romans, was uſually a ſlave, who attended perſons that ſtood candidates for offices, and prompted or ſuggeſted to them the names of all the citizens they met, that they might court them, and call them by their names: which among that people was the higheſt piece of civility.

NOMENCLATOR *of the Romiſh Church*, was an officer, whoſe buſineſs it was to call the perſons whom the pope invited to dinner.

He alſo liſtened to thoſe who were admitted to audience, in the ſame manner as thoſe now retained by the cardinals, called *auditors*.

NOMENCLATORES, among the *Botanical Authors*, are thoſe who have employed their labours about ſettling and adjuſting the right names, ſynonyms, and etymologies of names, in regard to the whole vegetable world.

NOMENCLATURE, NOMENCLATURA, a catalogue of ſeveral of the more uſual words in any language, with their ſignifications; compiled in order to facilitate the uſe and retaining of ſuch words to thoſe who are to learn the tongue.

We have Latin, Greek, French, &c. *nomenclatures*.

NOMINA *villarum*, an account of the names of all the villages, and the poſſeſſors thereof, in each county, drawn up by ſeveral ſheriffs, at the inſtance of king Edward II. and returned by them into the exchequer; where it is ſtill preſerved.

NOMINAL *characters*. See CHARACTER.

NOMINALS, or NOMINALISTS, a ſect of ſchool-philoſophers, the diſciples and followers of Occam, or Ocham, an Engliſh Cordelier, in the fourteenth century.

The *Nominaliſts* were great dealers in words; whence they were vulgarly denominated *word-ſellers*.

They had the denomination *Nominaliſts*, becauſe in oppoſition to the REALISTS, they maintained, that words, not things, were the object of dialectics.

This ſect had its firſt riſe towards the end of the eleventh century, and pretended to follow Porphyry and Ariſtotle; but it was not till Occam's time that they bore the name. The chief of this ſect in the eleventh century, was a perſon called John, who, on account of his logical ſubtilty, was called the Sophiſt, and his principal diſciples were Robert of Paris, Roſcelin of Compiegne, and Arnoul of Laon. At the beginning, the *Nominals* had the upper hand: but the Realiſts, though greatly divided among themſelves, were ſupported by men of great abilities; ſuch as Albertus Magnus, T. Aquinas, and Duns Scotus. The *Nominal* ſect became hereby into diſrepute; till William Occam, in the fourteenth century, again revived it, and filled France and Germany with the flame of diſputation. Having joined the party of the Franciſcan monks, who ſtrenuouſly oppoſed John XXII. that pope himſelf, and his ſucceſſors after him, left no means untried to extirpate the philoſophy of the *Nominaliſts*, which was deemed highly prejudicial to the intereſts of the church: and hence it was, that in the year 1339, the Univerſity of Paris, by a public edict, ſolemnly condemned and prohibited the philoſophy of Occam, which was that of the *Nominaliſts*. The conſequence was, that the *Nominaliſts* flouriſhed more than ever. In the fifteenth century, the controverſy was continued with more vigour and animoſity than ever; and the diſputants were not content with uſing merely the force of eloquence, but had frequently recourſe to more hoſtile and dangerous weapons; and battles were the conſequence of a philoſophical queſtion, which neither ſide underſtood. In moſt places, however, the Realiſts maintained a manifeſt ſuperiority over the *Nominaliſts*. While the famous Gerſon, and the moſt eminent of his diſciples were living, the *Nominaliſts* were in high eſteem and credit in the univerſity of Paris. But upon the death of theſe patrons, the face of things was much changed to their diſadvantage. In the year 1473, Lewis XI. by the inſtigation of his confeſſor, the biſhop of Avranches, iſſued out a ſevere edict againſt the doctrines of the *Nominaliſts*, and ordered all their writings to be ſeized and ſecured, that they might not be read by the people: but the ſame monarch mitigated this edict the year following, and permitted ſome of the books of that ſect to be delivered from their confinement. In the year 1481, he not only granted a full liberty to the *Nominaliſts* and their writings, but alſo reſtored that philoſophical ſect to its former authority and luſtre in the univerſity. Moſheim, vol. iii. p. 222. 8vo. Eng. ed.

The *Nominaliſts* were the founders of the univerſity of Leipſic: there are many yet abroad who pique themſelves on being *Nominals*.

The *Nominals*, with the Stoics, admit the formal conceptions or ideas of things, as the ſubject and foundation of univerſality; but to this they add names, which repreſent and ſignify, after the ſame univocal manner, and without any diſtinction, a great variety of ſingle things alike in genus and ſpecies.

Whence it is that they are called *Nominals*; as pretending, that to become learned, it is not enough to have juſt ideas of things, but it is likewiſe required to know the proper names of the genera and ſpecies of things, and to be able to expreſs them clearly and preciſely, without confuſion or ambiguity.

NOMINATION, the act of naming and appointing a perſon for ſome function, employ, or benefice.

The word is chiefly uſed for the right of preſenting to a benefice, &c.

In common law, however, there is a difference between *nomination* and PRESENTATION; the former being properly a power which a man has, by virtue of a manor, or otherwiſe, to appoint or name a clerk to a patron of a benefice, to be by him preſented to the ordinary.

NOMINATIVE, in *Grammar*, the firſt caſe of nouns which are declineable.

The ſimple poſition, or laying down of a noun, or name, is called the *nominative caſe*: yet it is not ſo properly a caſe, as the matter or ground whence the other caſes are to be formed, by the ſeveral changes and inflections given to this firſt termination. See CASE.

Its chief uſe is to be placed in diſcourſe before all verbs, as the ſubject of the propoſition, or affirmation, as, *Dominus regit me, the Lord governs me*; *Deus exaudit me, God hears me.*

NOMINATOR, he who names or preſents a perſon to an office, or benefice.

Hence *nominee*, the perſon named or preſented.

Errard obſerves, that there are ſome cuſtoms where the *nominator* is reſponſible for the ſolvibility of the nominee.

NOMINE *pænæ*, in *Law*, is a penalty incurred for not paying rent, &c. at the day appointed by the leaſe or agreement, for the payment thereof.

NOMINIS *identitate*. See IDENTITATE.

NOMOCANON, compounded of νομος, *law*, and κανων, *canon* or *rule*, a collection of canons, and of imperial laws relative or conformable thereto. See CANON.

The firſt *nomocanon* was made by Johannes Scholaſticus, in 554. Photius, patriarch of Conſtantinople, in 883, compiled another *nomocanon*, or collation of the civil laws with the canons: this is the moſt celebrated. Balſamon wrote a commentary on it, in 1180.

NOMOCANON alſo denotes a collection of the ancient canons of the apoſtles, councils, and fathers; without any regard to imperial conſtitutions.

Such is the *nomocanon* publiſhed by M. Cotelier.

NOMOCANON is ſometimes alſo uſed for a PENITENTIAL book of the Greeks.

NOMOPHYLACES, Νομοφυλακες, among the Athenians, magiſtrates who were to ſee the laws executed, being not unlike to our ſheriffs. They had the execution of criminals committed to their care, as alſo the charge of ſuch as were confined priſoners. They had alſo power to ſeize thieves, kidnappers, and highwaymen, upon ſuſpicion; and, if they confeſſed the fact, to put them to death: if not, they were obliged to proſecute them in a judicial way.

NOMOPHYLACES were likewiſe officers belonging to the Olympic games, whoſe buſineſs it was to inſtruct thoſe who were to contend in all the laws of the games. See HELLENODICÆ.

NOMOTHETÆ, Νομοθεται, among the Athenians, were a thouſand in number, and choſen by lot out of ſuch as had been judges in the court *Heliæa*. Their office was not (as their names ſeems to imply) to enact new laws by their own authority, for that could not be done without the approbation of the ſenate, and the people's ratification; but to inſpect the old, and, if they found any of them uſeleſs, or prejudicial, as the ſtate of affairs then ſtood, or contradictory to others, they cauſed them to be abrogated by an act of the people. Beſides this, they were to take care that no man ſhould plough, or dig deep ditches within the Pelaſgian wall; to apprehend the offenders, and ſend them to the archon.

NO *nearer*, in *Sea-Language*, is the command given by the pilot or quarter maſter, to the helmſman, to ſteer the ſhip *no nearer* to the direction of the wind than the ſails will operate to advance the ſhip in her courſe.

NON-ABILITY, in *Law*, an exception taken againſt the plaintiff in a cauſe, on ſome juſt ground why he cannot commence a ſuit in *Law*: as præmunire, outlawry, being profeſſed in religion, excommunicate, or a ſtranger-born. This laſt holds only on actions real, and mixed: and not in perſonal, except he be both a ſtranger and an enemy. The civilians ſay, that ſuch a man hath not *perſonam ſtandi in judicio*. See DISABILITY.

NON *admittas*. See NE-*Admittas*.

NON-APPEARANCE, a default in not appearing in a court of judicature. See APPEARANCE.

NON *aſſumpſit*, in *Law*, a plea in peſonal actions, whereby a man denies any promiſe made, &c. or that he made any ſuch promiſe within ſix years, which is an effectual bar to the complaint.

NON-CLAIM, in *Law*, the omiſſion or neglect of him who challenges not his right within the time limited by law: as, within a year and a day, where continual claim ought to be made.

By ſuch neglect he is either barred of his right; as upon *non-claim* within five years after a right accrued to him; or of his entry by deſcent, for want of a *claim* within five years after the diſſeiſin.

NON *compos mentis*, a phraſe denoting a perſon not to be of ſound memory or underſtanding.

Of this, in common law, there are ſaid to be four kinds. Firſt, an IDIOT born; ſecondly, he that by accident loſeth his memory, and underſtanding; thirdly, a LUNATIC, that has *lucida intervalla*, ſometimes underſtanding, and ſometimes not; fourthly, he that by his own act, for a time, depriveth himſelf of his right ſenſes, as a drunkard. But this laſt kind ſhall give no privilege to him, or his heirs.

A deſcent takes away the entry of an idiot, though the want of underſtanding were perpetual.

NON-CONFORMISTS is a general denomination comprehending all thoſe who do not conform to the eſtabliſhed worſhip of the church. Theſe are of two ſorts, viz. 1. Such as abſent themſelves from it through total irreligion, and attend the ſervice of no other perſuaſion: who by 1 Eliz. cap. 2. 23 Eliz. cap. 1. and 3 Jac. I. c. 4. forfeit one ſhilling to the poor, every Lord's day they ſo abſent themſelves, and 20*l*. to the king if they continue ſuch default for a month together: and if they keep any inmate thus irreligiouſly diſpoſed, in their houſes, they forfeit 10*l*. per month. And 2. Such as abſent themſelves from the worſhip of the eſtabliſhed church, under the plea of conſcience; and theſe are *Proteſtant* DISSENTERS, to whom the term is commonly applied, and PAPISTS. See alſo TOLERATION.

The word is ſaid to have had its riſe from a declaration of king Charles I. who appointed that all the churches of England and Scotland ſhould have the ſame ceremonies and diſcipline; the acquieſcence wherein, or diſſenting from which, determined *conformity* and *non-conformity*.

But this diſtinction primarily related to the rites of worſhip and eccleſiaſtical laws, enacted by Edw. VI. Thoſe who complied with them were *Conformiſts*, and thoſe who object, *Non-conformiſts*. See PURITANS.

NON *Damnificatus*, in *Law*, is a plea to an action of debt upon a bond, with condition to ſave the plaintiff harmleſs. Abr. 224. If the condition of a bond be to ſave harmleſs only, *non damnificatus* generally is a good plea; but if it be to diſcharge the plantiff, &c. then the manner of the diſcharge is to be ſhewn.

NON *decimando*. See MODUS *dicimandi*.

NON *diſtringendo*, a writ not to diſtrain, uſed in divers caſes.

NON *eſt culpabilis*, NON *cul.* q. d. *he is not guilty*, in *Law*, the general plea to an action of treſpaſs, whereby the defendant abſolutely denies the fact charged on him by the plaintiff: whereas, in other ſpecial pleas, the defendant grants the fact to be done, but alledges ſome reaſons in his defence, why he lawfully might do it.

As *non cul.* is the general anſwer in an action of treſpaſs, i. e. a criminal action civilly proſecuted; ſo is it in all actions criminally followed, either at the ſuit of the king, or others, wherein the defendant denies the crime objected to him.

NON *eſt factum*, in *Law*, is an anſwer to a declaration, whereby a man denieth that to be his bond or deed, whereupon he is impleaded.

NON *eſt inventus*, in *Law*, is the ſheriff's return to a writ, when the defendant is not to be found in his bailiwick. And there is a return that the plaintiff, *non invenit plegium*, on original writs. Shep. Epit. 1129.

NON *implacitando aliquem de libero tenemento ſine brevi*, a writ to prohibit bailiffs, &c. from diſtraining any man touching his freedom, without the king's writ.

NON *intromittendo quando breve præcipe in capite ſubdole impetratur*, a writ directed to the juſtices of the bench, or in eyre, commanding them not to give one that had, under colour of intitling the king to land, &c. as holding of him *in capite*, deceitfully obtained the writ called *præcipe in capite*, any benefit thereof, but to put him to this writ of right. Reg. Orig. 4. This writ having dependence on the *court of wards*, ſince taken away, is now diſuſed.

NON *juridici dies*. See DIES.

NON-JURORS, are perſons that refuſe to take the oaths to the government, who are liable to certain penalties; and for a third offence to abjure the realm, by 13 and 14 Car. II. cap. 1. Parſons, vicars, &c are to take the oaths, and give their aſſent to the declaration. 14 Car. II. cap. 4. or they ſhall not preach, under the penalty of 40*l*. &c. ſtat. 17 Car. II. cap. 2. Eccleſiaſtical perſons not taking the oaths on the Revolution, were rendered incapable to hold their livings: but the king was impowered to grant ſuch of the *nonjuring* clergy as he thought fit, not above twelve, an allowance out of their eccleſiaſtical benefices for their ſubſiſtence, not exceeding a third part. 1 W. and M. ſeſſ. 1. cap. 8. perſons refuſing the oaths, ſhall incur, forfeit, and ſuffer, the penalties inflicted on Popiſh recuſants, and the court of exchequer may iſſue out proceſs againſt their lands, &c. 7 and 8 Will. III. cap. 27. See the ſtat. Geo. I. cap. 55. and OATHS.

The *Non-jurors*, or high-church men, were particularly diſtinguiſhed by the following principles: 1. They maintained the doctrine of PASSIVE *obedience*. 2. That the hereditary ſucceſſion to the throne is of divine inſtitution, and, therefore, can never be interrupted, ſuſpended, or annulled, on any pretext. 3. That the church is ſubject to the juriſdiction, not of the civil magiſtrate, but of God alone, particularly in matters of a religious nature. 4. That, conſequently, the biſhops depoſed by king William III. remained, notwithſtanding their depoſition, true biſhops to the day of their death; and that thoſe who were ſubſtituted in their places were the unjuſt poſſeſſors of other men's property. 5. That theſe unjuſt poſſeſſors of eccleſiaſtical dignities were rebels againſt the ſtate, as well as ſchiſmatics in the church, and that all, therefore, who held communion with them were alſo chargeable with rebellion and ſchiſm. And, 6. that this ſchiſm, which rends the church in pieces, is a moſt heinous ſin, whoſe puniſhment muſt fall heavy on all thoſe who do not return ſincerely to the true church, from which they have departed. See *High* CHURCH.

NON *liquet*, *it does not appear*, a VERDICT given by a JURY, when a matter is to be deferred to another day of trial.

The ſame phraſe was uſed among the Romans: after hearing a cauſe, ſuch of the judges as thought it not ſufficiently clear to pronounce upon, caſt a ballot into the urn with the two letters *N. L.* for *non liquet*.

NON *merchandizando victualia*, a writ to juſtices of aſſize to enquire whether the magiſtrates of ſuch a town do ſell victuals in groſs, or by retail, during the time of their being in office, which is contrary to an ancient ſtatute, and to puniſh them if they do. Reg. Orig. 184.

NON *moleſtando*, a writ which lies for him who is moleſted contrary to the king's protection granted him.

NON *obſtante*, *notwithſtanding*, in *Law*, a clauſe frequent in ſtatutes, and letters patent; importing a licence from the king to do a thing, which at common law might be lawfully done; but being reſtrained by act of parliament cannot be done without ſuch licence.

All grants of ſuch penſions, and every *non obſtante* therein contained, ſhall be void. Henry III. took up the clauſe, *non obſtante* (firſt introduced by the pope), in his grants.

But the doctrine of *non obſtantes*, which ſets the prerogative above the laws, was effectually demoliſhed by the bill of RIGHTS at the Revolution, and abdicated Weſtminſter-hall when king James abdicated the kingdom. It is enacted by 1 W. and M. ſeſſ. 2. cap. 2. that no diſpenſation by *non obſtante*, of or to any ſtatute, or any part thereof, ſhall be allowed; but that the ſame ſhall be held void and of none effect, except a diſpenſation be allowed in ſuch ſtatute.

NON *obſtantes*, in the *Romiſh Canon-law*, make the third part of the proviſions of the court of Rome, beginning with *Non obſtantibus*, and compriſing abſolutions from cenſures, rehabilitations, and neceſſary diſpenſations for the enjoyment of benefices. None inferior to the pope can uſe the clauſe *Non obſtante*.

NON *omittas*, a writ which lies where the ſheriff having delivered a writ or proceſs to a bailiff of a franchiſe in which the party it is to be ſerved on dwells, and the bailiff having refuſed or neglected to ſerve it, upon the ſheriff's returning, that he delivered it to the bailiff, this ſecond writ ſhall be directed to the ſheriff, charging him to enter the franchiſe, and execute the king's command, either by himſelf or officer.

NON PLEVIN, *non plevina*, a default in not replevying of land in due time. See REPLEVIN.

In *Hengham Magna*, it is ſaid, that the defendant ſhould be ſure to replevy his lands ſeized by the king, within fifteen days; and that if he neglects, then, at the inſtance of the plaintiff at the next court-day, he ſhall loſe his ſeiſin, *ſicut per defaltam poſt defaltam*. But, by ſtat. 9 Edw. III. it was enacted, that no perſon ſhould loſe his land thenceforward becauſe of *non plevin*.

NON *ponendo in aſſiſis, & juratis*, a writ granted on divers occaſions to men for freeing them from ſerving on aſſizes and juries; as by reaſon of old age, charter of exemption, or the like.

NON *procedendo ad aſſiſam rege inconſulto*, a writ to ſtop the trial of a cauſe appertaining to one who is in the king's ſervice, &c. till the king's pleaſure be farther known.

NON *reſidence*, in *Law*, is applied to ſuch ſpiritual perſons as are not reſident on, but abſent themſelves, for one month together, or two at ſeveral times of the year, from their benefices or dignities. See BENEFICE.

Regularly, perſonal reſidence is required of eccleſiaſtical perſons upon their cures; though there are ſome exceptions in favour of particular perſons, as king's chaplains, biſhops, &c. See RESIDENCE.

NON *reſidentia pro clericis regis*, is a writ directed to the ordinary, charging him not to moleſt a clerk employed in the king's ſervice, on account of his *non-reſidence*.

NON *ſanæ memoriæ*, or NON *ſane memorie*, is an exception taken to an act declared to be done by another, importing that it was done at a time when the party that did it was mad, or not in his proper ſenſes. See NON *compos*.

NON *ſpiſſum*, in the *Ancient Muſic*. See APYCNON.

NON-*ſuch clay*, a particular ſort of earth, which, mixed with another clay brought from Worceſterſhire, makes a compoſition very uſeful for making the melting-pots uſed in the green glaſs making.

NON-SUIT, in *Law*, the dropping or letting fall a ſuit or action. *Non-ſuit* is a renunciation of a ſuit, by the plaintiff or defendant; moſt commonly upon the diſcovery of ſome error, or defect, when the matter is ſo far proceeded in, as that the jury is ready at the bar, to deliver their verdict. The civilians term it *litis renuntiatio*.

When the plaintiff is voluntarily *non-ſuited*, or withdraws himſelf, the crier is ordered to *call the plaintiff*; and if neither he nor any body for him appears, he is *non-ſuited*, the jurors are diſcharged, the action is at an end, and the defendant ſhall recover his coſts. A *non-ſuit* is more eligible for a plaintiff than a verdict againſt him and judgment, because in the former caſe he may commence the ſame ſuit again for the ſame cauſe of action; but in the latter he is for ever barred from attacking the defendant on the ſame ground of complaint. See JURY.

NON SUM *informatus*. See INFORMATUS *non ſum*.

NON-TENURE, a plea in bar to a real action, whereby the party urges, that he holdeth not the land mentioned in the court, or at leaſt ſome part of it.

Weſt diſtinguiſhes *non-tenure* into *general* and *ſpecial*. The firſt, where one denies himſelf ever to have been tenant to the land in queſtion. The ſecond, where he only alledges, that he was not tenant on the day whereon the writ was purchaſed.

NON-TERM, the time of vacation between term and term. See VACATION.

It was anciently called *the time or days of the king's peace*. See PEACE *of God and the church*.

Among the Romans it was called FERIÆ, or *dies* NEFASTI.

NON-ENTITY, whatever has no real being, or is only conceived negatively, or claims only a negative denomination. See ESSE, ESSENCE, &c.

NON-ESSENTIAL *modes*. See MODES.

NON-NATURALS, in *Medicine*, *res non naturales*, are the cauſes and effects of diſeaſes, whether near or remote.

Phyſicians have digeſted all the cauſes of diſeaſes into ſix claſſes, which they call the ſix *non-naturals*. Theſe are, 1. Air. 2. Meat and drink. 3. Motion and reſt. 4. The paſſions of the mind. 5. Excretions and retenſions. 6. Sleep and waking. See each under its proper article. They are thus called, becauſe, by their uſe or abuſe, they become either good, *naturals*; or evil, *contra-naturals*.

But the diviſion, in effect, is of no great uſe; the cauſes of diſeaſes being much more commodiouſly laid down otherwiſe. See Boerhaave's diviſion of the *Non-Naturals* under CAUSE.

NONÆ and *decimæ* were payments anciently made to the church by thoſe who were tenants of church-farms.

The *nonæ* were a rent or duty claimed for things belonging to huſbandry: the *decimæ* were claimed in right of the church.

NONAGE, in *Law*, an incapacity of doing certain things from a want of age.

The term of *nonage* is different, with regard to different things. In matters of inheritance, a man is in his *nonage* till twenty-one years; for marriage only to fourteen, &c. See AGE and MINOR.

NONAGE, NONAGIUM, alſo denotes the ninth part of a man's moveable goods, anciently paid in the nature of a MORTUARY; being claimed by the clergy upon the death of thoſe of their pariſh.

At firſt this was a third part of the goods, and was called *tertiagium*; till by a bull of Clement VI. it was reduced to a ninth.

NONAGESIMAL, in *Aſtronomy*, the ninetieth degree of the ecliptic, reckoned from its eaſtern term, or point.

The altitude of the *nonageſimal* is equal to the angle of the eaſt; and, if continued, paſſes through the poles of the ecliptic: whence the altitude of the *nonageſimal*, at a given time, under a given elevation of the pole, is eaſily found.

If the altitude of the *nonageſimal* be ſubtracted from 90°, the remainder is the diſtance of the *nonageſimal* from the vertex.

NONAGON, a figure having nine angles and ſides.

NONE, or NONES, NONÆ, one of the ſeventh canonical hours, in the Romiſh church. See HOUR.

None, or the ninth hour, is the laſt of the leſſer hours, that is ſaid before veſpers; and anſwers to three o'clock in the afternoon.

This ſingle office, and that for the dead, ends at *nones*; which, father Roſweyd obſerves, was anciently the hour for the breaking up of the ſynaxis, or uſual meetings at church of the primitive Chriſtians.

The hour of *none* was alſo the uſual time for taking the repaſt on faſt-days; though ſome would keep the faſt till night.

NONE *ſo pretty*, in *Botany*. See SAXIFRAGE.

NONE *ſuch*, in *Botany*. See CAMPION.

NONES, NONÆ, in the *Roman Calendar*, the fifth day of the months January, February, April, June, Auguſt, September, November, and December; and the ſeventh of March, May, July, and October: theſe four laſt months having ſix days before the *Nones*, and the others only four.

The word apparently has its riſe hence, that the day of the *nones* was nine days before the ides, and might be called *nono-idus*.

March, May, July, and October, had ſix days in their *nones*; becauſe theſe alone, in the ancient conſtitution of the year by Numa, had thirty-one days a-piece; the reſt have only twenty-nine, and February thirty. But when Cæſar reformed the year, and made other months contain thirty-one days, he did not likewiſe allot them ſix days of *nones*.

NONIUS, is a name erroneouſly given to the method of graduation now generally uſed in the diviſion of the ſcales of various inſtruments, and which ſhould be called VERNIER, from its real inventor. The method of *Nonius*, ſo called from its having been invented by Pedro Nunez, or *Nonius*, and deſcribed in his treatiſe de Crepuſculis, printed at Liſbon in 1542, conſiſts in deſcribing within the ſame quadrant, forty-five concentric circles, dividing the outermoſt into ninety equal parts, the next within into eighty-nine, the next into eighty-eight, &c. till the innermoſt was divided into forty-ſix only. By this means, in moſt obſervations, the plumb-line or index muſt croſs one or other of thoſe circles very near a point of diviſion: whence by computation, the degrees and minutes of the arch might be eaſily computed. This method is alſo deſcribed by *Nonius*, in his treatiſe De Arte atque Ratione Navigandi, lib. ii. cap. 6. where he would perſuade himſelf, that it was not unknown to Ptolemy. But as the degrees are thus divided very unequally, and it is very difficult to attain exactneſs in the diviſion, eſpecially when the numbers into which the arches are to be divided, are incompoſite, of which there are no leſs than nine, the method of diagonals, firſt publiſhed by Thomas Digges, eſq. in a treatiſe intitled Alæ ſeu Scalæ Mathematicæ, printed at London, in 1573, and ſaid to be invented by one Richard Chanſeler, a very ſkilful artiſt, was ſubſtituted in its room. However *Nonius*'s method was improved at different times; but the admirable diviſion now ſo much in uſe, is the moſt conſiderable improvement of it.

NONUPLA, in the *Italian Muſic*, denotes a quick time, peculiar to jigs. This ſpecies of time is otherwiſe called *the meaſure of nine times*, which requires two falls of the hand, and one riſe. There are three ſorts of *nonupla*. 1. *Nonupla di ſemi-minime*, or *dupla ſeſqui quarta*, thus marked $\frac{9}{4}$, where nine crochets are to be in the bar, of which four make a ſemi-breve in common time, i. e. in the down ſtroke, ſix, and but three up; it is uſually beat *adagio*. 2. *Nonupla di crome*, or *ſeſqui ottava*, marked thus ${}_{8}$, wherein nine quavers make a bar, inſtead of eight in common time, i. e. ſix down, and three up: it is beat *preſto*. 3. *Nonupla di ſemi-crome*, or *ſuper ſetti partiente nona*, thus diſtinguiſhed $\frac{9}{16}$, in which nine ſemi-quavers are contained in a bar, whereof ſixteen are required in common time, ſix down, and three up: it is ordinarily beat *preſtiſſimo*. See ADAGIO, PRESTO, and PRESTISSIMO.

Beſides theſe, there are two other ſpecies of *nonupla*, for for which ſee TRIPLE.

NONUS *humeri placentini*, in *Anatomy*, a muſcle, called alſo ROTUNDUS *minor*.

NOOK *of land*, *nocata nerræ*, in an old deed of ſir Walter de Pedwardyn, twelve acres and a half of land were called a *nook of land*; but the quantity is generally uncertain.

NOOSE, a name given by ſportſmen to a ſort of horſe-hair ſpringe made to take woodcocks, and very ſucceſsful, when the proper precautions are taken. The *nooze* is made of ſeveral long and ſtrong hairs twiſted together, with a running *nooze* at one end, and a large knot at the other, which is to be paſſed through the ſlit of a cleft ſtick, to prevent the *nooze* from being pulled away when the bird is caught in it.

The ſportſman, when he knows his buſineſs, does not ſtay to watch theſe ſnares, but ſets them in the morning, and returns again to them at four in the afternoon, when he ſeldom fails of meeting with a ſufficient number taken. The ſticks are to be about the bigneſs of a man's little finger, and are to be made ſharp at one end, that they may fix the better in the ground: to each of theſe is to be fixed one *nooze*. The ſportſman is to take out with him ſeveral dozens of theſe bundled up together, and going into the coppice woods where there lie many leaves upon the ground, he is to ſearch among theſe for the marks of woodcocks frequenting the place; if there come any there, it will ſoon be found out by the leaves, which are ſpread about from ſide to ſide by thoſe birds, in ſearching under them for worms. Their dung alſo, which is of a dark grey colour, being found about the place, is a proof of their frequenting it.

When the place is thus pitched upon, the ſportſman is to take a large circle at ſome diſtance from it, on each ſide, in the way where the woodcocks are ſuppoſed to come to the place; he is here to plant a ſmall hedge-row of furze, or other buſhes, of a conſiderable extent, and pretty thick, leaving gaps in it here and there. The woodcocks, in making up to their place of feeding, when they come to this hedge, will run along by the ſide of it, till they come to one of the gaps, and then go through, for they hate to take wing, and will run, at any time, a long way under a hedge, rather than fly over it. On this depends the ſucceſs of the ſport.

The *noozes* are to be fixed one in each of theſe gaps through which it is known the woodcocks will paſs; the ſtick to which it is faſtened is to be ſtuck firmly in the ground, and the *nooze* to be ſpread wide open on the ground, leaving only ſome dry leaves to ſupport it. The whole gap being occupied by this *nooze*, the woodcock, when he comes, cannot eaſily eſcape being taken by the legs in it, and when once caught he will lie till the ſportſman comes. While a ſportſman is walking about a wood in this view, it is very common for him to find ſpringes, or *noozes*, of horſe-hair, fixed at ſix inches high, in ſeveral places. This may be looked on as a proof that there are partridges in the wood, and theſe are the means uſed by the country people to take them. The woodcocks, though in the day they lie in woods, yet, in the night, they go out, and frequent rivers and brooks, and, in the froſty nights, ſuch ſprings as do not freeze are particularly reſorted to by them.

The ſportſman, when he has ſet his *noozes* in the woods for the day time, ſhould retire to the watery places near them and ſearch for the marks of theſe birds coming to them by their dung and other tokens. As ſoon as a place is found which they frequent, there muſt be a ſmall hedge-row built there alſo in the ſame manner as in the woods; and in the gaps, which are to be made at the diſtance of about ſix feet one from another, there are to be placed either the ſame ſort of *noozes* as thoſe in the woods, or the ſpringes made with hazel boughs, and the horſe-hair tied to a pack-thread. In either caſe, there is no doubt of ſucceſs, for the birds which have once frequented a place, will come to it every night, as long as they remain any where near it; but particularly, if there be any ſpring near a wood, the water not freezing when other waters are iced over, will be ſure to bring the woodcocks together at it, and *noozes* planted properly about this place, will ſeldom fail of ſucceſs. If they have been left a night or two without ſucceſs, the ſportſman is not to deſpair; for though there ſhould happen to be no woodcocks there when they are firſt ſet, theſe birds change place ſo often, that it need not be doubted but ſo proper a rendezvous will be ſoon reſorted to by them.

NOPE, in *Ornithology*, an Engliſh name uſed by ſome for the BULL-*finch*.

NORA, a word uſed by ſome of the chemical writers for *lime*, by others for *nitre*, and by others for all ſalts in general, as the word *ſal*.

NORMAL *line*, in *Geometry*, is uſed for a perpendicular line. See Perpendicular, and Subnormal.

NORMAN, in *Sea-Language*, a name given to a ſhort wooden bar, thruſt into one of the holes of the windlaſs, in a merchant ſhip, whereon to faſten the cable. It is only uſed where there is very little ſtrain on the cable, as in a commodious harbour, when the ſhip is well ſheltered from the wind and tide.

NORMANNORUM *terra*. See Terra.

NORROY, *North-Roy*, q. d. Northern king; the title of the third of the three kings at arms, or provincial heralds. See King *at Arms*, and Herald.

His juriſdiction lies on the north ſide of Trent, whence his name; as Clarencieux, on the ſouth.

NORTH, in *Coſmography*, one of the four cardinal points of the horizon, being that interſection of the horizon and meridian which is neareſt our pole.

North *latitude of the moon*. See Latitude.

North *company*. See Company.

North *dial*. See Dial.

North-*eaſt*, a rhumb, or point, in the middle between the eaſt and north.

North-*north-eaſt*, *north-eaſt-and-by-eaſt*, are ſubdiviſions of the compaſs between the *north* and *eaſt*. See Wind.

North-*eaſt paſſage*. The advocates for the *north-eaſt* paſſage, ſays a late writer, have divided that navigation into three parts; and by endeavouring to ſhew that theſe three parts have been paſſed at different times, they conclude from thence, that the whole taken collectively, is practicable. Theſe three parts are, 1. From Archangel to the river Lena. 2. From the Lena round Tſchukotſkoi Noſs, (or the *north*-eaſtern promontory of Aſia) to Kamtſchatka: and 3. From Kamtſchatka to Japan. With reſpect to the firſt part, no one ever aſſerted, that it has been performed in one voyage: from an account of the ſeveral voyages that have been made in theſe ſeas it appears, that there is a cape between the rivers Chatanja and Piaſida, that has never yet been doubled. As to the ſecond diviſion of the *north-eaſt-paſſage*, it has been affirmed, that a paſſage has been effected by ſeveral veſſels, which have, at different times, ſailed round the northern extremity of Aſia. But from the Ruſſian accounts it is inferred, that it has been performed but once, viz. by one Deſhneff, who, in 1648, is ſaid to have doubled this formidable cape. Of the third, or remaining part of this paſſage, no doubt can be entertained. The connection between the ſeas of Kamtſchatka and Japan has been eſtabliſhed by many voyages. Coxe's Account of the Ruſſian Diſcoveries, &c. 4to. 1780.

North *pole*. See Pole.

North *ſea*. See Sea.

North *ſtar*, the laſt in the tail of the Little Bear; called alſo the POLE-*ſtar*.

North *wall*. See Wall.

North-*weſt*, is a point or rhumb, in the middle between the *north* and weſt. See West, &c.

North-*weſt paſſage*. A *north-weſt paſſage* by Hudſon's-bay into the Pacific Ocean, has been more than once attempted of late years, but, hitherto, without ſucceſs. Some greatly doubt of the practicability of ſuch an enterprize, and think the obſervations made by the Ruſſians give us ſmall hopes. But, as they have not yet publiſhed the particulars of their diſcoveries, little can be ſaid about them. Some general things may be ſeen in the Phil. Tranſ. Nº 482. ſect. 14. It appears from thence, that the Ruſſians have paſſed between the land of Nova Zembla, and the coaſt of Aſia, and as the Dutch did formerly diſcover the northern coaſts of Nova Zembla, we may now be well aſſured, that that country is really an iſland.

North *wind*. See Wind.

NORTHERN *aſpect*, or Exposure. See Exposure.

Northern *light*, or *Aurora Borealis*. See Aurora *Borealis*.

Northern *ocean*. See Ocean.

Northern *ſigns* are thoſe ſix on the *north* ſide of the equator. See Sign.

Northern *hemiſphere*. See Hemisphere.

NORTHING, in *Navigation*, the difference of latitude, which a ſhip makes in ſailing towards the *north pole*.

NORWAY *rat*. See *Sable* Mouse and Rat.

NOSE, the *external* organ of ſmelling; or that part in men which ſtands prominent, in the middle of the face.

The *noſe* is uſually divided by anatomiſts into *external* and *internal*; a diviſion of very little ſervice.

It is farther ſubdivided into ſeveral parts, which make up its external figure.

The firſt is the *dorſum*, or ridge, running along the whole length of it; one part whereof, about the middle, more prominent than the reſt, is called the *ſpine*; and the extreme which in many is turned round, *orbiculus*. The ſides are called the *alæ*, or *pinnæ*.

The teguments of the *noſe* are common to the reſt of the face. Under theſe appear the muſcles of the *noſe*, which are three pair, viz. the *elevators alæ naſi*, ſerving to pull the alæ upwards, and turn them outwards; the *dilatatores alæ naſi*, which draw them from each other, and widen the external apertures of the noſtrils; and the *conſtrictores alæ naſi*, which draw them downwards nearer each other; and at the ſame time the upper lip alſo downwards. See each muſcle deſcribed under its proper head, Elevator, Dilatator, &c.

The frame of the *noſe* is chiefly ſupported by two bones, which end in cartilages of a triangular figure, and are divided in the middle by the third, called *ſeptum*, into two partitions, called the *nares*, or NOSTRILS.

This ſeptum likewiſe ends in a cartilage; by means of which cartilages, the lower part of the *noſe* is rendered moveable, which the upper, being perfectly oſſeous, is not. The cartilages of the alæ are tied to the others by ligaments; which looſe connection renders them moveable.

The bones of the *noſe* are either *proper* or *common*. The firſt of the *proper*, are the two external ones that conſtitute the dorſum, and are joined to the oſſa frontis, the fourth bone of the upper jaw, and to each other, partly by ſuture, and partly by harmony.

In the concave of the arch of theſe two bones, at their union internally, is placed the bony part of the ſeptum. Its upper part joins the os ethmoides; but in adults is continued ſo that the ethmoides, and its proceſs, called *criſta galli*, appear of a piece with the ſeptum. The ſeptum is thinneſt in the middle, and divides the right noſtril from the left; though its poſition is ſeldom perpendicular. It is capped with another thin bone, from its figure called *vomer aratri*; and is joined to the fourth bone of the upper jaw, and to the oſſa palati.

The other proper bones are the turbinata, or ſpongioſa, two of which are uſually found in each noſtril, ſometimes three, placed one over the other.

The middlemoſt, when there are three, is ſo placed as to ſhelter the perforation of the antrum maxillæ ſuperioris into the noſtril, and prevent the ſudden ruſhing in of air from the noſtril into the antrum. They are all very porous, and turned not unlike the ſhell concha Veneris. In quadrupeds, theſe bones are very numerous.

The *common bones* of the *noſe* are ſuch as make fences for the foramina narium, and help to compoſe the parts adjacent. The largeſt of theſe is the fourth bone of the upper jaw, which has the greateſt ſhare in framing the foramina.

This fourth bone, with the ſeptum and oſſa turbinata, chiefly frames the internal paries of the foramina. In the upper part, a portion of the os frontis, the inſide of the os unguis, the os cribroſum, with part of the ſphenoides; and backwards towards the fauces, the oſſa palati help to compoſe the foramina.

Beſides the cavities circumſcribed by the bones now mentioned, the foramina have ſeveral collateral cavities that open into them: the largeſt is that called *antrum genæ*; by Dr. Highmore, *antrum maxillæ ſuperioris*, framed in the fourth bone of the upper jaw, near two inches long, and an inch broad; the bony parts of which, with the ſphenoides, make the foramen lacerum externum. Its lower ſurface makes a thin covering for all the roots of the molares and canini, which frequently upon drawing a tooth, to which it ſticks, is taken along with it; whereby this cavity is opened into the alveolus, and conſequently into the mouth.

All theſe cavities of the *noſe* and cheek, as alſo the oſſa turbinata, ſeptum, &c. are inveſted with a membrane furniſhed with large arteries from the carotides; and veins, which empty themſelves into the jugulars; and nerves, from the fifth pair, as well as the olfactory nerves.

In this membrane are a great number of ſmall glands, placed very near each other, from whence flows all that pituita, commonly diſcharged at the noſtrils.

By means of this mucus or pituita is the membrane kept ſoft, and defended from the injuries of extraneous bodies, eſpecially thoſe of the air, which muſt paſs this way in inſpiration, when the mouth is ſhut.

By this means alſo the olfactory nerves, here diffuſed, are rendered capable of the perception of odoriferous effluvia, which the drineſs of the part would be apt to deſtroy. See Smelling.

Beſides this uſe of the *noſe*, which is the principal, nature has made it, as it were, a diverticulum to the eyes; there being a conſiderable paſſage into each noſtril that empties itſelf under the middle os turbinatum, ariſing from two apertures, called *puncta lacrymalia*, at the great canthus.

By this way, the ſuperfluous moiſture of the eyes is carried off, which would otherwiſe incommode the cheeks; as in effect it does, when thoſe parts are affected with any diſorder; as in the ægilops, and fiſtula lacrymalis.

The diſeaſes to which the *noſe* is ſubject, are a coryza, ozæna, polypus, ſarcoma, and noli me tangere, beſide ſneezing, and a loſs of ſmelling. See each in its place.

In Tartary, the greateſt beauties are thoſe who have the leaſt *noſes*. Ruybrock mentions the wife of the great Genghis Khan, the mother of Tamerlane, as a celebrated beauty, becauſe ſhe had only two holes for a *noſe*. In moſt other countries, China excepted, great *noſes* are in honour.

The Crim Tartars break the noſes of the children while young, as thinking it is a great piece of folly to have their *noſes* ſtand before their eyes.

Nose, *bleeding at the*. See Hæmorrhage.

Nose, *cutting off, or ſlitting the*, in *Law*. See Mahim.

Nose, *fracture of the*. In the *noſe* both bone and cartilage are ſubject to fractures, which happen ſometimes on either ſide and ſometimes in the middle from blows or falls; if either of the bones on the front of the *noſe* are fractured, it produces a flatneſs in the *noſe*, and the air meets with obſtructions in its paſſage through the noſtrils; and if the bone on either ſide is fractured, the part becomes hollow. When the cartilage is diſturbed, the *noſe* inclines too much on one ſide. Theſe fractures ſometimes happen without wound, but more uſually they are attended with a wound of the common integuments. If the injury of the *noſe* is very great, the fracture can never be ſo perfectly cured, but that ſome deformity will remain. The vicinity of this part to the brain alſo, which is frequently injured at the ſame time, renders caſes of this kind often dangerous. A caries alſo, or an ozæna, or polypus, are no uncommon attendants on this diſorder. In order to reſtore the bones of the *noſe* to their proper ſituation, the patient is to be placed in a ſeat oppoſite to the light, and his head held back by an aſſiſtant. The ſurgeon is to raiſe the depreſſed parts with a ſpatula, a probe, or a quill, applying externally the thumb of one hand, and the fore-finger of the other. If the bones of the *noſe* are fractured on both ſides, they are to be raiſed on each in this manner, and the cavity of the noſtrils is to be filled up with long doſſils, to prevent the bones from collapſing; covering the part alſo for this end with ſome plaſter, and applying firſt the dreſſings common in recent wounds. If the bone is fractured into ſeveral ſplinters, they are to be reduced into the proper places by the fingers; but if a ſplinter is ſo entirely ſeparated from the bone, that it will not eaſily unite with it again, it is to be taken out with the forceps. The bones will unite, when properly replaced, in about fourteen days, if no caries, or abſceſs, intervene. If the bone ſhould require a ſtronger ſupport than what has been hitherto mentioned, one may be formed out of ſtrong paper, either ſingle or double, and adapted to each ſide of the *noſe*, and ſupported by bolſters, and the whole muſt be kept in its place by a four-headed bandage not tied too tight. Heiſter.

Nose, *luxated*. It ſometimes happens, though not often, that the bones of the *noſe* are ſeparated from each other, or diſtorted out of their natural places, without a fracture. When this caſe happens, the patient is to be ſpeedily placed in a high chair, and an aſſiſtant muſt ſtand behind and hold his head firm in a proper poſture: the ſurgeon is then to introduce with one hand a thick probe, a gooſe quill, or a ſmall ſtick ſhaped for that purpoſe up the noſtril internally, by which means the depreſſed parts of the *noſe* may be thruſt out into their places; in the mean time he is to apply his other hand externally, to guide and direct the parts which are thus moved from within. This being done, and the bones properly replaced, there is ſcarce any thing elſe to be done, but to let a piece of ſticking plaſter lie upon the *noſe* for ſome time. Heiſter.

Nose, *wounds of the*. Wounds of the *noſe* are generally cured by the dry ſuture; but where the wound divides the cartilage, and penetrates ſo deep that the lips of it cannot be kept in contact by the application of ſticking plaſters, the true ſuture muſt be made through the ſkin, on each ſide of the wound; and Bicyny affirms, that when a part of the *noſe* has been actually cut off, and ſeparated from the reſt, it has been afterwards united, by means of ſutures. When the naſal bones have been fractured, it is uſual to place ſmall tubes of lead or ſilver under them for ſome time, leſt the paſſage of the *noſe* ſhould be ſtopped up by the ſhooting of new fleſh. Externally ſome vulnerary balſam, or glutinous powder, is to be uſed, and covered with ſticking plaſters, which muſt be kept on by the four-headed bandage. Heiſter.

Nose-*band*, in the *Manege*, called in French *muſerelle*, is that part of the head-ſtall of a bridle that comes over a horſe's noſe.

Nose-*bleed*, in *Botany*. See Yarrow.

NOSOCOMIUM, Νοσοκομειον, an hoſpital, or infirmary, for the reception of the diſeaſed.

NOSOLOGY, Νοσολογια, compounded of νοσος, *malady, diſeaſe*, and λογος, *diſcourſe, reaſon*, a diſcourſe or treatiſe of diſeaſes; otherwiſe called Pathology.

The importance of a comprehenſive and accurate *noſology* has been long and generally allowed: Baglivi, Boerhaave, Gorter, Gaubius, and Sydenham, have expreſſed their deſire of a work of this kind, the great object of which is to fix pathognomonics to every diſeaſe; or in which all diſeaſes are diſpoſed into certain claſſes, orders, and genera, founded on diſtinctions taken from the ſymptoms only, without regard to remote or proximate cauſes.

Felix Platerus, in his Praxis Medica, publiſhed in 1602, gave an imperfect ſketch of a *noſology* of this kind; but no writer ventured to purſue his idea for more than a century after his time. At length, M Sauvages of Montpelier, publiſhed in 1731, in duodecimo, the outlines of ſuch a work, under the title of Nouvelles Claſſes des Maladies, in which he profeſſes to define diſeaſes from their conſtant and evident ſymptoms only. In 1763 this work was augmented, by the addition of the ſpecies under each genus, into five volumes, in octavo; and afterwards enlarged into two quarto volumes, and publiſhed after his death in 1768. The celebrated Linnæus adopted his plan, and framed a ſet of inſtitutes, under the title of Genera Morborum: his ſcheme was firſt publiſhed in a theſis in 1759, and in a ſmall quarto, in 1763. In the claſſification of diſeaſes, he has nearly retained the arrangement of M. Sauvages, but he has altered his terms, changed the order of the claſſes, and added a new claſs, with which he begins his method. The number of claſſes is eleven, and they are as follow: 1. Exanthematici, or fevers attended with eruptions on the ſkin, comprehending three genera, viz. contagioſi, with ſix ſpecies; ſporadici, with three ſpecies; and ſolitarii, affecting a part of the body only, to which he has reduced only one ſpecies. 2. Critici, or critical fevers, including three genera, viz. the continentes, with four ſpecies: the intermittentes,

mittentes, with five ſpecies; and the exacerbantes, or remitting, with five ſpecies. 3. Phlogiſtici or inflammations, containing three genera, viz. the membranacei, with ſeven ſpecies; the parenchymatici, or viſceral, with ſeven ſpecies; and the muſculoſi, or muſcular, with one ſpecies. 4. Dolores, or painful diſeaſes, comprehending two genera, viz. intrinſeci, or of the internal parts with twenty ſpecies; and extrinſeci, or of the limbs, with five ſpecies. 5. Mentales, or diſeaſes in which the functions of the mind are diſturbed, comprehending three genera, viz. ideales, in which the judgment is principally affected, with ſeven ſpecies; imaginarii, affecting the imagination, with ſix ſpecies; and pathetici, in which the appetites and paſſions are principally affected, with twelve ſpecies. 6. Quietales, or diſeaſes in which the voluntary and involuntary motions, and the ſenſes, ſuffer a diminution, including three genera, viz. defectivi, or defects of the vital powers, with ſix ſpecies; ſoporoſi, or diminiſhed ſenſe and motion, with ten ſpecies; and privativi, or diminutions of the ſenſes, with fifteen ſpecies. 7. Motorii, or ſpaſmodic diſeaſes, containing two genera, viz. ſpaſtici, ſpaſtic, or tonic diſeaſes, with ten ſpecies; and agitatorii, or convulſive with fifteen ſpecies. 8. Suppreſſorii, or diſeaſes ariſing from or attended with oppreſſion of the organs and impeded excretions, comprehending two genera, viz. ſuffocatorii, with eighteen ſpecies; and conſtrictorii, with eight ſpecies. 9. Evacuatorii, or diſeaſes attended with increaſed excretion and diſcharges, comprehending five genera, viz. capitis, of the head, with ſix ſpecies; thoracis, of the breaſt, with four ſpecies; abdominis, of the belly, with fourteen ſpecies; genitalium, of the genital paſſages, with eleven ſpecies; and corporis externi, of the external parts, with two ſpecies. 10. Deformes, or diſeaſes occaſioning external deformity of the body, comprehending three genera, viz. emaciantes, emaciating, with five ſpecies; tumidoſi, enlarging the body, with eight ſpecies; and decolores, ſuch as deform or change the colour of the ſkin with five ſpecies. 11. Vitia, or cutaneous, external, or palpable diſeaſes, including eight genera, viz. humoralia, thoſe attended with vitiated or extravaſated fluids, with nine ſpecies; dialytica, ſolutions of continuity, as fractures, wounds, &c. with fourteen ſpecies; exulcerationes, ulcers, with thirteen ſpecies; ſcabies, cutaneous, with nineteen ſpecies; tumores, tumors, with ten ſpecies; procidentiæ, tumors ariſing from diſlocation of fleſhy or membranous parts, with eight ſpecies; deformationes, diſtortions of particular parts, and other deformities, with eighteen ſpecies; and maculæ, blemiſhes on the ſkin, with nine ſpecies.

The ſymptomatic plan of arranging diſeaſes has ſince been followed by ſome other profeſſors of phyſic. Dr. Vogel of Gottingen, in 1764, publiſhed his Definitiones Generum Morborum; Dr. Cullen of Edingburgh has alſo publiſhed a Synopſis Noſologiæ Methodicæ, and made it the baſis of his Firſt Lines of the Practice of Phyſic; in which by omitting many genera, and reducing others to the rank of ſpecies only, he has very conſiderably abridged the whole. In 1776, Dr. Sagar, at Iglaw, in Moravia, publiſhed a Syſtema, Morborum Symtomaticum, octavo, which is an uſeful abridgment of the work of M. Sauvages, with ſome alterations and additions.

NOSTOCH, the name of a vegetable ſubſtance which ſeems to differ from moſt of the other bodies of that kind, in ſeveral particulars.

It is a ſubſtance of an irregular figure, of a greeniſh brown colour, and ſomewhat tranſparent. It trembles at the touch, in the manner of a jelly, but it does not melt when held in the hand. It has therefore ſomewhat of the character of a vegetable leaf, but has neither veins nor fibres.

It is found in all ſorts of ſoils, but moſt frequently in ſandy ones, ſometimes on the gravel of garden walks, and moſt uſually makes its appearance after rain. It is found only in the ſummer months, and retains its humidity and perfect figure ſo long as it is a moiſt ſeaſon; but immediately dries up, and withers away, on the ſun or winds affecting it.

Many people have ſuppoſed this not to be a plant; it appears all on a ſudden, and, as it were, by a ſort of miracle, either from the earth or clouds, and ſome have called it *flower of earth*; others *flower of heaven*; and the obſcurity of its origin has occaſioned its being held in great eſteem among the chemiſts, who ſuppoſe that it contains an univerſal ſpirit capable of converting other metals into gold. Memoirs Acad. Par. 1722.

If the *noſtoch* has truly no roots, as appears to be very evidently the caſe, it follow, that it imbibes its nouriſhment in the manner of the ſea-plants, which imbibe the water by which they are nouriſhed at all their pores.

It ſhould ſeem that there are two ſpecies of this *noſtoch*, the one only a plain flat leaf; the other curled, wrinkled, and variouſly undulated; and it is on this laſt, that the fruits which produce the young plants are principally found. It may be, however, that the one of theſe may be the male, and the other the female of the ſame ſpecies, as in many larger plants; or poſſibly the being in the ſtate of fructification alone may make the difference.

NOSTRILS, *nares*, the two apertures or cavities of the noſe, through which the air paſſes, and which ſerve to convey odours and to carry off the pituita ſeparated in the ſinus of the baſe of the cranium.

The *noſtrils* are ſeparated by a cartilage called *ſeptum narium*, and lined with a very ſenſible membrane. See SMELLING.

Cicero obſerves, that the ſituation of the *noſtrils* ſo near the mouth is very convenient, as the judging of the ſmells of meat and drinks is a great part of their office: he adds, that their erect poſition argues the Creator's wiſdom; in regard all odours riſe from below upwards.

The *noſtrils* are ſometimes ſubject to be preternaturally cloſed; though this is a caſe that but rarely happens. It is ſometimes owing to a careleſs treatment in the ſmall-pox, in the bad kind of which the *noſtrils* have been known to cloſe, and adhere ſo ſtrongly to the upper lip, which is found turned back at the ſame time, as to leave no poſſibility of ſhutting the mouth. In this unhappy caſe the only relief is by the knife, ſeparating the lip from the noſe, and then opening a paſſage through each of the *noſtrils*. Theſe are to be kept open, either with tents, or leaden pipes, and the lip preſſed downward into its natural poſition by a compreſs and bandage, and this continued till the wounds are ſiccatrized. Heiſter.

NOSTRILS, *ſlitting the*, *&c.* in *Law*. See MAHIM.

NOSTRILS *of birds* are the nice inſtruments with which they are furniſhed for diſtinguiſhing their food: theſe are placed either in the middle of the upper mandible, or near the baſe, or at the baſe, or behind the baſe. Some birds have no *noſtrils*. They are generally naked, but ſometimes covered with briſtles reflected over them, or hid in the feathers.

NOSTRILS *of a fiſh*. See NARES *piſcium*,

NOSUS, a name by which ſome of the barbarous writers of the middle ages have called *alabaſter*: others alſo have called it *niſus*.

NOT *guilty*, the general iſſue or plea of the defendant, in any criminal action. See NON *eſt culpabilis*.

NOTABILIA *bona*. See BONA.

NOTARICON, the third part or ſpecies of the Jewiſh CABALA.

Rabbi Nathan in his Great Aruch, ſays, that *notaricon* is when a ſingle letter is taken for the ſign of a thing, i. e. for a whole name. He adds, that the word comes from the Latin *notarius*, a perſon who writes in notes, or ſhort-hand; and R. Elias Levita gives the ſame account in his Theſbites; except that, in lieu of one letter for a word, he mentions two or three.

But, after all, neither the one nor the other ſeems alone ſufficient; for, as a ſingle letter frequently makes a word, ſo, in the *notaricon*, a whole word ſometimes ſtands for a ſingle letter.

There are, therefore, two principal kinds of *notaricon*; the firſt is, when, by aphæreſis, or apocope, the firſt or laſt letters of ſeveral words are joined to make a ſingle word or phraſe; which, therefore, is of two kinds, the one initial the other final; and each is done ſeveral ways. The firſt of theſe kinds, which the Rabbins call *Raſche Theboth*, appears very ancient; and is ſuppoſed, by ſome, well verſed in the Hebrew, to have taken its origin from the Pſalms, and other places of Scripture, proceeding alphabetically, i. e. the firſt verſe beginning with א, the firſt letter of the alphabet; the ſecond with ב, the ſecond letter, &c. See ABECEDARY.

The ſecond kind is alſo very common, and is called *Sophe Theboth*; i. e. the end of words. For inſtance; by telling the laſt letters of the words מהשמומהלי, *Mihi, quodnam nomen eſt? Qodnam?* They find the name of God, Jehovah. This becomes ſtill more puerile, when they take the letters backwards.

The third kind is more modern, and is more groſs and perplexed; here a letter gives a whole word, inſtead of a word's only giving a letter; ſo that a word ſhall furniſh a whole phraſe.

Thus, for example, in the firſt word of Geneſis, בראשית, *bereſchit*, is found. He created the heaven and the earth, the ſea, the abyſs, &c.

NOTARY, *notarius*, primarily denotes one who takes notes, or ſhort draughts, of contracts, or other inſtruments.

From the 44th Novel of Juſtinian it appears, that contracts were firſt written in notes, or abbreviatures, by the *notaries*, or clerks of the tabelliones, and were not yet obligatory. Afterwards they were ingroſſed, or written at length by the TABELLIO himſelf, and then ſigned and ſealed.

Notary is more particularly uſed to denote an officer who draws and keeps notes and minutes of contracts, obligations, and other inſtruments, executed before him; and delivers out authentic copies, &c. thereof.

Ragueau diſtinguiſhes between *notarii* and *tabelliones*: *notaries*, he ſays, in ſeveral cities, are only to receive and paſs the minutes of contracts, and to deliver them to the parties in brief; being obliged to carry them to the tabelliones to be kept, and to have ingroſſed copies delivered out to the parties.

He adds, that the *notaries* were anciently clerks of the tabelliones; and that ſeparting, by degrees, from their maſters, they at length erected offices of their own; and, at laſt, took place of the tabelliones, who were ſuppreſſed.

They had their name *notarii* from *notæ*; becauſe anciently they wrote in notes, or ſhort hand.

Notaries are now little uſed among us, except in mercantile affairs; though in France they ſtill ſubſiſt in their legal capacity. The *notaries* of the chatelet are called the king's counſellors, and note-keepers.

Notary *public*, among us, is a perſon who draws, and publickly atteſts deeds or writings, between merchants, to make them authentic in another country.

Notaries have the drawing, paſſing, keeping, iſſuing, &c. of all deeds, contracts, charter-parties, &c. in the mercantile world. In their books are regiſtered proteſts, remonſtrances, &c. See Note and Bill.

Notaries, *eccleſiaſtical*, were officers in the firſt ages of the church, whoſe buſineſs was, to collect and preſerve the acts of the martyrs.

They are ſuppoſed to have been firſt inſtituted by St. Clement. Their number was ſeven, and they were diſpoſed in the ſeven quarters or regions of Rome.

Pope Fabian, judging the ſhort-hand of the *notaries* too obſcure for common uſe, added ſeven ſubdeacons to them, to tranſcribe at length what the *notaries* drew in ſhort.

At length theſe *notaries* were laid aſide, and two other kinds were eſtabliſhed in their ſtead; viz. *apoſtolical notaries*, and *epiſcopal notaries*; whoſe buſineſs lies in ſpiritual and beneficiary inſtruments,

NOTATION, in *Arithmetic*, the art of characterizing numbers, or of repreſenting them by proper figures.

The choice of arithmetical characters is arbitrary; hence, in various nations, they are various: but, perhaps, there are none ſo commodious as thoſe commonly uſed in Europe, uſually ſaid to have been invented by the Arabs, and thence called Arabic *characters*; though Dr. Wallis obſerves, that Altepedi, an Arab, refers the invention to the Indians.

The Greeks, Hebrews, and other eaſtern nations, as alſo the Romans, expreſſed numbers by the letters of their common alphabet. See Character.

Notation, in *Algebra*, is the repreſenting of quantities by letters of the alphabet; or calling them by thoſe names. See Quantity, Character, &c.

NOTE, *nota*, is uſed for a character, or abbreviature, ſerving to denote or expreſs ſomething in a little compaſs.

The ancient notaries wrote all in *notes*, or ſhort-hand; whence they were ſometimes denominated *curſores, quia notis curſim verba expediebant.*

Notes, in *Muſic*, are characters which mark the tones, i. e. the elevations and fallings of the voice, or sound; and the ſwiftneſs or ſlowneſs of its motions.

In the general, under *notes* are comprehended all the ſigns, or characters, uſed in muſic, for the marking harmony of ſounds.

But, in propriety, the word only implies the marks which denote the degrees of gravity or acuteneſs to be given each ſound.

The Greeks uſed the common letters of their alphabet of muſical *notes*; and, becauſe more *notes* were needed than they had letters, the defect was ſupplied by the different ſituation of the letters: viz. by placing them upright, inverted, &c. and by cutting off, or by doubling, ſome ſtrokes.

Thus the ſame letter *pi* expreſſed different *notes* in all the following forms; Π, ∐, ⊏, ⊐, Γ, Π. For every ſeveral mode they had no leſs than eighteen ſigns.

Now Alypius gives us ſigns for fifteen different modes, which with the differences of the genera, and the diſtinction between voice and inſtrument, Mr. Malcolm obſerves, make, in all, 1620 *notes*. Not that they had ſo many diſtinct characters; but the ſame character has different ſignifications on different occaſions. Thus Φ, in the diatonic genus, is lichanos hypaton of the Lydian mode; and a hypate meſon in the Phrygian.

The Latins, in the time of Boethius, had eaſed themſelves of ſo needleſs a burden, and only uſed the firſt fifteen letters of their alphabet for *notes*: theſe, pope Gregory, conſidering that the octave was the ſame, in effect, with the firſt, and that the order was the ſame in the upper and lower octave of the gamut, afterwards reduced to ſeven; which were to be repeated in a different character.

At length, in the eleventh century, a Benedictine, one Guido Aretine, in lieu of the letters, ſubſtituted the ſix ſyllables, *ut*, *re mi*, *fa*, *ſol*, *la*; placing them on different lines, and marking them with points. Laſtly, it was thought proper to add *notes*, likewiſe, in the ſpaces. See Gamut.

Of the ſeven muſical *notes*, *ut*, *re*, *mi*, *fa*, *ſol*, *la*, *ſi*; the firſt ſix are aſcribed to Aretine, who is ſaid to have invented them at Pompoſa, in the duchy of Ferrara; the ſeventh, viz. *ſi*, was added, according to ſome, by Vander Putten; according to others, by De Muris. It ſerves very good purpoſes, in avoiding the difficulty of the diviſions remaining in Guido's ſcale.

Indeed Voſſius will not allow Guido to have the honour of inventing any of them; but ſhews that the Egyptians had uſed them long before him: in which he is confirmed by the teſtimony of Halicarnaſſeus. However, common fame aſcribes to him not only the *notes*, but alſo the lines, letters, or clefs, flats, and ſharps.

The *notes*, *ut*, *re*, *mi*, &c. he is ſaid to have taken from a hymn in the veſpers of St. J. Baptiſt: *Ut queant laxis reſonare fibris*, &c.

Hitherto the *notes* only ſerved to expreſs the degree of tune: they were all of equal value, as to time, till about the year 1330, when John De Meurs, or De Muris, a doctor of Paris, gave different figures to the ſeveral points, to expreſs the quantity of time each was to be dwelt upon. See Time.

There are three things to be conſidered in theſe *notes*, 1. The *quantity*, i. e. the ſize and figure of the head. 2. The *quality*, i. e. the colour, of the head; whether it be white or black, or full or open. 3. The *properties*, as the Italians expreſs themſelves; viz. whether the *note* is accompanied with a virgula, or comma, or not. It muſt likewiſe be conſidered, whether the notes be ſeparate and diſtinct, or bound together.

The ſeveral muſical *notes* are the *large*, which contains 8. meaſures, though Merſennus makes it 12 (ſee its figure under Character); the *long*, containing 4 meaſures; the *breve*, containing 2; the *ſemibreve*, containing 1; the *minim*, $\frac{1}{2}$; the *crotchet*, $\frac{1}{4}$; the *quaver*, $\frac{1}{8}$; the *ſemiquaver*, $\frac{1}{16}$; and the *demiſemiquaver*, $\frac{1}{32}$.

Uſually we only diſtinguiſh ſix principal *notes*, repreſented by as many different characters; viz. the *ſemibreve*, equal to two minims; the *minim*, equal to two crotchets; the *crotchet*, equal to two quavers; the *quaver*, equal to two ſemiquavers; and the *ſemiquaver*, equal to two *demiſemiquavers*. See each under its proper article, Semibreve, Minim, Crotchet, &c.

The mathematicians compute, that one may make 720 changes, or varieties, with ſix *notes*, without ever repeating the ſame twice; and that, of the *notes* of each octave, one may make 40,320 different tunes, or ſongs.

Note is alſo uſed for a mark made in a book or writing, where there occurs ſomething remarkable, and worthy of particular notice.

Note is alſo uſed for an obſervation, or explication of ſome paſſage in an author, added in the margin, at the bottom of the page, or elſewhere, by an editor.

In this ſenſe, *note* ſtands contradiſtinguiſhed to text.

The *notes* make the principal difference in the editions of claſſic, &c. authors. We have Virgil, Horace, Terence, &c. with Ruæus's *notes*, the Dauphin's *notes*, Dacier's *notes*, Bentley's *notes*, Hare's *notes*, with *notis* variorum, &c.

Note is alſo a minute, or ſhort writing containing ſome article of buſineſs.

In which ſenſe we ſay, a *promiſſory note*, a *note under hand*, a *bank note*, &c.

Bank notes are made payable to bearer on demand; in which reſpect they differ from *poſt-bills*, which are payable to order at ſeven days ſight.

By 3 & 4 Ann. cap. 9. all *notes* ſigned by any perſons, and whereby ſuch perſons ſhall promiſe to pay to any other perſon, or order, &c. any ſum of money, the money mentioned in ſuch *note* ſhall be due, and payable to the perſon to whom made, and the *note* ſhall be aſſignable over as inland bills of exchange; whereupon the perſon to whom ſuch *note* is payable, or aſſigned, may maintain an action for the ſame againſt the perſon who ſigned, or any who indorſed the *note*, as in the caſes of inland bills, and recover damages and coſts of ſuit, &c. If the party on whom any inland bill of exchange ſhall be drawn, refuſes to accept it by underwriting it under his hand, the perſon to whom payable is to cauſe ſuch bill to be proteſted, as foreign bills; but no acceptance ſhall charge any perſon unleſs bills be underwritten or indorſed; and if it be not underwritten or indorſed, no drawer ſhall be obliged to pay coſts, damages, or intereſt thereon, unleſs proteſt be made for non-acceptance, and within fourteen days after the ſame be ſent, or notice thereof given to the party from whom the bill is received, or left in writing at his uſual place of reſidence. The bill being accepted, and not paid within three days after due, proteſt muſt be made, in writing, under a copy of the bill, by ſome notary public; or, if no ſuch notary be reſident in the place, then by any other ſubſtantial inhabitant, in the preſence of two credible witneſſes, and notice given as aforeſaid, to charge the drawer, &c. Though no proteſt ſhall be neceſſary, except the value ſhall be expreſſed to be received in ſuch bill and the bill be drawn for 20*l.* at leaſt. There is a proviſo in the act, that nothing therein ſhall diſcharge any remedy any perſon may have againſt the drawer, acceptor, or indorſer of any bill.

What has been ſaid of bills of exchange is applicable alſo to promiſſory *notes*, that are indorſed over and negotiated from one hand to another; only, that, in this caſe, as there is no drawer, there can be no proteſt for non-acceptance; or rather, the law conſiders a promiſſory *note* in the light of a bill drawn by a man upon himſelf, and accepted at the time of drawing: and, in caſe of non-payment by the drawer, the ſeveral indorſers of a promiſſory *note* have the ſame remedy, as upon bills of exchange, againſt the prior indorſers.

Stealing of *notes*, bills of exchange, &c. is felony, in the ſame degree as if the offender had robbed the owner of ſo much money, &c. and the forging *notes* for money, bills of exchange, indorſements, &c. is FELONY, by ſtat. 2 Geo. II. cap. 25.

To NOTE *a bill*, is when a public notary goes as a witneſs, or takes notice, that a merchant will not accept or pay it. See PROTEST.

NOTE *of a fine* is a brief of a FINE made by the CHIROGRAPHER, before it be ingroſſed. Or it is an abſtract of the writ of covenant and the concord; naming the parties, the parcels of land, and the agreement. This muſt be enrolled of record in the proper office, by 5 Hen. IV. cap. 14.

NOTÆ *maternæ, mother's ſpots.* See NÆVUS.

NOTE, *natural.* See NATURAL.

NOTHÆ *coſtæ*, in *Anatomy*, denote the five loweſt ribs, on each ſide; they are called *baſtard* or *ſpurious* RIBS, in regard they do not join with the breaſt bone, as the other ribs do; nor are they, as the others are, bony, but cartilaginous.

NOTHING, *nihil, nihilum*, or *non ens*.

The ſchoolmen diſtinguiſh between *nothing* taken *ſtrictly*, which is what is impoſſible, or implies a contradiction; and nothing taken more *generally*, which is both applied to what is poſſible, and impoſſible.

Again, they diſtinguiſh *nothing* into *negative*, which is the abſence of reality in any ſubject; and *privative*, which is the abſence of reality in a ſubject capable thereof, or wherein it ought to be found.

NOTHUS, νοθος, a Latin term, properly ſignifying a *baſtard*, or a perſon of ſpurious birth.

Hence it is applied figuratively, by phyſicians, &c. to ſuch diſeaſes, as, though, in reſpect of a ſimilitude of ſymptoms, &c. they have the ſame denomination as ſome others; yet are of a different origin, ſeat, or the like from the ſame.

NOTHUS is ſometimes alſo uſed for the back part of the cheſt, or thorax.

NOTIOMETER. See HYGROMETER.

NOTION, *notio*, in *Logic*, an idea or repreſentation of any thing in the mind.

This term and the word idea are often taken in the ſame ſenſe; but an ingenious author obſerves, that we cannot ſtrictly be ſaid to have an idea of an active being, or of an action, although we may be ſaid to have a *notion* of them. I have ſome knowledge, or *notion*, of my mind, and its acts about *ideas*, inaſmuch as I know, or underſtand what is meant by thoſe words. What I know, that I have ſome *notion* of.

However the terms idea and *notion* may be uſed convertibly. But yet it conduces to clearneſs and propriety, that we diſtinguiſh things very different by different names. It is alſo to be remarked, that all relations including an act of the mind, we cannot ſo properly be ſaid to have an idea, but rather a *notion* of the relations or habitudes between things; but, if in the modern way, the word idea is extended to ſpirits, relations, and acts, this is, after all, an affair of verbal concern.—Berkeley, Princip. of Hum. Knowl. ſect. 142. p. 160, 161. See IDEA.

M. Leibnitz is very accurate in the diſtinction of *notions*, in the Acta Erud. Leipſ. anno 1684.

NOTION, *a clear*, he defines to be ſuch an one as ſuffices us to recollect the object; v. g. that a given figure is reckoned in the number of triangles.

NOTION, *an obſcure*, is that which doth not ſuffice to recollect the object; ſuch, v. g. is that of a plant, which upon ſeeing, you are in a doubt whether or no it be the ſame you had ſeen elſewhere, and which is called by this or that name.

NOTION, *diſtinct.* See DISTINCT.

NOTION, *a confuſed*, is that wherein you are not able to aſſign the very marks or characters whereby you recollect the object, though it be reſolvable into them. Such, v. g. is the *notion* of red colour.

Abundant NOTION. See ABUNDANT.

NOTION, *an adequate.* See ADEQUATE.

NOTION, *an inadequate*, that wherein you have only a confuſed *notion* of characters that enter a diſtinct one.

Some confuſed *notions* are admitted into mathematics; viz. ſuch whoſe reſolution is of no great conſequence to any demonſtrations.

Thus, Euclid does not reſolve the *notion* of equality, though it enter the *notion* of an equilateral triangle, a rhombus, &c. inaſmuch as the propoſitions, for whoſe demonſtration it ſhould be uſed, are eaſily granted, without ſuch a detail: as v. g. that things equal to the ſame third are equal to one another, &c. but no *notions* are admitted into the number of mathematical definitions, except diſtinct ones, and thoſe too as adequate as poſſible, or as occaſion requires.

The ſchoolmen diſtinguiſh *notions* into *formal*, and *objective*; and each of theſe they ſubdivide into *firſt* and *ſecond*.

NOTION, *a firſt formal*, is the knowledge we have of any thing according to what it is, or has in itſelf; as the knowledge of fire, *quatenus* fire; of a light body, *quatenus* light, &c.

NOTION, *a firſt objective*, is the thing itſelf known, according to what it is, or has in itſelf; as the fire known as fire, &c.

NOTION, *ſecond formal*, is the knowledge of a thing according to what it receives from the underſtanding: as, of fire, that it is the ſubject, and not the predicate.

NOTION, *ſecond objective*, is what agrees to the thing by means of the operation of the intellect, or what it receives from the intellect.

NOTIONS, *common*, called alſo *prenotions*, προληψεις, and κοιναι εννοιαι, are certain principles ſuppoſed by ſome writers to be innate, and which therefore are ſelf-evident, i. e. appear, or are known by their own light, without the intervention of any medium or proof; being impreſſed, as it were, by the finger of God, to ſerve as the foundations of all our concluſions in the ſciences, which are to be demonſtrated hereby.

Theſe *common notions*, conſidered as the foundations of ſciences, are called AXIOMS.

They are called *common*, not as if ſo actually and neceſſarily perceived by every perſon, that nobody could be ignorant of, or deny them; but becauſe they are judged to be true and certain, by all perſons of ſound reaſon.

For the ſame reaſon as we ſay, ſuch a food is wholeſome; not that it is ſo to all men, but to all that are of a ſound body and conſtitution. Ariſtot. Topic. c. 4.

There are two kinds of *common notions*, viz. *theoretical*, which lay the ground-work for ſpeculation; ſuch are, every thing either is, or is not; nothing can be made by itſelf; the whole is greater than a part; equal things being added to equal, the ſums are equal; and *practical*, which lay the foundation for honeſty, and good morals; ſuch are, God is to be beloved, and worſhipped; our parents to be honoured; to give every body their due; to do as we would be done by.

Some philoſophers, however, and thoſe even of beſt note, deny the reality of any innate, or *common notions*; urging, that the mind does not need any actual *notions*; to prepare it to think, but that an innate faculty of thinking may ſuffice; as appears in an infant, from its perception of pain, taſte, colour, &c. They add, that the common organs of ſenſe, if they have but objects preſented to them, and the faculty we have of reflecting on, and variouſly combining or ordering, the ideas received thereby, are ſufficient to furniſh us with all the ſtock of knowledge we have. See IDEA and *Common* SENSE.

NOTIONAL *quantiy.* See QUANTITY.

NOTITIA, *notice*, ſomething that has come under a perſon's knowledge or obſervation.

Hence *notification*, the action of giving notice, &c.

NOTITIA is alſo the title of certain books, compoſed for giving a particular knowledge of the places, roads, &c. of a province, kingdom, dioceſe, or the like.

Such is the *Notitia Imperii*, &c. M. Valois has given a *Notitia Galliarum*, being a collection of the ſeveral names which the cities and provinces of that kingdom bore at different times.

The *Notitiæ Dignitatum Imperii*, both eaſtern and weſtern, are of the utmoſt uſe both in the Roman and in eccleſiaſtical hiſtory; yet they are of little ſervice, at leaſt to young people, without good notes; ſuch are thoſe of Pancirollus, &c. and unleſs the text, which is ſtrangely corrupted and mutilated, be ſupplied.

NOTONECTA, in *Natural Hiſtory*, the name of a ſpecies of water-inſect, approaching to the nature of the cimex. It always ſwims upon its back, and is very ſwift in its motions. Its belly, which it ſhews while in the water, is of a yellowiſh white; its legs are long; when taken out of the water it hops. It is indeed a very beautiful, and very nimble little creature; and is common in the ponds of water in Hyde-park, and in ſeveral other places about London. It has four wings, ſix legs, but no antennæ, and when it ſwims, which is almoſt always on the back, its body reſembles a boat in figure. This creature moſtly lives in the water, where it preys on ſmall inſects, ſucking their juices with its proboſcis in the manner of the water ſcorpion, and many other aquatic inſects.

NOTOPEDA, in *Zoology*. See ELATER.

NOTORIOUS, ſomething known, manifeſt, and public. Hence,

NOTORIA, *ars*. See ART.

NOTRE *Dame*, *our Lady*, a term frequently uſed for the holy Virgin. Hence, feaſts of *Notre Dame*; the office of *Notre Dame*; congregations, nunneries and orders of *Notre Dame*.

NOVACULA *piſcis*, the *razor-fiſh*, in *Ichthyology*, the name of a ſea-fiſh caught in the Mediterranean, and ſome other ſeas, and much eſteemed at the tables of the great.

It is a ſmall fiſh, ſeldom exceeding three or four inches in length, and, in its flat ſhape, ſomewhat reſembles the faber. It keeps about the ſhores, particularly ſuch as are ſtony, and ſeems never to go into deep water; and is caught on the ſhores of Majorca, Minorca, the iſland of Malta, and elſewhere, and lives on ſmall fiſh.— Salvian. de Aquat.

NOVACULARUM *lapis*, in *Natural Hiſtory*, the name given by De Laet to a ſtone which he deſcribes from Ximenes, who has it under the American name *iztli*.

It is the ſtone out of which the natives of America made their weapons of war, and tools for other uſes of life, before they knew the uſe of iron.

There are three ſpecies of this ſtone, the one blue, the other white, and the other black: they are all capable of a very high poliſh, and, when ſet in gold or ſilver, are very highly eſteemed by the natives: they reflect the images of things, in the manner of all other highly poliſhed bodies, and the two firſt are conſiderably tranſparent.

There are ſeveral quarries of theſe ſtones in the neighbourhood of Mexico, whence the Indians uſed to get them; they naturally ſplit in the getting out, into angular and edged figures, and theſe they afterwards faſhioned to the purpoſes they wanted them for, and poliſhed with the powder of a harder ſtone.

They ſtill make knives of them, in a very expeditious and very remarkable manner. They hold the maſs of ſtone between their feet, and, with an inſtrument prepared on purpoſe, they cut off pieces of four or five inches long, and about an inch broad, riſing to a prominence on each ſide in the middle, and growing very thin toward the edges: it is wonderful to ſee with what expedition they finiſh this odd workmanſhip. The knives, when made, are ſharper than any other inſtrument in the world; but they are very tender, eaſily broken, and more eaſily battered, and notched at the edges. They make alſo longer weapons of the ſame ſhape out of this ſtone, which they fix into wooden handles, with a ſort of gum; and theſe ſerve them as ſwords. They are very terrible weapons for one blow, but they ſeldom hold together ſo as to bear a ſecond. They make alſo the heads of their arrows with them; and, when theſe were firſt found by our travellers, they were not ſuppoſed to be of human workmanſhip, but to have fallen from heaven in thunder, and were called, by many authors, CERAUNIA. Ximenes, Hiſt. Ind. Occid. lib. x. cap. 13.

NOVALE, in our ancient cuſtoms, denotes land newly ploughed, and converted into tillage; and which had not been tilled within the memory of man before.

Quod novale *ſemel fuit, ſemper erit* novale *quoad decimarum retentionem vel ſolutionem. What was once* novale, *will ever remain ſo, as to the paying or non-paying of tythes. Excepta decima* novalium *cujuſdam terræ, quam de novo excoluerunt.* Pat. 6. Edw. III.

NOVALE is ſometimes alſo uſed for fallow land, i. e. land which has been ploughed for two years, and reſts, or lies fallow, one more; or that lies fallow every other year.

NOVATIANS, *Novatian*, a ſect of ancient heretics, that aroſe towards the cloſe of the third century, ſo called from Novatus, an African biſhop; or from Novatianus, a prieſt of Rome.

They were called alſo *Cathari*, from καθαρος, *pure*, q. d. Puritans.

Novatian firſt ſeparated from the communion of pope Cornelius, on pretence of his being too eaſy in admitting to repentance thoſe who had fallen off in times of perſecution.

Novatus coming to Rome, joined himſelf to the faction of Novation; and both maintained, that there was no other admiſſion into the church but by the repentance in baptiſm; grounding their opinon on that of St. Paul: "It is impoſſible for thoſe once enlightened, and who "have taſted the heavenly gift, if they fall away, to re"new themſelves by repentance."

Not that they denied but a perſon fallen into any ſin, how grievous ſoever, might obtain pardon by repentance; for they themſelves recommend repentance in the ſtrongeſt terms: but their doctrine was, that the church had it not in its power to receive ſinners into its communion; as having no way of remitting ſins but by baptiſm; which once received could not be repeated.

In proceſs of time the *Novatians* ſoftened and moderated the rigour of their maſter's doctrine, and only refuſed abſolution to very great ſinners.

The two leaders were proſcribed, and declared heretics, not for excluding penitents from communion, but for denying that the church had a power of remitting ſins.

NOVATION, INNOVATION, in the *Civil law*, denotes a change or alteration of an obligation, whereby it becomes extinguiſhed or annihilated.

Thus, when an obligation is diſcharged without receiving any money, but a ſimple promiſe is accepted in its ſtead, this occaſions a *novation*.

There are two kinds of *novations*; the one *voluntary*, the other *neceſſary* and conſtrained.

NOVATION, *neceſſary*, is that made in conſequence of a ſentence or decree of juſtice.

NOVATION, *voluntary*, is made three ways; viz. by changing the cauſe of the obligation, without the intervention of any other perſon; by changing the nature of the obligation; and by delegation, as when the debtor makes over a debt to the creditor for his ſatisfaction.

In all theſe caſes there is a will to innovate. Accordingly, Juſtinian ſays, *Voluntate, non lege, novandum.*

NOVEL, *novella*, in *Juriſprudence*, is a term uſed for the conſtitutions of ſeveral emperors; viz. Juſtin, Tiberius II. Leo, and particularly Juſtinian.

Moſt of Juſtinian's *Novels* were originally Greek, and afterwards were tranſlated into Latin. Their number is 168, compriſed in nine collections or chapters. See CIVIL *law*.

They had their name *novel*, either from their making a great alteration in the face of the ancient law; or, as Cujas rather thinks, becauſe made on new caſes not yet conſidered; and, after the reviſal of the code, compiled by order of the emperor.

Wherever Accurſius ſpeaks of *novels*, he means thoſe publiſhed, in Greek, by Juſtinian: the Latin verſion of them, made in the time of Bulgarus, he calls *Authentics*, by reaſon of its exactneſs and fidelity.

NOVEL, in *Matters of Literature*, a fictitious hiſtory of a ſeries of ſurpriſing and entertaining events in common life, wherein the rules of probability are, or ought to be ſtrictly obſerved; in which it differs from a romance, where the hero and heroine are ſome prince and princeſs, and the events, which lead to the cataſtrophe are, in general, highly abſurd and unnatural. The beſt *novels* are thoſe, which, by means of a well-told ſtory, convey a number of noble and elevated ſentiments, and inſtruct the reader in the knowledge of mankind.

NOVEL *aſſignment*, in an action of treſpaſs, is an aſſignment of time, place, or the like, in a declaration, otherwiſe or more particularly than it was in the writ.

NOVEL *diſſeiſin*. See ASSISE *of novel diſſeiſin*.

NOVEMBER, the eleventh MONTH in the Julian year, but the ninth in the year of Romulus; whence its name.

NOVEMSILES, or NOVENSILES, in *Mythology*, a ſpeices of gods worſhipped among the ancient Romans.

The *dii novemſiles* were the gods of the Sabines, adopted by Romulus; and had a temple built to them, in conſequence of a vow, by king Tatius.

Some antiquaries take the name to have been given to thoſe heroes who were laſt placed among the number of the gods; as Hercules, Veſta, Sanctity, Fortune, &c.

NOVEMVIRI, an order of magiſtrates at Athens, nine in number.

The *novemviri* were the chief magiſtrates of the city;

their office only held for one year. Their chief was called *archon*, whoſe name was recorded in the Athenian feaſts; as, at Rome, that of the conſuls.

The ſecond bore the title of *baſileus*; the third, of *polemarcha*, i. e. chief of the troops; and the remaining ſix, of *theſmothetes*.

NOVENDIALE, or Novemdiale, in *Antiquity*, a ſolemn SACRIFICE among the Romans, held on occaſion of any prodigies appearing to menace them with ill fortune.

It had its name from the term of its celebration; viz. *novem dies, nine days*.

NOUER *l'eguillette*, in the *Manege*. See Yerking.

NOVICE, a perſon not yet ſkilled or experienced in an art or profeſſion.

In the ancient Roman militia, *novicii*, or *novitii*, were the young raw ſoldiers, diſtinguiſhed by this appellation from the veterans.

In the ancient orders of knighthood there were *novices*, or clerks in arms, who went through a kind of apprenticeſhip before they were admitted knights.

Novice is more particularly uſed in monaſteries, for a religious, yet in his, or her year of probation, and who has not made the vows.

In ſome convents the ſubprior has the direction of the *novices*. In nunneries the *novices* wear a white veil, the reſt a black one.

A *novice* is not eſteemed dead in law, but is capable of inheriting till the time of actual profeſſion; nor can his benefices be taken away during the year of probation, without his conſent.

The council of Trent prohibits a *novice* from aſſigning over his benefices, till two months before the expiration of his year of probation; and he may even reſume them, if the profeſſion be null.

A *novice* is not allowed to make any donation to his ſuperior, by reaſon of the dependence he is under.—*Novices* may either quit the convent during their noviciate, or may be turned off by the convent.

NOVICIATE, a year of probation, appointed for the trial of religious, whether or no they have a vocation, and the neceſſary qualities for living up to the rule; the obſervation whereof they are to bind themſelves to by vow.

The *noviciate* laſts a year at leaſt; in ſome houſes more. It is eſteemed the bed of the civil death of a novice, who expires to the world by profeſſion.

Noviciate is alſo uſed for the houſes or places where *novices* are inſtructed.

In this ſenſe the *noviciate* is frequently a cloiſter ſeparate from the grand dormitory.

NOUN, *nomen*, in *Grammar*, a name or word which expreſſes the ſubject ſpoken of; or expreſſes a ſubject whereof ſomething is, or may be affirmed; as man, food, whiteneſs, Henry, &c.

A *noun*, therefore, in language, anſwers to an idea in logic.

The generality of ſubjects ſpoken of have particular names; yet there are others, which, without being attached to the ſame particular ſubject, are yet real *nouns*. Thus, beſides the particular name which each perſon bears, and whereby others denote him, he gives himſelf another when he ſpeaks of himſelf as *I*, or *myſelf*.

It is only the more particular names that in grammar have retained the quality of *nouns*; the more general ones are called *pronouns*.

Nouns, again, are to be viewed in another light, viz. as divided into *nouns ſubſtantive*, and *nouns adjective*.

They are called *ſubſtantives*, when the objects they deſign are conſidered ſimply in themſelves, and without any regard to their qualities.

They are called ADJECTIVES, when their objects are conſidered as clothed with any qualities.

But, in effect, the object is alone deſigned by the *nouns* ſubſtantives; which, in this view, are alone the proper *nouns*.

Adjectives, in reality, are only the modificatives of *nouns*; though in one view they may be conſidered as *nouns*; viz. as they do not ſo much repreſent a quality or circumſtance of the object, as the object itſelf, clothed with that quality or circumſtance. Nor muſt it be omitted, that a *noun* adjective frequently becomes a ſubſtantive: for as its nature is to expreſs the quality of an object, if that quality happen to be the object itſelf ſpoken of, then, according to our firſt definition, it becomes a ſubſtantive.

Thus, if I ſay, *a good intention*, the word *good* is here an adjective, repreſenting the intention as clothed with the quality of goodneſs; but if I ſay, *the good is to be choſen*, it is evident that *good* is here the ſubject ſpoken of, and of conſequence is a *noun* ſubſtantive. Nor are there caſes wanting, wherein *nouns* ſubſtantives become adjectives.

It is true, that in the common uſe of grammar, many *nouns*, that are really adjectives, are not reckoned as ſuch; none being eſteemed adjectives but thoſe which without any, or at leaſt any conſiderable change in their inflexion and termination, are joined indifferently to *nouns* ſubſtantives of different genders.

Nouns are again divided into *proper* and *appellative*.

Nouns proper are thoſe which expreſs a particular thing or perſon, ſo as to diſtinguiſh it from all other things of the ſame kind; as, Socrates.

Nouns appellative are thoſe common to ſeveral individuals of the ſame kind; as man, angel, &c.

Nouns *heterogeneous*, are ſuch as are of one gender in the ſingular number, and of another in the plural. See HETEROCLITE.

NOURISHING *clyſters*. See Clyster.

NOURISHMENT. See Nutrition.

NOVUS *auris muſculus*, in *Anatomy*, a name given by Fabricius to the muſcle called by Albinus *laxator tympani*, and, by others, *externus auris*, and *exterior*.

NOWED, Nowe, i. e. *knotted*, in *Heraldry*, is applied to the tails of ſuch creatures as are very long, and ſometime repreſented in coat-armour, as if tied up in a knot.

NUAYHAS, the *ague-tree*, a name given by the Indians to a ſort of bamboe cane, the leaves of which falling into the water, are ſaid to impregnate it with ſuch virtue, that the bathing in it afterwards will cure the ague. They uſe alſo a decoction of the leaves to diſſolve coagulated blood, giving it internally, and, at the ſame time, rubbing the bruiſed part externally with it.

There ſeems ſomething of fiction in the account of many particulars of this tree, in the Hortus Malabaricus, but it ſeems certain that the length of the ſtalks, or trunk, muſt be very great; for in the gallery of Leyden, there is preſerved a cane of it of twenty-eight feet long, and another but little ſhorter in the Aſhmolæan Muſeam at Oxford, which is more than eight inches in diameter; yet both theſe appear to be only parts of the whole trunk, they being nearly as large at one end as at the other.

NUBECULA, *little cloud*, in *Medicine*, a term ſometimes uſed for diſeaſe in the eye, where objects appear as through a cloud or miſt.

The *nubecula* ſeems to ariſe from certain groſs particles detained in the pores of the cornea, or ſwimming in the aqueous humour, and thus itercepting the rays of light.

Nubicula, or Nubes, is alſo uſed for what we otherwiſe call ALBUGO and PANNUS.

Nubecula is alſo uſed for a matter in form of a cloud, ſuſpended in the middle of the urine. This they ſometimes alſo called ENÆOREMA. See Urine.

NUBELOSA *linea*, a term uſed by the Latin writers on heraldry, to expreſs a ſort of clouded line in certain coats of arms. Our heralds call it NEBULE, and the French *nuance*. It is figured ſo as to repreſent clouds at the edge, and was given to the firſt of the families who bear it, as a token of their ſkill in aſtronomy and navigation.

NUBES, in *Natural Hiſtory*, a word uſed by the ancients to expreſs that whitiſh foulneſs which we frequently ſee in the bottom of the fineſt columns of cryſtal: we expreſs this by the ſame word, *cloud*.

The columnar emeralds are ſubject to the ſame ſort of foulneſs at their bottom; and this part was called the root of the emerald properly enough, as it was that end of the column where it grew to the ſtone; but the word root of emerald has been ſince applied to ſeveral very different ſubſtances of a green colour, and ſome degree of tranſparence.

NUBIGENUM *æs*, a term uſed by ſome hiſtorians to ſignify copper generated in the clouds, and falling from thence with rains, or in ſtorms. They talk alſo of iron, and of ſtones produced the ſame way, and call them *ferrum nubigenum*, and *lapides nubigeni*.

Many of the German hiſtorians mention the falling of iron in duſt, and in large pieces; and Avicenna tells us ſuch things of Italy. Phil. Tranſ. N° 156. See *Præternatural* Rains.

NUBILES *anni*. See Anni.

NUCHA, the hinder part of the nape of the neck; called alſo CERVIX.

NUCIFEROUS, an appellation given by botaniſts to trees which bear nuts.

NUCIFRAGA, in *Ornithology*, a name given by many to the COCCOTHRAUSTES, or *groſs-beak*, from its breaking nuts, and the ſtones of fruits.

NUCKIANÆ *glandulæ*, in Anatomy, a number of ſmall glands, ſituate in that part of the ſkull wherein the orbits of the eyes are, between the abducent muſcle of the eye, and the upper part of the os jugale. See Gland.

They were thus denominated from their diſcoverer, Ant. Nuck, profeſſor of phyſic at Leyden.

The ſame author gave his name to a SALIVAL duct, *ductus Nuckianus*.

NUCLEUS, a Latin word, literally denoting the kernel of a nut, or ſtone fruit; or, more ſtrictly the edible part contained within the ſkin of the kernel.

NUCLEUS is alſo uſed by Botaniſts, in a larger ſenſe, for any fruit or ſeed contained within a huſk or ſhell.

NUCLEUS is alſo uſed by Hevelius, and ſome other aſtronomers for the body of a comet, which others call its *head*, in contradiſtinction to its tail, or beard.

NUCLEUS is alſo applied by ſome to the central parts of the earth, and other planets, as ſuppoſing them to be looſe from the exterior part, which they conſider as a cortex or ſhell.

NUCLEUS, in *Architecture*, denotes the middle part of the flooring of the ancients, conſiſting of a ſtrong cement, over which they laid the pavement, bound with mortar.

NUCULA *terreſtris*, in *Botany*, a name given by ſome to the BULBOCASTANUM.

NUDE *compact*, *nudum pactum*, a bare contract, engagement, or promiſe of a thing without any conſideration: *Ex quo*, ſay the lawyers, *non oritur actio*. See CONTRACT.

NUDE *matter* denotes a bare allegation of a thing done.—See MATTER.

NUDIPEDALIA, among the ancients, a feſtival in which all were obliged to walk bare-footed.

This was done on account of ſome public calamity, as the plague, famine, an intenſe drought, and the like.

It was likewiſe uſual for the Roman matrons, when any ſupplication and vows were to be made to the goddeſs Veſta, to walk in proceſſion to her temple bare-footed.

NUDITIES, in *Painting* and *Sculpture*, denote thoſe parts of a human figure not covered with any drapery; or thoſe parts where the carnations appear.

NUEL, or rather NEWEL of a ſtair-caſe. See NEWEL, and STAIR-*caſe*.

NUFAR, in *Botany*, the name of the *water*-LILY. This was the original name, and was firſt uſed by the Arabians; from them the Greeks borrowed it, and variouſly changed it.

The Arabians themſelves added the prefix *nil* to it, to expreſs one particular kind of *water-lily* of Ægypt.

NULLITY, the quality of a thing null, that is void, and of no effect, by reaſon of ſomething contrary to law, cuſtom, or form.

There are two kinds of *nullities* to invalidate a contract, or other inſtrument, viz. *de facto*, and *de jure*. The former where the thing commences null *ipſo facto*, as ſoon as the thing is proved: in the latter the act does not immediately become null, but a handle is given thereby to have it entirely annulled, or ſet aſide.

NUMB-*fiſh*, a CRAMP-*fiſh*, in *Ichthyology*. See TORPEDO.

NUMBER, in *Arithmetic*, a collection or aſſemblage of ſeveral units, or ſeveral things of the ſame kind.

Stevinus chooſes to define *number* as that whereby the quantity of any thing is expreſſed: agreeable to which, ſir Iſaac Newton conceives a *number* to conſiſt, not in a multitude of units, as Euclid defines it, but in the abſtract ratio of a quantity of any kind to another quantity of the ſame kind, which is accounted as unity. And in this view he divides *number* into three kinds, viz. INTEGERS, FRACTIONS, and SURDS.

Wolfius defines *number* to be ſomething which refers to unity, as one right line refers to another. Thus, aſſuming a right line for unity, a *number* may likewiſe be expreſſed by a right line.

A leſs general definition of *number* that author thinks will not comprehend the ſeveral kinds of whole *numbers*, fractions, rationals, and ſurds.

The ſchoolmen, keeping to Euclid's definition, hold *number* to conſiſt of *matter* and *form*: the matter is the things numbered, e. g. coins: the form, the idea whereby comparing the ſeveral pieces, we bring them into one ſum, as ten: ſo that *number* depends altogether on the mind of the perſon that numbers; whence, changing the idea at pleaſure, a hundred men ſhall only be called one, or it ſhall be two, or four, &c. Hence, ſay they, the form of a *number* is not any thing added to the things numbered; for the idea is a mere mode of the mind, not any thing ſuperadded to the things. And hence, though there may be ſome efficacy in *number*, conſidered with reſpect to the matter, as when we ſay, a triple rope is not eaſily broken: yet there is none in reſpect to form; for what alteration ſhould my idea make? And hence the folly of the philoſophy of *numbers*.

The ſame philoſophers call *number a diſcrete quantity: quantity*, as it admits of more and leſs; and *diſcrete*, ſince the ſeveral units it conſiſts of are not united, but remain diſtinct.

NUMBERS, *for the manner of characterizing*, ſee NOTATION.

For that of expreſſing or reading thoſe already characterized, ſee NUMERATION.

NUMBER, *for the meaſure of a*, ſee MEASURE.

Mathematicians, conſidering *number* under a great many circumſtances, different relations, and accidents, make many kinds of *numbers*.

NUMBERS, *abſolule*, *abſtract*, *abundant*, *amiable*, *applicate*, *binary*. See the reſpective adjectives.

NUMBERS, *broken*, or *fractions*, are thoſe conſiſting of ſeveral parts of unity; or of thoſe which refer to unity, as a part of the whole. See FRACTION.

NUMBERS, *cardinal*, *circular*, *compoſite*, *concrete*. See the adjectives.

NUMBER, *cubic*, the product of a ſquare *number*, multiplied by its root; e. g. 8, the product of the ſquare *number* 4, multiplied by its root 2. See CUBIC.

All *cubic numbers*, whoſe root is leſs than 6, v. g. 8, 27, 64, 125, being divided by 6, the remainder is their root itſelf. Thus, 8, being divided by 6, 2, the remainder of the diviſion, is the cube root of 8. For the *cubic numbers* beyond 125, 216; the cube of 6, divided by 6, leaves no remainder; 343, the cube of 7, leaves a remainder of 1, which added to 6, gives the cube root of 343. And 512, the cube of 8, divided by 6, leaves 2, which added to 6, makes the cube root of 512. So that the remainder of the diviſions of the cubes above 216, divided by 6, being added to 6, always give the root of the *cubic number* divided, till that remainder be 5, and of conſequence 11 the cube root of the *number* divided: but the *cubic number* above this, being divided by 6, there remains nothing, the cube root being 12. Thus, if you continue to divide the higher cubes by 6, you muſt not add the remainder of the diviſion to 6, but to 12, the firſt multiple of 6, and thus coming to the cube of 18; the remainder of the diviſion muſt not be added to 6, nor to 12, but to 18; and ſo *in infinitum*.

Monſ. de la Hire, from conſidering this property of the *number* 6, with regard to *cubic numbers*, found, that all other *numbers*, raiſed to any power whatſoever, had each their diviſor, which had the ſame effect with regard to them, that 6 has with regard to cubes. And the general rule he has diſcovered is this: if the exponent of the power of a *number* be even, i. e. if that power be raiſed to the 2d, 4th, 6th, &c. power, it muſt be divided by 2; and the remainder, if there be any, added to 2, or to a multiple of 2, gives the root of the *number* correſponding to its power, i. e. the 2d or 6th root, &c. But, if the exponent of the power of the *number* be uneven, i. e. if it be raiſed to the 3d, 5th, 7th, &c. power, the duple of that exponent will be the diviſor, which ſhall have the property here required.

NUMBERS, *defective*. See DEFICIENT.

NUMBER, a *determinate*, is that referred to ſome given unit; as a ternary or three; which is what we properly call a *number*.

NUMBER, *even*, that which may be divided into two equal parts, without remainder or fraction: as 4, 6, 8, 10, &c. The ſum, as alſo the difference, and the factum or product of any number of *even numbers*, is always an *even number*.

An *even number*, multiplied by an *even number*, produces an *evenly even number*.

An *even number* is ſaid to be *evenly even*, when it may be meaſured or divided, without any remainder, by another *even number*.

Thus, twice 4 being 8, 8 is an *evenly even number*.

A *number* is ſaid to be *unevenly even*, when it may be equally divided by an *uneven number*; as 20, which may be divided by 5.

NUMBERS, *figurate* or *figural*. Thoſe of the firſt order are 1, 1, 1, 1, &c. thoſe of the ſecond order, the ſucceſſive ſums of thoſe of the firſt order, viz. 1, 2, 3, 4, 5, &c. and form an arithmetical progreſſion; thoſe of the third order are the ſucceſſive ſums of thoſe of the ſecond, viz. 1, 3, 6, 10, 15, &c. and are the triangular numbers; thoſe of the fourth order are ſucceſſive ſms of the third, viz. 1, 4, 10, 20, 35, and are the pyramidal numbers, and ſo on.

The *figurate numbers* of any order may be found without computing thoſe of the preceding orders, by taking the ſucceſſive products of as many of the *numbers* 1, 2, 3, 4, 5, &c. in their natural order, as there are units in the *number*, which denominates the order of *figurates* required, and dividing thoſe products always by the firſt product: thus the triangular *numbers* are found by dividing the products 1×2, 2×3, 3×4, 4×5, 5×6, &c. each by the firſt product 1×2. The pyramids alſo are found by dividing the products 1×2×3, 2×3×4, 3×4×5, 4×5×6, &c. each by 1×2×3. In general, the *figurate numbers* of any order denoted by M, are found by ſubſtituting ſucceſſively 1, 2, 3, 4, 5, &c. in the place of x in the general expreſſion $\frac{x.\,x+1.\,x+2.\,x+3.\ \&c.}{1.\ 2.\ 3.\ 4.\ \&c.}$ where the factors in the numerator and denominator are ſuppoſed to be multiplied by each other, and to be continued, till the number in each be equal to that which expreſſes the order of the figurates required, diminiſhed by unity. And when a *figurate number* of any order is divided by the correſponding figurate of any higher order, the numerator of the quotient is invariable, and x is in its denominator of as many dimenſions as there are units in the difference of the *numbers* that denote thoſe orders. See Maclaurin's Fluxions, art. 351, in the notes.

Numbers, *homogeneal*, are thoſe referred to the ſame unit. See Homogeneal.

Numbers, *heterogeneal*, thoſe referred to different units. For every *number* ſuppoſes ſome determinate unit, which is determined by the notion to which we have regard in numbering; e. g. it is a diſtinguiſhing property of a ſphere, that the ſeveral points of its ſurface are equidiſtant from its centre. If then this be laid down as a note of unity, all bodies, to which it agrees, will have the nature of unity; and are the ſame units, *quatenus*, contained under this notion. But, if ſpheres be diſtinguiſhed, e. g. with regard to the matter they are compoſed of, then thoſe which before were the ſame units commence different. Thus, ſix golden ſpheres, and three golden ſpheres, are *homogeneal numbers* among themſelves; and three braſs ſpheres, and four ſilver ones, are *heterogenous numbers*.

Numbers, *imperfect*, thoſe whoſe aliquot parts added together make either more or leſs than the whole, whereof they are parts.

Imperfect numbers are diſtinguiſhed into *abundant* and *defective*.

Number, *indeterminate*, is that referred to unity in the general; which is what we call Quantity.

Number, *irrational*, or *ſurd*, a *number* incommenſurable with unity. See Surd.

Numbers, *linear*, *mixt*. See the Adjectives.

Numbers, *muſical*. See Musical.

Number, *ordinal*. See Ordinal.

Number, *perfect*, that whoſe aliquot parts added together make the whole *number*; as 6, 28, &c. The aliquot parts of 6 being 3, 2, and 1 = 6; and thoſe of 28 being 14, 7, 4, 2, 1, which together make 28.

Number, *plain*, that ariſing from the multiplication of two *numbers*; e. g. 6, which is the product of 3 multiplied by 2. The *numbers*, which thus multiplied produce a *plain number*, as here, 2 and 3 are called the *ſides* of the plane.

Numbers, *polygonous*. See *Figurate* Number, and Polygonal.

Number, *primitive* or *prime*. See Prime.

Numbers, *pyramidal*. See Pyramidal.

Number, *rational*. See Rational.

Numbers, *ſimilar*. See Similar.

Number, *ſquare*. See Square.

Every *ſquare number*, added to its root, makes an even *number*.

Number, *uneven*, that which exceeds an *even number*, at leaſt, by unity; or which cannot be divided into two equal paats; ſuch as 3, 5, 9, 11, &c.

The ſum, or the difference of two *uneven numbers*, makes an *even number*; but the factum of two makes an *uneven* one.

If an *even number* be added to an *uneven* one, or if the one be ſubtracted from the other; in the former caſe, the ſum, in the latter, the difference, is an *nneven uumber*: but the factum of an *even* and *uneven number* is even.

The ſum of any *even number* of *uneven numbers* is an *even number*: and the ſum of any *uneven number of uneven numbers* is an *uneven number*.

Numbers, *whole*, called alſo *natural numbers*, and *integers*, or ſimply *numbers*, are all the various aſſemblages of unity, or the ideas we have of ſeveral multitudes; or, according to Wolfius, all thoſe which, in the manner of expreſſing, refer to unity, as a whole does to a part.

Number, *golden*, in *Chronology*. M. Caſſini defines the *golden number* by the number of years elapſed ſince that which had the new moon on its firſt day; as that of the year 1500, whoſe *golden number* was 0; which he takes for his epocha.

Number, *golden*, is alſo uſed, with ſomewhat leſs propriety, for a period of 19 years, invented by Meton the Athenian; at the end whereof, the ſame lunations return in the ſame days, though not preciſely in the ſame hour and minute of the day; but within an hour and a half of the ſame time.

In which ſenſe, *golden number* amounts to the ſame with what we otherwiſe call *lunar* Cycle, or *Metonic year*.

Hence this period, called by the Greeks *enneadecaeteris*, is not perfectly juſt; there being a proemptoſis, or leap, at the end of each 312 years; i. e. in that time, the lunations fall out a day ſooner than the *golden number* expreſſes them.

This, among other things, was what engaged pope Gregory XIII. to reform the calendar, to throw out the *golden number*, and ſubſtitute the cycle of epacts inſtead of it; for the uſe of the *golden number*, which, in the Julian calendar, ſerves to find the new moons, only ſerves, in the Gregorian, to find the cycle of epacts.

This *number* is ſaid to have had its name, *golden*, from the extent of its uſe; or, otherwiſe, becauſe the Athenians received it with ſo much applauſe, that they had it written in the public market in letters of gold.

Number, *golden, of any year of Chriſt, to find the*. Since the lunar cycle commences with the year before our Saviour's birth; to the year of our lord add 1: then dividing the ſum by 19; the remainder, after the diviſion, is the *golden number* required: if there be nothing remaining, the *golden number* is 19. Suppoſe, e. g. the *golden number* of the year 1781, were required: 1781+1=1782. And 1782, divided by 19, gives a quotient of 93, and leaves a remainder of 15, which is the *golden number* of that year. See Epact.

The following table ſhews the *golden number* (which is the ſame both in the old and new ſtyle), from the Chriſtian æra to A. D. 4000.

Hundreds of Years.			Years leſs than a Hundred.																		
			0 19 38 57 76 95	1 20 39 58 77 96	2 21 40 59 78 97	3 22 41 60 79 98	4 23 42 61 80 99	5 24 43 62 81	6 25 44 63 82	7 26 45 64 83	8 27 46 65 84	9 28 47 66 85	10 29 48 67 86	11 30 49 68 87	12 31 50 69 88	13 32 51 70 89	14 33 52 71 90	15 34 53 72 91	16 35 54 73 92	17 36 55 74 93	18 37 56 75 94
0	1900	3800	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
100	2000	3900	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5
200	2100	4000	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10
300	2200	&c.	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
400	2300	—	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1
500	2400	—	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6
600	2500	—	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11
700	2600	—	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
800	2700	—	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2
900	2800	—	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7
1000	2900	—	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12
1100	3000	—	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1200	3100	—	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3
1300	3200	—	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8
1400	3300	—	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13
1500	3400	—	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1600	3500	—	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4
1700	4690	—	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9
1800	3700	—	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14

Number *of direction*, in *Chronology*. The earlieſt Easter poſſible is the twenty-ſecond of March, and the lateſt the twenty-fifth of April. Within theſe limits are thirty-five days, and the number belonging to each of them is called the *number of direction*, becauſe thereby the time of the Eaſter is found for any given year.

To find this *number*, according to the new ſtyle, firſt find the DOMINICAL *letter*, then find the golden *number*, by the rule or table under the preceding article, entering the table with the complete hundreds of the ſame year at the left hand, and the year below an hundred at the top, and where the columns meet is the golden *number* for the ſame year. Laſtly, enter the annexed table, with the dominical letter on the left hand, and the golden *number* at the top; and where the colums meet is the *number of direction* for that year.—Thus, the dominical letter, new ſtyle, for the year 1781, is G, and the golden *number* is 15, by which, in the following table, the *number of direction* is found to be 25, which, reckoning from the 21ſt of March, ends on the 15th of April, which is Eaſter Sunday in that year.

Table ſhewing the *number of direction*, for finding Eaſter Sunday, by the golden *number* and Dominical letters.

G.N.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A	29	19	5	26	12	33	19	12	26	19	5	26	12	5	26	12	33	19	12
B	27	13	6	27	13	34	20	13	27	20	6	27	13	6	20	13	34	20	6
C	8	14	7	21	14	35	21	7	28	21	7	28	14	7	21	14	28	21	7
D	29	15	8	22	15	29	22	8	29	15	8	29	15	1	22	15	29	22	8
E	30	16	2	23	16	30	23	9	30	16	9	23	16	2	23	9	30	23	9
F	24	17	3	24	10	31	24	10	31	17	10	24	17	3	24	10	31	17	10
G	25	18	4	25	11	32	18	11	32	18	4	25	18	4	25	11	32	18	11

This Table is adapted to the New Style.

Ferguſon's Aſtron. p. 275.

Number, in *Grammar*, is a modification of nouns, verbs, &c. to accommodate them to the vareties of their objects, conſidered with regard to *number*.

Nouns, or names, agreeing to ſeveral things, may be conſidered either as applied to one of thoſe things ſingularly, or to a *number* of them; and thoſe either conſidered as ſeveral, or as united. To diſtinguiſh theſe caſes, two *numbers* have been invented, the *ſingular* and *plural*.

When a noun indicates an object conſidered as ſingle, or alone, or a *number* of them conſidered as united together, it is ſaid to be of the *ſingular number*: as, a tree, a troop, a temple.

When it indicates ſeveral objects, and thoſe as diſtinct, it is of the *plural number*: as trees, or temples. Thus, when I ſpeak of myſelf, as making part of ſeveral others, inſtead of I, I ſay, we, &c.

The Greeks have a third *number*, which they call the *dual number*, as ſignifying two. The Hebrews have ſomething like it; but then it only takes place when the words ſignify a thing double, either by nature, as the hands, the eyes, &c. or by art, as ſciſſars, tongs, &c.

As to common and appellative names, they ſeem all naturally to require a plural *number*; yet there are ſeveral, which have none, as the name of gold, ſteel, &c.

The difference of *numbers* in nouns is expreſſed by a difference of termination or ending.

In Engliſh, the ſingular is uſually converted into plural, by adding s; as tree, trees; hand, hands; &c. Where the pronunciation requires it, as when the ſingular ends in s or x, ſh or ch, it is uſually done by the addition of es, inſtead of s.

The plurals of adjectives, though varied from the ſingulars in moſt other languages, yet in Engliſh are generally the ſame.

NUMBERING *rods*. See **Neper's** *bones*.

NUMBERS, in *Poetry*, *Oratory*, *Muſic*, &c. are certain meaſures, proportions, or cadences, which render a verſe, period, or ſong agreeable to the ear.

Poetical and *proſaic numbers* are ſomewhat different.

Numbers, *poetical*, conſiſt in a certain harmony in the order, quanties, &c. of the feet and ſyllables; which make the piece muſical to the ear, and fit for ſinging; for which all the the verſes of the ancients were intended. See Rhythm.

It is of theſe *numbers* Virgil ſpeaks in his fourth eclogue:

> ——*Numeros memini, ſi verba tenerem.*

And again, in the ſixth eclogue:

> *Tum vero in numerum faunoſque feraſque videres*
> *Ludere*——

The *numbers* are what conſtitute the air and character of a verſe; and denominate it ſmooth, or ſoft, or low, or rough, or ſonorous. The following lines of Milton furniſh an inſtance of ſoft, eaſy *numbers*:

> *Then feed on thoughts, which voluntary move*
> *Harmonious* numbers; *as the tuneful bird*
> *Sings darkling, and, in ſhadieſt cavert hid,*
> *Tunes her nocturnal note*——

How different from the *numbers* of theſe!

> *Arms meet with arms, faucheons with faucheons claſh,*
> *And ſparks of fire, ſtruck out from armour, flaſh.*

Numbers, *rhetorical*, or *proſaic*, are a ſort of ſimple unaffected harmony, leſs glaring than that of verſe; yet ſuch as is perceived, and affects the mind with pleaſure. The *numbers* are that, by which the STYLE is ſaid to be eaſy, free, round, flowing, &c.

A fine inſtance of *numbers* we have in that paſſage of Tully for Marcellus: *Nulla eſt tanta vis, tantaque copia, quæ non ferro ac viribus debilitari frangique poſſit.* All the beauty of which would be entirely loſt to any tolerable ear, if the *numbers* were a little inverted, thus: *Nulla eſt vis tanta, & copia tanta, quæ non poſſit debilitari frangique viribus & ferro.*

Numbers are things abſolutely neceſſary in all writing, and even in all ſpeech. Hence Ariſtotle, Tully, Quintilian, &c. lay down abundance of rules as to the beſt manner of intermixing dactyls, ſpondees, anapeſta, iambuſes, choraic, and dichoraic moloſſuſes, &c. in order to have the *numbers* perfect.

The ſubſtance of what we have ſaid, is reducible to what follows: 1. The ſtyle becomes numerous, by the alternate diſpoſition and temperature of long and ſhort ſyllables; ſo as that the multitude of ſhort ones neither render it too haſty, nor that of longer ones too ſlow and languid. Thus Tully to Cæſar: *Domuiſti gentes immanitate barbaras, multitudine innumerabiles, locis infinitas, omni copiarum genere abundantes, &c.*

Sometimes, indeed, long or ſhort ſyllables are deſignedly thrown together, without any ſuch mixture, to paint the celerity or ſlowneſs of a thing by that of the *numbers*; as,

> *Quadrupedante putrem ſonitu quatit ungula campum.*
> Æneid. l. 8.
>
> *Luctantes ventos, tempeſtateſque ſonoras.*
> Id. l. 1.

2. The ſtyle becomes numerous by the intermixing words of one, two, or more ſyllables; e. g. *Vivis; & vivis non ad deponendam, ſed ad confirmandum audaciam.* Whereas the too frequent repetition of monoſyllables renders the ſtyle pitiful and grating: e. g. *Hac in re nos hic non ferit.*

3. It contributes greatly to the numerouſneſs of a period; to have it cloſed by magnificent and well-ſounding words; as, *Qui locus quietis ac tranquillitatis pleniſſimus fore videbatur, in eo maximæ moleſtiarum, & turbulentiſſimæ tempeſtates extiterunt.*

4. The *numbers* depend not only on the nobleneſs of the words in the cloſe, but in thoſe of the whole tenor of the period; as in that fine oration of Cicero for Fonteius, a brother of one of the Veſtal maids: *Nolite pati, judices, aras deorum immortalium, Veſtæque matris, quotidianis virginum lamentationibus de veſtro judicio commoveri.*

5. To have the period flow eaſily and equably, the harſh concurrence of letters and words is to be very ſtudiouſly avoided, particularly the frequent meeting of rough conſonants; as *ars ſtudiorum, rex Xerxes*: the beginning the firſt ſyllable of a word with the laſt of the preceding; as, *Res mihi inviſæ ſunt*: the frequent repetition of the ſame letter or ſyllable; as in that verſe of Ennius:

> *Africa terribili tremit horrida terra tumultu*:

and the frequent uſe of like-ending words; as *amatrices, ajutrices, præſtigiatrices, fuerunt.* See Juncture.

Laſtly, the utmoſt care is to be taken, leſt in aiming at *oratorial numbers*, you ſhould fall into *poetical* ones; and inſtead of proſe write verſe; which even Cicero himſelf is ſometimes guilty of: witneſs *Cum loquitur, tanti fletus gemituſque fiebant.*

With regard to Engliſh compoſition, the following cautions ſhould be obſerved: a number of monoſyllables ſhould not be crouded together, nor ſeveral words of the ſame termination, eſpecially if the accent falls on the ſame ſyllable in each of them; nor ſhould a ſentence end with a monoſyllable: to which may be added, that very long words are not ſuited to the beginning or concluſion of a period. Ward's Orat. vol. i. p. 380, &c.

NUMELLA, among the Romans, an engine of wood uſed in puniſhing offenders, whoſe necks and feet were made faſt in it.

Numella was likewiſe uſed to denote a rope or cord made of raw ox-hides to bind beaſts with.

NUMENIA, Νȣμηνια, or νεομηνια, in *Antiquity*, a feſtival obſerved at the beginning of every lunar mouth, in honour of all the gods, but eſpecially Apollo, who was called Νεομενιος, becauſe the ſun is the author of all lights; for whatever diſtinction of times and ſeaſons may be taken from other planets, yet they are all owing to him, as the original and fountain of all thoſe borrowed rays, which the reſt have only by participation from him.

For the ceremonies of this ſolemnity, ſee Potter, Arch. tom. i. p. 416.

NUMENIASTÆ, Νȣμηνιαςαι, among the *Ancients*, a deſignation given to thoſe who kept a feſtival on every new moon. See Numenia.

NUMENIUS is a name uſed by many authors for the curlew, a bird more uſually known by the name of arquata

Numenius *indicus*, the *Indian curlew*. See Guara.

NUMERAL *figures*. The antiquity of theſe in England has been ſuppoſed as high as the eleventh century, from an ancient date found at Colcheſter, at firſt thought to expreſs 1090; the figure in the place of hundreds being taken for a cypher, by not attending to the inſide ſtrokes, which were pretty near defaced; but upon a more accurate view that miſtake was diſcovered, and the date found to be 1490. See Phil. Tranſ. N° 439 and 475. See Arabic *Figures*, and Figures.

Numeral *letters*, thoſe letters of the alphabet, which are generally uſed for figures; as, I, V, X, L, C, D, M.

Numeral *characters*. See Character,

NUMERALS, in *Grammar*, are thoſe words which expreſs *numbers*; as ſix, eight, ten, &c. See Ordinals.

NUMERATION, in *Arithmetic*, the art of eſtimating or pronouncing any *number*, or ſeries of *numbers*.

The characters, whereby *numbers* are ordinarily expreſſed, are the nine following ones; 1, 2, 3, 4, 5, 6, 7, 8, 9.

It being the law of the common *numeration*, that when you are arrived at ten, you begin again, and repeat as before; only expreſſing the number of tens.

Weigelius, indeed, ſhews how to number, without going beyond a quaternary; i. e. by beginning to repeat at each fourth. And Leibnitz, in what he calls his *binary arithmetic*, begins to repeat at every ſecond; only uſing two characters, 1 and 0. But theſe are rather matters of curioſity than uſe.

That the nine numerical notes may expreſs not only units, but alſo tens or decads, hundreds or centuries, thouſands, &c. they have a local value given them; ſo as that, when either alone, or when placed in the right hand place, they denote units; in the ſecond place, tens; in the third, hundreds; and in the fourth, thouſands.

Now to expreſs any written number, or aſſign the proper value to each character: divide the propoſed number by commas into claſſes, allowing three characters in each claſs, beginning at the right hand. Over the right hand figure of the third claſs, add a ſmall mark, or tranſverſe line; over the right-hand figure of the fifth claſs, add two marks, or tranſverſe lines; over that of the ſeventh three, &c. The number of the left-hand of the firſt comma, expreſs by thouſands; that which has over it the firſt tranſverſe line, expreſs by millions; that with two, by billions; that with three, by trillions, &c. Laſtly, the left-hand character of each claſs, expreſs by hundreds; the middle one by tens; and the right-hand one by units. Thus will the *numeration* be effected.

E. gr. The following numbers $2'''$, $125{,}473''$, $613{,}578'$, 432,597, is thus expreſſed or read: two trillions, one hundred twenty-five thouſand four-hundred ſeventy-three billions, ſix-hundred thirteen-thouſand five-hundred ſeventy-eight millions, four-hundred thirty-two thouſand five-hundred and ninety-ſeven.

NUMERATOR, in ſpeaking of fractions, ſignifies the number, which ſhews how many of thoſe parts, which the integer is ſuppoſed to be divided into, are expreſſed by the fraction.

The *numerator* is that part of a fraction which is placed over the little bar, by which it is ſeparated from the under number called the *denominator*, and which ſhews into how many parts the integer is divided.

Thus, v. gr. $\frac{7}{10}$ expreſſes ſeven tenths; where 7 is the *numerator*, and 10 the denominator. See Fraction.

NUMERICAL, Numerous, or *numeral*, ſomething that relates to number.

Numerical *algebra* is that, which makes uſe of numbers, inſtead of letters of the alphabet.

Numerical *difference* is the difference, whereby one individual is diſtinguiſhed from another.

Hence a thing is ſaid to be *numerically* the ſame, *idem numero*, or *numerice*, when it is the ſame in the ſtricteſt ſenſe of the word. See Unity and Identity.

NUMERO, in *Commerce*, &c. a term prefixed to any number of things; marked or abbreviated thus, N°. See Book.

De **Numero**, i. e. by tale, is uſed in ancient authors for the payment, e. gr. of a pound in a certain number of pieces, viz. twenty ſhillings.

In contradiſtinction to *libra penſa*, or a pound weighed out.

NUMEROUS *arithmetic*. See Arithmetic.

Numerous *exegeſis* See Exegesis.

NUMIDA, in *Ornithology*. See Guinea *Hen*.

NUMISMATOGRAPHIA, a Greek term uſed for the deſcription and knowledge of ancient medals and coins, whether of gold, ſilver, or braſs.

Fulvius Urſinus, Ant. Auguſtinus, biſhop of Saragoſa, Erizzo a noble Venetian, and Sambucus, a Poliſh gentleman, have all ſucceeded in the *numiſmatographia*. Nor muſt the more modern authors on the ſame ſubject be omitted; viz. the two Mezzabarbs, Patin, Spanheim, Hardouin, Morel, Vaillant. Joubert, Baudelot, Beger; and, among ourſelves, Evelyn.

NUMMULARIA, in *Botany*. See Money-*wort*.

NUMMULARIUS, among the Romans, was uſed to ſignify a *banker*, or perſon who deals in money.

It likewiſe denoted an aſſayer, or one who eſtimated the goodneſs and value of money, as to its weight and fineneſs of metal.

NUMMUS, or Numus, among the Romans, a particular piece of money, otherwiſe called *ſeſtertius* or *ſeſterce*.

This was ſometimes called *nummus ſeſtertius*. *Decem millia numûm, & decem millia ſeſtertium*, were Roman ſums, which amounted to the ſame.

NUN, Nonna, a word anciently uſed for a female religious, and ſtill retained in that ſenſe in our language and in other languages, particularly the French, but by way of ridicule and burleſque.

The word comes from *nonna*, *nonnana*, or *nonnanis*, all Latin terms, firſt uſed for penitents, then for religious.

Borel derives it from *nonno*, or *nonna*, which, in Italian, ſignifies *grandſather* or *grandmother*; and adds, that it was applied by way of honour to the woman, as that of father to the man, religious.

Nun or *nonnes*, uſed to ſignify a monk, are of Hebrew extraction, from *nin*, or *nun*, *a ſon*.

Hence alſo *nunnery*, a monaſtery of female religious.

Nun, in *Ornithology*, the common Engliſh name for the parus *cæruleus*, or blue titmouse, diſtinguiſhed from the common titmouſe by its ſmallneſs, and by its having its blue head ſurrounded by a white line.

Nun is alſo the name of a peculiar ſpecies of pigeon, called by Moore the *columba veſtalis*. It is but a ſmall pigeon, but ſometimes larger than the jacobine, and has a very particular plumage, from which it takes its name, its head being as it were covered with a veil.

The body of this ſpecies was all white, the head, tail, and ſix of the flight-feathers black, red, or yellow; the eyes are pear-coloured, and the hood white: this is a large tuft of feathers on the hinder part of the head, and the more numerous they are, the more the bird is eſteemed. This is a very beautiful ſpecies of pigeon, and is very much eſteemed. Some of its feathers, however, will vary ſometimes from their true colour; theſe birds are called foul-feathered: but it is a mere accidental variety, the young of ſuch being often as perfect and beautiful as of any others.

NUNCIATION, *nunciatio*, among the Romans, was particularly uſed to ſignify the report which the augur made concerning what he had ſeen.

This he did to the chief magiſtrate preſent, and the magiſtrate communicated the ſame to the people, and ſo diſmiſſed the aſſembly, which was called *obnunciation*.

NUNCIO, or Nuntio, an ambaſſador from the pope to ſome catholic prince or ſtate; or a perſon who attends, on the pope's behalf, at a congreſs, or an aſſembly of ſeveral ambaſſadors.

The word *nuncio* has the ſame import with ambaſſador; but is reſtrained, in its uſe, to the ambaſſadors of popes alone; as that of internuncio is to their envoys extraordinary.

The *nuncio* has a juriſdiction, and may delegate judges, in all the ſtates where he reſides, except in France, where he has no authotity, but that of a ſimple ambaſſador.

NUNCUPATIVE, in the *Schools*, a term uſed to expreſs ſomething that is only nominal, or has no exiſtence but in name.

Felix of Urgel maintained, that Jeſus Chriſt, as man, was only God *nuncupatively*, i. e. nominally. Alcuin, in his anſwer to Felix, maintains, that it is to fall into Neſtorianiſm to diſtinguiſh two Sons of God in Jeſus Chriſt, the one natural, the other adoptive; and two Gods, the one real, the other *nuncupative*.

NUNCUPATIVE *will* denotes a laſt WILL or TESTAMENT only made verbally, or *viva voce*, and not put in writing.

NUNDINAL, NUNDINALIS, a name which the Romans gave to the eight firſt letters of the alphabet, uſed in their calendar.

This ſeries of eight letters, A, B, C, D, E, F, G, H, is placed and repeated ſucceſſively from the firſt to the laſt day of the year: one of theſe always expreſſed the market-days, or the aſſemblies called *nundinæ*, *quaſi novendinæ*, becauſe they returned every nine days.

The country people, after working eight days ſucceſſively came to town the ninth, to ſell their ſeveral commodities and to inform themſelves of what related to religion and government.

Thus, the *nundinal* day being under the letter A on the 1ſt, 9th, 17th, and 25th, days of January, &c. the letter D will be the *nundinal* letter of the year following. Theſe *nundinals* bear a very great reſemblance to the DOMINICAL *letters*, which return every eight days, as the *nundinals* did every nine.

NUNTIO. See NUNCIO.

NUPER *obiit*, in *Law*, a writ which lies for a coheireſs being deforced by her coparcener of land or tenements, whereof their common father or anceſtor died ſeiſed in fee-ſimple.

If the anceſtor died ſeiſed in fee-tail, the coheireſs deforced ſhall have a formedon.

NUPTIAL, ſomething that relates to MARRIAGE.

NURSERY, in *Gardening*, denotes a ſeminary, or ſeed-plot, for raiſing young trees or plants.

Some authors make a difference between *nurſery* and *ſeminary*, holding the former not to be a place wherein plants were ſown; but a place for the reception and rearing of young plants, which are removed, or tranſplanted hither from the ſeminary, &c.

With regard to a *nurſery*, it may be obſerved in general, that the mould of it ſhould be rich, deep, and ſtiffiſh, though the trees be afterwards removed into a proper ſoil. Having fixed upon the place, let it be well fenced, ſo as to keep out not only cattle, but rabbits and hares; then trench the land all over, turning the turf down to the bottom of the trench, and covering it with the other mould, taking care not to dig deeper than the natural ſoil. When the whole is thus trenched, or double dug, which muſt be in September, the ſurface ſhould be ſmoothed, and laid out in quarters for the reception of the different trees from the SEMINARY.

Mr. Lawrence recommends the having ſeveral *nurſeries* for the ſeveral kinds of trees: one for tall ſtandards; viz. apples, aſhes, elms, limes, oaks, pears, ſycamores, &c. another for dwarfs; viz. ſuch as are intended for apricots, cherries, peaches, plums, &c. and a third for evergreens.

In France, their *nurſeries*, which are but few when compared with thoſe in England, are chiefly confined to the propagation of fruit trees, from whence they have the appellation of *pepinier*, for there is ſcarce any of thoſe gardens, where a perſon can be ſupplied either with evergreens, flowering-ſhrubs, or foreſt-trees. And in Holland, their *nurſeries* are principally for flowers; ſome few of them indeed propagate tender exotic plants. But thoſe *nurſeries* in the neighbourhood of London, do, ſeveral of them, include all theſe; from hence moſt of the curious perſons abroad are ſupplied with furniture for their gardens; therefore every planter ſhould begin by making a *nurſery* upon the ground which is intended for planting, where a ſufficient number of trees may be left ſtanding, after the others have been drawn out, to plant into other places; which for all large-growing trees, but particularly ſuch as are cultivated for timber, will be found by much the moſt advantageous method; for all thoſe trees which come up from the ſeed, or which are tranſplanted very young into the places where they are deſigned to remain, will make a much greater progreſs, and become larger trees, than any of thoſe which are tranſplanted at a greater age; and hereby the expence and trouble of ſtaking, watering, &c. will be ſaved, and the trees will ſucceed much better. Theſe ſhould be thinned gradually as the trees advance; for, by taking away too many at firſt, the cold will check the growth of the remaining trees. But then thoſe trees, which are taken out from theſe *nurſeries* after a certain age, ſhould not be depended on for planting; and it will be prudence rather to conſign them for fuel than to attempt to remove them large, whereby in endeavouring to get them up with good roots, the roots of the ſtanding trees will be often much injured.

What has been here propoſed, muſt be underſtood for all large plantations in parks, woods, &c. but thoſe *nurſeries* which are only intended for the raiſing ever-greens, flowering-ſhrubs, or plants which are deſigned to embelliſh gardens, may be confined to one ſpot; becauſe a ſmall compaſs of ground will be ſufficient for this purpoſe. Two or three acres of land employed this way, will be ſufficient for the moſt extenſive deſigns, and one acre will be full enough for thoſe of moderate extent.

Such a *nurſery* as this ſhould be conveniently ſituated for water; for where that is wanting, there muſt be an expence attending the carriage of water in dry weather. It ſhould alſo be as near the houſes as it can with conveniency be admitted, in order to render it eaſy to viſit at all times of the year, becauſe it is abſolutely neceſſary that it ſhould be under the inſpection of the maſter, for unleſs he delights in it, there will be little hopes of ſucceſs.

The many advantages, which attend the having ſuch a *nurſery*, are ſo obvious to every perſon who has turned his thoughts the leaſt to the ſubject, that it is needleſs to mention them here: the carefully keeping the ground always clean from weeds, is a point of great importance; for if theſe are permitted to grow, they will rob the young trees of their nouriſhment. Another principal buſineſs is to dig the ground between the young plants at leaſt once every year, to looſen it for the roots to ſtrike out; but if the ground is ſtiff, it will be better to be repeated twice a year, viz. in October and March, which will greatly promote the growth of the plants, and prepare their roots for tranſplanting.

In a *nurſery* for fruit-trees, the following rules are to be obſerved. 1. That the ſoil ſhould not be better than that in which the trees are to be planted out for good. 2. That it ought to be freſh, and not ſuch as has been already worn out by trees, or other large-growing plants. 3. It ought neither to be too wet, nor too dry, but rather of a midding nature; though, of the two extremes, dry is to be preferred; becauſe, though trees in ſuch a ſoil do not make ſo great a progreſs, yet they are generally ſounder, and more diſpoſed to fruitfulneſs. 4. It muſt be incloſed in ſuch a manner that neither cattle nor vermin may come in; and ſo as particularly to exclude hares and rabbits, which, when the ground is covered with ſnow, are great deſtroyers of young trees. 5. The ground being incloſed ſhould be carefully trenched about two feet deep; this ſhould be done in Auguſt, that it may be ready for receiving young ſtocks at the ſeaſon for planting, which is commonly about the beginning of October: in trenching the ground, you muſt be careful to cleanſe it from the roots of all noxious weeds. 6. The ſeaſon being come for planting, level down the trenches as equal as poſſible; and then lay out the ground into quarters, which may be laid out in beds for a ſeminary, in which you may ſow the ſeeds or ſtones of fruit. 7. And having provided yourſelves with ſtocks, the next year proceed to tranſplant them, in the following manner: draw a line acroſs the ground intended to be planted, and open a number of trenches exactly ſtraight; then take the ſtocks out of the ſeed-beds; in doing which, you ſhould raiſe the ground with a ſpade, in order to preſerve the roots as entire as poſſible; prune off the very ſmall fibres, and if there are any that have a tendency to root directly downwards, ſuch roots ſhould be ſhortened. Then plant them in the trenches, if they are deſigned for ſtandards, in rows three feet and a half or four feet, from each other, and a foot and half diſtant in the rows; but if for dwarfs, three feet, row from row, and one foot in the row will be a ſufficient diſtance. Theſe plants ſhould by no means be headed, or pruned at top, which will weaken them, and cauſe them to produce lateral branches. If the winter ſhould prove very cold, lay ſome mulch on the ſurface of the ground near their roots, taking care not to let it lie too thick near the ſtems of the plants, and to remove it as ſoon as the froſt is over. In the ſummer ſeaſon deſtroy the weeds, and dig up the ground every ſpring between the rows. The ſecond year after planting, ſuch of the ſtocks as are deſigned for dwarfs will be fit to bud; but thoſe that are deſigned for ſtandards ſhould be ſuffered to grow five or ſix feet high before they are budded or grafted; for the manner of doing which, ſee the articles INOCULATION and ENGRAFTING.

As to timber-trees, Mr. Miller adviſes thoſe gentlemen who would have plantations in parks, woods, &c. to make *nurſeries* upon the ground intended for planting, where a ſufficient number of the trees may be left ſtanding, after the others have been drawn out to plant in other places.

The ground intended for the flower *nurſery* ſhould be well ſituated to the ſun; and defended from ſtrong winds by plantations of trees and buildings. The ſoil alſo ſhould be light and dry, eſpecially for bulbous-rooted flowers; for in this *nurſery* the off-ſets of all bulbous-rooted flowers ſhould be planted, and remain there till they become blowing roots, when they ſhould be removed into the pleaſure-garden, and planted either in beds or borders, according to the goodneſs of the flowers. Theſe flowers may alſo be raiſed in the *nurſery* from ſeed. The ſeedling auriculas, polyanthuſes, ranunculuſes, anemonies, carnations, &c. ſhould be raiſed in this *nurſery*, where they ſhould be preſerved till they have flowered, when all thoſe ſhould be marked that are worthy of being tranſplanted into the flower-garden; this ſhould be done in their proper ſeaſons: for all theſe ſeedling flowers ought not indiſcriminately to be expoſed to public view in the pleaſure-garden, becauſe it always happens, that there are great numbers of ordinary flowers produced among them, which will there make but an indifferent appearance. Miller.

The *nurſery* for ſtandards ſhould be in a rich, light ſoil, ſown, with the proper ſeeds, in October or November: for apples and pears, crab and wild pear kernels are to be preferred for ſtocks: elms and limes are to be raiſed from planted ſuckers: and walnuts to be ſown with the green ſhell upon them, to preſerve them from mice. In this *nurſery*, if it be well managed and weeded for two years, the crabs and pears will be fit for grafting and inoculating the third year.

Firs and pines are to be raiſed from thoſe little ſeeds taken out of their large apples.

The *nurſery* for dwarfs does beſt by itſelf, that it may not be over-topped by taller trees. Stones of apricots and peaches are not proper to raiſe thoſe trees; but, in lieu thereof, ſow the ſtones of the pear-plum, muſſel or bonum magnum plum; which prove better, and more laſting, than the former. For ſtocks for all ſorts of cherries, black-cherry-ſtones do beſt.

Mr. Mortimer directs all ſtone-fruit to be ſown quickly after gathering; for that, if they be kept, they will be two years before they come up: add, that if they have not all the moiſture of the winter to rot the ſhells, the kernel will ſcarce come up at all.

To furniſh the *nurſery* of ever-greens, the ſeveral ſorts of ſeeds or berries, as yew, holly, juniper, &c. are to be put in ſo many diſtinct pots or boxes, with ſome fine mould over them, and thus buried for a year; after which they are to be taken out, and ſown.

If they were to be ſown when gathered, like other ſeeds, they would not come up the firſt year, nor grow ſo kindly.

NUSANCE, Nocumentum, in *Law*, is uſed not only for a thing done to the hurt or annoyance of another, in his free-lands or tenements, but alſo for the aſſize, or writ lying for the ſame.

The word is derived from the French, *nuire*, *to hurt*.

The word is mentioned anno 22 Hen. VIII. cap. 4.

Nuſances are either public or private: a public *nuſance* is an offence againſt the public in general, either by doing what tends to the annoyance of all the king's ſubjects, or by neglecting to do what the common good requires: in which caſe annoyances and injuries to ſtreets, highways, bridges, and large rivers; as alſo diſorderly ale-houſes, bawdy-houſes, gaming-houſes, ſtages for rope-dancers, mountebanks, &c. cottages erected ſingly on the waſte, making and ſelling of ſquibs and fire-works, or throwing them about in any ſtreet, eaves-droppers, a common-field, and keeping of hogs in any city or market-town, are held to be common *nuſances*. A private nuſance is when only one perſon or family is annoyed, by the doing of any thing; as where a perſon ſtops up the LIGHT of another's HOUSE, or builds in ſuch a manner that the rain fall from his houſe upon his neighbour's; as likewiſe the turning or diverting water from running to a man's houſe, mill, meadow, &c. corrupting or poiſoning a water-courſe, by erecting a dye-houſe, or a lime-pit, for the uſe of trade, in the upper part of the ſtream; ſtopping up a way that leads from houſes to lands; ſuffering a houſe to decay, to the damage of the next houſe; erecting a brew-houſe in any place not convenient; or an houſe of office, &c. ſo near another perſon's houſe as to offend him by its ſmell; or exerciſing any offenſive trade, and ſetting up a fair or market to the prejudice of another.

Indictment lies for a public or common *nuſance* at the king's ſuit, whereon the party offending ſhall be fined and impriſoned; but no action can be brought in this caſe except one man ſuffers more by a common *nuſance* than another; as where a pit is dug in the highway, and he falls into it. Action on the caſe, or aſſize of *nuſance*, lies, for any private *nuſance*, at the ſuit of the party aggrieved, and on ſuch actions judgment is given that the *nuſance* ſhall be removed, and the injured party recover damages: but if a perſon has only a term of years in a houſe or lands, as he has no freehold therein, he can only have an action on the caſe, by which means the *nuſance* will be removed without his recovering damages.

The continuation of a *nuſance* is by the law conſidered as a new *nuſance*, and therefore, where a perſon ſuffers a *nuſance* to be ſet up, and then alienates and lets the land, &c. without removing it, an action of the caſe lies againſt him who erected it; and alſo againſt the alienee or leſſee, for continuing it. It has been adjudged that any perſon may remove a *nuſance*, in which caſe, even the cutting down a gate that croſſes the highway is legal; yet if a man deſtroys the *nuſance* himſelf, before he commences his action, he cannot have it afterwards, nor recover damages. Neither the lord of a manor, nor the king himſelf, can licence any perſon to make or erect a *nuſance*. Manwood makes three kinds of *nuſances* in the foreſt; the firſt, *common nuſance*; the ſecond, *ſpecial nuſance*; the third, *general nuſance*.

The writ of *nuſance*, *de nocumento*, is either ſimply *de nocumento*, or *de parvo nocumento*.

Writs of *nuſance* are now properly termed *treſpaſſes*, and actions upon the caſe.

Nusance, *abatement of*, denotes the removal of it, which the party aggrieved is allowed to do, ſo as he commits no riot in the doing of it.

Nusance, *aſſize of*, is a writ, wherein it is ſtated that the party injured complains of ſome particular fact done, *ad nocumentum liberi tenementi ſui*, and therefore commanding the ſheriff to ſummon an aſſize; that is, a jury, and view the premiſes, and have them at the next commiſſion of aſſizes, that juſtice may be done therein; and if the aſſize is found for the plaintiff, he ſhall have judgment of two things. 1. To have the *nuſance* abated, and 2. To recover damages. This action, as well as that called *quod permittat proſternere*, are now out of uſe, and have given way to the action on the caſe; in which no judgment can be had to abate the *nuſance*, but only to recover damages.

NUSTAM, a word uſed by Paracelſus and his followers to expreſs the cream of milk, or the pellicle which in ſome caſes ſwims upon the ſurface of wine.

NUT, among *Botaniſts*, a PERICARPIUM of an extraordinary hardneſs; which contains a ſofter edible nucleus, or kernel.

Of theſe we have divers kinds; ſmall nuts, filberds, cheſnuts, walnuts, &c. which ſee.

Nut, *Barbadoes*. See Pinhones.

Nut, *bladder*, the Engliſh name of a diſtinct genus of plants, called by botaniſts *ſtaphylæa*, and *ſtaphylodendron*. See Bladder *nut*.

Nut, *caſhew*. See Anacardium.

Nut, *cob*. See Hazle.

Nut, *cocoa*, the name of a genus of plants, called by botaniſts CACAO.

Nut *earth*, in *Botany*, a name given to two diſtinct genuſes of plants, called by botaniſts *bulbocaſtanum*, and *arachis*. See Earth-*nut*.

Nut, *fauſel*. See Areca.

Nut, *hazle*. See Hazle.

Nut, *Malabar*, the name of a ſpecies of the JUSTICIA.

Nut, *peas*, the name by which ſome call the *lathyrus* of botanical writers. See *Chichling* Vetch.

Nut, *phyſic*, a name ſometimes given to the *ricinoides* of Tournfort. See Turnsole.

This is alſo a name ſometimes given to the CASSADA, and ſometimes to the CROTON. See Pinei *nuclei*, &c.

Nut, *pig*, a name by which the *bulbocaſtanum*, or earh *nut*, is ſometimes called. See Pig-*nut*.

Nut, *piſtachia*. See Pistachia.

Nut, *Spaniſh*, a name by which ſome call the SISYRINCHIUM of botanical writers, or the IRIS with a double bulb of Linnæus.

Nut, *vomic*. See Nux *vomica*.

Nut, *wall*, the name of a well known genus of trees, called by Linnæus *juglans*, and by Tournefort ſimply *nux*. See Walnut.

Nuts *of an anchor*, in a ſhip, are two little prominences, appearing like ſhort ſquare bars of iron, fixed acroſs the upper part of the anchor-ſhank, to ſecure the ſtock of it in its place; for which purpoſe there is a correſponding notch, or channel, cut in the oppoſite parts of the ſtock, of the ſame dimenſions with the *nuts*.

Nut-*cracker*, the *corvus* CARYOCATACTES of Linnæus, called by its Engliſh name becauſe it feeds on nuts.

Nut-*hatch*, in *Ornithology*, the Engliſh name of a bird known among authors by that of SITTA; and from its climbing trees in the manner of the wood-pecker, called by ſome, though improperly, *picus cinereus*, the grey wood-pecker.

Nut-*jobber*, in *Ornithology*, an Engliſh name for the SITTA, more commonly known among us by the name of the *nut-hatch*.

Nut-*oil*, is the oil of walnuts, preſſed out of the kernels by means of a ſcrew-preſs. This is uſed for the mixing with flake white or other pigments, where the clearneſs of the colour is of great conſequence, and would be injured by the brown hue of linſeed oil.

NUTATION, in *Aſtronomy*, a kind of trepidation, or tremulous motion of the axis of the earth; whereby its inclination to the plane of the ecliptic is not always the ſame; but varies backwards and forwards ſome ſeconds: and the period of theſe variations is nine years. This *nutation* was diſcovered by Dr. Bradley, who publiſhed an account of his diſcovery in the year 1737. He alſo diſcovered the cauſe of this phenomenon in the Newtonian ſyſtem of attraction.

The firſt principle of that ſyſtem is known to be, that all bodies mutually attract each other in the direct ratio of their maſſes, and in the inverſe ratio of the ſquares of their diſtances. From this mutual attraction, combined with motion in a right line, Newton deduces the figure of rhe orbits of the planets, and particularly that of the earth. If this orbit was a circle, and if the terreſtrial globe was a perfect ſphere, the attraction of the ſun would have no other effect than to keep it in its orbit, and would cauſe no irregularity in the poſition of its axis; but neither is the earth's orbit a circle, nor its body a ſphere; for the earth is ſenſibly protuberant towards the equator, and its orbit is an ellipſis, which has the ſun in its focus. When the poſition of the earth is ſuch, that the plane of its equator paſſes through the centre of the ſun, the attractive power of the ſun acts only ſo as to draw the earth towards it, ſtill parallel to itſelf, and without changing the poſition of its axis, and this happens at the equinoxes. In proportion as the earth recedes from thoſe points, the ſun alſo goes out of the plane of the equator, and approaches that of one or other of the tropics; the ſemidiameter of the earth, which is then expoſed to the ſun, being no longer equal, the equator is more powerfully attracted than the reſt of the globe, which cauſes ſome alteration in its poſition, and its inclination upon the plane of the ecliptic: and as that part of the orbit, which is compriſed between the autumnal and vernal equinox, is leſs than that which is compriſed between the vernal and autumnal, it follows, that the irregularity cauſed by the ſun, during his paſſage through the northern ſigns, is not entirely compenſated by that which he cauſes during his paſſage through the ſouthern ſigns; and that the paralleliſm of the terreſtrial axis, and its inclination with the ecliptic, will be a little changed. But though the irregularity is now accounted for, we are ſtill at a loſs for the cauſe of its happening in a period of nine years. This difficulty, however, will immediately diſappear.

The ſame effect which the ſun produces upon the earth, by its attraction, is alſo produced by the moon, which acts with greater force, in proportion as it is more diſtant from the equator: now, at the time when its nodes concur with the equinoxial points, its greateſt latitude is added to the greateſt obliquity of the ecliptic. At this time, therefore, the power which cauſes the irregularity in the poſition of the terreſtrial axis, acts with the greateſt force; and the revolution of the nodes of the moon, being performed in eighteen years, it is clear, that in eighteen years the nodes will twice concur with the equinoxial points; and, conſequently, that twice in that period, or once every nine years, the earth's axis will be more influenced than at any other time; ſo that it will have a kind of ballancing backward and forward, the period of which will be nine years, as Mr. Bradley had obſerved; and this balancing he calls *the nutation of the terreſtrial axis*. See Phil. Tranſ. N° 406 and N° 485. in vol. xlv. p. 1. &c. and a fuller account of Dr. Bradley's obſervations under the article STARS.

That the moon has the like motion, is ſhewn by Sir Iſaac Newton, in the firſt book of his Principia; but he obſerves withal, that this motion muſt be very ſmall, and ſcarce ſenſible.

NUTMEG, *nux moſchata*, a delicate kind of aromatic fruit, or ſpice, brought from the Eaſt Indies; whereof there are diſtinguiſhed two kinds, the *male* and *female*.

The *female* is that chiefly uſed among us; its form is round, its ſmell agreeable, and its taſte hot and pungent.

The *male* is a wild nut, of a longiſh form and without either taſte or ſmell; yet ſometimes put off, while yet in the fruit, for the female.

Nutmegs are incloſed in four different covers; the firſt, a thick fleſhy coat, ſomething like that of our walnuts, which ſpontaneouſly opens, when ripe. Under this lies a thin reddiſh reticular coat, of an agreeable ſmell, and aromatic taſte, called *mace*; by others, though improperly, *flower of nutmeg*. This wraps up the ſhell, and opens in proportion as the fruit grows. The ſhell, which makes the third cover, is hard, thin, and blackiſh. Under this is a greeniſh film, of no uſe: and in this is found the *nutmeg*, which is properly the kernel of the fruit. Every *nutmeg* has a little hole in it, which ſome ignorantly take for a defect.

The *nutmegs* are cured, according to Rumphius, by dipping them in a thickiſh mixture of lime and water, that they may be every where coated with the lime, which contributes to their preſervation.

The largeſt heavieſt *nutmegs* are to be choſen; ſuch as are of the ſhape of an olive, well marbled without ſide, reddiſh within, unctuous in ſubſtance, and of a fragrant ſmell. The *nutmeg* is greatly uſed in our foods, and is of excellent virtues as a medicine; it is a good ſtomachic, promotes digeſtion, and ſtrengthens the ſtomach. It alſo ſtops vomiting; is an excellent remedy in flatulences; and is happily joined with rhubarb and other medicines, in diarrhœas. It is obſerved to have a ſoporific virtue, and to exert it too ſtrongly, if taken in immoderate quantities. It has a conſiderable degree of aſtringency; and given after toaſting before the fire, till thoroughly dry and crumbly, it has been ſometimes known alone to cure diarrhœas.

As to MACE, it muſt be choſen in large blades, of a high colour, and like the *nutmeg* in taſte and ſmell.

Nutmegs, preſerved green, are excellent to fortify the ſtomach, and reſtore the natural heat. They are particularly eſteemed carminative. The powder called *duke's powder*, eſteemed a ſovereign remedy againſt rheums, is only *nutmeg* pulverized with ſugar, and a little cinnamon.

Nutmegs, by diſtillation, or expreſſion, yield an oil of great fragrancy, and uſe in medicine.

When diſtilled with water, they yield nearly one ſixteenth their weight of a limpid eſſential oil, very grateful, poſſeſſing the flavour of the ſpice in perfection, and which is ſaid to have ſome degree of an antiſpaſmodic or hypnotic power: on the ſurface of the remaining decoction is found floating an unctuous concrete matter, like tallow, of a white colour, nearly inſipid, not eaſily corruptible, and hence recommended as a baſis for odoriferous balſams: the decoction, freed from this ſebaceous matter, and inſpiſſated, leaves a weakly bitter, ſubaſtringent extract. The eſſential oil, and an agreeable cordial water, lightly flavoured with the volatile parts of the *nutmeg*, by drawing off a gallon of proof ſpirit from two ounces of the ſpice, are kept in the ſhops. Both the oil and ſpirituous tincture and extracts, agree better with weak ſtomachs than the *nutmegs* in ſubſtance. Two kinds of ſebaceous matter, ſaid to be expreſſed from the *nutmeg*, are diſtinguiſhed in the ſhops by the name of *oil of* MACE. Lewis.

The whole commerce of *nutmegs* is in the hands of the Dutch Eaſt India company. The *nutmeg* tree, which is ſaid to reſemble the pear-tree, is propagated after a particular manner: Tavernier tells us, that the birds, devouring the *nutmeg* when ripe, give it back whole by ſtool; and that thus falling down to the gronnd, beſmeared with a viſcous matter, it takes root, and produces a tree.

NUTRITION, in the *Animal Oeconomy*, the acceſſion or appoſition of new parts to the body, ſimilar to thoſe it already conſiſted of, either for its augmentation, or for the reparation of ſuch as are worn off.

By the continual motion of the fluids in the minute veſſels of the body, and the actions of the muſcles, &c. ſmall parcels are of neceſſity worn off from the ſolids, become mixed with the fluids, move with them, and are at length eliminated and exhaled through the pores.

And, at the ſame time, the fluids, diminiſhed, as they are, by a conſtant attrition, apply to the orifices of the perſpiring veſſels, and vaniſh out of the body

Hence the animal body, by the very condition of its frame, becomes ſoon liable to deſtruction.

To preſerve life, therefore, it is neceſſary, that a reſtitution be made to the juices and ſolids of the body, equal and ſimilar to what is loſt in thoſe motions; which is what we call the *action of nutrition*.

Now, the loſt juices are eaſily ſupplied by meat, drink, air, &c. taken in the ſtomach, digeſted, converted into chyle, then into blood, and thence ſecreted by the proper duct, and carried, by the action of the body, to the proper receptacles; after the manner laid down under DIGESTION, CHYLIFICATION, SANGUIFICATION, and SECRETION.

But the *nutrition* of the ſolid parts is much more obſcure. This, indeed, has proved the ſubject of infinite doubts and differences among authors; nor had we any rational or ſatisfactory accounts of the ſame, till that of the accurate Boerhaave, whoſe doctrine is as follows:

Every ſolid part of the body conſiſts of other leſſer ones, in all reſpects like the larger; veſſels, v. g. of veſicles, and thoſe of others ſtill ſmaller; bones of officles, &c. Which ſtructure goes beyond all limits of ſenſe, however aſſiſted by art; as appears by the experiments and obſervations of Malpighi, Ruyſch, Leewenhoeck, and Hook. Yet it is ſcarce poſſible this diviſion and ſubdiviſion ſhould be infinite, as thoſe of foods and juices are.

Again, it appears from microſcopes, injections, ſmall wounds, exſiccations, &c. that the ſolid parts of the body are very ſmall, compared with the fluids; and it is alſo demonſtrable, from conſidering the riſe and generation of the veſſels, and the reſolution of the greater veſſels into their ſmaller conſtituent ones, that all the ſolid maſs of the body is conſtructed of mere nerves, as its elements. And, in effect, all this maſs, an incredible ſmall particle only excepted, at firſt, aroſe out of what was a very ſmall colliquament, much like the nervous juice itſelf; as is abundantly ſhewn by the great Malpighi, in his two treatiſes on incubated eggs. For neither does the white of the egg nouriſh, till, by means of the incubation, it have paſſed innumerable degrees of fluidity, from its firſt thickneſs, to that exceeding ſubtilty wherein it terminates. But, even then, the liquor, thus given to the embryo, is exceedingly thick, in compariſon with what it is to be, when converted into its veſſels and viſcera.

Now, the firſt tender ſolids, ariſing from this ſubtile humour, do again paſs infinite intermediate degrees before they arrive at their utmoſt ſtate and conſiſtence; as is ſhewn by Malpighi in eggs, and by Ruyſch in embryoes and fœtuſes. Hence, therefore, it follows, that the ſolids, in their firſt formation out of the liquids whence they ariſe, only differ from them in reſt, coheſion, and figure. Therefore, ſuch a particle, now in its fluid ſtate, will become a part of the ſolid to be formed out of it, as ſoon as there happens to be a power to effect its coheſion with the other ſolid parts, howſoever that coheſion be effected.

This coheſion is eaſily produced in a fibre already formed if there happen to be a proper cavity in the ſolid, left open by ſome loſt particle, and, at the ſame time, a particle in the fluid, anſwerable thereto in bulk, figure, and nature; and, laſtly, if there be a power wherewithal to intrude it in that place, or accommodate it thereto. Thus will ariſe a real *nutrition* of the ſolids in the minute veſſels, by whoſe union the large ones are formed; that is, in the nerves, or in veſſels ſimilar thereto. Which being impracticable by any other liquid than that brought into theſe veſſels, it appears very evident, that the nervous juice, at leaſt a juice perfectly like it, is the immediate matter of *nutrition*: whence *nutrition* appears one of the laſt and moſt perfect actions of the body; ſince, to have this laudable, all the precedent actions muſt of neceſſity have been ſo.

The chyle, therefore, which ſome make the immediate matter of *nutrition*, is, indeed, fitted to fill the larger veſſels; but it cannot nouriſh or reſtore them. This, when attenuated, changed, more intimately mixed in the lungs by means of reſpiration, and thus fitted for the paſſage of certain veſſels, is indeed rendered fitter, yet far from being quite fit to be the matter of *nutrition*. But, by the repeated action of the lungs, the viſcera, veſſels, &c. there is formed out of this humour, a ſoft, tenaceous, plaſtic, inſipid ſerum, which, thickening by the fire, becomes perfectly like the white of an egg. This, fluid, therefore, has in it all the conditions found in that, from whence, by ſure experience, we know all the ſolid parts of an animal ariſe by mere incubation. It is, therefore, a ſtep nearer, but is not yet quite diſpoſed for nutriment: much leſs is the cruor, or red globular part of the blood, ſo. Neither are yet fitted to enter the veſſels; yet both the one and the other are, by different authors, made the nutritive juice.

But as the heat of the incubation, ſo the action of the viſcera and veſſels on the ſerum, introduces various changes therein, till at length a part of it be rendered ſubtile enough for the purpoſe required. This, when exhauſted, is inſtantly repaired: and thus we have the true immediate matter of *nutrition*.

But this ſame humour, loſing too many of its oily parts, by many repeated circulations, is rendered too ſharp; and being likewiſe ſtripped of its moſt liquid parts, from the ſame cauſe, becomes too denſe, and is thus rendered unfit for this ſecretion. Hence the neceſſity of new chyle, and new food, to keep up *nutrition*.

The matter of *nutrition* thus aſcertained, the manner wherein, and the cauſe whereby it is effected, are as follow: a juice being driven directly through a full, conic, or cylindric, elaſtic or rigid canal; if its courſe be from a wider to a narrower part, or if it have any thing to oppoſe its motion, will endeavour to ſtretch the ſides of its canal, according to the axis of its length. This muſt be the caſe every where in the body, except, perhaps, in the veins and receptacles. By this niſus, or endeavour, how weak ſoever, continually repeated, the veſſels will be inſenſibly lengthened out; and, in lengthening, they will be made more and more ſlender. Hence the laſt extremities of the veſſels, which in man are extremely ſmall, are continually ſtretched, and rendered leſs and leſs coherent, i. e. ſtill nearer and nearer to a diſſolution; and thus at length will they cohere ſo weakly, as ſcarce to differ from fluids.

While ſuch motion goes on, therefore, and the propulſion is continued, there will, of neceſſity, happen theſe two things: firſt, the outmoſt particles of the minuteſt tubes, being torn off, will again be converted into a kind of humour, what part of the body ſoever they ſtick in. Secondly, the ſmalleſt particles, which, by their union, compoſed the ſlendereſt fibrillæ, will be ſo ſeparated from each other, as to leave open interſtices, in thoſe places where, before, they cohered. Both theſe effects will be produced at all times, and in all parts of the body, ſo long as life continues, eſpecially where nature is ſtrong, and the actions of the body is violent. But the ſame humour whereby theſe effects are produced containing abundance of particles ſimilar to thoſe thus ſeparated and loſt, conveys and applies them to thoſe interſtices, by that very impetus whereby it endeavours to diſtend the canals; and thus intercepted, at length, it forms, adapts, and faſtens them, ſo as to adhere in the ſame manner as the former.

The matter, preparation, application, energy of motion, ſtill remaining the ſame; what, from time to time, is loſt, is thus preſently reſtored; and the ſolids continue in the ſame ſtate as before, i. e. they are perpetually *nouriſhed*, and ſupplied, and preſerved.

In this the Creator's wiſdom is very conſpicuous; in that the ſame power which inevitably deſtroys, does repair again at the ſame time, and by the ſame action; and that the greater the loſs is, the more copious the ſupply; and, laſtly, that thoſe parts firſt ſpent in the action of the body, are the firſt reſtored.

Farther, it is evident, that the newer, the more tender, and the nearer to the moving cauſe, theſe veſſels are, the more eaſily will they be lengthened, diſtended, deſtroyed, and repaired: our bodies, therefore, the nearer to their origin, the more do they grow. For, the action ſtill continuing, the greater veſſels become more extended by their fluid; and at the ſame time, the ſmaller, whereof the membranes, or coats, of the larger ſort are compoſed, are compreſſed, dried, and at laſt concreted, and grow up; whence ariſes a firmneſs, indeed, of the fibres, but a loſs of the veſicles.

Thus what were formerly veſſels, commence mere hard ligaments; and thus the fluids being once fixed, the ſeveral veſſels coaleſce: from the concurrence of theſe cauſes ariſe the ſtrength, hardneſs, rigidity, and thickneſs, of the ſolid parts.

Hence the number of veſſels is greateſt in embryoes, and, as age comes on, it ſenſibly diminiſhes; and hence it is, that their weakneſs conſtantly declines, and their ſtrength and firmneſs increaſe. In young people, therefore, the quantity of humours is redundant, and greatly exceeds the ſolids: in old men, the ſolids exceed the fluids. And hence we ſee the reaſon, manner, and appearance, of growth, ſtate, declenſion, and, at length, of death, from pure old age.

A perſon who conſiders this account, and compares it with what is actually obſervable in the body, will find every circumſtance to obtain; thus the whole cuticula is every where, and at all times, conſtantly deſquamating, peeling off, and again renewing; and thus the hair, nails, teeth, continually rubbed, torn, and worn off, come again: parts taken off from the veſſels and the bones ſoon grow again: and the ſordes, or filth, rubbed off from the extremities of the veſſels, when examined by a microſcope, or diluted, and viewed in water, appear plainly to conſiſt both of ſolid and fluid parts; and thoſe carried off by waſhing, ſhaving, &c. are the ſame.

Hence, too, we ſee, that a general increaſe of the bulk of the body, with regard to habit, as in fat, fleſhy, brawny perſons, does not ariſe from any increaſe of the ſolids, but by their extenſion into larger cavities, crouded with ſtagnant humours. And hence fatneſs becomes hurtful, as it loads, weakens, and ſuffocates.

Whence ariſes a very conſiderable diſtinction between *nutrition* and *repletion*, to which a phyſician muſt have ſpecial regard; the one ſtrengthening and condenſing the veſſels, the other weakening, looſening, and extending the ſame.

Hence, laſtly, we ſee, why the fabric of the ſolids is not deſtroyed by the contained fluids; how our machine comes to ſubſiſt ſo long; why, when a nerve is corrupted the *nutrition* of that part it belongs to ceaſes; and why the ſame obtains in the artery: why in an embryo there are no ſolids, in a fœtus very few, in old men a great deal; and why even the nerves, tendons, arteries and receptacles, become firſt cartilaginous, and then bony.

Dr. Prieſtley concludes, from ſome experiments undertaken with a view of diſcovering the principle of *nutrition*, in vegetable and animal ſubſtances, that the principle is PHLOGISTON, in ſuch a ſtate as to be capable of becoming, by putrefaction, a true inflammable air, but not generally ſuch as to burn with exploſions; but rather with a blue and lambent flame, mixed with a certain proportion of fixed air. This principle in *nutrition*, is immediately held in ſolution by the gaſtric juice, and in the chyle formed by it: and when it has entered into the circulation with the chyle, and anſwered the purpoſe in the animal œconomy for which it is deſigned, it is thrown out again by means of the BLOOD in the lungs, and communicated to the air, which is phlogiſticated with it. Exp. and Obſ. vol. v. ſect. 6.

NUTRITION *of plants.* See VEGETATION, SAP, CIRCULATION, PLANTS, &c.

NUTRITION, in *Pharmacy*, a kind of preparation, conſiſting in the gradual mixture of liquors of different natures, by ſtirring them together till they have acquired a thick conſiſtence, as in making butter of Saturn, or unguentum nutritum.

NUTRITIOUS *juice.* See NUTRITION.

NUTRITIVE *faculty.* See FACULTY.

NUTRITUM, in *Pharmacy*, is a denomination given to a deſiccative, cooling unguent, prepared by the agitation and nutrition of litharge of gold with oil and vinegar, or the juice of ſolanum, in a mortar.

NUX, in *Botany.* See HAZLE-NUT, WALNUT, &c.

NUX *maris*, in *Natural Hiſtory*, a name given by many writers to a peculiar ſpeeies of ſea-ſhell. It is one of the *dolium*, or *concha globoſa* kind, and a ſpecies of that genus called GONDOLA.

NUX *regia*, the *royal nut*, a name given by ſome authors to the *walnut.*

NUX *vomica*, the fruit, or, or as ſome will have it, the ſtone of a vegetable fruit, growing in ſeveral parts of Egypt, and in the iſlands of Timor and Ceylon; of a ſtrong narcotic quality, ſo as to be ranked in the number of poiſons.

It is the produce of a large tree, called by Plukenet, *cucurbitifera Malabarienſis, ænopliæ foliis rotundis, fructu orbiculari rubro cujus grana ſunt* nuces vomicæ *officinarum.* See STRYCHNUS.

It is round and flat, of a grey mouſe-colour without, and of various colours within; ſometimes yellow, ſometimes white, ſometimes brown; it is covered with a kind of woolley matter, but internally it is hard and tough like horn. The largeſt, whiteſt, neweſt, and cleaneſt are the beſt.

The kernel diſcovers to the taſte a conſiderable bitterneſs, but makes little or no impreſſion on the organs of ſmell.

This drug is ſaid to be an aſſured poiſon for all animals except men. On the contrary, Hermannus, botanic profeſſor at Leyden, who has written expreſly on it, ſays, that the *vomic nuts* of Timor and Ceylon are, for the human ſpecies, excellent ſudorifics, and are alſo to be ranked among diuretic medicines.

It has been recommended in tertian and quartan fevers, in virulent gonorrhœas, as well as an alexipharmic. Fallopius relates, that it was given with ſucceſs in the plague; that in doſes of from a ſcruple to half a dram, it procured a plentiful ſweat; in which caſe the patient recovered. However, it is now conſidered, and not without good reaſon, as a deleterious drug.

The principal ſymptoms it has been obſerved to produce, in human ſubjects and brutes, are, great anxieties, ſtrong convulſions, or epileptic fits, paralytic tremors, great increaſe of the motion of the heart and of reſpiration, and reachings and ſubverſions of the ſtomach. The LIGNUM *colubrinum* and IGNATIUS's *bean*, partake of the ſame qualities with the *nux vomica* Lewis.

NUX *galla.* See GALL.

NYCTAGES, or NECTAZONTES, derived from νυξ, *night*, a religious ſect, diſtinguiſhed by their inveighing againſt the practice of waking in the night, to ſing the praiſes of God; in regard, ſaid they, the night was made for reſt.

NYCTALOPIA, or NYCTALOPS, a diſeaſe which prevents the ſeeing by day, not by night; or an indiſpoſition wherein a perſon ſees better by night than by day.

The word comes from the Greek νυξ, *night*, and αλωπηξ, *fox*; this animal being ſaid to ſee leſs by day than night. In which ſenſe the word is uſed by Hippocrates.

The *nyctalopia* is ſuppoſed to be owing to the ſpirits being too much diſſipated in the day, but collected by night. See SIGHT.

Boerhaave ſays, the *nyctalopia* conſiſts in this, that the uvea is moveable, and at the ſame time very open.

NYCTALOPIA is alſo uſed by ſome for a diſeaſe of the eyes, which prevent their ſeeing when the ſun is ſet, and the light begins a little to diminiſh.

In which ſenſe it amounts to the ſame with *nocturna cæcitas.*

In the general, any diſeaſe which prevents the ſeeing at any particular time, when others ſee, is called *nyctalopia:* In the Philoſophical Tranſactions we have an inſtance of a *nectalopia*, or *nocturna cæcitas*, in a youth of twenty years of age, who had been affected with it as long as he could remember.

NYCTANTHES, in *Botany.* See *Arabian* JASMINE.

NECTELIA *orgia*, formed from νυξ, *night*, and τιλειν, *to perform*, feaſts in honour of Bacchus; ſo called becauſe held in the night-time.

A great part of the ceremony conſiſted in running through the ſtreets, with the bottle and glaſs in hand, and drinking: but there was no impurity unpractiſed in them.

The Athenians celebrated the *Nyctelia* every three years, at the beginning of the ſpring.

NYCTHEMERON, Νυχθημερον, the natural day. See DAY.

NYCTICORAX. See *Night* RAVEN.

NYCTOSTRATEGI, Νυκτοςρατεγοι, among the *Ancients*, officers appointed to prevent fires in the night time.

At Rome, they had the command of the watch, and, from their number and office were called *nocturni triumviri.*

NYGMA, a word uſed by ſome of the medical writers to expreſs a wound by puncture.

NYL-GHAU, in *Zoology*, an animal brought from the Eaſt Indies, and lately deſcribed for the firſt time by Dr. Hunter. The name denotes a blue cow, or rather a bull, *ghau* or *gau* being a maſculine. Moſt of theſe animals that have been brought to England, have been received from Surat or Bombay; and it is conjectured, that they are indigenous in the province of Guzarat. The *nyl-gau* is larger than any ruminant of this country, except the ox; its fleſh will probably be found delicious; and if it ſhould prove docile enough to be eaſily trained to labour, its great ſwiftneſs, with conſiderable ſtrength, might be applied to valuable purpoſes. In ſize it ſeems to be a mean between black cattle and deer; being as much ſmaller than the one as it is larger than the other; and in its form there is a very evident mixture of reſemblance to both. Its body, horns, and tail, are not unlike thoſe of a bull, and the head, neck, and legs, are very like thoſe of a deer. Some have made this animal a ſpecies of the antelope, but Mr. Hunter, who diſſected it, apprehends, that it is a new ſpecies. The colour, in general, is aſh or grey, from a mixture of black hairs and white: moſt of them are half white towards the root, and half black: the height of the back is about four feet, and the trunk from the root of the neck to the pendulous tail is about the ſame length; along the ridge of the neck and back, the hair forms a ſhort and thin, upright mane; the legs are ſmall in proportion to their length; the neck is long and ſlender as in the deer, and when the head is raiſed, it reſembles the Italic *S*; at the throat there is a ſhield-like ſpot of beautiful white hair; and lower down, on the beginning of the covexity of the neck, there is a mane-like tuft of long black hair. There are ſix grinders in each ſide of the jaw; and four inciſores in each half of the lower jaw; the horns are ſeven inches long, and of a triangular ſhape. The *nyl-ghau* eats oats, is fonder of graſs and hay, and more fond of wheat bread. When thirſty, it would drink two gallons of water. It is vicious and fierce in the rutting ſeaſon, but at other times tame and gentle. The female differs ſo much from the male, that we ſhould ſcarcely ſuppoſe them to be the ſame ſpecies. She is much ſmaller, both in height and thickneſs. In her ſhape and yellowiſh colour, ſhe very much reſembles deer, and has no horns; yet has four nipples, and is ſuppoſed to go nine months with young; ſhe has commonly one at a birth, and ſometimes twins. The young male *nyl-ghau* is like the female in colour, and therefore like a fawn.

The firſt of theſe animals, that were ever brought to England, were ſent from Bombay to lord Clive, in 1767: they were male and female, which bred every year. For a more minute deſcription of this animal, ſee Phil. Tranſ. vol. lxi. part i. art. 21. *Tab.* IV. *Quadrupeds, fig.* 40.

NYMPH, NYMPHA, in *Mythology*, a ſort of heathen divinity, ſuppoſed to preſide over waters, rivers, and fountains.

The word comes from νυμφη, *a bride*, or *woman newly married*; and was applied to theſe deities becauſe repreſented under the figure of young maids. Though others derive *nymph* from *lympha, water*, on account of their inhabiting near the waters. See LYMPHATI.

Some extend the name *nymph* farther, and compriſe under it the goddeſſes of the fountains, foreſts, and trees; called particularly, *Oreades, Dryads*, and *Hamadryads*; as well as thoſe of the ſea, called Nereids, and thoſe of the air, called *Auræ.*

Meurſius is of opinion, the Greeks borrowed their notion of thoſe divinities from the Phœnicians; for *nympha*, in their language, ſignifying *ſoul*, the Greeks imagined, that the ſouls of the ancient inhabitants of Greece were become *Nymphs*. Particularly, that the ſouls of thoſe who had inhabited the woods were called *Dryads*; thoſe who had inhabited the mountains, *Oreades*; thoſe who had dwelt on the ſea-coaſts, *Nereids*; and, laſtly, thoſe, who had their place of abode near rivers, or fountains, *Naiads*.

Nymph-*animal*, in *Natural Hiſtory*, one of the terms uſed by Swammerdam, in his claſſing the inſects according to their ſtates and productions. It expreſſes thoſe creatures which are produced in their perfect form from the egg, and are ſubject to no changes of any kind afterwards. See *Transformation of* Insects.

Nympha, among *Naturaliſts*, is ſometimes uſed for the little ſkin wherewith inſects are incloſed; both while they are in the egg, and after they have undergone the firſt apparent transformation. See Insects.

Nympha is more frequently uſed by naturaliſts for the inſects themſelves, while they have yet only the form of worms, or maggots.

The word properly ſignifies bride, or a new married woman; it being now, when it has laid aſide its former ſkin, that it begins to ſhew all its parts diſtinctly. In this change it loſes its motion for a while, as when in the egg; ſo that theſe inſects are twice in their *nympha* ſtate, firſt in the maggot, which is their firſt *nympha*; and again in this change, which is their ſecond. See Aurelia.

The only difference between the two *nympha* ſtates conſiſts in this, that in the latter the members appear more diſtinctly. Swammerdam calls this latter *nympha aurea*, or *aurelia*, and *chryſalis*; and the former ſimply *nympha*. The *nymphæ* are otherwiſe diſtinguiſhed into *vermiformes*, and *oviformes*.

NYMPHÆ, in *Anatomy*, are two ſoft, ſpongy, red bodies, deſcending from the tip of the clitoris to the ſides of the urinary paſſage, thus reaching to about the middle of the orifice of the vagina; where they grow leſs and leſs, till they diſappear. See *Tab. Anat. (Splanch.) fig.* 9. *lit.* n n. *fig.* 13. *lit.* e e.

Their breadth is uncertain, uſually in maids half a finger; ſometimes they are large, and are capable of being diſtended to a great degree; ſo as to hang a good way out of the body: whence, in ſome, it has been neceſſary to cut theſe as well as the clitoris.

The uſe of the *nymphæ* is, by ſwelling in the act of coition, to embrace the penis, and by their ſenſibility to affect the woman, and mutually invite to procreation.

The ſubſtance is very ſpongy, compoſed of membranes, and veſſels looſely cohering, and therefore eaſily diſtendible.

NYMPHÆA, in *Botany*. See *Water*-Lily.

NYMPHAGOGI, Νυμφαοογογοι, among the *Ancients*, an appellation given to thoſe who led the bride from her father's houſe to that of the bridegroom.

NYMPHARENA, in *Natural Hiſtory*, the name of a ſtone found in the beds of ſome rivers, and having the appearance of a ſea-horſe's tooth. Doubtleſs it was a petrified tooth of that or ſome other ſuch animal, ſuch things being often ſound now, though in thoſe early ages they were little known or regarded.

NYMPHARIUM, in *Botany*, a name given by the Greek writers of the later ages to the *water* Lily.

NYMPHARUM *oculi*, in *Natural Hiſtory*, a name given by ſome of the ancient writers to a ſtone we call *oculus beli*, and ſometimes to the operculum of a ſhell-fiſh, common on the ſea-ſhores in many places, and called *umbilicus Veneris*. We are told of Caligula, that he carried his ſoldiers armed to the ſea ſide, to pick up the *nympharum oculi*, and ſhells. It is certain, in this place, the word only means *umbilicus Veneris*, for the other *oculi nympharum* are found only on the ſhores, and in the beds of ſome particular rivers, not on the ſea ſhores, among ſhells.

NYMPHEUM, Νυμφειον, derived from νυμφη, *bride*, among the *Ancients*, a public hall, or building, magnificently adorned and diſpoſed for banqueting and entertainment; where thoſe, who wanted conveniences at home, held their marriage-feaſts, &c.

Some authors rather take the ancient *nympheum* to have been a grotto, adorned with ſtatues, jets, and other ornaments; and that it had its name by corruption, from *lymphæum*, of *lympha*, *water*. In which ſenſe it muſt have been a public bath.

NYMPHOIDES, in *Botany*, the name of a genus of plants, approaching the nature of the water lily, or *nymphæa*, in external appearance, and thence uſually eſteemed a ſpecies of that genus, but improperly. There are three ſpecies. In the Linnæan ſyſtem this is a ſpecies of Menyanthes.

NYMPHOMANIA, in *Medicine*, the ſame with furor *uterinus*.

NYMPHOTOMIA, in *Surgery*, the operation of cutting off part of the nymphæ, or of the clitoris, by ſome alſo called *nympha*, when they are ſo large and tumid, as to prevent the conſummation of marriage, or render it very difficult.

The Egyptians, Galen obſerves, frequently practiſed the *nymphotomia*; but in our parts of the world, it is rarely found neceſſary.

When it happens to be ſo, the caſuiſts give their judgment, that the woman is obliged to undergo it.

The *nymphotomia* is properly the circumciſion of women.

NYSSA, in *Botany*. See Tupelo-*tree*.

O.

O, The fourteenth letter of the alphabet; and the fourth vowel.

The grammarians call it a cloſe vowel; becauſe pronounced with the mouth ſhut.

Among the Latins, the *O* bore ſo great an affinity to the U, that they frequently confounded them; writing *conſol*, and pronouncing *conſul*. See Gruter's Inſcript.

Thus, alſo, they wrote *æquom* for *æquum*, *aorelius* for *aurelius*, *compaſcuos*, *duomvir*, *&c.*

The Greeks had two *O's*; viz. omicron, *ο*, and omega, *ω*; the firſt pronounced with the tip of the lips with a ſharper ſound; the ſecond in the middle of the mouth, with a fuller ſound, equal to *oo* in our language. The long and ſhort pronunciation of our *O* are equivalent to the two Greek ones; the firſt as in *ſuppoſe*; the ſecond, as in *obey*.

O is uſually denoted long by a ſervile *a* ſubjoined, as *moan*; or by *e* at the end of the ſyllable, as *bone*; when theſe vowels are not uſed, it is generally ſhort.

O, among the *Ancients*, was a numerical letter ſignifying eleven; as in the verſe,

O *numerum geſtat, qui nunc undecimus extat.*

When a daſh was added at the top, as Ō, it ſignified eleven thouſand.

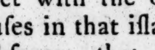
Among the Iriſh, the letter *O*, at the beginning of the name of a family, is a character of dignity, annexed to great houſes. Thus, in the hiſtory of Ireland, we frequently meet with the *O Neals*, *O Carrols*, &c. conſiderable houſes in that iſland.

Camden obſerves, that it is the cuſtom of the lords of Ireland to prefix an *O* to their names to diſtinguiſh them from the commonalty.

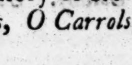
A majuſcule *O*, in *Muſic*, is a note of time, called by us *ſemibreve*, by the Italians, *circolo*, making what they call *tempo perfetto*.

The ancients uſed *O* as a mark of triple time; from a notion that the ternary, or number three was the moſt perfect of numbers, and therefore properly expreſſed by a circle, the moſt perfect of figures.

It is not, ſtrictly ſpeaking, the letter *O*, but the figure of a circle ○, or double CƆ, by which the modern ancients in muſic, uſed to expreſs what they called *tempo perfetto*, or triple time. Hence the Italians call it *circolo*. This circle was ſometimes pointed, and ſometime barred thus,



or thus,



But theſe equally ſignified a triple time. Broſſard.

The ſeven antiphones, or alternate hymns of ſeven verſes, &c. ſung by the choir in the time of Advent, were formerly called *O*, from their beginning with ſuch an exclamation.

In the ſtatutes of St. Paul's church in London, there is one chapter *De faciendo O.* Lib. Stat. MSS. f. 86.

O is an adverb of calling, or interjection of ſorrow or wiſhing.

O. Ni. in the *Exchequer*.—As ſoon as the ſheriff enters into, and makes up his accounts for iſſues, amerciaments, and mean profits; the practice is to mark on his head *O. ni.* which ſignifies, *Oneratur, niſi habeat ſufficientem exonerationem:* and immediately he becomes the king's debtor, and a debet is ſet on his head.—Upon which the parties become debtors to the ſheriff, and are diſcharged to the king.

OAK, *quercus*, in *Botany*, a genus of the *monoecia polyandria* claſs. Its characters are theſe: it hath male and female flowers on the ſame tree; the male flowers are diſpoſed in a looſe katkin, and have an empalement of one leaf, divided into four or five parts, no petal, but many ſtamina; the female flowers, which ſit cloſe to the buds, have a hemiſpherical thick empalement of one leaf, which is rough and entire, almoſt hiding the flower, which has no petal, but a ſmall oval germen, ſupporting a ſingle five-pointed ſtyle, crowned by ſingle permanent ſtigmas; the germen afterwards becomes an oval nut, or acorn, with a thick cover, having one cell, whoſe baſe is fixed into the empalement, or cup.—Miller reckons twenty, and Linnæus fourteen ſpecies.

The firſt ſort, mentioned by Miller, is the moſt common *oak* of this country, which is ſo well known as to need no deſcription; the leaves of this have pretty long footſtalks, and the acorns have none, but ſit cloſe to the branches.

The ſecond ſort, or the *oak* with long foot-ſtalks to the acorn, is not ſo common here as the firſt, but in the wilds of Kent and Suſſex are many large trees of this kind.

The third ſort, or the broad-leaved evergreen *oak*, grows upon the Apennines, and alſo in Swabia and Portugal.

The fourth ſort, or broad-leaved female *oak*, grows common in ſome parts of France.

The fifth ſort, or the *oak* with ſoft, hairy, downy leaves, grows in the ſouth of France and Italy: where alſo the ſixth ſort, or dwarf *oak*, with galls growing together by pairs, by threes, or in larger cluſters, is found. This is a low buſh *oak*, which riſes but ſix or ſeven feet high.

The ſeventh ſort, or *oak* with prickly cups, and ſmaller acorns, grows in Burgundy.

The eighth ſort, or cut-leaved Italian *oak*, grows naturally in Spain and Italy. The acorns of this ſort are long and ſlender, the cups rough and a little prickly, ſitting cloſe to the branches. The acorns of this ſort are ſweet, and are frequently eaten by the poor in the ſouth of France, who, in times of ſcarcity, grind them, and make bread with the flour. This is the *phagus* of the Greeks, and *eſculus* of Pliny.

The ninth ſort, or *oak* with a prickly cup and a larger acorn, grows naturally in the Levant, from whence the acrons are annually brought to Europe, where they are uſed for dying: theſe are called velani, and the tree velanida, by the Greeks. It is one of the faireſt ſpecies of *oak* in the world. The leaves are ſtiff, of a pale green on their upper ſide, and on their under ſide are a little downy; the acrons have very large ſcaly cups, which almoſt cover them; the ſcales are ligneous and acute-pointed, ſtanding out a quarter of an inch; ſome of the cups are as long as middling apples.

The tenth, with broad ſpiny leaves; eleventh, or cheſnut-leaved *oak*; and twelfth, or black *oak*, grow naturally in North America; as does alſo the thirteenth, or ſcarlet *oak* of Virginia, which is alſo called the red *oak*, from the leaves changing to that colour before they fall. The wood is not durable.

The fourteenth ſort, or white *oak* of Virginia, is in moſt eſteem there for building.

The fifteenth ſort, or willow-leaved *oak*, grows alſo in North America.

The ſixteenth ſort, or narrow-leaved evergreen *oak*, is called the ilex, or holm *oak*, of which there are ſeveral varieties, which will ariſe from acorns of the ſame tree.

The ſeventeenth ſort, or holly-leaved evergreen *oak*, is ſuppoſed to be a different ſort. The leaves are ſhorter and broader than the other, approaching in ſhape to thoſe of the holly tree, and are ſet with prickles on their edges.

The eighteenth ſort, is the *oak* from which the kermes, or what is called ſcarlet grain, is collected; which is an inſect that harbours on this tree. It grows naturally in Provence and Languedoc, where it is known by the title D'Avaux. This is of ſmall growth. See KERMES.

The nineteenth ſort is called the live *oak*, in America: from the acorns of this kind the Indians draw a ſweet oil, little inferior to that of ſweet almonds.

The twentieth ſort is the cork tree, of which there are two or three varieties. See CORK. The exterior bark of this tree is taken off every eight or ten years; but there is an interior bark which nouriſhes the trees, ſo that the ſtripping off the outer is ſo far from injuring them, that it is neceſſary to continue the trees, for thoſe whoſe bark is not taken off, ſeldom laſt longer than fifty or ſixty years in health; whereas the trees, which are barked every eight or ten years will live a hundred and fifty years or more. The bark of the young trees is porous and good for little, however it is neceſſary to take it off when the trees are twelve or fifteen years old, without which the bark will not be good, and after eight or ten years, the bark will be fit to take off again; but this ſecond peeling is alſo of little uſe; but the third peeling the bark will be in perfection, and will continue ſo many years; for the beſt cork is taken from old trees. The time of year for ſtripping off this bark is July, when the ſecond ſap flows plentifully. This is performed with an inſtrument like that uſed for diſbarking *oaks*.

All the ſorts of *oaks* are propagated by ſowing their acorns; and the ſooner they are put into the ground, after they are ripe, the better they will ſucceed; for they are very apt to ſprout where they are ſpread thin, and if they are laid in heaps, they ferment and rot in a little time; therefore the beſt ſeaſon for ſowing them is in October, by which time they will be fallen from the trees. Where *oak* trees are cultivated with a view to profit, the acorns ſhould be ſown where the trees are deſigned to grow, for thoſe which are tranſplanted will never arrive to the ſize of thoſe which ſtand where they are ſown, nor will they laſt ſo long ſound.

The firſt thing to be done is that of fencing the ground very well, to keep out cattle, hares, and rabbits; for if either of theſe can get into the ground, they will ſoon deſtroy all the young trees. Indeed they will, in a few years, grow to be out of danger from hares and rabbits, but it will be many years before they will be paſt injury from cattle. After the ground is well fenced, it ſhould be prepared by ploughing it three or four times, and after each ploughing, by harrowing it well, to break the clods, and cleanſe the ground from couch, and the roots of all bad weeds. Indeed, if the ground is green ſward, it will be better to have one crop of beans, peas, or turneps, off the ground, before the acorns are ſown, provided theſe crops are well hoed, to ſtir the ſurface and deſtroy the weeds; for if this is obſerved, the crop will mend, and improve the land for ſowing.

In making choice of the acorns, all thoſe ſhould be preferred, which are taken from the largeſt and moſt thriving trees; and thoſe of pollard trees ſhould be rejected, though the latter are generally the moſt productive of acorns; but thoſe of the large trees commonly produce the ſtrongeſt and moſt thriving plants. The ſeaſon for ſowing of the acorns being come, and the ground having been ploughed and harrowed ſmooth, the next work is to ſow the acorns, which muſt be done by drawing drills acroſs the ground, at about four feet aſunder, and two inches deep, into which the acorns ſhould be ſcattered at two inches diſtance. When the acorns are ſown, the drills ſhould be carefully filled in, ſo as to cover the acorn ſecurely; for if any of them are expoſed, they will entice the birds and mice, and if either of theſe once attack them, they will make great havock with them. The reaſon of directing the drills to be made at this diſtance is for the more convenient ſtirring of the ground between the rows, to keep the young plants clear from weeds; for if this is not carefully done, it cannot be expected that the young plants ſhould make much progreſs.

After the plants have grown two years, it will be proper to draw out ſome of them, where they grow too cloſe; but in doing this, great care ſhould be had not to injure the roots of thoſe left, for as the plants, which are drawn out, are not only fit for plantations deſigned for pleaſure, ſo theſe ſhould not be ſo much regarded in their being removed, as to ſacrifice any of thoſe which are deſigned to remain: in the thinning of theſe plantations, the plants may at the firſt time be left about one foot aſunder, which will give them room enough to grow two or three years longer, by which time it may be eaſy to judge, which are likely to make the beſt trees: therefore theſe may be then fixed on as ſtandards to remain.

When the plants have been reduced to the diſtance of about eight feet, they will not require any more thinning: but in two or three years time, thoſe which are not to remain will be fit to cut down, to make ſtools for underwood; and thoſe which are to remain will have made ſuch progreſs, as to become a ſhelter to each other: for this is what ſhould be principally attended to whenever the trees are thinned; therefore, in all ſuch places as are much expoſed to the wind, the trees ſhould be thinned with great caution, and by ſlow degrees; for if the air is let too much at once into the plantations, it will give a ſudden check to the trees, and greatly retard their growth; but in ſheltered ſituations there need not be ſo great caution uſed.

The diſtance to be allowed for thoſe trees, which are deſigned to remain for timber, is from twenty-five to about thirty feet, which will not be too near, where the trees thrive well; in which caſe their heads will ſpread ſo as to meet in about thirty or thirty-five years: nor will this diſtance be too great, ſo as to impede the upright growth of the trees. This diſtance is intended, that the trees ſhould enjoy the whole benefit of the ſoil; therefore, after one crop of the underwood, or at the moſt two crops are cut, it would be proper to ſtub up the ſtools, that the ground may be entirely clear for the advantage of the growing timber.

The ſoil in which the *oak* makes the greateſt progreſs, is a deep rich loam, in which the trees grow to the largeſt ſize; and the timber of thoſe trees which grow upon this land is generally more pliable than that which grows on a ſhallower or drier ground; but the wood of the latter is much more compact and hard. Indeed, there are few ſoils in England in which the *oak* will not grow, provided there is proper care taken in their cultivation. The other ſorts of *oak*, which are only planted for pleaſure, either in parks or gardens, may be raiſed from acorns ſown in beds, and the plants may be trained in a nurſery three or four years; then they ſhould be planted where they are to remain; for although they are not cultivated for their wood, yet the younger they are planted out, the better they will ſucceed, provided they are kept clean from weeds, and ſecured from animals. Miller's Gard. Dict.

Of the *oak*, the bark, the buds, the acorus, and their cups are uſed; as alſo the GALLS, which are excreſcences cauſed by inſects, on the *oaks* of the eaſtern countries, of which there are divers ſorts; ſome perfectly round and ſmooth, ſome rougher with ſmall protuberances, but all generally having a round hole in them. All the parts of the *oak* are ſtyptic, binding, and uſeful in all kinds of fluxes and bleedings, either inward or outward. The bark is frequently uſed in gargariſms for the relaxation of the uvula, and for ſore mouths and throats: it is alſo uſed in reſtringent clyſters and injections, againſt the prolapſus uteri or ani. The acorns, beaten to powder, are frequently taken by the vulgar for pains in the ſide. The only officinal preparation is the *Aqua Germinum Quercus*.

An extract made from the bark, is ſaid by ſome to be equal to that of the Peruvian bark.

OAK *of Jeruſalem*. See GOOSE-*foot*.

OAK, *poiſon*. See POISON-*wood*.

OAK, *ſea*. See FUCUS, SEA-*plants*, and WRECK.

OAK-*leaf galls*. Theſe are of ſeveral kinds; the remarkable ſpecies called the muſhroom gall is never found on any other vegetable ſubſtance but theſe leaves; and beſide this there are a great number of other kinds.

The double gall of theſe leaves is very ſingular, becauſe the generality of productions of this kind affect only one ſide of a leaf or branch, and grow all one way; whereas this kind of gall extends itſelf both ways, and is ſeen on each ſide of the leaf, in form of two protuberances, oppoſite the one to the other. Theſe are of differently irregular ſhapes, but their natural figure ſeems that of two cones, with broad baſes, and very obtuſe points, though ſometimes they are round, or very nearly ſo.—See *Tab. of Inſects*, N° 25.

Theſe make their firſt appearance on the leaf in April, and remain on it till June or longer. They are at firſt green, but afterwards yellowiſh, and are ſofter to the touch than many other of the productions of this kind: they are uſually about the ſize of a large pea, but ſometimes they grow to the bigneſs of a nut. When opened they are found to be of that kind, which are inhabited each by one inſect only, and each contain one cavity. The cavity in this is, however, larger than in any other gall of the ſize, or even in many others of three times the ſize; the ſides of it being very little thicker than the ſubſtance of the leaf.

It is not eaſy to aſcertain the origin of the ſeveral ſpecies of flies, which are, at times, ſeen in this manner to come out of the ſame ſpecies of galls. It ſeems the common courſe of nature, that only one ſpecies of inſect forms one kind of gall; yet it may be, that two or three kinds may give origin to the ſame kind. There is, however, another occaſion of our ſeeing different ſpecies come out of different galls of the ſame kind; and this is the effect of the enemies of the proper inhabitants.

It might appear that the parent fly, when ſhe had formed a gall for the habitation of her worm offspring, had placed it in an impregnable fortreſs: but this is not the caſe; for it frequently happens, that a fly, as ſmall perhaps as that which gave origin to the gall, produces a worm which is of the carnivorous kind, as the other feeds on vegetable juices. This little fly, well knowing that where there is one of theſe protuberances on a leaf, there is a tender and defenceleſs inſect within, pierces the ſides of the gall, and depoſits her egg within it. This, when it hatches into a worm, feeds upon the proper inhabitant, and finally, after devouring it, paſſes into the chryſalis ſtate, and thence appears in the form of its parent fly, and is ſeen making its way out of the gall, in the place of the proper inhabitant.

On opening theſe leaf-galls, which are properly the habitation only of one animal, it is common to find two, the ſtronger preying upon the body of the other, and ſucking its juices as it does thoſe of the leaf; often it is found wholly employed in devouring its unoffending neighbour at once: this is probably the caſe when its time of eating is nearly over; and, in fine, when we find the gall inhabited by only one inſect, or containing only one chryſalis, as it ought in its natural ſtate to do, we are never certain that this is the proper inhabitant, as it may be one of theſe deſtroyers who has eaten up the other, and ſupplied its place.

Oak, *miſletoe of the.* See Mistletoe.

Oak *puceron*, a name given by naturaliſts to a very remarkable ſpecies of animal of the puceron kind. The generality of ſuch animals live on the ſurface of the branches and leaves of trees and plants; but theſe bury themſelves in the clefts of the *oak*, and ſome other trees, and getting into the crevices, where the bark is a little ſeparated from the wood, they there live at eaſe, and feed to their fill, without being expoſed to their common enemies.

Theſe are the largeſt of all the ſpecies of pucerons; the winged ones are nearly of the ſize of the common houſe-fly, and the naked, or ſuch as have no wings, though leſs than theſe, are yet much larger than any other ſpecies of pucerons; the winged and naked kinds in theſe, as well as in the other ſpecies of pucerons, are all mothers, and great numbers of young ones may be preſſed out of the body of either kind, when gently ſqueezed. The winged ones are black, and the others of a deep brown or coffee colour; they have the moſt remarkable trunk of any animal in the world; it is more than twice the length of their bodies, and has not its origin at the extremity of the head, as in other inſects, but is fixed into the breaſt, near the origin of the firſt pair of legs. When the creature is walking, it carries this ſtraight along the belly, and trailing a conſiderable length behind it, but with the point turned up, that it may be out of the way of accidents, and be ready to ſuck. When the creature has a mind to ſuck a part of the tree that is juſt before it, it draws up, and ſhortens the trunk, till it brings it to a proper length and direction; but when it ſucks in the common way, it crawls upon the inner ſurface of the bark, and the turned up end of the trunk, which reſembles a tail, fixes itſelf againſt the wood that is behind it, or contiguous to its back, and ſucks there. The extremity of this trunk holds ſo faſt by the wood, that when it is pulled away, it frequently brings a ſmall piece of the wood away with it.

The ants are as fond of theſe as of the other ſpecies of pucerons, and that for the ſame reaſon, not feeding upon them, but on their dung, which is a liquid matter of a ſweet taſte, and is the natural juice of the tree, very little altered. Theſe creatures are the ſureſt guides where to find this ſpecies of puceron; for if we at any time ſee a number of theſe crawling up an *oak* to a certain part, and there creeping into the cleft of the bark, we may be aſſured that in that place there are quantities of theſe *oak pucerons*. Reaumur's Hiſt. Inſ. vol. vi. p. 64. 76.

The ants are ſo extremely fond of the juices of the tree, when prepared for them by paſſing through the body of this animal, that when the puceron has a drop not yet evacuated, but hanging only in part out at the paſſage, an ant will often ſeize on it there.

Oak *ſnake*, in *Zoology*. See Dryinus.

OAKHAM, Ockham, or Oakum, in the *Sea-Language*, denotes the matter of old ropes untwiſted, and pulled out again into looſe hemp, like hurds of flax, to be uſed in the cauking of ſhips.

White oakum is formed of untarred ropes.

OAR, in *Navigation*, a long piece of timber, flat at one end, and round or ſquare at the other, whereby a boat, barge, galley, &c. is rowed, or advanced along the water.

That part of the *oar* which is out of the veſſel, and which enters into the water, is called the blade, or waſh; and that which is within-board is termed the loom, whoſe extremity, being ſmall enough to be graſped by the rowers, is called the handle.

In a veſſel with *oars*, the water is to be conſidered as the point of ſupport, or fulcrum; the *oar* as a lever; the boat as the burden to be moved, and the rower's hand as the moving power. See Lever, and Mechanic *power*.

The burden is to be conſidered as applied to that point of the lever where the *oar* reſts on the boat; which point in large veſſels is called the *row-port*, but in lighters and boats it is always termed the *row-lock*. The greater, therefore, the diſtance of the hand from that point, and the leſs the diſtance of the water from that point, the greater effect will the *oars* have.

Oars, *to ſhip the*, is to fix them in the *row-locks* ready for rowing.

Oar, in *Natural Hiſtory*. See Ore.

OARISTUS, or Oaristys, a term in the *Greek Poetry*, ſignifying a dialogue between a huſband and his wife; ſuch as that in the ſixth book of the Iliad, between Hector and Andromache.

Scaliger obſerves, that the *oariſtus* is not properly any particular little poem, or entire piece of poetry; but always a part of a great one. He adds, that the paſſage now cited in Homer, is the only proper *oariſtus* extant in the ancient poets.

OAST. See Oost.

OASY. See Oazy.

OAT, *avena*, in *Botany*, a genus of the *triandria digynia* claſs. Its characters are theſe: the flowers are collected in a looſe panicle, and have a bivalvular empalement ſwelling in the middle; the petal of the flower is bivalve, having a ſpiral beard, twiſting, jointed, and reflexed; there are two oval nectariums, ſitting upon the upper ſide of the germen, which have three ſlender ſtamina; the germen afterwards become an oblong ſwelling ſeed, having a longitudinal ſurrow, and cloſely ſhut up in the cover or chaff. Linnæus enumerates ſixteen ſpecies.

There are three varieties of *oats* cultivated in England; viz. the white, the black, and the brown or red: there is alſo a naked *oat*, which is ſometimes cultivated in the diſtant parts of England, but is rarely ſeen near London. The white *oat* is the moſt common about London; the black is more cultivated in the northern parts of England, and is eſteemed a very hearty food for horſes; but the firſt makes the whiteſt meal, and is chiefly cultivated where the inhabitants live much upon *oat* cakes.

This grain is a great improvement to many eſtates in the North of England, Scotland, and Wales; for no ſoil is too rich or too poor, too hot or too cold for it: and in wet harveſts, when other grain is ſpoiled, this will receive little or no damage, for the ſtraw and huſks are of ſo dry a nature, that, if they were houſed wet, they will not heat or become mouldy in the mow, as other grain uſually does. It is therefore of great advantage in the North, where the harveſt is generally late, and the autumn wet.

Oats are often ſown on land which has the former year produced wheat, barley, or rye. The common method is to plough in the ſtubble, about the beginning of February, ſow the *oats*, and harrow them in; but they muſt be harrowed in the ſame direction that the furrows lie, for if it be done croſſways, the ſtubble will be raiſed to the ſurface. But this is not a good method of huſbandry, for when there is time to plough the ſtubble in autumn, it will rot in winter; and then another ploughing and harrowing, juſt before the *oats* are ſown, will make the ground finer and better to receive the grain. The general allowance is four buſhels to an acre, but three buſhels, ſays Miller, are more than enough: the uſual produce is about twenty-five buſhels to an acre, though it ſometimes amounts to more than thirty.

Oats are alſo ſown upon land when it is firſt broken up, before the ground is brought to a tilth for other grain, and is frequently ſown upon the ſward with one ploughing: but it is much better to give the ſward time to rot before the *oats* are ſown, as the roots of the graſs will prevent thoſe of the corn from ſtriking downward.—Miller.

There is a duty on the importation of *oats*, when not above 16*s*. a quarter, of 5*s*. 4*d*. but if the price be at or above 16*s*. a quarter, the duty ſhall ceaſe, and 2*d*. a quarter only be paid. 22 Car. II. cap. 13. 13 Geo. III.

cap. 43. No perſon is allowed to export *oats*, when the price is at or above 14*s*. a quarter, under the penalty of forfeiting the *oats*, and 20*s*. for every buſhel, together with the veſſel, &c. A bounty on exportation is allowed, when *oats* are under 14*s*. a quarter, of 2*s*. for every quarter. See CORN.

Some phyſicians have greatly recommended a diet drink made of *oats*, in various diſtempers. The method of preparing the drink is as follows: take of recent *oats*, entire and well waſhed, one pound and a half; of the freſh root of ſuccory, cut into ſlices, one handful; ſpring water, twelve pints; boil all together in a clean earthen veſſel to the conſumption of half, and then ſtrain the liquor through a linen cloth, and add to it ſix ounces of coarſe ſugar, and half an ounce of ſal prunellæ; let it boil again, and afterwards be taken off the fire, and ſet by, for a day and a night, in a cool place; then pour off the clear liquor, and keep it in a cellar in veſſels cloſe ſtopped.

Two ordinary cup-fulls of this liquor, given twice a day, three hours before, and as many after dinner, are ſaid to do wonders in the cure of all kinds of fevers, colic pains, pleuriſies, itches, cutaneous tumors, and hypochondrical diſorders; as alſo in cleanſing the kidnies from ſand, and opening the obſtructed viſcera. The uſe of it is ordered to be continued thirteen days, and, if the patient be cacochymic, a gentle purge is to be given before it is taken. It is accounted a great preſervative againſt illneſs, if taken thrice a year, in ſpring, in autumn, and in the dog days; and the inventor of it, Joannes de St. Catherina, is ſaid to have kept himſelf alive by it to the age of an hundred and twenty years, without any diſeaſes.

Dr. Lower, having tried it, and found its good effects, by repeated experience, made it public, and the celebrated Hoffman has written an expreſs treatiſe about it, in which he recommends it both in intermittent and continued fevers, but adviſes purified nitre to be uſed inſtead of the ſal prunellæ, and obſerves that the two boilings, ordered by Dr. Lower, are not neceſſary, but that the ſugar and nitre may be added at firſt. It muſt be kept carefully in ſummer, otherwiſe it ſoon becomes ſour and unfit for uſe.

Thoſe who deſire to have it coloured may boil in it an ounce of alkanet root, and two ounces of red ſanders, which will give it a fine red colour, without at all affecting its virtues.

It is, unqueſtionably, a very valuable medicine, affording ſingular relief wherever obſtructions of the veſſels are to be removed, or ſalts to be waſhed out of the habit; where the viſcid juices are to be diluted, or a due degree of moiſture, and humidity reſtored. It is alſo excellent for allaying thirſt in fevers, and for ſtopping hæmorrhages.

OAT, *wild*, in *Huſbandry*, a kind of *oat*, or *oat* graſs, which comes up of itſelf, without ſowing, and is much hated and dreaded by the farmers. This, in many counties of England, is the greateſt of all hindrances of the good crops of barley, and often of other grain. It is a rough and hairy *oat*, and uſually black. In the wetter years, and after much froſt, this is found to be moſt troubleſome.

The beſt remedy the farmer has againſt this, is to ſow the land moſt apt to produce it with beans, and when they are come up to about three inches high, to turn in ſheep upon the ground, about twenty ſheep to an acre; theſe will eat up all the ſhoots of the wild *oat*, and not touch the beans ſo long as there are any of the *oat* ſhoots left. See GRASS, and FESTUCA.

OAT-*ſnail*. See SNAIL.

OATH, *juſjurandum*, is uſually defined a religious aſſertion, or aſſeveration; wherein a perſon invokes the Almighty, renounces all claim to his mercy, or even calls for the divine vengeance upon himſelf, if he ſpeak falſly.

Some civilians look on this definition as two lax, ſince it may agree to perjury; and would have this eſſential to an oath, that the thing affirmed be true. But this is arbitrary.

An *oath* is eſteemed a kind of civil medium, between the perſon that gives it, and him to whom it is given; whereby ſome controverſy or other matter, which could not otherwiſe be determined, is brought to an iſſue. Its form, and the ceremonies with which it is attended, are arbitrary, and various in different countries.

The *oaths* we make to God are called *vows*, and in ſome caſes *ſacraments*.

OATH, in legal ſenſe, is a ſolemn action, whereby God is called to witneſs the truth of an affirmation given before one or more perſons impowered to receive the ſame.

Legal *oaths* end with, So help me God; anciently with, So help me God at his holy DOME, i. e. judgment.

This, according to our law-books, is called a *corporal oath*; becauſe the party, when he ſwears, touches the Goſpels with his right hand.

But in ſome old cuſtoms of Anjou and Maine, it appears that *corporal oath* was anciently a ſimple affirmation, or vow of faith and fidelity, made by a vaſſal who has no liege, by lifting up his hand; in contradiſtinction to that made by a liege vaſſal, which was made by laying his hand on the Goſpel.

An *oath* is called *canonica purgatio*, becauſe allowed of by the canons; to diſtinguiſh it from *vulgares purgationes*, viz. by battle, fire ordeal, &c. which the church always diſcouraged. In ſmall matters, which the plaintiff could not prove, or, if he could, if his proof were ſet aſide, the defendant might purge himſelf by his own *oath*: this was called, *jurare propria manu*.

But in matters of more weight, he was to bring other credible perſons, uſually of the ſame quality with the plantiff, to ſwear that they believed the defendant had ſworn the truth.

Theſe were called *compurgators*, or *ſacramentales*; and their number was greater or leſs, according to the quality of the defendant, and the nature of the thing in queſtion. Hence, *jurare duodecima manu*.

OATH is alſo uſed for a ſolemn promiſe faithfully to execute or obſerve ſomething. See JURY and TRIAL.

In this ſenſe we ſay, *ſtate oaths*, the *oaths of* SUPREMACY, *oath of* ALLEGIANCE, *oath of* ABJURATION.

All that bear offices in the government, peers, and members of the houſe of commons, eccleſiaſtical perſons, members of colleges, ſchool-maſters, preachers, ſerjeants at law, counſellors, attornies, ſolicitors, advocates, proctors, &c. are enjoined to take the *oaths* of allegiance, ſupremacy, and abjuration: and perſons neglecting or refuſing are declared incapable to execute their offices and employments, diſabled to ſue in law or equity, to be guardians, executors, &c. or to receive any legacy, or deed of gift, to be in any office, &c. and to forfeit 500*l*.

We have frequently acts paſſed for indemnifying perſons, who have omitted to qualify themſelves for offices and promotions, within the time limited by law, and for allowing farther time for that purpoſe.

Kings and princes ſwear to the performance of the treaties they make; though, anciently, they did not ſwear of themſelves, but others ſwore in their name.

OATH, *coronation*, is, by 1 W. & M. ſtat. 1. cap. 6. to be adminiſtered to every king and queen, who ſhall ſucceed to the imperial crown of theſe realms, by one of the archbiſhops or biſhops of the realm, in the preſence of all the people: it is conceived in the following terms: *The archbiſhop or biſhop ſhall ſay*, Will you ſolemnly promiſe and ſwear to govern the people of this kingdom of England, and the dominions thereto belonging, according to the ſtatutes in parliament agreed on and the laws and cuſtoms of the ſame? *The king or queen ſhall ſay*, I ſolemnly promiſe ſo to do. *Archbiſhop or biſhop*. Will you, to your power, cauſe law and juſtice, in mercy, to be executed in all your judgments? *King or queen*. I will. *Archbiſhop or biſhop*. Will you, to the utmoſt of your power, maintain the laws of God, the true profeſſion of the Goſpel, and the proteſtant reformed religion, eſtabliſhed by the law? and will you preſerve unto the biſhops and clergy of this realm, and to the churches committed to their charge, all ſuch rights and privileges, as by law do or ſhall appertain to them, or any of them? *King or queen*. All this I promiſe to do. *After this the king or queen, laying his or her hand upon the holy Goſpels ſhall ſay*, The things which I have here before promiſed, I will perform and keep. So help me God. *And then ſhall kiſs the book*. Blackſt. Com. book i. p. 235.

OATH *ex Officio*. See EX OFFICIO.

Falſe **OATH**. See PERJURY.

OATH, *teſt*. See TEST.

OATMEAL. The ſelling of corrupt *oatmeal* is puniſhable by ſtatute, which ſhall be forfeited for the ſecond offence, &c. See 51 Ed. I.

OAZY, or OASY *ground*, a name given by the ſeamen to ſoft, ſlimy, or muddy ground.

OBADIAH, or the *Prophecy of* OBADIAH, a canonical book of the Old Teſtament, which is continued in a ſingle chapter, and is partly an invective againſt the cruelty of the Edomites, who mocked and derided the children of Iſrael, as they paſſed into captivity; and, with other enemies, their confederates, invaded and oppreſſed thoſe ſtrangers, and divided the ſpoil among themſelves: and partly a prediction of the deliverance of Iſrael, and of the victory and triumph of the whole church over her enemies.

OBEDIENCE, *obedientia*, is ſometimes uſed in the *Canon Law*, for an office, or the adminiſtration of it.

In our *Ancient Cuſtoms*, *obedientia* was uſed in the general for every thing that was enjoined the monks, by the abbot.

OBEDIENTIA, in a more reſtrained ſenſe, was applied to the farm belonging to the abbey, to which the monks were ſent *vi ejuſdem obedientiæ*, either to look after the farm or collect the rents. Hence, alſo, thoſe rents themſelves were called *obedientiæ*.

OBELIAS, among the ancients, a kind of ſmall cakes, which were toaſted on little ſpits, and ſerved at table as a deſert, to be eaten dipped in ſweet wine, called *paſſum*.

OBELISCUS *marmoreus*, in *Natural Hiſtory*, the name of a very remarkable ſpecies of a ſhell fiſh, unknown to us in its recent ſtate, but met with very frequently foſſile in the Swediſh ſtone uſed for pavements, and ſome other kinds, and more accurately named by late authors *polythalamium*, and *orthoceratites*, and by Klein TUBULUS *marinus concameratus*.

OBELISK, *obeliſcus*, a quadrangular pyramid, very ſlender, and high; raiſed as an ornament, in ſome public place, or to ſhew ſome ſtone of enormous ſize; and frequently charged with inſcriptions, and hieroglyphics.

Borel derives the word from the Greek οϐελος, *a ſpit, broach, ſpindle*, or even a kind of *long javelin*. Pliny ſays, the Egyptians cut their *obeliſks* in form of ſun-beams; and that in the Phœnician language, the word *obeliſk* ſignifies *ray*.

The Egyptian prieſts called their *obeliſks* the *ſun's fingers*; becauſe ſerving as ſtyles, or gnomons, to mark the hours on the ground. The Arabs call them *Pharaoh's needles*: whence the Italians call them *aguglia*; and the Engliſh *Cleopatra's needles*.

The difference between *obeliſks* and pyramids, according to ſome, conſiſts in this, that the latter have large baſes, and the former very ſmall ones, compared with their height.

Though Cardan makes the difference to conſiſt in this, that *obeliſks* are to be all of a piece, or conſiſt of a ſingle ſtone; and pyramids of ſeveral.

The proportions of the height and thickneſs are nearly the ſame in all *obeliſks*; that is, their height is nine, or nine and a half, ſometimes ten times their thickneſs; and their thickneſs, or diameter, a-top, is never leſs than half, nor greater than three-fourths, of that at bottom.

This kind of monument appears very ancient; and, we are told, was firſt made uſe of to tranſmit to poſterity the principal precepts of philoſophy, which were engraven in hieroglyphical characters hereon. In aftertimes they were uſed to immortalize the actions of heroes, and the memory of perſons beloved.

The firſt *obeliſk* we know of was that raiſed by Rameſes, king of Egypt, in the time of the Trojan war. It was 40 cubits high, and, according to Herodotus, employed 20,000 men in the building. Phius, another king of Egypt, raiſed one of 45 cubits; and Ptolemy Philadelphus another of 88 cubits, in memory of Arſinoe. See PORPHYRY.

Auguſtus erected an *obeliſk* at Rome, in the Campus Martius, which ſerved to mark the hours on an horizontal dial, drawn on the pavement.

F. Kircher reckons up fourteen *obeliſks*, celebrated above the reſt; viz. that of Alexandria, that of the Barberins, thoſe of Conſtantinople, of the Mons Eſquilinus, of the Campus Flaminius of Florence, of Heliopolis, of Ludoviſio, of S. Mahut, of the Medici, of the Vatican, of M. Cælius, and that of Pamphylia.

One of the uſes of *obeliſks* among the ancients was to find the meridian altitudes of the ſun, at different times of the year. Hence they ſerved inſtead of very large gnomons. One of the *obeliſks* now ſtanding at Rome, that of St. John's Lateran, is in height 108 Engliſh feet, without the pedeſtal; and the other *obeliſk*, brought to Rome by Auguſtus, buried under the Campus Martius, wants but little of the ſame height. Pliny gives us a deſcription of this gnomon, lib. xxxvi. ſect. 15. From him it appears, that there was laid down, from the foot of the *obeliſk* northward, a level pavement of ſtone, equal in breadth to the breadth of the *obeliſk* itſelf, and equal in length to its ſhadow at noon, upon the ſhorteſt day; that is to ſay, that its length was to the height of the *obeliſk*, almoſt as 22 to 10, and that under this pavement, there were properly let in parallel rulers of braſs, whoſe diſtance from the point, directly under the apex of the *obeliſk*, were reſpectively equal to the length of the ſhadow thereof at noon, on the ſeveral days of the year, as the ſame lengths decreaſed from the ſhorteſt day to the longeſt, and again increaſed from the longeſt day to the ſhorteſt. Vide Phil. Tranſ. N° 482. art. 5. vol. xliv. p. 365. where we alſo find ſome remarks by Mr. Folkes on Hardouin's Amendment of a Paſſage in Pliny's Natural Hiſtory, lib. ii. ſect. 74. Edit. Pariſ. 1723. fol. about the length of the ſhadows of gnomons in different latitudes. See GNOMON.

OBELISK, in *Grammar*, is a character in form of a dagger (†), ſerving to refer the reader to ſome note, or other matter, in the margin.

OBELUS, in *Antiquity*, denotes a little line or ſtroke, like a needle; whence its name οϐελος, which ſignifies *needle*. The word is chiefly uſed in ſpeaking of Origen's Hexapla; wherein he diſtinguiſhes, with an aſteriſk or ſtar, the ſupplements he makes to the texts of the Septuagint, where it falls ſhort of the Hebrew meaning; and with an *obelus* or lineola (—), thoſe places where the Septuagint had any thing not in the Hebrew.

St. Jerom ſays, the *obelus* was only uſed in thoſe places where ſomething was to be retrenched from the Septuagint, as ſuperfluous, and the aſteriſk in thoſe that were defective. Theſe marks frequently occur in ancient manuſcripts. Uſually the *obelus* is accompanied with two dots, the one above, the other underneath, as (÷); and the aſteriſk is a St. Andrew's croſs, cantoned with four points.

OBESITY, *obeſitas*, in *Medicine*, the ſtate of a perſon too much loaded with fat and fleſh, otherwiſe called CORPULENCY.

OBEY, in the *Manege*. A horſe is ſaid to *obey* the hand and heels, to *obey* the aids or helps, when he knows and anſwers them according to demand.

OBJECT, derived from *objicere*, *to ſet before*, which is compoſed of *ob* and *jaceo*, *I lie againſt*, in *Philoſophy*, ſomething apprehended, or preſented to the mind, by ſenſation, or by imagination.

An *object* is ſomething that effects us by its preſence, that moves the eye, ear, or ſome other of the organs of ſenſe; or, at leaſt, is repreſented to us by the imagination.

The ſchool-philoſophers define *object* to be that about which a power, act, or habit, is employed. Thus, good is the *object* of the will; truth of the underſtanding; ſo colour is the *object* of ſight; ſound, of hearing, &c.

Objects are uſually divided into *next*, *proxima*, which are thoſe the power or habit is immediately employed on; in which ſenſe colour is the next *object* of ſight. And *remote*, which are thoſe only perceived by means of the former: in which ſenſe, the wall is the remote *object* of ſight, ſince we only ſee it by means of its colour, &c.

Ideas are the immediate *objects* of the mind in thinking: bodies, their relations, attributes, &c. are the mediate *objects*.

Hence it appears, that there is a ſort of ſubordination of *objects*. But note, that a *next object*, with regard to a *remote* one, is properly a SUBJECT, not an *object*.

They alſo diſtinguiſh *objects per ſe*, which are what properly move or affect our ſenſes: ſuch are the ſenſible qualities. And *objects per accidents*, which are ſubſtances, and only affect us by being inveſted with ſenſible qualities.

Again, they diſtinguiſh between *common objects*, which are ſuch as affect divers ſenſes; as are motion, figure, &c. and *proper objects*, which only affect one SENSE.

There are ſeveral conditions requiſite to an *object of ſenſe*; as, that it be material; that it be within a certain diſtance of a competent extent: its ſenſible qualities ſufficiently intenſe, &c.

It is the *object* that reflects or emits the rays of light, which occaſion viſion. *Objects*, of themſelves, are inviſible; we only ſeem to perceive them, becauſe the different texture of their ſurface, diſpoſing them to reflect differently coloured rays, occaſions in us ſeveral ſenſations of colour, which we attribute to them.

The *objects* of the eye, or viſion, are painted on the retina; though not there erect, but inverted, according to the laws of optics. This is eaſily ſhewn, from Cartes's experiment of laying bare the vitreous humour on the back part of the eye, and putting over it a bit of white paper, or the ſkin of an egg, and then placing the fore part of the eye to the hole of a darkened moon. By this means is had a pretty landſcape of the *objects* abroad, painted invertedly on the back of the eye.— How, in this caſe, the *objects* which are painted inverted ſhould be ſeen erect, is matter of controverſy.

OBJECT-*glaſs* of a teleſcope or microſcope is the glaſs placed at the end of the tube which is next the *object*.

To prove the regularity and goodneſs of an *object-glaſs*, ſtrike two concentric circles on paper, the one having its diamater the ſame with the breadth of the *object-glaſs*; the other half that diameter; divide the inner circumference into ſix equal parts; and making ſix fine ſmall holes therein with a needle, cover one ſide of the glaſs with this paper; then expoſing it to the ſun, receive the rays that paſs through theſe ſix holes on a plane, at a juſt diſtance from the glaſs; and, by withdrawing or approaching this plane, from or to the glaſs, we ſhall find whether the rays, that paſs through theſe ſix holes, unite exactly together at any diſtance from the glaſs; if they do, we may be aſſured of the regularity of the glaſs, that is, of its juſt form; and, at the ſame time, we obtain exactly the glaſs's focal length.

Indeed, there is ſcarce any better way of proving the excellency of an *object-glaſs*, than by placing it in a tube, and trying it with ſmall eye-glaſſes, at ſeveral diſtant objects; for that *object-glaſs* which repreſents objects the brighteſt and moſt diſtinct, which bears the greateſt aperture, and moſt convex and concave eye-glaſs, without colouring or hazineſs, is always the beſt.

A circular *object-glaſs* is ſaid to be truly centered, when the centre of its circumference is ſituated in the axis of the glaſs; and to be ill centered when the centre of its circumference lies beſide the axis.

To prove whether *object-glaſſes* be well centered, hold the glaſs at a due diſtance from the eye, and obſerve the two reflected images of a candle: where thoſe images unite, or coaleſce, there is the true centre. If this be in the middle, or central point of the glaſs, then it is known to be truly centred.

There are various methods of finding the true centre of an *object-glaſs:* the following was the method uſed by Mr. George Graham. Let a couple of ſhort cylindrical tubes be turned in wood or braſs, and let the convexity of the narrower be ſo exactly fitted to the concavity of the wider as juſt to turn round in it, with eaſe, but without waddling; and let the planes of the baſes of the tubes be exactly perpendicular to their ſides. Place the baſe of the narrower tube upon a ſmooth braſs plate or a wooden board, of an equal thickneſs, and with any ſharp-pointed tool, deſcribe a true circle upon the board round the outward circumference of the baſe; and upon the centre of this circle, to be found when the tube is removed, deſcribe a larger circle upon the board.

Theſe two circles ſhould be ſo proportioned, that the one may be ſomewhat greater, and the other ſomewhat ſmaller than any of the glaſſes intended to be centered by them. Then having cleared out all the wood within the inner circle, put the end of the tube into this hole, and there faſten it with glue, ſo that the baſe of the tube may lie in the ſurface of the board: then having fixt the wider tube very firmly, in a hole made in a window-ſhutter, and having darkened the room, lay the glaſs to be centered upon the board fixt to the narrower tube; and having placed the centre of it as near as you can gueſs over the centre of the hole, fix it to the board with two or three lumps of pitch, or ſoft cement, placed at its circumference. Then put the narrower tube into the wider as far as it can go, and fix up a ſmooth ſcreen of white paper to receive the pictures of *objects* that lie before the window; and when they appear diſtinct upon the ſcreen, let the inner tube be turned round upon its axis, and if the centre of the glaſs happens to be in this axis; the picture will be perfectly at reſt upon the ſcreen; if not, every point of it will deſcribe a circle. Witn a pencil mark the higheſt and the loweſt places of any one circle, deſcribed by ſome remarkable point in that part of the picture which appears moſt diſtinct; and when this point of the picture is brought to the higheſt mark, ſtop the circular motion of the tube, and keeping it in that poſition, depreſs the *object-glaſs* till the point aforeſaid falls exactly in the middle between the two marks. Then turn the tube round again, and the point of the picture will either reſt there, or will deſcribe a much ſmaller circle than before, which muſt be reduced to a quieſcent point by repeating the ſame operation. Then the centre (of refraction) of the glaſs will lie in the axis of the tube, and by conſequence will be equidiſtant from the circumference of the large circle deſcribed upon the board fixt to it. Now to deſcribe a circle upon the glaſs *f g h*, *Tab.* V. *Optics*, *fig.* 82. about its centre of refraction, let a long ſlender braſs plate *a c b*, be bent ſquare at each end, as repreſented in the figure, leaving a piece in the middle, equal in length to the diameter of the large circle *a d b e*, that was deſcribed upon the board; and let the ſquare ends of the plate be filed away ſo as to leave a little round pin in the middle of each. Then having laid it over the glaſs, along any diameter of the large circle *a d b e*, make two holes in the board to receive the pins *a b*; and find the centre of this circle upon the long plate; and with this centre *c* deſcribe as large a circle as you can, upon the glaſs underneath, with a diamond-pointed compaſs; and grind away all the margin as far as this circle *f i k*, in a deep tool for grinding eye-glaſſes; and then the glaſs will be truly centered. If the pitch, or cement, be too ſoft to keep the glaſs from ſlipping, while the circle is deſcribing, it may be fixt firmer with wax, or harder cement. Smith's Optics, book iii. chap. 3.

Mr. Savery gives the following rule, which is very convenient for the uſe of the glaſs-grinder, and will enable him expeditiouſly to try whether a convex lens is well centred. Provide a round plate of braſs (or hardened ſteel, if it can be prevented from ruſting), conveniently thick, and well hardened by hammering, having many notches round it, one a little wider than the next, and numbered 1, 2, 3, &c. in their proper order, each of them being wider at the bottom than at the entrance. *Tab.* V. *Optics*, *fig.* 83. Fit one of theſe notches to the thickeſt ſide of the *object-glaſſes*, ſo that the edge may reach to about half its depth; and if the oppoſite ſide paſs to the bottom of the notch, grind the lens narrower on the thinneſt ſide, till you find it at that part as thick as where you firſt tried it in the notch. After this manner reduce the glaſs to an equal thickneſs on its four quarters, and then grind off from other places what is needful to make it circular: let care be taken, when the lens is tried in the notch, that it be not warmer on one ſide than the other by grinding, but ſtay till it is quite cold; and obſerve likewiſe not to thruſt it in harder on the one ſide than on the oppoſite ſide. Phil. Tranſ. vol. xlviii. p. 177, &c. The chief advantage of having a glaſs well centred is this, that the rays coming through any given hole or aperture, whoſe centre coincides with the axis of the glaſs, will form a more diſtinct image than if that centre lay beſide the axis; becauſe the aberrations of the rays from the geometrical focus of the pencil, are as the diſtances of their points of incidence from the centre of refractions in the glaſs.

As *object glaſſes* are commonly included in cells that ſcrew upon the end of the tube of a teleſcope, one may examine whether they be well centred, by fixing the tube, and obſerving while the cell is unſcrewed, whether the croſs-hairs keep fixed upon the ſame lines of an object ſeen through the teleſcope. See Centering.

Object is alſo uſed for the matter of an art or ſcience; or that about which it is employed.

In which ſenſe the word coincides with *ſubject*.

The ſchool philoſophers diſtinguiſh divers kind of *objects* in the ſame ſcience; viz.

Object, *material*, which is the thing itſelf that is conſidered, or treated of. And thus it is the human body, which is the object of medicine.

Object, *formal*, is the manner of conſidering it. And thus the ſame human body, conſidered with a view to the healing of it, is the *formal object* of the medicine.

OBJECTUM *quod complexum*, of an art, is the aggregate whole, or a collection of all the objective concluſions, or conſequences, found in the ſcience.

Objectum *quod incomplexum* is a collection of all the ſubjects of the objective concluſions. Thus, therefore, air, as elaſtic, is the *complex object* of one branch of phyſics; and air itſelf or the ſubject of the concluſion, the *incomplex object* of the ſame branch.

Objectum *quo complexum* is a collection of all the objective antecedents of the ſcience.

Objectum *quo incomplexum* is a collection of all the mediums, or arguments, contained in thoſe antecedents, and whereby thoſe concluſions are proved.

In theſe caſes, the *object* is ſaid to be *complex*, inaſmuch as it includes both an affirmation and negation; and *incomplex*, as it includes neither: *quod*, as being that which *(quod)* is ſhewn in the ſcience; and *quo*, as being that whereby *(quo)* the concluſions therein are proved.

Schoolmen alſo diſtinguiſh an *object per ſe*, and *per accidens*; *objectum adæquatum*, and *inadæquatum*; *attributionis*, and *attributum*, &c.

OBJECTION, in *Reaſoning*, ſomething urged to overthrow a poſition; or a difficulty raiſed againſt an allegation, or propoſition, of a perſon with whom we are diſputing.

The anſwering of *objections* comes under that branch of oratory, or that part of an oration, called CONFIRMATION, or CONFUTATION.

Objection, *over-ruling an*. See Over-ruling.

OBJECTIVE, Objectivus, is uſed in the ſchools in ſpeaking of a thing which exiſts no otherwiſe than as an object known.

The eſſe, or exiſtence of ſuch a thing, is ſaid to be *objective*. Others call it *ratio objectiva*.

Objective is alſo uſed for the power, or faculty, by which any thing becomes intelligible. And for the act itſelf, whereby any thing is preſented to the mind, and known.

Hence a thing is ſaid *to exiſt objectively*, *objectivè*, when it exiſts no otherwiſe than in being known, or by being an object of the mind.

This ſome will have to be real ESSE; others deny it.

Objective *evidence*. See Evidence.

Objective *line*. See Line.

Objective *notion*. See Notion.

Objective *plane*. See Plane.

OBIIT *nuper*. See Nuper.

OBIT, **Obitus**, in our *Ancient Cuſtoms*, was a funeral ſolemnity, or office for the dead; commonly performed when the corpſe lay uninterred in the church.

Obit is alſo an anniverſary office, or maſs, held yearly, in the Romiſh church, on a certain day, in memory of ſome perſon deceaſed.

One of the moſt ancient *obits* in Europe is that of king Childebert, founded in the abbey of St. Germains Deſprez, and ſaid on the eve of St. Thomas's day.

The tenure of *obit*, or chantry-lands, held of the ſubject by ſuch ſervice, is decreed to be extinct with us, by ſtat. 1 Edward VI.

OBITUARY, *obitarium*, a funeral regiſter, wherein are written the names of the dead, and the days of their burial; for whom obits, or anniverſaries, are to be performed.

Theſe, in ſome places, are alſo called *mortuaries*; but more frequently *necrologies*, or *calendars*.

Obituary is more particularly uſed for a book containing the foundation or inſtitution of the ſeveral obits in a church or monaſtery.

This is more frequently called the MARTYROLOGY.

OBLADA, in *Ichthyology*, a name given by ſome to the *melanurus* of authors, a fiſh of the *ſparus* kind, diſtinguiſhed by Artedi by the name of the *ſparus variegated with longitudinal lines, and with a large black ſpot on each ſide near the tail.*

OBLATA, things given, or voluntarily offered, particularly to the king by any of his ſubjects.

They are thus called, becauſe the *oblata*, or offerings to our kings were ſo ſtrictly looked to in the reign of king John, and Henry III. that they were entered in the fine-roll under the term *oblata*; and, if not paid, were put in charge to the ſheriff.

Oblata, in the *Exchequer*, ſignifies old debts; brought, as it were, together, from preceding years, and put to the preſent ſheriff's charge.

Oblata is alſo a word uſed by ſome authors to expreſs a ſort of purging tablet, made of fine flour and ſugar, with ſome purging ingredients.

Oblatæ is alſo uſed to ſignify the conſecrated wafers, or hoſts, diſtributed to the communicants in the maſs or ſacrament of the altar; and ſometimes the cuſtomary treats in religious houſes have been called by the name of *oblatæ*.

OBLATI, anciently, were ſecular perſons, who beſtowed themſelves and their eſtates, on ſome monaſtery, and were admitted as lay-brothers.

There were ſome of the *oblati*, properly called *donati*, who gave their perſons, their families, and effects; and even entered into a kind of ſervitude themſelves, and their deſcendants.

They were admitted by putting the bell-ropes of the church round their necks, and, as a mark of ſervitude, a few pence on their heads.

The donati took religious habits, but different from thoſe of the monks.

In the archives of the abbey of St. Paul de Verdun is a permiſſion given, in 1360, to a man of that abbey, to marry a wife; on condition, that, of the children ariſing from the marriage, one half ſhould belong to the abbey, in quality of *oblati*; the other half to the biſhop. This kind of *oblati* are ſaid to have taken their firſt riſe in the eleventh century.

In the earlier times, thoſe only are called *oblati*, whom their parents engaged from their infancy, to the monaſtic life. Thoſe who embraced it themſelves, when at an age capable of choice, were called *converts*, *converſi*.

The *oblati* made no profeſſion; yet kept the celebate, lived in obedience to the ſuperiors, and did the drudgery of the monaſtery: yet they differed from the ſervants of the houſe, who were allowed to marry.

The *oblati* and donati were, properly, ſervants by devotion, as the others were by condition.

Helyot ſays, the *oblati* differed from converts, inaſmuch as the latter made the profeſſion, and wore the habit, which the former did not.

Oblati were alſo, in France, a kind of lay-monks, anciently placed by the king in all the abbeys and priories in his nomination; to whom the religious were obliged to give a monk's allowance, on account of their ringing the bells, and ſweeping the church, and the court.

Theſe offices were uſually filled with lame ſoldiers, and invalids, ſome of whom had penſions on benefices, without any duty. But theſe *oblati*, with their peſinons, have ſince been all removed to the hotel of the Invalids at Paris.

OBLATIONS, **Offerings**, properly denote things offered to God.

In the canon law, *oblations* are defined to be any thing offered by godly Chriſtians to God, and the church, i. e. to the prieſts, whether they be moveables, or immoveables.

Oblations, were anciently of various kinds, viz. *oblationes altaris*, which the prieſts had for ſaying maſs. *Oblationes defunctorum*, given by the laſt wills of the faithful to the church. *Oblationes mortuorum*, thoſe given by the relations of the dead, at their burials. *Oblationes pænitentium*, thoſe given by penitents. And *oblationes pentecoſtales*, or Whitſun-offerings.

Till the fourth century, the chnrch had no fixed revenues, nor any other means of ſubſiſtence but alms, or voluntary *oblations*.

Under this term are now comprehended not only thoſe ſmall cuſtomary ſums commonly paid by every perſon, when he receives the ſacrament of the Lord's Supper, at Eaſter, which, in many places is 2*d*. from every communicant, and in London 4*d*. a houſe; but alſo the cuſtomary payments for marriages, chriſtenings, churchings, and burials. The four offering days are Chriſtmas, Eaſter, Whitſuntide, and the feaſt of the dedication of the pariſh church. It hath been decreed, with regard to Eaſter offerings, that they are due of common right, and not by cuſtom only. Offerings may be recovered before the juſtices of the peace, by the ſmall tythe act of 7 and 8 Will. cap. 6.

OBLIGATION, an act whereby a perſon engages, or binds himſelf, or is bound by another, to do ſomething; as to pay a ſum of money, to be ſurety, or the like.

The acceptance of a bill of exchange, is a kind of *obligation* to pay it.

The exacting of intereſt on a ſum due by a ſimple *obligation*, is accounted uſury.

All *obligations* ariſe from contracts, or quaſi-contracts; from crimes, or quaſi-crimes; and, in the Roman law, were either civil, or prætorian; i. e. either approved by the civil law, or introduced by the prætor.

There are three kinds of *obligations*; *natural*, *civil*, and *mixt*.

Obligations, *natural*, are founded on the mere bond of natural equity, without any civil neceſſity, and without producing any action of conſtraint. Such are the *obligations* a minor is under.

Obligation, *civil*, is that ſupported by civil authority alone, and which induces a conſtraint, without any principle or foundation in natural equity. Such is the *obligation* on a man condemned unjuſtly.

Obligation, *mixt*, or an *obligation* both natural and civil, is that which, being founded in natural equity, is farther confirmed and enforced by civil authority.

There are alſo *perſonal obligations*, *hypothecary obligations*, *obligations* of goods, body, &c.

Obligation in a more ſtrict ſenſe, denotes a bond containing a penalty, with a condition annexed, for payment of money at a certain time; or for performance of covenant, or the like.

A bond, or *obligation*, is ſaid to differ from a bill, in that the latter is commonly without a penalty, and without condition. Yet a bill may be *obligatory*. Coke on Littleton.

Till the Conqueſt, writings were rendered *obligatory* by certain marks of gold croſſes, &c. The Normans firſt introduced the cuſtom of making bills and *obligations* with a print or ſeal in wax, ſet to every one's ſignature, atteſted by three witneſſes.

OBLIGATO, in the *Italian Muſic*, ſignifies *for*, *on purpoſe for*, or *neceſſary*, as *doi violini obligato*, on purpoſe for two violins; and ſo of other things, as *con fagotto obligato*, that muſt be played with a baſſoon, &c.

Sometimes it ſignifies confined, or reſtrained, by certain rules, ſubjected to certain limits or laws, in order to perform ſome particular thing, to give ſome particular expreſſion of a paſſion, action, &c. In this ſenſe we ſay, *contrapunto obligato*, *fuga obligata*, &c. We alſo ſay, the baſs is *obligato*, when it is only a ground of a certain number of bars, which are to be repeated over and over; ſuch is the baſs to chacones, &c. and every baſs wherein one is obliged to keep a certain movement, and to perform only certain notes, &c.

OBLIGEE, in *Law*, is the party to whom an obligation, or bond is made.

OBLIGOR, in *Law*, the party who enters into or executes an obligation, or bond.

OBLIQUATION, in *Catroptics*. *Cathetus of* OBLIQUATION is a right line drawn perpendicular to a mirror, in the point of incidence, or reflection of a ray. See CATHETUS.

OBLIQUE, in *Geometry*, ſomething aſlant, indirect, or that deviates from the perpendicular.

Oblique *angle*. See ANGLE.

Oblique-*angled triangle* is that whoſe angles are *oblique*; i. e. either obtuſe, or acute.

Oblique *circle*, is the ſtereographical projection of the ſphere, any circle that is *oblique* to the plane of projection.

Oblique *line*, a line which, falling on another, makes an *oblique* angle.

A line falling *obliquely* on another makes the angle on one ſide obtuſe, and that on the other acute.

Oblique *planes*, in *Dialling*, are ſuch as recline from the zenith, or incline towards the horizon.

The obliquity, or quantity of this inclination, or reclination, is eaſily found by a quadrant; it being an arch of ſome azimuth, or vertical circle intercepted between the vertex of the place and of that plane. This azimuth, or vertical circle, is always perpendicular to the plane.

Oblique *percuſſion*, is that wherein the direction of the ſtriking body is not perpendicular to the body ſtruck, or is not in a line with its center of gravity. See Percussion.

The ratio an *oblique* ſtroke bears to a perpendicular one, is demonſtrated to be as the ſine of the angle of incidence to the radius.

Oblique *powers* or *forces*. See Motion, Direction, &c.

Oblique *projection*, in *Mechanics*, is that where a body is impelled in a line of direction, which make an *oblique* angle with the horizontal line. See Projection.

Oblique *ſphere*, in *Geography*, is that whoſe horizon cuts the equator *obliquely*; and one of whoſe poles is raiſed above the horizon, by an elevation equal to the latitude of the place.

It is this obliquity that occaſions the inequality of days and nights.

Thoſe who live under an *oblique* ſphere (as we, and all thoſe in the temperate zone, do) never have their days and nights equal, except in the equinoxes.

Oblique *aſcenſion*, in *Aſtronomy*. See Ascension.

Oblique *deſcenſion*. See Descension.

To find the *oblique aſcenſion* and *deſcenſion* by the globe, ſee Globe.

Oblique *ſailing*, in *Navigation*, is when the ſhip, being in ſome intermediate rhumb between the four cardinal points, makes an *oblique* angle with the meridian, and continually changes both its latitude and longitude.

Oblique ſailing is of three kinds; viz. *plain ſailing*, *Mercator's ſailing*, and *great circle ſailing*. See Sailing.

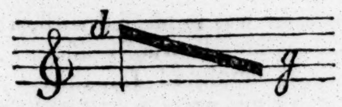
The ſeamen alſo call the application of the method of calculating the parts of *oblique* plain triangles, in order to find the diſtance of a ſhip from any cape, head-land, &c. by the name of *oblique ſailing*.

Oblique *diſtillery*, in *Chemiſtry*. See Distillation.

Oblique *flanks*, in *Fortification*. See Flank.

Oblique *caſes*, in *Grammar*, are all the caſes of the declenſions of nouns, beſides the nominative. See Case.

OBLIQUO, in the *Italian Muſic*, ſignifies two breves tied together, which make but one body, whence it is named in Italian *nota d' un corpo ſolo*; ſometimes there is a tail, on the right, or left ſide, either aſcending, or deſcending. See Note and Ligature. However it be, the two extremes mark the ſound, the middle ſerves only to tie them thus:



OBLIQUUS, in *Anatomy*, (ſee Muscle), is applied ſubſtantively to ſeveral muſcles of the head and eye; particularly the

Obliquus *capitis major*, or *par* Obliquum *inferius*, the ſixth muſcle of the head; ſo called becauſe ſerving to turn the head aſide; though it has neither its origin nor inſertion in the head.

This riſes fleſhy from the external parts of the ſpine of the ſecond vertebra of the neck, and, ſwelling into a fleſhy belly, runs *obliquely* to the tranſverſe proceſs of the firſt vertebra. This ſome rank among the muſcles of the neck.

Obliquus *capitas ſuperior*, or *minor*, or *par obliquum ſuperius*, the ſeventh muſcle of the head; which, ſpringing fleſhy from the tranſverſe proceſſes of the ſecond vertebra of the neck, and aſcending *obliquely*, is inſerted laterally into the occiput.

Others will have its origin to be in the occiput, where the common opinion places its inſertion; its inſertion they make in the tranſverſe proceſſes of the firſt vertebra, near that of the ſame ſide.

The two *oblique* muſcles, by pulling the tranſverſe proceſs, give the head a ſemicircular motion.

Obliquus *oculi ſuperior*, or *major*, the fifth muſcle of the eye.

It has its origin in the upper part of the orbit; whence, tending upwards towards the inward canthus of the eye, it paſſes through a cartilage on the bone of the forehead, called *trochlea*; whence, alſo, the muſcle itſelf is called *trochlearis*: thence it is reflected to its termination in the *ſclerotica*, on the back part of the ball of the eye. When this muſcle acts, that part of the ball of the eye is drawn downwards towards the trochlea, whereby the pupil is directed downwards, towards the leſſer canthus; and, at the ſame time, the whole ball of the eye ſomewhat outwards.

Obliquus *oculi inferior*, or *minor*, riſes from the external margin of the lower part of the orbit, near the inner canthus; whence, riſing towards the outer canthus, it terminates near the other. It draws the ball of the eye outwards, and turns its pupil upward, contrary to the former. See Rotator.

Obliquus *deſcendens*, or *declivis*, a very broad pair of muſcles of the abdomen, each covering one half thereof, and part of the thorax; ſo called from the *oblique* courſe of its fibres. It ariſes from the two laſt true ribs, and five ſpurious ones; and is indented with the ſerratus major anticus by five or ſix digitations, each whereof receives a nerve from the interſtices of the rib: it ſprings, likewiſe, from the margin of the ileum, and ends in a broad tendon in the linea alba. See *Tab. Anat. (Myol.) fig*. 7. *n*. 19. *fig*. 1. *n*. 45. and *fig*. 6. *n*. 31.

This is alſo called *obliquus externus*, *ſuperior*, or *major*; ſee farther Winſlow's Anatomy. p. 163.

Beſides the ordinary uſe aſcribed to it by all anatomiſts, which is, to compreſs the inteſtines and bladder; Cowper and Gliſſon attribute it to another, which is, to turn the trunk of the body without moving the feet.

Obliquus *aſcendens*, or *acclivis*, lies under the lower part of the former; running with a courſe juſt contrary, from the lower part upwards: its fleſhy fibres have their origin from the edge of the ileum, and end at the ſpurious ribs: it terminates with a large double tendon in the linea alba, the upper part whereof, creeping over the muſculus rectus, and the other creeping under it, and joining together at the linea alba, do, as it were, ſheathe the rectus. See *Tab. Anat. (Myol.) fig* 2. *n*. 30. *fig*. 1. *n*. 44.

It is alſo called *obliquus internus*, ſee farther Winſlow's Anatomy, p. 165.

Its uſe is, to ſhut and compreſs the belly; as, alſo, the cavity of the thorax, in reſpiration; and it aſſiſts, with its antagoniſt, the *deſcendens*, in turning the body without moving the legs.

Obliquus *auris*, lies in the external part of the canal of the aqueduct; whence, paſſing upwards and backwards, it enters the tympanum, by a very *oblique* ſinuoſity, immediately above the bony circle to which the tympanum is fixed; and is inſerted into the ſlender proceſs of the malleus.

OBLIQUITY, that which denotes a thing *oblique*.

The *obliquity of the ſphere* is the cauſe of the inequality of the ſeaſons, of nights and days.

Obliquity *of the ecliptic*, is the angle which the ecliptic makes with the equator.

OBLONG, in *Geometry*, a figure longer than it is broad. Thus a rectangled parallelogram, whoſe ſides are unequal, is an *oblong*: ſo an ellipſis is alſo an *oblong*.

Oblong *leaf*. See Leaf.

OBLONGATA *medulla*. See Medulla and Crura.

OBNUNCIATION, *obnunciatio*, in *Roman Antiquity*. See Nunciation.

OBOE, or Oboi, in the *Italian Muſic*, is uſed to ſignify an *hautboy* or *hoboy*, or that a part is to be played on that inſtrument.

OBOLARIA, in *Botany*, a genus of the *didynamia angioſpermia* claſs: the characters of which are, that the calyx is bifid; the corolla campanulated, and divided into four ſegments; the capſule has one cell, two valves, and is polyſpermous; and the ſtamina ariſe from the diviſions of the corolla. There is only one ſpecies.

OBOLATA *terræ*, in our *Ancient Law Books*, is a certain quantity of land, which ſome authors fix at half an acre; though others make it but half a perch.

According to Thomaſius, the *obolus terræ* contains ten feet in length, and five in breadth.

OBOLUS, an ancient ſilver money of Athens, the ſixth part of a drachm; worth ſomewhat more than a penny farthing ſterling.

The word comes from the Greek, ωβολος, of οϐελος, *ſpit*, or *broach*, either becauſe it bore ſuch an impreſſion, or becauſe, according to Euſtathius, it was in form thereof: but thoſe now in the cabinets of the antiquaries are round.

They alſo ſtruck ſilver pieces of one, two, three, four, and five *oboli*, of half, and of one fourth of an *obolus*.

Obolus was alſo uſed, among our *Anceſtors*, for half a noble or florin; where the noble was eſteemed as the penny, and its quarter part a farthing.

In effect, in the old hiſtories and accounts of coins, we are to underſtand by the word *denarius*, the whole coin, be it angel, rial, &c. by the *abolus*, its half; and by *quadrans*, its fourth part.

Obolus, in *Medicine*, is uſed for a weight of ten grains, or half a ſcruple.

Du Cange ſays, the *obolus* weighs three carats, or four grains of wheat; others divide it into ſix areolæ, and the areola into ſeven minutes; others into three ſiliquæ, each ſiliqua into four grains, and each grain into a lentil and a half.

Among the Sicilians *obolus* alſo denoted a weight of a pound.

OBRANG, in *Botany*, the name given by the people of Guinea to a very ſingular and remarkable plant, the virtues of which they greatly praiſe. They boil it in water, and uſe the decoction by way of fomentation, to take down ſwellings of the teſticles. Its leaves have ſome faint reſemblance to thoſe of our liquorice, whence Petiver has called it *glycyrrhizæ folio ſingulari frutex Guineenſis ſpinis gemellis.*

OBREPTITIOUS, **Obreptitius**, a quality of letters patent, or any other inſtrument which confers a favour, title, or conceſſion; denoting it obtained of a ſuperior by ſurprize, or by concealing from him the truth, which was neceſſary to have been expreſſed, in order to render it valid.

In which ſenſe the word ſtands oppoſed to *ſurreptitious*, where ſome falſhood has been expreſſed, in order to procure it the more eaſily. *Obreption* annuls the grant, wherever found.

By the canon law, a perſon demanding a benefice, without expreſſing thoſe he is already poſſeſſed of, forfeits, &c. by *obreption.*

OBRINE, **Knights** *of* **Obrine**, a military order inſtituted in the thirteenth century by Conrade, duke of Mazovia and Cujavia, whom ſome authors call alſo duke of Poland.

He firſt gave them the name of *knights of Jeſus Chriſt.* Their firſt grand-maſter was Bruno. Their chief end was to defend the country from the Pruſſians, who were yet idolaters, and committed great cruelties.

Duke Conrade putting them in poſſeſſion of fort Obrine, they hence took a new name; and it was agreed between them, that whatever lands they conquered from the Pruſſians, ſhould be equally divided with him.

But the Pruſſians blocking up the fort, ſo that none of the knights could get out, the order became uſeleſs, and was ſoon ſuppreſſed. Upon this, Conrade called in the Teutonic knights.

OBRIZUM, in *Antiquity*, a kind of gold. Pliny ſays, that they call the gold that has been ſeveral times purified in the fire, *obrizum. Auri experimento ignis eſt ut ſimili colore rubeat quo ignis; atque ipſum* obrizum *vocant. Abriz* in Arabic, or Perſian, ſignifies fine gold without mixture, which the Greeks and Latins call *obrizum.*

OBSCURA *camera.* See **Camera** *Obſcura.*

Obscura *Clara.* See **Clair-obscure.**

OBSCURE, ſomething that is dark, or that only receives and returns a little light.

Obscure is alſo uſed, in a figurative ſenſe, for a thing that is not clear, expreſs, and intelligible; that one does not fully apprehend; or that may be conſtrued into divers ſenſes.

Obscure *notion*, or *idea.* See **Notion**, or **Idea.**

Obscure, *clair.* See **Clair-obscure.**

OBSCURITY, that which denominates a thing obſcure.

Obſcurity is a fault that may either be in the perception, or the diction.

Obſcurity in the perception ariſes chiefly hence, that we do not conceive things as they are, or as we find them; but as we judge them to be before we know them: ſo that our judgment precedes our knowledge, and is made the rule or ſtandard of our conceptions. Whereas nature and reaſon direct, that things ſhould be judged of according as they are known; and that they are to be known, not as they are in themſelves, but only in ſuch manner as God was pleaſed to have them known.

Obſcurity in the diction may ariſe, firſt, from the ambiguity of the ſenſe of words; ſecondly, from the figures or ornaments of rhetoric; thirdly, from the novelty or obſoleteneſs of the words.

OBSECRATION, *obſecratio*, in *Rhetoric*, a figure whereby the orator implores the aſſiſtance of God, or man. This figure Cicero makes admirable uſe of, for K. Deiotarus, to Cæſar. *Per dexteram te iſtam oro, quam regi Deiotaro hoſpes hoſpiti porrexiſti: iſtam, inquam, dexteram non tam in bellis & in prœliis, quam in promiſſis & fide firmiorem.* Thus Virgil:

> *Quod te per cæli jucundum lumen, & auras,*
> *Per genitorem oro, per ſpem ſurgentis Iuli,*
> *Eripe me his, invicte, malis*———

OBSEQUIES, funeral ſolemnities, or ceremonies performed at the burials of eminent perſonages.

The word is derived from the Latin *obſequium*, *obedience*; theſe *obſequies* being the laſt devoirs we can render to the deceaſed. See **Burial** and **Funeral.**

OBSERVANCE literally denotes the act of obſerving, or complying with, a rule, law, or ceremony.

Hence *obſervance* is ſometimes alſo uſed for a **rule**, ſtatute, or ordinance to be obſerved.

Observance, *obſervantia*, is particularly underſtood, in a monaſtic ſenſe, of a community of religious, who are bound to the perpetual obſervation of the ſame rule. In which ſenſe the word coincides with *congregation* or *order.*

The **Cordeliers** denominated themſelves, *Religious of the Obſervance*; the *great*, and the *leſſer obſervance.*

Thoſe Franciſcans are called *Brethren of the Obſervance*, who religiouſly obſerve the primitive laws and inſtitution of their founder, in oppoſition to **Conventuals.** See **friars** *Obſervant.*

Among the Bernardines, there are monks of the *ſtrict obſervance*, who eat nothing but fiſh.

OBSERVANTINES, religious Cordeliers of the obſervance. In Spain there are bare-footed *Obſervantines.*

OBSERVATION, in the *Sea Language*, the taking of the ſun's, or any ſtar's, meridian altitude, in order thereby to find the latitude.

For the method of making an *obſervation*, ſee **Latitude.**

The finding of a latitude from the meridian altitude obſerved, they call *working an obſervation.*

Observations, in *Aſtronomy.* See **Coelestial** *obſervations.*

OBSERVATORY, *obſervatorium*, a place deſtined for obſerving the heavenly bodies; or a building uſually in form of a tower, raiſed on ſome eminence, and covered with a terrace, for making aſtronomical obſervations.

The more celebrated *obſervatories* are,—1. The Greenwich *obſervatory*, built in 1676, by order of king Charles II. at the ſolicitation of ſir Jonas Moor, and ſir Chriſtopher Wren; and furniſhed with the moſt accurate inſtruments by the ſame; particularly a noble ſextant of ſeven feet radius, with teleſcope-ſights.

The perſon to whom the province of obſerving was firſt committed, was Mr. J. Flamſteed; a man, who, as Dr. Hailey expreſſes it, ſeemed born for the employment. For the ſpace of fourteen years, with unwearied pains, he watched the motions of the planets, chiefly thoſe of the moon, as was given him in charge; that a new theory of that planet, exhibiting all her irregularities, being found, the longitude might thence be determined.

In the year 1690, having provided himſelf with a mural arch of ſeven feet diameter, well fixed in the plane of the meridian, he began to verify his catalogue of the fixed ſtars, which hitherto had depended altogether on the diſtances meaſured with the ſextant, after a new and very different manner; viz. by taking the meridian altitudes, and the moments of culmination, or the right aſcenſion and declination.

This inſtrument he was ſo pleaſed with, that he laid the uſe of the ſextant almoſt wholly aſide. Thus was the aſtronomer royal employed for thirty years; in the courſe of which time nothing had appeared in public, worthy ſo much expence and preparation: ſo that the obſerver ſeemed rather to have been employed for his own ſake, and that of a few friends, than for the public; though it was notorious, the obſervations that had been made were very numerous, and the papers ſwelled to a great bulk.

This occaſioned prince George of Denmark, in the year 1704, to appoint certain members of the Royal Society, viz. the honourable Fr. Roberts, ſir C. Wren, ſir Iſaac Newton, Dr. Gregory, and Dr. Arbuthnot, to inſpect Mr. Flamſteed's papers, and chuſe out of them ſuch as they ſhould think fit for the preſs; purpoſing to print them at his own expence: but the patron of the work dying, before the impreſſion was half finiſhed, it lay ſtill for ſome time; till at length it was reſumed by order of queen Anne; and the care of the preſs committed to Dr. Arbuthnot; and that of correcting and ſupplying the copy, to Dr. Halley.

Such was the riſe and progreſs of the Hiſtoria Cœleſtis; the principal part whereof is the catalogue of fixed ſtars, called alſo the Greenwich catalogue.

Flamſteed was ſucceeded by Dr. Halley; and Dr. Halley by Dr. Bradley, in 1742, ſo deſervedly celebrated for his diſcovery of the aberration of the ſtars (ſee **Light**) and the **nutation** of the earth's axis: who was ſucceed in 1762, by the rev. Dr. Maſkeline, the preſent aſtronomer royal.

The *Greenwich obſervatory* is found, by very accurate obſervations, to lie in 51° 28′ 30″, north latitude.

2. The *Paris obſervatory*, built by Louis XIV. in the Fauxburgh St. Jaques. It is a very ſingular, but withal a very magnificent building; the deſign of M.

Perrault. It is eighty feet high, and a-top is a terrace. It is here M. de la Hire, M. Caſſini, &c. have been employed. This *obſervatory* was begun in 1664, and finiſhed in 1672. The difference in longitude between this and the *Greenwich obſervatory*, is 20° 20′ weſt.

In the *Paris obſervatory* is a cave, or cellar, of one hundred and ſeventy feet deſcent, for experiments that are to be made far from the ſun, &c. particularly ſuch as relate to congelations, refrigerations, indurations, conſervations, &c.

In this cave there is a thermometer of Mr. de la Hire, which is always at the ſame height, and indicating the temperature of the place to be always the ſame.

3. Tycho Brahe's *obſervatory* was in the little iſland Ween, or the Scarlet Iſland, between the coſts of Schonen and Zealand, in the Baltic. It was erected and furniſhed with inſtruments at his own expence; and was called by him Uraniburgh. In this place he ſpent twenty years in obſerving the ſtars. The reſult is his Catalogue.

Mr. Gordon, in Phil. Tranſ. obſerves, that this was not the fitteſt place for ſome kind of obſervations, particularly the riſings and ſettings; as it lay too low, and was landlocked on all the points of the compaſs but three; and the land horizon being exceeding rugged and uneven.

4. *Pekin obſervatory*. Father Le Compte deſcribes a very magnificent *obſervatory*. erected and furniſhed by the late emperor of China, in his capital, at the interceſſion of ſome Jeſuit miſſionaries, chiefly father Verbieſt, whom he made his chief obſerver.

The inſtruments are exceedingly large; but the diviſions are leſs accurate, and the contrivance, in ſome reſpects, leſs commodious, than thoſe of the Europeans. The chief are an armillary zodiacal ſphere, of ſix Paris feet diameter, an equinoctial ſphere ſix feet diameter, an azimuthal horizon ſix feet diameter, a large quadrant, ſix feet radius, a ſextant eight feet radius, and a celeſtial globe ſix feet diameter.

OBSERVATORY *portable*. See EQUATOREAL.

OBSESSION, an action, or rather paſſion, of being beſet by an evil ſpirit; which, without entering the body, torments, and, as it were, beſieges the perſon without. In which ſenſe, *obſeſſion* differs from poſſeſſion.

The marks of *obſeſſion*, according to ſome, are a being hoiſted into the air, and thrown violently down without being hurt; ſpeaking languages never learnt; having an averſion to all acts and offices of religon, &c.

Some phyſicians look on all caſes of *obſeſſion* as natural, and curable by natural medicines, particularly by an unguent, called *unguentum carriohteri*; with purgatives, or vomitives.

Of this opinion is doctor Gabriel Clauderus, member of the Leopoldine academy, which he confirms with the teſtimony of Fromannus, in his treatiſe De Faſcinationibus, and Ganſius de Corallis; adding, that it has been confeſſed by many witches and ſorcerers, that the plant hypericon, and other ſimples, &c, incommode them terribly, and prevent their operations.

He confirms this ſentiment hence, that the devil, in thoſe he thus beſets, makes uſe of the melancholic humour, or the atra bilis, and the groſſer impurities of the blood, without always acting immediately of himſelf. For which he refers to the books of Melchior Sebizius, and Jerom Jordan De Divino in Homine; and gives the proceſs of a cure of a manifeſt *obſeſſian* of a child of a year old at Delitſchebourgh, three leagues from Leipſic. In truth, the devil hath no ſhare in the matter. See DÆMONIACAL *poſſeſſion*.

OBSIDIANUS *lapis*, in the *Natural Hiſtory of the Ancients*, the name of a ſtone which they have alſo deſcribed under the name of the *China marble*. It is a very ſmooth and hard marble, extremely difficult to cut, but capable of a fine poliſh, and was uſed among the ancient Greeks for the making of reflecting mirrors. See MARBLE.

The later writers have ſuppoſed the name *obſidianus* derived from ſomebody of the name of *Obſidius*, who was the inventor of this uſe of it; but it ſeems only a falſe ſpelling of the word *opſianus*, *απο της οψεος*, from ſeeing the images of things in it.

OBSIDIONALIS, an epithet which the Romans gave to a ſort of crown wherewith they honoured ſuch of their generals as had delivered a Roman army, or fortreſs, beſieged by the enemy; and had raiſed the ſiege, or obliged them to decamp.

The words comes from the Latin *obſidio*, *ſiege*.

It was alſo called *graminea*, becauſe made of graſs or herbs found on the ſpot or ſoil.

It was the ſoldiery who beſtowed this crown; which, doubtleſs, was the reaſon of its not being of a more precious matter.

ORSTETRICAL *art*, the art of midwiſery. See DELIVERY.

OBSTITA, among the Romans, a term uſed to ſignify places that had been thunder-ſtruck, which were otherwiſe called *bidentalia*. See BIDENTAL.

OBSTRUCTION, in *Medicine*, a let or ſtoppage of the natural paſſages or cavites of the body; occaſioned either by the exceſſive quantity, or the vicious quality, of the humours; as lentor, thickneſs, or the like.

Obſtructions are ſuppoſed uſually to ariſe from the groſs parts of the blood, detained in the extremities of the capillary veſſels, and thus blocking them up.

Some phyſicians doubt wether there be any ſuch thing as *obſtructions* in the viſcera; or rather attribute the inconveniencies, uſually aſcribed to *obſtructions*, to the acrimonies and crudities of the ſtomach. But their reaſons are not convincing. It is true *obſtructions* may not perhaps be ſo frequent as is uſually ſuppoſed; and many of the ſymptoms aſcribed to them, are, doubtleſs, owing to diſorders of the ſtomach; but then there is no denying, that there are any *obſtructions* at all in the viſcera, &c. ſchirruſes, and other kinds of tumors, are inconteſtable proofs hereof.

Obſtructions frequently prove the cauſes of dropſies. See DROPSY.

OBSTRUENTS. See DEOBSTRUENT.

OBSTRUXIT, *Quare* OBSTRUXIT. See QUARE.

OBTUNDENTIA, a word uſed by ſome authors to expreſs ſuch medicines as are given to obtund, or edulcorate the acrimony of the humours.

OBTURATOR, in *Anatomy*, a name given to two muſcles of the thigh, on account of their ſhutting or covering up, the foramen, or aperture, between the os pubis and the hip-bone.

The *obturator internus* and *marſupialis* are the two parts, or diviſions, that make the GEMINI.

OBTURATOR *externus*, a ſmall flat muſcle, which fills up the foramen ovale of the os innominatum exteriorly, and reaches from thence to the great trochantor of the os femoris behind the neck of that bone. It is fixed by fleſhy fibers to the outer, or anterior ſide of the os pubis, all the way to the foraman ovale, to the edge of that hole next the ſmall ramus of the iſchium, under the acetabulum, where a tendon is formed which continues its courſe behind the neck of the os femoris toward the great trochanter, and is inſerted between the gemelli and quadratus, in a ſmall foſſula, between the apex of the great trochanter, and the baſis of the collum femoris. See *Tab. Anat.* (*Myol.*) *fig.* 7. *n* 25. Winſlow.

OBTURATOR *internus*, a flat muſcle, almoſt triangular, ſituated in the bottom of the pelvis; it covers the foramen ovale, and almoſt all the inſide of the os pubis and iſchium. It is fixed to the internal labium of all the anterior half of the foramen ovale, a little to the neighbouring part of the *obturator ligament*, and alſo both above and below the foramen. It is likewiſe fixed to the upper half of the inſide of the os iſchium, from the upper oblique notch in the foramen ovale, to the ſuperior part of the great poſterior ſinus of the os ilium.

From all this extent, the fleſhy fibers contracting in breadth, run down below the ſpine of the iſchium, where they go out of the pelvis through the poſterior notch in the iſchium.

The inſide of the body of this muſcle, or that turned to the cavity of the pelvis, is pretty uniform; but the outſide, or that turned toward the foramen ovale, and which touches the bone, has four middle radiated tendons, which uniting at the poſterior notch of the iſchium, run over it from behind forward, as over a pulley, each tendon ſliding in a particular cartilaginous channel. Afterwards the four tendons, having got out of the pelvis, are pretty ſtrictly united in one large flat tendon, which, croſſing over that of the pyriformis, unites with it, having firſt received on each ſide ſome aditional fleſhy fibers from the two gemelli. The great tendon ſlides freely, in a ſort of membranous vagina, formed by theſe muſcleſs, and is inſerted in the middle of the ſuperior part of the cavity of the great trochanter, adhering cloſely to the capſular ligament of the joint, and being united to the tendons of the glutæus minimus, and pyriformis. Winſlow.

OBTURATOR *ligament*. This is one of the proper ligaments of the oſſa innominata, and fills up all the great foramen ovale, except the oblique notch at its upper part. It is faſtened preciſely to the edge of the circumference of that hole, from the anterior part of the oblique notch, all the way to the ſymphyſis between the os pubis, and os iſchium. From thence to the poſterior part of the inferior notch, it is fixed to the internal labium of the edge of the circumference, forming a kind of ſmall channel with the external labium; and afterwards it is fixed to the common edge of the foramen ovale, and cotyloide notch. By this diſpoſition, an opening is left between this ligament, and the ſuperior oblique notch, and immediately below this common opening, there are two ſmall perforations in the ligament alone. Winſlow.

OBTUSE literally imports blunt, dull, &c. in oppoſition to acute, ſharp, briſk, &c.

Obtuse *angle*, in *Geometry*. See Angle.

Obtuse-angled *triangle*, is a triangle, one of whoſe angles is obtuſe.

Obtuse-*angular ſection of a cone*, a name given to the hyperbola by ancient geometricians, becauſe they conſidered it only in ſuch a cone, whoſe ſection by the axis is a triangle, *obtuſe*-angled at the vertex. See Conic *ſection*.

Obtuse *appui*. See Appui.

OBVENTIONS, *obventiones*, in *Ancient Law Books*, ſignify the produce of a benifice, or ſpiritual living; including oblations, tithes, rents, and other revenues.

OCCASIO, in *Ancient Law Writers*, denotes a tribute which the lord impoſed on his vaſſals, or tenants, on occaſion of war, and other exigencies.

OCCASIONAL *cauſe*, &c. See Cause, Efficient, &c.

OCCATION, a term in the ancient huſbandry, by which they expreſſed what we do by harrowing, though they performed it with a different inſtrument, a kind of rake. With the teeth of this inſtrument, they levelled the ground, and broke the clods, and, with the hand, ſtrewed the corn over this level ground. Then they brought on the plough, and plouged it in; ſo that the grain was ſown in furrows, as we expreſs it, and uſually came up, as we ſee it does at this time with us, in the ſame caſe, in the lower parts only. After it had got a few leaves, they went over the ground again with the ſame inſtrument a ſecond time, to clear away the weeds, and move the earth about the roots of the young plants. If they did this lengthways of the furrows, the earth being ſomewhat hardened, there fell but little of it among the corn; but if they did it croſſways of the furrows, a great deal fell down upon, and among, the young plants, and, in a manner, buried them; they were uſually obſerved to grow better for this croſs harrowing, except in cold places; and the huſbandmen thought the vigour of the plants was owing to the burying them with new earth; but this was really rather prejudicial to them, and the advantage they had aroſe from the more deep ſtirring of the ground. Tull's Huſbandry.

OCCHIO, in *Glaſs Making*, the hole of the floor of the tower of the leer.

OCCIDENS, an affected name given by ſome of the chemical writers to *vinegar*.

OCCIDENT, in *Geography*, the weſtward quarter of the horizon, or that part of the horizon where the ecliptic, or the ſun therein, deſcends into the lower hemiſphere.

Occident, *equinoctial*, that point of the horizon where the ſun ſets, when entering Arias or Libra.

Occident, *eſtival*, that point of the horizon where the ſun ſets at his entrance into the ſign Cancer, when the days are longeſt.

Occident, *hybernal*, that point of the horizon where the ſun ſets, when entering the ſign of Capricorn; at which time, the days, with us, are ſhorteſt.

OCCIDENTAL, a term chiefly uſed in commerce, to diſtinguiſh commodities brought from the Weſt Indies, i. e. America, from thoſe brought from the Eaſt Indies, which are ſaid to be *oriental*.

In this ſenſe we ſay *occidental* bezoar.

Occidental *pearl*. See Pearl.

Occidental *horizon*. See Horizon.

OCCIPITAL, in *Anatomy*, a term applied to the parts of the occiupt, or of the hinder part of the head.

Occipital *bone*. See Occipitis *os*.

OCCIPITALES, or Occipital *muſcles*, (ſee Muscle,) are a pair of muſcles of the head, whoſe origin is in the ſame place with that of the frontales, in the upper part of the head near the vertex, but which go a quite oppoſite courſe, viz. from before, hindwards: and are inſerted into the lower part of the hairy ſcalp, or ſkin of the occiput, which they ſerve to draw upwards. See *Tab. Anat. (Myol.) fig. 6. n. 1.*

Dr. Drake obſerves, that the *occipitalis* and frontalis are one continued digaſtric muſcle on each ſide; that part called the *occipitalis*, after a ſmall deſcent, becomes a thin tendon, and marches over the whole bregma, where it divides; the one part going to the os jugale; and the other, growing fleſhy, acquires the name frontalis.

OCCIPITIS *os*, or *os proræ*, in *Anatomy*, the fourth bone of the cranium; ſo called from its ſituation in the occiput. See *Tab. Anat. (Oſteol.) fig. 2. lit. g. fig. 7. n. 2.*

It forms the back part of the head; ſerves for the articulation of the head with the trunk; contains a part of the brain, and almoſt all the cerebellum; and gives paſſage to the medulla oblongata, and a great many of the nerves and veſſels; and inſertion to a great many of the muſcles.

It is the hardeſt and thickeſt of all the bones of the cranium. Its figure is triangular. In new-born children it is divided into four; but it grows up, and becomes one, in time.

It is joined to the bones of the ſinciput at the lambdoidal ſuture; as likewiſe to the petroſa, and os ſphenoides, at the ſphenoidal ſuture.

The parts of this bone are either ſolid or hollow, i. e. empty: the ſolid are two proceſſes, called *coronæ*; the hollow parts are either foramina, or ſinuſes.

The foramina are either common or proper. The common are two, one on each ſide, common with the oſſa petroſa, affording a paſſage to the nerves par vagum, and to the internal jugular veins.

The proper foramina are five. The firſt is very large; and through this it is that the ſpinal marrow paſſes: two others give paſſage to the nerves of the tongue, and the two laſt an entrance to the cervical arteries.

It has two large ſinuſes withinſide, for the reception of the two hemiſpheres of the cerebellum.

On each ſide the foramina which give paſſage to the ſpinal marrow, is uſually a proceſs lined with a cartilage, articulated with the firſt vertebra of the neck.

In lieu of this, is ſometimes only a prominence of the bone; which, on the proceſs where it is found, receives the inſertions of the muſcles of the head, whereof there are ten; viz. the par ſplenium, par complexum, par rectum majus externum, par rectum minus externum, par obliquum ſuperius, obliquum inferius, par maſtoideum, rectum internum majus, rectum internum minus, and rectum literale; each of which ſee in its proper place.

OCCIPITO-*frontalis*, in *Anatomy*, is, according to Douglas, a muſcle of the head; which he thus deſcribes: it riſes fleſhy from the tranſverſe line of the occiput, oppoſite to part of the ſuperior termination of the maſtoidæus, and part of the beginning of the trapezius next it; and then tendinous from the reſt of that line backwards, ariſing after the ſame manner on the other ſide; from thence it grows ſtrait up, and ſoon becoming all tendinous, it covers the two parietal bones, and the *oſſa ſquamoſa* above the temporal muſcles, its outer eye being faſtened to the *os jugale* on each ſide: this broad tendon near the coronal ſuture grows fleſhy, and deſcends with ſtrait fibres as low as the *muſculi orbiculares*.

It is inſerted into the ſkin at the eye-brows, having ſent down, between them, a narrow fleſhy ſlip, or elongation, which is continued over the *oſſa naſi*, as far as its cartilaginous part, where its fibres run off on each ſide, and terminate in the ſkin above the *muſculus naſi proprius*.

When this digaſtric muſcle, which covers all the upper part of the ſkull, like a cap, acts, it pulls the ſkin of the head backward, at the ſame time it draws up and wrinkles that of the forehead, being antagonized by the corrugator.

OCCIPUT, the hinder part of the head or ſkull; or the part wherein is the os occipitis.

Scultetus obſerves, that cauterizing the *occiput* is very frequent in many places.

OCCULT, ſomething ſecret, hidden, or inviſible. The *occult* ſciences are, magic, necromancy, cabbala, &c.

Agrippa has ſeveral books of *occult philoſophy*, full of the vaineſt, wildeſt dreams imaginable: and Fludd nine volumes of the *cabbala*, or *occult ſciences*, wrapt up under ſigures or Hebrew characters.

Weak philoſophers, when unable to diſcover the cauſe of an effect, and unwilling to own their ignorance, ſay, it ariſes from an *occult virtue*, an *occult cauſe*, an *occult quality*.

Occult, in *Geometry*, is uſed for a line that is ſcarce perceivable, drawn with the point of the compaſſes, or a black-lead pencil.

Occult, or dry lines, are uſed in ſeveral operations; as the raiſing of plants, deſigns of building, pieces of perſpective, &c. They are to be effaced, when the work is finiſhed.

Occult *cancers*. See Cancer.

OCCULTATION, in *Aſtronomy*, the time a ſtar or planet, is hid from our ſight, by the interpoſition of the body of the moon, or of ſome other planet. See Eclipse.

Occultation, *circle of perpetual*. See Circle.

OCCUPANT, *in law*, he that firſt ſeizes and takes poſſeſſion of a thing.

If a tenant hold land, &c. for the term of another's life, and ſuch tenant die firſt, without making any eſtate of it; he that firſt enters to hold that term out, is ſaid to acquire a property: and is called an *occupant*, by reaſon his title comes by the firſt occupation.

So, if a tenant, for his own life, grant over his eſtate to another; if the grantee dies before him, there ſhall be an *occupant*.

OCCUPATION, or Occupancy, in the *Cival Law*, denotes the poſſeſſion of ſuch things as at preſent properly belong to no private perſon, but are capable of being made ſo. As, by ſeizing or taking ſpoils in war; by catching things wild by nature, as birds, and beaſts of game, &c. or by finding things before undiſcovered, or loſt by their proper owners.

Occupation is alſo uſed, in *Common Law*, for the putting a man out of his freehold in time of war.

Occupation amounts to the ſame with DISSEISIN in time of peace; only that the former is deemed not ſo great an offence.

Occupation is alſo uſed for holding tenure, or poſſeſſion. As, when we ſay, ſuch land is in the tenure or *occupation* of ſuch a man; that is, in his poſſeſſion.

Occupations, in the ſtatutes De Bigamis, denotes uſurpations upon the king, by uſing liberties or franchiſes a perſon is not entitled to.

As any unjuſt entry upon the king into lands and tenements is called an INTRUSION; ſo an unlawful uſing of franchiſes is called an *occupation*.

OCCUPAVIT, in *Law*, a writ which lies for him who is ejected out of his land, or tenement, in time of war; as a novel diſſeiſin lies for one ejected in time of peace.

OCCUPIERS *of walling*, a term in the ſalt works for the perſons who are the ſworn officers, that allot, in particular places, what quantity of ſalt is to be made, that the markets may not be over-ſtocked, and ſee that all is carried fairly and equally between the lord and tenant. Theſe perſons always appoint how many houſes ſhall work at a time; and, when there is ſalt to be made, theſe appoint a cryer to proclaim it to all the workers, that they may put to their fires at the ſame time; and a like proclaiming of the time when they ſhall leave off; and thoſe who continue to work after this prohibition, are to have their ſalt ſpoiled or deſtroyed.

OCEAN, in *Geography*, the vaſt collection of ſalt and navigable water, which encompaſſes the whole globe of the earth.

The word comes from the Latin *oceanus*, of the Greek *ωκεανος*, which Euſtathius derives from *ωκεως ναειν*, *to ſlide ſwiftly*; others ſay, the Greeks borrowed it from the Phœnicians, who called the circumference of the *ocean*, *og*; from the Hebrew חוג, *hhog*, *circuit*, *ambit*.

The *ocean* is that huge body of waters wherein the two grand continents known to us, the new and old, are incloſed like iſlands.

By computation it appears, that the *ocean* takes up conſiderably more of what we know of the terreſtrial globe than the dry land.

Dr. Keill computes the ſurface of the whole *ocean* to be 85490506 ſquare miles: ſo that, ſuppoſing the depth of the *ocean*, at a medium, to be ¼ of a mile, the quantity of water in the whole will be 21372626½ cubic miles. See GLOBE, and *Magnitude of the* EARTH.

Yet Dr. Burnet computes that all the waters in the *ocean* were not ſufficient to drown or overflow the dry land ſo high as the Scriptures ſay it was at the deluge: ſeven or eight *oceans*, according to him, would ſcarce have ſufficed.

The *ocean*, penetrating the land at ſeveral ſtreights, quits its name of *ocean*, and aſſumes that of *ſea*, or *gulf*; to which are uſually added ſome epithets, to diſtinguiſh it: as Mediterranean ſea, Perſian gulf, &c. In very narrow places it is called *ſtreights*, *ſinus*.

The *ocean* takes divers names, according to the divers countries it borders on: as the *Britiſh ocean*, *German ocean*, &c. According to Maty, the *ocean* may be commodiouſly divided into *ſuperior*, or *upper*; and *inferior*, or *lower*.

Ocean, *upper*, which the ancients called the *exterior*, as environing all the known parts of the world, he ſubdivides, according to the four cardinal points, into the *northern*, *ſouthern*, *eaſtern*, and *weſtern*.

Ocean, *northern*, called alſo the *glacial*, *frozen*, and *Scythian*, is that part of the *upper ocean* next the north pole; bounded on the ſouth with the arctic circle, and the northern coaſts of Europe, Aſia, and America; and on the north with the unknown lands about the pole.

It is called the *icy* or *frozen ocean*, becauſe thoſe who have attempted a paſſage through it to China, &c. have always been ſtopped with the ice; and *Scythian ocean*, becauſe waſhing the coaſts of Scythia.

Ocean, *weſtern*, or *Atlantic*, is that part of the grand *ocean* which waſhes the weſtern coaſts of Europe and Africa, and the eaſtern of America, extending from the arctic circle to the equinoctial.

Ocean, *ſouthern*, or *European*, is that part reaching from the equinoctial to the unknown antarctic lands.

Ocean, *eaſtern*, or *Indian*, has its firſt name from its ſituation to the eaſt; as its latter from India, the chief country it waſhes. It reaches from the coaſt of Ajan to the Iſle aux Latrons, i. e. of *Thieves*.

It waſhes the ſhores of the eaſtern coaſts of Africa, and the ſouth of Aſia, and is bounded on the eaſt by the Indian iſlands, and the ſouthern continent.

Ocean, *inferior*, or *American*, is that vaſt part of the grand *ocean*, which waſhes the coaſt of America; unknown, in great meaſure at leaſt, to the ancients. It is divided into three parts, viz.

The *north-ſea*, which waſhes the eaſtern coaſt of America, from the arctic circle to the tropic of Capricorn.

The *Magellanic ſea*, extending from the tropic of Capricorn to the *Terra aſtralis incognita*.

The *ſouth ſea*, or *pacific*, which waſhes the weſtern coaſts of America to the eaſt, as far as the iſle of Thieves; and from ſouth to north, from the tropic of Capricorn to the land of Jeſſo.

Ocean, *for the ſaltneſs of the*, ſee SALTNESS.

Ocean, *for the tides obſerved in the*, ſee TIDES.

Phil. Sachſius, in 1664, printed a diſſertation, intitled Oceanus Microcoſmicus, dedicated to Bartholine; wherein he ſhews that there is a circular motion in the waters, like that of the blood in the human body; that they all come from the *ocean*, and return thither again. The thought is Solomon's, Eccleſ. xii. See VAPOUR, SPRING, &c.

OCELLATI *lapides*, in *Natural Hiſtory*, a name given by the ancients, ſometimes to expreſs certain ſtones, found on the ſhores, and in the beds of rivers, and naturally marked with the figure of an eye; and ſometimes for ſmall round ſtones of the ſhape of the groove of the eye, made by art for children to play with, and of the nature of what we call marbles. Suetonius tells us, that Auguſtus Cæſar uſed ſometimes to divert himſelf with playing *nucibus et ocellatis*.

The word *lapidibus* is underſtood after the laſt word, and the meaning of the author plainly is, that he played, like a boy, with nuts and marbles. But we have abundant teſtimony among the ancient naturaliſts of the word having been uſed alſo as the name of the gem which we now call *oculus beli*, and all thoſe other ſtones of the agate, or other ſemi-pellucid kinds, which had the figure of an eye naturally impreſſed upon them, that is a round ſpot of a different colour, in the center of a ſmall roundiſh ſtone. Theſe were ſcarce among the ancients, becauſe they had none but the true *oculi beli*, or ſuch ſtones as were of a particular ſpecies, and were found naturally of the ſhape and ſize of an eye; but we have them much more common, becauſe our jewellers, whenever they find a natural ſpot in an agate, ſurrounded with a white circle, cut it out from the reſt of the ſtone, and ſell it as a natural *oculus beli*.

OCELOT of *Buffon*, in *Zoology*, called by others the *Mexican cat*, and by Hernandez *tlacoozelotl*, is a ſpecies of cat, or *felis pardalis* of Linnæus, with its head, back, upper part of the rump, and tail, of a bright tawny; a black ſtripe extends along the top of the back, from head to tail; and from the forehead to the corners of the eyes, a ſtripe of black; the forehead ſpotted with black; the ſides whitiſh, marked lengthways with long ſtripes of black, ſprinkled with ſmall black ſpots; the neck and rump marked in the ſame manner; and the tail ſpotted with ſmall ſpots near its baſe, and black at the end. This animal inhabits Mexico, the neighbourhood of Carthagena, and Braſil; lives in the mountains; is very voracious, but fearful of mankind; preys on young calves, and different ſorts of game; lurks amidſt the leaves of trees; and ſometimes extends itſelf along the boughs, as if dead, till the monkies, approaching to examine it, become its prey. Pennant. See *Tab.* IV. *Quadrupeds*, Nº 41.

OCHLOCRATIA, from *οχλος*, *multitude*, and *κρατος*, *power*, *command*, a form of government wherein the populace has the whole power and adminiſtration in its own hand.

OCHNA, in *Botany*, the name of a genus of plants of the *polyandria monogynia* claſs, the characters of which are theſe: the cup is a perianthium, compoſed of five ſmall leaves, of an oval but pointed ſhape, ſtanding expanded, and falling with the flower: the flower is compoſed of five roundiſh petals, with very obtuſe ends, and with ungulæ of the length of the leaves of the cup; the ſtamina are a number of fine ſlender filaments, converging at the ends; the germen of the piſtil is oval, and terminates in a pointed ſtyle, which is erect and longer than the ſtamina; the fruit is a very large, and fleſhy receptacle, of a roundiſh, truncated form, in either ſide of which there is lodged a ſingle berry, of an oval figure; the ſeeds are ſingle, and of an oval figure alſo. There are two ſpecies.

OCHRA, or *gallinula* OCHRA, in *Ornithology*, the name of a ſpecies of moor-hen. It is all over of a duſky and obſcure yellowiſh green, and is browner on the breaſt and belly than on the back, yet with the ſame yellowiſh green predominant; the head, neck, breaſt and wings, have ſeveral white ſpots; and the face is in part white; the beak is part black, and part red; and the legs are of a yellowiſh colour.

Ochra *vitrioli*, in *Natural Hiſtory*, a name given to that yellow earth, or *ochre*, which is one of the principles, or conſtituent parts of all vitriol. This is ſeparated from it by ſolution in water, and falls to the bottom of the veſſel; and the yellow ſubſtance that tinges the ſides of fountains, and ſprings of chalybeat waters, in many places, is the ſame ſubſtance, and ſhews that they are only ſolutions of vitriol, which, as ſuch, muſt needs depoſit that earth, which, though retained imperceptibly in the vitriol, yet cannot be ſuſtained in water ſo well as while that ſalt was ſolid.

Baſil Valentine tells us, that repeated ſolutions of the ſame quantity of vitriol, will, at length, free it from all its earth; and that then it will be found a very different ſubſtance from what it was before, and fit for ſeveral wonderful experiments, which he deſcribes. This ſeparation of the earth of vitriol has been tried in vain, by twenty repeated ſolutions; but there is a much ſhorter way of effecting it, which is this: powder a good quantity of Dantzick or Hungarian vitriol; put it into a high and narrow cucurbit, and add to it a conſiderable quantity of water; keep a fire under it for four days, and the earth will, in a very great quantity, ſubſide from it, when cold, in much greater quantity from this one operation than from ſeveral repeated ones of the common kind.

Another method which ſeparates more than its earth from it, is this. Let the veſſel containing the powdered vitriol, without any addition of water, be placed in a balneum Mariæ, and kept hot in the ſame manner for four days; the vitriol will, in this caſe, melt, as if water were put to it. While it continues in this fluid ſtate, the *ochre*, or earth, and not only that, but, with it, the metalline parts, and the groſs ſulphur, will, in a great meaſure ſubſide, and become a hard cake, the vitriol continuing fluid about it. Let this be poured off, and, when cold, it will cryſtallize, leaving only a ſmall quantity of a liquamen behind. This operation may be repeated two or three times, and the vitriol then becomes a very different ſubſtance to what it was before, and is fitted for ſeveral operations, which it would not otherwiſe ſucceed in. Many have tried to effect this ſeparation by liquation, by means of a dry heat, placing the veſſel in ſand and filings of iron, or over the flame of a lamp, burning ſpirit of wine, or oil; but it never will ſucceed this way, though the vitriol be ever ſo long kept in a ſtate of liquation. Phil. Tranſ. N° 103.

The *ochra vitrioli* may be obtained alſo in a great proportion, though in another form, if, after a long and intenſe calcination, the vitriol is freed from its ſalt by an ablution of warm water often repeated. The far greater part of the remaining colcothar, thus dulcified, is earth, with an admixture only of a ſmall quantity of ſome metalline parts.

Another way of obtaining it, is diſſolving vitriol in common water, and adding to the ſolution filings of zinc, or ſalts of tartar, or ſome other alkali. See VITRIOL.

A great proof of the earth called *ochra vitrioli* being contained in a large quantity of that ſalt is, that it requires no earth beſide to be mixed with it in diſtillation: whereas common ſalt, nitre, and the other ſalts, require a great quantity of common earth to be added to them, to prevent their fuſion. Alum, and vitriol alone, require no ſuch additions, the firſt of theſe containing a very large quantity of alkalious white earth, as the other does of an ochreous yellow one.

OCHRES, in *Natural Hiſtory*, the name of a large genus of earths, uſed principally by the painters. The moſt common kinds are either yellow, or red, though there are brown, blue, and green *ochres*, and a number of diſtinct ſpecies of all theſe colours. Of the yellow *ochres*, Dr. Hill, in his Hiſtory of Foſſils, deſcribes eleven ſpecies. Of the red, the ſame number. Of the brown, two. Of the blue, and green, one ſpecies each; and of the black two.

The greater number of theſe are, or have been, at one time or other, in uſe in painting, in different parts of the world. Some, however, there are, eſpecially of the yellow and red kinds, which that author has himſelf diſcovered in different parts of our own, and other kingdoms, which are worthy the trials of the perſons concerned in that branch of trade, as they have already been proved, at his requeſt, in ſmall quantities, and found to anſwer very well.

Some authors refer *ochre* to the claſs of ſemi-metals rather than earths. It conſiſts, according to them, of earth and a metal, particularly iron, combined.

Mr. Boyle aſſures us he has ſeen a piece of *ochre* richer in metals than moſt iron-ores; and which was even rendered magnetical by heating, and then cooling it in a perpendicular poſition.

Ochre, in effect, is always impregnated with iron, and is what generally gives to the chalybeat ſprings their medicinal virtue; many of which we ſee upon the water's ſtanding, will depoſit the *ochre* at the bottom of the veſſel. Some authors eſteem *ochre* proper to promote the melting of metals, when they are too harſh and brittle; but its chief uſe is in painting.

The beſt *ochre* is that of Berry in France. There are ſeveral kinds dug up in England; ſome of them uſed in painting, and others in poliſhing looking-glaſſes; and it is very probable that both our own country, and our plantations abroad, contain many treaſures of them, the value of which is yet unknown.

Dr. Liſter obſerves, that ocherous earths are ſeparated in greater or leſs quantities, from all the medicinal ſprings of England; and it is to theſe and the nitrous and muriatic ſalts, that they all owe their virtues. The *ochre* they contain is uſually of the nature of that which our painters, to diſtinguiſh it from the yellower kind, call *brown ochre*. This is produced from the iron ores that are met with in the way of the current of theſe waters; and, among the reſt, the pyrites affords a great deal of them. All kinds of the pyrites, and all the lime-ſtones of England, when they are ſubject to be much moiſtened under ground, will, in time, ſhoot out their ſalts, and part with their earths.

The earth of the pyrites is *ochre*, and the ſalt of the lime-ſtone is the calcareous nitre, an alkaline ſalt of the nature of the natrum of Egypt; and to theſe two ſubſtances, and a ſmall portion of common ſalt, which the waters take up in their paſſage through the earths that contain it, all the virtues of them are owing. The ſalt of the pyrites being green vitriol, it might be expected that this ſhould be found in the waters impregnated by that ſubſtance; but Dr. Liſter obſerves, that though there are many ſprings in England which are well known to receive their virtues from this foſſil, yet there is no ſuch thing as vitriol to be obtained from any of them; and this is not wonderful, ſince we know that the pyrites will not yield its vitriol when newly taken out of the earth, but muſt be expoſed a conſiderable time firſt to the air; ſo that the *ochre* only is the ſenſible thing that it receives from this ſubſtance, and, perhaps, with it ſome ſaline matter, which is the baſis of vitriol, and would be vitriol in time, on a due expoſition to the air. *Ochres* ſeem to have been depoſited from ferruginous or vitriolic waters, nearly in the ſame manner as a reddiſh or yellowiſh powder is precipitated from ſolutions of iron in vitriolic acid, by expoſure to air. By reduction with charcoal, or other inflammable matter, a conſiderable quantity of iron may be extracted from theſe earths. Wallerius obſerves, that this iron is of the red-ſhort kind, or brittle when hot. By calcination all *ochres* acquire a red colour.

OCHROPUS *gallinula*, in *Ornithology*, a name by which many authors have called a bird more uſually known by the name of TRINGA.

OCHROPUS, or *gallinula* OCHROPUS, the *yellow-legged moor-hen*, a ſpecies of the *gallinula*, or *moor-hen*. It is of the ſize of the common kind; its beak, as well as its legs, is yellow, or of a ſulphur colour; its back is of a reddiſh brown, the tips of its wings of a very fine red; it has white variegations on its head, and in the middle of its wings, and on its belly; the longeſt feathers of its wings are black; and there are alſo ſpots of black on the back in ſeveral places; the edges of its eye-brows are of a deep ſaffron-colour; and it has, beſide all theſe colours, a great deal of grey in the wings; it has no hinder toe. It builds in thickets, in watery places, among ruſhes and high graſs.

OCHRUS, in *Botany*. See PEA.

OCIMUM, in *Botany*. See BASIL.

OCKHAM. See OAKHAM.

OCKNUS, in *Ornithology*, a name by which Ariſtotle, and others of the ancients, have called the BITTERN, or *butter-bump*.

OCOR, a name given by ſome chemiſts to ſal ammoniac.

OCREA, among the *Ancients*, a kind of military ſhoe, or ſhort boot, which was made of white tin, and ornamented with gold or ſilver, about the ancles. Its uſe was very ancient; the Greeks were ſo well provided with them in Homer's time, that he thence gives them the appellation of ἐυκνημιδες Αχαιοι. Among the Romans, none were allowed to wear the *ocreæ*, but the two upper claſſes of the people, or ſuch whoſe eſtate exceeded 7500 drachmas.

OCTABIS, in *Law*. See OCTAVE.

OCTAETERIDES, formed from οκταετηρις, compoſed of οκτω, *eight*, and ετος, *year*, in *Chronology*, &c. the ſpace or duration of eight years.

OCTAETERIS, οκταετηρις, in *Antiquity*, a cycle, or term of eight years, at the end of which three entire lunar months were added. This CYCLE was in uſe till Meton, the Athenian, reformed the CALENDAR, by finding out the golden number, or cycle of nineteen years.

OCTAETIS, in *Natural Hiſtory*, a name given by Linnæus, and many other authors, to a kind of ſtar-fiſh of the aſtrophyte claſs, the rays of which are eight in number, where they firſt part from the body, but ſoon divide into many more.

OCTAGON. See Octogon.

OCTAHEDRON, or Octaedron, in *Geometry*, one of the five regular bodies; conſiſting of eight equal and equilateral triangles.

The *octahedron* may be conceived as conſiſting of two quadrilateral pyramids put together at their baſes.

Its ſolidity, therefore, is had, by multiplying the quadrangular baſe of either by one third of the perpendicular height of one of them, and then doubling the product.

The ſquare of the ſide of an *octahedron* is in a ſubduple ratio of the ſquare of the diameter of the circumſcribing ſphere.

OCTANDRIA, formed of οκτω, *eight*, and ανηρ, *male*, in *Botany*, a claſs of plants with hermaphrodite flowers, and eight ſtamina, or male parts in each. This claſs comprehends four orders, viz. *monogynia*, including thirty-one genera of plants with one ſtyle; *digynia*, containing four genera of plants with two ſtyles; *trigynia*, comprehending five genera with three ſtyles; and *tetragynia*, containing three genera with four ſtyles. See *Tab.* I. *and* IV. *of Botany*, *claſs* 8.

The plants of this claſs are the maple tree, heath, &c. See Fructification.

OCTANT, or Octile, in *Aſtronomy*, an aspect, or poſition of two planets, &c. wherein their places are diſtant by an eighth part of a circle, or 45 degrees, from one another.

OCTAPLA, formed from οκτω, *eight*, q. d. *ſomething with eight rows or columns*, a term in the ſacred learning, uſed for a kind of ancient Polyglot Bible, conſiſting of eight columns.

In the firſt column was the Hebrew text, in Hebrew characters: in the ſecond, the ſame text in Greek characters; in the third, the Greek verſion of Aquila; in the fourth, that of Symmachus; in the fifth, the Septuagint; in the ſixth, that of Theodotion: in the ſeventh, that called the *fifth*, the laſt was that called the *ſixth*.

Origen was the author of the *octapla*, as well as of the tetrapla and hexapla.

OCTATEUCH, in the *Sacred Literature*, is uſed for the eight firſt books of the Old Teſtament, viz. Geneſis, Exodus, Leviticus, Numbers, Deuteronomy, Joſhua, Judges, and Ruth. Procopius of Gaza has ten commentaries on the *Octateuch*.

OCTAVE, in *Muſic*, an harmonical interval conſiſting of eight tones, or degrees of ſound.

The moſt ſimple perception the ſoul can have of true ſounds is that of uniſon; becauſe the vibrations there begin and end together. The next to this is the *octave*; wherein the more acute ſound makes preciſely two vibrations, while the graver or deeper makes one; and wherein, by conſequence, the vibrations of the two meet at every vibration of the more grave.

Hence uniſon and *octave* paſs almoſt for the ſame concord. Hence alſo the proportion of the ſounds that form the *octave*, are in numbers, or in lines, as 2 to 1, ſo that two chords or ſtrings of the ſame matter, thickneſs, and tenſion, one whereof is double the length of the other, produce the *octave*.

The *octave* is called, by the ancients, diapason, becauſe containing all the ſimple tones and concords; all of which derive their ſweetneſs from it, as they ariſe more or leſs directly out of it.

To be juſt, it muſt contain diatonically ſeven degrees, or intervals; and, conſequently, eight terms, or ſounds: whence its name, *octave*.

The *octave* containing in it all the other ſimple concords, and the degrees being the differences of theſe concords; it is evident, the diviſion of the *octave* comprehends the diviſion of all the reſt.

By joining, therefore, all the ſimple concords to a common fundamental, we have the following ſeries:

$$1 \; ; \; \tfrac{5}{6} \; : \; \tfrac{4}{5} \; : \; \tfrac{3}{4} \; : \; \tfrac{2}{3} \; : \; \tfrac{5}{8} \; : \; \tfrac{3}{5} \; : \; \tfrac{1}{2}.$$

Fund. 3d l, 3d g, 4th, 5th, 6th l, 6th g, 8ve.

Again, the ſyſtem of *octave* containing all the original concords, and the compound concords being the ſum of *octave*, and ſome leſſer concord; in order to have a ſeries to reach beyond an *octave*, we muſt continue them in the ſame order through a ſecond *octave*, as in the firſt; and ſo on through a third and fourth *octave*. Such a ſeries is called the *ſcale of muſic*.

Though the compoſition of *octaves* may be carried on infinitely, yet three or four *octaves* are the greateſt length we go in ordinary practice: the old ſcales went no farther than two, or at moſt three *octaves*, which is the full compaſs of an ordinary voice: and, notwithſtanding the perfection of the *octave*; yet, after the third, the agreement diminiſhes very faſt; nor do they ever go ſo far at one movement, as from one extreme to the other of a double or triple *octave*: ſeldom beyond a ſingle *octave*: nor is either voice or inſtrument well able to go beyond. To form a fourth *octave*, if the acuter ſtring be half a foot, which is but a ſmall length to give a clear ſound, the longer muſt be eight feet. If, then, we go beyond the fourth *octave*, either the acute term will be too ſhort, or the grave one too long.

The *octave* is not only the greateſt interval of the ſeven original concords, but the firſt in degree of perfection. As it is the greateſt interval, all the leſs are contained in it. Indeed, the manner wherein the leſs concords are found in the *octave*, is ſomewhat extraordinary; viz. by taking both an harmonical and arithmetical mean between the extremities of the *octave*, and then both an arithmetical and harmonical mean between each extreme, and the moſt diſtant of the two means laſt found; i. e. between the laſt extreme and the firſt arithmetical, and between the greater extreme and the firſt harmonical mean, we have all the leſſer concords.

Mr. Malcolm obſerves, that any wind-inſtrument being over-blown, the ſound will riſe to an *octave*, and no other concord; which he aſcribes to the perfection of the *octave*, and its being next to uniſon.

From this ſimple and perfect form of the *octave*, ariſes this peculiar property, that it may be doubled, tripled, &c. and ſtill be concord; i. e. the ſum of two or more *octaves* are concord; though the more compound, gradually the leſs agreeable. He adds, there is that agreement between its extremes, that whatever ſound is concord to one extreme of the *octave*, is ſo to the other.

Deſcartes, from an obſervation of the like kind, viz. that the ſound of a whiſtle, or organ pipe, will riſe to an *octave*, if forcibly blown, concludes, that no ſound is heard, but its acute *octave* ſeems ſome way to echo or reſound in the ear.

Octave, *diminiſhed*. See Diminished *Octave*, and Interval.

Octave, or Octabis, in *Law*, denotes the eighth day after any feaſt, incluſively; which ſpace is alſo called *utas*.

Octave, among the Romaniſts, is uſed for the ſpace or period of eight days allowed for the celebration of a feaſt, or ſervice, in commemoration of ſome ſaint, or on other ſolemn occaſions.

Eaſter, Whitſuntide, St. John Baptiſt, St. Laurence, Epiphany, the Dedication, &c. are celebrated with *octaves*. The office in the *octave* is ſemi-double.

OCTAVINA, in the *Italian Muſic*, a kind of ſmall ſpinet, eaſily moved, having only one row of keys, and thoſe not to the uſual number, perhaps not to above three octaves, the common ones going to four, or more. See Spinet.

OCTILE, or Octant, in *Aſtrology*, an aſpect of two planets when diſtant from each other by an eight of the zodiac, i. e. a ſign and half, or 45°.

OCTO, *ad* Octo. See Ad octo.

OCTOBER, the eighth month of the year, in Romulus's calendar; though the tenth in that of Numa, Julius Cæſar, &c. conſiſting of thirty-one days.

October has ſtill retained its firſt name in ſpite of all the different names the ſenate and Roman emperors would have given it. The ſenate ordered it to be called *Fauſtinus*, in honour of *Fauſtina*, the wife of Antoninus the emperor: Commodus would have had it bear the name of *Invictus*: and Domitian made it be called *Domitianus*, after his own name.

OCTOGON, or Octagon, in *Geometry*, a figure of eight ſides, and eight angles.

When all the ſides and angles are equal, it is called a *regular octogon*, or an *octogon* that may be inſcribed in a circle.

Octogon, in *Fortification*, denotes a place that has eight baſtions. See Bastion.

OCTOPHORUM, among the *Ancients*, a carriage with eight wheels.

It alſo ſignified a chair, or litter, *lectica*, carried by eight chairmen, which kind of chair was moſtly uſed by the women.

OCTOSTYLE, in the *Ancient Architecture*, the face of a building, or ordonnance, containing eight columns.

The eight columns of the *octoſtyle* may either be diſpoſed in a right line, as in the Pſeudodiptere temple of Vitruvius, and in the Pantheon; or in a circle, as in the round Monoptere temple of Apollo Pythius at Delphi, &c.

OCTO *tales*. See Tales.

OCTUNX, a word uſed by ſome diſpenſatory writers to ſignify eight ounces.

OCULARES, *dentes*, or *cynodentes*, the eye-teeth. See Teeth.

OCULATA, in *Ichthyology*, a name given by many to the fiſh more uſually called MELANURUS. It has the name *oculata* from the remarkable largeneſs, and fine golden iris of its eye.

OCULATUS *lapis*, the *eyed-ſtone*, a name given by Mercatus, in his Metallotheca Vaticana, and, by many other writers, to what we call the *pudding-ſtone*, a ſtone formed of a great number of pebbles, of a ſmall ſize, immerſed, and formerly bedded in a flinty cement, little leſs hard than the ſtones themſelves, and in ſome ſpecies not at all ſo. The reſemblance of theſe round pebbles, when the maſs was cut, to the eyes of animals, probably gave origin to this name. See *Tab. of Foſſils*, *Claſs* 5.

This *pudding-ſtone* is not the only inſtance of this effect of the rapidity of the waters of the deluge in running off from the face of the earth; for there are found in many places great numbers of ſtones which have been parts of ſtrata, or larger maſſes, and which have been broken off, and rolled into the form of pebbles at that time. And among what we commonly underſtand by the name pebbles, we find many which have prominent ridges running round them, which have been veins harder in their matter than the reſt of the ſtone; and therefore, while the reſt has been worn away, theſe have remained leſs worn, and conſequently ſtanding higher than the other parts.

OCULI, *eyes*, in *Botany*, the gemmæ or buds of a plant juſt putting forth, or the knots out of which thoſe buds ariſe.

Oculi, *abductor*, *depreſſor*, *elevator*, and *obliquus*. See the reſpective articles.

Oculi *ſpeculum*. See SPECULUM.

OCULIPETA, in *Zoology*, a ſpecies of ſerpents.

OCULIST is a name appropriated to a ſurgeon, who applies himſelf particularly to the ſtudy and cure of diſeaſes of the eye.

OCULUM *aperiens*, in *Anatomy*, a name given by ſeveral authors to a muſcle of the face, called by the generality of writers APERIENS *palpebram*, and *aperiens palpebram rectus*; by Albinus LEVATOR *palpebræ ſuperioris*.

OCULUS, in *Anomy*. See EYE.

Oculus *beli*, in *Natural Hiſtory*, the name of one of the ſemipellucid gems of the genus of the *hydrophanæ*, and called by Dr. Hill *hydrophanes albido-cinereus*, *flavo-variegatus*, *nucleo centrali nigerrimo*, or the greyiſh white *hydrophanes*, variegated with yellow, and with a black central nucleus. See *Tab. of Foſſils*, *Claſs* 5.

It is a very elegant and beautiful gem; its baſis, or ground, is a whitiſh grey, variegated with yellow, and ſometimes with red, and a little black, but that more rarely, and is found in ſmall maſſes from half an inch to an inch in diameter; of a rounded figure, and thickeſt in the middle, tapering away gradully to the ſides; the outer part of the ſtone, or that toward the edges all round, is ever of a whitiſh grey, more or leſs variegated with yellow, &c. and its central nucleus is always of a deep and fine black, ſurrounded by a broad circle, of a pale yellow, and repreſenting very beautifully the pupil and iris of the eye; theſe are encloſed in the matter of the ſtone, and are often ſurrounded by other very fine concentric circles, of a pale flame-colour; but more frequently there is only the black pupil, ſurrounded by the yellow iris, and that placed in the body of the ſtone which repreſents the white of the eye; the ſhape of the ſtone alſo favours its reſemblance of an eye, and the whole is very elegant. It is of the hardneſs of the agate, and takes a tolerable poliſh; when thrown into water, it has, in a great meaſure, the property of the *oculus mundi*, the whole ſtone bocomes greatly more bright and lucid, and the grey part becomes of a plainly yellowiſh caſt.

There are many things improperly called *oculus beli* by our jewellers, but the genuine ſpecies is very rare. Nothing is more common than to find in the agates little circular veins of different colours round a central ſpot; theſe the lapidaries frequently cut out, with a proper quantity of the ſtone about them, and call them *oculus beli*. They are not peculiar to the agate, but are common alſo in the cornelian, and ſtand ſometimes ſingle, ſometimes two or three together, and, according to the colours of the circles, repreſent the eyes of various animals. Hill.

Oculi *cancrorum*. See CRAB's *eyes*.

Oculus *cati*. See ASTERIA.

Oculus *Chriſti*, in *Botany*, a name given to a ſpecies of clary, from the ſuppoſed virtues of its ſeeds in clearing the ſight, which it does by its viſcous covering; for when any thing happens to fall into the eye, if one of theſe ſeeds is put into one corner, and the eye-lid kept cloſe over it, moving the ſeed gently along the eye, whatever happens to be there will ſtick to the ſeed, and ſo be brought out.

Oculus *leporinus*, a diſtemperature of the eyes, called alſo ECTROPIUM.

Oculus *marinus*, the *ſea-eye*, a name given by ſome authors to the UMBILICUS *marinus*, from its reſemblance to the ſhape of an eye.

Oculus *mundi*, in *Natural Hiſtory*, the name of one of the ſemi-pellucid gems, of the genus of the *hydrophanæ*. It is of one plain and uniform colour, which is a whitiſh grey, and has no veins, or other variegations. It is found in ſmall maſſes, of the ſhape of our common flints and pebbles; it has but a very obſcure degree of tranſparence, and is not capable of a fine poliſh. This ſtone, however, though of little beauty, has this very ſingular property, that, when thrown into a baſon of water, in the ſpace of half a minute it begins to change its appearance, and very ſoon, inſtead of a pale grey, becomes of a very bright, and conſiderably pellucid, pale yellow, like that of amber, or the yellow cornelian; this it retains as long as it remains in the water, but as ſoon as taken out, and dried, it reſumes its grey colour, and becomes as opake as before. It is found, ſo far as is yet known, only in China; but the ſhores of ſome of our own rivers afford us ſtones coming up to its qualities in ſome degree, though not ſo beautifully tranſparent in water as the oriental. Hill's Hiſt. of Foſſ. p. 468.

Oculus *Veneris*, a name given by ſome to the UMBILICUS *marinus*.

OCYMOPHYLLON, in *Botany*, a name given by Buxbaum to a new genus of plants, the characters of which are theſe: the flower is of the ſtamineous kind, having no petals; this ſtands upon the embryo fruit, which afterwards becomes an oblong quadrangular ſeed-veſſel, divided into four cells, and containing roundiſh and very ſmall ſeeds; its leaves are like thoſe of the common ocymum, or baſil, whence its name; and its place of growth is in damp marſhes. Boccone has deſcribed it under the improper name of *glaux*, calling it the great, green-flowered, *marſh glaux*. Act. Petropol. vol. iv. p. 421.

OCYMUM, in *Botany*. See BASIL.

ODA, in the *Turkiſh Seraglio*, ſignifies a *claſs*, *chamber*, or *order*.

The grand ſignior's pages are divided into five claſſes, or chambers, called *odas*. See PAGE.

The firſt, which is the loweſt in dignity, is called the *great oda*, from the number of perſons that compoſe it. Theſe are the juniors, who are taught to read, write, and ſpeak the languages; which are, the Turkiſh for this world; the Arabic for paradiſe; and the Perſian for hell, by reaſon of the hereſy of the people that ſpeak it.

The ſecond is called the *little oda*; where, from the age of fourteen or fifteen years, the youth are trained up to arms, and the ſtudy of ſuch polite learning as the Turks are acquainted with; viz. logic, arithmetic, geometry, and a little aſtrology.

In each of theſe chambers is a page of the privy-chamber, who ſuperintends them, as the perfects in the colleges of the Jeſuits.

The third chamber, called *kilar-oda*, comprehends two hundred pages; which, beſides their other exerciſes, are commanded by the kilerdgi-bachi, for the ſervice of the buttery and fruitery.

The fourth only conſiſts of twenty-four; theſe, under the khazineda-bachi, take care of the treaſure in the grand ſignior's apartment, where they never enter with any cloaths on that have pockets.

The fifth is called *khas-oda*, i. e. privy chamber, and conſiſts of forty pages, which attend the emperor's bed-chamber. The firſt of this chamber is called *oda bachi*, the ſecond *ſiliktar*, &c.

Eight of theſe pages keep conſtant guard every night in the emperor's bed-chamber: they are poſted in ſeveral places, ſome nearer him, others farther off, according to their degrees in the chamber. They are to take care the lights, kept conſtantly in the chamber, do not glare in his eyes, and awake him; and if they find him diſturbed with any troubleſome dream, to take care he be awaked by one of the agas.

ODABACHI, or ODDABASSI, an officer in the Turkiſh ſoldiery, equivalent to a ſerjeant or corporal among us.

The common ſoldiers, and janizaries, called *oldachis*, after having ſerved a certain term of years, are always preferred, and made biquelairs; and of biquelairs, in time, become *odabachis*, i. e. corporals of companies, or chiefs of certain diviſions, whoſe number is not fixed; being ſometimes ten, and ſometimes twenty.

Their pay is ſix doubles per month, and they are diſtinguiſhed by a large felt, a foot broad, and above a foot long, hanging on the back, with two long oſtrich feathers.

ODD. See EVENLY, and FOOT.

ODE, *oda*, from the Greek *ᾠδὴ*, *cantus*, *ſong*, or *ſinging*, in the *Ancient Poetry*, a ſong; or a compoſition proper to be ſung, and compoſed for that pupoſe; the ſinging being uſually accompanied with ſome muſical inſtrument, chiefly the lyre.

Ode, in the *Modern Poetry*, is a lyric poem, conſiſting of long and ſhort verſes, diſtinguiſhed into ſtanzas, or ſtrophes, wherein the ſame meaſure is preſerved throughout.

The *odes* of the ancients, Voſſius obſerves, had a regular return of the ſame kind of verſe, and the ſame quantity of ſyllables, in the ſame place of every ſimilar verſe: "But there is nothing (ſays he) but confuſion of quantities in the modern *odes*; ſo that, to follow the natural quantity of our ſyllables, every ſtanza will be a different ſong."

He ſhould have obſerved, however, that all the ancient *odes* were not of ſuch kind. But he proceeds: "The moderns have no regard to the natural quantity of the ſyllables, and have introduced an unnatural and barbarous variety of long and ſhort notes, which they apply without any regard to the natural quantity of ſyllables; ſo that it is no wonder our vocal muſic has no effect." De Poem Cantu.

Among the ancients, *ode* ſignified no more than a ſong; with us, they are different things. The ancient *odes* were generally in honour of their gods, as are many of thoſe of Pindar and Horace: ſometimes on other ſubjects, as thoſe of Anacreon, Sappho, &c. The Engliſh *odes* are generally compoſed in praiſe of heroes, and great exploits; as thoſe of Dryden, Prior, &c.

The diſtinguiſhing character of the *ode* is *ſweetneſs*: the poet is to ſooth the minds of his readers by the variety of verſe, and the delicacy of words; the beauty of numbers, and the deſcription of things moſt delightful in themſelves. Variety of numbers is eſſential to the *ode*. At firſt, indeed, the verſe of the *ode* was but of one kind; but for the ſake of pleaſure, and the muſic to which they were ſung, they by degrees ſo varied the numbers and feet, that their kinds are now almoſt innumerable. One of the moſt conſiderable is the Pindaric diſtinguiſhed by the boldneſs and rapidity of its flights.

The ancient *ode* had originally but one ſtanza, or ſtrophe; but was at laſt divided into three parts; *ſtrophe, antiſtrophe, and epode*. The prieſts going round the altar, ſinging the praiſe of the gods, called their firſt entrance *ſtrophe*, i. e. turning to the left; the ſecond, turning to the right, they called *antiſtrophe*, q d. returning: laſtly, ſtanding ſtill before the altar, they ſung the remainder; which they called *epode*.

ODE, *Alcaic*. See ALCAIC.

ODEUM, *ωδειον*, among the *Ancients*, was a place deſtined for the rehearſal of the muſic to be ſung on the theatre.

ODEUM was ſometimes alſo extended to buildings that had no relation to the theatre. Pericles built an *odeum* at Athens, where muſical prizes were contended for: Pauſanias ſays, that Herod the Athenian built a magnificent *odeum* for the ſepulchre of his wife.

Eccleſiaſtical writers alſo uſe *odeum* for the choir of a church.

ODHAL *right*. Pontoppidan, in his Hiſtory of Norway, p. 290. obſerves, that in the northern languages, *odh* ſinifies *proprietas*, and *all*, *totum*. Hence he derives the *odhal* right in thoſe countries, and hence perhaps is derived the *udal* right in Finland. Now the tranſpoſition of theſe northern ſyllables *allhodh*, will give us the true etymology of the *allodium*, or abſolute property of the feudiſts; as by a ſimilar combination of the latter ſyllable with *fee*, which ſignifies a conditional reward or ſtipend, *feeodh*, or *feudum*, will denote ſtipendiary property. Blackſt. Com. book ii. p. 45. *n*.

ODIN, in *Mythology*, called alſo in the dialect of the Anglo-Saxons *Woden*, or *Wodan*, a name given by the ancient Scythians to their ſupreme God, and aſſumed, about ſeventy years before the chriſtian æra, by Sigge, a Scythian prince, who conquered the northern nations, made great changes in their government, manners, and religion, enjoyed great honours, and had even divine honours paid him. According to the account given of this conqueror by Snorto, the ancient hiſtorian of Norway, and his commentator Torfæus, *Odin* was a Scythian, who withdrew himſelf, with many others in his train, by flight, from the vengeance of the Romans, under the conduct of Pompey; and having officiated as prieſt in his own country, he aſſumed the direction of the religious worſhip, as well as the civil government, of the nations which he conquered. Having ſubdued Denmark, Sweden, and Norway, he retired to Sweden, where he died. There is nothing certain in this account; but it is probable, that the god, whoſe prophet or prieſt this Scythian pretended to be, was named *Odin*, and that the ignorance of ſucceeding ages confounded the deity with his prieſt, compoſing out of the attributes of the one, and the hiſtory of the other, the character of the northern conqueror. He deluded the people by his enchantments and ſkill in magic: having cut off the head of one Mimer, who in his life time was in great reputation for wiſdom, he cauſed it to be embalmed, and perſuaded the Scandinavians that he had reſtored it to the uſe of ſpeech; and he cauſed it to pronounce whatever oracles he wanted. The Icelandic chronicles repreſent *Odin* as the moſt eloquent and perſuaſive of men; they aſcribe to him the introduction of the art of poetry among the Scandinavians, and likewiſe the invention of the Runic characters. He had alſo the addreſs to perſuade his followers, that he could run over the world in the twinkling of an eye; that he had the direction of the air and tempeſts; that he could transform himſelf into all ſorts of ſhapes, could raiſe the dead, could foretel things to come, deprive his enemies, by enchantment, of health and vigour, and diſcover all the treaſures concealed in the earth. They add, that, by his tender and melodious airs, he could make the plains and mountains open and expand with delight; and that the ghoſts, thus attracted, would leave their infernal caverns, and ſtand motionleſs about him. Nor was he leſs dreadful and furious in battle; changing himſelf into the ſhape of a bear, a wild bull, or a lion, and amidſt ranks of enemies committing the moſt horrible devaſtation, without receiving any wound himſelf. See EDDA, and Mallet's North. Antiq. vol. i. ch. iv. and v.

ODIO & *atia*, anciently called *breve de bono & malo*, is a writ directed to the ſheriff, to inquire whether a man, being commited to priſon on ſuſpicion of murder, be committed on juſt ſuſpicion, or only malice, and ill will.

ODONTALGIA, *οδονταλγια*, formed from *οδȣς*, *tooth*, and *αλγος*, *pain*, in *Medicine*, the TOOTH-*ach*; one of the moſt common, yet moſt ſevere, pains the body is ſubject to.

ODONTOIDES, *οδοντοειδης*, formed from *οδȣς*, *tooth*, and *ειδος*, *form*, in *Anatomy*, an apophyſis in the middle of the ſecond vertebra; ſo called from its reſemblance to a tooth.

Its ſurface is ſomewhat unequal, that the ligament which comes out of it, and binds it to the occiput, may take the better hold.

It is alſo encompaſſed with a ſolid ligament, contrived on purpoſe to prevent the ſpinal marrow from being compreſſed by this apophyſis.

ODOR, or ODOUR. See SMELL.

ODORAMENTUM, in *Pharmacy*, a medicine applied for the benefit of its ſmell, whether it be fetid, or agreeable.

Such are frequently uſed in hyſteric and hypochondriac diſorders; e. gr. aſſa fœtida, camphor, &c.

ODORIFEROUS *glands*. See GLANDS.

ODOROUS, or ODORIFEROUS *things*, are ſuch as exhale a briſk, agreeable ſmell, ſenſible at a diſtance.

Such are the jeſſamin, roſe, tuberoſe, &c.

ODYSSEY, *Odyſſea*, formed from *Οδυσσεια*, which ſignifies the ſame with *Οδυσσευς*, *Ulyſſes*, an EPIC poem of Homer, wherein he relates the adventures that befel Ulyſſes in his return to Ithaca from the ſiege of Troy.

The deſign of the Iliad, F. Boſſu obſerves, is to inſtruct the ſtates of Greece, conſidered as united in one body, or as parts of the whole; and that of the *Odyſſey*, to inſtruct thoſe ſame ſtates, conſidered in their private capacities.

A ſtate conſiſts of two parts: the head, which commands, is the firſt; and the members, that obey, the ſecond. Now, inſtructions are required both for the one and the other; but it is poſſible to have them both conveyed under the ſame perſon.

The fable, then, of the *Odyſſey* is as follows. A prince had been obliged to quit his country, and lead an army of his ſubjects upon a foreign expedition. After having glorioufly executed this, he was upon his return home; but in ſpite of all his endeavours, was detained for ſeveral years by tempeſts, which threw him on ſeveral countries very different from one another as to manners, cuſtoms, polity, &c.

In the dangers he had to ſtruggle with, his companions, neglecting his advice, all periſhed through their own default. In the mean time, the great men of his country, abuſing his abſence, commit ſtrange diſorders in his palace, ſquander his treaſure, lay ſnares for his ſon, and will needs force his wife to chooſe a huſband among them; all this from an opinion, that he was entirely loſt. But at length he returns; and having diſcovered himſelf to his ſon, and ſome others of his friends who had perſiſted in their allegiance, he becomes an eye-witneſs of the inſolence of his courtiers; puniſhes them as they deſerved; and reſtores that peace and tranquillity to his iſland, which had been baniſhed during his abſence.

The truth or model whereon this fable is founded is, that a perſon's abſence from home, ſo that he cannot have an eye to his affairs, accaſions great diſorders. Accordingly,

ingly, the hero's abſence is the principal and moſt eſſential part of the action, and takes up the greateſt part of the poem.

This poem, Boſſu adds, is more calculated for the people than the Iliad is, where the ſubjects ſuffer rather from the ill conduct of their princes than by their own faults. The great names of heroes, Ulyſſes, &c. do not here repreſent the pooreſt peaſants leſs than princes, Cæſars, Alexanders, &c. The meaneſt people are as liable to ruin their eſtates and families by negligence, &c. as the greateſt; and accordingly have as much need of Homer's lectures, and are as capable of profiting by them, as kings themſelves.

Gerard Croes, a Dutchman, in a book entitled Ομηϱος Εϐϱαιος, printed at Dort, in 1704, endeavours to prove, that the ſubjects of Homer's two poems are taken from the Scriptures; that the action of the *Odyſſey*, in particular, is nothing elſe but the adventures of the Iſraelites till the death of Moſes; and that the *Odyſſey* was compoſed before the Iliad, the ſubject whereof is the taking of Jericho. What fancies!

ŒCONOMICS, *œconomica*, that part of moral philoſophy, which teaches how to manage the affairs of a family, or houſhold.

ŒCONOMUS, οικονομὸς, a perſon appointed to direct and manage a vacant church revenue, or that of a hoſpital, or other community.

Œconomus was alſo anciently uſed for a protector, or advocate, who defended the rights and effects of churches, monaſteries, &c.

Œconomus was alſo an appellation given to a church-officer, who took care of the buildings and repairs of the church, and received and diſtributed alms according to the directions of the biſhop.

In this ſenſe it is that the ſixth council appoints, that every church have its *œconomus*.

ŒCONOMY, οικονομια, the prudent conduct, or diſcreet and frugal management of a man's eſtate, or that of another.

Œconomy, *public*. See *Public* POLICE.

Œconomy, *animal*, the firſt branch of the theory of medicine; or that which explains the parts of the human body, their ſtructure and uſe; the nature and cauſes of life and health, and the effects or phenomena ariſing from them.

This is otherwiſe called *phyſiology*; and its objects juſt enumerated are called the *naturals*, or *res ſecundum naturam*.

Œconomy, *legal*, or *Jewiſh*, or *diſpenſation*, is the manner wherein God thought good to guide and govern his people under the miniſtry of Moſes. See JUDAISM.

This included not only the political and ceremonial laws, but alſo the moral law, inaſmuch as it pronounced a curſe on all thoſe who did not fulfil it perfectly.

Œconomy, *evangelical*, or *Chriſtian*, or *diſpenſation*, is uſed in oppoſition to the *legal*; and comprehends all that relates to the covenant of grace, which God has made with men by Jeſus Chriſt.

Œconomy *of the parts of plants*. See PLANT.

ŒCUMENICAL, formed of the Greek οικȣμενικος, of οικȣμενη, the *habitable earth*, or the *whole earth*, ſignifies as much as *general*, or *univerſal*.

In this ſenſe we ſay an *œcumenical* council, or ſynod; meaning one at which the whole Chriſtian church aſſiſted, or to which they were invited.

Du-Cange obſerves, that many of the patriarchs of Conſtantinople, aſſumed to themſelves the quality and denomination of *œcumenical* patriarchs; particularly John the Faſter in 590, and Cyril his ſucceſſor. Gregory the Great of Rome was exceedingly enraged at it; pretending it was a title of pride, and the character of antichriſt; as ſuppoſing the title of *œcumenical* to imply univerſal biſhop, or biſhop of all the world: whereas, in effect, it implied no more than the quality of chief of the eaſtern church; in like manner as the firſt doctor of the church of Conſtantinople was called *doctor œcumenicus*.

The title *œcumenical* biſhop was firſt offered to Leo. I. but he refuſed it: nor did his ſucceſſors accept of it for a long time. The fifth council of Conſtantinople gave it to John, patriarch of that city; though ſome of the Romaniſts pretend, that the emperor Phocas gave it, by way of preference, to the biſhop of Rome. See POPE. But thoſe of Conſtantinople have preſerved it; and ſo late as the council of Baſil, that patriarch uſed the title. But *œcumenical* here is only to be underſtood as of the extent of each patriarchate.

ŒDEMA, οιδημα, a tumour which appears whitiſh, ſoft, and lax, without any notable change of colour, heat, pain, or pulſation; and which yields to the preſſure of the finger, ſo as for ſome time to retain the dent or impreſſion thereof.

The word comes from the Greek οιδαω, *I ſwell*; whence οιδημα, a *tumor*. Accordingly Hippocrates uſes the word *œdema* for any tumor in general.

The general cauſe of *œdemas* is vulgarly ſuppoſed to be a *pituita*, as it is called, or a phlegmy humour in the body. But the true and immediate cauſe is the diſcharge of the lymph into the CELLULÆ *adipoſæ*. See DROPSY.

Contuſions, fractures, luxations, &c. when of long ſtanding, often give riſe to *œdemas*, eſpecially in dropſical and aged perſons; ſo alſo do irregular living, want of exerciſe, ruptures, diſorders of the lymphatics, defluxions of humours, weakneſs of joints, &c.

The chief ſeat of this tumour is in the legs: in a leucophlegmatia, the whole body is *œdematous*. It frequently comes upon other diſeaſes, eſpecially clinics; and is familiar to women with child. It is dangerous when it tends to an abſceſs; when it hardens, it becomes ſcirrhous.

There are alſo *ſpurious œdemas*; in which caſe the pituitous homour is mixed with other humours, whence the tumour becomes eryſipelatous, ſcirrhous, and ſometimes gipſous; and hence wens, &c.

ŒDEMATOUS, in *Medicine*, ſomething that is of the nature of an *œdema*; or ſeized, or afflicted, with an *œdema*. Thus we ſay, an *œdematous arm*, *œdematous leg*, &c.—Phyſicians divide tumours into *inflammatory*, *œdematous*, *ſcirrhous*, *ſcrophulous*, *cancerous*, &c.

The perſons moſt ſubject to *œdematous* tumours, are people of a phlegmatic habit, and ſuch as have had ſuppreſſions of ſome natural evacuations. Men who have had the hæmorrhoidal diſcharges ſtopped upon them, and women labouring under ſuppreſſions of the menſes, are more than all others ſubject to them. Perſons ſomewhat advanced in age are, in general, more ſubject than young ones, and women with child, particularly during the more advanced ſtate of their pregnancy, are often afflicted with them. The long holding the legs in cold water will ſometimes alone occaſion them, and, among the poorer country people, the women who make a cuſtom of ſtanding in the water to waſh their cloaths are often affected with theſe ſwellings in one or both knees. People who have received large wounds, and have had them treated raſhly, with cold applications, are alſo ſometimes thrown into danger of theſe ſwellings. The repelling tumours of other kinds, and ſometimes the ſtriking in an eryſipelas, or other cutaneous eruptions, will alſo occaſion them; and ſometimes people who have been treated with too hot a regimen in acute fevers, are ſubject to ſwellings in their feet, which though they appear red, and are hot at times, yet, when ſtrictly examined, appear to be truly *œdematous*.

Prognoſtics in this caſe. *Oedematous* ſwellings are always very obſtinate, and tedious in their cure; but they are the more ſo when their cauſes are the more complicated, and more things than one conſpire to their origin. None of theſe ſwellings are ſo eaſily cured as thoſe which ariſe from external injuries, or ſimple refrigeration; and thoſe which ariſe from cutaneous humours ſtruck in, are often found very eaſy of cure, provided that they are not of very long ſtanding; and in general, ſuch as are very cold when out of bed, and always very hot when in it, are more difficult of cure than others. But this is to be obſerved, that there is great difference between a cure of theſe tumors, and the only ſtriking them in; the latter caſe being very often attended with much worſe complaints than the tumors themſelves, the too frequent conſequences of ſuch retropulſions being inflammations of the abdomen and præcordia, and abſolute dropſies.

Oedematous tumors ſeldom, of themſelves, prove dangerous, or mortal; but when they are of a long continuance, the effect of old age, or a dropſical habit; when they grow hard, ſcirrhous, painful, or come to ſuppurate, the cure is generally tedious and uncertain. Thoſe which attend wounds, fractures, or the like, are leſs difficult to cure.

Method of cure. The firſt ſtep towards a cure muſt be the correcting the mucous and viſcid ſtate of the humours: this is beſt done by the neutral ſalts, as tartarum vitriolatum, and the like; and by gum ammoniacum, the roots of pimpernel, and woods of ſaſſafras, guaiacum, and the like; with the warm aromatics, as ginger, and the ſpices, and carminative ſeeds. The matter, when thus attenuated, is to be evacuated by purges of a ſtrength proportioned to the conſtitution of the patient; and, after this, the true tone of the parts is to be re-eſtabliſhed by chalybeats, and the part to be ſecured from a relapſe with a large bandage, and with warm and ſtrengthening fomentations. It rarely happens that theſe ſwellings ulcerate; but when they do, there is no application ſo proper as the liquor of myrrh. Junker's Conſp. Med. p. 410.

The method of treating *œdematous* tumors is very different,

ent, according to the different cauſes to which they owe their riſe. The external method of treating theſe tumors in the legs and feet is uſually to have recourſe to frequent frictions with warm cloths; theſe are to be repeated every night and morning, and the parts to be rubbed each time till they appear very red, and are hot; the limb is then carefully to be preſerved from the injuries of the cold air, and it is a very proper method to wear ſtockings made of ſome warm furr, and to lie with hot bricks, wrapped up in cloths, near the legs and feet, to divide, and attenuate the blood; a proper bandage is, after theſe methods, to be applied, which is to aſcend gradually from the feet up to the knees; this ſtrengthens the limb, and prevents a ſtagnation, and collection of the blood in any part of it. Proper ſtrengthening internal medicines muſt be given during all this time; and, after the trying what has been already directed, ſtrengthening remedies are to be attempted externally alſo: to this end the limb may be placed over burning rectified ſpirit of wine, wrapping it up in cloths in ſuch manner that it may receive the ſteam; this will incline the ſtagnating fluids to eſcape through the ſkin, or elſe render them fit to return into the circulation, and at the ſame time will do much toward reſtoring the proper tone of the limb. In many families it is a ſecret to apply the herb great celandine, bruiſed in manner of a pultice, either alone, or mixed with the perſicaria acris, or water-pepper, and great benefit is ſometimes obtained by theſe herbs, for they are very active medicines, and powerful reſolvents. Others apply alſo, for the ſame purpoſe, the lepidium, or pepper-wort, and horſe-raddiſh root, ſcraped and moiſtened with white wine; but the moſt excellent remedy of this kind is the cataplaſm made of pigeon's dung, mixt with common ſalt and vinegar, and applied warm, and often removed. A fomentation of no ſmall uſe is made alſo of a ley made of oak aſhes, mixed with ſmith's forge-water, adding a little ſpirit of wine, and a ſmall quantity of alum. This may be applied with ſtupes, or the legs may be bathed in the liquor, as warm as it can well be borne, twice a day. Spirit of wine alſo, either alone, or mixed with lime-water and alum, or lime-water alone, are good fomentations; and another, from which great benefit has been received, is this: take ſpirit of wine, and common vinegar, of each a pint: crude alum, an ounce and half; vitriol, an ounce; mix all together, and uſe it as the foregoing. Great care muſt always be taken after the uſing theſe, or the like fomentation, that the limb be well covered with bandages and ſtockings; the patient muſt alſo, during the time, drink ſparingly, and uſe moderate exerciſe frequently. The medicinal waters, eſpecially the ſulphureous, often do ſervice in theſe caſes, but they do not always ſucceed. Dr. Harris, relates, that he has cured the moſt dangerous of theſe caſes with a mixture of the aperient ſaffron of ſteel, and the bark. Others ſpeak of having performed cures with the bark alone; but there are not wanting ſome who declare this to be a very dangerous method. Heiſter.

Under the claſs of *œdematous tumors*, are ranked condylomata, criſtæ, rhagades, thymi, talpæ, or natæ, the ganglium and pſydracium. See CONDYLOMA, CRISTÆ, TUMOR, &c.

ŒDICNEMUS, in *Ornithology*, the name of a bird called alſo *charadrius* by Geſner and Aldrovand, and in Engliſh the *ſtone* CURLEW. It is a conſiderably large bird, weighing eighteen ounces; its beak is about two fingers breadth long, and is ſtrait, pointed at the end, and partly black, partly yellow; it has a naked, yellowiſh, green membrane under its eyes; its legs are long and yellow; and it has only three toes, having no hinder one; its thighs are naked half the way up, as in other water birds; breaſt and thighs are white; its throat, back, and neck, of a mixture of reddiſh brown and black, much like the colour of the curlew; whence the Engliſh have very improperly called it the *ſtone curlew*; the under part of its tail is reddiſh. It breeds very late, the young being often found callow at the latter end of October. It lives principally in watery places, and flies in the night, making at that time a very remarkable ſhrill noiſe.

ŒNANTHE, in *Botany*. See *Water* DROPWORT.

ŒNANTHE, or *dropwort*, in *Botany*, is alſo a name originally given by the ancient Greeks to the flowers of the wild vine. It was afterwards made to expreſs alſo the flowers of the common manured vine, and the young grapes while ſmall, and juſt appearing from the flowers: theſe with the tendrils, and ſmall leaves of the vines, were ſometimes uſed for the making garlands, and ornamenting other things; and after this, another plan of a very different nature became uſed on the ſame occaſions, and called by the ſame name.

ŒNANTHE, in *Ornithology*, the name of a genus of birds of the ſmaller ſize, of which there are four ſpecies. 1. The common *œnanthe*, called the *fallow-finch*, or *wheat-ear*. 2. The *œnanthe*, called *anthus*, and *florus*; and in Engliſh, the *whinchat*. 3. The *œnanthe*, called *rubetra*, and in Engliſh the *ſtone-chatter*, or *moor-titling*. 4. The American *œnanthe guirarhu nheengeta*. See WHEAT-EAR, WHINCHAT, &c.

ŒNARIA, a name given by the ancients to aſhes prepared from the leaves, tendrils, and young ſtalks of the vine. They were accounted highly diuretic.

ŒNELÆUM, οινελαιον, formed of οινος, *wine*, and ελαιον, *oil*, in *Pharmacy*, a mixture of wine and oil; uſually of thick black wine, and oil of roſes.

In fractures with wounds, where the bone is not bare, Scultetus orders that the compreſſes, to make them ſtick, be drenched with *œnelium*, to ſooth the pain, and prevent an inflammation; and the bandage to be every day moiſtened with the ſame, till the inflammation be out of all danger.

ŒNISTERIA, in *Antiquity*, ſacrifices held by the youth of Athens, before the firſt time of cutting the hair, and ſhaving the beard.

The etymology of the word, which comes from οινος, *wine*, ſhews, that the matter here offered was wine.

Theſe ſacrifices were offered to Hercules; and the quantity of what was offered was regulated by law.

ŒNOGALA, a word uſed by Hippocrates, and other of the Greek authors, to expreſs a mixture of milk and wine for immediate drinking. Others have uſed it to expreſs wine alone heated, ſo as to be juſt as warm as new milk.

ŒNOMANTIA, οινομαντεια, in *Antiquity*, a ſpecies of divination by wine, which is done by making conjectures from the colour, motion, noiſe, and other accidents of the wine of libations.

ŒNOPTÆ, a kind of officers, or cenſors, at Athens, who attended at their feaſts, regulated the number of cups each was to drink, and took care that none drank too much or too little.

Thoſe who would not be kept within the bounds of temperance, were preſented by the *œnoptæ* to the areopagus. The *œnoptæ* were alſo called *eyes*, *oculi*.

ŒNOS, in *Ornithology*, the name uſed by authors for the *ſtock-dove*, or *wood-pigeon*, called alſo by ſome *vinago*, ſomewhat larger than the common pigeon, but of the ſame ſhape and general colour. Its neck is of a fine changeable hue, as differently oppoſed to the light; and its breaſt, ſhoulders, and wings, are of a fine purpliſh hue, or red wine colour, from whence it has its name *vinago*. Its legs are red, and feathered a little below the joint.

ŒNOSTAGMA, a name given by ſome of the chemical writers to *ſpirit of wine*.

ŒNOTHERA, in *Botany*. See *Tree* PRIMROSE.

ŒPATA, in *Botany*, a name by which ſome authors have called the tree which produces the fruit called *anacardium Orientale*, or the Malacca bean.

ŒSOPHAGÆUS, in *Anatomy*, one of the muſcles of the pharynx, which it encompaſſes round like a ring.

It is ſingle, and ſerves to ſqueeze the aliment down, by cloſing the pharynx after the manner of a ſphincter; whence ſome call it the *ſphincter gulæ*; others *deglutitor*, or *ſwallower*.

Dr. Drake will have it no more than a production of the pterygopharyngæus, whoſe fibres ſurround the pharynx from a tendinous line on the back part of it; though Verheyen makes it a diſtinct pair.

ŒSOPHAGUS, οισοφαγος, in *Anatomy*, the gula, or gullet; a membranous pipe or paſſage, whereby our food and drink are conveyed from the mouth to the ſtomach. See *Tab. Anat. (Splanch.) fig. 2. lit.* a.

The *œſophagus* deſcends from the fauces to the ſtomach, between the aſperia arteria, and the vertebræ of the neck and back, in a ſtrait line, excepting for a little deflexion bout the fifth vertebra of the thorax, where it turns a little to the right to make way for the great artery, which runs along with it to the ninth; where turning again towards the laſt, it croſſes the artery, and piercing the diaphragm, ends at the left orifice of the STOMACH.

It conſiſts of ſeveral coats or membranes, uſually reckoned three; though ſome make them four, others five or ſix, allowing the cruſta villoſa to be one; which laſt diviſion Dr. Drake follows, as moſt accurate.

The firſt coat is membranous, and only deſigned for a covering for the reſt; and ſeems only a continuation of the outward membrane of the ſtomach, derived from the peritonæum; though ſome derive it from the pleura, and others from the diaphragm.

The ſecond coat is muſcular, conſiſting of ſtrong fleſhy fibres like other muſcles; ſo that it ſeems to make the gullet a hollow fiſtulous muſcle. According to Steno and Willis, it conſiſts of two orders of fibres, going from top to bottom in ſpiral lines, contrary to and decuſſating each other; which deſcription is very exact of the gullet of ruminants, but not ſo of that of men. In men it conſiſts of two fleſhy lamellæ, like two diſtinct muſcles; the outward compoſed of ſtraight longitudinal fibres; the inner of annular fibres, without any obſervable angles. The uſe of this coat is to promote deglutition; the longitudinal fibres, when in contraction, ſhortening the *œſophagus*, and making its capacity larger to admit of the matter to be ſwallowed; and the annular, on the contrary, contracting the capacity, and cloſing behind the deſcending aliment, preſs it downwards; ſo that the two orders of fibres ſeem to act as antagoniſt-muſcles to each other.

The next coat, called the *vaſcular*, conſiſts of a double membrane; the outer formed of irregular fibres and innumerable veſſels interwoven; the inner of ſtrait longitudinal fibres, mixed with little glands; whence ſome call it the *glandulous*. This membrane adheres cloſely to another within, called the *nervous coat*, which is exceedingly fine, and made up of exceſſively ſlender fibres, variouſly diſpoſed. It is continued to that which covers the fauces, mouth, and lips; whence it happens, that tickling the bottom of the fauces by vellicating this membrane, provokes a retching to vomit.

This membrane has a quick ſenſation; and in this part, as ſome think, is the ſeat of thirſt, the organ whereby the appetite of drinking is excited. It is lined inwardly with a villous cruſt, which Dr. Drake takes to be the excretory ducts of the glands, and not unlike the cuticula of the cutis, to defend the ſubjacent membrane. In excoriations, this is ſometimes caſt out at the mouth.

The upper opening of the *œſophagus*, ſituate at the bottom of the fauces, is called the PHARYNX.

The inflammation of the *œſophagus* is ſometimes a ſymptom attending the quinzy. See ANGINA, and QUINZY.

ŒSTROMANIA, a name given by ſome authors to the uterine diſorders which ſometimes affect young women, and is commonly called FUROR *uterinus*.

ŒSTRUS, in *Zoology*, the name of a ſpecies of fly, called alſo ſometimes the *gad-fly*, *breeze-fly*, and *aſilum*. See GAD-*fly*.

The *œſtrus*, in the Linnæan ſyſtem, is a genus of two-winged flies, the mouth of which has neither teeth nor proboſcis. There are five ſpecies which are very troubleſome to oxen, horſes, ſheep, and deer.

ŒSTRUM *Veneris*. See VENERIS.

ŒSYPE, or ŒSYPOS, a kind of fatty mucilage, of the conſiſtence of an unguent, of a greyiſh colour, and a ſickiſh diſagreeable ſmell, drawn from the greaſy wool growing on the throats and between the buttocks of ſheep.

The word is formed from the Greek *οις*, *ſheep*, and *σηπω*, *I putrefy*, or *corrupt*; the *œſype* being a filthy, and, as it were, corrupted matter, drawn from ſheep.

This wool they waſh, boil it in water, let the lotions, or decoctions, ſtand for ſome time, and from the top ſkim off a fatty ſubſtance, which being ſtrained through a linen cloth, and ſet to cool, makes the *œſype*, much uſed externally to reſolve, ſoften, and appeaſe pain.

ŒTHODES *ulcus*, a term uſed by the Greek writers for ſuch ulcers as had tumid and callous lips; and as ſuch ulcers are uſually very difficult to heal, the word became afterwards appropriated to all ſorts of ulcers difficult to cure.

OFFA *alba*, a name which Van Helmont gives to the white coagulum, ariſing from a mixture of rectified ſpirit of wine with ſpirit of urine, or ſpirit of ſal ammoniac.

Note, The ſpirit of urine muſt be diſtilled from well fermented wine, and the other muſt be well dephlegmated; elſe no *offa* will ariſe.

Some call it the *offa alba* of Paracelſus, others of Van Helmont; whence it is ſometimes called *offa Helmontiana*; but Van Helmont was not the inventor of it, but Raim. Lully, ſays Boerhaave.

The manner of making the *offa alba* is deſcribed by this laſt author, who obſerves it to be difficult, as it requires both liquors to be perfect, and ſome nice circumſtances to be obſerved.

Van Helmont endeavours to account for the formation of the ſtone in the bladder, from this experiment; but, as Boerhaave obſerves, the *offa alba* has nothing in common with the ſtone.

Boerhaave recommends this mixture as a good deobſtruent, taken in Canary, faſting.

OFFENCE, *delictum*, in *Law*, an act committed againſt the law, or omitted where the law requires it.

Offences are diſtinguiſhed into two kinds, viz. ſuch as are capital, and ſuch as are not. Capital *offences* are thoſe for which the offender is to loſe his life. Thoſe not capital, where the offender may forfeit his lands and goods; be fined, or ſuffer corporal puniſhment, or both, but not loſe his life. Hale, P. C. 2. 126, 134. Under capital *offences* are comprehended high treaſon, petit treaſon, and felony; and *offences* not capital include the remaining part of the pleas of the crown, and come under the title of miſdemeanours.

Some *offences* are puniſhable by the common law, but moſt of them by ſtatutes.

OFFERING. See OBLATION, and HEAVE-*offering*.

OFFERING, *burnt*. See HOLOCAUST.

OFFERTORY, *offertorium*, an anthem ſung, or played on the organ, at the time the people are making an offering.

Anciently, the *offertery* conſiſted of a pſalm ſung with its anthem; though it is ſomewhat dubious whether the pſalm was ſung entire; St. George mentioning, that when it was time, the pope looking at the choir who ſung it, gave the ſign when they ſhould end.

OFFERTORY was alſo a name anciently given to the linen whereon the offerings were laid. Dr. Harris ſays, it was properly a piece of ſilk, or fine linen, wherein the occaſional oblations or offerings of each church were wrapped up.

OFFICE, *officium*, in a moral ſenſe, denotes a duty; or that which virtue, and right reaſon, direct a man to do.

Virtue, according to Chauvin, is the purpoſe of doing well: the thing which immediately follows, or ariſes from this purpoſe, is obedience; which ſame is alſo denominated *officium*: ſo that an office is the object of an obedience to VIRTUE.

Cicero, in his diſcourſe of *offices*, cenſures Panætius, who had written before him on the ſame, for omitting to define the thing or ſubject on which he wrote; yet he does himſelf fall under the ſame cenſure. He inſiſts much on the diviſion of *offices*, but forgets the definition. In other of his pieces we find him defining *office* to be an action which reaſon requires to be done: *Quod autem ratione actum ſit, id* officium *appellamus*.

The Greeks, he obſerves, made two ſpecies of *office*: *perfect*, called by them *κατορθωμα*; and *common*, or *indifferent*, called *καθηκον*; which they define ſo, as that, what is abſolutely right, makes a *perfect office*; and what we can only give a probable reaſon for, a *common*, or *intermediate office*.

OFFICE, in a civil ſenſe, denotes the mutual aid and aſſiſtance which men owe to one another.

Benevolence inſpires a man with an endeavour to do good *offices* to all mankind.

OFFICE is alſo a particular charge, or truſt, whereby a man is authorized to do ſomething.

Loyſeau defines *office* a dignity attended with a public function. The word is primarily uſed in ſpeaking of the *offices* of judicature and policy: as, the office of a ſecretary of ſtate, that of a juſtice of peace, of a ſheriff, &c.

Offices are either venal, or not venal. *Venal offices* are thoſe bought with money.

Venal offices are ſubdivided into two kinds; viz. *dominia*, and *caſual*. *Dominial*, or *offices in fee*, are thoſe abſolutely torn off, and ſeparated from the king's prerogative, ſo as not to become vacant by death, but paſſing in the nature of a fee, or inheritance.

Of theſe we have but few inſtances among us, which go beyond a firſt reverſion. Among the French they are more frequent.

Caſual offices are thoſe given for life, by patent, commiſſion, &c. and which become vacant, by the officer's death, to the king's benefit; unleſs the officer have before reſigned, or diſpoſed of it.

The venality of *offices* of judicature is one of the grievances in the French policy. See VENAL.

OFFICE, *alienation*, *alternate*, *crown*, *jewel*, *poſt*. See the reſpective articles.

OFFICE, *victualling*. See VICTUALLING.

OFFICE is alſo uſed for a place, apartment, or board appointed for the officers to attend in, for the diſcharge of their reſpective duties or employments.

Such are the *ſecretary's office*, *firſt fruits office*, the *ſix clerks office*, the *paper office*, *ſignet office*, the *prothonotary's office*, *pipe office*, *king's ſilver office*, *exciſe office*, *office of ordnance*, &c. See SECRETARY, FIRST-*fruits*, SIX CLERKS, PAPER, PIPE, SIGNET, EXCISE, ORDNANCE, &c.

Of ſuch *offices*, ſome are diſtinguiſhed by the name of *board*, and other of *chambers*, as the board of green cloth, &c.

Where the inquiſition obtains, the tribunal thereof is called the *holy office*.

OFFICE, in the *Canon Law*, is uſed for a BENEFICE which has no juriſdiction annexed to it.

OFFICE is alſo uſed, in *Common Law*, for an inquiſition made to the king's uſe of any thing found by virtue of his *office* who enquires, or makes an inquiſition, *ex officio*.

Hence, to traverſe an *office*, is to traverſe an inquiſition taken of *office* before an eſcheator. To return an *office*, is to return that which is found by virtue of the *office*.

There are two ſorts of *offices* iſſuing out of the exchequer by commiſſion; viz. an *office* to entitle the king in the thing enquired into; and an *office* of inſtruction.

Office is alſo uſed for divine ſervice celebrated in public.

St. Jerom is the perſon, who, at the requeſt of pope Damaſus, is ſaid to have firſt diſtributed the Pſalms, Epiſtles, and Goſpels, in the order in which they are now found in the Romiſh *office*. The popes Gregory and Gelaſius added the prayers, reſponſes, and verſes; and St. Ambroſe the graduals, hallelujahs, &c.

Office is more particularly uſed in the Romiſh church, for the manner of performing the ſervice; which varies every day.

Thus they ſay the *office* of Sunday; the *office* of ſuch a ſaint, &c. The *office* is either *ſingle*, *half-double*, or *double*.

Office, again, is applied to a particular prayer preferred in honour of a ſaint.

When any perſon is canonized, a particular *office* is at the ſame time aſſigned him out of the common *office* of the confeſſors, the Virgin, or the like. See Saint and Canonization.

We ſay, the *office* of the Virgin; of the Holy Spirit; of the paſſion; the holy ſacrament, &c. The *office* of the dead is rehearſed every day, excepting on feaſt-days, among the Carthuſians. The *office* of the Holy Virgin is alſo added to the *office* of the day, in the order of Bernardines.

Offices, with regard to architecture, denote all the apartments that ſerve for the neceſſary occaſions of a great houſe, or palace, or thoſe where the ſervants are employed: as kitchens, pantries, brewhouſes, confectionaries, fruiteries, granaries, &c. as alſo waſh-houſes, wood-houſes, ſtables, &c.

The *offices* are commonly in the baſſecour; ſometimes they are ſunk underground, and well vaulted.

OFFICER, a perſon poſſeſſed of a poſt or office.

Great Officers *of the crown*, or *ſtate*, are the lord high-ſteward, the lord chancellor, the lord high-treaſurer, the lord preſident of the council, the lord privy-ſeal, the lord great chamberlain, the lord high conſtable, the earl marſhal, and lord high admiral. See Chancellor, Treasurer, Marshal, &c.

Officers *of juſtice* are thoſe who are entruſted with the adminiſtration of equity and juſtice in the courts thereof.

Officers, *royal*, are thoſe who adminiſter juſtice in the king's name; as the judges, &c. See Judge.

Officers, *ſubaltern*, are thoſe who adminiſter juſtice in the name of ſubjects. Such are thoſe who act under the earl-marſhal, admiral, &c.

Officers *of policy* are thoſe in whom the government and direction of the affairs of a community are inveſted. Such are mayors, ſheriffs, &c.

Officers *of war* are thoſe who have command in the forces.

Theſe are either *general*, *field*, or *ſubaltern officers*.

Officers, *general*. See General *officers*.

Officers, *field*, are ſuch as have command over a whole regiment; ſuch as the colonel, lieutenant-colonel, and major.

Officers, *ſubaltern*. See Subaltern.

Officers, *commiſſion*, are ſuch as are appointed by the king's commiſſion.

Such are all from the general to the cornet and enſign, incluſive.

They are thus called in contradiſtinction to *non-commiſſioned officers*, as ſerjeant-majors, quarter-maſter-ſerjeants, ſerjeants, corporals, drum and fife-majors, who are nominated by their reſpective captains, and appointed by the commanding *officers* of regiments, and by them reduced without a court martial.

Officers, *ſtaff*, are the quarter-maſter-general, and the adjutant-general, who are ſtrictly ſaid to exiſt only in time of war: alſo, the quarter-maſters, adjutants, ſurgeons, and chaplains of regiments.

Officers, *warrant*, are thoſe who have no commiſſions, but only warrants from ſuch boards or perſons as are authorized by the king to grant them.

Officers, *ſea*, or *officers of the marine*, are thoſe who have command in ſhips of war.

Officers, *flag*. See Flag.

Officers *of the houſhold*, are the lord ſteward, treaſurer of the houſhold, comptroller, cofferer, maſter, clerks of the green-cloth, &c. the lord chamberlain, vice-chamberlain, gentlemen of the privy and bed-chamber, gentlemen uſhers, grooms, pages, maſter of the wardrobe, of the ceremonies, &c. the maſter of the horſe, avenor, equerries, ſurveyors, &c. See Houshold. See alſo each *officer* in his proper article.

Officers, *ſtaff*, are ſuch as in the king's preſence bear a white ſtaff; and at other times, going abroad, have a white ſtaff borne before them by a footman bare-headed. Such are the lord ſteward, lord chamberlain, lord treaſurer, &c.

The white ſtaff is taken for a commiſſion; and at the death of the king, the *officers* break their ſtaff over the hearſe made for the king's body, and thereby diſcharge their inferior *officers*.

Officers, *municipal*. See Municipal.

Officers, *reformed*. See Reformado.

Officers *of the mint*. See Mint.

Officers, *ſignals for*. See Signal.

OFFICIAL, *officialis*, in the *Canon Law*, the biſhop's deputy or lieutenant; or an eccleſiaſtical judge appointed by a biſhop, chapter, abbot, &c. with charge of the ſpiritual juriſdiction thereof.

Of theſe there are two kinds: the one, as it were, vicar-general of the church, exerciſing juriſdiction throughout the whole dioceſe, called by the canoniſts *officialis principalis*, in our ſtatute law the biſhop's chancellor.

There is no appeal from his court to the biſhop; his being eſteemed the *biſhop's* court.

The other called *officialis foraneus*, as having his juriſdiction *foris*, *& extra civitatem*, is appointed by the biſhop when the dioceſe is very large; having a certain extent of territory aſſigned him, wherein he reſides.

This *official* has but a limited juriſdiction, though he have *univerſitatem cauſarum*, and exerciſe it in the biſhop's name. Our ſtatute-law calls him *commiſſary*.

The biſhops, eſpecially thoſe of large ſees, finding themſelves oppreſſed with a multiplicity of buſineſs, at firſt, diſcharged a part of it upon their archdeacons and prieſts, to whom they gave commiſſions revocable at pleaſure. Theſe are called *vicarii*, or *officiales*.

As we do not meet with this term any where before the conſtitutions of the *ſextus decretalium*, it is pretty apparent the cuſtom had not its riſe till the end of the thirteenth century.

In proceſs of time the function was divided into two; and the title *official* given to him with whom the biſhop entruſted the exerciſe of litigious juſtice; and that of vicars general, or grand vicars, to thoſe who had the voluntary juriſdiction.

The number of *officials* was ſoon exceſſively multiplied; and not only biſhops, but chapters and archdeacons, would have their *officials*.

The *officials*, by degrees, had drawn to their cognizance and juriſdiction moſt of the civil cauſes; till they were taken out of their hands by appeals, &c.

Official is alſo uſed, in our laws, for a deputy appointed by an archdeacon, for the executing of his juriſdiction.

OFFICIALTY, the court, or juriſdiction, whereof an *official* is head.

The practice of *officialties* is now reduced into a little compaſs; and actions of promiſes, and diſſolutions of marriages, are the principal things tranſacted therein.

OFFICIARIIS *non faciendis, vel amovendii*, a writ directed to the magiſtrates of a corporation, requiring them not to make ſuch a man an *officer*, or to put one out of the *office* he hath, until enquiry is made of his manners, &c.

OFFICINAL, formed of *officina*, a *ſhop*, in *Pharmacy*, a term applied to ſuch medicines, whether ſimple or compound, as are required to be conſtantly kept in readineſs in the apothecaries ſhops, to be mixed up in extemporaneous preſcriptions.

The *officinal ſimples* are appointed, among us, by the college of phyſicians; and the manner of making the compoſitions is directed in their Diſpenſatory.

OFFICIO, *ſuſpenſio ab*. See Suspension.

Officio, *ex*. See Ex *officio*, and Information.

Officio, *quod clerici non eligantur in*. See Quod.

OFFING, or Offin, in the *Sea Language*, that part of the ſea that is at a good diſtance from ſhore; where there is deep water, and no need of a pilot to conduct the ſhip into port.

If a ſhip from ſhore be ſeen ſailing out to ſeaward, they ſay ſhe ſtands for the *offing*. And if a ſhip having the ſhore near her, have another a good way without her, or towards the ſea, they ſay, that ſhip is in the *offing*.

OFF-SETS, in *Gardening*, &c. are thoſe young ſhoots which ſpring and grow from roots that are round, tuberous, or bulbous. See Root, Bulb, &c.

The word is alſo applied by ſome to the looſe, outer, brown ſkins of tulips, onions, &c.

Off-sets, in *Surveying*, are perpendiculars let fall, and meaſured from the ſtationary lines, to the hedge, fence, or extremity of the incloſure.

Off-set-*ſtaff*, in *Surveying*, a rod, or ſtaff, of any convenient length; for inſtance, of ten links of the chain.

This ſtaff is divided into ten equal parts. Its uſe is for the ready meaſuring the diſtances from the ſtation line of things proper to be repreſented in a plan. See CHAIN.

OEF-TRACING. See CALQUING, COUNTER-*drawing*, DESIGNING, and PENTAGRAPH.

OFF-WARD, in the *Sea Language*, the ſame with contrary to the ſhore: thus they ſay, *the ſhip heels off-ward*, when, being aground, ſhe heels toward the water-ſide; *the ſhip lies with her ſtern to the off-ward, and the head to the ſhore-ward*, when her ſtern is towards the ſea, and head to the ſhore.

OGEE, or **OG**, in *Architecture*, a moulding, conſiſting of two members, the one concave, the other convex, the ſame with what is otherwiſe called *cymatium*. See *Tab. Archit. fig.* 7 and 25. N° 15.

Vitruvius makes each member of the *ogee* a quadrant of a circle; Scamozzi, and ſome others, make them ſomewhat flatter, and ſtrike them from two equilateral triangles.

The figure of the *ogee* bears ſome reſemblance to that of an S.

OGEE, in *Gunnery*, an ornamental moulding in the ſhape of an S, uſed in GUNS, MORTARS, and HOWITZES.

OGIVES, or *og* arches, are arches or branches of a Gothic VAULT, which, in lieu of being circular, paſs diagonally from one angle to another, and form a croſs with the other arches which make the ſide of the ſquares, whereof the *ogives* are diagonals.

The middle, where the *ogives* cut or croſs each other, is called the *key*, which is ſometimes carved in form of a roſe, or a cul de lampe. The members or mouldings of the *ogives* are called nerves, branches, or reins; and the arches which ſeparate the *ogives*, double arches.

OGLIO. See OLIO.

OGRESSES, or AGRESSES, in *Heraldry*. See PELLETS.

OIL, *oleum*, formed from *olea*, *olive-tree*, the fruit whereof abounds in ſuch juice; a fatty, unctuous, inflammable matter, drawn from ſeveral natural bodies.

Others define *oil* to be a compound body, little, if at all ſoluble in water, which is capable of burning with a flame, accompanied with ſmoke and ſoot, and of leaving a reſiduum of coal after its diſtillation. The conſtituent parts of *oil* are phlogiſton, acid, water, and earth; for all theſe principles are diſcovered in the decompoſition of any oil: to which we may add, that *oils*, when decompoſed by heat, or by mineral acids, emit a very large quantity of elaſtic vapour, or a kind of fixable air. *Oil* appears to be one of the proximate principles of all vegetables and animals; and conſtitutes the eſſential diſtinction betwixt them and minerals, in which the ſmalleſt particle of *oil* cannot be diſcovered. As to the general properties of *oil*, it may be obſerved, that all *oils* are volatile; and thoſe which poſſeſs this property in the leaſt degree may be evaporated with much leſs than a red heat. They are alſo eaſily inflammable in open air, when expoſed to a heat capable of evaporating them, by contact of any inflamed matter; and they are entirely decompoſed by their inflammation. This inflammable property of *oil* had led the ancient chemiſts, down to the time of Beccher and Stahl, to give the name of *oil* to the inflammable principle of metals, of ſulphur, and of charcoal; whereas this principle is one of the conſtituent parts of *oil*; nor can it be transferred from oil to any other body, without previous decompoſition, and its ceaſing to be *oil*. In diſtilling *oil*, there firſt ariſes an acid phlegm, and afterwards the *oil* itſelf, which is accompanied with an acid. In the retort there remains a ſmall quantity of coal; which, as well as the ſoot of *oil*, are combuſtible with difficulty; but when the whole inflammable principle is burnt, nothing remains but aſhes, which, when well waſhed from the fixed alkali they may contain, are a pure earth. There is reaſon to believe, that *oil* in its greateſt purity and ſimplicity, or the *oily principle*, is eſſentially the ſame in all vegetable and animal matters; and that the differences, however conſiderable, in the ſeveral kinds of *oils*, proceed merely from the extraneous matters combined with them. It appears, likewiſe, that *oils*, by repeated diſtillations, are not only purified and rendered ſimpler, but eſſentially altered. They are alſo liable to alteration by the action of air, and by the concurrence of other circumſtances which favour fermentation. Acids have in general a power of acting upon *oils*; but the effects produced by their combination with them are very various, according to the nature of the acid, the degree of its concentration, and to the kind of *oil*; and the difference of their effects evidently proceeds from the difference of their affinities with the inflammable principle. Alkalis act upon all *oils*, and combine with them to a certain degree; but more or leſs readily, according to the nature of the *oil*. In general, the leſs thin and volatile any *oil* is, the more eaſily ſoluble it is by alkalis; and reciprocally *oils* may be united with metallic ſubſtances. They moſt ſenſibly attack copper and lead, diſſolving copper even without heat. The action of *oils* on metals is probably by means of their acid and phlogiſton, with which the air perhaps alſo concurs. But *oils* are moſt eaſily combined with the calxes of lead.

The *oils* in common uſe are of three different kinds. The firſt are mere *oily*, or fatty bodies, extracted either by expreſſion, or by decoction: of the firſt kind are thoſe of almonds, linſeed, nuts, olives, and the like; and of the other, that of bay-berries, and the like, which are procured by boiling the ſubſtance on which the *oil* collects itſelf on the top of the water.

The ſecond kind of *oils* are thoſe extracted from vegetables, by common diſtillation by the alembic, with the help of water; theſe contain the *oily* and volatile part of the plant, and carry, by way of pre-eminence, the name of *eſſential* or *etherial oil*.

The third ſort of *oils* are the fetid ones, which are, in like manner, produced by diſtillation, but by means of a different diſtillation in a naked fire, and without the aſſiſtance of water.

The word *oil* is ſometimes applied to the juices which diſtil naturally from plants and trees; as balm, &c. but more ſtrictly to thoſe juices drawn by EXPRESSION, &c. from plants, fruits, grains, or ſeeds; as *oil of olive*, *nut-oil*, &c.

OIL, among the *Ancient Chemiſts*, is the ſecond of the elements, or hypoſtatical principles, otherwiſe called *ſulphur*.

All natural bodies yield *oil*, either by diſtillation, putrefaction, or liquation, called *per deliquium*: and hence the chemiſts will have it a neceſſary ingredient in the compoſition of all bodies. They make it the principle of odours; and to the diverſities thereof aſcribe all the difference of bodies in reſpect of ſmells. See PHLOGISTON.

All plants, unleſs diſtilled with water, yield a fetid *oil* at the end of diſtillation; but aromatic ones, beſides this, yield another *oil*, which ariſes after the phlegm, and at the beginning of the diſtillation: this chemiſts call an *eſſential oil*, becauſe it retains the natural ſmell of the plant; whereas the ſecond *oil*, even that of aromatic plants, ſtinks intolerably.

M. Homberg, from an obſervation that plants which yield the moſt acid, yield likewiſe the moſt *oil*, took occaſion to think, that the acid might aſſiſt the *oil* to diſengage itſelf from the body, and to riſe in diſtillation; which he found to anſwer in the experiment. Mineral acids proved to have more force on the *oil* of plants, and put them in a condition of riſing in diſtillation, and in greater quantity, by the action of fire, than vegetable ones. Accordingly, whereas the perfumers find a great difficulty in raiſing eſſential *oil* of roſes; and ſcarce get an ounce out of a hundred pounds of the flower; M. Homberg, on his principle, got at leaſt one-third more; viz. by laying the roſes fifteen days in water impregnated with ſpirit of vitriol, before diſtillation.

The chemiſts doctrine of principles, Mr. Boyle ſhews to be very deficient in the article of *oils*: for the characteriſtic of a ſulphur, or that which denominates a thing ſuch, is its inflammability: now there are at leaſt three ſubſtances manifeſtly different in conſiſtence, texture, or both, which, according to that notion, ought to be referred to ſulphurs: for ſometimes the inflammable ſubſtance obtained from a mixed body by means of fire, appears in form of an *oil* that will not mix with water; ſometimes in form of an inflammable ſpirit, which will readily unite with that liquor; and ſometimes alſo in form of a conſiſtent body, almoſt like common ſulphur.

Dr. Slare, in Philoſ. Tranſ. gives us a ſcheme or analyſis of *oils*. He diſtinguiſhes *oils* into vegetable, animal, and mineral.

The vegetable he divides into *eſſential* and *not eſſential*.

The *eſſential*, again, are either perfect ſtillations made by the analyſis of the chemiſt's fire; where the oleaginous particles are truly ſeparated from all other; as thoſe from the ſeeds of cumin, fennel, and dill: or light and etherial, uſually drawn from the tops of plants, and ſpecifically lighter than water, and ſome of them than ſpirit of wine; as thoſe from thyme, wormwood, hyſſop, lavender, roſemary, penny-royal, rue, ſage, ſavin, &c. or ponderous, which commonly ſink in water.

Thoſe *not eſſential* are imperfect, made by expreſſion; being decompounded of ſeveral parts of the plants; as of almonds, olives, walnuts, lime, rape, &c.

The *animal oils* are either thoſe of the ſolid parts, as hartſhorn, human ſkull, hoofs, &c. or thoſe of the fluids, as of human blood.

Laſtly, the *mineral oils* are thoſe of amber, petroleum, Barbadoes tar, to which ſome add bees-wax.

Of theſe *oils* there are twelve, that, by a mixture of compound ſpirit of nitre, make an ebullition, exploſion, and flame; eighteen, that make an ebullition and exploſion without flame; and four that produce neither.

Plato obſerves, that *oil* is deſtructive to all plants; and, he adds too, to the life of animals, except that of man, to which it is agreeable, as alſo to the reſt of his body. He adds farther, that it is very uſeful to the external parts of the body, but ſometimes hurtful to the internal. Fernelius obſerves, that *oil* ſoftens, moiſtens, and lubricates the body, and takes off the ſenſe of wearineſs; for which reaſon the Greeks call it *acopum*: it alſo renders the body prompt and agile. Dioſcorides ſays it cures leproſies, &c.

The uſe of *oil* in ſtopping the violent ebullition of various ſubſtances, may be very great in many occaſions of life. It is well known that if a mixture of ſugar, honey, or the like, be boiling on the fire, and in danger of riſing over the ſides of the veſſel, the pouring in a little *oil* immediately makes it ſubſide. In many caſes the marking a circle round the inſide of a veſſel, in which a liquor of this kind is to be boiled, with a piece of hard ſoap, ſhall, like a magic ring, confine the ebullition to that height, and not ſuffer it to ſtir any farther. This is wholly owing to the *oil*, or fat, contained in the ſoap: but there is, beſides theſe, another very important uſe of *oil*, on a like occaſion, which is the pouring a little of it on any metallic ſolution, while making; this reſtrains the aſcent of the noxious vapours; preſerves the operator from danger; and, at the ſame time, by keeping down the evaporating matter, gives redoubled ſtrength to the menſtrum.

Pliny has mentioned an extraordinary effect of *oil*, in ſtilling the ſurface of water when it is agitated with waves, and the uſe made of it, by the divers, for this purpoſe. *Omne*, ſays he, *oleo tranquillari*, &c. lib. ii cap. 103. and Plutarch, in Quæſt. Natur. aſks, *Cur mare oleo conſperſum perlucidum ſit et tranquillum?* Pliny's account ſeems to have been either diſcredited or diſregarded by our writers on experimental philoſophy, till it was confirmed by ſeveral curious experiments of Dr. Franklin, which were publiſhed in the year 1744.

The property of *oil* above mentioned has, however, been well known to modern divers and dredgers for oyſters, at Gibralter, and elſewhere. The divers in the Mediterranean, in particular, deſcend, as in Pliny's time, with a little *oil* in their mouths, which they now and then let out; and which on riſing to the ſurface of the ſea, immediately renders it ſmooth, ſo as to permit the light to paſs through the water, undiſturbed by various and irregular refractions.

The Bermudians, it is ſaid, are enabled to ſee and ſtrike fiſh, which would be concealed from their view, through the roughneſs of the ſea, by pouring a little *oil* upon it. And the Liſbon fiſhermen effect a ſafe paſſage over the bar of the Tagus, by emptying a bottle or two of *oil* into the ſea, when the ſurf is ſo great as to endanger its filling their boats. Our ſailors have alſo obſerved, that the water is always much ſmoother in the wake of a ſhip that hath been newly tallowed than it is in one that is foul.

Dr. Franklin was led, by an accidental obſervation made at ſea, in 1757, to attend particularly to Pliny's account; and the various informations which he afterwards received relating to it induced him to try ſome experiments on the ſubject. Standing on the windward ſide of a large pond, the ſurface of which was rendered very rough with the wind, he poured a tea-ſpoonful of *oil* on the water. This ſmall quantity produced an inſtant calm over a ſpace of ſeveral yards ſquare, which ſpread amazingly, and extended itſelf gradually, till it reached the lee ſide, making all that quarter of the pond perhaps half an acre, as ſmooth as a looking-glaſs. On repeating this experiment, which conſtantly ſucceeded, one circumſtance ſtruck him with particular ſurprize; this was the ſudden, wide, and forcible ſpreading of a drop of *oil* on the face of the water, which, he adds, "I do not know that any body has conſidered."

When a drop of *oil* is put on a looking-glaſs, or poliſhed marble, it ſpreads very little: but on water it inſtantly expands into a circle extending ſeveral feet in diameter, becoming ſo thin as to produce the priſmatic colours, for a conſiderable ſpace, and beyond them ſo much thinner as to be inviſible, except in its effects of ſmoothing the waves at a much greater diſtance. It ſeems, ſays Dr. Franklin, as if a mutual repulſion between its particles took place as ſoon as it touched the water, and a repulſion ſo ſtrong as to act on other bodies ſwimming on the ſurface, as ſtraws, leaves, &c. forcing them to recede every way from the drop, as from a centre, leaving a large clear ſpace. The quantity of this force, and the diſtance to which it will operate, the author ſays, he has not yet aſcertained; but he thinks it a curious enquiry, and wiſhes to underſtand whence it ariſes.

In endeavouring to account for the ſingular effects of *oil*, Dr. Franklin obſerves, that there ſeems to be no natural repulſion between water and air, ſuch as to keep them from coming into contact with each other.—Therefore air, in motion, which is wind, in paſſing over the ſmooth ſurface of water, may rub, as it were, on that ſurface, and raiſe it into wrinkles, which, if the wind continues, are the elements of future waves. The ſmalleſt wave does not immediately ſubſide, but in ſubſiding raiſes nearly as much of the water next to it. A ſmall power, continually operating, will produce a great action: ſo that the firſt raiſed waves, being continually acted upon by the wind, are, though the wind does not increaſe in ſtrength, continually increaſed in magnitude, riſing higher and extending their baſes, ſo as to include a vaſt maſs of water in each wave, which, in its motion, acts with great violence. But if there be a mutual repulſion between the particles of *oil*, and no attraction between *oil* and water, *oil* dropt on water will not be held together by adheſion to the ſpot on which it falls; it will not be imbibed by the water; but be at liberty to expand itſelf and ſpread on a ſurface, that prevents, perhaps, by repelling the *oil*, all immediate contact; the expanſion will continue till the mutual repulſion between the particles of *oil* is weakened, and reduced to nothing by their diſtance.

Dr. Franklin imagines, that the wind blowing over water, thus covered with a film of *oil*, cannot eaſily catch upon it, ſo as to raiſe the firſt wrinkles, but ſlides over it, and leaves it as ſmooth as it finds it. It moves a little the *oil*, indeed, which being between it and the water, ſerves it to ſlide with, and prevents friction: hence the *oil* dropt on the windward ſide of the pond, proceeds gradually to leeward, as may be ſeen by the ſmoothneſs it carries with it quite to the oppoſite ſide: for the wind, being thus prevented from raiſing the firſt wrinkles, which he calls the elements of waves, cannot produce waves, which are to be made by continually acting upon and enlarging thoſe elements, and thus the whole pond is calmed.

Upon the whole, there is great room to ſuppoſe (notwithſtanding the partial failure of an experiment made at Portſmouth, by Dr. Franklin, and others), that ſeafaring people may derive advantages from uſing *oil* on particular occaſions, in order to moderate the violence of the waves, or to leſſen the ſurf which ſometimes renders the landing on a lee-ſhore dangerous or impracticable.

To this purpoſe we are informed, that the captain of a Dutch Eaſt India ſhip, being overtaken by a ſtorm, found himſelf obliged, for greater ſafety in wearing the ſhip, to pour *oil* into the ſea, to prevent the waves breaking over her, which had an excellent effect, and ſucceeded in preſerving her. Phil. Tranſ. vol. lxiv. part. 2. p. 445, &c. See Lump-*fiſh*.

The kinds of *oils*, their properties, manners of expreſſion, &c. are numerous: for the generality of them, the reader is referred to the proper articles.

Such as could not be more conveniently inſerted, are as follow.

Oil *of amber*. See Amber.

Oil *of bitter almonds*. See Almonds.

Oil *of ſweet almonds*, cold drawn, or without fire, is prepared various ways. Some peel the almonds before they pound them; others pound them without peeling. Some warm them in luke-warm water; others in *balneo Mariæ*; ſome only bruiſe them; others beat them into a paſte. In effect there are almoſt as many different ways of preparing this *oil*, as there are perſons who make it their buſineſs to prepare it.

In this diverſity, Pomet gives us a method eaſier, and leſs expenſive than any of the reſt, which, it ſhould ſeem, we cannot do better than follow.

Method of procuring **Oil** *of ſweet almonds by expreſſion without fire*. Take a pound and a half of ſweet almonds, new and dry; after pounding them in a mortar, paſs them through a coarſe ſieve, lay them in a hair-cloth, and put them under the preſs between two plates of copper, ſteel, or the like; preſs them gently; and when all the unctuous and fluid part is expreſſed, you will have a ſweet *oil* without any ſediment, which is ſcarce avoidable in any of the other manners.

Sweet almonds yield, on expreſſion, near half their own weight of *oil*; which, though it has no particular taſte or flavour, is ſomewhat more agreeable to the palate than *oil* olive, or moſt of the other common expreſſed *oils*; and hence is employed medicinally for internal uſes, in preference to thoſe *oils*, for obtunding acrid juices, and ſoftening and relaxing the ſolids; in tickling coughs, hoarſeneſs, coſtiveneſs, nephritic pains, &c. See Almonds.

Oils, *animal*, in general, are thoſe that are obtained from animal ſubſtances, either in the ſtate of butter and fat, uncombined with the other principles of animal matters; of which kind are fat, marrow, the expreſſed *oils* of yolks of eggs, ſpermaceti, &c. Or, in a ſtate of combination, afforded by diſtillation of the gelatinous ſubſtance, which forms almoſt entirely all the parts compoſing animal bodies, as fleſh, tendons, nerves, cartilages, bones, horns, hair, &c.

Oil, *animal*, *oleum animale*, in a more reſtricted ſenſe, the name of an eſſential *oil* diſtilled by a retort from blood, and recommended as a powerful remedy in epilepſies, the gout, and other obſtinate diſeaſes.

It was originally uſed in Germany in theſe intentions, and has become of late much uſed in England, but ſhould not be given too freely as an internal. As an external, it may probably be of good ſervice in removing fixed pains, hard tumors, &c. for it is extremely penetrating.

Oil, *animal*, *rectified*, called alſo *oil of dippel*, is the *oil* obtained from thoſe parts of animals which contain the pureſt gelatinous ſubſtance, and that are entirely free from fat, attenuated, and rendered more volatile by repeated diſtillations. By a ſufficient number of diſtillations, it may be rendered almoſt as white, thin, and volatile, as æther. This *oil* is particularly recommended for epileptic and convulſive affections. It is given from four to ten or twelve drops, in ſome proper vehicle.

Oil *of antimony*, a name given to the *butter of* ANTIMONY, and ſome other ſolutions of antimony by acids.

Oil *of arſenic*. See Arsenic.

Oil *of aſpic*, or *ſpike*. See Spike.

Oil *of balm*. See Balsam and Baum.

Oil *of bays* is an eſſential *oil*, obtained from the berries of the BAY. Theſe berries give out to the preſs an almoſt inſipid fluid *oil*; and on being boiled in water, a thicker butyraceous one, of a yellowiſh green colour, impregnated with the flavour of the berry. The berries and leaves of the bay are accounted ſtomachic, carminative, and uterine: with this view, infuſions of the leaves are drank as tea, and the eſſential *oil* of the berries is given on ſugar, or diſſolved by means of mucilages, or in ſpirit of wine, from one to five or ſix drops. But the principal uſe of theſe ſimples in the preſent practice is external: they are made ingredients in carminative glyſters, warm cataplaſms, and uterine baths; and the butyraceous *oil* of the berries ſerves as a baſis for ſome nervine liniments, and mercurial and ſulphureous unguents. Lewis. See Daphnelæon.

Oil *of beech*. See Beech-*oil*.

Oil *of been*, or *ben*. See Ben.

Oil *of bricks*. See Bricks.

Oil, *Britiſh*, an empirical medicine of the ſame nature with the petrolea; the genuine ſort being extracted by diſtillation from a hard bitumen, or a kind of ſtone-coal, found in Shropſhire, and other parts of England. Lewis.

Oil *of camphor*. See Camphor.

Oil *of caſtor*. See Castor.

Oil, *cauſtic*. See Arsenic.

Oil *of chamomile*. See Chamomile.

Oils, *chemical*, are diſtinguiſhed from the expreſſed *oils*; ſuch as thoſe of almonds, linſeed, olives, and the like, which are made by ſo ſimple a proceſs as mere ſqueezing. To procure this chemical principle pure and unmixed from the matter diſtilled from a vegetable body, the unctuous matter obtained from the proceſs may be waſhed from its adhering ſalts, and groſſer earth, in warm water, barely by ſhaking them in a glaſs together, then ſeparating the *oil* from the water by means of the common ſeparating glaſs; in which, if the *oil* be ſpecifically heavier than the water, it ſinks to the bottom, and may be ſuffered to run out firſt, by means of the pipe of that glaſs which has its inſertion at the bottom; if ſpecifically lighter than the water, it may be kept behind, as it floats on the top of the water, while all that is poured off, and has carried the groſs fæculent parts with it.

Oil *of cinnamon*. See Cinnamon.

Oil *of cloves*. See Clove-*tree*.

Oil, *connecting*, in *Chemiſtry*, a term uſed by Boerhaave, and his followers, to expreſs a certain *oil*, found in all vegetable ſubſtances, but wholly different from, and independent of, their eſſential *oil*. This is not poſſeſſed of any of their virtues or qualities, but ſeems the ſame in all plants, and is the means of their conſiſtence and ſolidity, giving tenacity to their earth, which, without it, falls to duſt, and the plant exiſts no more.

This *oil* is not ſeparable by boiling water, as the eſſential *oil* is, but only by fire: when a plant has been boiled and diſtilled, its eſſential *oil*, ſalt, &c. are all carried off, and what remains is only the earth corrected by this *oil*. This being expoſed to the fire, the *oil* diſcovers itſelf in a thick, black, ſtinking ſmoak, and, finally, taking fire, it burns away, and leaves only the earth, which was the baſis of the plant; retaining its form, indeed, if the proceſs has been carefully made, but falling into a ſhapeleſs powder only on being roughly breathed upon.

This great author, therefore, eſtabliſhes it as a rule, that there are three ſorts of *oil* in plants. 1. An *oily* froth. 2. The *eſſential oil*, diſſolved in decoction. And, 3. This *connecting*, or *conſolidating oil*, ſeparable only by a naked fire.

Oil *of cumin*. See Cumin.

Oils, *drying*, are formed of linſeed *oil*, prepared by means of boiling, ſometimes with and ſometimes without the addition of other ſubſtances. Thoſe commonly added to *oil*, in this preparation, are white vitriol, ſugar of lead, ſeed-lac, gum maſtic, gum ſandarac, gum anime, gum copal, umbre, colcothar, litharge, and red-lead. A drying *oil* for the nicer works may be prepared by boiling two ounces of gum ſandarac, white vitriol, and ſugar of lead, of each one ounce, in a pint of nut or poppy *oil*, till the ſolid ingredients be diſſolved, and the mixture becomes of the colour of linſeed *oil*. For coarſer work, take one gallon of linſeed *oil*, one pound of litharge of gold or ſilver, half a pound of white vitriol, and ſugar of lead, gum arabic, and umbre, of each a quarter of a pound; boil them as long as the diſcolouring of the *oil*, which is the gradual conſequence of boiling, will allow. That made for ſale is prepared by boiling one gallon of linſeed *oil*, and one pound and a half of red-lead, as long as the colour will bear it. When the calxes of lead are united in ſmall quantity with *oil*, they diminiſh its fluidity, and diſpoſe it to dry more readily. Theſe *oils* are much uſed in painting, on account of their drying quality. When a large quantity of calxes of lead is combined with *oil*, they form with it a ſolid, opake, and tenacious body, capable of ſoftening by heat. Theſe combinations are uſeful in pharmacy, for giving a convenient conſiſtence and tenacity to many plaſters.

Oil *of the earth*, *oleum terræ*, in the *Materia Medica*, the name of a thick mineral fluid of a duſky browniſh black, with a faint caſt of purple, and of the conſiſtence of a thin ſyrup, very little tranſparent, and of a ſtrong penetrating ſmell, like that of common *oil* of amber. It ouzes out of the cracks of rocks, in ſeveral parts of the iſland of Sumatra, and ſome other parts of the Eaſt Indies, and is much eſteemed there in paralytic diſorders; but it is ſeldom imported into England; what our Eaſt India ſurgeons and captains uſually bring over under this name, being only a vegetable *oil* impregnated with the virtues of certain of their foſſils by boiling. See Petrol.

Oils, *empyreumatic*, *or fœtid*, comprehend all the *oils* of vegetable and animal matters obtained by diſtillation, with a heat ſuperior to that of boiling water; becauſe theſe *oils*, have a diſagreeable, burnt, or empyreumatic ſmell. See Empyreuma.

Oils, *eſſential*, are thoſe which have evidently the ſmell of the vegetable from which they are obtained. All theſe *oils* are ſufficiently volatile to riſe with the heat of boiling water; and this degree of volatility is one of their ſpecific characters. The moſt uſual and beſt method of obtaining the eſſential *oil* of a vegetable by diſtillation is to take the plant in the prime of its age, when its ſmell is the ſtrongeſt, and to chuſe thoſe parts of the plant in which the ſmell chiefly reſides; to put them in the cucurbit of an alembic, without a water-bath; to add as much water as is ſufficient to prevent the plants from touching the bottom of the veſſel; to adjuſt a worm to the noſe of the alembic, and to give at once the degree of heat which is proper to make the water boil. In this way, the water riſes impregnated with the ſmell of the plant, and it carries along with it all its eſſential *oil*, part of which is mixed with the water, and renders it turbid, and the reſt of the *oil* floats upon the ſurface, or ſinks to the bottom, according to its ſpecific gravity. Let the diſtillation be continued till the water becomes clear, and more water muſt from time to time, be put into the cucurbit, that the plant may be always kept moiſt. Theſe *oils* have an acrid and cauſtic taſte, on account of the copious and diſengaged acid with which they are penetrated; and this acid is the cauſe of their ſolubility in ſpirit of wine. All eſſential *oils* are ſubject to loſe, by evaporation, their moſt volatile and thin part, in which the ſpecific ſmell of the vegetable, from which they are obtained, reſides; and by this loſs they become thick, and acquire the conſiſtence and ſmell of turpentine, or even of reſins. In this ſtate they are not, properly ſpeaking, eſſential *oils*, becauſe they are no longer volatile with the heat of boiling water. Eſſential *oils*, altered by time, but retaining their ſmell, are rectified by a ſecond diſtillation.

lation. But even this new diſtilled *oil* is ſubject to change and thicken.

This diſadvantage in keeping the eſſential *oils* diſtilled in the common way, has occaſioned Mr. Geoffroy to contrive another method of making them. This renders them more limpid and fluid than in the common way, and they are never ſubject to grow thick; but the medium not being water, ſo much of the *oil* cannot be procured from the ſubject, becauſe ſome is abſorbed and ſtained in the medium. The inſtance this gentleman gives of his new method, is in the eſſence of citron, and it is this:

A common alembic is to be filled with the thin pared external rinds of the fruit; a ſufficient quantity of ſpirit of wine is to be poured on theſe, and the veſſel being well cloſed, the whole is to ſtand ſome time in digeſtion; during this time, the ſpirit charges itſelf with a vaſt quantity of the eſſential *oil* of the bark, and being carefully diſtilled in balneo Mariæ, it brings over with it a great deal incorporated in itſelf, but, beſide that, there is a large portion ſwimming on the ſurface of the ſpirit, and eaſily ſeparable from it in the common way: this is as clear, pellucid, and thin, as the ſpirit itſelf, and is, in all reſpects, ſuperior to the eſſence made by any other means. The ſpirit of wine may be ſaved for a ſecond operation of the ſame kind, and there will then be no loſs from it; for being already ſated with as much of the *oil* as it naturally abſorbs, it will take in no more by the ſame means, and therefore may ſerve for ever ſo many new diſtillations, without loſs. If all the *oil* be finally deſired to be ſeparated from the ſpirit, it may eaſily be obtained by mixing the ſpirit with a large quantity of water, as is done in making the *oil* of ſpike. The *oil* will then ſwim at top, and the ſpirit may be ſeparated again from the water by diſtillation.

Some of the eſſential *oils* are ſo abundantly charged with ſalts, that in long keeping, they will actually depoſit plain concretions of the ſaline kind.

The *oils* of plants have not always the ſame taſtes with the plant they are diſtilled from, or, at leaſt, not in the ſame degree. Nothing is more bitter than wormwood, yet the *oil* of wormwood has no remarkable bitterneſs. Aniſe, which is of a ſweet taſte, yields, on the contrary, an *oil* infinitely more ſweet than the ſeed; and pepper, which is ſo remarkably hot and acrid, affords an *oil* no way remarkable for its pungency. Thyme, which is in itſelf very acrid and pungent, conveys that property, in a yet greater degree, to its *oil*; there is, indeed, no eſſential *oil* ſo acrid and fiery as that of this plant. The fetid *oils* drawn in dry diſtillation by the retort, in an open fire, no way differ from theſe but by the damage the fire has done them, and may always be converted into theſe by repeated diſtillations. Nay, the very fat *oils*, ſuch as that of almonds, may be attenuated ſo far as to become as fine, and as ſubtile, as the eſſential *oils*. This is to be done by means of quick-lime; and ſeveral repeated diſtillations of this *oil* or any other of a like kind, with freſh lime to every diſtillation, will reduce it to be volatile, penetrating, and capable of being raiſed, and diſtilled, by means of water, which is the great teſt of the eſſential *oils*. The bituminous, and fetid *oils*, may alſo, in the ſame manner, be reduced, by repeated diſtillations to the ſtate of the eſſential ones, and to be equally fluid and limpid, and equally penetrating. Memoirs Acad. Par. 1721.

The eſſential *oils* of vegetables may be divided into two claſſes, according to their different ſpecific gravities, ſome floating upon water, and others readily ſinking to the bottom thereof. Thus the eſſential *oils* of cloves, cinnamon, and ſaſſafras, readily ſink, but the *oils* of lavender, marjoram, mint, &c. ſwim upon the water. The lighteſt of all the eſſential *oils* is, perhaps, that of citron peels, which even floats on ſpirit of wine: and the heavieſt of them ſeems to be the *oil* of ſaſſafras.

For the obtaining the full quantity of the more ponderous *oils* from cinnamon, cloves, ſaſſafras, &c. it is proper 1. To reduce the ſubjects to fine powder. 2. To digeſt this powder for ſome days in a warm place, with thrice its quantity of ſoft river water, made very ſaline with the addition of ſea ſalt, or ſharp with oil of vitriol. 3. To uſe the decoction left in the ſtill, inſtead of common water, for a freſh digeſtion. 4. To uſe alſo, for the ſame purpoſe, the water of the ſecond running, after it has been cleared of its *oil*. 5. Not to diſtil from too large a quantity of the ſubject at once. 6. To leave a conſiderable part of the ſtill empty. 7. To uſe a briſk fire, or a ſtrong boiling heat at firſt, but to ſlacken it a little afterwards. 8. To have a low ſtill head, with a proper internal lodge, and current, leading to the noſe of the worm. And, 9. To cohobate the water, or pour it back upon the matter in the ſtill, after ſeparating its *oil*, and repeating this once or twice more.

The vegetable world affords vaſt variety of eſſential *oils*, moſt of them very odorous, and of great virtues; but different vegetables yield *oils* of different conſiſtence, and in different quantities.

The eſſential *oils* of many of the plants uſually diſtilled have their peculiar reſervoirs in the plant. M. Geoffroy, perceiving this, determined to ſearch for them through the different parts of the plants, and enquire into the reaſon of ſeveral precautions which are always found neceſſary, in order to ſucceed in the diſtillation of them. See OIL-*bladders*, infra.

Eſſential *oils* are, in general, the moſt inflammable of all *oils*, and they unite more eaſily with acids than the ſweet *oils*, which are not volatile.

Theſe *oils* are employed in painting, in ſpirituous liquors uſed at the table and at the toilette, in perfumes, and in medicine. As they act very powerfully, ſmall doſes, as from one drop to four or five, incorporated with ſugar, muſt be given internally. They are recommended as cephalic and antiſpaſmodic, in convulſive and hyſterical affections: they are alſo ſtimulant, ſudorific and ſtrengthening. All drugs which are alexipharmic, cephalic, tonic, and ſtomachic, containing vegetable aromatic, derive their virtues from the eſſential *oils* of theſe vegetables. The ſame may be ſaid of all medicinal, aromatic and ſpirituous waters. In ſome caſes, eſſential *oils* are employed externally, as ſtrengtheners, and to allay painful ſpaſms of nervous and tendinous parts, to reſolve and diſſipate acrid humours, which occaſion pain, without any ſenſible inflammation; but they muſt not, on account of their cauſtic quality, be uſed alone, but formed into liniments or pomatums, by mixing them with a ſufficient quantity of fat, or fat *oils*. Dict. Chem. art. *Eſſential* OILS. When applied to the human body, they ſtimulate, corrode, and reſiſt, putrefaction; and mixed with the blood raiſe ſome degree of fever. Med. Eſſ. Edinb. vol. v. art. 24.

As many of the eſſential *oils* are dear, it is a very common practice to adulterate, or debaſe them ſeveral ways, ſo as to render them cheaper both to the ſeller and the buyer. Theſe ſeveral ways ſeem reducible to three general kinds, each of which has its proper method of detection. Theſe three ways are, 1. To adulterate them with expreſſed *oils*. 2. With alcohol. And, 3. With cheaper eſſential *oils*.

If any eſſential *oil* be adulterated with an expreſſed *oil*, it is eaſy to diſcover the fraud, by adding a little ſpirit of wine to a few drops of the ſuſpected eſſential *oil*, and ſhaking them together; for the ſpirit will diſſolve all the *oil* that is eſſential, or procured by diſtillation, and leave all the expreſſed *oil* that was mixed with it untouched.

If an eſſential *oil* be adulterated with alcohol, or rectified ſpirit of wine, it may be done in any proportion, up to that of an equal quantity, without being eaſily diſcoverable either by the ſmell, or taſte. The way to diſcover this fraud is to drop a few drops of the *oil* into a glaſs of fair water; and if the *oil* be adulterated with ſpirit, the water will immediately turn milky, and by continuing to ſhake the glaſs, the whole quantity of ſpirit will be abſorbed by the water, and leave the *oil* pure at top. Shaw's Lectures, p. 145.

Finally, if an eſſential *oil* be adulterated by a cheaper eſſential *oil*, this is commonly done very artfully: the method is to put fir-wood, turpentine, or *oil* of turpentine into the ſtill, along with the herbs to be diſtilled for their *oil*, ſuch as roſemary, lavender, origanum, &c. and, by this means, the *oil* of turpentine diſtilled from theſe ingredients comes over in great quantity, and is intimately blended with the *oil* of the genuine ingredient. The *oils* thus adulterated always diſcover themſelves in time, by their own flavour being overpowered by the turpentine ſmell; but the ready way to detect the fraud is to drench a piece of rag, or paper, in the *oil*, and hold it before the fire; for thus the grateful flavour of the plant will fly off, und leave the naked turpentine ſcent behind.

OIL, *fern*. See FERN.

OIL, *granulated*, is that fixed in little grains; this is the beſt, and moſt eſteemed, eſpecially of *oils* of olives.

OIL, *green*, *oleum viride*, a form of medicine preſcribed in the late London Pharmacopœia, and made in the following manner; take leaves of bay, rue, marjoram, ſea-wormwood, and chamomile, each three ounces; *oil* of olives, a quart. Boil the herbs in the *oil* till they are criſp, and then ſtrain off the *oil*; and when it has ſtood for the fæces to ſubſide, put it up for uſe.

OIL *inflammable with acids*. See INFLAMMABILITY.

OIL *of juniper*. See JUNIPER.

OIL *of lavender*. See LAVENDER.

OIL *of lead*, is a ſolution of ſalt of LEAD in the eſſential *oil* of turpentine. This preparation is a powerful antiſeptic.

OIL *of lemon*, called the eſſence of *lemon*. See LEMON.

OIL *of linſeed*. See FLAX and LINSEED.

OIL *of mace*. See MACE.

OIL *of marjoram*. See MARJORAM.

OIL, *medullary*. See MEDULLARY.

OIL *of mercury*, a ſolution of corroſive ſublimate in ſpirit of urine. See MERCURY.

OIL *of mint, muſtard, myrrh, nut, nutmeg*. See the ſeveral ſubſtantives.

OIL *of olives*, is the moſt popular, and moſt univerſal of all other; being that chiefly uſed in medicine, in foods, ſallads, and in the manufactures.

It is drawn from olives by preſſes or mills made for the purpoſe. The fruit is gathered when at its utmoſt maturity, in December and January, as it begins to redden: being put under the mill, as ſoon as gathered, it yields that *oil* ſo very ſweet, and of ſo charming an odour, called *virgin-oil*. But, as the olives newly gathered yield but little *oil*, thoſe who rather regard quantity than goodneſs, leave them on the ground for ſome time before they preſs them. See OLIVE.

Neither the ſmell nor taſte of the ſecond *oil* is very agreeable; though there is a third kind ſtill worſe, which is the common *oil* procured by throwing boiling water on the preſſings, and re-preſſing them more ſtrongly.

The conſumption of this *oil* is incredible; the ſouth parts of France, Provence, Languedoc, &c. as alſo Candia, ſome parts of Italy, &c. yield vaſt quantities. Its uſe every body knows; it being reputed one of the moſt univerſally uſeful things in the whole world.

In order to prevent this *oil* from growing rancid, ſome ſea-ſalt is added, which not being diſſoluble in the pure *oil*, imbibes the water and mucilaginous parts, and ſinks with them to the bottom. It does not differ materially from the other flavourleſs expreſſed *oils*; but it is preferred to them for dietetic uſes; and in plaſters and unguents, though more rarely employed as an internal medicine.

OIL, *palm*, or OIL *of Senegal*, a thick unctuous liquor, of a yellow colour, and a violet ſmell; ſo called, becauſe drawn, by ebullition, or by expreſſion, from the fruit of a kind of palm-tree, growing in ſeveral places of Africa, eſpecially in Senegal.

The Africans uſe this *oil* as we do butter; and burn it in their lamps when old. With us, it is only uſed in ſome external applications, for pains and weakneſs of the nerves, cramps, ſprains, and other ſuch complaints. The common people ſometimes apply it to chilblains; and when uſed early, not without benefit. It is ſometimes counterfeited with wax, *oil* of olives, iris, and turmeric; but the trick is found out either by air or fire. The air alters the colour of the genuine, and leaves the counterfeit unchanged: and, on the contrary, fire changes the counterfeit, but does not alter the genuine.

OIL *of Jamaica pepper*. See PIMENTO.

OIL *of petrol*. See NAPHTHA and PETROLEUM.

OIL *of black pitch*. See PITCH.

OIL *of poppy*. See POPPY.

OIL, *red*, in the *Porcelain Manufacture*, a name given to a peculiar colour uſed on the china ware, or to thoſe pieces of the ware which are coloured with it. It is a very elegant ornament, and would be worthy our attempting to imitate in England, on our better ſorts of wares. They do it in the following manner: they mix the red colour, called *tam-lun-hum*, or the copperas red (ſee PORCELAIN) with OIL *of ſtone*, and with another *oil*, as they expreſs it, of the ſame kind, made of a whitiſh ſort of pebble, or agate, found on the ſhores of their rivers, and the place of which might probably be ſupplied with us by common cryſtal. The powder is to be thoroughly mixed with theſe liquors, and the veſſel dipt carefully into the mixture, or ſome parts of it only covered with it in figures: after this, it is to be ſet by to dry, and, when thoroughly dried, it is to be baked in the common way. The general method is that of covering the veſſel all over, both inſide and out, with this red; and it comes out of the moſt bright and brilliant colour imaginable, but it will not ring when ſtruck upon, as our common china ware does. We ſeldom ſee this in any degree of perfection, but it is very elegant when fine.

OIL, *rock*. See PETROLEUM.

OIL, *roſemary*. See ROSEMARY.

OIL *of ſage*. See SAGE.

OIL *of ſaſſafras*. Many of the vegetable *oils* obtained by diſtillation, will be found, under certain circumſtances, to approach to camphor. The *oil* of thyme may be cryſtallized, according to a proceſs of Mr. Newmann's, who calls it, in that, *camphora thymi*. Phil. Tranſ. Nº 479.

The *oil* of ſaſſafras is peculiarly liable to cryſtallization in certain circumſtances, and that into the moſt beautiful forms. Mr. Maud gives an account of a quantity of this *oil*, which having ſtood expoſed to the air in a very froſty night, in an open veſſel, was in the morning found changed three parts in four of it into very beautiful and large cryſtals: they were of an hexagonal form, very tranſparent, and of three or four inches in length, and half an inch in thickneſs. Theſe cryſtals ſubſided in water, and were indiſſoluble in it; they were readily inflammable at the fire, and were reduced by heat to their priſtine fluid ſtate: hence it is evident that they ſtill retain the natural qualities of an *oil*, though they appear under ſo very different a modification of their parts. What is moſt remarkable in this change, is, the metamorphoſis of a fluid to a ſolid body, of ſo determinate and regular a figure, and that theſe cryſtals ſhould be perfectly clear and colourleſs, though the liquor from which they froze was of a yellowiſh colour, not unlike that of Madeira wine.

This ſeems to afford a new inſtance of cryſtallization, which is generally accounted for by the particles of a fluid, or thoſe of any other body ſuſpended in a fluid, being brought nearer by cold, and, at length, coming within the ſphere of each other's attraction, and uniting together into an immediate contact. This *oil* being a very heavy fluid, much heavier than water, is the more likely thus to unite, as its parts are nearer together. This may be a hint to the curious to diſcover wherein conſiſts the difference of ſolidity and fluidity; and it likewiſe ſhews how much the colour of bodies depends upon the mechanical ſituation of their parts.

OIL, *ſtillatitious*. See STILLATITIOUS.

OIL *of ſtone*. In the manufacture of the Chineſe porcelain, they uſe a liquid matter of a white colour, which they call by this name, on which their great myſtery of finiſhing their work depends; yet this has been leſs enquired into by the imitators of that ware in Europe than many other articles of leſs conſequence. The ſtone of which this *oil* is made, is of the ſame degree of hardneſs with that which the petunſe is prepared of. They procure it from quarries, and chuſe ſuch as is of a good white colour, and has many dark green ſpots in it.

Theſe ſpots are of the colour of the leaves of cypreſs. Sometimes a ſtone is choſen which has a brown ground, variegated with ſpots and blotches of a reddiſh colour. They firſt carefully waſh this ſtone; then laying it in a clean place, they break it to pieces with iron inſtruments, and afterwards grind theſe to a perfectly fine and impalpable powder, by rubbing them in large mortars, with peſtles of ſtone faced with iron, and turned either by the labourers, or by water. When the whole is thus reduced to a fine powder, they throw it into a veſſel of water; and ſtirring it briſkly about, they let the coarſer part ſubſide to the bottom, and there ſwims a fine thick matter like cream, for two or three inches depth on the ſurface. This they carefully ſcum off, and putting it into another veſſel, of clear water, they let it throw down any coarſe matter it may yet contain; and, finally, taking off the thick ſurface again, they mix this with ſome freſh water in another veſſel, and leave it to ſubſide; then pouring on the clean water, they take out the remainder at the bottom of the veſſel, which is perfectly fine, and reſembles a thick cream. To every hundred pounds of this they add one pound of a ſubſtance of the nature of which we are not yet perfectly informed. It is ſaid to be a mineral reſembling alum. They calcine this firſt, and then beat it to a fine powder; and this being added to the cream, or *oil*, as it is called, ſerves to keep it always in the ſame liquid ſtate. This ſubſtance, when finiſhed in this manner, has very little title to the name of an *oil*; it is rather a varniſh, and is always uſed in mixture with another varniſh, which is called at this time fern *oil*, and uſed to be called lime *oil*; it is prepared in the ſame manner with the other after burning. See FERN-*oil*.

OIL *of ſulphur* is a name given to the concentrated acid of SULPHUR.

OIL *of tartar*. See TARTAR.

OIL, *train*. See *Whale* FISHERY, and TRAIN.

OIL *of Venus*, a name given by Lemery to the ſalt formed by the union of copper with the nitrous acid, when it is reſolved into a liquor by the moiſture of the air. This is a cauſtic and eſcharotic.

OIL, *virgin*, is underſtood of *oils* expreſſed from olives, nuts, &c. freſh gathered, without being heated, too much preſſed, &c. See OIL *of olives*.

OIL *of vitriol*. See VITRIOL.

OIL *of wax*. See WAX.

Oil frequently takes new names from the drugs mixed with it; as *oil of roſes*, which is that mixed with roſes; *oil of jeſſamy*, that perfumed with jaſmin.

OIL *anointing with*. See UNCTION.

OIL-*bag*, a veſſel in birds, replete with an unctuous ſubſtance, ſecreted by one, ſometimes two glands, for the purpoſe, diſpoſed among the feathers; which, being preſſed by the bill or head, emits its *oily* matter, for dreſſing and pruning the feathers.

OIL *beetle*. See *Oil* BEETLE.

OIL-*bladders*, in *Plants*. It is a diſcovery, partly of Mr. Tournefort, and partly of Mr. Geoffroy, that the eſſential *oils* of all plants are contained in their perfect and pure ſtate, in the plant themſelves, while growing; they have, in different vegetables, different parts aſſigned for their reception; in ſome the flower; in others, the flower cup only, as in roſemary, and the like; in others the bark; in ſome, the parenchyma of the root; and in others, the wood.

Wherever they are lodged, they are always contained in theſe veſicles, or capſules, which require only to be broken, or burſt open, in order to ſet them looſe; this is effected by the boiling water in the common diſtillations, and the natural ſubtilty and lightneſs of the *oil* then makes it eaſily riſe in vapour, and its oleaginous quality rendering it incapable of mixing with the water, it ſwims at the top, and is eaſily ſeparated.

Theſe veſicles are moſt uſually placed in or about the flower; and it is in many plants a very eaſy matter to trace them to their ſeveral places of principal reſidence. Mr. Tournefort has obſerved that theſe *oil-bladders* in the fraxinella, taking their origin at the root, thence aſcended to to the fruit, or covering of the ſeeds. This plant has a very remarkable variety in its *oil* in the different parts. The flower is ſweet-ſcented; the veſicles placed along the ſtalk contain a very ſharp and acrid *oil*, ſomewhat reſembling the eſſence of lemons, when kept a long time. The leaves have ſcarce any ſenſible odour, but the root has a ſcent peculiar to itſelf, and different from that of all the reſt of the plant. Geoffroy, ap. Memoires Acad. Paris, 1721.

The eſſential *oil* of cinnamon has alſo a difference of the ſame kind, which is owing to the different fluid contained in the veſicles in different parts; the bark of the root yields an *oil*, which, after keeping ſome time, always yields a pure and genuine camphor; whereas the *oil* of the bark from other parts of the tree has nothing of this property.

It is alſo eaſy to obſerve, that the capſules of certain fruits have more odour than the fruits themſelves. The coat which covers the piſtachia nut, contains much more eſſential *oil* than its kernel; and the bark which ſurrounds the amomum, and cardamoms, has much more ſmell than the kernel of the ſeed. The firſt bark of the nutmeg is well known to have a more fragrant ſmell than the nutmeg itſelf, being the mace; yet there is, within this, another covering of that fruit, which has no ſcent at all.

Moſt of the ſeeds of the umbelliferous plants, which uſually paſs for aromatics of the firſt and moſt eminent kind, have, in reality, no ſmell at all in themſelves; the *oil-bladders* which yield their virtues being placed in their outer covering, the kernel within the ſeed uſually containing a fat *oil* of the olive or almond kind, and wholly different from the eſſential. The *oil* of aniſeed made by expreſſion is fluid, of a green colour, and of a fatty nature, but is highly ſcented with the *oil* which it has taken with it from the covering: on the contrary, the eſſential *oil* procured from the ſame ſeed by diſtillation, is thin, not fatty, of a much more clear and penetrating ſcent, of a pale colour, with no admixture of greenneſs, and readily concretes into a maſs like butter on external cold. In coriander ſeed, the kernel carefully ſeparated from its membranes has no ſmell, and contains only a fatty *oil*, like that of the olive, while the veſicles are all ranged in the rind, and therefore in that alone is the aromatic ſmell. Theſe veſicles in the ſkin of fruits are the occaſion of the ſweet flavour of many; as of the ſtrawberry, raſpberry, and the like; in theſe they are too ſmall to be diſtinguiſhable, while, in the thicker rinds of the orange and lemon kind, they are eaſily diſcerned, and on the leaſt preſſure, burſt, and throw out their contents, which make what we call the *zeſt*, and which is ſeparated in this manner in greateſt quantity in hot countries; and where there are plenty of the fruit, is preſerved under the name of *bergamot*, and other eſſences of a like kind.

There is, however, no ſubject in the vegetable world in which theſe veſicles are more plainly perceived than in the berries of the juniper, a fruit very well known, and in conſtant uſe with us. Theſe berries are firſt green, afterwards of a reddiſh brown, and finally black, and they are two years in coming to maturity. The berry is formed at the top, in the manner of a bud of the roſe, or piony, which is juſt ready to open: and it ſometimes does open into four or five parts, according to the number of ſeeds it contains. It contains, beſide theſe, an acrid, a ſweet, and an aromatic juice, which leaves a ſenſible bitterneſs behind it in the mouth.

In order to account for theſe ſo different taſtes in the ſame fruit, Mr. Geoffroy attributes its acrid quality to the ſkin, or huſk, and in ſome berries, indeed, to the unripeneſs of the whole, for want of a due heat of the weather; the ſweet taſte is from the juice of the fruits, which is properly a ſaccharine or melleous liquor, and the aromatic flavour is wholly owing to the *oil* which is lodged in the veſicles expanded over the whole inner ſubſtance of the fruit. Theſe ſubſtances are indeed ſo determinately marked in the berry, that it is poſſible to ſeparate them; but theſe are not all the differences of taſte and matter in this little fruit, every kernel of which has in it five or ſix veſicles, lodged each in a peculiar and appropriated cavity, in the external part of the ſeed. Theſe are eaſily ſeparated from the reſt of the fruit, and when that is dry, are found to contain an abſolute reſin; they are of a duſky colour, and each drop of reſin in them is of an oval figure, and is very bitter to the taſte; hence therefore is the remarkable bitterneſs that affects the mouth, when the berry is thoroughly broken by the teeth.

The knowledge of this may be of great uſe to the apothecary in his medicinal preparations of juniper berries of ſeveral kinds. When he wants only the extract, which is the melleous juice of the berries alone, they ought not to be ſtamped or bruiſed, to diſlodge their reſin, which has no buſineſs there, but ſhould be only boiled, and the decoction inſpiſſated. But when the eſſential *oil* is required, the whole berry muſt be bruiſed, and that in a thorough manner, that all its kernels may be broken. The cells, or veſicles of *oil*, now indurated into a reſin, burſt open, and the whole diſperſed in ſuch a manner that the water may affect it. Memoires Acad. Par. 1721.

In order to diſcover what are the parts of a plant in which the eſſential *oil* moſt abounds, it will be proper to examine what part yields the moſt ſmell; and this will be found different in different plants. In ſome the ſeat of odour occupies the whole body of the flower; in others only ſome particular part of the flower has it; and in ſome it is principally lodged in the covering; and in ſome it is diſperſed every way, through the body of the fruit. In ſome inſtances it is found lodged in other parts of the plant, and ſometimes it is equally ſtrong in every part of it.

This principle of the eſſential *oil* varies alſo not only in regard to the place where it reſides, but in the different ſcents it yields in different places: or in the ſame parts of the plant in different ſeaſons.

It is to be obſerved in the ſweet-ſcented woods, that the place where the reſin is collected in greateſt quantities, is in the knots from which young branches are to riſe; this is very eaſily obſervable in the firs and juniper. This is not, however, the caſe in all the reſinous woods; for ſome of theſe abound ſo in reſin, that their ſeveral woody beds, or layers, are all connected to one another by beds of reſin; as is the caſe in guaiacum, in the calambac wood, and that of aloes. And this is more peculiarly remarkable in the laſt: for in the fineſt wood of this kind, ſent from the Eaſt Indies, the woody parts are ſtript away, and only theſe reſinous beds are left remaining; and, conſequently, while the coarſer and cheaper ſorts burn like our woods to a charcoal, this precious kind melts upon the fire like a true reſin, and is the fineſt ſcented ſubſtance imaginable.

In all the reſinous woods, the young ſhoots of the tree are to be preferred for the extraction of the eſſential *oil*. This is well known to thoſe who traffic largely in this way; and even the liquid balſams, of which enough cannot be obtained by inciſion, may be thus procured: they boil the tops of the branches, and the young ſhoots, in water, and collect, from the ſurface of that liquor, the fluid balſam which the boiling has ſeparated from the ſhoots, and which cannot mix with it. See *Eſſential* Oil.

Oil *dregs*. See Dregs.

Oil, *gilding in*. See Gilding.

Oil-*mill*. See Mill.

Oil, *painting in*. See Painting.

Oil-*ſtone*, *cos olearia*, in *Natural Hiſtory*, is a ſtone of a whitiſh colour, with a faint mixture of a bluiſh grey; and it is ſometimes ornamented with black ſpots and dendritæ. It is of a moderately fine and compact texture, hard and heavy, and capable of a tolerable poliſh. It is not acted upon by acids, gives fire very freely with ſteel, and when burnt, acquires a pure white colour. This ſtone has not yet been found in England; but in the eaſtern parts, and in Germany, there are large ſtrata of it. It is much uſed by our artificers for ſetting a fine edge on their tools, and is only uſed with *oil*, which by degrees changes its colour to a deep brown. They call it the Turkey-ſtone. De Coſta's Hiſt. of Foſſils, p. 153.

OILY *grain*, *ſeſamum*, in *Botany*, a genus of the *didynamia angioſpermia* claſs. Its characters are theſe: the flower has an erect, permanent empalement, cut at the top into five very ſhort equal parts; the flower has one ringent petal, with a roundiſh tube, the length of the empalement; the chaps are ſwollen, bell-ſhaped; the brim is cut into five points, four of which are almoſt equal; the other is twice their length; it has four ſtamina riſing from the tube, which are ſhorter than the petal, the two inner being ſhorter than the other, terminating by erect ſummits, and an oval hairy germen, ſupporting a ſlender ſtyle, longer than the ſtamina, crowned by a ſpear-ſhaped ſtigma, divided into two parts; the germen becomes an oblong almoſt four-cornered capſule, having four cells, filled with oval compreſſed ſeeds. Linnæus enumerates two, and Miller three ſpecies.

The *ſeſamum* with oblong entire leaves, called the Eaſtern fox-glove, is much uſed by the Egyptians and African Negroes, both as food and medicine. The Arabians call the expreſſed oil of the ſeeds *zeid taib*, that is, good oil, by way of eminence, becauſe it is of frequent uſe with meats; and in Egypt is ſold dearer than oil of olives. Parkinſon.

OILY *waters.* See WATERS.

OINTMENT, in *Pharmacy* and *Surgery*, &c. See UNGUENT.

OISEAU, in *Conchyliology*, the name of a peculiar ſpecies of oyſter, of ſo remarkable a figure, that it repreſents a bird, with its wings expanded, and has a ſmall protuberance at the hinge, repreſenting a head, and a long proceſs at the oppoſite end, which very well repreſents a tail. It is of a duſky reddiſh colour on the outſide, and of a fine pearly hue within. When the outſide of this ſhell is taken off, and it is nicely coloured, by cutting it down to a proper depth in every part, it is of a fine reddiſh yellow, and is the aurora ſhell of collectors.

OISTER, in *Zoology*. See OYSTER.

OKE, an Egyptian weight, conſiſting of three rotolos, each of twelve ounces, at twelve drachms to the ounce, and ſixteen carats to the drachm.

OKELAS, in Egypt, and ſome other of the eaſtern countries, are a ſort of indifferent buildings round a court, and commonly appropriated to the merchants of ſome particular country, with their goods; as at Cairo, there is one for the merchants of Nubia, and the black ſlaves, and other goods they bring with them; and another for white ſlaves from Georgia.

OKER. See OCHRE.

OLAX, in *Botany*, a genus of the *triandria monogynia* claſs. Its characters are theſe: the empalement is entire, and the flower funnel-ſhaped, and divided into three parts; the nectarium is compoſed of four leaves. There is only one ſpecies.

OLD *age*. See AGE, and LONGEVITY.

OLD *aſtronomy*. See ASTRONOMY.

OLD *ſtyle*. See STYLE.

OLD *ſubſidy*. See SUBSIDY.

OLD *impoſition of tonnage*. See DUTY.

OLD-*wife-fiſh*, a name by which a ſpecies of BALISTES is called in ſeveral of our plantations. See ACARAUNA.

OLD-*wife* is alſo a name given to the *wraſſe*, a ſpecies of LABRUS.

OLD *works*, in *Mining*, are ſuch that are either fallen in, or ſtand unwrought.

OLDENLANDIA, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe: the empalement of the flower is permanent, ſitting upon the germen; the flower has four oval petals, which ſpread open, and four ſtamina, terminated by ſmall ſummits; it hath a roundiſh germen, ſituated under the flower, crowned by an indented ſtigma; the germen afterwards turns to a globular capſule, with two cells, filled with ſmall ſeeds. We have but one ſpecies of this plant in the Engliſh gardens. Linnæus enumerates ſix ſpecies.

OLEA, in *Botany*. See OLIVE-*tree*.

OLEA is alſo the name of a ſtone deſcribed by Ludovicus Dulcis, and ſome other ſuch authors, who attribute great virtues to it, and ſay it was variegated with ſeveral colours, as yellow, black, white, green, &c. It ſeems to have been ſome one of the common agates, to which their ignorance had prompted them to give a new name.

OLEA *Bohemica*, in *Botany*, a name by which ſome authors have called the *zizypha* or *zizyphus*, the wild *jujube* tree.

OLEAGINOUS, ſomething that partakes of the nature of oil; or out of which oil may be expreſſed.

Thus olives, nuts, almonds, &c. are *oleaginous* fruits, or fruits out of which oil is expreſſed.

Pines, firs, &c. are *oleaginous* woods, yielding reſin, turpentine, &c. Of all woods, *oleaginous* ones burn the beſt. An *oleaginous* urine in malignant fevers is a ſign of death.

OLEANDER, or ROSE-BAY, *nerium*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the empalement of the flower is permanent, and cut into five acute ſegments: the flower has one funnel-ſhaped petal, cut into five broad obtuſe ſegments, which are oblique; it hath a nectarium, terminating the tube, which is torn into hairy ſegments; it hath five ſhort awl-ſhaped ſtamina within the tube; it hath an oblong germen, which is bifid, with ſcarce any ſtyle, crowned, by ſingle ſtigmas; the germen afterwards turns to two long, taper, acute-pointed pods, filled with oblong ſeeds, lying over each other like the ſcales of a fiſh, and crowned with down. There are four ſpecies.

Theſe plants are generally propagated by layers in this country, for although they will take root from cuttings, yet that being an uncertain method, the other is generally purſued: and as the plants are very apt to produce ſuckers or ſhoots from their roots, thoſe are beſt adapted for laying; for the old branches will not put out roots: when theſe are laid down, they ſhould be ſlit at a joint, in the ſame manner as it is practiſed in laying of carnations. There are few plants which are equal to them, either to the ſight or ſmell, for their ſcent is very like that of the flowers of the white thorn; and the bunches of flowers will be very large if the plants are ſtrong.

It is called nerium, from *νηρος*, *neros*, *humid*, becauſe it grows in humid places. The plant itſelf has a force which is inſuperable; for its juice excites ſo great and violent an inflammation, as immediately to put a ſtop to deglutition; and if it be received into the ſtomach, that part is rendered incapable of retaining any thing, the pernicious drug exerting its force, and purging both upwards and downwards.

Nerium in qualities reſembles the apocynum. But when handled and examined upon an empty ſtomach, in a cloſe chamber, they cauſe a numbneſs coming by degrees, with a pain in the head, which ſhews that ſomething poiſonous belongs to the ſmell, though there is no danger, if it be received in the open air, as may be found upon trial. Antidotes againſt its poiſon are vinegar and all acids.

OLEARIA, in *Natural Hiſtory*, the name of a genus of round-mouthed ſea-ſnail, or COCHLEA *lunaris*. It is of a very large ſize, capable of holding two quarts, and had its name *olearia* from its being anciently uſed in families, as the veſſel in which they kept oil.

OLEASTER, in the *Materia Medica*, the name of the *ſallow thorn*, or *ſea buckthorn*, the *rhamnoides ſalicis folio* of botanical authors.

OLECRANUM, ωλεκρανον, in *Anatomy*, an eminence behind the bend of the elbow; being the part whereon the arm bears when we reſt on the elbow. See *Tab. Anat. fig.* 7. *n.* 11.

This eminence is nothing elſe but the poſterior apophyſis of the head of the ulna, which ſtays that bone, and prevents its ſlipping back; ſo as to form an acute angle when the arm is bent.

The *olecranum* is received into the hinder ſinus of the lower end of the humerus; and with the fore protuberance of the ulna, which is received into the fore ſinus of the humerus, it forms a perfect ginglymus, whereby the two bones move as on a hinge.

OLEOSUM *ſal volatile*. See SAL.

OLERON, *laws of*. The inhabitants of the iſland of *Oleron*, near the coaſt of Poictou, have been able mariners for ſix or ſeven hundred years paſt; ſo that they framed and drew up the laws of the navy or marine, which are ſtill called the laws of *Oleron*. See USES *and cuſtoms of the ſea*. Theſe laws, being accounted the moſt excellent ſea-laws in the world, are recorded in the Black Book of the admiralty.

OLEUM, *oil*. See OIL.

OLEUM *Medicum*, in the writings of the ancients, a name given to a famous oil which had a quality of burning under water, in ſpite of all that could be done to quench it. It was called *Medicum*, becauſe of its being produced among the Medes, and ſome have called it *oleum Medeæ*, becauſe it was ſuppoſed to be that ſubſtance with which Medæa anointed the crown of her rival. Ammianus Marcellinus tells us, that if an arrow was anointed with this oil, and ſhot out of a bow againſt any inflammable ſubſtance, the whole immediately took fire, and, if any one attempted to quench the flames by water, they only burnt the more fiercely for it. The *venenum Pharicum* of Nicander is ſuppoſed to be the ſame with this oil.

OLEUM *Medeæ*, a name given by the ancients to the mineral fluid, more generally known by that of NAPHTHA.

OLEUM *vitri antimonii*, in *Medicine*, a name given by Baſil Valentine, and others, to a famous preparation of antimony, which they keep as a ſecret, or at leaſt declare in ſuch terms as are unintelligible, and boaſt of, as the univerſal medicine. The learned Kerkring has given the proceſs for making this red oil of the glaſs of antimony, but that in ſo enigmatical a manner, that he ſeems himſelf not to expect any body to underſtand him; and only ſays, in his own juſtification, that he has given it in plainer terms than any body had done before him. The author relates many wonderful things of this diaphoretic oil, on his own experience; particularly, the curing a confirmed dropſy, by throwing off the water by ſweat; ſo that the patient, in a manner, ſwam in it, and the drops run through the bed, in all parts, to the floor. It were well if we could underſtand the proceſs.

OLFACTORY *nerves*, in *Anatomy*, the firſt pair of nerves ſpringing out of the medulla oblongata; ſo called as being the immediate inſtruments of ſmelling. See *Tab. Anat. (Oſteol.) fig.* 5. *lit. h. h.*

The ancients called them *proceſſus papillares*; which Dr. Drake thinks a more ſuitable name, till their arrival at the os cribroſum, becauſe they rather appear productions of the medulla oblongata than diſtinct nerves, againſt which, their manifeſt cavities, and their communication with the ventricles, argue.

The *olfactory nerves* have their riſe juſt below the os frontis, and, as ſoon as they have made their way through the os cribroſum, are diſtributed among the membranes of the noſe.

OLIBANUM, in *Pharmacy*, a kind of gum reſin, uſually called *male* FRANKINCENSE.

It has its name *olibanum*, *quaſi oleum Libani*; becauſe diſtilled in form of an oil, from a tree growing on mount Lebanon.

OLIGACTIS, in *Natural Hiſtory*, a name given by Linkius, and others, to a genus of ſtar-fiſh, conſiſting of thoſe which have fewer than five rays.

OLIGAEDRA, in *Natural Hiſtory*, the name of a genus of CRYSTALS.

The word is derived from the Greek ολιγος, *a few*, and ἑδρα, *a plane*, or *ſide*, and expreſſes a cryſtal, which is compoſed of only a few planes.

The bodies of this claſs are cryſtals of the imperfect kind, being compoſed of columns affixed irregularly to ſome ſolid body at one end, and, at the other, terminated by a pyramid; but the column and pyramid being both pentangular, the whole conſiſts only of ten planes, not, as the common kind, of twelve. See *Tab. of Foſſils, Claſs* 3.

OLIGARCHY, formed from ολιγος, *few*, and αρχη, *government*, a form of government, wherein the adminiſtration is in the hands of a few perſons.

The ſtates of Venice and Genoa may be ranked among *oligarchies*.

Oligarchy amounts to much the ſame thing with ariſtocracy; unleſs perhaps the former imports a kind of defect or corruption; as if the ſovereign power were monopolized by a few perſons, in prejudice of the rights of a great number.

OLIGOTROPHEROS, among the Greeks, a name given to the finer ſort of bread made of the fineſt flour.—They called it by this name becauſe of the little ſhare of nouriſhment it conveyed; and by way of diſtinction from it, called the brown bread *polytropheros*, or *much nouriſhing*.

OLIO, or OGLIO, a ſavoury diſh, or food, compoſed of a great variety of ingredients; chiefly found at Spaniſh tables.

The forms of *olios* are various. To give a notion of the ſtrange aſſemblage, we ſhall here add one from an approved author.

Take rump of beef, neats tongues boiled and dried, and Bologna ſauſages; boil them together, and, after boiling two hours, add mutton, pork, veniſon, and bacon, cut in bits; as alſo turneps, carrots, onions, and cabbage, borage, endive, marigolds, ſorrel, and ſpinach; then ſpices, as ſaffron, cloves, mace, nutmeg, &c. This done, in another pot put a turkey or gooſe, with capons, pheaſants, wigeons, and ducks, partridges, teals, and ſtock-doves, ſnipes, quails, and larks, and boil them in water and ſalt. In a third veſſel, prepare a ſauce of white wine, ſtrong broth, butter, bottoms of artichokes, and cheſnuts, with cauliflowers, bread, marrow, yolks of eggs, mace, and ſaffron: laſtly, diſh the *olio*, by firſt laying out the beef and veal, then the veniſon, mutton, tongues, and ſauſages, and the roots over all; then the largeſt fowls, then the ſmalleſt, and laſtly pour on the ſauce.

OLITORY, a kitchen-garden, or a garden of herbs, roots, &c. for food. See GARDEN, SALLET, &c.

OLIVARIA, *corpora*, in *Anatomy*, are two protuberances in the under part of the brain, placed on each ſide the corpora pyramidalia, towards the lower end; having their name from their figure, which reſembles that of an olive.

OLIVE *tree*, *olea*, in *Botany*, a genus of the *diandria monogynia* claſs. Its characters are theſe: it has a ſmall tubulous empalement of one leaf, cut into four ſegments at the top; the flower conſiſts of one petal, which is tubulous, cut at the brim into four ſegments; it has two ſhort ſtamina, terminated by erect ſummits, and a roundiſh germen, ſupporting a ſtrong ſingle ſtyle, crowned by a thick bifid ſtigma; the germen afterwards turns to an oval ſmooth fruit or berry, with one cell, encloſing an oblong oval nut. Miller reckons five, and Linnæus three ſpecies.

In Languedoc and Provence, where the *olive tree* is greatly cultivated, they propagate it by truncheons, ſplit from the roots of the trees; for as theſe trees are frequently hurt by hard froſts in winter, ſo when the tops are killed, they ſend up ſeveral ſtalks from the root; and when theſe are grown pretty ſtrong, they ſeparate them with an axe from the root; in the doing of which they are careful to preſerve a few roots to the truncheons; theſe are cut off in the ſpring after the danger of the froſt is over, and planted about two feet deep in the ground, covering the ſurface with litter or mulch, to prevent the ſun and wind from penetrating and drying the ground: when the plants have taken new root, they are careful to ſtir the ground, and deſtroy the weeds.

Theſe trees will grow in almoſt any ſoil, but when they are planted in rich moiſt ground, they grow larger and make a finer appearance than in poor land; but the fruit is of leſs eſteem, becauſe the oil made from it is not ſo good as that which is produced in a leaner ſoil. The chalky ground is eſteemed the beſt for theſe trees, and the oil which is made from the trees growing in that ſort of land is much finer, and will keep longer than the other.

In the countries where the inhabitants are curious in the making of their oil, they are frequently obliged to get truncheons of the ordinary ſorts of *olives* to plant; but after they have taken good root, they graft them with that ſort of *olive* which they prefer to the others. In Languedoc, they chiefly propagate the cormeau, the ampoulan, and moureau, which are three varieties of the firſt ſpecies, or Provence *olive* with a ſmaller oblong fruit; but in Spain the ſecond ſort, or Spaniſh *olive* with the largeſt fruit is generally cultivated, where they have more regard to the ſize of the fruit, and the quantity of oil they will produce, than to their quality. In England the plants are only preſerved by way of curioſity, and are placed, in winter, in the green-houſe, for variety. Miller.

The oil is preſſed out from the *olives*, which are laid together awhile to wither; and then ground in a mill; and having hot water poured on them, they are preſſed out, the water ſubſiding, and the oil ſwimming on the top. What is drawn from the unripe *olives* is called omphacinum, and is accounted drying and reſtringent, and fitter for ſome external remedies: what is preſſed out of the ripe fruit is called OIL of *olives*, being what is generally eaten, and made uſe of in medicine; the different fineneſs being from the different care and management in the making it. The ſweeteſt, and what we eſteem moſt, comes from Provence.

The oil is moderately heating and mollifying, rendering the body lax and ſoluble; it is good for diſorders of the breaſt and lungs, tempering the ſharp choleric humours in the bowels, and ſo helps griping and the colic; and is uſeful againſt all corroſive mineral poiſons, as arſenic and ſublimate, &c. It opens the urinary paſſages, and is good for the ſtone and gravel. The pickled *olives* are grateful to the ſtomach, and are ſuppoſed to promote appetite and digeſtion: the ripe ones are more eaten in the eaſtern countries among the Greeks, being great part of their food, eſpecially in Lent.

There are three kinds of *olives* frequently ſold, different in ſize and goodneſs; viz. thoſe of Verona, thoſe of Spain, and thoſe of Provence.

The *olives*, while on the tree, are intolerably bitter, without any thing of that delicious taſte, which procures them admittance at the richeſt tables. To fit them for that, they muſt be prepared as follows:

OLIVES, *curing or pickling*. In the months of June and July, long before the *olives* are fit to yield their oil, they are gathered, and laid to ſteep ſome days in freſh water; when taken out, they are put in a ley made of water prepared with barilla or kali, with aſhes of olive ſtones calcined; or at leaſt with lime.

They are next laid in a liquor of water and ſalt, with which they are put into thoſe little barrels, wherein they are brought to us. To give them the flavour, they throw over them an eſſence uſually compoſed of cloves, cinnamon, coriander, and fennel.

This eſſence is a kind of ſecret among thoſe who deal herein; and in effect it is in this that all the difficulty of the preparation lies.

OLIVE *gum*. See GUMMI *olivæ*.

OLIVE, *ſpurge*. See SPURGE *laurel*.

OLIVE, *wild*, *olæagnus*, in *Botany*, a genus of the *tetrandria monogynia* claſs. Its characters are theſe: the flower has a bell-ſhaped empalement of one leaf, which is quadrifid, rough on the outſide, but coloured within; it has no petals, but four ſhort ſtamina, which are inſerted in the diviſions of the empalement; at the bottom is ſituated a roundiſh germen, which becomes an obtuſe oval fruit, with a puncture at the top encloſing an obtuſe nut. There are three ſpecies, natives of the Eaſt. Miller.

Olive, *Barbadoes wild*, *bontia*, in *Botany*, a genus of the *didynamia angioſpermia* claſs. The flower hath a ſmall erect empalement, which is quinquefid and permanent; it is of the ringent kind, gaping at the brim; the upper lip is erect, the lower lip trifid and turning backward; it has four ſtamina, two of them longer than the other; and in the centre is ſituated an oval germen, which becomes an oval berry with one cell, including a nut of the ſame form. We have but one ſpecies.

This plant is greatly cultivated in the gardens of Barbadoes, for making hedges; than which there is not a more proper plant to thrive in ſuch hot countries, it being an evergreen, and of quick growth. Theſe plants being ever green, and growing of a pyramidal form, make a pretty variety in the ſtove among other exotics.—Miller.

Olive-*colour* is a yellow mixed with black.

The term is chiefly uſed in ſpeaking of the tincture of the complexion: the Spaniards and Indians are rarely white, generally *olive* complexioned.

OLOC, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to their *quail*. It is like our's in all reſpects, but much ſmaller.

OLOCENTROS, in *Natural Hiſtory*, a name given by the old Greeks to a ſmall animal of the ſpider kind, whoſe bite was accounted mortal. It is the ſame with the *ſolipuga*, ſo called from its ſtinging, or biting moſt violently, in places, or ſeaſons, where the ſun had the moſt power, as Africa, &c. The name *ſolifuga* was a corrupt way of writing that word, and this ſeems alſo a falſe way of writing the word HELIOCENTROS, which ſignifies the ſame as *ſolipuga*.

OLVAIDIA, in *Botany*, a name given by ſome authors to *chamomile*.

OLY, a word uſed by ſome chemical writers to expreſs the oily part of metals, ſeen, in ſome circumſtances, ſwimming upon the ſurface of their ſolutions.

OLYMPIAD, Ολυμπιας, in *Chronology*, a ſpace or period of four years; whereby the Greeks reckoned their time. See Epocha.

The Peloponneſian war began on the firſt year of the 87th *Olympiad*. Alexander the Great died the firſt year of the 114th; and Jeſus Chriſt was born on the firſt year of the 195th *Olympiad*.

The *Olympiads* were alſo called *anni Iphiti*, from *Iphitus*, who inſtituted, or at leaſt renewed, the ſolemnity of the Olympic games.

We do not find any computation by *Olympiads* after the 364th, which ended with the year of Chriſt 440. Except that in a charter of our king Ethelbert, the years of his reign are ſaid to be reckoned by *Olympiads*.

OLYMPICS, or **Olympic** *games*, were ſolemn games, which laſted five days, famous among the ancient Greeks; inſtituted, according to ſome, by Hercules, in honour of Jupiter, in the year of the world 2886, and re-eſtabliſhed by Iphitus, 372 years after this period; and held at the beginning of every fifth year, that is, every 50th month, on the banks of the Alpheus, near Olympia, a city of Elis; to exerciſe their youth in five kinds of combats.

Theſe games became ſo conſiderable, that the Greeks made them their epocha; diſtinguiſhing their years by the returns of the *Olympics*.

Thoſe who were conquerors in them, were ſo honoured by their countrymen, that, at their return, a piece of the wall of the city was pulled down to give paſſage to their chariots.

The prize contended for was a crown made of a peculiar ſort of wild olive appropriated to this uſe.

Olympic *fire*. See Fire.

OLYMPICI, *gli*, the title of the academiſts of Vicenza, in Italy. See Academy.

OLYMPIONICES, Ολυμπιονικης, in *Antiquity*, an appellation given to thoſe who came off victorious in the Olympic games.

The *Olympionices* were infinitely honoured in their country, as being eſteemed to have done it immortal honour. The Athenians particularly were ſo laviſh in their preſents to the *Olympionices*, their countrymen, that Solon found it neceſſary to reſtrain their liberality by a ſpecial law, which imported, that the city ſhould only give 500 drachmas to the *Olympionices*; which amounted to about 58 ounces of ſilver of our weight.

OLYRA, a name given by many botanical writers to the *ſprat-corn*, the *zea*, and *triticum amylæum*, or *ſtarch corn* of other authors. This is a ſort of grain cultivated in many parts of Germany; it comes to ripeneſs toward the latter end of autumn, and is uſed for the common food of the poorer ſort of people; it is like the ſpelt wheat, but is ſomewhat leſs nutritive.

In the Linnæan ſyſtem of botany, the *olyra* is a genus of the *monoecia triandria* claſs. This genus has male and female flowers; the calyx of the former is a ſingle-flowered, bearded glume; and the glume of the corolla has no beard; the glume of the calyx of the latter is ſingle flowered, ſpreading, and ovated; the ſtyle is bifid; and the ſeed cartilaginous. There is only one ſpecies.

OMAGRA, a name given by ſome medical writers to the Gout, when ſeated in the articulation of the humerus with the ſcapula.

OMBRE, a celebrated game at cards; played by two, by three, or by five perſons; but generally by three.

The game of *ombre* is borrowed from the Spaniards; and requires all the phlegm and gravity of that people in the playing.

The name ſignifies as much as *the game of man*; *ombre*, or *hombre*, in Spaniſh, ſignifying *man*; in alluſion to the thought and attention required herein.

In *ombre by three*, nine cards are dealt to each party; the whole *ombre* pack being only 40, by reaſon the eights, nines, and tens are thrown aſide: he that wins muſt take five tricks, or four when the other five are divided, ſo as one have two and the other three.

After the cards are dealt, if none of the parties think their hand ſtrong enough to attempt for the ſtake or game, they all *paſs*; and after ſomething put down to the former ſtake, deal over again. If any will attempt for it, he henceforth is called the *ombre*; and the other two become leagued together, like two partners at whiſt, to defend it againſt him.

Note, each has the refuſal of being *ombre*, according to his order of ſeniority.

There are two ways of undertaking for the game: in the firſt, which is moſt uſual, after chooſing what he will have trumps, he *diſcards*, or lays aſide, what number of his cards he pleaſes, and in their lieu takes an equal number from the remainder of the pack; the like do the other two. The other way is, when he dare truſt to his own hand, and therefore declines to diſcard, or change any cards, but leaves that to the others, which is called playing *ſans prendre*: if he gains the point, in this latter caſe, he reaps ſomewhat extraordinary, more than in the firſt.

If he fail in either caſe, he is ſaid to be *beaſted*: and the failure is called a *remiſe*, or *repueſte*; and if one of the defenders of the ſtake win more tricks than he, ſuch perſon is ſaid to win *codille*, and takes up the ſtake the *ombre* played for: and in both caſes, the *ombre* is to forfeit the value of the ſtake played for, to the board.

If the *ombre* win all the nine tricks, it is called winning the *vole*, and he reaps doubly; and if he attempt it, and miſcarry, he ſuffers proportionably.

The overſights and irregularities committed in the courſe of the game, are called *beaſts*, and ſubject the perſons chargeable therewith to forfeitures.

As to the order and value of the cards at *ombre*, it is to be obſerved, that the ace of ſpades, called *ſpadille*, is always the firſt or higheſt trump, in whatever ſuit the trump be; the deuce of trumps, when trumps are either of the black colours, or the ſeven, if of the red, is the ſecond trump, and called *manille*; the ace of clubs, called *baſto*, the third; and if either of the red ſuits be trump, the ace of that ſuit, called *punto*, the fourth. The reſt in the black ſuits are valued according to the following order; viz. king, queen, knave, ſeven, ſix, five, four, and three. In the red ſuits they follow thus; king, queen, knave, deuce, three, four, five, and ſix.

The three firſt, or principal trumps, are called *matadores*; which have this privilege, that they are not obliged to attend an inferior trump when it leads; but, for want of another ſmall trump, the perſon may renounce trumps, and play any other card. Add, that if the three *matadores* be in the hands of the *ombre*, in caſe he be beaſted, he is to forfeit for them; or, if he gain his point, he is to have a conſideration for them, but for nothing leſs than three. And it muſt be farther noted, that the trumps immediately ſucceeding theſe; viz. punto, king, queen, &c. if they be found in the ſame hand with the former, are alſo reputed as *matadores*, and to be allowed, or forfeited for, like the reſt; and this as low as the ſequence reaches without interruption.

There are ſome varieties in the manner of playing the game of *ombre*. Sometimes he who has *ſpadille* is obliged to play, let his game be ever ſo bad; which is called *forced ſpadille*: ſometimes when all have paſſed, a perſon undertakes the game on condition of diſcarding or making up his hand, before he names trump; which is called the *gaſcarille*.

In *ombre by five*, which ſome even prefer to that by *three*, as not requiring ſo much attention; only eight cards a-piece are dealt; and five tricks muſt be won, otherwiſe the *ombre* is *beaſted*.

Here the perſon who undertakes the game, after naming the trump, calls a king to his aſſiſtance: upon which, the perſon in whoſe hand the king is, without diſcovering himſelf, is to aſſiſt him as a partner, and to ſhare his fate. If between both they can make five tricks, the *ombre* wins; and then the auxiliary king ſhares the ſpoil; and *vice verſa*.

If the ombre *venture* the game without calling in any king, this too is called playing *ſans prendre*; in which caſe the other four are all againſt him, and he muſt win five tricks alone, or be *beaſted*. The reſt is much the ſame as by *three*, *mutatis mutandis*

Ombre *de ſoleil*, in *Heraldry*, *ſhadow of the ſun*, is when the ſun is borne in armoury, ſo as that the eyes, noſe, and mouth, which at other times are repreſented, do not appear; and the colouring is thin, ſo that the field may be ſeen through it.

OMBRIA. See Brontia, and Ceraunia.

OMBROMETOR, a machine to meaſure the quantity of rain that falls. We have the deſcription and figure of one in Phil. Tranſ. N° 473. p. 12. It conſiſts of a tin funnel, whoſe ſurface is an inch ſquare, a flat board, and a glaſs tube ſet into the middle of it in a groove. The riſe of the water in the tube, whoſe capacity, at different times, muſt be meaſured, and marked, ſhews the quantity of rain that has fallen.

OMELET, or Amlet, a kind of pancake, or fricaſſee of eggs, with other ingredients, very uſual in Spain and France.

Menage derives the word from the Italian *animella, little ſoul*; which, he ſays, the people uſe for the nice bits among the giblets of fowls, &c. uſed for fricaſſees, as livers, hearts, kidneys, gizzards, &c. From whence by reſemblance, is formed the French *amelette*, *a fricaſſee of eggs*. Tripod derives the word from *αμα*, *together*, and λυειν, *to diſſolve*, *moiſten mix*. And M. de la Mothe le Vayer, from the French *œuf*, *egg*, and *melez*, *mingled*.

The forms of *omelets* are various. We meet with farced *omelets*, *omelets* with ſugar, *omelets* of green peas, *omelets à la Turq*, &c.

A noted author in this way preſcribes the following one: the eggs being beaten, are to be ſeaſoned with ſalt and pepper, and then fried in butter made boiling hot; this done, gravy to be poured on, and the whole ſtrewed with chives and parſley, ſhred ſmall. When one ſide is fried enough, it is to be turned on the other.

OMELYSIS, a word uſed by Hippocrates, and others of the ancients, to expreſs the meal of barley, crude or not parched. It is recommended, when reduced to the form of a poultice, by boiling in wine and oil, for curing all tumors of the tonſils. It is alſo recommended, mixed in water, to be drank in hæmorrages of the uterus. Authors of later date have made the word *omelyſis* ſtand for all ſorts of meal or flour, and ſome for an equal mixture of the meal of barley, linſeed, and fenugreek ſeed, in equal quantities; in medicine uſed for horſes. And Cœlius Aurelianus uſes it frequently for a cataplaſm made either of meal, or bread, and water.

OMEN, a ſign or indication of ſomething future, taken from the mouth of a perſon ſpeaking.

Feſtus derives the word *omen*, from *oremen*, *quod ſit ore*; as being a presage by the mouth.

Omen *prærogativum*, among the Romans, was the vote of the firſt tribe or century in their comitia.

When a law, &c. was propoſed, or an election to be made, an urn was brought in to the prieſts there preſent, into which were caſt the names of the tribes, or centuries, or curiæ; as the comitia were either tributa, centuria, or curiata. And the lots being drawn, that tribe, century, &c. whoſe name came up firſt, was called *tribus*, or *centuria prærogativa*, becauſe their voices were aſked firſt. And ſo much did the Romans depend on this prerogative century, that the reſt generally followed them. Hence a perſon who had the voices of the prerogative was ſaid to have *omen prærogativum*.

OMENTA, a word uſed by ſome anatomical writers to expreſs the membranes of the brain.

OMENTUM, in *Anatomy*, a fat thin membrane, ſpread over the inteſtines, and following them in all their ſinuoſities. See *Tab. Anat. (Splanch.) fig.* 2. *lit. g. g. fig.* 3. *lit. m m.*

The *omentum* is the ſame with what is otherwiſe called *epiploon*, *caul*, *reticulum*, &c.

It reaches from the bottom of the ſtomach (to which it is connected) to the navel, at which it ordinarily terminates; though in ſome ſubjects it goes farther, ſo as upon a rupture of the peritonæum, to fall into the ſcrotum. Beſides the ſtomach, it is faſtened to the concave part of the liver, the backſide of the duodenum, part of the colon, the back, and the ſpleen; its other extremity to the ſmall guts.

Its form reſembles that of a pouch or ſatchel, which may be inflated with a blow-pipe to the capacity of a gallon.

Its ſubſtance is membranous, conſiſting of two leaves, or coats, between which, and on the ſurfaces of which, are innumerable veins, arteries, nerves, and vaſa adipoſa, or fat veſſels, variouſly interwoven, and by their interſections dividing the part into a multitude of little areolæ, reſembling the maſhes of a fine net; whence the name *rete*.

The fat, in its proper ducts, running along with the other veſſels, renders theſe areolæ very obſcure; while the intermediate ſpaces are filled with a tranſparent membrane, full of ſmall holes, ſo that the whole appears a beautiful kind of net.

Its arteries come from the cœliac and meſenteries, and its veins run to the porta, and are called epiploicæ; its nerves are from the intercoſtals.

The fat here, as in the membrana adipoſa, is either brought by the ducts into the adipoſa cells, or elſe delivered from the cells into the ducts; for the fineneſs of the veſſels, &c. renders their courſe exceeding difficult to trace: it is even doubted whether or no they be hollow. Malpighi, and many others, incline to the former opinion, and take the *omentum* to be nothing elſe but a large pouch, full of innumerable little ones, filled with fat; they add, that the ductus adipoſi are real veſſels, ariſing out of the *omentum*, and ſpreading themſelves, by means of the membrana adipoſa, throughout the whole body; diſtributing fat to every part, in the ſame manner as the arteries diſtribute blood. See Fat, and Ductus *adipoſi*.

The particular uſe of the *omentum* is to promote the periſtaltic motion of the guts, by lubricating them with its oily ſubſtance, which tranſudes through its pores; and by following them in their doublings and windings, to ſerve them as a bolſter to ſlide upon; and, by filling up their hollows, prevent their being too much diſtended with flatulencies, yet giving way to them when replete with aliment. See Hiſt. Acad. Scienc. an. 1725. p. 12. ſeq.

The *omentum* is ſingle in all animals, excepting monkeys, in which it is triple or quadruple.

Omentum, *falling down of the*. On large wounds of the abdomen, the *omentum* will frequently protrude itſelf through the wound, either alone, or with ſome portion of the inteſtines. When this is the caſe the firſt buſineſs is to enquire whether the protruded part preſerves its heat, moiſture, and natural colour: if it is not found faulty in any of theſe circumſtances, it muſt be gently returned, but when the ſtraitneſs of the wound forbids this, the protruded part muſt be taken off cloſe to the wound, and the wound healed according to the common form. The *omentum* in this caſe will adhere to the internal part of the wound, without bringing on any diſorder, or inconvenience to the patient. But where the inteſtines fall out at the ſame time, the *omentum* is to be fomented by an aſſiſtant with warm milk and water, till the inteſtines are returned.

If any part of the protruded *omentum* be cold, dry, livid, putrid or corrupted, the mortified part muſt be entirely cut off before the reſt is returned, leſt the neighbouring parts ſhould be brought into conſent, which would inevitably prove fatal to the patient. The corrupted part is to be taken off in this manner: paſs a waxed thread two or three times round the ſound part of the *omentum*, near the place where it is injured, and faſten it with a knot, to prevent any hæmorrhage from enſuing after the reduction of it; when you have made a ſecure ligature, take off the corrupted part with the knife, or ſciſſars, and return what is ſound, leaving, at leaſt, the length of a foot of the ligature hanging out of the wound of the abdomen, till it ſlips off from the ſound part of the *omentum*. The wound muſt be dreſſed in the common way, the depending part of it being kept open by a large tent: and, at every dreſſing, the ligature muſt be pulled a little gently forward, till it has, at length, entirely ſlipped off from the ſound part of the *omentum*. Heiſter.

OMER, in the *Jewiſh Antiquity*. See Corus.

OMISSION, in *Rhetoric*. See Paralepsis.

OMITTAS, in *Law*. See Non *omittas*.

OMNES, in the *Italian Muſic*, a Latin term, which we ſometimes find uſed for tutti, *all*, or *altogether*.

OMNIUM is a term of finance, denoting all the particulars included in the contract between government and the public for a loan: ſuch as ſtock at 3 or 4 per cent. lottery tickets at a ſtipulated price, annuities for a certain term, &c.

OMNIUM *florum aqua.* See AQUA.

OMOPHAGI, formed of ωμος, *crude*, and φαγω, *I eat*, among the ancient geographers, a name given to certain nations who fed on raw fleſh, as the Scythians, &c.

OMOPHORIUM, formed from ωμος, *ſhoulder*, and φερω, *I bear*, a little cloak, anciently worn by the biſhops over their ſhoulders, thereby to repreſent the good ſhepherd, who brings home the ſtrayed ſheep on his ſhoulders.

For this reaſon the *omophorium* was put off at the opening of the Goſpels; becauſe then the true ſhepherd, Jeſus Chriſt, was ſuppoſed preſent in perſon.

Some confound the *omophorium* with the *pallium*, worn by the patriarchs; but there was this difference, that the pallium was a long cloak of purple, and was peculiarly reſerved for patriarchs; though ſince given to ſome biſhops, by way of diſtinction.

OMOPLATE, ωμοπλατη, from ωμος, *ſhoulder*, and πλατυς, *broad*, in *Anatomy*, is uſed, in the general, for the ſhoulder, but more particularly for two bones, ſituate on the hind part of the upper ribs, one on each ſide; called alſo *ſcapulæ*, and *ſhoulder-blades*. See SCAPULA and SHOULDER.

Theſe bones are broad, and eſpecially in the middle; thick in their apophyſes; of a triangular form, concave within, and convex without; and are joined to the clavicles and arms.

OMOPLATÆ *octavus*, in *Anatomy*, a name given by Spigelius and others to a muſcle, called by Winſlow *the upper portion of the rhomboidalis*; but by Albinus the *rhomboides minor*. What Winſlow calls the lower portion of the rhomboidalis, he calls the rhomboidæus major.

OMOPLATO-HYOIDÆUS, a muſcle called alſo CORACOHYOIDÆUS, and *ornohyoidæus*.

OMPANORATE, an appellation given to the prieſts of the iſland of Madagaſcar.

Theſe are the ſchoolmaſters of the country, and teach Arabic and writing. They have ſeveral books, but none of them contain more than ſome chapter of the Alcoran, and a few phyſical recipes.

They are divided into ſeveral orders, bearing ſome reſemblance to our eccleſiaſtical dignities; as *ombiaſſe*, ſecretary or phyſician; *tibon*, ſubdeacon; *mouladzi*, deacon; *faquihi*, prieſt; *catibon*, biſhop; *lamlamaha*, archbiſhop; *ompitſiquili*, prophets or diviners; *ſabaha*, calif, or the chief of the religion.

The *ompancrates* deal much in taliſmans, and other charms, which they call *hitidzi*, and which they ſell to the grandees of the place. They alſo made little ſtatues, or images, called *auli*, which they conſult as oracles, and to which they aſcribe various powers; as the making rich, deſtroying enemies, &c. They have public ſchools, where they teach their ſuperſtitions and ſortileges.

The *ompitſiquili* practiſe geomancy, and are moſtly conſulted on diſeaſes, and the ſucceſs of affairs; reſolving all queſtions by figures drawn on a little table covered with ſand.

OMPHACION, ομφακιον, derived from ομφαξ *unripe grape*. in *Pharmacy*, the juice of ſour or unripe grapes.

Some have alſo given the name to a kind of oil, pretended to be drawn from olives, while yet green and ſour. But Pomet charges it as an impoſture, adding that olives yield no oil at all till perfectly ripe.

OMPHACITIS, a name given by naturaliſts to a ſmall ſort of gall of the oak.

OMPHACIUM. See OMPHACION.

OMPHACOMELI, a ſort of *oxymel* made of the juice of unripe grapes and honey.

OMPHALEA, in *Botany*, a genus of the *monoecia triandria* claſs. Its characters are, that it has male and female flowers: the calyx of the former conſiſts of four leaves, and it has no corolla; the receptacle is ovated, and the antheræ joined to it; the latter are the ſame with reſpect to the calyx and corolla as the former; the ſtigma is trifid; and the fruit is a fleſhy three-celled capſule, containing a ſingle ſeed. There are two ſpecies.

OMPHALOCELE, ομφαλοκηλη, formed of ομφαλος, *navel*, and κηλη, *tumor*, in *Medicine*, a kind of hernia, or tumor in the navel, ariſing like other ruptures, from a relaxation and diſtenſion of the peritonæum, by which either the omentum, or the guts, fall down.

It is otherwiſe called EXOMPHALUS.

Its remoter cauſes are violent ſtrains, loud cries, abundance of ſerous humour, difficult delivery, &c.

OMPHALODES, in *Botany*. See HOUND'*s tongue*.

OMPHALOMANTIA, a word uſed by ſome authors to expreſs a ſort of divination pretended to by the midwives and old women, of telling how many more children a woman is to have, by examining the number of knots on the umbilical cord.

OMPHALO-MESENTERIC, in *Anatomy*. All fœtuſes are wrapped in at leaſt two coats, or membranes; moſt of them have a third, called *allantoides*, or urinary.—Some, as the dog, cat, hare, &c. have a fourth, which has two blood-veſſels; viz. a vein and an artery, called *omphalo meſenteries*; becauſe paſſing along the ſtring to the navel, and terminating in the meſentery.

OMPHALOPTER, or OMPHALOPTIC, in *Optics*, a glaſs that is convex on both ſides, popularly called a *convex* LENS.

OMPHALOTOMY, ομφαλοτομια, the operation of cutting the navel-ſtring of new-born infants. See UMBILICAL.

OMPHALUS. See ENTEROMPHALUS, EXOMPHALUS, and HYDROMPHALUS.

OMPHALUS, in *Natural Hiſtory*, a term uſed by the ancients to expreſs what they at other times call *umbunculus* in ſtones; that is, a ſmall round and prominent ſpot, in the centre of the ſtone.

The ZMILAMPIS, which was a kind of oculus beli found in the Euphrates, had uſually a blue prominent pupil, and this was called *omphalus*, and UMBUNCULUS, indifferently, and ſo in other ſtones. The words have both the ſame origin, and are uſed to expreſs its being like the button, or prominent piece, in the middle of a ſhield called by the Greeks *omphalos*, and by the Latins *umbo*.

OMPHAX, in the *Natural Hiſtory of the Ancients*, the name they gave to a gem of the pellucid kind, and of a diſagreeable greeniſh colour, with a mixture of yellow.—Pliny, and ſome other old writers, make this a kind of the aqua marine, calling it the *beryllus oleaginus*; but the earlier writers very juſtly determined it not to be of the beryl kind, but properly a diſtinct ſpecies of gem; and therefore very properly called it by a peculiar generical name.

ONAGER, in *Natural Hiſtory*, the name given by authors to the *wild aſs*, a creature common in Syria, and ſome other places, and differing very little more from the common aſs, than as creatures in their native wildneſs do from thoſe of the ſame ſpecies kept in ſtables, and brought up to be domeſtic animals. The ſkin of this creature is very robuſt and durable, and makes the common ſhagreen leather uſed by our caſe-makers, &c. its ſurface being rough with ſmall tubercles. See ZEBRA.

ONAGRA, in *Botany*. See PRIMROSE.

ONANIA, and ONANISM, terms which ſome late empirics have framed to denote the crime of ſelf-pollution, mentioned in ſcripture to have been practiſed by Onan, and puniſhed in him with death. Some take it for the ſame with what in other places of ſcripture, particularly Levit. chap. xx. is called *giving of ſeed to Moloch*; for which the puniſhment allotted is ſtoning to death.

This is but ill warranted; the ableſt critics make them quite different things. Selden is poſitive the Jews, in imitation of their neighbours, actually ſacrificed their children to Moloch. Others fancy they only made them paſs between two fires, in order to obtain the idol's favour and protection.

ONCA, in *Zoology*, a ſpecies of the FELIS, in the Linnæan ſyſtem. See JAGUARA.

The *onca* of Buffon is ſuppoſed to be the leſſer PANTHER of Oppian, and the panthera of Pliny. It has a large head, ſhort ears, long hair on the whole body, the colour is a whitiſh aſh, tinged with yellow; the head is marked with ſmall round ſpots, and behind each ear is a large black ſpot; the upper part of the neck is varied with large ſingle ſpots, and the ſides of the back with longitudinal marks, conſiſting of ſeveral ſpots; the ſpots on the legs are ſmall and thinly diſperſed; the tail is full of hair, and irregularly marked with large ſpots. This ſpecies inhabits Barbary, Perſia, Hyrcania, and China, is uſed for the chace of antelopes and hares, and is as much under command as a ſetting dog, returns at the leaſt call, and jumps up behind his maſter, being carried on the crupper on horſeback.—*Tab.* IV. *Quadrupeds*, Nº 42.

ONCOS, ογκος, in *Antiquity*, was uſed to ſignify an ornament of the head, peculiar to thoſe who offered ſacrifice.

ONDEE, in *Heraldry*. See WAVED.

ONDEGGIARE, in the *Italian Muſic*, ſignifies to return the hand beating time, not directly, but by degree; as *ondeggiare la mano*, to keep it wavering in the air, or giving it two motions, before it is quite lifted up to end the bar, and thence to fall it to beat a firſt, ſecond, or third time, of that or another meaſure.

ONE *berry*, in *Botany*. See *Herb* PARIS.

ONE *blade*, in *Botany*. See SMILAX.

ONE-*wheel plough*. See PLOUGH.

ONEIROCRITICA, ονειροκριτικη, the art of interpreting dreams, or a method of foretelling future events, by means of dreams.

The word is formed from the Greek, ονειρος, *dream*, and κριτικη, of κρισις, *judgment*. Some call it *oneirocratia*, and derive it from ονειρος, and κρατεω, *I poſſeſs*, *I command*. It appears from ſeveral paſſages of ſcripture, that there was, under the Jewiſh diſpenſation, ſuch a thing as foretelling future events by dreams; but then there was a particular gift, or revelation, required for that purpoſe.

It ſhould ſeem, hence, that dreams are really ſignificative, and do forebode ſomething to come; and all that is wanting among us is the *oneirocritica*, or the art of knowing what: yet it is the opinion of many, that dreams are mere chimeras; bearing, indeed, ſome relation to what has paſſed, but none to what is to come. As to the caſe of Joſeph, it was poſſible for God, who knew all things, to diſcover to him what was in the womb of fate; and, to introduce that, he might take the occaſion of a dream; not but that he might as well have foretold it from any other accident or circumſtance whatever: unleſs God, to give the matter more weight, ſhould purpoſely communicate ſuch a dream to Pharaoh, in order to fall in with the popular notion of dreams and divination, which then prevailed among the Egyptians. See DREAM.

ONEIROCRITICS, formed from ονειρος, *dream*, and κρισις, *judgment*, a title given to interpreters of dreams, or thoſe who judge of events from the circumſtances of dreams.

There is no great regard to be had to thoſe Greek books called *oneirocritics*; nor do we, indeed, know why the patriarch of Conſtantinople, and others, ſhould amuſe themſelves with writing on ſo mean a ſubject.

Rigault has given us a collection of the Greek and Latin works of this kind; one attributed to Aſtrampſichus; another to Nicephorus, patriarch of Conſtantinople; to which are added, the treatiſes of Artimedorus and Achmet. But the books themſelves are little elſe but reveries; a kind of waking dreams, to explain and account for ſleeping ones.

The ſecret of *oneirocriticiſm*, according to them all, conſiſts in the relation ſuppoſed to be between the dream and the thing ſignified; but they are far from keeping to the relations of agreement and ſimilitude; and frequently they have recourſe to others, of diſſimilitude and contrariety.

ONEIROGMOS, a word uſed by the ancients to expreſs *venereal dreams*.

ONEIROPOLI, ονειροπολοι, in *Antiquity*, perſons whoſe buſineſs it was to make predictions from dreams.

ONEIROSCOPI, ονειροσκοποι, in *Antiquity*. See ONEIROPOLI.

ONERANDO *pro rata portionis*, a writ which lies for a joint-tenant, or tenant in common, when diſtrained for more rent than the proportion of his land comes to.

ONGLEE, or ONGLE, is uſed by the French heralds to denote the talons or claws of beaſts or birds, when of colours different from the body.

ONIONS, *cepa*, in *Botany*. For the characters, ſee GARLICK. The botanic difference between them being the ſwelling pipy ſtalk of the *onion*, which is much larger in the middle than at either end.

The three ſorts of *onions* propagated for the ſake of their roots, for winter uſe, are the Straſburg *onion*, the red Spaniſh *onion*, and the white Egyptian *onion*. Theſe are to be propagated by ſowing their ſeeds in the latter end of February, or beginning of March, in a dry, and ſomewhat ſandy ſoil, yet rich: in about a month's time the plants will appear, and, in a fortnight after that, they will be forward enough for hoeing, which muſt be done with a very ſmall hoe, cutting up all the weeds, and leaving the *onions* two inches aſunder; this ſhould be done in a dry ſeaſon, and the ground will then be clear of weeds for a month. At the end of this time, they muſt be hoed again, and cut to three inches apart; and, a month after this, to ſix inches ſquare, at which diſtance they will thrive well, and grow very large.

Towards the middle of Auguſt, the *onions* will have arrived at their full growth, which is known by their blades hanging down, and ſhrivelling: and they muſt at this time be pulled up, and ſpread on a dry place, and turned every day, to prevent their ſtriking freſh roots; in a fortnight's time they will be dry enough to houſe, and ſhould be wiped clean, and ſpread thin in an upper loft or garret.

The differences between the ſpecies are not eſſential, as they often degenerate into one another; and even the large Portugal *onion*, after a few years, with us, will loſe itſelf ſo far, that no one would imagine it came of that race.

ONION, *Welch*, a ſort of *onions* propagated by gardeners, for the uſe of the table in ſpring; they never make any bulb, and are therefore only to be eaten green in ſallads. They are propagated by ſowing their ſeeds towards the end of July, in beds of a dry, but rich ſoil, about three feet and a half wide; and, in a fortnight after ſowing, they will appear above ground; they muſt be kept carefully cleared from weeds. About October their blades die away, which has occaſioned ſome to think the whole plantation loſt, and to dig up the ground for ſome other uſe; but, if they are ſuffered to ſtand, they will ſhoot up again very ſtrong in Jannary, and from that time will grow very vigorouſly, and reſiſt all weathers, and will be fit to draw for young *onions* in March, and are extremely green and fine, and more valued at market, at that ſeaſon, than any other kind: but they are much ſtronger than any other *onions*, and have very much of the taſte of garlic.

There are alſo the following ſorts of *onions* cultivated in the kitchen-gardens; viz. the ſhallot, or ESCHALLOTS; the ciboule, which, according to Miller, is the ſame with the Welch *onion*, and the CIVES.

Onions are much eaten, and it would be well if they were yet more ſo; they attenuate tough humours, cleanſe the ſtomach, excite appetite, and promote the natural excretions, particularly expectoration and urine, and in ſome degree the menſes. But they are apt to breed flatulencies, and, if eaten too largely, to affect the head and diſturb the ſleep afterwards, eſpecially with perſons of hot bilious diſpoſitions. They are powerfully antiſeptic, and on this account are recommended as a ſalubrious addition to the food in ſcorbutic caſes.

An *onion* boiled to a perfect ſoftneſs, is recommended by many as a cataplaſm for ripening peſtilential buboes. A freſh cut *onion* rubbed on the part till it become red, and itch, is ſaid to be a cure for baldneſs. A mixture of equal parts of juice of *onions* and ſpirit of wine is eſteemed a cure for deafneſs, a few drops being put at times into the ears. An *onion* cut in two, and macerated an hour in the ſame ſpirit, is a good application for the head-ach. A cataplaſm of roaſted *onions* and butter is an excellent application for the piles.

ONIONS, *Sea*. See SQUILL.

ONION-*ſhell*, in *Natural Hiſtory*, a name given by authors to a peculiar kind of *oyſter*, which is of a roundiſh figure and very thin and tranſparent, and repreſents very exactly a piece of the peel of an *onion*. See OSTREA.

ONISCUS, in *Ichthyology*, a name given by Athenæus, and others of the Greek writers, to the ACCIPENSER, or STURGEON.

ONISCUS is alſo the officinal name of the WHITING.

ONISCUS, in *Zoology*, is alſo a name uſed by ſome to expreſs the common MILLEPEDES, called in Engliſh *woodlice*, and *ſows*.

It is a genus of the *aptera* inſects in the Linnæan ſyſtem, with fourteen feet, ſetaceous, bent antennæ, a mouth furniſhed with two palpi, the head intimately joined to the thorax, and an oval body; comprehending fifteen different ſpecies.

ONKOTOMY, formed from ογκος, *tumor*, and τεμνω, *I cut*, in *Surgery*, the operation of opening a tumor or abſceſs.

ONOBRYCHIS, in *Botany*. See SAINTFOIN.

ONOCENTAURUS, a fabulous animal, ſuppoſed to be a compound of a man and an aſs. Ælian ſpeaks of *onocentaurs*. It was half man and half aſs, as the *centaur* was half man and half horſe. Lib. vii. cap 9.

ONOCLEA, *ſenſible polypody*, in *Botany*, a genus of ferns, which has the flowers in two rows, and looking two ways, and the part that ſerves for fructification furniſhed with five valves.

ONOMANCY, or rather ONOMAMANCY, the art of divining the good or evil fortune which ſhall befal a man, from the letters of his name.

The word is ſuppoſed to be formed from the Greek ονομα, *name*, and μαντεια, *divination*. Indeed, there is ſomething ſingular in the etymology; for in ſtrictneſs, *onomancy* ſhould rather ſignify divination by aſſes; being formed from ονος, *aſinus*, and μαντεια; to ſignify divination by names, it ſhould be *onomatomancy*.

Onomantia was a very popular and reputable practice among the ancients. The Pythagorians taught, that the minds, actions, and ſucceſſes of men, were according to their fate, genius, and name; and Plato himſelf ſeems ſomewhat inclinable to the ſame opinion.

One of the greateſt rules of *onomancy*, among the Pythagoreans, was, that an even number of vowels in a name ſignified an imperfection in the left ſide of a man; and an odd number in the right. Another rule, about as good as this, was, that that thoſe perſons were the moſt happy, in whoſe names, the numeral letters, added together made the greateſt ſum; for which reaſon, ſay they, it was, that Achilles vanquiſhed Hector; the numeral letters in the former name amounting to a greater number than the latter.

And it was, doubtleſs, from a principle much of the ſame kind, that the young Romans toaſted their miſtreſſes at their meetings as often as there were letters in their names. Thus Martial,

Nævia ſex cyathis, ſeptem Juſtina bibatur.

ONOMATOPŒIA, formed from *ονομα*, *name*, and *ϖοιεω*, *fingo*, *I feign*, in *Grammar* and *Rhetoric*, a figure of ſpeech, whereby names and words are formed, to the reſemblance of the ſound made by the thing ſignified.

Thus in the word *trique-trac* formed from the noiſe made by moving the men at this game: and from the ſame ſource ariſe the *buz* of bees, the *grunting* of hogs, the *cackling* of hens, the *ſnoring* of people aſleep, the *claſhing* of arms, &c.

The ſureſt etymologies are thoſe deduced from the *onomatopœia*.

ONONIS, in *Botany*. See Rest *Harrow*.

ONOPORDUM, *woolly thiſtle*, in *Botany*, a genus of the *ſyngeneſia polygamia æqualis* claſs; of which Linnæus enumerates four ſpecies.

ONONYCHITES, formed from *ονος*, *aſs*, and *ονυξ*, *hoof*, ſomething that has hoofs like the feet of an aſs.

Ononychites was an appellation which the heathens in the firſt century gave the God of the Chriſtians, becauſe they owned and adored the ſame God with the Jews.—For it was a notion (however it had its riſe), as appears from Tacitus, Hiſt. lib. v. cap. 3. that the Iſraelites, much afflicted with thirſt, were led to a ſpring by an aſs going to drink; and that, in gratitude for the benefit, they worſhipped an aſs; and that the Chriſtians did ſo likewiſe. See Tertull. Apol.

ONOS, in *Ichthyography*, a name given by ſome authors to the ÆGLEFINUS, or common HADDOCK.

Onos is uſed by Athenæus, and many other of the Greek writers, for the fiſh which we call the HAKE, the *aſellus minor* of authors, called by Bellonius, Geſner, and ſome others, the *merlucius*.

ONOSMA, in *Botany*, a genus of the *pentandria monogynia* claſs; the corolla of which is bell-ſhaped, and yielding four ſeeds. There are three ſpecies.

ONTOLOGY, or Ontosophy, the doctrine or ſcience *de ente*, that is, of being, in the general, or abſtract. See Ens.

Ontology coincides with what in the ſchools is more uſually called *metaphyſics*.

ONYCOMANCY, or, as ſome write it, Onymancy, derived from *ονυξ*, *nail*, and *μαντεια*, *divination*, a kind of divination, by means of the nails of the fingers.

The ancient practice was to rub the nails of a youth with oil and ſoot, or wax, and to hold up the nails, thus ſmeared, againſt the ſun. Upon them were ſuppoſed to appear figures or characters, which ſhewed the thing required.

Hence, alſo, modern chiromancers call that branch of their art which relates to the inſpection of the nails, *onycomancy*.

ONYX, in *Natural Hiſtory*, the name of a genus of the ſemipellucid gems; the characters of which are, that they have variouſly-coloured zones, but none of red, theſe making them ſardonyxes; and that they are formed of cryſtal debaſed, but by a very ſmall admixture of earth, and compoſed either of a number of flat plates, or of a ſeries of coats made by incruſtation round a central nucleus; the different coloured ones being covered with a coat of the baſis or common matter of the ſtone, and ſeparated from one another by, and alternately variegated with, thin veins of that matter, in form of other zones.

As there have been many diſputes about what were properly the gems of the ancients, the *onyx* has not been leſs perplexed than the reſt. The characters here aſſigned them will diſtinguiſh them, however, from all other ſtones; and will not let the careful obſerver eaſily be deceived, when he ſees a ſtone in its rough and native ſtate; but they will not ſo well ſerve the leſs nice enquirer from being impoſed upon in purchaſing *onyxes* when cut and wrought. Our lapidaries ſeem to have had a deſign of baniſhing the diſtinctions of the agate and *onyx* out of the world; for as the zones are the moſt obvious character of the *onyx*, they have found an eaſy way to make pieces, cut properly out of maſſes or agates reſemble them. Agates, though never plated or formed of regular zones, are frequently veined in ſtrait narrow lines; and a piece of one of theſe agates cut perpendicularly to the ſite of theſe veins, gives the very figure of the zones of an *onyx*.

The white Gambay agate is what they uſually chooſe for this purpoſe; ſuch pieces of this ſtone as have the black dendritæ in them, when properly cut out from the reſt of the maſs, are their Mocoa ſtones; but other parts of the ſame ſtone, which have not theſe delineations, but have ſtrait cloſe veins, are cut out in a proper direction, and ſold for *onyxes*. Theſe may always, however, be diſtinguiſhed by their wanting the proper degree of purity, and tranſparence; and by this, that the common pale auricular *onyxes*, which are the kind theſe moſt reſemble, have always a peculiar blueiſh caſt, which is not found in theſe counterfeits.

We have four ſpecies of the *onyx* now in uſe among our lapidaries. The firſt is a blueiſh white one, with broad white zones: this was the true *onyx* of the ancients, and is compoſed of a blueiſh white *onyx*, variegated with white and brown zones: it is ſometimes found compoſed of flat and even plates of theſe, laid cloſely on one another, and ſometimes is in form of a pebble, compoſed of a central nucleus of pure cryſtal, or nearly pure, ſurrounded with thoſe cruſts which form the zones. It is very common in the Eaſt Indies, and is found alſo in New Spain, and ſometimes in Germany and Italy, though of much ſmaller value, and leſs brightneſs, hardneſs, and tranſparence.

The ſecond is a very pure *onyx*, with ſnow-white veins, which is exceeding bright and tranſparent, and, though compoſed only of two colours, is inferior to very few of the *onyxes* in beauty. It is always found in the form of a roundiſh pebble, uſually about the ſize of an egg, and compoſed of ſeveral coats of a blueiſh white, and a fine and pure white, laid evenly round a central nucleus of a pure but ſhattery cryſtal; the whole is very bright, and the blueiſh part very little leſs tranſparent than pure cryſtal; the nucleus is generally of an angular form, and the coats or zones, being all exactly of the ſame ſhape, make a very beautiful appearance. It is found only in the Eaſt Indies, and is very much eſteemed in Italy, but with us is not ſo much regarded as it deſerves.

The third ſpecies is the *jaſponyx*, which ſee under its proper head.

The fourth is the brown *onyx*, with blueiſh white zones. This is a very clear and pure ſtone, but is ſo much leſs beautiful than the other kinds, that, though very common in the Eaſt Indies, it is very ſeldom ſeen or regarded among us. Hill's Hiſt. of Foſſ. p. 490.

Onyx, in *Conchyliology*, the name given by the curious to a ſpecies of VOLUTA, found in cabinets, but never met with in that ſtate on the ſea-ſhores. The true account of this is, that the ſhell in this elegant form owes its appearance to art, having been poliſhed, and having had its outer coat taken off. With this outer coat, which is of a duſky yellow, it is often kept in the ſame cabinet under another name, being then called by the French, the cierge or wax ſhell.

Onyx, in *Zoology*, a name by which Pliny, and many other of the ancient writers have called the SOLEN.

Onyx *indicus*, in the *Materia Medica of the Ancients*, a term uſed by the Greek writers to expreſs what is uſually called *unguis odoratus*, or the ſweet hoof. Some call it *onychus iudicus*, as particularly Myrepſus, in his antidote of fifty ſpecies. . The ſame author mentions the *blatta byzantia*, and tells us that it is not the ſame thing with the *onyx indicus*, but that the Italians called by this name the *os naſi*, or bone of the noſe, of the purple fiſh. What he means by this is probably the bony tongue of that animal, nature having given it ſuch a weapon to pierce the ſhells of thoſe fiſh on which it is to feed.—We frequently find the chamæ, and other ſhell-fiſh, with holes bored through the upper ſhell as exact as if it were done with an inſtrument: this has been done by the purple fiſh, to get at the fleſh of the animal within for food; and the bony tongue, with which this fiſh performs this, is called, by the Italians of thoſe times, *blatta byzantia*. Actuarius tranſlates the blatta byzantia of all the earlier writers by the phraſe *os naſi purpuræ*; and the interpreters of the Arabian writers give the ſame name to what they call *unguis odoratus*, or *onyx indicus*, for the Arabian name exactly expreſſes this.

OOROO, a kind of cloth made by the people of Otaheite and of other iſlands in that neighbourhood, from the bark of the BREAD-FRUIT tree; the proceſs of its manufacture has been explained under the word AOUTA, which is a name given in thoſe countries to another kind of cloth, made of the bark of the paper-mulberry tree, preciſely after the ſame manner.

OOSCOPIA, *ωοσκοπια*, in *Antiquity*, a ſpecies of divination, wherein predictions were made from eggs.

OOST, or Oast, in *Huſbandry*, a name given by the people who manure hops, for the kiln in which they dry them after they are picked from the ſtalks. This is a ſquare room, built up of brick or ſtone, ten feet wide, more or leſs, and having a door on one ſide. In the midſt of this room is a fire-place, about thirteen inches wide, and as much high; and, in length, reaching from the mouth ſo nearly to the back part of the kiln, that a man has juſt room to go round it. This fire-place is called a *herſe*, and the fire is let out into the room by ſeveral holes in the ſides, in the ſame manner as in malt-kilns. Five feet above this is laid the floor, on which the hops are to be laid to dry; and this muſt have a wall round it of four feet high, to keep the hops from falling out. At one ſide of the upper bed muſt be made a window by which to puſh out the hops, as they are dried, into the room prepared for them. The beds muſt be made of laths an inch ſquare, placed at a quarter of an inch diſtance from one another, and ſupported by beams underneath. The hops are to be poured on this bed with a baſket, till the whole is covered half a yard thick with them; when this is done, lay them even with a rake, and let a fire be made in the fire-place below. Some recommend a wood fire, but experience ſhews that nothing does ſo well as charcoal; let the fire be kept at the mouth of the furnace, for the air will be carried all the way through; and thus let the hops lie, never ſtirring them till they are thoroughly dry; when they rattle under the rake, and the inner ſtalks are brittle, they are ſufficiently dried, and are to be puſhed out, and a freſh parcel laid in the *ooſt* in their place.

Some people dry their hops in a common malt-kiln, ſpreading them on a hair-cloth about ſix inches thick, and now and then turning them till they are all thoroughly dried, then laying them in a heap till they are to be put in bags. But both theſe ways are liable to ſome inconveniencies; the *ooſt* generally over-dries the under ones, by the time that the upper ones are dry, enough; and the hair-cloth, and the turning in the other way, breaks and ſhatters them, and ſpills many of the ſeeds. See TIN-*floor*.

OPACITY, in *Philoſophy*, a quality of bodies which renders them opake; that is, impervious to the rays of light.

The term *opacity*, is uſed in oppoſition to *tranſparency*.

Opacity, according to the Carteſians, conſiſts in this; that the pores of the body are not all ſtrait, or directly before each other; or rather not pervious every way.

But this doctrine is deficient: for though it muſt be allowed, that, to have a body tranſparent, its pores muſt be ſtrait, or rather open every way; yet how it ſhould happen, that not only glaſs and diamonds, but even water, whoſe parts are ſo very moveable, ſhould have all their pores open and pervious every way; and, at the ſame time, the fineſt paper, or the thinneſt gold plate ſhould exclude the light, for want of ſuch pores, is inconceivable. So that another cauſe of *opacity* muſt be found. Now all bodies have vaſtly more pores or vacuities than are neceſſary for an infinite number of rays to find a free paſſage through them in right lines, without ſtriking on any of the parts themſelves: for ſince water is nineteen times lighter, i. e. ſo much rarer than gold; and yet gold itſelf it ſo very rare, that magnetic effluvia paſs freely through it, without any oppoſition; and quickſilver is readily received within its pores, and even water itſelf by compreſſion; it muſt have much more pores than ſolid parts: conſequently, water muſt have, at leaſt, forty times as much vacuity as ſolidity.

The cauſe, therefore, why ſome bodies are opake, does not conſiſt in the want of rectilinear pores, pervious every way; but either in the unequal denſity of the parts, or in the magnitude of pores, and their being either empty, or filled with a different matter; by means whereof, the rays of light, in their paſſage, are arreſted by innumerable refractions and reflections, till falling at length, on ſome ſolid part, they become quite extinct, and are utterly abſorbed.

Hence cork, paper, wood, &c. are opake; while glaſs, diamonds, &c. are pellucid. For in the confines or joining of parts alike in denſity, ſuch as thoſe of glaſs, water, diamonds, &c. among themſelves, there ariſes no refraction or reflection, by reaſon of the equal attraction every way; ſo that ſuch of the rays of light as enter the firſt ſurface, paſs ſtrait through the body, excepting ſuch as are loſt and abſorbed, by ſtriking on ſolid parts: but in the bordering of parts unequal in denſity, ſuch as thoſe of wood and paper, both with regard to themſelves, and with regard to the air or empty ſpace in their larger pores, the attraction being unequal, the reflections and refractions will be very great: thus the rays will be unable to paſs through ſuch bodies, being continually driven about, till they become extinct.

That this interruption or diſcontinuity of parts is the chief cauſe of *opacity*, ſir Iſaac Newton argues, does appear hence; that all opake bodies immediately begin to be tranſparent, when their pores become filled with a ſubſtance of equal, or almoſt equal, denſity with their parts. Thus paper dipped in water or oil, the ſtone called *oculus mundi* ſteeped in water, linen-cloth dipped in oil or vinegar, and other ſubſtances ſoaked in ſuch fluids as will intimately pervade their little pores, become more tranſparent than before.

On the contrary, the moſt tranſparent ſubſtances, by emptying their pores, or ſeparating their parts, may be rendered very opake. Thus ſalts, or wet paper, or *oculus mundi*, by drying; horn, by ſcraping; glaſs, by pulverizing, or flawing; and water itſelf, by being beat into bubbles or froth; are rendered opake.

Indeed, to render bodies opake, and coloured, their interſtices muſt not be leſs than of ſome determinate ſize; for the moſt opake bodies that are, if their parts be very minutely divided, as when metals are divided in acid menſtruums, become perfectly tranſparent.

OPAH, or *king-fiſh*, in *Ichthyology*, a ſpecies of fiſh common on the coaſt of Guinea; it is ſmooth-ſkinned, without ſcales or teeth; it has one erect fin to its back, which riſes below its neck, and reaches almoſt to its tail; there is alſo on each ſide, behind the gills, a fin; and a pair of fins a little before the vent under its belly; from behind the vent runs one fin within a little of the tail; and the tail-fin is large and forked; the eyes of this fiſh are large, the irides ſcarlet, encompaſſed with a circle of a gold colour, verged with ſcarlet; its noſtrils are placed above its eyes; the upper part of the body is of a dark blue, or violet colour; this, and the ſides which are of a bright green, are ſpeckled with oblong white ſpots; the chaps of a pale red; the noſe, gills, and belly of a ſilver colour; and all the fins of a bright ſcarlet; the mouth is ſmall, the tongue thick, and reſembling a human tongue, but thick ſet with prickles, which are pointed backwards, and which ſeem to ſerve inſtead of teeth for retaining its prey or food. The fiſh from which this deſcription is taken, was three feet ſeven inches long, and three feet ten inches round in the thickeſt part, and weighed eighty-two pounds; the fleſh of the fore-part was firm, and had the appearance of beef, and the hinder part like fine veal. Phil. Tranſ. vol. xlvi. p. 518. See *Tab*. III. *Fiſhes*, N° 30.

OPAL, *opalus*, in *Natural Hiſtory*, a precious ſtone, of various colours; changeable according to the different poſition of the ſtone to the light.

It is generally claſſed among the ſiliceous earths, although ſome ſpecimens are ſo ſoft as to be capable of being ſcratched with a knife.

The *opal* is a gem of a very peculiar kind, and has been eſteemed by many, in all ages, of very great value; though, at preſent, it is of leſs price, in proportion to its ſize, than any other of the finer gems. The Romans eſteemed it the fourth gem in value; and its ſingularity, as well as beauty, ſeem very well to entitle it to at leaſt that rank, it is ſofter than any of the other gems, and is with difficulty poliſhed to any degree of nicety; its moſt frequent ſize is between that of a pea, and a horſe-bean, but it is found as ſmall as the head of a large pin, and up to the ſize of a walnut; its figure is very various and uncertain, but is never found in a columnar or cryſtalliform ſtate; its moſt uſual figure is an irregularly oblong, flatted at the bottom, and convex at the top, and dented with various ſinuoſities on the ſides. There have been found ſome of the regular ſhape of a kidney, and others almoſt perfectly round, and, not unfrequently, it is met with in thin flat pieces. It is often found looſe among the earth of mountains, ſometimes on the ſhores of rivers, and not unfrequently bedded, in the coarſer kinds of jaſper, ten or twenty opals of different ſizes and colours, being frequently found in one ſtone.

It is naturally of a ſmooth ſurface, and fine gloſs; and many of the fineſt *opals* that have been ſeen, have been worn with their native poliſh: its colour, as it appears in a fine ſpecimen, is of ſo mixed a nature as not to be eaſily deſcribed, but is beſt expreſſed by comparing it with the fineſt ſort of mother of pearl; it differs, however, greatly from that in its ſuperior luſtre and brightneſs, and in being ſo pellucid that one may ſee deep into the ſtone. As it is variouſly turned about, it ſhews the colours of all the other gems, yellow, red, blue, green, purple, and a milky grey: when the ſtone is broken, moſt of theſe colours diſappear, which ſhews that they ariſe by reflection from one or two principal ones. The laſt of theſe colours is the native dye of the ſtone, and it has many of the others in a ſuperior beauty even to the gems to which they naturally belong, particularly the fire-colour of the carbuncle, which ſeems in the *opal* to lie deep in the body of the ſtone. It is the moſt difficult to counterfeit of all the gems; and this is done by a very fine, and well choſen piece of ſome pearly ſhell. It is ſometimes found wanting one or more of the colours, and ſometimes of a deep bluiſh black, with no other colour viſible on changing the light, but a deep red, which is very ſtrong and glowing, and makes it a very beautiful ſtone: ſometimes it has alſo a general yellowiſh caſt, and ſometimes a greyiſh one, which greatly impair the reflections of the other colours, and injure the ſtone.

It is found in Egypt, and Arabia, and in ſome parts of the Eaſt Indies, and in Europe. The oriental ones are the fineſt, but thoſe of Bohemia are often very beautiful. Hill's Hiſt. of Foſſ. p. 600.

To imitate this gem in natural cryſtal uſe the following method: take yellow orpiment, and white arſenic, of each two ounces; crude antimony, and ſal ammoniac, of each one ounce: powder all theſe, and mix them well together; put this powder into a large crucible, and lay upon it ſmall fragments of cryſtal, and, upon theſe, other larger pieces of cryſtal; fill up the crucible with theſe, and lute on to it another crucible inverted, with a hole at the bottom as big as a ſmall pea; when the lute is dry, ſet the veſſel in a quantity of charcoal in a large chimney, covering them up with coals to the middle of the upper crucible: ſo long as the materials fume out at the hole, keep up a ſtrong fire; when that is over, let the fire go out of itſelf; and then unlute the crucibles; the greateſt part of the cryſtal will be found tinged to the colours of various gems; not only the *opal*, which will be very fair and beautiful, but the topaz, and ruby colour will be ſeen in others.

A compoſition of ſemi-tranſparent white glaſs and paſte, reſembling the *opal*, may be formed by taking of the compoſition for hard GLASS, or PASTE, deſcribed under thoſe articles, ten pounds, and of horn, bone, or ivory, calcined to a perfect whiteneſs, half a pound: grind them well together, and fuſe them with a moderate heat.

OPALIA, in *Antiquity*, feaſts celebrated at Rome in honour of the goddeſs Ops.

Varro ſays, that they were held three days after the expiration of the Saturnalia: according to Macrobius they were held on the nineteenth of December, which was one of the days of the Saturnalia. He adds, that thoſe two feaſts were celebrated in the ſame month, becauſe Saturn and Ops were huſband and wife; and that it is to them we owe the invention of corn and fruits: for which reaſon, the feaſt was not held till the harveſt and fruit-time was entirely over.

The ſame author obſerves, that the vows offered to the goddeſs were made ſitting on the ground; to ſhew, that ſhe was earth, the mother of all things.

OPALIN. See MAGNESIA *Opalina*.

OPEN *flank*, in *Fortification*, is that part of the flank which is covered by the orillon.

OPEN *fire*. See FIRE, and REVERBERATORY.

OPEN *fountain*. See FOUNTAIN.

OPEN *pound*. See POUND.

OPENING *a vein*. See PHLEBOTOMY.

OPENING *of trenches* is the firſt breaking of ground by the beſiegers, in order to carry on their approaches towards a place. See TRENCH.

OPENING *of gates*, in *Aſtrology*, is when one planet ſeparates from another, and preſently applies to a third, bearing rule in a ſign oppoſite to that ruled by the planet with which it was before joined.

OPENING *the mouth*. See MOUTH.

OPERA, a dramatic compoſition, ſet to muſic, and ſung on the ſtage, accompanied with muſical inſtruments; and enriched with magnificent dreſſes, machines, and other decorations.

Bruyere ſays, that it is eſſential to the *opera* to keep the mind, the eyes, and ears, in an enchantment. St. Evremond calls the *opera* a chimerical aſſemblage of poetry and muſic: where the poet and muſician mutually cramp each other.

The *opera* we derive from the Venetians, among whom it is held one of the principal glories of their carnival. Riccoboni dates the public exhibition of *operas* from the year 1637, when the opera of Andromache was performed at the theatre of St. Caſſan, at Venice. Meneſtrier aſcribes the invention of it to Johannes Sulpitius, a native of Veroli, in the Campania di Roma, towards the end of the 15th century. Creſcimbeni aſcribes it to Emilio Cavaliere, who, in 1590, exhibited, in the palace of the grand-duke at Florence, two dramas of the paſtoral kind, ſet to muſic. Others ſay, that it was invented by Ottavio Rinuccini, a native of Florence; and that his firſt compoſition of this kind was a paſtoral, called Daphne, which was ſucceeded by his Eurydice: and that this latter was repreſented on the theatre at Florence, in 1600, upon occaſion of the marriage of Mary de Medicis, with Henry IV. of France. See Hawkin's Hiſt. of Muſic, vol. iii. p. 424, &c.

While the Engliſh and French comic and tragic theatres were forming, the Venetians invented the *opera*: the abbot Perrin, introductor of ambaſſadors to Gaſton, duke of Orleans, was the firſt who formed the deſign of introducing it into Paris; and he obtained the king's privilege for the ſame in 1669; and it was not long before it paſſed thence into England. The author of the Spectator obſerves, that the French muſic agrees with the accent and pronunciation much better than the Engliſh; and they are, at the ſame time, better calculated for the gay humour of that people.

At Rome they had a kind of *ſpiritual operas*, frequent in Lent; conſiſting of dialogues, duos, trios, ritornellas, choruſes, &c. the ſubject whereof is taken out of Scripture, the life of ſome ſaint, or the like. The Italians call them *oratorios*. The words are frequently Latin, and ſometimes Italian.

OPERA-*glaſs*, in *Optics*, is ſo called from its uſe in play-houſes, and ſometimes a *diagonal perſpective*, from its conſtruction, which is as follows. ABCD (*Tab.* V. *Optics*, *fig.* 84.) repreſents a wooden tube about four inches long: in each ſide of which there is a hole EF and GH, exactly againſt the middle of IK a plane mirror, which reflects the rays falling upon it to the convex glaſs LM; through which they are refracted to the concave eye-glaſs NO, whence they emerge parallel to the eye at the hole $r\ s$, in the end of the tube. Let P a Q be an object to be viewed, from which proceed the rays P c, $a\ b$, and Q d: theſe rays, being reflected by the plane mirror IK, will ſhew the object in the direction $c\ p$, $b\ a$, $d\ q$, in the image $p\ q$, equal to the object PQ, and as far behind the mirror, as the object is before it: the mirror being placed ſo as to make an angle of 45 degrees, with the ſides of the tube. And as in viewing near objects it is not neceſſary to magnify them, the focal diſtances of both the glaſſes may be nearly equal; or if that of LM be three inches, and that of NO one inch, the diſtance between them will be but two inches, and the object will be magnified three times, which is ſufficient for the purpoſes to which this glaſs is applied.

If the object be very near, as XY, it is viewed through a hole $x\ y$, at the other end of the tube AB, without an eye-glaſs; the upper part of the mirror being poliſhed for that purpoſe, as well as the under. The tube unſcrews near the object-glaſs, LM, for taking out and cleanſing the glaſſes and mirror. The peculiar artifice of this glaſs is to view a perſon at a ſmall diſtance, ſo that no one ſhall know who is obſerved; for the inſtrument points to a different object from that which is viewed, and as there is a hole on each ſide, it is impoſſible to know on which hand the object is ſituated, which you are viewing. The poſition of the object will be erect through the concave eye-glaſs. See POLEMOSCOPE.

OPERATION, in the general, the act of exerting, or exerciſing ſome power, or faculty, upon which an effect follows.

The nobleſt *operation* of man is that by the ſchoolmen called *vital*, or *immanent*; viz. the *operation* of the mind; which, with regard to the underſtanding, is threefold; apprehenſion or preception, diſcretion or judgment, and reaſoning or diſcourſe.

The directing of theſe makes the object of LOGIC.

With regard to the will, the immanent *operations* are willing and nilling: to which are referred loving and hating.

OPERATION, in *Medicine*, denotes a methodical action of the hand, on the human body; in order to re-eſtabliſh health.

Bleeding is a very common, but, at the ſame time, a dangerous *operation*.

Trepanning is one of the fineſt *operations* in ſurgery.

The Cæſarean *operation* is the cutting open a woman with child, and drawing out the child through the aperture.

The other chirurgical *operations* are ſutures, tapping, caſtrating, cutting for the fiſtula, amputation, extirpation, cupping, &c. See SUTURE, &c.

OPERATION, *high*. See HIGH and LITHOTOMY.

OPERATION, *lateral*. See LITHOTOMY.

OPERATION is more particularly uſed in medicine, for the means whereby any remedy produces its ſalutary effect; or that ſeries of actions, mediate and immediate, whereby its remote end is attained.

See the *operations* of each kind of medicines under the proper heads, SPECIFICS, PURGATIVE, EMETICS, OPIATES, &c.

OPERATION, in *Chemiſtry*, denotes the proceſſes, or experiments, by means whereof the proper changes are produced in bodies, and the effect of the art procured.

The changes chemiſtry produces in bodies, are reducible to two kinds; viz. an union of parts, and a ſeparation thereof: thus chemiſtry either ſeparates ſpirits, ſalts, oils, &c. or compounds them together.

A chemical *operation*, then, conſiſts in changing the ſituation of the parts; particularly, either in moving ſome parts, but not the whole, which is called *ſeparating*; or, in adding new parts, which is called *uniting*.

All chemical *operations*, therefore, are reducible to two general kinds: viz. ſuch whereby the parts of bodies, before joined or united, are ſeparated, which the ancient chemiſts called *ſolution*; and ſuch whereby the parts before disjoined, are combined, or united, called *coagulation*.

Some, however, object digeſtion as a third ſpecies of *operation*, not reducible to either of them; but Boerhaave ſhews, that it is a compoſition of both.

Moſt chemiſts. however, look on this diviſion as ſcarce accurate and minute enough, and ſubdivide the art into a number of particular or ſubordinate *operations*; as CALCINATION, VITRIFICATION, DISTILLATION, SUBLIMATION, COHOBATION, AMALGAMATION, FERMENTATION, PUTREFACTION, &c.

OPERATION, in *Theology*, is uſed for the actions, both of the Word and the man, in Jeſus Chriſt. See PERSON.

The orthodox teach, that there are two *operations* in Jeſus Chriſt, the one divine, the other human; and not one *theandric operation*, as was the doctrine of the Monothelites and Monophyſites.

OPERATOR, in *Medicine*, &c. a perſon who operates, or works with the hand, on the human body, to preſerve or reſtore its health.

We ſay an *operator for the ſtone*, meaning a lithotomiſt, or a perſon who cuts.

OPERATOR *for the eyes* denotes a perſon who couches cataracts, &c.

OPERATOR *for the teeth* ſignifies a tooth-drawer, &c. See TEETH.

OPERCULUM, in the *Hiſtory of Shell-fiſh*, denotes the cartilaginous cover, with which nature has furniſhed the mouths of the univalve water-ſhells; for as to the land ones, they have only a viſcid liquor to ſupply the place of an *operculum*.

OPHIASIS. See ALOPECIA.

OPHICARDELON, in *Natural Hiſtory*, the name of a gem mentioned by Pliny, which, he ſays, was a black ſtone covered at top and bottom with white: this ſeems without all doubt, to have been the *camea* of our jewellers.

OPHIDION, in *Ichthyology*, the name of a fiſh of the eel kind, and reſembling the common eel, and conger, in ſhape, but that it is ſhorter in proportion to its thickneſs, and more flatted, and of a paler colour; it ſeldom exceeds eight inches in length, and the back is grey, and the ſides of a bright ſilver colour; it is clothed with ſmall ſcales, which are long and narrow, and are not placed like tiles hanging over one another, as in other fiſhes, but only ſcattered here and there, and laid in no order; the mouth is large, and the jaws are furniſhed with very ſmall teeth, and, beſides theſe, with three ſmall eminences ſet with the like teeth; the one on the roof of the palate, the other lower on each ſide; the eyes are large, and it has one pair of fins near the gills; it is a very delicate fiſh, and is caught in great plenty in the Mediterranean, and ſold at Venice, and other places.

The name *ophidon* is given by Artedi to a genus of fiſhes the characters of which are theſe: they are of the malacopterygious, or ſoft-finned kind; the body is oblong and of a cylindric figure, and has three fins. The ſpecies of this genus are properly only two, diſtinguiſhed by the cirri, or beards; the firſt is the *ophidion* with four cirri growing from the lower jaw: this is the *ophidion* of authors. The ſecond is the *ophidon* without cirri: this is found in the Baltic.

OPHIOBORUS, in *Natural Hiſtory*, a name given by the ancients to a ſpecies of carnivorous fly, which feeds on the bodies of beetles, or other flies, or on the fleſh of dead ſerpents. Its wings are of the colour of poliſhed braſs, whence it was alſo called by the Greeks *chalcomuia*, the *braſs-fly*.

OPHIOGLOSSUM, in *Botany*. See ADDER'S *Tongue*.

OPHIOMANCY, Οφιομαντεια, compounded of οφις, *a ſerpent*, and μαντεια, *divination*, in *Antiquity*, the art of making predictions from ſerpents. Thus Calchas, on ſeeing a ſerpent devour eight ſparrows with their dam, foretold the duration of the ſiege of Troy. And the ſeven quoils of a ſerpent that was ſeen on Anchiſes's tomb, were interpreted to mean the ſeven years that Æneas wandered from place to place before he arrived in Latium. Thus, Virgil, Æn. lib. v. ver. 85.

Septem enim gyros, ſeptena volumina traxit.

OPHIOMORPHITES, in *Natural Hiſtory*, the name given by ſome authors to the foſſils called more uſually CORNU *Ammonis*; which are compoſed of ſeveral wreaths, rolled in a ſpiral form over one another, and reſemble a ſnake when rolled up. Theſe are found of prodigious ſizes, ſome not leſs than the fore-wheel of a chariot. They are evidently formed from ſome ſea-ſhell, the ſhelly matter remaining on ſome of them, and all being compoſed of ſeveral cells, communicating with one another by means of a ſiphunculus, in the manner of thoſe of the nautilus.

OPHIOPHAGI, in *Natural Hiſtory*, a name given by ſome to the *eagle*, *vulture*, and ſome other birds of prey which are ſometimes ſeen to feed on ſerpents.

Pliny gives the name *ophiophagi* to a certain people of Æthiopia, whom he deſcribes as very barbarous and ſavage, going always naked, and feeding on ſerpents, whence the appellation. Solinus, who generally copies Pliny but imperfectly, has perverted his meaning ſtrangely in this paſſage, having placed the *ophiophagi* in Arabia Felix, inſtead of Æthiopia.

OPHIORRHIZA, in *Botany*, a genus of the *pentandria monogynia* claſs; the corolla of which is funnel-ſhaped; the germen is bifid; the ſtamina are two, and the fruit has two lobes. There are two ſpecies.

OPHIOXYLON, in *Botany*, a genus of the *polygamia monoecia* claſs: the flowers are hermaphrodite and male; the calyx of the former as well as the corolla are divided into five ſegments, and the corolla is funnel-ſhaped; it has five ſtamina, and one piſtil; the calyx of the latter is bifid; the corolla divided into five ſegments, funnel-ſhaped, and furniſhed with a cylindric nectarium; it has two ſtamina. There is only one ſpecies.

OPHITES, Οφιτης, in *Natural Hiſtory*, a ſort of variegated marble of a duſky green ground, ſprinkled with ſpots of a lighter green; otherwiſe called *ſerpentine*.

It is thus called from the Greek οφις, *ſerpent*; becauſe its ſpots reſemble thoſe of that animal.

The ancients knew three ſpecies of this kind, which they call the black, the white, and the grey *ophites*, and this laſt alſo frequently *tephria*; and allowing theſe ſpotted variegations to be the characters of an *ophites*, we have, beſide theſe, two others known at this time.

The other two *ophitæ*, which ſeem not to have been known to the ancients, are, 1. A greyiſh brown one with green ſpots. It is frequent in Egypt, and Arabia, and is ſaid to have been dug in England. The ſecond is a pale grey one, with green ſpots and veins. It is very hard, and capable of an elegant poliſh. It is frequent in Germany, and tables are made of the larger pieces and vaſes of the ſmaller ones. It is ſaid alſo to be found in England.

OPHITES, in *Eccleſiaſtical Hiſtory*, is alſo the name of a ſect of ancient heretics, who ſprung out of the Gnoſtics, in the latter end of the ſecond century; ſo called from their worſhipping the ſerpent that ſeduced Eve.

This ſerpent, they taught, was inſtructed thoroughly in all knowledge; and they make it the father and author of all the ſciences.

On which principle they founded a thouſand chimeras: part of which may be ſeen in St. Epiphanius. See GNOSTIC.

They ſaid this ſerpent was the Chriſt; that he was very different from Jeſus born of the Virgin, into whom, ſaid they, the Chriſt deſcended; and that it was this Jeſus, not the Chriſt, that ſuffered. Accordingly, they made all thoſe of their ſect renounce Jeſus to follow Chriſt.

In conſequence of this opinion, they nouriſhed a certain number of ſerpents, which they looked upon as ſacred, and to which they offered a ſubordinate kind of honour and worſhip.

The Sethians, or Sethites, mentioned by Theodoret, were either the ſame with the *Ophites*, or very little different from them.

The leader of this ridiculous ſect was one Euphrates; it had its origin among the Jews, and was of a more ancient date that the Chriſtian religion. A part of its followers embraced the Goſpel, while the other retained their primitive ſuperſtition; and from hence aroſe the diviſion of the *Ophites* into Chriſtian and Antichriſtian.

OPHIUCUS, in *Aſtronomy*, a conſtellation of the northern hemiſphere; called alſo SERPENTARIUS.

OPHRYS, in *Botany*. See TWYBLADE.

OPHTHALMIA, Οφθαλμια, in *Surgery*, a diſeaſe of the eyes; properly, an inflammation of the tunica adnata, or conjunctiva; accompanied with a redneſs, ſwelling, heat, and pain.

The word is formed from the Greek οφθαλμος, *eye*. Celſus calls the *ophthalmia*, *lippitudo*, by reaſon of a gum ſticking to the eye-lids in this diſeaſe, which the Latins called *lippa*.

The *ophthalmia* is either *moiſt*, or *dry*: in the firſt there is a ſhedding of tears; in the ſecond, none at all.

It ſometimes happens in the *ophthalmia*, that the two eye-lids are ſo diſtorted, that the eye continues conſtantly open, without being able to ſhut; which is called χημωσις; ſometimes the eye-lids are ſo faſtened together, that the eye cannot be opened, which they called φιμοσις, q. d. cloſure of things that ſhould be open.

The immediate cauſe of the *ophthalmia* is the blood flowing in too great abundance in the little veſſels of the adnata, ſo as to ſtagnate therein, and by that means diſtend them. The remote cauſes are the ſame with thoſe of other inflammations.

This diſeaſe may be occaſioned by external injuries; by the ſtoppage of cuſtomary evacuations: by long expoſure to the night air; by watching, and reading or writing much by candle-light; by drinking ſpirituous liquors; by exceſs of venery; by the acrid fumes of metals; by a venereal taint; and by a ſcrophulous or gouty habit. The diſeaſe is ſometimes epidemic, eſpecially after wet ſeaſons; and Dr. Buchan obſerves, that he has frequently known it to prove infectious. It may be alſo occaſioned by a moiſt air, or living in low damp houſes. In children, it often proceeds from imprudently drying up ſcabby heads, a running behind the ears, or other ſimilar diſcharges: and it often ſucceeds the ſmall-pox or meaſles, eſpecially in children of a ſcrophulous habit. A ſlight inflammation of the eyes, eſpecially from an external cauſe, is eaſily cured; but when the diſeaſe is violent, and continues long, it often leaves ſpecks upon the eyes, or dimneſs of ſight, and ſometimes ends in total blindneſs.

Snow, applied to the afflicted eye, is reputed a good remedy for the *ophthalmia*: the Ephemerides of the Leopoldine academy mention an *ophthalmia* cured by applying cow's dung, while hot, between two linen cloths, to the eye. A fox's tongue, and the fat and the gall of a viper, are empirical preſervatives againſt the *ophthalmia*.

The cure of *ophthalmias*, according to the modern practice, depends chiefly on the due repetition of purgatives. If theſe fail, recourſe is had to veſicatories iſſues, ſetons, &c. though Pitcairn prefers bleeding; it being his obſervation, that no diſeaſe requires copious bleeding ſo much as the *ophthalmia*.

This inflammation, ſays Mr. Warner, ſhould be removed as ſoon as poſſible, by taking blood in proper quantities from the temples by leeches, or the lancet, or from one of the external jugular veins; or from the arm or foot, and occaſionally repeating it. Cupping in the head, neck, or between the ſhoulders is adviſeable, when the patient will not ſubmit to the uſe of leeches or the lancet; and bliſters are likewiſe proper applications. Dr. Buchan recommends a ſeton in the direction of the ſpine, and in the middle between the ſhoulder-blades, which may be dreſſed twice a day with yellow baſilicon. The loſs of blood, Mr. Warner obſerves, when aſſiſted by mercurials given in proper doſes alone, or mixed with ſmall quantities of opium, will, with the farther aſſiſtance of cooling purges adminiſtered at proper intervals, be found of the utmoſt conſequence. The quantity of mercury, and the ſtrength of the purges muſt be adapted to the age and ſtrength of the patient; and repeated every ſecond or third night, and on the ſucceeding morning, as may be found neceſſary. On the intermediate days, antiphlogiſtic medicines ſhould be preſcribed, together with a ſtrict regimen in diet; and opiates ſhould be uſed occaſionally: and this treatment ſhould be continued, till there is a remiſſion of pain, fever, and reſtleſſneſs: then, and generally not before, the bark, in infuſion, decoction, or ſubſtance, mixed with ſomething opening, if neceſſary, ſhould be given more or leſs frequently, according to the ſymptoms and appearances. During the inflamed ſtate of the eyes, the patient ſhould be kept in the dark, and nothing painful or ſtimulating ſhould be applied to them: but fomentations of the ſofteſt kind ſhould be uſed two or three times a day, or oftener, if neceſſary. Soft cooling ointments, and emollient relaxing cataplaſms, will be found uſeful in many circumſtances of this diſeaſe; taking heed at the ſame time, not to bandage down the eye-lids for a longer time than is neceſſary, leſt this confinement ſhould obſtruct a freedom of circulation in the minute veſſels of the eye and its coverings, and prevent the tears and ciliary ſecretions from being properly ſecreted and diſcharged. When the inflammation diſappears, and in ſome caſes before it has quite diſappeared, Mr. Warner recommends lotions that are cooling, and moderately aſtringent, ſuch as are compoſed of a ſolution of ſaccharum ſaturni, or of the pulvis è ceruſſa comp. or of the extractum ſaturni, to be uſed two or three times a day, till the eyes reſume their natural ſtrength and colour. Aſtringent ointments may be ſometimes rubbed upon the internal ſurface of the edges of the eye-lids; but eye-waters are, in moſt caſes, preferable to theſe ointments. If the inflammation of the eyes be joined with a venereal, ſcrophulous, or ſcorbutic habit of body, it will be neceſſary to recur to the uſe of mercurius dulcis ſublimatus, merc. calcin. pil. plum. the extract of hemlock, alkaline abſorbents, decoctions of the woods prepared in lime-water, or common water, and the Peruvian bark in ſubſtance. Warner on the Eyes, p. 42, &c. Mr. Ware, in his remarks on the *ophthalmy*, &c. 1780, recommends the application of the Thebaic tincture of the London Diſpenſatory; compoſed of opium and warm aromatics, digeſted in mountain wine. Two or three drops of this tincture are applied to the naked eye, by dropping them from a vial, once or twice a day, as the ſymptoms are more or leſs violent. A ſharp pain is excited, ſucceeded by a copious flow of tears, which continue a few minutes, and gradually abate; and after this the patient is eaſy: the inflammation is often abated by one ſingle application; and many bad caſes, ſays Mr. Ware, have been completely cured by it in leſs than a fortnight, after every other kind of remedy had been uſed for weeks, and ſometimes months, without ſucceſs. The powers of electricity have been ſucceſsfully applied to a very obſtinate inflammation of the eyes: when the eyes of the patient had been electrified three days with the inſtrument deſcribed under GUTTA *ſerena*, the inflammation began viſibly to abate, and in a fortnight's time quite ſubſided; but the pupil of the eye was ſo nearly cloſed, that ſcarce any of it could be ſeen. He continued to be electrified every day for five weeks, and the pupil gradually dilated, till he attained a degree of ſight ſufficient to diſtinguiſh objects at ſome diſtance. The pain left him, and he omitted the uſe of electricity without experiencing any farther inconvenience.

Thoſe that are liable to frequent returns of this diſorder, ought conſtantly to have an iſſue in one or both arms. Bleeding or purging in the ſpring or autumn will be alſo very beneficial. Such perſons ought to live regularly, avoiding ſtrong liquor, the night air, and late ſtudies.

Pitcairn, and ſome others, diſtinguiſh an *external* and *internal ophthalmia*; the firſt in the adnata, which is that hitherto ſpoken of; the ſecond in the retina. The ſymptoms or indications of the latter, are muſcæ volitantes, duſt ſeeming to fly in the air, &c.

This, when inveterate, degenerates into a GUTTA *ſerena*, or AMAUROSIS.

OPHTHALMICS, medicines proper for diſeaſes of the eyes.

Such are *ophthalmic* waters. See WATER. *Ophthalmic* powders, ointments &c. There is an excellent *ophthalmic* prepared of ſaccharum ſaturni.

OPHTHALMIC *nerves*. The fifth pair of nerves of the brain, dividing into three branches; the firſt is called *ophthalmic*, becauſe it goes to the eye. This, again, ſubdivides into two branches, after ſending out ſeveral twigs, which encompaſs the optic nerves, and are diſtributed into the choroides. See NERVES.

OPHTHALMOGRAPHIA, formed from οφθαλμος, *eye*, and γραφω, *I deſcribe*, that branch of anatomy which conſiders the ſtructure and compoſition of the EYE, the uſe of its parts, and the principal effects of viſion.

Our countryman Dr. William Briggs, has publiſhed an excellent *ophthalmographia*, and Plempius another.

OPHTHALMOSCOPIA, that branch of phyſiognomy which conſiders a perſon's eyes and looks; to deduce thence the knowledge of his temperament, humour, and manners.

OPIATE, OPIATUM, in *Medicine*, is ſometimes applied to any confection, or electary.

In which ſenſe it is defined an internal remedy, variouſly compoſed of powders, pulps, liquors, ſugar, or honey, reduced into a ſoft conſiſtence.

The *opiate* of Solomon is a compoſition of great fame, ſo called from one Solomon, a phyſician, its inventor; and firſt publiſhed by Lawrence Joubert.

There is a particular kind of *opiates*, called *incarnatives*, for the teeth and gums, made of alum, ſumach, lignum aloes, myrrh, maſtic, &c. reduced into powder.

OPIATE is alſo uſed for any medicine given with an intention to procure ſleep.

In which ſenſe the word is of the ſame import with *narcotic*, *hypnotic*, *ſoporific*, or *pacific*.

OPIATE is more particularly uſed for a compoſition, wherein opium is an ingredient.

The operation of *opiates*, or the manner wherein they produce their effect in the body, Dr. Quincy thus lays down: all pain is a ſtimulus on the part affected, and is attended with contractions of the pained membranes, which occaſion a greater afflux than ordinary of the nervous juice that way: on the other hand, pleaſure, or a delightful ſenſation in any part, is accompanied with a ſmooth undulation, and eaſy reflux of the nervous juice towards the brain. This is, as it were, the entertainment of the mind; with which being taken up, it doth not determine the ſpirits to the organs of motion; that is, there is ſuch a relaxation of the muſcular fibres, and ſuch a diſpoſition of the nervous fluid, as is neceſſary to ſleep.

Now, it is ſhewn, that an agreeable ſenſation produced in the ſtomach, together with a diſtenſion of its membranes, is the immediate cauſe of that ſleepineſs to which we are inclinable after eating; the one engaging the mind, the other acting on the body. For pleaſure amuſes the ſoul, and the fulneſs of the veſſels in the brain checks and hinders, in ſome meaſure, the derivation of the nervous juice in the organs.

Now, to apply this; a moderate doſe of an *opiate* uſually tranſports people with pleaſing ſenſation, to that degree that, as they often expreſs themſelves, they are in heaven: and though they do not always ſleep (which proceeds from the preſentation of pleaſing images to the mind ſo ſtrongly, that, like dreams, they over-engage the fancy, and ſo interrupt the ſtate of reſt), yet they enjoy ſo perfect an indolence and quiet, that no happineſs in the world can ſurpaſs the charms of ſo agreeable an ecſtaſy.

Thus we have from the medicines, but in a far more eminent degree, all thoſe effects which are obſerved to follow upon that grateful ſenſe in the ſtomach which a moderate fullneſs produceth. For no bodies are ſo fit and able pleaſingly to affect our ſenſible membranes, as thoſe which conſiſt of volatile parts, whoſe activity is tempered and allayed by the ſmoothneſs of ſome which are lubricating and oily; for they lightly rarefy the juices of the ſtomach, and cauſe a pleaſant titillation of its nervous coat, whereby there is induced an agreeable plenitude, and the mind is entertained with ideas of ſatiſfaction and delight.

And thus we eaſily ſee upon what mechaniſm the other virtues of *opiates* depend; for their eaſing pains, checking evacuations, &c. proceed not only from the mind's being taken up with a pleaſing ſenſe, whereby it is diverted from a diſagreeable one; but all pain being attended with a contraction of the part, the relaxation of the fibres, which they cauſe, eludes and deſtroys the force of the ſtimulus.

Opiates are found to abate immoderate ſecretions and evacuations, which they do by removing that irritation of the organs, whereby they are occaſioned. And herein lies the incraſſating quality of thoſe medicines, in that the twitching ſenſe upon the membranes of the lungs, bowels, &c. being leſſened, the ſharp humour is ſuffered to lodge there in a greater quantity, before it is ſo troubleſome as to be thrown off and expelled; it being all one as if there were no irritation of the part, if the uneaſy ſenſe thereof be not regarded by the mind. And theſe effects will all be heightened by the mixture of the *opiate* particles with the blood; which is hereupon rarefied, and diſtends its veſſels, eſpecially thoſe of the brain; and this does ſtill, to a greater degree, leſſen the influx of the nervous fluid to the parts, by preſſing upon the tubuli, or little canals, through which it is derived.

Whence the reaſon of that difficulty of breathing, which *opiates* occaſion; this ſymptom being inſeparable from the rarefaction of the blood in the lungs.

OPILIO, in *Natural Hiſtory*, the name given to a peculiar genus of ſpiders. The diſtinguiſhing character of which is, that they have but two eyes; their legs are uſually very long, and their ſkin hard and firm; they do not ſpin webs like the common ſpiders, for the catching their prey; their head ſeems to grow to the middle of their ſhoulders; their forceps is terminated by two claws like thoſe of the leg of a crab: they differ from the common ſpider alſo in the nature of their excrements, thoſe of this kind being hard and ſolid, the others liquid.

Of theſe there are four principal kinds. See TANT.

The *opilio*, in the Linnæan Syſtem, is a ſpecies of the PHALANGIUM.

OPIMATORES, among the Romans, military men, who had the direction and management of the proviſions, and were to take care that the army wanted nothing.

OPINION, OPINIO, denotes a probable belief; or a doubtful and uncertain judgment of the mind.

Opinion is better defined the aſſent of the mind to propoſitions not evidently true at firſt ſight; nor deduced, by neceſſary conſequence, from others that are ſo; but ſuch as carry the face of truth.

The ſchools define, *opinion*, *aſſenſus intellectus cum formidine de oppoſito*; and aſſent of the underſtanding, with ſome fear or diſtruſt of the contrary being true.

According to logicians, demonſtration begets ſcience, or knowledge; and probable arguments beget *opinion*.

Wherever the mind's acquieſcence in a truth propoſed to it is accompanied with any doubt, this is what we call an *opinion*.

Plato makes *opinion* a medium between knowledge and ignorance; clearer and more expreſs than ignorance, yet more obſcure and unſatisfying than knowledge.

OPISTHODOMUS, *οπισθοδομος*, among the Athenians, the public treaſury, ſo called from its being ſituated on the backſide of Minerva's temple. Here, beſides other public money, a thouſand talents were laid in ſtore, againſt any very urgent occaſion; but if any man expended them upon a trivial account, he was to be put to death. Alſo the names of all that were indebted to the commonwealth were entered in a regiſter in this place. The tutelar gods of this treaſury, were Jupiter Σωτηρ, or the Saviour, and Plutus, the god of riches, whom they repreſented with wings, and placed next to the ſtatue of Jupiter the Saviour; which was unuſual in other places.

OPISTHOGRAPHUM *οπισθογραφον*, among the *Ancients*, a waſte-book, or ſchedule, on which were writ extemporary things that wanted to be reviſed and corrected afterwards.

The word is compounded of *οπισθεν*, i. e. *afterwards*, or *on the backſide*, and *γραφω*, *I write*; becauſe it was writ over again on the backſide of every page, which was left blank for that purpoſe.

OPISTHOTONOS, Οπισθοτονος, compounded of *οπισθεν*, *backward*, and *τεινειν*, *to ſtretch or bend*, in *Medicine*, a kind of convulſion, or ſpaſmodic diſeaſe, wherein the body is bent backwards, ſo as to form a kind of a bow. In which ſenſe the word ſtands oppoſed to EMPROSTHOTONOS, wherein the body is bent forwards.

The *opiſthotonos* ariſes from a tonic motion of the muſcles of the poſterior parts of the body; eſpecially thoſe on the back of the head.

Dr. Chalmers, of South Carolina, in his account of the diſeaſes of this claſs, obſerves, that the *opiſthotonos* is moſt common in ſummer, when people are alternately expoſed to the ſcorching heat of the ſun, and heavy ſhowers; and that it often ſeizes on thoſe who ſleep abroad, expoſing themſelves to the cool night-air. This obſervation is farther confirmed by Dr. Huck Saunders.

The *opiſthotonos* often comes on gradually, and is miſtaken for three or four days, for the rheumatic complaint, commonly called a crick in the neck: the patient feels a ſtiffneſs in the back part of the neck and about the ſhoulders; which increaſes ſo as to render it troubleſome for him to turn his head, or bend it forward: by degrees he finds it difficult to open the jaws and to ſwallow; and is ſenſible of a painful traction under the cartilago enſiformis, which ſtrikes through to the back, and inſtantly increaſes the rigidity about the neck and ſhoulders, draws the head backward a little, and ſhuts the jaws cloſer. The ſpaſm under the ſternum, which is the pathognomic ſymptom of this diſeaſe, becomes more violent, and frequent in its return, as the diſeaſe advances, and is ſucceeded by a ſtronger retraction of the head, with great rigidity and pain all round the neck, and along the ſpine, to the lower extremities: the countenance is pale and contracted, the jaws are cloſed together, and cannot be opened ſo wide as to receive the end of the little finger. The maſtoid, coracohyoid, and ſternohyoid muſcles, as well as all the others concerned in deglutition, and the deltoid and pectoral, are moſt violently contracted, ſo that the ſhoulders are ſtrongly raiſed forward, and the arms are ſtretched or drawn acroſs the body. In a few ſeconds, the ſpaſm ceaſes, after which the ſhoulder and arms recline, and the inferior extremities relax, though the parts never altogether loſe their rigidity: the face is generally fluſhed in the intervals, and bears ſtrong appearances of diſtreſs and melancholy; the tongue is ſtiff and torpid; the belly always bound; and the patient generally wiſhes to avoid drinking, ſpeaking, or being moved, either of which is apt to occaſion a return of the ſpaſm. In the laſt ſtage of the diſeaſe the ſpaſm returns oftener than once in a minute, is much more violent, and continues longer, ſo that the patient has ſcarcely any remiſſion. The anterior muſcles of the whole body now ſuffer equal contractions with the poſterior but the laſt overcomes the force of the others; ſo that the ſpine is ſtrongly recurvated, and forms a hollow arch with the bed, and the patient reſts on the back part of the head and the heels. The belly is flat and drawn inward, and the muſcles are ſo rigidly contracted, that they do not ſeem in the leaſt to yield to the deſcent of the diaphragm in inſpiration; the lower extremities are violently diſtended; the tongue darted out and often torn by the ſnapping of the teeth, and the muſcular fleſh that lies between the arch of the lower jaw and the head of the trachea thruſt upwards within the throat: the countenance is contracted, and the patient in a foam of ſweat; the eyes watery and languid; and a pale or bloody froth bubbles out from between the lips. In this ſtate the perſons afflicted are commonly delirious; and a ſevere ſpaſm or general convulſion terminates their ſuffering by death.

In ſome caſes this diſeaſe is very rapid in its progreſs: and proves fatal within the third day, generally in twenty-four, thirty-ſix, or forty-eight hours. But few die after the ninth or eleventh day. The warm bath with gentle friction, and the free uſe of opiates, are the remedies for this diſeaſe: to which it will be proper to add glyſters, prepared with a decoction of chamomile flowers, mallows, &c. and a large proportion of oil. The rigid parts may be alſo fomented, and then embrocated with camphorated oil and tinctura Thebaica, twice a day, as occaſion requires, during the courſe of the diſeaſe. Muſk is likewiſe a very efficacious and uſeful remedy in this diſorder. See the references under *Locked* JAW.

OPIUM, formed from *οπος*, *juice*, in *Pharmacy*, &c. a narcotic, gummy-reſinous juice, drawn from the head of the white poppy, and afterwards inſpiſſated. It is of a dark reddiſh-brown colour in the maſs, and when reduced into powder, yellow.

When the juice flows of itſelf, through inciſions made in the poppy-heads, it is properly called *opium.* When drawn by expreſſion, it ought rather to be called *meconium.* The difference between the qualities and virtues of the two juices is very conſiderable. The former is preferable on all accounts, but it is exceedingly rare; the Turks, among whom it is produced, and who make great uſe of it, never allowing it to be exported. So that it is the latter that is ordinarily uſed among us, and ſold for *opium.*

Kæmpfer relates, that the heads, when almoſt ripe, are wounded with a five-edged inſtrument, by which as many parallel inciſions are made at once from top to bottom; that the juice which exudes is next day ſcraped off, and the other ſide of the head wounded in like manner; and that the juice is afterwards worked with a little water, till it acquires the conſiſtence, tenacity, and brightneſs of the fineſt pitch.

It is moſtly brought from the Levant and Cairo, in flat cakes or irregular maſſes, from four to about ſixteen ounces in weight, covered with leaves; generally very impure; the Levantines, to ſhorten their labour, and to have the more juice, drawing it equally from the heads and the leaves of poppies, by expreſſion, and then reducing it to the thickneſs of an extract by fire. Though a late traveller into their countries aſſures us, it is drawn by decoction, and afterwards inſpiſſated. See Mem. Acad. R. Scien. an. 1732, p. 427.

Dr. Charles Alſton, profeſſor of botany and the materia medica, in the univerſity of Edinburgh, has given us a diſſertation on *opium* in the Medical Eſſays of that place, vol. v. art. 12. This gentleman is of opinion, that notwithſtanding the authorities of Lemery, Savary, Monſieur de la Condamine, in the Mem. de l'Acad. des Sciences for 1732, all which would lead us to conclude we have nothing but the meconium, or the expreſſed juice or decoction of the plant, our *opium* is neither an extract, nor an inſpiſſated expreſſed juice of poppies, but the milky juice drawn by inciſion from poppy heads. To ſhew this, the doctor, according to the directions of Dioſcorides, on a dry day before noon, cut off the crown of white poppy heads, ſo as to avoid penetrating into the cavity of the fruit, and collected the milk with a ſilver ſpoon in a China cup. The juice being expoſed to the open air, in a few days thickened to the conſiſtence of *opium*, and was of a fiery, hot, bitter taſte, and ſoporiferous ſmell, and more ſo than the common *opium*, of a dark yellowiſh-brown colour on the outſide, ſomewhat higher within, and appeared as if compoſed of drops: after ten years keeping, its colour and taſte remained. This agreed with the account Bellonius, lib. iii. obſ. 15. gives of the beſt *opium.* That which was gathered from the papaver vulgare, or wild poppy, was ſomewhat of a lighter colour; but Dr. Alſton thinks this but accidental as the milk ſoon turns black on the knife. He alſo ſlightly ſcarified ſome poppy heads, after the Perſian manner. When the juice was thickened, he ſcraped off the *opium*, and obtained more of it than by the other method. To procure the tear in its utmoſt perfection, he cut off the ſtar from ſeveral heads, and bending them down, let the milk drop into a cup. It grew ſolid as *opium*, and being formed into a lump, appeared uniformly white; nor was there any difference in the juice of different poppies.

Secondly, the doctor obſerves, that the extract and inſpiſſated juice ſcarce any way reſemble *opium*; nor is their taſte and ſmell like it. The extract appears black when dried, and ſo does the juice, but when diluted, the firſt is brown and the latter green. The extract is tough and adheſive, the juice rough and friable, and grows mouldy a day or two after expreſſion. *Opium* may poſſibly be mixed with either of theſe; and the greeniſh-brown *opium* may have ſome ſmall portion of the juice in it. Its penetrating ſmell is certainly owing to the mixture of ſome aromatic ſubſtance.

Thirdly, *opium* contains more reſin than either the inſpiſſated juice or extract. One third of *opium* appears to be reſin, while the juice and extract ſcarce yield one tenth part.

Fourthly, if *opium* was not the tear of the poppy, there would be no occaſion for ſowing ſo many fields with poppies in Egypt, and other places. Nor would it be ſo powerful a medicine, for its anodyne virtues depend chiefly on the milky juice.

It is a popular error, that there is any ſuch thing as *white opium*; for though the juice, as it runs from the heads of the poppies, be of a milk-colour, it always becomes of a very deep brown as it thickens. Wherever it is found yellowiſh or ſoft, it is a ſign that the juice has not had fire enough.

Moſt of the *opium* ſold at Conſtantinople is brought from Anatolia, from a place called, by the Turks, Aphium Carahiſſat, i. e. Black Caule of *Opium.* It is alſo produced in the territory of the Thebes, in Egypt, whence the beſt *opium* was formerly called Thebaic *opium*: but no diſtinction is now made with regard to the places of its production.

It muſt be choſen dry, the ſmootheſt and blackeſt poſſible: of a diſagreeable ſmell, a bitteriſh, ſomewhat hot, biting taſte, and neither rugged nor ſticky, nor all in a maſs.

Opium is acrid, bitter, and ſtrongly odoriferous. On attentively taſting it, a nauceous bitterneſs is firſt perceived; then a pungent heat affects the tongue, next the palate, and laſt of all the lips. The heat continues ſome time, the bitterneſs longer, provoking a plentiful diſcharge of ſaliva. It alſo heats the noſe, and produces an inclination to ſneeze.

Opium is certainly diaphoretic, and has ſtimulating qualities, which ſtrongly refute the notion of its being refrigerating; it is certainly a hot medicine, though in many caſes it diminiſhes preternatural heat.

Opium conſiſts of five parts of gum, four of reſin, and three of earth, or other impurities, not diſſolvable either in watery or ſpirituous menſtruums. From theſe laſt it is purified, in the ſhops, by ſoftening the *opium* with boiling water, in the proportion of a pint to a pound, into the conſiſtence of a pulp, with care to prevent its burning; and whilſt it remains quite hot, ſtrongly preſſing it from the fæces through a linen cloth; the ſtrained *opium* is then inſpiſſated in a water-bath, or other gentle heat, to its original conſiſtence. When thus ſoftened with a ſmall quantity of water, the gummy and renſious parts paſs the ſtrainer together; whereas, if diſſolved by a larger quantity, they would ſeparate from one another. Suppoſing that the reſin of *opium* is as good, or as much wanted as the gum, or the mucilaginous part, brandy will be found the beſt menſtruum.

The moſt active principles of *opium* are very fixed; for it keeps well, and, when forty years old, remains hard, ſolid, and retains its taſte: and it ſeems that the practice of roaſting *opium*, in order to correct it, by diveſting it of its narcotic part, is of no ſervice; and many other proceſſes have been propoſed for correcting the ill qualities, which *opium* is ſuppoſed to poſſeſs, beſides roaſting it; ſuch as fermentation, long-continued digeſtions or boiling, and repeated diſſolutions and diſtillations. Theſe proceſſes, ſays Dr. Lewis, no not promiſe any ſingular advantage: and he adds, that diminiſhing the doſe of *opium* is a more certain method of leſſening its effects. Alkaline ſalts, he ſays, diminiſh the ſoporific virtue of the *opium*; fixed alkalis render it diuretic, whilſt volatile ones determine its action to the cutaneous pores; and acids almoſt entirely deſtroy its force.

Upon a chemical analyſis *opium* yields phlegm, urinous ſpirit, oil, a volatile and a fixed ſalt, and ſome earth; but little of the virtues of *opium* can be inveſtigated, or explained, from its analyſis, ſince ſimples extremely different as to their effects on human bodies, afford the ſame principles on diſtillation, as Homberg has ſhewn by the analyſis of the deadly night-ſhade, and cabbage. See Mem. de l' Acad. des Sciences. an. 1701.

The curious may find the analyſis of *opium* in the above mentioned diſſertation by Dr. Alſton.

It has been diſputed, whether the activity of *opium* reſides in its gummy or reſinous parts. From the experiments of Hoffman and Neumann, it ſeems to be neither in the gum, nor in the reſin; but in a certain ſubtle part of the reſinous, matter, ſomewhat analogous to eſſential oils, but of a much leſs volatile kind: and they relate, that on boiling the *opium* in water, there ariſes to the ſurface a frothy viſcid, unctuous, ſtrong-ſcented ſubſtance, to the quantity of two or three drams from ſixteen ounces; that this ſubſtance, in the doſe of a few grains, has killed dogs that could bear above a dram of crude *opium*; that in diſtillation with water, though it does not riſe itſelf, it gives over, at leaſt in part, the active principle of which it is the matrix; impregnating the diſtilled liquor with its ſcent and its ſoporific power; as eſſential oils exhale their odoriferous principle in the air, without being diſſipated themſelves. But what this ſubtile and active principle really is, in eſſential oils, odorous vegetables, or *opium*, is equally unknown. Neumann ſays, that he knows a preparation of *opium*, by which a whole chamber full of men may be preſently

ſtupefied,

ſtupeſied, deprived of their ſenſes, and even of their lives without ſwallowing a ſingle grain: and he thinks that it operates much in the ſame manner as the vapours of burning charcoal, or as the exhalations of fermenting liquors.

The uſe of *opium*, taken in proper doſes, is to procure ſleep, and a temporary reſpite from pain, or the action of any ſtimulating power. One grain is generally a ſufficient, and, in ſome caſes, too large a doſe: though maniacal perſons, and thoſe who labour under violent ſpaſms, require frequently two, three, or more grains. But uſe makes the quantity of *opium* ſafe, and even beneficial, which would otherwiſe prove poiſonous. Daily experience confirms this; and they who habituate themſelves to *opium*, find it as neceſſary as ſpirituous liquors to tiplers, and can take fifty or ſixty grains: Charas ſays, that he has taken twelve grains himſelf, and adds, that he knows one who made no ſcruple of thirty-ſix. And in the Phil. Tranſ. we have an inſtance of one Mr. Lovelock, who, in a fever, in three days time, took one hundred and two grains.

A few grains will deſtroy a perſon unaccuſtomed to it; but ſome diſorders, as madneſs, enervate its force. Among the Eaſtern nations, a dram of *opium* is but a moderate doſe. The Turks are ſaid to take this quantity when they go to battle, or undertake any affair that requires vigour and ſtrength. Garcias mentions one who took ten drams every day, and though ſhe appeared ſtupid and ſleepy, yet ſhe diſputed very readily and learnedly on any ſubject. It is remarkable that, notwithſtanding this exceſſive uſe of *opium*, the Turks are generally long lived, if we credit Bellonius.

The action of *opium* is very analagons to that of wine or vinous ſpirits; the good and ill effects of both differ little. See Wedelius in his Opiologia, and Geoffroy's Materia Medica. Platerus affirms that wine is narcotic, and Sydenham that *opium* is the moſt excellent cordial in nature.

Dr. Smyth, while at Smyrna, took pains to obſerve what the doſes of *opium* taken by the Turks, in general, were. He found that three drams in a day were a common quantity among the larger takers of it, but that they could take ſix drams a day without miſchief. A Turk eat this quantity before him, three drams in the morning, and three in the evening, with no other effect than its giving him great chearfulneſs. But the taking it thus habitually greatly impairs the conſtitution; the perſons who accuſtom themſelves to it, can by no means live without it, and are feeble and weak; their legs are uſually thin, and their gums eaten away, ſo that the teeth ſtand bare to the roots; they are alſo often of a yellow complection, and look much older than they really are. The Turkiſh meſſengers, when ſent upon buſineſs of haſte, always carry *opium* with them, and take largely of it when tired; they ſay it immediately gives them ſtrength and ſpirits to proceed, taken with proper precaution. Phil. Tranſ. Nº 223.

Dr. Ruſſel in his Hiſtory of Aleppo, p. 84. informs us, that the greateſt quantity he knew to be taken, was three drams in twenty-four hours; and the immediate effects which he obſerved it to have on ſuch as were addicted to it, were, that their ſpirits were exhilarated, and from a doſing, depreſſed ſtate into which they ſunk, after paſſing the uſual time of taking their doſe, they became quite alert. The conſequences of a long uſe of it are, that they ſoon look old and beſotted, like ſuch as in Europe have ruined their conſtitutions by hard drinking. And it may be conſidered as a point of fact, that they ſeldom live to a good old age: though they are rarely carried off by dropſies or ſuch other diſeaſes, which are the uſual conſequences of hard drinking amongſt us; but having firſt loſt their memory, and moſt of their intellectual faculties, they decline, in all appearance, in the ſame way as thoſe who ſink under the weight of years.

We have an account, in the Memoirs of the Academy of Sciences at Paris, of the death of a young man at Cairo, from his being decoyed into taking a very large doſe of this medicine. Among a number of young people in that city, who frequently drank together, there was one who always boaſted of his ſuperior power to bear a large quantity of liquor; and his companions, determined to get the better of him for once, diſſolved, without his knowing of it, a dram of *opium* in the liquor he was to drink; the conſequence was, that, inſtead of falling aſleep, as they expected he would, he fell into violent deliriums, and afterwards into a profound and dead ſleep.

The next morning his comrades went to ſee him, and triumph in their victory, but found him dying, looking livid, without pulſe, and with his mouth cloſed. They ſent for aſſiſtance, but in vain. After the death of the perſon, the body, arms, and thighs, became covered with livid tumors, as big as the head of a young child, and theſe emitted an intolerable ſtench, almoſt as ſoon as the corpſe was cold. There is one very ſingular accident in regard to this caſe, which is, that this ſtench allured all the cats from the neighbouring houſes, who came with great eagerneſs, and were hardly prevented from devouring the body.

Dr. Lewis has given us the following view of the general effects of *opium*. It renders the ſolids, while the operation of the *opium* continues, leſs ſenſible of every kind of irritation, whether proceeding from an internal cauſe, or from acrimonious medicines, as cantharides, and the more active mercurials, of which it is the beſt corrector. It relaxes the nerves; abating or removing cramps or ſpaſms, even thoſe of the moſt violent kind; and increaſing paralytic diſorders and debilities of the nervous ſyſtem. It incraſſates thin ſerous humours in the fauces and adjacent parts; by which means, it proves frequently a ſpeedy cure for ſimple catarrhs and tickling coughs; but in phthiſical and peripneumonic caſes, dangerouſly obſtructs expectoration, unleſs this effect be provided againſt by ſuitable additions, as ammoniacum and ſquills. It produces a fullneſs and diſtenſion of the whole habit; and thus exaſperates inflammations both internal and external, and all plethoric ſymptoms. It promotes perſpiration and ſweat; but reſtrains all other evacuations, unleſs when they proceed from relaxation and inſenſibility of the parts, as the colliquative diarrhœa in the advanced ſtate of hectic fevers. It promotes labour-pains, and delivery more effectually than the medicines of the ſtimulating kind uſually recommended for that purpoſe; partly perhaps by increaſing plenitude, and partly by relaxing the ſolids, or taking off ſpaſmodic ſtrictures. And indeed all the preceding effects are perhaps conſequences of one general power, being nearly allied to thoſe which natural ſleep produces.

The operation of *opium* is generally accompanied with a ſlow but ſtrong and full pulſe, and a ſlight redneſs, heat, and itching of the ſkin: it is followed by a weak and languid pulſe, lowneſs of the ſpirits, ſome difficulty of breathing, or a ſenſe of tightneſs about the breaſt, a ſlight giddineſs of the head, dryneſs of the mouth and fauces, and ſome degree of nauſea. Given on a full ſtomach, it commonly occaſions a nauſea from the beginning, which continues till the *opium* is rejected along with the contents of the ſtomach. Where the evacuation of acrid humours, accumulated in the firſt paſſages, is ſuppreſſed by it, great ſickneſs and uneaſineſs are generally complained of, till the ſalutary diſcharge either takes place again ſpontaneouſly, or is promoted by art.

An over doſe occaſions either immoderate mirth or ſtupidity, a redneſs of the face, ſwelling of the lips, relaxation of the joints, vertigo, deep ſleep, with turbulent dreams and ſtartings, convulſions, and cold ſweats. Geoffroy obſerves, that thoſe who recover, are generally relieved by a diarrhœa, or by a profuſe ſweat, which is accompanied with a violent itching. The proper remedies, beſides emetics, bliſters, and bleeding, are acids and neutral mixtures: Dr. Mead ſays, he has given, with extraordinary ſucceſs, repeated doſes of a mixture of ſalt of wormwood and lemon juice.

A long continued uſe of *opium* is productive of great relaxation and debility, ſluggiſhneſs, heavineſs, loſs of appetite, dropſies, tremors, acrimony of the humours, frequent ſtimulus to urine, and propenſity to venery. On leaving it off, after habitual uſe, an extreme lowneſs of the ſpirits, langour, and anxiety ſucceed; which are relieved by having again recourſe to *opium*, and, in ſome meaſure, by ſpirituous or vinous liquors. Lewis's Mat. Med.

The virtues of *opium*, internally taken, depend chiefly on its action on the ſtomach. There are many inſtances of terrible ſymptoms, and death itſelf, cauſed by narcotics, before they went out of the ſtomach, and without inflaming it, or cauſing any viſible change in it, far leſs vitiating the maſs of blood; and alſo the ſame ſymptoms being removed, and death prevented by vomiting. Dr. Alſton is alſo of opinion, 1. That the anodyne and hypnotic virtues of *opium* do not depend on its action on the brain or on the blood. 2. That it affects firſt and principally the nerves to which it is applied; next ſuch as more immediately communicate with them; then thoſe which ſerve for ſenſation and voluntary motion; and laſt of all, by conſent, the whole nervous ſyſtem. 3. That this impreſſion on the nerves differently affects the ſenſorium commune and the mind, according to its degree, and the nature and function of the nerves primarily acted upon. 4. That the primary, or firſt obſervable effect of the mechanical impreſſion of the narcotic part of *opium* on the nerves, is the relaxation of the fibres. Now as this relaxation of the nerves, and conſequently of the moving fibres, demonſtrates *opium* to be more than a palliative remedy in a great many diſeaſes; ſo it is not difficult by it to account for its bad as well as good effects. For by relaxing to a certain degree, it may prove anodyne, cordial, diaphoretic, hypnotic, &c. or cauſe ſtagnations, deliriums, lethargies, apoplexies, and death.

It does not appear that *opium* rarefies the blood, or that the operation of this medicine depends on ſuch a rarefaction. If it were, it ſeems likely that bleeding might be a remedy for the ſymptoms occaſioned by the abuſe of *opium*; but ſome authors affirm that veneſection is mortal, even the day after a narcotic has been taken.

Opium given too ſoon, to ſtop the operation of emetics, has been known to produce dangerous effects. See Med. Eſſ. Edinb. vol. iv. art. 6.

The reſinous part of *opium* being noxious in Mr. Godfrey's opinion, he propoſes to make liquid laudanum, by digeſting an ounce and a quarter of *opium*, in half a pint of diſtilled water, twenty-four hours, ſhaking the veſſel frequently; then filtres it, and adds three ounces of ſpirit of wine; after which, the other ingredients may be added at pleaſure.

Opium, externally applied, is diſcutient, anodyne, and ſoporiferous, and has almoſt the ſame effects as when taken inwardly; but, that it can make any part inſenſible of pain is not evident. Wedelius declares he never could obſerve any ſuch effects. One inconvenience following the moderate application of *opium*, mandragora, and hyoſciamus for pains of the eyes, taken notice of by Galen, is the midriaſis, or a preternatural dilatation of the pupils. Mr. Ray gives a notable inſtance of this kind, ariſing from the application of a leaf of the deadly night-ſhade to a cancerous ulcer a little below the eye. The uvea, in a night's time, entirely loſt its muſcular force, and was ſo relaxed, that the pupil, in the cleareſt light remained four times bigger than that of the other eye.

Opium rather coagulates than attenuates the blood. This favours what is affirmed by ſome authors, that the blood has been found congealed or frozen, as they expreſs it, about the hearts of thoſe who have been killed by *opium*.

The effects of *opium* on other animals, are not much different from its effects on men. Dr. Alſton put a few drops of a ſolution of *opium* into a frog's ſtomach, and the circulation of the blood of the animal being examined by a microſcope, no alteration was perceived in the blood, as to its conſiſtence, colour of the ſerum, magnitude, figure, or colour of the red globules, but its velocity was ſurpriſingly diminiſhed. In about half an hour, the blood regained its common celerity, and the frog its vigour. On giving the creature a ſecond doſe, the blood moved ſlower than it did the firſt time, and its velocity gradually decreaſing, ſtagnated firſt in the ſmaller, then in the larger veſſels, and in a quarter of an hour the frog expired. It is remarkable, that notwithſtanding the diminution of the velocity of the blood, the pulſe was not leſs frequent, and that even when the circulation ſtopt in the foot, the pulſe remained viſible by an undulatory motion. On opening the frog, its ſtomach was found full of a clear mucus, tinged with the *opium*, and every thing alſo ſeemed perfectly natural. This experiment was repeated ſeveral times, with the ſame appearances.

A dog being killed by an injection of a ſolution of *opium* into his crural vein, on opening his thorax the lungs were found ſound, but very ſmall, and white, without any blood in them. The heart was big, and all its great veſſels diſtended with blood; but nothing preternatural was obſerved in the brain or abdomen.

Willis, Sylvius, and Muller, look on *opium* as a coagulating poiſon, which fixes the ſpirits in the nerves. Wepfer and Pitcairn, on the contrary, maintain it to be a hot diſſolving poiſon, which ſubtilizes the blood, exalts and reduces it to vapours, which bloat up the arteries; and the bloated arteries, compreſſing the veins and nerves, ſhut up the paſſage of the ſpirits.

Tinctures of *opium* in water, wine, and proof ſpirit, have the ſame effects as the *opium* in ſubſtance; with this difference that they exert themſelves ſooner in the body, and are leſs diſpoſed to leave a nauſea on the ſtomach. See TINCTURE.

In a ſolid form, *opium* is ſometimes mixed with ſaponaceous or gummy ſubſtances, which promote its diſſolution in the ſtomach; and ſometimes with reſinous ones, which render its diſſolution and operation more gradual and ſlow: and to theſe is commonly added ſome aromatic ingredients, to prevent its occaſioning a nauſea. Of the firſt kind are the *ſoap* PILLS; and of the ſecond the PILLS *of ſtorax*.

OPIUM *Cyreniacum*, in the *Materia Medica*, a name given by ſome of the writers of the middle ages to *aſſa fœtida*. This was the *ſcordolaſaron* of the Greek writers of thoſe times, and was called *Cyreniacum* from the place whence it was principally brought. Avicenna tells us, that, in his time, it was brought principally from Kirvan, and that is Cyrene.

OPLITODROMI, Οπλιτοδρομοι, among the Greeks, a deſignation given to thoſe who ran in armour, at the Olympic, and other games.

The word comes from the Greek *οπλον*, *armour*, and *δρομος*, *a race*.

OPOBALSAMUM, in *Pharmacy*, a whitiſh juice, gum, or reſin, diſtilled from the branches of a tree, called *balſamum*, or the *balſam-tree*.

It is whitiſh, pretty thick, tranſparent, and of a ſmell approaching turpentine, but more agreeable.

It is the ſame with the celebrated *balſamum verum*, or balm of the Levant.

It obtains a place among the alexipharmics, and is a good ingredient in the theriaca Andromachi, and mithridate; very ill ſupplied with the expreſſed oil of mace for a ſuccedaneum, which does not at all come up to the ſubtilty and activity of its parts, but is of a much heavier texture.

This, as all other balſams, is ſuppurative, deterſive, and incarnating, applied outwardly to tumors, ulcers, or green wounds. See BALSAM *of Gilead*.

OPOCALPASON, OPOCARPASωN, *οποκαλπασον*, *οποκαρπασον*, the juice of a tree called *calpaſi*; this juice reſembles myrrh, but is poiſonous and deadly, inducing a ſtrangulation. Galen, de Antidot. lib. i. ſays, that in the courſe of his time, he had obſerved the fatal effects in many who had ignorantly taken myrrh mixed with *opocalpaſum*. For they who prepare antidotes, he ſays, purpoſely mix this as an ingredient, taking it for the beſt ſort of myrrh; becauſe they had obſerved it to be a very good medicine in collyria, where it attenuates ſanies without corroſiveneſs, and ſometimes removes an incipient cataract. And if you put, ſays he, this kind of myrrh into a plaſter, cerate, or any attenuating medicine, to be outwardly applied, you will increaſe its virtue, but the effects of it taken into the body are deadly. James.

OPODELDOC, in the *Materia Medica*, the name of a plaſter ſaid to be invented by Mindererus, though often mentioned by Paracelſus. There is a famous popular ointment, which goes by the name of *opodeldoc*, which is ſaid to be thus prepared.

Take of the root of marſhmallows, comfrey, gentian, long birthwort, angelica, of each one ounce and a half; of the herbs ſanicle, ladies mantle, mouſe-ear, colts-foot, ſnakeroot, periwinkle, bruiſed, of each half a handful; of the leaves of roſemary, ſage, and lavender, of each one handful; juniper berries, two ounces; cumin ſeeds, one ounce; camphor and caſtor powdered, of each one ounce and a half; and of ſpirit of wine, three pints and a half.

Put all into a glaſs cucurbit, well luted, and digeſt for ten hours in balneo Mariæ, that is in hot water, but not to boil, then ſtrain; and the ſpirit of wine being ſufficiently impregnated with the ingredients, then add one pound of Caſtile ſoap ſhaved thin; digeſt in the ſame manner as before, until the ſoap is diſſolved.

Lute the juncture carefully, with two or three doubles of paper, daubed over with the white of eggs, and tied about with thread; the luting being dried, then digeſt in balneo Mariæ for ten hours, the matraſs being fixed in the middle of the kettle, with a layer of ſtraw under it, to keep it at the diſtance of two inches from the bottom: for the firſt eight hours, keep the water ſo hot about it, that you can ſcarce hold your finger therein; and the two other hours augment the heat, but not ſo much as to make the water boil.

After the ſpirit of wine is thoroughly impregnated with the tincture of the roots, herbs, leaves, and powders, cool it gently, and ſtraining it through a linen cloth, pour it again into the matraſs, with one pound of Caſtile ſoap, ſhaved thin; then fit the veſſel of rencounter to the matraſs; lute the junctures, and digeſt as before, till the ſoap is entirely mixed with the ſpirit, and the whole reduced to an ointment; then take out the matraſs, and ſuffer it to cool.

If the doſes and other directions are duly obſerved, it will be of the conſiſtence of an unguent, neither too thick nor thin, and the method of trying if it is truly prepared, is, to rub ſome of it on your hand, which it will immediately penetrate, leaving only a greeniſh ſtain; though the natural colour of the ointment is brown. It is excellent in ſtrains, relaxations of the ſinews in horſes, as well as in the human kind; alſo in all pains, numbneſs, weakneſs in the joints, or other parts, being well rubbed in. James.

The Edinburgh Pharmacopœia directs the *opodeldoc* to be made in a much more ſimple manner, viz. by digeſting two ounces and a half of Spaniſh ſoap, in a pint of rectified ſpirit of wine, and afterwards adding half an ounce of camphor, a dram of oil of roſemary, and a dram of oil of origanum.

OPOPANAX, Οποπαναξ, formed from οπος, *juice*, and παναξ, the name of the plant which yields it, in *Pharmacy*, a concrete gummy reſinous juice, yellow without ſide, white within, fatty, and brittle, of a bitter, acrid, and ſomewhat nauſeous taſte, and a very ſtrong, diſagreeable ſmell.

The Latins call it *panax Herculeum*, from Hercules, who is ſuppoſed to have firſt diſcovered its ſpecific virtues. It is one of the three celebrated panaceas, or univerſal medicines, to which the ancients attributed ſuch wonderful virtues. The two others are the Aſclepium and Chironium; the firſt found by Æſculapius, the ſecond by Chiron.

The gum *opopanax* flows by inciſion from the roots of a plant which is brought from Turkey, and the Eaſt Indies; growing abundantly in Achaia, Bœotia, Phocis, and Macedonia: while it is liquid, it is white; but as it dries and hardens, it aſſumes a beautiful golden yellow. There are three kinds of it imported; that in tears, ſuppoſed to be a ſpecies of *all-heal*, or WOUND-*wort*; that in the maſs; and that counterfeited, or flatted. The firſt is the beſt, and the ſecond is the better, as it has the more tears; the third is a rank ſophiſtication, and good for little.

Of an ounce of this gum-reſin, two drams and two ſcruples are ſoluble by ſpirit of wine, and three drams two ſcruples are ſoluble by water. Both water and ſpirit, by diſtillation with *opopanax*, acquire its flavour; but no oil is thereby ſeparated. *Opopanax* is an uſeful attenuant and deobſtruent, and in conſiderable doſes looſens the belly. It is given from a ſcruple to a dram with the ſame intentions as ammoniacum or galbanum; and, joined in ſmaller doſes, is an auxiliary to thoſe and the other deobſtruent gums. It is alſo uſed in the cure of wounds; whence it enters the compoſition of the unguentum divinum, with the galbanum, ammoniac, and bdellium.

OPOPIA, a name given by ſome anatomical writers to the bones which form the receptacle of the eyes.

OPORICE, a name given by the ancients to a medicine compoſed of the autumnal fruits, and extolled for its great virtues againſt weakneſſes of the ſtomach and dyſenteries.

It was compoſed of five quinces with their ſeeds, as many pomegranates, a pint of ſervices, a pint of Syrian ſumach, and half an ounce of ſaffron; all theſe were put together into a gallon of muſt, and boiled over a very gentle fire to the conſiſtence of honey, with great care to avoid burning.

OPOS, a word uſed by the old medical writers to expreſs the juices of plants, whether flowing ſpontaneouſly, or by means of inciſions. It is uſed by Hippocrates to expreſs the juice of ſilphium, which was called ſimply the juice, by way of eminence, as we call the quinquina bark ſimply the bark. Others have made it ſignify the juice of the fig-tree, and the caprificus, which they had in frequent uſe to curdle their milk.

OPOSSUM, or POSSUM, in *Zoology*, the name of a very remarkable American animal, the DIDELPHIS *marſupialis* of Linnæus, deſcribed by various authors, under the names of *maritacaca*, *carigoi*, *ropoza*, *carigueya*, *jupatuma*, *tlaquatzin*, *ſarigoi*, and *ſemivulpa*. See *Tab.* IV. *Quad. fig.* 43.

It is a creature of the ſize of a large cat; its head is ſhaped like that of a fox; its noſe is ſharp, and its upper jaw longer than the under; its teeth are ſmall, but like thoſe of the fox, and it has two long ones like the hare, in the front of the mouth; its eyes are very beautiful, ſmall, black, round, and vivid; its ears long, ſmooth, and very ſoft, placed erect, like thoſe of the fox, and very thin and tranſparent, of a black colour edged with white; it has black whiſkers, like thoſe of a cat; and has other hairs of the ſame kind on the other parts of its face, and over its eyes; its tail is round, and a foot long, and is of great ſervice to it, as it uſes it to twiſt round the branches of trees, hanging itſelf to them by that means; the tail is hairy near the inſertion, but naked all the other part, covered with ſmall ſcales, and is partly black, partly of a browniſh white; its hinder feet are conſiderably longer than the fore ones, and each has five toes; they much reſemble hands, and the nails are white and crooked, the hinder one being, as in the monkey kind, the longeſt; its head, and legs, as Hernandez obſerves, ſomething reſemble thoſe of the badger; it has a broad, longitudinal, black ſtreak, on the face; it is of a blackiſh colour with a mixture of a brown and grey on the back and ſides, and has ſomewhat of a faint yellowiſh caſt on the belly.

What diſtinguiſhes this creature, however, from all the other animals of the world, is, that it has a bag or pouch into which it receives its young as ſoon as delivered; this is a ſort of open uterus, and is placed under the belly near the hinder legs; in this the young are ſheltered till they are able to ſhift for themſelves, and when they begin to be ſtrong enough they frequently run out and return in again. The creature is of a ſtinking ſmell, like our fox or martin. It feeds on ſugar canes, and ſome other vegetables; but not wholly on theſe, for it frequently preys on birds which it catches on the trees, and often plays the fox's trick of ſtealing poultry.

The male *opoſſum*, as well as the female, has this kind of pouch under its belly, and takes upon himſelf, at times, the care of carrying and preſerving the young in caſe of any impending danger. Phil. Tranſ. N° 239. p. 123.

The fleſh of the old animals is very good, like that of a ſucking pig; the hair is dyed by the Indian women, and wove into garters and girdles: and the ſkin is very fœtid. When the Endeavour was refitting in Endeavour river, in New Zealand, Mr. Banks found here a female animal of the *opoſſum* kind, and with it two young ones. They reſembled the remarkable one which Buffon has deſcribed in his Natural Hiſtory, by the name of PHALANGER, but were not the ſame. Mr. Banks thinks Buffon miſtaken in ſuppoſing this tribe to be peculiar to America; and that it is more probable, as Pallas has obſerved in his Zoology, that the PHALANGER itſelf is a native of the Eaſt Indies; for this animal which Mr. Banks ſpeaks of, reſembled it in the extraordinary conformation of the feet, in which it differs from animals of every other tribe.

OPPILATION, in *Medicine*, the act of obſtructing or ſtopping up the ducts, or paſſages of the body, by redundant or peccant humours.

The word is chiefly uſed for obſtructions of the lower belly.

Viſcid, heavy foods, difficult of digeſtion, are *oppilative*; they do not paſs off well, but ſtop in the mouth of the veſſels.

OPPILATIVE. See DEOPPILATIVE.

OPPONENT, a perſon who withſtands or oppoſes another.

The term is chiefly uſed in ſpeaking of ſcholaſtic or academic diſputes or exerciſes, where a perſon who oppoſes a theſis, or impugns it by his objections, is called *opponens*, *opponent*.

OPPOSER, *foreign*. See FOREIGN *Oppoſer*.

OPPOSITES, *oppoſita*, among *Logicians*, are ſuch things as differ among themſelves; but ſo as not to differ in like manner from ſome third.

By which circumſtance, *oppoſites* differ from *diſparates*.

The ſchoolmen reckon four kinds of *oppoſites*; viz. relatively, contrarily, privatively, and contradictorily *oppoſites*.

Either, ſay they, the oppoſition is between ens and non ens; if the former, it is either with a dependent ens, which makes a relative oppoſition, the loweſt of all; or an independent one, which is a contrary oppoſite: if a non ens, it is either with a non ens ſecundum quid, which is privative, or with a non ens ſimply, which is the higheſt oppoſition.

OPPOSITES, *oppoſita*, complexly taken, are propoſitions that claſh with each other. As, man is animal; and man is not an animal.

OPPOSITE *angles*. See ANGLE.

If a line S T (*Tab.* II. *Geometry*, *fig.* 46.) meet two other lines, A P and B R, in different points A and B, but in the ſame direction; the angles u and y, as alſo z and y, hereby formed, are called *oppoſite* angles; particularly u, the *external oppoſite* angle, and z, the *internal oppoſite* angle of y.

OPPOSITE *cones* denote two ſimilar cones, vertically *oppoſite*, that is, having the ſame common vertex, as well as the ſame axis. See CONE.

OPPOSITE *ſections* are two hyperbolas made by cutting two *oppoſite* cones by the ſame plane. See HYPERBOLA.

OPPOSITION, in *Geometry*, the relation of two things, between which a line may be drawn perpendicular to both.

OPPOSITION, in *Logic*, the quality of diſagreement between propoſitions which have the ſame ſubject, and the ſame attribute.

Oppoſition is ſaid, by logicians, to be either *complex* or *incomplex*.

Incomplex, or *ſimple oppoſition*, is the diſagreement of two things, which will not ſuffer each other to be in the ſame ſubject.

Thus *heat* is oppoſed to *cold*, *ſight* to *blindneſs*, &c. Which *oppoſition* has already been obſerved to be of four kinds.

Complex oppoſition is defined by Ariſtotle, to be the affirming and denying the ſame predicate of the ſame ſubject, not taken equivocally, but for the ſame, in the ſame manner, and at the ſame time, as, Socrates is learned; and Socrates is not learned.

The later ſchoolmen, deviating from their maſter, define *oppoſition* an affection of enunciations, whereby two abſolute propoſitions, the ſame extremes being ſuppoſed in the ſame order and number, and underſtood without any ambiguity, of the ſame thing, oppoſe each other, either in reſpect of quantity or of quality, or of both. According to the former definition, there are three ſpecies of *oppoſition, contrary, ſubcontrary*, and *contradictory:* according to the ſecond, a fourth ſpecies is admitted, viz. *ſubaltern.*

To know how and wherein propoſitions are oppoſite, they muſt be compared, in quantity and quality, all the ways they can be compared in. If they be oppoſite both in quality and quantity, i. e. if the one be affirmative, and the other negative; the one univerſal, the other particular; they are ſaid to be contradictory; v. gr. no pleaſure is allowed; ſome pleaſure is allowed.

If they be only oppoſite in quality, and not in quantity, they are called *contraries*, if univerſal: and *ſubcontraries*, if particular; v. gr. all uſe of wine is evil; no uſe of wine is evil. Some means of preſerving reputation are allowed; ſome means of preſerving reputation are not allowed.

If the propoſitions be only oppoſite in quantity, they are called *ſubalterns*; v. gr. every man is liable to ſin; ſome man is liable to ſin. But this laſt is no proper *oppoſition*; inaſmuch as the univerſal propoſition always includes the particular one.

Single propoſitions, which can only be oppoſed in quality, are reducible to contrary ones.

The eſſential properties of propoſitions, conſidered with regard to their *oppoſition*; are, 1. That of two contradictory propoſitions, there is one always true, and another falſe. 2. Two contradictory propoſitions can never be both true; but may be both falſe. 3. Subcontrary propoſitions may be all true at the ſame time; as happens when the attribute is accidental to the ſubject: but when it is eſſential to it, the one is true, the other falſe. 4. Subalterns may be either true or falſe at the ſame time; or the one may be true, the other falſe. If the attribute be eſſential to the ſubject, the ſubaltern affirmatives are true, and the negatives falſe; but if the negatives deny the ſubject an attribute incompatible with the ſubject, they will be both true. When the attribute is accidental to the ſubject, the univerſal ſubaltern is ordinarily falſe, and the particular one true.

Opposition, in *Rhetoric*, denotes a figure, whereby two things are joined together, which appeared incompatible; as when Horace ſays, a *wiſe folly.*

In Bouhours's notion, this figure, which ſeems to deny what it eſtabliſhes, and contradicts itſelf in appearance, is very elegant. See Antithesis.

Opposition, in *Aſtronomy*, is that aſpect or ſituation of two ſtars or planets, wherein they are diametrically oppoſite to each other, or 180°, that is, a ſemicircle, apart.

When the moon is diametrically oppoſite to the ſun, ſo that ſhe ſhews her whole illumined face; ſhe is ſaid, with regard to the ſun, to be in *oppoſition*; and ſhe is then ſaid to be *in her full*, and ſhines all night long. See Moon and Phases.

Eclipſes of the moon never happen but when ſhe is in *oppoſition* with the ſun, and when they both meet in or near the nodes of the ecliptic.

Mars in his *oppoſition* to the ſun is nearer the earth than he is to the ſun.

OPSONOMUS, in *Antiquity*, a magiſtrate of Athens, whereof there were two or three; choſen out of the ſenate or council.

Their office was to inſpect the fiſh-market, and to take care that every thing was done in order, and according to the laws.

OPTATIVE, in *Grammar*, the third mood in the conjugations of verbs, ſerving to expreſs an ardent deſire or wiſh for any thing.

Inſtead of a particular mood, or a particular ſet of inflections to expreſs this deſire, the Engliſh, Latins, &c. expreſs it by an adverb of wiſhing prefixed to it. The Latins by *utinam*; the French by *plût à Dieu*; and the Engliſh by *would to God*, &c.

In theſe languages, ſetting aſide the adverb, the *optative* is the ſame with the ſubjunctive; the inflexion of the verb, which make what we call the moods, being the ſame in both.

Indeed, in the Greek, the wiſh is expreſſed by a particular inflexion, thence called *optative*; and in the French, Spaniſh, and Italian, there is ſomething like it; their triple ſenſes ſerving the ſame purpoſe. But the *optative* mood may be ſafely retrenched from the Latin and Engliſh.

OPTERIA, formed from οπτομαι, *I ſee*, among the *Ancients*, preſents made to a child the firſt time a perſon ſaw it.

Opteria was alſo uſed for the preſents which the bridegroom made his bride when ſhe was conducted to him; this being the firſt time he ſaw her. See Barthol. de Puerp. vet.

OPTIC or **Optical**, ſomething that relates to vision, or the ſenſe of ſeeing.

Optic *angle.* See Angle.

Optic *axis.* See Axis.

Optic *chamber.* See Camera *Obſcura.*

Optic *glaſſes* are glaſſes ground either concave or convex; ſo as either to collect or diſperſe the rays of light; by means whereof viſion is improved, and the eye ſtrengthened, preſerved, &c.

For the manner of grinding and poliſhing *optic glaſſes*; ſee Grinding, Polishing, Glass, &c. For their phenomena, ſee Lens, Mirror, &c.

The principal among *optic glaſſes* are *teleſcopes, microſcopes, ſpectacles, reading glaſſes, magic lanterns*, &c. See the conſtruction and uſe of each under its proper article, Telescope, Microscope, Spectacle, Magic *Lantern*, &c.

OPTICAL *inequality*, in *Aſtronomy*, is an apparent irregularity in the motions of far diſtant bodies; ſo called, becauſe not really in the moving bodies, but ariſing from the ſituation of the ſpectator's eye; ſo that if the eye were in the centre, it would always ſee the motions uniform.

The *optical inequality* may be thus illuſtrated: ſuppoſe a body revolving in the periphery of a circle ABDEFGQP (*Tab.* V. *Optics, fig.* 85.) and moving through equal arches AB, BD, DE, EF, in equal times; and ſuppoſe the eye in the plane of the ſame circle, but at a diſtance from it, viewing the motion of the body from O: when the body goes from A to B, its apparent motion is meaſured by the angle AOB, or the arch HL, which it will ſeem to deſcribe. But in an equal time, while it moves through the arch BD, its apparent motion will be determined by the angle BOD, or the arch LM, which is leſs than the former arch HL. And when arrived at D, it will be ſeen at the point M of the line NLM. But it ſpends the ſame time in deſcribing DE, as it does in AB or BD; and when arrived at E, it is ſtill ſeen at M; appearing ſtationary in all the ſpace from D to E. When it arrives at F, the eye will ſee it in L; and at G, it will appear at H; ſo it will ſeem to have gone retrograde: and, laſtly, from Q to P, it will again appear ſtationary.

Optic *nerves*, the ſecond pair of nerves, ſpringing from the crura of the medulla oblongata, and paſſing thence to the eye. See *Tab. Anat.* (*Oſteol.*) *fig.* 5. *lit.* i. i.

Theſe nerves approach, by degrees, in their receſs from their origin; and at length meet, in the baſis of the brain, near the infundibulum. Thence they again ſeparate, but without decuſſating; and proceed one to each eye.

They are covered with two coats, which they take from the dura and pia mater; and which, by their expanſions, form the two membranes of the eye, called the *uvea* and *cornea.*

The *retina*, which is a third membrane, and the immediate organ of ſight, is only an expanſion of the fibrous, or inner, and medullary part of theſe nerves.

The conſtruction of the *optic* nerve ſeems to be different from that of the other nerves, which all appear to conſiſt of hard fibres: for this, before it enters the orbit of the eye, is only a coat or cover formed by the pia mater, and including a production of the medulla of the brain, which is eaſily ſeparated from it. At its entrance into the eye, it takes another coat from the dura mater: which two coats are bound together by exceeding fine filaments: that from the pia mater is continued in the choroides, and that from the dura mater in the uvea.

From their entrance within the orbit, to the ball of the eye, the medulla, incloſed under the two coats, is ſeparated into a number of little cells anſwering to each other. See Vision.

Optic *pencil.* See Pencil *of Rays.*

Optic *place* of a ſtar, &c. See Place.

Optic *pyramid*, in perſpective, is the pyramid ABCO (*Tab. Perſpective, fig.* 3.) whoſe baſe is the viſible object, ABC; and its vertex in the eye O; formed by rays drawn from the ſeveral points of the perimeter to the eye.

Hence alſo may appear what is meant by *optic* triangle.

Optic rays are particularly uſed for thoſe wherewith an *optic* pyramid, or *optic* triangle, is terminated. As OA, OC, OB, &c.

OPTICORUM *nervorum thalami.* See Thalami.

OPTICS, *optica*, is properly the ſcience of direct vision.

Optics is alſo uſed, in a larger ſenſe, for the ſcience of viſion, or viſibles in general.

In which ſenſe, *optics* includes CATOPTRICS, and DIOPTRICS: and even PERSPECTIVE.

Optics, in its more extenſive acceptation, is a mixed mathematical ſcience, which explains the manner wherein viſion is performed in the eye; treats of ſight in the general; gives the reaſons of the ſeveral modifications or alterations, which the rays of light undergo in the eye; and ſhews why objects appear ſometimes greater, ſometimes ſmaller, ſometimes more diſtinct, ſometimes more confuſed, ſometimes nearer, and ſometimes more remote. In this extenſive ſignification, it is conſidered by ſir Iſaac Newton in his admirable work called Optics.

Optics makes a conſiderable branch of natural philoſophy; both as it explains the laws of nature, according to which viſion is performed; and as it accounts for abundance of phyſical phenomena, otherwiſe inexplicable. For what can be determined about light, colours, tranſparency, opacity, meteors, the rainbow, parhelia, &c. but on the principles of *optics?* What about the nature of the ſtars? The ſtructure of the mundane ſyſtem? The motions of the planets? The eclipſes of the luminaries? &c. *Optics*, therefore, makes a conſiderable part of aſtronomy. Euclid has written on the ancient *optics* and catoptrics: dioptrics were unknown to the ancients. F. Honorat. Fabri has an abridgment of *optics*, catoptrics, and dioptrics; father Eſchinard has given a century of problems in *optics*; Vitellio and Alhazen have performed well on the elements of *optics*. Father Kircher has a large volume on the ſecrets of *optics*, of light and ſhadow, and their ſurpriſing effects, which paſs on the people for magic. We have alſo *l'Optrique* & Catoptrique of F. Merſenne, Paris, 1651. Dioptrique Oculaire of Father Cherubin, Paris, 1671, fol. Chriſt. Sheineri *Optica*, Lond. 1652. Jacobi Gregorii *Optices*. Barrovii Lectiones *Opticæ*, Lond. 1663. Joh. Bapt. Porta De Refractione *Optices*, Lond. 1669, Principe Generale de *l'Optique*, by Mr. Leibnitz, in the Leipſic Acts, 1682. L'Occhiale all' Occhio, or Dioptrica Practica, Carol. Ant. Mancini, Bologna, 1660, 4to. Phyſico-matheſis de Lumine, Coloribus, & Iride, per F. Mar. Grimaldi, Bononiæ, 1665. 4to. Cogitationes Phyſico-mechanicæ de Natura Viſionis, per Joh. Ott. Scaphuſam, Heidel, 1670, 4to.; and, which ought to be named firſt, the great ſir Iſaac Newton's *Optics*, Latin and Engliſh, 4to. and 8vo. We have alſo an excellent and comprehenſive work on *Optics*, by Dr. Smith, 4to. and an elaborate Hiſtory of the Preſent Sate of Diſcoveries relating to Viſion, Light, and Colours, by Dr. Prieſtley, 4to. 1772.

From *optics* likewiſe ariſes *perſpective*, all the rules whereof have their foundation in *optics*. Indeed Tacquet makes perſpective a part of *optics*; though John archbiſhop of Canterbury, in his Perſpectiva Communis, calls *optics*, catoptrics, and dioptrics, by the name *perſpective*.

OPTIMATES, in *Antiquity*, one of the diviſions of the Roman people, oppoſed to *populares*.

According to Tully's deſcription, the *optimates* were the beſt citizens, or thoſe who deſired their actions might be approved by the better ſort; and the populares thoſe, who, out of a thirſt of vain-glory, did not ſo much conſider what was right, as what would pleaſe the populace, and get an intereſt in them.

Others rather make the *optimates* to be the vigorous aſſertors of the dignity of the chief magiſtrate, and the ſticklers for the grandeur of the ſtate; who cared not if the inferior members ſuffered, if it were for the advancement of the commanding powers; and the populares, thoſe who courted the favour of the populace, and encouraged them to demand larger privileges, to bring matters nearer to a level.

OPTIO, among the Romans, an aſſiſtant or leutenant belonging to every centurion.

They were called *optiones*, from *opto*, *I chooſe*; becauſe it was in the option of the centurion to chooſe whom he pleaſed for this employment; though at firſt it was otherwiſe, the *optio* being choſen by the tribune or chief commander of the legion.

The *optiones* were not peculiar to the camp, but were uſed alſo in many other offices of life.

OPTION, the power or faculty of wiſhing, or chooſing; or the choice a perſon makes of any thing.

When a new ſuffragan biſhop is conſecrated, the archbiſhop of the province, by a cuſtomary prerogative, claims the collation of the firſt vacant benefice, or dignity, in that ſee, according as he ſhall chooſe; which choice is called the archbiſhop's *option*.

But in caſe the biſhop dies, or is tranſlated, before the preſent incumbent of the promotion choſen by the archbiſhop ſhall die or be removed, it is generally ſuppoſed that the *option* is void; inaſmuch as the granter, ſingly and by himſelf, could not convey any right or title beyond the term of his continuance in that ſee. And if the archbiſhop dies before the avoidance ſhall happen, the right of filling up the vacancy ſhall go to his executors or adminiſtrators.

OPULUS, in *Botany*. See WAYFARING-*tree*.

OPUNTIA, in *Botany*. See *Prickly* PEAR.

OR, in *Heraldry*, *yellow*, or the colour of gold.

Without this colour, or argent, ſilver, there can be no good armory.

In the coats of nobles, it is called *topaz*; and in thoſe of ſovereign princes, *ſol*. It is repreſented in engraving by ſmall points, or dots, all over the field, or bearing: as in *Tab*. II. *Herald*. *fig*. 73.

It is accounted the ſymbol of wiſdom, temperance, faith, force, conſtancy, &c.

*Toiſon d'*OR. See TOISON.

ORA, in *Antiquity*, was a term equivalent to an ounce; but it has been much debated among our antiquaries, whether the *ora*, the mention of which ſo often occurs, was a coin, or only money of account. Dr. Hickes obſerves, that the mode of reckoning money by marks and *oras* was never known in England till after the Daniſh ſettlements; and by examining the old nummulary eſtimates among the principal Gothic ſtates upon the Baltic, it appears, that the *ora* and ſolidus were ſynonymous terms, and that the *ora* was the eighth part of the mark. From ſeveral of the Daniſh laws, it likewiſe appears that the Daniſh *ora*, derived by corruption from *aureus*, was the ſame as the Frank ſolidus of twelve pence. As a weight, the *ora* was regarded as the uncia or unit, by which the Daniſh mark was divided; and in Domeſday-book the *ora* is uſed for the ounce, or the twelfth part of the nummulary Saxon pound, and the fifteenth of the commercial: as a coin, it was an aureus, or the Frank ſolidus of twelve pence. And from the accidental coincidence of the Frank aureus with the eighth part of their mark, the Danes probably took occaſion to give it the new name of *ora*. There was another *ora*, mentioned in the rolls of the 27th of Henry III. the value of which was ſixteen pence; and this was probably derived from the half mancus of the Saxons. Such, in all appearance, was the original of theſe two *oras*; as there were no *aurei* of that period, to which theſe two denominations of money of ſixteen and twelve pence can poſſibly be aſcribed. It is obſerved farther, that the name *ora* diſtinguiſhes the gold coins in ſeveral parts of Europe to this day. The Portugueſe *moidore* is nothing elſe but *moeda d'oro*, from the Latin *moneta de auro*: the French *Louis d'ores* come from the ſame uſe of the word, and owe their appellation to the *ora*. Clarke on Coins, p. 307, &c.

ORACH, *atriplex*, in *Botany*, a genus of the *polygamia monoecia* claſs. Its characters are theſe: it has female and hermaphrodite flowers on the ſame plant; the hermaphrodite flowers have a permanent empalement of five leaves, with membranaceous borders; they have no petals, but five awl-ſhaped ſtamina; in the centre is placed the orbicular germen, which afterward becomes an orbicular compreſſed ſeed, ſhut up in the five cornered empalement; the female flowers have a two-leaved empalement, without petals or ſtamina; in the center is a compreſſed germen, which becomes an orbicular compreſſed ſeed, incloſed in the heart-ſhaped valves of the empalement. Miller particularizes three ſpecies; acknowledging that there are ſeveral more. Linnæus enumerates twelve ſpecies.

The pale green *orach* is ſometimes cultivated in gardens as a culinary herb, being uſed as ſpinach, and, by ſome, much preferred to that herb; but there are few in England that are fond of it. It is to be ſown in ſpring as ſpinach, and muſt be eaten while it is young; for when it is run up to ſeed, it is very ſtrong. If ſuffered to ſcatter its ſeeds in a garden, it will make itſelf a laſting inhabitant, without farther trouble: the ſeeds often remain many years in the ground, and every time it is turned up, ſend up new plants. Miller.

The herb itſelf bruiſed, and applied to the parts in which thorns or other ſmall ſplinters have plunged, extracts them, and cures the wound occaſioned by them. When applied to the navel, it diſlodges and expels worms; it is alſo uſed in mollifying clyſters, and in ſuch dreſſings as are intended to mitigate and allay pain; its diſtilled water, mixed with aloes, ſtops hæmorrhages, and cures ſcald heads; the ſeeds are purgative, but often act like an emetic. The country people in Lombardy make pies of the herb, in conjunction with butter and cheeſe, which they look upon as excellent food. In Virginia the inhabitants prepare a ſalt from the ſtalks of this herb, which they uſe in dreſſing their victuals.

There is a ſpecies of this plant called *atriplex olida*, *ſtinking orach*. It grows upon dunghills, and other waſte places, and has a ſtrong, fetid, fiſhy ſmell. This is a herb particularly appropriated to the female ſex, being aperitive, deobſtruent, and uſeful in uterine diſorders; good to promote the menſtrual evacuations, to expel the after-birth, to help child-bed purgations, to appeaſe ſtrangulation of the womb, and to take off hyſteric fits. It is uſually given in a decoction; and there is a ſyrup kept in the ſhops, made with the juice of this plant, and ſugar.

ORACH, *berry-bearing*. See BLITE.

ORACH, *creeping ſhrubby*. See ATRAPHAXIS.

ORACH, *wild*. See GOOSE-*foot*.

ORACLE, an anſwer, uſually couched in very dark and ambiguous terms, ſuppoſed to be given by dæmons of old, either by the mouths of their idols, or by thoſe of their prieſts, to the people, who conſulted them on things to come.

The Pythian was always in a rage when ſhe gave *oracles*. Ablancourt obſerves, that the ſtudy or reſearch of the meaning of *oracles* was but a fruitleſs thing; and that they were never underſtood till after their accompliſhment. Hiſtorians relate, that Crœſus was tricked by the ambiguity and equivocation of the *oracle*:

> Κροισος Αλυν διαβας μεγαλην αρχην καταλυσει.

Thus rendered in Latin:

> *Crœſus Halym ſuperans magnam pervertet opum vim.*

ORACLE is alſo uſed for the DÆMON who gave the anſwer, and the place where it was given.

The principal *oracles* of antiquity are that of Abæ, mentioned by Herodotus; that of Amphiaraus; that of the Branchidæ at Didymus; that of the camps at Lacedæmon; that of Dodona; that of Jupiter Ammon; that of Nabarca, in the country of the Anariaci, near the Caſpian Sea; that of Trophonius, mentioned by Herodotus; that of Chryſopolis; that of Claros, in Ionia; that of Mallos; that of Patarea; that of Pello in Macedonia; that of Phaſelides in Cilicia; that of Sinope in Paphlagonia; that of Orpheus's head, mentioned by Philoſtratus, in his Life of Apollonius, &c.

But of all *oracles*, the *oracle* of Apollo Pythius at Delphi was the moſt celebrated; this was conſulted in the *dernier reſſort*, by moſt of the princes of thoſe ages. See PYTHIA.

Mr. Bayle obſerves, that at firſt it gave its anſwers in verſe; and that it fell at length to proſe, upon the people's beginning to laugh at the poorneſs of its verſification.

It is a pretty general opinion among the more learned, that *oracles* were all mere cheats and impoſtures; either calculated to ſerve the avaricious ends of the heathen prieſts, or the political views of the princes.

M. Bayle ſays poſitively, they were mere human artifices, in which the devil had no hand. He was ſtrongly ſupported by Van Dale, and M. Fontenelle, who have written expreſly on the ſubject.

There are two points in diſpute on the ſubject of *oracles*; viz. whether they were human, or diabolical machines; and whether or no they ceaſed upon the publication or preaching of the Goſpel?

Plutarch has a treatiſe on the ceaſing of ſome *oracles*; and Van Dale, a Dutch phyſician, has a volume to prove they did not ceaſe at the coming of Chriſt; but that many of them ceaſed long before; and that others held till the fall of Paganiſm, under the empire of Theodoſius the Great; when Paganiſm being diſſipated, theſe inſtitutions could no longer ſubſiſt.

Van Dale was anſwered by a German, one Mœbius, profeſſor of theology at Leipſic, in 1685. M. Fontenelle eſpouſed Van Dale's ſyſtem, and improved upon it in his Hiſtory of *Oracles*; and ſhewed the weakneſs of the argument uſed by many writers in behalf of Chriſtianity, drawn from the ceaſing of *oracles*.

It was Euſebius who firſt endeavoured to perſuade the Chriſtians, that the coming of Jeſus Chriſt had ſtruck the *oracles* dumb; though it appears from the laws of Thodoſius, Gratian, and Valentinian, that the *oracles* were ſtill conſulted as low as the year 358. Cicero ſays, the *oracles* became dumb, in proportion as people, growing leſs credulous, began to ſuſpect them for cheats.

Plutarch alledges two reaſons for the ceaſing of *oracles*: the one was Apollo's chagrin; who, it ſeems, took it in dudgeon to be interrogated about ſo many trifles. The other was, that in proportion as the genii, or dæmons, who had the management of the *oracles*, died, and became extinct, the *oracles* muſt neceſſarily ceaſe. He adds a third and more natural cauſe for the ceaſing of *oracles*; viz. the forlorn ſtate of Greece, ruined and deſolated by wars. For, hence, the ſmallneſs of the gains let the prieſts ſink into a poverty and contempt too bare to cover the fraud.

Moſt of the fathers of the church took it to be the devil that gave *oracles*; and looked on it as a pleaſure he took to give dubious and equivocal anſwers, in order to have a handle to laugh at them. Voſſius allows that it was the devil who ſpoke in *oracles*; but thinks that the obſcurity of his anſwers was owing to his ignorance as to the preciſe circumſtances of events. That artful and ſtudied obſcurity, wherein the anſwers were couched, ſays he, ſhewed the embarraſs the devil was under; as thoſe double meanings they uſually bore, provided for their accompliſhment. Where the thing foretold did not happen accordingly, the *oracle*, forſooth, was miſunderſtood.

Euſebius has preſerved ſome fragments of a philoſopher, called Oenomaus; who, out of reſentment for his having been ſo often fooled by the *oracles*, wrote an ample confutation of all their impertinencies: "When we come "to conſult thee, ſays he to Apollo, if thou ſeeſt what "is in futurity, why doſt thou uſe expreſſions that will "not be underſtood? Doſt thou not know, that they "will not be underſtood? If thou doſt, thou takeſt pleaſure in abuſing us; if thou doſt not, be informed of "us, and learn to ſpeak more clearly. I tell thee, that "if thou intendedſt an equivoque, the Greek word "whereby thou affirmedſt, that Crœſus ſhould overthrow "a great empire, was ill choſen; and that it could ſignify nothing but Crœſus's conquering Cyrus. If things "muſt neceſſarily come to paſs, why doſt thou amuſe "us with thy ambiguities? What doſt thou, wretch as "thou art, at Delphi; employed in muttering idle prophecies!"

But Oenomaus is ſtill more out of humour with the *oracle*, for the anſwer which Apollo gave the Athenians, when Xerxes was about to attack Greece with all the ſtrength of Aſia. The Pythian declared, that Minerva, the protectreſs of Athens, had endeavoured in vain to appeaſe the wrath of Jupiter; yet that Jupiter, in complaiſance to his daughter, was willing the Athenians ſhould ſave themſelves within wooden walls; and that Salamis ſhould behold the loſs of a great many children, dear to their mothers, either when Ceres was ſpread abroad, or gathered together.

Here Oenomaus loſes all patience with the god of Delphi. "This conteſt, ſays he, between father and daughter is "very becoming the deities! It is excellent, that there "ſhould be contrary inclinations and intereſts in heaven. "Poor wizard, thou art ignorant whoſe the children are, "that Salamis ſhall ſee periſh; whether Greeks or Perſians. It is certain they muſt be either one, or the "other; but thou neededſt not to have told ſo openly, that "thou kneweſt not which. Thou concealeſt the time "of the battle under thoſe fine poetical expreſſions, *either when Ceres is ſpread abroad, or gathered together*; "and wouldeſt thou cajole us with ſuch pompous language? Who knows not, that if there be a ſea-fight, "it muſt either be in ſeed-time or harveſt? It is certain "it cannot be in winter. Let things go how they will, "thou wilt ſecure thyſelf by this Jupiter, whom Minerva is endeavouring to appeaſe. If the Greeks loſe "the battle, Jupiter proved inexorable to the laſt; if "they gain it, why then Minerva at length prevailed."

ORACLES *of the Sibyls*. See SIBYL.

ORAL, ſomething delivered by the mouth, or voice.

In this ſenſe, we ſay, *oral law*, *oral tradition*, &c.

ORANDO *pro rege & regno*, an ancient writ. Before the Reformation, while there was no ſtanding collect for a ſitting parliament, when the houſes of parliament were met, they petitioned the king that he would require the biſhops and clergy to pray for the peace and good government of the realm, and for a continuance of the good underſtanding between his majeſty and the eſtates of the kingdom; and accordingly the writ *de orando pro rege & regno*, was iſſued, which was common in the time of king Edward III.

ORANG *outang*, in *Zoology*, the *homo troglodytes*, or *nocturnus*, of Linnæus, called alſo the *man of the wood*, is a ſpecies of ape without a tail; with a flat face, and a deformed reſemblance of the human; ears exactly like thoſe of a man; ſhort neck; hair on the head longer than on the body; body and limbs covered with reddiſh and ſhaggy hair; face and paws ſwarthy; and buttocks covered with hair. The want of nails, and of the ſecond phalanx in the large toes, form a remarkable characteriſtic of this animal; though nature ſeems, in this reſpect, to be inconſtant in different ſpecies. This animal inhabits the interior parts of Africa, the iſles of Sumatra, Borneo, and Java. It is ſolitary, and lives in the moſt deſert places, feeding on fruits and nuts; grows to the height of ſix feet; and has ſuch ſtrength as to overpower the ſtrongeſt man. See *Tab.* IV. *Quadrupeds*, Nº 44. They will attack and kill the negroes who wander in the woods; drive away the elephants, beating them with their fiſts or with clubs; and throw ſtones at people who offend them; they ſleep in trees, and ſhelter themſelves from the inclemency of the weather; their appearance is grave, and their diſpoſition melancholy; they are very ſwift, walk erect, and can only be taken alive, and tamed when they are young; in which caſe they are very docile. M. Buffon relates, that he had ſeen this animal offer his hand to thoſe who came to ſee him, and walk with them, as if he had been one of the company; that he has ſeen him ſit at table, unfold his napkin, wipe his lips, make uſe of his knife and fork, pour out his drink into a glaſs, take his cup and ſaucer, put in ſugar, pour out the tea, and ſtir it, in order to let it cool; and that he has done this not only at the command of his maſter, but often without bidding. He did no kind of miſchief, and offered himſelf to be careſſed by ſtrangers. The food which he preferred to every other was dried ripe frut. A travellar relates, that he has ſeen a female of this ſpecies at Java, who every morning regularly made its own bed; at night lay down with the head on the bolſter, and covered itſelf with the quilt. When its head ached, it wrapped a handkerchief round it. Hoppius, in his Anthropomorpha, 1760, takes great pains to prove, that the *orang-outang* is incapable, from the extreme dilatation of the pupil, of ſeeing in the day time. Dr. Camper, late profeſſor of aſtronomy, &c. in the univerſity of Groningen, having diſſected the whole organ of voice in the *orang*, in apes, and ſeveral monkies, concludes, that *orangs* and apes are not made to modulate the voice like men; for the air paſſing by the *rima glottidis* is immediately loſt in the ventricles or ventricle of the neck, as in apes and monkies, and muſt, conſequently, return from thence without any force and melody within the throat and mouth of theſe creatures; and this ſeems to be the moſt evident proof of the incapacity of *orangs*, apes, and monkies, to utter any modulated voice, as indeed they have never been obſerved to do. Phil. Tranſ. vol. lxix. part i. art. 14. where the reader may find an account of the diſſection of the organs of ſpeech of the *orang-outang*, illuſtrated by figures.

This animal, ſome have ſuppoſed, is the prototype of all the Fauns, Satyrs, Pans, and Sileni, deſcribed by the ancient poets, and whoſe forms are come down to us in the works of the painters, and ſculptors of antiquity; varied and embelliſhed according to the fancy of the authors. They ſeem to have been more numerous formerly than at preſent, if we credit the account of the large troop, to whom Alexander, when in India, prepared to give battle; and the attack made by Hanno on another large body, in an iſland on the coaſt of Africa, where he took three of the females, whoſe ſkins were depoſited in the temple of Juno, and found there by the Romans at the taking of Carthage. Vide Strab. lib. xv. & Hannonis Periplum, p. 77. ed. Hagæ, 1674.

Mr. Pennant apprehends, that the ſatyrs of the ancients were a ſpecies of monkey, and not the ſame with this animal; becauſe Ælian and Ptolemy affirm, that they had tails. See SIMIA and CHIMPANZEE.

ORANGE-*tree*, *aurantium*, in *Botany*. This genus is joined by Linnæus to the CITRON. Its characters are theſe: the impalement of the flower is ſmall, of one leaf, and indented into five parts; the flower has five oblong ſpreading petals, and many ſtamina, which are frequently joined in ſmall ſeparate bodies at the bottom; in the center is ſituated the germen, which becomes a globular fleſhy fruit, compreſſed at both ends, having a thick, fleſhy pulp, and divided into ſeveral cells, each containing two oval callous ſeeds. There are five ſpecies, including ſeveral varieties. Thoſe in the Engliſh gardens are the yellow and white-ſtriped leaved *orange*; the curled leaved *orange*; the horned *orange*; the double flowering *orange*; and the hermaphrodite *orange*.

The manner of raiſing them from ſeeds is this; when you purpoſe to raiſe ſtocks for budding, they ſhould be raiſed from citron ſeeds, taken out of the rotten fruit in ſpring; for the ſtocks of this kind are preferable to any other, both for their quickneſs of growth, and their readily taking buds either of *oranges*, lemons, or citrons.

A good hot-bed muſt be prepared, either of horſe-dung or tanner's bark. The laſt, where it can be had, is much the beſt; the ſeeds muſt be ſown in pots of rich earth, and theſe, when the bed is of a due temper, muſt be plunged into it. The pot muſt be watered frequently, and the glaſſes of the hot-bed ſhaded with mats in the heat of the day, and at times raiſed to give air.

The ſeeds will come up in three weeks, and a month after this the plants will be fit to tranſplant into ſingle pots. The bed muſt be now renewed, and ſome pots of about five inches over at the top, muſt be filled half full with freſh earth, mixed with very rotten cow dung. Place one plants in the middle of each of theſe pots, and then fill it up with the ſame earth; then place theſe pots in the new hot-bed, and water the plants every day. By July, the plants will be two feet high, and muſt then be hardened by degrees to the air, by raiſing more and more the glaſſes of the hot-bed. In September they muſt be taken into the green-houſe; in the winter ſeaſon they muſt have frequent ſmall waterings, and in ſpring their heads muſt be waſhed, to cleanſe them from filth. In ſpring, they muſt have again a gentle hot-bed, but in June they muſt be hardened again; and in Auguſt they will be fit to bud.

At this time you are to make choice of cuttings from very thriving and fruitful trees; chuſing ſuch buds as are round. When the ſtocks are budded, they muſt be removed into the green-houſe, to ſhelter them from wet, turning their buds from the ſun, but letting them have as free air as poſſible, and refreſhing them often with water. They muſt remain in the green-houſe all winter, and in the ſpring muſt have another bark hot-bed; then cutting off the ſtocks about three inches above the buds, obſerve to give them as much water as they require.

The buds with this management will be by July two or three feet high, and they muſt then be hardened by degrees, that they may bear the green-houſe in the winter; and as this will be a ſufficient height for the ſtems, it is proper at this time to ſtop the leading branch, to force out lateral ſhoots. This firſt winter they will be tender, and muſt be taken great care of, and after this they require no more care than full grown trees.

This is a regular and certain way of ſupplying a greenhouſe with *orange-trees*; but there is a much more expeditious one, which is the purchaſing ſuch trees as are brought over every year from Italy. Theſe are as large when we receive them, as thoſe of our own produce will be in eighteen or twenty years growth; and though they have but ſmall heads then, will be brought to have very good ones in three years, and to produce very fine fruit.

In the choice of theſe trees, thoſe which have two buds in ſtock are preferable to thoſe which have only one; and the ſtraitneſs of the ſtem, freſhneſs of the branches, and plumpneſs of the bark, are greatly to be regarded. When you have purchaſed a proper number of theſe trees, each of them is to be ſet in a tub of water, with its head and half its trunk above the ſurface; they are to ſtand in this two or three days, then they are to be taken out, their roots picked, and bruſhed clean, and the tops of the branches cut off, and they are to be planted ſingly, in pots juſt large enough to contain their roots, in a mixture of freſh earth and rotten cow-dung. Theſe are to be ſet in a moderate hot tanner's bark bed, and ſome potſhreds muſt be always put at the bottom of the pots, to keep their holes ſom being ſtopped, and give a free paſſage to the water. They are to be moderately watered at proper times, and by the month of June they will ſhoot out pretty long ſhoots, which muſt be ſtopped, in order to produce the lateral branches. They muſt now be hardened by degrees, and in the middle of July muſt be brought into the open air, in ſome warm ſituation, defended from winds, and from the too great heat of the ſun. In September they muſt be removed into the greenhouſe, and watered gently during the winter. In the ſucceeding ſummer, the branches muſt be ſtopped from growing to their lengths, to furniſh a good head, and they muſt be frequently watered. And after this, they will require no farther management, but to be new potted every year; which ſhould be done in April, and the earth prepared for it a year beforehand, of cow-dung and freſh earth. The roots ſhould be ſoaked a quarter of an hour in water, and afterwards ſcrubbed very clean, before they are put into the new pot.

If the old *orange-trees* have bad heads, the way to mend them is to cut them moſtly off, and proceed with them in the ſame manner as with the trees brought from Italy. All *orange-trees* require frequent waterings, but theſe ſhould not be large; there muſt always be a paſſage for the water to run off at the bottom of the pot or tub; they muſt have as much freſh air in winter as the ſeaſon will allow, and they ſhould not be placed too near each other in the green-houſe. In ſummer they ſhould be placed where they may have the morning and evening ſun, without too much wind; and they ſhould not be houſed till October. The ſhaddock and citron are much tenderer than the *orange*, and ſhould therefore be houſed ſooner.

In the Philoſophical Tranſactions, N° 114, there is a very remarkable account of a tree ſtanding in a grove near Florence, having an *orange* ſtock, which had been ſo grafted upon, that it became in its branches, leaves, flower, and fruit, three-formed; ſome emulating the *orange*, ſome the lemon or citron, and ſome partaking of both forms in one; and what was very remarkable, was, that theſe mixed fruits never produced any perfect ſeeds; ſometimes there were no ſeeds at all in them, and ſometimes only a few empty ones.

The ſeeds of the *orange* kind ſeem different in their nature from thoſe of all other plants. In the generality of others, the ſeed is only a ſort of nidus, and bed of a nouriſhing matter, for the young plant contained in ſome one part of it, and called the plantula ſeminalis; and however minute the ſeed itſelf may be, this plantula is but a very ſmall part of it; but the ſeeds of the *orange*, though contained in the inſide of a pulpy fruit, and in all reſpects ſeeming of the nature of the common ſeeds, yet, when examined nicely, are found to contain not a ſimple plantula ſeminales, but each of theſe ſeeds or kernels, contains within it another complete ſeed. Both in the *orange* and lemon kinds, on opening what we call the ſeeds, when the ſkin, or membrane, is ſtripped off, there are frequently found two ſeeds encloſed in that membrane, that is, under the ſkin, and without ſide of the kernel, there is a ſmall ſeed, the like of which does not appear in the ſeed of any other fruit.

It is true, indeed, that in hazel nuts, as alſo in almonds, and in peach and apricot kernels, we often find a double ſeed, or kernel, but then each of them is ſeparately encloſed in its own membrane, and has no communication with the other, but is only placed in ſimple contact with it; and each has its diſtinct ſtalk, or ſtring, by which it ſeverally receives its nouriſhment; and in theſe, the containing of two kernels ſeems only an accident, a kind of ſuperfœtation, as in the twin births of animals, which naturally bear only one.

When one of the *orange* or lemon ſeeds is ſtripped of its outer membrane, there appears a little ſtring, which lying under it, cauſes a protuberance in the firſt ſkin; and from this ſtring not only the ſeed, but the plant within it, receives its nouriſhment; and the firſt and hard ſkin, which is eaſily ſeparated, ſeems only given to it for the defence of the inward parts; whereas nuts, almonds, peach-ſtones, and the like, have a much harder and firmer coat given them for the ſame purpoſe. The ſtring which appears through the firſt membrane extends its ſmall veſſels alſo through the ſecond membrane near the ſeat of the plantule; but theſe are ſo extremely fine, that we loſe them before they enter it, no microſcope being able to ſhew them farther than where they grow extremely ſmall and fine, near the entrance into this part. It is an amazing thought, but it is alſo an evident truth, that the ſmall ſtring, which runs in this manner under the coat of this ſeed, contains in it as many diſtinct veſſels as are to be found in a full grown *orange-tree*; for if all theſe veſſels were not in the young plant, while involved in its matrix, whence ſhould they come afterwards? When this ſtring is cut tranſverſely and examined before a good microſcope, ſomething of this appears; for there are ſeen in it the ſections of ſeveral veſſels, and the ſmall quantity of pulpy matter between them is encloſed in a ſeemingly thick and tough membrane, together with them, in order to keep the whole together: if the ſeed, or kernel, be itſelf cut acroſs, it appears to be only a congeries of a great number of globules of a ſoft matter, preſſed together. Within this ſeed thus cut, and under all its membranes, are ſeen the two regular and perfect ſeeds, lodged together, and not ſeparated by any membrane, as the accidental double kernels of nuts, &c. always are; ſometimes indeed, there is only one ſuch obſerved, and ſometimes there are three. Theſe are not always of the ſame ſize, but one is often larger than the others. Each of theſe is, however, a true, perfect, and diſtinct ſeed, and is divided naturally into two lobes, and theſe ſeem only to have been united at firſt, juſt where the young plant lies, ſo that this whole kernel ſeems to have been deſtined by nature for no other end, but to foſter and cheriſh the young plant, till it become able to ſhoot up and live above ground. In the heart of this inner ſeed is found the plantula ſeminalis, which is not larger than a ſmall grain of ſand to the naked eye. The wonderful conformation of this ſtructure cannot but ſtrike any one who is uſed to examine ſeeds, with great amazement. It is plain, that the ſeed contained within the other ſeed, can only receive its nouriſhment from the veſſels contained in the ſtring above deſcribed. But it is amazing, that theſe ſhould not be, as uſual, immediately diſtributed from that general cord, or congeries of them, to the ſeed itſelf, but to another that is in the center ſeed, and can only come to the inner ſeed, after having paſſed through this, and been in it divaricated into other veſſels too fine for the eye to trace.

Signior Franciſco Lana, in his prodromus to ſome philoſophical diſcoveries, tells us, that there is a way of producing *oranges*, without ſowing or planting the trees, only by infuſing the flowers in oil of almonds; for that this oil will, every year afterwards, at the proper ſeaſon, produce both flowers, and ripe *oranges*.

The *oranges* in common uſe with us are the Seville and China *oranges*. The flowers of the Seville *orange* are highly odoriferous, and very juſtly eſteemed one of the fineſt perfumes. In diſtillation with water, they impregnate it with their agreeable odour, and yield a ſmall quantity of fragrant eſſential oil: the diſtilled water, called *aqua naphæ*, and oil, called *ol. ſeu eſſentia Neroli*, are generally brought to us from Italy and France. The leaves have alſo a pleaſent ſmell, and bitteriſh taſte. In diſtillation with water, a ſmall portion of oil, of an agreeable flavour, ſeparates from the veſicles, which appear againſt the light like tranſparent ſpecks on their ſurface. The yellow rind, ſeparated from the white fungous matter under it, is a grateful, warm, aromatic bitter; often uſed as ſtomachic and corroborant. It is warmer than the peel of lemons, of a more durable flavour, and abounds more with a light fragrant eſſential oil, which is lodged in diſtinct cells on the ſurface of the peel, and exudes upon wounding it. Eight ounces of the freſh rind give a ſtrong impregnation to four or five pints of water; which, with the adition of ſugar, forms an agreeable ſyrup, prepared in the ſhops. A ſpirituous water is obtained by diſtilling a gallon of proof ſpirit from ſix ounces of the dry rind; and a ſimple is prepared by drawing over a gallon of water from four ounces of the dry peel; and this is found to be an uſeful diluent in fevers or other diſeaſes.

The juice of *oranges* is a grateful acid, of great uſe in inflammatory and putrid diſorders, both acute and chronical. This juice contains an eſſential acid ſalt, mixed with much mucilage. The ſalt may be obtained in cryſtals, by diluting the juice, clarifying it with whites of eggs, and evaporation. In this way a ſaline extract may be made, capable of being preſerved, and poſſeſſed of the ſame medicinal qualities as the juice, which is ſaid to be very powerful in the ſcurvy.

The rind of the China, or ſweet *orange*, has a weak ſmell, and very little bitterneſs, and is ſcarcely ever employed for any medicinal uſe. The juice is an uſeful refrigerant in inflammatory diſpoſitions, and an excellent antiſeptic in ſcorbutic and other putrid diſorders. Lewis.

Oranges are ordinarily brought from Nice, Ciouta, the iſles of Hieres, Genoa, Provence, Portugal, the American iſlands, and even China, and the coaſts of India.

Thoſe called *China oranges* were firſt brought into Europe from China, by the Portugueſe; and it is ſaid the very tree, whence all the European *orange-trees* of this ſort were produced, is ſtill preſerved at Liſbon, in the houſe of the count S. Laurent.

Thoſe moſt eſteemed, and that are made preſents of as rarities in the Indies, are no bigger than a billiard-ball; when ſweetened with a little ſugar, they are eſteemed excellent for diſorders of the breaſt. The juice is cooling and antiſcorbutic.

Oranges are ordinarily preſerved in halves and quarters. They are firſt peeled, then ſcooped, and dried in a ſtove. *Orangeal* is the *orange-peel* cut in pieces, and candied. Italy furniſhes a great deal of flower of *oranges*, either dry or liquid.

Orange, *ſea*, in *Natural Hiſtory*, a name given by count Marſigli to a very remarkable ſpecies of marine ſubſtance, which he calls a plant. It is tough and firm in its ſtructure, and in many things reſembles the common fucus; but inſtead of growing into the branched form the generality of thoſe ſubſtances have, it is round and hollow, and in all reſpects reſembles the ſhape of an *orange*. It has, by way of root, certain very fine filaments, which faſten themſelves to the rocks or to ſhells, ſtone, or any thing elſe that comes in the way. From theſe there grows no pedicle, but the body of the *orange*, as it is called, is faſtened by them to the rock, or other ſolid ſubſtances. The *orange* itſelf is uſually of about three or four inches in diameter; and while in the ſea, is full of water, and retains this when taken up. In this ſtate it frequently weighs a pound and a half, but when the water is let out, and it is dried, it becomes a mere membrane, weighing ſcarce any thing. It is beſt preſerved, by ſtuffing it full of cotton, as ſoon as the water is let out of it, and hanging it up to dry in this form. Its ſurface is irregular and rough, and its colour a duſky green on the outſide, and a clearer, but ſomewhat bluiſh green within; and its thickneſs about an eighth part of an inch. When viewed by the microſcope, it is ſeen to be all over covered with ſmall glandules, or, indeed, compoſed of them; for they ſtand ſo thick, one by another, as to leave no ſpace between, and ſeem to make up the whole ſubſtance; ſo that it appears very like the rough ſhagreen ſkin uſed to cover toys. Theſe are all ſo many hollow ducts, through which the ſea-water finds a paſſage into the globe formed by this ſkin, and by this means it is kept always full and diſtended; on cutting it with a pair of ſciſſars, the water immediately runs out, and the ſkins collaſpe; but there is ſomething farther remarkable,

markable, which is, that the whole ſubſtance, near the wounded place, is in motion, and ſeems as if alive, and ſenſible of the wound. The glandules are found full of water, and reſembling ſmall tranſparent bottles; and what goes to the ſtructure of the plant beſide theſe, is an aſſemblage of a vaſt number of filaments, all which are alſo hollow, and filled with a clear and tranſparent fluid.

There is another ſubſtance of this kind, deſcribed by count Marſigli, Triumfetti, and others, and called the *ramoſe*, or branched *orange*. This is very much of the nature of the former; but, inſtead of conſiſting of one round globule, it is formed of ſeveral oblong ones, all joined ſo together, that they repreſent the branches of ſome of the fucuſſes, but that they are ſhorter; and theſe are all hollow and full of water, in the ſame manner as the ſingle globes of the common kind. This has, by way of root, certain fine and ſlender filaments, which faſten it to the ſtones or ſhells near which it is produced: and it is of a duſky greeniſh colour on the ſurface, and of a fine bluiſh green within. The ſurface, viewed by the microſcope, appears rough, as in the other, and the glandules are of the ſame kind, and are always found full of clear water. Marſigli, Hiſt. de la Mer, p. 81. See CORALLINES.

ORANGE-*colour*, is a hue or die that partakes equally of red and yellow; or is a medium between the two.

In heraldry, the term *orange* or *orenge* is given in blazon to all roundles that are tenne or tawny.

ORANGE-*dew*, a ſort of dew which falls in the ſpring-time from the leaves of *orange* and lemon trees, and is extremely fine and ſubtile. Mr. De La Hire obſerving this, placed ſome flat pieces of glaſs under the leaves to receive it, and having thus procured ſome large drops of it, was deſirous of finding out what it was. He ſoon found that it was not a merely aqueous fluid, becauſe it did not evaporate in the air; and that it was not a reſin, becauſe it readily and perfectly mixed with water: it was natural here to ſuppoſe it a liquid gum; but neither did this, on examination, prove to be the caſe; for being laid on paper, it did not dry as the other liquid gums do. Its anſwering to none of theſe characters, and its being of the conſiſtence of honey, and of a ſweet ſugar-like taſte, gave a ſuſpicion of its being a kind of manna; and whatever in the other trials had proved it not a reſin, a gum, &c. all equally tends to prove that it is this ſubſtance.

ORANGE-*flower-water*. See WATER.

ORANGE-*lake* See LAKE.

ORANGE, *mock*. See PHILADELPHUS.

ORANGEADE, a drink made of orange-juice, water, and ſugar.

Lemery ſays it may be given to people in the height of a fever.

ORANGERY, a gallery in a garden, or parterre, expoſed to the ſouth, but well cloſed with a glaſs window, to preſerve oranges in, during the winter ſeaſon.

The *orangery* of Verſailles is the moſt magnificent that ever was built: it has wings, and is decorated with a Tuſcan order.

ORANGERY is alſo uſed for the parterre, where the oranges are expoſed in kindly weather.

ORARIUM, in *Eccleſiaſtical Writers*, the ſame with BRANDEUM.

ORATION, a ſpeech or harangue, framed according to the rules of oratory, and ſpoken in public.

All the kinds of *orations* may be reduced to three heads; viz. *demonſtrative*, *deliberative*, and *judicial*.

To the demonſtrative kind belong all ſuch diſcourſes as relate to the praiſe or diſpraiſe of perſons or things, as *panegyrics*, *genethliaca*, *epithalamia*, *epicedia*, *euchariſtiæ*, *epinicia*, and *congratulations*.

To the deliberative kind belong whatever may become a ſubject of debate, conſultation, or advice, by means of *perſuaſion*, *diſſuaſion*, *exhortation*, and *commendation*.

To the judicial kind belong all ſubjects which pertain to the ſecurity of property, the protection of innocence, the maintenance of juſtice, and puniſhment of crimes, by *accuſation*, *confirmation*, *confutation*, &c. See each under its proper article, CONFIRMATION, &c.

Ariſtotle is ſaid to be the author of this diviſion, which ſeems to be very juſt; ſince, perhaps, there is no ſubject of oratory, whether ſacred or civil, that may not be referred to one or other of theſe heads.

ORATION, *funeral*. See FUNERAL.

ORATOR. See ORATORY.

ORATORIO, in the *Italian Muſic*, a ſort of ſpiritual drama of dialogues, containing recitatives, duettos, trios, ritornellos, choruſſes, &c.

The ſubjects of theſe pieces are uſually taken from the Scriptures, or from the life of ſome ſaint, &c.

The muſic for the *oratorio* ſhould be in the fineſt taſte, and moſt choſen ſtrains. Theſe *oratorios* are greatly uſed at Rome in time of Lent; and of late in England.

Meneſtrier attributes the origin of *oratorios* to the cruſades, and ſays, that the pilgrims returning from Jeruſalem and the Holy Land, &c. compoſed ſongs, reciting the life and death of the ſon of God, and the myſteries of the Chriſtian faith, and celebrating the atchievements and conſtancy of ſaints and martyrs. Others, with greater probability, obſerve, that the *oratorio* was an avowed imitation of the OPERA, with this difference only, that the foundation of it was always ſome religious, or at leaſt, moral ſubject. Creſcimbeni aſcribes its origin to San Filippo Neri, born at Florence in 1515; who, in his chapel, after ſermons and other devotions, in order to allure young people to pious offices, had hymns, pſalms, and ſuch like prayers, ſung by one or more voices. Among theſe ſpiritual ſongs were dialogues; and theſe entertainments becoming more frequent and improving every year, were the occaſion that in the ſeventeenth century *oratorios* were firſt invented, ſo called from the place of their origin. Hawkins's Hiſt. of Muſic, vol. iii. p. 441, &c.

ORATORY is the art of ſpeaking well, upon any ſubject, in order to perſuade; and to ſpeak well, as Cicero explains it, is to ſpeak juſtly, methodically, floridly, and copiouſly. In which ſenſe the word imports the ſame with RHETORIC; the difference between the two only conſiſting in this, that one is taken from the Greek language, and the other from the Latin. However, the caſe is not preciſely the ſame with the words *rhetorician* and *orator*. For although the Grecians uſed the former to expreſs both thoſe who taught the art, and ſuch as practiſed it; yet the Romans afterwards, when they adopted that word into their language, confined it to the teachers of the art, and called the reſt *orators*.

Lord Bacon defines *rhetoric*, or *oratory*, to be the art of applying and addreſſing the dictates of reaſon to the fancy, and of ſo recommending them as to affect the will and deſires. The end of rhetoric, he obſerves, is to fill the imagination with ideas and images, which may aſſiſt nature, without oppreſſing it.

Voſſius defines rhetoric, the faculty of diſcovering what every ſubject affords of uſe for perſuaſion. Hence, as every author muſt invent arguments to make his ſubjects prevail; diſpoſe thoſe arguments, thus found out, in their proper places; give them the embelliſhments of language proper to the ſubject; and, if this diſcourſe be for public delivery, utter them with that decency and force which may ſtrike the hearer; *rhetoric* or *oratory*, becomes divided into four parts, viz. INVENTION, DISPOSITION, ELOCUTION, and PRONUNCIATION.

As to the hiſtory of *oratory*, the firſt invention of it is aſcribed by the Egyptians, and fables of the poets, to Mercury. Quintilian obſerves, with reſpect to the origin of this art, that we derive the faculty of ſpeech from nature; but the art from obſervation; and that men, perceiving that ſome things in diſcourſe are ſaid to advantage, and others not, accordingly marked thoſe things, in order to avoid the one, and imitate the other: and that they alſo added ſome things from their own reaſon and judgment, which being confirmed by uſe, they began to teach others what they knew themſelves. But it is not known when this method of obſervation firſt took place. It is reaſonable to believe, that the Greeks had the principles of this art ſo early as the time of Pittheus, whoſe nephew Theſeus lived not long before the taking of Troy. And at this time Cicero thought it was in much eſteem among them. After this period, there is a great chaſm in the hiſtory of *oratory*: for Quintilian ſays, that afterwards Empedocles, who flouriſhed about five hundred years after Troy was taken, is the firſt upon record who attempted any thing concerning it. About this time there aroſe ſeveral maſters of this art, the chief of whom Quintilian has enumerated; as Corax and Tiſias, of Sicily; Gorgias, of Leontium, in the ſame iſland, the ſcholar of Empedocles; Thraſymachus, of Calcedon; Prodicus, of Cea; Protageras, of Abdera; Hippias, of Elis; Alcidamus, of Elea; Antiphon, who firſt wrote orations; Polycrates and Theodore, of Byzantium. Nor ſhould we omit Plato, whoſe elegant dialogue, entitled Gorgias, is ſtill extant. To theſe ſucceeded Iſocrates, the moſt renowned of the ſcholars of Gorgias, extolled by Cicero as the greateſt maſter and teacher of *oratory*; Ariſtotle, whoſe ſyſtem of *oratory* is eſteemed the beſt and moſt complete of any in the Greek language; Demoſthenes, who was an auditor of Iſocrates, Plato, and Iſæus, and who has been eſteemed by the beſt judges the prince of Grecian orators; Æſchines, who taught rhetoric at Rhodes; Theodectes and Theophraſtus, diſciples of Ariſtotle; Demetrius Phalereus, ſcholar of Theophraſtus: Hermagoras;

goras; Apollonius Molon; Areus Cæcilius; Dionyſius, of Halicarnaſſus; Apollonius, of Pergamus; and Theodore of Gaza. After the time of Quintilian we may mention Hermogenes, and Longinus, the author of the excellent treatiſe Of the Sublime.

This art was introduced late, and with difficulty among the Romans. In the year of their city 502, when, by the induſtry of ſome Grecians, the liberal arts began to flouriſh in Italy, a decree paſſed the ſenate, by which all philoſophers and rhetoricians were ordered to depart out of Rome: but in a few years after, on the arrival of certain ambaſſadors from Athens to Rome, the Romans were ſo charmed with the eloquence of their harangues, that they could no longer be reſtrained from purſuing the ſtudy of *oratory*. According to Seneca, Lucius Plotius, a Gaul, was the firſt who taught the art of *oratory*, at Rome, in Latin, and the firſt Roman, who engaged in it was Blandus, of the equeſtrian order; and he was ſoon ſucceeded by others. The writers on this art, enumerated by Quintilian, were M. Cato, the cenſor, and after him Anthony, the orator; but he who carried eloquence to its higheſt pitch was Cicero, who has likewiſe, by his rules, given the beſt plan, both to practiſe and teach the art. He alſo mentions Cornificius, Stertinius, Gallio the father, Celſus, Lenas, Virginius, Pliny, and Rutilius.

Quintilian himſelf deſerves the higheſt commendation for diligence and accuracy as a writer; of whom St. Jerom ſays, that he was the firſt who taught publicly at Rome, and received a ſalary from the treaſury. This he places in the eighth year of Domitian; whereas Suetonius informs us, that Veſpaſian was the firſt who granted out of the treaſury a yearly ſalary of near 800*l.* ſterling, to the Latin and Greek rhetoricians. Since the revival of learning, there has been a great number of writers, who have treated on the ſubject of *oratory*, and contributed to the perfection of it, both in theory and practice.

We ſhall cloſe this article with obſerving, in the words of a very good judge, that the method of forming the beſt ſyſtem of *oratory* is to collect it from the fineſt precepts of Ariſtotle, Cicero, Quintilian, Longinus, and other celebrated authors; with proper examples taken from the choiceſt parts of the pureſt antiquity. On this plan, the learned Dr. Ward has formed his ſyſtem, to which we refer the reader, and on the ſubject of this article to his firſt lecture, vol. i. Concerning the diſtribution of the ſubject of *oratory*, ſee ORATION.

ORATORY is alſo uſed, among the Romaniſts, for a cloſet, or little private apartment, in a large houſe, near a bedchamber, furniſhed with a little altar, and a book-ſtand, for private devotion.

The ancient *oratories* were little chapels, adjoining to monaſteries, wherein the monks ſaid prayers, before they had any churches. Several councils and ſynods have condemned the uſe of private *oratories*.

In the ſixth and ſeventh centuries, *oratories* were little churches, frequently built in burial-grounds, without either baptiſtery, cardinal prieſt, or any public office; the biſhop ſending a prieſt to officiate occaſionally.

ORATORY is alſo uſed for a ſociety or congregation of devout perſons, who form a kind of monaſtery, and live in community; but without being obliged to make any vows. Hence,

ORATORY, *prieſts of the*, a community of ſecular prieſts, who live together in a monaſtic manner, but without vows. They were firſt eſtabliſhed at Rome, about the year 1590, by St. Philip Neri, a Florentine, under the title of *Oratory of Sancta Maria in the Valicella*.

The name of this religious ſociety was derived from an apartment, accommodated in the form of an *oratory*, or cabinet for devotion, which S. Philip Neri built at Florence for himſelf, and in which for many years he held ſpiritual conferences with his more intimate companions.

On the model of this the cardinal Berulle eſtabliſhed a congregation of the *Oratory* of Jeſus, in 1613, in France, which has ſince increaſed: ſo that there are now ſixty houſes of *Prieſts of the Oratory* in that kingdom.

The fathers, or *Prieſts of the Oratory*, are not, properly ſpeaking, religious or monks, being bound by no vows, and their inſtitute being purely eccleſiaſtical or ſacerdotal.

There is ſome difference, however, between the Italian and French inſtitutions. S. Philip Neri, to prevent the confuſion which the great number of houſes uſually occaſioned in congregations, would have his to be a ſingle houſe: and though others were at liberty to form the like congregations, yet they were to have no dependence on one another.

For this reaſon the houſes of the *Oratory*, in Italy and Flanders, are all independent; whereas thoſe in France have a relation to each other, and all depend on the ſame chief, who has the quality of ſuperior-general; and, with three aſſiſtants, governs the whole congregation.

ORB, *orbis*, in *Aſtronomy*, a ſpherical body or ſpace, contained under two ſuperficies; the one concave, the other convex.

The ancient aſtronomers conceived the heavens as conſiſting of ſeveral vaſt azure tranſparent *orbs* or ſpheres, incloſed in one another; or vaſt circles, which in their areas included the bodies of the planets; the radii whereof were compriſed between the center of the earth, and the higheſt point to which the planets riſe, ſuppoſing the earth to be in the center.

There are *orbs concentric*, i. e. having the ſame center; and *orbs eccentric*.

The *magnus* ORBIS, or *great* Orb, is that wherein the ſun is ſuppoſed to revolve; or, rather it is that wherein the earth makes its annual circuit.

ORB, in *Aſtrology*. An *orb* of light is a certain ſphere, or extent of light, which the aſtrologers allow a planet beyond its center.

They ſay, that, provided the aſpects do but fall within this *orb*, they have almoſt the ſame effect as if they pointed directly againſt the center of the planet. See ASPECT.

The *orb* of Saturn's light they make to be 10 degrees; that of Jupiter 12 degrees; that of Mars 7 degrees 30 minutes; that of the Sun 17 degrees; that of Venus 8 degrees; that of Mercury 7 degrees; that of the Moon 12 degrees 30 minutes.

ORBICULAR *leaf*, in *Botany*. See LEAF.

ORBICULARE *os*, or ORBICULAR *bone*, in *Anatomy*, the fourth of the little bones of the inward ear; tied by a ſlender ligament to the ſtapes; and named from its figure, which is round.

It was firſt diſcovered by Fran. Sylvius. Its uſe is, in the extenſion and relaxation of the tympanum. See EAR and OS.

ORBICULARIS, or *conſtrictor labiorum*, in *Anatomy*, is one of the muſcles of the lips. See CONSTRICTOR.

ORBICULARIS, or *deprimens palpebrarum*, is a muſcle ſpringing from each corner of the eye, and anſwered by another of like figure and ſtructure in the lower eyelid; which are therefore often conſidered as one *orbicular* muſcle. See *Tab. Anat.* (*Myol.*) *fig.* 1. *n.* 2.

Its fibres environ the eye-lids, and are inſerted into them, not unlike the ſphincters of other parts: it is faſtened to that part of the margin of the orbit, towards the noſe, made by the fourth bone of the upper jaw.

ORBICULARIS, in *Botany*, a name given by ſome authors to the *artanita*, or CYCLAMEN, called in Engliſh ſow-*bread*.

ORBICULARIS *inteſtini*, in *Anatomy*, a name given by Veſalius, and ſome others, to the muſcle now known by the name of the SPHINCTER *ani*.

ORBIS, in *Ichthyology*, the name of a genus of fiſh, of which there are a great many ſpecies: that, however, which is uſually meant by the word *orbis* above, is the ſpecies called *orbis primus* by Rondeletius, and *orbis Ægyptiacus* by Salvian, becauſe frequently caught in the oſtia of the Nile. Excepting the tail, this fiſh is of a round figure. It has no ſcales, but is covered with a firm and hard ſkin all over, full of ſmall prickles, which render it very rough; its mouth is ſmall, and has four broad teeth; it has only one hole on each ſide for its gills, and a fin under each; it has another fin near the tail on its under part, and another anſwering to it in its upper; the tail is one broad and flat fin; it is not eatable, for the whole fiſh is head, or rather belly. See *Tab.* III. *of Fiſh*, Nº 31 and 32.

There is an opinion, that when this fiſh is dried and hung up by the tail, it will always turn its mouth to that quarter from whence the wind blows.

The other ſpecies of this genus are, the *orbis lagocephalus*, *orbis ſcutatus*, *orbis muricatus*, *orbis ranæ rictu*, *orbis ſpinoſus Cluſii*, *orbis muricatus alter Cluſii*, and the *orbis oblongus teſtitudinis capite*.

ORBIT, *orbita*, in *Aſtronomy*, the path of a planet or comet; or, the line deſcribed by its centre in its proper motion in the heavens.

The ſun's, or rather the earth's *orbit*, is the curve which it paſſes along in its annual revolution; called the ECLIPTIC.

The *orbit* of the earth, and that of all the primary planets, is an ellipſis, in one of whoſe foci the ſun is placed; in which ellipſis they move according to this law, that a radius drawn from the centre of the ſun to the centre of the planet, always deſcribes areas proportional to the times.

The ancient aſtronomers made the planets deſcribe circular *orbits*, with an uniform velocity: Copernicus himſelf could not believe they ſhould do otherwiſe. *Fieri nequit*, ſays he, *ut cœleſte corpus ſimplex uno orbe inæqualiter moveatur*. So that, to account for their inequalities, they were obliged to have recourſe to eccentrics and epicycles; from the embarraſs whereof Copernicus himſelf could not entirely diſentangle himſelf.

But after him came aſtronomers, who, with a little more phyſics, have made no difficulty of changing theſe circular *orbits* into elliptical ones; and of making them move with different velocities in different parts thereof.

Of theſe elliptic *orbits*, there have been two kinds aſſigned: the firſt that of Kepler, which is the common ellipſis; to which Seth Ward, though he himſelf keeps to it, thinks one might venture to ſubſtitute circular *orbits*, by uſing two points, taken at equal diſtances from the centre, on one of the diameters, as they do in the foci of the ellipſis. The ſecond is that of M. Caſſini, whoſe character is this; that the products of the right lines, drawn from each point of its circumference, are every where equal; whereas, in the common ellipſis, it is the ſum of thoſe right lines that is always the ſame.

M. Varignon ſhews how inconſiſtent Copernicus's ſentiment is with the mechaniſm of the heavens: ſince the forces which planets have, to retain them in their *orbits*, muſt almoſt always conſpire to make them move with really different velocities; and that, among an infinity of caſes, there is but one wherein they can move uniformly.

The ſemidiameter of the earth's *orbit* is now ſtated to be 94,696,969 miles Engliſh, and the ſemidiameter of Saturn's *orbit* about ten times as great.

The *orbits* of the planets are not all in the ſame plane as the ecliptic, or the earth's *orbit* round the ſun; but are variouſly inclined to it, and to one another: but ſtill the plane of the ecliptic interſects the plane of the *orbit* of every planet in a right line, which paſſes through the ſun.

The quantities of the inclinations of the planes of the *orbits* of the primary planets to that of the ecliptic, are as follow: that of Saturn is an angle of two degrees; that of Jupiter, an angle of 1 deg. 20 min. that of Mars is almoſt 2 deg. that of Venus is a little more than 3 deg. 20 min. and that of Mercury a little more than 7 deg. See PLANET.

The *orbits of comets* Caſſini takes to be rectilinear; but they are now known to be very eccentric ellipſes. See COMET.

ORBITS, in *Anatomy*, the two large cavities or ſockets, wherein the eyes are placed. See *Tab. Anat. (Oſteol.) fig. 1. lit. b.*

Their figure is pyramidal: they are formed of the proceſſes of the os frontis and the upper jaw-bone, joined together; and are perforated at bottom, to give paſſage to the optic nerves.

ORBITER, in *Anatomy*, a name ſometimes given to two holes or cavities, either from their reſemblance of, or nearneſs to the orbits of the eyes.

The *orbiter externus* is a hole in the cheek-bone below the orbit.

The *orbiter internus* is a hole in the coronal bone of the ſkull, within the orbit.

ORCHARD, a ſeminary or plantation of fruit-trees.

In planting of an *orchard* great attention ſhould be paid to the nature of the ſoil, and ſuch ſorts of fruits only ſhould be choſen as are beſt adapted to the ground deſigned for planting, otherwiſe there can be little hopes of their ſucceeding: and it is for want of rightly obſerving this method, that we ſee in many countries *orchards* planted, which never arrive to any tolerable degree of perfection; the trees ſtarving, and their bodies either covered with moſs, or the bark cracked and divided, both which are evident ſigns of the weakneſs of the trees; whereas if, inſtead of apples, the *orchard* had been planted with pears, cherries, or any other ſort of fruit better adapted to the ſoil, the trees might have grown very well, and produced great quantities of fruit.

As to the poſition of the *orchard*, if there is liberty to chooſe, a riſing ground, open to the ſouth-eaſt, is to be preferred; but by no means upon the ſide of a hill, where the declivity is very great, for in ſuch places the great rains commonly waſh down the better part of the ground, whereby the trees would be deprived of proper nouriſhment; but where the riſe is gentle, it is of great advantage to the trees, by admitting the ſun and air between them, better than where they are upon an entire level. The ſituation will be ſtill more advantageous if it be defended from the weſt, north, and eaſt winds, for theſe are the winds that are moſt injurious to fruit trees.

A method has been lately practiſed, by ſome particular gentlemen, with very good ſucceſs, that is to plant the trees fourſcore feet aſunder, but not in regular rows. The ground between the trees they plough and ſow with wheat and other crops, in the ſame manner as if it were clear from trees; and they obſerve their crops to be full as good as thoſe expoſed, except juſt under the trees, when they are grown large, and afford a great ſhade; and by thus ploughing and tilling the ground, the trees are rendered more vigorous and healthy, ſcarcely ever having any moſs, or other marks of poverty, abide much longer, and produce better fruit. In making choice of trees for an *orchard*, you ſhould always obſerve to procure them from a ſoil nearly akin to that where they are to be planted, or rather poorer; for if you have them from a very rich ſoil, and that wherein you plant them is but indifferent, they will not thrive well, eſpecially for four or five years after planting: ſo that it is a very wrong practice to make the nurſery, where young trees are raiſed, very rich, when the trees are deſigned for a middling or poor ſoil. The trees ſhould alſo be young and thriving; for whatever ſome perſons may adviſe to the contrary, yet it has always been obſerved, that though large trees may grow and produce fruit, after being removed, they never make ſo good trees, nor ſo long-lived, as thoſe which are planted while young. Theſe trees, after they are planted out, will require no other pruning, but only to cut out dead branches, or ſuch as croſs each other, which render their heads confuſed and unſightly: the pruning them too often, or ſhortening their branches, is very injurious, eſpecially to cherries and ſtone-fruit, which will gum prodigiouſly, and decay in ſuch places where they are cut; and the apples and pears, which are not of ſo nice a nature, will produce a greater quantity of lateral branches, which will fill the heads of the trees with weak ſhoots, whenever their branches are thus ſhortened; and many times the fruit is hereby cut off, which on many ſorts of fruit-trees is firſt produced at the extremity of their ſhoots.

It hath been obſerved in Herefordſhire, the great county for *orchards*, that when *orchards* are ſo planted or ſituated that the air is pent up amongſt the trees, the vapours will ariſe from the damp of the ground, and the perſpiration of the trees collect the heat of the ſun and reflect it in ſtreams, ſo as to cauſe what they call a fire-blaſt, which is the moſt hurtful to their fruits; and this is moſt frequent where the *orchards* are open to the ſouth ſun. As *orchards* ſhould never be planted unleſs where large quantities of fruit are deſired, ſo it will be the ſame thing to allow twice or three times the quantity of ground, ſince there may be a crop of grain of any ſort upon the ſame ſpot of land, ſo that there is no loſs of ground; and for a family only, it is hardly worth while to plant an *orchard*, ſince a kitchen-garden well planted with eſpaliers, will afford more fruit than can be eaten while good, eſpecially if the kitchen-garden be proportioned to the largeneſs of the family; and if cyder be required, there may be a large avenue of apple trees extended croſs a neighbouring field, which will render it pleaſant, and produce a great quantity of fruit; or there may be ſome ſingle rows of trees planted to ſurround fields, &c. which will fully anſwer the ſame purpoſe, and be leſs liable to the fire-blaſt before mentioned. Miller.

Orchards are ſtocked by tranſplantation, ſeldom by ſemination.

The ſeaſon for tranſplanting apple trees into *orchards*, is in the months of October and November, provided the ſoil be dry; but if it be moiſt the beginning of March will be a better ſeaſon: if the leaves be not all off at the time they are removed, they muſt be pulled off; and they are likewiſe to be pruned. Trees may be tranſplanted into *orchards* after three years grafting, and ought not to be ſet at a leſs diſtance than forty feet; but thoſe trees that are planted at twice this diſtance will ſucceed better. In the following ſpring, if the ſeaſon prove dry, green ſward, with the graſs downward, ſhould be laid about the roots, and this will preſerve them moiſt, and ſave much expence in watering. In ploughing between the trees, care ſhould be taken not to go too deep among the roots, ſo as to wound them: with this caution, ſtirring the ſurface of the ground will be of great ſervice.

The ſide-branches of all tall *orchard* fruit-trees are to be cut off, till the tree be arrived at the height deſired: if the tree be to ſpread low, ſome are to be left on each ſide; ſo as to form a kind of balance. For the firſt three years at leaſt, they muſt not grow thick, and buſhy-headed: this muſt be prevented, by cutting off ſome of the inſide ſhoots, and ſuch as grow acroſs each other, or pendent. See PRUNING.

The ſoil, if not rich enough, is to be amended in two or three years, by opening it around the tree, and on the outſide of the ground firſt dug when the tree was ſet; and in a month's time filling it up again with a proper compoſt, or manure.

Perſons robbing *orchards* are to make ſuch recompence of damage as a juſtice ſhall award, and forfeit not exceeding 10 *s.* or be ſent to the houſe of correction, &c. Stat. 43 Eliz. cap. 7. See LARCENY.

ORCHESOGRAPHY, the art of noting all the ſteps and motions uſed in dancing. See DANCE.

ORCHESTRA, in the *Drama*, the lower part of the ancient theatre; made in form of a ſemicircle, and ſurrounded by the ſeats.

It was ſo called, becauſe, in the Grecian theatres, it was a place where they held their balls; from ορχεομαι, *I dance.*

The *orcheſtra*, among the Greeks, made a part of the ſcena; but, on the Roman theatres, none of the actors went down to the *orcheſtra*, which was taken up with ſeats for the ſenators, magiſtrates, veſtals, and other perſons of diſtinction; anſwering, nearly, to the pit in our theatre. With us the *orcheſtra* is the name of the place where the muſicians ſit.

ORCHIL. See ARCHIL.

ORCHIS, *ſatyrion*, or FOOL'*s-ſtones*, in *Botany*, a genus of the *gynandria diandria* claſs. Its characters are theſe: it has a ſingle ſtalk, with a vague ſheath, and no empalement; the flower hath five petals, three without and two within; the nectarium is of one leaf, fixed to the ſide of the receptacle, between the diviſion of the petals; the upper lip is ſhort and erect, the under large, broad and ſpreading; the tube is pendulous, hornſhaped, and prominent behind; it hath two ſhort ſlender ſtamina, ſitting upon the pointal, with oval erect ſummits, fixed to the upper lip of the nectarium; it hath an oblong contorted germen, under the flower, with a ſhort ſtyle, faſtened to the upper lip of the nectarium; the germen afterwards turns to an oblong capſule, with one cell, having three kernel-ſhaped valves, opening on the three ſides, but jointed at the top and bottom, filled with ſmall ſeeds like duſt. Miller enumerates ten, and Linnæus thirty-three ſpecies.

All thoſe ſorts of *orchis*, deſcribed by Miller, grow wild in ſeveral parts of England, but, on account of the extreme oddneſs and beauty of their flowers, deſerve a place in every good garden; and the reaſon of their not being cultivated in gardens, proceeds from the difficulty of tranſplanting them: though this may be eaſily overcome, where a perſon has an opportunity of marking their roots, in their time of flowering, and letting them remain until their leaves are decayed, when they may be tranſplanted with ſafety; for it is the ſame with moſt ſort of bulbous or fleſhy-rooted plants, which if tranſplanted before their leaves decay, ſeldom live, notwithſtanding you preſerve a large ball of earth about them; for the extreme parts of their fibres extend to a great depth in the ground, from whence they receive their nouriſhment, which if broken or damaged by taking up their roots, ſeldom thrive after; for though they may ſometimes remain alive a year or two, yet they grow weaker, until they quite decay; which is alſo the caſe with tulips, fritillarias, and other bulbous roots. But if their ſoil and ſituation be adapted to their various ſorts, they will thrive and continue ſeveral years, and during their ſeaſon of flowering will afford as great varieties as any flowers which are at preſent cutivated. Miller.

For the medicinal virtues of the *orchis* root, ſee SALEP.

ORCHIS-*root*, in the *Materia Medica*, is otherwiſe named *ſalep*, vulgarly called *ſaloop*. See SALEP.

ORCHIS, in *Ichthyology*, a name given by Geſner, and ſome others, to the fiſh commonly called ORIS, and, by Artedi, the ſpherical OSTRATION, with four teeth, and ſmall ſpines all over it.

ORCHOTOMY, derived from ορχος *teſticle*, and τομε, *ſection*, of τεμνω, *I cut*, a word uſed by ſome chirurgical writers for the operation of caſtration.

ORCYNUS, in *Ichthyology*, a name by which ſome authors have called the fiſh commonly known by the name of the TUNNY or *thynnus*.

ORDEAL, *ordalium*, a form of trial, that is, of diſcovering innocence or guilt; practiſed in England, in the time of Edward the Confeſſor: and ſince, as low as king John and king Henry III.

The word, in the original Saxon, ſignifies *a great judgment*, formed of *or*, *great*, and *deal*, or *dele. judgment.*

It was called *purgatio vulgaris*, or *judicium Dei*, in oppoſition to *bellum* or *combat*, the other form of purgation: and alſo to the canonical purgation, which was by the oath of the party.

The *ordeal* was of various kinds; viz. that of fire, that of red-hot iron, that of cold water, that of judicial pottage, that of hallowed cheeſe, that of boiling water, that of a green croſs, and that of dice laid on relics, covered with a woollen cloth. There were particular maſſes for each ſpecies of *ordeal*.

The more popular kinds of *ordeal* were thoſe of red hot iron, and water: the firſt for freemen and people of faſhion; the ſecond for peaſants.

Fire-*ordeal* was performed either by taking up in the hand, unhurt, a piece of red hot-iron, of one, two, or three pounds weight; or elſe by walking barefoot and blindfold, over nine red-hot plough-ſhares, laid lengthwiſe, at unequal diſtances; and if the party eſcaped without injury, he was adjudged innocent; but if it happened otherwiſe, as without colluſion it generally did, he was then condemned as guilty.

It is a popular ſtory, in our hiſtories, that Emma, mother of Edward the Confeſſor, being accuſed of too much familiarity with Alwyn biſhop of Wincheſter, demanded the *ordeal* of red hot iron; and paſſed bare-footed and hood-winked over nine red hot plough-ſhares, without touching any of them.

Water-*ordeal* was performed either by plunging the bare arm up to the elbow in boiling water, and eſcaping unhurt; or by caſting the perſon ſuſpected into a river or pond of cold water, and if he floated therein, without any action of ſwimming, it was deemed an evidence of his guilt, but if he ſunk he was acquitted.

It is eaſy to trace out the traditional relics of this water-*ordeal*, in the ignorant barbariry ſtill practiſed in many countries, to diſcover witches, by caſting them into a pool of water and drowning them to prove their innocence. This purgation by *ordeal*, ſeems to have been very ancient, and very univerſal, in the time of ſuperſtitious barbarity. It was known to the ancient Greeks, vide Antigone of Sophocles, v. 270. And Grotius Com. on Numb. v. 17. gives many inſtances of water-*ordeal*, in Bithynia, Sardinia, and other places.

It was very anciently known in Perſia, and perhaps originated from their ſuperſtitious veneration for fire. Records of trial by *ordeal* remain above 500 years before the Chriſtian æra. It is ſtill in practice, where ſatisfactory evidence cannot be obtained, among the GENTOOS, in Hindoſtan, and of very high antiquity. It is mentioned ſeveral times in the code of Gentoo laws, as a common mode of proof. The modes of this *ordeal* are various in India, according to the choice of the party, or nature of the offence; but the infallibility of the reſult is to this day as implicitly believed, as it could have been in the darkeſt ages of antiquity. See chap. iii. of the Code of Gentoo Laws, by Halhed.

The moſt reſpectable authors, ancient and modern, attribute the invention of water-*ordeal*, in the Chriſtain church, to pope Eugenius II. though Le Brun, a prieſt of the Oratory, maintains, that it was more ancient.—However this be, the cuſtom was condemned and abrogated, by the authority of Lewis the Meek, about the year 829. It was afterwards revived, and practiſed in the 10th, 11th and 12th centuries.

The firſt account we have of Chriſtians appealing to the fire-*ordeal*, as a proof of their innocence, is that of Simplicius, biſhop of Autun, who lived in the fourth century. This prelate, as the ſtory is related, before his promotion to the epiſcopal order, had married a wiſe, who loved him tenderly, and who, unwilling to quit him after his advancement, continued to ſleep in the ſame chamber with him. The ſanctity of Simplicius ſuffered, at leaſt in the voice of fame, by the conſtancy of his wife's affection: and it was rumoured about, that the holy man, though a biſhop, perſiſted, in oppoſition to the eccleſiaſtical canons, to taſte the ſweets of matrimony; upon which, his wife, in the preſence of a great concourſe of people, took up a conſiderable quantity of burning coals, which ſhe held in her cloaths, and applied to her breaſts, without the leaſt hurt to her perſon or her garments, as the legend ſays, and her example being followed by her huſband, with the like ſucceſs, the ſilly multitude admired the miracle, and proclaimed the innocence of the loving pair. A ſimilar trick was played, by St. Brice, in the fifth century.—Moſh. Eccl. Hiſt. vol. ii. p. 169. n. f. Eng. ed. 1768.

The practice of *ordeal* obtained very generally, in more modern times; and even in England, ſo late as king John's time, we find grants to the biſhops and clergy to uſe the *judicium ferri, aquæ, et ignis.* And both in England and Sweden, the clergy preſided at this trial, and it was only performed in the churches or in other conſecrated ground. However the canon law declared, very early againſt trial by *ordeal*, as being the fabric of the devil. Upon this authority, though the canons themſelves were of no validity in England, it was thought proper (as had been done in Denmark, above a century before) to diſuſe and aboliſh this trial entirely in our courts of juſtice, by an act of parliament, of 3 Hen. III. according to ſir Edward Coke, or rather by an order of the king in council. Blackſt. Com. vol. iv. p. 338. &c.

ORDEFF, or **OREDEF**, a word frequently uſed, in charters of privileges, for a liberty whereby a man claims the ore found in his own ground.

It properly ſignifies ore lying under-ground; as a *delf* or *delf of coal* is coal lying in veins under ground.

ORDER, in *Architecture*, a ſyſtem of the ſeveral members, ornaments, and proportions of a column and pilaſter. Or, a regular arrangement of the projecting parts of a building, whereof the column is the chief, ſo as to form one beautiful whole. See *Tab. Archit. fig.* 24, 25, 26, 27, 28.

Perrault defines *order* to be, that which preſcribes the proportions of entire columns, and determines the figures of certain parts ſuitable to the different characters, which their different uſes and ends require.

M. Le Clerc defines an *order* to be a column charged with an entablature, and ſupported on a pedeſtal.

The definitions Vitruvius, Barbaro, Scamozzi, &c. give of *order*, are ſo obſcure, that it were vain to repeat them: without dwelling, therefore, on the definition of a word, which cuſtom has eſtabliſhed, it is ſufficient to obſerve, that there are five *orders* of columns; three whereof are Greek, viz. the *Doric*, *Ionic*, and *Corinthian*; and two Italic, viz. the *Tuſcan* and *Compoſite*.

The three Greek *orders* repreſent the three different manners of building; viz. the *ſolid*, *delicate*, and *middling*: the two Italic ones are imperfect productions thereof. The little regard the Romans had for theſe laſt, appears hence, that we do not meet with one inſtance, in the antique, where they are intermixed: that abuſe the moderns have introduced by the mixture of Greek and Latin *orders*, Daviler obſerves, ariſes from their want of reflection on the uſe made thereof by the ancients.

The origin of *orders* is almoſt as ancient as human ſociety.

The rigour of the ſeaſons firſt led men to make little cabins, to retire into; at firſt half under-ground, and the half above, covered with ſtubble: at length, growing more expert, they planted trunks of trees on-end, laying others acroſs to ſuſtain the covering.

Hence they took the hint of a more regular architecture: for the trunks of trees, upright, repreſent columns; the girts or bands, which ſerved to keep the trunks from burſting, expreſſed baſes and capitals; and the ſummers, laid acroſs, gave a hint of entablatures; as the coverings, ending in points, did of pediments.—This is Vitruvius's hypotheſis; which we find very well illuſtrated by M. Blondel.

Others take it, that columns took their riſe from pyramids, which the ancients erected over their tombs; and that the urns, wherein they encloſed the aſhes of the dead, repreſented the capitals, whoſe abacus was a brick, laid thereon to cover the urns: but Vitruvius's account appears the more natural.

At length the Greeks regulated the height of their columns on the foot of the proportions of the human body.

For the meaſures of the ſeveral orders, ſee COLUMN.

Theſe *orders* took their names from the people among whom they were invented: Scammozzi uſes ſignificative terms to expreſs their character, when he calls the *Tuſcan*, the *Gigantic*; the *Doric*, the *Herculean*; the *Ionic*, the *Matronal*; the *Compoſite*, the *Heroic*; and the *Corinthian*, the *Virginal*. See TUSCAN, DORIC, &c.

To give a general idea of the *orders*, it muſt be obſerved, that the whole of each *order* is compoſed of two parts, at the leaſt, viz. the column and entablature; and of four parts, at the moſt, when there is a pedeſtal under the column, and an acroter or little pedeſtal a-top of the entablature: that the column has three parts; viz. the *baſe*, the *ſhaft*, and the *capital*: the entablature has three likewiſe; viz. the *architrave*, the *frieze*, and *corniche*: which parts are all different in their ſeveral *orders*. See ENTABLATURE, CAPITAL, &c.

B, *Tab. Archit. fig.* 40. is an example of the manner of placing one *order* over another, where there are ſeveral ranges of columns, as at St. Paul's Cathedral, the Banqueting-Houſe at Whitehall, and many other public edifices. They are determined by the *order*, over which they ſtand, and the greateſt diameter of the upper tier of columns is in general made equal to the diameter of the lower tier at the top of the columns; and the axis of the upper column is placed immediately over the centre of the lower column; which diſpoſition determines the INTERCOLUMNIATION.

ORDER, *ruſtic*. See RUSTIC.

ORDER, *Attic*. See ATTIC.

ORDER, *Perſian*. See PERSIAN.

In ſome caſes the CARIATIDES, or *Perſian order*, is introduced as an Attic, over columns; as in the front of the Royal Academy, in the Strand.

ORDER, *caryatic*. See CARYATIDES.

ORDER, *Gothic*. See GOTHIC.

ORDER, *French*, is a new-contrived *order*, wherein the capital conſiſts of attributes agreeing to that people; as cocks heads, fleur de lis, &c.

Its proportions are *Corinthian*. Such is that of M. Le Brun, in the grand gallery at Verſailles; and that of M. Le Clerc.

M. Le Clerc gives a ſecond *Tuſcan order*, and a *Spaniſh order*, beſides his *French order*. The *Tuſcan* he ranks between the firſt *Tuſcan* and *Doric*. Its height he makes 23 ſemidiameters 22 minutes; the column to have 15, the pedeſtal 5, and the entablature 3, and 22 minutes: and he propoſes its frieze to be adorned with turtles, which are the arms of Tuſcany.

The *Spaniſh order* he places between the *Corinthian* and *Compoſite*. The whole *order* he makes 30 ſemidiameters, 28 minutes; whereof the column has 9 and 25 min. the pedeſtal 16 and 18 min. and the entablature 4 and 15 min. The horns of the abacus he ſuſtains with little volutes; the middle, in lieu of a roſe, has a lion's ſnout; that animal being the ſymbol of Spain, and expreſſing the ſtrength, gravity, and prudence of that nation.

There has been alſo an *order*, where lions and unicorns have been made to iſſue from the volutes, in compliment to the arms of the king of England, and called the *Britannic order*: but all theſe diſtinctions are alterations without improvement, and encumber rather than ornament the original figure of the antique capital.

ORDERS, *Greek*. See GREEK.

ORDER, in *Rhetoric*, is the placing of each word and member of a ſentence in ſuch a manner, as will moſt contribute to the force, beauty, or evidence of the whole; according to the genius and cuſtom of different languages. With regard to *order*, we may obſerve in general, that, in Engliſh, the nearer we keep to the natural or grammatical *order* it is generally the beſt; but in Latin, we are to follow the uſe of the beſt writers; a joint regard being always had to the judgment of the ear, and the perſpicuity of the ſenſe, in both languages. See DISPOSITION.

ORDER is alſo uſed for a claſs or diviſion of the members of the body of a ſtate; with regard to aſſemblies, precedence, &c.

In this ſenſe, *order* is a kind of dignity, which, under the ſame name, is common to ſeveral perſons; and which, of itſelf, does not give them any particular public authority, but only rank, and a capacity of arriving at honours and employments.

To abridge this definition, *order* may be ſaid to be a dignity attended with an aptitude for public employ. By which it is diſtinguiſhed from an *office*, which is the exerciſe of a public truſt.

In this ſenſe, nobility is an *order*, &c. The clericate is alſo an *order*, &c.

ORDER is alſo the title of certain ancient books, containing the divine office, with the order and manner of its performance.

Roman order is that wherein are laid down the ceremonies which obtain in the Romiſh church. See RITUAL.

ORDER, in *Aſtronomy*, &c. A planet is ſaid to go according to the *order* of the ſigns, when it is direct; proceeding from Aries to Taurus, thence to Gemini, &c.—It goes contrary to the *order* or ſucceſſion of the ſigns, when it is retrograde, i. e. when it goes back from Piſces to Aquarius, &c.

ORDER, in *Botany*, is a name given to a ſubdiviſion of plants, in the Linnæan ſyſtem; which in the firſt 13 claſſes takes its denomination from the number of piſtils or female parts of the plant; and theſe are uſually reckoned from the baſe of the ſtyle, if there be any; but if the ſtyle be wanting, the number is taken from the ſtigmata. Of the three *orders* of the 14th claſs the firſt two are founded on a diſtinction in the fruit, and the third expreſſes ſuch plants as have many petals. The two *orders* of the 15th claſs are founded on a diſtinction in the pericarpium. The *orders* of the three next claſſes are founded on the number of ſtamina in each brotherhood, or diſtinct ſet of ſtamina. The four firſt *orders* of the 19th claſs are founded on four caſes of the POLYGAMY *of flowers*; the 5th *order* comprehends thoſe plants which have partial cups growing out of the common calyx, which ſurround and divide the floſculi, or florets; and the 6th order has a ſimple flower, and not a flower compounded of many florets, as in the other *orders*. The *orders* of the 20th claſs are founded on the number of ſtamina. The *orders* of the two preceding claſſes are diſpoſed under the titles of thoſe claſſes, to which their reſpective flowers would have belonged, if the ſtamina and piſtillum had been under the ſame covers. In the 23d claſs, the titles of the two firſt *orders* are the ſame with thoſe of the 21ſt and 22d claſſes, and are to be underſtood in the ſame manner. The 3d *order* has been eſtabliſhed in favour of a ſingle genus, viz. the *ficus*; in which the polygamy is on three diſtinct plants, one producing male flowers, another female, and the third hermaphrodite or androgynous. The diſtinguiſhing characters of the four *orders* of the 24th claſs are not ſo accurately aſcertained as thoſe of the others. See FRUCTIFICATION.

A diſtinct and intelligible view of the different *orders* may be obtained by conſulting *Tab.* III. IV. V. VI. and VII. *of Botany*, explained by the following references, for which the editor is indebted to Mr. Miller's late excellent Illuſtration of the Sexual Syſtem of Linnæus.

Claſs I. *Order* 1. *Canna.* (See *Tab.* III.) The whole flower is repreſented in the firſt figure; the perianthium is triphyllous, as 1; the corolla monopetalous, but divided into ſix ſegments, 2, 2; the nectarium is ſhaped like a petal, and divided into two ſegments, the upper aſcending archwiſe, the inferior rolled back, 3; the filament is wanting, but the anthera adheres to the margin of the ſuperior ſegment of the nectarium, 4; the parts of the piſtil are a roundiſh germen, 5; ſword-ſhaped ſtyle, 6, adhering to the nectarium; and a linear ſtigma, 7, growing to the margin of the ſtyle.

Ord. 2. *Blitum.* The perianthium is tripartite, 1; no corolla; the filament briſtly, 2; the antheræ twins, 3; the germen ovate, 4; the ſtyles two, 5, 5; and the ſtigmas ſimple, 6, 6.

Claſs II. *Ord.* 1. *Monarda.* The perianthium of one leaf, 1; the corolla monopetalous, but divided into two lips, 2; the two filaments are ſetaceous, 3; the antheræ compreſſed, 4; the germen quadrifid, 5; the ſtyle filiform, 6; and the ſtigma bifid, 7.

Ord. 2. *Anthoxanthum.* The calyx is a bivalvular glume, with one flower, 1; the corolla is an uniflorous bivalvular glume, each valve having a dorſal ariſta, 2; the nectarium is diphyllous, thin, cylindrical, embracing the germen, ſtamen, and ſtyle, 3, 3; the filaments like two hairs, 4, 4; the antheræ double forked, 5, 5; the germen oblong, 6; and the ſtyles thread-ſhaped, 7, 7.

Ord. 3. *Piper.* The perianthium monophyllous, 1; no corolla, or filaments; the antheræ are two, placed at the root of the germen, 2; the germen is large, 3; there are no ſtyles, but three briſtly ſtigmas, 4; a filiform ſpadix, covered with flowers, 5.

Claſs III. *Ord.* 1. *Crocus.* The calyx a ſpatha, 1; the corolla is monopetalous; its tube, 2, is long, and its limb divided into ſix parts, 3; the filaments are three and awl-ſhaped, 4; the antheræ are arrow-ſhaped, 5; the germen is roundiſh, 6; the ſtyle filiform, 7; the ſtigmas are three, 8, 8.

Ord. 2. *Avena.* The calyx is a glume generally with many flowers; the glume is bivalvular, the valves without beards, 1; the wild oat having a beard, 2; the corolla bivalvular, having a beard ſpirally wreathed, and growing out at its bark; the filaments are three, and like hairs, 3; the antheræ oblong and bifurcate, 4; the germen obtuſe, 5; the ſtyles are two, reflex, thread-like, and feathered at the top, 6; but the ſtigmas undivided.

Ord. 3. *Mollugo.* The calyx a perianthium of five leaves, 1; no corolla; the filaments three, lying cloſe to the piſtil, 2; the antheræ ſimple, 3; the germen ovate and triſulcate, 4; the ſtyles are three and ſhort, 5.

Claſs IV. *Ord.* 1. *Dipſacus.* The common perianthium of the calyx is multiflorous, 1; the proper perianthium ſcarce diſtinguiſhable to the naked eye, 2; the univerſal corolla equal, 3; the proper corolla monopetalous, 4; the filaments are four, 5; the antheræ incumbent, 6; the germen, 7; and the ſtyle filiform, 8.

Ord. 2. *Hamamelis.* The involucrum is triphyllous, 1; the calyx a double perianthium, the exterior diphyllous, and the interior tetraphyllous, 2; the corolla has four long linear petals, 3; the nectarium four folioles, truncated, and grown to the corolla, 4; the filaments are four and linear, 5; the antheræ obovate like two together, with a ſmall elevated top, 6; the germen ovate and hairy, 7; the ſtyles two, 8; and the ſtigmas truncated, with an elevated top, 9.

Ord. 3. *Potamogeton.* The corolla hath four petals, 1; the filaments are four, but very ſhort, 2; the antheræ are twins, 3; the germina are four, 4; no ſtyle; the ſtigmas obtuſe, 5.

Claſs V. *Ord.* 1. *Nerium.* The perianthium monophyllous, and quinquepartite 1; the corolla of one leaf, and funnel-ſhaped, but divided at the upper part into five, 2; the filaments are five, and ſhort, 3; the antheræ arrow-ſhaped, inclining together, and terminating in a long thread, 4; the germen roundiſh and bifid, 5; the ſtyle cylindric, 6; and the ſtigma truncate, 7.

Ord. 2. *Anethum.* The univerſal umbel conſiſts of many partial umbels, 1; a partial umbel, 2; and univerſal involucrum none; a partial one none; the proper perianthium obſolete; the univerſal corolla uniform; the floſcules all fertile, and conſiſting of five petals, 3; the filaments five and capillary, 4; the antheræ roundiſh, 5; the germen, 6; the ſtyles two, 7; and the ſtigmata obtuſe, 8.

Ord. 3. *Turnera.* The perianthum monophyllous, its tube cylindrical, the limb quinquepartite, 1; the petals five, 2; the filaments five, 3; the antheræ, 4; the conic germen, 5; the ſtyles three, 6; a ſtyle magnified, 7; the ſtigmas are bundles of hairs, 8.

Ord. 4. *Parnaſſia.* The petals five, 1; the filaments five, 2; the antheræ, 3; the nectaria five, 4; the germen ovate, 5; no ſtyle; the ſtigmas four, 6.

Ord. 5. *Craſſula.* The perianthium pentaphyllous, 1; the petals five, united at their baſe, 2; the filaments five, 3; the antheræ oblong, 4; the germina five, 5; the nectaria five, 6; the ſtyles five, 7; and the ſtigma obtuſe, 8.

Ord. 6. *Myoſurus.* The perianthium pentaphyllous, 1; no corolla; the nectaria five, 2; the filaments five, 3; the antheræ oblong, 4; the germina numerous, 5; each germen is conic and ſmooth, 6; no ſtyles; ſtigmas ſimple, 7.

Claſs VI. *Ord.* 1. *Amaryllis.* The corolla hexapetalous, bell-ſhaped, with a hook on every other petal, 1; the filaments ſix, 2; the antheræ, 3; the germen, 4; the ſtyles, 5; and the ſtigmas, 6.

Ord. 2. *Oryza.* The glume of the calyx, 1; the corolla is bivalve, 2; the nectaria are two, 3; the filaments ſix, and capillary, 4; the antheræ bifid, 5; the germen ſhaped like a top, 6; the ſtyles two, 7; and the ſtigmas elevated, 8.

Ord. 3. *Rumex.* The perianthium triphyllous; the petals three, 1; the filaments ſix, 2; the antheræ, 3; the germen, 4; the ſtyles three, 5; the ſtigmas, 6.

Ord. 4. *Petiveria.* The perianthium monophyllous, but quadripartite, 1; no corolla; the filaments ſix, 2; the antheræ oblong, 3; the germen compreſſed, 4; the ſtyles four, 5; and the ſtigmas, 6.

Ord. 5. *Aliſma.* The petals three, 1; the filaments ſix, 2; the antheræ roundiſh, 3; the germina more than five, 4; a ſingle germen, 5; the ſtyle, 6; and ſtigma, 7.

Claſs VII. *Ord.* 1. (See *Tab.* IV.) *Æſculus.* The perianthium monophyllous, tubulous, quinquefid, 1; corolla, five petals inſerted in the calyx, 2 *a*; filaments ſeven, inſerted in the receptacle, ſubulate, bending downward, pilous, 2 *b*, 3 *a*; anthera ovate, riſing upright, 2 *c*, 3 *b*; germen ovate and villous, 4 *a*, 5 *a*, ending in a ſubulate ſtyle, 5 *b*; ſtigma acuminate, 5 *c*.

Ord. 3. *Saururus.* The amentum (or catkin) oblong, covered with flowers, 1; the proper perianthium monophyllous, ovate, lateral, coloured, and hairy, 2, 3; corolla none; filaments ſeven, filiform, 3 *a*; anthera oblong, erect, 3 *b*; germina four, ovate, 4 *a*; ſtyles thickiſh, ſubulate, 4 *b*; ſtigmas ſimple, acute, 4 *c*.

Claſs VIII. *Ord.* 1. *Oenothera.* The perianthium monophyllous, the tube cylindraceous, the limb quadripartite, 1; corolla, four petals, obcordate, 2 *a*; inſerted at the diviſures of the calyx, 3; filaments eight, ſubulate, incurved, inſerted in the mouth of the calyx, ſhorter than the corolla, 2 *b*, 4 *a*; antheras oblong, incumbent, 2 *c*, 4 *b*; germen cylindraceous, ſtanding under the corolla, 5 *a*; ſtyle filiform, of the length of the ſtamina, 5 *b*; ſtigmas quadrifid, thick, obtuſe, reflexed, 5 *c*.

Ord. 2. *Galenia.* The perianthium ſmall, quadrifid, and concave, 1; corolla none; filaments eight, like hairs, 2 *a*; anthera divided into two lobes, 2 *b*, 3 *a*; germen nearly round, 2 *c*, 4 *a*; ſtyles two, ſimple, reflexed, 4 *b*; ſtigmas, ſimple, obtuſe, 4 *c*.

Ord. 3. *Polygonum.* The perianthium turbinate, on the outſide coloured, quinquepartite, 1 *a*, 2 *a*; corolla none, except the coloured calyx: filaments often eight, ſubulate, ſhort, 2 *b*, 3 *a*; antheras ſubrotund, incumbent, 2 *c*, 3 *b*; the germen triquetrous, 2 *d*, 4 *a*; ſtyles often three, filiform, very ſhort, 4 *b*; ſtigmas ſimple, 4 *c*.

Ord. 4. *Adoxa.* The flowers terminating in a head, 1; perianthium below the flowers, bifid, ſpreading flat, 2; corolla monopetalous, quadrifid, ſpreading flat, 3 *a*; filaments eight, 3 *b*, 4 *a*; antheras ſubrotund, 3 *c*, 4 *b*; germen within the receptable of the corolla, 3 *d*, 5 *a*; ſtyles four, ſimple, erect, 5 *b*; ſtigmas ſimple, 5 *c*.

Claſs IX. *Ord.* 1. *Caſſyta.* The perianthium triphyllous; the folioles acute, concave, a little ſpreading, 1 *a*, 2 *a*; petals three, their margins from the middle to their points convolute, 2 *b*; the nectarium is formed of three glands, coloured, truncate, the length of the germen, and ſtanding round it, 3 *a*, 4 *a*; filaments nine, 2 *c*, 4 *b*; antheras with three lobes, 4 *c*; germen ſtanding under the flower, 2 *d*, 4 *d*, 5 *a*; ſtyle 5 *b*; ſtigma trilobate, 5 *c*.

Ord. 2. *Rheum.* Calyx none; corolla monopetalous, the limb cut into ſix ſegments, 1 *a*; filaments nine, inſerted into the corolla, 1 *b*; antheras twins, 1 *c*; germen three-cornered, 2 *a*; ſtyles ſcarce any, 2 *b*; ſtigmas three, reflex, plumoſe, 2 *c*.

Ord. 3. *Butomus.* The involucrum ſimple, triphyllous, 1; petals ſix, 2 *a*; filaments nine, of which ſix are exterior, 3 *a*; antheras as if compoſed of two plates, 3 *b*; germens ſix, 4 *a*, terminating in ſtyles, 4 *b*; ſtigmas ſimple, growing to the inſide of the ſtyles, 4 *c*.

Claſs X. *Ord.* 1. *Kalmia.* The perianthium quinquepartite, 1; corolla monopetalous, partly hypocrateriform, and partly infundibuliform, cut into five ſegments, 2 *a*; ten nectariferous horn-ſhaped cavities, which before the flower is perfectly blown contain the ſtamens and antheras like a ſheath, 2 *b*, 3 *a*; filaments ten, inſerted into the baſe of the corolla, 3 *b*; antheras ſimple, 3 *c*; germen roundiſh, 4 *a*; ſtyle filiform, 4 *b*; ſtigma obtuſe, 4 *c*.

Ord. 2. *Saxifraga.* The perianthium monophyllous, quinquepartite, 1; petals five, 2 *a*; filaments ten, 3 *a*; antheras ſubrotund, 3 *b*; germen roundiſh, tapering upwards, 3 *c*, 4 *a*, ſo as to form two ſhort ſtyles, 4 *b*; ſtigmas obtuſe, 4 *c*.

Ord. 3 *Stellaria.* The perianthium pentaphyllous, 1; petals five, bipartite, oblong, 2 *a*; filamens ten, every other ſhorter, 3 *a*; antheras heart-ſhaped, 3 *b*; germen ſubrotund, 3 *c*, 4 *a*, ſtyles three, 4 *b*; ſtigmas obtuſe, 4 *c*.

Ord. 4. *Oxalis.* The perianthium quinquepartite, 1; corolla monopetalous, quinquepartite, the ungues joined together at their baſes, 2 *a*; filaments ten, capillary, the exterior ſhorter than the interior, 3 *a*; antheras ſubrotund, furrowed, 3 *b*; germen quinquangular, 4 *a*; ſtyles five, filiform, 4 *b*; ſtigmas obtuſe, 4 *c*.

Ord. 5. *Phytolacca.* Calyx none (except the corolla is taken for a coloured calyx); petals five, 1 *a*, 2 *a*; filaments ten (eight or twenty), 2 *b*; antheras ſubrotund, 2 *c*; germen orbicular, divided on the outſide by little bands or wreaths, 2 *d*, 3 *a*, terminating with ten (or eight) ſtyles, 3 *b*; ſtigmas ſimple, 3 *c*.

Claſs XI. *Ord.* 1. *Aſarum.* The perianthium monophyllous, bell-ſhaped, ſemitrifid, coriacious, coloured, villous, 1; corolla none; filaments twelve, ſubulate, inſerted on the top of the germen, 2 *a*, 3 *a*; antheras, oblong, joined to the middle of the filaments, 2 *b*, 3 *b*; germen below the calyx, and hid within its ſubſtance, 3 *c*, 4 *a*; ſtyle, a cylindraceous cone, hexagonal, 3 *d*, 4 *b*; ſtigma ſtar-ſhaped, 3 *e*, 4 *c*.

Ord. 2. *Agrimonia.* The perianthium monophyllous, quinquefid, ſitting on the top of the germen, 1 *a*; ſurrounded by another calyx, 1 *b*; petals five, and inſerted in the calyx, 2 *a*; filaments capillary, inſerted into the calyx, 2 *b*; antheras twins, 2 *c*; germen ſitting under the calyx, 3 *a*; ſtyles two, ſimple, 3 *b*; ſtigmas 3 *c*.

Ord. 3. *Euphorbia.* Perianthium monophyllous, ventricoſe, having at the mouth four teeth, ſometimes five, 1 *a*, 2 *a*; petals four, ſome few five, turbinated, gibbous, ſwelled, truncated, 1 *b*, 2 *b*, with the calycine denticles alternate, 2 *c*; the ungues faſtened to the margin of the calyx, 2 *d*; filaments many, twelve or more, filiform, articulated, inſerted on the receptacle, 3 *a*; antheras didymous, ſubrotund, 3 *b*; germen ſubrotund, triquetrous, with a footſtalk, 4 *a*; ſtyles three, bifid, 4 *b*; ſtigmas obtuſe, 4 *c*.

Ord. 5. *Sempervivum.* The perianthium divided into from ſix to twelve ſegments, with hairs round their margin, 1; petals, from ſix to twelve, a little larger than the calyx, 2 *a*; filaments from ſix to twelve, 2 *b*; antheras, ſubrotund; before they diſcharge their pollen, ſubovate, 3 *a*, with four furrows, after the pollen is diſcharged, 3 *b*; germens from ſix to twelve, placed in a circle, erect, 4 *a*, terminating in as many ſtyles, 4 *b*; ſtigmas, acute, villous, 4 *c*.

Claſs XII. *Ord.* 1. *Punica.* The perianthium monophyllous, bell-ſhaped, quinquefid, 1; petals five, inſerted into the calyx, 2 *a*; filaments numerous, capillary inſerted into the calyx, 3 *a*; antheras a little oblong, 3 *b*; germen placed below the calyx, 3 *c*, 4 *a*; ſtyle ſimple, 4 *b*; ſtigma headed, 4 *c*.

Ord. 2. *Cratægus.* The perianthium monophyllous, having five teeth, 1; petals five, inſerted in the calyx, 2 *a*; filaments twenty, inſerted in the calyx, 3 *a*; antheras ſubrotund, 3 *b*; germen below the flower, 4 *a*; ſtyles two, 4 *b*; ſtigmas, 4 *c*. N. B. Fig. 4. is a longitudinal ſection.

Ord. 3. *Sorbus.* The perianthium monophyllous, having five teeth, 1; petals five, ſeſſile, inſerted into the calyx, 2 *a*; filaments twenty, inſerted into the calyx, 2 *b*; antheras roundiſh, 2 *c*; germen ſtanding under the receptacle, 3 *a*; ſtyles three, 3 *b*; ſtigmas capitate, 3 *c*. N. B. Fig. 3. is a longitudinal ſection.

Ord. 4. *Pyrus.* The perianthium monophyllous, ſemiquinquefid, 1; petals five, inſerted into the calyx, 2 *a*, 3 *a*; filaments twenty, inſerted into the calyx, 3 *b*; antheras ſimple, 3 *c*; germen placed below the calyx, 3 *d*; ſtyles five, 3 *e*; ſtigmas ſimple, 3 *f*. N. B. Fig. 3. is a longitudinal ſection.

Ord. 5. *Rubus.* The perianthium monophyllous, quinquepartite, 1; petals five, inſerted in the calyx, 2 *a*; filaments many, inſerted in the calyx, 2 *b*; antheras ſubrotund, compreſſed, 2 *c*, 3; germens numerous, 4 *a*; ſtyles filiform, coming out of the ſides of the germens, 4 *b*; ſtigmas ſimple, 4 *c*.

Claſs XIII. *Ord.* I. (See *Tab.* V.) *Sarracenia.* The calyx is a double perianthium, the inferior with three ſmall leaves, 1 *a*, the ſuperior with five leaves, large and coloured, 1 *b*, 2 *a*; petals five, inflex, aſſurgent, betwixt the angles of the ſtigma, covering the ſtamens, embracing the top of the ſtigma, 2 *b*; filaments many, 3 *a*; antheras ſimple, 3 *b*; germen roundiſh, furrowed, 3 *c*; ſtyle cylindrical, growing thicker at the top, 3 *d*; ſtigma ſhield-ſhaped, the ſtyle inſerted in its middle, membranaceous, quinquangular, overſhading the ſtyle, germen, and ſtamens, like an umbrella, 2 *c*, 3 *e*.

Ord. 2. *Pœonia.* The perianthium pentaphyllous, the folioles ſubrotund, reflex, unequal in ſize and ſituation, 1; petals, five, 2 *a*; filaments numerous, ſhort, about three hundred ſtanding in three circles round the germens, 3 *a*; antheras oblong, quadrangular, large and quadrilocular, 3 *b*; germens two, ovate and downy, 3 *c c*; ſtigmas recurvate, 3 *d d*.

Ord. 3. *Aconitum.* Calyx none; petals five, unequal, the uppermoſt helmet-ſhaped and tubulate, the two lateral ones are broad, ſubrotund, oppoſite, connivent, the two undermoſt are oblong, bending downwards, 1 *a b c*; nectaria two, covered by the helmet-ſhaped petal, 1 *d*; filaments many, ſhort, 1 *e*, 2 *a*; antheras heart-ſhaped, 2 *b*; germens three (ſometimes five), 3 *a*, terminating in a ſtyle, 3 *b*; ſtigmas ſimple, acuminate, 3 *c*.

Ord. 5. *Aquilegia.* Calyx none; petals five, 1 *a*, 2 *a*; the nectaria five, equal, with the petals placed alternate 1 *b*; each is horn-ſhaped, on the upper part gradually broad, aſcending obliquely on the outer ſide with an opening or mouth fixed on the inner ſide to the receptacle, 4; the baſe advancing to a long tube, growing narrower, the apex obtuſe, incurved; filaments from thirty to forty, the outer ſhort, 1 *c*, 5 *a*; antheras oblong, 5 *b*; germens five, 6 *a*, terminating in ſubulated ſtyles, longer than the ſtamens, 5 *c*, 6 *b*; ſtigmas ſimple, 5 *d*, 6 *c*; the germens are each covered with two paleas, 5 *e*.

Ord. 6. *Stratiotes.* The ſpatha diphyllous, uniflorous, 1, 2 *a*, on both ſides carinated, the carinas jagged with ſhort ſpines; perianthium monophyllous, tripartite, 2 *b*, 3; petals three, obcordate, 2 *c*; filaments twenty, ſhort, inſerted in the receptacle, 4 *a*; antheras ſimple, ſagittated, and lanceolated, 4 *b*; germen inferous, 5 *a*; ſtyles ſix, bipartite, 5 *b*, longer than the ſtamens; ſtigmas ſimple, 5 *c*.

Ord. 7. *Ranunculus.* The perianthium pentaphyllous, 1; petals five, 2; the nectarium at the ungues of each petal hath a hollow or cavity, 3 *a*; the eſſential character conſiſts in the nectarium, the other parts being commonly inconſtant and different, which when unknown, cauſes a great deal of confuſion; the nectarium is in ſome ſpecies only an open pore, in others ſurrounded with a cylindraceous margin, and ſome few cloſed by an emarginated ſcale; filaments many, four in the magnified one, *a*; antheras oblong, twins, 4, in the magnified one, *b*; germens numerous, collected in a ſmall head, 5 *a*; ſtyles none; ſtigmas reflexed, very ſmall; a germen magnified, 5 *b*; its ſtigma 5 *c*.

Claſs XIV. *Ord.* 1. *Melittis.* The perianthium monophyllous, bell-ſhaped, villous, the mouth bilabiate, the upper lip higher, the inferior lip ſhorter and trifid, 1; corolla monopetalous, gaping, the tube long and narrow, the upper lip erect, the inferior, patent, trifid, 2; filaments four, the inner ones ſhorter than the outer, 3 *a*; antheras in pairs, croſs ways, bifid, 3 *b*; germen quadrifid, villous, 4 *a*; ſtyle filiform, 4 *b*; ſtigma bifid, 4 *c*.

Ord 2. *Melianthus.* The perianthium large, quinquepartite; the ſuperior lacinias erect, oblong, 1 *a*, the under lacinia very ſhort, 1 *b*, ſhaped like a bag, downwards gibbous; the two middle lacinias lanceolate, 1 *c*; petals five, the upper one erect, 2 *a*; the other four on the upperſide patent, reflexed at the apex, 2 *b*; the nectarium is in the undermoſt lacinia of the calyx; filaments four, 2 *c*; antheras cordate, oblong, on the fore part quadrilocular, 2 *d*; germen tetragonous, ending in four knobs, 3 *a*; ſtyle, 3 *b*; ſtigma, quadrifid, 3 *c*.

Claſs XV. *Ord.* 1. *Lunaria.* The perianthium tetraphyllous, the folioles ſpread at their apex, two of them are gibbous at the baſe like a ſack, 1; corolla tetrapetalous, each petal terminating with an unguis, the length of the calyx, 2 *a*; filaments ſix, four longer and two ſhorter, 3 *a*; antheras, 3 *b*; germen on a pedicle, 3 *c*; ſtyle of a conic form, 3 *d*; ſtigma, 3 *c*.

Ord. 2. *Cheiranthus.* The perianthium tetraphyllous, the two exterior folioles are gibbous at their baſes, 1; corolla tetrapetalous, 2 *a*; filaments ſix, four longer and two ſhorter, 3 *a*; antheras bifid at the baſe, 3 *b*; germen, in ſhape of a priſm, tetragonous, 3 *c*; ſtyle ſhort, 3 *d*; ſtigma bipartite, 3 *e*.

Claſs XVI. *Ord.* 1. *Hermannia.* The perianthium monophyllous, quinquefid, 1; corolla pentapetalous, 2 *a*, twiſting from the right to the left, 3 (N. B. Fig. 3. is magnified); the ungues of the petals on both ſides are provided with a nectariferous membrane, rolled up lengthway, and in form of a tube, 4; filaments five, joined together in one body at the baſe, 5 *a*; antheras, 5 *b*; germen ſubrotund, pentagonous, quinquangular, 6 *a*; ſtyles five, ſtanding near each other, 6 *b*; ſtigmas, ſimple, 6 *c*.

Ord. 2. *Geranium.* The perianthium monophyllous, quinquepartite, 1; petals five, 2 *a*; filaments ten, five longer, five ſhorter, alternately, 3 *a*; antheras turn on the apex of the filament like the needle of a compaſs, 3 *b*; germen quinquangular, having a beak like that of a crane, 4 *a*; ſtyle, 4 *b*; ſtigmas five reflexed, 4 *e*.—N. B. The African geraniums have commonly the calyx at the baſe, tubulous and monophyllous, the petals unequal, the filaments at their baſe ſlightly grown together, generally no more than ſeven antheras, their ſeeds uncovered with long feathery beards. The European geraniums, &c. have a calyx conſiſting of ſix leaves.

Ord. 4. *Pentapetes.* The involucrum uniflorous, triphyllous, 1 *a*, 2 *a*; the perianthium monophyllous, quinquepartite, 1 *b*, 2 *b*; corolla monopetalous, the tube ſhort, the limb quinquepartite, 3 *a*; filaments fifteen, connected at the baſe into a tube, 3 *b*, 4 *a*; five filaments long, without antheras or farina, between two or three filaments with their anthera, ſtands one of the longer ones, without their anthera, 4 *b*; anthera, 3 *c*, 4 *c*; germen ſubrotund, with five furrows, 5 *a*; ſtyle, cylindraceous, 5 *b*; ſtigma, 5 *c*.

Ord. 5. *Alcea.* The perianthium double; the exterior monophyllous, divided into ſix ſegments, 1 *a*, the interior monophyllous, ſemiquinquefid, 1 *b*; petals five, joined together at their baſe, 2 *a*; filaments numerous, forming at the baſe a pentagonous cylinder, inſerted into the corolla, 2 *b*, 3 *a*; antheras reniform, 3 *b*; germen orbicular, 1 *c*; ſtyle cylindraceous, 1 *d*; ſtigmas numerous (twenty), 1 *e*.

Claſs XVII. *Ord.* 2. *Fumaria.* The perianthium diphyllous, 1, 2 *a*; corolla oblong, tubulated, gaping, 2 *b*; filaments two, each incloſed in its lip, 3 *a*; antheras three, terminating each filament, 3 *b*; germen oblong, 3 *c*, 4 *a*; ſtyle the length of the filaments in this ſpecies, 3 *d*, 4 *b*; ſtigma, 3 *e*, 4 *c*.

Ord. 3. *Polygala.* The perianthium tripartite, 1; one of the folioles ſtands above the corolla, and two below it, 2 *a*; corolla butterfly-ſhaped, the number of petals undetermined, 3; the wings, 3 *a*; the vexillum (or ſtandard), 3 *b*; filaments diadelphous, eight in one body, 4 *a*; antheras eight, 4 *b*; germen oblong, 5 *a*; ſtyle, 5 *b*; ſtigma terminates with a navel, 5 *c*.

Ord. 4. *Lathyrus.* The perianthium monophyllous, ſemiquinquefid, campanulate, 1; corolla butterfly-ſhaped, 2, the carina (or keel), 2 *a*, opens in the middle internally; filaments diadelphous, one ſtamen ſtanding by itſelf, the others in one body divided into nine, 3 *a*; antheras, 3 *b*; germen oblong 4 *a*; ſtyle, 4 *b*; ſtigma villous, 4 *c*.

Claſs XVIII. *Ord.* 1. *Theobroma.* The perianthium quinquepartite, the folioles plain with three nerves, 1; petals five, with five nerves, inſerted by the unguis into the ſquamas of the exterior nectarium under and within its apex, 2 *a*; filaments five, ſhort, between the ſquamas of the interior nectarium, as the antheras, which are from three to ſeven, in each family, grow on the outſide of the nectarium; the antheras are didymous, divaricated, uniform, and yellow, 3 *a*; germen ſtanding above the flowers, cylindraceous, quinquangular, 4 *a*; ſtyles five, approximate, 4 *b*; ſtigmas 4 *c*.

Ord. 2. *Citrus.* The perianthium monophyllous, quinquedentate, 1; petals five, 2 *a*; filaments often twenty, ſtanding in a circle, or cylinder, joined together in many or few ſmall bodies, 3 *a*; antheras, 3 *b*; germen, 4 *a*; ſtyle 4 *b*; ſtigma globoſe, hath within nine loculaments, 4 *c*; the ſtigma magnified, 4 *d*.

Ord. 3. *Hypericum.* The perianthium quinquepartite, 1; petals five, having round the margin, in this ſpecies, glandules, 2 *a*, 3 *a*; filaments numerous, grown together at the baſe in five or ſix phalanxes, 3 *b*; antheras ſmall, on both ſides canaliculated; on the apex a black gland, 4 *a*; germen ovate, in this ſpecies, 5 *a*, ſtyles three, ſpreading, 5 *b*; ſtigmas, 5 *c*.

Claſs XIX. *Ord.* 1. (See *Tab.* VI.) *Leontodon.* The common calyx, 1; the interior ſcales linear, 1 *b*; the exterior ſcales fewer, often reflexed, 1 *b*; the compound corolla, 2; the corollulas, of which it is compoſed, being hermaphrodite, 3; the proper corolla monopetalous, quinquedentate, 3; filaments five, 4 *a*; antheras cylindraceous, tubuloſe, 4 *b*; germen, 5 *a*; ſtyle 5 *b*; ſtigmas two, revolute, 5 *c*.

Ord. 2. *Xeranthemum.* The common calyx, 1; the compound corolla unequal, in which the hermaphrodite corollulas are very numerous, tubular, placed in the diſk; the female corollulas leſs numerous, tubular, placed in the circumference, 2 *a*, 3 *a*; the firſt being the proper corollas of the hermaphrodite floſcules, are funnel-ſhaped, much ſhorter than the calyx, the limb quinquefid, 4, 5; the ſecond, being the proper corollas of the female floſcules, are tubular, 6 *a*; ſtamens of the hermaphrodite flowers have five ſhort filaments, 5 *a*; antheras cylindraceous, tubular, 5 *b*; germen of the hermaphrodites, ſhort, coronate, crowned in this ſpecies with a crown of five ſetaceous points, 4 *a*; the ſtyle filiform, 5 *c*; ſtigma bifid, 5 *d*; germen of the females as in the hermaphrodites, 6, 7; ſtyle, 7 *a*; ſtigma, elevate, 7 *b*.

Ord. 3. *Helianthus.* The calyx, 1; the compound corolla radiate, its corollulas are either thoſe of hermaphrodite floſcules, numerous, and placed in the diſk, 2 *a*, or thoſe of the female floſcules, leſs numerous, much longer, and placed in the radius, 2 *b*; the proper corolla of the hermaphrodite floſcules are cylindraceous, 3; the proper corolla of the female floſcules in the form of a tongue, 4; filaments of the hermaphrodites, five, 5 *a*; antheras cylindraceous, 3 *a*, 5 *b*; germen of the hermaphrodite floſcules oblong, 5 *c*; ſtyle filiform, 5 *d*; ſtigma bipartite, reflex, 5 *e*; germen of the female floſcules ſmall, 4 *a*; ſtyle none; ſtigma none.

Ord. 4. *Calendula.* The common calyx ſimple, 1; the corolla a compound radiated flower, 2; the hermaphrodite corollulas many in the diſk, 3 *a*; the female corollulas many, 3 *b*; the proper hermaphrodites tubulous, 4; the limb quinquefid, 4 *a*; the female tongue-ſhaped, 5, with three teeth, 5 *a*; filaments of the hermaphrodite five, 6 *a*; antheras cylindraceous, tubulous, 6 *b*; germen of the hermaphrodite oblong, 6 *c*; ſtyle filiform, 6 *d*; ſtigma bifid, 6 *e*; germen of the female oblong, trigonous, 5 *b*; ſtyle filiform, 5 *c*; ſtigmas two, 5 *d*.

Ord. 5. *Ethinops.* The calyx a common one, containing many flowers, 1 *a*; the partial perianthium uniflorous, 2 *a*; corolla monopetalous, funnel-ſhaped, the border divided into five, reflex, ſpreading, 2 *b*; filaments five, like hairs, ſhort 3 *a*; antheras cylindraceous, with five teeth, 3 *b*; germens oblong, 4 *a*; ſtyle filiform, 4 *b*; ſtigma double, 4 *c*.

Ord. 6. *Lobelia.* The perianthium monophyllous, quinquedentate, growing round the germen, 1 *a*; corolla monopetalous, the tube cylindraceous, 1 *b*; the limb quinquepartite, 1 *c*; filaments five, 2 *a*; antheras growing together in the form of an oblong cylinder, 2 *b*; germen 3 *a*; ſtyle cylindraceous, 3 *b*; ſtigma, 3 *c*.

Claſs XX. *Ord.* 1. *Orchis.* The calyx, the ſpatha, 1 *a*; the ſpadix, 1 *b*; perianthium none; petals five, the two interior form a helmet, 2 *a*; filaments two, 2 *b*; antheras, 2 *c*; germen oblong, 2 *d*; ſtyle, 2 *e*; ſtigma, 2 *f*.

Ord. 2. *Siſyrinchium.* Calyx an univerſal ſpatha, diphyllous, 1; petals ſix, 2 *a*; filaments three, iſſuing from the outward coat of the ſtyle, 3 *a*; antheras bifid at their lower end, fixed to the ſtyle at the bottom of the ſtigma, 3 *b*; germen, 3 *c*; ſtyle, 3 *d*; ſtigma trifid, 3 *e*.

Ord. 4. *Paſſiflora.* The involucrum three-leaved, placed ſo as to leave ſome ſpace betwixt it and the flower, 2 *a*; calyx a perianthium monophyllous, quinquepartite, the keel ending in a hooked briſtle, 2 *b*, 3 *a*; petals five, 2 *c*, 3 *b*; nectarium a triple crown, ſurrounding the piſtillum, divided into rays, 4 *a*, *b*, *c*: filaments five, fixed to the column, growing together at the baſe, 5 *a*; antheras, 5 *b*; germen, 5 *c*; ſtyles three, 5 *d*; ſtigmas, 5 *e*.

Ord. 5. *Ariſtolochia.* Calyx none; corolla monopetalous, tubulous, the limb dilated, 1; filaments none; antheras

antheras

theras ſix, quadrilocular, at their baſe joined to the ſtigmas, 2 *a*; germen oblong, ſtanding below the flower, angular, 2 *b*; ſtyle ſcarce any; ſtigma ſubgloboſe, ſexpartite, concave, 2 *c*.

Ord. 7. *Arum.* The calyx, the ſpatha, monophyllous, 1; the ſpadix club-ſhaped, 2 *a*; below ſurrounded with germens, 2 *b*; corolla none; filaments none; otherwiſe than like nectarias, which are thickiſh at their baſe, 2 *c*; terminating in a filiform cirrhis or tendrils, 2 *d*; in a double order, coming out in the middle of the ſpadix; antheras many, ſeſſile, tetragonous, between the double order of the cirrhis or tendrils, 2 *e*, joined to the ſpadix; germens many, covering the baſe of the ſpadix, 2 *f*; ſtyles none; ſtigmas being a beard of little hairs, 2 *g*.

Claſs XXI. *Ord.* 1. *Zanichellia.* Male flowers; the calyx monophyllous, tridentated at the mouth, 1; corolla none; filament one, 1 *a*; anthera ſagittated, 1 *b*.

Female flower cloſe to the male; the calyx a monophyllous perianthium, ſcarce viſible, 2; corolla none; germens four, 3 *a*; ſtyles four, 3 *b*; ſtigmas four, 3 *c*.

Ord. 3. *Tripſacum.* The male flowers; the calyx a glume or chaff, bearing on each ſide two flowers, having two valves, 1; corolla the chaff, bivalve, 1, 2; filaments three, 3 *a*; antheras, 3 *b*.

The female flowers; the calyx, the chaff, divided into two or four, 4; at the baſe winding into a gaping hollow, 5 *a*; the corolla, the chaff, having three valves, 6; germen oblong, 7 *a*; ſtyles two, 7 *b*; ſtigmas hairy, 7 *c*.

Ord. 4. *Urtica.* The male flowers; the perianthium tetraphyllous; the folioles have a prickle at the apex, 1; petals none; filaments four, 1 *a*; antheras bilocular, 1 *b*.

Female flowers, 7; the perianthium two valves, 3. 4 *a*; corolla none; germen, 4 *a*; ſtyles none; ſtigma 4 *b*.

Ord. 5. *Parthenium.* The common perianthium ſimple, pentaphyllous, 1; corolla compound and convex; the hermaphrodite corollules are many in the diſk, 2 *a*; the females ſtanding round the hermaphrodites, five in the radius, 2 *b*; the property of the hermaphrodite florets monopetalous, 3; tubulous, the mouth quinquefid, 3, 4; the female florets monopetalous, 5, 6, tubulous; the filaments of the hermaphrodites five, capillary, 7 *a*; antheras, 7 *b*; germen of the hermaphrodites within its proper receptacle, hardly to be obſerved, 4 *a*, 7 *c*; ſtyle capillary, 3 *a*; ſtigma none; germen of the females below the flower, 6 *a*; in form of a top, heart-ſhaped, compreſſed, large; ſtyle filiform, 6 *b*; ſtigma two, filiform, 6 *c*.

Ord. 8. *Juglans.* The male flowers diſpoſed in an oblong amentum, 1; the calyx, the common amentum, all over looſely imbricated, in form of a cylinder, conſiſting of uniflorous ſcales, 2; each fixed in the centre on the outſide of the corolla, bending outwards, 3; corolla ſexpartite, with footſtalks, 2 *a*; inſerted both in the inner centre of the corolla and the rachis, 1 *a*; filaments many (eighteen), very ſhort, 4 *a*; antheras, 4 *b*.

The female flowers have no amentum, two or three are ſitting on the ſame plant, and are ſeſſile, 5; calyx is the perianthium, it is quadrifid, 6 *a*; corolla quadripartite, acute, erect, 6 *b*; germen oval, 7 *a*; ſtyles two, very ſhort, 7 *b*; ſtigma large, on the top lacerated, 7 *c*.

Ord. 9. *Pinus.* The male flowers growing in a ſpike, 1; calyx, the ſcales of the gem, open during the flowering time; thoſe near the baſe and apex ſteril, 1 *b*, *c*; corolla none, unleſs the little ſcales which adhere to the antheras may be ſo called, 2 *a*; filaments many, growing round a column, in little oval ſpikes, 1 *d*, 3 *a*; antheras oval, after the diſcharge of the pollen they become flexulous and lacerated, 3 *b*; endowed with dorſal ſcales, 3; theſe ſcales are oblong, tapering at both ends.

The female flowers on the ſame plant, 4; the calyx, the common catkin, ovate, conſiſting of ſcales, of which each contains two flowers, 5; corolla none; germen elevated, ſmall, 5 *a*; ſtyle, 5 *b*; ſtigma hairy, 5 *c*.

Ord. 10. *Momordica.* The male flowers; the perianthium monophyllous, concave, quinquefid, 1; corolla quinquepartite, 2; filaments three, 3 *a*; antheras in two of the filaments are bifid, having ears on both ſides, 3 *b*; the third having only on one ſide an ear.

Female flowers on the ſame plant with the male, 4; perianthium monophyllous, ſtanding above the germen, quinquepartite, 5 *a*; corolla as in the male, 4 *a*; filaments three, very ſhort, without antheras, 5 *b*; germen ſtanding below the flowers, of a conic form, large, 5 *c*; ſtyle one, 5 *d*; ſtigmas three, 5 *e*, 6 *a*.

Ord. 11. *Andrachne.* The male flowers, 1; perianthium pentaphyllous, 2; petals five, 1 *a*; nectaria one within each petal, 1 *b*; filaments five inſerted at the baſe of the ſtyle, 3 *a*; antheras, 3 *b*.

The female flowers on the ſame plant with the males, 4; perianthium pentaphyllous, 4 *a*; petals none; nectaria the ſame as in the male flowers; germen globoſe, 5 *a*; ſtyles three, bipartite, 5 *b*; ſtigmas globoſe, 5 *c*.

Claſs XXII. *Ord.* 2. (See *Tab.* VII.) *Salix.* The male, 1; the calyx, the common amentum, oblong, with an involucrum formed of the gem, 1 *a*; conſiſting of ſquamas, having one flower, 2; petals none; nectarium a cylindraceous gland in the centre of the flowers, 2 *a*; filaments two, 2 *b*; antheras didymous, quadrilocular, 2 *c*.

The female, 3; the amentum and ſquamas the ſame as in the male; corolla none; germen ovate, 4 *a*; attenuated into a taper ſtyle, not very diſtinct, 4 *b*; ſtigmas two, bifid, revolute, 4 *c*.

Ord. 3. *Empetrum.* The male, 1; perianthium tripartite, 2; petals three, 1 *a*; filaments three, 1 *b*; antheras bipartite, 1 *c*.

The female, 3; perianthium and petals as in the male; germen depreſſed, 4 *a*; ſtyle ſcarce any; ſtigmas nine, 4 *b*.

Ord. 4. *Viſcum.* The male, 1; perianthium quadripartite, 2; corolla none; filaments none; antheras four, oblong, acuminate, one joined to each of the calycine folioles, 1 *b*, 3 *a*.

The female very often oppoſite to the male flowers, 4; perianthium tetraphyllous, fixed on the germen, 5 *a*; corolla none; germen oblong, trigonous, 6 *a*; ſtyles none; ſtigma obtuſe, 6 *b*.

Ord 5. *Humulus.* The male, 1; perianthium pentaphyllous, 1 *a*; corolla none; filaments five, 1 *b*; antheras with four furrows, 1 *c*.

The females, 2; univerſal involucrum quadripartite, 2 *a*; the partial involucra tetraphyllous, 3 *a*; the folioles ſubrotund and ovate, having eight flowers, 3 *b*; each flower hath its perianthium monophyllous, 4; corolla none; germen, 5 *a*; ſtyles two, 5 *b*; ſtigmas, 5 *c*.

Ord. 6. *Tamus.* The male, 1; perianthium ſexpartite, 1 *a*; corolla none; filaments ſix, 1 *b*; antheras 1 *c*.

The female, 2; perianthium monophyllous, ſexpartite, ſitting on the apex of the germen, 2 *a*; petals none; nectarium an oblong point, adhering to the baſe of every ſingle ſegment of the perianthium, 2 *b*; germen ovately oblong, ſtanding under the calyx, 2 *c*; ſtyle cylindraceous, 2 *d*; ſtigmas three, 2 *e*.

Ord. 7. *Populus.* The male, 1; the common amentum oblong, conſiſting of uniflorous ſquamas, 1 *a*, 2; petals none; filaments eight, 1 *b*; anthera tetragonous, large, 1 *c*.

The female, 3; amentum and ſquamas as in the male, 4; germen ovate, narrow at both ends, 3 *a*; ſtyle ſcarcely to be obſerved, 3 *b*; ſtigma quadrifid, 3 *c*.

Ord. 8. *Mercurialis.* The male, 1; perianthium tripartite, 1 *a*; corolla none; filaments nine or twelve, 1 *b*; antheras globoſe, didymous, 1 *c*.

The female, 2; perianthium as in the male; corolla none; nectaria two ſharp points, one on each ſide of the germen, 2 *a*; germen roundiſh, 2 *b*; ſtyles two, reflexed, 2 *c*; ſtigmas acute, reflexed, 2 *d*.

Ord. 9. *Kiggelaria.* Male, 1; perianthium monophyllous, quinquepartite, 1 *a*; petals five, longer than the calyx, 1 *b*; nectaria five, obtuſe, with three lobes, 1 *c*; filaments ten, 2 *a*; antheras, 2 *b*.

The female, 3; calyx the ſame as in the male; corolla the ſame as in the male; germen ſubrotund, 3 *a*; ſtyles five, 3 *b*; ſtigmas obtuſe, 3 *c*.

Ord. 10. *Meniſpermum.* Male, 1; perianthium hexaphyllous, 1; petals eight, 2 *a*; filaments ſixteen, cylindric, 3 *a*; anthera, 3 *b*.

Female, 4; calyx and corolla the ſame as in the male; filaments eight, ſimilar to thoſe of the male, 4 *a*; antheras pellucid, ſterile, 4 *b*; germens two or three, ſtanding on a pedicle, 5 *a*; ſtyles, 5 *b*; ſtigmas, 5 *c*.

Ord. 11. *Cliffertia.* Male, 1; perianthium triphyllous, 1 *a*; corolla none; filaments about thirty, 1 *b*; anthera didymous, 1 *c*.

Female, 2; perianthium triphyllous, 2 *a*; corolla none; germen 3 *a*; ſtyles two, feathery, 3 *b*; ſtigmas, 3 *c*.

Ord. 12. *Juniperus.* Male, 1; the amentum in form of a cone, having a common rachis, 2 *a*; to which there are three oppoſite flowers, 2 *b*; the tenth flower terminating the amentum, each flower ſerving for a baſe fixed to the pedicle of the column; corolla none; filaments (in the terminating flowers) three, at the baſe joined in one body, in the lateral flowers ſcarcely to be obſerved, 3 *a*; antheras three, ſeparate in the terminating flowers, 3 *b*; in the lateral ones fixed to the ſcales of the calyx, 4.

The female, 5; perianthium tripartite, joined with the germen, 5 *a*; petals three, 5 *b*; germen below the flower, 6 *a*; ſtyles three, 6 *b*; ſtigmas, 6 *c*.

Ord. 13. *Ruſcus.* Male, 1; perianthium hexaphyllous, 1 *a*; petals none; nectarium, 1 *b*; filaments none; antheras three, inſerted on the apex of the nectarium, at their baſe coherent, 1 *c*.

Female, 2; perianthium as in the male; petals as in the male; nectarium as in the male; germen hid within the nectarium, 3 *a*; ſtyle cylindraceous, 3 *b*; ſtigma, 3 *c*.

Ord. 14. *Clutia.* Male, 1; perianthium pentaphyllous, 1 *a*; petals five, ſhorter than the calyx, 1 *b*; the exterior nectaria tripartite, placed within the petals, 2 *a*; the interior necteria, 2 *b*; filaments five, fixed in the middle of the ſtyle, ſpreading horizontally, 1 *c*; antheras ſubrotund, 1 *d*; germen none; ſtyle cylindraceous, club-ſhaped, 1 *e*.

Female, 3; perianthium as in the male; petals as in the male; nectaria exterior none; the interior five, in pairs, ſituated as in the male, 3 *a*; germen ſtanding above the flower, 3 *b*; ſtyles three, bifid, 3 *c*; ſtigmas, 3 *d*.

Claſs XXIII. *Ord.* 1. *Veratrum.* Hermaphrodite flowers, 1; calyx none, except the corolla be taken for it, 1 *a*; which conſiſts of ſix petals; filaments ſix, 1 *b*; anthera quadrangular, 1 *c*; germens three, 2 *a*; ſtyles three, 2 *b*; ſtigmas, 2 *c*.

The male flowers on the ſame plant, below the females, 2; calyx, corolla, and ſtamens the ſame as in the hermaphrodite.

Ord. 2. *Fraxinus.* Hermaphrodite flower, 1; calyx none; ſometimes it hath a monophyllous perianthium, quadripartite, 1 *a*; corolla none; ſometimes it hath four petals, 1 *b*; filaments two, 1 *c*; antheras having four furrows, 1 *d*, germen ovate, 1 *e*; ſtyle cylindraceous, 1 *f*; ſtigma, 1 *g*.

The female, 2; all as in the hermaphrodite. The common female aſh has very often ſome hermaphrodite flowers interſperſed; and the hermaphrodite female flowers, have neither calyx nor corolla. The flowering aſh having both a corolla and a calyx, is always a true hermaphrodite, and without male flowers intermixt.

Ord. 3. *Ficus.* Calyx a common one, obovate, large, fleſhy, concave, ſhut up with many ſcales, 1; the ſcales magnified, 2 *a*; whoſe interior ſurface is all over covered with florets, of which the uppermoſt approaching the calycine margin are hermaphrodites, and are few, 2 *b*; thoſe underneath are females, which are numerous, 2 *c*; the hermaphrodite flowers, each whereof ſitting on a peduncle, 3; the proper perianthium, tripartite, 3 *a*, 4 *a*; corolla tetrapetalous, fixed at the baſe of the ſtamens, 4 *b*; filaments four, 4 *c*; antheras two in the middle of each filament, 4 *d*; germen oval, 3 *b*; ſtyle, 3 *c*; ſtigma, 3 *d*.

The female flowers, each whereof ſitting on a peduncle, 5; the proper perianthium, quinquepartite, 5 *a*; corolla none; germen oval, 5 *b*; ſtyle coming out on one ſide of the apex of the germen, 5 *c*; ſtigmas two, 5 *d* — N. B. The fructifications ſhould be examined a little before the maturity of the fruit. The fruit of a fig is not a pericarpium, but a receptacle, the interior ſides of which ſupport the flowers with the fructification.

Claſs XXIV. *Ord.* 1. *Polypodium.* The ſtripes on the forepart channelled, 1 *a*, 2 *d*; on the hind part rounded, covered with chaffy ſcales; the front is oblong, acute, bipinnate, branches alternate, 1 *b*, ſpreading, lanceolate, pinnate; the pinnæ for the moſt part alternate, ſeſſile, grown together at the baſe; the fructification in rows, 3 *a*; one row on each ſide of the mid-rib, the clypei (or ſhields) membranaceous, 4, orbiculate, peltate, 5, pedunculated, is at the time of flowering, flat, covering the fructifications, 4; after the flowering reflexed, 6, lacerated, deciduous; the capſular globules roundiſh, 6 *a*, numerous, faſciculated, on ſmall footſtalks, 7; the upper ſide of the clypeus (or ſhield) magnified, 4; the under ſide, 5; the clypeus after the flowering reflexed, with mature globules, 6; the whole cluſter of globules diſengaged from the pinna and the clypeus, 8; the ſame diſengaged from the pinna, and ſtill adhering to the clypeus, 9; a few globules with their foot-ſtalks, 7; a ſingle globule in the ſtate of flowering, rough on the upper part, half-way down, with ſmall tubercles, and four ſhallow wrinkles, 10; the ſame nearly ripe, 11; the ſame ripe, the roughneſs and wrinkles being then vaniſhed, 12; the ſame burſt in two, throwing out the ſeeds, 13; the ſame empty, 14; the ſeeds, 15; the conceptacle of the ſeeds, 16. N. B. The frons is a ſpecies of trunk, whoſe branches and leaves are blended together, and generally united with the fructification, which is only applicable to ferns and palms; and the ſtipes is the baſe of this trunk in palms, ferns, and muſhrooms.

Ord. 2. *Bryum.* Calyx, the calyptra, 1, 2, 3, 4 *a*; anthera, ſubrotund or oblong, 5 *a*; the mouth with a little ciliated ring, covered with a conic operculum, 6 *a*; receptacle, no apophyſis; perichetium none, but a tubercle for the baſe of the peduncle, root fibrous, 2 *a*; trunk erect, ſomewhat branched, 2 *b*; leaves, 2 *c*; capſule, at firſt erect, 2, green, afterwards pendulous 7, and reddiſh; the operculum magnified, 8 *a*; *fig.* 2, the moſs in its early ſtate with its calyptra, *a*; *fig.* 3 *a*, the calyptra taken off; *fig.* 4, as the moſs increaſes, the calyptra *a* withers; *fig.* 6, as the calyptra increaſes it becomes pendulous; *fig.* 8, the operculum *a* taken off to diſcharge the ſeeds *b*; *fig.* 10. a longitudinal ſection, to ſhew how the petals or ſetæ are placed within, and how the anthera is fixed to the operculum *a*; *fig.* 11. 5. when the operculum *(a)* is taken off, the outer row of petals or ſetæ ſpring back, but the inner remain erect; each row contains ſixteen petals, but in leſs than ſix or ten ſeconds, fold themſelves up, as in *fig.* 8 and 14; *fig.* 9. a longitudinal ſection of the ſame; *fig.* 11. the operculum on the inner ſide with the anthera *a*; *fig.* 12. the anthera taken out of the operculum *a c*; *fig.* 13. a horizontal ſection of the operculum with the anthera, much magnified *a c*; *fig.* 14 the ſituation of the petals or ſetæ greatly magnified, *p*; *fig.* 15. two leaves, the outſide *c*, the inſide *i*.

Ord. 3. *Fucus.* Root fibrous, 1 *a*; leaves linear, cartilaginous, ſmooth, without joints, very branched, the branches alternate, the little branches many on each ſide alternately, 1, 2; in *fig.* 2. the branches are magnified, the fruit, the veſicles lateral, ſcattered without order, ſeſſile globous, black, the ſize of poppy ſeeds; *fig.* 3. is a veſicle magnified.

Ord. 4. *Agaricus.* The fungus horizontal with thin plates underneath, 2; the ſtem erect, cylindraceous, ſtriated, white, ſolid, bulbous at the baſe, 1 *c*, 2 *c*; the volva or calyx growing in the middle, 1 *a*, 2 *a*, the cap convex, white, ſomewhat lacerated and ſquamated, 1 *b*; the lamellas or thin plates, 2, 3, 4, a little convex, entire, a ſingle lamella, 4 *a*, at firſt reddiſh, 5 *a*, afterwards a brown black, 2, 3, 4; a ſection, *fig.* 3. a maſs of old horſe dung, collected by the gardeners, wherein are lodged white ſhreds or filaments, 6 *a*, which contain the ſeeds or cauſes of muſhrooms; a ſingle ſhred or filament, 7; the manner in which the fungi firſt appear, 6 *b*; a fungus on its under ſide, before it expands itſelf, to ſhew how the pileus and the volva are connected, 8; a vertical ſection on the ſame, 5.

ORDER, in *War*, denotes an arrangement of the parts of an ARMY, either by land or ſea; whether for marching, ſailing, or engaging.

ORDER *of battle.* See BATTLE and LINE.

An ORDER *of march* is diſpoſed in two or three columns, according to the ground. The *orders* and EVOLUTIONS make the ſubject of the ſcience of tactics.

ORDER is more particularly uſed for the equal diſtance of one rank or file, from another.

The uſual *order* in files is three feet; in ranks ſix feet. The open or marching *order* is twice as much.

ORDERLY *ſerjeant*, and ORDERLY *men*, in *Military Language*, are thoſe who are appointed to attend on general officers, or ſuch other officers as are entitled to ſuch, who walk behind them with their arms.

ORDERLY *book*, is a book provided for every company, in which the ſerjeants write down both general and regimental *orders*, that the officers may read them.

ORDERS, in *Law*, are of ſeveral ſorts, and by divers courts; as of the Chancery, King's Bench, &c. *Orders* of the Court of Chancery, either of courſe or otherwiſe, are obtained on the petition or motion of one of the parties in a cauſe, or of ſome other intereſted in, or affected by it; and they are ſometimes made upon hearing, and ſometimes by conſent of parties. Pract. Solic. 26.

ORDERS, in a *Military Senſe*, denote all that is lawfully commanded by ſuperior officers. Thus, *orders* are given out every day, whether in camp, garriſon, or on a march, by the commanding officer; which *orders* are afterwards given to every officer in writing by their reſpective ſerjeants.

ORDERS, by way of eminence, or *holy* ORDERS, denote a character peculiar to eccleſiaſtics, whereby they are ſet apart for the miniſtry.

This the Romaniſts make their ſixth ſacrament.

In the reformed churches there are but three *orders*; viz. biſhops, prieſts, and deacons. In the Romiſh church there are ſeven, excluſive of the epiſcopate: all which the council of Trent enjoins to be received, and believed, on pain of anathema.

They are diſtinguiſhed into *petty*, or *ſecular orders*; and *major*, or *ſacred orders.*

ORDERS, *the petty*, or *minor*, are four: viz. thoſe of door-keeper, exorciſt, reader, and acolyth.

Thoſe in petty *orders* may marry without any diſpenſation: in effect, the petty *orders* are looked on as little other than formalities, and as degrees neceſſary to arrive at the higher *orders*. Yet the council of Trent is very ſerious about them: enjoins that none be admitted into them, without underſtanding Latin; and recommends it to the biſhops, to obſerve the intervals of conferring them, that the perſons may have a ſufficient time to exerciſe the function of each *order*: but it leaves the biſhops a power of diſpenſing with thoſe rules: ſo that the four *orders* are uſually conferred the ſame day, and only make the firſt part of the ceremony of ordination.

The Greeks diſavow theſe petty *orders*, and paſs immediately to the ſubdiaconate; and the reformed to the diaconate.

Their firſt riſe Fleury dates in the time of the emperor Juſtinian. There is no call nor benefice required for the four petty *orders*; and a baſtard may even enjoy them without any diſpenſation; nor does bigamy diſqualify.

Orders, *ſacred*, or *major*, we have already obſerved, are three: viz. thoſe of deacon, prieſt, and biſhop.

The council of Trent retrieving the ancient diſcipline, forbids any perſon being admitted to the major *orders*, unleſs he be in peaceable poſſeſſion of a benefice ſufficient for a decent ſubſiſtence; allowing no ordinations on patrimonies or penſions; except where the biſhop judges it for the ſervice of the church.

A perſon is ſaid to be promoted to *orders per ſaltum*, when he has not before paſſed the inferior *orders*. The council of Conſtantinople forbids any biſhop being ordained without paſſing all the degrees; yet church hiſtory furniſhes us with inſtances of biſhops conſecrated, without having paſſed the *order* of prieſthood; and Panormus ſtill thinks ſuch an ordination valid.

Orders, *military*, are companies of knights, inſtituted by kings and princes; either for defence of the faith, or to confer marks of honour, and make diſtinctions among their ſubjects.

There have been five *orders*, purely military, in England; viz. thoſe of the knights of the Garter, knights Bannerets, knights of the Bath, knights Bachelors, and knights Baronets.

The French have had *five* military *orders*; viz. that of the *Genette*, inſtituted by Charles Martel; but which ſoon fell. The *order of the Virgin Mary*, ſince called the *order of the Star*, inſtituted by king John, in 1352. The *order of St. Michael*, inſtituted in 1469, by Lewis IX. The *order of the* Holy *Ghoſt*, or the *blue ribband*; the members of which are firſt to be knights of St. Michael. And the *order of St.* Louis, inſtituted by Lewis XIV. in 1693. The princes of the blood, marſhals of France, admirals, and generals, become knights of St. Louis by their offices.

Order *Alcantara, of Amaranth, of Argonauts, of the Band of Calatrava, of Chriſt, of the Croſs, of the Elephant, of the Ermine, of the Golden Fleece, of St. James, of the Knot, of St. Lazarus, of the Roſary, of the Star, of the Stole, and of the Thiſtle*, &c. See the reſpective articles. See the references under Knights.

Order *of Merit*, was inſtituted by Frederic III. king of Pruſſia, as a reward to thoſe officers whoſe behaviour deſerved ſome mark of diſtinction. The enſign of this *order* is a golden ſtar of eight rays, enamelled with blue, which is worn appendant to a black ribband, edged with ſilver: and the motto is *Pour la merite*.

Order *of St. Alexander Newſki*, or the red ribband, was inſtituted by Peter I. emperor of Ruſſia: but the czarina Catherine I. conferred it in the year 1725.

Orders, *religious military*, are thoſe inſtituted in defence of the faith, and privileged to ſay maſs; and who are prohibited marriage, &c.

Of this kind are the knights of Malta, or of St. John of Jeruſalem. Such alſo were the knights Templars, the knights of Calatrava, knights of St. Lazarus, Teutonic knights, &c. See Malta, Templar, &c.

Father Putignani accounts thoſe *military orders* where marriage is not allowed, real *religious orders*. F. Papebroch ſays, it is in vain to ſearch for *military orders* before the twelfth century.

Orders, *religious*, are congregations, or ſocieties, of monaſtics, living under the ſame ſuperior, in the ſame manner, and wearing the ſame habit.

Religious orders may be reduced to five kinds; viz. *monks, canons, knights, mendicants*, and *regular clerks*. See Monk, Canon, &c.

Father Mabillon ſhews, that till the ninth century, almoſt all the monaſteries in Europe followed the rule of St. Benedict; and that the diſtinction of *orders* did not commence till upon the re-union of ſeveral monaſteries into one congregation: that St. Odo, abbot of Cluny, firſt began this re-union, bringing ſeveral houſes under the dependence of Cluny: that, a little afterwards, in the eleventh century, the Camaldulians aroſe; then, by degrees, the congregation of Vallombroſa; the Ciſtercians, Carthuſians, Auguſtines; and at laſt, in the thirteenth century, the Mendicants. He adds, that Lupus Servatus, abbot of Ferrieries, in the ninth century, is the firſt that ſeems to diſtinguiſh the *order* of St. Benedict from the reſt, and to ſpeak of it as a particular *order*.

White order denotes the order of regular canons of St. *Auguſtine*. See Augustins.

Black order denoted the order of Benedictins.

Theſe names were firſt given theſe two *orders* from the colour of their habit; but are diſuſed ſince the inſtitution of ſeveral other *orders*, who wear the ſame colours.

Grey order was the ancient name of the Cistercians; but ſince the change of the habit, the name ſuits them no more.

Order *of Charity*. See Charity.

Order *of St. Saviour*. See Saviour.

Order, *third*. See Third.

Order, in the *Geometry of Curves*. See Gender, Line, and Curve.

Orders, *book of*. See Book.

Order, *interlocutory*. See Interlocutory.

ORDINAL, Ordinale, a book containing the order or manner of performing divine ſervice. See Ritual.

Ordinal, in *Grammar*, an epithet given to ſuch numbers as mark the order of things, or in what rank they are placed.

Thus, firſt, ſecond, tenth, hundredth, &c. are *ordinal* numbers. See Cardinal.

ORDINANCE, or Ordonnance, a law, ſtatute, or command, of a ſovereign or ſuperior.

Ordinance of parliament, is ordinarily uſed in the ſame ſenſe as *ſtatute*, or act of parliament.

In the parliament-rolls, acts are often called *ordinances of parliament*. Though in ſome caſes we find a difference made between the two; *ordinances* being only temporary things, by way of prohibition; and capable of being altered by the commons alone; whereas an act is a perpetual law, and cannot be altered but by king, lords, and commons.

Sir Edward Coke aſſerts, that an *ordinance* of parliament differs from an *act*, as the latter can only be made by the king, and the threefold conſent of the eſtates; whereas the former may be made by one or two of them.

Ordinance of the foreſt, is a ſtatute made in the thirty-fourth year of Henry I. relating to forest-matters.

In the French juriſprudence, *ordonnances* are ſuch laws as are eſtabliſhed by the king's authority alone. All *ordonnances* begin with *à tous preſens & à venir ſalut*.

Ordinance, or **Ordnance**, is alſo a general term for all ſorts of great guns, or cannon, mortars, &c. uſed in war. See Cannon, and Gun.

The ſtrength and ſerviceableneſs of a piece of *ordinance* depends much on the thickneſs of the metal, eſpecially about its chamber and breech, which is called its *fortification*.

Of this there are three degrees, both for cannons and culverins. Such are the ordinarily fortified, alſo called *legitimate pieces*. Thoſe whoſe fortification is leſſened, are called *baſtard pieces*. Thoſe doubly fortified, are called *extraordinary pieces*.

The fortification of a gun is reckoned from the thickneſs of the metal at the touch hole, at the trunnions, and at the muzzle, in proportion to the diameter of the bore. The doubly fortified pieces are a full diameter of the bore in thickneſs at the touch-hole, $\frac{1}{16}$ of it at the trunnions, and $\frac{7}{16}$ at the muzzle: the leſſened cannons have but $\frac{3}{4}$, or $\frac{12}{16}$, of the diameter of their bore, in the thickneſs at the touch-hole, $\frac{0}{16}$ at the trunnions, and $\frac{5}{16}$ at the muzzle.

All the double fortified culverins, and all the leſſer pieces of that kind, have a diameter and $\frac{1}{8}$ at the touch-hole, $\frac{15}{16}$ at the trunnions, and $\frac{9}{16}$ at the muzzle. And the ordinary fortified culverins are every way as the doubly fortified cannon; and the leſſened culverins as the ordinary cannon, in all reſpects. The ordinary-fortified cannon have $\frac{}{8}$ at the touch-hole, $\frac{5}{8}$ at the trunnions, and $\frac{3}{8}$ at the muzzle.

Ordinance, in *Painting*. See Ordonnance.

Ordinance, or **Ordnance** *office*, is the ſtanding grand magazine of arms, habiliments, inſtruments, and utenſils of war, as well by ſea as land; not only of thoſe lodged in the Tower, but in all the garriſons, caſtles, forts, &c. in Great Britain, from whence, as occaſion requires, his majeſty's armies are ſupplied.

The officers of the *ordinance* are, the *maſter-general*, with a ſalary of 1500*l.* a year, from whom are derived all orders and diſpatches relating to the ſame, as the ſervice ſhall beſt require, and who has the ſole command of the royal regiment of artillery. This poſt has often been annexed to the office of general and commander in chief. The ſame military reſpect is paid to the maſter-general of the *ordinance*, as to generals of horſe and foot; that is, on all occaſions to have the march beat to him, and to be ſaluted by all officers, the colours excepted.

Under him is a *lieutenant-general of the ordinance*, with a ſalary of 1100*l.* a year, who receives orders from the maſter-general, and the reſt of the prime officers at the board; ſees them duly executed; orders the firing of guns on days of rejoicing; and ſees the train of artillery fitted out when ordered to the field.

Next to him is the *ſurveyor-general*, with a ſalary of 700*l.* a year, who has the inſpection of the *ordinance*, ſtores, and proviſions of war, in the cuſtody of the ſtore-keepers; he allows all bills of debts, keeps a check on labourers, &c.

Under theſe is a *clerk of the ordinance*, with a ſalary of 600*l.* a year, who records all orders or inſtructions given from the government of the office; with all patents, grants, names of officers, &c. draws all eſtimates for proviſions, and ſupplies all letters, inſtructions, commiſſions, deputations, contracts, &c. and ſerves as a check between the two accomptants of the office, the one for money, the other for ſtores.

This office has alſo a ſtore-keeper, with a ſalary of 400*l.* a year, who takes into his cuſtody all *ordinance*, ammunition, ſtores, &c. thereto belonging; and indents and gives in legal ſecurity for the ſafe keeping thereof; and renders an exact account from time to time.

Here is alſo a *clerk of the deliveries*, with a ſalary of 400*l.* a year, whoſe duty is to draw up all proviſions, either at the Tower, or any other of his majeſty's magazines, to ſee them duly executed, &c.

And laſtly, a *treaſurer* and *paymaſter*, with a ſalary of 500*l.* a year, through whoſe hands paſſes the money of the whole office, as well for payment of ſalaries, as debentures.

Under theſe ſuperior officers belonging to the civil branch of the *ordinance*, there are ſecretaries and clerks, &c. The military branch of the *ordinance* is under the direction of a chief engineer, &c. See ENGINEER.

ORDINANCE, or **ORDNANCE** *bills*, commonly called *ordnance debentures*, are bills iſſued by the board of *ordnance* on the treaſurer of that office, for the payment of ſtores, &c. Theſe are not payable at any certain time, and do not bear any intereſt, ſo that the diſcount upon them is often very high: but they are ſeldom much above two years in arrear.

ORDINANCE, *ſpiking up the*. See SPIKING.

ORDINARII, in *Antiquity*, were a ſort of gladiators; being thoſe appointed to exhibit combats on certain ſtated days, &c.

ORDINARY, ſomething that happens, or paſſes frequently, or uſually.

We ſay, the *ordinary* courſe of things: whatever is done without miracles, is done by *ordinary* agents.

ORDINARY *culverin*. See CULVERIN.

ORDINARY *minion*, &c. See MINION, &c.

ORDINARY, *ambaſſador*, or *envoy in*. See EMBASSADOR, and ENVOY.

ORDINARY is alſo applied to ſeveral officers and ſervants belonging to the king's houſhold, who attend on common occaſions. Thus we ſay, phyſician in *ordinary*, &c.

ORDINARY, in *Naval Language*, denotes the eſtabliſhment of the perſons employed by government to take charge of the ſhips of war, which are *laid-up* in the ſeveral harbours adjacent to the royal dock-yards. Theſe are principally compoſed of the warrant-officers of the ſaid ſhips, as the gunner, boatſwain, carpenter, deputy-purſer, and cook, and three ſervants. There is beſides a crew of labourers inrolled in the liſt of the *ordinary*, who paſs from ſhip to ſhip occaſionally to pump, moor, remove, or clean them, whenever it is neceſſary.

The term *ordinary* is alſo applied ſometimes to the ſhips themſelves: it is likewiſe uſed to diſtinguiſh the inferior ſailors from the moſt expert and diligent. The latter are rated *able* on the navy books, and have 1*l.* 4*s.* per month; whereas thoſe who are rated *ordinary*, have only 19*s.* per month. Falconer.

ORDINARY, *ordinarius*, in the *Civil Law*, is any judge veſted with authority to take cognizance of cauſes, in his own right, as he is a magiſtrate; and not by deputation.

ORDINARY *court of chancery*. See PETTY *bag*.

ORDINARY, in *Common* and *Canon Law*, denotes him who has *ordinary* or immediate juriſdiction in eccleſiaſtical cauſes in ſuch a place.

In which ſenſe archdeacons are *ordinaries*. Though the appellation be moſt frequently given to the biſhop of the dioceſe, who has the *ordinary* eccleſiaſtical juriſdiction, and the collation to benefices therein.

There are ſeveral chapels, chapters, abbeys, &c. exempted from the juriſdiction of the *ordinary*.

The archbiſhop is *ordinary* of the whole province, to viſit, and receive appeals from the inferior judicatures.

The Romiſh canoniſts call the pope *ordinary* of *ordinaries*, ſince by the Lateran council he has uſurped the right of collating, by prevention, to all benefices; in excluſion of the *ordinary collators*.

ORDINARY *of aſſizes and ſeſſions* was a deputy of the biſhop of the dioceſe, anciently appointed to give malefactors their NECK-verſes, and judge whether they read or not; alſo to perform divine ſervice for them, and aſſiſt in preparing them for death. So

ORDINARY *of Newgate*, is one who is attendant in *ordinary* upon the condemned malefactors in that priſon, to prepare them for death; and he records the behaviour of ſuch perſons.

ORDINARY, or *honourable* **ORDINARY**, in *Heraldry*, a denomination given to certain charges properly belonging to that art.

The *honourable ordinaries* are ten in number; viz. the *chief*, *pale*, *bend*, *feſſe*, *bar*, *croſs*, *ſaltier*, *chevron*, *bordure*, and *orle*. See CHIEF, PALE, &c.

The heralds give ſeveral reaſons for their being called *honourable*: viz. 1. Their great antiquity, as having been uſed ever ſince armoury was ſet on foot. And, 2. Becauſe they denote the ornaments moſt neceſſary for noble and generous men: thus the chief repreſents the helmet, wreath, or crown, covering the head: the pale repreſents his lance or ſpear: the bend and bar, his belt; the feſſe his ſcarf; the croſs and ſaltier, his ſword; the chevron, his boots and ſpurs; and the bordure and orle, his coat of mail.

As to the allotting or diſtributing of theſe *ordinaries*, ſome authors write, that when a gentleman, having behaved himſelf gallantly in fight, was preſented to the prince, or general, and a ſuitable coat-armour ordered him; if he were wounded in the head, they gave him a chief; if in the legs he had a chevron; and if his ſword and armour were diſcoloured with the blood of the enemies, a croſs or bordure.

Some heralds have attempted to increaſe the number of *honourable ordinaries* to twenty; adding to thoſe above mentioned, the plain *quarter*, the *giron*, the *eſcutcheon*, *cappe* dexter and ſiniſter, *emmanch* dexter and ſiniſter, *chauſſe* dexter and ſiniſter, and the *point*. But theſe are not yet authoriſed.

Some writers diſtinguiſh *ordinaries* into honourable and *ſubordinate*. *Honourable ordinaries*, which are the principal charges in heraldry, they define as made of lines only; which according to their diſpoſition and form, receive different names. Of theſe they reckon nine, viz. the *chief*, *pale*, *bend*, *bend ſiniſter*, *feſs*, *bar*, *chevron*, *croſs*, and *ſaltier*. The *ſubordinate ordinaries* are ancient heraldic figures, frequently uſed in coats of arms, and diſtinguiſhed by peculiar terms: theſe are the *gyron*, *canton*, *fret*, *pile*, *orle*, *ineſcutcheon*, *treſſure*, *flanches*, *flaſques*, *voiders*, *lozenge*, *fuſil*, and *maſcle*. Porny's Elem. of Heraldry, p. 50, and 114.

ORDINATE. See CO-ORDINATE.

ORDINATES, in *Geometry* and *Conics*, are lines drawn from any point of the circumference of an ellipſis, or other conic ſection, perpendicularly acroſs the axis, or the other ſide.

The Latins call them *ordinatim applicatæ*. Such are the lines M M, M M, &c. (*Tab. Conics, fig.* 26.)

Half of each of theſe, as the lines E M, E M, &c. are properly only *ſemi-ordinates*, though popularly called *ordinates*.

The *ordinates* of a curve may more generally be defined to be right lines parallel to one another, terminated by the curve, and biſected by a right line called the DIAMETER. In curves of the ſecond order; if any two parallel right lines be drawn ſo as to meet the curve in three points; a right line which cuts theſe parallels ſo, as that the ſum of two parts terminating at the curve on one ſide the ſecant, is equal to the third part terminated at the curve on the other ſide; will cut all other right lines parallel to theſe, and that meet the curve in three points, after the ſame manner, i. e. ſo as that the ſum of the two parts on one ſide will always be equal to the third part on the other ſide.—And theſe three parts, equal on either ſide, Sir Iſaac Newton calls *ordinatim applicatæ*, or *ordinates of curves of the ſecond order*. See CURVE.

To find the greateſt and leaſt *ordinates* to curves. See MAXIMUM.

ORDINATE *in a parabola*, *hyperbola*, and *ellipſis*. See the reſpective articles.

ORDINATE *ratio* is that wherein the antecedent of the firſt ratio is to its conſequent, as the antecedent of the ſecond is to its conſequent.

ORDINATION, the act of conferring holy orders; or of initiating a candidate into the diaconate, or prieſthood.

As to the qualification of the perſons to be ordained. See DEACON and PRIEST.

The form of *ordination* in the church of England is annexed to the book of Common Prayer, and the authority of it eſtabliſhed by 5 and 6 Edw. VI. cap. 1. 8 Eliz. cap. 1. by art. thirty-ſix of the thirty-nine ARTICLES, and by the eighth canon.

The *ordination* of biſhops is more properly called CONSECRATION.

Ordination has always been eſteemed the principal prerogative of biſhops; and they ſtill retain the function as a kind of mark of ſpiritual ſovereignty in their dioceſes.

In the ancient diſcipline there was no ſuch thing as a vague, and abſolute *ordination*; but every one was to have a church, whereof he was to be *ordained* clerk, or prieſt. In the twelfth century they grew more remiſs, and *ordained* without any title, or benefice.

The council of Trent reſtored the ancient diſcipline, and appointed, that none ſhould be *ordained* but thoſe who were provided of a benefice ſufficient to ſubſiſt them. The ſhadow of which practice ſtill obtains among us.

The reformed hold the call of the people the only thing eſſential to the validity of the miniſtry; and teach, that *ordination* is only a ceremony which renders the call more auguſt and authentic.

Accordingly the proteſtant churches of Scotland, France, Holland, Switzerland, Germany, Poland, Hungary, Denmark, &c. have no epiſcopal *ordination*. For Luther, Calvin, Bucer, Melancthon, &c. and all the firſt reformers and founders of theſe churches, who ordained miniſters among them, were themſelves preſbyters, and no other. And though in ſome of theſe churches there are miniſters called ſuperintendants, or biſhops, yet theſe are only *primi inter pares*, the firſt among equals; not pretending to any ſuperiority of orders. Having themſelves no other orders than what either preſbyters gave them, or what was given them as preſbyters, they can convey no other to thoſe they ordain. On this ground the proteſtant diſſenters plead that their *ordination*, though not epiſcopal, is the ſame with that of all the illuſtrious proteſtant churches abroad; and object, that a prieſt ordained by a popiſh biſhop, ſhould be received into the church of England as a valid miniſter, rightfully ordained; whilſt the orders of another, ordained by the moſt learned, religious preſbyter, which any foreign country can boaſt, are pronounced not valid, and he is required to ſubmit to be ordained afreſh.

In oppoſition to epiſcopal *ordination*, they urge, that Timothy was ordained by the laying on of the hands of the preſbytery, 1 Tim. iv. 14. that Paul and Barnabas were ordained by certain prophets and teachers in the church of Antioch, and not by any biſhop preſiding in that city, Acts xiii. 1, 2, 3. and that it is a well known fact, that preſbyters, in the church of Alexandria, ordained even their own biſhops for more than two hundred years in the earlieſt ages of Chriſtianity. They farther argue, that biſhops and preſbyters are in Scripture the ſame; and not denominations of diſtinct orders or offices in the church: referring to Philip. i. 1. Tit. i. 5, 7. Acts xx. 27, 28 and 1 Pet. v. 1, 2.

To the ſame purpoſe they maintain, that the ſuperiority of biſhops to preſbyters is not pretended to be of divine but of human inſtitution, not grounded on ſcripture, but only upon the cuſtom or ordinances of this realm, by the firſt reformers and founders of the church of England, nor by many of its moſt learned and eminent doctors ſince. See Stillingfleet's Irenic. chap. 8. p. 385. in which the learned author affirms and ſhews this to be the ſentiment of Cranmer, and other chief reformers both in Edw. VI. and Queen Elizabeth's reign, of archbiſhop Whitgift, biſhop Bridges, Loe, Hooker, Sutcliff, Hales, Chillingworth, &c. Moreover, the book intitled the Inſtitution of a Chriſtian Man, ſubſcribed by the clergy in convocation, and confirmed by parliament, owns biſhops and preſbyters by ſcripture to be the ſame. Beſides, the proteſtant diſſenters alledge, that if epiſcopal *ordination* be really neceſſary to conſtitute a valid miniſter, it does not ſeem to be enjoined by the conſtitution of the church of England: becauſe the power of *ordination* which the biſhops exerciſe in this kingdom, is derived entirely and only from the civil magiſtrate; and he authoritatively preſcribes how, and to whom *ordination* is to be given: that if an *ordination* ſhould be conducted in other manner and form than that preſcribed by him, ſuch *ordition* would be illegal, and of no authority in the church. Accordingly the biſhop at the *ordination* of the candidate aſks, Are you called according to the will of our Lord Jeſus Chriſt, and the due order of this realm? The conſtitution and law of England ſeem to know nothing of uninterrupted lineal deſcent, but conſiders the king, veſted (by act of parliament or the ſuffrage of the people) with a fullneſs of all power eccleſiaſtical in theſe realms, as empowering and authoriſing biſhops to ordain: and this power of *ordination* was once delegated to Cromwel, a layman, as vicegerent to the king. They farther think it ſtrange that the validity of order and miniſtrations ſhould be derived, as ſome have contended, from a ſucceſſion of popiſh biſhops; biſhops of a church, which, by the definition of the nineteenth article of the church can be no part of the true viſible church of Chriſt, and biſhops, likewiſe, who conſider the proteſtant clergy, although ordained by proteſtant biſhops, as mere common unconſecrated laymen. They object alſo to that ſubſcription, which is the term of *ordination* in the church of England. See Towgood's Diſſent from the Church of England fully juſtified, &c. edit. 5. 1779, p. 196, &c.

The council of Rome in 744, orders, that no *ordinations* ſhall be held except on the firſt, fourth, ſeventh, and tenth months. With us, by can. 31. *ordination-days* are the four Sundays immediately following the Emberweeks; being the ſecond Sunday in Lent, Trinity-Sunday, and the Sundays following the firſt Wedneſday after September the 14th, and December the 13th.

Pope Alexander II. condemns *ordination per ſaltum*, as they call it; i. e. the leaping to a ſuperior order without paſſing through the inferior.

Ordination is one of the ſacraments of the church of Rome.

ORDNANCE. See ORDINANCE.

ORDONNANCE, or ORDINANCE, in *Painting*, denotes the diſpoſition of the parts of a picture either with regard to the whole piece, or to the ſeveral parts; as the groups, maſſes, contraſts, aſpects, &c.

In the *ordonnance* there are three things regarded; viz. the place, or ſcene, where; the diſtribution, how; and the contraſt.

In the firſt, regard is to be had to the *diſpoſition* of things to ſerve as a ground-work; and to the *plan*, or poſition of bodies: under the former whereof come, 1. The *landſcape*; whether an uninhabited place, where there is full liberty of repreſenting all the extravagancies of nature; or inhabited, where the marks of cultivation, &c. muſt be exhibited.

2. The *building*, whether ruſtic; wherein the painter's fancy is at liberty: or regular; wherein a nice attention is required to the orders.

3. The mixture of both; wherein it is a maxim to compoſe in great pieces, and make the ground-plot big enough, to neglect ſome little places, in order to beſtow more on the whole maſs, and to ſhew the more conſiderable places with the more advantage; and to mark ſome agitation in all the things that move.

As to the plans of bodies, they are either ſolid; which, again, are either ſo by nature, and which muſt be proportioned to their places; or artificial, where regard is to be had to the rules of geometry, perſpective, architecture, &c. Or they move: which they do, either by a voluntary motion, wherein care muſt be had to proportion them to their ſituation, and to ſtrengthen them by regarding the equilibrium; or by ſome extraordinary power, as machines, &c. where the cauſes of their motions muſt appear. Or they are things at a diſtance. In all which an even plane muſt ſtill be propoſed to find their preciſe ſituation, and ſettle their place by ſudden breaks and diſtances agreeable to perſpective.

In placing the figures, regard muſt be had, 1. To the *group*, which connects the ſubject, and ſtays the ſight. In this are to be conſidered the knot or nodus, which binds the group; and the nearneſs of figures, which we may call the chain, as it holds them together; that the group be ſuſtaimed by ſomething looſe and diſtinct from it; and by the ſame joined and continued to the other groups: and that the lights and ſhadows be ſo diſpoſed, as that we may at once ſee the effect of all the parts of the compoſition.

2. To the *actions*, wherein forced attitudes are to be avoided, and ſimple nature ſhewn in her moſt advantageous poſture. In weak and lean figures, the nudities are not to be ſhewn; but occaſions of covering them are to be ſought. In all human figures, ſpecial care to be taken, the head be well placed between the ſhoulders; the trunk on the haunches; and the whole on the feet.

3. To the *drapery*; which is to be adjuſted, ſo as it may appear real garments, and not ſtuffs looſely thrown on. The folds to be ſo diſpoſed as to leave the great parts, wherein the nudity may appear, free; ranging the little folds about the joints, and avoiding them on the relievo of the members. And, laſtly, to diſpoſe the draperies, by raiſing the ſtuff, and letting it fall eaſily and lightly, that the air, ſuſtaining the folds, may let them fall ſoft.

Laſtly, in the *contraſt*, are to be conſidered the actions, which vary infinitely: the aſpects, which in actions of the ſame kind, may, by their difference, make a contraſt: the ſituation, according as they meet above or under the ſight, far or near. And, laſtly, cuſtom; which extends, indeed, to all parts of painting, but is particularly to be regarded in the *ordonnance*; to be managed diſcreetly, however, and ſtiffneſs and formality avoided.

ORDONNANCE, in *Architecture*, is nearly the ſame as in paintings; viz. the compoſition of a building, and the diſpoſition of its parts, both with regard to the whole, and to one another.

Vitruvius defines *ordonnance* to be that which regulates the ſize or magnitude of all the parts of a building with reſpect to their uſe.

This definition is cenſured by M. Perrault, who takes the *ordonnance* to conſiſt in the diviſion of the plan or ſpot of ground whereon the building is to be raiſed; i. e. in the apportioning or laying it out, agreeable to the intended dimenſions of the whole fabric; which Mr. Evelyn expreſſes in fewer words, by "determining the meaſure or "what is aſſigned to compoſe the ſeveral apartments."

On this foundation, *ordonnance* is the judicious contrivance of the plan or model; as when the court, hall, lodgings, &c. are neither too large, nor too little: but the court, v. gr. affords convenient light to the apartments about it, and is large enough for uſual acceſs. The hall of fit capacity to receive company; the bed-chambers accordingly, &c. When theſe diviſions are either too great or too ſmall, with reſpect to the place, as a large court to a little houſe, or a little chamber, in a magnificent palace; the fault is in the *ordonnance*.

This the ancients called *taxis*; and diſtinguiſhed it from *diatheſis*, diſpoſition; which is, where all the parts and members of a building are aſſigned their juſt places and ſituation with regard to their quality, office, rank, &c. without any regard to the dimenſions, or quantity: as, that the veſtible or porch be before the hall, the hall before the parlour, and that before the withdrawing-room, &c. The bed-chambers, again, to look to the ſun-riſing; and libraries, galleries of paintings, and cabinets of curioſities, &c. to the north.

ORE, in *Natural Hiſtory*, the mineral glebe, earth, or ſtone, dug out of the mines, to be purified and to have the metalline parts procured, and ſeparated from the ſame. The *ore* is frequently called the *mineral*; and by ſome the *marcaſite*; though, on other occaſions, a difference is made in the ſignification of theſe two words; the denomination *ore* being only given where the mineral is rich enough of metal to be wrought. When it is not, it is denominated *marcaſite*.

Ores, ſays the editor of the Chemical Dictionary, conſiſt 1. Of metallic ſubſtances in a calcined or rather calciform ſtate; or, 2. Of theſe ſubſtances combined with other matters, with which they are ſaid to be mineraliſed.

Calcined metallic ſubſtances, or calciform *ores*, are metallic ſubſtances deprived of phlogiſton, and in the ſtate of a calx, or metallic earth. See CALX. Such are all ferruginous ochres, which are calxes of iron.

Mineraliſed *ores* are, 1. Simple, containing only one metallic ſubſtance: or, 2. Compound, containing two or more metallic ſubſtances.

Of the ſimple, and alſo of the compound *ores*, four kinds may be diſtinguiſhed.

1. *Ores* conſiſting of metallic ſubſtances mineraliſed by ſulphur. Such is the lead-*ore* called galena, compoſed of lead and ſulphur.

2. *Ores* conſiſting of metallic ſubſtances mineraliſed by arſenic. Such is the white pyrites, containing iron and arſenic.

3. *Ores* conſiſting of metallic ſubſtances mineraliſed by ſulphur and by arſenic. Such is the red ſilver-*ore*, containing ſilver, arſenic, and ſulphur.

4. *Ores* conſiſting of metallic ſubſtances mineraliſed by ſaline matters. Such are the native vitriols. Such alſo is probably the corneous ſilver-*ore*, which, according to M. Cronſtedt's opinion, is a luna cornea, or ſilver combined with marine acid. To this claſs alſo may be referred the ſilver mineraliſed by an alkaline ſubſtance, which Mr. Von Juſti pretends to have diſcovered.

Henckel, and after him Cramer, and the author of the Dictionary of Chemiſtry, pretend that in mineraliſed *ores*, beſides the above mentioned metallic and mineraliſing ſubſtances, are alſo contained a metallic and an unmetallic earth. But Wallerius affirms, that the exiſtence of ſuch earths cannot be ſhewn, and that ſulphur is incapable of diſſolving unmetallic earths, and even the calxes of all metallic ſubſtances, excepting thoſe of lead, biſmuth, and nickel.

Having thus defined and diſtinguiſhed the ſeveral general claſſes of *ores*, we proceed to ſhew how they are lodged, and where they are found.

Metals and metalliferous *ores* are found in various places.

1. They are found under water; in beds of rivers, lakes, and ſeas, and chiefly at the flexures of theſe: ſuch are the auriferous and ferruginous ſands, grains of native gold, ochres, and fragments of *ores* waſhed from mines.

2. They are found diſſolved in water: ſuch are the vitriolic waters containing iron, copper, or zinc.

3. They are found upon the ſurface of the earth. Such are many ochres; metalliferous ſtones, ſands, and clays; and lumpsof *ores*. Mr. Gmelin ſays, that in the northern parts of Aſia, *ores* are almoſt always found upon or near the ſurface of the ground.

4. They are found upon the ſurface of the earth. When the quantity of theſe collected in one place is conſiderable, it is called a mine.

Subterranean metals and *ores* are differently diſpoſed in different places.

1. Some are infixed in ſtones and earths, forming nodules or ſpots diverſely coloured.

2. Some are equably and uniformly diffuſed through the ſubſtance of earths and ſtones to which they give colour, denſity, and other properties. Such are the greateſt part of thoſe earths, ſtones, ſands, clays, cryſtals, flints, gems, and fluors, which are coloured.

3. Some form ſtrata in mountains. Such are the ſlates containing pyrites, copper-*ore*, lead *ore*, ſilver-*ore*, or blend. Theſe lie in the ſame direction as the ſtrata of ſtones betwixt which they are placed; but they differ from the ordinary ſtrata in this circumſtance, that the thickneſs of different parts of the ſame metalliferous ſtratum is often very various; whereas the thickneſs of the ſtony ſtrata is known to be generally very uniform.

4. Fragments of *ores* are frequently found accumulated in certain ſubterranean cavities, in fiſſures of mountains, or interpoſed betwixt the ſtrata of the earth. Theſe are looſe, unconnected, frequently involved in clay, and not accreted to the contiguous rocks or ſtrata immediately, nor by intervention of ſpar or of quartz, as the *ores* found in veins are. Tin and iron mines are frequently of the kind here deſcribed.

5. Large entire maſſes of *ores* are ſometimes found in the ſtony ſtrata of mountains. Theſe are improperly called cumulated veins, becauſe their length relatively to their breadth and depth, is not conſiderable.

6. Some inſtances are mentioned of entire mountains conſiſting of *ore*. Such is the mountain Taberg in Smoland; and ſuch are the mountains of Kerunavara and Luoſavata in Lapland, the former of which is one thouſand four hundred perches long, and one hundred perches broad. Theſe mountains conſiſt of iron-*ore*.

7. Laſtly, and chiefly, metals and *ores* are found in oblong tracts, forming maſſes called veins, which lie in the ſtony ſtrata compoſing mountains. See MINERALOGY.

Some *ores* are ſo kindly as to melt readily of themſelves, without any aſſiſtance from the common fluxes; theſe are of great value to the owners. Others are more intractable, and require the aſſiſtance of various fluxes, and others ſo very obſtinate as not to be worked in the larger way, where there can be no very conſiderable expence allowed for fluxes. On this account many mines remain at this time unwrought, as being untractable in the large way without great charges; hence the improving the buſineſs of fluxes ſerves to render them at once both cheap and effectual, and muſt be of great ſervice to metallurgy. See FLUXES.

The *ores* of the richer metals, as gold and ſilver, uſually contain a very conſiderable portion of ſulphur; and Alonſo Barba tells us, that the moſt expert mineraliſts in Peru always eſteem abundance of ſulphur a ſign of a rich *ore* in the neighbourhood. Among the richeſt *ores* of the mountain of Potoſi, there are ſuch quantities of native brimſtone, that the cavities in the mines are often filled with a blue flame, on only bringing a lighted candle into them ſo as to touch their ſides. It has been wondered at, that, where there is abundance of ſulphur in theſe mines, there ſhould be no vitriol found, that being only a metal diſſolved by means of ſulphur; but this objection ceaſes, when we conſider the denſe and compact nature of theſe two metals, which renders them not ſoluble by means of ſulphur, as the others are. Wherever there is ſtore of ſulphur, or of pyrites, or other ſtones which contain ſulphur in the mines of copper and iron, great ſtore of vitriols are always found there alſo, being formed by the corroſion of the *ores* of thoſe metals by ſulphur, which renders them ſoluble in water, from which they again concrete in form of ſalts. Chemiſtry is able to imitate the operations of nature on this occaſion ſeveral ways; for copper or iron, being formed in thin plates, and either rubbed over with the acid ſpirit of ſulphur, or calcined with powder of common ſulphur, become ſoluble in water, and afford cryſtals of true vitriol wholly analogous to the natural ones, and either blue or green, as iron, or copper are the metals employed; but theſe proceſſes not being able to produce cryſtals of ſalt, or vitriol, from either ſilver or gold, it is not wonderful that nature is not able to form them by the ſame means.

The general formation of ſulphur from the *ores* of metals yet lying in the bowels of the earth, is, probably, after this manner. An acid, ſaline, ſulphureous ſteam, or vapour, ſuch as common ſulphur is eaſily reduced to, by heat not greater than that within the bowels of the earth, inſinuating itſelf either through the pores of ſtones or through their cracks, which are always frequent about the veins of metals, penetrates into the bed of *ore*; ſuppoſe of copper. The vapour is continually ſupplied with freſh quantities from below; and as it blends itſelf with the metal, corrodes it as the fume of brimſtone will the ſame copper in plates. The metal, thus corroded, being ſoluble in water, as we find by experience, it is neceſſary that the *ore* muſt, under the ſame management, be ſo too; and, in this caſe, the water, which is continually pervading all the ſtrata of the earth, waſhes off the diſſolved metal: and wherever it happens to be ſtayed in ſmall quantities afterward, whether within the vien of the metal, or at a diſtance from it, it cryſtallizes the ſalt it contains, and common blue vitriol is produced, if the metal in the vein be iron. The ſame proceſs is obſerved, and the event is the ſame in all reſpects, when copper is the metal corroded, except that the vitriol, inſtead of blue, is green: this plainly accounts for the obſervation of the workers in copper-mines, that vitriol and brimſtone are uſually found together, the one being a natural conſequence of the other. Sulphur is, indeed, often found where there is no vitriol; but vitriol is very ſeldom found without ſulphur, it being not a diſtinct principle, but a genuine production of ſulphur. Phil. Tranſ. N° 104.

Ores, *dreſſing, or waſhing of,* is the preparing them as they come rough from the mine, for the working by fire. This is done ſeveral ways in different countries, and in reſpect to the different *ores* of the metals. In Devonſhire we have a very eaſy method, which is ſo expeditious, and ſo good for all the purpoſes, that it is worthy of imitation in other places. After the *ore* is dug, it is toſſed up by hand from ſhamble to ſhamble by the ſhovel-men in the mine, and drawn up in buckets by a winch at the top of the ſhaft. As ſoon as the whole quantity for one dreſſing is brought up, the large ſtones are broken, and the whole is then carried to the mills, where one horſe turns a wheel that moves the machines for powdering a great quantity of it; theſe are called the ſtamping or knocking mills. The *ore* is unloaded at the head of the paſs or entrance into theſe mills; this paſs is made of two or three bottom-boards and two ſide-boards, in form of a hollow trough, and ſtands in a ſlanting direction. The *ore* by its own weight is carried down this trough, and lodges itſelf in the coffer. The coffer is a long ſquare box made of the firmeſt timber, and of three feet long and a foot and half broad; the *ore* is not ſuffered to fall into this all at once, but is ſtopped over the mouth of the trough by a croſs board, where a cock turns in a quantity of water at the ſame time, which waſhes down juſt as much of the *ore* with it into the trough, as there ought to be. In this coffer there are three lifters placed between two ſtrong board-leaves, having two braces or thwart-pieces on each ſide to keep them ſteady, as a frame with ſtamp-heads. Theſe heads are of iron, and weigh about thirty or forty pounds a-piece, and ſerve to the breaking the lumps of ore in the coffer.

The lifters are about eight feet long, and half a foot ſquare. They are always made of heart of oak and have as many in-timbers or guiders between them; they are lifted up in order, by a double number of tappets, which are faſtened to as many arms paſſing diametrically through the great beam, which is either turned by the wheel and horſe, or, where there is conveniency of water, by an overſhot water-wheel on two boulſters. The tappets exactly but eaſily meet with the tongues, which are ſo placed in the lifters, as that they eaſily ſlide from each other, and ſuffer the lifters to fall with great force on the *ore* in the trough. The frequent pounding of theſe ſoon reduces the large maſſes into a ſort of ſand, which is waſhed out of the trough by the continual current of the water from the cock through a braſs-grate, which is placed at one end of the coffer between two iron bars. This operation is called by the miners *bricking*, or brick-working the *ore*. See **Buddle.**

The powdered *ore* is conveyed out of the trough into the *launder*, which is a trench cut in the floor of eight feet long, and ten feet over; this is ſtopped at the lower end with turf, ſo that the water is all ſuffered to paſs away, and the powder of the *ore* is ſtopped. Thus the launder by degrees fills up with the dreſſed *ore*, and this is removed out with ſhovels, as occaſion requires. The launder is divided into three parts, the forehead, the middle, and the tail; that *ore* which lies in the forehead, that is, within a foot and a half of the grate, is alway the richeſt and beſt, and is laid up in a heap by itſelf; the middle and tail afford a poorer one, and theſe are ſometimes laid up in ſeparate heaps; ſometimes thrown in one heap together.

Ores, *eſſaying, or aſſaying of.* See **Assaying**, and the following references. Conſult on this ſubject, Cramer's Art of Aſſaying, and the extracts ſubjoined to the article of *ores* in the Chemical Dictionary.

Ores *of antimony, arſenic, biſmuth, cobalt, copper, gold, iron, lead, mercury, platina, ſilver, tin, zinc.* See the ſeveral articles.

Ores, *ſmelting of.* See **Smelting.**

Ore, in *Navigation.* See **Oar.**

OREILLARD, in the *Manege.* See **Wide**-*eared.*

OREJUELAS, in *Botany*, a name uſed by ſome authors for the *flos auriculæ*, a flower growing in New Spain, and uſed in making chocolate.

ORELLANA, in *Botany.* See **Sanicle.**

OREON, a name given by the ancients to a kind of **horse** *tail* which they found growing on the mountains in wet and damp places. It is to this ſpecies that many authors have attributed the principal virtues of the genus; and this ſeems to have been the ſame with our great water *horſetail.* Neophytus ſays, that it roſe up with a ſingle ſtalk reſembling a young reed, and that this was compoſed of ſeveral joints, which, in the manner of cups, were inſerted one into another; and that from theſe joints the leaves grew, and that they reſembled thoſe of the pine-tree. The branches are what this author calls leaves, and they do pretty well reſemble the leaves of the pine-tree. They are long and ſlender and of a bright green. Our great *horſetail* loves the heads of ſprings in hilly countries, and is always moſt plentiful in ſuch places.

OREOSELINUM, in *Botany.* See **Spignal.**

OREXIS, *appetite.* The *appetite*, when exceſſive, or otherwiſe vitiated, is diſtinguiſhed by medical writers into ſeveral kinds, and deſcribed under ſeveral names, according to its difference in degree, and other particulars.

The firſt kind is the **addephagia**: this is the name given to that ſpecies in which the food is not only eaten in too large a quantity, but is ſwallowed in a particularly ravenous manner.

The ſecond is the *orexis canina*: in this caſe the patient is continually eagerly longing for food; and if it is not ready ſo ſoon as he deſires, he is ſubject to fainting-fits; after the recovery from which he does not feel the ſame craving *appetite.* See **Bulimy.**

The third is the **pica**, or *ſitta*: this is the caſe when the patient has an eager appetite to things not fit for food; ſuch as chalk, cinders, tobacco-pipes, and the like.

The fourth is the **malacia**: this is diſtinctively made the name of that ſpecies of *exceſſive appetite* in which the patient has a great deſire for ſome particular things, but thoſe of the nature of common food, and uſually of the nicer, and more delicate kind.

Signs attending it. An over-large eating is uſually attended with cardialgias, anxieties, and ſtraitneſs of the breaſt; after this, with nauſeas, eructations, and not unfrequently with a vomiting, or a diarrhœa; often a dizzineſs of the head follows, and ſometimes very violent pains in it, with a laſſitude and pains in the limbs, and pains and rumblings in the abdomen; finally, ſometimes fevers, ſometimes ſuffocations, and ſometimes convulſions, are the conſequence.

Perſons ſubject to it. The *exceſs of appetite*, in its different kinds, affects different ſets of people. The *addephagia* is uſually the caſe with boys who are juſt come to diſtinguiſh good taſte, and feed as their parents do; and ſometimes with women who have more ſenſation than judgment. People in general of ſanguine and ſanguineo-phlegmatic habits, eat more food than others; and choleric perſons often eat, and uſually ſwallow their food, quicker than others. Perſons of melancholic habits, are uſually of all others, the leaſt eaters. Finally, people, in general, eat heartily, and even exceſſively, when they come, from a coarſe and homely diet, to a more elegant and agreeable one; and this *exceſſive appetite* becomes a ſymptomatic complaint with people who are troubled with worms, and with hypochondriac complaints, with quartans, and often with epilepſies.

The *malacia* ſeems particularly to affect women during the time of their being with child. The *pica* is common to women with child; to young women before the firſt eruption of the menſes; with thoſe who are emaciated by a too violent flux of that diſcharge; and, finally, ſometimes, though more rarely, to perſons in epilepſies, and in quartans.

Cauſes of it. *Exceſſive appetite* is generally occaſioned by a too great love to agreeable taſtes, which generally degenerates into a cuſtom of devouring things of agreeable flavours, greedily; and, finally, into an habitual and almoſt neceſſary deſire of them. In infants who are overmuch fed by their nurſes, the fault is not in the will, but even this alſo, in fine, becomes habitual, and not to be overcome eaſily.

Prognoſtics in it. *Exceſſive appetite* does great miſchief among men, and is a very common complaint, inaſmuch that there are ten thouſand who err in eating more than nature requires, for one who eats leſs. It is common for perſons recovered from illneſſes to have an *exceſſive appetite*; but if this be indulged to the extent, it uſually brings on either a return of the ſame diſeaſe, or, at leaſt, one equally bad. People, after long hunger, have alſo the ſame ſort of *exceſſive appetite* as after diſeaſes; but there have been frequent inſtances, that thoſe who indulged it freely have died upon the ſpot. In general, the conſequences of *exceſſive appetite* indulged, are diſeaſes of many kinds, particularly obſtructions of the viſcera, cachexies, and atrophies. When the *pica* attends a quartan, it very often happens that all medicines are vain in the attempt of a cure, till that unnatural *appetite* has been perfectly ſated. When young girls fall into a *pica* from a want of the menſes at a due time, they are always relieved from it by the appearance of that evacuation; but in perſons who fall into it from inordinate profluvia of that diſcharge, it is uſually very difficult of cure, and the ſame difficulty always attends it when hereditary.

When people have eat to an immoderate degree by reaſon of any of theſe kinds of *exceſſive appetites*, the beſt method of relieving them, is by giving them large draughts of warm water, till they vomit; or, if the ſtomach will not be brought to diſcharge its contents by this means, a few grains of emetic tarter are to be given, or a ſmall doſe of ipecacuanha. After this the bowels are to be gently relaxed; but this is by no means to be done by any violent medicines, the ſtimulus of which would bring on violent and dangerous pains. After the miſchief of a monſtrous repletion is, by this means, got over, the beſt preſervative for the future is abſtinence, and gentle exerciſe. There have, however, been inſtances of people being cured of this diſcaſe, by palling the *appetite* by large draughts of oil, regularly taken, three times a day. The good women have a way of curing the *pica* in girls, by making the chalk, and other ſuch things which they are to eat, bitter, or of ſome other diſagreeable taſte; when a girl has once been tricked in this manner, ſhe will often have as violent a diſtaſte to theſe unnatural eatables, as ſhe before had an inclination for them; and, in like manner, grown perſons who have violent *appetites* to certain particular foods, have been cured by conveying into them an infuſion of tobacco, or ſome other ſuch thing as will provoke vomiting, ſo diſguiſed as not to be taſted, while eaten. When the ſtomach and bowels, over-loaded by theſe meals, are, of themſelves, diſcharging their abundant contents, by vomit, or ſtool, it is a very raſh and dangerous practice to give any thing to ſtop theſe emotions till the whole is thoroughly carried off. Junker's Con. Med. p. 605, ſeq.

ORFFYREUS's *wheel*, in *Mechanics*, is a machine ſo called from its inventor, which he imagined to be a *perpetual* MOTION. This machine, according to the account given of it by M. s'Graveſande, in his Oeuvres Philoſophiques publiſhed by Allamand, Amſt. 1774, conſiſted of a large circular wheel, or rather drum, twelve feet in diameter, and fourteen inches in depth, and very light; as it was formed of an aſſemblage of deals, the intervals between which were covered with waxed cloth, in order to conceal the interior parts of it. The two extremities of an iron axis, on which it turned, reſted on two ſupports. On giving the wheel a ſlight impulſe in either direction, its motion was gradually accelerated; ſo that after two or three revolutions it acquired ſo great a velocity as to make twenty-five or twenty-ſix turns in a minute. This rapid motion it actually preſerved during the ſpace of two months, in a chamber of the landgrave of Heſſe, the door of which was kept locked, and ſealed with the landgrave's own ſeal. At the end of that time it was ſtopped, to prevent the wear of the materials. The profeſſor, who had been an eye-witneſs to theſe circumſtances, examined all the external parts of it, and was convinced that there could not be any communication between it and any neighbouring room. *Orffyreus*, however, was ſo incenſed, that he broke the machine in pieces, and wrote on the wall, that it was the impertinent curioſity of profeſſor s'Graveſande which made him take this ſtep. The prince of Heſſe, who had ſeen the interior parts of this wheel, being aſked by s'Graveſande, whether, after it had been in motion ſome time, there was any change obſervable in it, and whether it contained any pieces that indicated fraud or deception, anſwered both queſtions in the negative, and declared that the machine was of a very ſimple conſtruction.

ORFUS, in *Ichthyology*, the name of a freſh-water fiſh, common in Germany, and called there the *orft*, the *rerve*, and the *nerfling*; ſeeming by the deſcription of Geſner, and other authors, to be the ſame with our *rud*, or *rubellio fluviatilis*. See *Tab.* III. *of Fiſh*, N° 33.

ORGAL, or ARGOL, the lees of wine dried, and uſed by dyers to prepare the cloth for the more readily taking their ſeveral colours. See TARTAR.

ORGAN, Οργανον, is uſed in the general for any thing framed and deſtined for ſome certain action, uſe, or operation.

ORGAN, or **ORGANICAL** *part*, in *Phyſiology*, is ſuch a part of the body as is capable of the performance of ſome perfect act, or operation.

In which ſenſe all the parts, even the moſt ſimple, may be denominated *organical*.

The *organs* are divided into *primary* and *ſecondary*. The *primary* are thoſe compoſed of ſimilar parts, and appointed for ſome one ſingle function. Such as conſiſt of ſeveral of theſe, though appropriated to one ſingle action, are eſteemed *ſecondary organs*.

Thus the veins, arteries, nerves, and muſcles, are *primary organs*; and the hands, fingers, &c. are *ſecondary organs*.

ORGAN *of ſenſe* is that part of an animal body, by means whereof it perceives external objects.

Theſe, ſome divide into *internal*, which is the brain; and *external*, viz. the eye, ear, noſe, &c.

ORGAN, in *Fortification*. See ORGUES.

ORGAN, in *Muſic*, denotes the largeſt and moſt harmonious of all wind-inſtruments; on which account it is called the *organ*, οργανον, the inſtrument, by way of excellence; chiefly uſed for playing a thorough baſs, with all its accompaniments.

The invention of the *organ* is very ancient, though it is agreed it was little uſed till the eighth century. It ſeems to have been borrowed from the Greeks. Vitruvius deſcribes one in his tenth book. The emperor Julian has an epigram in its praiſe. St. Jerom mentions one with twelve pair of bellows, which might be heard a thouſand paces, or a mile; and another at Jeruſalem, which might be heard to the mount of Olives.

Ancient Annaliſts, ſays Dr. Burney, are unanimous in allowing, that the firſt *organ* which was ſeen in France was ſent from Conſtantinople, as a preſent from the emperor Conſtantine Copronymus the ſixth, in 757, to king Pepin; which, as well as Julian's epigram, gives the invention to Greece, where the hydraulicon had likewiſe its origin.

It has been a ſubject of debate, when the uſe of *organs* was introduced into the church. Bellarmine ſays, that they began to be uſed in the ſervice of the church, in the time of pope Vitalian, about the year 660, as Platina relates out of the Pontifical; or, as Aimonius thinks, after the year 820, in the time of Lewis the Pious. A learned writer has ſhewn that neither of theſe dates can be juſt; alledging, that Thomas Aquinas expreſly ſays, that, in his time, i. e. about the year 1250, the church did not uſe muſical inſtruments, leſt ſhe ſhould ſeem to judaize. Pierce's Vind. of the Diſſenters, ed. 1718, p. 395.

Bingham, in his Antiq. of the Chriſtian Church, vol. i. p. 314. folio ed. adds, that Marinus Sanutus, who lived about the year 1290, firſt brought the uſe of them into churches. However, it appears from the teſtimony of Gervas, the monk of Canterbury, who flouriſhed about the year 1200, that *organs* were introduced more than one hundred years before this time: in his deſcription of Lanfranc's church, as it was before the fire in 1174, he has theſe words, "*Crux auſtralis ſupra fornicem* organa *geſtare ſolebat.*" Decam Scriptores, p. 1293, line 25.

Venerable Bede, who died in 735 ſays nothing of the uſe of *organs* or other inſtruments in our churches or convents, when he is very minutely deſcribing the manner in which the pſalms and hymns were ſung. However, according to Mabillon and Muratori *organs* became common in Italy and Germany during the tenth century as well as in England; about which time they had admiſſion in the convents throughout Europe. Burney's Hiſt. Muſic. Vol. 2. p. 66. 114.

The ſtructure of the modern *organ* may be conceived as follows:

The *organ* is an aſſemblage of ſeveral rows of pipes. Its ſize is uſually expreſſed by the length of its largeſt pipe: thus we ſay an *organ* of thirty-two feet, of ſixteen feet, of eight feet, and of two feet.

Church *organs* conſiſt of two parts; viz. the main body of the *organ*, called the *great organ*; and the *poſitive*, or *little organ*, which is a ſmall beauffet, uſually placed before the great *organ*.

The *organ* has at leaſt one ſet of keys, when it has only one body; and two or three, when it has a poſitive. The large *organs* have four, ſometimes five ſets. Beſides, the pedals or largeſt pipes have their key, the ſtops or touches whereof are played by the feet: ſaid to be the invention of Bernhard, a German, about the year 1400. Theſe command certain pipes, which, to increaſe the harmony, are tuned below the diapaſon. The keys of an *organ* are uſually divided into four octaves; viz. the ſecond ſub-octave, firſt ſub-octave, middle-octave, and firſt-octave. Each octave is divided into twelve ſtops or frets; whereof the ſeven black mark the natural ſounds, and the five white the artificial ſounds; i. e. the flats and ſharps. So that the keys uſually contain forty-eight ſtops or touches. Some organiſts add to this number one or more ſtops in the third ſub-octave, as well as in the ſecond. Note, in harpſichords and ſpinets, the natural ſtops or keys are uſually marked white, the artificial ones black. The pedals extend to two or three octaves at the pleaſure of the organiſt: ſo that the number of ſtops is indeterminate.

Each key or ſtop preſſed down opens a valve or plug, which correſponds lengthwiſe, to as many holes as there are rows of pipes on the ſound-board. The holes of each row are opened and ſhut by a regiſter or ruler pierced with forty-eight holes. By drawing the regiſter, the holes of one row are opened, becauſe the holes of the regiſter correſpond to thoſe of the ſound-board. So that, by opening a valve, the wind brought into the ſound-board by a large pair of bellows finds a paſſage into the pipe, which correſponds to the open hole of the ſound-board. But by puſhing the regiſter, the forty-eight holes of the regiſter not anſwering to any of thoſe of the ſound-board, that row of pipes anſwering to the puſhed regiſter is ſhut. Whence it follows, that by drawing ſeveral regiſters, ſeveral rows of pipes are opened; and the ſame thing happens, if the ſame regiſter correſpond to ſeveral rows. When all the ſtops are drawn, and the regiſters open, the wind pervades the whole inſtrument, and we hear that full and complete harmony, which is what the ancient writers mean to expreſs by the term diapaſon.

Hence the rows of pipes become either ſimple or compound: *ſimple*, when only one row anſwers to one regiſter; *compound*, where ſeveral. The organiſts ſay, a row is *compound*, when ſeveral pipes play upon preſſing one ſtop.

And thoſe orders of pipes, whether ſimple or compound, which in the conſtruction of the inſtrument are connected together, and rendered ſubſervient to one touch of the key, are called ſtops. The ſimple ſtops, or thoſe in which only one pipe anſwers to the touch of the key, are the diapaſon, principal, tierce, twelfth, fifteenth, flute, block-flute, trumpet, clarion, nazard, vox humana, krumhorn, and ſome others. The compound ſtops are the cornet, the ſeſquialtera, mixture, furniture, &c. and are ſo called, becauſe in them ſeveral pipes are made to ſpeak at the touch of a ſingle key; as in the ſeſquialtera three, in the cornet five, in the mixture and in the furniture three, four, or more; and the full *organ* or chorus is compounded of all. Of the ſtops of an *organ*, the moſt uſual are the diapaſons, the open and ſtopped, the tierce, ſeſquialtera, flute, cornet, tenth, twelth, fifteenth, principal furniture, mixture, trumpet, clarion, hautboy, larigot, vox humana, krumhorn, and nazard. The foreign *organs*, eſpecially thoſe of Germany, have many more; particularly that in the abbey church of Weingarten, a town in the upper Palatinate, which has ſixty-ſix, and contains no fewer than ſix thouſand ſix hundred and ſixty-ſix pipes. The *organ* at Haerlem is ſaid to have ſixty ſtops, many of them but little known to the Engliſh workmen, and diſtinguiſhed by names that expreſs the ſound which they produce. Hawkins's Hiſt. Muſic, vol. iv. p. 149.

The pipes of the *organ* are of two kinds; the one with mouths like our flutes; the other with reeds. The firſt, called *pipes* of mutation, conſiſt,

1. Of a foot AABB (*Tab.* II. *Miſcell. fig.* 25.) which is a hollow cone, and which receives the wind that is to ſound the pipe. 2. To this foot is faſtened the body of the pipe BBDD. Between the foot and the body of the pipe is a diaphragm, or partition EEF, which has a little, long, narrow aperture to let out the wind. Over this aperture is the mouth BBCC; whoſe upper lip, CC, being level, cuts the wind as it comes out at the aperture. The pipes are of pewter, of lead mixed with a twelfth part, or, as ſome ſay, with half of tin, and of wood. Thoſe of tin are always open at their extremities: their diameter is very ſmall, and their ſound very clear and ſhrill. Thoſe of lead mixed are larger; the ſhorteſt open, the longeſt are quite ſtopped; the mean ones partly ſtopped, and having, beſides, a little ear on each ſide of the mouth, to be drawn cloſer, or ſet farther aſunder, in order to raiſe or lower the ſound. The wooden pipes are made ſquare, and their extremity ſtopped with a valve or tampion of leather. The ſound of the wooden and leaden pipes is very ſoft; the large ones ſtopped, are uſually of wood; the ſmall ones of lead. The longeſt pipes give the graveſt ſound; and the ſhorteſt the moſt acute: their lengths and widths are made in the reciprocal ratios of their ſounds: and the diviſions regulated by their rule, which they call *diapaſon*. But the pipes that are ſhut are of the ſame length as the open ones, which yield the ſame ſound. Uſually, the longeſt pipe is ſixteen feet; though in extraordinary *organs* it is thirty-two. The pedal tubes are always open, though made of wood, and of lead.

A *reed pipe* conſiſts of a foot AABB (*Tab.* II. *Miſcell. fig.* 26.) which carries the wind into the ſhalot, or reed CD, which is a hollow demy-cylinder, fitted at its extremity D into a kind of mould II, by a wooden tampion FG. The ſhalot is covered with a plate of copper EEFF, fitted at its extremity FF into the mould by the ſame wooden tampion: its other extremity EE is at liberty; ſo that the air entering the ſhalot, makes it tremble or ſhake againſt the reed; and the longer that part of the tongue which is at liberty, FL, is made, the deeper is the ſound. The mould II, which ſerves to fix the ſhalot or reed, the tongue, tampion, &c. ſerves alſo to ſtop the foot of the pipe, and to oblige the wind to go out wholly at the reed.

Laſtly, in the mould is ſoldered the part HHKK, called the *tube*, whoſe inward opening is a continuation of that of the reed. The form of this tube is different in the different ranks of pipes.

The degree of acuteneſs and gravity in the ſound of a reed-pipe, depends on the length of the tongue, and that of the pipe CK, taken from the extremity C of the ſhalot, to the extremity K of the tube.

The quality of the ſound depends upon the width of the reed, the tongue, and the tube; as alſo on the thickneſs of the tongue, the figure of the tube, and the quantity of wind.

To diverſify the ſounds of the pipes, they add a valve to the port-vent, which lets the wind go in fits or ſhakes.

Of the pipes in an *organ*, thoſe called the diapaſons are to be conſidered as the baſis or foundation: above theſe ſucceed in regular order other ſimple ſtops, tuned in harmonical intervals to the diapaſons, as the tierce or third, the ſeſquialtatera in the ratio of three to two, of the fifth: ſome in the octave, others in the tenth, which is the replicate of the third, the twelfth the replicate of the fifth, the biſdiapaſon, and ſo on to the twenty-ſecond. Among the modern improvements of the *organ*, the moſt remarkable are the ſwell and the tremblant: the former, invented by an Engliſh artiſt, conſiſts in a number of pipes placed in a remote part of the inſtrument, and incloſed in a kind of box, which, being gradually opened by the preſſure of the foot, increaſes the ſound as the wind does the ſound of a peel of bells, or ſuppreſſes it in like manner by the contrary action. The tremblant is a contrivance by means of a valve in the port-vent or paſſage from the wind cheſt, to check the wind and admit it only by ſtarts; ſo that the notes ſeem to ſtammer, and the whole inſtrument to ſob, in a manner very offenſive to the ear. There is a tremblant in the *organ* at the German chapel in the Savoy. Hawkins, ubi ſupra, p. 150.

ORGAN, *hydraulic*, denotes a muſical machine that plays by means of water inſtead of wind.

Of theſe there are ſeveral in Italy in the grottos of vineyards.

Cteſebes of Alexandria, who lived in the reign of Ptolemy Euergetes, is ſaid to have firſt invented *organs* that played by compreſſing the air with water, as is ſtill practiſed. Archimedes and Vitruvius have left us deſcriptions of the *hydraulic organ*. Felibein, de la Vie des Archit. See Hawkins's Hiſt. of Muſic, vol. i. p. 190, &c.

In the cabinet of queen Chriſtina is a beautiful and large medallion of Valentinian, on the reverſe whereof is ſeen one of theſe *hydraulic organs*; with two men, one on the right, the other on the left, ſeeming to pump the water which plays it, and to liſten to its ſound. It has only eight pipes, placed on a round pedeſtal. The inſcription is PLACEA SPETRI, if it be not wrong copied, which we ſuſpect.

ORGANICAL, in the *Ancient Muſic*, was that part performed with inſtruments.

The *organical* comprehended three kinds of inſtruments; viz. *wind inſtruments*, as the trumpet, flute, &c. *ſtringed inſtruments*, as the lute, lyre, &c. and *pulſatile inſtruments*, or thoſe played on by beating, as drums, &c. See each in its place, TRUMPET, &c.

ORGANICAL *part* is that part of an animal or plant or deſtined for the performance of ſome particular function. See ORGAN.

ORGANICAL *parts*, in Buffon's ſyſtem of generation. See GENERATION.

ORGANICAL *diſeaſe*, a diſeaſe in the *organical* part of the body, whereby its function is impeded, ſuſpended, or deſtroyed.

ORGANICAL *deſcription* of curves is the method of deſcribing them on a plane by means of inſtruments. See CURVE.

ORGANO, in the *Italian Muſic*, is uſed to ſignify the thorough baſs. It is uſually ſcored with figures over the notes, for the harpſichord, baſs-viol, and lute.

ORGANZINE, in the *Silk-trade*. See SILK.

ORGASM, οργασμος, denoting violence, or turgeſcency; formed from οργαω, *turgeo*, *I ſwell*, an ecſtacy or impetuous deſire of coition, occaſioned by a turgeſcency of the ſeminal veſſels, which are no longer able to reſtrain their contents.

The ancients alſo extend *orgaſm* to the other humours, and even excrements, which being accumulated, and coming to ferment, demand excretion.

Quincy uſes *orgaſm* for an impetuous, or too quick motion of the blood, or ſpirits; whereby the muſcles are diſtended with an uncommon force.

ORGIA, οργια, in *Antiquity*, feaſts and ſacrifices performed in honour of Bacchus, inſtituted by Orpheus, and chiefly celebrated on the mountains by wild, diſtracted women, called *Bacchæ*.

Euſebius derives the word απο της οργης, *fury*, *madneſs*.

Others from *οροϛ, mountain*; becauſe Orpheus removed from Thrace to mount Citheron: others from *οργαϛ*, a place conſecrated to ſome divinity: others from *ειϱγαν to remove, to repulſe*; in regard the profane were to be driven away.

The *orgia* were alſo called *Orphica*, from their inſtitutor, and BACCHANALIA, DIONYSIA, and LIBERALIA.

They were held every third year. The chief ſolemnities were in the night-time; and were attended with all manner of impurities.

They were carried to ſuch an exceſs, that in the year of Rome 564, the ſenate was obliged to aboliſh them through the whole empire.

Servius ſays, that at firſt *orgia* was a common name for all kinds of ſacrifices among the Greeks, of the ſame import with the word *ceremoniæ* among the Romans.

ORGUES, in *Fortification*, thick long pieces of wood, pointed and ſhod with iron, and hung each by a ſeparate rope over the gateway of a city, ready on any ſurprize or attempt of the enemy to be let down to ſtop up the gate.

The ends of the ſeveral ropes are wound round a windlas, by means of which they may be all let down together.

Orgues are preferable to herſes, or portcullices, becauſe theſe may be either broke by a petard, or they may be ſtopped in their falling down; but a petard is uſeleſs againſt an *orgue*; for if it break one or two of the pieces, they immediately fall down again, and fill up the vacancy; or if they ſtop one or two of the pieces from falling, it is no hindrance to the reſt; for being all ſeparate, they have no dependence upon one another.

ORGUES are alſo uſed for a machine compoſed of ſeveral harquebuſs or muſquet-barrels, bound together; by means whereof ſeveral exploſions are made at the ſame time; uſed to defend breaches, and other places attacked.

ORGYA, *οϱγυια*, an ancient Grecian meaſure, containing ſix feet.

Some repreſent the *orgya* as the Grecian pace.

Heſychius deſcribes it as the ſpace comprehended between the two hands, when the arms are extended; anſwering to the Roman *ulna*, and our fathom.

ORICHALCUM, or AURICHALCUM, braſs. See BRASS.

It is evident, from all accounts, that the *orichalcum* of the ancients was a fictitious ſubſtance, not a natural metal. They made it on the ſame baſis that we make braſs at preſent; but they had ſeveral ways of doing it, and diſtinguiſhed it into ſeveral kinds. They had a white ſort in frequent uſe and great eſteem; and even the yellow they diſtinguiſhed into two principal ſorts, under different names. The *orichalcum* and ÆS *flavum*, braſs and yellow copper, are with us ſynonymous terms, but with them they were uſed to expreſs different combinations of the ingredients.

ORICHALCUM, or AURICHALCUM *album*, *white braſs*.

This was a metal well known among the ancients, and celebrated by Ariſtotle and by Strabo, and others, under the name of *κϱαμα λευκον*. It was made by mixing an earth with copper, while in fuſion; but what that earth was, we are not informed.

None of our methods ſeem to be the ſame with their's, ſince the metal is debaſed by all our's, and becomes brittle; whereas in their management according to their own accounts, it ſeems not to have loſt any thing of its ductility, though it acquired a peculiar brightneſs.

ORIENT, ORIENS, in *Geography* or *Aſtronomy*, the eaſt, or eaſt point of the horizon.

It is thus called from the Latin, *oriri*, *to ariſe*; becauſe it is in this point the ſun riſes.

ORIENT, *equinoctial*, is uſed for that point of the horizon wherein the ſun riſes when he is in the equator, or when he enters the ſigns Aries and Libra. See SPRING, and AUTUMN.

ORIENT, *æſtival*, is the point wherein the ſun riſes in the middle of ſummer, when the days are longeſt.

ORIENT, *hybernal*, is the point where the ſun riſes in the middle of winter, when the days are ſhorteſt.

ORIENTAL, ſomething ſituated towards the eaſt with regard to us: in oppoſition to *occidental*.

In this ſenſe we ſay, *oriental pearls*, q. d. ſuch as are found in the Eaſt Indies (ſee PEARL.) *Oriental languages*, meaning the Hebrew, Syriac, Chaldee, and Cophtic. See LANGUAGE.

ORIENTAL *bezoar*. See BEZOAR.

ORIENTAL *Bibles*. See BIBLE.

ORIENTAL *emerald*. See EMERALD.

In aſtronomy a planet is ſaid to be *oriental*, when it appears in the eaſt before the ſun. See RISING.

ORIENTAL *philoſophy*, is ſometimes uſed for the philoſophy of the Eaſt, or that of the Perſians, Chaldeans, and Arabians (ſee MAGI); but by eccleſiaſtical writers it is generally uſed for that which was ſtyled gnoſis or ſcience, and which was adopted by the GNOSTICS.

The firſt principals of the *oriental philoſophy* ſeem perfectly conſiſtent with the dictates of reaſon; for its firſt founder muſt undoubtedly have argued in the following manner: "There are many evils in this world, and men ſeem "impelled by a natural inſtinct to the practice of thoſe "things which reaſon condemns; but that eternal Mind, "from which all ſpirits derive their exiſtence, muſt be "inacceſſible to all kinds of evil, and alſo of a moſt "perfect and beneficent nature; therefore the origin of "thoſe evils, with which the univerſe abounds, muſt be "ſought ſomewhere elſe than in the Deity. It cannot "reſide in him who is all perfection; and therefore "it muſt be without him. Now, there is nothing with"out or beyond the Deity, but matter; therefore matter "is the centre and ſource of all evil, of all vice."

Having taken for granted theſe principles, they proceeded farther, and affirmed that matter was eternal, and derived its preſent form, not from the will of the ſupreme God, but from the creating power of ſome inferior intelligence, to whom the world and its inhabitants owed their exiſtence. As a proof of this aſſertion, they alledged that it was incredible, that the ſupreme Deity, perfectly good, and infinitely removed from all evil, ſhould either create or modify matter, which is eſſentially malignant and corrupt, or beſtow upon it, in any degree, the riches of his wiſdom and liberality.

The *oriental* philoſophers were divided in their opinion, when they proceeded to argue from theſe principles. Some imagined two eternal principles, from whence all things proceeded; the one preſiding over light, and the other over matter; and, by their perpetual conflict, explained the mixture of good and evil, that appears in the univerſe. Others maintained, that the being, which preſided over matter was not an eternal principle, but a ſubordinate intelligence, one of thoſe whom the ſupreme God produced from himſelf. They ſuppoſed that this being was moved, by a ſudden impulſe, to reduce to order the rude maſs of matter, which lay excluded from the manſions of the Deity, and alſo to create the human race. A third ſort fell upon a ſyſtem different from the two preceding, and formed to themſelves the notion of a triumvirate of beings, in which the ſupreme Deity was diſtinguiſhed both from the material, evil principle, and the creator of this ſublunary world. Theſe, then, were the three leading ſects of the *oriental philoſophy*, which were ſubdivided into various factions, by the diſputes that aroſe, when they came to explain more fully their reſpective opinions, and to purſue them into all their monſtrous conſequences.

The diviſions among the various ſects of theſe philoſophers, did not prevent their holding, in common, certain opinions concerning the Deity, the univerſe, the human race, and ſeveral other ſubjects. They were unanimous in acknowledging the exiſtence of an eternal nature, in whom dwelt the fulneſs of wiſdom, goodneſs, and all other perfections, and of whom no mortal was able to form a complete idea. This great Being was conſidered by them, as a moſt pure and radiant light, diffuſed through the immenſity of ſpace, which they called pleroma, a Greek word which ſignifies *fulneſs*; and they taught concerning him and his operations, the following things: "The eternal nature, infinitely perfect and in"finitely happy, having dwelt from everlaſting in a pro"found ſolitude, and in a bleſſed tranquility, produced, "at length, from itſelf, two minds of a different ſex, "which reſembled their ſupreme parent in the moſt "perfect manner. From the prolific union of theſe two "beings others aroſe, which were alſo followed by ſuc"ceeding generations; ſo that, in proceſs of time, a "celeſtial family was formed in the pleroma. This di"vine progeny being immutable in its nature, and above "the power of mortality, was called by the philoſo"phers, *æon*," a term which ſignifies in the Greek language, an eternal nature. How many in number theſe *æons* were, was a point much controverted among the *oriental* ſages.

"Beyond the manſions of light, where dwells the deity "with his celeſtial offspring, there lies a rude and un"wieldy maſs of matter, agitated by innate, turbulent, "and irregular motions. One of the celeſtial natures "deſcending from the pleroma, either by a fortuitous "impulſe, or in conſequence of a divine commiſſion, "reduced to order this unſeemly maſs, adorned it with "a rich variety of gifts, created men, and inferior ani"mals of different kinds to ſtore it with inhabitants, "and corrected its malignity by mixing it with a cer"tain portion of light, and alſo of a matter celeſtial and "divine. This creator of the world is diſtinguiſhed from "the ſupreme Deity by the name of demiurge. His “character is a compound of ſhining qualities, and inſupportable arrogance; and his exceſſive luſt of empire effaces his talents and his virtues. He claims dominions over the new world he has formed, as his ſovereign right; and, excluding totally the ſupreme Deity from all concernment in it, he demands from mankind for himſelf and his aſſociates, divine honours.”

“Man is a compound of a terreſtrial and corrupt body, and a ſoul which is of a celeſtial origin, and, in ſome meaſure, an emanation from the divinity. This nobler part is miſerably weighed down and encumbered by the body, which is the ſeat of all irregular luſts and impure deſires. It is this body that ſeduces the ſoul from the purſuit of truth, and not only turns it from the contemplation and worſhip of the ſupreme Being, ſo as to confine its homage and veneration to the creator of this world, but alſo attaches it to terreſtrial objects, and to the immoderate purſuit of ſenſual pleaſures, by which its nature is totally polluted. The ſovereign mind employs various means to deliver his offspring from this deplorable ſervitude, eſpecially the miniſtry of divine meſſengers, whom he ſends to enlighten, to admoniſh, and to reform the human race. In the mean time, the imperious demiurge exerts his power in oppoſition to the merciful purpoſe of the ſupreme Being, reſiſts the influence of thoſe ſolemn invitations, by which he exhorts mankind to return to him, and labours to efface the knowledge of God in the minds of intelligent beings. In this conduct, ſuch ſouls, as, throwing off the yoke of the creators and rulers of this world, riſe to their ſupreme parent, and ſubdue the turbulent and ſinful motions, which corrupt matter excites within them, ſhall, at the diſſolution of their mortal bodies, aſcend directly to the pleroma. Thoſe, on the contrary, who remain in the bondage of ſervile ſuperſtition, and corrupt matter, ſhall, at the end of this life, paſs into new bodies, until they awake from their ſinful lethargy. In the end, however, the ſupreme God ſhall come forth victorious, triumph over all oppoſition, and, having delivered from their ſervitude the greateſt part of thoſe ſouls that are impriſoned in mortal bodies, ſhall diſſolve the frame of this viſible world, and involve it in a general ruin. After this ſolemn period, primitive tranquillity ſhall be reſtored in the univerſe, and God ſhall reign with happy ſpirits, in undiſturbed felicity, though the everlaſting ages.” Moſheim's Eccl. Hiſt. vol. i. p. 69, &c. 8vo.

ORIFICE, Orificium, the mouth or aperture of a tube, pipe, or other cavity.

Orifice, in *Anatomy*, is particularly applied to the mouths of the ſeveral ducts, veſſels, and other cavities; as of the bladder, uterus, ſtomach, &c.

The upper *orifice* of the ſtomach is the part where hunger is felt; the lower *orifice* is called the *pylorus*.

There are ſome operations in chemiſtry, where the *orifices* of the veſſels muſt be ſealed hermetically.

Orifice is alſo uſed by extenſion, for the aperture of a wound, or ulcer.

ORIGANUM, in *Botany*. See Marjoram.

ORIGENIANS, Origeniani, a ſect of ancient heretics, who even ſurpaſſed the abominations of the Gnoſtics.

St. Epiphanius ſpeaks of them as ſubſiſting in his time but in very ſmall number. He ſeems to fix their riſe about the time of the great *Origen*; but does not ſay they took their name from him. On the contrary, he diſtinguiſhes them from the *Origeniſts*, whom he derives from *Origen Adamantius*; adding, indeed, that they firſt took their name from one *Origen*; by which he intimates, that it was not the great *Origen*. And St. Auguſtine ſays expreſly it was another. As to their doctrine, all that modeſty will allow to be ſaid, is, that they rejected marriage; that they uſed ſeveral apocryphal books, as the acts of St. Andrew, &c. and that, to excuſe their open crimes, they accuſed the catholics of doing the ſame in private.

ORIGENISTS, in *Church Hiſtory*, followers of the opinions of Origen, a preſbyter of Alexandria, who, in the third century, maintained, that Chriſt is only the Son of God by adoption; that the human ſoul had a pre-exiſtent ſtate, and had ſinned in heaven before the body was created; that the torments of the damned ſhall not be eternal, but that all intelligent beings ſhall be reſtored to order and happineſs, and that the devils themſelves ſhall be relieved at laſt.

Origen, as Moſheim repreſents him, was a man of vaſt and uncommon abilities, and the greateſt luminary of the Chriſtian world that the age in which he lived exhibited to view. Had the juſtneſs of his judgments been equal to the immenſity of his genius, the fervour of his piety, his indefatigable patience, his extenſive erudition, and his other eminent and ſuperior talents, all encomiums muſt have fallen ſhort of his merit. Yet ſuch as he was, his virtues and his labours deſerve the admiration of all ages, and his name will be tranſmitted with honour through the annals of time, as long as learning and genius ſhall be eſteemed among men. However, Origen, notwithſtanding his diſtinguiſhed abilities, was miſled by his imagination, and by that taſte for *oriental philoſophy* which prevailed in his time. Enchanted by the charms of this philoſophy, derived from the Platonic ſchool, he ſet it up as the teſt of all religion, and imagined that the reaſons of each doctrine were to be found in that favourite philoſophy, and their nature and extent to be determined by it; nor can it be denied, that many of the corruptions of Chriſtianity proceeded from this ſource. Hence ſprung both the ſcholaſtic and myſtic theology, and to the ſentiments that were now adopted, we may aſcribe the riſe of monks and hermits. Origen was alſo miſled by his imagination: for, having entertained that it was very difficult, if not impoſſible, to defend every thing in the ſacred writings from the cavils of heretics and infidels, ſo long as they were explained literally, according to the real import of the terms, he maintained that the ſcriptures were to be interpreted in the ſame allegorical manner that the Platoniſts explained the hiſtory of the Gods. In conſequence of this pernicious rule of interpretation, he alledged, that the words of ſcripture were, in many places, abſolutely void of ſenſe; and that though in others there were, indeed, certain notions conveyed under the outer terms according to their literal force and import, yet it was not in theſe that the true meaning of the ſacred writers was to be ſought, but in a myſterious and hidden ſenſe, ariſing from the nature of the things themſelves. This hidden ſenſe he endeavours to inveſtigate throughout his commentaries, neglecting and deſpiſing, for the moſt part, the outward letter. He divided his hidden ſenſe into moral, which diſplays thoſe doctrines that relate to the ſtate of the ſoul and the conduct of life; and miſtical or ſpiritual, which repreſents the nature, the laws, and hiſtory of the ſpiritual or myſtical world. This myſtical world he again ſubdivided into two diſtinct regions, one called the ſuperior, i. e. heaven; and the other the inferior, by which he meant the church. And thus he was led to another diviſion of the myſtical ſenſe into an earthly or allegorical ſenſe, adapted to the inferior world; and a celeſtial or anagogetical one, adapted to the ſuperior region. Origen found a violent enemy in Demetrius, biſhop of Alexandria; who obliged him, in the year 231, to retire from his charge in Cæſarea: and farther to ſatisfy his vengeance, he aſſembled two councils, in the firſt of which he condemned him unheard; and deprived him of his office; and in the ſecond had him degraded from the ſacerdotal dignity. However, the character and doctrine of Origen were held by many, and eſpecially by the monks, in the higheſt veneration, and cheriſhed in this and the following centuries with a kind of extravagant enthuſiaſm. Hence many commotions were raiſed in the church, which were terminated by the fifth general council, aſſembled at Conſtantinople, by Juſtinian, A. D. 553, in which Origen and his followers were again condemned. The tenets of Origen which gave the greateſt offence were the following, viz. 1. That, in the Trinity, the Father is greater than the Son, and the Son than the Holy Ghoſt. 2. The pre-exiſtence of ſouls, which Origen conſidered as ſent into mortal bodies for the puniſhment of ſins committed in a former ſtate of being. 3. That the ſoul of Chriſt was united to the word before the incarnation. 4. That the ſun, moon, and ſtars, &c. were animated and endowed with rational ſouls. 5. That after the reſurrection, all bodies will be of a round figure. 6. That the torments of the damned will have an end; and that, as Chriſt had been crucified in this world, to ſave mankind, he is to be crucified in the next to ſave the devils.

St. Epiphanius inſiſts very largely on the errors of this father; but, as he declares himſelf too warmly againſt him, there may be ſomewhat of exaggeration in what he ſays. Nor do St. Jerom, or Theophilus of Alexandria, ſeem to have kept their zeal within the proper bounds, in ſpeaking of Origen. For which reaſon, no doubt, it was, that St. Chryſoſtom himſelf was accuſed of being an *Origeniſt*, becauſe not ſo vehemently bent againſt him; and condemned to baniſhment by the council of Chalcedon, in the year 403. *Origeniſm* ſpread itſelf chiefly among the monks of Egypt.

The myſtic theology of Origen ſeems to be adopted by our modern Quakers. On the ſubject of this article, conſult Moſheim's Eccl. Hiſt. vol. i.

ORIGINAL, a firſt draught, deſign, or autograph, of any thing; ſerving as a model, or exemplar, to be imitated or copied.

Scarce any of the ancient titles, tenures, &c. are now found in the *originals*. They are only vidimuſes, or copies collated from the *originals*.

Original. In the court of King's Bench the uſual *original* writ in actions, is for action of treſpaſs upon the caſe; and this court doth not iſſue *originals* in actions of debt, covenant, or account, &c. Whereas the court of Common Pleas proceeds by *original* in all kinds of actions; but to arreſt and ſue a party to outlawry, it is made uſe of by both courts. And for *originals* in treſpaſs on the caſe, there is a fine payable to the crown, where the damages are laid above forty pounds, in proportion to the damage. Practiſ. Solic. 254, 255.

The *original* is the foundation of the capias and all ſubſequent proceſs, the return whereof is generally the teſte of the capias, though the capias may be taken out before the *original*, by leaving the præcipe with the filazer, who will make out the capias upon it, and afterwards carry it to the curſitor, to make an *original*: and the filazer, when it is returned, is to file it with the cuſtos brevium.

Original *ſin*. See Sin.

Original *conveyances*. See Conveyance.

Original *writs*. See Writ.

ORIGINALIA, in the *Exchequer*, are records or tranſcripts, ſent to the remembrancer's office out of Chancery.

They differ from *recorda*, which contain the judgments and pleadings in ſuit tried before the barons.

ORIGINARY, *originarii*, among the Romans, an appellation given to ſlaves born in their maſter's houſes, who were otherwiſe called *vernæ*.

ORILLON, in *Fortification*, a ſmall rounding of earth, lined with a wall; raiſed on the ſhoulder of thoſe baſtions that have caſemates, to cover the cannon in the retired flank, and prevent their being diſmounted by the enemy. *Orillons* and retired flanks are conſtructed by deſcribing the front MPQRST (*Tab. Fort. fig.* 15. N° 2.) in the manner directed under art. Fortification *according to M. Vauban's firſt method*, and dividing the flank into three equal parts, of which let S *r* be one; then from the oppoſite flanked angle M draw a line M *r*, in which take $mr = 5$ toiſes; take alſo R *n* in the line of defence MR produced equal to 5 toiſes, and join *nm*; upon which as a baſe, deſcribe the equilateral triangle *npm*, and from the angle *p*, oppoſite to the baſe, as a centre, deſcribe the circular flank *nm*; and if S *r* be biſected by the perpendicular 1, 2, and another be erected on the face ST at S, the point of interſection, 2, of theſe two perpendiculars will be the centre of the arc which forms the *orillon*.

There are other ſorts of *orillons*, properly called Epaulements, almoſt of a ſquare figure.

ORIOLUS, in *Ornithology*, a name by which ſeveral authors have called the Galbula, a very beautiful yellow bird, of the truſh kind, remarkable for its manner of hanging its neſt. See *Tab.* III. *of Birds*, *fig.* 38.

ORION, in *Aſtronomy*, one of the conſtellations of the ſouthern hemiſphere.

The word is formed from the Greek ουρειν, *to make water*; the ancients ſuppoſing, that it raiſed tempeſts at its riſing and ſetting.

The ſtars in the conſtellation *Orion*, in Ptolemy's catalogue, are thirty-eight; in Tycho's and Hevelius's ſixty-two; in the Britannic catalogue, ſeventy-eight. The names, ſituations, magnitudes, longitudes, and latitudes whereof are as follow:

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longitud.			Latitude. South.			Magnitude.
			°	'	"	°	'	"	
Preced. and 6th in the lion's ſkin.		♊	7	32	39	15	25	30	4
5th in the lion's ſkin.	π		8	00	53	13	31	20	4
7th in the lion's ſkin.			7	46	00	16	48	55	4
1ſt and north. in the lion's ſkin.	o		9	09	15	8	16	07	4.5
			7	56	9	19	57	15	6
5.									
3d in the lion's ſkin.	g		9	22	11	11	09	17	6
4th in the lion's ſkin.	π		9	14	55	12	24	02	6
8th in the lion's ſkin.	z		8	09	40	20	02	42	4
2d in the lion's ſkin.	o		10	00	34	9	06	31	4.5
Laſt and ſouth in the lion's ſkin.			9	11	42	20	53	51	4.5
10.									
Prec. of 2 infor. tow. the horn of ♉	y		12	11	56	7	25	55	5
North. in the preced. arm.			12	21	32	13	22	20	6
South and ſubſeq. in the arm.			12	24	47	13	22	51	6
	i		12	20	45	14	22	37	5
Sub. of the inf. tow. the horn of ♉	y		13	27	34	7	21	32	5
15.									
	b		12	51	58	13	5	34	6
That againſt the preced. ſide.			13	13	48	20	07	24	4.5
That againſt the preced. arm.			14	42	26	11	43	44	6.5
Bright one in preced. foot called *regel*.	β		12	30	00	31	10	11	1
More north. over the heel.	τ		13	30	26	29	52	52	4
20.									
			14	46	42	20	30	01	6
North. in the prec. ſide under the girdle.			15	13	36	23	31	19	5
Preced. and north. in the ſide.	m		15	48	42	19	37	39	6
In the preced. ſhoulder.	γ		16	37	35	16	51	30	2
Preced. and ſouth. in the back.	ψ		16	12	26	21	21	07	5
25.									
			16	10	46	21	40	44	6
S. in the prec. ſide, under the girdle			15	55	49	24	05	24	6
In the hilt of the ſword.	η		15	49	47	25	34	47	3
Under the left heel.	ε		15	13	47	30	57	44	5
Preced. of 4 in the back, (as it were in a right line)	ψ		16	50	50	20	08	18	5
30.									
			17	23	22	24	21	29	6
That fol. the ſhould to the ſouth.	A		18	02	50	17	20	25	5
2d of four in the back.	n		18	01	10	20	00	09	6
Preced. in the girdle.	δ		18	01	38	20	36	07	2
			19	19	28	9	2	31	6
35.									
Under the point of the ſword.	υ		17	34	05	30	35	12	4
Preced. in the head.	φ		19	15	51	13	51	19	5
In the back the 3d.			18	51	06	19	34	10	6
In the head the north. of three.	λ		19	22	18	13	25	02	4
South. and ſubſeq. of the head.	φ		19	46	28	14	02	58	5
40.									
Prec. of the contig. in the middle of the ſword.	θ		18	37	58	28	42	45	6
Preced of the north. of the contig. in the mid. of the ſword.	e		18	42	11	2	10	17	5
Subſeq. in the mid. of the ſword.	θ		18	39	50	28	41	23	4
South. in the ſword.	ι		18	39	17	29	14	37	3.4
Laſt of the north. in the ſword.	c		18	46	48	28	11	45	5
45.									
Middle of three in the girdle.	ε		19	07	44	24	33	23	2
Laſt of 4 in the line of the back.	ω		20	09	56	19	16	03	5
That under the 3d of the girdle.	σ		19	45	41	25	58	47	4
Subſ. under the point of the ſwo.	d		19	35	25	30	34	50	5
Third and laſt in the girdle.			20	21	45	25	20	17	2
50.									
Preced. in the hind-ſide.	b		20	58	49	21	56	12	5
			22	32	37	16	59	55	6
In the hind-knee.	κ		22	03	41	33	07	06	3
Preced. of two in the club.	χ		24	22	23	3	11	44	5
			23	09	32	30	58	58	6
55.									
Latter of two in the hind-ſide.			23	38	10	21	37	54	6
	χ		24	29	13	3	44	01	5
Glittering ſtar in the hind-ſhoul.	α		24	25	00	26	04	26	1
			25	14	10	21	38	50	6
That follow. the ſide out of form.	μ		25	20	41	22	56	04	6
6.									
In the lower part of the hind-arm.	χ		26	16	05	13	50	01	4
Subſ. in the club.	χ		26	36	0	3	20	40	6
			26	21	38	8	02	56	6
			27	11	40	3	48	31	6
Second of 2 in the club.	χ		27	18	25	3	21	33	5.6
65.									
			26	59	00	19	19	18	6
Prec. of the S. in ♊ of hind-hand.	ν		27	31	17	8	42	16	4.5
			28	30	25	3	39	59	6
Prec. of the north. in the ſquare.	f		28	34	14	7	19	30	6
Laſt of the ſouth. in the ſame.	ξ		28	34	01	9	14	49	4.5
70.									
	f		29	12	10	4	16	02	6
Laſt of the north.	k		29	24	09	7	17	31	6
	k		29	34	49	10	53	13	6
North in the hind ulna.	l	♋	29	45	12	11	10	30	6
South in the hind ulna.			00	00	00	3	28	25	6
75.									
			1	57	50	18	05	18	6
			3	6	57	23	4	8	6
			3	9	5	23	34	26	6

Orion's *river*, in *Aſtronomy*, a conſtellation called alſo Eridanus.

ORIS *columna*. See Columna.

Oris *diſtortor*. See Distortor.

Oris *ſpeculum*. See Speculum.

ORITES, in *Natural Hiſtory*, the name of a ſtone deſcribed by the ancients, and celebrated by the writers of the middle ages for its wonderful virtues. Pliny ſays, that it was round, and remained unhurt in the fire, and that ſome called it *ſideritis*. To this the later writers have added, that there are three kinds of it: the firſt round and black; this rubbed over with oil of roſes, was famous for the bites of venomous beaſts. The ſecond was green, variegated with veins and ſpots of white; this was to be annexed to the bodies of perſons, to preſerve them from many ſorts of injuries. And the third was compoſed of parallel plates, and ſaid to have the virtue of cauſing abortion, if only carried in the pocket.

ORITORIUS *lapis*, a name given by Ludovicus Dulcis, and ſome other authors, to the *ochreoferreous ætitæ*, or eagle ſtones; particularly to a ſpecies of them common in Germany, and uſed in the ſhops there, and in ſome other places, under the name of *eagle ſtones*. Theſe are of a browniſh colour and ſmooth ſurface, and are eaſily broken, being only compoſed of a thin cruſt of ferruginous earth, encloſing ſeveral ſmall lumps of a greeniſh marle, which rattle in it when ſhaken.

ORIZEUS *color*, a term uſed by authors to expreſs the yellow colour of the eyes and urine of perſons afflicted with a JAUNDICE.

ORKNEY *beans*, in *Natural Hiſtory*, a name given by authors to a ſort of fruit found on the ſhores of the *Orkney* iſlands near Scotland. Theſe are of ſeveral diſtinct ſpecies, and are none of them the produce of thoſe iſlands, nor of any places thereabout, but are probably of American origin, many of them being plainly natives of Jamaica.

They are found principally on thoſe coaſts which are moſt expoſed to the waves of the great ocean, and are on theſe ſo plentiful, that they might be gathered in large quantities, if of any value; but the only uſe they are put to, is to making of ſnuff-boxes out of them. Sir Robert Sibbald, and Mr. Wallace, in their accounts of Scotland, have both named them under the title of *Molucca* BEANS.

ORLE, ORLET, or ORLO, in *Architecture*, a fillet under the ovolo, or quarter-round of a capital. See *Tab. Archit. fig.* 25.

The word is French, formed from the Latin *orletum*, or *orlum*, of *ora*, a *border* or *liſt*.

When it is at the top or bottom of the ſhaft, it is called the *cincture*.

Palladio alſo uſes *orlo* for the plinth of the baſes of columbs and pedeſtals.

ORLE, in *Heraldry*, is an ordinary in form of a fillet, drawn round the ſhield, near the edge or extremity thereof, leaving the field vacant in the middle.

Its breadth is but half that of the bordure, which contains a fifth part of the ſhield; the *orle* only a tenth: add, that the *orle* is its own breadth diſtant from the edge of the ſhield; whereas the bordure comes to the edge itſelf.

There is ſometimes one *orle*, ſometimes there are two, and ſometimes three. When there are three, or more, they take up the whole ſhield. It is ſometime borne flory, or counter-flory, or like the treſſure.

The form of the *orle* is the ſame with that of the ſhield; whence it reſembles an ineſcutcheon: as repreſented in *Tab.* II. *Heraldry*, *fig.* 74.

If a round of martlets, cinqueſoils, &c. be placed about any ordinary, in manner of an *orle*, they are ſaid to be *en orle*, or *orle-wiſe*.

ORLEANA, in the *Materia Medica*, the name of the ARNOTTO, or ROUCOU.

ORLOPE, or ORLOP, in the *Sea-language*, a platform of planks laid over the beams in the hold of a ſhip of war, whereon the cables are uſually coiled, and the ſeveral officers ſtore-rooms contained. It is alſo uſed for the uppermoſt ſpace or deck in a great ſhip, from the main-maſt to the mizen.

In three-decked ſhips, the ſecond and loweſt decks are ſometimes alſo called *orlopes*. See *Tab. Ship. fig.* 2. *lit.* I, E, F.

ORNAMENTS, in *Architecture*, expreſs all the ſculpture, or carved work, wherewith a piece of architecture is enriched.

ORNAMENTS *in relievo* are thoſe carved on the contours of mouldings: as leaves, ſhells, ſcrolls, flowers, &c. See RELIEVO.

ORNAMENTS *in creux* are thoſe cut within the mouldings; as eggs, flutes, &c. See CREUX.

Vitruvius and Vignola alſo uſe the word *ornament* to ſignify the entablature.

ORNAMENTS, *diſtribution of*. See DISTRIBUTION.

ORNICUS *lapis*, a name given by ſome authors to the *ſapphire* of the ancients, which is a peculiar ſpecies of our *lapis lazuli*, in which the gold-coloured matter is not diſpoſed in veins, but in ſeparate ſpots of the form of a ſtar. It was firſt called *oriniſcus*, and *orinus*, by corruption from *aurinus*, *golden*; and thence came, at length, the word *ornicus*.

ORNITHIÆ, a name given by the ancients to certain winds, which uſually blew in ſpring, at the time when the birds of paſſage came over to them. Pliny ſays, that theſe winds blew from the weſt, and that, by ſome, the Eteſian winds were called by this name. Others ſuppoſe that they blew from the north, or north-weſt.

ORNITHOGALUM, in *Botany*. See STAR *of Bethlehem*.

ORNITHOLOGY, formed from ορνις, *bird*, and λογος, *diſcourſe*, that branch of natural hiſtory which conſiders and deſcribes BIRDS, their natures and kinds, their form, external and internal; and teaches their œconomy and uſes.

Linnæus arranges the whole claſs of birds under ſix orders, according to the different figures of their beaks; viz. 1. The *accipitres*, or birds with uncinated or hooked beaks. This order comprehends four genera, and ſeventy-eight ſpecies.

2. The *picæ*, or birds that have convex and compreſſed beaks, containing twenty-two genera, and two hundred and forty-three ſpecies.

3. The *anſeres*, comprehending ſuch birds as have depreſſed and dentated, or ſerrated beaks, comprehending twelve genera, and a hundred and ſix ſpecies.

4. The *grallæ*, or thoſe furniſhed with ſubcylindric and obtuſe beaks, including eighteen genera, and a hundred and twenty-ſeven ſpecies.

5. The *gallinæ*, or birds which have the beak of a convex form but crooked, and the upper chap imbricated, comprehending ſeven genera, and thirty-nine ſpecies.

6. The *paſſeres*, or birds with conic and ſharp-pointed beaks, including fifteen genera, and three hundred and thirty-ſeven ſpecies.

In the deſcription of birds, beſides the beak, BILL, or ROSTRUM, noſtrils, and tongue, the feet, wings, and tail, are chiefly attended to. In moſt birds the toes are four in number; three ſtanding forwards, and one backwards; in ſome two toes ſtand forward, and two backward; ſome feet, again, are palmated, or have the toes connected together by a membrane.

With regard to the wings, the long quill-feathers are called by authors *remiges*, as ſerving to fly with; and the other feathers, placed over the reſt of the body, *tectrices*. The long feathers of the tail are called *rectrices*, as ſerving to ſteer the bird's courſe through the air.

As to the other terms made uſe of in the deſcription of birds, they are theſe: *cera* expreſſes the membrane or naked tunic, which ſurrounds and extends itſelf over more or leſs of the baſe of the beak; *uropigium* is the rump; *capiſtrum* is the front, or fore-part of the head; *vertex*, the ſummit or crown; *nucha*, or nape, the hindpart, with the next joint of the neck; *lora*, or ſtraps, the ſpace between the bill and the eyes; *genæ*, or cheeks, the ſpace beneath the eyes; the *orbitæ*, or eyelids, which in ſome birds are naked, in others covered with ſhort ſoft feathers; the *ſupercilia*, which in the grous kind denote a ſcarlet naked ſkin above the eyes; and the term is alſo applied to any line of a different colour that paſſes from the bill over the eyes; but birds have no eye-brows, nor external ears, the ſound being admitted through an orifice, which is open in all but owls, whoſe ears are furniſhed with valves: and as to other terms, they will be found explained under their ſeveral heads. See FEATHERS, NECK, WINGS, &c.

We have an excellent *Ornithology* of Fr. Willughby, eſq. and another of Mr. Ray, a poſthumous work, which is chiefly an abridgment of the former, with the addition of his *ichthyology*; and ſeveral kinds wanting in the other. Willughby, herein, ſpeaks with aſſurance of a ſwan that lived three hundred years; and a gooſe that they were obliged to kill at eighty, on account of its miſchievouſneſs.

Mr. Pennant's Genera of Birds, is an uſeful introduction to the ſcience of *ornithology*. In this work, publiſhed in 1781, the author, diſtinguiſhed by his extenſive and accurate acquaintance with this and other parts of zoology, arranges birds into two general diviſions: the firſt, or that of land birds, comprehends ſix orders; viz. the rapacious, or *accipitres* of Linnæus; the *pies*, or *picæ*, of the ſame author; the *gallinaceous*, or *gallinæ*; the *columbine* and the *paſſerine*, which two orders include the *paſſeres* of Linnæus; and the *ſtruthious*, or *gallinæ*, and *geallæ*, of Linnæus. The ſecond diviſion, or that of water-fowl, includes three orders; viz. the clovenfooted, or waders, to which ſome of the *grallæ* of Linnæus are reduced; the pinnated feet, and the web-footed, comprehending ſeveral genera of the *gralle* and *anſeres* of the ſame writer.

The ſyſtem of Mr. Ray, compoſed in 1667, and publiſhed in 1678, founded on an arrangement firſt ſuggeſted by Belon of Mons, in France, in a work publiſhed in 1555, is preferred by Mr. Pennant to every other.

ORNITHOMANCY, a kind of divination, or method of arriving at the knowledge of futurity by means of birds.

ORNITHOMANCY, amongſt the Greeks, was the ſame with AUGURY among the Romans.

ORNITHOPODIUM, or ORNITHOPUS, in *Botany*. See BIRD'*s foot*.

ORNITHOSCOPI, ορνιθο,κοποι, in *Antiquity*, diviners, or ſoothſayers, who made predictions, and drew omens, from birds. They were likewiſe called *ornithomantes*, and *orneoſcopi*, &c.

ORNUS *fraxinus* is that ſpecies of the ASH-*tree* in the Linnæan ſyſtem, which, according to Dr. Cirillo of Naples, produces the MANNA. It is the aſh-tree; whoſe ſmaller leaves are ſawed, with flowers having petals. In order to obtain the manna, thoſe whoſe buſineſs it is, in July and Auguſt make an oblong inciſion, and take off from the bark of the tree about three inches in length, and two in breadth; they leave the wound open, and by degrees the manna runs out, and is almoſt ſuddenly thickened to its proper-conſiſtence, and is found adhering to the bark of the tree. This is collected in baſkets, and called *mana graſſa*. When they want fine manna, they apply to the inciſion of the bark thin ſtraw or ſmall bits of ſhrubs, ſo that the manna in coming out runs upon theſe bodies, and is collected in a ſort of regular tubes, which give it the name of *manna in cannoli*. Phil. Tranſ. vol. lx. art. 22.

OROBANCHE, in *Botany*. See *Broom* RAPE.

OROBO, a name given by the chemiſts to any ſort of metallic glaſs.

OROBOIDES, a name given by Hippocrates, and other authors, to a furfuraceous ſediment in the urine of perſons who have the jaundice: it is uſually of a reddiſh brown colour; and is not peculiar to that diſeaſe, but is found in ſome others.

OROBUS, in *Botany*. See *Bitter* VETCH.

OROCONITES, in the *Materia Medica*, a name given by Hippocrates, and others, to a bulbous root that is recommended as a rich food. It has the name from the Greek *ορος, a mountain*, and *κονιτες, of a conic figure*. This ſhews that it was a root of ſuch a ſhape, found growing in mountainous places; but the learned have been puzzled in their attempts to find out what it was.

ORONTIUM, in *Botany*, a name given by ſome authors to the *antirrhinum*, called in Engliſh *calf's ſnout*, or *ſnapdragon*.

ORONTIUM, or *floating arum*, in the Linnæan *Syſtem*, is a genus of the *hexandria monogynia* claſs. Its characters are, that the ſpadix is cylindric, and covered with little flowers; the corolla has ſix naked petals; there is no ſtyle, and the huſks contain ſingle ſeeds. There is only one ſpecies.

OROSMADES, a deity among the Perſians, which is deemed the principle, or author of good, in the ſyſtem of Zoroaſter, revived by the Manichees. *Oroſmades* produced the good ſpirits and the ſtars, and encloſed them in an egg, which was broken by Arimanius; whence proceeded confuſion, and a mixture of good and evil. But after many conflicts the good deity totally vanquiſhes the evil one.

OROSPIRA, in *Ornithology*, a name by which the ancient naturaliſts called the BRAMBLING, or *mountain-finch*.

The word is Greek, and expreſſes *mountain-chaffinch*. See MONTIFRINGILLA.

ORPELLO, a preparation of braſs uſed in the glaſs trade, and prepared in this manner: cut plates of braſs into ſmall pieces, and place them in a luted crucible in a ſtrong fire, but not ſo violent as to melt it. Let it ſtand in this manner for four days, in which time it will be well calcined; when cold, powder and ſift it, and finally grind it on a porphyry. This will be a black powder; ſpread this on tiles, which place on burning coals in the leer, near the hole, for four days; take off the aſhes that may fall into it, and finally powder and ſift it fine for uſe. It is known to be nicely prepared, when, on mixing with the melted metal in the glaſs furnace, it makes it ſwell and boil.

The colour it gives is a very elegant ſky-colour, and a ſea-green, or a mixt colour, between them, according to the quantity and degree of calcination. Neri's Art of Glaſs, p. 35.

ORPHAN, a child, or minor, deſtitute of father; or that has neither father nor mother.

Hence the Taborites, or followers of Ziſca, finding themſelves, at his death, without chief or conductor, took the appellation of *orphans*.

Among the Athenians, the *orphans* whoſe fathers had loſt their lives in the ſervice of their country, were under the guardianſhip of the POLEMARCHUS, who was to provide them with a competent maintenance out of the public treaſury.

In the city of London there is a court of record eſtabliſhed for the care and government of *orphans*. The lord-mayor and aldermen of London have the cuſtody of *orphans* under age, and unmarried, of freemen that die; and the keeping of all their lands and goods; and if they commit the cuſtody of an *orphan* to any man, he ſhall have a writ of *raviſhment of ward*, if the *orphan* be taken away; or the mayor and aldermen may impriſon the offender, until he produces the infant. If any one, without the conſent of the court of aldermen, marries ſuch an *orphan* under the age of twenty-one years, though out of the city, they may fine and impriſon him until paid.

Executors and adminiſtrators of freemen dying, are to exhibit true inventories of their eſtates before the lord-mayor and aldermen in the court of *orphans*, and give ſecurity to the chamberlain of London and his ſucceſſors, by recognizance, for the *orphan's* part; which if they refuſe to do, they may be committed to priſon until they obey.

The lord mayor and commonalty of London being anſwerable for the *orphans* money paid into the chamber of the city, and by ſome accidents become indebted to the *orphans* and their creditors, in a greater ſum than they could pay; it was enacted by 5 & 6 W. & M. cap. 10. that the lands, markets, fairs, &c. belonging to the city of London, ſhall be chargeable for raiſing 8000*l.* to be appropriated for a perpetual fund for *orphans*; and towards raiſing ſuch a fund, the mayor and commonalty may aſſeſs 2000*l.* yearly upon the perſonal eſtates of the inhabitants of the city, and levy the ſame by diſtreſs. A duty is alſo granted of 4*s.* per ton on wines imported, and on coals; and every apprentice ſhall pay 2*s.* 6*d.* when he is bound, and 5*s.* when he is admitted a freeman, for raiſing the fund, which is to be applied for payment of the debts due to *orphans*, by intereſt, after the rate of 4 *per cent.*

By the cuſtom of London, the ſhare of the children, or *orphanage* part, is not fully veſted in them till the age of twenty-one, before which they cannot diſpoſe of it by teſtament; and if they die under that age, whether ſole or married, their ſhares ſhall ſurvive to the other children; but after the age of twenty-one, it is free from any *orphanage* cuſtom, and, in caſe of inteſtacy, ſhall fall under the ſtatute of diſtributions.

ORPHANUS, in *Natural Hiſtory*, a name given by ſome authors to a poor ſpecies of *opal*, called by ſome *pſeudo-opalus*: it has no other colours beſide a milky white, and purpliſh red. This ſtone is frequent in Germany, and Hungary.

ORPHEOTELISTÆ, Ορφεοτελισται, in *Antiquity*, perſons initiated in the Orphic myſteries. They aſſured all that were admitted into their ſociety of certain felicity after death; which when Philip, one of that order, boaſted of, Leotychidas, the Spartan, replied, "Why do not "you die then, you fool, and put an end to your miſ"fortunes, together with your life?" At their initiation, little elſe was required of them beſides an oath of ſecrecy.

ORPHEUS, in the *Ancient Mythology*, was the ſon of Oeagrus, king of Thrace, and of the Muſe Calliope. He excelled in poetry, and eſpecially in muſic, to ſuch a degree, that he is repreſented as taming the moſt ferocious animals, changing the courſe of the winds by his melody, and as cauſing the trees of the foreſt to dance in concert with his lyre. In the character of *Orpheus*, according to the account that is recorded concerning him, were comprehended not only the ſciences of muſic and poetry, but thoſe alſo of moral philoſophy, legiſlature, and theology. Diodorus Siculus, lib. iv. cap. 25. ſays of him, that he was a man who diligently applied himſelf to literature, and having learned the mythical part of theology, travelled into Egypt, where he attained to farther knowledge, and became the greateſt of all the Greeks in the myſterious rites of religion, theological ſkill, and poetry. To which Pauſanias, lib. ix. p. 586. adds, that he gained great authority, as being believed to have found out expiations for wicked actions, remedies for diſeaſes, and appeaſements of the divine diſpleaſure. The general tradition of the Greeks derived the Thracian religious rites and myſteries from *Orpheus*; and Suidas expreſly declares, it is commonly ſaid, that *Orpheus* the Thracian was the firſt inventor of the religious myſteries of the Greeks, and that religion was called Θρησκεια, *Threſkeia*, as being a Thracian invention. Some, however, have doubted, from what Cicero ſays, *Orpheum poetam docet Ariſtoteles nunquam fuiſſe*; *Ariſtotle teacheth, that there never was ſuch a man as* Orpheus *the poet*, whether there ever exiſted ſuch a perſon. But Dr. Cudworth has ſhewn, from the general teſtimony of ancient writers, that there was ſuch a perſon, who is commonly ſuppoſed to have lived before the Trojan war, (that is, in the time of the Iſraelitiſh judges) or at leaſt to have been ſenior both to Heſiod and Homer, and alſo to have died a violent death; moſt writers affirming that he was torn in pieces by women, becauſe their huſbands deſerted them, in order to follow him. The ſame learned writer has alſo inquired into the ſuſpected authenticity of the poems aſcribed to *Orpheus*; and he inclines to the opinion, that they were either written by him, or that they were very ancient, and contained his doctrine and opinions. He farther argues, that though *Orpheus* was a polytheiſt, and aſſerted a multiplicity of gods, he nevertheleſs acknowledged one ſupreme, unmade deity, as the original of all things; and that the Pythagoreans and Platoniſts not only had *Orpheus* in great eſteem, being commonly called by them the *Theologer*, but were alſo thought in great meaſure to have owed their theology and philoſophy to him, deriving it from his principles and traditions. Cudworth's Intellectual Syſtem, book i. chap. 4. § 17. p. 294, &c. ed. 2. by Birch.

Orpheus, in *Ichthyology*, the name of a fiſh caught in the Archipelago. It is of a broad and flat figure, and of a fine purple colour; its eyes are large and prominent, and its teeth ſerrated; it has only one fin on the back, and the anterior rays of that are prickly, and others ſoft to the touch; its anus is ſmall, and is ſaid to have no paſſage for the ſemen.

This was the fiſh called *orpheus* by the ancients, but the modern Greeks call another fiſh by that name. It is a ſpecies of the ſparus, of a flat figure, but very thick, has a ſmall mouth, and is covered with ſmall, but very rough ſcales, which adhere very firmly to the fleſh; the tail is not forked; it has fleſhy lips, and very ſmall teeth; its back and ſides are black; its belly white; it has a large black ſpot at the root of the tail; its head is reddiſh, and its fins are very elegantly diverſified with various colours; it has only one back-fin, and that has the anterior ray prickly, the hinder ones not at all ſo. It grows ſometimes to twenty pounds weight, and is much eſteemed among the modern Greeks.

ORPIMENT, *auripigmentum*, a bituminous mineral, uſually found in copper mines, and ſuppoſed to contain particles of gold, which may be extracted by chemiſtry, but which were never found to countervail the expence.

Orpiment is found in lumps of ſeveral ſizes and figures; its colour is always yellow, intermixed with ſhades of other colours; as green, red, orange, &c.

Sometimes it is found almoſt quite red; which is the proper ſandaracha of the ancients.

But that uſually called *red orpiment*, or *red arſenic*, is only the yellow *orpiment* heated to a great degree, in a crucible, with oil of hemp-ſeeds, olives, or nuts.

Painters, farriers, &c. make a great conſumption of this mineral; but as it is found a violent corroſive, and is even reputed a poiſon, it muſt be uſed with a great deal of caution.

Orpiment muſt be choſen of a yellow golden hue, eaſy to ſcale, and the ſcales very thin, ſmall, and ſhining like gold.

Some authors injudiciouſly diſtinguiſh *orpiment* into three kinds: white, which is the ſame with arſenic, and not properly any ſpecies of *orpiment*; *yellow*, which is the proper *orpiment*; and *red*, which is ſandarach, or REALGAR.

The Indians uſe *orpiment*, corrected with juice of lemons, with good ſucceſs, againſt fevers.

Orpiments are inflammable foſſile ſubſtances, compoſed of numbers of thin flakes, like the talcs, which eaſily ſplit, and are ſeparated from one another, and are flexile and not elaſtic, ſoluble in oil, fuſible in a moderate fire, and yielding in burning an offenſive ſmell like that of garlic.

Theſe, like the talcs, are, in ſome of the ſpines, compoſed of large plates, or flakes, each making the whole ſurface of the maſs, and, in others, of ſmall flakes lodged in extraneous matter, or cohering alone into a maſs in form of ſpangles.

Of this genus of foſſils, there are only three known ſpecies. 1. A broad flaked, gold-coloured kind, well known among the ancients, as is plain from the deſcription of it left us by Dioſcorides, and much eſteemed at preſent by our painters. This is found in ſeveral places, as in the iſlands of the Archipelago, in the mines of Goſſelaer, in Saxony, in ſome parts of Turkey, and the Eaſt Indies, and in its utmoſt purity about Smyrna; this makes the fineſt of all yellows in painting. 2. The ſmall-flaked, yellow kind, which is the common *orpiment* of the ſhops, and is a fine colour, though greatly inferior to the former. This is found in many parts of the Turkiſh dominions, and in Germany. And, 3. Red *orpiments*. This has been a name given by the more judicious to ſandarach, and, by the vulgar, to red arſenic, but is to be reſtrained only to this foſſile, which is of a fine bright red, and of the regular texture of the *orpiments*, and anſwering all their characters. This is a very beautiful ſubſtance of a fine bright red, very gloſſy, and a little tranſparent, and is found in the Turkiſh dominions, in the iſlands of the Archipelago, and even in our own country, Dr. Hill having received ſome of it from Cornwall, under the name of red mundic.

The Engliſh druggiſts are guilty of an unpardonable piece of ignorance, in that, in general, they know no difference between yellow *orpiment*, and the yellow factitious arſenic, which they regularly ſell under its name: the *orpiment* is known to be a ſafe internal medicine, and the thing they ſell under its name is a very terrible poiſon. The colour-men, however, who ſell both, are well acquainted with the difference. Hill's Hiſt. of Foſſils, p. 294.

ORPINE, in *Botany*, a ſpecies of HOUSELEEK.

The common *orpine* grows naturally in woods and ſhady places in many parts of England. Of this there are two varieties, the one with white, and the other with purple flowers; it has a perennial root, compoſed of many glandulous knobs, from which come out round ſucculent ſtalks, two feet high, garniſhed with fleſhy keel-ſhaped leaves, a little ſawed. The ſtalk is terminated by a corymbus of flowers, which are ſtar-pointed.

The ſtalks of the common *orpine* are frequently cut in ſummer, and fixed in lathes framed together, as ſcreens for fire-places in rooms. Theſe ſtalks will ſhoot all over the frames; and if the frames are taken out once a week, and watered, they will continue in verdure for two months.

The leaves of *orpine* are accounted vulnerary and aſtringent; being chiefly uſed for eroſions of the inteſtines in a dyſentery.

Orpine, *baſtard*, *andrachne*, in *Botany*, a genus of the *monoecia gynandria* claſs. Its characters are theſe: there are male and female flowers on the ſame plant; the male flower hath a five-leaved empalement, hath five ſlender petals, and five ſlender ſtamina; the female flowers come out from the wings of the ſtalk near the male; theſe have a five-leaved empalement, but no petals; there are three ſlender ſtyles, which are inſerted in the rudiment, and a globular capſule, having three cells, in each of which are lodged two triangular obtuſe ſeeds. We have but one ſpecies.

This is a low plant, whoſe branches trail on the ground; the leaves are ſmall, of an oval ſhape, ſmooth, and of a ſea-green colour. It is found wild in ſome parts of Italy, and in the Archipelago; and being a plant of no great beauty, it is ſeldom cultivated but in botanical gardens.

Orpine, *leſſer*. See Crassula.

ORRACH, in *Botany*. See Orach.

ORRERY, an aſtronomical inſtrument, or rather machine for repreſenting the motions and various appearances of the ſun and planets; and hence, with greater propriety, called PLANETARIUM.

The reaſon of its being called an *Orrery*, was this: Mr. Rowley, a mathematical inſtrument-maker, having got one from Mr. George Graham, the original inventor, to be ſent abroad with ſome of his own inſtruments, he copied it, and made the firſt for the earl of *Orrery*. Sir Richard Steel, who knew nothing of Mr. Graham's machine, thinking to do juſtice to the firſt encourager, as well as to the inventor, of ſuch a curious inſtrument, called it an *Orrery*, and gave Mr. Rowley the praiſe due to Mr. Graham. Deſaguliers, Experiment. Phil. vol. i. p. 430.

Since that time *Orreries* have been much in vogue, and executed in the moſt ornamental manner.

ORRHAGOGA, formed of ορος, *ſerum*, and αγω, *I draw away*, a name given by the ancients to ſuch medicines as operated violently, as purges, and evacuated ſerous and watery humours.

ORRHOPHIGION, a word uſed by anatomical authors, ſometimes to expreſs the extremity of the ſpine, but more frequently the line or ſeam which runs from the penis along the middle of the ſcrotum to the anus.

ORRHOPISSA, a name given by the ancients to the thinner or more fluid parts of tar.

ORRICE, a name given by the vulgar to the IRIS-*root*.

ORRUS, in *Botany*, a name by which many of the ancients called the cultivated pine-tree, from its being remarkably full of juice.

The firſt perſon who has given us the name is Theophraſtus; but he is followed in it not only by the other Greeks, but alſo by the Latins, who have called the ſame tree for the ſame reaſon *ſapinus*, a contraction or abbreviation of the word *ſapapinus*, the juicy pine. Pliny tells us, that this laſt was the name of the manured pitch-tree; but in this he errs; for Vitruvius, and others, tell us, that the pine nuts, *nuces pineæ*, which were eaten and uſed in medicine, were the fruit of the *ſapapinus*, or *ſapinus*; and it is evident that theſe muſt be the produce of a pine-tree, not of a pitch-tree, or any thing of the fir kind.

ORTEGIA, in *Botany*, a genus of the *triandria monogynia* claſs. Its characters are, that the flower hath a five-leaved empalement, and no petal; the fruit is a capſule with a ſingle cell, containing many ſeeds. There is only one ſpecies.

ORTEIL, in *Fortification*. See Berme.

ORTHIA, in *Mythology*, the ſurname of DIANA, who had a temple at Lacedæmon.

ORTHOCERATITES, in *Natural Hiſtory*, a name by which ſome late authors have called a ſpecies of ſea-ſhell, found frequently foſſile, but not known at preſent in its recent ſtate; called by others *polythalamium*, and *tubulus marinus concameratus*. It is uſually ſtrait, but ſometimes its end is twiſted like the *cornu ammonis*. See Tubuli *concamerati*, and *Tab.* III. *Foſſils*, *claſs* 9.

ORTHODORON, ορθοδωρον, an ancient Greek long meaſure; being the ſpace from the carpus, or wriſt, to the tips of the fingers, rated at eleven inches.

ORTHODOXI, in *Botany*, ſuch ſyſtematic writers as have formed their methods on the true natural foundation, and divided the plants under their conſideration into claſſes and genera, according to the characters of their parts of fructification. Theſe are either the *univerſales*, or *particulares*; by the firſt are meant, thoſe who have thus ranged the whole vegetable world; and by the latter, thoſe who have undertaken only ſome claſs of plants, as the umbelliferous, &c. See BOTANY.

ORTHODOXY, formed from ορθος, *right*, and δοξα, *opinion*, *judgment*, a ſoundneſs of doctrine or belief, with regard to all the points and articles of faith.

According to the proper etymology of the word, *orthodoxy* denotes what every honeſt man believes his own opinions to be, in contradiſtinction to the opinions of others, which he rejects. In England it is vulgarly reſtricted to ſignify the opinions contained in the Thirty-nine Articles; and in Scotland it is in like manner uſed to denote the doctrines contained in their confeſſion of faith. It is, in general, applied to the opinions that are maintained by thoſe called CALVINISTS.

Orthodoxy is uſed in oppoſition to *heterodoxy*, or HERESY.

ORTHODOXY, or, *Feaſt of* ORTHODOXY, denotes a ſolemn feaſt in the Greek church, inſtituted by the empreſs Theodora; ſtill held on the firſt Sunday in Lent, in memory of the reſtoration of images in churches, which had been taken down by the ICONOCLASTS.

ORTHODROMICS, that part of navigation which teaches the art of ſailing in the arch of ſome great circle.

The word is Greek, ορθοδρομικα, derived from ορθος, *rectus*, *ſtraight*, and δρομος, *curſus*, *run*, or *diſtance*; q. d. the ſtraight or ſhorteſt diſtance; and this can only be in the arch of a great circle.

ORTHOEPY, formed of ορθος, *right*, and επος, *word*, in *Grammar*, denotes the juſt utterance of words. For PRONUNCIATION the beſt rule is, ſays Dr. Johnſon, to conſider thoſe as the moſt elegant ſpeakers who deviate leaſt from the written words.

ORTHOGONIAL, *orthogonius*, in *Geometry*, denotes as much as rectangular, or right-angled.

When the term is referred to a plain figure, it ſuppoſes one leg or ſide to ſtand perpendicular to the other: when ſpoken of ſolids, it ſuppoſes their axis to be perpendicular to the plane of the horizon.

ORTHOGRAPHIC *projection of the ſphere.* See PROJECTION.

ORTHOGRAPHY, formed from ορθος, *right*, and γραφη, *writing*, in *Grammar*, the art of ſpelling; that is, writing words juſtly, and with all the proper and neceſſary letters. Or it is the art of combining letters into ſyllables, and ſyllables into words.

Orthography makes one of the greateſt diviſions or branches of grammar.

That diverſity found in moſt of the modern languages, eſpecially the Engliſh and French, between the pronunciation and *orthography*, makes one of the principal difficulties in acquiring them; yet does it ariſe from the ſame ſource as the languages themſelves.

The Gauls, e. gr. forming a new language from the ancient Latin, took the liberty to model the words to their fancy: at firſt, indeed, it is probable they wrote as they pronounced; but, by degrees, finding that words, pronounced with all their letters, ſounded harſh, they began to pronounce more ſmoothly.

Thus, in ſpeaking, they thought fit to ſoften that harſhneſs reſulting from the concurrence and claſhing of conſonants; but as the *orthography*, or writing, did not offend the ear, it ſtill continued on its former footing.

Attempts have been ſince made to reduce the writing to that pronunciation, or to make us write as we ſpeak; which has occaſioned great diſputes. Pelletier of Mans, was the firſt who pleaded for the change of the *orthography*; and after him Maigret, Peter Ramus, De Bois, Menage, and others; but in vain.

They have, however, occaſioned a ſchiſm among writers, which has done more harm than the evil they intended to reform, the French writers being now divided into two parties; one of which adheres to the *old*, the other to the *new orthography*. The latter, F. Buffier obſerves, is the moſt conſiderable body; yet are theſe divided among themſelves, ſome being for carrying the reformation much farther than others.

The chief matters urged in behalf of the ancient *orthography* are, that by changing it we ſhould loſe ſight of the origin and etymology of words borrowed from the Greek and Latin, &c. That it does not matter what characters are uſed to expreſs ſounds in writing, provided one knows the relation between thoſe characters and the ſounds they repreſent; that by a neceſſary conſequence of ſuch change, the language would, in time, be all altered, and we ſhould loſe the uſe of our old authors; as ours, in their turn, would likewiſe become unintelligible.

What is alledged for the *new orthography* is, its being more commodious, natural, eaſy, ſhort, &c.

Some authors take a middle courſe between the two extremes, retrenching the letters where they are abſolutely uſeleſs, as the *ſ* in a multitude of words; and yet ſtudiouſly retaining all the letters whereon the etymology has any dependence.

In the Engliſh, the *orthography* is more vague and unaſcertained than in any other language we know of. Every author, and almoſt every printer, has his particular ſyſtem; nay, it is ſcarce ſo well with us as that: we not only differ from one another, but there is ſcarce any that conſiſts with himſelf. The ſame word ſhall frequently appear with two or three different faces in the ſame page, not to ſay, line. See ENGLISH.

The ancients, who have written treatiſes of *orthography*, are Velius Longus, Marius Victorinus, Flavius Caper, Caſſiodorus, and Beda. Among the moderns, Torelli, Lipſius, Dauſquius, Scoppa, Valla, and Manutius the Younger, have treated on the ſame ſubject.

ORTHOGRAPHY, in *Geometry*, is the art of drawing, or delineating the fore-right plan or ſide of any object, and of expreſſing the heights or elevations of each part.

It is called *orthography*, from the Greek ορθος, *right*, and γραφη, *deſcription*, from its determining things by perpendicular right lines falling on the geometrical plan; or rather, becauſe all the horizontal lines are here ſtrait and parallel, and not oblique, as in repreſentations of perſpective.

ORTHOGRAPHY, in *Architecture*, is the elevation of a building, ſhewing all the parts thereof in their true proportion. The *orthography* is either *external* or *internal*.

ORTHOGRAPHY, *external*, is a delineation of the outer face or front of a building, exhibiting the principal wall, with its apertures, roof, ornaments, and every thing viſible to an eye placed before the building.

ORTHOGRAPHY, *internal*, called alſo *ſection*, is a delineation, or draught of a building, ſuch as it would appear, were the external wall removed.

ORTHOGRAPHY *of a building, to draw the.* Draw a right line for a baſis or ground-line (*Tab.* III. *Perſpective, fig.* 47.) A B, and at one end erect a perpendicular A D. Upon A B ſet off the widths and diſtances of the gates, windows, &c. In the right line A D ſet off the heights of the ſeveral parts viſible in the face of the building, v. gr. of the doors, windows, the roof, chimneys, &c. and apply a ruler to each point of diviſion.

The common interſections of the right lines drawn from three points, parallel to the lines A B and A D, determine the external *orthography* of the building; and after the ſame manner is the internal *orthography* laid down. See PERSPECTIVE.

ORTHOGRAPHY, in *Fortification*, is the profile, or repreſentation of a work; or a draught ſo conducted, as that the length, breadth, height, and thickneſs, of the ſeveral parts are expreſſed; ſuch as they would appear, if it were perpendicularly cut from top to bottom.

ORTHOPNŒA, ορθοπνοια, compounded of ορθος, *right*, *erect*, and πνεω, *I reſpire*, or *breathe*, in *Medicine*, a great difficulty of reſpiration, wherein the patient is obliged to ſit, or ſtand upright, to be able to breathe.

An *orthopnœa* is a ſpecies or degree of an ASTHMA.

It may be cauſed by pus, thick, or mucilaginous juices, or polypus in the bronchia; mercurial and other fumes hindering the playing of the lungs; ſtoppage of evacuations; cachexies; ill digeſtions; or whatever affords viſcid chyle, or occaſions the blood to run ſlower through the lungs, either by ſtraitening the canals, or thickening the blood, or hindering the motion of the animal ſpirits, ſo that they cannot elevate the breaſt; or that cauſes the blood to be more rareſied, or more in quantity, ſo that there is not ſufficient room to receive it into the veſſels of the lungs.

ORTHRAGORISCUS, in *Ichthyology*, the name uſed by Rondeletius, and ſome other authors, for the fiſh more commonly known by the name of the *mola*, and called in Engliſh the SUN-*fiſh*.

ORTIVE, *ortivus*, in *Aſtronomy*. *Ortive*, or *eaſtern amplitude*, is an arch of the horizon intercepted between the point where a ſtar riſes, and the eaſt point of the horizon, or point where the horizon and equator interſect. See AMPLITUDE.

ORTYGOMETRIA, in *Ornithology*. See DAKER-*hen*.

ORVALA, in *Botany*, the name given by Linnæus to a genus of plants, called *papia* by Micheli. The characters are theſe: the perianthium is compoſed of one leaf; it is tubulated and dilated at the mouth, and is crooked and divided into five ſegments, the lower two being ſhorter than the reſt; the flower is compoſed of one petal, and is not of the labiated kind; the tube is of the length of the cup; the limb is erect, long, and divided into four ſegments; the upper of which is oblong, convex, and falcated, and lunated at the point; the lower is oblong, and is alſo lunated at the point; and the ſide ones are oblong and pointed, and divided each into three ſegments; the ſtamina are four filaments of the length of the flower;

they are placed under the upper ſegments of the flower; the antheræ are two in number; the germen of the piſtil is divided into four; the ſtyle is ſimple, and of the ſame length with the ſtamina; the ſtigma is bifid, and acute; the ſeeds are four, and of an oval kidney-like ſhape. In the laſt edition of the Linnæan ſyſtem, this is a ſpecies of LAMIUM.

ORVALA, in *Botany*, is alſo a name uſed by ſome authors for the *horminum* or *clary*.

ORVIETA, *penitents of*. See PENITENTS.

ORVIETAN, a celebrated antidote, or counter-poiſon; ſo called, becauſe invented, and originally ſold, by an operator from Orvieta, in Italy, who made experiments thereof in his own perſon, on the public ſtage, by taking ſeveral doſes of poiſons.

In Charas's Pharmacopœia is a method of making *Orvietan*; where it appears, that Venice treacle is one of the principal ingredients of it.

ORYCTOGRAPHY, formed of ορυκτος, *foſſil*, and γραφω, *I deſcribe*, is that part of natural hiſtory wherein foſſils are deſcribed.

ORYCTOLOGY, of ορυκτος, *foſſil*, and λογος, *diſcourſe*, is that part of phyſics which treats of foſſils. Under this head comes the doctrine of ſalts, ſulphurs, ſtones, gems, and metals.

ORYGMA, ορυγμα, among the Athenians, a name given to the pit, more uſually called BARATHRUM; whence the public executioner received the appellation of ὁ επὶ τω ορυγματι.

ORYX, in *Zoology*, an animal, mentioned by Ariſtotle and Pliny, with only one horn. Pliny makes it a ſpecies of wild goat; but Columella thinks it was a kind of deer. It is ſaid, that this creature was of great uſe in Africa, to relieve the ſcorched inhabitants from thirſt, there being always found in its body veſicles full of a very wholeſome and pleaſant liquor.

ORYZA, in *Botany*. See RICE.

ORYZEUM, a name given by many of the chemical writers to gold.

OS, in *Anatomy*. See BONE.

Os *Argenteum*, in *Natural Hiſtory*, the name of a ſpecies of ſhell-fiſh, of the round-mouthed, ſnail, or LUNARIS *cochlea* kind. It has a very elegant ſilver colour in the round opening, or mouth of the ſhell.

Os *aureum*, the *golden mouth*, in *Natural Hiſtory*, a name given to a ſpecies of cochleæ of the lunar kind, or of that genus which have a round mouth. This, in the *os aureum*, is of a fine yellow. See LUNARIS *cochlea*.

Os *calcis*, in *Anatomy*. This is the largeſt bone of the foot, of which it makes the poſterior part, and in ſome meaſure the baſis. It is oblong and very irregular, and may be divided into a body and two apophyſes, one great and anterior, the other ſmaller, lateral, and internal. The body of the *os calcis* has ſix ſides; one poſterior, one anterior, one ſuperior, one inferior, and two lateral. The poſterior ſide is broad, unequally convex, and, as it were, divided into two portions, one ſuperior, ſmall, and poliſhed; the other inferior, much larger, unequal, and rough, which, in children, is an apophyſis, and may be termed the *tuberoſity* of the *os calcis*. The lower part of it is bent downward, and terminates in two tubercles or obtuſe points, which belong rather to the inferior than the poſterior ſides of the bone. The upper ſide may be divided into two parts, one poſterior and unequal, having a ſmall depreſſion; the other anterior, convex, and cartilaginous, proportioned to the great inferior cavity of the aſtragalus. This ſide is turned obliquely forward, and by this obliquity becomes part of the foreſide, the remaining part of which is loſt in the anterior apophyſis. The lower ſide is narrow, and behind it lie the two tubercles already mentioned, of which the internal is the biggeſt; they both ſerve for the inſertion of the aponeuroſis in the ſole of the foot, but chiefly the biggeſt. The two lateral ſides are continued over the anterior apophyſes; the external is gently convex and unequal, covered only with the common integuments and ligaments; the internal is hollow and depreſſed. The greater anterior apophyſis lies in the ſame direction with the body, being a continuation thereof. It has five ſides or remarkable parts, and were it not for the body would have a ſixth. The upper ſide has an irregular and unequal depreſſion, which, together with that in the apophyſis of the aſtragalus, forms a conſiderable foſſula; and its anterior extremity has a ſmall cartilaginous ſurface, anſwering to one of thoſe in the apophyſis of the aſtragalus. The anterior ſide of the apophyſis is broad, oblique, cartilaginous, partly convex, and partly concave, and is articulated with a like ſurface of the os cuboides: this is the foreſide of the whole *os calcis*, when conſidered without any diviſion. The outſide of the apophyſis is very rough, being a continuation of the outſide of the body, with a tubercle or eminence of the place where the two ſides meet. This, however, is not found in all ſubjects. On the lower part of this tubercle is a cartilaginous ſurface for the paſſage of the tendon of the *peronæus longus*: ſometimes we ſee only ſome ſmall veſtiges of this eminence, and often none. We ſometimes alſo meet with a cartilaginous ſurface, ſmall, lower down, and more forward near the anterior extremity of the apophyſis, for the paſſage of the ſame tendon. The lower ſide is a tuberoſity continued from the ſide of the body, and deſigned for the inſertion of muſcles. The lateral apophyſis is almoſt common to the body, and to the great anterior apophyſis, and increaſes the cavity on the inſide of the *os calcis*. On its upper part it has a very ſmooth cartilaginous ſurface, articulated with one of the inferior ſurfaces of the aſtragalus. This apophyſis is very low down, and its inferior part is ſmooth for the paſſage of tendons. Winſlow's Anatomy, p. 97, ſeq.

For the cartilages of the *os calcis*, ſee FOOT.

Os *calcis luxated*. It ſometimes happens, that the *os calcis* above, and no other bone of the foot, is diſplaced or luxated by ſome external force; and this happens ſometimes toward the external, ſometimes toward the internal ſide of the foot. When this accident happens, it is eaſily diſcovered by the violent pain it occaſions; and by the inequality of the part, that is, there is a cavity plainly obſervable in one part, and a tumor in the other, on the place. The reduction of this diſlocation is very eaſy. The patient is to be placed on a bed, and while two aſſiſtants extend the limb in the oppoſite directions, the ſurgeon replaces the diſlocated bone with his fingers, and the preſſure of the palm of his hand, and then there is no more than a proper bandage and reſt required to the cure. Heiſter's Sur. p. 174.

Os *carpi*. See WRIST.

Os *magnum carpi*. See MAGNUM.

OSSA *claviculæ*. See CLAVICULÆ.

Os *coccygis*. See COCCYGIS *os*.

Os *cuneiforme*. See SPHENOIDES, and CUNEIFORMIA *oſſa*.

Os *ethmoides*. See ETHMOIDES.

Os *femoris*. See FEMUR.

Os *frontis*. See *Tab. Anat. (Oſteology) fig.* 1. *lit. a*. This is ſituated in the anterior part of the ſkull, and forms that part of the face which is called the forehead, from whence it has its name. Its figure is ſymmetrical, reſembling a large ſhell almoſt round. Though this has always been looked upon as one bone, it is to be obſerved that it is ſometimes found divided into two equal parts by a continuation of the ſagittal ſuture; and this diviſion is equally common to both ſexes. Conſidered as one bone it may be divided into an upper part, which belongs to the crown of the head; a lower part, which belongs to the baſis of the ſkull; an interior part which is the forehead; and two lateral parts, at which the temples begin. Its two ſides are the one external, which is in its greateſt part convex, and forms the forehead; the other internal, which is concave in proportion. On the outſide are obſerved the following eminences: two ſuperciliary arches, which form the upper edge of each orbit, or the ſupercilia; three riſings, not always equally apparent, one between the two arches, and the other two above them, which may be called the knobs of the forehead; five apophyſes, one at the extremity of each arch, one between the orbits, which ſuſtains the oſſa naſi, and which in ſome ſubjects makes a part of the bony ſeptum of the noſe: this laſt may be called the naſal apophyſis, the other four the angular apophyſes. The external cavities are theſe: two orbitary portions, or vaults, forming the upper portions of the orbit; a remarkable depreſſion in each of theſe vaults above the external angle, which contains the lachrymal gland; a ſmall depreſſion above the internal angle, to which is fixed the cartilaginous pulley of the great oblique muſcle of the eye; two portions of the temporal foſſæ; two little criſtæ, which form the anterior extremity of the great ſemicircular plane of the temples on each ſide, at the edge of the ſuperciliary arches, near the external angle; two ſuperciliary foramina, which are ſometimes double, and ſometimes only notches; and, laſtly, two holes, or portions of holes, called the internal orbitary holes.

On the inſide of this bone we ſee a ſharp perpendicular eminence, called the frontal or coronal ſpine, directly oppoſite to the middle riſing on the outſide already mentioned; above the ſpine, a portion of the groove for the longitudinal ſinus, which, when the ſpine is wanting, runs down lower; below the ſpine a conſiderable opening, called the ethmoidal opening, becauſe it contains the os ethmoides; the ſides of this are always more or leſs cellular. Between this opening and the coronal ſpine, a blind opening, which in ſome ſubjects is wholly in the *os frontis*, in others common to that bone and to the os ethmoides, and which ſeems to open into the frontal ſinuſes near the noſe. There are alſo the anterior foſſæ of the baſis of the ſkull, which receive the anterior lobes of the brain, and which, by jutting out forward, form the riſings on the outſide, before taken notice of: toward the lower part they are uneven, anſwering the inequalities of the lobes, and they are alſo a little raiſed, to make room for the orbits; and, finally, ſulci, or furrows for the arteries of the dura mater, and ſometimes other indeterminate depreſſions. Though this bone is in general compoſed of two tables, and a diploe, yet the orbitary vaults are very thin, and without any diploe. About the middle of the lower part of the bone, where the middle riſing is commonly ſituated, the two tables are parted, to form two cavities called the frontal, or ſuperciliary ſinuſes; and the ſeparated portions are here each of them compoſed in ſome meaſure of two tables, or at leaſt have two ſurfaces, which make in all four ſurfaces or tables.

The frontal ſinuſes are extended on the edge of the ſuperciliary on each ſide, more or leſs, all the way to the ſuperciliary perforations; below they are open, and communicate with the cells of the os cribroſum. They are commonly parted by a bony ſeptum, which is often more or leſs uneven; ſometimes alſo it is perforated, and ſometimes part of it, ſometimes the whole is wanting.

In different ſubjects theſe ſinuſes are obſerved to vary extremely both in extent and form; in ſome theſe are very ſmall, and often very irregular, in their diſpoſition cellulous; ſometimes alſo they are entirely wanting, and in ſuch ſubjects the cavity of the noſe is larger than ordinary; one of them does not open into the noſe, but only communicates with the other.

The *os frontis* is articulated by ſuture with ſeven other bones, the oſſa parietalia, os ethmoides, os ſphenoides, oſſa lachrymalia, oſſa naſi, maxillaria, and the oſſa malarum. It contains the anterior lobes of the brain, and a portion of the longitudinal ſinus, and forms the forehead, the upper parts of the orbits, and the portion of the temples. Winſlow's Anatomy, p. 21.

Os *humeri*. See HUMERUS.

Os *hyoides*. See HYOIDES.

Mr. Du Vernoy obſerves, that the right ſide of the *os hyoides* is ſhorter than the left.

Os *ilium*. See ILIUM.

Os *innominatum*. See INNOMINATUM.

Ossa *innominata, cartilages of the*. Theſe are not ſo numerous as might be imagined, on examining the bones in a dried ſkeleton, where we are apt to think we ſee the dried remains of cartilages on the criſta of the os ilium, on the tuberoſity of the os iſchium, and on the grooves and notches which give paſſage to the tendons of muſcles; but none of theſe incruſtations are true cartilages, but for the moſt part tendinous, aponeurotic, or ligamentary, which ſubſtances being dried, look more like cartilages than the true cartilages themſelves in the ſame ſtate. The true cartilages of theſe bones in adults are properly five in number, three of which are common, and two proper. The firſt and principal common cartilage, is that which makes the ſymphyſis of the oſſa pubis. This forms a kind of arch, which is more conſiderable in men than in women; the two others join the oſſa ilium to the os ſacrum, but are thinner than that of the oſſa pubis. The proper cartilages are thoſe which line the cotyloide cavities, in the edge of each of which there is a notch or opening between the anterior or inferior parts, and in the cavity itſelf there is a broad and ſhallow depreſſion, reaching from the notch beyond the middle part of the cavity; all the reſt of the acetabulum is covered with a very white, ſhining, ſmooth cartilage, which terminates preciſely at the edge of the cavity. Winſlow's Anatomy, p. 122. See FEMUR.

Ossa *innominata, ligaments of the*. Theſe are of two kinds, common and proper: the common ligaments are thoſe which go between theſe and the neighbouring bones, of which there are a conſiderable number: one ſuperior, inſerted by one end in the internal labium of the poſterior part of the os ilium; one inferior and anterior, fixed by one end in the inner ſide of the criſta of the os ilium, and by the other in the ſuperior and anterior part of the firſt falſe tranſverſe apophyſes of the os ſacrum. Several inferior and poſterior, fixed by one end along the internal labium of the tuberoſity of the criſta of the os ilium, and by the other in the firſt three falſe tranſverſe apophyſes; and to theſe muſt be added the ligaments by which the os femoris is joined to the *os innominatum*. The principal proper ligaments are four; the two ſacroſciatic, the obturator, and the inguinal, which ſee under their proper heads; but, beſide theſe, there is another ſmall, flat, and very ſtrong ligament, which runs tranſverſely between the two angles of the cotyloide notch, and may be termed the proper, or tranſverſe ligament thereof. The elaſtic border of the cotyloide cavity may likewiſe be reckoned among the ligaments: it is a ſort of additional piece, ſtrongly united to the edge of the cavity, but eaſily yielding any way, on preſſure. The two ligaments by which the os femoris is connected to the *os innominatum*, are alſo inſerted into this bone; one of theſe ligaments ſurrounds the whole articulation, and the other is contained in it: the firſt is called the orbicular ligament, the other, though very improperly, the round ligament: the orbicular is very ſtrong and unequally thick, and ſurrounds the whole convex circumference of the ſupercilium of the cotyloide cavity. The ligament which lies in the joint is not round, but is a flat cord, broad at one end, and narrow at the other, and in ſome degree of a triangular ſhape. Winſlow's Anat. p. 122.

Os *innominatum, fractured*. A fracture of this bone very ſeldom happens; but when it deos, it is readily diſcovered by the injury and ſymptoms in the neighbouring parts, and is the more particularly dangerous, when the patient diſcharges a brown bloody matter. In reſtoring this bone, the patient muſt lie down on his ſound ſide: the bone muſt be replaced with the hands, covered with compreſſes, dipt in ſpirit of wine, and kept on by the ſpica bandages. Afterwards bleeding, with cooling and relaxing medicines, muſt be uſed, and a thin diet obſerved. Heiſter's Surg. p. 126.

Os *iſchii*. See ISCHIUM.

Os *lunare*. See LUNARE *os*.

Ossa *malarum*. See MALARUM *oſſa*.

Ossa *maxillaria*. See MAXILLARY *bones*.

Ossa *metacarpi*. See METACARPUS.

Os *occipitis*. See OCCIPITIS *os*.

Os *orbiculare*. This, in the carpus, is the fourth bone of the firſt row. It has its name from the roundneſs of its figure, and is, for the ſame reaſon, by ſome called *os piſiforme*, and *os lenticulare*; it is, however, not perfectly or regularly round; it has but one cartilaginous ſide, which is irregularly orbicular, the border or circumference of which repreſents a kind of narrow collar. The reſt of the bone is rough, convex, and irregularly round, making more of the four eminences on the concave ſide of the carpus. This bone, and the os cuneiforme, may be ſuppoſed to make a third row, diſtinct from the other two. Winſlow's Anatomy, p. 83.

Ossa, *naſi*. See NOSE.

Ossa, *palati*. See PALATE.

Ossa, *parietalia*. See PARIETALIA *oſſa*.

Os *pectoris*. See STERNUM.

Os *pubis*. See PUBIS.

Os *ſacrum*, in *Anatomy*, the lower extremity of the *ſpina dorſi*; being that part on which we ſit. See. *Tab. Anat. (Oſteol.) fig.* 3. *n.* 15. *fig.* 7. *n.* 20.

It is doubted whence this name ſhould ariſe. Some think it is ſo called, becauſe the ancients offered this part in ſacrifice to the gods; others, becauſe it is very large; and others, again, becauſe it encloſes the natural parts. As this bone is the baſis by which the whole ſpine is ſupported, it has by ſome been called *os baſilare*; its figure comes near to that of a long triangle, with the baſis upward, and apex downward. It is hollow within, and thus contributes in forming the cavity at the bottom of the hypogaſtrum, called the pelvis; its fore-part is ſmooth, by which means the parts contained in it are ſecured from being wounded; and its hinder part is rough, that the muſcles may the better adhere to it. Anatomiſts, in its deſcription, divide it into the upper part, or baſis, the lower as it is ſituated, or apex; two ſides, the anterior or concave, and the poſterior or convex; and two lateral parts or edges. The pieces of which it is compoſed in infants, called falſe vertebræ, are five in number, and are united together by cartilages, which in time almoſt diſappear, leaving only little ridges, or lines, more or leſs prominent in their places. The firſt of theſe is much larger than any of the true vertebræ, but their ſize diminiſhes by very great degrees as they deſcend; ſo that the loweſt, which makes the point of the *os ſacrum*, has ſcarcely the appearance of a vertebra. At the baſis, or upper part of the *os ſacrum*, are two articular apophyſes, anſwering to the inferior ones of the laſt vertebra of the loins. Below each of theſe apophyſes laterally is a large notch, and between them we ſee diſtinctly enough the body of this firſt falſe vertebra, which is like that of the lumbar vertebræ, being very much inclined backward; ſo that the body of this firſt falſe vertebra, as well as that of the laſt true one, is longer before than behind; and from this obliquity it is that the *os ſacrum*, and laſt lumbar vertebra, form, at their connection, a very conſiderable angle. The lateral parts are broad at top, forming on each hand a large, irregular, cartilaginous ſurface, in the figure of a great S, and ſometimes of a bird's head. By theſe two ſides the *os ſacrum* is connected to the oſſa innominata, by a cartilaginous ſymphyſis. Between each of theſe lateral ſides, and the neareſt poſterior holes, there is a large rough depreſſion, and under that another not ſo large. Theſe depreſſions are often pierced by ſeveral holes, which loſe themſelves in the ſubſtance of the bone. Winſlow's Anatomy, p. 60.

It is in the *os ſacrum* that the cavity which contains the ſpinal marrow terminates.

Os *ſacrum, fractured.* When this bone is found to be fractured the fragments are to be reduced into their proper places with the fingers; and if any part of it be depreſſed inwards, a finger dipped in oil or butter, and with the nail cloſe cut off, muſt be introduced up the anus, in order to thruſt the depreſſed fragment into its proper place, to which it is to be directed externally by the other hand. This being performed, a ſticking plaſter is to be applied, and compreſſes dipped in ſpirit of wine over it, to be kept on by the T bandage, or the plaſters may be let alone, and only the compreſs and bandage applied. The patient muſt keep his bed a fortnight, lying on his ſides; or if he will needs ſit up, it muſt be on a chair without a bottom, that the bones may not be diſplaced by touching the ſeat. Heiſter.

Os *ſcaphoides.* See Scaphoides.

Os *ſcapulæ.* See Scapula,

Os *ſepiæ.* See Cuttle-*fiſh-bone.*

Os *ſphenoides.* See Sphenoides.

Ossa *temporum.* See Temples, and *Oſſa* Petrosa.

Os *tincæ.* The ſides of the *os tincæ* have been known to open together in women with child, and have been divided by inciſion, in order to extract the child. See Med. Eſſ. Edinb. vol. iii. art. 19.

Os *trapezium, trapezoides,* and *unciforme.* See the ſeveral articles.

OSBECKIA, in *Botany,* a genus of the *octandria monogynia* claſs. Its characters are, that the empalement of the flower is divided into four ſegments; that the flower has four petals; and that the fruit is a four-celled capſule, ſurrounded with the truncated tube of the empalement. There is only one ſpecies.

OSCHEALIS *hernia,* a term uſed by ſome writers for a hernia of the ſcrotum.

OSCHEOCELE, *οσχεοκηλη,* formed from the Greek *οσχεον, ſcrotum,* and *κηλη, tumor,* in *Medicine,* a kind of hernia wherein the inteſtines or omentum deſcend into the ſcrotum.

OSCHOPHORIA, in *Antiquity,* feaſts inſtituted by Theſeus, in acknowledgment for his having deſtroyed the Minotaur, and by that means freed his country, Athens, from the tribute of ſeven young men, who were to be ſent every year into Crete, to be devoured by that monſter. The word is formed from the Greek *οσχη, branch of a vine laden with, grapes* and *φερω, I bear.* Plutarch ſays, they were ſo named, becauſe inſtituted by Theſeus at his return to Athens, which happened to be at the time of vintage. Some ſay, the *Oſchophoria* were inſtituted in honour of Minerva and Bacchus, who had aſſiſted Theſeus in his enterprize. Others, that they were in honour of Bacchus and Ariadne.

To celebrate the *Oſchophoria,* the young people, who had fathers and mothers alive, ran to the temple of Bacchus, and that of Minerva, with grapes in their hands. He, who arrived there firſt, was the conqueror, and was to perform the ſacrifice, by pouring out of a phial a mixture of wine, honey, cheeſe, flour, and oil.

OSCILLA, in *Antiquity,* ſmall images of wax or clay, made in the ſhape of men or women; which were conſecrated to Saturn, in order to render him propitious.

OSCILLATION, in *Mechanics, vibration;* or the reciprocal aſcent and deſcent of a pendulum.

Oscillation, *axis of,* is a right line, parallel to the apparent horizontal one, and paſſing through the centre; about which the pendulum *oſcillates.*

M. Huygens's whole doctrine of *oſcillation* is founded on this hypotheſis, that the common centre *of gravity* of ſeveral bodies, connected together, muſt return preciſely to the ſame height whence it fell; whether thoſe weights return conjointly, or whether, after their fall, they return ſeparately; each with the velocity it had then acquired.

This ſuppoſition was oppoſed by ſeveral, and very much ſuſpected by others. And ſome, who inclined to believe it true, yet thought it too daring to be admitted into a ſcience, which demonſtrates every thing.

At length M. James Bernouilli demonſtrated it by ſtrict geometry, by referring the weights to a lever; and publiſhed in the Mem. Acad. of Scien. of Paris, for the year 1703. After his death, a more eaſy and natural demonſtration of the centre of *oſcillation* was advanced by his brother, and publiſhed in the Mem. of the ſame Academy, for the year 1714: the ſubſtance whereof may be conceived as follows:

A ſimple pendulum of a determinate length and weight, raiſed to a determinate height, whence it is to fall till it recovers its vertical line, employs in that fall, or demivibration, a determinate ſpace of time, which can never poſſibly be either greater or leſs. Which time is neceſſarily ſuch, becauſe the agitative force, i. e. the force which produces the motion of the pendulum, is determined in every thing that concurs to the formation thereof: ſo that it can only cauſe one certain effect.

The agitative force of the pendulum ariſes from three things: 1. The power or moment of gravity. 2. The maſs or body tied to the end of the inflexible rod. 3. The diſtance of that body from the point of ſuſpenſion, or, which is the ſame, the length of the rod, or the pendulum.

Now, 1. The power of gravity, be the cauſe what it will, is that power, which makes a body fall, and that, v. gr. at the rate of $15\frac{1}{12}$ feet in the firſt ſecond of time. It is viſible, then, that this force is the effect of a quantity, which determines thoſe $15\frac{1}{12}$ feet, and that a heavy body would paſs more or leſs ſpace in the ſame firſt ſecond, if the force of gravity were greater or leſs.

2. As that force is inherent in each point, or infinitely ſmall part of a body, the greater the body is, or the larger its maſs, the greater quantity of motion or force it has.

3. The diſtance of the moving body from the point of ſuſpenſion, or the length of the rod, is always the radius of a circle, whereof the moving body deſcribes an arch; and of conſequence, the greater the radius is, *cæteris paribus,* the larger arch the body deſcribes. And, at the ſame time, the greater height it falls from, the greater velocity it acquires.

Now, the agitative force of the pendulum is only that of the body faſtened to the end of the rod. So that it is the product of the force of the weight of the maſs of that body, and of its diſtance from the point of ſuſpenſion. The force of gravity, therefore, being always the ſame, and a body or weight, faſtened to the end of the rod, always the ſame, it is impoſſible, that two ſimple pendulums, of a different length, ſhould be ſo iſochronal, or ſhould make their vibrations in the ſame time; for by virtue of thoſe different lengths, the velocities will be unequal, and of conſequence, the times of their vibrations will be ſo.

But if it be ſuppoſed, that there are, in nature, different powers of gravity, it will then be poſſible, that two ſimple pendulums, of different lengths, ſhould be iſochronal; the one animated by the natural weight, the other by the imaginary one.

If the imaginary gravity or weight be greater than the natural one, the pendulum, imagined iſochronal to the natural one, will neceſſarily deſcribe a larger ſpace or arch in the ſame time; and of conſequence the weight will be faſtened at a greater diſtance from the point of ſuſpenſion. Though, to have an iſochroniſm, the two agitative forces of the two pendulums muſt be equal; yet, of the three things which compoſe theſe forces, there are always two greater in the imaginary than the real pendulum: the third, therefore, i. e. the maſs or ball, muſt be diminiſhed in the neceſſary proportion.

As the ſpace or arch deſcribed by the imaginary pendulum is greater than that by the natural pendulum, in the ſame ratio as the imaginary gravity is greater than the natural one, and a radius of that arch greater in the ſame ratio, are two things inſeparable; the two gravities will be always to one another, as thoſe two radii, or the two lengths of the two pendulums; which always gives the expreſſion of the imaginary gravity, and, by a neceſſary conſequence, that of a diminiſhed maſs or ball of the imaginary pendulum. If the power of gravity be imagined leſs than that of the natural one, it is eaſy to obſerve how it is to be taken; but that were needleſs in our deſign.

If now there be a compound pendulum, charged with two weights or balls faſtened to the ſame rod, M. Bernouilli conceives each of thoſe weights removed to a greater diſtance from the point of ſuſpenſion than it was before; but both to the ſame; and diminiſhed, in maſs, in a due proportion: ſo as that both together only make one ſimple pendulum, animated with one weight, the expreſſion whereof is had, and iſochronal to the natural compound pendulum.

Thus, we ſhall have one ſimple natural pendulum iſochronal to the compound natural one, by having a ſimple natural pendulum iſochronal to the ſimple imaginary pendulum before found; which is very eaſy: ſince, as the imaginary gravity is ſo the natural, ſo is the length of the ſimple imaginary pendulum to the length of the ſimple natural pendulum; and it is there the centre of *oſcillation* is required.

We ſhould here take notice that Mr. Taylor, a celebrated mathematician of our own country, diſcovered about the ſame time with Mr. John Bernouilli, a ſimilar ſolution of this problem, and publiſhed it in his Methodus Incrementorum. See Pendulum.

Oscillation, *centre of,* in a ſuſpended body, is a certain point therein, each vibration whereof is performed in the ſame manner, as if that point or part alone were ſuſpended at that diſtance from the point of ſuſpenſion.

Or, it is a point, wherein, if the whole length of a compound pendulum be collected, the ſeveral *oſcillations* will be performed in the ſame time as before. See CENTRE *of Oſcillation*.

OSCINES, among the Romans, an appellation given to ſuch birds, from whoſe chattering or notes, omens and predictions were drawn. See ALITES.

OSCITATION, the act popularly called YAWNING.

OSCULA, in *Anatomy*, a term uſed for the orifices, or openings of the larger veſſels.

OSCULATION, in *Geometry*, is uſed for the contact between any given curve and its oſculatory circle; that is, the circle of the ſame curvature, with the given curve. See CURVATURE.

OSCULATORY *circle*, in *Geometry*, is uſed chiefly by foreign mathematicians, for the circle of curvature; that is, the circle having the ſame curvature with any curve at any given point. See CURVATURE.

OSCULATORY *parabola*. See PARABOLA.

OSCULATORY *point*, the point of contact between a curve and its *oſculatory* circle. See CURVATURE.

OSCULUM, in the new analyſis. A circle deſcribed on the point C, as the centre (*Tab. Analyſis, fig.* 12.) with the radius of the evolute M C, is ſaid to *oſculate*, kiſs, the curve deſcribed by evolution in M; which point M is called by the inventor, Huygens, the *oſculum of the curve*. The line M C is called the *radius of the oſculum*.

The evolute B C F is the place of the centres of all the circles that *oſculate* the curve A M, deſcribed by evolution. The doctrine of the *oſcula of curves* is owing to M. Leibnitz who firſt ſhewed the uſe of Huygens's evolute in meaſuring the curvature of curves. See EVOLUTE.

OSCULUM *pacis*. Anciently it was a cuſtom in the church, that, in the celebration of maſs, after the prieſt had conſecrated the water, and ſpoken the words, *Pax Domini vobiſcum*, the people kiſſed each other; which was called *oſculum pacis*.

When this cuſtom was abrogated, another aroſe; and, while the prieſts ſpoke the words, a deacon, or ſubdeacon, offered the people an image to kiſs; which they called *pacem*.

OSIANDRIANS, a ſect among the Lutherans ſo called from Andrew Oſiander, a celebrated German divine.

Their diſtinguiſhing doctrine was, that a man is juſtified formally, not by the faith and apprehenſion of the juſtice of Jeſus Chriſt, or the imputation of our Saviour's juſtice, according to the opinion of Luther and Calvin; but by the eſſential juſtice of God.

OSIANDRIANS, *ſemi*, were ſuch among the *Oſiandrians*, as held the opinion of Luther and Calvin with regard to this life; and that of Oſiander, with regard to the other; aſſerting, that man is juſtified here by imputation; and hereafter by the eſſential juſtice of God.

OSIER, in *Botany*. See WILLOW.

OSIRIS, in *Mythology*, one of the great gods of the Ægyptians, to whom they paid their chief worſhip. *Oſiris* was ſuppoſed to repreſent the ſun, and Iſis the moon.

Some writers in theology have ſuppoſed, that all the other deities of the Egyptians were only attributes of *Oſiris* and ISIS.

OSLEOM *iron*, in the *Wire Works*, a particular ſort of bars of iron wrought on purpoſe for the manufacture of iron-wire. Theſe are ſmall and ſquare, and the firſt thing done with theſe, toward the making them into wire, is, the ſtraining, or drawing them at a furnace to ſmall rods, of the thickneſs of one's little finger; theſe they bow round, and deliver them to the wire-drawers. See WIRE.

OSMERUS, in *Ichthyography*, the name of a genus of fiſh, of the malacopterygious, or ſoft-finned kind: the characters of which are theſe: the branchioſtege membrane contains ſeven or eight bones on each ſide; the back and belly fins are placed at the ſame diſtance from the top of the ſnout; by which it is diſtinguiſhed from the coregoni and ſalmons; the teeth are large, and are placed on the tongue, in the palate, and in the jaws. The ſpecies of *oſmerus*, enumerated by Artedi, are two.

OSMITES, in *Botany*, a genus of the *ſyngeneſia polygamia fruſtranea* claſs: its characters are, that it has a chaffy receptacle; that the down is ſcarce diſcernible; that the corolla conſiſts of ſeveral rays united together; and that the calyx is imbricated, and ſo dry on the margin as to ſound when touched. There are three ſpecies.

OSMOND *royal*, or *flowering fern*, in *Botany*. This is one of the kinds of FERN, which is diſtinguiſhed from the other ſorts by its producing flowers on the top of the leaves, whereas the others, for the moſt part, produce them on the back of their leaves.

There is but one kind of this plant which grows wild in England, but there are ſeveral ſorts of them which grow in America; but as they are ſeldom kept in gardens, it is needleſs to enumerate their ſpecies.

The common ſort grows on bogs in ſeveral parts of England, therefore whoever hath an inclination to tranſplant it into gardens, ſhould place it in a moiſt, ſhady ſituation, otherwiſe it will not thrive. Miller.

Linnæus makes a diſtinct genus of the *oſmunda*, in the claſs of *cryptogamia* ferns: whoſe characters are, that it has a branched ſpike, and that the parts of fructification are globular. He enumerates ſeventeen ſpecies.

OSMONDS, in our *Old Writers*, a kind of iron anciently brought into England. It is mentioned in ſtat. 32 Hen. VIII. cap. 14.

OSNABURGHS, a kind of coarſe linen imported from Germany: of which there are two kinds; the one white, and the other brown. The manufacture of the white is well underſtood in our own country; but the method practiſed in Germany of manufacturing the brown ſort, and of giving it its peculiar colour, is not known. Some have ſuppoſed, that it depends on the manner of bleaching the flax, and others on that of bleaching the yarn after it is ſpun.

OSOSOR, a word uſed by ſome authors as a name for OPIUM.

OSPREY, in *Ornithology*. See BUZZARD and HALIÆTUS.

OSPRION, a word uſed by ſome authors for a bean, which is its proper and determinate ſignification; but by ſome authors it is extended to all ſorts of pulſe.

OSSA, in *Anatomy*. See BONE and OS.

OSSÆI, or OSSENI, a name ſometimes given to the Jewiſh ſect of religion called ESSENIANS.

OSSELET, in the *Manege*, is a very hard excreſcence, reſembling a little bone, on the inſide of the knee (and never on the outſide), appearing to be of the ſame ſubſtance with the reſt of the knee, and only diſtinguiſhable from the knee by its extending a little lower.

OSSERVANZA, in the *Italian Muſic*, is uſed for ſinging or playing with care; that is, executing a piece of muſic juſtly and exactly as it is marked, without adding or diminiſhing.

OSSICLE, OSSICULUM, *little bone*; a diminutive of *os*, *bone*.

In which ſenſe the term is frequently found among anatomiſts.

Boaniſts alſo aſſume *oſſiculum* for the ſtone of a cherry, plum, apricot, or any other ſtone-fruit.

OSSICULA *auditoria*, in *Anatomy*, are four little bones contained in the cavity of the tympanum, or barrel of the EAR, and aſſiſting to the hearing; they are denominated from things they have been ſuppoſed to bear a reſemblance to, the malleus, incus, ſtapes, and os lenticulare, called by others the os *orbiculare*; each of which ſee under their proper heads.

OSSICULA *muſculorum*, in *Ichthyology*, a name given by authors to thoſe oblong and ſlender bones which are ſituated in the fleſh of ſome kinds of fiſh between the muſcles: theſe, in the anterior part, and eſpecially near the head, are of a forked ſhape; but in the hinder part of the body, they are uſually ſimple and ſlender. Theſe ſorts of bones are found in the following kinds of fiſh: 1. In all the cyprini. 2. In the eſoces. 3. In the culpeæ. 4. In the eels. 5. In the coregones. 6. In the oſmerus. 7. In the ſalmon kind. 8. In mackrel. and 9. In the ammodytes or ſand-eel. In the five laſt, theſe bones touch the ſpine at one end, but in the others they no where come near it.

The uſe of theſe looſe bones ſeems to be, to ſtrengthen and ſupport the muſcles, that by this means they may be able the more forcibly to move the body, and turn it about: they are peculiar to fiſh, no land animal having them.

OSSIFICATION, in the *Animal Oeconomy*, the formation of the bones; but more eſpecially the converſion of parts naturally ſoft to the hardneſs and conſiſtency of bones. Bones, Dr. Drake argues, are formed out of the moſt comminute or broken parts of the blood; ſince we ſee, that the blood of old men, which by a long courſe of circulation, becomes, in a manner, unfit for the common office of nutrition, will, however, *oſſify*, and convert into bones, many of the tendons and ligaments, and even the coats of the veſſels themſelves, whoſe ſubſtance, being next to the bones, the moſt compact, admits only of the ſmalleſt particles of the blood; which therefore ſooneſt become *oſſeous*, as they are frequently found.

Dr. Neſbit's opinion of *oſſification* is, that in the blood, or a fluid ſecreted from it, there is an oſſifying juice conſiſting of particles which are not apparent: that when ever nature deſigns an *oſſification* between membranes, or within a cartilage, ſhe occaſions a more than uſual afflux of this fluid; which ſo much diſtends the veſſels which were before inviſible, as to make them capable of receiving the red globules of blood, which is always to be ſeen near to the place where *oſſification* is begun. In this blood, gritty bony particles are to be felt by the point of a knife; which have been formed by the attraction and coheſion of the particles of the oſſifying juice obſtructed, along with the other groſſer fluids in the beginning of the veſſels prepared to receive refluent juices. The blood being capable of forming fine membranes, the membranous parts

parts of a bone, which act as a gluten to keep theſe particles and fibres together, if there be any ſuch, that do not ariſe from the coats of its veſſels, are produced by a coheſion round the cretaceous particles of a part of the fluid, in which they were generated and contained. Thus the membranes of cartilages ſerve as a bed between, or within which the bony particles are depoſited, or ſhoot; but without any intermixture of the particles of the bone and cartilage, or continuation of the fibres of the one ſubſtance to thoſe of the other, as is evident in cartilages containing bones kept long enough in water, and then ſlit; for the bone will, as ſoon as the large veſſels that enter its ſubſtance are divided, ſlip as eaſily, if not eaſier, from it, than an acorn does out of its cup: and there is a ſmoothneſs and poliſh of the parts of both cartilage and bone, which ſhew there is no conjunction of the fibres of the two ſubſtances. While the bones are increaſing within cartilages, the cartilages are extended and ſpread out; by which, with the preſſure which they ſuffer, and the great influx of various fluids, and the nutritious matter being hindered to flow freely into them, they decreaſe continually; and at laſt may truly be ſaid to be entirely deſtroyed. See BONES.

Dr. Buddeus endeavours to prove, that the preternatural *oſſifications*, which are commonly ſaid to be formed in different parts of the body, do not deſerve that name; for that theſe hard ſubſtances have ſcarce any other properties of bone, except whiteneſs and hardneſs.

OSSIFRAGUM, in *Botany*, a name given by Bartholine, and ſome other writers, to a peculiar kind of graſs, growing in ſome parts of Norway. It comes up early in the ſpring, before any other graſs, and the cattle are tempted to eat it: but it emaciates them, and makes them ſickly; their back bones become protuberant if they feed any time on it, and their legs ſo weak that they can hardly go. The remedy among the country people is a very odd one. They collect the bones of different animals, and break them into ſmall pieces. The cattle greedily devour this ſort of food when offered them in this diſeaſe, and there follows a ſort of drivelling at the mouth for a conſiderable time, after which they become well. It is poſſible there may be much error in this ſtory. The kingdom of Norway is full of mines, and the effluvia of theſe may be the occaſion of the cattle's illneſs, and the ceaſing of theſe effluvia their cure; for it is not probable that either of theſe effects ſhould be owing to the graſs or the bones.

OSSIPAGINA, in *Botany*, a name given by Arnobius and ſome other of the old Greek writers to the conſolida major, or greater comfry. It had this name from its ſuppoſed quality of agglutinating broken bones on being taken internally.

The Greek writers have ſometimes called this plant *pecte*.

OSTENSIO, a tax anciently paid by merchants, &c. for leave to ſhew, or expoſe their goods to ſhew and ſale in markets.

OSTENSIVE *demonſtrations*, ſuch as plainly and directly demonſtrate the truth of any propoſition.

In which they ſtand diſtinguiſhed from *apagogical* ones, or reductions *ad abſurdum*, or *ad impoſſibile*, which prove the truth propoſed, by demonſtrating the abſurdity or impoſſibility of the contrary.

Oſtenſive demonſtrations are of two ſorts: ſome barely, but directly, prove the thing to be; which they call οτι. Others demonſtrate the thing from its cauſe, nature, or eſſential properties; and theſe are called in the ſchools διοτι. See DEMONSTRATION.

OSTEOCOLLA, οϛοεκολλα, in *Natural Hiſtory*, a white, or aſh-coloured ſparry ſubſtance, ſhaped like a bone, and by ſome ſuppoſed, without ſufficient reaſon, to have the quality of uniting broken bones; on which account it is ordered in ſome plaſters.

It is found in long, thick, and irregularly-cylindric pieces, which are uſually hollow, but are ſometimes filled up with a marly earth, and ſometimes contain within them the remains of a ſtick, round which the *oſteocolla* had been formed; but though it is plain from thence, that many pieces of *oſteocolla* have been formed by incruſtations round ſticks, yet the greater number are not ſo; but are irregularly tubular, and ſeem formed of a flat cake, rolled up in a cylindric ſhape. The cruſts of which theſe are compoſed do not form regular concentric circles round the internal cavity, as muſt have been the caſe had they been formed by incruſtation, but ſhewing plainly that they were once ſo many thin ſtrata, compoſing a flat ſurface, which has afterwards been rolled up as one might do a paper three or four times doubled, into two, three, or more ſpiral lines; in which caſe, each ſingle edge of the paper would be every where a regular part of a continued ſpiral line drawn from a given point; but they would by no means be ſo many detached concentric circles.

The *oſteocolla* is found of various ſizes, from that of a crow-quill to the thickneſs of a man's arm. It is compoſed of ſand and earth, which may be ſeparated by waſhing the powdered *oſteocolla* with water, and is found, both in digging and in ſeveral brooks, in many parts of Germany, and elſewhere.

Oſteocolla is called *hammoſteus* in many parts of Germany. It has this name in theſe places from the obſervation of its always growing in ſand, never in clay, or any ſolid ſoil, nor even in gravel. Where a piece of it any where appears on the ſurface, they dig down for it and find the branches run ten or twelve feet deep. They uſually run ſtraight down, but ſometimes they are found ſpreading into many parts near the ſurface, as if it were a ſubterraneous tree, whoſe main ſtem began at twelve feet depth, and thence grew up in a branched manner, till met by the open air. The main trunk is uſually of the thickneſs of a man's leg, and the branches that grow out from it are thickeſt near the trunk, and thinner as they ſeparate from it. The thinneſt are about the ſize of a man's finger. The people employed to collect this *oſteocolla*, when they cannot find any mark of it on the ſurface, ſearch after the ſpecks of white or little lumps of whitiſh ſoft matter, which they find lying in different parts on the top of the ſand. Theſe always lead them either to a bed of perfect *oſteocolla*, or to ſome in the formation. If they miſs of the ſubſtance which they ſeek after, they ſtill find the ſubſtance like rotten wood; which, when traced in its courſe, is found to proceed from a main trunk, at the depth of that of the *oſteocolla*, and to ſpread itſelf into branches in the ſame manner. The diggers call this ſubſtance the flower of *oſteocolla*, or *hammoſteus*.

The *oſteocolla* found in the earth is at firſt ſoft and ductile, but in half an hour's time, if expoſed to the air, it becomes as hard as we find it in the ſhops. The method to take up a perfect piece for a ſpecimen is to open the ground, clear away the ſand, and leave it ſo for an hour or thereabouts: in this time it will harden, and may be taken out whole. It is certain, that the *oſteocolla* is produced at this time; for, if a pit be cleared of it, there will more grow there in a year or two, but with this difference, that it will be ſofter and will not harden ſo eaſily in the air as the other.—What the rotten ſubſtance reſembling the decayed branches of trees is, it is not eaſy to ſay, unleſs it really be ſuch: but the opinion of the common people, that it is the root of ſomething, is abſurd; becauſe its thickeſt part always lies at the greateſt depth, and the branches all run upwards. The *oſteocolla* is a marly ſpar, which concretes round this matter; but what it is that determines it to concrete no where on the ſame ground but about theſe branches it is not eaſy to ſay. The rottenneſs of this ſubſtance, which forms the baſis of the *oſteocolla*, renders it very liable to moulder and fall away; and hence it is that we uſually ſee the *oſteocolla* hollow. Sometimes it is found ſolid, but in this caſe there will be found to have been a vegetable matter ſerving as its baſis, and inſtead of one branch, it will be found in this caſe to have concreted about a number of fibres, the remains of which will be found in it on a cloſe examination. Phil. Tranſ. Nº 39.

OSTEOCOLLA-*flower*. See FLOWER.

OSTEOCOLLA-*root*. See ROOT.

OSTEOCOLLON, in *Botany*, a name given by ſome authors to the great comfry.

This name was given by ſome of the old writers to the ſymphytum, or comfry, from an opinion that its agglutinating quality reached to the bone, and that it was of great ſervice taken internally, in caſes of fractures.

OSTEOCOPOS, or OSTOCOPOS, formed from οϛεον, *bone*, and κοπτειν, *to break*, *cut*, or *cleave*, is uſed by ſome for an acute pain, wherein the patient is affected as if his bones were breaking.

It riſes from a ſharp humour vellicating the perioſteum, or membrane, wherewith the bones are inveſted. It is particularly incident to ſcorbutic and pocky perſons.

OSTEOGONY. See OSSIFICATION.

OSTEOLOGY, οϛεολογια, formed from οϛεον, *bone*, and λογος, *diſcourſe*, that part of anatomy which teaches the nature and fabric of the bones of the human body; their form, diſpoſition, articulation, uſe, &c. See *Tab. Anat.* *P.* 1. *Oſteol.*

There are properly two kinds of *oſteology*, one of which is to be learned from bones dried and prepared by boiling, and the other from the bones of a dead ſubject, as they are naturally connected with each other. Both theſe methods are very neceſſary for the practice of phyſic, and for the exact knowledge of the human body. By examining dry bones, however, we can only learn their exterior forms, their ſituation, and the connection which they may have with one another; but when we conſider them as joined together in a dead body, we are in a condition to obſerve many other things in regard to them very uſeful in phyſic: becauſe their connections with one another by cartilages and ligaments, and by the diverſity of articulations, are ſometimes very different in the dry from what you ſee them in the freſh bones; there are, for inſtance, in dry bones, certain cavities which appear to be cotyloide, becauſe they are diveſted of their cartilages; but in freſh bones, they are found to be glenoide, their cavities being filled with cartilages. And, on the other hand, ſome cavities appear to be glenoide in the ſkeleton, which are cotyloide in the body, their cavities being augmented by cartilaginous ſupercilia.

The exterior form and qualities of bones are much better demonſtrated alſo from freſh ſubjects than from prepared bones; becauſe they loſe a great many things in boiling, ſuch as the cartilaginous bodies, the perioſteum, the mucilaginous ſubſtance found between them, and the marrow contained in their cavities; all which may be ſhewn in a freſh body, but cannot be ſeen in a ſkeleton. Riolan. Enchiridion Anatomicum.

Dr. Clopton Havers has given us an *oſteology* in good repute. See BONES.

OSTEOSPERMUM, in *Botany*. See *Hard ſeeded* CHRYSANTHEMUM.

OSTIA, in *Anatomy*, a term uſed indifferently with *oſcula*, *orifices*, &c. for the mouths or apertures of the veſſels of the body; as the *oſtia vaginæ*, &c.

OSTINATO, or *Contrapunto* OSTINATO, in the *Italian Muſic*, is much the ſame with PERFIDIA.

OSTRACION, in the Linnæan ſyſtem of *Ichthyology*, the name of a large genus of fiſh of the claſs of the *amphibia nantes*.

The characters which diſtinguiſh the fiſh of this genus are, that they have no belly-fins, and their ſkin is always hard and often prickly.

The characters of the *oſtracion*, according to Artedi, are theſe: there is no branchioſtege membrane; the figure of the body is particular, being globoſe, or ſpherical, or roundiſh, oval, or oblong and ſquare, or finally conic; the ſkin is very hard, and uſually beſet with rigid and hard ſpines, either on the whole body or on ſome part of it, but in ſome ſpecies it is wholly ſmooth; there are no belly-fins; the number of the others is five; there are two pectoral or lateral fins, two others are on the back, the other at the anus and the tail; the mouth is ſmall; the teeth are large; and the eyes are covered with the common ſkin of the head; there are on each ſide two foramina for the noſtrils, near the eyes; the lips may be drawn back, but in their natural ſtate they cover the greater part of the teeth.

The ſpecies of this genus enumerated by Linnæus are nine.

OSTRACISM, οϛρακισμος, a kind of popular judgment, or condemnation among the Athenians; being a ſentence of baniſhment againſt perſons, whoſe too great power rendered them ſuſpected to the people; or whoſe merit and credit gave umbrage, leſt they ſhould attempt ſomething againſt the public liberty, and their power degenerate into tyranny.

It had the denomination *oſtraciſm*, becauſe the people gave their votes, by writing the name of the perſon to be baniſhed in a ſhell, by the Greeks called οϛρακον, and caſting the ſhells into an urn.

This kind of baniſhment had nothing infamous in it, as not being for a crime; but on the contrary, was held very honourable, as it was a mark of popularity.

It laſted for ten years; but the baniſhed perſon had the full enjoyment of his eſtate all the time.

Oſtraciſm was null, unleſs there were 6000 citizens in the aſſembly of the people, whereby it was decreed.

OSTRACITES, in *Natural Hiſtory*, a name given by authors to the foſſile *oyſters*, common in many parts of England. Theſe are of various ſhapes and kinds; and the name is by ſome authors made to ſignify the ſhell itſelf, when preſerved in its native ſtate and condition; as is the caſe with thoſe found about Woolwich and Blackheath; and by others, the ſtones caſt or formed in thoſe ſhells, or in cavities from whence they have been waſhed away and diſſolved: in both theſe caſes the ſtone carries the exact reſemblance of the ſhell, even in its niceſt lineaments; in the firſt caſe, carrying every mark of the inſide, in the other of the outer ſurface.

We have this ſtone in great plenty in many parts of England; and it is very famous, in ſome places, for its virtues in caſes of the gravel, and the like complaints. See *Tab.* III. *of Foſſils*, *Claſs* 9.

It is to be obſerved that all the foſſile ſhells, and particularly the *lapides Judaici*, or Jew's ſtones, which have been the ſpines of ſea echini, have been eſteemed diuretics, and good in the ſtone and gravel. Among the ancients, Dioſcorides, Pliny, and all the reſt recommend them highly.

Dr. Home, in the Philoſ. Tranſ. ſays, it rather diſſolves the little ſtones than forces them out, as not being remarkably diuretic.

He adds, that he preſcribes it in powder, with a third part of flores chamæmeli.

The doſe is from half a drachm to a whole one, in white wine.

OSTRACITIS is alſo the name of a kind of CADMIA, found at the bottom of furnaces where copper is purified.

It is very heavy, and in ſtructure reſembles an oyſter-ſhell; whence its name.

It is eſteemed aſtringent and deterſive; and is an ingredient in ſeveral unguents.

OSTRACODERMATA, a term uſed by Ariſtotle to expreſs that claſs of ſhells which we call *teſtaceous*, in oppoſition to the cruſtaceous animals or malacoſtraca.—The definition Ariſtotle gives of this claſs of animals is, that they are ſoft within, but hard without; that their ſhells may be bruiſed or broken, but their parts cannot be torn from one another, as they can in the cruſtaceous kind, ſuch as the lobſter; whoſe ſhell covering the legs, body, tail, &c. being ſo many diſtinct pieces of ſhell, and only joined by membranes, may be torn aſunder by pulling till thoſe membranes give way. Philoſ. Tranſ. N° 219. p. 199.

OSTREA, in *Ichthylogy*. See OYSTER.

OSTRICH, *ſtruthio*, in *Ornithology*, according to Linnæus, makes a diſtinct genus of birds of the order of *grallæ*, the characters of which are, that its beak is of a conical ſhape, its noſtrils ovated, its wings unfit for flight, and its feet formed for running. He enumerates three ſpecies. See *Tab.* III. *of Birds*, N° 39.

The camel *oſtrich* is the talleſt of all the bird kind, meaſuring ſeven or eight feet when it ſtands erect; its head is ſimple, or not ornamented with the appendages which are common to moſt birds of this order; its legs are very long and naked; and the ſtructure of the foot, having only two toes, is particular. It often lays fifty eggs in the ſand, which it ſits upon only in the night. The other ſpecies are the CASSOWARY and NHANDUGUACU.

OSTRUCIUM, a name given by the Latin writers of late ages to the plant called ſmyrnium and oluſatrum. Macer calls this plant caulis ſylveſtris, and has given to it the virtues attributed by the ancients to the ſtruthion, ſuppoſing theſe to be the two names of the ſame plant; but this is evinced to be an error by the writings of all the ancient Greeks. Theophraſtus in particular ſays, that the ſtruthion is a prickly or thorny plant. This alone is ſufficient to prove it can have no relation to the *oſtrucium* of the later authors, or Alexanders, which is a ſmooth umbelliferons plant.

This inaccuracy of the writers who collect their accounts from the ancients is ſometimes of bad conſequence; ſince thoſe who are unable to have recourſe to the original authors, are miſled ſo far as to ſuppoſe the virtues of one plant may be found in another.

OSWEGO *tea*, in *Botany*. See MONARDA.

OSYRIS, in *Botany*. See POET'S *caſſia*.

OSYRIS is alſo uſed by ſome authors for the linaria, or *toad*-FLAX.

OTACOUSTIC, formed from ȣς ωτος, *ear*, and ακȣω, *I hear*, a term applied to inſtruments which aid or improve the ſenſe of hearing. See ACOUSTIC.

OTALGIA, ωταλγια, formed from ους ωτος, *ear*, and αλγος, *pain*, in *Medicine*, denotes a pain in the ear, eſpecially that in the fartheſt parts of the auditory paſſage.

The *otalgia* uſually ariſes from an inflammation; though ſometimes from a ſharp ſerous humour, which vellicates the membrane wherewith the canal of the ear is lined. It is ſometimes alſo occaſioned by a wound or ulcer in that part, or by ſome pungent matter gathered within the ear.

The ſmoke of tobacco, conveyed into the ear through a pipe, Etmuller recommends as good to aſſuage this pain; as alſo millepedes in a proper vehicle.

The *otalgia* is ſaid alſo ſometimes to ariſe from a worm in the ear; which is to be drawn out alive, or killed within. Warm milk, they ſay, tempts the worm to come forth; wormwood juice deſtroys it within.

OTAPULLI, in *Botany*, a name given by ſome authors to the tree which produces the *gamboge*, or *gutta gamba* of the ſhops.

OTARDIS. See BUSTARD.

OTENCHYTES, a name given by ſome authors to a ſyringe made for injecting into the ears.

OTHOMAN. See OTTOMAN.

OTHONE, *οθονη & οθονιον*, among the ancients, a kind of linen garment worn by women.

OTHONI, a word uſed by chemical writers for what they otherwiſe call the *mercury of the philoſophers*, or *philoſophic ops.*

OTHONNA, the name given by ſome authors to a ſtone found in Egypt, and deſcribed to be always in ſmall pieces, and of the colour of poliſhed braſs: probably it is ſome ſpecies of the *pyrites.*

OTHONNA, in *Botany.* See RAGWORT.

OTIOSI, in the *Hebrew Cuſtoms.* The learned are exceedingly divided about the *decem otioſi, ten idle perſons*, ſpoken of in the Jewiſh ſynagogues.

Some ſay they were the three preſidents and the ſeven readers; others, that they were ten perſons hired to attend conſtantly at the ſynagogue, becauſe, without the number ten, it could be no regular ſynagogue, or legal aſſembly; ſo that the *decem otioſi* were ten idle folks kept in pay, to form by their preſence a legal ſynagogue or quorum.

Vitringa, in his Archi-Synagoga, refutes this opinion; and will have the *otioſi* to have been ten directors or officers in the ſynagogue.

He ſhews, that each ſynagogue had its directors; that the number was greater or leſs, according to the dignity of the ſynagogue; that the ſmalleſt had at leaſt two; that, from the earlieſt times, each ſynagogue had its chief, called *archi-ſynagogus*, who had two colleagues, to be preſent at the ceremonies, and other acts of religion, and to take care every thing were done with decency; but that the archi-ſynagogus reſerved to himſelf the power of teaching: that, beſides theſe three, the archi-ſynagogus named ſeveral readers, who read in the ſynagogue every Sabbath; and that theſe made the *decem otioſi* of the ſynagogue; ſo called, becauſe, being diſengaged from all other employment, their whole attendance was on divine ſervice.

OTIS. See BUSTARD.

OTITES *digitus*, the *ear-finger*, a name given by authors to the finger next the little one.

OTOMO, in *Ornithology*, the name of a bird of the lagopus kind, called alſo *colmeſtre*, and by the Germans *ſteinhum*, that is *ſtonehen.* It is of the bigneſs of a tame pigeon; its belly and wings are white, with only a very few browniſh feathers; its head, neck, and breaſt are variegated with brown feathers, and the upper part of the neck with black and white; its beak is very ſhort and black, and it has fine red granulated membranes over its eyes; its tail is principally black, but is variegated with brown and white; and its legs and feet are feathered to the ends of the toes.

Mr. Ray is of opinion, that this is the ſame ſpecies of bird with the common white *lagopus*, it being no way different but in colour, and thoſe birds being ſaid to change colour in the ſummer months. It is caught in the mountains of Germany, and is a very delicate bird for the table.

OTTER, *lutra*, in *Zoology*, an animal called by the Greeks, from its loving the water, *ενυδρις, enhydris.* See *Tab.* IV. *of Quadrupeds*, N° 45.

In the Linnæan ſyſtem of zoology, the *lutra* is a ſpecies of the MUSTELA.

The *otter* is ſmaller than the beaver, and has a longer and more ſlender body. Its tail is alſo longer than that of the beaver, and is all over covered with hair; and its legs are very ſhort in proportion to the ſize of its body; but very ſtrong, broad, and muſcular; and the joints are articulated ſo looſely, that the animal is capable of turning them quite back, and bringing them on a line with the body, ſo as to perform the office of fins. The feet have all five toes each, which are naturally expanded, and are connected by a membrane like the toes of a web-footed fowl; and are all ſo equally diſtant, that there is no diſtinction of any in the place of the great toe in other animals. The head and face exactly reſemble the beaver, and the ears are ſmall and placed under the eyes, near the upper jaw, as in the beaver; the neck is ſhort, and equal in thickneſs to the head; the noſe, and corners of the mouth are furniſhed with very long whiſkers; it has thirty-ſix teeth, ſix cutting, and two canine above and below, and five grinders on each ſide in both jaws: the hair is ſhort and of a cheſnut brown, but paler under the belly; and there are two ſmall ſpots of white on each ſide of the noſe, and another under the chin; the tail has ſhorter hair than that of the body, but longer than that of the legs.

The *otter* is ſuppoſed by ſome to be of the caſtor or beaver kind, being like it an amphibious creature, and living both in water and on land; beſide that the reſemblance in point of ſhape is ſuch, as, if his tail were off, he would be in all reſpects like the beaver; differing in nothing but habitation; the beaver frequenting both the ſalt water and the freſh; but the *otter*, as ſome have ſuppoſed, only the freſh; but this is a miſtake, for *otters* have often been ſeen in the ſea, ſwimming and bringing their booty on ſhore.

Though the *otter* lives much in the water, he does not breathe like fiſhes, but after the manner of quadrupeds. He is web-footed, like our water-fowl, and can endure to be under water a long time without reſpiration; and yet in fiſhing he is frequently found to pop up his noſe for breath. He has an admirable ſmell, whereby ſome ſay he will directly wind a fiſh in the water a mile or two off; and is a moſt pernicious beaſt to a fiſh-pond, his dexterity at diving, and hunting under water, being ſuch, that ſcarce any fiſh can eſcape him: if by painful hunting aſhore he cannot fill his belly, he will feed on herbs, ſnails, or frogs, and kill lambs, ſucking pigs, and poultry. It is ſaid, that two *otters* will in concert, hunt the ſalmon: one ſtations itſelf above, and the other below the place where the fiſh lies, and continue chaſing it, till the ſalmon is wearied, and becomes their prey.

The *otter* will ſwim a-fiſhing two miles together, always againſt the ſtream, that when his belly is full the current may carry him down again to his lodging, which is always near the water, and artificially built with boughs, ſprigs, and ſticks, couched together in fine order.

It always makes the entrance of its hole under water; makes upwards towards the ſurface, and forms, before it reaches the top, ſeveral lodges, that in caſe of high floods it may have a retreat; and it contrives to make a ſmall orifice for the admiſſion of air.

The *otter* brings four or five young at a time: and it is obſervable that the male *otters* never make any noiſe when they are taken, but the pregnant females make a moſt ſhrill ſqueal.

The *otter* is capable of being tamed, ſo as to follow his maſter like a dog, and even to fiſh for him, and return with its prey.

The fleſh of this beaſt is rank and fiſhy, as often feeding on ſtinking fiſh: for which reaſon it is not eaten among us: though among the Germans it is a pretty common food; and the Carthuſian friars, who are forbidden to eat all manner of fleſh beſide, are allowed this. Some in England alſo have of late ſaid much in praiſe of *otter* pye.

The ſkin of this animal is very valuable, if killed in the winter, and it is much uſed in cold countries for lining cloaths; but in England it is only uſed for covers for piſtol furniture. The beſt furs of this kind are brought from the northern part of Europe and America. The Indians uſe their ſkin for pouches, and ornament them with bits of horn.

OTTER, *ſea*, or *muſtela lutris* of Linnæus, is ſaid to differ from the common ſort, in being larger, and having a rougher coat, which is very black and gloſſy; beneath this there is a ſoft down. This ſpecies is very harmleſs, affectionate to their young, which they breed once a year, and feed on ſhell-fiſh.

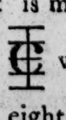
They are hunted for their ſkins, which are of great value; and the fleſh of the young reſembles a ſucking lamb, and is reckoned very delicate meat. They are found in great numbers in the Aleutian, and Fox and Bering's iſlands, between Aſia and America.

There is alſo another ſpecies, the *muſtela lutreola* of Linnæus, which very much reſembles the common *otter* in ſhape and colour, but is thrice as ſmall. It is found in Poland and the north of Europe; and is the ſame animal with the minx of North America. It lives on fiſh, frogs, and water-inſects. Its fur is very valuable, being in beauty next to that of the ſable.

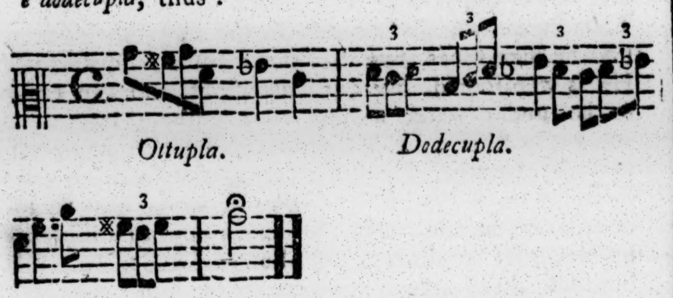
OTTER-*hunting.* See HUNTING.

OTTERPIKE, in *Ichthyology*, the name of a large ſpecies of the *draco marinus*, or *ſea-dragon*, called in Engliſh the *weaver*: it is not much larger than the *weaver*, but is of a great variety of beautiful colours; and, inſtead of the yellow ſide-lines which that fiſh has, this has rows of large black ſpots.

OTTOMAN, or OTHOMAN, an appellation given to the empire of the Turks, or rather to their emperors, from *Othomannus*, or *Oſman*, the firſt prince of the preſent family.

OTTUPLA, in the *Italian Muſic*, ſignifies *octuple*, or the meaſure of four times: it is marked with a ſemi-circle, C; and ſometimes thus:  when it is to be played very quick. In this time, eight quavers are contained in a bar. But it often happens, that ſuddenly, inſtead of two quavers for every time of the bar, three are required;

this is called *dodecupla*. It is enough to place a 3 over three quavers, or notes of equal value, to ſhew that the meaſure muſt be changed; and when this 3 is omitted, it ſufficiently demonſtrates the meaſure to be *ottupla* again: this makes what is called by the Italians *ottupla è dodecupla*, thus:



Corelli, in the laſt movement of his tenth ſonata, opera terza, very often uſes an 8 for the *dodecupla*, to ſhew, that the triple there is changed to common time.

OTUS, in *Ornithology*, the name of the common *horn*-OWL, of the ſmaller kind, in many reſpects different from the great *horn-owl* or *eagle-owl*. It is a moderately large bird; its beak is black. It is common in Italy, and is ſometimes caught in ſome parts in England, and generally fixes its abode in mountainous places.

OVA, *eggs*, in *Natural Hiſtory*. See EGG.

OVA, in the *Human Anatomy*, are little ſpherical bodies, in form of bladders or bubbles; conſiſting each of two concentric membranulæ, replete with a limpid humour, like the white of an egg, found under the external membrane of the ovaries of women, and connected to the minute orifices of the veſicles that compoſe the ſubſtance of the ovaries themſelves, by a calix.

After the uſe of venery, the *ova* ſwell ſenſibly, become more and more pellucid, their membranes grow thicker, and at length raiſe that of the ovary in form of papillæ, till at laſt, breaking the membrane of the ovary, they are detached from their calix, taken into the cavities of the Fallopian tubes, and thence conveyed into the womb; where being cheriſhed and impregnated with the male-ſeed they commence embryos; or for want of that are again ejected.

The ingenious Dr. Kirkring was the firſt who advanced the generation of all animals to be from *ova*, and that even man himſelf is produced out of an egg. The ſyſtem occaſioned great raillery at the time, and the author found himſelf under a neceſſity of publiſhing all his obſervations by way of juſtification. The eggs which he found in the teſticles of all females countenanced his opinion, and he gave figures of the parts in their natural ſituation, and of the eggs which he found in women from the age of eighteen to more than forty, in his different diſſections. Among the other creatures he examined, he found many ſmall eggs in the teſticles of cows, and other creatures of the viviparous kind.

The *ova* in which the lineaments of the fœtus are found after conception, are themſelves formed without ſuch lineaments, not only in married women, but maids who have had no commerce with men at all; and it is the ſame in creatures naturally oviparous. The pullet will even lay her eggs without any intercourſe with the cock, but then they will have none of the lineaments of the young fowl, which are found in the eggs laid after treading.

The eggs found in the teſticles of unmarried women are generally of the ſize of a pea, round, and containing a glutinous liquor, which will harden, on boiling, in the ſame manner as the yolk and white of a common egg. The taſte is rather unpleaſant than inſipid, and they are inveloped in two ſkins, which after they are fallen into the womb become two membranes, called the amnion and chorion, which enlarge as the contents enlarge.

Fallopius obſerved thoſe eggs in women before the time of Kirkring, but it was this author who carried on the conjectures of the other into a ſort of certainty, and added proofs to what he had firſt hinted from a number of experiments; and Wharton, in his account of human generations, is of opinion, that the ſemen penetrates into the teſtes of the female by means of the Fallopian tubes; in which caſe, the impregnation is in this inſtance performed exactly as in others of the oviparous creatures, and the whole difference amounts to no more than this, that in ſome the impregnated matter loſes its figure of the egg before it is excluded the parent; but, in others, it retains it till it is not only put forth out of the body, but hatched by its genial heat afterwards.

The egg being impregnated by the ſemen, admitted this way, deſcends into the womb, and there becomes, in a few days of the bigneſs of a cherry; and afterwards increaſes, as we have already obſerved. This author having an opportunity of opening the body of a woman who had died ſuddenly about four days after the end of one of the menſtrual diſcharges, found in the womb an egg, of the bigneſs of a black cherry: he aſked the huſband carefully, whether he had lain with his wife ſince the time of the menſes; and was informed that he had. This egg was evidently the produce of that impregnation; and though, at the utmoſt, it could be no more than four days old, the fœtus was plainly diſtinguiſhable in it, on an accurate inſpection; and the head in ſome ſort found: the reſt of the body ſeemed an unformed maſs of fleſh. The bones, as they are afterwards to become, are at theſe young periods mere griſtles, and harden by degrees afterwards; but they ſoon acquire that degree of firmneſs, that the fleſh may be taken off, and they may be preſerved as ſkeletons. At about three weeks, from the time of the conception, the fœtus has its cartilages for bones ſo perfect and ſo firm, that with due care in the management of ſo tender an object, the fleſh may be ſeparated, and a ſkeleton preſerved of this ſmall ſize. The head is very large, at this period, in proportion to the body; but what is afterwards to become the ſkull is only a membrane inflated with wind. The arms and hands are ſeen diſtinctly, and even all the fingers are formed. The number of the ribs may be eaſily counted, and the toes are as diſtinct as the fingers; but they are all ſo minute and tender, that a very nice hand, and very great art, are neceſſary for the diſplaying them. After another week, that is when the fœtus is a month old, the bones are ſo well formed, that the whole figure preſerves its form, and is able to ſupport itſelf. The jaw-bones appear; the clavicles are formed; and all the ribs are very fair and diſtinct except the firſt and laſt; and theſe two, even after another month, do not acquire the conſiſtence of bones. At this period of one month, the joints of the arms, and thoſe of the legs, are all very diſtinctly ſeen.

On examining a fœtus at two weeks beyond this period, that is, at ſix weeks from the time of conception, the inferior jaw-bone has in it ſomewhat very remarkable; for it is plainly ſeen to be compoſed of ſix little bones; whereas in the younger periods this is not obſervable; and when the child is born, they are all joined together and make but one bone.

Theſe are the proportions of growth in fœtuſes, which have continued regularly growing till the time of the death of the parent, and have been taken out by diſſection afterwards: much leſs is to be judged from abortions, where the regular proceſs of nature, in the growth and formation of the fœtus is perverted, and the child has, perhaps, been dead ſome months before it is excluded, or has been ſickly, and therefore not capable of taking nouriſhment, and growing as it ſhould have done. For theſe reaſons, it not unfrequently happens, that an abortive fœtus of four months is not larger than one of theſe regular fœtuſes of ſix or eight weeks; nor the parts any thing more advanced in their ſtate and ſolidity, or, if at all, but very imperfectly and irregularly.

Mr. Dennys has added ſome obſervations on this ſyſtem: he agrees, that theſe eggs, in which the rudiments of the fœtus are firſt to be diſcerned, are generated in the teſticles of the female, and made to deſcend thence by the ſpirituous effect of the male-ſemen, making its way thither through the tubes: and adds, that they are of very different forms and ſizes in different women. The ſame woman often has, in her teſticles, eggs of very different ſizes; and as the proportion to their ſtate and different animals, no regard ſeems paid in it to their bulk, ſince not only thoſe of a cow are much ſmaller than thoſe of a woman, but thoſe of a duck, or hen, are vaſtly larger than either. The firſt beginnings of things do not always bear a proportion to their ſtate and increaſe in the animal or vegetable world: beans are a much larger ſeed than that of the apple or pear, though the latter raiſes a large tree, while the former only furniſhes a ſmall plant. The reaſon why the eggs of fowls are proportionably larger than thoſe of the human ſpecies, or of quadrupeds is, that they are to contain not only the young animal, but alſo the food for it to live on the firſt part of its life.

Monſieur Gaulois obſerves, that the veſicles or eggs, in all ſorts of females, are to be obſerved in there ſorts of ſtate or condition: firſt, while they are faſtened to the place where nature lodged them, as in a repoſitory: ſecondly, when they are looſened from the place: and thirdly, when they encloſe the embryo. See GENERATION.

OVA, among the ancients, a kind of verſes, wherein the verſes were reduced to the form of an egg.

OVA, in *Architecture*, are ornaments in form of eggs, carved on the contour of the ovolo, or quarter round;

and ſeparated from each other by anchors or arrows heads. The Engliſh uſually call theſe ornaments *eggs and anchors.* See *Tab. Archit. fig.* 10.

Inſtead of eggs, the ancients ſometimes carved hearts, on which occaſion it was that they introduced arrows, to ſymbolize love.

OVAL *ellipſis*, an oblong curvilinear figure with two unequal diameters; or a figure encloſed with a ſingle curve line, imperfectly round, its length being greater than its breadth, like an egg; whence its name.

The proper *oval* or egg-ſhape, is an irregular figure, being narrower at one end than the other; in which it differs from the ellipſis, which is the mathematical *oval*, and is equally broad at each end.

The common people confound the two together: the geometricians alſo call the *oval*, a *falſe ellipſis*.

The method of deſcribing an *oval* chiefly uſed among workmen is by a cord or ſtring, as E *f* M (*Tab.* III. *Geomet. fig.* 62.) whoſe length is equal to the greater diameter of the *oval*, and which is faſtened, by its extremes, to two points or nails, E, *f*, planted in its longer diameter; by which means the *oval* is made ſo much the longer, as the two points or nails are farther apart.

Oval *column*. See Column.

The ancients have been repreſented as authoriſing this deformed figure for the plan of a column: but this is a miſtake, probably occaſioned by the diſcovery of fragments, where flanked columns have been ſet back to back againſt a ſcreen or wall of nearly the ſame width with the diameters of the columns: theſe remains, defaced by time, might ſuggeſt, to a ſuperficial enquirer, that the column originally had an oval baſe.

Oval *crown*. See Crown.

Oval *leaf*. See Leaf.

OVALE *foramen*, in *Anatomy*. See Foramen *ovale*.

OVARY, *ovarium*, in *Anatomy*, that part of a female animal wherein the ova or eggs are formed and lodged.— See *Tab. Anat. (Splanch.) fig.* 11. *lit. h h.*

The *ovaries* in women are alſo called *teſtes muliebres*, *female teſticles*, from their uſe, which the ancients ſuppoſed analogous to that of the teſticles in men.

They are two in number, lying near the ends of the Fallopian tubes, two fingers diſtance from the uterus, to which they are connected by a ſtrong ligament called *vas deferens*, and in ſome meaſure by the Fallopian tubes, and the broad ligament about the region of the ileum. They are faſtened to the peritonæum by the ſpermatic veſſels; by which means they are kept ſuſpended about the ſame height with the fundus uteri.

Their figure is ſemioval; their ſurface is ſomewhat uneven; their ſize different in different ſtages of life. At the time of puberty, when largeſt, they uſually weigh about a drachm and a half.

They are covered with a common membrane from the peritonæum; their ſubſtance is whitiſh, compoſed of a number of little, thin, membranous, and ſlender fibres, interwoven with arteries, veins, and nerves.

Among theſe fibres and veſſels are interſperſed a number of little round bodies, like bladders, full of a limpid ſubſtance, and called ova or eggs, of great uſe in generation.

Ovary, *dropſy of the*. See Dropsy.

Ovarium *of fiſh*. All fiſh have *ovaria*, but they, as well as the eggs they contain, differ greatly in the different kinds, in number, ſituation, figure, and ſtructure. In the cetaceous, the cartilaginous, and moſt of the other kinds of fiſh, the *ovarium* is double, or there are two *ovaria*; but in ſome fiſh, as in the *oſmarus*, the *perca fluviatilis* of Bellonius, and perhaps in ſome others, it is ſingle. As to its ſituation, it generally occupies the whole length of the abdomen, as in moſt of the ſpinoſe fiſh; and in the petromyzum and accipenſer. In many of the cartilaginous fiſhes it occupies only the upper part of the abdomen; and finally, in the cetaceous fiſhes, it is placed at the corner of the uterus. As to its figure, it is generally oblong and compreſſed, and is ſeen in moſt of the ſpinoſe kinds: in thoſe fiſh which have it ſingle, it is oblong and cylindric, and in cetaceous fiſhes it is round.

The eggs themſelves are alſo very different in number and ſtructure. In regard to number they are in ſome fiſh very few, as in the cetaceous kinds. In the cartilaginous kinds they are ſomewhat more numerous, amounting to fifty or a hundred; and in other kinds of fiſh they are ſo numerous, as to be beyond account. In regard to their ſize and ſtructure they alſo differ conſiderably: in ſome fiſh they are large, and reſemble a hen's egg in their contents; having a white, and yolk, and cicatricula, all diſtinct in them, as in the cartilaginous fiſh of many kinds. In others, as in the cetaceous kinds, they are very ſmall and ſimple, and have no diſtinct appearance either of white, yolk, or of the cicatricula. Hence it is evident, that the fœtus of cetaceous fiſh, while included in the egg, receives its nouriſhment from the womb itſelf; but in the others, as the cartilaginous, and other fiſh, the white of the egg ſerves as nouriſhment to the fœtus while it remains in it.— Finally, in the generality of other fiſh, the eggs are very ſmall, and probably do contain a white and yolk, though their ſize makes it not eaſy to ſee their parts diſtinctly. All the ſpinoſe fiſh have theſe ſmall ſorts of eggs, and among the cartilaginous ones, the accipenſer and petromyzum. It has been ſuppoſed by ſome, that the eggs of theſe fiſh were ſimple bodies, and only anſwered to what Harvey, and other authors on theſe ſubjects, call the *cicatricula*; but this cannot be the caſe, for if ſo, the young fiſh muſt periſh; for the ſemen of the male fiſh is only ſcattered over the eggs while they lie in the water, and ſerves only to the rendering them prolific. The figure of all the eggs of fiſh, ſo far as is yet known, is round.

OVATED *leaf*, among *Botaniſts*. See Leaf.

OVATION, *ovatio*, in the *Roman Hiſtory*, a leſſer triumph allowed to commanders for victories won without the effuſion of much blood; or for the defeating of rebels, ſlaves, pirates, or other unworthy enemies of the republic.

Their entry was on foot; ſometimes on horſeback: but never in a chariot; and they wore crowns of myrtle, called *ovales*; having all the ſenate attending in their retinue.

The denomination *ovatio*, according to Servius, and Plutarch, in his life of Marcellus, is derived from *ovis*, *ſheep*; becauſe the conqueror ſacrificed a ſheep on this occaſion to Jupiter; whereas, in the greater triumph, they ſacrificed a bull.

Others derive it from the ſound or din of the acclamations and ſhouts of joy, made by the people, in honour of the ſolemnity; the people and ſoldiery, on this occaſion, redoubling the letter O, as in the great triumph they did the words, *Io triumphe*.

The *ovation* was firſt introduced in the year of Rome 325, in honour of the conſul Poſthumius Tubertus, after his defeating the Sabines.

OUCH, in our old writers, a collar of gold, or ſuch like ornament, worn by women about their necks. Stat. 24 Hen. VIII. cap. 13.

OVELTY. See Owelty.

OVEN, or *aſſaying* Oven, in *Metallurgy*, is the particular ſort of furnace uſed by the aſſayers in their operations on metals. See *Aſſaying* Furnace, and *Tab.* III. *Chemiſtry*, *fig.* 37.

OVER-*blow*, in the *Sea-Language*. They ſay it *over-blows* when the wind blows ſo very hard that the ſhip can bear no top-ſails.

Over-*board*, in *Sea-Language*, denotes the ſtate of being thrown out of a ſhip or boat into the water on which ſhe ſwims; alſo the act of falling from ſuch a veſſel into the ſea, &c. as the ſhip ſprung a leak, and obliged us to throw the guns *over-board*; or, a heavy ſea broke over the deck, and carried two of our men *over-board*.

Over-*caſt-ſtaff*, is a ſcale or meaſure, uſed by ſhipwrights, to determine the difference between the curves of thoſe timbers which are placed near the greateſt breadth, and thoſe which are ſituated near the extremities of the keel, where the floor riſes and grows narrower.

Over-*done*, in the *Manege*, in French, *outré*. A horſe is ſaid to be *over-done*, or *outré*, when his wind and ſtrength are broke and exhauſted with fatigue.

Over-*flowing*, or *inundation*.

The farmers of England, having long obſerved how great an advantage it was to meadow and paſture land to be ſometimes *over-flowed* by the ſudden riſe of brooks, rivers, or the like, which brings the ſoil of the uplands upon them, and makes them need no other mending or manuring, though conſtantly mowed, have found an artificial method of working the ſame end, and by it producing the ſame good effect in many of their grounds without any ill one. The benefit of the natural *over-flowings* of meadow lands, which lie in the way of floods, is in ſome ſort taken off, by their being ſubject alſo to theſe inundations at improper times; as when a winter flood has cauſed a fine crop of graſs, a ſummer flood ſometimes comes and deſtroys it all before the haymaking ſeaſon.

There are ſome lands ſo advantageouſly ſituated, that with the aſſiſtance of art they may be laid under water or left dry, at the pleaſure of the farmer. Theſe are the moſt valuable of all graſs-lands, and it is upon theſe that the farmer practiſes his artificial *over-flowings*; improving them in winter by letting in the floods to have their ſoil for manure upon them, and keeping them dry in ſummer when the graſs is long.

The artificial *over-flowing* of lands is commonly effected by directing the ſtreams of rivers, brooks, ſprings, or land floods, or ſome part of them, out of their proper channel; but where the ſtreams lie ſo low as to be incapable of *over-flowing* the lands, they are made uſe of to turn ſuch engines as may raiſe a quantity of water ſufficient to do it. The beſt and cheapeſt engine for effecting this, is that called the PERSIAN *wheel*; which may be made of any ſize, according to the height the water is to be raiſed to, and the ſtrength of the ſtream by which it is turned. This wheel is placed ſo, that its bottom only is immerſed in the ſtream; and there are open boxes at its cogs; theſe are all filled one after another with water, which is raiſed with them to the upper part of the wheel's circuit, and then naturally empties itſelf into a trough which carries it to the land.

Where there are no ſtreams to turn this wheel, the farmers have recourſe to pumps, and other engines, moved by wind. Lands that lie near brooks give more frequent opportunities for theſe practices, than thoſe which are near rivers; the brooks having greater falls, and the rivers running more ſlow and level; but when it can be effected by the water of large rivers, the land is yet more enriched by it, theſe waters being more fruitful than the others.

When the water is, by this engine, thrown into the trough, it is to be conducted by it to the higheſt part of the land; and when that is ſufficiently flooded, the water is to be let into a large but not deep trench, ſeveral ſmall ones running out of which to all parts of the land, may convey it every where, and every part may be enriched by it. It is always proper to contrive this matter ſo, that the *over-flowing* may be often repeated, and the water quickly carried off; for when it is ſuffered to lie long upon the land in winter, it is apt to breed ruſhes and other coarſe plants in the ground.

Some farmers graze their lands till Chriſtmas, and ſome longer; but as ſoon as fed bare, from Allhallows till ſpring, that the graſs is not too high, is the propereſt time of *over-flowing*, except that it prove a dry time in April or May. If this happen, *over-flowing* the lands at this time will be of ſingular advantage; for the graſs will grow three times as faſt after it, in hot weather, as it would in cold. Land-floods are the beſt to *over-flow* with in winter, and warm fattening ſprings in ſummer; only it muſt be obſerved, that the water of one operation is dried in before any more is let on. It is always beſt alſo to do it at night, that the moiſture may be ſoaked into the ground before the heat of the day; for otherwiſe the land is often burnt. The waſhings of towns and of public highways is of great improvement to lands, as is alſo the waſhings of lands where ſheep feed.

All waters are not proper for this purpoſe of *over-flowing* of lands to enrich them: the waters of coal mines, and other places where there is any ſulphureous mineral mixed among them, being apt to deſtroy and kill the graſs wherever they come. Theſe waters are eaſily known from the healthful ſpring, by their leaving a reddiſh mud or ſediment behind them wherever they have paſſed; but it is poſſible, that even theſe may have their uſe when properly applied. They ſeem to contain a vaſt quantity of ſalt of ſome kind, and we know that urine, dung, and many other things that are moſt fit of all others to enrich land, will burn up and deſtroy plants, if improperly laid on in large quantities: the caſe may be the ſame in theſe, and very probably theſe waters abounding in ſalt would do great good if they were properly blended with common water, and let in upon the lands with floods of ſweet water. The farmers have gone ſo far towards the proving the truth of this, that they have found ſome of theſe ſprings, when more diſtant from their ſource, not only more innocent than before, but beneficial.

Cold clay lands, and other ſtrong lands that lie flat, will only be improved by *over-flowing* them with land floods, and that only in ſummer, when the ſeaſon is very dry. Theſe lands will not bear water in ſuch quantity at any other time, becauſe it will not ſoak into them eaſily; and it is for the contrary reaſon, that the light and ſpungy lands are always moſt improved by *over-flowing*. Mortimer's Huſbandry. See LAND.

OVER-*grown*, in the *Sea Language*. When the waves of the ſea grow high, the ſailors call it *rough ſea*; but when the ſurges and billows grows vaſtly high, then it is an *over-grown ſea*.

OVER-*haul*, in the *Sea Language*. A rope is ſaid to be *over-hauled*, when drawn too ſtiff, or hauled the contrary way.

OVER-*haul the runner*, in the *Sea Language*. See RUNNER.

OVER-*haul the ſheet*, in the *Sea Language*. See SHEET.

OVER-*hauling*, in *Sea Language*, denotes the act of opening and extending the ſeveral parts of a TACKLE, or other aſſemblages of ropes, communicating with blocks or dead eyes. It is uſed to remove thoſe blocks to a ſufficient diſtance from each other, that they may be again placed in a ſtate of action, ſo as to produce the effect required.

OVER-*hauling* is alſo vulgarly expreſſed of an examination or inſpection into the condition of a perſon or thing.

OVER-MASTED, denotes the ſtate of a ſhip, whoſe maſts are too high, or too heavy for the weight of her hull to counterbalance.

OVER-RAKE, in the *Sea-Language*. When a ſhip, riding at anchor, ſo over beats herſelf into a head-ſea, that ſhe is waſhed by the waves breaking in upon her; they ſay, the waves *over-rake* her.

OVER-REACH, in the *Manege*, is when a horſe ſtrikes his hind-feet againſt his fore.

The word is alſo uſed for a ſtrain, or painful ſwelling, of the maſter-ſinew of a horſe; occaſioned by ſuch *over-reach*.

OVER-RIDE, in the *Manege*, the ſame with OVER-*done*.

OVER-RULING *an objection*, in *Law*, is the rejecting or ſetting it aſide by the court.

OVER-RUNNING, among *Printers*. See PRINTING, and CORRECTION.

OVERSAMESSA, an ancient fine or penalty, impoſed before the ſtatute of hue and cry, on ſuch perſons, as, hearing of a robbery or murder, did not purſue the malefactor.

OVERSEERS *of the poor*, are public officers, who muſt be ſubſtantial houſeholders, created by the ſtat. 43 Eliz. cap. 2. and nominated yearly in Eaſter week, or within one month after Eaſter (though a ſubſequent nomination will be valid) under the hand and ſeal of two or more juſtices of the peace in the ſame county, and dwelling near the pariſh whereof one to be of the quorum; to provide for the poor of every pariſh; and are ſometimes two, or three, or four, according to the largeneſs of the pariſh. The *overſeers* thus appointed, and taking upon them the office, ſhall, within fourteen days, receive the books of aſſeſſment and accounts from their predeceſſors, and what money and materials ſhall be in their hands, and reimburſe them their arrears. 17 Geo. II. cap. 38.

Their office and duty, according to ſtat. 43 Eliz. are principally theſe: firſt, to raiſe competent ſums for the neceſſary relief of the poor, impotent, old, and blind, and ſuch as are not able to work; and, ſecondly, to provide for ſuch as are able, and ſuch as cannot otherwiſe get employment: but this latter part of their duty, which, according to the wiſe regulations of that ſalutary ſtatute, ſhould go hand in hand with the other, is now moſt ſhamefully neglected. However, for theſe joint purpoſes, they are empowered to make and levy rates upon the ſeveral inhabitants of the pariſh, by the ſame act of parliament, which has been farther enforced and explained by ſeveral ſubſequent ſtatutes. And by 17 Geo. II. cap. 38. if any perſon ſhall be aggrieved by any thing done or committed by the churchwardens and *overſeers*, or by any of his majeſty's juſtices of the peace, he may, giving reaſonable notice to the churchwardens or *overſeers*, appeal to the next quarterly ſeſſions, when the ſame ſhall be heard and finally determined: but if reaſonable notice be not given, then they ſhall adjourn the appeal to the next quarter ſeſſions; and the court may award reaſonable coſts to either party.

Overſeers, neglecting their duty, ſhall forfeit for every default 20*s*. to the poor, to be levied by diſtreſs, or be committed to the common gaol. 43 Eliz. And by 17 Geo. II. any pariſh officer, neglecting to obſerve the directions of that act, ſhall forfeit on conviction, within two calendar months after the offence committed, a ſum not exceeding 5*l*. nor leſs than 40*s*. to the poor, by diſtreſs. *Overſeers* are indemnified in the performance of their duty by 43 Eliz. 1. Jac. cap. 5. and 21 Jac. cap. 12.

Churchwardens, by 43 Eliz. are called *overſeers of the poor*, and they join with the *overſeers* in making a poor rate, &c. But the churchwardens having diſtinct buſineſs of their own, uſually leave the care of the poor to the *overſeers* only; though anciently they were the ſole *overſeers of the poor*. See POOR.

OVER-*ſet*, or *overthrow*, in the *Sea Language*. A ſhip is ſaid to *over-ſet* when her keel turns upwards; which misfortune happens either by bearing too much ſail, or by grounding her, ſo that ſhe falls upon one ſide.

OVER-*worked*, in the *Manege*, is the ſame with OVER-*done*. It is called, in French, *eſtrapaſſer*.

OVER-*laying of children* may be prevented by a machine called ARCUCCIO.

OVERT *act*, a term in *Law*, ſignifying an *open act*; or an act capable of being manifeſted and proved.

The word is formed from the French, *ouvert*, *open*.

In which ſenſe it is diſtinguiſhed from an *intentional act*.

OVERT-*pound*. See POUND.

OVERT-*word*, denotes a plain open word, not to be miſtaken.

OVERTURE, or Ouverture, *opening*, or *preluding*; a term uſed for the ſolemnities at the beginning of a public act or ceremony; as of an opera, tragedy, concert of muſic, &c.

The *overture* of the theatre, or ſcene, is a piece of muſic, uſually ending with a fugue.

The *overture* of a jubilee is a general proceſſion, &c.

OVI *albumen*. See Albumen.

OVICULUM, in the *Ancient Architecture*, a little *ovum*, or egg.

Some alſo uſe the word *oviculum* for ovolo.

Baldus will have this to be the Leſbian astragal of Vitruvius. Daviler.

OVIEDA, in *Botany*, the name given by Linnæus to a genus of plants, of the *didynamia angioſpermia* claſs; called by Plumier *valdia*. The characters of which are theſe: the perianthium is a ſhort and broad one-leaved cup, lightly divided into five erect and pointed ſegments, and remaining after the flower has fallen; the flower conſiſts of one petal, and is of the labiated kind; the tube is extremely long and ſlender, and ſtands upon the germen of the piſtil; it is ſomewhat thicker at the top than at the baſe, and the upper lip is hollow and emarginated; the lower is divided into three ſegments; the ſtamina are four filaments longer than the flower; the antheræ are roundiſh; the germen of the piſtil is globoſe, and ſtands between the cup and the flower; the ſtyle is capillary, and of the length of the ſtamina; and the ſtigma is bifid and acute; the fruit is a globoſe berry, placed in the cup, which grows larger to receive it, and is of a campaniform ſhape; the ſeeds are oval, and are two in number. There are two ſpecies.

OVILIA, or Septa, in *Ancient Rome*, a place in the Campus Martius, at firſt railed in like a ſheep's pen; whence its name.

Afterwards it was mounted with marble, and beautified with walks and galleries; as alſo with a tribunal, or ſeat of juſtice.

Within this precinct, or incloſure, the people were called to give their ſuffrages for the election of magiſtrates.

The aſcent into the *ovilia* was not by ſtairs, but by pontes; a ſort of bridges made for the time; every curia, tribe, and century, as the aſſembly was centuriate or tribute, &c. having its proper bridge.

Whence the proverb, *de ponte dejiciendus*, where a perſon is to be debarred from giving his vote. See Comitia.

OVIPAROUS, in *Natural Hiſtory*, a term applied to ſuch animals as produce their young *ab ovo, from eggs*; as birds, inſects, &c.

The *oviparous* kind ſtand in oppoſition to thoſe which bring forth their young alive, called *viviparous* animals, as man, quadrupeds, &c.

Oviparous animals may be defined to be ſuch as conceive eggs, which they afterwards bring forth, and from which, by the incubation of the parent, or ſome other principle of warmth and fermentation, at length ariſe animals; which after they have ſpent the moiſture or humour they were ſurrounded withall, and are grown to a ſufficient bulk, firmneſs, and ſtrength, break their ſhell, and come forth.

The *oviparous* kind, beſide birds, include divers ſpecies of animals; as ſerpents, lizards, tortoiſes, crabs, lobſters, frogs, &c. See Egg.

The diſtinction between *oviparous* and viviparous creatures, ſeems, in the inſect world, to be much leſs fixed and determinate than is ſuppoſed. It is evident, that ſome flies, which are naturally *oviparous*, if they are kept from the finding a proper nidus for their eggs, be it meat, or any thing elſe, will retain them ſo long beyond their due time of excluſion, that they will hatch into worms in the body of the parent, and be afterwards depoſited alive in fleſh, or in the manner of the young of the viviparous inſects. Bartholine gives an account, in his Medical Obſervations, of a hen, which, inſtead of eggs, brought forth no leſs than five living chickens; but ſhe died of it.

OVIS, in *Zoology*. See Sheep.

OUMIEN, a name given by the Chineſe to a peculiar ſort of porcelain of which they are very fond. It is black ornamented with gold. They ſometimes alſo call the blue and gold, which is made in the ſame manner, by the ſame name. They colour it with three parts of the azure, and ſeven parts of oil of ſtone, and lay on the gold afterwards. If they would have it bluiſh, they add leſs of the azure, and ſome ceruſs white.

OUNCE, Uncia, a little weight, the ſixteenth part of a pound avoirdupois; and the twelfth of a pound troy.

The word is derived from the Latin, *uncia*, the twelfth part of any whole, called *as*; particularly in geometrical meaſures, an inch, or the twelfth part of a foot.

The *ounce avoirdupois* is divided into ſixteen drachms.

The *ounce troy* into twenty penny-weights, and the penny-weight into twenty-four grains. See Weight.

The *ounce*, *once*, makes the eighth part of a French mark, and is divided into three gros or drachms; the drachm into three penny-weights or ſcruples; and the ſcruple into twenty-four grains; each grain being computed to weigh a grain of wheat.

All precious merchandizes, as gold, ſilver, ſilk, &c. are ſold by the *ounce*.

Ounce *pearls*, are thoſe too ſmall to be ſold by tale; uſually called *ſeeds of pearl*, or *ſeed-pearls*.

Ounce *cottons*, brought from Damaſcus, are of a kind and quality ſuperior to any other cotton.

Ounce, in *Zoology*. See Onca.

Ounce is alſo the Engliſh name of the lynx, or *lupus cervarius*, a very fierce beaſt of prey.

OVOLO, Ovum, in *Architecture*, a round moulding, whoſe profile or ſweep in the Ionic and Compoſite capitals, is uſually a quadrant of a circle; whence it is alſo popularly called the *quarter-round*.

It is uſually enriched with ſculptures among the ancients, in form of cheſnut-ſhells; whence Vitruvius, and others of the ancients call it *echinus*, *cheſnut-ſhell*. See *Tab. Archit. fig.* 5. *fig.* 25. N° 5.

Among us, it is uſually cut with the repreſentation of eggs and anchors, or arrows heads, placed alternately; whence its Italian name, *ovolo*; Latin, *ovum*; and French, *œuf*; q. d. *egg*.

OUR *Lady*. See Notre Dame.

Our *Lady of the Thiſtle*. See Thistle.

OURAN, or Uran Soangus, the name of an imaginary ſect of magicians in the iſland Gromboccanore, in the Eaſt Indies.

The word implies *men-devils*: theſe people were ridiculouſly ſuppoſed to have had the art of rendering themſelves inviſible, and paſſing where they pleaſed, and, by theſe means, doing infinite miſchief; for which reaſon, the people hate and fear them exceedingly, and always kill them on the ſpot, when they can take them.

OURISSIA, in *Ornithology*, a name by which Cluſius and ſome other authors have called the humming-*bird*, or *guainumbi*.

OUROLOGY, in *Medicine*, a name given by authors to a treatiſe or diſcourſe on the ſubject of urine. The chemiſts have given us treatiſes on the analyſis of urine, and the preparations of it, ſuch as the phoſphorus, &c. under the name of *ourologies*: and medical writers have, under the ſame name, given us treatiſes on the prognoſtics from the urine, and its various appearance in different diſeaſes.

The firſt ſtep towards judging of the urine is to fix ſomething as its ſtandard in a healthy ſtate, all the deviations from which, in whatever reſpect, are to be judged ſignals of diſtempers or deſtempered habits. This ſtandard is beſt taken from the urine of a perſon in health, of between thirty and forty years old, and it is of a citron colour and moderate conſiſtence, of a due and ſomewhat ſtrong ſmell, and made in a conſiderable quantity. This, when it has ſtood a proper time, is alſo to depoſit a natural ſediment. By being well acquainted with all the ſtages and changes in this, the diſeaſed urine will be eaſily judged of by its ſeveral peculiarities in difference from it.

It is ſaid by ſome, that people often die with good and healthful urine; but this is only ſaid by thoſe who are not ſkilful in urine: for it is as impoſſible for the urine to be healthful at the approach of death in diſeaſes, as for the blood to be ſo.

The time of inſpecting the urine, and the time that the urine is made that is to be inſpected, are alſo circumſtances of great conſequence. The urine by which the beſt judgment is to be formed, is that made after the firſt ſleep in the night; and the time of judging of this is not immediately when it is made, but about two hours after, when it has had time to ſettle. It muſt, in the mean time, be ſet to ſettle in a moderate air, neither too cold nor too hot. The firſt hinders the ſettling, and the latter rarefies the colour; and, if very great, it cauſes an ebullition, which deſtroys what ſhould ſwim upon the ſurface of the urine. The urine muſt not be judged of in the ſun, nor by candle light; for either of theſe lights will give falſe colours: but the proper place is, where there is a moderate, not glaring light; and when it is firſt received, it muſt be held very ſtill and ſteady; afterwards it will be proper to ſhake it, to ſee the whole that ſwims in it, and will ſeparate from it.

The colour of the urine is the moſt precarious of all its appearances, and to be judged of with the greateſt caution.

What is taken to be the mark of a diſeaſe in this caſe, is often only the effect of medicines or the food; rhubarb or ſaffron will make the urine yellow, and a common ſallad will make it greeniſh; but theſe tinctures go off after a few hours from the time of the taking the things which occaſion them. People who live in a hot air, and thoſe who uſe violent exerciſe, uſually make more high-coloured urine than others The ſubſtance, the quantity, the qualities, and the contents of the urine, will always diſcover to the attentive view the nature, cauſe, and ſymptoms of the perſon who made it. What is moſt to be obſerved as to the ſubſtance of the urine is, whether it be thick or thin, clear or turbid, oily or not oily. The copiouſneſs of it is only to be judged of by compariſon of the quantity voided within the twenty-four hours, by the patient, with that he uſed to void in health, or that quantity which, at a medium, a man in health does uſually void.

Among the qualities of the urine, the principal is the ſmell. This is affected not only by diſeaſes, but by medicines taken for them. The urine is on many occaſions rendered fœtid; and there are ſome things which communicate an agreeable ſmell to it, ſuch as turpentine, and many of the diſtilled oils. Among the things which render the urine fœtid, the principal are ulcers and purulent matter. The taſte of the urine alſo declares its qualities. It is naturally of a ſaltiſh and ſulphureous taſte; but this goes off, and a ſweetneſs or inſipidity is obſerved in it. The principal colours of the urine in its various ſtates, as inflamed by diſeaſes, are white, yellow, reddiſh, and black; to one or two of theſe, differing in degree, or to mixtures of two or more of them in different proportions, may be referred the other leſs common colours of pale citron, high red, green and blue, which laſt two, in any perfect degree, are very uncommon. The moſt dangerous of all urines are the blue and the black, particularly the laſt: the ancients, however, judged too ſeverely of it. Galen ſays, he never knew any one recover who made black urine; but we meet with ſome inſtances of children eſcaping after this ſymptom.

The contents of the urine are of three kinds; the ſediment, or matter ſubſiding to the bottom; the matter hanging in the middle; and the matter ſwimming at the top. Theſe differ according to their degrees of weight, and in all theſe the phyſician is to obſerve, the ſubſtance, colour, uniformity, and likeneſs. For example: the beſt ſediment is that which is moderate in ſubſtance and quantity, white, uniform, and alike both for matter and time. We are not to expect a ſediment in the urine in all diſeaſes; and in ſome a thinner, in others a thicker ſediment, is the beſt ſymptom. Among all the appearances of the middle and the top of the urine, the worſt is that of a ſort of clouds forming themſelves in the urine, and riſing to the top entirely. Theſe are the ſigns of light-headedneſs, and often of death itſelf.

Beſides theſe, which are the general contents of urine, there are particular ones; ſuch as mealy matter, ſcales, coagulated blood, purulent matter, aſhes, ſlime, pieces of ſeeming fleſhy matter, ſmall hairs, woolly filaments, flying duſt, tough ſtuff adhering to the ſides of the veſſel, and reſembling the webs of ſpiders, bladders, froth, fat, or cream-like ſubſtances, and finally ſandy or ſtony matter. This laſt is the moſt frequent of all, and is of two kinds; the one found in the body; the other only ſeparated from the urine after it is diſcharged. It is of great conſequence to know theſe, as they give great light into the nature of nephritic complaints. The ſandy matter generated in the body, always precipitates itſelf to the bottom of the urine, as ſoon as it is made, and remains looſe in it; but the other only ſeparates from it in the pot, and adheres to the ſides of it in form of a ſort of cruſt. It has been ſuppoſed by many, that preſages of the ſtone may be made from theſe ſeparations from the urine, but there is no certainty in it; only this, that thoſe who have been uſed to void grains of ſand, if they ſuddenly leave it off, and from that time begin to make a whitiſh and thin urine, may be ſuſpected to have a ſtone breeding in them.

The nature of the ſand, voided at times by people afflicted with the ſtone, may ſerve as a guide to judge of the nature of the diſeaſe. When it is hard and red, the ſtone is likely to be ſituated in the bladder; if hard and white, the kidnies are likely to be the ſeat of the diſorder. We have inſtances of very particular matters voided by urine, beſides theſe: ſome wholly erroneous; others certain, though very ſtrange. Plempius gives an account of a woman who voided a yellow fatty matter with her urine for ſeveral months, after the going off of a quartan ague, and, though ſhe diſcharged great quantities of this, was not at all the better for it. Phil. Tranſ. N° 100 See **Urine**.

OUSTED, formed from the French *oſter*, *to remove*, or *take away*, in our *Ancient Law Books*, a being removed, or put out of poſſeſſion.

OUSTER, or *diſpoſſeſſion*, in *Law*, is an injury that carries with it the amotion of poſſeſſion; for thereby the wrong doer gets into the actual occupation of the land or hereditament, and obliges him that hath a right to ſeek his legal remedy, in order to gain poſſeſſion, and damages for the injury ſuſtained. This *ouſter* may either be of the freehold by abatement, intruſion, diſſeiſin, diſcontinuance, and deforcement; or of chattels real, as an eſtate by ſtatute-merchant, ſtatute-ſtaple, or elegit, or an eſtate for years.

Ouster *le main*, *amovere manum*, in *Law*, denotes a livery of lands out of the king's hands; or a judgment given for him that traverſed, or ſued, a monſtrans le droit.

When it appeared upon the matter diſcuſſed, that the king had no right or title to the land he had ſeized, judgment was given in chancery, that the king's hand be amoved. Hereupon, *ouſter le main*, or *amoveas manum*, was awarded to the eſcheator, to reſtore the land, &c.

But now all wardſhips, liveries, *ouſter le mains*, &c. are taken away and diſcharged, by ſtat. 12. Car. II.

Ouster *le mer*, in *Law*, a cauſe of excuſe or eſſoin; where a man not appearing in court upon ſummons, it is alledged, that he is beyond the ſeas.

OUT-FIT, in *Sea Language*, is generally uſed to ſignify the expences of equipping a ſhip for a ſea-voyage; or of arming her for war, or both together. See Fitting-*out*.

Out, **Outside**, or **Without**, in the *Manege*, is the contrary of *in*, *inſide*, *inner*, &c. See In, Inn, &c.

Out, in *Sea Language*. See In.

OUTFANGTHEFE, a privilege whereby a lord was enabled to call any man dwelling in his fee, but taken for felony in another place, to judgment in his own court.

The word is formed from the Saxon *ut*, *extra*, *without*; *fang*, *capio*, *vel captus*; and *theof*, *thief*, q. d. *fur extracaptus*. Spelm.

OUTIN, in *Ichthyology*, a name by which ſome call the fiſh known among authors by the name of oxyrynchus.

OUTLAW, Utlagatus, one deprived of the benefit of the law, or put out of the king's protection.

Bracton ſays, an *outlaw* forfeits every thing he has; and that, from the time of his *outlawry*, he wears a wolf's head; and any body may kill him *impune*; eſpecially if he defend himſelf, or fly. But, in the beginning of king Edward III's reign, it was reſolved by the judges, that it ſhould not be lawful for any man, but the ſheriff alone (having lawful warrant for it), to put to death a man *outlawed*.

OUTLAWRY, or **Utlawry**, **Utlagaria**, the puniſhment of him who, being called into law, and lawfully ſought, does, (after an original writ, and the writs of capias, alias & pluries, returned by a ſheriff with a non eſt inventus, and an exigent, with a proclamation awarded thereupon) contemptuouſly refuſe to appear.

He muſt alſo be called at five county court-days a month between each other; and, if he appear not in that time, *pro exlege tenebitur, cum principi non obediat, nec legi; & extunc exlegabitur*; i. e. he ſhall be pronounced to be out of the king's protection, and deprived of the benefit of the law.

The effect of which is, if he be *outlawed* at the ſuit of another, in a civil cauſe, he ſhall forfeit all his goods and chattels to the king, and the profits of his land, while the *outlawry* remains in force: and if in treaſon or felony, all his lands and tenements which he has in fee, or for life, and all his goods and chattels: and in this latter caſe the law interprets his abſence a ſufficient evidence of his guilt, and without requiring farther proof, accounts him guilty of the fact, on which enſues corruption of blood, &c. And then, according to Bracton, he may periſh without law, &c.

But now, to avoid ſuch inhumanity, it is holden that no man is intitled to kill him wantonly or wilfully; but in ſo doing he is guilty of murder, unleſs it happens in the endeavour to apprehend him: for any perſon may arreſt an outlaw, either of his own head, or by writ or warrant of capias *utlagatum*, in order to bring him to execution. But ſuch *outlawry* may be frequently reverſed by writ of error; the proceeding therein being very nice and circumſtantial; and if any ſingle minute point be omitted or miſconducted, the whole *outlawry* is illegal, and may be reverſed: upon which reverſal, the party accuſed is admitted to plead to, and defend himſelf againſt the indictment.

If after *outlawry*, in civil caſes, the defendant appears publicly, he may be arreſted by a writ of *capias utlagutum*, and committed till the outlawry be reverſed: which reverſal may be had by the defendant's appearing perſonally in court, (and in the king's bench without any perſonal appearance, ſo that he appears by attorney, according to ſtatute 4 and 5 W. and M. cap. 18.) and any plauſible cauſe, however ſlight, will in general be ſufficient to reverſe it; it being conſidered only as a proceſs to compel appearance. But then the defendant muſt pay full coſts, and put the plaintiff in the ſame condition, as if he had appeared before the writ of *exigi facias* was awarded. It is ordained by *Mogna Charta*, that no freeman ſhall be outlawed, but according to the law of the land.

A minor, or a woman, cannot be *outlawed.* A woman is ſaid to be *waived,* when a man is *outlawed.* See Waive.

Outlawries, *clerk of the.* See Clerk.

OUTLICKER, or **Outligger,** in a *Ship,* a ſmall piece of timber, three or four yards long, as occaſion ſerves, made faſt to the top of the poop, and ſtanding right out a-ſtern: at the uttermoſt end of it is a hole, into which the ſtanding part of the ſheet is received, and made faſt through the block of the ſheet; and then again received through another block, which is ſeized to this *outlicker,* hard by the end of it. This is ſeldom uſed in men of war, or in great ſhips; and whenever it is made uſe of, it is becauſe the mizen-maſt is placed ſo far aft, that there is not room enough within board to hale the ſheet flat.

Outligger ſeems the true orthography of the word, which appears to be derived from the Dutch *uitlegger,* q. d. *outlier.*

OUTNESS, is uſed by ſome for that relation of things by which one appears out of, or at a diſtance from another. Dr. Berkeley, in his Eſſay on Viſion, makes uſe of the word *outneſs*; and obſerves, that we form no notion of *outneſs* from the ſenſe of ſeeing merely, but only from motion.

OUT *of trim,* in *Sea Language,* the ſtate of a ſhip when ſhe is not properly balanced for the purpoſes of navigation; which is either occaſioned by the ſize or poſition of her maſts and ſails; or by the comparative quantity or arrangement of her cargo and ballaſt in the hold.

OUT-PARTERS, in our *Ancient Writers,* were a ſort of thieves or highwaymen, on the frontiers of Scotland, who rode about to ſetch in ſuch things as they could lay hold on.

OUT-POSTS, in a military ſenſe, a body of men poſted beyond the grand guard, and ſo called, as being without the rounds or limits of the camp.

OUT-RIDERS are bailiffs errant, employed by ſheriffs, or their deputies, to ſummon people in the remoteſt parts of their hundreds, to the county or hundred courts.

OUT-RIGGER, in a *Ship,* a ſtrong beam of timber, of which there are ſeveral fixed on the ſide of a ſhip, and projecting from it, in order to ſecure the maſts in the act of careening. The outer ends of theſe beams are firmly laſhed to a bolt in the ſhip's ſide beneath, by which they are enabled to ſupport the maſt, by counteracting the ſtrain it ſuffers from the effort of the careening tackles; which, being applied in the maſt-head, draws it downwards, ſo as to act upon the veſſel with the power of a lever, whoſe fulcrum is in her centre of gravity.

Out-rigger is alſo a ſmall boom, occaſionally uſed in the tops, to thruſt out the breaſt back-ſtays to windward, in order to increaſe their tenſion, and thereby give additional ſecurity to the top-maſt. This boom is uſually furniſhed with a tackle at its inner end, communicating with one of the top-maſt-ſhrouds, and has a notch in the outer end to contain the back-ſtay, and keep it ſteady therein. As ſoon as the back-ſtay is drawn tight, by means of its tackle in the chains, the *outrigger* is applied aloft, which forces it out to windward, beyond the circle of the top, ſo as to increaſe the angle which the maſt makes with the back-ſtay, and accordingly enable the latter the better to ſupport the former. This machine is ſometimes applied without any tackle: it is then thruſt out to its uſual diſtance beyond the top-rim, where it is ſecurely faſtened: after which the back-ſtay is placed in the notch, and extended below. Falconer.

OUTWARD *flanking angles.* See Angle.

OUT-WORKS, in *Fortification,* all thoſe works made without ſide the ditch of a fortified place, to cover and defend it. See Fortification *according to M. Vauban's method.*

Out-works, called alſo *advanced* and *detached works,* are thoſe which not only ſerve to cover the body of the place, but alſo to keep the enemy at a diſtance, and prevent their taking advantage of the cavities and elevations uſually found in the places about the counterſcarp; which might ſerve them either as lodgments, or as rideaux, to facilitate the carrying on their trenches, and planting their batteries againſt the place. Such are ravelins, tenailles, horn-works, queue d'arondes, envelopes, crown-works. The moſt uſual of theſe are ravelins, or half-moons, formed between the two baſtions, on the flanquant angle of the counterſcarp, and before the curtain, to cover the gates and bridges.

OUVERTURE. See Overture.

OVUM *anguinum,* a name given by many authors to a foſſil, ſuppoſed by the vulgar to be the petrified egg of a ſerpent, but being really like the brontiæ and ombriæ, ſpecies of the echinites.

This ſome have ſuppoſed to be a bead of glaſs, uſed by the Druids, to impoſe upon the vulgar, whom they taught to believe that the poſſeſſor would be fortunate in all his attempts, and that it would give him the favour of the great.

Ovum *phyloſophicum,* or *chymicum,* is a glaſs body of an oval form, reſembling an egg: uſed for the ſublimation of mercury.

Ovum *polypi,* in *Natural Hiſtory,* a name given by ſome of the earlier writers to the papyraceous or thin-ſhelled nautilus. The reſemblance of the body and arms of the fiſh which inhabits this ſhell, with thoſe of the ſea-polypus, gave occaſion to their ſuppoſing this creature the ſame animal, not yet got out of the egg. The ſhell of this ſpecies being very thin, and looking like an egg-ſhell, gave farther countenance to this error in leſs knowing ages.

Ovum *Rumphii,* in *Natural Hiſtory,* the name of a ſpecies of *porcelain ſhell,* of the oblong kind, called an *egg,* from its ſhape, by that author. See Porcelain *ſhell.*

OUZELL, or *Brook* **Ouzell,** in *Ornithology,* an Engliſh name for the *rallus aquaticus,* more uſually called the *water*-rail.

Ouzell, or *Ring* **Ouzell,** an Engliſh name for a bird of the *merula* or *blackbird* kind, the turdus *torquatus* of Linnæus, remarkable for a white ring about its neck, and thence called by authors *merula torquata*; it is more commonly called in Engliſh, the *ring amzell.* See Amzell, and *Tab.* III. *of Birds,* Nº 30.

Ouzell, *roſe-coloured,* the turdus *roſeus* of Linnæus; is in ſize equal to that of a ſtare; the bill at the point is black, but at the baſe of a dirty fleſh-colour; the head is adorned with a creſt hanging backwards; the head, creſt, neck, wings, and tail, are black, gloſſed with a changeable blue, purple, and green; the breaſt, belly, back, and leſſer coverts of the wings are of a roſe colour, mixed with a few ſpots of black; the legs of a dirty orange-colour. This bird is found in Lapland, Italy, and Syria. About Aleppo, it is called the locuſt-bird. See *Tab.* IV. *Birds,* Nº 40.

OUZEL, or *water* **Ouzel,** the Engliſh name of the *merula aquatica,* or sturnus *aquaticus* of Linnæus. It is about the ſize of the common black-bird, but has a ſhorter body, and a thicker neck; its beak is ſtraight, ſharp, and black, and its head, and the upper part of its neck, are of a browniſh black; its back and wings are variegated with black and grey; its throat and breaſt are of a ſnow white; but the belly toward the tail is black; its tail is ſhort, and it is very thick-feathered, as are in general all the water-birds. It frequents waters, and is very common in many parts of Germany, nor much leſs ſo in the northern counties of England. It feeds on fiſh, and ſometimes on inſects, and though not a web-footed fowl, will ſometimes dive under water after its prey.

OWELTY, or **Ovelty** *of ſervices,* in our *Law Books,* an equality of ſervices; as when the tenant paravail owes as much to the meſne, as the meſne does to the lord paramount.

OWL, *ſtrix,* in the Linnæan ſyſtem of *Ornithology,* a diſtinct genus of birds of the hawk-kind, the diſtinguiſhing characters of which are, that the head is large and round; the bill ſtrong and hooked, without cere: the noſtrils are covered with briſtly feathers; the eyes and ears are large, and the tongue bifid. Linnæus reckons twelve ſpecies.

Thoſe moſt known in our country are the following, viz.

Owl, *brown* or *ivy,* the *ſtrix ſtridula* of Linnæus. This is diſtinguiſhed from the other ſpecies of the *owl* kind by theſe characters: its beak is of a pale horn-colour, and ſhort, but the opening of its mouth is very wide; its eyes are remarkably large and protuberant, nearer to its ears than in any other animal, and the apertures of its ears are very large and covered with a membrane; the colour of the back, head, coverts of the wings, and ſcapular feathers is of a fine tawny red; elegantly ſpotted and powdered with duſky ſpots of various ſizes; on the coverts of the wings, and on the ſcapulars are ſeveral large white ſpots; the coverts of the tail are tawny, without any marks; the tail is barred and ſpotted with pale red and black; the breaſt and belly are yellowiſh mixed with white, and marked with narrow black ſtrokes pointing downwards; and the legs are covered with feathers down to the toes. This is what we call the *ſcreech-owl*; to which the folly of ſuperſtition had given the power of preſaging death by its cries.

Mr. Pennant calls this ſpecies the *tawny owl*; and he has given the appellation of *brown owl* to the *ſtrix ulula* of Linnæus, which agrees with the former in its marks, and differs only in colour. In this the head, wings, and back, are of a deep brown, ſpotted with black like the other; the coverts of the wings and the ſcapulars are adorned with ſimilar white ſpots; the exterior edges of the four firſt quill-feathers in both are ſerrated; the breaſt in this is of a very pale aſh-colour, mixed with tawny, and marked with oblong jagged ſpots; the feet are feathered down to the claws: and the circle round the face is aſh-coloured ſpotted with brown. Both theſe ſpecies inhabit woods, where they reſide the whole day; in the night they are very clamorous, make havock among pigeons, leverets, and moles, breed in hollow trees, or ruined edifices, and lay four eggs of an elliptic form and whitiſh colour. Pennant.

Owl, *churn*, the *caprimulgus Europæus* of Linnæus, is a moderately large *owl*; its head is not ſo large in proportion to the body as in the other *owls*; its beak is black, and very ſhort; its mouth extremely wide, and irides hazel; the plumage has a beautiful mixture of black, white, aſh-colour, and ferruginous, diſpoſed in lines, bars, and ſpots; the male is diſtinguiſhed from the female by a great oval white ſpot near the end of the three firſt quill-feathers, and another on the outermoſt feathers of the tail; the plumage is alſo more ferruginous; the legs are ſhort, ſcaly, and feathered below the knee; and the middle toe is connected with thoſe on each ſide by a ſmall membrane as far as the firſt joint; and the claw of the middle toe is thin, broad, and ſerrated. This bird makes a ſhort ſtay with us; appears in the latter end of May, and diſappears from the northern parts of our iſland in the latter end of Auguſt, but ſtays in the ſouthern parts above a month later. It is called *goat-ſucker* from a vulgar opinion that it ſucks the teats of goats; an error delivered down from the days of Ariſtotle. Its notes are very ſingular; the loudeſt reſembles that of a large ſpinning-wheel; and the other is a ſharp ſqueak, which it often repeats, and ſeems to be a note of love. Pennant.

Owl, *eagle*, *ſtrix bubo* of Linnæus, is in ſize almoſt equal to an eagle; the irides are bright yellow; the head and whole body are finely varied with lines and ſpots of black, brown, cinereous, and ferruginous: the wings are long, the tail ſhort and marked with duſky bars; the legs are thick, and covered to the ends of the toes with a cloſe and full down of a teſtaceous colour; and the claws are large, hooked, and duſky. This ſpecies inhabits inacceſſible rocks and deſert places, and preys on hares and feathered game. Its appearance in cities was deemed an unlucky omen, and it was thought by the ancients to be, like the ſcreech *owl*, the meſſenger of death. Pennant.

Owl, *grey*. See *Brown* Owl, above.

Owl, *horn*, or *long-eared* Owl, *ſtrix otus* of Linnæus, is the name of a ſpecies diſtinguiſhed by two cluſters of feathers ſtanding up over its ears, and reſembling horns: it is alſo called *noctua aurita*. The irides of this ſpecies are of a bright yellow, the bill black; the circle of feathers ſurrounding the eyes is white tipt with reddiſh and duſky ſpots, and the part next the bill black; the breaſt and belly are of a dull yellow, marked with ſlender brown ſtrokes pointing downwards; the thighs and vent-feathers are of the ſame colour, without ſpots; the back and coverts of the wings are varied with deep brown and yellow; the quill-feathers of the ſame colour, having a broad bar of red near the ends of the outermoſt: the tail is marked with duſky and reddiſh bars, but beneath appears aſh-coloured; the horns or ears are about an inch long, and conſiſt of ſix feathers variegated with yellow and black; and the feet are feathered down to the claws. Pennant. See *Tab.* IV. *Birds*, N° 41. and Horn-*coot*.

Mr. Pennant has alſo deſcribed a *ſhort-eared owl*, with ſmall horns conſiſting only of a ſingle feather, with long wings. It is a bird of paſſage, and has been obſerved to viſit Lincolnſhire, in the beginning of October, and to retire early in the ſpring; and therefore, as it performs its migrations with the woodcock, its ſummer retreat is Norway. In the day time it lies hid in long old graſs; and the farmers are fond of ſeeing theſe birds in the fields, as they clear them from mice.

Owl, *little*, *ſtrix paſſerina* of Linnæus, is an elegant ſpecies, ſcarcely exceeding a thruſh in ſize, though the fulneſs of its plumage makes it appear larger. The irides are of a light yellow colour; the bill of a paper colour; the feathers that encircle the face are white tipped with black; the head brown, ſpotted with white; the back and coverts of the wings of a deep olive brown, the latter ſpotted with white; on the breaſt is a mixture of white and brown; the belly is white, marked with a few brown ſpots; the tail of the ſame colour with the back, in each feather barred with white, and adorned with circular white ſpots; the legs and feet are covered with feathers down to the claws.

The Italians made uſe of this *owl* to decoy ſmall birds to the limed twig. Pennant.

Owl, *white*, or *common barn* or *church* Owl, the *ſtrix flammea* of Linnæus, and the *aluco minor* of Aldrovandus, is a domeſtic ſpecies, inhabiting barns and outhouſes; and very uſeful in clearing thoſe places from mice: at twilight it viſits the fields, and ſkims along the ground in ſearch of field-mice; and in the breeding ſeaſon reſorts to the eaves of churches, holes in lofty buildings or hollows of trees.

This ſpecies Mr. Pennant apprehends, does not hoot, but ſnores and hiſſes in a violent manner; and while it flies along will often ſcream moſt tremendouſly.—A circle of ſoft white feathers ſurrounds the eyes of this bird; the upper part of the body, the coverts, and ſecondary feathers of the wings are of a fine pale yellow; on each ſide of the ſhaft are two grey and two white ſpots, placed alternately; the exterior ſides of the quill-feathers are yellow; the interior white, marked on each ſide with four black ſpots; the lower ſide of the body is wholly white; the interior ſides of the feathers of the tail are white; the exterior marked with obſcure duſky bars; the legs are feathered to the feet; the feet covered with ſhort hairs; and the edge of the middle claw ſerrated. Pennant.

Owl *fiſh*, or *ſea* Owl, in *Ichthyography*, an Engliſh name for the *lumpus*, more frequently called the lump-*fiſh*; and by the Scotch the *cock-paddle*.

Owl *pigeon*, the name of a particular ſpecies of *pigeon*, called by Moore the *columba bubo nominata*. It is a ſmall and ſhort-bodied pigeon; it has a ſhort round head, and has a ſeries of feathers that ſeparate and open two ways upon the breaſt: but its moſt remarkable character is its beak, the upper chop of which is bent, and hooked over like an owl's: this is the occaſion of its name. It is of various colours, as white, blue, or black, but is always of one colour, never pied.

OWLER, a maſter of a ſhip, or other perſon, who conveys wool, or other prohibited goods, in the night, to the ſea-ſide, in order to ſhip them off contrary to law.

The name is derived hence, that like owls they only ſtir abroad in the night-time.

OWSE, among tanners, is oaken bark, beaten or ground ſmall, to ſerve in the preparation of leather.

OX, *bos*, in *Zoology*. See Bos and Bull.

The *ox* is a very ſerviceable animal, in many reſpects: but his nature depends wholly on that of the bull and cow, from which he is bred. Derbyſhire and Lancaſhire are ſaid to have the beſt *oxen* in England. Wales and the iſland of Angleſea afford a kind that are very valuable to the farmers, as they will fatten upon middling land; and the Scotch *oxen* are yet hardier than theſe. The long-legged ſhort-horned cow, of the Dutch breed, is the beſt for milk; but then this kind needs to be very carefully kept. This ſort of cow will often yield two gallons of milk at a time.

The largeſt *oxen* are to be choſen for work, and for feeding, but then it muſt be where there is land rich enough to maintain them. When they are to draw, care muſt be taken to match them well, both for height and ſtrength; for if one be ſtronger than the other, the weakeſt will ſoon be deſtroyed. They muſt never be driven beyond their natural pace, for the beating of them throws them into ſurfeits, and many other diſeaſes. The time of putting *oxen* to work is at three years old; they muſt be worked gently the firſt year, eſpecially in hot weather, and fed with a large quantity of hay: this will enable them to bear their labour better than graſs; and they ſhould be always kept in a middle ſtate, neither too fat nor too lean. They may be worked till they are ten or twelve years old, and then ſold.

It is obſerved, that meat and fair treatment ſucceed much better with this animal than blows. The beſt way to break a young one to the yoke is to put him to it with an old tame *ox* of about his own height and ſtrength. If he prove unruly after this, he muſt be kept hungry, and made to feed out of the driver's hand. *Oxen* are much more profitable to keep than horſes, there being no loſs in them: and an old wrought *ox* fattening as well as a young one, and being as good meat. Their keeping alſo is cheaper, for they eat no oats: their harneſs and their ſhoes alſo are conſiderably cheaper, and they are not ſo ſubject to diſeaſes. They muſt always indeed have good graſs and good hay, and they are not ſo ſerviceable as horſes, when there is much working in carts, and where the ways are good; but for winter plowing, where the ground is heavy, an *ox* will do as much work as a horſe.

Every farmer, who can keep two teams, would do wiſely to have one of them of horſes, and the other of *oxen*; it is much better to yoke them together by the necks and breaſts, than by the horns as ſome do; and where a man keeps an *ox* team, he ſhould raiſe two *oxen* and two cow calves every year, to keep up his ſtock; for it is better for a farmer, in all neceſſary things, to be a ſeller than a buyer. Chalky lands ſpoil the feet of *oxen* more than any other.

Stealing Oxen, or creatures of the *ox* kind, old or young, whether bull, cow, &c. ſtrictly ſo called, ſteer, bullock, heifer, or calf, is now felony without benefit of clergy; as is likewiſe killing any of theſe, with an intent to ſteal any part of their carcaſes. Stat. 15 & 16 Geo. II. cap. 34. and Stat. 14 Geo. II. cap. 6. See CATTLE.

OXEN, *diſeaſes of.* As ſcarce any creature is more uſeful to man than the *ox* kind, nothing is more worthy conſideration than the nature and origin of their diſeaſes, and the remedies for them. The ſame diſtemper that has of late years carried off ſuch vaſt numbers of theſe cattle, with us and elſewhere, has at other times raged in Italy. In the year 1710, and the ſucceeding one, there was a great mortality amongſt the horned cattle there, and the occaſion of it was evidently the unnatural ſeaſon preceding. The whole autumn before had been wet, and at the time of the winter ſolſtice there were continual cold winds, and ſmall but laſting rains. The ſpring that ſucceeded was alſo cold and rainy, and the defect of heat and abundance of moiſture made a change in the whole face of nature: the medicinal ſprings had not their wonted effect; and the fruits of the earth could not appear at their proper ſeaſons, nor in their due perfection. The graſs was injured by this, and the ground rendered continually damp and unwholeſome; and to this was evidently owing the malignity and contagious diſeaſe that raged among the cattle afterwards. It was ſuppoſed at that time with them, as of late with us and elſewhere, that the contagion was brought in among their *oxen* by ſtrange cattle coming from infected places: but this proved to be an error; for if an *ox* was removed to ever ſo diſtant a paſture, he never eſcaped the better for it: the whole earth and its productions were vitiated throughout the country, and there was no ſafety in any part of it. Michelotti de Morbis Boum.

The uſe of this obſervation muſt be, the keeping the cattle in ſucceeding years out of the way of thoſe things which occaſion their ſickneſs in ſuch as theſe. If the autumn or winter be extremely cold and wet, remove the cattle out of the low grounds, and put them to feed in ſandy dry ſoils on the higheſt grounds; give them water from ſuch places where the ſun has moſt power, and it is leſs chilling cold than in others; and in caſes of imminent danger, always mix ſome ſalt in it. If the bad weather continues, let them always have clean ſtraw to lie on, and a dry covering; and in caſes where the contagion is already begun, the fumigating of the houſes where they are kept with bay leaves and eleutherian bark, is judged convenient. As to remedies, when they are once ſeized with the diſtemper, it is hard to underſtand what intention to preſcribe in, and how to aſcertain the doſes; and as the late practice, in attempting to cure, has been of very little ſervice, the cautions for the preſerving and preventing the diſeaſe, ought to be redoubled, to prevent an almoſt incurable misfortune.

The diſeaſes of *oxen* are much leſs frequent than thoſe of the human ſpecies; but wherever they appear, they uſually become more violent after a time, and generally are very contagious. In Italy, in the year 1711, there appeared a diſeaſe among the *oxen*, which carried off as great numbers as the diſtemper among us has done. Some acrid and cauſtic ſalts in the blood ſeem to have been one of the principal cauſes of this diſeaſe; as when the blood was let out of the ear of the dying cattle, and fell upon the ground, there were always found, as it dried up, certain concretions of ſalt, ſparkling like ſo many cryſtals.

In many of the creatures which were opened, after dying with this diſeaſe, the inſides of the ſtomach and inteſtines were found covered with tubercles like the puſtules of the ſmall pox: the common people ſuppoſed this the cauſe of the diſeaſe; but upon farther enquiry, it appeared only one of the effects of it; for ſuch beaſts as died very ſuddenly, of this diſeaſe, when opened, had their inteſtines ſound; ſo that theſe puſtules on their ſurface appear to have been only a ſymptom of the diſeaſe in a very advanced ſtage. All medicines were found vain in this diſeaſe; and ſuch of the creatures as recovered had always puſtules of this kind on their ſkin, which ouzed out a bloody ichor.

From the whole it appears, that this diſeaſe was an acute fever in theſe creatures, of a malignant kind; and that the texture of the blood was always broke in it; and that its cauſe was to be attributed to various ſalts, taken in from the air, or in eating and drinking. Many had called it a plague among the cattle, but it appeared rather what we underſtand by the name of a contagious peſtilential fever, than an abſolute plague; and a peculiarly humid ſeaſon, joined with exhalations of mineral ſubſtances out of the earth, for ſome reaſon which we cannot comprehend, more frequent than uſual, brought it upon theſe creatures, whoſe noſes being continually near the ground, gave theſe exhalations immediate entrance.

The method of cure ſeems to conſiſt in two intentions; the firſt of abating the fever; the ſecond of reſtraining the acrimonious malignity of the ſalts.

Purges of all kinds are cautiouſly to be avoided; and bleeding in the beginning is always neceſſary, and muſt be more largely admitted in the more robuſt creatures. The common medicines given, as febrifuges and cephalics, all do harm; the fumigations of divers kinds are idle or miſchievous; the moſt of theſe things intended as reliefs tend plainly to the increaſing of the diſeaſe, as they add to the accelerated motion of the blood, and break its texture more than before. The moſt rational method of treatment is this:

As ſoon as a beaſt is ſeen to be affected, let him be ſeparated from the reſt and kept warm. When his mouth begins to be ſore, let a clyſter be given; and if this does not work, then a gentle emollient may be given by the mouth, made of lenitive electary and cream of tartar, diſſolved in a large quantity of water-gruel; this is the more neceſſary if the creature be fat: if a lean beaſt be ſeized, bleeding is the firſt thing to be done; after this a ſeton muſt be made in the neck, and the parts about where the vein was opened ſhould be ſcarified. If the fever does not abate on theſe methods, the creature ſhould be blooded again: then, inſtead of the great quantities of watery liquors, which are uſually given, the creature ſhould have ſomething ſtrong, ſuch as a mixture of wine, with its liquor, and that in conſiderable quantity.—When the fever abates, he is to be allowed but little drink for the three firſt days, and that ſhould be a decoction of mallows, with a mixture of lemon juice, or ſome other ſuch acid. In caſes where the ſeton does not diſcharge kindly, a bliſter muſt be applied over it. When by this means the creature begins to recover, elm leaves and olive leaves are to be mixed with the hay it eats; the creature muſt be walked out a little, and its litter changed for freſh: this ſhould be done every day, in caſes where the creature is weak and poor.

For the preſervation of cattle from the diſeaſe, nothing is ſo proper as the taking great care that they drink only clean and pure water, and that they eat only dry food till ſome hours after ſun-riſe: they muſt be carefully kept out of infected places, and their ſtables fumigated, by burning in them frankincenſe, juniper berries, and the like ingredients; or by firing off ſmall quantities of gun-powder at ſeveral times, or ſprinkling vinegar and camphor on a red-hot iron. The creatures mouths ſhould be waſhed at times with lemon-juice, and their ears with vinegar or urine: and no hogs, ſheep, or other animals ſhould be ſuffered to feed among them. Gazola de Peſte Boum.

Theſe were the ſentiments of Gazola on this fatal diſeaſe, which he had carefully attended to in all its ſtages. Lanciſi, however, diſſents from this author in ſome particulars. He ſays, that the diſtemper was a true plague among the cattle; and obſerves, that this very plague among the *oxen* was well known among the ancients. It was firſt brought into Italy from Hungary, and infected the cattle by the breath, by the pores of the ſkin, or by any other paſſage that is found open. He preſcribes for the preſervation, the taking great care that they have perfectly good food and drink; and adviſes the waſhing their mouth and noſtrils with a mixture of vinegar, garlic, ſulphur, ſalt, and juniper berries; and both he and Gazola agree in adviſing the rubbing the creatures over with ſweet oil. This author condemns all medicines, and even bleeding, but greatly recommends ſetons, cauteries, and bliſters. He adviſes theſe to be uſed as ſoon as ever the creature is perceived to be ſick, and that not only on the neck, but on the ſhoulders, the hips, and any other part. Lanciſi, ap. Acta Eruditor. Ann. 1715.

Franciſcus Fantaſti publiſhed a treatiſe on the ſame ſubject, about the ſame time; and by his writings it appears that the *oxen* were ſeized differently, and affected with different ſymptoms in different places, though the cauſe of the diſtemper was evidently the ſame in them all.

Some of the cattle, he obſerved, voided great quantities of blood by the urinary paſſages. Theſe uſually died, and on opening them the blood was always found fluid, and the brain was often decayed, or full of fœtid matter; and the marrow in their bones was found dried up and waſted, and all the humours were found evidently tending to a ſtate of corruption.

This author rejects bleeding in all periods of the diſeaſe, as a practice that could be of no uſe in a caſe where the blood and humours had all loſt their due ſtate, and were tending to corruption. He recommends ſcarification and cauteries; he alſo greatly recommends the trepanning the horns to the medullary part, and the making ſetons in the ears, on their necks, and in their breaſts: the only internal medicine he preſcribes is a mixture of the theriaca diateſſaron, two ounces; diaſcordium, one ounce; powder of Peruvian bark, two ounces. This doſe is to be given every day, for three ſucceſſive days, diſſolved in three pints of the juice of brook-lime, water-creſs, and ſcurvy-graſs, with the addition of a pint of ſtrong white wine.

John Baptiſt Mazzini wrote in another part of the world, at the ſame time, on the ſame ſubject; with him we find, that the *oxen*, which were ſeized with the diſeaſe, continually had a running of a mucous matter from their noſe, and a weeping at the eyes; and that when the corners of theſe creatures eyes were waſhed with wine, in which ſage leaves had been infuſed, there came out ſeveral cluſters of ſmall and ſlender worms twiſted one among another, and forming little bundles of twenty and more. He obſerves alſo, that theſe creatures, when affected, uſually carried their heads upward, not bending to the earth as uſual. This author adviſes every thing to be done to promote perſpiration; he preſcribes contrayerva and angelica root, in white wine, in large doſes once or twice a day, warm; and recommends the fumigating their ſtalls with juniper and bay berries. The waſhing of their mouths and noſtrils with wine and ſulphur is alſo preſcribed in his treatiſe: a decoction of roſemary, fennel, and ſage, with white wine vinegar and ſalt, is alſo recommended as a drink to be often given; and he preſcribes the holding their heads forcibly in a depending poſture, that they may give opportunity to the ſaliva to run out, and the waſhing of their mouths with vinegar and ſalt to cleanſe it of the foulneſs. Mazzini, Litter. ad Valliſnier. de Peſte Boum.

Ox-*eye*, *buphthalmum*, in *Botany*, a genus of the *ſyngeneſia polygamia ſuperflua* claſs. Its characters are theſe: it hath a compound radiated flower, compoſed of hermaphrodite and female florets, and the hermaphrodite flowers compoſe the diſk and are funnel-ſhaped; in the center is ſituated an oval compreſſed germen, which becomes an oblong ſeed; the female florets which compoſe the rays are ſtretched out on one ſide like a tongue, and are indented at the top in three parts; theſe have no ſtamina, but a double-headed germen, which becomes a ſingle compreſſed ſeed, cut on each ſide. There are nine ſpecies.

An infuſion of the flowers of this plant is ſaid to be an excellent diuretic, and the leaves are eſteemed vulnerary, but neither are now in uſe.

Ox-*eye*, in the *Sea Language*, a name given by the ſeamen to thoſe dreadful ſtorms that are ſometimes met with on the coaſt of Guinea; for at firſt it appears in the form of an *ox*'s eye, and not much bigger; but it deſcends with ſuch celerity, that in a very little ſpace of time, and often before they can prepare themſelves for it, it ſeems to them to overſpread the whole hemiſphere; and at the ſame time forces the air with ſo much violence, that the ſhips are ſometimes ſcattered ſeveral ways, ſome directly contrary, and ſometimes are ſunk downright.

Ox-*eye*, *certhia*, in *Ornithology*. See Creeper.

Ox-*eye*, or *great titmouſe*. See Fringillago.

Ox-*eye*, in *Optics*. See Scioptic and Camera *obſcura*.

Ox-*eye daiſy*. See *Corn* Marygold.

Ox-*fly*, in *Natural Hiſtory*, a ſpecies of two-winged fly, bred from a fly-worm, hatched under the ſkin of oxen, from the egg of the parent fly lodged there.

The female of this fly makes a number of ſmall wounds in the backs of the horned cattle, and in each of theſe depoſits an egg: which is afterwards hatched by the warmth of the creature's body. As ſoon as hatched, the young worm finds itſelf in a very convenient lodging, and in a way to be furniſhed with all the neceſſaries of life.

The places where they lie are eaſily diſcovered, as there is ever a tumor about them, like that on the foreheads of children from falls; within this, and under the thick ſkin of the creature, is the worm lodged. The country-people know very well that a worm is contained within each of theſe tumors, but they are ſomewhat miſtaken as to the fly it comes from; the gad-fly being the moſt buſy about theſe creatures, and giving them moſt vexation, they naturally enough have ſuppoſed this the produce of the egg of that fly; but this is an erroneous opinion: Mr. Valliſnieri ſeems the firſt who underſtood the true ſtate of the caſe, and he has given a very full and excellent account of it.

Theſe worms may be properly enough ſtyled the inhabitants of animal galls, ſince the tumors which contain them are truly analogous to the galls of the oak and other the like vegetable excreſcences.

The hole in theſe tumors is not only uſeful to the animal for a breathing place, but it has another not leſs neceſſary uſe; which is to let off a quantity of abundant matter formed in the tumor, which would, if confined there, occaſion a large abſceſs, and choak and deſtroy the animal.

If theſe worms were endued with the qualities of thoſe of the common fleſh-fly, and had hooks at their head-part to tear and pull the fleſh in pieces, the creature who had thirty or forty of theſe gnawing devourers in its back, preying upon its fleſh at once, would be in a very miſerable ſtate: but this is by no means the caſe, the creatures having no organs to tear its fleſh with, they only live on the matter found in the abſceſs, and give the creature no great pain; being only like ſo many tents kept in a wound neceſſary to be preſerved open, or ſo many peas in iſſues.

The worms may at any time be diſlodged from theſe tumors, by a moderate preſſure, and made to come out at the hole of the tumor. This, though it appear conſiderably too little, yet anſwers the purpoſe; as the body of the worm well enough bears preſſure, and it is only neceſſary, in order to get them out whole, to renew the force upon the tumor, for the puſhing out every ſeparate ring of its body.

As ſoon as it is out of its habitation, it falls to the earth, where it crawls ſlowly about till it finds a place where it may reſt to go through its ſeveral changes, under a ſtone, or in any quiet place.

Stags and ſome other animals are ſubject to theſe worms in the ſame manner as oxen, and the ſeveral ſtages they go through in the tumors on theſe animals are the ſame with thoſe of the ox.

When they have fixed upon a place to reſt in for their changes, they loſe all motion, and their ſkin becomes black and hard, and makes a ſhell for their remaining in through their ſucceeding changes.

When the time of the egreſs of the fly is come, it appears a two-winged one indeed, but ſo extremely like the humble-bees of a middling ſize, that it is not eaſily to be diſtinguiſhed for what it is: one humble-bee cannot be more like another than theſe flies are to that ſpecies of them; their bodies are as ſhort, all of the ſame colours, and are even more hairy.

This fly, cloſely examined, appears to be of the ſecond claſs, and to have a mouth without teeth or lips, and its mouth very ſmall; the antennæ are ſhort, rounded at their ends, and of a gloſſy hue; the reticular eyes are of a deep cheſnut colour.

The female has, in the under and hinder part of her body, a cylindric tube, which ſhe can thruſt out at pleaſure, and which is the inſtrument with which ſhe pierces the ſkin of the animal to depoſit her egg. Reaumur Hiſt. Inſ. vol. iv. p. 503, ſeq. to 537.

Ox-*lip*. See Primrose.

Ox-*tongue*. See Picris.

OXGANG, or Oxgate *of land*, is ordinarily taken, in our old law-books, for fifteen acres; being as much land as it is ſuppoſed one ox can plow in a year.

Bovata terræ, q. d. quantum ſufficit ad iter vel actum unius bovis.

In Lincolnſhire they ſtill corruptly call it *oſkin* of land.

This term is uſed in Scotland for a portion of arable land, containing thirteen acres.

OXALIS, in *Botany*. See *Wood* Sorrel.

OXALME, in the *Materia Medica of the Ancients*, the name of a compoſition of vinegar and brine, made by a ſolution of ſea-ſalt in water. This was uſed externally in ulcers, and ſuppoſed of great ſervice againſt the bites of venomous animals, and for the curing children's ſcabby heads. It was alſo uſed as a ſtyptic poured into wounds, and was ſometimes given warm in clyſters; but theſe were always followed by thoſe of milk.

OXELÆUM, a word uſed by many authors to expreſs a mixture of vinegar and oil, for outward application, in caſes of bruiſes and other injuries.

OXUCIÆ, in *Natural Hiſtory*, the name of a genus of foſſils of the claſs of the *ſelenitæ*, but of the columnar, not the rhomboidal kind.

The word is derived from the Greek *οξυς*, *ſharp*, and *κιων*, a *column*; and expreſſes a body of a columnar form, and pointed or ſharp at the ends.

The *ſelenitæ* of this genus conſiſt of ſix equal planes, having their top or bottom no broader or more depreſſed than the others; and in this differing from the *iſchnambluces*, or flatted columnar *ſelenitæ*, as they do from the *iſambluces* or *cryſtalliform*, but broken ended ones, by having their ends naturally tapering off to a point. See *Tab. of Foſſils, Claſs* 2.

The bodies of this genus, like thoſe of the other genera of the columnar *ſelenitæ*, are liable to a longitudinal crack in their middle; and this ſometimes includes a little clay, in form of an ear of graſs. See Selenitæ.

Of this genus there are only two known ſpecies.

OXYA, in *Botany*, a name by which many authors, eſpecially the Greeks, have called the *fagus* or *beech-tree*.

OXYBLATTA, among the *Ancients*, is uſed to denote a bright and gloſſy kind of purple colour.

OXYCEDRUS, in *Botany*, a name given by ſome authors to the *cedrus folio cupreſſi*, or the *berry-bearing cedar.* Chabræus, p. 72.

OXYCOCCUS, in *Botany*. See WHORTLE-*berry*.

OXYCRATE, *oxycratum*, οξυκρατον, formed of οξυς, *ſharp*, *ſour*, and κεραννυμι, *I mix*, in *Pharmacy*, &c. a mixture of water and vinegar.

The uſual proportion is one ſpoonful of vinegar to five or ſix of water.

Oxycrate is proper to aſſuage, cool, and refreſh. They make fomentations of *oxycrate*, clyſters, of *oxycrate*, &c.

OXYCROCEUM, formed from οξυς, *ſharp*, *ſour*, and κροκος, *ſaffron*, in *Pharmacy*, a preparation much uſed in plaſters for fractures, and to form calluſes; compoſed chiefly of ſaffron, with gums diſſolved in vinegar.

OXYGALA, οξυγαλα, formed from οξυς, *ſharp*, *ſour*, and γαλα, *milk*, ſour milk.

The Turks uſe this as a popular drink, and call it *igur*. Vigenere ſays, they drink ſour milk diluted with water; which is found to cool and nouriſh better than the milk alone.

OXYGARUM, a word uſed by the ancients to expreſs a mixture of vinegar and GARUM, which is a pickle for preſerving fiſh, or a ſimple mixture of ſea-ſalt and water.

OXYGLUCA, a word uſed by the ancients to expreſs a liquor made of a mixture of honey, water, and vinegar. The common way of making it was by macerating the combs, after the honey was preſſed out, in water; and then adding a ſmall portion of vinegar, to give it a tartneſs. It was ſometimes made without the addition of the acid, and made a weaker ſort of mead, uſed as a common drink in hot weather. Galen ſays it was the ſame with the *apomeli*.

OXYGONIUS, *oxygonous*, formed of οξυς, and γωνη, *angle*, in *Geometry*, *acute-angled*; a figure conſiſting wholly of acute angles, or angles leſs than ninety degrees.

The word is chiefly applied to triangles, where the three angles are all acute, or leſs than ninety degrees each.

OXYLIPES, a word uſed by ſome authors as a name for bread, which has a mixture of vinegar in it; intended ſometimes for eating, ſometimes for medicinal uſes.

OXYMEL, οξυμελι, formed from οξυς, *ſour*, and μελι, *mel*, *honey*, in *Pharmacy*, a mixture of honey and vinegar boiled to the conſiſtence of a ſyrup.

There are two kinds of *oxymel*, the one *ſimple*, the other *compound*.

OXYMEL *ſimple*, is compoſed of two pounds of good HONEY, and a pint of white-wine vinegar, boiled into the conſiſtence of a ſyrup; it is proper to incide and ſcour any phlegm adhering to the throat and breaſt.

OXYMEL, *compound*, only differs from the *ſimple*, in that to the honey and vinegar they add the decoction of the five greater opening roots; with the ſeeds of ſmallage, parſley, and fennel. It is uſed to open obſtructions of the liver and ſpleen.

OXYMEL *colchicum of Storck*. See COLCHICUM.

OXYMORON, or *ſeeming contradiction*, in *Rhetoric*, is a ſpecies of ANTITHESIS, when the parts of a ſentence diſagree in ſound, but are conſiſtent in ſenſe. Thus Ovid, lib. viii. ver. 47, ſays of Althea, *impietate pia eſt*.

OXYMYRSINE, in *Botany*, a name by which authors have called the *ruſcus*, or *butcher's broom*.

OXYPHŒNICON, in *Botany*, a name uſed by ſome authors for the tree whoſe fruit is the *tamarind* of the ſhops.

OXYPYCNI, οξυπυκνοι, in the ancient Greek *Muſic*, was a name given to ſuch chords as formed the higheſt ſounds of the *ſpiſſa*. There were five *oxypycni* in the ſcale. See PYCNI and SPISSUM.

OXYREGMIA, οξυρεγμια, formed from οξυς, and ερευγω, *ructo*, in *Medicine*, a ſourneſs of the ſtomach-liquor, occaſioning acid belches. See RUCTATION.

OXYRRHODON, *oxyrrhodinum*, compoſed of οξυς, *ſour*, and ροδον, *roſe*, a mixture of two parts of oil of roſes, and one part of vinegar, ſtirred together for ſome time.

To theſe are ſometimes added diſtilled waters. It is uſed for inflammations and to dry up tetters.

Scultetus preſcribes it as follows: two whites of eggs beaten, one ounce and a half of vinegar of roſes, four ounces of roſe-water, and two ounces of oil of roſes.

OXYRYNCHUS, in *Ichthyology*, the name of a fiſh of the truttaceous kind, called by ſome *bautin*, and *outin*. It is caught frequently in the Engliſh and other ſeas, and is frequently carried to market in Holland among the whitings. It is very much of the ſhape and figure of the trout, but a little flatter, and is covered with large white ſcales.

OXYS, in *Botany*. See *Wood* SORREL.

OXYSACCHARUM, οξυσακχαρον, compounded of οξυς, *ſour*, and σακχαρον, *ſugar*, a liquid medicine, compoſed of ſugar and vinegar.

The name is more peculiarly given to a ſyrup prepared with vinegar, the juice of ſour pomegranates and ſugar; uſed to cool, refreſh, and reſiſt the malignity of peccant humours.

OXYSAL *diaphoreticum*, the name of a compound medicine greatly recommended by ſeveral authors, and invented by Angelus Sala. The manner of preparing it is this: take fine ſalt of carduus benedictus, put it into an earthen pot, and pour upon it gradually ſome ſtrong wine-vinegar, or ſpirit of ſugar; continue to pour this on till the ebullition ceaſes, and an agreeable ſmell ariſes, and the matter has an agreeable, though ſomewhat acid, taſte; let all the humidity from this mixture be evaporated over a gentle heat; and after this, let all the ſalt be again diſſolved in water, and ſet in digeſtion in blaneo Mariæ for eight days: a liquor of a beautiful and pellucid colour is there produced, which, when poured carefully off into another veſſel, is to be again evaporated to a dryneſs with a very gentle heat, and the remaining matter, which is the ſalt, is to be collected together, and kept in a phial carefully ſtopt; for it is ſubject to run, if left to the acceſs of the air, like the common alcali ſalt.

OXYSCHÆNOS, in the *Materia Medica*, the name of the *juncus acutus capitulis ſorgli*; *or hard pricking large ſea-ruſh*.

OXYTOCHIA, formed of οξυς, *ſharp*, and τιπτω, *I bring forth*, in *Medicine*, a term uſed by many authors to expreſs ſuch medicines as are given to promote delivery.

OXYTRIPHYLLUM, in *Botany*, a name uſed by ſome authors for the *trifolium bituminoſum*, or *ſtinking trefoil*.

OYER ſeems to have been anciently uſed for what we call ASSISES.

OYER *and terminer*, a commiſſion directed to the judges and other gentlemen of the county to which it is iſſued, by virtue whereof they are empowered to hear and determine treaſons, and all manner of felonies and treſpaſſes.

The term is French, and literally denotes to hear and determine. In our ſtatutes it is ſometimes written *oyer and determiner*.

It is the firſt and largeſt of the five commiſſions by which our judges of aſſize do ſit, in their ſeveral circuits.

Anciently it was only in uſe upon ſome ſudden outrage, or inſurrection, in any place.

OYER *de record* is a petition made in court, praying that the judges, for better proof-ſake, will be pleaſed to hear, or look upon, any record.

In the like ſenſe, a perſon may demand *oyer* of a bond, deed, covenant, or the like.

O YES, a corruption of the French *oyez*, *hear ye*, being a term, or formula, wherein the criers in our courts enjoin ſilence or attention, before they make proclamation of any thing.

OYSTER, *oſtrea*, in *Natural Hiſtory*, the name of a very large genus of ſhells, the characters of which are theſe: it is a bivalve ſhell, of a coarſe external ſtructure, and dirty appearance, each ſhell being compoſed of a great number of laminæ not nicely cloſed down upon one another. It is in ſome ſpecies ſmooth, in others ſtriated, tuberous, or prickly; uſually flat, but ſometimes globoſe, plicated, and wrinkled into ſinuſes; the lower ſhell being always deeper than the other. Its animal is a TETHYS. Under this genus Linnæus enumerates thirty-one ſpecies. Aldrovand ſuppoſes this genus of ſhell-fiſh obtained the name *oſtreum*, from the Greek οστεον, *a bone*, as they are of a bony hardneſs. See *Tab. of Shells*, N° 17.

Moſt authors have confounded the two genera of *oyſters* and chamæ together, though there is an obvious and invariable diſtinction. The *oyſter* is rough, and has a ſort of beak; and notwithſtanding the roughneſs of both ſhells, it always ſhuts very evenly and firmly: add to this, that one of its ſhells is flat, the other convex; and is thus abſolutely diſtinguiſhed from the chamæ. Hiſt. Nat. Eclair. p. 313.

Oyſters in their growth become faſtened to every ſolid ſubſtance which they happen to come into contact with; and rocks, ſmall ſtones, wood, ſea-plants, and a thouſand other things, are found at times with *oyſters* adhering to them, whoſe ſhells have fitted themſelves to the form of the thing itſelf, and loſt their natural ſhape. The people who fiſh for, and trade in *oyſters*, pretend to diſtinguiſh two kinds; one which is fecund, and will breed; the other, which is barren. They ſay, they diſtinguiſh theſe by a little black fringe, which always ſurrounds the good breeding *oyſters*.

The way to make *oyſters* green is, to put them into ſmall pits where the water is about three feet deep, in the ſalt marſhes, and where the ſun has great power; in theſe they become green in three or four days.

The ſpecies of *oyſters* being very numerous, they may be better underſtood by being arranged under ſome general heads.

1. Some *oyſters* are plane and ſmooth.
2. Some *oyſters* are ſmooth, yet foliated on the ſurface.

3. Some *oyſters* are of a globoſe form, and carry ſpines on their ſhells.

4. Some *oyſters* are of a globoſe figure, and jagged with high-raiſed laminæ.

5. Some *oyſters* are oblong and umbonated.

The *oyſter* affords the curious in microſcopic obſervations a very pleaſing entertainment. In the clear liquor many little round living animalcules have been found, whoſe bodies being conjoined, form ſpherical figures, with tails not changing their place otherwiſe than by ſinking to the bottom, as being heavier than the fluid; theſe have been ſeen frequently ſeparating, and then coming together again. In other *oyſters*, animalcules of the ſame kind were found, not conjoined, but ſwimming by one another, whence they ſeemed in a more perfect ſtate, and were judged by Mr. Leewenhoeck to be the animalcules in the roe or ſemen of the *oyſter*.

A female *oyſter* being opened, incredible multitudes of ſmall embryo *oyſters* were ſeen, covered with little ſhells, perfectly tranſparent, and ſwimming along ſlowly in the liquor; and in another female the young ones were found of a browner colour, and without any appearance of life or motion.

Monſieur Joblot alſo kept the water running from *oyſters* three days, and it appeared full of young *oyſters* ſwimming about nimbly in it; theſe increaſed in ſize daily, but a mixture of wine, or the vapour of vinegar, killed them.

In the month of Auguſt *oyſters* are ſuppoſed to breed, becauſe young ones are then found in them. Mr. Leewenhoeck, on the fourth of Auguſt, opened an *oyſter*, and took out of it a prodigious number of minute *oyſters*, all alive, and ſwimming nimbly about in the liquor, by means of certain exceeding ſmall organs, extending a little way beyond their ſhells; and theſe he calls their beards. In theſe little *oyſters* he could diſcover the joinings of the ſhells, and perceived that there were ſome dead ones, with their ſhells gaping. Theſe, though ſo extremely minute, are ſeen to be like the large *oyſters* in form.

As to the ſize of them, he computes, that a hundred and twenty of them in a row would extend an inch; and, conſequently, that a globular body, whoſe diameter is an inch, would, if they were alſo round, be equal to a million ſeven hundred and twenty-eight thouſand of them. He likewiſe found animalcules in the liquor five hundred times leſs than the embryo *oyſters*. Leewenhoeck, Arcan. Nat. tom. iv. p. 513.

It is not very uncommon to ſee on *oyſter*-ſhells, when in a dark place, a ſhining matter or bluiſh light, like a flame of brimſtone, which ſticks to the fingers when touched, and continues ſhining and giving light for a conſiderable time, though without any ſenſible heat. This ſhining matter being examined with a microſcope, was found to conſiſt of three different ſorts of animalcules. Phil. Tranſ. Nº 279. See OYSTER-*worm*, infra.

From another account, preſerved in Sprat's Hiſtory of the Royal Society, from p. 307 to 309, we learn that the *oyſters* caſt their ſpawn, which the dredgers call their ſpat, in the month of May; this ſpat cleaves to ſtones, old *oyſter*-ſhells, pieces of wood, &c. at the bottom of the ſea, which they call cultch; and it is conjectured, that the ſpat in twenty-four hours begins to have a ſhell. In the month of May, the dredgers, by the law of the admiralty court, have liberty to take every kind of *oyſter*, whatſoever be their ſize. When they have taken them, they gently raiſe with a knife the ſmall brood from the cultch, and then they throw the cultch in again, to preſerve the ground for the future, unleſs they be ſo newly ſpat, that they cannot be ſafely ſevered from the cultch: in this caſe they are permitted to take the ſtone or ſhell, &c. which the ſpat is upon, one ſhell having often twenty ſpats. After the month of May, it is felony to carry away the cultch, and puniſhable to take any other *oyſters*, except thoſe of the ſize of a half-crown piece; or ſuch as when the two ſhells are ſhut will admit of a ſhilling to rattle between them. This brood, and other *oyſters*, are carried to creeks of the ſea, and thrown into the channel, which are called their beds or layers, where they grow and fatten; and in two or three years the ſmalleſt brood will become *oyſters* of the foreſaid ſize. There are great penalties, impoſed by the admiralty court, upon thoſe that fiſh out of the grounds which the court appoints, or that deſtroy the cultch, or that take any *oyſters* that are not of the proper ſize, or that do not deſtroy a fiſh, which they call the five-finger, the common ſea-ſtar, becauſe that fiſh gets into the *oyſters* when they gape, and ſucks them out. The reaſon of the penalty for deſtroying the cultch is, that they find when this is taken away, the ouſe will increaſe, and the muſcles and cockles will breed there, and deſtroy the *oyſters*, becauſe they have no convenience for depoſiting their ſpat. The *oyſters* are ſick after they have ſpat; but in June and July they begin to mend, and in Auguſt they are perfectly well: the male *oyſter* is black-ſick, having a black ſubſtance in the fin; and the female white-ſick, as they term it, having a milky ſubſtance in the fin. *Oyſters* are ſalt in the pits, ſalter in the layers, and ſalter at ſea. It is obſerved, that when the tide comes in, they lie with their hollow ſhell downwards, and when it goes out they turn on the other ſide; they do not remove from their places, except in cold weather to cover themſelves in the ouſe.

OYSTER *fiſhery*. See FISHERY.

OYSTERS, *foſſile*. The greateſt bed of foſſile *oyſters* any where known is that near Reading, in Berkſhire. They have the entire ſhape, figure, and are of the ſame ſubſtance with the recent *oyſter*-ſhells, and yet muſt have lain there for a long time, the oldeſt hiſtories that mention the place giving an account of them. They are extended over no ſmaller a ſpace than ſix acres of ground; and juſt above them there is a large ſtratum of a greeniſh loam, called by ſome writers a green earth, and by others a green ſand. It is compoſed of a crumbly marle, and a very large portion of ſand. Under them there is a thick ſtratum of chalk. They all lie in a level bed, and the ſtrata above the ſhells are natural and have never been dug through till the time of finding the ſhells.

The *oyſter*-ſhells and green earth together make a ſtratum of about two foot thick; and over this a much thicker ſtratum, of a bluiſh and very brittle clay; but this has never been dug through, except where we find the ſhells. The people call this *piecy-clay*, and ſay it is fit for no uſe. This bed of clay is about a yard deep, and above it is a ſtratum of fuller's earth, about two foot and a half deep; it is of a very good kind, and is uſed by the clothiers. Over this there lies a ſtratum of a fine white ſand unmixed either with the clay or fuller's earth: this is near ſeven feet deep, and above this there is a ſtratum of a ſtiff red clay, of which they make tiles in the place. This is covered with a little vegetable mould, and the depth of this ſtratum of tile-clay cannot be aſcertained, becauſe of the unevenneſs of the hill.

Theſe *oyſters* are ſometimes found whole, but more uſually in ſingle ſhells. When they are in pairs, there is uſually ſome of the green ſand found within them: they ſeldom ſtick very faſt together; ſo that unleſs very carefully taken up, it is not eaſy to get them in pairs. Phil. Tranſ. Nº 261. p. 484.

OYSTER-*ſhells*. Theſe are an alkali of a more powerful kind than is commonly ſuppoſed, and probably are in reality much better medicines than many of the more coſtly and pompous alkalis of the ſame claſs. The proof of alkalis is in their ſolution by acid ſpirits; and Mr. Homberg found, that they diſſolved much more eaſily in the acids of nitre and ſea-ſalt than pearls, coral, and the reſt; which he ſuppoſes owing to their containing in the body of the ſhell a conſiderable portion of ſal-ſalſus, which is eaſily perceived upon the tongue, and which keeps the whole ſubſtance of the ſhell in a ſort of half-diſſolved ſtate. Theſe ſhells are found to produce very great effects on the ſtomach, when injured by acid humours; and Mr. Homberg is of opinion that this their eaſineſs of ſolution is one great reaſon of their good effects, and that the quantity of ſal-ſalſus which they contain, contributes not a little towards it, ſince we are not to look upon that as a mere ſalt, but a ſalt of a peculiar kind, formed of ſea-ſalt by the organs of the animal, and the ſeveral fermentations it undergoes in the body of it, in the ſame manner as the nitrous and other ſalts of the earth ceaſe to be nitrous, &c. as ſoon as they have been blended with the juices of plants, and form with them a ſalt peculiar to that plant; and this is plainly the caſe in regard to this ſalt, ſince it is evidently of a more penetrating taſte, and of a different ſmell, from the ſalt left by the ſea-water between the ſeveral external ſcales, or flakes of the ſhell.

As *oyſter*-ſhells were found by Mr. Homberg to be a very valuable medicine, and as one of the common methods of preparing them is by calcination, which he obſerves cannot but much impair their virtues, he gives the following method of preparing them for taking inwardly, which was what he always uſed.

Take the hollow ſhells of the *oyſters*, throwing away the flat ones as not ſo good; waſh them perfectly clean, and then lay them to dry in the ſun: when they appear dry, beat them to pieces in a marble mortar, they will be then found to contain yet a large quantity of moiſture; lay them again in the ſun till perfectly dried, and then finiſh the powdering them, and ſift the powder through a fine ſieve. Give twenty or thirty grains of this powder every morning, and continue it three weeks or a month. Mem. Acad. Par. 1700.

For the method of calcining *oyſter*-ſhells, and thus preparing a phoſphorus, ſee *Canton's* PHOSPHORUS.

OYSTER *worm*, in *Natural Hiſtory*, a name given by writers to a kind of ſmall worm found in *oyſters*, which ſhines in the dark, in the manner of the glow-worm; but with an univerſal light, and not in a peculiar part only.

The firſt obſerver of theſe *oyſter-worms* was M. De Lavoye, who communicating his obſervations to M. Auzout, gave occaſion to a very diſtinct account of them from this author.

The firſt thing that preſents itſelf on the opening of the *oyſters* which contain theſe worms, is only a ſort of ſhining clammy moiſture, which appears like a ſtar of a blueiſh colour, and, being drawn out, will extend itſelf to near half an inch long, and ſhine as much for that whole length as in the contracted ſtate; it will alſo ſhine for ſome time after it is taken out of the *oyſter*.

On a ſtricter obſervation, theſe ſhining ſubſtances are found to be real living worms, and there are indeed three diſtinct ſpecies of them. One ſort is whitiſh, and has twenty-four or twenty-five feet on each ſide: there is a black ſpeck on one ſide the head, and the back exactly reſembles that of an eel, when the ſkin is ſtripped off. The black ſpeck in the head is certainly an eye; and it is remarkable that the creature has but one. The ſecond ſort of theſe worms is red; this alſo has but one eye; its body is made up of ſeveral rings; its noſe is like that of a dog, and it has the ſame number of feet with the former. The third ſort is very different from the other two; it is ſpeckled, and its head is like that of a foal, and has a tuft of hair on each ſide. There are other worms found alſo in the *oyſter*, particularly a large greyiſh one, with two horns, a great head, and ſeven or eight whitiſh feet; but theſe do not ſhine. This light occurs more frequently in large than in ſmall *oyſters*; there are few of theſe large ones that do not yield it in the ſhells, and in ſome it is ſeen in the *oyſters* themſelves. Journal de Sçavans, 1666.

OZE, a word uſed by ſome writers to expreſs a *fœtor*, or *ill ſmell of the mouth*.

OZENA, οζαινα, in *Medicine*, a putrid and ſtinking ulcer, in one or both noſtrils; wherein the humour is very acrid, or corroſive, ſanious, and ſometimes mixed with a bloody mucus.

It ſometimes proceeds from neglected or ill-managed wounds, contuſions, &c. in the noſtrils; eſpecially ſcorbutic, ſcrophulous, or venereal habits; and ſometimes follows the ſmall-pox.

It often ſpreads and eats through the alæ; and, at other times preys into the ſeptum naſi, cartilage, and os palati, eſpecially in venereal caſes; whence the great danger of the noſe in that diſtemper.

Fixed AIR, ſays Dr Percival, in his Eſſays, p. 235. conveyed by a proper tube into the noſtrils, ſeems likely to prove the beſt topical application in the *ozena*, whether the diſeaſe be ſeated in the *antrum Highmorianum*, or in the frontal ſinuſes It will be eaſy to guard the patient againſt drawing into his lungs too large a quantity of this air, by directing him to breathe with his mouth open during the operation.

P.

P, A labial conſonant, formed by a ſlight compreſſion of the anterior part of the lips, and retaining an uniform ſound, and the fifteenth letter in the Engliſh alphabet.

When the *P* is followed with an *H* in the ſame word, it has the ſound of an *F*; thus P*h*iloſophy is proncunced *F*iloſophy: and this is generally the caſe in words derived from the Greek.

P and *B* are ſo like each other, that Quintilian declares, that in the word *obtinuit*, his reaſon required him to put a *b*, but that his ears could hear nothing but a *p*, *optinuit*: hence in ancient inſcriptions, and old gloſſaries, it appears, that theſe two letters have often been confounded.

Several nations ſtill pronounce one for the other, the Welſh and Germans particularly, who ſay, *ponum vinum* for *bonum vinum*.

Plutarch obſerves, it was uſual for thoſe of Delphi to ſay βαλειν for παλειν, βικρον for πικρον; and among the Latins, as often as an *s* followed, the *b* was changed into a *p*, as *ſcribo*, *ſcripſi*.

P is ſometimes mute before *t*, as *accompt*; but in modern orthography it is uſually omitted.

P, in the *Italian Muſic*, frequently repreſents *piano*; which is what in our muſic we call *ſoft*, i. e. the force of voice or inſtrument is to be diminiſhed, ſo as to make a kind of echo.

P P ſignifies *piu piano*, i. e. *more ſoft*, or a ſecond echo, weaker or more remote than the former: and *P P P* ſignifies *pianiſſimo*, *ſofteſt of all*, or a third echo, the voice being as it were loſt in the air.

P. M. among *Aſtronomers*, is frequently uſed for *poſt meridiem*, or *afternoon*; and ſometimes for *poſt mane*, *after the morning*, i. e. *after midnight*.

P was alſo uſed among the ancients as a numeral letter ſignifying the ſame with the G, viz. a hundred; according to the verſe of Ugutio.

> *P ſimilem cum G numerum monſtratur habere.*

Though Baronius thinks it rather ſtood for ſeven.

When a daſh was added a-top of $\bar{\text{P}}$, it ſtood for four hundred thouſand.

St. Jerom obſerves, on Daniel, that the Hebrews had no *P*; but that the *ph* ſerved them inſtead thereof; adding, that there is but one word in the whole Bible read with a *P*, viz. *apadno*.

The Greek π ſignified 80. The Latins uſed P as an abbreviature. Thus P. ſtood for Publius, pondo, &c. in S.P.Q.R. or Senatus populuſque Romanus, for populus; R.P. denoted reſpublica; P.C. patres conſcripti; PR.S. prætoris ſententia, &c. On the French coins, P denotes thoſe that were ſtruck at Dijon.

P. in *Medicinal Preſcription*, is uſed for *pugil*, or the eighth part of a handful.

P. Æ. ſignifies *partes æquales*, equal parts of any ingredient: otherwiſe denoted by ā or ana.

P. P. ſignify *pulvis patrum*, i. e. Jeſuit's powder, or the cortex Peruvianus in powder; which is ſo called, becauſe firſt brought into Europe by thoſe fathers; and *p. p. t. preparatus*, *prepared*.

PABOS, in *Botany*. See CAAMINI.

PABULUM is ſometimes uſed among naturaliſts for fuel, or that part in combuſtible bodies which the fire immediately feeds on, or is ſupported by.

PACA, *mus paca* of Linnæus, in *Zoology*, the name of an American animal of the GUINEA-*pig* kind, having the general characters of the rat kind, and the voice and hair of the hog.

This is the largeſt of all the animals of this kind, being of the ſize of a ſmall pig. The colour of the upper part of the body is a dark brown; the lower part or ſides marked lengthways with lines of grey ſpots; and the belly white; it has five toes on each foot; and a very ſhort tail; it does not uſe its fore-feet in the manner of hands, as the other ſpecies do, but eats on the ground like the hog; and is in ſome places called the hog rabbit; it is uſually fat, and the fleſh very well taſted.— This animal inhabits Braſil and Guiana, and burrows underground. There is a variety, quite white, found on the banks of the river St. Francis. Ray and Pennant.

PACALIA, a feaſt held among the ancient Romans, in honour of the goddeſs *Pax*, Peace.

Alnhelmus, de Laud. Virgin. ſpeaking of the impure feſtivals and ceremonies of the heathens, calls one of them *Pænalia*; which paſſage Gronovius charges as faulty, alledging, that there was no feaſt of that name, but that it ſhould have been *Pacalia*, or perhaps *Palilia*.

The ancients, who perſonified, and even deified every thing, were not forgetful of Peace: ſhe had an altar at Rome, and a ſtately temple; and religious rites were paid her with great ſolemnity.

PACAMO, in *Ichthyology*, the name of a long-bodied fiſh of the muſtela kind, caught among the rocks, and of a very well-taſted fleſh It is uſually about eleven fingers long and grows narrower and ſmaller toward the tail; its head is large, broad, and thick; its mouth is of the ſhape of a half-moon, and has very ſolid but not ſharp teeth; its ſkin eaſily ſlips off from the body like that of an eel.

PACE, *paſſus*, *ſtep*, a meaſure taken from the ſpace between the two feet of a man in walking.

The *ordinary pace* of a man is two feet and a half; though many reckon it a yard: the *geometrical* or *German pace*, called alſo the *greater pace*, is five feet.

The ancient Roman and modern Italic mile conſiſts of a thouſand *paces*, *mille paſſus*. The French league is 3000 *paces*, and the German 4000.

PACE, in the *Manege*, is a certain manner of motion, or progreſſion of a horſe.

The natural paces of a horſe are three, viv. the WALK, TROT, and GALLOP: to which may be added an AMBLE, becauſe ſome horſes have it naturally.

For the *artificial paces*, ſee AIRS.

Horſes that mix their *paces*, i. e. ſhuffle betwixt a walk and amble, &c. are ſeldom of any value. The defect proceeds from their fretful, fiery temper: and ſometimes from a weakneſs either in their reins or legs.

PACES, in *Surgery*. See TOOTH-*drawing* and *Tab. Surgery*, *fig.* 13.

PACHAMAC, in *Mythology*, the name which the idolaters of Peru gave to the Sovereign Being whom they worſhipped, together with the ſun and other imaginary deities. The principal temple of this deity was ſituated in a valley, about four leagues from Lima, and was founded by the incas of Peru. This idol was held in the greateſt veneration. Pizarro derived great riches from the temple of *Pachamac*; and the ruins that ſtill remain furniſh a very high notion of its magnificence.

PACHAMAMA, the name of a Peruvian goddeſs.

PACHODECARHOMBIS, in *Natural Hiſtory*, the name of a genus of foſſils, of the claſs of the ſelenitæ.

The word is derived from the Greek παχυς, *thick*, δεκα, *ten*, and ῥομβος, *a rhombus*, and expreſſes a thick rhomboidal body, compoſed of ten planes. See *Tab. of Foſſ. Claſs* 2.

The characters of this genus are, that the ſelenitæ of it conſiſt of ten planes; but as the top and bottom in the leptodecarhombes, or moſt common kind of the ſelenitæ, are broader and larger planes than any of the reſt, the great thickneſs of this genus, on the contrary, makes its four longer planes in all the bodies of it, meeting in an obtuſe angle from its ſides, its largeſt planes. Of this genus there are four ſpecies.

PACHUNTICA, formed of παχυνω, *I incraſſate*, a term uſed by ſome medical writers to expreſs incraſſating medicines.

PACIFIC, peaceful, or free from troubles, tumults, &c.

PACIFIC *age* is a denomination given to that period in which our Saviour was born, on account of the general peace which then prevailed through the Roman empire.

PACIFIC *letters*, *literæ pacificæ*, in the *Ancient Church*, was a denomination given to all ſorts of letters teſtimonial, given by the biſhop or chorepiſcopus to their prieſts, when they had occaſion to travel abroad; certifying that the bearer was a catholic, and in communion with the church.

The life of pope Sixtus I. taken from the pontifical of pope Damaſus, mentions that pope as the firſt who introduced thoſe letters called *Formatæ*, *Canonicæ*, *Commendatitiæ*, *Communicatoriæ*, *Eccleſiaſticæ*, & *Pacificæ*.

PACIFIC *Ocean*, or South Sea, in *Geography*, that vaſt ocean which ſeparates Aſia from America; it is called *Pacific* from the moderate weather the firſt mariners, who ſailed in it, met with, between the tropics; and it was called South Sea, becauſe the Spaniards croſſed the Iſthmus of Darien from north to ſouth. It is properly the weſtern ocean with regard to America.

Geographers call the South Sea, *Mare Pacificum*, the *Pacific Ocean*, as being leſs infeſted with ſtorms than the Atlantic. M. Frezier affirms, it does not deſerve that appellation; and that he has ſeen as violent tempeſts therein as in any other ſea: but Magellan happening to have a very favourable wind, and not meeting with any thing to ruffle him, when he firſt traverſed this vaſt ocean, in 1520, gave it the name which it has retained ever ſince. Maty, however, adds, that the wind is ſo regular there, that the veſſels would frequently go from Acapulco to the Philippine Iſlands, without ſhifting a ſail.

PACIFICATION, the act of reſtoring or re-eſtabliſhing the public peace and tranquillity.

The word is applied to many ordinances of the kings of France, deſigned to pacify the troubles that occured in the kingdom, with regard to religion, during the ſixteenth century, and particularly appropriated to the periods put to the religious broils raiſed in France, in the year 1598, by the edict of Nantz; and the civil commotions, between the Engliſh and Scots, ending in 1638.

PACIFICATOR is commonly underſtood in the ſame ſenſe with mediator; viz. one who endeavours to reconcile princes or powers at variance.

Wicquefort makes a difference between mediator and *pacificator*. The peace being concluded between France and England, in 1621, the inſtruments on each ſide were put in the hands of certain ambaſſadors, who had been employed as *pacificators*, not as mediators, to be kept till ſuch time as the ratification had been exchanged. So the archbiſhop of Piſa, the duke of Tuſcany's ambaſſador at Madrid, was never eſteemed a mediator, though the French ambaſſadors allowed him to be preſent at the conferences held with the commiſſioners of Spain, to act as a *pacificator* of the differences between them. The grand-duke had not offered his mediation, nor would France have accepted it, Wicquefort, part ii. ſect. 11.

PACIFICATORS, in *Church Hiſtory*, a name given to thoſe who, in the ſixth century, followed the HENOTICUM of Zeno.

PACK, in *Commerce*, denotes a quantity of goods, made up in loads, or bales, for carriage. A *pack* of wool is a horſe's load, containing ſeventeen ſtone and two pounds, or 240 pounds weight. See WOOL.

PACKAGE. A duty ſet and rated in a table taken of goods and merchandizes; and all goods not ſpecified in the table are to pay for *package* duties, after the rate of one penny in the pound, according as they are valued in in the book of rates.

PACKERS are really, what their title expreſſes, *packers* as well as preſſers of all all ſorts of bale goods (intended for exportation), for the great trading companies and merchants, for which they are anſwerable, if they ſhould happen to receive any damage through bad package; beſides this, ſeveral of them are conſiderable dealers.

PACKET, or PACKET-BOAT, a veſſel appointed by government to carry the mail of letters, packets, and expreſſes, from one kingdom to another, by ſea, in the moſt expeditious manner. Thus the *packet-boats* under the direction of the poſt-maſter-general of Great Britain carry the mails from Dover to Calais, from Falmouth to Liſbon, from Harwich to Helvoetſluys, and from Parkgate to Dublin. See POST.

PACO *caatinga*, in *Botany*, a coniferous ſpecies of Braſilian CANNA. Margr.

The ſtalk of this plant, being chewed, attracts humours from the head: thus uſed it is heating and breaks the ſtone; and being chewed frequently in a day, and the juice ſwallowed, is an excellent remedy againſt the gonorrhœa, which it cures in leſs than three days, without the help of any other medicine. It is offenſive to the ſtomach by its acor, and therefore the frequent uſe of it is to be avoided.

There is a ſecond ſpecies of this plant, which is diſtinguiſhed by the ſweetneſs of its leaves underneath, and by its red flowers: and a third ſpecies, known by its ceruleous tetrapetalous flowers. Ray.

PACO *ſeroca*, in *Botany*, Marg. *piſo*, a ſpecies of Braſilian CANNA, which bears its fruit in cluſters at the bottom of the ſtalk. The freſh leaves as well as the ſtalk and fruit, before it is ripe, being rubbed, give a ſmell like ginger, which is very grateful, and therefore ſerves inſtead of ſpices. They are alſo uſed in hot baths. Ray.

PACOS, in *Zoology*, the name of a ſpecies of camel, uſually, but very imporperly, accounted a ſpecies of ſheep; and known among many by the name of the *Indian ſheep*, or *Peruvian ſheep*.

It very much reſembles that ſpecies of camel uſually known by the name of *glama*, and found in the ſame countries; but this is much ſmaller, and is much leſs tractable, and a very obſtinate animal.

The reaſon of this creature's having been accounted a ſheep is, that its hair is ſo long as to reſemble wool, and it is clothed prodigiouſly thick with it; its head and neck alone have more wool on them than the whole body of our largeſt ſheep: its body is clothed in the ſame proportion with a woolly hair equally fine; it is a much weaker creature than the glama, and is ſeldom uſed for carrying burthens, though the tame ones will carry from fifty to ſeventy-five pounds; but is kept as our ſheep, for the ſake of its wool and its fleſh, which is very well taſted, and is a rich food.

Theſe animals live in large herds, are very timid and exceſſively ſwift. The Indians take them in a ſtrange manner: they tie cords, with bits of wool or cloth hanging to them, about three or four feet from the ground, acroſs the narrow paſſes of the mountains, then drive the animals towards them, which are ſo terrified by the flutter of the rags as not to dare to paſs, but huddling together, give the hunters opportunity to kill with their ſlings as many as they pleaſe.

PACOURII, in *Botany*, De Laet. a vaſt tree growing in the iſland of Maragnan, belonging to Braſil; it bears leaves like thoſe of the apple-tree, a white flower, and a fruit of the bigneſs of two fiſts. The rind or peel of this fruit, which is about an inch thick, being boiled or preſerved in ſugar, is reckoned a delicacy. Ray.

PACQUING, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a ſmall bird of the ſparrow kind, but very beautifully variegated. It feeds on the ſeeds of graſs.

PACT, PACTUM, or PACTION, in *Law*, a covenant or convention between two or more parties.

Ulpian derives the word from the Latin verb *paciſci*, *to bargain*, *agree*, *contract*: others, with more probability, from *paco*, *I appeaſe* or *pacify*; or from *pango*, *I fix*, *eſtabliſh*.

The civil lawyers, after Ulpian, define the word *pact*, the conſent of two or more parties to the ſame thing. *Duorum aut plurium in idem conſenſus*, lib. iii. ſect. 2. *ff. de pactis*.

There are two ſpecies of conventions, viz. the *pact* and *contract*. A *pact* againſt good manners, againſt public or natural equity, is null. It is a maxim in law, *Ex nudo pacto non oritur lex*.

PACTA *conventa*, in Poland, are the articles agreed on between the king and the republic; and which they mutually oblige each other to obſerve.

PAD-*ſaddle*. See SADDLE.

PADDLE, a ſort of oar, uſed by the ſavages of Africa and America, to navigate their canoes. It is much ſhorter and broader in the blade than the oar of a boat, and irregularly employed in rowing and ſteering.

PADDLE, in *Glaſs-making*, the name of an inſtrument with which the workman ſtirs about the ſand and aſhes in the calcar.

PADDOCK, or PADDOCK-*courſe*, a piece of ground, conveniently taken out of a park, ordinarily a mile long, and a quarter of a mile broad, encompaſſed with pales or a wall, for the exhibiting of races with greyhounds, for wagers, plates, or the like.

At one end of the *paddock* is a little houſe, where the dogs are to be entered; and whence they are ſlipped; near which are pens to encloſe two or three deer for the ſport.

The deer when turned looſe, run all along by the pale; and the ſpectators are placed on the other ſide.

Along the courſe are ſeveral poſts; viz. the law-poſt, 160 yards from the dog-houſe and pens; the quarter of a mile poſt; half-mile poſt; and pincing poſt; beſide the ditch, a place made to receive the deer, and preſerve them from farther purſuit.

Near the ditch are placed judges or triers. The keeper, to ſlip the dogs fairly, puts a falling collar upon each, to ſlip through a ring; and the deer being turned looſe and put forward by a teazer, as ſoon as it is arrived at the law-poſt, the dog-houſe door is thrown open, and the dogs ſlipped.

If now the deer ſwerve ſo much, as that his head is judged nearer the dog-houſe than the ditch, before he arrives at the pinching-poſt, it is no match; but muſt be run over again three days after. If there be no ſuch ſwerve, but the deer runs ſtrait as far as the pinching-poſt, then the dog neareſt him, if he chance to ſwerve afterwards, or by any accident be blanched, or if there be no ſuch ſwerve, &c. the dog that leaps the ditch firſt wins the match.

PADLE, or PADLE-*ſtaff*, a ſmall ſtaff, ſhod with iron, for cleanſing the plough from ſtuble, dirt, &c.

PADOGI, a ſpecies of puniſhment uſed in Ruſſia. In this puniſhment the body of the criminal is ſtripped to the waiſt, and then laid upon the ground; one ſlave holds the head between his knees, and another the lower part of the body; then rods are applied to the back, till ſome perſon gives notice to deſiſt, by crying out, enough.— This puniſhment is conſidered in Ruſſia merely as a correction of the police, exerciſed on the ſoldier by military diſcipline, by the nobility on their ſervants, and by perſons in authority over all ſuch as are under their command.

Ever ſince the acceſſion of Elizabeth to the throne of Ruſſia, the puniſhments were reduced to two kinds, viz. the *padogi* and KNOUT.

PADUAN, among *Medaliſts*, a modern medal made in imitation of the antique; or a new medal ſtruck with all the marks and characters of antiquity.

The name is taken from *Paduan*, *Paduanus*, a famous Italian painter, who ſucceeded ſo well in the impoſture, if it may be ſo called, that the beſt judges are at a loſs to diſtinguiſh his medals from the genuine ones.

This *Paduan* was thus called from the place of his birth, Padua; his proper name was Giovanni Cavino; others ſay, Lewis Lee; he flouriſhed in the ſeventeenth century. Gotheb Rink adds, that he had an aſſociate in this forgery, called Alexander Baſſianus. His ſon Octavian, though born at Rome, was alſo called the *Paduan*.

PADUAN is properly applicable to thoſe medals only, which are ſtruck on the matrices of the elder *Paduan*; which are ſtill preſerved. Though it is frequently uſed in the general for all medals of this kind.

Joubert obſerves, that there have been a *Paduan* and *Parmeſan* in Italy, and a *Carteron* in Holland, who had the knack of imitating the antique in perfection. The *Parmeſan* was Laurentius Parmeſanus. We may alſo add another Italian who excelled in this way, viz. Valerius Bellus Vicentinus; but his medals are not ſo common as thoſe of the reſt.

PADUS, in *Botany*. See LAUREL.

PÆAN, ϖαιαν, in *Antiquity*, a hymn in honour of Apollo, or ſome other of the gods; chiefly uſed on occaſion of victory and triumph.

Feſtus derives the word *απο του ϖαιειν*, *ferire*, *to ſmite*, *ſhoot*: but Heſychius rather takes Apollo to have been denominated *Pæan*, from παιω, θεραπευω, *I heal*; in alluſion to his being the deity of medicine.

The *Pæan* took its name from Apollo himſelf; who was denominated *Pæon*; becauſe in his combat with the ſerpent Python, his mother Latona encouraged him to make uſe of his arrows, by crying frequently, *ιη ϖαι*, *ιη ϖαι*, *do boy*, *bravely boy*.

PÆAN or **PÆON** is alſo a name of a foot in the ancient poetry; ſo called, as commonly ſuppoſed, becauſe appropriated to the hymn *Pæan*; though Quintilian derives the name from its inventor *Pæon*, a phyſician. There were four kinds of feet called *Pæans*.

The firſt *Pæan* conſiſts of four ſyllables, one of which is long, and the reſt ſhort, as *colligere*; the ſecond is compoſed of a ſhort, a long, and two ſhort, as *reſolvere*; the third of two long, a ſhort, and a long, as *communicant*; and the fourth of three ſhort and one long, as *temeritas*.

PÆCILIA, in *Ichthyology*, a name given by Schoneveldt, and ſome others, to the fiſh called by moſt authors the *muſtela foſſilis*. It is properly a ſpecies of *cobitis*, and is called by Artedi the *bluiſh cobitis*, with five longitudinal black lines on the body.

PÆDARTHROCACES, in *Surgery*, is a diſeaſe of the bones, raiſing them into tumors near the joints, and differing from the ſpina ventoſa, in that it is not attended either with violent pains, or eroſions of the bone and adjacent parts.

The word is derived from the Greek, *ϖαις*, *a child*, *αρθρον*, *a joint*, and *κακον*, *an evil*, ſignifying that it is a diſorder of the joints, to which children are principally ſubject; which is the caſe, becauſe the bones of children being ſofter than thoſe of adults, are therefore the more eaſily diſtended by humours, and more frequently raiſed into tumors; theſe are hard in this caſe, and the adjacent ſoft parts are not inflated, and are free from redneſs, inflammation, and pain. It is, however, to be obſerved, that this diſorder, though at firſt very different from the SPINA *ventoſa*, is ſometimes known to degenerate into that diſorder. Heiſter.

PÆDERIA, in *Botany*, a genus of the *pentandria monogynia* claſs. It is of a twiſted form, the ſtyle is bifid, and the fruit is a brittle berry, containing two ſeeds. There is only one ſpecies.

PÆDEROTA, in the Linnæan ſyſtem of *Botany*, is a genus of plants of the *diandria monogynia* claſs; the characters of which are, that the cup is a perianthium, divided into four ſegments, and remaining after the flower is fallen; the ſeveral ſegments are ſtrait and pointed; the flower is compoſed of a ſingle petal, which forms a cylindric tube, nearly of the length of the cup, placed erect at its extremity, and divided into two labia, the upper of which is long, hollow, and narrow, the under expanded, but ſomewhat erect, broadeſt in its upper part, lightly divided into three ſegments, and thoſe all equal, the ſtamina are two filaments bent downward, and of the ſame length with the cup; the antheræ are ſomewhat erect; the piſtil has a roundiſh germen, a thread-like ſtyle, of the ſame length with the ſtamina, and a truncated ſtigma; the fruit is a flatted capſule of an oval figure, but bifid, and pointed at the top, conſiſting of two cells, with four valves; the ſeeds are very numerous, oblong, and obtuſe, and adhere to a columnar receptacle. There are two ſpecies, one of which is the *honorata* of Micheli.

PÆDEROTA, among ſome of the old botanical writers, is alſo a name given to the *acanthus*, or *bear's breech*.

PÆDO-BAPTISM, a compound of ϖαις, ϖαιδος, *infant*, and βαπτισμος, *baptiſm*, infant BAPTISM, or that conferred on children.

PÆDO-BAPTISTS, formed of ϖαις, ϖαιδος, *infant*, and βαπτιζω, *I baptize*, are thoſe who maintain that BAPTISM ſhould be adminiſtered to infants. In ſupport of this opinion, they plead, that if infants, under the Chriſtian diſpenſation, were excluded from the privilege of baptiſm, the Chriſtian inſtitution muſt appear, in this reſpect, to be leſs complete and perfect than that of the Jews: and it is not likely, by arguing *à priori*, that God would appoint an external ſign of peculiar diſtinction and benefit for children under the patriarchal and Jewiſh conſtitution, without any ſimilar appointment under the Chriſtian diſpenſation; more eſpecially as the firſt proſelytes to Chriſtianity, and thoſe in particular who were converted from among the Jews, would naturally expect ſome token of diſtinction and privilege, comprehending their children, and reſembling in its deſign, though milder in its nature, that which Chriſtianity had abrogated. This expectation was farther encouraged by the very condeſcending and affectionate manner in which our Lord expreſſes himſelf concerning infants; particularly when he ſays, Mark x. 14. "Of ſuch is the kingdom of God;" which ſome underſtand to ſignify, that the rights and privileges of the Chriſtian church belong to ſuch. With theſe views, it is eaſy to conceive to what ſubjects they would apply the general charge to baptize proſelytes, unleſs they had been directed and reſtricted by ſome expreſs order.

An order of limitation was abſolutely neceſſary to prevent their miſtaking the proper ſubjects of baptiſm, and miſapplying this ordinance, if infants were to be excluded. This would be the more likely, as they would explain the precepts of Chriſt, concerning baptiſm, by the cuſtom prevailing among the Jews, in his time: and as it was the practice, when proſelytes came over to the Jewiſh religion, to baptiſe the children with the parents, the apoſtles would naturally conclude, that children were included in the general commiſſion, Matt. xxviii. 19.

Mr. Wall has endeavoured to ſhew, from the books of the Jews themſelves, and thoſe of others, that underſtood the Jewiſh cuſtoms, and have written concerning them, that it was the cuſtom of the Jews before our Saviour's time, and, as they affirm, from the beginning of their law, to baptize as well as circumciſe any proſelyte that joined them from other nations, and with him, at his deſire, his infant children likewiſe.

Moreover, the advocates for infant baptiſm urge more directly the argument from circumciſion after this manner: the covenant made with Abraham was a covenant of grace, by which ſpiritual and eternal bleſſings were promiſed to him (ſee Matt. xxii. 31, 32. Heb. xi. 6. Rom. iv. 11—17. Gal. iii. 6—18. 29.) and as ſuch comprehended both Jews and Gentiles, and their ſeed. Circumciſion was inſtituted by God as a token of that covenant, and as ſuch, he commanded that it ſhould be adminiſtered to the infant offspring of his covenant people. Gen. xvii. 1—4. And yet, though the covenant endureth, that ancient token of it is aboliſhed; nor is there any external ſign or ſeal of it, under the Chriſtian diſpenſation, except baptiſm. We have, therefore, reaſon to think, that this ordinance was intended to ſucceed circumciſion, as it reſembles it in many reſpects, and ſeems to be called the circumciſion of Chriſt, by the apoſtle Paul, Col. ii. 11, 12. And inaſmuch as circumciſion was adminiſtered to infants, in token of this covenant, baptiſms being its ſubſtitute and antitype, ought to be adminiſtered to infants likewiſe. Conſult Acts ii. 39. Rom. xi. 17, &c.

Another argument for infant baptiſm is deduced from the words of the apoſtle, 1 Cor. vii. 14. which are ſuppoſed to have a direct reference to infant baptiſm; becauſe *holy* often ſignifies thoſe that might be admitted to ſacred rites, and *unclean* ſuch as were to be excluded from them. Doddr. *in loc.*

The *Pædo-baptiſts* acknowledge that there is no direct and expreſs command to baptize infants; but appealing to the hiſtory of the adminiſtration of baptiſm, they argue, that the apoſtles are ſaid to have baptized whole families, Acts xvi. 15. 33. 1 Cor. i. 16. and, therefore, probably infants, comprehended under this general denomination. And they apprehend, that they have been able to trace ſuch intimations at leaſt of infant baptiſm, in the earlieſt ages of the church, as may, to a high degree of probability, prove it to be an apoſtolic, and conſequently divine inſtitution.

Irenæus, who was born about the time of St. John's death, and probably of Chriſtian parents, mentions infants among the regenerate, i. e. the baptiſed, as the word generally ſignifies in his writings

Juſtin Martyr, about forty years after the time of the apoſtles, ſpeaks of ſome who had been *made diſciples* from their infancy.

Tertullian, about one hundred years after the apoſtles, though he adviſes parents to defer baptizing their children, except when their lives were in danger, ſpeaks of the practice as generally received and obſerved in his time.

Cyprian, about one hundred and fifty years after the apoſtles, is allowed by all to ſpeak expreſsly of infant baptiſm, as generally uſed in the church; and we learn, that, in his time, A. D. 253, a queſtion being agitated among ſixty-ſix biſhops, in the council of Carthage, Whether an infant muſt be kept till he was eight days old before he be baptized, all unanimouſly gave their opinion to the contrary.

There are many paſſages that expreſly refer to infant baptiſm in the works of Origen, who was born of Chriſtian parents; and as his father was martyred in the year 202, when he was ſeventeen years old, the remoter Chriſtians of his family muſt have been nearly contemporary with the apoſtles.

In the *Apoſtolic* CONSTITUTIONS, which are allowed to be very ancient, expreſs mention occurs of infant baptiſm, as commanded by Chriſt. Matth. xix. 14.

The learned Wall, who took great pains in this inquiry, informs us, that, in the firſt four hundred years after the apoſtles, there appears to be only one, viz. Tertullian, who, in ſome caſes, adviſed the delay of infant baptiſm; and another, viz. Gregory, who practiſed ſuch delay in the caſe of his own children: but no ſociety of men adopted this opinion, nor did any one perſon pretend to ſay it was unlawful to baptize infants: and in the next ſeven hundred years, there is not ſo much as one man to be found, that either ſpoke for or practiſed any ſuch delay; and, if truth were to be determined by numbers, the general and uniform practice of the Chriſtian church is very much in favour of infant baptiſm.

On the other hand, the Baptiſts plead, that infants are incapable of complying with the terms required in order to baptiſm, i. e. repentance and faith, and of receiving thoſe inſtructions which Chriſt directed, as previous to it. Matt. xxviii. 19. compared with 1 Peter, iii. 21. But the *Pædo-baptiſts* reply, that thoſe inſtructions and conditions were required only of thoſe who were capable of them. Beſides, the word μαθητευσατε, which ſome underſtand of *teaching*, previous to baptiſm, may ſignify *make diſciples:* and that infants may be comprehended under that name, ſome have argued from Acts xv. 10. The word uſed by Juſtin Martyr, in the paſſage above cited, and applied to infants, is εμαθητευσαν, And it has been farther alledged, that the penmen of ſcripture, and other Chriſtian writers, have commonly uſed the word to ſignify the reception of any one to the number and degree of diſciples, as preparatory to ſubſequent inſtruction; ſo that perſons, thus received in order to be taught, were, before the inſtruction itſelf, denominated diſciples. Compare Luke ix. 57. and Matt. viii. 19, 20, 21. Euſebius Evang. Demonſt. lib, iii. ſect. 7. where he ſtyles thoſe who were deſirous of learning of Chriſt, his diſciples.

It is farther objected, that infants are incapable of receiving any benefit from baptiſm; and that, in this caſe the ordinance is expoſed to contempt. The *Pædo-baptiſts* reply to this objection by maintaining on the contrary, that there are many advantages reſulting from baptiſm adminiſtered to infants, both to them and principally to their parents, whoſe immediate act it is; that an ordinance, as in the caſe of Chriſt, who was himſelf baptized, may ſometimes be adminiſtered to thoſe who are not capable of *all* the purpoſes for which it was originally inſtituted, and which it may ſubſerve with regard to others; and ſtill farther, that this argument againſt baptizing infants, by proving too much, proves nothing; for if infants are incapable of the ends of baptiſm, under the Chriſtian diſpenſation, infants under former diſpenſations were equally incapable of the ends of circumciſion; and, therefore, ſuch an inſtitution was uſeleſs and improperly enjoined.

The objection founded on the ſilence of the New Teſtament, with regar dto infants as the ſubjects of baptiſm, is already anſwered, in the beginning of this article, and the objection retorted againſt the Baptiſts themſelves. The hiſtory of the practice of baptizing infants has been already ſtated; and though it is urged, that Juſtin Martyr contends for a profeſſion of faith as neceſſary in order to baptiſm, whence was derived the uſe of ſponſors, in the caſe of infants, it is anſwered by the *Pædo-baptiſts*, that Juſtin ſpeaks of the adult, or may conſider the confeſſion of the ſponſor as the child's, being made in his name: and this is the more probable as the ſubſequent fathers uſe the ſame languege lnog after infant baptiſm was the prevailing practice.

The *Pædo-baptiſts* alſo differ from the Baptiſts as to the mode of adminiſtering this Chriſtian ordinance. The former perform it by ſprinkling or pouring on water; the latter by the immerſion of the whole body, which they conteſt to be an eſſential circumſtance. In favour of immerſion it is pleaded, that the word βαπτιζω, being derived from βαπτω, properly ſignifies *to plunge:* on the other hand it is urged, that in this diminutive and derivative form it may ſignify any method of waſhing, and is ſometimes uſed in ſcripture for waſhing things which were not dipped in water, but on which it was poured. Compare Luke xi. 38. Mark vii. 4. and thoſe paſſages in which the pouring out of the ſpirit is called baptiſm. Acts i. 5. 8. ch. xi. 15. 16. to which ſome add, 1 Cor. x. 2. obſerving that βαπτω is never uſed for baptiſm.

Farther, the Baptiſts argue, that John performed his baptiſm by immerſion, and that his practice is obligatory upon all Chriſtians. To this ſome have replied, that John's baptiſm is diſtinguiſhed from Chriſtian baptiſm, and that ſome, who had received his baptiſm, were again baptized in the name of Chriſt. Acts xix. 3, 4, 5. And, therefore, that his example does not bind Chriſtians. However, it is at leaſt doubtful, whether John, who was of the line of the prieſts that had been always uſed to perform their purifications by ſprinkling, did really baptize by immerſion. On the affirmative it is urged, that we read of his baptizing (εν) in Jordan: but to this is anſwered, that εν ſignifies *by*, *at*, or *with*, and conſequently furniſhes no proof that John plunged his diſciples into the river of Jordan. It is farther pleaded, that he choſe a place for this purpoſe, where there was much water; and this he might have done, for the convenience of ſprinkling as well as of plunging, conſidering the numbers that reſorted to his baptiſm, Matt. iii. 5. It is improbable, that ſuch multitudes of both ſexes, and at a diſtance from their own habitations, ſhould be baptized in any other mode.

Another argument, in favour of immerſion, is drawn from the account of Philip and the Eunuch. Acts viii. 38, 39. who went down (εις) *into* the water; and, after the baptiſm, they are both ſaid to come up (εκ) *out of* the water. But many paſſages might be cited, where εις ſignifies *to* or *unto*, and εκ *from*. Matt. xv. 24. chap. xvii. 27. chap iii. 11. John ix. 1. 2 Cor. v. i. Rev. xix. 5.

It is farther argued, that plunging alone repreſents our being buried with Chriſt in baptiſm, and conſequently that this ceremony is eſſential. Compare Rom. vi. 4. Col. ii. 12. The *Pædo-baptiſts*, though they allow that there is in theſe paſſages an alluſion to the mode of baptiſm which then generally prevailed, maintain, that in the inſtitution of the ordinance, there is no declaration that it was chiefly deſigned to repreſent this, and perſons were baptized before it was generally known that Chriſt ſhould die and ariſe from the dead. Our being cleanſed from ſin ſeems to be the thing primarily intended, which may well be repreſented by pouring on water; and as this more naturally repreſents the pouring out of the ſpirit, the ſprinkling us with it, and the ſprinkling of the blood of Jeſus, it may anſwer as valuable purpoſes as that mode, which, more directly, repreſents death and a reſurrection.

The moſt conſiderable argument in favour of immerſion is, that it was practiſed in the primitive ages. Several texts in the New Teſtament, ſay the Baptiſts, plainly declare this. Matt. iii. 6. 16. John iii. 23. Acts viii. 36—39. But from theſe paſſages, the *Pædo-baptiſts* reply, that no certain concluſion in favour of immerſion can be drawn; nor from the ſubſequent hiſtory of the Chriſtian church. Though they allow that immerſion might be uſed, there are ſome caſes in which it is more probable that the mode of baptiſm was ſprinkling; partly on account of the number baptized at once, and partly becauſe many of them were ſtrangers, and far from their own habitations, and therefore deſtitute of that change of raiment which decency, conveniency, and ſafety, would have required. We might add farther, that baptiſm by ſprinkling is, in its nature and the circumſtances attending it, more ſuitable to the mild and benign genius of Chriſtianity, and to the deſigned extent of it's ſpread through all the various climates of the earth, than baptiſm by immerſion. See, on this ſubject, Wall's Hiſtory of Infant Baptiſm, 4to. 1707. Wall's Defence of the Hiſtory againſt Gale, &c. 8vo. 1702. Towgood's Baptiſm of Infants a reaſonable Service. Fleming's Plea for Infants, &c. &c.

For a ſummary of the principal arguments in favour of baptizing adults, and by immerſion. See BAPTISTS.

PÆDOTHYSIA, παιδοθυσια in *Antiquity*, an inhuman cuſtom, that prevailed amongſt the ancient heathens of ſacrificing their children. Thus it is related in the ſcriptures, that the king of Moab, being beſieged by the Iſraelites in his capital, and reduced to great ſtraits, took his eldeſt ſon, that ſhould have reigned in his ſtead, and offered him for a burnt offering upon the wall, on which the ſiege was raiſed. 2 Kings iii. 27.

From Phœnicia this cruel practice paſſed into Europe, and Africa, and ſpread itſelf far and wide: and it is reported, that the Mexicans are, at preſent, guilty of it.

PÆNOE, in *Botany*, the name of a very large tree, which grows in Malabar.

The reſin, diſcharged from the root, bark, fruit, and other parts of this tree, when boiled with oil, is uſed either for a hard or liquid pitch; and is, in the Indian ſacrifices, ſometimes burnt inſtead of incenſe.

The kernels of the fruit when bruiſed, and, in conjunction with warm water, levigated on a marble, corroborate the ſtomach, remove a nauſea and vomiting, allay racking pains of the belly, and cure the cholera. The reſin of this tree, when melted with the oleum ſeſami, is an excellent vulnerary balſam; when reduced to a powder, and exhibited, it alſo powerfully cures a gonorrhœa, and other vulnerary ſymptoms. Ray.

PÆNULA, or PENULA, among the Romans, a thick ſhort, cloſe-bodied garment, fit for a defence againſt cold and rain.

PÆONIA, in *Botany*. See PIONY.

PÆONITES, in *Natural Hiſtory*, a name given by ſome writers to the ſtone called by others *pæanites*, and eſteemed of great uſe to women in labour. It ſeems to have been called *pæonites*, from Pæonia, in Macedonia, where it was found.

PAGAN, *paganus*, a heathen, gentile, or idolater, one who adores falſe gods.

Baronius derives the word *paganus, a pagis, villages*, becauſe, when Chriſtians became maſters of the cities, the heathens were obliged, by the edicts of Conſtantine and his ſons, to go and live in the country villages, &c.

Salmaſius will have the word come from *pagus*, conſidered as originally ſignifying *gens*, or *nation*: whence he obſerves, we ſay indifferently, *pagans*, or gentiles.

The abbot de Fleury gives another origin of *pagan*: he obſerves, that the emperor Conſtantine, going from Antioch, againſt Maxentius, in 350, aſſembled all his troops, and adviſed ſuch as had not received baptiſm to receive it immediately; declaring withal, that ſuch as ſhould be found unbaptized ſhould quit the ſervice, and go home.

Hence, perhaps, ſays the abbot, the name *pagan* might be given to thoſe who choſe the latter; the Latin word *paganus* properly ſignifying *a perſon who does not bear arms*, in oppoſition to *miles, a ſoldier*.

And hence it might, in time, extend to all heathens; or, continues he, the word might come from *pagus, village*, in regard the peaſants were thoſe who adhered longeſt to the idolatry of the heathens.

PAGANALIA, an ancient rural feaſt thus called, becauſe celebrated in the villages, *in pagis*. In the *paganalia*, the peaſants went in ſolemn proceſſion all around the village, making luſtrations to purify it. They had alſo their ſacrifices, wherein they offered cakes on the altars of the gods.

Halicarnaſſeus and St. Jerom refer the inſtitution of the *Paganalia* to Servius Tullus. They were held in the month of February.

PAGANELLUS, in *Ichthyology*. See GOGET.

PAGANINA, an Italian word, uſed by ſome authors to expreſs the firſt excrements of children: theſe dried and reduced to powder, are eſteemed by ſome a very great and powerful medicine againſt epilepſies. It is to be taken in ſmall doſes, every day, for ſome time.

PAGANISM, the religious worſhip and diſcipline of pagans; or the adoration of idols and falſe gods.

The gods of *paganiſm* were either men, as Jupiter, Hercules, Bacchus, &c. or ficticious perſons, as Victory, Fame, Fever, &c. or beaſts, as in Egypt, crocodiles, cats, &c. or finally, inanimate things, as onions, fire, and water, &c.

PAGARCHUS, παγαρχος, formed from *pagus, village*, and αρχη, *command*, among the ancients, a petty magiſtrate of a pagus, or little diſtrict, in the country.

PAGE, formed from παις, *child, boy*, a youth of ſtate, retained in the family of a prince, or great perſonage, as an honourable ſervant, to attend in viſits of ceremony, carry meſſages, bear up trains, robes, &c. and at the ſame time to have a genteel education, and learn his exerciſes.

The *pages* in the king's houſhold are various, and have various provines aſſigned them: as *pages* of HONOUR, *pages* of the preſence-chamber, *pages* of the back-ſtairs, &c.

Pages were anciently diſtinguiſhed from the other ſervants in livery, by their wearing drawers in lieu of breeches; and ſleeves turned up with velvet.

Cujas and Gothofred obſerve, that *pages* in the emperors families were called *pædagogiani pueri*. Fauchet ſays, the word *page* was firſt given to the little boys who attend tilers, to bring them their tiles, &c. that till the time of Charles VI. or VII the name was common to the baſeſt ſervants; and it is ſince then, that *page* is become a term of honour; and the meaner ſervants are diſtinguiſhed from them by the name of lacqueys, valets, &c.

PAGE, is particularly uſed, in the Turkiſh ſeraglio, for the children of tribute, or ſlaves who wait on the grand ſignior.

They are commanded by the firſt aga, and conſtitute four claſſes, called ODAS.

PAGE *of a book*. See PRINTING.

PAGEANT, a triumphal car, chariot, arch, or other the like pompous decoration, variouſly adorned with colours, flags, &c. carried about in public ſhews, proceſſions, &c.

PAGEL, in *Ichthyology*, a name given by the Spaniards to that fiſh which authors in general called the ERYTHRINUS, or *rubellio*, and ſome the *xathus* and *pagrus*. It is properly a ſpecies of the *ſparus*, and is diſtinguiſhed by Artedi from the reſt of that genus, by the name of the *ſilver-eyed red-bodied* SPARUS.

PAGOD, a name which the Portugeſe have given to all the temples of the Indians, and all the idolaters of the Eaſt.

The *pagods* of the Chineſe and Siameſe are exceedingly magnificent.

The revenues of the *pagod* of Janigrade are ſo great as to ſubſiſt, every day, from fifteen to twenty thouſand pilgrims.

PAGOD is alſo uſed for the idol adored in the temple.

Hence many give the name *pagod* to thoſe little porcelain images brought from China.

PAGOD is alſo the name of a gold coin, current in ſeveral parts of the Indies, on the footing of the piece of eight. The Engliſh coin *pagods* at Fort St. George, and the Dutch at a Palicate.

There are alſo ſilver *pagods* ſtruck at Narſingua, Biſnagar, &c. which uſually bear the figure of ſome monſtrous idol: whence their names. They are of various values.

PAGOYUM, a word uſed by Paracelſus and his followers, to expreſs an imaginary being, which preſides over, or is the occaſion of diſeaſes, whoſe cauſes are leſs known and which have been ſuppoſed to ariſe from inchantment. Such is the doctrine of this ſtrange writer; and on this ſubject he has written a treatiſe called *Pagoyus*.

PAGRUS, in *Ichthyology*, the name of a ſea-fiſh, the *ſparus pagrus* of Linnæus known in Engliſh by the name of the *ſea-bream*, and the *red gilt-head*. It is a conſiderably large fiſh, growing ſometimes to ten or twelve pounds weight. It is very broad in proportion to its length, and is alſo conſiderably thick; its head is flatted at top, and, at the baſis of the gill-fins, it has on each ſide a large black ſpot; the irides are ſilvery; the inſide of the covers of the gills, the mouth, and the tongue are of a fine red; the ſkin at the end of the dorſal and anal fins is gathered up, and hides the laſt rays; the ſcales are large, the tail forked, and the colour of the whole body is red. It is caught in conſiderable plenty in the Mediterranean, and is common in the markets of Italy. Some account it a very delicate fiſh, but many think it eats too dry. See *Tab.* III. *Fiſh*, Nº 34.

PAGRUS is alſo uſed by Joannes Cuba, and others, for the fiſh commonly called *dentex*, the *ſynodon*, and *ſynagris* of the Greeks. It is a ſpecies of the ſparus, and is accurately diſtinguiſhed by Artedi, by the name of the *variegated ſparus*, with a ſharp back, and with four large teeth.

PAGRUS is alſo a name given by Paulus Jovius, and ſome other authors, to the fiſh called ERYTHRINUS and *rubellio*, and by Appian, *xathus*. It is of the ſparus kind, and is diſtinguiſhed by Artedi, by the name of the *ſilver-eyed red-bodied ſparus*.

PAGRUS *Indicus*, a name by which ſome authors have called the Eaſt Indian fiſh, more uſually known by the name of BRAMA *ſaxatilis*.

PAHIE is one of the claſſes of canoes or boats uſed by the inhabitants of the iſlands in the South Sea. The *pahie* is of different ſizes, from ſixty to thirty feet long, but very narrow; a tranſverſe ſection of it reſembles the ſpade of cards, the whole being much wider in proportion to its length. The largeſt *pahies* are uſed for fighting, in which caſe they are fitted with a ſtage or platform; but principally for long voyages. Hawkſworth's Voy. vol. ii. p. 222, &c. See IVAHAH.

PAIGLES. See PRIMROSE.

PAIN, an uneaſy ſenſation, ariſing from a ſudden and violent ſolution of continuity, or other accident in the nerves, membranes, veſſels, muſcles, &c. of the body. *Pain*, according to ſome, conſiſts in a motion of the organs of ſenſe; and according to others, it is an emotion of the ſoul, occaſioned by thoſe organs.

From the phyſical definition of *pain*, it follows, that whatever may diſtract or ſeparate the parts of the nerves or membranes from one another, may cauſe *pain*; but there is nothing in the compaſs of nature which may not do that, with whatever figures and properties it be endued: for ſince ſomewhat may always be applied, or added, to any other body, ſuch body may at length increaſe into a bulk too big to flow through a canal of a given diameter, and will therefore require more room: wherefore, while the ſides of a canal are thruſt outward beyond what they uſed to be, that is, while the parts compoſing thoſe ſides, before contiguous, become looſened and moved away from one another; if that body ſtrike upon thoſe ſides with a briſk impetus; and that impetus be continually renewed, the ſolution will be conſiderable, or the niſus towards a ſolution violent; that is, there will be *pain*. Wherefore the conſtituent parts of fluids, being ſufficiently augmented in dimenſion, and propelled with a continually repeated impetus againſt any canal of our body, may occaſion that ſolution, in which conſiſts the eſſence of *pain*.

For it comes to the ſame thing, whether ſome parts be added to a body; or the parts of that body be, by any cauſe whatſoever, ſeparated to ſo great an interval near the ſides of a canal, as to conſtitute a dimenſion equal to that which would ariſe from the addition of a new part; for the bulk may ſo far increaſe both ways, as that the natural capacity of the canal ſhall not be big enough to contain it, without ſome violent dilatation, and a diſtraction of the fibres it is compoſed of: and conſequently *pain* muſt enſue.

Farther, as there may be always ſomewhat added to another body; ſo from any body may ſomewhat be always taken away: a body ſo diminiſhed in dimenſion, and impelled with a conſiderable impetus, will break through the interſtices of the fibres, where it is leſs than the capacity of ſuch interſtices, and is moved obliquely: and becauſe the ſuperficies of the fibres are not wont to be contained under geometrical right lines, but to have particles ſtanding out and prominent, theſe it divides from one another. And thus any body, of whatſoever figure, may occaſion in us *pain*, ſo it be big enough to diſtend the veſſels beyond their uſual meaſure, or ſmall enough to enter the pores in the ſides of a canal, with an impetus in the manner intimated.

And what is thus advanced, with relation to things within the veſſels, may be eaſily applied to others out of the veſſels.

PAIN, in *Medicine*, conſidered as a ſymptom of a diſeaſe, makes a conſiderable article in a palliative cure. See DOLOR.

PAINS, *after*. See DELIVERY, and LYING-*in women*.

PAIN-*d'abeilles*, a word uſed by ſome to expreſs what the ancients called *ambroſia*, or the yellow ſubſtance found concreted in lumps on the legs of bees, and ſuppoſed by the generality of the world to be real wax.

Experiments made by Mr. Reaumur and others, have ſufficiently proved that this ſubſtance is not wax, nor has it any of the properties of wax; but it has been conjectured, that this is the matter out of which wax is finally made.

In tracing this ſubſtance up to its origin, we find that the bees collect the farina of flowers, which when moulded by their feet into a lump, makes this matter. It is very probable, that they feed on this matter, and, as ſome imagine, after paſſing through certain changes in their bodies, it becomes wax. This was an opinion ſo old as the days of Pliny; ſome of the authors he quotes calling this ſubſtance *ambroſia*, or the food of theſe little deities; but later obſervations overthrew this opinion, till it again got credit under the more accurate examinations made by Mr. Reaumur, on the ſtructure and parts of the bee. This is a food not only eaten occaſionally by the bees, but neceſſary to their ſupport, and is found ſtored up in their hives againſt a bad ſeaſon. The combs have their different cells made for different purpoſes; and, beſide that, ſome are deſtined for receiving honey, and ſome for the young worms which are hereafter to become bees; there are ſome alſo which ſerve to contain this yellow matter, collected on the legs of theſe inſects. In fine weather, when more of this matter is collected than is eaten for immediate nouriſhment, the bees ſcrape off the lumps of it from their legs into ſome of the holes, or cells of the combs, where, others following their example, there finally become large reſerves of it; which are eaten on ſuch days when they cannot go out in ſearch of more.

The bee collects this yellow matter, which, according to Reaumur, is the prime conſtituent of the wax, from whatever flowers happen to be moſt plentiful about the hives; and though generally yellow, as the farina of moſt plants is ſo, yet it is ſometimes ſeen in red or green lumps on their thighs; but whatever be its natural colour, it is always turned yellow before it is diſcharged from the body of the animal; and when the ſtomach of any of them is diſſected, after feeding on a red ſubſtance collected from flowers, the farina of which is of that colour, the change is found to be made as to colour in this part, for the whole is found there in form of a yellow jelly. This matter is taken out of the ſtomachs of ſeveral bees, and dried, is found to be of a diſagreeable ſmell, like fermented matter, and of a pungency ſomewhat reſembling that of the volatile ſalts. Mr. Reaumur was hence induced to try the effect of the volatile ſalts in turning the bees bread, or rough wax, into perfect wax by digeſtions, continued a long time, but in vain. If we may give credit, however, to the German Ephemerides, there is a much more eaſy way of reducing this matter, while yet contained in the apices of the plant, into true wax; and that without the aſſiſtance of the work of the bees. Mr. David Maja gives an account, in thoſe papers, that the perſons he employed in beating roſes into conſerve, always obſerved in the pounding of the roſes, before the ſugar was put to them, that a piece of ſolid but ſoft matter was found adhering to the peſtle of the mortar, which, on a ſtrict examination, proved to be true and genuine wax. It appeared from this experiment that the juice of the petals or leaves of the roſes, was able, by the aſſiſtance of beating, to convert into true wax the farina contained in the apices of that flower. Mr. Reaumur tried what effect the juice of roſes would have on the yellow matter collected on the legs of the bees, and on the farina of plants, but no treatment he could give theſe ſubſtances was ever able to produce wax. Mr. Reaumur alledges as an abſolute proof, that the bees eat the rough wax or bees bread; that, by obſerving the bees of a certain hive to come home loaded with it every day, ſeveral times over, during the month of April, and a great part of May; and after this, opening and examining the hive they belonged to, there were found no new combs, nor were the old bees enlarged in ſize; it is true, that there were ſome cells found filled with magazines of this matter, but as the far greater part was brought to no ſort of account, it ſeems very plain that they had eat it. It is to be obſerved, that the bees have their ſeveral periods of going out in ſearch of this matter and of honey: it would be too fatiguing for them to be always thus at work; and to avoid this there is always a very large part of them, even more than half the hive, found at reſt within it; theſe are ſuch as have worked till they are tired, and the others in turn take this manner of reſting, and ſend theſe out to work again. Reaumur's Hiſt. Inſ. vol. x. p. 68.

But it is neceſſary to add, that Butler, Purchas, Ruſden, and Thorley, very accurate obſervers of the various operations of bees, have urged ſeveral arguments to diſprove the identity of the ſubſtance now deſcribed, and wax. When the hives, they ſay, have been for a year or more filled with combs down to the floor, and there is no more room to build, the bees carry in this matter in the greateſt plenty; and even when no more wax is wanting, beſides the ſmall quantity which is required for ſealing up the honey and the breeding cells. They alſo urge, that this ſubſtance is very different from wax; as the particles of the former will ſeparate from each other, and be crumbled to powder when examined between the fingers, whereas thoſe of the latter will adhere, and cleave together; and if the one be carried to the fire, it will melt and diſſolve, whereas the other will be converted into aſhes and duſt. The difference of the colours of this ſubſtance is an additional proof that it was not wax, which, when it is gathered and wrought into combs, is always white, and the change of its colour is owing merely to the age of the combs, and breath of the bees. Beſides, it is obſerved, that new ſwarms for the firſt, ſecond, or third day, carry in little or nothing of this matter; though in that ſpace of time they have conveyed into the hive ſufficient quantities of wax, formed into ſeveral large combs: on the contrary, when they carry in the greateſt quantity of this matter, they collect the leſs wax: becauſe the new ſwarms want the wax, and the old ſtocks want food and nouriſhment for their young. Moreover, Mr. Thorley found upon the belly of a bee, which he caught as it was entering the hive, within the plaits, no leſs than ſix pieces of ſolid wax, perfectly white and tranſparent: and he has alſo at other times found wax in the ſame ſituation. Thorley's Inquiry into the Nature, &c. of Bees, ed. 1774, p. 106. See WAX.

PAINE *fort, & dure*, in *Law*, an eſpecial puniſhment, formerly inflicted on one, who, being arraigned of felony, refuſed to put himſelf upon the ordinary trial of God and his country, and thereby ſtood mute by the interpretation of law.

This is vulgarly called *preſſing to death*. The proceſs whereof is thus deſcribed:

"He ſhall be ſent back to the priſon, whence he came; "and be laid in ſome low dark room, where he ſhall lie "naked on the earth, without any litter, ruſhes, or other "cloathing, and without any raiment about him, but "only ſomething to cover his privy members; and he "ſhall lie upon his back with his head covered, and his "feet; and one arm ſhall be drawn to one quarter of the "room, with a cord, and the other arm to another quar"ter, and his legs in the ſame manner; then let there be "laid upon his body iron, or ſtone, as much as he may "bear, or more; and the next day following, he ſhall "have three morſels of barley-bread without drink; and "the ſecond day he ſhall have drink three times, as much "at each time as he can drink, of the water next unto "the priſon, except it be running water, without any "bread; and this ſhall be his diet, till he dies."

This ſpecies of puniſhment is now diſcontinued by 12 Geo. III. cap. 20. See MUTE.

PAINIM, the ſame with PAGAN.

PAINT, *black oil*, in the *Arts*, is prepared by grinding, with a proper quantity of oil, the charcoal or ſoot blacks, or the natural black earths, or the pit-coal, till they are united into a ſmooth, uniform, thick compound, which is occaſionally diluted with more oil to a due conſiſtence for being worked freely with the bruſh or pencil. The fineſt black colour is made with ivory black, ground before the addition of the oil, into an impalpable powder. The material moſt commonly made uſe of is lamp-black, the unctuoſity of which diſpoſes it to mix more eaſily and perfectly with oil than other pigments; but it derives hence the imperfection and diſadvantage of drying ſlowly, which may be remedied by a due preparation of the oil; as by ſetting it on fire, and boiling it, as in the method of making PRINTING-*ink*. An opake deep black *paint* with water, is made by grinding ivory-black with gum water, or with the liquid which ſettles from white of eggs, after they have been beaten up and ſuffered to ſtand a little. Some uſe gum-water and the white of eggs together; and obſerve that a ſmall addition of the latter makes the mixture flow more freely from the pencil, and improves its gloſſineſs. Lewis's Com. Phil. Techn. p. 356, &c.

PAINTED *lady*, among the *Floriſts*, a term for a particular ſort of carnations, the flowers of which have all their petals red or purple on the outſide, and white underneath.

PAINTER, in *Naval Language*, a rope employed to faſten a boat either along ſide of the ſhip to which it belongs, or to ſome wharf, key, &c. as occaſion requires. See SHANK-*Painter*.

PAINTER, in the *Hiſtory of the Arts*, one who poſſeſſes and practiſes the art of PAINTING

PAINTERS, *houſe*. The price of painters work is limited by ſtatute, and they ſhall not take above 16*d*. a-day, for laying any flat colour, mingled with oil or ſize, upon timber, ſtone, &c. and plaiſterers are forbid uſing the trade of a *painter* in London, or to lay any colours of painting, unleſs they are ſervants to *painters*, &c. on pain of 5*l*. But they may uſe whiting, blacking, red lead, oker, &c. mixed with ſize only, ſtat. 1. Jac. I. cap. 23.

Painting is meaſured by the ſquare yard in the ſame manner as WAINSCOTING, the mouldings being meaſured by a thread; the ſaſhes of windows are paid for by the piece.

PAINTING, PICTURA, the art of repreſenting all viſible objects by lines and colours, on an even and uniform ſurface.

Painting is ſaid to have had its riſe among the Egyptians: and the Greeks, who learned it of them, carried it to its perfection, if we may believe the ſtories related of their Apelles and Zeuxis.

The Romans were not without conſiderable maſters in this art, in the latter times of the republic, and under the firſt emperors: but the inundation of Barbarians, who ruined Italy, proved fatal to *painting*, and almoſt reduced it to its firſt elements: nor was it recovered in Europe till the age of Julius II. and Leo. X. This laſt revolution in the hiſtory of *painting* has given occaſion for diſtinguiſhing it into ancient and modern. The ancient *painting* comprehends the Greek and Roman: the modern has formed ſeveral ſchools, each of which has its peculiar character and merit.

It was in Italy, however, that the art afterwards returned to its ancient honour, and about the middle of the thirteenth century; when Cimabue, born at Florence, A. D. 1240, betaking himſelf to the pencil, tranſlated the poor remains of the art, from a Greek painter or two, into his own country.

He was ſeconded by ſome Florentines: the firſt who got any reputation was Ghirlandaio, Michael Angelo's maſter, born in 1449; Pietro Perugino, Raphael Urbin's maſter, born in 1446; and Andrea Verocchio, Leonardo Da Vinci's maſter, born in 1432.

But theſe ſcholars vaſtly ſurpaſſed their maſters; they not only effaced all that had been done before them, but carried *painting* to a pitch from which it has ever ſince been declining.

It was not by their own noble works alone that they advanced *painting*, but by the number of pupils they bred up, at the ſchools they formed.

Angelo, born in 1474, in particular, founded the ſchool of Florence; Raphael, born in 1483, the ſchool of Rome; and Leonardo, born in 1445, the ſchool of Milan; to which muſt be added, the Lombard ſchool, eſtabliſhed about the ſame time, and which became very conſiderable under Giorgione, born in 1477, and Titian, born alſo in 1477.

Beſides the Italian maſters, there were other very great ones on this ſide the Alps, who had no communication with thoſe of Italy: ſuch were Albert Durer, in Germany: Holbens, in Switzerland; Lucas, in Holland; and others in France and Flanders; but Italy, and particularly Rome, was the place where the art was practiſed with the greateſt ſucceſs; and where, from time to time, the greateſt maſters were produced.

To Raphael's ſchool ſucceeded that of the Caraccios, which has laſted, in its ſcholars, almoſt to the preſent time; wherein the French painters, by the munificence of Louis XIV. ſeem almoſt in a condition to vie with thoſe of Greece or Italy.

In Paris they have two conſiderable bodies of painters: the one, the *royal academy of painting and ſculpture*; the other, the *community of maſters in painting, ſculpture*, &c. Our own country has for the two laſt centuries been diſtinguiſhed by its artiſts, and by the encouragement it has afforded to perſons of diſtinguiſhed merit. See ACADEMY.

The art of *painting* is divided, by Freſnoy, into three principal parts; invention, deſigning, and colouring; to which ſome add a fourth, viz. diſpoſition. Felibien divides *painting* into compoſition, deſigning, and colouring. M. Teſtlin, painter to the late king, divides it, ſomewhat more accurately, into the deſign or draught, the proportion, the expreſſion, the clair-obſcure, the ordonnance, and the colouring; to which his Engliſh tranſlator adds the perſpective. Under each of theſe heads, he gives us the rules and ſentiments of the beſt maſters. See DESIGN, PROPORTION, EXPRESSION, CLAIR-OBSCURE, ORDONNANCE, COLOURING, &c.

Painting is of various kinds, with regard to the materials uſed; the matter whereon they are applied, and the manner of applying them. Hence we diſtinguiſh *painting* in oil; *painting* in water-colours, or limning; *painting* in freſco; *painting* on glaſs; *painting* in enamel; and *painting* in miniature, &c.

PAINTING *in oil.* The art of *painting* in oil was unknown to the ancients, as writers on this ſubject have generally ſuppoſed; and the invention of it has been uniformly aſcribed to a Flemiſh painter, one John van Eyck, or John de Bruges, who is ſaid to have firſt diſcovered, and put it in practice in the beginning of the fifteenth century, or about 1410: before his time, all the painters wrought in freſco, or in water-colours.

A late writer has produced ſeveral arguments to prove, that *painting* in oil was known, if not to the ancients, long before the pretended diſcovery of John and Hubert van Eyck. The claims of this artiſt are founded on the teſtimony of Vaſari, in his Lives of the Painters, firſt publiſhed in 1566; a writer who was neither a countryman of Van Eyck, nor a contemporary; as he wrote and publiſhed his book one hundred and fifty years after his death. Before Vaſari's time it does not appear, that any Flemiſh or Dutch hiſtorian has aſcribed this invention to their countryman, nor among the high encomiums on John Van Eyck as a painter, in his epitaph in the church of St. Donat at Bruges, is there any mention of his having invented *oil-painting*. Beſides, inſtances occur, and are recorded by ſeveral writers of Flemiſh *oil-paintings*, which were executed before the time of the ſuppoſed inventor. And Mr. Horace Walpole, in his Anecdotes of Painting in England, has produced ſome unqueſtionable facts, which prove, that *oil painting* was known and practiſed in this kingdom long before the time in which Van Eyck is reported to have invented it in Flanders. Among ſeveral arguments and facts to the ſame purpoſe, it is alledged, that Theophilus, in a Treatiſe De Arte *Pingendi*, diſcovered in the library of Trinity-college, Cambridge, who is ſuppoſed to have lived in the tenth or eleventh century, deſcribes the method of making linſeed oil for the uſe of painters, and gives two receipts for making oil-varniſh. Raſpe's Critical Eſſay on Oil-Painting, 4to, 1781.

This, however, was an invention of the utmoſt advantage to the art; ſince, by means hereof, the colours of a *painting* are preſerved much longer and better, and receive a luſtre and ſweetneſs which the ancients could never attain to, what varniſh ſoever they made uſe of to cover their pieces.

The whole ſecret only conſiſts in grinding the colours with nut-oil or linſeed-oil; but it muſt be owned, the manner of working is very different from that in freſco, or in water; becauſe the oil does not dry near ſo faſt; which gives the painter an opportunity of touching and retouching all the parts of his figure, as often as he pleaſes: which, in the other kinds, is a thing impracticable.

The figures too are here capable of greater force and boldneſs; inaſmuch as the black becomes blacker, when ground with oil, than with water; beſides that, all the colours, mixing better together, make the colouring ſweeter, and more delicate and agreeable; and give an union and tenderneſs to the whole work, inimitable in any of the other manners.

It muſt be acknowledged that *paintings* in oil are liable to decay and fade; whereas the vehicle, whatever it was, uſed by the ancients, gave their works an advantage over thoſe of the moſt celebrated moderns in points of duration. Pauſanias deſcribes the paintings in the Poikile, at Athens, without the leaſt intimation that they were decayed or faded, in the courſe of ſix hundred years; and the ancient picture called the Aldobrandine Marriage, now to be ſeen in the palace of that name at Rome, continues to this day a fine picture, though probably painted two thouſand years ago. Beſides, the vehicle of the ancients did not change or corrupt the pigments tempered with it; the Aldobrandine picture, and thoſe at Herculaneum are evidences to this purpoſe.

The colours proper to be uſed in oil, for red, are vermilion, native cinnabar, lakes, ſcarlet oker, common Indian red, terra di Sienna burnt, and mixed with white, red oker, Spaniſh brown, Venetian red, and red lead: for blue, ultramarine, Pruſſian blue, ultramarine aſhes, verditer, indigo, and ſmalt: for yellow, king's yellow, Naples yellow, yellow oker, Dutch pink, light pink, maſticot, common orpiment, terra di Sienna unburnt, and mixed with white, and turpeth mineral: for green, terra verte, verdigriſe, diſtilled verdigriſe, or cryſtals of verdigriſe, and Pruſſian green: for purple, true Indian red: for brown, burnt terra di Sienna, unmixed, with white, brown pink, brown oker, umbre, and aſphaltum: for white, white flake and white lead: for black, lamp black, ivory black, and blue black. See each deſcribed in its place.

As to oils, the beſt are thoſe of walnuts, poppies, linſeed, ſpike, and turpentine.

For the drying oils, ſee *Drying* OIL; and for the method of preparing varniſh, ſee VARNISH.

Painting in oil is performed on walls, on wood, canvas, ſtones, and all ſorts of metals; but more commonly on canvas, wood, or copper plate.

The pieces of canvas prepared by proper primings, and called by painters cloths, are the grounds for *oil-painting* moſt in uſe. Theſe are ſold by the colourmen, but may be prepared in the following manner: let the cloths be firſt well ſoaked with drying oil, laid on hot, and when nearly dry let two or three coats of drying oil and red oker, mixed as thick as they can be worked, be ſpread over it. Then, the laſt being dry, let the cloth be bruſhed over with hot drying oil, as long as it appears to ſink in; and laſtly, let it be covered with a coat of white lead and oil, rendered grey or of any other colour deſired, by admixture of the proper pigments. This laſt coat may be poliſhed to a due degree, by rubbing with a pumice ſtone, or by glazing it with the glaſs poliſhers uſed for linen, and called callender-ſtones.

The common method of preparing wood for oil colours is to clear-coat it with ſize and whiting, and then to cover it with white lead and oil. But for paintings of value, the wood ſhould be bruſhed over with hot drying oil, as long as it will ſoak in, and then covered with a coat of white lead, or flake, coloured according to what may be deſired.

When copper-plates are uſed, there is no occaſion for any other priming than one coat of oil, and lead, and oker, rendered of the colour deſired; and the ſurface of the priming made as ſmooth as poſſible by means of the pumice or calender-ſtone. A fine ground for copper-plates may be prepared by uſing flake white and fat oil, with any colour required, which being laid on the plates, placed in a horizontal poſition to dry, will poliſh itſelf very highly by the running of the oil, which ſhould be very fat.

To PAINT *on a wall.* When well dry they give it two or three waſhes with boiling oil, till the plaſter remain quite greaſy, and will imbibe no more. Over this they apply deſiccative or drying colours, viz. white chalk, red oker, or other chalks beaten pretty ſtiff. This layer being well dried, they ſketch out, and deſign their ſubject on it, and at laſt paint it over; mixing a little varniſh with their colours, to ſave the varniſhing afterwards.

Others, to fortify their wall better againſt moiſture, cover it with a plaiſter of lime, marble-duſt, or a cement made of beaten tiles ſoaked with linſeed-oil, and at laſt prepare a compoſition of Greek pitch, maſtic, and thick varniſh boiled together, which they apply hot over the former plaiſter; and when dry, they lay the colours as before.

Others, in fine, make their plaiſter with lime-mortar, tile-cement, and ſand; and this being dry, they apply another of lime, cement, and iron ſcoriæ; which being well beaten, and incorporated with whites of eggs, and linſeed oil, makes an excellent plaiſter. When this is dry, the colours are applied as before. See FRESCO.

To PAINT *on wood.* They uſually give their ground a layer of white tempered with ſize; or they apply the oil above mentioned; the reſt is done as in *painting* on walls. See PAINTING *in oil.*

To PAINT *on cloth or canvas.* The canvas being ſtretched on a frame, they give it a layer of ſize, or paſte-water; and when dry, they go over it with a pumice-ſtone, to ſmooth off the knots. By means of the ſize, the little threads and hairs are all laid cloſe on the cloth, and the little holes ſtopped up ſo that no colour can paſs through. When the cloth is dry, they lay on oker in oil, which is a natural earth, and bears a body, ſometimes mixing with it a little white lead to make it dry the ſooner. When dry, they go over it again with the pumice-ſtone, to make it ſmooth.

After this, they ſometimes add a ſecond layer compoſed of white lead; and a little charcoal black to render the ground of an aſh-colour: obſerving in each manner to lay on as little colour as poſſible, that the cloth may not break, and that the colours, when they come to be painted over, may preſerve the better.

In ſome *paintings* of Titian and Paulo Veroneſe, we find they made their ground with water, and painted over it with oil; which contributed much to the vivacity and freſhneſs of their works: for the water-ground, by imbibing the oil of the colours, leaves them the more beautiful; the oil itſelf taking away much of their vivacity. As little oil therefore is to be uſed as poſſible, if it be deſired to have the colours keep freſh: for this reaſon ſome mix them with oil of ſpike, which evaporates immediately, yet ſerves to make them manageable with the pencil. See PAINTING *in oil.*

To PAINT *on ſtones or metals*, it is not neceſſary to apply ſize, as on cloth; it ſuffices to add a ſlight layer of colours, before you draw your deſign; nor even is this done on ſtones where it is deſired the ground ſhould appear, as on certain marbles and agates of extraordinary colours.

Painting *in diſtemper, in enamel, encauſtic, in freſco, or glaſs, in miniature, in moſaic.* See the ſeveral articles.

Painting *in varniſh.* See Japanning.

It has been lately a practice with ſome eminent portrait painters, to make a compound vehicle, by mixing oils and varniſh together; and this is called *painting in varniſh.*

Painting *in water-colours.* See Limning and Miniature.

Painting *china-ware.* See Porcelain.

Painting *papier maché.* See Papier *maché*, and Japanning.

Painting, *imitation of, in colours.* See Mezzotinto.

Painting *on glaſs by means of mezzotinto prints.* See Back-*painting.*

Paintings *in oil, method of taking off,* &c. The art of removing *paintings* in oil, from the cloth or wood on which they are originally done, and transferring them to new grounds of either kinds of ſubſtance, is of great uſe. For thoſe on cloth or canvaſs, the method is as follows: let the decayed picture be cleanſed of all greaſe that may be on its ſurface, by rubbing it very gently with crumb of ſtale bread, and then wiping it with a very fine ſoft linen cloth. It muſt then be laid, with the face downwards, on a ſmooth table covered with fan-paper, or the India-paper; and the cloth on the reverſe muſt be well ſoaked with boiling water, ſpread upon it with a ſponge, till it appears perfectly ſoft and pliable. Turn the picture with the face upwards, and having ſtretched it evenly on the table, pin it down with nails at the edges. Having melted a quantity of glue and ſtrained it through a flannel cloth, ſpread part of it, when a little ſtiffened, on a linen cloth of the ſize of the *painting*, and when this is ſet and dry, lay another coat over it; when this is become ſtiff, ſpread ſome of the glue, moderately heated, over the face of the picture, and lay over it the linen cloth already prepared in the moſt even manner, and nail it down to the picture and table. Then expoſe the whole apparatus to the heat of the ſun, in a place where it may be ſecured from rain, till the glue be perfectly dry and hard; when this is the caſe, remove the picture and linen cloth from the table. Turn the picture with the face downwards, and let it be ſtretched and nailed to the table as before; then raiſe round its edge a border of wax as in the etching of copper-plates, forming a kind of ſhallow trough with the ſurface of the picture; into which pour a proper corroding fluid, as oil of vitriol, aqua fortis, or ſpirit of ſalt, but the laſt is to be preferred: dilute either of theſe with water to ſuch a degree, determined by previous trials, that they may deſtroy the threads of the original canvaſs or cloth of the picture, without diſcolouring it. When the corroding fluid has anſwered this purpoſe, drain it off through a paſſage made at one end of the border of wax, and waſh away the remaining part by repeatedly pouring quantities of freſh water on the cloth. The threads of the cloth muſt be then carefully picked out till the whole be taken away. The reverſe ſurface of the *painting*, being thus wholly freed from the old cloth, muſt be well waſhed with water by means of a ſponge, and left to dry. In the mean time prepare a new piece of canvaſs of the ſize of the *painting*; and having ſpread ſome hot glue, purified as before, and melted with a little brandy or ſpirit of wine over the reverſe of the *painting*, lay the new canvaſs evenly upon it, while the glue is hot, and compreſs them together with thick plates of lead or flat pieces of poliſhed marble. When the glue is ſet, remove theſe weights, let the cloth remain till the glue is become perfectly dry and hard. Then the whole muſt be again turned with the other ſide upwards, and the border of wax being replaced, the linen cloth on the face of the *painting* muſt be deſtroyed by means of the corroding fluid; particular care is neceſſary in this part of the operation; becauſe the face of the *painting* is defended only by the coat of glue which cemented the linen cloth to it. The painting muſt then be freed from the glue by waſhing it with hot water, ſpread and rubbed on the ſurface by a ſponge. The *painting* may afterwards be varniſhed as a new picture; and if the operation be well conducted, it will be transferred to the new cloth in a perfect ſtate.

When the *painting* is originally on wood, it muſt firſt be detached from the ceiling or wainſcot where it was fixed; and the ſurface of it covered with a linen cloth, cemented to it by means of glue, as already directed. A proper table being then provided, and overſpread with a blanket, or thinner woollen cloth, laid on in ſeveral doubles; the *painting* muſt be laid upon it with the face downwards, and fixed ſteady; and the board or wood on which it was done, muſt be planed away, till the ſhell remains as thin as it can be made, without damaging the paint under it. The proceſs is afterwards the ſame as that in the caſe of *paintings* on canvaſs; till the *painting* on wood be in like manner transferred to a cloth or canvaſs. Doſſie's Hand. Arts vol. ii. p. 417, &c.

PAIR, **Par**, a collective term, uſed for two equal or ſimilar things ordinarily joined together; though more frequently for artificial things than for natural ones. As, a *pair* of gloves, of ſtockings, of ſhoes, &c.

Pair is alſo uſed in compound things, for two parts alike to each other, though they only make one whole. As, a *pair* of ſciſſars, &c.

Pair is alſo uſed for a ſet or ſyſtem of ſeveral things joined to make another complete: as a *pair* of bagpipes, &c.

Pair, again, is uſed, by extenſion, for a thing that is ſingle, as a *pair* of tables, &c.

Pair, **Par**, in *Anatomy*, denotes an aſſemblage or conjugation of two nerves, which have their origin together in the brain or ſpinal marrow; and are thence diſtributed into the ſeveral parts of the body, one on the one ſide, and the other on the other.

Thus we ſay, *the firſt pair, the ſecond pair,* &c. the *par vagum, par quintum,* &c. ſometimes *the olfactory pair, ophthalmic pair,* &c.

PALA, in *Botany*, a name by which ſome authors have called the *nutmeg-tree.*

Pala, in *Ichthyology*, a name uſed by ſome authors for a fiſh of the truttaceous kind, more uſually known by the name of *ferra.* See Guiniad.

PALACE, *palatium*, a name generally given to the dwelling houſes of kings and princes.

Procopius derives the word from a Grecian called *Pallas*, who gave his own name to a magnificent houſe he had built; adding that Auguſtus, after him, gave the name *palatium* to the houſe of the Roman emperors on the hill which for that reaſon was called the *Palatine* mount. Others take it the contrary way; and ſay that Romulus's houſe, wherein Auguſtus lived, was properly called *palatium*, becauſe ſituate on the *Palatine* mount. Be this as it will, it is certain, *palatium*, from a proper name, in time became common to all houſes of kings.

And as the kings uſually heard and determined cauſes in their houſes, in what part of the realm ſoever they were ſituate; hence alſo *palatium* became a name for a court of juſtice, which uſage is ſtill retained, eſpecially in France.

In courſe of time the name *palace* has alſo been applied to the houſes of other perſons; taking different epithets, according to the quality of the inhabitants; as imperial *palace*, royal *palace*, pontifical, cardinal, epiſcopal, ducal *palace*, &c.

PALÆSTE, the name of a Greek meaſure of length, being the ſame with the *dochme* and *doron*, and containing four finger-breadths, or digits.

PALÆSTRA, παλαιστρα, among the ancient Greeks, a public building, where the youth exerciſed themſelves in wreſtling, running, playing at quoits, &c.

Some ſay, the *palæſtra* conſiſted both of a college, and an academy; the one for exerciſes of the mind, the other for thoſe of the body. But moſt authors rather take *palæſtra* to be a xyſtus, or mere academy for bodily exerciſes, according to the etymology of the word, which comes from παλη, *wreſtling*, one of the chief exerciſes among the ancients.

The length of the *paleſtræ* was marked out by ſtadia, each equal to one hundred and twenty-five geometrical paces; and hence the name *ſtadium* was given to the arena whereon they ran.

PALÆSTROPHYLAX, formed from παλαιστρα, and φυλαξ *guardian*, or *keeper*, among the *Ancients*, was the director of a palæstra; and of the exerciſes performed therein.

This officer was alſo called *xyſtarcha* and *gymnaſiarchi.*

PALALACA, in *Natural Hiſtory*, the name given by the people of the Philippine iſlands to a bird common among them, and ſomewhat reſembling the *upupa*, or hoopoe. From the deſcription which father Camelli gives of this bird, it ſeems very plainly to be a ſpecies of *woodpecker*, of a very large and beautiful kind.

PALANQIN, a kind of chaiſe, or chair, borne by men on their ſhoulders; much uſed by the people of China, and the Eaſt, as a vehicle for their eaſy conveyance from place to place.

PALAPARIJA, in *Zoology*, the name of a ſpecies of Eaſt India ſerpent, found in the iſland of Ceylon. It is a large kind, and beautifully variegated in colour, with a great deal of red about it. It is one of thoſe ſpecies which naturally live underground.

PALARIA, among the Romans, a kind of exerciſe performed at a ſtake by the ſoldiers.

The ſtake being fixed immoveable in the ground, and ſix feet high above it; the young undiſciplined ſoldiers advanced againſt it armed with a hurdle and cudgel, inſtead

ſtead of a ſhield and ſword, and went through all the rules of attack and defence, as if actually engaged with an adverſary. Sometimes they ſtood at a diſtance, and attacked it with miſſive weapons, at the ſame time uſing all the requiſite motions for defending themſelves, and warding off what might be thrown againſt them.

PALATE, *palatum*, in *Anatomy*, the fleſh that compoſes the roof, i. e. the upper and inner part of the MOUTH. Du Laurence ſays it has its name from the Latin *pali*; becauſe encloſed with two rows of teeth, reſembling little ſtakes, which the Latins call *pali*.

The *palate* is a little vaulted or concave; it is lined with a glandulous coat, under which are great numbers of pretty conſpicuous glands, ſcattered in the fore-part of it like grains of millet, with many interſtices, whoſe excretory ducts, piercing the membrane, open into the mouth; but towards the hinder part they lie much thicker; and about the root of the uvula, they are gathered ſo cloſe together, that they appear to form one pretty large conglomerate gland, called by Verheyen, *glandula conglomerata palatina*.

Towards the bottom of the *palate*, behind the uvula, is a pretty large perforation, which, a little from its orifice, divides into two, each whereof goes to one of the noſtrils. Many take the *palate* to be the organ of taſting.

Wounds of the *palate*, and other parts of the mouth are only to be healed by being anointed with honey of roſes, either alone, or mixed with balſam of Peru, or with oil of myrrh *per deliquium*.

PALATE, *bones of the*. There are two bones ſituated in the poſterior part of the arch of the *palate*, between the *pterygoide apophyſis* and the *oſſa maxillaria*, and running up on the ſides of the *naſal foſſæ* all the way to the bottom of each orbit. The figure of theſe bones is not ſquare, as has been ſaid by thoſe who have only ſeen that portion of them which belongs to the *palate*, and from thence have named them *oſſa palati*. The entire bone is crooked, hooked, pointed, and uneven, though of a ſmall ſize. Each of theſe may be divided into four portions, one ſuperior, one middle, and two lower; whereof one is the anterior, the other the poſterior. The lower and anterior portion, to be called properly the *portio palatina*, is the baſis or body of the bone, and the only part of it which the ancient anatomiſts, except Vidus Vidius have, obſerved. It completes the arch of the *palate*, and the bottom of the *naſal foſſa*; the inner edge of it is raiſed, and that joined to the like edge of the other bone, forms a groove, which receives part of the *ſeptum narium*, in the ſame manner as the other part of it is received in a like groove of the *oſſa maxillaria*. The poſterior edge is gently ſloped, and ends inward in a point, which joins a like point in the other bone.

The lower and poſterior portion to be called properly the *pterygoide*, is pointed and hollowed on each ſide, to join the *pterygoide apophyſis*, of which it completes the *foſſa*, being fixed like a wedge in the irregular notch of that proceſs. Exteriorly it is uneven, the better to be connected with the *os maxillare*. This portion is diſtinguiſhed from the *portio palatina*, and alſo from the middle portion by an oblique half canal, which with the half canal in the maxilliary tubercle, forms an entire canal, the lower end of which is the poſterior *foramem palatinum*.

The middle portion, properly to be called the *naſal*, is very thin, and is ſituated laterally. The internal ſide of it is a little concave, the outſide a little convex; the concavity is turned towards the nares, and at the lower part of it there is a tranſverſe eminence or bony line, which diſtinguiſhes this portion from the *portio palatina*. The convex outſide partly covers the opening of the maxillary lines. At the lower part of it is a tranſverſe groove, anſwering to the eminence on the other ſide, and moulded, as it were, by the tranſverſe exterior eminence of the *os maxillare*.

The upper portion, properly called the *orbitary portion*, is diſtinguiſhed from the *naſal portion* by a notch, which, together with the *pterygoide apophyſis* of the ſphenoidal bone, forms an opening more or leſs conſiderable, which may be called the *foramen ſpheno-palatinum* or *pterygo-palatinum*. This portion has five little ſides, three of which are rather cavities. One ſuperior, which completes the extremity of the bottom of the orbit, and is more or leſs flat, very ſmall, ſmooth, and triangular. One anterior, which is a little hollow, covering the upper part of the maxillary tubercle, and by a ſmooth raiſed edge, completing the *fiſſura ſpheno-maxillaris*. The third ſide is likewiſe anterior, more hollow, than the former, and joins the back part of the labyrinth of the *os ethmoides*. The fourth is poſterior, and more or leſs hollow, anſwering to the ſphenoidal *ſinus*. The fifth is lateral and external, covering the poſterior and upper part of the maxillary *ſinus*. Theſe ſides and cavities, however, ſometimes vary; being in ſome ſubjects found ſingle, in others complex: there is very little diploe in theſe bones, except in the *palatine* and *pterygoide* portions. They are joined to each other by the *portio palatina*; to the vomer by the common groove, formed by their raiſed edges; to the maxillary bones before and laterally; and behind to the ſphenoidal bone; to the inferior ſhells of the nares by their tranſverſe eminences; and laſtly, by their orbitary portions to the *os ethmoides*, *oſſa maxillaria*, and *os ſphenoides*. They complete the arch of the *palate*, the *pterygoide* and *naſal foſſæ*, and the orbit. They aſſiſt alſo in ſupporting the vomer and the *conchæ narium inferiores*. Winſlow.

Ulcers of the **PALATE**. See ULCERS.

PALATINATE, PALATINATUS, a province or ſignory, poſſeſſed by a *palatine*, and from which he takes his title and dignity.

The *palatinates* now ſubſiſting, are either thoſe of Germany or Poland. Thoſe of Germany are the principalities of the Upper and Lower Rhine, i. e. of Bavaria, and the Rhine.

The *palatinates* in Poland are the provinces and diſtricts of the Poliſh grandees or ſenators, who are the governors thereof.

PALATINE, *count* PALATINE, *comes* PALATINUS, in *Ancient Cuſtoms*, was a title given to all perſons who had any office or employment in the prince's palace.

The appellation is derived hence, that anciently the emperors ſent the judges of their palace, whom they called *comites palatini*, or *pals-graves*, to correct the abuſes of the other judges in the provinces of Saxony, Bavaria, Franconia, and the Rhine.

Matthæus ſays, that the *palatines* were originally thoſe who had the ſuperintendance of the palace, the ſame with what the Greeks called *curopalatæ*, and the French *maîtres du palais*: though in time the name became more general.

The title of count *palatine* is now appropriated to the princes of Sultzbach, Deuxponts, and Berkenfeld, who are three branches of the ſame family. The elector *palatine* is a prince of the firſt of theſe branches, i. e. the prince *palatine* of the Rhine.

PALATINE was afterwards a title conferred on thoſe delegated by princes to hold courts of juſtice in the provinces; and on ſuch among the lords as had a palace, i. e. a court of juſtice in their own houſes.

The French writers make the *palatines* of Champagne to be the firſt who bore that title; which, they will have it, the Germans and other people borrowed from them, not they from the Germans.

At preſent the word *palatine* is reſtrained to a prince of Germany, or a lord of Poland, poſſeſſed of a *palatinate*.

In the code we find a title *De palatinis ſacrarum largitionum*. Theſe were a kind of treaſurers of the empire.

County **PALATINE**. See COUNTY.

PALATINE *games*, *ludi* PALATINI, among the Romans, were games inſtituted in honour of Julius Cæſar, as ſome will have it, or, as others ſay, of Auguſtus.

It is pretended, that Dion calls them *Auguſtalia*; which ſhould ſeem to confirm the ſecond opinion. Indeed, it is certain, that he ſays Livia inſtituted particular games in the *Palatine* Mount, in honour of that prince, but he apparently diſtinguiſhes them from thoſe called Auguſtalia.

The Romans had alſo their Apollo *Palatinus*, a ſurname of that deity, given him in reſpect to the temple erected to him by Auguſtus on the *Palatine* Mount, in conſequence of a report of the aruſpices, which required it to be done: Auguſtus enriched it alſo with a noble library; as is intimated by Horace, lib. i. epiſt. iii. ver. 17.

PALATINE *tribe*, was one of the four tribes into which Rome was anciently divided by Servius Tullus.

PALATINI. See ACOLYTHI

PALATO-SALPINGÆUS, called alſo *muſculus tubæ novus Valſalvæ*, and *pterygoſtaphylinus externus*, a muſcle ariſing broad and tendinous from the edge of the lunated part of the os palati, ſeveral of its fibres being ſpread on the membrane that covers the foramen narium; whence growing into a ſmall thin tendon, it is reflected about the hook-like proceſs in the inner-wing of the proceſſus pterygoidæus internus, and is inſerted carnous, into all the membranous, fleſhy, and cartilaginous parts of the tube, which leads from the palate to the ear. It is uſed to dilate and keep open this tube.

PALATO-STAPHYLINUS, in *Anatomy*, a muſcle called alſo PTERYGOSTAPHYLINUS *internus*.

PALE, PALUS, a little pointed ſtake, or piece of wood, uſed in making incloſures, ſeparations, &c.

The pale was an inſtrument of puniſhment and execution among the ancient Romans; and ſtill continues ſo among the Turks. Hence EMPALEMENT; the paſſing a ſharp *pale* through the fundament up the body.

PALE, in *Heraldry*, is one of the honourable ordinaries of an eſcutcheon; being the repreſentation of a *pale* or ſtake, placed upright; conſiſting of two perpendicular lines, drawn from the top of the baſe to the eſcutcheon, and containing the third middle part of the field. *Tab.* II. *Heraldry*, *fig.* 49.

when there are ſeveral, more properly called *pallets*, they are proportioned ſo as that two take up two fifths of the field; and three take up three ſevenths: and, in thoſe caſes, the number of pieces are ſpecified as well as that of thoſe they are charged with, &c.

Pales are borne various ways, as *wavy*, *crenellé*, *faillis*, *indented*, *ingrailed*, &c. There are alſo the *cometed*, and *flaming pale*, which are pointed, ſometimes waved, &c.

Paled, Pale, in *Heraldry*. A coat is ſaid to be *paled*, when it is equally charged with pales of metal, and colour. It is *counter-paled* when it is cut, and the two *demi-pales* of the chief, though of colours the ſame with thoſe of the point, yet differ in the place where they meet; ſo that if the firſt of the chief be metal, that correſponding to it, underneath, is of colour.

The coat is ſaid to be *paliſſe*, when the *pales* are pointed like thoſe uſed in the defence of places.

Pale, *in*, is applied to things borne one above another, in manner of a *pale*.

Pale, *party per*, is where the ſhield is divided by a ſingle line through the middle, from top to bottom. Se Paly.

PALED *flowers*, in *Botany*, are thoſe which have thin leaves ſet about, or ſurrounding a head, or thrum; as in marigolds, &c.

PALES, or **Piles**, in *Carpentery*, denote rows of ſtakes driven deep in the ground to make wooden bridges over rivers, and to erect other edifices on.

Du-Cange derives the wood from the Latin name *palla*, *a hanging*, or *piece of tapeſtry*: the ancients gave the name *pales*, to the hangings or linings of walls: thus a chamber was ſaid to be *paled* with cloth of gold, with ſilk, &c. when covered with bands or ſtuffs of two colours. Hence alſo the original of the word *pale*, *a ſtake*, &c. The arms of Arragon are paled, *or* and *gules*.

Tertullian obſerves, that the Romans planted *pales* to ſerve as boundaries of inheritances; and that they conſecrated them to the god Terminus, under the name of *pali Terminales*.

Ovid tells us, they were crowned and adorned with flowers, feſtoons, &c. and that the god was worſhipped before theſe *pales*. See Terminalia.

Pales for building, ſerve to ſupport the beams which are laid acroſs them, from one row to another; and are ſtrongly bound together with croſs-pieces.

PALFREYS, *palfredi*, *palafredi*, *paleſridi*, were an elegant and eaſy ſort of horſes, which, for their gentleneſs and agreeable paces, were uſed upon common occaſions by military perſons and others: their pleaſing qualities ſoon recommended them to the fair-ſex, who, having no coaches, uſed theſe *palfreys*, and always travelled on horſeback. Camden ſays, that W. de Fauconberge held the manor of Cukeney, in the county of Nottingham, in ſerjeantry, by the ſervice of ſhoeing the king's *palfrey*, when he came to Mansfield. Co. Lit. 149.

PALICII *dii*, in *Mythology*, were the ſons of Jupiter by the nymph Thalia. The inhabitants of Sicily adopted theſe for their deities, and in honour of them erected a magnificent temple at Palica. Their altar became the aſylum of the unhappy, and particularly of fugitive ſlaves. In this temple, according to Diodorus, the moſt important affairs were tranſacted, and the moſt ſevere puniſhment was inflicted on perjury.

PALILIA, a feaſt among the ancient Romans in honour of the goddeſs Pales.

The *Palilia*, by ſome called *Parilia*, were celebrated by the ſhepherds on the firſt of May; to beſeech that goddeſs to take care of their flocks, and preſerve them from wolves and diſeaſes.

Part of the ceremony conſiſted in lighting heaps of ſtraw, and jumping over them.

PALILICIUM, in *Aſtronomy*, a fixed ſtar of the firſt magnitude in the Bull's eye; called alſo ALDEBARAN.

Pliny gives the name *Palilicium* to the Hyades, of which the *Palilicium* is properly only one. See Taurus.

PALINCOTOS, a term uſed by Hippocrates to expreſs ſuch diſeaſes as are wont to return with all their violence upon the patient, after their ſeeming to have left him, whether for a longer or ſhorter period of time.

PALINDROMIA, a term uſed by Hippocrates and many other writers, to expreſs a preternatural running of the peccant matter of diſeaſes to the more noble parts.

PALINDROMUS, παλινδρωμος, *retro currens*, *running backward*, formed of παλιν, *again*, and δρομος, *courſe*, a verſe, or ſentence which runs the ſame, when read either backwards or forwards.

Such is the verſe,

Roma tibi ſubito motibus ibit amor.

Some people of leiſure have refined upon the *palindromus*, and compoſed verſes, each word whereof is the ſame backwards as forwards. As that inſtance in Camden:

Odo tenet mulum, madidam mappam tenet Anna.
Anna tenet mappam madidam, mulum tenet Odo.

PALING, or **Paleing**, in *Agriculture*, &c. a kind of fence-work for fruit-trees, &c. planted in fields, &c.

It conſiſts of three ſmall poſts driven into the ground, at a foot and a half diſtance; with croſs bars nailed to each other, near the top.

In fixing the pales, in form of a triangle, room is to be left for the tree to play and bow by the high winds without galling. The trees are to be bound to a ſtake for a year or two; after which fern or ſtraw may be ſtuffed in betwixt the tree, and uppermoſt rails, to keep it upright.

If the place be open to deer, rabbits, or the like, a poſt is to be nailed to the bar between every two pales.

PALINGENESIA, Παλιγγενεσια, formed of παλιν, *anew*, and γενεσις, *generation*, a new birth, or REGENERATION.

Palingenesia is alſo uſed by ſome for the migration or paſſage of the ſoul of a deceaſed perſon into another body.

The *palingeneſia* is almoſt the ſame thing with the METEMPSYCHOSIS taught by Pythagoras, and ſtill believed by the Brachmans, Banjans, and other philoſophers of the Eaſt.

Palingenesia, is uſed among chemiſts for the reproducing a mixed body from its aſhes.

This has been pretended to by many, as well as the philoſopher's ſtone and other wonderful powers; but as to the *palingeneſia*, or reſuſcitation of plants, the inſtances produced are no more than ſome of thoſe artificial vegetations which the learned Monſ. Homberg has obſerved and deſcribed many times. See Homberg in Mem. Acad. Sciences, 1710; and Boyle's Works Abridg. vol. i. p. 69.

PALINGMAN, in our *Old Statutes*, ſeems to be a merchant-denizen, one born within the Engliſh pale. Stat. 22 Edw. IV. cap. 23. and 11 Hen. VII. cap. 22.

PALINIDRYSIS, a word uſed by Hippocrates to expreſs the ſubſiding of a tumor by the diſperſion of the matter that occaſioned it without its breaking.

PALINODY, Παλινωδια, a diſcourſe contrary to a preceding one.

Hence the phraſe *Palinodiam canere*, *to ſing palinody*, q. d. to make a recantation.

The word in the original Greek ſignifies *ſinging again*, or anew. Hence it has paſſed as a general name for any poem, or the like, which contains a retractation in favour of a perſon whom the poet before had offended.

The poet Steſichorus is ſaid to be the firſt author of the *palinody*. The ſixth ode of the firſt book of Horace, beginning, *O matre pulchra*, is a true *palinody*.

PALINTOCIA, Παλιντοκια, formed from παλιν, *anew*, and τοκος, of τικτω, *I bring forth*, in *Antiquity*, the birth or delivery of a child a ſecond time.

Thus the ſecond birth of Bacchus, proceeding out of Jupiter's thigh, was a *palintocia*.

Palintocia, is alſo uſed for the reſtitution of uſury, or the refunding of intereſts.

The Megareans having expelled their tyrant, ordained the *palintocia*; that is, they made a law, that all the creditors ſhould return to their debtors the intereſts they had received for money lent.

PALIRRHŒA, a word uſed by the old Greek authors to expreſs the reflux or retrograde courſe of the humours, as in caſe of the cholera morbus, where people vomit up their ſtools.

PALISADE, or **Palisado**, in *Fortification*, an incloſure of ſtakes or piles driven into the ground, each ſix or ſeven inches ſquare, and nine or ten feet long; three whereof are hid underground. They are fixed about ſix inches aſunder, and braced together by pieces nailed acroſs them near the tops, and ſecured by thick poſts at the diſtance of every four or five yards.

Paliſades are placed in the covert-way, at three feet from, and parallel to the parapet or ridge of the glacis, to ſecure it from being ſurpriſed. They are alſo uſed to fortify the avenues of open forts, gorges, half-moons, the bottoms of ditches, the parapets of covert-ways; and, in general, all poſts liable to ſurprize, and to which the acceſs is eaſy.

Paliſades are uſually planted perpendicularly; though ſome make an angle inclining towards the ground next the enemy, that the ropes caſt over them, to tear them up, may ſlip.

Palisades, *turning*, are an invention of M. Coehorn, in order to preſerve the *paliſades* of the parapet of the covert-way from the beſieger's ſhot.

He orders them ſo, that as many of them as ſtand in the length of a rod, or in about ten feet, turn up and down like traps; ſo as not to be in ſight of the enemy till they juſt bring on their attack; and yet are always ready to do the proper ſervice of *paliſades*.

Palisade, in *Gardening*, denotes a ſort of ornament; being a row of trees which bear branches and leaves from the bottom, cut and ſpread in manner of a wall, along the ſide of an alley, or the like; ſo as to appear like a wall covered with leaves.

Theſe *paliſades* are made of jeſſamine, phillyrea, &c.

PALISSE′, in *Heraldry*, a range of *paliſades* before a fortification repreſented on a feſſe, riſing up a conſiderable height; and pointed a-top, with the field appearing through them. *Tab. Herald. fig.* 31.

PALIURUS, in *Botany*. See *Chriſt* THORN.

PALL, in *Heraldry*, denotes a kind of croſs, repreſenting the *pallium*, or archiepiſcopal ornament, ſent from Rome to the metropolitans; which is blazoned thus: he beareth gules, a *croſs pall*, argent. *Tab.* II. *Heraldy, fig.* 55.

Pall. See Pallium.

PALLA, among the old Romans, a mantle which women wore over the gown called STOLA.

It was borne on the left ſhoulder, whence paſſing to the other ſide, under the right arm, the two ends were bound under the left arm, leaving the breaſt and arm quite bare. It made abundance of plaits or wrinkles: whence, according to Varro; it had its name: viz. from ϖαλλω, *vibro, I ſhake*, or *tremble*.

Among the Gauls there was alſo a kind of *palla* worn by the men, called *Gallica palla*.

PALLADIUM, in *Antiquity*, a ſtatue of the goddeſs Pallas, preſerved in Troy, whereon the fate of that city is ſaid to have depended.

The tradition is, that in building a citadel, in honour of Pallas, and a temple in the moſt elevated part thereof, the *palladium* dropped from heaven, and marked out the place which the goddeſs was pleaſed to poſſeſs. After this Apollo gave an oracle, importing, that Troy ſhould never be taken while the *palladium* was found within its walls: which occaſioned Diomede and Ulyſſes, in the time of the Trojan war, to undertake the ſtealing thereof. It is ſaid, there was, anciently, a ſtatue of Pallas preſerved at Rome, in the temple of Veſta; which ſome pretended to be the true *palladium* of Troy, brought into Italy by Æneas: it was kept among the ſacred things of the temple, and only known to the prieſts and veſtals. This ſtatue was eſteemed the deſtiny of Rome; and there were ſeveral others made perfectly like it, to ſecure it from being ſtolen. See Ancyle.

There was alſo a *palladium* in the citadel of Athens, placed there by Nicias.

Theſe *palladiums*, in all probability, were no other than a kind of TALISMANS.

PALLAS, in *Mythology*. See Minerva.

Pallas, in *Aſtronomy*, a name given by ſome to the firſt ſatellite of Jupiter. Lowthorp's Abr. Phil. Tranſ. vol. i. p. 407.

PALLAX, a name given by ſome of the affected chemical writers to an imaginary factitious ſtone, compoſed of the heaven and earth, of the moon or ſilver, with an equal weight of the ſun or gold. This is their own explication of it.

PALLET, among *Painters*, a little oval table, or, piece of wood, or ivory, very thin and ſmooth; on and round which the painters place the ſeveral colours they have occaſion for, to be ready for the pencil.

The middle ſerves to mix the colours on, and to make the tints required in the work. It has no handle, but, in lieu thereof, a hole at one end, to put the thumb through to hold it.

Pallet, among *Potters, Crucible-makers*, &c. is a wooden inſtrument, almoſt the only one they uſe, for forming, beating, and rounding their works.

They have ſeveral kinds; the largeſt are oval, with a handle; others are round, or hollowed triangularly; others, in fine, are in manner of large knives, ſerving to cut off what is ſuperfluous on the moulds of their work.

Pallet, in *Gilding*, is an inſtrument made of a ſquirrel's tail; uſed to take up the gold leaves from the pillow, to apply and extended them on the matter to be gilt. See Gilding.

Pallet, in *Heraldry*, is the moiety, or half of the pale; or a ſmall pale, half the breadth of the uſual one.

The *pallet* muſt never be charged with any thing either quick or dead; neither can it be divided into two equal parts; but it may be into four; for one fourth part of the *pallet*, or two eighth parts of the pale, is called an endorſe.

If the pale be upon any beaſt, they ſay, the beaſt is *debruiſed* with the pale: but if the beaſt be upon the pale, they ſay he is *ſupported* by it.

Pallets, in *Clock* and *Watch-work*, are thoſe pieces or levers, which are connected with the pendulum or balance, and receive the immediate impulſe of the ſwing-wheel, or balance-wheel, ſo as to maintain the vibrations of the pendulum in clocks, and of the balance in watches. The *pallets* in all the ordinary conſtructions of clocks and watches, are formed on the verge or axis of the pendulum or balance, and are of various lengths and ſhapes, according to the conſtruction of the piece, or the fancy of the artiſt. For the modern improvements, comparative advantages, and the manner of conſtructing *pallets*, ſee Scapement.

Pallet, in *Ship-building*, is a room within the hold, cloſely parted from it, in which, by laying ſome pigs of lead, &c. a ſhip may be ſufficiently ballaſted, without loſing room in the hold; which, therefore, will ſerve for ſtowing the more goods.

PALLIATION, the act of mitigating, ſoothing, or diſguiſing a thing.

Hence, in medicine, *palliation* is uſed for the quieting and aſſuaging of pain, and providing againſt the ſeverer ſymptoms of a diſeaſe, when nothing can be directly levelled againſt the cauſe.

PALLIATIVE *indication*, is where the ſymptoms of a diſeaſe give too much trouble and danger, to have their cure deferred, till the diſeaſe whereon they depend is removed.

Here the ſymptoms themſelves are to be cured, or mitigated, apart; and hence,

Palliative *cure*, is the anſwering of a *palliative* indication; or the removal or mitigation of the ſymptoms of a diſeaſe, the cauſe of the diſeaſe ſtill remaining.

Boerhaave obſerves, that every mitigation of a ſymptom takes away ſomewhat from the diſeaſe itſelf; ſo that to cure all the ſymptoms together, is almoſt to cure the whole diſeaſe.

The principal ſymptoms, which call for ſuch a ſort of cure, are thirſt, pain, too much waking, and fainting.

PALLIER, or **Paillier**, in *Building*, a landing-place in a STAIRCASE: or a ſtep, which, being broader than the reſt, ſerves to reſt upon.

The term is pure French, and is not much uſed in Engliſh. In perrons, on large ſtair-caſes, where there are ſometimes, ſeveral *palliers* in the ſame range, or line, they ought to have each at leaſt the width of two ſteps. Thoſe in the turns of ſtair-caſes, ought to be as broad as long. Vitruvius calls the *palliers* on landing-places of the theatres, *diazomata*.

PALLIFICATION, or **Piling**, in *Architecture*, denotes the piling of the ground-work, or the ſtrengthening it with piles, or timber driven into the ground; which is practiſed when people build upon a moiſt, or marſhy ſoil.

PALLIO *Cooperire*. It was an ancient cuſtom, where children were born out of lawful wedlock, and their parents afterwards intermarried, that thoſe children, together with the father and mother, ſhould ſtand *pallio cooperti*, under a cloth ſpread over them, while the marriage was ſolemnizing; which was a kind of adoption, and had the effect of a legitimation.

Thus Robert Groſthead, the famous biſhop of Lincoln, in one of his letters, ſays: *In ſignum legitimationis, nati ante matrimonium conſueverunt poni ſub* pallio *ſuper parentes eorum extento, in matrimonii ſolemnizatione*.

Selden, in his notes on Fleta, adds, that the children of John of Gaunt, duke of Lancaſter, by Catharine Swinford, though legitimated by act of parliament, yet were *covered with the pall* at the time of the marriage of their parents.

PALLISADES. See Paliſade.

PALLISADOED *crown*. See Crown.

PALLIUM, or **Pall**, a pontifical ornament worn by popes, patriarchs, primates, and metropolitans of the Romiſh church, over their other garments, as a ſign of their juriſdiction.

It is in form of a band, or fillet, three fingers broad, and encompaſſes the ſhoulder; whence, by ſome authors, it is called *ſuperhumerale*. It has pendants, or ſtrings, about a palm long, both before and behind; with little laminæ of lead rounded at the extremes, and covered with black ſilk, with four red croſſes.

Some, with Euſebius, will have the *pallium* to have been introduced by pope Linus; adding that as the ephod was the mark of the pontifical authority in the Jewiſh ſynagogue, ſo is the *pallium* in the Romiſh church.

Others have obſerved, that there is no mention made hereof before the year 336.

Laſtly, others will have it to have been firſt granted by Conſtantine the Great, to pope Sylveſter; from whence is paſſed to the other patriarchs and archbiſhops.

The *pall*, it is certain, was originally part of the imperial habit, being a rich robe of ſtate, very magnificent, and reaching quite to the ground; and it has been ſaid, that the biſhops of Rome were allowed to wear it by Conſtantine the Great; and that in proceſs of time the ſame honour was granted by the emperors to the other patriarchs. Hence, when they were either driven from their ſees, or voluntarily quitted them, they returned their *palls* to the emperors. When the popes firſt took upon them to grant that honorary badge, which they did before the pontificate of Gregory the Great, choſen in 590, they did not preſume to do it till they had obtained leave of the emperor. But the ſucceſſors of Gregory, upon the decline of the empire, took upon them to beſtow that mark of diſtinction independently of them, and as a gift of their own. However, that it might no longer be deemed part of the imperial habit, which it was treaſonable to wear without leave from the emperors, they changed its ancient form to the preſent. At what time the popes aſſuming the diſpoſing of the *pall*, independently of the emperors, is not well known; but it is certain, that no biſhop was obliged to apply to Rome for it till the year 742, when Boniface, biſhop of Mentz, perſuaded the biſhops of France and Germany to paſs a decree, obliging their metropolitans to apply to the pope for that ornament, and to promiſe, upon their receiving it, a canonical obedience to the commands of St. Peter. This practice proving very favourable to the ambitious deſigns of the biſhops of Rome, they ſpared no pains to impoſe it upon all metropolitans; iſſuing, with this view, various decrees concerning the nature, virtue, and neceſſity of the *pall*; till, at length, they proceeded to declare it unlawful for a metropolitan, archbiſhop, or primate, to exerciſe any branch of his power, till he had received his *pall* from Rome; nay, in ſeveral decrees, the metropolitical juriſdiction and power were ſaid to be conferred by the *pall*; and thus they made the pope the fountain of all eccleſiaſtical power and authority. This doctrine ſeems to have been firſt broached in the ninth century, though vigorouſly oppoſed by Hincmar, archbiſhop of Rheims, and ſeveral others. However, the doctrine prevailed; and the *pall* was declared by Innocent III. in the thirteenth century, to be an enſign or token of the plenitude of the apoſtolic power, and ſaid to communicate a competent ſhare of that power to thoſe who received it from the hands of the popes. Till the time of Gregory VII. the new metropolitans were only required to ſend for their *palls* within the ſpace of three months after their ordination; but this pope obliged all, unleſs prevented by ſome lawful impediment, to come for them in perſon to Rome; and the promiſe of canonical obedience, upon receiving their *palls*, was changed into an oath of allegiance, ſuch as vaſſals by the feudal laws were obliged to take to their princes. Gregory the Great conferred the *pall* without fee or reward; and in a council held at Rome in 595, decreed, that it ſhould be given gratis; but it is well known, that in ſucceeding times the grant of the *pall* became one of the chief funds of the popiſh ſee. Exorbitant ſums were exacted not only for the *palls* that were ſent to preſbyters, or private biſhops, when raiſed to the archiepiſcopal dignity, but likewiſe for thoſe that were ſent to archbiſhops on their tranſlation from one ſee to another. For by the canons, an archbiſhop is not to carry away his *pall* with him, but to demand a new one; and his ſucceſſor is not to make uſe of the *pall*, which his predeceſſor had left, but to apply to Rome for another. Bower's Hiſt. of the Popes, vol. iii. p. 6. note *(c)*.

The pope pretends to the ſole right of conferring the *pallium*; though ſome patriarchs have granted it to their ſuffragans, having firſt received it themſelves from the Roman ſee.

Anciently, the pope uſed to ſend the *pallium* to certain of his dioceſan biſhops, on whom he laid a good part of his authority, and who were a kind of collaterals to him, as the patricii were to the emperors.

The firſt who received it in France was Vigilius, archbiſhop of Arles: this was done, in order, as Paſquier obſerves, to give him the precedency over the other biſhops.

Anciently they went to Rome to ſeek the *pallium* in perſon; afterwards it was ſent by the pope's legates. At laſt the cuſtom was introduced of ſending perſons expreſs to demand it, with this form, *Inſtanter, Inſtantius, Inſtantiſſime.*

By the popiſh canon laws, a metropolitan, till he have received the *pallium*, cannot conſecrate biſhops, or churches, and he may not be called archbiſhop, &c. Upon a tranſlation, he muſt have the *pallium* afreſh; and till then he cannot hold a ſynod, nor perform any of his archiepiſcopal functions.

The *pallium* was anciently interred with the perſon.

The uſe of the *pallium* is reſtrained to certain ſeaſons and occaſions; none, but the pope, having a right of wearing it always, and in all places.

The pope, ſometimes, ſends it to biſhops of his own accord; and has, ſometimes, given the right hereof to particular churches.

Among the Greeks all the biſhops wear the *pallium*.

In ancient records, we find mention made of another *pallium*, which was a long garment ſpread over with croſſes; Tertullian ſays it was a diſtinguiſhing garment of the Chriſtians; that of the heathens being called *toga*.

PALLIUM *ducale*, in *Natural Hiſtory*, a name given by writers on ſhells to a kind of PECTEN or *ſcallop*, of a large ſize and beautiful appearance, though ſimple colour. There are two ſpecies of this, a red and a yellow one.

PALLIUM-*purpureum*, a name given by Baſil Valentine, and other of the affected writers in chemiſtry, to a powder of a purple colour, prepared from gold. It is made by preparing an amalgama of gold and mercury; and after the mercury is driven off by the retort, the remaining matter is mixed with ſulphur, and calcined by a well regulated fire till reduced to a purple powder. This is called alſo the *ſolar powder*, and has, like the other preparations of this metal, many imaginary virtues aſcribed to it.

PALM, *palmus*, an ancient long meaſure, taken from the extent of the hand.

The Roman *palmus* was of two kinds: the *great palm*, taken from the length of the hand, anſwered to our ſpan, and contained 12 fingers, digits, or fingers breadths, or 9 Roman inches, equal to about 8½ Engliſh inches. See DIGIT, and SPAN.

The *ſmall palm*, taken from the breadth of the hand, contained 4 digits or fingers, equal to about 2 Engliſh inches, 9 tenths.

The Greek *palm* or *doron* was of two kinds. The ſmall contained four fingers, equal to little more than 3 inches. The great contained five fingers. The double Greek *palm*, called *dichas*, contained alſo in proportion. See MEASURE.

The modern *palm* is different in different places where it obtains. At Rome it contains 8 inches, 3½ lines; at Naples, according to Riccioli, 8 inches, according to others 8 inches 7 lines; at Genoa, 9 inches 9 lines; at Morocco and Fez, 7 inches $\frac{2}{10}$; in Languedoc, and ſome other parts of France, the *palm* is 9 inches 9 lines. The Engliſh *palm* is 3 inches.

At Leghorn there are two kinds of *palms*, the one for woollens, the other for ſilks; the firſt one third ſhorter than the latter.

PALM, *palma*, in *Anatomy*, denotes the inſide of the HAND; called alſo *vola* and *metacarpion*.

PALM, *dwarf*, or **PALMETTO**, *chamærops*, in *Botany*, a genus of the *palmæ*, in the appendix to the Linnæan ſyſtem. Its characters are, that it hath male and hermaphrodite flowers in diſtinct plants; the hermaphrodite flowers are all included in one commmon ſpatha or hood, which is compreſſed and bifid, and the ſpadix or club is branching; each flower hath a ſmall three-pointed empalement; they have one thick upright petal, cut into three parts, and turning inward at the top, and five compreſſed ſtamina, which join at their baſe; they have three roundiſh germina, each having a diſtinct ſtyle, which become ſo many round berries, having one cell, each containing a ſingle ſeed; the male flowers are like the hermaphrodite, but the ſtamina are not diſtinct, nor have they any germen. Miller reckons two ſpecies, and Linnæus only one. The *palmetto* grows naturally in Spain, covering the ſandy land like the fern in England.

PALM-*tree*, *palma*, in *Botany*, belonging to a ſeparate claſs in Linnæus's appendix. Its characters are theſe: it hath male and female flowers, in ſome ſpecies on the ſame plant, in others on different plants; and the empalements of the male flowers are divided into three parts; the flowers have three petals, and ſix ſtamina, terminated by oblong ſummits, with an obſolete germen, ſupporting three ſhort ſtyles, crowned by acute ſtigmas; theſe are barren; the female flowers have a common ſheath, but no empalement; they have ſix ſhort petals, and an oval germen ſitting upon an awl-ſhaped ſtyle, crowned by a trifid ſtigma; the germen becomes a fruit of various forms and ſizes in different ſpecies. There are fourteen ſpecies, of which are the date tree, the cocoa-nut tree, the macaw tree, the cabbage tree, and dragon tree.

The common date tree grows plentifully in Africa, and ſome of the eaſtern countries; from whence the fruit is brought to England. See DATE.

The cocoa-nut is cultivated in moſt of the inhabited parts of the Eaſt and Weſt Indies, but is ſuppoſed to be a native of the Maldives, and the deſert iſlands of the Eaſt Indies. It is one of the moſt uſeful trees to the inhabitants of America, who have many of the common neceſſaries of life from it; the bark of the nut is made into cordage, the ſhell of the nut into drinking-bowls, the kernel affords a wholeſome food, and the milk contained in the ſhell a cooling liquor; the leaves of the tree are uſed for thatching houſes, and are wrought into baſkets, and other utenſils.

The macaw tree is very common in the Caribbee iſlands, where the negroes pierce the tender fruit, from whence flows a pleaſant liquor, of which they are very fond; and the body of the tree affords a ſolid timber, with which they make javelins, arrows, &c. and is by ſome ſuppoſed to be a ſort of ebony. Miller.

The famous cabbage-tree of Barbadoes is a kind of *palm*; it grows to the height of three hundred feet, and though the ſprouts of one year's growth are ſo tender, that they are eaten as cabbages, yet the tree itſelf is one of the moſt durable woods we are acquainted with, and will not rot on any account, but is ſo firm, that it is ſcarce poſſible to make a nail enter it. Phil. Tranſ. Nº 36.

The dragon-tree, or *phœnix* of Linnæus, is a native of the Cape Verd iſlands; and is ſo called, becauſe the inſpiſſated juice of the plant becomes a red powder, very like that of the eaſtern dragon's blood, and is frequently uſed inſtead of it in the ſhops; but the tree, whence the dragon's blood is obtained, is of a very different genus.

The ſeveral ſpecies of this genus may be all raiſed with us from the ſeeds, which muſt be ſown in pots of light earth, and plunged into a bark hot-bed. When the young plants come up, they muſt be tranſplanted into ſingle pots, and preſerved in the ſtove. The ſoil they ſucceed beſt in is made of one third paſture-land, one third ſea-ſand, and the other third rotten tanner's bark, or rotten horſe-dung; and they muſt be planted in pots, in proportion to their ſize, but theſe ſhould not be too large. They will require to be removed once a year; but this muſt be done with great care.

PALM-*oil*. See OIL.

PALM-*wine*, called in the Eaſt *toddi*, is obtained by inciſion of the trunk of a ſpecies of palm-tree, whence iſſues a liquor very grateful to the palate, but liable, eſpecially on account of the heat of the climate, ſoon to turn ſour. See MAMMEE-*tree*.

PALM, in *Naval Language*, is an implement uſed inſtead of a thimble, in making and mending ſails. It is formed of a piece of leather or canvas, on the middle of which is fixed a round plate of iron, of an inch in diameter, whoſe ſurface is pierced with a number of ſmall holes, to catch the head of the ſail-needle. The leather is formed ſo as to encircle the hand, and button on the back of it, while the iron remains in the *palm*; ſo that the whole ſtrength of the hand may be exerted to thruſt the needle through the canvas, when it is ſtiff, and difficult to be penetrated. Falconer.

PALMA *Chriſti*, *ricinus*, a genus of the *monoecia adelphia* claſs. Its characters are theſe: it hath male and female flowers diſpoſed in the ſame ſpike; the male flowers, which are ſituated in the lower part of the ſpike, have ſwelling empalements, cut into three parts; the flowers have no petals, but have a great number of ſlender ſtamina, which are connected in ſeveral bodies, and are terminated by roundiſh twin ſummits; the female flowers, which are ſituated on the upper part of the ſpike, have empalements cut into five ſegments, and are armed with prickles; they have no petals, but in the centre is ſituated an oval germen, which is cloſely ſhut up in the empalement, ſupporting three ſhort ſtyles, which are bifid, crowned by ſingle ſtigmas; the germen turns to a roundiſh fruit, having three furrows, divided into three cells, opening with three valves, and each cell containing one almoſt oval ſeed. Miller enumerates eight, and Linnæus only three ſpecies.

Theſe plants deſerve a place in every curious garden, for the ſingular beauty of their leaves (notwithſtanding their flowers make no great appearance), eſpecially thoſe ſorts which may be propagated every year from ſeeds, without requiring a greenhouſe.

The inhabitants of the Weſt Indies draw an oil for lamps from the ſeed of theſe plants; and as they come up as weeds in thoſe warm countries, they are at no pains to propagate them. This oil is good to kill lice in children's heads.

The ſeed ſold in the ſhops under the name of *cataputia major*, is the ſeed of a ſpecies of the *palma Chriſti*; theſe have been formerly given by ſome perſons to purge watery humours, which they do both upwards and downwards with great violence, ſo that at preſent theſe ſeeds are rarely uſed. Miller. See CASTOR *oil*.

PALMARIS, in *Anatomy*, a muſcle ſerving to contract the palm of the hand in graſping. See *Tab. Anat. (Myol.) fig.* 2. *n.* 25. It ariſes from the internal protuberance of the humerus, and, by a long and ſlender tendon, paſſes above the annular ligament to the palm of the hand, where it expands itſelf into a large aponeuroſis, which cleaves cloſe to the ſkin above, and to the ſides of the metacarpus below, and to the firſt phalanx of the fingers; by which means it makes four caſes for the tendons of the fingers to paſs through.

The muſcle is ſometimes wanting, but the aponeuroſis is always there.

PALMARIS *brevis*, or *quadratus*, a muſcle that lies under the aponeuroſis of the firſt. It ariſes from the bone of the metacarpus that ſuſtains the little finger, and from that bone of the carpus which lies above the reſt. It goes tranſverſely, and is inſerted into the eighth bone of the carpus. See the next article.

It ſerves to draw the palm of the hand into a concave figure.

PALMARIS *cutaneus*, a muſcle commonly known by the name of the *palmaris brevis*. It is a ſmall thin plane of fleſhy fibres, ſituated tranſverſely, or more or leſs obliquely, under the ſkin of the large eminence in the palm of the hand, between the carpus and the little finger; its fibres adhering to the ſkin, and being in ſome meaſure interwoven with the *membrana adipoſa*. Theſe fibres are fixed along the edge of the *aponeuroſis palmaris*, from the large ligament of the *carpus* toward the little finger; and they run in for ſome ſpace on the plane of the *aponeuroſis*, but without any connection with the bones of the *metacarpus*. Near the *aponeuroſis* theſe fibres are more or leſs tendinous, and ſome of them often croſs each other. They are ſometimes ſo thin and pale, as hardly to be ſenſible; and in ſome objects the muſcle ſeems to be divided into ſeveral parts. Winſlow.

It is a doubt with ſome authors whether the *palmaris cutaneus* or *brevis* be a diſtinct muſcle. Fallopius calls it *caro quædam quæ muſculorum effigiem habet*; a portion of fleſh which has the appearance of a muſcle. And Douglas calls it, *caro quadrata*; a ſquare portion of fleſh: though he adds the name *palmaris brevis*, given it, on its ſuppoſition of being a muſcle, by another author.

PALMATED-*roots*, are tuberoſe roots of a flattiſh ſhape, and divided into ſeveral oblong and ſlender branches, reſembling ſo many fingers. Of this ſort are the roots of ſome of the orchis kind, called hence *palmated*.

PALMATED-*leaf*, among *Botaniſts*. See LEAF.

PALMATED-*ſtones*, *palmati lapides*, in *Natural Hiſtory*, a name given by the ancients to a ſort of ſtones which were always found of the ſhape of a hand with its fingers. They were frequent in Spain; and ſome, which were found of a fine black, were reputed to be a kind of marble. The greater number were white, and were compoſed of the matter of one of the ſofter and leſs beautiful quarry-ſtones.

PALMER, in our *Ancient Writers*, is uſed for a pilgrim, and ſometimes for a croiſe, on account of a ſtaff made of the palm-tree, which they ever afterwards bore as a badge of their devotion. See PILGRIM, and CROISES.

PALMETTO. See *Dwarf* PALM.

PALMETTO-*royal*, a name given by Ligon to a tree of the palm kind. Its trunk is very tall and ſtraight, and hollowed regularly in the centre; yet ſo tough, that it is never blown down, nor deſtroyed by ſtorms. It is recommended for making long teleſcopes for celeſtial obſervations.

PALMIPEDES, *web-footed*, in *Ornithology*, the name of a genus of birds living about waters, and furniſhed by nature with feet for ſwimming. The general characters of theſe birds are theſe: they have all ſhort legs, excepting only three, the *flamingo*, *corrira*, and *avoſetta*, which are ſingular, and of a peculiar genus. Their thighs are feathered to the joint; their hinder toes, if any, are ſhort; their rumps are leſs prominent than in other birds; and they have in general broad beaks, and have an appendage on the extremity of their upper chap.

PALMIPES, among the Romans, a long meaſure, containing a foot and a *palm*, or five *palms*; and was leſs than the cubit by one *palm*.

PALMISTRY, a kind of divination, performed by inſpecting the lines and marks of the hands and fingers; called alſo *chiromancy*.

PALMS, among *Botaniſts*, white buds ſhooting out of willows, or ſallows, before the leaf; of the expanſions whereof the flowers of that tree are formed.

PALM-SUNDAY, *Dominica* PALMARUM, the Sunday next before Eaſter Sunday; or the laſt Sunday in LENT. It has been thus called from the primitive days, on account of a pious ceremony then in uſe, of bearing *palms*, in memory of the triumphant entry of Jeſus Chriſt into Jeruſalem, eight days before the feaſt of the paſſover, deſcribed by St. Matthew, chap. xxi. St. Mark, chap. xi. and St. Luke, chap. xix.

The ancients had other names for this day. For, 1. They called it *Dominica Competentium*, i. e. *Sunday of the Competentes*; becauſe, on that day, the catechumens came to aſk the biſhop leave to be admitted to baptiſm, which was conferred the Sunday following.

They had alſo then given them the ſymbol, or credo, to get off by heart, to be repeated to the biſhop in the ceremony of baptiſm.

2. They call it *Capitiluvium*, the Sunday of waſhing the head; becauſe thoſe who were to be baptized the

following Sunday, were prepared by waſhing their heads on this day.

Some time afterwards they called it *Indulgence Sunday*, becauſe the emperors and patriarchs uſed to diſtribute gifts on that day.

PALMULARII, more properly called PARMULARII, in *Antiquity*, a ſort of GLADIATORS, who fought armed with a ſort of little buckler, called PARMA.

PALMYRENE *Ruins*, or *Ruins of* PALMYRA, in *Ancient* and *Modern Geography*, are the ruins of a famous city of this name, ſituate in a deſart of Syria, about forty-eight leagues from Aleppo, and as far from Damaſcus, twenty leagues weſt from the Euphrates, and in the latitude of 34° N. This city appears to have been originally built by Solomon, and called Tadmor. 1 Kings ix. 18. 2 Chron. viii. 4. Joſephus aſſures us, that this was the ſame city which the Greeks and Romans afterwards called Palmyra; and it is ſtill called Tadmor by the Arabs of the country. But many circumſtances, beſides the ſtyle of the buildings, render it probable that the preſent ruins are not thoſe of the city built by Solomon, though neither hiſtory nor tradition mention the building of any other. It is firſt mentioned by the Roman hiſtorians as a place which Mark Anthony attempted to plunder, pretending that it had not obſerved a juſt neutrality between the Romans and Parthians. In the time of Caracalla it was a Roman colony; and the *Palmyrenes*, who aſſiſted Alexander Severus againſt the Parthians, were again conſpicuous in the reign of Gallienus, under Oedonathus, who was made his aſſociate in the empire. He was ſucceeded by Zenobia his queen, who broke the alliance with Gallienus, and made herſelf ſole miſtreſs of Syria and Meſopotamia. At length, Aurelian having taken Palmyra, after a long ſiege, carried the princeſs to Rome, to grace his triumphs, and with her, her ſecretary Longinus, known for his admirable work on the Sublime, who was put to death. The city revolting in her abſence, Aurelian returned and deſtroyed it, putting to death moſt of the inhabitants, without regard either to age or ſex. Little is known concerning the ſtate of Palmyra ſince the time of Mahomet, except that it was conſidered as a place of ſtrength, and that in the twelfth century there were two thouſand Jews in it.

With reſpect to the ruins, they appear to be of two different and diſtinct periods; the oldeſt are ſo far decayed as not to admit of menſuration, and ſeem to have been reduced to that ſtate by the hand of time; the other appear to have been broken into fragments by violence. Of the inſcriptions none are earlier than the birth of Chriſt, and none are later than the deſtruction of the city by Aurelian, except one, which mentions Diocleſian. It is ſcarcely leſs difficult to account for the ſituation of this city than for its magnificence; the moſt probable conjecture is, that as ſoon as the ſprings of Palmyra were diſcovered by thoſe who firſt traverſed the deſart in which it is ſituated, a ſettlement was made there for the purpoſe of carrying on the trade of India, and preſerving an intercourſe between the Mediterranean and Red Sea. This trade, which flouriſhed long before the Chriſtian æra, accounts not only for its ſituation, but alſo for its wealth. As it lay between Egypt, Perſia, and Greece, it was natural to expect, that traces of the manners and ſciences of thoſe nations ſhould be diſcovered among the *Palmyrenes*; who accordingly appear to have imitated the Egyptians in their funeral rites, the Perſians in their luxury, and the Greeks in their buildings; and therefore the buildings, which now lie in ruins, were probably neither the works of Solomon, nor of the Seleucidæ, nor, few excepted, of the Roman emperors, but of the *Palmyrenes* themſelves.

Palmyra was formerly encompaſſed by palms and fig-trees, and covered an extent of ground, according to the Arabs, near ten miles in circumference; and might probably have been reduced to its preſent confined and ruined ſtate by quantities of ſand, driven over it by whirlwinds. The walls of the city are flanked by ſquare towers; and it is probably by their general direction, that they included the great temple, and are three miles in circumference. But of all the monuments of art and magnificence in this city, the moſt conſiderable is the Temple of the Sun. The whole ſpace containing its ruins, is a ſquare of two hundred and twenty yards, encompaſſed with a ſtately wall, and adorned with pilaſters within and without to the number of ſixty-two on a ſide. Within the court are the remains of two rows of very noble marble pillars, thirty-ſeven feet high; the temple was encompaſſed with another row of pillars fifty feet high; but the temple itſelf was only thirty-three yards in length, and thirteen or fourteen in breadth. This is now converted into a moſque, and ornamented after the Turkiſh manner. North of this place, is an obeliſk, conſiſting of ſeven large ſtones, beſides its capital, and the wreathed work about it, about fifty feet high, and juſt above the pedeſtal, twelve in circumference. Upon this there was probably a ſtatue, which the Turks have deſtroyed. At a ſmall diſtance there are two others, and a fragment of a third, which gives reaſon for concluding that they were once a continued row. There is alſo a piazza forty feet broad, and more than half a mile in length, incloſed with two rows of marble pillars, twenty-ſix feet high, and eight or nine feet in compaſs; and the number of theſe, it is computed, could not have been leſs than five hundred and ſixty. Near this piazza appear the ruins of a ſtately building, ſuppoſed to have been a banquetting-houſe, elegantly finiſhed, with the beſt ſort of marble. In the weſt ſide of the piazza there are ſeveral apertures for gates into the court of the palace, each adorned with four porphyry pillars, thirty feet long, and nine in circumference. There are ſeveral other marble pillars differently arranged, on the pedeſtals of which there appear to have been inſcriptions, both in the Greek and *Palmyrenes* languages, which are now altogether illegible. Among theſe ruins there are alſo many ſepulchres, which are ſquare towers, four or five ſtories high, and varying in ſize and ſplendour. We are indebted for an account of theſe very magnificent remains of antiquity, partly to ſome Engliſh merchants who viſited them in 1678 (Phil. Tranſ. N° 217, 218.), but chiefly to M. Bouverie and Mr. Dawkins, accompanied by Mr. R. Wood, who travelled thither in 1751. The reſult of their obſervations was publiſhed in 1753, in the form of an Atlas, containing fifty-ſeven copper-plates, admirably executed.

PALPABLE, ſomething that may be perceived by the ſenſes, eſpecially by the ſenſe of feeling.

Hence impalpable powder.

PALPEBRÆ, in *Anatomy*. See EYE-LIDS.

PALPEBRÆ *ſuperioris primus*, in *Anatomy*, a name given by Coſſerius and ſome others to one of the muſcles of the face, whoſe office it is to lift up the upper eye-lid, and by that means open the eye: it is hence called by Cowper and Douglas, APERIENS *palpebram*; by ſome, *aperiens oculum*; and by Albinus, the *levator palpebræ ſuperioris*.

PALPITATION, *palpitatio*, in *Medicine*, a preternatural beating, or pulſation, of any of the ſolid parts of the body, eſpecially the heart.

The *palpitation* of the heart is an irregularity in the motions of that viſcus, whereby it is driven with violence towards the ribs, in its contraction, attended with a great feebleneſs of pulſe.

There are ſeveral degrees of this *palpitation*; ſometimes it is great, ſometimes moderate, ſometimes ſmall: it is ſometimes ſo impetuous, as to be heard, and even ſeen, by the bye-ſtanders. The trepidation, or trembling, of the heart differs from the *palpitation*, or panting. In the former, the pulſations are faint, ſlow, and faltering; in the latter, the ſhakes are immoderate, violent, and convulſive.

This is ſometimes idiopathic, or a diſeaſe in itſelf, and attendant on no other; but that rarely happens, and it is uſually ſymptomatic, and merely an attendant on other diſorders. In general we are to diſtinguiſh a *palpitation of the heart* thus conſidered as a diſeaſe, or at leaſt as a ſymptom of one, from thoſe commotions of the heart which we occaſionally bring on by running, or any other violent exerciſe, which throw the blood into commotions.

Signs of it. The evident and obvious ſymptom of this complaint, is the vehement pulſation of the heart againſt the ſolid parts of the breaſt, which is often ſo great, that it may be ſeen, or even heard, by the perſons who ſtand by. To this there are uſually joined an anxiety of the *præcordia*, which throws the perſon into a ſweat, a languor and laſſitude of the limbs in general, a paleneſs of the face, a difficulty of reſpiration and cardialgia, with frequent faintings; and, finally, there is uſually a coſtiveneſs and flatulence of the abdomen attending on it.

Perſons ſubject to it. It is a complaint that chiefly affects perſons of ſedentary lives, and of a plethoric habit of body. Scorbutic, hyſteric, and hypochondriac perſons are alſo frequently ſubject to it; and ſuch as have obſtructions of the menſes. Thoſe people who have been uſed to regular bleedings, and have afterwards neglected them, are alſo ſubject to this complaint; and thoſe who are ſubject to ſudden paſſions, and frequently ſuppreſs them. Sleeping in the open fields has alſo been known to bring it on; and perſons of a melancholy habit are uſually more than others ſubject to it. Young women, whoſe menſes have not appeared, or who have had them ſuppreſſed by ſome accident, and in whom nature is labouring to bring them on again, are alſo very ſubject to violent *palpitations*; and ſuch as have acute intermittent fevers coming upon them. Perſons of plethoric habits are often ſeized with *palpitations of the heart* in their ſleep, and when they wake they feel them for ſome minutes afterwards. Finally, perſons who have polypuſes of the heart are always grievouſly afflicted with *palpitations*, attended with difficulty of breathing.

Cauſes of it. Beſides what has been already obſerved, it is to be remarked, that the paſſions of the mind very frequently occaſion this diſorder: thus, ſudden terror, fear, a ſuppreſſion of anger, and the like, will at any time bring on a *palpitation*, without any other cauſe. A high diet and eaſe, with a ſedentary life, alſo often occaſion them: and in young people, not arrived at puberty, they are often found to be occaſioned by worms in the inteſtines.

The cauſe of the *palpitation*, according to Boerhaave, is uſually an inordinate and violent influx of the vital ſpirits into the villi of the heart; as in violent paſſions, ſudden fear, hyſteric affections, and in violent and ſudden motions. Sometimes it is owing to an irritation of the fibres of the heart, occaſioned by ſome ſharp ſtimulus; as an inflammation of the heart, or pericardium, or ſome other diſorder thereof, from a ſtone, worms, hairs, an aneuriſm, or the like.

Sometimes it ariſes from a thick, copious, polypous blood; and ſometimes from the arteries being become cartilaginous, or bony; or their extremities being obſtructed therewith.

In the Dictionary de Trevoux, an author, himſelf afflicted with this diſeaſe, makes a particular diſquiſition into its nature and cauſe.

Anatomy, he obſerves, ſhews us a great number of occaſional cauſes in this diſeaſe; but phyſicians are ſtill at a loſs to determine the efficient cauſe.

The moderns, with better reaſon than the ancients, ſeek for it in the blood of the pulmonary artery, which is ſuppoſed to rebound impetuouſly towards the right ventricle of the heart, by being prevented from purſuing its courſe towards the other veſſels of the lungs, on their being ſtopped by ſome obſtruction, or compreſſed, from various cauſes.

In opening the carcaſes of people dead of this diſeaſe, or ſubject to it while living, worms, or polypuſes, have been often found in the pericardium.

In ſome the heart is extraordinarily big, and the pulmonary artery dilated to double, or quadruple, its ordinary capacity, with obſtructions of the pulmonary vein, conſiſting of cartilaginous matters, which cram its cavities ſo cloſe, that, as Blancard tells us, in his Anatomy, it is ſometimes difficult even to get a pin in. From theſe obſervations ſome have concluded, that the capillary, and other veſſels of the lungs, oppoſing an impaſſable dyke to the courſe of the thickeſt part of the blood, driven thither by the contraction of the heart, ſo that only a ſmall quantity can find a paſſage through them, the reſt muſt make an effort againſt their ſides, and oblige them to give way, and ſtretch them out, in proportion to the quantity of blood impelled againſt them by the contraction of the heart.

But becauſe the pulmonary artery cannot ſtretch wide enough to receive all the blood of the right ventricle, driven thither at a contraction; and ſince the blood, on account of obſtructions, cannot continue its progreſſive motion, in proportion to the velocity wherewith it is impelled by the contraction of the heart; the heart at each contraction, fails to expreſs into the pulmonary artery all the blood it contained in its right ventricle. Thus that part of the blood which remains, receiving the whole ſtock impreſſed by the contraction, returns it again to the heart by reflection, ſtriking impetuouſly againſt its ſides, and making it bound and ſhoot towards the ribs.

The ſame conſequences will ariſe from obſtructions of the aorta, preventing the entire evacuation of the left ventricle; and, generally, from all obſtructions or compreſſions of the veſſels, as polypuſes, abſceſſes, and dropſies, in the parts near the heart. As to worms, their biting and gnawing the fibrous parts of the heart muſt occaſion violent refluxes of ſpirits towards the brain, followed with copious effluvia of other ſpirits into the nerves of the lungs, by the conſent of parts. And, by ſuch means, violent and convulſive contractions will be occaſioned throughout the whole texture of the lungs; which, oppoſing the free paſſage of the blood, may alſo occaſion a *palpitation* of the heart.

The ſame diſeaſe may alſo ariſe from a compreſſion of the lungs, occaſioned by the extraordinary rarefaction of vicious and fermentative juices ſojourning in the ſtomach and inteſtines; which dilate thoſe parts to that degree, that the diaphragm and lungs being extremely ſtreightened, the blood cannot circulate without a great deal of difficulty; a *palpitation* therefore muſt enſue, which will laſt as long as that rarefaction in the firſt paſſages.

Such, according to modern phyſicians, are the immediate cauſes of the *palpitation* of the heart: the remote, or occaſional cauſes, are whatever may occaſion ſuch obſtruction of the pulmonary artery, &c.

In the ſame work, another phyſician lays down winds, or flatuſes, as the cauſe of the *palpitation*: he adds, that the ancients, to a man, looked on that as the moſt ordinary occaſion thereof; in effect, ſays he, from this ſource may be deduced a multitude of cauſes of ſympathetic *palpitation*, by means of the ventricle, the diaphragm, mediaſtinum, &c.

Others will have the ſole cauſe of *palpitation* to be a viſcid blood; which, by its extraordinary rarefaction, dilating the pulmonary artery, and, by that means, opening the cavity of its capillary veſſels towards their extremes, or, by this dilatation, compreſſing the other little veſſels of the lungs, prevents the blood from continuing its circulating motion with freedom; and thus occaſions a *palpitation* of the heart.

All theſe authors hold the *palpitation* a dangerous diſeaſe; and Galen obſerves, that thoſe much troubled with it when young, never live to be old.

According to M. Piſon, a doctor of the faculty at Paris, the *palpitation* of the heart may ariſe, either from a too abundant ſeroſity ſwelling the proper membrane of the heart, as Galen found to be the caſe in opening a monkey; or from too great a quantity of water contained in the pericardium; by which means the heart being ſtreightened, and diſabled from moving with its uſual freedom, is obliged to make ſeveral jerks, or half-beats, inſtead of the regular motions it had before: or, again, it may ariſe from a ſeroſity thrown into the ventricles of the heart, either from the grand veſſels, which furniſh the blood, or from the lungs, or from the brain. Of theſe three cauſes the moſt ordinary ſeems to be, the too great extenſion of the pericardium, by water, as it is found to be in the bodies of moſt of thoſe opened after this diſeaſe.

The different cauſes have their different ſymptoms. The boiling ſeroſity thrown out of the blood-veſſels into the heart, ſhews itſelf by ſudden beatings of the temples, whizzings in the ear, dimneſs of the ſight, and wandering pains in various parts of the body.

In that produced by the abundance of water in the pericardium, or from the humour ſwelling the proper membrane of the heart, the heart ſeems as if ſuffocated in water, the pulſe is weak, and the *palpitation* continual, or nearly ſo; together with a feveriſhneſs, and a difficulty of breathing. To which may be added, that the diſeaſe comes by little and little.

Prognoſtics in it. The beginnings of complaints of this kind, and ſlighter caſes, when they continue ſo, are attended with no great danger; but when the diſorder grows into a habit, it is not only very troubleſome, but very dangerous. When more cauſes than one conſpire to produce it, it is not only more violent, but the patient is more ſubject alſo to relapſes; and in the end, inflammations, ſpittings of blood, polypuſes of the heart, and infarctions of the viſcera come on; not unfrequently alſo are left fevers, which become dangerous. Sometimes alſo convulſions, and other affections of a like kind, even palſies, are brought on by theſe diſorders. Finally, when an habitual *palpitation of the heart* has been brought on by terror alone, it always proves very difficult of cure, whatever means are uſed.

Method of cure. The primæ viæ muſt be firſt cleanſed by infuſions of rhubarb and ſena, and other gentle purges: after this it is proper to bleed in the foot; but it is to be obſerved, that if the orifice be not large, nor the blood taken away in ſufficient quantity, it is of not the leaſt effect in this caſe. After this the blood is to be attenuated by drinking plentifully of warm and weak liquors, and by moderate exerciſe. After this, ſome of the gentle alexipharmics are to be given, and the ſpring juices of brook-lime, water-creſs, and the like. Finally there are to be given ſuch things as promote an equal diſtribution of the blood and humours; mixtures of volatiles and alkalis, as of ſpirit of hartſhorn, and tincture of ſalt of tartar, and gentle anodynes, if neceſſary. Beſides theſe, clyſters will often do great good, as will alſo the frequent waſhing the feet with warm water, and the hanging camphor near the part, and ſpirit of caſtor, ſaffron, and the like, do well to be rubbed on the breaſt.

Bleeding muſt never be omitted in this caſe, for without it no medicines will be able to take effect. In caſes when a hypochondriac habit conſpires in the cauſe of this complaint, the attemperating powders of nitre, cinnabar, and the like, always prove of very great ſervice. In caſes of a chloroſis with this complaint, bitters and chalybeates uſually prove a remedy; and when a ſuppreſſion of the menſes, or hæmorrhoids, is the cauſe, the bringing them to their priſtine regular ſtate is a cure. It is never proper to allay the motion till the plethora, which occaſions it, is removed, unleſs in caſes of its coming on merely by the paſſions, without any antecedent cauſe in the blood; in this caſe, gentle opiates may be given without danger. Steel medicines, and the volatile ſalts, when they are given in an imprudent manner, always make the diſeaſe worſe, inſtead of doing any thing toward a cure. Finally, a change of a ſedentary life into a moderately active one, will do more than any medicines. Junck. Conſp. Med. p. 626, ſeq.

Monſieur de la Hire was cured of a chronical *palpitation* of the heart, by a quartan ague.

PALSGRAVE, a term uſed among the Germans, of the ſame import with PALATINE.

It is compounded of the Latin *palatium*, and the Dutch *grave*, *governor*, q. d. governor, or ſuperintendant of a prince's palace.

PALSY, *paralyſis*, in *Medicine*, a diſeaſe wherein the body, or ſome of its parts, loſe their motion, and ſometimes their ſenſation, or feeling.

The cauſes of the *palſy* are, an impeded influx of the nervous ſpirits into the villi of the muſcles, or of the arterious blood into their veſſels: this may happen from ſome fault, either in the brain, the nerves, the muſcles, or their veſſels.

The occaſional and prediſpoſing cauſes are various; as drunkenneſs, wounds of the brain or ſpinal marrow, preſſure upon the brain or nerves, very cold or damp air, the ſuppreſſion of cuſtomary evacuations, ſudden fear, want of exerciſe, and whatever relaxes the ſyſtem, as drinking much tea, coffee, &c. The *palſy* may likewiſe proceed from wounds of the nerves themſelves, from the poiſonous fumes of metals or minerals, as mercury, lead arſenic, &c.

The *palſy* is ſaid to be *perfect*, or complete, when there is a privation of motion and ſenſation at the ſame time.

Imperfect, when one of the two is deſtroyed, the other remaining.

This diſeaſe is more or leſs dangerous, according to the importance of the part affected. A *palſy* of the heart, lungs, or any part neceſſary for life, is mortal. When it affects the ſtomach, the inteſtines, or the bladder, it is highly dangerous. If the face be affected, the caſe is bad, as it ſhews that the diſeaſe proceeds from the brain. When the part affected feels cold, is inſenſible, or waſtes away, or when the judgment and memory begin to fail, there is little hope of a cure. Buchan.

Hoffman diſtinguiſhes *palſies* into ſerous and ſanguineous. In the firſt kind, raiſing an artificial fever by hot, acrid, nervous, and volatile medicines, by ſtrong exerciſe, and hot bathing, often effects a cure. But in the ſanguineous kind, accompanied with febrile motions, ſuch remedies ought not to be applied. Oper. tom. iii. p. 198. § 26.

The *palſy*, again, is either *univerſal*, *lateral*, or *partial*.

PALSY, *univerſal*, called alſo *paraplegia*, or *paraplexia*, is a general immobility of all the muſcles that receive nerves from the cerebrum, or cerebellum, except thoſe of the head. Its cauſe is uſually ſuppoſed to reſide in the ventricles of the brain, or in the root of the ſpinal marrow. Etmuller makes this a different diſeaſe from the *paralyſis*; which he ſuppoſes to conſiſt in a relaxation of the ligaments and membranes ſerving for motion; but the *paraplegia* is a mere obſtruction of the nerves.

The *paraplegia* is ſeldom a primary diſeaſe, uſually a ſecondary one, attending, or following, an apoplexy, ſcorbutus, carus, or arthritis.

PALSY, *lateral*, called alſo *hemiplegia*, is the ſame diſeaſe with the *paraplegia*, only that it affects but one ſide of the body. Its cauſe is the ſame, only that it is reſtrained to one ſide of the brain, or ſpinal marrow.

Mr. Boyle gives an account of an *hemiplegia*, or *palſy* of one ſide, occaſioned by a ſmall ſplinter of a bone preſſing on the dura mater. The patient in leſs than five hours after the bone was taken out, found himſelf able to move his finger, and within two or three days to lift his arm, which had been reduced to ſkin and bone, but ſoon recovered its proper ſize.

PALSY, *partial*, is that where ſome particular part, or member, alone is affected; e. gr. where the motion of the arm or leg is deſtroyed.

Quincy obſerves, that a *palſy*, where motion is deſtroyed, ſenſation remaining, may be produced, firſt, by too much humidity ſtretching the muſcular fibres in length; ſecondly, from cold things, which thicken the juices; thirdly, from external compreſſion; and, fourthly, from hot things, which ſtreighten the ſupple membranes and veſſels. All theſe cauſes affect either the blood or muſcles; the former, by thickening that humour, ſo that it cannot ſuddenly rareſy; and the latter, by relaxing the muſcles into too great a length by too much moiſture, or contracting them into too narrow dimenſions, by too much heat. But the ſenſation may yet be preſerved, becauſe, notwithſtanding all theſe hindrances, the animal ſpirits and nerves may not be at all affected.

The cauſes of the *palſy*, where ſenſation is deſtroyed, motion remaining, he obſerves, may be all thoſe things which ſo far thicken the animal ſpirits in the nerves, ariſing below the cerebellum, that though, indeed, they may flow into the muſcles through the nerves, and there, by the occurſion of ſome liquor ſecreted from the blood, may rareſy, yet they cannot alone flow in ſuch quantities into the nerves, as from a very ſlight cauſe to be made to undulate; whence ſenſation will ceaſe, without loſing the motion of the part.

The cauſes of this kind of *palſy* are alſo whatſoever render thoſe nerves more lax and moiſt, and ſo leſs apt for lively vibrations; the animal ſpirits flowing in the mean time into the muſcles, from whence motion is performed without ſenſation.

The cure of the *palſy*, according to Waldſchmidt, does not differ much from that of the venereal diſeaſe. Internally, mercurials, ſudorifics, and decoctions of the woods, are good; externally, unctions, particularly of ſpirituous and penetrating things, not on the part affected, but on the ſpina dorſi.

In young perſons of a full habit, the *palſy* muſt be treated in the ſame manner as the ſanguine APOPLEXY; the patient muſt be bled, bliſtered, and have his body opened by ſharp clyſters, or purgative medicines. But in old age, or when the diſeaſe proceeds from relaxation or debility, a quite contrary courſe muſt be purſued. The diet muſt be warm and attenuating, conſiſting chiefly of ſpicy and aromatic vegetables, as muſtard, horſe-radiſh, &c. The drink may be generous wine, muſtard-whey, or brandy and water. Friction with the fleſh-bruſh, or a warm hand, is extremely proper, eſpecially on the parts affected. Bliſtering plaſters may alſo be applied to theſe parts with advantage. When this cannot be done, they may be rubbed with the volatile liniment, or the nerve ointment of the Edinburgh Diſpenſatory. One of the beſt external applications is ELECTRICITY; the ſhocks of which ſhould be received on the part affected, and repeated daily for ſeveral weeks. Vomits ought alſo to be frequently adminiſtered; cephalic ſnuff, or any thing that makes the patient ſneeze, is likewiſe of uſe. If the tongue be affected, the mouth may be frequently gargled with brandy or muſtard, or the patient may hold a bit of ſugar in his mouth, wet with the *palſy* drops, or compound ſpirits of lavender. The wild valerian root is a very proper medicine in this caſe; and this may be taken either in an infuſion of ſage leaves, or half a dram of it in powder in a glaſs of wine three times a-day. If the patient cannot uſe the valerian, he may take of ſal volatile oleoſum, compound ſpirits of lavender, and tincture of caſtor, of each half an ounce; let them be mixed together, and forty or fifty drops taken in a glaſs of wine three or four times a-day. A table-ſpoonful of muſtard-ſeed, taken frequently, is a very good medicine; the patient ought likewiſe to chew cinnamon-bark, ginger, or other warm ſpices. Exerciſe is of the utmoſt importance, and a cold damp air ſhould be carefully avoided. Buchan.

This diſtemper, according to Dr. Cheyne, may be cured by a total cow-milk diet. He thinks the medicines commonly preſcribed in ſuch caſes may retard the progreſs of the diſtemper, but that it is never to be eradicated if the ſtroke be deep, or life far ſpent, but by cow-milk only.

Among ſeveral remarkable caſes of this terrible diſeaſe, we have, in the Philoſophical Tranſactions, one of a periodical *palſy*. The author quotes two inſtances of a like kind, by way of countenance to that which he relates. The German Ephemerides mention a young paralytic man who ſpoke only one hour in every four-and-twenty, and that always at a regular time, beginning between twelve and one at noon every day, and his power of ſpeech ceaſing always between one and two: this continued twelve years upon him. The other caſe is not recorded in books, though well atteſted.

The caſe in the Tranſactions, is of a ruddy ſanguine young woman who fell into a *palſy*, in which ſhe loſt her voice, and the uſe of her legs. This was at firſt carried off by medicines, but afterwards rerurning again at times, at length became regularly periodical, ſeizing her on the Tueſday of every week, and going off again on the Friday. This courſe it obſerved very regularly for the firſt year, except twice.

After this, on taking proper medicines for ſome conſiderable ſpace of time, ſhe became ſo well, that her fits laſted only a day and a half, coming on always on a Tueſday morning, and going off again on a Wedneſday. In this manner ſhe continued to have them ſeveral months, but ſhe was at length perfectly recovered. Phil. Tranſ. Nº 242. p. 60.

There is a kind of *palſy*, called *beriberii*, to which the natives of the Eaſt Indies are peculiarly ſubject.

The word in the Indian language ſignifies a *ſheep*; and

Bontius ſuppoſes it was attributed to this diſeaſe, becauſe the perſons afflicted with it thruſt out their knees, and lift up their legs ſo much in walking, as in ſome ſort to imitate the gait of ſheep. It is a kind of tremor, or *palſy*, in which the uſe of the hands and feet is in a great meaſure taken away; and ſometimes it extends itſelf to the whole body.

The principal cauſe of this diſeaſe is ſaid to be a thick viſcous humour, which in the night ſeaſon, eſpecially in the rainy time, which holds inceſſantly from November to May, falls upon the nerves, while people, fatigued with the heat of the day, throw aſide their cloaths, and ſleep without any covering; by which means the phlegmatic humour, which before was generated principally in the brain, eaſily ſeizes upon the nerves; for the nights in theſe countries, compared to the days, are very cold. The conſequence of this is, that the joints become lengthened, the pituitous humours inſinuating themſelves between the junctures, ſo as to relax the nerves and ligaments. Though this diſeaſe, for the moſt part, comes on very gradually, and by ſlow advances, yet ſometimes it ſeizes a perſon all at once, as when any one, being very much fatigued and hot, drinks a vaſt quantity of any cold liquor. And thus we ſee, even in our own country, that when any one has been violently heated by exerciſe, and drinks an immoderate quantity of a cold liquor, it often throws him into the utmoſt hazard of his life.

The ſymptoms of this diſeaſe are always manifeſt, even to the ſight. There is ever an univerſal laſſitude of the whole body. All motion, but particularly that of the hands and feet, becomes vitiated and depraved; and the ſame ſort of throbbing and titillation is felt as we feel in our fingers and toes in cold weather, only the pain is leſs acute; and ſometimes the voice is ſo far affected, that the patient can ſcarce ſpeak articulately.

Bontius himſelf was once afflicted with this diſtemper, while in the Eaſt Indies, and had this particular ſymptom of it in ſo great a degree, that for a whole month thoſe who ſat cloſe by him could not, without great difficulty, hear what he ſaid. Theſe are the common ſymptoms of the diſeaſe; but beſide theſe, it is at times attended with all thoſe others which may be ſuppoſed to ariſe from a cold cauſe.

The cure is uſually very tedious; for theſe cold humours are very ſlowly, and with difficulty diſcuſſed. The diſeaſe is not naturally mortal, however, unleſs it affects the breaſt; in which caſe it ſometimes wholly ſtops the breath. In order to a cure, the patient is of all things to avoid confining himſelf to his bed; walking, riding, and all ſorts of exerciſe, are uſeful; ſtrong and ſhort frictions are alſo very uſeful, and the Bengal ſervants are uſed to theſe, and are very dexterous in the uſe of them. There is alſo great relief had from fomentations made of decoctions of the herb *lagondi*, which has all the virtues of our chamomile and melilot, but in a much greater degree. The leaf of this plant is like that of our perſicaria or arſmart; and its ſmell very aromatic. The hands and feet are alſo to be anointed with oil of cloves, or mace, mixed with oil of roſes. But more than all theſe, there is relief found in a kind of naphtha, which is very common in Sumatra, and is called *miniac tarnoh*, or *oil of the earth*. This is of a ſtrong, but not very nauſeous ſmell, and is ſo great a remedy, that being rubbed on the hands and legs, it is always an almoſt immediate relief. The Barbarians know as well as we the value of this precious balſam; and the king of Achin, who is the moſt powerful prince in that iſland, has forbidden its exportation, under pain of death; ſo that the inhabitants can only bring it off by ſtealth in the dead of the night, to the Dutch and Engliſh ſhips which happen to lie in the way.

Theſe are the things which give temporary relief; but as the diſeaſe is of the chronic kind, the cure is to be of performed by long courſes of the decoctions of the roots of China and ſarſaparilla, and guaiacum wood, which, by their gentle heat, diſcuſs the cold humours which are the root of the diſeaſe, and carry them off by perſpiration or urine. Purging at proper intervals is alſo highly neceſſary; and the cathartics moſt in uſe there in this caſe, are aloes and gamboge. Bleeding is by all means to be forbid; and the relics of the diſeaſe are uſually very happily carried off by Venice treacle, and other ſudorific and nervous medicines, and gentle exerciſe is the beſt remedy to prevent its return. Bontius, De Medicina Ind.

PALSY, *electary for the*, is made of powdered muſtard-ſeed and conſerve of roſes, of each an ounce, with as much ſyrup of ginger as is ſufficient to make an electary. A tea-ſpoonful of this may be taken three or four times a day.

PALSY *drops*. See LAVENDER.

PALSY, *infuſion for the*. See INFUSION.

PALUDAMENTUM, in *Antiquity*, a garment worn by the Romans in time of war; being the coat of arms of their principal men, eſpecially the generals; who, for that reaſon, were diſtinguiſhed by the appellation *paludati*.

The ſoldiers only having ſhort coats, were therefore named *ſagati*.

This garment was open on the ſides with ſhort ſleeves, by ſome reſembled to angels wings; and came down no lower than the navel.

It was either white or red: Valerius Maximus remarks, it was an ill omen to Craſſus, that they gave him a black *paludamentum*: *Pullum ei traditum eſt* paludamentum, *cum in prælium euntibus album, aut purpureum, dari ſoleret.*

Cornutus ſays, the Romans wore the toga in peace, and the *paludamentum* in war. And hence the phraſe, *Togam* paludamento *mutavit*. See CHLAMYS.

PALUM *ſanctum*, in *Botany*, a name by which ſome authors have called a ſpecies of the *guaiacum-tree*, called the *lignum ſanctum*, or *holywood*.

PALUMBARIUS *accipitur*, in *Ornithology*. See GOSHAWK.

PALUMBUS, in *Ornithology*. See *Ring*-DOVE.

PALY, or PALE′, in *Heraldry*. When an eſcutcheon is divided into ſix, eight, or ten diviſions, pale-wiſe, i. e. by perpendicular lines drawn from the top to the bottom, it is blazoned *paly* of ſix, eight, or ten, &c. pieces.

If the number be odd, then the field is firſt named, and the number of the pales ſpecified. See PALE.

The like is to be underſtood alſo of BARRY and BENDY.

PALY-BENDY is, when a coat is divided, both pale and bend-wiſe: in *paly-bendy* the field is divided by perpendicular lines, which is called *paly*; and then, again, by diagonals croſſing the former, from the dexter ſide to the ſiniſter, which is the *bendy*. See *Tab. Herald. fig.* 30. The field is *paly-bendy*, topaz and diamond.

PAMBŒOTIA, παμϐοιωτια, in *Antiquity*, a feſtival celebrated by all the Bœotians, who aſſembled near Coronea, at the temple of Minerva, ſurnamed Itonia.

PAMMACHION, παμμαχιον, a name by which the exerciſe *pancratium* is ſometimes called, whence the combatants were likewiſe called *pammachi*, ϖαμμαχοι.

PAMPINIFORME *corpus*, in *Anatomy*, a ſort of plexus, or knot of blood-veſſels, formed by the ſpermatic veins; which, in their progreſs through the teſtes conſtitute a body called *corpus varicoſum pampiniforme*, or PYRAMIDALE.

PAMUCHLEN, in *Ichthyology*, a name by which ſome call the ſpecies of *cod-fiſh*, commonly named by authors *aſellus ſtriatus*.

PAN, in *Mythology*, the ſon of Mercury and Penelope, and the deity who preſided over huntſmen, ſhepherds, and thoſe whoſe occupations led them to frequent the fields. The fable ſays, that Mercury transformed himſelf into a he-goat to pleaſe Penelope; and to this circumſtance is attributed the origin of his horns and cloven feet, as well as the whole tribe of fauns and ſatyrs. He is called *Pan*, Παν, it is ſaid, becauſe Penelope, in the abſence of Ulyſſes, granted favours to all her lovers, and *Pan* himſelf was the fruit of this intercourſe. However, Epimenides ſays, that he was the ſon of Jupiter and Caliſta; others ſay, that he was the ſon of the Air and a Nereid, or of the Heaven and Earth. He is commonly repreſented with a ſhepherd's crook, and a kind of flute, with many pipes. He was particularly revered among the Arcadians, to whom he iſſued oracles, and who celebrated, in honour of him, the LUPERCALIA. Evander carried the worſhip and feaſts of *Pan* to Rome.

The Egyptians give a different account of this deity. According to them, he was one of the generals of Oſiris, who engaged with Typhon; and whoſe army being ſituated in a valley, all the avenues of which were guarded by the enemy, he ordered the ſoldiers in the night to march with loud exclamations, which being returned in echoes, terrified the enemy, and put them to flight; whence they ſay comes the expreſſion PANIC terror. Polyænus attributes to *Pan* the invention of the order of battle of the phalanx, and of the diſtribution of an army into the right and left wings, or horns, whence, it is ſaid, he derived his horns. The name *Pan*, which ſignifies *all*, has led ſome to make him the ſymbol of nature. Encyclopedie.

PANACEA, Πανακεα, formed from παν, *all*, and ακεομαι, *I cure*, an univerſal medicine or remedy for all diſeaſes. The accurate Boerhaave overturns the notion of *panaceas*; and ſhews, from the different cauſes, natures, effects, ſeats, &c. of diſeaſes, that ſeveral may, indeed, be cured by one medicine; but all, by none.

He obſerves, that the moſt univerſal remedies known, are water, fire, mercury, and opium; and adds, that by theſe alone, cautiouſly diſguiſed, ſome have acquired the reputation of univerſal phyſicians.

PANACEA, PANACES, or PANAX, *all-heal*, is alſo applied to ſeveral plants, by reaſon of the extraordinary virtues aſcribed to them.

There are three of the *panaceas* peculiarly famed among the ancients: the *Heraclean*, *Aſclepian*, and *Chironian*: theſe were ſo called from their inventors Hercules, Aſclepias, and Chiron.

The firſt is the *panax Heraclea vera ficulnea folio*, in Engliſh, *true all-heal of Hercules.* From the root and ſtem of this is drawn, by inciſion, the gum opopanax.

The *Aſclepian*, according to ſome botaniſts, is a kind of ferula, which Caſ. Bauhin calls *Libanotis ferrulæ folio & ſemine.*

The *Chironian*, according to ſome, is a kind of helianthemum: according to Bradley, it is Doria's woundwort.

PANACIA, Πανακεια, in *Antiquity*, a feſtival in honour of Panace.

PANADA, PANATA, or PANATELLA, a diet conſiſting of bread boiled in water, to the conſiſtence of a pulp; given to ſick perſons whoſe digeſtion is weak, or to whom ſtronger food would be improper.

The word is formed from the name of the principal ingredient *panis*, *bread.*

It is ſometimes made thin, to ſerve as drink; and ſometimes, likewiſe, is ſweetened, &c. to render it more palatable.

PANAGE, or PANNAGE, in our *Ancient Cuſtoms.* See PANNAGE.

PANALETHES, a name uſed by many authors for a plaſter, ſuppoſed to be of the greateſt virtues. It is deſcribed by Aëtius.

PANAMA-*ſhell*, a ſpecies of DOLIUM.

PANARIS, or PANARITIUM, formed probably of ϖαρονυχια, q. d. an abſceſs at the root of the nails, derived from ϖαρα, *juxta*, and ονυξ, *unguis*, a word uſed by ſome authors to expreſs a WHITLOW, or *paronychia.*

PANATA, or PANATELIA. See PANADA.

PANATHÆNEA, ϖαναθηναια, in *Antiquity*, a feaſt celebrated at Athens, in honour of Minerva, whom the Greeks called *Athena.*

Harpocration and Suidas refer its inſtitution to Erichthonius IV. king of Athens, who lived before Theſeus. Theodoret, alone, ſays the feaſt was eſtabliſhed by Orpheus.

Be this as it will, till Theſeus this was a particular feaſt of the city of Athens, and was called ſimply *Athenæa*: but that prince uniting all the people of Attica into one republic, they afterwards all aſſiſted at the feaſt; whence the name *Panathenæa*, i. e. the feaſt of all Attica.

In effect all Attica was preſent; and each people ſent a bullock for the ſacrifices, and for the entertainment of the vaſt multitude of people aſſembled.

There were two kinds of *Panathenæa*; the *great*, celebrated every five years; and the *little*, every year, or every three years; if we may credit the author of the argument of Demoſthenes's oration againſt Midias.

The ceremonies were the ſame in the *great* and the *little Panathenæa*; excepting for a banner, wherein the actions of the goddeſs were repreſented in embroidery performed by maids, with the names of thoſe who had diſtinguiſhed themſelves in the ſervice of the republic; which was only borne at the greater.

PANAX, in *Botany.* See GIN-*ſeng.*

PANCALA *aurea*, a name of a famous antidote, compoſed of many ingredients, deſcribed by Myrepſus.

PANCARPIA, the name of a ſort of cake much uſed at Alexandria, and uſually covered with paper for the ſake of its keeping the longer.

PANCARPUS, in *Antiquity*, a ſort of ſpectacle or ſhew, which the Roman emperors frequently exhibited to the people.

The word is formed from the Greek παν, *all*, and καρπος, *fruit.* Whence the name was alſo given by the Athenians to a ſacrifice, wherein all kinds of fruits were offered.

The *Pancarpus* of the Romans was a kind of chace, or hunt: for the performance hereof, a number of beaſts, as hares, deer, bullocks, &c. were ſhut up in the circus, or amphitheatre; into which trees were frequently tranſplanted, ſo as to form a kind of foreſt, wherein the beaſts were let looſe; whence the *Pancarpus* was alſo called *Sylva.*

The beaſts were thus abondoned to the people; i. e. to all who were diſpoſed to ſhare in the pleaſure of the chace who purſued, ſhot, killed, and cut in pieces, all they could lay hold of. Heliogabalus, the Gordians, and Probus, gave this diverſion very frequently, and it continued till the time of the emperor Juſtinian, in the ſixth century.

Caſaubon, Cujas, Pithou, &c. make the *Pancarpus* and *Sylva*, the ſame thing; Salmaſius will have them different. The *Sylva*, according to him, was ſuch a diverſion as that above deſcribed: but the *Pancarpus* a combat, wherein robuſt people, hired for that purpoſe, fought with wild beaſts; which opinion he confirms from Caſſian, Juſtinian, Claudian, Firmicus, Manilius, and Caſſiodorus.

PANCH. See PAUNCH.

PANCHREAS. See PANCREAS.

PANCHREATIC. See PANCREATIC *juice.*

PANCHREST, PANCHRESTOS, ϖαγχρηστος, formed of ϖαν, *all*, and χρηστος, *uſeful*, in *Medicine*, a PANACEA, or remedy for all diſtempers.

PANCHRESTARII, among the Romans, are thoſe who prepared the *panchreſt*, or *univerſal remedy.*

PANCHRUS, the name given by ſome of the ancient writers on natural hiſtory to a gem which they ſay has all colours: probably the opal.

PANCHYMAGOGUE, PANCHYMAGOGUM, formed from ϖαν, *all*, χυμος, *juice*, and αγειν, to *draw off*, in *Pharmacy*, a purging extract made from aloes, rhubarb, ſena, ſcammony, jalap, agaric, coloquintida, and black hellebore. Its name ariſes hence, that, being a compoſition of all the kinds of purgatives, it was ſuppoſed to have the virtue of purging all the ſorts of humours from the body at once.

PANCLADIA, Πανκλαδια, in *Antiquity*, a feſtival celebrated by the Rhodians when they pruned their vines.

PANCRASIUM, in the *Materia Medica*, a name uſed by ſome authors for the *ſquill*, of the root of which the oxymel of ſquills is made.

PANCRATIAN *verſe*, the name of a ſort of Greek verſe, conſiſting of two trochees and a ſupernumerary ſyllable: φευγε λοιδορων.

It is ſo called from its ſuppoſed inventor Pancrates, who is ſaid to have lived before the time of Meleager, another poet who flouriſhed under the firſt ſucceſſors of Alexander.

PANCRATIASTES, in *Antiquity*, a combatant in the exerciſe called PANCRATIUM.

PANCRATIASTES was alſo applied to one who had gained the victory in all the kinds of exerciſe uſed in the PANCRATIUM.

PANCRATIUM, Παγκρατιον, compounded of ϖαν, *all*, and κρατεω, *I overcome*, among the *Ancients*, a kind of intermixed exerciſe, conſiſting of the lucta or wreſtling, and the boxing or pugilate.

The *pancratium* was the third gymnaſtic exerciſe, and was not introduced till long after the others.

The people who were engaged in theſe exerciſes, were called *Pancratiaſtæ*; which name was alſo given to ſuch as did not confine themſelves to one exerciſe, but ſucceeded in ſeveral different ones.

PANCRATIUM, in *Botany.* See *Sea* DAFFODIL.

PANCREAS, Παγκρεας, formed of ϖαν, *all*, and κρεας, *fleſh*, in *Anatomy*, popularly called the *ſweet-bread*, a great conglomerate gland; or a body compoſed of an infinite number of little glands, tied up in the ſame common membrane; ſituate at the bottom and hind-part of the ſtomach, and reaching from the duodenum to the ſpleen. See *Tab. Anat. (Splanch.) fig.* 1. *lit. f.*

The glands it conſiſts of are bound together both by the veſſel, and by a membrane proper to each of them; and all together are looſely clothed with a thin membrane, from the peritonæum.

Its colour is a pale red; its form like that of a dog's tongue; it is eight or nine fingers long, $2\frac{1}{2}$ broad, and one thick; its weight four or five ounces, but the dimenſions in weight vary in different ſubjects. Its arteries come from the pylorica, duodenalis, and chiefly from the ſplenica; its veins (which are rami of the ſplenica) go to the porta; its nerves come partly from the hepatic plexus, partly from the plexus ſplenicus, and partly from the plexus meſentericus ſuperior.

Each gland has an excretory duct, which, uniting, form one common excretory duct, called *ductus pancreaticus Virtſungi*, from Wirtſungus, profeſſor of anatomy at Padua, the diſcoverer thereof.

This duct, running along the middle of the *pancreas*, opens into the cavity of the duodenum, generally by two mouths, the one four or five fingers below the pylorus, ſometimes at the ſame orifice with the ductus cholidochus; the other lower. It is of the bigneſs of a raven's quill, near the inteſtines; but leſs, farther off. De Graaf obſerves, that it is frequently double.

Mr. Winſlow obſerves, that where the great extremity of the *pancreas* is connected to the curvature of the duodenum, it ſends down an elongation, which adheres very cloſely to the following portion of the inteſtine; and upon a careful examination, he found a particular pancreatic duct, ramified like the large one, which ran toward and interſected this great duct, into the extremity of which it opened, after having perforated the duodenum. This portion he calls *pancreas minus*, and it ſometimes opens ſeparately into the duodenum, in which there are ſeveral ſmall holes, round the ductus cholidochus, which anſwer to the *pancreas.*

The *pancreas* ſerves to ſeparate a peculiar humour from the blood, which is called the PANCREATIC *juice*.

PANCREAS *Aſellii*, in *Comparative Anatomy*, is a large gland in the middle of the meſentery of ſome brutes, eſpecially dogs; to which moſt of the lacteals reſort; and whence the chyle is conveyed, by large veſſels, that have their riſe immediately from the inteſtines, and are called *lactia ſecundi generis*.

It has its name from the author who firſt took notice of it, Aſellius. M. Perrault obſerves, that the fiſh called *plaiſe*, has four hundred and forty *pancreaſes*; though it has but five ducts opening into the inteſtine, three of which correſpond to eighty *pancreaſes*, and two of them to one hundred a piece.

PANCREATIC *juice*, an inſipid, limpid juice or humour ſeparated from the blood, and prepared in the *pancreas*.

This juice is not acid as moſt authors have ſuppoſed; nor alkaline, as ſome authors have thought; but a little ſaline, and much reſembling the ſaliva in its origin, veſſels, and properties.

It is carried by the *pancreatic* duct into the duodenum, where it ſerves to dilute the chyle, to render it more fluid, and fit to enter the mouths of the lacteals; and perhaps to temper and dilute the bile, to change its viſcidity, bitterneſs, colour, &c. and make it mix with the chyle, in order to reduce the ſeveral taſtes, odours, and properties of the ſeveral foods into one homogeneous one.

Janſſon ab Almeloveen will have the *pancreatic juice* to have been known to Hippocrates and Galen. De Graaf, a Dutch phyſician, has found means of collecting a quantity of it for experiments; and has publiſhed a treatiſe expreſs, de Succo Pancreatico.

Brunner relates, that the *pancreatic* duct, in ſeveral dogs, having been tied and cut, they ſtill continued to eat and drink, and perform all the other functions of life as uſual. One of them ſeemed only to have the better ſtomach for it.

PANDA, in *Mythology*, a goddeſs who was invoked and honoured as the protectreſs of travellers and navigators. The goddeſs of peace was alſo called *Panda*, becauſe ſhe opened the gates of cities which were ſhut in time of war. According to Varro, *Panda* is a ſurname of Ceres, derived *à pane dando*, becauſe ſhe gave bread to mankind.

PANDALEON, in *Medicine*, a remedy appropriated to diſorders of the breaſt and lungs, invented by the Arabians and later phyſicians; conſiſting of grateful ingredients anſwering the ſame end with the linctus, but different from it in form, in which it agrees with troches: it differs however in this, that troches are made in a certain figure, whereas the *pandaleon*, after the ſugar is duly boiled, and the ingredients ſufficiently mixed, is poured into a box, and becomes indurated, and a ſufficient quantity is to be taken out either in a ſpoon, or on the point of a knife.

The *pandaleon* therefore is a ſolid medicine like a cake, receiving its form from the box into which it is poured: and it conſiſts of powders, pectoral conſerves, and lozenges of ſugar.

PANDECTS, PANDECTÆ, in *Juriſprudence*, the DIGEST, or collection made by Juſtinian's order, of five hundred and thirty-four deciſions, or judgments of the ancient lawyers, on ſo many queſtions occurring in the CIVIL *law*; to which that emperor gave the force and authority of law by an epiſtle perfixed to them.

The word is Greek Πανδεκται, compounded of *παν*, *all*, and δεχομαι, *capio*, *I take*; q. d. a compilation, or a book containing all things. Though others, as Bartoli, will have it formed from παν, and δεχομαι; as if theſe books contained the whole doctrine of the law.

The *Pandects* conſiſt of fifty books, and make the firſt part of the body of the civil law.

They were originally denoted by two π π; but the copiſts taking thoſe π π for *ff*, the cuſtom aroſe of quoting them by *ff*. The *Florentine Pandects* are thoſe printed from a famous ancient manuſcript at Florence.

Papias extends the denomination of *Pandects* to the Old and New Teſtament.

There are alſo PANDECTA *medecinæ*, *Pandects of medicine*: theſe are a kind of dictionary of things relating to medicine, compiled by Mat. Sylvaticus, of Mantua, who lived about the year 1297. Leunclavius has publiſhed *Pandects* of Turkey; and biſhop Beveridge *Pandects* of the Canons, *Pandecta* Canonum.

PANDEMON, Πανδημον, in *Antiquity*, the ſame with the feſtival Chalceia and ATHENÆA.

It was ſo called from the great concourſe of people that uſed to meet at this ſolemnity.

PANDIA, Πανδια, in *Antiquity*, an Athenian feſtival in honour of Jupiter. For the origin of this ſolemnity, ſee Potter, Archæol. Græc. lib. ii. cap. 20. tom. i. p. 422.

PANDICULATION, PANDICULATIO, in a general ſenſe, is a violent and tenſive motion of the ſolids, which uſually accompanies the act of yawning; and is otherwiſe called *ſtretching*.

PANDICULATION is alſo uſed in a peculiar ſenſe, for the reſtleſſneſs, ſtretching, and uneaſineſs which uſually accompany the cold fit of an intermitting fever.

It is ſuppoſed to ariſe from a convulſive dilatation of the muſcles, whereby nature endeavours to throw off ſomething that diſturbs her.

PANDORA, in *Mythology*, the name of the firſt woman, according to Heſiod; ſo called from παν, *all*, and δωρον, *gift*: becauſe the gods united to confer upon her every quality and endowment that could conduce, as the fable ſays, to the miſery of mankind. *Pandora*, it is farther ſaid, kept theſe gifts in a veſſel, the cover of which ſhe opened, and they were diſperſed over the face of the earth.

PANDROSOS, Πανδροσος, in *Antiquity*, an Athenian feſtival in honour of *Pandroſia* the daughter of king Cecrops.

PANDURA, or PANDORON, a muſical inſtrument, uſed among the ancients, much reſembling the lute.

The word, according to ſome, is formed from the Greek παν, and δορον, i. e. all gifts, all ſorts of gifts. Iſidore derives the name from its inventor *Pandorus*; others from *Pan*, to whom they attribute this invention, as well as that of the flute.

It has the ſame number of ſtrings with the lute; but they are of braſs, and of conſequence give a more agreeable ſound than thoſe of the lute. Its frets are of copper, like thoſe of the ciſtre; its back is flat, like that of the guittar; and the rims of its table, as well as its ribs, are cut in ſemicircles.

Du-Cange obſerves, that Varro, Iſidore, and others of the ancients, mention it as having only three ſtrings; whence it is ſometimes alſo ſpoken of under the denomination τριχορδον, *trichordum*.

PANDYSIA, Πανδυσια, in *Antiquity*, public rejoicings when the ſeaſon, through its coldneſs and intemperance, forced the ſailors to ſtay at home.

PANEGYRIC, PANEGYRIS, or PANEGYRICUS, an oration in praiſe of ſome extraordinary thing, perſon, or virtue.

The name is Greek, πανεγυρις, formed of παν, *all*, and αγειρω, *I aſſemble*; becauſe anciently held in public and ſolemn aſſemblies of the Greeks, either at their games, their feaſts, or their religious meetings.

The *panegyric* is ranked among the demonſtrative kind of orations.

To make their *panegyrics* the more ſolemn, they uſed to begin with the praiſes of the deity in whoſe honour the games, &c. were celebrated; then they deſcended to the praiſe of the people or country where they were celebrated; then to the princes or magiſtrates who preſided at them; and at length to the champions, eſpecially the conquerors who had gained the prizes in them.

F. De Colonia lays down two methods, or ſeries, obſerved in *panegyrics*. The *artificial*, where, without any regard to the order of time, every thing is reduced to certain heads. Thus Tully refers the whole praiſe of Pompey to his ſkill in war, his virtue, authority, and felicity.

The other *natural*; wherein the order and time of hiſtory are obſerved. This ſeries he divides into three periods: the ſpace before the perſon's birth; that wherein he lived; and, if he be dead, that which followeth his death. This natural ſeries requires much leſs art, genius, &c. than the other.

The topics or ſources of *panegyric* are, chiefly, the family and country of the hero, arguries at his birth, his virtues, the talents of his body and mind, honours, riches, manner of his death and the conſequences thereof.

PANEGYRIC, πανηγυρικος, is alſo the name of a church-book, in uſe among the Greeks; ſo called, as conſiſting of *panegyrics*, or diſcourſes in praiſe of Jeſus Chriſt, and the ſaints; it is found in MS. in moſt churches, but is not the ſame in all, each church having its particular ſaints; and the compilers of this kind of books uſually ſuited their collections to the taſte of their own devotion.

They are diſpoſed according to the order of months, and frequently conſiſt of twelve volumes, anſwering to the twelve months of the year.

PANEGYRIS, Πανηγυρις, among the Greeks, a fair, or feſtival day, on which the people uſed to meet together. It exactly correſponded to the NUNDINÆ of the Romans.

PANEL, PANELLA, PANELLUM, in *Law*, is derived, by Spelman, from *pagella*, *a ſchedule*, or *page*; in which ſenſe we ſay, a *panel* of parchment, a *counterpanel* of an indenture, &c.

PANEL, or PANNEL, is more commonly uſed for a ſchedule, or roll, containing the names of ſuch jurors as the ſheriff returns to paſs upon any trial.

Hence the impanelling of a JURY, is the entering of their names, by the ſheriff, into a *panel*, or little ſchedule of parchment; called alſo the *panel of aſſize*, *panellum aſſiſæ*. Coke on Littleton will have *panel* to be an Engliſh word, ſignifying a little part; as being a diminutive of the word *pane*, *part*; but Spelman takes this for an overſight.

PANEL, in *Joinery*, &c. See PANNEL.

PANELLENIA, Πανελληνια, in *Antiquity*, a public feſtival celebrated by an aſſembly of people from all parts of Greece.

PANEMUS, in *Chronology*, the Bœotian name of the Athenian month METAGITNION, which was the ſecond of their year, and anſwered to the latter part of our July and beginning of Auguſt.

PANEMUS among the Corinthians, anſwered to the Attic month BOEDROMION, or, according to Petavius, to our November. In the ancient Macedonian calendar, it was the ninth month of the year: but after the conqueſt of Arabia, they gave this name to the ſixth month.

PANEROS, the name of a beautiful ſtone dedicated to Venus, it was called alſo by ſome *panſebaſtos*, and was probably one of the beautiful agates.

PANES, in the *Ancient Theology*. See FAUNS.

PANGOLIN, of Buffon, in *Zoology*, is the ſhort-tailed *manis*, or MANIS *pentadactyla* of Linnæus, with back, ſides, and legs, covered with blunt ſcales, with briſtles between each; tail not longer than the body; ears not unlike the human; and ſkin, belly, and inſide of the legs hairy. See LACERTA *ſquamoſa*.

It inhabits the iſlands of India, and is probably a native of Guinea: it feeds on lizards and inſects, and is eſteemed very delicate food. *Tab.* IV. *Quadrupeds*, N° 46.

PANGONIA, in *Natural Hiſtory*, the name of a genus of cryſtal. See *Tab. of Foſſils, Claſs* 3.

The word is derived from the Greek *ϖαν*, *numerus*, and *γονυ*, *an angle*, or bending, and expreſſes a cryſtal compoſed of many angles.

The bodies of this genus are ſingle-pointed, or imperfect cryſtals, compoſed of dodecangular or twelve-planed columns, terminated by twelve-planed pyramids, and the whole body, therefore, made up of twenty-four planes. Of this genus there are only three known ſpecies. Hill.

PANIC, or PANIC *fear*, a term uſed for a needleſs or ill-grounded fright.

Polyænus fetches the origin of the phraſe from *Pan*, one of the captains of Bacchus, who, with a few men, put a numerous enemy to rout, by a noiſe which his ſoldiers raiſed in a rocky valley, favoured with a great number of echos. This ſtratagem making their number appear much greater than it really was, the enemy quitted a very commodious encampment, and fled. Hence all ill grounded fears have been called *panics* or *panic fears*; and it was this that gave occaſion to the fable of the nymph Echo's being beloved by the god PAN.

Others derive the origin of the expreſſion hence; that, in the wars of the Titans againſt the gods, PAN was the firſt who ſtruck terror into the hearts of the giants. Theon on Aratus ſays, he did it by the means of a ſea-ſhell, which ſerved him for a trumpet, whereof he was the inventor.

PANIC, *panicum*, in *Botany*, a genus or the *triandria digynia* claſs. Its characters are theſe: there is one flower in each chaff; the chaff opens with three valves, which are oval, ending in acute points; the petals open with two oval acute-pointed valves; the flowers have three ſhort hair-like ſtamina, terminated by oblong ſummits; and a roundiſh germen ſupporting two hair-like ſtyles, crowned by feathered ſtigmas; the germen becomes a roundiſh ſeed, faſtened to the withered petals. Miller enumerates five, and Linnæus thirty ſpecies.

PANICASTRELLA, in *Botany*, the name by which Micheli has called a genus of plants named by Linnæus CENCHRUS.

PANICLE, PANICULA, in *Botany*, a ſoft woolly beard, or ſtring, whereon the ſeeds of ſome plants hang pendulous: as in reeds, millet, &c.

Such are hence called *paniculated plants*.

According to Mr. Miller, the *panicula*, or panicle, is a ſtalk diffuſed into ſeveral pedicles, or foot-ſtalks, ſuſtaining the flowers or fruits, as in oats, &c.

PANIONIA, Πανιωνια, in *Antiquity*, a feſtival in honour of Neptune, celebrated by a concourſe of people from all the cities of Ionia.

One thing is remarkable in this feſtival, that if the bull offered in ſacrifice happened to bellow, it was accounted an omen of divine favour; becauſe that ſound was thought to be acceptable to Neptune.

PANIS *&* *cereviſiæ aſſiſa*. See ASSISA.

PANIS *&* *cereviſia emendatio*. See EMENDATIO.

PANIS *dæmonum*, in *Natural Hiſtory*, a name given by authors to a ſort of coarſe ſtone, common in Sweden, and ſome other places, and uſually found in a roundiſh, but ſomewhat flatted maſſes, reſembling a loaf in form.

PANNAGE, PANAGE, or PAWNAGE, are uſed in our law-books, &c. for the MAST of woods; as of beech, acorns, &c.

As alſo for the running and feeding of ſwine, or other cattle, in foreſts.

And for the moneys taken by the agiſtors for the ſame.

PANNAGIUM *liberum*, or *free pannage*, was a liberty of free running of ſwine in certain foreſts or woods, granted by privilege to certain private perſons, and ſeveral religious houſes.

Linwood defines *pannagium*, by *paſtus pecorum in nemoribus, & in ſilvis, utpote de glandibus, & aliis fructibus arborum ſylveſtrium, quarum fructus aliter non ſolent colligi.* It is alſo mentioned, 20 Car. II. *Quiſque villanus habens decem porcos dat unum porcum de* pannagio; by which it appear that one hog in ten was given for the *pannage*.

PANNEL, in *Law*. See PANEL.

PANNEL, in the *Scotch Law*, denotes the priſoner at the bar or perſon who takes his trial before the court of juſticiary for ſome crime.

PANNEL, or PANEL, in *Joinery*, &c. a tympan, or ſquare piece of wainſcot, ſometimes carved, framed, or grooved in a large piece, between two mounters or upright pieces, and two traverſes or croſs pieces.

Hence alſo *pannels* or panes of glaſs, are compartiments or pieces of glaſs of various forms; ſquare, hexagonal, &c.

PANNEL, in *Maſonry*, denotes one of the faces of a hewn ſtone.

PANNELS *of a ſaddle* are two cuſhions full of hair, or flocks, placed under the ſaddle, one on one ſide, next the horſe's back, to prevent the bow from hurting the horſe.

The word is formed from the French *panneau*, of *pan*, *flat ſide*.

PANNICULUS, in *Anatomy*, a term frequently uſed for a MEMBRANE.

The word is formed by diminution, from *pannus*, *cloth*, q. d. a little cloth, or fine web.

Hence *panniculus adipoſus*, &c. is the ſame with *membrana adipoſa*, &c.

PANNICULUS *carnoſus* is a fleſhy membrane, which the ancient anatomiſts ſuppoſed to be common to the whole body, and to be the fourth integument or covering thereof, after the epidermis, cutis, and the adipoſus.

This fleſhy *pannicle*, according to them, is a thick membrane, which covers the whole body, and even becomes muſculous in ſome parts; but the lateſt anatomiſts deny any ſuch membrane in the human body; maintaining, that what the ancients called the *fleſhy pannicle* is only the fatty or adipoſe one. Dr. Drake makes it a double membrane, one half of which forms the membrana adipoſa, and the other half the membrana communis of the muſcles.

The uſe the ancients aſcribed to the *fleſhy pannicle* was to wrinkle and contract the ſkin; but the truth is, whereever the ſkin wrinkles, there are particular muſcles for that purpoſe, called *cutaneous muſcles*.

Theſe muſcles the ancients owned; but they ſaid, their office was confined to particular motions; adding, that there are places where no fat is found between the cutis and the *fleſhy pannicle*; which is falſe.

Farther, even in animals which do move the ſkin, this *pannicle* is no more thon a cutaneous muſcle, as well as the dartos.

Some of the modern anatomiſts, however, admit the *fleſhy pannicle*, and deny the adipoſe one; ſuppoſing the latter, in reality, only part of the former.

PANNIER, in *Architecture*. See CORBEL.

PANNONICA *bolus*, in the *Materica Medica*, a name by which Kentman, and ſome others, have called the earth more uſually known by the name of *bolus* TOCCAVIENSIS.

PANNUS, derived from *ϖανος*, *a web*, a Latin word ſignifying cloth, web, &c.

PANNUS, in *Medicine*, a diſeaſe of the eye, popularly called the *web*.

The *pannus* is an excreſcence ariſing on the adnata or conjunctiva, leſs hard and membranous than the unguis; and repreſenting a web, or plexus of little veins ſwelled with blood.

Its cauſe is, an obſtruction of the blood in the minute veſſels of that tunic.

Its cure is much the ſame with that of the OPHTHALMIA.

A chief difference is, that, in the UNGUIS, the membranous excreſence only covers part of the eye, after the manner of a nail; whereas in the *pannus* it covers the whole.

PANOCHIÆ, a name by which ſome chirurgical authors call *buboes* in the groin.

PANOMPHÆUS, Πανομφαιος, in *Antiquity*, a deſignation given to Jupiter, becauſe he was looked upon as the original author of all ſorts of divination, having the books of fate, and out of them revealing either more or leſs, as he pleaſed, to inferior dæmons.

PANOPSIA, Πανοψια, in *Antiquity*. See PYANEPSIA.

PANORPA, in *Zoology*. See SCORPION *Fly*.

PANSAPAN, in *Botany*, a name by which ſome authors have called the tree whoſe wood is the LOGWOOD, uſed in dying and in medicine.

PANTALOON, or PANTALON, the name of an ancient garment frequent among our forefathers, conſiſting of breeches and ſtockings all of a piece.

The denomination comes from the Venetians, who firſt introduced this habit, and who are called *Pantaloni*, from St. *Pantaleon*, who was formerly their patron.

PANTALOON, on the *Theatre*, is a buffoon or maſked perſon who performs high and groteſque dances, and ſhews violent and extravagant poſtures and airs.

The word is alſo uſed for the habit and dreſs theſe buffoons uſually wear; which is made preciſely to the form of their body, and all of a piece from head to foot.

And hence thoſe who wear a habit of this kind: for conveniency, under their other cloaths, are called *pantaloons* of Venice.

PANTARBE, in *Natural Hiſtory*, a name given by authors to an imaginary ſtone, the virtues of which were ſimilar to thoſe of the magnet; but exerted upon gold as thoſe of the load-ſtone upon iron. The ancients, as well as later writers, ſeem to have all had an opinion, that there was ſuch a ſtone as this, and the *amphitane* of Pliny is deſcribed as poſſeſſing this remarkable quality; but neither they nor we ever found reaſon from any experiment to believe that there was any ſuch ſtone.

PANTHEA, Πανθεια, among the *Ancients*, were ſingle ſtatues, compoſed of the figures, or ſymbols of ſeveral different divinities combined.

Father Joubert, who calls them *Panthea*, and who has obſerved them on ſeveral medals, ſays their heads are moſt commonly adorned with the ſymbols or attributes belonging to ſeveral gods.

An inſtance hereof we have in a medal of Antoninus Pius; which at the ſame time repreſents Serapis, by the buſhel it bears; the Sun, by the crown of rays; Jupiter Ammon, by the ram's horns; Pluto by the large beard; and Æſculapius, by the ſerpent twiſted in his hand.

M. Baudelot, in a diſſertation on the Lares, will have the *Panthea* to have had their riſe from the ſuperſtition of thoſe, who, taking ſeveral gods for the protectors of their houſes, united them all in the ſame ſtatue, by adorning it with the ſeveral ſymbols proper to each of theſe deities.

PANTHEISTS, is a denomination by which the followers of Spinoza are diſtinguiſhed, and derived from the nature of their doctrine, which confounds God with the univerſe; repreſenting them as one and the ſame being, and admitting only one ſubſtance whence all things proceed, and into which they all return. See SPINOZIM.

PANTHEON, Πανθεον, thus named from ϖαν, *all*, and ϑεος, *God*, in *Architecture*, a temple, or church, of a circular form; dedicated to all the gods, or to all the ſaints.

The *Pantheon* of ancient Rome is of all others the moſt celebrated, and that whence all the reſt take their names. It was built by Agrippa, ſon-in-law of Auguſtus, in his third conſulate, twenty-five years before Chriſt: though ſeveral antiquarians and artiſts have ſuppoſed that the *pantheon* exiſted as long ago as the common-wealth, and that Agrippa only embelliſhed it and added the portico. To this purpoſe they alledge the authority of Dion Caſſius, who ſpeaking of Agrippa, ſaps, he alſo finiſhed or perfected the *Pantheon*.

It was dedicated by him to Jupiter Ultor, Jupiter the Revenger; and had the name *Pantheon*, on account of the great number of ſtatues of the gods ranged in ſeven niches all round it; and becauſe built of a circular form, to repreſent heaven, the reſidence of the gods. It has but one door, and one window receiving all its light from the top of its dome. It is one hundred and forty-four feet diameter within, and juſt as much in height, and of the Corinthian order. Before each niche are two columns of antique yellow marble fluted, and of one entire block. The whole wall of the temple, as high as the grand cornice incluſive, is caſed with divers ſorts of precious marble in compartiments: and the frieze is entirely of porphyry.

The eruption of Veſuvius, in the reign of Tiberius, damaged the *Pantheon* very conſiderably: but it was ſucceſſively repaired by Domitian, Adrian, and Septimius Severus: and it ſubſiſted in all its grandeur till the incurſion of Alaric, in the time of Honorius: on this occaſion it was ſtripped of ſeveral of its ſtatues and ornaments of gold and ſilver. About thirty-nine years after this, Genſeric, king of the Vandals, took away part of its marbles and ſtatues: at length pope Boniface IV. obtaining this *Pantheon* of the emperor Phocas, converted it into a church, without any alteration in the building; and dedicated it to the Virgin, and all the martyrs. And it ſtill ſubſiſts at Rome under the title of Notre Dame de la Rotonda. However, in 655, Conſtantius II. ſtripped it of its inſide and outſide brazen coverings, which he tranſported to Syracuſe.

There was alſo at Rome another *Pantheon*, dedicated to Minerva, as the goddeſs of medicine. It was in the form of a decagon, and the diſtance from one angle to another meaſured $22\frac{1}{2}$ feet. Between the angles there were nine chapels of a round figure, deſigned for ſo many deities: and over the gate there was a ſtatue of Minerva.

The *Pantheon* of Athens was in many reſpects little inferior to that of Rome, built by Agrippa. The Greek Chriſtians converted it into a church, dedicated to the Virgin, under the name of *Panegia*. The Turks changed it into a moſque.

The *Pantheon* of Niſmes, was a temple in that city, wherein were twelve niches, for ſtatues, ſuppoſed to have been deſtined for the twelve great gods.

In the ESCURIAL is a magnificent chapel, called *Pantheon*, thirty-five feet in diameter, and thirty-eight high, from the pavement, which is of marble and jaſper inlayed. The whole inſide of the chapel is of black marble, except the luthern, and ſome ornaments of jaſper, and red marble.

In this chapel are depoſited the bodies of the kings and queens: there are only places made for twenty-ſix: eight of which are already filled.

PANTHERA, *panther*, in *Zoology*. See LEOPARD, and *Tab.* IV. *Quadrupeds*, N° 47. ONCE, and *Tab.* IV. *Quadrupeds*, N° 42. See alſo PARDALIS.

PANTHERA *lapis*, in *Natural Hiſtory*, the name of a ſpecies of ſtone found in Egypt, and the Eaſt Indies, and deſcribed to be of a yellowiſh colour, variegated with duſky ſpots of the colour of thoſe on the ſkin of the panther. The writers of the middle ages have attributed many abſurd properties to it: it ſeems to have been a ſpecies of agate.

PANTHERINE *tables*, *pantherinæ menſæ*, among the Romans, tables made of citron-wood, which were held in ſuch high eſteem, as to equal the value not only of ſilver, and gold, but likewiſe of pearls. They had this name from their being ſpotted after the manner of panthers.

PANTICES, a word uſed by ſome medicinal writers to expreſs the inteſtines.

PANTOMIME, Παντομιμος, among the *Ancients*, a perſon who could imitate all kinds of actions and characters by ſigns and geſtures, without ſpeaking.

The *pantomimes* made a part in the theatrical entertainments of the ancients; their chief employment was to expreſs, in geſtures and action, whatever the chorus ſung, changing their countenance and behaviour as the ſubject of the ſong varied.

They were very ancient in Greece, being derived from the heroic times, according to ſome; but however this may be: they were certainly known in Plato's time. In Rome it was ſo late as the time of Auguſtus before they made their appearance.

As to their dreſs, it was various, being always ſuited as near as poſſible to that of the perſon they were to imitate. The crocota was much uſed among the Roman *pantomimes*, in which, and other female dreſſes, they perſonated women. See MIME.

PANTON-*ſhoe*, in the *Manege*, a horſe-ſhoe contrived for receiving narrow and hoof-bound heels. Its ſpunges are much thicker on the inſide than on the outſide; ſo that the part which reſts upon the horn or hoof, runs ſlopewiſe to the end. that the thickneſs of the inſide of the ſhoe may bear up the heel, and throw or puſh it to the outſide.

Panton-ſhoes are likewiſe proper for horſes that have falſe quarters.

PANZY, in *Botany*. See VIOLET, and HEART's *Eaſe*.

PAPA. See POPE.

PAPACY. See POPEDOM.

PAPAL *crown* is a deep cap, or mitre of cloth of gold, encompaſſed with three coronets, or circles of gold, adorned with flowers; and the whole enriched with precious ſtones; having a globe at top, finiſhed with a croſs. See CROWN.

PAPAN, in *Natural Hiſtory*, the name given by the inhabitants of the Philippine Iſlands, to a ſpecies of duck common in their lakes and marſhes. This is very large and beautiful, aud is called by father Camelli *anas regia*, or the *royal duck*: it is not ſo common, however, as the little kind which they call SALAYASIR.

PAPAVER, in *Botany*. See POPPY.

PAPAW, *carica*, in *Botany*, a genus of the *dioecia decandria* claſs. Its characters are theſe: it is male and female in different plants; the flowers of the male are funnel-ſhaped, and of one leaf having a long ſlender tube, which expands at the top, where it is divided into five narrow obtuſe parts; it hath ten ſtamiua, five of which are alternately longer than the other; the female flowers have

a ſmall permanent empalement, indented in five parts, with five long ſpear-ſhaped petals; the oval germen afterwards becomes a large oblong fleſhy fruit, having five longitudinal cells, which are full of ſmall, oval, furrowed ſeeds, encloſed in a glutinous pulp. There are two ſpecies.

The whole plant abounds, with a milky acrid juice, which is eſteemed good for the ringworm; the flowers of the female *papaw* come out between the leaves, toward the upper part of the plant, upon very ſhort foot-ſtalks, ſitting cloſe to the ſtem; they are large and bell-ſhaped, compoſed of ſix petals, and are commonly yellow; when, theſe fall away the germen ſwell to a large fleſhy fruit the ſize of a ſmall melon, which are of different forms; ſome angular, and compreſſed at both ends, others oval or globular, and ſome pyramidal; the fruit alſo abounds with the ſame acrid milky juice as the plants. The fruit when ripe, is by the inhabitants of the Caribbee Iſlands, eaten with pepper and ſugar, as melons, but is much inferior to a common melon in flavour, in its native country; but thoſe which have ripened in England were deteſtable. The only uſe made of this fruit, was, when they were about half grown, to ſoak them in ſalt water to get out the milky juice, and pickle them for mangos, for which they have been a good ſubſtitute.

Theſe plants, being natives of hot countries, will not thrive in England, unleſs they are preſerved in a warm ſtove, which ſhould be of a proper height to contain the plants; when they are grown to a large ſize, they make a noble appearance, with their ſtrong upright ſtems, which are garniſhed on every ſide near the tops, with large ſhining leaves, ſpreading out near three feet all round the ſtem; the flowers of the male ſort come out in cluſters on every ſide; and the fruit of the female growing round the ſtalks, between the leaves, being ſo different from any thing of European production, may intitle them to the care of the curious. When theſe plants are ſhifted from ſmall pots into larger, care muſt be taken to preſerve the ball of earthy to the roots, for whenever their roots are left bare, they rarely ſurvive it. Miller.

Papaw-*tree* of North America. See *Cuſtard* Apple

PAPER, a thin flexible leaf, uſually white, artificially prepared of ſome vegetable ſubſtance, chiefly to write upon with ink.

The word is formed from the Greek ϖαπυρος, *papyrus*, the name of an Egyptian plant, called alſo βιϐλος, *biblus*, whereon the ancients uſed to write.

Various are the materials, on which mankind in different ages and countries have contrived to write their ſentiments; as on ſtones, bricks, the leaves of herbs and trees, and their rinds or barks; alſo on tables of wood, wax, and ivory; to which may be added plates of lead, linen rolls, &c. At length the Egyptian *papyrus* was invented; then parchment, then cotton *paper*, and laſtly, the common, or linen *paper*.

Vide Maffei Iſtor. Diplom. lib. ii. § 3. 10 Bibl. Ital. tom. ii. p. 242. Leo Allat. Antiq. Hetruſc. p. 127, ſeq. Hug. de Scrib. Origin. Alex. ab Alexand. lib. ii. cap. 30. Barthol. diſſ. 4. de Libr. Legend. p. 90, ſeq.

In ſome places and ages they have even written on the ſkins of fiſhes: in others on the inteſtines of ſerpents; and in others, on the backs of tortoiſes. Mabill. de Re Diplom. lib. i. cap. 8. Fabric. Biblioth. Nat. cap. 21, &c.

There are few ſorts of plants but have at ſome times been uſed for *paper* and books: and hence the ſeveral terms, *biblos*, *codex*, *liber*, *folium*, *tabula*, *tillura*, *philura*, *ſcheda*, &c. which expreſs the ſeveral parts on which they were written: and though in Europe all theſe diſappeared upon their introduction of the *papyrus* and parchment, yet in ſome other countries the uſe of divers of them obtains to this day. In Ceylon, for inſtance, they write on the leaves of the talipot. And the Bramin MSS. in the Tulinga language, ſent to Oxford from Fort St. George, are written on leaves of the ampana, or palma Malabarica: Hermannus gives an account of a monſtrous palm-tree called *codda pana*, or *palma montana Malabarica*, which about the thirty-fifth year of its age, riſes to be ſixty or ſeventy feet high, with plicated leaves nearly round, twenty feet broad; wherewith they commonly cover their houſes; and on which they alſo write; part of one leaf ſufficing to make a moderate book. They write between the folds, making the characters through the outer cuticle Knox. Hiſt. Ceyl. lib. iii. Le Clerc. Bibl. Univ. tom. xxiii. p. 242. Phil. Tranſ. N° 246. p. 422, ſeq. Vide Hort. Ind. Malab. p. 3. Phil. Tranſ. N° 145. p. 108.

In the Maldivee Iſlands, the natives are ſaid to write on the leaves of a tree called *macaraquean*, which are a fathom and a half long, and about a foot broad. And in divers parts of the Eaſt Indies, the leaves of the muſa arbor, or plantain-tree, dried in the ſun, ſerved for the ſame uſe, till of late that the French have taught them the uſe of European *paper*. Ray, in fine, enumerates divers kinds of Indian and American trees which bear leaves proper to be uſed as *paper*; particularly one called *xagua*, which has ſomething in it extraordinary; its leaves are ſo large, and of ſo cloſe a texture, that they cover a man from top to toe, and ſhelter him from the rain, and other inclemencies of the weather, like a cloak: and from the innermoſt ſubſtance of theſe leaves, a *paper* is taken; being a white and fine membrane like the ſkin of an egg, as large as a ſkin of our vellum or parchment, and nothing inferior for beauty and goodneſs to the beſt of our *papers*.

Vide Savr. D. de Comm. tom. ii p. 967. Vide Ray Hiſt. Plantar. tom. ii. lib. 32. Nouv. Rep. Let. tom. xii. p. 361.

Paper is chiefly made among us of linen, or hempen rags, beaten to a pulp in water, and moulded into ſquare ſheets, of the thickneſs required. But it may alſo be made of nettles, hay, turnips, parſnips, colewort-leaves, aſbeſtus, or any thing that is fibrous; nay, it may be made of white woollen rags: though this would not ſerve for writing, becauſe of the hairineſs The Chineſe *paper* is ſo fine, that many of the Europeans have thought it was made of ſilk; not conſidering, ſays du Halde, that ſilk cannot be beat into ſuch a paſte, as is neceſſary to make *paper*: but it is to be obſerved, that the ſame author afterwards ſpeak of a *paper*, or parchment, made of the balls of ſilk worms; and the like we are aſſured by others is done at Cathay.

Hought. Collect. N° 360. tom. ii. p. 418, ſeq. Deſcript. of China, p. 360, ſeq. Vide Buſbeq. Legat. Turc. Epiſt. iv. p. 329

Paper, with regard to the manner of making it, and the materials employed therein, is reducible to divers kinds: as the *Egyptian*, *European*, and *Chineſe paper*: we alſo find mention of *cotton paper*, *bark-paper*, and *aſbeſtine* or *incombuſtible paper*.

Paper, *Egyptian*, is that which was principally uſed among the ancients: it was made of a ruſh called *papyrus*, or *biblus*, growing chiefly in Egypt, about the banks of the Nile: though it was alſo found in India; and Guilandinus aſſures us, he ſaw in Chaldæa, at the confluence of the Tigris and Euphrates, large fens, wherein with his own hands he plucked a *papyrus* differing in nothing from that of the Nile. Strabo likewiſe ſpeaks of a ſort of *papyrus* growing in Italy; but we do not find that this was ever uſed for making *paper*.

The deſcription given by Pliny of the *papyrus*, or *paper-reed*, is ſomewhat obſcure. Its root, according to him, is of the thickneſs of a man's arm, and ten cubits long; from this ariſe a great number of triangular ſtalks ſix or ſeven cubits high, each thick enough to be eaſily ſpanned; its leaves are long like thoſe of the bulruſh; its flowers ſtamineous, ranged in cluſters at the extremities of the ſtalks; its roots woody and knotty like thoſe of ruſhes, and its taſte and ſmell near akin to thoſe of the CYPERUS, under which genus Linnæus has claſſed the *papyus*.

Vide Plin. Hiſt. Nat. lib. xiii. cap. 11. Vide Theophr. Hiſt. Plant. lib. iv. cap. 9. and Delecamp, who gives us a figure of it, Hiſt. lib. xviii. p. 1883. See alſo Bauhin. lib. xviii. cap. 186. who, with Geſner, makes it a ſpecies of Cyperus. Grew Muſ. Reg. Societ. p. ii. ſect. 2. p. 225, ſeq. Maffei Iſtor. Diplom. Bibl. Ital. tom. ii. p. 246.

Beſides *paper*, they made ſails, ropes, and other naval rigging; as alſo mats, blankets, cloaths, and even ſhips, of the ſtalk of the *papyrus*. Moſes, we are told, when a child, was expoſed on the banks of the Nile, εν θιϐη ϖαπυρȣ, i. e. in a baſket of *papyrus*. The Egyptian prieſts wore ſhoes of *papyrus*.

Guilandinus, a Pruſſian phyſician before mentioned, has a celebrated work expreſly on the ancient *papyrus*, by way of commentary on three chapters of Pliny, wherein is amply, and with great learning, explained all that relates to this ſubject yet Scaliger has written a ſevere critique on it, in which ſome inaccuracies of Guilandinus are pointed out; but this has not hindered Kirchmayer from adopting almoſt Guilandinus's whole book in his diſſertation on the *payprus*. Add, that the moſt ingenious and learned count Scipio Maffei has lately vindicated Guilandinus againſt the exceptions of Scaliger, as well as of Voſſius and Hardouin. Vide Iſtor. Diplomat. lib. ii. Bibl. Ital. tom. ii. p. 248

Melch. Guilandini Papyrus, h. e. Commentarius in tria C. Plinii Majoris de Papyro capita, ſc. lib. xiii. cap. 11, 12, 13. firſt publiſhed at Venice in 1572, and afterwards at Amberg, in 1613, by Salmuth. It ſeems, Guilandinus intended a commentary on the whole of Pliny's Natural Hiſtory; but this ſmall part, not exceeding a moderate page, taking him up full ſix months, it is no wonder he was diſcouraged from proceeding with the reſt.

In theſe three chapters he has reſtored about twenty paſſages in the text of Pliny, not merely from his own conjecture, or the help of MSS. but from the nature of the things deſcribed, and the teſtimonies of authors of the firſt rank: beſides that, he had been upon the ſpot, where formerly the *papyrus* was manufactured, and had carefully examined all the ancient Greek and Latin authors who ſpeak of it.

Joſ. Juſt. Scaligeri Animadverſiones in Melchioris Guilandini Commentarium in tria C. Plinii capita, lib. xiii. Hiſtoriæ Mundi ſive Naturalis, quibus agit de Papyro, firſt publiſhed in the Lectiones Bibliothecariæ Memorabiles, of Rudolphus Capellus, at Hamburgh, in 1682. where he follows Guilandinus ſtep by ſtep, finds as many faults in him as his father had done in Cardan, and uſes him altogether as coarſely; every-where pointing out his literary miſtakes, and labouring to ſhew, that inſtead of reſtoring Pliny, he has often miſtaken and corrupted him.

M. Seb. Kirchmaieri Uffenhaimenſis Franci Diſſertatio Philologica de Papyro veterum, Wittebergæ 1666, 4to. He had done better ſervice, if, beſides Guilandinus, he had conſulted others, and particularly Scaliger. But as he choſe to follow one rather than many, and that too as the blind follow their guides, his fate has been much the ſame.

The origin of the art of making *paper* of the *paryprus* is very obſcure; no doubt it was firſt diſcovered in Egypt. Iſidore fixes it more particularly to the city Memphis, Orig. lib. vi. cap. 10. in which he ſeems to be countenanced by Lucan, where he ſays,

> *Nondum flumineas Memphis contexere biblos*
> *Noverat*——— Pharſal. lib. iii. v. 222.

The æra of this invention is warmly diſputed: Varro, the moſt learned of the Romans, fixed it to the time of Alexander the Great, after the building of the city of Alexandria by that conqueror; but ſeveral objections, of no ſmall weight, are brought againſt this deciſion. Pliny recites a paſſage out of a very ancient annaliſt, one Caſſius Hemina, wherein mention is made of *paper* books found in Numa's tomb, five hundred and thirty-five years after his death, which had been buried with him: now Numa was prior to Alexander by above three hundred years. Guilandinus, in effect, maintains, with great erudition, that the name and uſe of the *papyrus* were known to the Greeks long before Alexander conquered Egypt; and that the words βιϐλος, and βιϐλιον occur in their received ſignification in authors prior to, or at leaſt older than Alexander: particularly Anacreon, Alcæus, Plato the comedian, Ariſtomenes, Cartinus, Antiphanes, Plato the philoſopher, Æſchylus, and Ariſtotle. And whereas ſome ſpeak of a kind of unknown *pſeudo-biblos*, in uſe before the diſcovery of the true ſort, he argues, on the contrary, that the *biblus* mentioned by thoſe authors, prior to the conqueſt of Alexander, appears from Herodotus, Theophraſtus, and others, to be the very ſame plant with the *biblus*, or *papyrus*, of which *paper* was afterwards made: even Homer and Heſiod, the moſt ancient Greek poets, and who, by Herodotus's teſtimony lived about four hundred years before himſelf, appear to have been no ſtrangers to the *papyrus*, ſince they both make expreſs mention of it.

Vide Plin. lib. xiii. cap. 13. Guiland. Papyr. Membr. 2. Reim. Idea Syſt. Antiq. Liter. p. 285, ſeq. Kirchman. Diſſ. de Papyr. art. 11. ſect. 2.

To this it may be anſwered, that ſuppoſing the plant *papyrus* known in Greece long before Alexander's conqueſt of Egypt; it no more follows, that they had then the uſe of *paper*; than it follows that men had wine immediately on the diſcovery of the vine.

In reality, Guilandinus, produces teſtimonies, from Anacreon and Alcæus, in which the *papyrus* is employed for binding, and not for *paper*: add, that he ill tranſlates τυ φρεαλυχνον, *ellychnium*; ſince λυχνον here is the torch itſelf. Nor does the poet ſay it was made of *papyrus*, but tied up with it. Vide Scalig. lib. cit. Reimm. ubi ſupra, p. 305, ſeq.

Some have even doubted whether the art of manufacturing the *papyrus* was ſo ancient as Alexander's time; chiefly on this ground, that, for two hundred years after Alexander, men wrote on ſkins, and on the barks of trees: but this is no-wiſe concluſive. The ſcarcity of the new manufacture may account for it: for ſome ages afterwards, even as low as Tiberius, we read of ſuch a ſcarcity of *paper*, that its uſe, even in contracts, was diſpenſed with by a decree of the ſenate, and the opinion of the judges. The ſame conſideration may be carried farther: *paper* might have been known in Egypt, Judæa, Syria, and Aſia on this ſide Taurus, long before the birth of Alexander, though not in common uſe: but it might be later before the Europeans received it; and probably it was by means of Alexander's conqueſt that it firſt became publicly known there.

When the manufacture of the Egyptian *paper* ceaſed; is another queſtion; for, at preſent, the *papyrotechnia Ægyptiaca* may be reckoned among thoſe arts that are loſt. Euſtathius, the learned commentator on Homer, teſtifies, that even in his time, viz. in 1170, it was diſuſed: Mabillon, indeed, maintains, that it continued till the eleventh century after Chriſt; and cites one Fridegod, a monkiſh poet of the tenth century, as ſpeaking of it as ſubſiſting in the age before his, that is in the ninth: and that it continued longer, the ſame Mabillon endeavours to evince, from ſeveral papal bulls wrote on it as low as the eleventh century.

Vide Euſtath. ad Homer. Odyſſ. φ. Voſſ. de Art. Gram. lib. i. cap 37. Vide Mabill. De Re Diplomat. lib. i. cap. viii. ſect. 6, ſeq. Reim. Idea Syſt. Antiq. Liter. p. 311.

Maffei, on the other hand, maintains, with more probability, that the *papyrus* was generally diſuſed before the fifth century; for that we find no authentic records, written on it, dated ſince that time; thoſe bulls of popes, cited by Mabillon, appearing rather to be written on cotton *paper*. But this, we may obſerve, relates only to the general and legal uſe of the *papyrus*. For that it ſhould have continued to be made by particular perſons ſeveral hundred years after it firſt began to give way, is not to be wondered at. Vide Maffei Iſtor. Diplomat loc. cit. Bibl. Ital. tom. ii. p. 251.

In reality, a more commodious ſort of *paper*, made of cotton, having been invented ſome ages before in the Eaſt, and coming to be introduced into Europe, ſeems to have brought the *papyrus* into diſuſe. To which the continual wars with the Saracens, by which the traffic to Alexandria was rendered precarious, might poſſibly not a little contribute.

Yet ſeveral books, written on leaves of the *papyrus*, have even continued to our days: Mabillon ſays, he had one of them; and adds, that there was another in the Petavian library, being a volume in ſmall folio, containing ſeveral ſermons of St. Auguſtine; he alſo mentions a third, containing that father's epiſtles, formerly belonging to the church of Narbonne, and now in the cuſtody of madame De Phirmacon; beſides the homilies of Avitus, biſhop of Vienne, and divers diplomas or charters, all written on the *papyrus*, which appear not to be leſs than eleven hundred years old. But the deciſions of this learned father concerning MSS. notwithſtanding all his diplomatic ſkill ſo highly boaſted of, are not always infallible: witneſs his taken the MS. of St. Mark's Goſpel, at Venice, to be written on the Egyptian *papyrus*; and that of Joſephus, at Milan, not to be ſo. Maffei ſhews, on the contrary, that the former is cotton *paper*; and that the latter appears at firſt ſight, to be Egyptian: not but the Venetian MS. is very old; but it has been ſo much uſed, that its leaves are, as it were, transformed into the original paſte from whence they are made.

Vide Mabill. Suppl. ad Libr. de Re Diplomat. Journ. des. Sçav. tom. xxxii. p. ii. p. 992. Maffei, lib. cit. Bibl. tom. ii. p. 252. And Montfacon. Paleog. Græc. p. 14.

Paper, *manner of making the Egyptian*. They began with lopping off the two extremes, of the *papyrus*, viz. the head and root, as of no uſe in this manufacture; the remaining ſtem they ſlit lengthwiſe into two equal parts, and from each of theſe they ſtripped the thin ſcaly coats or pellicles, whereof it was compoſed, with the point of a penknife The innermoſt of thoſe pellicles were looked on as the beſt, and thoſe neareſt the rind or bark the worſt; they were kept apart accordingly, and conſtituted different ſorts of *paper*.

Theſe pellicles are called, in Pliny, by twelve different names; viz. *philura*, *ramentum*, *ſcheda*, *cutis*, *plagula*, *corium*, *tænia*, *ſubtegmen*, *ſtatumen*, *pagina*, *tabula*, and *papyrus*.

The generality of critics, in lieu of a pen-knife, employ a needle to ſeparate the pellicles; in which they are warranted by the common text of Pliny, *Præparantur ex eo chartæ, diviſo acu in prætenues, ſed quam latiſſimas philuras*. But Guilandinus makes a correction here: he had found, by experiment, that the pellicles of *papyrus* cannot be ſeparated by a needle; but that a very ſharp knife is required; for which reaſon, inſtead of *diviſo acu*, he reads *diviſo ſcapo*. In which he is followed by Maffei, though Hardouin, Voſſius, Pitiſcus, and others, retain the ancient reading.

Vide Guiland. Papyr. Membr. 10 ſect. 3. & 5. Maffei. Iſtor. Diplom. ap. Bibl. Ital. tom. ii. p. 247, ſeq. Voſſ. De Art. Grammat. lib. i. cap. 37. Pitiſc. L. Ant. tom. i. p. 413. voc. Charta. Hardou. ad Plin. lib. xiii. cap. 12.

As the pellicles were taken off, they extended them on a table; then two or more of them were laid over each other tranſverſely, ſo as that their fibres made right angles: in this ſtate they were glued together by the muddy

waters

a ſmall permanent empalement, indented in five parts, with five long ſpear-ſhaped petals; the oval germen afterwards becomes a large oblong fleſhy fruit, having five longitudinal cells, which are full of ſmall, oval, furrowed ſeeds, encloſed in a glutinous pulp. There are two ſpecies.

The whole plant abounds, with a milky acrid juice, which is eſteemed good for the ringworm; the flowers of the female *papaw* come out between the leaves, toward the upper part of the plant, upon very ſhort foot-ſtalks, fitting cloſe to the ſtem; they are large and bell-ſhaped, compoſed of ſix petals, and are commonly yellow; when, theſe fall away the germen ſwell to a large fleſhy fruit the ſize of a ſmall melon, which are of different forms; ſome angular, and compreſſed at both ends, others oval or globular, and ſome pyramidal; the fruit alſo abounds with the ſame acrid milky juice as the plants. The fruit when ripe, is by the inhabitants of the Caribbee Iſlands, eaten with pepper and ſugar, as melons, but is much inferior to a common melon in flavour, in its native country; but thoſe which have ripened in England were deteſtable. The only uſe made of this fruit, was, when they were about half grown, to ſoak them in ſalt water to get out the milky juice, and pickle them for mangos, for which they have been a good ſubſtitute.

Theſe plants, being natives of hot countries, will not thrive in England, unleſs they are preſerved in a warm ſtove, which ſhould be of a proper height to contain the plants; when they are grown to a large ſize, they make a noble appearance, with their ſtrong upright ſtems, which are garniſhed on every ſide near the tops, with large ſhining leaves, ſpreading out near three feet all round the ſtem; the flowers of the male ſort come out in cluſters on every ſide; and the fruit of the female growing round the ſtalks, between the leaves, being ſo different from any thing of European production, may intitle them to the care of the curious. When theſe plants are ſhifted from ſmall pots into larger, care muſt be taken to preſerve the ball of earthy to the roots, for whenever their roots are left bare, they rarely ſurvive it. Miller.

PAPAW-*tree* of North America. See *Cuſtard* APPLE

PAPER, a thin flexible leaf, uſually white, artificially prepared of ſome vegetable ſubſtance, chiefly to write upon with ink.

The word is formed from the Greek ϖαπυρος, *papyrus*, the name of an Egyptian plant, called alſo βιϐλος, *biblus*, whereon the ancients uſed to write.

Various are the materials, on which mankind in different ages and countries have contrived to write their ſentiments; as on ſtones, bricks, the leaves of herbs and trees, and their rinds or barks; alſo on tables of wood, wax, and ivory; to which may be added plates of lead, linen rolls, &c. At length the Egyptian *papyrus* was invented; then parchment, then cotton *paper*, and laſtly, the common, or linen *paper*.

Vide Maffei Iſtor. Diplom. lib. ii. § 3. 10 Bibl. Ital. tom. ii. p. 242. Leo Allat. Antiq. Hetruſc. p. 127, ſeq. Hug. de Scrib. Origin. Alex. ab Alexand. lib. ii. cap. 30. Barthol. diſſ. 4. de Libr. Legend. p. 90, ſeq.

In ſome places and ages they have even written on the ſkins of fiſhes: in others on the inteſtines of ſerpents; and in others, on the backs of tortoiſes. Mabill. de Re Diplom. lib. i. cap. 8. Fabric. Biblioth. Nat. cap. 21, &c.

There are few ſorts of plants but have at ſome times been uſed for *paper* and books: and hence the ſeveral terms, *biblos*, *codex*, *liber*, *folium*, *tabula*, *tillura*, *philura*, *ſcheda*, &c. which expreſs the ſeveral parts on which they were written: and though in Europe all theſe diſappeared upon their introduction of the *papyrus* and parchment, yet in ſome other countries the uſe of divers of them obtains to this day. In Ceylon, for inſtance, they write on the leaves of the talipot. And the Bramin MSS. in the Tulinga language, ſent to Oxford from Fort St. George, are written on leaves of the ampana, or palma Malabarica: Hermannus gives an account of a monſtrous palm-tree called *codda pana*, or *palma montana Malabarica*, which about the thirty-fifth year of its age, riſes to be ſixty or ſeventy feet high, with plicated leaves nearly round, twenty feet broad; wherewith they commonly cover their houſes; and on which they alſo write; part of one leaf ſufficing to make a moderate book. They write between the folds, making the characters through the outer cuticle Knox. Hiſt. Ceyl. lib. iii. Le Clerc. Bibl. Univ. tom. xxiii. p. 242. Phil. Tranſ. N° 246. p. 422, ſeq. Vide Hort. Ind. Malab. p. 3. Phil. Tranſ. N° 145. p. 108.

In the Maldivee Iſlands, the natives are ſaid to write on the leaves of a tree called *macaraquean*, which are a fathom and a half long, and about a foot broad. And in divers parts of the Eaſt Indies, the leaves of the muſa arbor, or plantain-tree, dried in the ſun, ſerved for the ſame uſe, till of late that the French have taught them the uſe of European *paper*. Ray, in fine, enumerates divers kinds of Indian and American trees which bear leaves proper to be uſed as *paper*; particularly one called *xagua*, which has ſomething in it extraordinary; its leaves are ſo large, and of ſo cloſe a texture, that they cover a man from top to toe, and ſhelter him from the rain, and other inclemencies of the weather, like a cloak: and from the innermoſt ſubſtance of theſe leaves, a *paper* is taken; being a white and fine membrane like the ſkin of an egg, as large as a ſkin of our vellum or parchment, and nothing inferior for beauty and goodneſs to the beſt of our *papers*.

Vide Savr. D. de Comm. tom. ii p. 967. Vide Ray Hiſt. Plantar. tom. ii. lib. 32. Nouv. Rep. Let. tom. xii. p. 361.

Paper is chiefly made among us of linen, or hempen rags, beaten to a pulp in water, and moulded into ſquare ſheets, of the thickneſs required. But it may alſo be made of nettles, hay, turnips, parſnips, colewort-leaves, aſbeſtus, or any thing that is fibrous; nay, it may be made of white woollen rags: though this would not ſerve for writing, becauſe of the hairineſs. The Chineſe *paper* is ſo fine, that many of the Europeans have thought it was made of ſilk; not conſidering, ſays du Halde, that ſilk cannot be beat into ſuch a paſte, as is neceſſary to make *paper*: but it is to be obſerved, that the ſame author afterwards ſpeak of a *paper*, or parchment, made of the balls of ſilk worms; and the like we are aſſured by others is done at Cathay.

Hought. Collect. N° 360. tom. ii. p. 418, ſeq. Deſcript. of China, p. 360, ſeq. Vide Buſbeq. Legat. Turc. Epiſt. iv. p. 329.

PAPER, with regard to the manner of making it, and the materials employed therein, is reducible to divers kinds: as the *Egyptian*, *European*, and *Chineſe paper*: we alſo find mention of *cotton paper*, *bark-paper*, and *aſbeſtine* or *incombuſtible paper*.

PAPER, *Egyptian*, is that which was principally uſed among the ancients: it was made of a ruſh called *papyrus*, or *biblus*, growing chiefly in Egypt, about the banks of the Nile: though it was alſo found in India; and Guilandinus aſſures us, he ſaw in Chaldæa, at the confluence of the Tigris and Euphrates, large fens, wherein with his own hands he plucked a *papyrus* differing in nothing from that of the Nile. Strabo likewiſe ſpeaks of a ſort of *papyrus* growing in Italy; but we do not find that this was ever uſed for making *paper*.

The deſcription given by Pliny of the *papyrus*, or *paper-reed*, is ſomewhat obſcure. Its root, according to him, is of the thickneſs of a man's arm, and ten cubits long; from this ariſe a great number of triangular ſtalks ſix or ſeven cubits high, each thick enough to be eaſily ſpanned; its leaves are long like thoſe of the bulruſh; its flowers ſtamineous, ranged in cluſters at the extremities of the ſtalks; its roots woody and knotty like thoſe of ruſhes, and its taſte and ſmell near akin to thoſe of the CYPERUS, under which genus Linnæus has claſſed the *papyus*.

Vide Plin. Hiſt. Nat. lib. xiii. cap. 11. Vide Theophr. Hiſt. Plant. lib. iv. cap. 9. and Delecamp, who gives us a figure of it, Hiſt. lib. xviii. p. 1883. See alſo Bauhin. lib. xviii. cap. 186. who, with Geſner, makes it a ſpecies of Cyperus. Grew Muſ. Reg. Societ. p. ii. ſect. 2. p. 225, ſeq. Maffei Iſtor. Diplom. Bibl. Ital. tom. ii. p. 246.

Beſides *paper*, they made ſails, ropes, and other naval rigging; as alſo mats, blankets, cloaths, and even ſhips, of the ſtalk of the *papyrus*. Moſes, we are told, when a child, was expoſed on the banks of the Nile, εν θιϐη ϖαπυρω, i. e. in a baſket of *papyrus*. The Egyptian prieſts wore ſhoes of *papyrus*.

Guilandinus, a Pruſſian phyſician before mentioned, has a celebrated work expreſly on the ancient *papyrus*, by way of commentary on three chapters of Pliny, wherein is amply, and with great learning, explained all that relates to this ſubject yet Scaliger has written a ſevere critique on it, in which ſome inaccuracies of Guilandinus are pointed out; but this has not hindered Kirchmayer from adopting almoſt Guilandinus's whole book in his diſſertation on the *payprus*. Add, that the moſt ingenious and learned count Scipio Maffei has lately vindicated Guilandinus againſt the exceptions of Scaliger, as well as of Voſſius and Hardouin. Vide Iſtor. Diplomat. lib. ii. Bibl. Ital. tom. ii. p. 248.

Melch. Guilandini Papyrus, h. e. Commentarius in tria C. Plinii Majoris de Papyro capita, ſc. lib. xiii. cap. 11, 12, 13. firſt publiſhed at Venice in 1572, and afterwards at Amberg, in 1613, by Salmuth. It ſeems, Guilandinus intended a commentary on the whole of Pliny's Natural Hiſtory; but this ſmall part, not exceeding a moderate page, taking him up full ſix months, it is no wonder he was diſcouraged from proceeding with the reſt.

In theſe three chapters he has reſtored about twenty paſſages in the text of Pliny, not merely from his own conjecture, or the help of MSS. but from the nature of the things deſcribed, and the teſtimonies of authors of the firſt rank: beſides that, he had been upon the ſpot, where formerly the *papyrus* was manufactured, and had carefully examined all the ancient Greek and Latin authors who ſpeak of it.

Joſ. Juſt. Scaligeri Animadverſiones in Melchioris Guilandini Commentarium in tria C. Plinii capita, lib. xiii. Hiſtoriæ Mundi ſive Naturalis, quibus agit de Papyro, firſt publiſhed in the Lectiones Bibliothecariæ Memorabiles, of Rudolphus Capellus, at Hamburgh, in 1682. where he follows Guilandinus ſtep by ſtep, finds as many faults in him as his father had done in Cardan, and uſes him altogether as coarſely; every-where pointing out his literary miſtakes, and labouring to ſhew, that inſtead of reſtoring Pliny, he has often miſtaken and corrupted him.

M. Seb. Kirchmaieri Uffenhaimenſis Franci Diſſertatio Philologica de Papyro veterum, Wittebergæ 1666, 4to. He had done better ſervice, if, beſides Guilandinus, he had conſulted others, and particularly Scaliger. But as he choſe to follow one rather than many, and that too as the blind follow their guides, his fate has been much the ſame.

The origin of the art of making *paper* of the *paryprus* is very obſcure; no doubt it was firſt diſcovered in Egypt. Iſidore fixes it more particularly to the city Memphis, Orig. lib. vi. cap. 10. in which he ſeems to be countenanced by Lucan, where he ſays,

> *Nondum flumineas Memphis contexere biblos*
> *Noverat*——— Pharſal. lib. iii. v. 222.

The æra of this invention is warmly diſputed: Varro, the moſt learned of the Romans, fixed it to the time of Alexander the Great, after the building of the city of Alexandria by that conqueror; but ſeveral objections, of no ſmall weight, are brought againſt this deciſion. Pliny recites a paſſage out of a very ancient annaliſt, one Caſſius Hemina, wherein mention is made of *paper* books found in Numa's tomb, five hundred and thirty-five years after his death, which had been buried with him: now Numa was prior to Alexander by above three hundred years. Guilandinus, in effect, maintains, with great erudition, that the name and uſe of the *papyrus* were known to the Greeks long before Alexander conquered Egypt; and that the words βιϐλος, and βιϐλιον occur in their received ſignification in authors prior to, or at leaſt older than Alexander: particularly Anacreon, Alcæus, Plato the comedian, Ariſtomenes, Cartinus, Antiphanes, Plato the philoſopher, Æſchylus, and Ariſtotle. And whereas ſome ſpeak of a kind of unknown *pſeudo-biblos*, in uſe before the diſcovery of the true ſort, he argues, on the contrary, that the *biblus* mentioned by thoſe authors, prior to the conqueſt of Alexander, appears from Herodotus, Theophraſtus, and others, to be the very ſame plant with the *biblus*, or *papyrus*, of which *paper* was afterwards made: even Homer and Heſiod, the moſt ancient Greek poets, and who, by Herodotus's teſtimony lived about four hundred years before himſelf, appear to have been no ſtrangers to the *papyrus*, ſince they both make expreſs mention of it.

Vide Plin. lib. xiii. cap. 13. Guiland. Papyr. Membr. 2. Reim. Idea Syſt. Antiq. Liter. p. 285, ſeq. Kirchman. Diſſ. de Papyr. art. 11. ſect. 2.

To this it may be anſwered, that ſuppoſing the plant *papyrus* known in Greece long before Alexander's conqueſt of Egypt; it no more follows, that they had then the uſe of *paper*; than it follows that men had wine immediately on the diſcovery of the vine.

In reality, Guilandinus, produces teſtimonies, from Anacreon and Alcæus, in which the *papyrus* is employed for binding, and not for *paper*: add, that he ill tranſlates τυ φρεαλυχνον, *ellychnium*; ſince λυχνον here is the torch itſelf. Nor does the poet ſay it was made of *papyrus*, but tied up with it. Vide Scalig. lib. cit. Reimm. ubi ſupra, p. 305, ſeq.

Some have even doubted whether the art of manufacturing the *papyrus* was ſo ancient as Alexander's time; chiefly on this ground, that, for two hundred years after Alexander, men wrote on ſkins, and on the barks of trees: but this is no-wiſe concluſive. The ſcarcity of the new manufacture may account for it: for ſome ages afterwards, even as low as Tiberius, we read of ſuch a ſcarcity of *paper*, that its uſe, even in contracts, was diſpenſed with by a decree of the ſenate, and the opinion of the judges. The ſame conſideration may be carried farther: *paper* might have been known in Egypt, Judæa, Syria, and Aſia on this ſide Taurus, long before the birth of Alexander, though not in common uſe: but it might be later before the Europeans received it; and probably it was by mean's of Alexander's conqueſt that it firſt became publicly known there.

When the manufacture of the Egyptian *paper* ceaſed, is another queſtion; for, at preſent, the *papyrotechnia Ægyptiaca* may be reckoned among thoſe arts that are loſt. Euſtathius, the learned commentator on Homer, teſtifies, that even in his time, viz. in 1170, it was diſuſed: Mabillon, indeed, maintains, that it continued till the eleventh century after Chriſt; and cites one Fridegod, a monkiſh poet of the tenth century, as ſpeaking of it as ſubſiſting in the age before his, that is in the ninth: and that it continued longer, the ſame Mabillon endeavours to evince, from ſeveral papal bulls wrote on it as low as the eleventh century.

Vide Euſtath. ad Homer. Odyſſ. φ. Voſſ. de Art. Gram. lib. i. cap 37. Vide Mabill. De Re Diplomat. lib. i. cap. viii. ſect. 6, ſeq. Reim. Idea Syſt. Antiq. Liter. p. 311.

Maffei, on the other hand, maintains, with more probability, that the *papyrus* was generally diſuſed before the fifth century; for that we find no authentic records, written on it, dated ſince that time; thoſe bulls of popes, cited by Mabillon, appearing rather to be written on cotton *paper*. But this, we may obſerve, relates only to the general and legal uſe of the *papyrus*. For that it ſhould have continued to be made by particular perſons ſeveral hundred years after it firſt began to give way, is not to be wondered at. Vide Maffei Iſtor. Diplomat loc. cit. Bibl. Ital. tom. ii. p. 251.

In reality, a more commodious ſort of *paper*, made of cotton, having been invented ſome ages before in the Eaſt, and coming to be introduced into Europe, ſeems to have brought the *papyrus* into diſuſe. To which the continual wars with the Saracens, by which the traffic to Alexandria was rendered precarious, might poſſibly not a little contribute.

Yet ſeveral books, written on leaves of the *papyrus*, have even continued to our days: Mabillon ſays, he had one of them; and adds, that there was another in the Petavian library, being a volume in ſmall folio, containing ſeveral ſermons of St. Auguſtine; he alſo mentions a third, containing that father's epiſtles, formerly belonging to the church of Narbonne, and now in the cuſtody of madame De Phirmacon; beſides the homilies of Avitus, biſhop of Vienne, and divers diplomas or charters, all written on the *papyrus*, which appear not to be leſs than eleven hundred years old. But the deciſions of this learned father concerning MSS. notwithſtanding all his diplomatic ſkill ſo highly boaſted of, are not always infallible: witneſs his taken the MS. of St. Mark's Goſpel, at Venice, to be written on the Egyptian *papyrus*; and that of Joſephus, at Milan, not to be ſo. Maffei ſhews, on the contrary, that the former is cotton *paper*; and that the latter appears at firſt ſight, to be Egyptian: not but the Venetian MS. is very old; but it has been ſo much uſed, that its leaves are, as it were, transformed into the original paſte from whence they are made.

Vide Mabill. Suppl. ad Libr. de Re Diplomat. Journ. des. Sçav. tom. xxxii. p. ii. p. 992. Maffei, lib. cit. Bibl. tom. ii. p. 252. And Montfacon. Paleog. Græc. p. 14.

Paper, *manner of making the Egyptian.* They began with lopping off the two extremes, of the *papyrus*, viz. the head and root, as of no uſe in this manufacture; the remaining ſtem they ſlit lengthwiſe into two equal parts, and from each of theſe they ſtripped the thin ſcaly coats or pellicles, whereof it was compoſed, with the point of a penknife The innermoſt of thoſe pellicles were looked on as the beſt, and thoſe neareſt the rind or bark the worſt; they were kept apart accordingly, and conſtituted different ſorts of *paper*.

Theſe pellicles are called, in Pliny, by twelve different names; viz. *philura*, *ramentum*, *ſcheda*, *cutis*, *plagula*, *corium*, *tænia*, *ſubtegmen*, *flatumen*, *pagina*, *tabula*, and *papyrus*.

The generality of critics, in lieu of a pen-knife, employ a needle to ſeparate the pellicles; in which they are warranted by the common text of Pliny, *Præparantur ex eo chartæ, diviſo acu in prætenues, ſed quam latiſſimas philuras.* But Guilandinus makes a correction here: he had found, by experiment, that the pellicles of *papyrus* cannot be ſeparated by a needle; but that a very ſharp knife is required; for which reaſon, inſtead of *diviſo acu*, he reads *diviſo ſcapo*. In which he is followed by Maffei, though Hardouin, Voſſius, Pitiſcus, and others, retain the ancient reading.

Vide Guiland. Papyr. Membr. 10 ſect. 3. & 5. Maffei. Iſtor. Diplom. ap. Bibl. Ital. tom. ii. p. 247, ſeq. Voſſ. De Art. Grammat. lib. i. cap. 37. Pitiſc. L. Ant. tom. i. p. 413. voc. Charta. Hardou. ad Plin. lib. xiii. cap. 12.

As the pellicles were taken off, they extended them on a table; then two or more of them were laid over each other tranſverſely, ſo as that their fibres made right angles: in this ſtate they were glued together by the muddy

a ſmall permanent empalement, indented in five parts, with five long ſpear-ſhaped petals; the oval germen afterwards becomes a large oblong fleſhy fruit, having five longitudinal cells, which are full of ſmall, oval, furrowed ſeeds, encloſed in a glutinous pulp. There are two ſpecies.

The whole plant abounds, with a milky acrid juice, which is eſteemed good for the ringworm; the flowers of the female *papaw* come out between the leaves, toward the upper part of the plant, upon very ſhort foot-ſtalks, ſitting cloſe to the ſtem; they are large and bell-ſhaped, compoſed of ſix petals, and are commonly yellow; when, theſe fall away the germen ſwell to a large fleſhy fruit the ſize of a ſmall melon, which are of different forms; ſome angular, and compreſſed at both ends, others oval or globular, and ſome pyramidal; the fruit alſo abounds with the ſame acrid milky juice as the plants. The fruit when ripe, is by the inhabitants of the Caribbee Iſlands, eaten with pepper and ſugar, as melons, but is much inferior to a common melon in flavour, in its native country; but thoſe which have ripened in England were deteſtable. The only uſe made of this fruit, was, when they were about half grown, to ſoak them in ſalt water to get out the milky juice, and pickle them for mangos, for which they have been a good ſubſtitute.

Theſe plants, being natives of hot countries, will not thrive in England, unleſs they are preſerved in a warm ſtove, which ſhould be of a proper height to contain the plants; when they are grown to a large ſize, they make a noble appearance, with their ſtrong upright ſtems, which are garniſhed on every ſide near the tops, with large ſhining leaves, ſpreading out near three feet all round the ſtem; the flowers of the male ſort come out in cluſters on every ſide; and the fruit of the female growing round the ſtalks, between the leaves, being ſo different from any thing of European production, may intitle them to the care of the curious. When theſe plants are ſhifted from ſmall pots into larger, care muſt be taken to preſerve the ball of earthy to the roots, for whenever their roots are left bare, they rarely ſurvive it. Miller.

PAPAW-*tree* of North America. See *Cuſtard* APPLE

PAPER, a thin flexible leaf, uſually white, artificially prepared of ſome vegetable ſubſtance, chiefly to write upon with ink.

The word is formed from the Greek ϖαπυρος, *papyrus*, the name of an Egyptian plant, called alſo βιϐλος, *biblus*, whereon the ancients uſed to write.

Various are the materials, on which mankind in different ages and countries have contrived to write their ſentiments; as on ſtones, bricks, the leaves of herbs and trees, and their rinds or barks; alſo on tables of wood, wax, and ivory; to which may be added plates of lead, linen rolls, &c. At length the Egyptian *papyrus* was invented; then parchment, then cotton *paper*, and laſtly, the common, or linen *paper*.

Vide Maffei Iſtor. Diplom. lib. ii. § 3. 10 Bibl. Ital. tom. ii. p. 242. Leo Allat. Antiq. Hetruſc. p. 127, ſeq. Hug. de Scrib. Origin. Alex. ab Alexand. lib. ii. cap. 30. Barthol. diſſ. 4. de Libr. Legend. p. 90, ſeq.

In ſome places and ages they have even written on the ſkins of fiſhes: in others on the inteſtines of ſerpents; and in others, on the backs of tortoiſes. Mabill. de Re Diplom. lib. i. cap. 8. Fabric. Biblioth. Nat. cap. 21, &c.

There are few ſorts of plants but have at ſome times been uſed for *paper* and books: and hence the ſeveral terms, *biblos*, *codex*, *liber*, *folium*, *tabula*, *tillura*, *philura*, *ſcheda*, &c. which expreſs the ſeveral parts on which they were written: and though in Europe all theſe diſappeared upon their introduction of the *papyrus* and parchment, yet in ſome other countries the uſe of divers of them obtains to this day. In Ceylon, for inſtance, they write on the leaves of the talipot. And the Bramin MSS. in the Tulinga language, ſent to Oxford from Fort St. George, are written on leaves of the ampana, or palma Malabarica: Hermannus gives an account of a monſtrous palmtree called *codda pana*, or *palma montana Malabarica*, which about the thirty-fifth year of its age, riſes to be ſixty or ſeventy feet high, with plicated leaves nearly round, twenty feet broad; wherewith they commonly cover their houſes; and on which they alſo write; part of one leaf ſufficing to make a moderate book. They write between the folds, making the characters through the outer cuticle Knox. Hiſt. Ceyl. lib. iii. Le Clerc. Bibl. Univ. tom. xxiii. p. 242. Phil. Tranſ. N° 246. p. 422, ſeq. Vide Hort. Ind. Malab. p. 3. Phil. Tranſ. N° 145. p. 108.

In the Maldivee Iſlands, the natives are ſaid to write on the leaves of a tree called *macaraquean*, which are a fathom and a half long, and about a foot broad. And in divers parts of the Eaſt Indies, the leaves of the muſa arbor, or plantain-tree, dried in the ſun, ſerved for the ſame uſe, till of late that the French have taught them the uſe of European *paper*. Ray, in fine, enumerates divers kinds of Indian and American trees which bear leaves proper to be uſed as *paper*; particularly one called *xagua*, which has ſomething in it extraordinary; its leaves are ſo large, and of ſo cloſe a texture, that they cover a man from top to toe, and ſhelter him from the rain, and other inclemencies of the weather, like a cloak: and from the innermoſt ſubſtance of theſe leaves, a *paper* is taken; being a white and fine membrane like the ſkin of an egg, as large as a ſkin of our vellum or parchment, and nothing inferior for beauty and goodneſs to the beſt of our *papers*.

Vide Savr. D. de Comm. tom. ii p. 967. Vide Ray Hiſt. Plantar. tom. ii. lib. 32. Nouv. Rep. Let. tom. xii. p. 361.

Paper is chiefly made among us of linen, or hempen rags, beaten to a pulp in water, and moulded into ſquare ſheets, of the thickneſs required. But it may alſo be made of nettles, hay, turnips, parſnips, colewort-leaves, aſbeſtus, or any thing that is fibrous; nay, it may be made of white woollen rags: though this would not ſerve for writing, becauſe of the hairineſs. The Chineſe *paper* is ſo fine, that many of the Europeans have thought it was made of ſilk; not conſidering, ſays du Halde, that ſilk cannot be beat into ſuch a paſte, as is neceſſary to make *paper*: but it is to be obſerved, that the ſame author afterwards ſpeak of a *paper*, or parchment, made of the balls of ſilk worms; and the like we are aſſured by others is done at Cathay.

Hought. Collect. N° 360. tom. ii. p. 418, ſeq. Deſcript. of China, p. 360, ſeq. Vide Buſbeq. Legat. Turc. Epiſt. iv. p. 329.

PAPER, with regard to the manner of making it, and the materials employed therein, is reducible to divers kinds: as the *Egyptian*, *European*, and *Chineſe paper*: we alſo find mention of *cotton paper*, *bark-paper*, and *aſbeſtine* or *incombuſtible paper*.

PAPER, *Egyptian*, is that which was principally uſed among the ancients: it was made of a ruſh called *papyrus*, or *biblus*, growing chiefly in Egypt, about the banks of the Nile: though it was alſo found in India; and Guilandinus aſſures us, he ſaw in Chaldæa, at the confluence of the Tigris and Euphrates, large fens, wherein with his own hands he plucked a *papyrus* differing in nothing from that of the Nile. Strabo likewiſe ſpeaks of a ſort of *papyrus* growing in Italy; but we do not find that this was ever uſed for making *paper*.

The deſcription given by Pliny of the *papyrus*, or *paper-reed*, is ſomewhat obſcure. Its root, according to him, is of the thickneſs of a man's arm, and ten cubits long; from this ariſe a great number of triangular ſtalks ſix or ſeven cubits high, each thick enough to be eaſily ſpanned; its leaves are long like thoſe of the bulruſh; its flowers ſtamineous, ranged in cluſters at the extremities of the ſtalks; its roots woody and knotty like thoſe of ruſhes, and its taſte and ſmell near akin to thoſe of the CYPERUS, under which genus Linnæus has claſſed the *papyus*.

Vide Plin. Hiſt. Nat. lib. xiii. cap. 11. Vide Theophr. Hiſt. Plant. lib. iv. cap. 9. and Delecamp, who gives us a figure of it, Hiſt. lib. xviii. p. 1883. See alſo Bauhin. lib. xviii. cap. 186. who, with Geſner, makes it a ſpecies of Cyperus. Grew Muſ. Reg. Societ. p. ii. ſect. 2. p. 225, ſeq. Maffei Iſtor. Diplom. Bibl. Ital. tom. ii. p. 246.

Beſides *paper*, they made ſails, ropes, and other naval rigging; as alſo mats, blankets, cloaths, and even ſhips, of the ſtalk of the *papyrus*. Moſes, we are told, when a child, was expoſed on the banks of the Nile, εν θιϐη ϖαπυρȣ, i. e. in a baſket of *papyrus*. The Egyptian prieſts wore ſhoes of *papyrus*.

Guilandinus, a Pruſſian phyſician before mentioned, has a celebrated work expreſly on the ancient *papyrus*, by way of commentary on three chapters of Pliny, wherein is amply, and with great learning, explained all that relates to this ſubject yet Scaliger has written a ſevere critique on it, in which ſome inaccuracies of Guilandinus are pointed out; but this has not hindered Kirchmayer from adopting almoſt Guilandinus's whole book in his diſſertation on the *payprus*. Add, that the moſt ingenious and learned count Scipio Maffei has lately vindicated Guilandinus againſt the exceptions of Scaliger, as well as of Voſſius and Hardouin. Vide Iſtor. Diplomat. lib. ii. Bibl. Ital. tom. ii. p. 248.

Melch. Guilandini Papyrus, h. e. Commentarius in tria C. Plinii Majoris de Papyro capita, ſc. lib. xiii. cap. 11, 12, 13. firſt publiſhed at Venice in 1572, and afterwards at Amberg, in 1613, by Salmuth. It ſeems, Guilandinus intended a commentary on the whole of Pliny's Natural Hiſtory; but this ſmall part, not exceeding a moderate page, taking him up full ſix months, it is no wonder he was diſcouraged from proceeding with the reſt.

In theſe three chapters he has reſtored about twenty paſſages in the text of Pliny, not merely from his own conjecture, or the help of MSS. but from the nature of the things deſcribed, and the teſtimonies of authors of the firſt rank: beſides that, he had been upon the ſpot, where formerly the *papyrus* was manufactured, and had carefully examined all the ancient Greek and Latin authors who ſpeak of it.

Joſ. Juſt. Scaligeri Animadverſiones in Melchioris Guilandini Commentarium in tria C. Plinii capita, lib. xiii. Hiſtoriæ Mundi ſive Naturalis, quibus agit de Papyro, firſt publiſhed in the Lectiones Bibliothecariæ Memorabiles, of Rudolphus Capellus, at Hamburgh, in 1682. where he follows Guilandinus ſtep by ſtep, finds as many faults in him as his father had done in Cardan, and uſes him altogether as coarſely; every-where pointing out his literary miſtakes, and labouring to ſhew, that inſtead of reſtoring Pliny, he has often miſtaken and corrupted him.

M. Seb. Kirchmaieri Uffenhaimenſis Franci Diſſertatio Philologica de Papyro veterum, Wittebergæ 1666, 4to. He had done better ſervice, if, beſides Guilandinus, he had conſulted others, and particularly Scaliger. But as he choſe to follow one rather than many, and that too as the blind follow their guides, his fate has been much the ſame.

The origin of the art of making *paper* of the *paryprus* is very obſcure; no doubt it was firſt diſcovered in Egypt. Iſidore fixes it more particularly to the city Memphis, Orig. lib. vi. cap. 10. in which he ſeems to be countenanced by Lucan, where he ſays,

> *Nondum flumineas Memphis contexere biblos*
> *Noverat*——— Pharſal. lib. iii. v. 222.

The æra of this invention is warmly diſputed: Varro, the moſt learned of the Romans, fixed it to the time of Alexander the Great, after the building of the city of Alexandria by that conqueror; but ſeveral objections, of no ſmall weight, are brought againſt this deciſion. Pliny recites a paſſage out of a very ancient annaliſt, one Caſſius Hemina, wherein mention is made of *paper* books found in Numa's tomb, five hundred and thirty-five years after his death, which had been buried with him: now Numa was prior to Alexander by above three hundred years. Guilandinus, in effect, maintains, with great erudition, that the name and uſe of the *papyrus* were known to the Greeks long before Alexander conquered Egypt; and that the words βιϐλος, and βιϐλιον occur in their received ſignification in authors prior to, or at leaſt older than Alexander: particularly Anacreon, Alcæus, Plato the comedian, Ariſtomenes, Cartinus, Antiphanes, Plato the philoſopher, Æſchylus, and Ariſtotle. And whereas ſome ſpeak of a kind of unknown *pſeudo-biblos*, in uſe before the diſcovery of the true ſort, he argues, on the contrary, that the *biblus* mentioned by thoſe authors, prior to the conqueſt of Alexander, appears from Herodotus, Theophraſtus, and others, to be the very ſame plant with the *biblus*, or *papyrus*, of which *paper* was afterwards made: even Homer and Heſiod, the moſt ancient Greek poets, and who, by Herodotus's teſtimony lived about four hundred years before himſelf, appear to have been no ſtrangers to the *papyrus*, ſince they both make expreſs mention of it.

Vide Plin. lib. xiii. cap. 13. Guiland. Papyr. Membr. 2. Reim. Idea Syſt. Antiq. Liter. p. 285, ſeq. Kirchman. Diſſ. de Papyr. art. 11. ſect. 2.

To this it may be anſwered, that ſuppoſing the plant *papyrus* known in Greece long before Alexander's conqueſt of Egypt; it no more follows, that they had then the uſe of *paper*; than it follows that men had wine immediately on the diſcovery of the vine.

In reality, Guilandinus, produces teſtimonies, from Anacreon and Alcæus, in which the *papyrus* is employed for binding, and not for *paper*: add, that he ill tranſlates τυ φρεα λυχνον, *ellychnium*; ſince λυχνον here is the torch itſelf. Nor does the poet ſay it was made of *papyrus*, but tied up with it. Vide Scalig. lib. cit. Reimm. ubi ſupra, p. 305, ſeq.

Some have even doubted whether the art of manufacturing the *papyrus* was ſo ancient as Alexander's time; chiefly on this ground, that, for two hundred years after Alexander, men wrote on ſkins, and on the barks of trees: but this is no-wiſe concluſive. The ſcarcity of the new manufacture may account for it: for ſome ages afterwards, even as low as Tiberius, we read of ſuch a ſcarcity of *paper*, that its uſe, even in contracts, was diſpenſed with by a decree of the ſenate, and the opinion of the judges. The ſame conſideration may be carried farther: *paper* might have been known in Egypt, Judæa, Syria, and Aſia on this ſide Taurus, long before the birth of Alexander, though not in common uſe: but it might be later before the Europeans received it; and probably it was by mean's of Alexander's conqueſt that it firſt became publicly known there.

When the manufacture of the Egyptian *paper* ceaſed; is another queſtion; for, at preſent, the *papyrotechnia Ægyptiaca* may be reckoned among thoſe arts that are loſt. Euſtathius, the learned commentator on Homer, teſtifies, that even in his time, viz. in 1170, it was diſuſed: Mabillon, indeed, maintains, that it continued till the eleventh century after Chriſt; and cites one Fridegod, a monkiſh poet of the tenth century, as ſpeaking of it as ſubſiſting in the age before his, that is in the ninth: and that it continued longer, the ſame Mabillon endeavours to evince, from ſeveral papal bulls wrote on it as low as the eleventh century.

Vide Euſtath. ad Homer. Odyſſ. φ. Voſſ. de Art. Gram. lib. i. cap 37. Vide Mabill. De Re Diplomat. lib. i. cap. viii. ſect. 6, ſeq. Reim. Idea Syſt. Antiq. Liter. p. 311.

Maffei, on the other hand, maintains, with more probability, that the *papyrus* was generally diſuſed before the fifth century; for that we find no authentic records, written on it, dated ſince that time; thoſe bulls of popes, cited by Mabillon, appearing rather to be written on cotton *paper*. But this, we may obſerve, relates only to the general and legal uſe of the *papyrus*. For that it ſhould have continued to be made by particular perſons ſeveral hundred years after it firſt began to give way, is not to be wondered at. Vide Maffei Iſtor. Diplomat loc. cit. Bibl. Ital. tom. ii. p. 251.

In reality, a more commodious ſort of *paper*, made of cotton, having been invented ſome ages before in the Eaſt, and coming to be introduced into Europe, ſeems to have brought the *papyrus* into diſuſe. To which the continual wars with the Saracens, by which the traffic to Alexandria was rendered precarious, might poſſibly not a little contribute.

Yet ſeveral books, written on leaves of the *papyrus*, have even continued to our days: Mabillon ſays, he had one of them; and adds, that there was another in the Petavian library, being a volume in ſmall folio, containing ſeveral ſermons of St. Auguſtine; he alſo mentions a third, containing that father's epiſtles, formerly belonging to the church of Narbonne, and now in the cuſtody of madame De Phirmacon; beſides the homilies of Avitus, biſhop of Vienne, and divers diplomas or charters, all written on the *papyrus*, which appear not to be leſs than eleven hundred years old. But the deciſions of this learned father concerning MSS. notwithſtanding all his diplomatic ſkill ſo highly boaſted of, are not always infallible: witneſs his taken the MS. of St. Mark's Goſpel, at Venice, to be written on the Egyptian *papyrus*; and that of Joſephus, at Milan, not to be ſo. Maffei ſhews, on the contrary, that the former is cotton *paper*; and that the latter appears at firſt ſight, to be Egyptian: not but the Venetian MS. is very old; but it has been ſo much uſed, that its leaves are, as it were, transformed into the original paſte from whence they are made.

Vide Mabill. Suppl. ad Libr. de Re Diplomat. Journ. des. Sçav. tom. xxxii. p. ii. p. 992. Maffei, lib. cit. Bibl. tom. ii. p. 252. And Montfacon. Paleog. Græc. p. 14.

Paper, *manner of making the Egyptian.* They began with lopping off the two extremes, of the *papyrus*, viz. the head and root, as of no uſe in this manufacture; the remaining ſtem they ſlit lengthwiſe into two equal parts, and from each of theſe they ſtripped the thin ſcaly coats or pellicles, whereof it was compoſed, with the point of a penknife The innermoſt of thoſe pellicles were looked on as the beſt, and thoſe neareſt the rind or bark the worſt; they were kept apart accordingly, and conſtituted different ſorts of *paper*.

Theſe pellicles are called, in Pliny, by twelve different names; viz. *philura*, *ramentum*, *ſcheda*, *cutis*, *plagula*, *corium*, *tænia*, *ſubtegmen*, *flatumen*, *pagina*, *tabula*, and *papyrus*.

The generality of critics, in lieu of a pen-knife, employ a needle to ſeparate the pellicles; in which they are warranted by the common text of Pliny, *Præparantur ex eo chartæ, diviſo acu in prætenues, ſed quam latiſſimas philuras.* But Guilandinus makes a correction here: he had found, by experiment, that the pellicles of *papyrus* cannot be ſeparated by a needle; but that a very ſharp knife is required; for which reaſon, inſtead of *diviſo acu*, he reads *diviſo ſcopo*. In which he is followed by Maffei, though Hardouin, Voſſius, Pitiſcus, and others, retain the ancient reading.

Vide Guiland. Papyr. Membr. 10 ſect. 3. & 5. Maffei. Iſtor. Diplom. ap. Bibl. Ital. tom. ii. p. 247, ſeq. Voſſ. De Art. Grammat. lib. i. cap. 37. Pitiſc. L. Ant. tom. i. p. 413. voc. Charta. Hardou. ad Plin. lib. xiii. cap. 12.

As the pellicles were taken off, they extended them on a table; then two or more of them were laid over each other tranſverſely, ſo as that their fibres made right angles: in this ſtate they were glued together by the muddy waters of the Nile. Theſe, being afterwards preſſed to get out the water, then dried and laſtly flatted and ſmoothed by beating them with a mallet, conſtituted *paper*: which they ſometimes poliſhed farther by rubbing it with an hemiſphere of glaſs or the like.

In other countries, where the waters of the Nile were not to be had, the pellicles were faſtened together with a paſte made of the fineſt wheat-flour, mixed with hot water, and a ſprinkling of vinegar.

The ingenious and learned count de Caylus, in his account of the *papyrus*, informs us, that the intermediate part of the ſtalk was cut and ſeparated into different laminæ, which were ſet apart, and dried in the ſun for the manufacture. Theſe laminæ were joined together horizontally or tranſverſely, in ſheets or leaves, upon a ſmooth board: then moiſtened with water, which diſſolved a kind of viſcous glue in the pores of the plant, ſerving to cement and render the whole uniform. The ſheet, being thus formed, was put into a preſs, and afterwards dried for uſe. Such, he ſays, was the proceſs of making *paper* in Egypt; but as the ſheets were coarſe, brown, unequal, and imperfect, the Romans invented methods to bring the fabric to perfection. They contrived a glue or gum, by means of which they could occaſionally enlarge the ſize and volume. They bleached it to a ſurpriſing degree of whitneſs; they beat it with hammers, ſo as to render it more thin and leſs porous; they ſmoothed and poliſhed it with ivory; and by a ſort of calender gave it a ſhining gloſs, like that of the Chineſe *paper*. According to the different degrees of delicacy, whiteneſs, and ſize, it acquired different appellations either from the names of particular manufactures, from the great perſonages who uſed it, or from the particular uſes to which it was applied; ſuch as the Fannian, the Livian, the Claudian, the Imperial, the Hieratic and the Amphitheatric.

There were *paper* manufactures in divers cities of Egypt; but the greateſt and moſt celebrated was that at Alexandria, where, according to Varro's account, *paper* was firſt made. It is certain at leaſt it was from hence that Greece and Italy was furniſhed, on account of the convenient ſituation of that port: and it is more than probable it was this that gave the Romans occaſion to conclude the art had been invented there. It was not till late, when Egypt was reduced into a Roman province, that they had much intercourſe, or even knowledge of the inland cities of Egypt, where *paper* was alſo made. The trade and conſumption of this commodity were in reality incredible. Vopiſcus relates, that the tyrant Firmus, who rebelled in Egypt, publicly declared he would maintain an army only with *paper* and glue, *papyro & glutine*. This, Caſaubon underſtands as ſpoken of the produce and revenue of *paper*; though Salmaſius takes it to be meant of the *papyrus* itſelf, which could ſupply moſt of the neceſſaries of life. Vide Montfauc. Palæogr. Græc. lib. i. cap. 2. p. 14.

We find divers ſpecies of Egyptian *paper* mentioned in ancient writers: ſome denominated from the places where they were manufactured; as 1. The *Amphitheatrica*, ſuppoſed to have been made in ſome building belonging to an amphitheatre at Alexandria: though Guilandinus, with more probability, reads it *Arthribitica*, from Arthribus, a city in the middle of the Delta, which was the place of its manufacture. What countenances this correction, is, that we find mention of this *paper* before there was ſo much as an amphitheatre at Rome, much leſs at Alexandria. 2. *Saitica*, made in the city Sai. 3. *Tæniotica*, or, according to others, *Taitica*, whoſe place authors are not agreed on. There were alſo other ſorts denominated from the makers; as 1. the *Fanniana*, from the grammarian Rhem. Fannius Palæmon, who kept a *paper* work. This kind was ſmall, but finer than the Amphitheatrical *paper*; being firſt wrought at Alexandria, and afterwards finiſhed at Rome. 2. *Claudia*, firſt made by order of the emperor Claudius. This was reputed the beſt of all, in that, beſides the two pellicles, in common with the reſt, it had a third. Others were denominated from the uſes they were intended for; as, 1. *Hieratica*, the firſt or oldeſt ſort, which was appropriated to religious uſes; this was afterwards denominated *Auguſta* and *Liviana*, in compliment to the emperor of that name, and his wife; who, according to ſome, improved and made it whiter than before. 2. *Emporetica*, or *Emporica*, a ſmall, and coarſe ſort, ſerving for ſhopkeepers uſes, to tie up goods, &c. The qualities for which the ancient *papers* were prized, were their thinneſs, cloſeneſs, whiteneſs, and ſmoothneſs; though their breadth alſo conſiderably enhanced their value. That ſort called *charta Claudia* was thirteen inches wide; the *Hieratica*, eleven; the *Fanniana*, ten; and the *Amphitheatrica*, nine: as to the *Saitica*, it exceeded not the diameter of the mallet it was beaten with.

See farther concerning the ancient *paper*, in Nigriſoli Diſſ. de Charta, ejuſque Uſu apud Antiquos. Ext. in Galer. de Minerv. tom. iii. p. 249, ſeq. Other authors are enumerated in Fabric. Bibl. Antiq. cap. xxi. ſect. 9. p. 609. Pitſc. L. Ant. loc. cit.

Paper, *bark*, if it may be ſo called, was only the *liber*, or inner whitiſh rind encloſed between the outer *bark* and the wood of divers trees, as the maple, plane, beech, and elm, but eſpecially the *tilia*, φιλυρα, or *linden-tree*, which was that moſtly uſed for this purpoſe. On this, ſtripped off, flatted, and dried, the ancients wrote books; ſeveral of which are ſaid to be ſtill extant.

Vide Plin. Hiſt. Nat. lib. xiii. cap. 11. Hardou. Not. ad eund. Suid. Lex. in voc. φιλυρα. Iſid. Orig. lib. vi. cap. 13. Alexand. ab. Alexand. lib. ii. cap. 30. Salmuth. ad Pancirol. lib. ii. tit. 13. p. 252, ſeq.

Mabillon and Montfaucon ſpeak frequently of manuſcripts and diplomas on *bark*, and are very expreſs in diſtinguiſhing between the *papyrus* uſed by the Egyptians, and the *liber* or *bark* in uſe in other countries. The two are alledged to differ in this, that the *bark paper* was thicker and more brittle than the *papyrus*, as well as more apt to cleave or ſhiver, by which the writing was ſometimes loſt; as is the caſe in a *bark* manuſcript in the abbey of St. Germains, where the bottom of the *paper* remains, but the outer ſurface, on which the letters had been drawn, is in many places peeled off.

Vide Montfauc. Palæogr. Gr. lib. i. cap. 2. p. 15. Mabill. de Re Diplom. lib. i. cap. 8. Reimm. Idea Syſt. Antiq. Liter. p. 311.

But Maffei, it muſt not be forgot, combats the whole ſyſtem of *bark* manuſcripts and charters as a popular error; and maintains, that the ancients never wrote diplomas on *bark*; that the diſtinction between the *papers* made of *papyrus* and of *cortex*, is without foundation; that the only uſe of the *tilia*, or *linden*, was for making thin boards or tablets for diptycha or pocket-books, wherein they wrote on both ſides, as is done among us: an advantage which they could not have in the Egyptian *paper*, by reaſon of its thinneſs.

A late French writer on the rules of criticiſm wanders ſtill farther out of the way, when he ſpeaks of a ſort of *paper*, in Egypt, made of the pith of the cyprus: he deſcribes the manner of preparation which was by reducing this pith to a pulp, and then ſpreading it out in leaves. Vide Hon. St. Marie Reflex. ſur les Regl. de la Crit. tom. ii. diſſ. 77. This we ſuſpect for a chimera hatched only in the critic's brain.

Not but there occur divers anomalous ſorts of *paper*, which antiquaries are not a little puzzled what ſpecies to refer them to; ſuch is that of two bulls in the archives of the church of Gironne, iſſued by the antipopes Romanus and Formoſus, between the years 891, and 895. They are two ells long and one broad; and conſiſt of two leaves or pellicles glued together tranſverſly, and are ſtill legible in moſt places. The conjectures of the French literati, in regard to theſe, are numerous: the abbot Hiraut de Belmont has a diſcourſe expreſs on the occaſion. Some will have them made of the leaves of the *alga*, or *ſea-wreck*; others of the leaves of a ruſh, called *la boga*, growing in the marſhes of Rouſillon; others of *papyrus*; others of *cotton*; and others of *bark*. So little certainty does there really appear to be in theſe things, on which the critics nevertheleſs often lay a great ſtreſs. Vide Mem. de Trev. Sept. 1711. p. 1559, ſeq.

Paper, *cotton*, *charta bombycina*, βομβυκινη (thus called from βομβυξ, a word which anciently ſignified *ſilk*, though in after-times βομβυξ and βαμβυξ came to denote *cotton*), is a ſort of *paper* which has been in uſe upwards of ſeven hundred years ago, as is ſhewn by Montfaucon from ſeveral authorities: what is more, *cotton paper* appears to have been very common at the beginning of that time, and conſequently muſt have been invented long before, probably about the cloſe of the ninth, or the beginning of the tenth century.

In the French king's library are MSS. on this *paper*, which, by the character, and other circumſtances, appear to be of the tenth century. Be this as it will, from the twelfth century, *cotton* MSS. were more frequent than parchment ones.

Vide Montfauc. Palægr. Græc. lib. i. cap. 2. p. 17, ſeq. item, lib. iv. cap. 6. p. 209. Maffei, lib. cit. Bibl. Ital. tom. ii. p. 252.

Paper, *incombuſtible*, is made of the *lapis* ASBESTOS, or *linum vivum*, which will bear burning without being injured.

Dr. Bruckman, profeſſor at Brunſwick, has publiſhed a natural hiſtory of the *aſbeſtine*, or *incombuſtible paper*; and, what is moſt remarkable, has printed four copies of his book on this *paper*: they are depoſited in the library of Wolfembuttel. Vide Bibl. Germ. tom. xiv. p. 190.

The manner of making this extraordinary *paper* is deſcribed by Mr. Lloyd, from an eſſay made by himſelf. He pounded a quantity of the aſbeſtos in a ſtone mortar, till it became a downy ſubſtance; then ſifted it in a fine ſearce, and by this means purged it indifferent well from its terrene parts; becauſe the earth or ſtones he could not pick out of it before, or at the pounding, being reduced to a powder, came through the ſearce, the linum remaining. This done, he brought it to the *paper*-mill; and putting it in water, in a veſſel juſt big enough to make a ſheet with ſuch a quantity, he ſtirred it pretty much, and deſired the workmen to proceed with it in the uſual method, with their writing-*paper* mould; only to ſtir it about always before they put their mould in; conſidering it as a far more ponderous ſubſtance than what they uſed; and that conſequently, if not immediately taken up after it was agitated, it would ſubſide.

The *paper* made of it proved but coarſe, and was very apt to tear: but this being the firſt trial, there is reaſon to believe it might be much improved; nor did the workmen doubt, but in caſe it was pounded in one of their mortars, for twenty hours ſpace, it would make good writing-*paper*. Vide Phil. Tranſ. Nº 166. p. 824. See Asbestos.

Paper, *linen* or *European*, is chiefly made of linen rags beaten to a pulp with great hammers, and the ſoil carried off by a continual ſupply of freſh water, conveyed among the pulp in little troughs, till it be rendered perfectly white.

Beſides the chief uſe of this *paper*, which is for writing and printing on, there is a great conſumption of it in packing up goods, and on other occaſions.

The manufacture of *paper* has got footing in moſt countries; though France, Holland, and Genoa, are the places where it ſucceeds beſt. In the general it depends much on the quality of the linen worn in the country where it is made: where that is coarſe and brown, &c. the rags, and conſequently the *paper* made thereof, muſt be ſo too. Hence the whiteneſs of the Dutch and Flemiſh *papers*, beyond the Italian and French, and much more the German *papers*. The Engliſh manufacture was a long while in no great reputation; but it is every day improving; inſomuch that we now import little of the ordinary ſorts, which were formerly all brought from abroad. Yet *paper*-mills are of ſome ſtanding among us. We find one erected at Dartford, as early as the year 1588, which we believe was the firſt, and which is celebrated by a noted poet of that age, Thomas Churchyard, in a work in verſe, intitled, A Deſcription and Diſcourſe of *Paper*, and the Benefits it brings; with the ſetting forth of a *Paper*-Mill, built near Dartford, by a High-German, called Mr. Spilman, Jeweller to the Queen. Lond. 1588. 4to.

In reality, the deficiency of the Engliſh *paper* manufacture did not ſeem owing ſo much to the quality of our rags, as to the want of ſkill and attention in the makers; but the manufacture of *paper* has been very conſiderably encouraged in our country, and has already arrived to a great degree of perfection.

Anderſon, in his Hiſt. of Com. vol. ii. p. 197. ſays, that till about the year 1690, there was ſcarce any other kind of *paper* made in England, but the coarſe brown ſort. But the war with France occaſioning high duties on foreign *paper*, the French proteſtant refugees ſettled in England chiefly, and alſo our own *paper*-makers now began to make white writing and printing *paper*, which, he adds, in length of time, has been brought to ſo great perfection, both for beauty and ſubſtance, that in our own time we import only certain kinds of Genoa and Dutch *paper*, which bears but a very ſmall proportion to all the *paper* uſed in the Britiſh dominions. This has produced, it is ſaid, a ſaving to Britain of 100,000*l.* which was paid annually to France for *paper* only.

Another writer ſays, that the Engliſh manufactures now provide about ſeven-eighths of the whole quantity of *paper* conſumed in Great Britain.

When and by whom *linen paper* was invented is a ſecret, which Polydore Virgil owns he could never trace. Scaliger will have it to have been found out by the Germans. Maffei affirms it certain, that the invention is owing to the Italians. Others aſcribe it to ſome refugee Greeks at Baſil, who took the hint from the manner of making *cotton paper* in their own country. Conringius takes the Arabs to have firſt brought it among us. Perhaps the Chineſe have the beſt title to the invention; who for many ages made *paper* much after the ſame manner; and even, in ſome provinces of the ſame materials, viz. hemp, &c.

Vide Polyd. Virg. de Inventor. Rer. lib. ii. cap. 8. Secund. Scaliger. p. 7. Fabric. Bibl. Antiq. cap. 9. ſect. 21. Iſtor. Diplom. lib. ii. Bibl. Ital. tom. ii. p. 253. Phil. Tranſ. Nº 288. p. 1515. Conring. Epiſt. ap. Act. Erud. Lipſ. an. 1720. p. 94. Savar. D. Comm. tom. ii. p. 963. Du Hald. Deſcr. Chin, tom. i. p. 363.

Linen paper appears to have been firſt introduced among us towards the beginning of the fourteenth century— The learned Conringius denies, that there are many manuſcripts of this *paper* above four hundred years old; with whom agrees the count Maffei, who finds no marks of its uſe before the year 1300.

Vide Conring. Epiſt. ap. Act. Erud. Lipſ. an. 1720. p. 94. Maffei Iſtor. Diplom. lib. ii. Bibl. Ital. tom. ii. p. 253.

Some indeed go much farther back; and take the *libri lintei*, mentioned by Livy, and other Roman writers, to have been written on *linen paper*: but Guilandinus, and after him Allatius, and others, have ſufficiently refuted this notion; and ſhewn, that the *libri lintei* were written on actual pieces of linen cloth, or canvas, prepared for this purpoſe, ſuch as painters ſtill uſe; and not on paper made of linen rags.

Vide Liv. Dec. 1. lib. 4. Plin. Hiſt. Nat. lib. xiii. cap. 11. Pitiſc. L. Ant. tom. ii. p. 85. Guiland. Papyr. Memb. 25. Salmuth. ad Pancirol. lib. ii. tit. 13. p. 253.

Others run into the contrary extreme, and make *paper* the invention of a very late date. The Jeſuit Inchofer dates its origin about three hundred years ago: with whom agrees Milius, in his Hortus Philoſophicus, who maintains, that the art of making *paper* was not invented till about the year 1470. Of the ſame opinion ſeems Ray, who tells us the art of making this *paper* was not known in Guernſey, till the year 1470, and when two perſons, named Anthony and Michael, firſt brought it to Baſil, out of Galicia in Spain. In effect, if the invention be owing to the refugee Greeks at Baſil, who fled thither after the ſacking of Conſtantinople, it muſt at leaſt be poſterior to the year 1452, when that city was taken. Some add a farther argument for the novelty of *paper*, drawn from the novelty of hempen cloth, which Rabelais, who died in 1553, mentions as firſt found out about a hundred years before him; and which was ſo ſcarce in the time of Charles VII. of France, who died in 1461, that the queen his wife, was the only woman in France, that had a couple of ſhifts of it.

Vide Mabill. de Re Diplom. lib. i. cap. 8. Reimm. Idea Syſt. Antiq. Liter. p. 313, ſeq. Balbin. Miſcell. Hiſt. Bohem. cap. 22. Act. Erud. Lipſ. 1682. p. 243. Ray Hiſt. Plant. lib. xxii. Phil. Tranſ. Nº 288. p. 1515. Naudæan. p. 82. Nouv. Rep. Let. tom. xxvi. p. 571.

But theſe ſuggeſtions are refuted by Mabillon, from the teſtimonies of writers prior to the time here ſpoken of, and from many manuſcripts of about four hundred years old, which are written on *linen paper*. The Jeſuit Balbinus produces divers inſtances of *paper* manuſcripts, written before the year 1340. An ingenious writer of our own country aſſures us, he had a piece of *paper* which agreed well with the charter dated in 1358, in the thirty-ſecond year of Edw. III. He adds, that in the archives of the library belonging to the dean and chapter of Canterbury, is an inventory of the goods of Henry, prior of Chriſt-Church, who died in 1340, written on *paper*; and that in the Cotton Library there are ſeveral writings on our *paper*, in the times of moſt of our kings and queens, as high as the fifteenth of Edw. III. which coincides with the year 1335. And Dr. Prideaux aſſures us he has ſeen a regiſtration of ſome acts of John Cranden, prior of Ely, made on *paper*, which bears date in the fourteenth year of king Edward II. that is, anno Domini, 1320.

Mabill. loc. cit. Balbin. lib. cit. Phil. Tranſ. Nº 288. p. 1515. Prid. Connect. p. 1. l. 7. p. 710.

Add, that the invention of *paper* may appear more modern than it is, becauſe records were not uſed to be written on it, but it was a conſiderable time confined to letters, and other fugacious compoſitions; which is ſo true, that, to this day, few inſtruments of any conſequence are written on it, though it have been ſo long in uſe. It is even alledged, that Peter, the venerable abbot of Cluny, who died in 1157, has a paſſage in his book againſt the Jews, which plainly indicates *paper* books to have been then known; on the authority whereof Valeſius, in his notes on the panegyric of Berengarius Auguſtus, ſcruples not to make *paper* upwards of 500 years old.

Father Hardouin aſſures us, he had ſeen records or diplomas on it prior to the thirteenth century. But this will hardly be credited. Count Maffei aſſures us, that in all his reſearches he could never meet with one more ancient than the year 1367. It is highly probable the learned Jeſuit miſtook a cotton manuſcript for a linen one: a miſtake eaſily made, as the chief difference between the two conſiſts in the greater thinneſs of the linen *paper*. But it is known we have linen *papers* of very different degrees of thickneſs; and the like may be ſaid of thoſe of cotton.

Vide Maffei Iſtor. Diplom. lib. ii. Bibl. Ital. tom. ii. p. 253, ſeq.

The invention, according to Prideaux, ſeems to have been brought from the Eaſt; becauſe moſt of the old manuſcripts, in Arabic, and other Oriental languages, are written on this ſort of *paper*: ſome of which are certainly much older than any of the dates above mentioned. This author thinks it moſt probable, that the Saracens of Spain firſt brought it out of the Eaſt into that country; from whence it was propagated through the reſt of Europe.

Paper, *linen*, *method of making*. The proceſs begins with preparing the rags. Theſe, when brought to the *paper*-mills, are firſt to be ſorted into what they call the *grobin fine*, *grobin ſecond*, and *grobin trees*: for, among the reſt, there will be ſome linſey-woolſey, which the dirt makes indiſcoverable till they are once waſhed. The way of waſhing is, by putting them in a puncheon with many holes in the bottom, and grates on the ſide made of ſtrong wires. Here the rags are to be often ſtirred, that the dirt may run from them.

When ſufficiently waſhed, they are laid in ſquare heaps, and covered cloſe with pieces of clean ſacking, till they thoroughly ſweat and rot, which is called *fermenting*, and is uſually performed in four or five days; if they be not taken up from theſe heaps in due time, they are apt to mildew, diſcolour, and take fire. When duly fermented, they twiſt them in handfuls, then cut them with a ſharp hook ſet faſt in a frame, with the point upwards, and the edge from the workman: ſtill drawing them upwards, and cutting them piece by piece about half an inch long, or as ſhort as the fingers will allow.

With the rags thus prepared, they prime or feed the mortars, which are made oval, and about half a yard deep, of heart of oak, well ſeaſoned. At the bottom of each is an iron plate, an inch thick, eight inches broad, and thirty long; ſhaped inward like a mould for a ſalmon, with head and tail rounded. In the middle is a waſhing block grooved, with five holes in it, and a piece of hair ſieve faſtened on the inſide. This keeps the hammers from touching it, and prevents any thing going out except the foul water.

The mortars are ſupplied with water night and day by little troughs, from a ciſtern, fed by buckets fixed to the ſeveral floats of a wheel, ſo long as the wheel goes. In theſe mortars the rags being beaten fit for a remove to the preſſes juſt by, they take them out with little iron-hooped pails; this they can do out of any of the mortars, whoſe hammer they can ſtop whilſt the others work. This makes what they call the *firſt ſtuff*.

From the mortars, this firſt ſtuff is lodged in boxes of five feet high, made, like the corn-chandler's bins, with the bottom board aſlant, and a little ſeparation on the front, for the water to drain away. The pulp of rags being in, they take away as many of the front boards as are needful, and preſs the maſs down hard with their hands: the next day they put on another board, and add more pulp, till the box is full. And here it remains mellowing a week, more or leſs, according to the weather.

In the whole proceſs, there muſt be no iron work where it may be liable to grow ruſty, which would iron-mould the ſtuff, and ſtain the *paper*.

After this, the ſtuff is again put into clean mortars, and is beaten afreſh, and removed into boxes, as before; in which ſtate it is called the *ſecond ſtuff*.

The like we are to underſtand of the third time, which fits it for the pit mortar, when it is again beaten, till ſome of it being mixed in fair water, and brewed to and fro, appears like flour and water without lumps in it.

Thus prepared, it is fit for the pit mortar, which has flat hammers without nails. Into this, by a trough, runs water continually whilſt they work at the fat; and here the beating and water diſſolve it perfectly: after which it is carried into the fat, and more is brought from the boxes. And thus they do ſucceſſively.

The fat is primed according to art, when the liquor has ſuch a proportion of the pulp, as that a mould dipped in it will take up as much as will make the ſheet of *paper* of the thickneſs deſired. A mould is a ſquare ſieve about an inch deep, bottomed with braſs-wire cloth, ſupported with ſticks to prevent the wire from bagging down, and to keep it perfectly horizontal: becauſe if it any way bags, one part of the ſheet of *paper* will be thicker than the other.

This mould the maker dips, with a deckle on, into the fat; and takes it out again, ſhaking it, that the water may run clear from the pulp in the ſieve; and thus he delivers it to the coucher, who couches it upon a felt laid on a plank, and lays another felt on it; and ſo ſucceſſively, a ſheet and a felt, a ſheet and a felt, till a poſt, i. e, one preſſing, containing ſix quires, be made. Of poſt *paper* they may make twenty poſts or more per day. The coucher, having done his office, returns the mould to the maker, and the maker to the coucher ſucceſſively.

A poſt being made, either the maker or coucher whiſtles, upon which four or five men advance, one whereof draws the poſt under the preſs with two little hooks; and the reſt preſs it with great force till no water is left, which is quickly done with two or three pulls.

This being done, the poſt is pulled from the preſs, and ſet on the right ſide by the laying ſtool; then the layer takes off the firſt felt, returns it to the coucher, and lays the firſt ſheet on the laying ſtool, over which he lays the ſecond, then the third very regularly; and thus ſucceſſively till the whole poſt be laid out. Which done, it is ſet by till toward the end of the day; and then the whole day's work is preſſed again, and the ſheets are ſet exactly one on another, ſo that the whole looks like one ſolid paſteboard.

This, after two or three pulls, as before, is taken out again by the dry workman, and carried up into the loft, and hung ſix or ſeven ſheets together upon lines faſtened to a thing called a *tribble*, each tribble containing thirty lines ten or twelve feet long.

When thus dried, it is taken down, laid on a three-footed ſtool, and there rubbed ſmooth with the hands; and afterwards placed in heaps, ſeven or eight feet high, in a very dry place; where it ſtands till the ſizing, which is the next operation.

Chooſing a fine, dry, temperate day, they put into a copper two barrels of water; and into this, when juſt warm, they put ſixty pounds weight of clean parchment, or vellom ſhavings; which they boil till it be reduced to a perfect ſize; they then ſtrain it through a fine cloth, on which is ſtrewed a due proportion of white vitriol and roch-alum, finely powdered, into a tub a foot deep.

Near to this tub are brought four or five reams of the *paper*; and a full gage, or ſo much as can be taken up with the hand at a time, is dipped into the ſize, being as hot as the hands can well bear it; and by a certain gentle quick management, it is ſo ordered, that every ſheet ſhall be ſized: after which it is put regularly into the preſs, and when preſſed, moved thence into the drying loft, and hung uſually ſheet by ſheet till dry. But care is taken, that the direct rays of the ſun come not nigh it till it be dry, which would otherwiſe endanger the evaporation of the ſize. When thoroughly dry, it is taken down, ſmoothed with the hands as before, heaped, preſſed hard, and ſo it ſtands all night. Next morning it is taken out, and carried into the ſtorehouſe, where it is ſorted: what is fit for inſide quires, are laid by themſelves, and the outſide by themſelves; and then it is preſſed again, and ſo commonly ſtands all night. In the morning it is carried into the ſtorehouſe again where it is told into quires of twenty-four or twenty-five ſheets each, folded, laid by in heaps; and when there is a preſs full it is preſſed again, double for a while, and then made into reams of twenty quires each, and bales of ten reams to a bale.

Vide Hought. Collect, tom. ii. p. 412, ſeq. Moor's Mathem. Comp. p. 16.

The broken ſheets are commonly put together, and two of the worſt quires are placed on the outſides of the ream, called *outſide* quires; thus being tied up in wrappers made of the ſettling of the fat, it is fit for ſale.

With ſome of the aforeſaid pulp, is alſo made PASTEBOARD, after the ſame manner as *paper*, only that it is thicker.

With a fine ſort of this paſteboard, they alſo make playing CARDS.

Dr. Lewis recommends to the conſideration of the *paper*-makers, whether a particular *paper* might not be prepared for thoſe uſes, with regard to which the long duration of the writing is of principal importance, by impregnating it with galls, or other aſtringents, in ſome of the operations which it undergoes before it receives the glazing: as for inſtance, by uſing an aſtringent infuſion, inſtead of common water, in the laſt operation, when the matter is reduced into a pulp, for being formed into ſheets. Com. Phil. Techn. p. 394.

Paper is ſold by the ream, every where, we think, except in the *paper*-works of Auvergne, where it is ſold by weight at the rate of fourteen ounces to the pound; each ream, according to its kind, being to weigh a certain number of pounds, preſcribed by authority.

The acts of the 10 Ann. cap. 19. and 12 Ann. ſtat. 2. cap. 9. altered and explained by 12 Ann. ſtat. 2. cap. 19. 11 Geo. cap. 7, and 13 Geo. III. cap. 67. by which certain duties were laid on *paper* imported, and on all *paper* made and painted in Great Britain, are repealed by 21 Geo. III. cap. 24. except ſo much as relates to the duty impoſed upon *paper* to be printed, painted, or ſtained, in Great Britain, to ſerve for hangings, or other uſes: and the following duties are impoſed; viz. for every ream (at twenty quires of twenty-four ſheets each to the ream, the ream of double demy for news-*papers* excepted, each quire of which is to contain twenty-five ſheets,) of imperial writing *paper*, 9*s*. ſuper-royal, 6*s*. 9*d*. royal, 5*s*. medium, 4*s*. demy, 2*s*. 9*d*. thick poſt, 2*s*. 3*d*. thin poſt, 1*s*. 9*d*. ſmall poſt, 1*s*. 3*d*. fool's cap, 1*s*. 6*d*. pot, 1*s*. double atlas, for writing and copper-plate printing, 30*s*. demy, for ditto, 1*s*. 9*d*. copy or baſtard, 1*s*. fool's-cap, 10*d*. littris fool's-cap, 10*d* pot 8*d*. grand eagle or double elephant, 11*s*. colombier, 7*s* atlas (worth 3*l*.), 10*s*. atlas (worth 2*l*.), 6*s*. 6*d*. ſmall atlas, 5*s*. imperial, 4*s*. 9*d* ſuper royal, 3*s*. 6*d*. long royal, 3*s*. royal, 2*s*. 6*d*. demy, 1*s*. 9*d*. ſhort demy or crown, 1*s*. 3*d*. large fan, 2*s*. ſmall fan, 1*s*. 6*d*. elephant, 2*s*. 3*d*. *paper* for bank or banker's bills or notes, 2*s*. double demy, for printing, 5*s*. 6*d*. per bundle (each bundle conſiſting of forty quires); royal, 3*s*. 6*d*. per ditto; royal inferior, 2*s*. medium, 2*s*. 9*d*. demy ſingle, 2*s*. 6*d*. demy inferior, 1*s*. 6*d*. double crown, 2*s* 4*d*. double crown inferior, 1*s*. 9*d*. ſingle crown, 2*s*. ſingle crown inferior, 1*s*. 3*d*. demy tiſſue, 1*s*. 3*d*. crown tiſſue, 10*d*. double pot, 1*s*. 6*d*. cartridge, 1*s*. 9*d*. ſquare cartridge, 2*s*. ſmall cartridge, 1*s*. 6*d*. elephant common, 1*s*. 3*d*. ſugar blue, 2*s*. per ream; ſugar blue of ſmaller ſize, 1*s*. 6*d*. per ream; ſugar blue, crown ſize, 1*s*. 3*d*. purple royal, 1*s*. blue elephant, 1*s*. 6*d*. blue royal, 2*s*. per bundle; blue demy and bloſſom, 1*s*. 3*d*. per bundle; blue crown ſingle, 9*d*. royal hand thick 10*d*. per ream; royal hand, 1*s*. per bundle; lumber hand, 1*s*. double two pound, 9*d*. ſingle two pound, 4*d*. middle band double, 1*s*. 6*d*. middle hand, 9*d*. ſmall hand double, 1*s*. ſmall hand, 6*d*. couples, pound and half-pound, 4*d*. imperial cap, 1*s*. per ream; havon cap, 9*d*. bag cap, 8*d*. Kentiſh cap, 6*d* four pounds, 6*d*. ſmall cap, 4*d*. double four pounds, 1*s*. ſingle two pounds, 6*d*. per bundle; couples, pound and half pound, 4*d*. paſteboard, mill-board, ſcale-board, and glazed *paper*, 4*s*. 6*d* per hundred weight.

Theſe duties are to be paid by the makers, and managed by the commiſſioners of exciſe; and they are ſubject to an additional duty of 10 per cent. on the produce thereof.

Stained *paper* (beſides the duty paid for the *paper* before ſtaining) is ſubject by the former acts, to a duty of 1½*d*. a yard ſquare.

Paper-makers are enjoined to give notice to the proper officers of their names, places of abode, ſtore-houſes, &c. and to make regular entries, on oath, every ſix weeks, of all *paper*, &c made by them, on penalty of 50*l*. and the duty ſhall be paid in ſix weeks after entry, on pain of double duty.

Paper-makers are forbid to remove or to conceal their *paper*, &c. till the officer has taken account thereof, on penalty of 50*l*. and forfeiture of the paper, &c. The commiſſioners are to provide ſtamps for ſtamping ſuch *paper* for which the duty is paid: and *paper* removed from one place to another, without a proper ſtamp, ſhall be forfeited.

Perſons moleſting officers in the execution of this act incur a penalty of 50*l*. and the penalties and forfeitures ſhall be appropriated, one moiety to the king, and the other moiety to the informer.

There is a drawback of the duties on *paper* exported; and alſo for books, printed at Oxford or Cambridge, and in the univerſities of Scotland, in the Latin, Greek, Oriental or Northern languages.

Paſteboard, made of *paper* that hath paid the duty, ſhall not be charged with farther duty.

Papers are of various kinds. With regard to colours, they may be divided into *white*, *brown*, *blue*, &c. With regard to quality, into *fine*, *ſecond*, *baſtard*, *ſuperfine*, &c. With regard to uſe, into *writing*, *printing*, *preſſing*, *cap*, *cartridge*, *copy*, *chancery*, *poſt*, &c. With regard to dimenſions, into *demy*, *medium*, *fool's-cap*, *pot*, *royal*, *ſuper-royal*, *imperial*, *elephant*, *atlas*, &c. With regard to country, into *German*, *Lombard*, *Rochelle*, *Genoa*, *Holland*, &c.

French *papers* are divided into *large*, *middle*, and *ſmall*

To the ſmall belong thoſe called *petit Romaine*, *petit Raiſin*, or *Bâton royal*, *petit nom de Jeſus*, and *petit à la main*, all thus nominated from the marks impreſſed on them in making. Alſo the *cartier*, for the backs of playing cards; *pot*, for the figure ſide; *couronne*, which has commonly the arms of the comptroller-general of the finances; *telliere*, with the arms of the late chancellor *Tellier*, and a double T; and *champy*, or *a chaſſis la ſerpente*, ſo called from its mark, the ſerpent; which, being extremely fine and thin, is uſed by fan-makers.

To the middling ſort belong the *grand raiſin ſimple*, *carré ſimple*, *cavilier*, and *lombart*, the three laſt of which are for printing; *l'ecu*, or *de compte ſimple*, *carré double*, *l'ecu double*, *grand raiſin double*, and *couronne double*, which three laſt are denominated *double* on account of their ſtrength and thickneſs. Add to theſe the *pantaloon*, or *paper* with the Dutch arms; and grand *cornet*, ſo denominated from the impreſſion on it.

To the large belong the *grand Jeſus*, *petit & grand fleur-de-lis*, *chapilet*, *colombier*, *grand aigle*, *dauphin*, *ſoleil*, and *l'étoile*, which are thus called from the figures they bear, being all proper for printing either at the letter-preſs or rolling-preſs; alſo for merchants books, and for drawing on. The *grand monde* is the largeſt of all. Vide Savar. D. de Comm. tom. ii. p. 965, ſeq.

We have alſo *printed-paper*, for hanging rooms. See Paper-*hangings*. *Stamped-paper*, to write obligations, deeds, and contracts upon. *Ruled-paper*, for books of accounts, &c. To which may be added *cut-paper*, and *gilt-paper*, for letters, &c. See Gilding *of paper*.

Paper, *blue*, is a ſort uſed by tradeſmen to wrap up goods; as ſugar-loaves, pieces of linen, &c.

Paper, *blotting*, is *paper* not ſized, and in which therefore ink readily ſinks or ſpreads. It is uſed in books of account, &c. in lieu of ſand, to prevent blotting and diſfiguring the oppoſite pages. The ſame kind is likewiſe uſed by apothecaries in filtrating juices, and other matters, for which the *manica Hippocratis* is not ſo proper.

Paper, *teint*, or *demi-teint*, for deſigning on, is either *brown*, *blue*, or *biſtered*.

Paper, *biſtered*, is white *paper* waſhed over with a ſponge dipped in ſoot-water. Its uſe is to ſave the labour of the crayon, in places which are to be ſhadowed the ſame depth with the teint of this *paper*. For light places, they are made thereon with white chalk. Vide Corneil. Elem. de la Peint. Prat. cap. 15. p. 34, ſeq.

Paper, *marbled*, is a ſort of *paper* variouſly ſtained, or painted as it were with divers colours; made by applying a ſheet on the ſurface of a liquor wherein colours diluted with oil or ox's gall are ſuſpended.

The manner of making it is thus: a trough is provided of the ſhape and dimenſions of a ſheet of the *paper* to be marbled, and about four fingers deep: this is made of lead or wood well joined, and pitched or primed to contain the liquor. For the liquor a quarter of a pound of gum tragacanth is macerated four or five days in fair water: this they ſtir from time to time, and add to it daily freſh water, till it be of a conſiſtency ſomewhat thinner than oil; then they ſtrain it into the trough.

The colours to be applied thereon, for blue, are indigo ground up with white lead, or Pruſſian blue and verditer may be uſed: for green, indigo and orpiment, the one ground and the other tempered, mixed and boiled together with common water; or verdigriſe, a mixture of Dutch pink and Pruſſian blue, or verditer, in different proportions: for yellow, orpiment bruiſed and tempered; or Dutch pink and yellow oker: for red, the fineſt lake, ground with raſpings of Braſil wood, which has been prepared by boiling half a day; or carmine, roſe pink, vermilion, and read lead; the two latter of which ſhould be mixed with roſe pink or lake, to bring them to a ſofter caſt: for orange, *orange* Lake, or a mixture of vermilion or red-lead, with Dutch pink, for purple: roſe pink and Pruſſian blue. Into all theſe colours, properly ground with ſpirit of wine, they put a little ox or fiſh gall, which is two or three days old; and if the colours dilate not of themſelves ſufficiently, they add more gall: on the contrary, if they ſpread too much, the gall is over-doſed, and muſt be corrected by adding more of the colour without gall.

For the operation of marbling: when the gum is well ſettled in the trough, they extend a ſheet of *paper*, and plunge it very ſhallow into the liquor, ſuddenly lifting it out again, in order to ſtir up, and raiſe the ſubſiding gum towards the ſurface, and for the more univerſal impregnating of the liquor.

This done, and all the colours ranged in gallipots on the table, where alſo the trough is placed, they begin by dipping a bruſh of hog's hair into any colour, commonly the blue firſt, and ſprinkle it on the ſurface of the liquor: if the colour has been rightly prepared, it will dilate itſelf duly therein. This done, the red is applied in the like manner, but with another pencil: after this the yellow: laſtly the green. For white, it is made by only ſprinkling fair water, mixed with ox's gall, over the liquor.

When all the colours are thus floating on the liquor, to give them that agreeable cambletting, which we admire in marble-*paper*, they uſe a pointed ſtick; which, being applied by drawing it from one ſide of the trough to the other, with addreſs, ſtirs up the liquor, and fluctuating colours: then with a comb, made of wood, about five inches long, with braſs teeth, about two inches in length, and a quarter of an inch diſtant from each other, taken by the head with both hands, they comb the ſurface of the liquor in the trough, from one extreme to another, permitting only the teeth to enter: this being performed with a gentle and uniform motion makes thoſe clouds and undulations on which the beauty of the *paper* depends.

If it be farther deſired to have the colours lie in any other fantaſtical poſture, repreſenting ſerpents, or the like, it is effected with the pointed ſtick above mentioned, by drawing it over what has been already combed; but this muſt be done with a dextrous hand, and with a ſhallow dip into the liquor, circling, as if you would draw ſome flouriſh, or figured letter.

Laſtly, the colours being in this poſture, the operator diſplays and applies on them a ſheet of white moiſtened *paper*; to do which, artiſt-like, requires a ſleight only to be obtained by practice; becauſe the ſurfaces of the liquor and the *paper* are to meet equally in all parts; which done, before the colours have time to ſoak through, which, unleſs the *paper* be very thick, will be in the ſpace of two or three pulſes, he lifts up the *paper* nimbly, and with an even hand; and then, after ſpreading it a while on a board, hangs it on a line to dry; which when ſufficiently done, they firſt rub it with a little ſoap, and then poliſh it with a marble ſtone, ivory knob, or glaſs poliſhers; or with a burniſher of jaſper or agate.

It muſt be obſerved, that the ſprinkling of the colours is to be renewed, and all the other ceremonies performed with the ſtick and comb, at every application of freſh *paper*, by reaſon that every *paper* takes off all the colour from the liquor.

Vide Kirch. de Luce & Umbra, lib. x. par. 2. cap. 4. Merr. Obſerv. on Neri de Art. Vitr. cap. 42. p. 312. Hought. Collect. tom. ii. p. 419, ſeq.

Some eſſays have been made to enrich the marbling, by mixing gold and ſilver with the colours; which ſucceeded well in many attempts in the French king's library, though the expence has hindered the practice from obtaining. Savar. ubi ſupra.

Mr. Boyle tells us, that *paper*, beſides its common uſes, may be made into frames for pictures, fine emboſſed work, and other parts of furniture. For this purpoſe, a convenient quantity of the beſt white ſort may be ſteeped for two or three days in water, till it becomes very ſoft; then reducing it by the mortar and hot water into a thin pulp, it is laid on a ſieve to draw off its ſuperfluous moiſture; then putting it into warm water, wherein a conſiderable quantity of freſh glue, or common ſize, has been diſſolved, it may afterwards be put into moulds to acquire the deſigned figure; and when taken out may be ſtrengthened, as occaſion requires with plaſter, or moiſtened chalk, and when dry painted or overlaid.

This hint is ſince improved into a regular manufacture, under the name of PAPIER *machée*.

Another uſe of *paper* is to ſtop up cracks or fiſſures in wooden veſſels to hold water; for, in this caſe, it will forcibly dilate, and fill the place wherein it is to lodge.

PAPER, *Chineſe*, is of various ſorts; ſome is made of the rinds or barks of trees, eſpecially thoſe abounding in ſap, as the mulberry-tree and elm, but chiefly of the bamboo and cotton-tree; but, in reality, almoſt each province has its peculiar *paper*: that of Se-chwen is made of hemp; that of Fo-kyang, of ſoft bamboo; that uſed in the northern provinces, of the bark of the mulberry-tree; that of the province of Che-kyang, of wheat or rice-ſtraw; that of the province of Kyang-nang, of the ſkin found in the ſilk-worms balls: in fine, in the province of Hu-quang, the tre-chu, or ko-chu, furniſhes the principal material for *paper*.

For PAPERS *made of the barks of trees*; the manner of their preparation may be exemplified in the inſtance of that of the bamboo, a tree of the cane or reed kind, being hollow, and divided into joints; but much larger, ſmoother, harder, and ſtronger, than any other ſort of reed.

For this *paper*, they ordinarily only uſe the ſecond coat or ſkin of the bark, which is ſoft and white; this they beat in fair water to a pulp, which they take up in very large moulds or frames, ſo that they have ſheets ten or twelve feet long, and ſometimes more. They are completed by dipping them ſheet by ſheet in alum-water, which ſerves inſtead of the ſize uſed among us; and not only hinders the *paper* from too freely imbibing the ink, but gives it that luſtre which at firſt ſight makes it look ſilvered, or at leaſt varniſhed over.

The *paper* thus made is white, ſoft, and cloſe, without the leaſt roughneſs to ſtop the motion of the pen, or occaſion the riſing of any of its fibres; though being made of the bark of a tree, it cracks more eaſily than the European *paper*: add that it is more apt to take moiſture, that the duſt ſticks to it; and that the worms ſoon get into it; to prevent which laſt inconveniency, they are obliged often to beat their books and expoſe them to the ſun. Add, that its thinneſs making it liable to be ſoon worn out, the Chineſe are under a frequent neceſſity of renewing their books, by freſh impreſſions taken from their blocks.

Vide Le Compt. Nouv. Mem. ſur Chin. lett. 7. Kuſt. Bibl. Nov. Libr. an. 1697, p. 67, ſeq. Lett. Edif. & Cur. tom. xix. p. 479.

But the *paper* of the bamboo, it is to be obſerved, is neither the beſt, nor the moſt uſed, in China. In the former of theſe reſpects, it yields the priority to the *paper* made of the cotton-ſhrub, which is the whiteſt and fineſt, and at the ſame time leaſt ſubject to the inconveniencies above mentioned; becauſe it keeps as well, and is as durable, as the European *paper*.

Dr. Grew thinks we may have plants in England, which contain a down that in all probability would make as fine a *paper* as that made by the Chineſe, from their cotton-ſhrub. By which it appears he miſtakenly imagined that the Chineſe *paper* was made not from the rind of the cotton-ſhrub, but from the down or cotton itſelf. Vide Grew Muſ. Reg. Soc. par. ii. ſect. i. cap. 5. p. 215.

But the *paper* in moſt common uſe in China, is that made of the tree called *chu-ku*, or *ku-chu*, which du Halde compares, firſt to a mulberry-tree, then to a fig-tree, then to a ſycamore tree, and laſtly, to increaſe the embarraſſment, to a ſtrawberry-tree. By all which, we know no more of it than if he had ſaid nothing about it.

The method of preparing it for *paper*, is by firſt ſcraping off lightly the thin outſide of the tree, which is greeniſh: then they take off the inner rind in long thin ſlips, which they blanch in water, and in the ſun; and afterwards prepare them in the ſame manner as the bamboo. It muſt not be forgot, that in the other trees it is only the inward bark that ſerves for making *paper*; but the bamboo, as well as the cotton-ſhrub, have this peculiarity, that not only their bark, but their whole ſubſtance, may be employed, by means of the following preparations.

Out of a wood of the largeſt bamboos, they ſelect ſhoots of a year's growth, which are about the thickneſs of the calf of a man's leg: theſe they ſtrip of their firſt green rind, and ſplit them into ſtraight pieces of ſix or ſeven feet long: the pieces thus cleft, they ſteep in a pond of muddy water, till they rot and grow ſoft by the maceration. In a fortnight they take them out, waſh them in clean water, ſpread them in a large dry ditch, and cover them with lime for a few days; then they take them out again, and having waſhed them a ſecond time, they ſlip them into ſmall filaments, which they expoſe in the ſun to dry and whiten: they throw them into large coppers, where they are thoroughly boiled: and laſtly, reduce them by the ſtrokes of large hammers to a thin paſte or pulp.

After this, they take ſome ſhoots of a plant called *ko-teng*; they ſoak them four or five days in water, till there come out an unctuous ſizy ſort of juice; this they mix with the pulp of which the *paper* is to be made, ſomewhat in the ſame manner as painters temper their colours; care being taken not to put in too much, nor too little of it; on which the goodneſs of the *paper* much depends.

When they have mixed the juice of ko-teng with the cleft bamboo, and beaten the whole till it reſembles a thick clammy water, they pour it into a large deep reſervoir, conſiſting of four walls, raiſed breaſt high, and having the ſides and bottom ſo cemented, that the liquor cannot run out, nor ſoak in.

This being done, and the workmen placed at the ſides of the reſervoir, they dip in their moulds, and take up the ſurface of the liquor, which almoſt inſtantly becomes *paper*; the mucilaginous and gluey juice of the ko-teng binding the parts, and rendering the *paper* compact, ſoft, and gloſſy, qualities which the European *paper* never has when firſt made.

To harden the ſheets, and make them bear ink, they dip them into alum water: this operation is called *faning*, from the Chineſe word *fan*, which ſignifies *alum*. The manner is this: ſix ounces of fiſh glue, cut very ſmall, are put in divers porringers of water, which they afterwards boil up, ſtirring it all the time to prevent lumps: when the whole is reduced to a liquid ſubſtance, they throw into it three quarters of a pound of calcined alum, which they melt and incorporate with it.

This mixture is next poured into a wide baſon, acroſs which is laid a ſmall round ſtick; then they ſhut the edge of each ſheet in another cleſt from end to end, and in this manner dip the ſheet, gently drawing it out as ſoon as it is wetted, by ſliding it over the round ſtick. When the whole ſheet has been paſſed nimbly through this liquor, which makes it whiter, and more compact, the long ſtick that holds the ſheet by the edge, is ſtuck into a hole in the wall, and the ſheet hung up to dry.

For the mould, wherewith they take up the ſheet, its frame is ſo contrived, that it may be raiſed, or lowered at pleaſure; and its bottom is not made with wire as ours, but with little ſlender ſlips of bamboo, drawn ſeveral times through holes made in a ſteel plate, whereby they are rendered as fine as wire; they are then boiled in oil till thoroughly ſoaked, that the mould may enter lightly into the water, and not ſink deeper than is requiſite to take up matter enough for a ſheet.

To make ſheets of any extraordinary ſize, care is taken to have a reſervoir and mould large in proportion. This mould is ſuſtained by ſtrings which paſs over the pulley; and the moment theſe pull up the frame, the workmen, placed aſide the reſervoir, aſſiſt to take the ſheet off; working together in a regular manner.

For drying the ſheets when taken off, they have a hollow wall, whoſe ſides are well whitened: at one end hereof is an aperture, through which, by means of a pipe, they convey the heat of a neighbouring furnace; and at the oppoſite end is a ſmall vent to let out the ſmoke. By help of this ſort of ſtove, they dry the *paper* almoſt as faſt as it is made.

Silvering of *paper*, as it is called, is another ſecret among the Chineſe, practiſed at a very ſmall charge, and without uſing any ſilver. In order to this, they take two ſcruples of glue, made of neats-leather, one ſcruple of alum, and half a pint of clean water: theſe they ſimmer over a ſlow fire, till the water is conſumed, that is, till no more ſteam ariſes; then on a ſmooth table they ſpread ſome ſheets of *paper*, and on this, with a pencil, they apply two or three layers of the glue: then they take a powder made of talc boiled, and mixed with $\frac{1}{3}$ the quantity of alum; the two are ground together, ſifted, and the powder boiled again in water, then dried in the ſun, and laſtly pounded again. This powder they ſift through a fine ſieve, ſpreading it uniformly on the ſheets prepared as above: after which they hang them in the ſhade to dry; and this effected, they lay them again on the table, and rub them gently with clean cotton to take off the ſuperfluous talc, which ſerves a ſecond time for the ſame purpoſe. With this powder diluted in water, mixed with glue and alum, they draw any figures at fancy on the *paper*. Vide Du Halde, Deſcrip. Chin. tom. i. p. 368.

The æra of the invention of *paper*, among the Chineſe, was, according to Martini, about 160 years before Chriſt.

Paper, *Japan*. ***Paper*** is made in Japan of the bark of the *morus papyrifera ſativa*, or *true paper-tree*, after the following manner: every year, when the leaves are fallen off, or in the tenth Japaneſe month, which commonly anſwers to our December, the young ſhoots, which are very ſucculent, are cut off into ſticks about three feet long, or ſomething leſs, and put together in bundles to be afterwards boiled with water and aſhes. If they ſhould grow dry before they can be boiled, they muſt be firſt ſoaked in common water, for about twenty-four hours, and then boiled. Theſe bundles, or faggots, are tied cloſe together, and put upright into a large kettle, which muſt be very well covered, and then they are boiled till the bark ſhrinks ſo far as to let about half an inch of the wood appear naked at the top. When the ſticks have all been ſufficiently boiled, they are taken out of the water, and expoſed to the air till they grow cold, then they are ſlit open lengthways, for the bark to be taken off, which being done, the wood is thrown away as uſeleſs, but the bark dried and carefully preſerved, as being the ſubſtance out of which they are in time to make their *paper*, by letting it undergo a farther preparation, conſiſting in cleaning it a-new, and afterwards picking out the better from the worſe. In order to this, it is ſoaked in water three or four hours, and being grown ſoft, the blackiſh ſkin which covers it is ſcraped off, together with the green ſurface, of what remains, which is done with a knife, which they call *kaadſi kuſaggi*, that is, *a kaadſi razor*; at the ſame time alſo the ſtronger bark, which is a full year's growth, is ſeparated from the thinner, which covered the younger branches, the former yielding the beſt and whiteſt *paper*, the latter only a dark and indifferent ſort. If there is any bark of more than a year's growth, mixed with the reſt, it is likewiſe picked out, and laid aſide as yielding a coarſer and worſe ſort of *paper*; all groſs knotty particles, and whatever elſe looks in the leaſt faulty and diſcoloured, is picked out at the ſame time, to be kept with the laſt coarſe matter.

After the bark has been ſufficiently cleanſed, and prepared and ſorted according to its differing degrees of goodneſs, it muſt be boiled in clear ley. From the time it begins to boil, they keep perpetually ſtirring it with a ſtrong reed, pouring from time to time ſo much freſh ley in, as is neceſſary to condenſe the evaporation, and to ſupply what hath been already loſt by it: this boiling muſt be continued till the matter is grown ſo tender, that being but ſlightly touched with the finger it will diſſolve and ſeparate into flocks and fibres. Their ley is made of any ſort of aſhes, in the following manner: two pieces of wood are laid acroſs over a tub and covered with ſtraw, on which they lay wet aſhes, and then pour boiling hot water upon it, which, as it runs through the ſtraw into the tub underneath, is imbued with the ſaline particles of the aſhes, and makes what they call ley.

After boiling the bark as above deſcribed, follows the waſhing of it, which is of no ſmall conſequence in *paper*-making, and muſt be managed with great judgment and attention; if it hath not been waſhed long enough, the *paper* will be ſtrong, indeed, and of a good body, but coarſe and of little value; and if, on the contrary, the waſhing has been too long continued, it will afford a whiter *paper*, but ſuch as will not bear ink. This part of *paper*-making, therefore, muſt be managed with the greateſt care and judgment, ſo as to keep to a middle degree, and avoid either extreme. They waſh it in a river, putting the bark into a ſort of ſieve, which will let the water run through, and ſtirring it continually with the hands and arms, till it comes to be diluted into a delicate ſoft pulp, or mucilage. For the finer ſort of *paper* the waſhing muſt be repeated; but the bark muſt be put into a piece of linen, inſtead of a ſieve, becauſe the longer the waſhing is continued the more the bark is divided, and would come at laſt to be ſo thin and minute, that it would run out at the holes of the ſieve, and be loſt, and at the ſame time alſo, what hard knots or flocks, and other heterogeneous uſeleſs particles remain, muſt be carefully picked out, and put up with a coarſer ſort of bark for worſe *paper*. The bark having been ſufficiently waſhed, is put upon a thick, ſmooth, wooden table, in order to its being beaten with ſticks of the hard *kuſnoki* wood, which is commonly done by two or three people until it is wrought fine enough, and becomes withal ſo thin as to reſemble a pulp of ſoaked *paper*, which being put into water will diſſolve and diſperſe like meal.

The bark, being thus prepared, is put into a narrow tub, with the flat ſlimy infuſion of rice, and the infuſion of the *oreni* root, which likewiſe is very ſlimy and mucilaginous. Theſe three things being put together muſt be ſtirred with a thin clean reed, till they are thoroughly mixed and wrought into an uniform liquid ſubſtance, of a good conſiſtence; this ſucceeds beſt in a narrow tub, but afterwards the mixture is put into a larger one, which is not unlike thoſe made uſe of in our *paper*-mills; out of this tub the leaves are taken off one by one, on proper patterns made of bulruſhes, inſtead of braſs wire, called *mys*. Nothing remains now but a proper management in drying of them; in order to this they are laid up in heaps, upon a table covered with a double matt, and a ſmall piece of reed is put between every leaf, which ſtanding out a little way, ſerves, in time, to lift them up conveniently, and take them off ſingly. Every heap is covered with a ſmall plank or board, of the ſame ſhape and ſize with the *paper*, on which are laid weights, firſt, indeed, ſmall ones, leſt the leaves, being then wet and tender, ſhould be preſſed together into one lump, but, by degrees, more and heavier, to preſs and ſqueeze out all the water. The next day the weights are taken off, the leaves are lifted up one by one, by the help of the ſmall ſtick above mentioned, and with the palm of the hand, clapped to long rough planks made for this purpoſe which they will eaſily ſtick to, becauſe of the little humidity ſtill remaining. After this manner they are expoſed to the ſun, and when quite dry, taken off, laid up in heaps, pared round, and ſo kept for uſe or ſale.

It has been obſerved, that the infuſion of rice, with a gentle friction, is neceſſary for this operation, becauſe of its white colour, and a certain clammy fatneſs, which at once gives the *paper* a good conſiſtence, and pleaſing whiteneſs. The ſimple infuſion of rice-flour will not do it, becauſe it wants that clammineſs, which, however, is a very neceſſary quality. The infuſion ſpoken of is made in an unglazed earthen pot, wherein the rice grains are ſoaked in water, and the pot afterwards ſhaken, gently at firſt, but ſtronger by degrees; at laſt, freſh cold water is poured upon it, and the whole percolated through a piece of linen. The remainder muſt go under the ſame operation again, freſh water being put to it, and this is repeated ſo long as there is any clammineſs remaining in the rice. The Japaneſe rice is by much the beſt for this purpoſe, as being the whiteſt and fatteſt ſort growing in Aſia.

The infuſion of the *oreni* root is made after the following manner: the root pounded, or cut ſmall, is put into freſh water, which in one night's time turns mucilaginous, and becomes fit for uſe, after it has been ſtrained through a piece of linen. The different ſeaſons of the year require a different quantity of water to be mixed with the root. They ſay the whole art depends entirely upon this. In the ſummer, when the heat of the air diſſolves the jelly, and makes it more fluid, a greater quantity is required, and leſs in proportion in the winter, and in cold weather; too much of this infuſion mixed with the other ingredients will make the *paper* thinner in proportion; too little, on the contrary, will make it too thick, therefore a middle quantity is required to make a good *paper*, and of an equal thickneſs; however, upon taking out a few leaves, they can eaſily ſee whether they have put too much or too little of it. Inſtead of the *oreni* root, which ſometimes, at the beginning of the ſummer, grows very ſcarce, the *paper*-makers make uſe of a creeping ſhrub, called *ſane kadſura*, the leaves whereof yield a mucilage in great plenty, though not altogether ſo good for this purpoſe, as the mucilage of the above mentioned *oreni* root. They alſo uſe the *juncus ſativus*, which is cultivated in Japan with great care and induſtry. It grows tall, thin, and ſtrong; the Japaneſe make ſails of it, and very fine matts to cover their floors.

It hath been obſerved above, that when the leaves are freſh taken off from the patterns, they are laid up in heaps, on a table covered with two matts. Theſe two matts muſt be of a different fabric, one which lies lowermoſt is coarſer, but the other, which lies uppermoſt, is thinner, made of thin, ſlender bulruſhes, which muſt not be twiſted too cloſe one to another, but ſo as to let the water run through with eaſe, and very thin, not to leave any impreſſion upon the *paper*.

A coarſer ſort of *paper*, proper to wrap up goods, and for ſeveral other uſes, is made of the bark of the *kadſe kadſura* ſhrub, after the method above deſcribed. The Japaneſe paper is very tight and ſtrong, and will bear being twiſted into ropes.

A thick ſtrong ſort of *paper* is ſold at Siriga (one of the greateſt towns in Japan, and the capital of the province of that name), which is very neatly painted and folded up, ſo much in a piece as is wanted for a ſuit; it looks ſo like ſilken or woollen ſtuff, that it might be miſtaken eaſily for them. A thin neat ſort of *paper*, which hath a yellowiſh caſt, is made in China and Tonquin, of cotton and bamboos: at Siam, the Samnites make their *paper* of the bark of the *pliok-kloi* tree, of which they have two ſorts, one black and the other white, both very coarſe, rude and ſimple, as they themſelves are. They fold it up into books, much after the ſame manner fans are folded, and write on both ſides, not, indeed, with a pencil, in imitation of thoſe more polite nations who live farther eaſt, but with a rude ſtylus made of clay.

Thus far we have given a deſcription of the way of making *paper* in the Eaſt, which the late learned Becmannus was ſo deſirous to know, and ſo earneſtly entreated travellers to enquire into, being, however, miſtaken, in ſuppoſing that it was made of cotton, whereas it evidently appears by this account, that all the nations beyond the Ganges make it of the bark of trees and ſhrubs. The other Aſiatic nations on this ſide the Ganges, the black inhabitants of the moſt ſouthernmoſt parts excepted, make their paper of old rags of cotton ſtuff, and their method differs nothing from ours in Europe, except that it is more ſimple, and the inſtruments they make uſe of are groſſer. See SON.

PAPER-*books*, in *Law*, are the iſſues in law, &c. upon ſpecial pleadings, made up by the CLERK of the *papers*, who is an officer for that purpoſe.

PAPER-*cloaths* became a mode a few years ago in France. M. Flachs has a diſſertation expreſs on the ſubject, wherein he tells us, this faſhion ſcarcely outlived half a day; and undertakes to ſhew, that it is no new thing, but had been practiſed among the ancients. But then it ſhould be conſidered, that the old Egyptian *paper* was a very different thing from our's; as being likewiſe uſed for ſails, ropes, &c.

PAPER, *flock*, is a kind of *paper*-hanging, lately invented, which is emboſſed by means of chopt cloth. The *paper* deſigned for receiving the flock is generally firſt prepared with a varniſh ground, of a proper colour; and it is not uncommon to print ſome moſaic, or other ſmall running figure, in colours, on the ground, before the flock is laid on: this may be done with any pigment of the colour deſired, tempered in varniſh, and laid on by a print cut for the purpoſe.

The manner of laying on the flock is either by means of a print, or by a ſtencil. But as the ſtencil can execute nothing but detached parts, and conſequently is unfit for all deſigns where running work, ſcrolls, or other more complicated ornaments, are introduced; it is extremely confined, with reſpect to the nature of the deſigns for which it can be employed; and the print is therefore moſt generally preferred. The method of laying on the flock by means of a print is this: a wooden print being cut (ſee PAPER-*hangings*) in ſuch manner, that the part of the deſign, which is intended for the flock, may project beyond the reſt of the ſurface, the varniſh is put on a block covered with leather, or oil cloth, and the print is then uſed to lay the varniſh on all the parts where the flock is to be fixed. The ſheet thus prepared by the varniſhed impreſſion, is now to be removed to another block or table; and to be ſtrewed over with flock; which is afterwards to be gently compreſſed by a board, or ſome other flat body, to make the varniſh take the better hold of it. Then the ſheet is to be hung on a frame till the varniſh be perfectly dry; at which time the ſuperfluous part of the flock is to be bruſhed off by a ſoft camel's-hair bruſh, and the proper flock will be found to adhere in a very ſtrong manner. When the ſtencil is uſed, the ſame method is to be purſued: the varniſh for holding the flock being laid on by that inſtead of a print; and the flock afterwards ſtrewed upon it, as in the other caſe.

The uſual method of preparing the flock is, by cutting woollen rags, or pieces of cloth, with the hand, by means of a large bill or chopping-knife. But it is much more eaſily and better done by a machine; which may be worked by a horſe-mill, at the ſame time ſuch mill is employed for cutting diamonds, or any other ſimilar purpoſe. In ſuch caſe, the conſtruction of that part of the machine, which is made for the cutting the flock is this.

A box is made for containing the rags or cloth to be cut; which is open at the top; and of ſuch ſize, as may beſt ſuit the quantity of rags that the force employed can cut. A blade is alſo to be made, the length of which is to be equal to the breadth of the box; and it ſhould be ſtrong; and muſt be charged with as great a weight as the force employed can be made to raiſe with a quick motion. The box being filled with the rags or cloth to be cut, is placed under the blade, and made to move by hitches, after the ſtroke of the blade is given, juſt ſo far as where it is proper the blade ſhould again cut the cloth or rags: while, at the ſame time, the blade is lifted up, and let fall on the cloth, which it cuts through, till by ſucceſſive ſtrokes, and the progreſſive motion of the box under it, the whole quantity of cloth or rags in the box has been cut. The box muſt then be turned, ſo that one of the ſides may become the front; and the operation muſt be repeated; by which means the cloth or rags, having been cut both ways, will be reduced to the ſtate in which the matter is called flock; and fit to be employed for the purpoſe of *paper*-hangings. The work neceſſary for conveying from the principal mover in the mill, the motion for thruſting forward the box, and raiſing the blade, may be eaſily ſupplied by any ingenious wheel-wright, and need not therefore be particularly deſcribed here.

There is a kind of counterfeit *flock-paper*, which, when well managed, has very much the ſame effect to the eye as the real; though done with leſs expence. The manner of making this ſort is, by laying a ground of varniſh on the *paper*; and having afterwards printed the deſign of the flock in varniſh, in the ſame manner as for true; inſtead of the flock, ſome pigment, or dry colour, of the ſame hue with the flock required by the deſign, but ſomewhat of a darker ſhade, being well powdered, is ſtrewed upon the printed varniſh, and produces greatly the ſame appearance. Handmaid to the Arts, vol. ii. p. 458, &c.

PAPER-*hangings* are of ſeveral kinds; ſome of which are made in the repreſentation of ſtucco-work, for covering ceilings, or the ſides of halls, ſtair-caſes, paſſages, &c. and others in imitation of velvet, damaſk, brocades, chints, or ſuch ſilks and ſtuffs as are employed for hanging rooms.

The principal difference in the manufacture lies in the grounds; ſome of which are laid in varniſh, and others in the common vehicles for water colours.

The kind of *paper* employed for this uſe is a ſort of cartoon,

toon, manufactured for the purpoſe, which muſt be ſtamped before it be painted. 1 Geo. ſtat. 2. cap. 36.

The colours proper to be uſed for painting *paper* hangings are all thoſe that can be uſed in water and varniſh. But for common deſigns done with water only, the following are moſt proper.

For red; lake, vermilion, roſe-pink, and red oker: for blue; Pruſſian blue, verditer, and indigo: for yellow; the yellow-berry waſh, Dutch pink, and yellow oker: for green; verdigriſe, or a mixture of the blue colours with the yellow colours, particularly with the yellow-berry waſh: for orange; vermilion, or red-lead, with Dutch pink: for purple; a waſh made of logwood, or a mixture of the lake or roſe-pink, with deep-coloured Pruſſian blue, or with indigo: for black; ivory black, and in ſome nicer caſes lamp-black: for white; whiting: and for the heightenings; white-lead.

Where great brightneſs is required, the lake ſhould be uſed for the crimſon red, and Pruſſian blue for the blue; but for many purpoſes, roſe-pink uſed alone for the crimſon red, and indigo mixt with whiting for the blue, will anſwer the purpoſe with greatly leſs expence. The lake, roſe-pink, Pruſſian blue, and Dutch pink, intended for this uſe, ſhould be procured in a moiſt ſtate.

The colours uſed in varniſh may be the ſame as thoſe uſed in water; but for this purpoſe, thoſe juſt mentioned ſhould be obtained dry.

As for the vehicles of the colours; when water is uſed, it muſt be inſpiſſated with ſize and gum Arabic or Senegal. When burniſh is uſed, it muſt be formed of oil of turpentine, and the reſins and gums which will diſſolve in that menſtruum. With reſpect to the grounds for *paper* hanging, thoſe that are laid in water are made by mixing whiting with the ſize above mentioned, and laying it on the *paper*, with a proper bruſh, in the moiſt even manner. Nothing more is neceſſary, when the ground is to be left white; and the *paper* being hung on a proper frame, till it be dry, is fit to be painted. When coloured grounds are wanted, the ſame method muſt be purſued; and the ground of whiting firſt laid; except that, in paler colours, a ſecond coating may ſometimes be ſpared, by mixing ſome ſtrong colour with the whiting. But where a greater force of colour is wanted the pigment or colouring ſubſtance muſt be tempered with the proper vehicle, and then ſpread over the white coat. The varniſh grounds are made much in the ſame manner, by mixing the proper colour with the varniſh, and ſpreading it on the *paper*.

There are three methods, by which *paper*-hangings are painted: the firſt by printing on the colours; the ſecond by uſing the ſtencil; and the third by laying them on with a pencil, as in other kinds of painting.

When the colours are laid on by printing, the impreſſion is made by wooden prints; which are cut in ſuch manner, that the figure to be expreſſed is made to project from the ſurface, by cutting away all the other part. This, being charged with the colours tempered with their proper vehicle, by letting the print gently down on a block, on which the colour is previouſly ſpread, conveys it from thence to the ground of the *paper*, on which it is made to fall more forcibly by means of its weight, and the effort of the arm of the perſon who uſes the print. The manner of doing this, when more particularly explained, is thus.

The *paper*, being properly prepared by a ground of whiting, colour, or varniſh, is laid on a proper block, on which a piece of leather is ſtrained. The colour, mixt with its proper vehicle, is ſpread on another piece of leather or oil cloth, laid on a flat block, ſomewhat larger than the print; which is done by a boy or man who attends for that purpoſe; and having the colour by him, in a pot, ſpreads it with a bruſh on the block betwixt every ſtroke and impreſſion the printer makes. The print is previouſly cut in ſuch manner, correſpondently to the deſign of the painting, that there ſhall be a projection on the ſurface anſwering to every part, where that colour intended to be conveyed by this print is neceſſary. The printer then takes the print either in his right hand, or, when too heavy to be ſo managed, in both, and drops it gently on the block, juſt charged with colour; from whence he again immediately raiſes it in the moſt perpendicular direction, and lets it fall in the ſtrongeſt, though moſt even manner, he can, on the *paper*; increaſing the force by all the additional velocity he can give the print. When this is done, the ſheet printed is immediately taken off the block, and hung up to dry; and another being put in its place, the ſame operation is repeated, till the whole quantity of *paper* be printed. It is eaſy to conclude, that there muſt be as many ſeparate prints, as there are colours to be printed: and they are to be uſed ſucceſſively in the ſame manner as the firſt. But where there are more than one, great care muſt be taken, after the firſt, to let the print fall exactly in the ſame part of the *paper*, as that which went before: otherwiſe the figure of the deſign would be brought into irregularity and confuſion. In common *paper* of low price it is uſual, therefore, to print only the outlines, and lay on the reſt of the colours by ſtencilling, which both ſaves the expence of cutting more prints; and can be practiſed by common workmen, not requiring the great care and dexterity neceſſary to the uſing prints.

The manner of ſtencilling the colours is this. The figure, which all the parts of any particular colour make in the deſign to be painted, is to be cut out, in a piece of thin leather, or oil cloth. Theſe pieces of leather, or oil cloth, are called ſtencils; and being laid flat on the ſheets of *paper* to be printed, ſpread on a table or floor, are to be rubbed over with the colour properly tempered by means of a large bruſh. The colour paſſing over the whole is conſequently ſpread on thoſe parts of the *paper* where the cloth or leather is cut away, and give the ſame effect as if laid on by a print. This is nevertheleſs only practicable, without great care, in parts where there are only detached maſſes, or ſpots of colours: for where there are ſmall continued lines, or parts that run one into another, it is difficult to preſerve the connection or continuity of the parts of the cloth; or to keep the ſmaller corners cloſe down to the *paper*; and therefore, in ſuch caſes, prints are preferable.—Stencilling is indeed a cheaper method of ridding coarſe work than printing; but without ſuch extraordinary attention and trouble, as render it equally difficult with printing, it is far leſs beautiful and exact in the effect. For the outline of the ſpots of colour want that ſharpneſs and regularity that are given by prints; beſides the frequent extralineations, or deviations from the juſt figure, which happen by the original miſplacing of the ſtencils, or the ſhifting the place of them during the operation.

Pencilling is only uſed in the caſe of nicer work, ſuch as the better imitations of the India *paper*. It is performed in the ſame manner as other paintings in water, or varniſh.

It is ſometimes uſed only to fill the outlines already formed by printing; where the price of the colour, or the exactneſs of the manner in which it is required to be laid on, render the ſtencilling or printing it leſs proper: at other times it is uſed for forming or delineating ſome parts of the deſign, where a ſpirit of freedom and variety, not to be had in printed outlines, are deſired to be had in the work.

The manner of proceeding with theſe ſeveral methods is, in common work, to ſtencil firſt all parts of each colour in the deſign, and to give an outline to the whole at laſt, by printing with brown or black: but where there is any running part of the deſigns, ſuch as ſcrolls, or the ſtems or ſtalks of creeping plants, or flowers, which are to be printed in any other colour than brown or black, a print muſt be uſed for them; though, if they require only brown or black, they may be done by the ſame print which makes the outlines.

In the finer *paper*, where ſeveral colours are laid on with the prints, the principal colour is begun with, and the reſt taken ſucceſſively; the print for the outline being laid on laſt. In caſes where the pencil is to be uſed, the outline is nevertheleſs to be made before the colours are laid on by the pencil, if ſuch outline is to be made at all; becauſe that is the guide to the perſon who lays on the colour; and confines them to a correctneſs.

In *paper* printed with deſigns in *chiaro oſcuro*, ſuch as the imitation of ſtucco work, and baſs-relieves, the order of printing muſt be, to lay on the ground-colour firſt: afterwards the ſhades; and laſtly the lights: and the ſame rule of ſucceſſion ſhould be obſerved where the colours are pencilled. Handmaid to the Arts, vol. ii. p. 445, &c.

Paper-hangings may be ſpangled with that kind of talc called iſinglaſs, which being reduced to a groſs flaky powder, has a great reſemblance to thin ſilver ſcales or powder. It is laid on by ſtrewing over the varniſh, which forms the grounds, before it begins to dry. When it is laid on in a figure, for the repreſentation of embroidery, the figure muſt be printed in varniſh, and the talc ſtrewed upon it, and treated like flock. Smalt may alſo be uſed in the ſame manner as flocks or ſpangles.—But hangings of this kind are now little uſed.

Paper-*mills* (in the court of king's bench) is where all the writings belonging to that court are depoſited.

Paper-*office* (in the palace of Whitehall) is where all the public writings, matters of ſtate and council, proclamations, letters, intelligences, negociations of the king's miniſters abroad, and generally all the *papers* and diſpatches that paſs through the offices of the ſecretaries of ſtate, are lodged, and diſpoſed in the way of library. It was chiefly from this noble repoſitory that biſhop Burnet had materials for his Hiſtory of the Reformation.

Paper *portraits and pictures*. One Elizabeth Pyberg, who lived at the Hague, in 1699, cut in *paper* not only towns, as Loo and Hounſlerdyke, but even faces to an extreme likeneſs. Mr. Ellys aſſures us, ſhe did king William and queen Mary better than any limner he had ever ſeen, and refuſed 1000 guilders for the pieces; which were ſo curious, that he could not believe the queen's drapery not to be point till he had moſt accurately examined it. Vide Phil. Tranſ. N° 286, p. 1418.

Paper, *ſtamped*. See Stamp.

Papers is a term alſo uſed for writings, eſpecially thoſe relating to a man's eſtate, property, dealings, or the like. In which ſenſe, *papers* include books of accounts, invoices, and orders; alſo deeds, bonds, charters, and the like.

Papers is alſo ſometimes uſed for manuſcript books.

Papers is more particularly uſed of late days for gazettes, journals, and other public news-writings.

We have daily *papers*, weekly *papers*, morning *papers*, evening *papers*, occaſional *papers*, political *papers*, literary *papers*, *papers* of entertainment, &c.

Paper, among *Bankers*, and other negociants, is alſo uſed for bills of exchange, bank and promiſſory notes, &c.

Subſtituting *paper* for money, and giving the *paper* an arbitrary value, was the way of paying debts introduced in France by Mr. Law. A royal BANK was eſtabliſhed, to which people were to carry their money, and receive the value of it in bills, which were to paſs current in trade as ſo much money. Vide Chevign. Scienc. des Perſ. de la Cour, tom. ii. p. 292. It was made confiſcation of goods, and the gallies, for any man to keep above forty livres by him of any but *paper money*. When the regent was told what a rage was ſpirited up againſt him about the arrets of making *paper* current, and how openly the people threatened him, he anſwered coolly, the French were like watch-dogs, they would bark, but not bite: *Les François reſemblent aux chiens a garde, ils aboyent, mais ne mordent pas.* Miſt. Miſc. Lett. tom. iv. p. 16. Hence,

Paper-*credit* is uſed to ſignify any kind of property that is transferred or circulated from one perſon to another, by means of any written *paper* obligation, inſtead of hard money, merchandizes, or lands: ſuch as exchequer bills, bank notes, bills of exchange, promiſſory notes, bonds, and mortgages; under which denomination ſome include all transfers made by ſtocks, &c.

PAPHIS, in *Ichthyology*, a name by which ſome have called the gar-fiſh.

PAPIA, in *Botany*, the name of a genus of plants, called by Linnæus ORVALA.

PAPIAN-*Popæan Law*, in *Roman Antiquity*, was enacted by the conſuls M. Papius Mutilus, and Q. Popæus Secundus. This law obliged all men to marry at a certain age, eſtabliſhed great exemptions and privileges in favour of thoſe that had children, and laid heavy fines on all who, after a certain age, continued ſingle. It was alſo called the Julian law, becauſe it had been publiſhed by the order of Auguſtus, who was of the Julian family. The ſeverity of this law was mitigated by Tiberius.

PAPIER *maché* is made of cuttings of white or brown paper, boiled in water, and beaten in a mortar, till they are reduced into a kind of paſte, and then boiled with a ſolution of gum arabic or of ſize, to give tenacity to the paſte, which is afterwards formed into different toys, and by preſſing it into oiled moulds either of wood or of plaſter of Paris. When dry, it is done over with a mixture of ſize and lamp-black, and afterwards varniſhed. See Gilding, Japanning, and Varnish.

PAPILIO, in *Zoology*, the generical name, including a numerous genus of four-winged inſects of the LEPIDOPTERA order, comprehending in the Linnæan ſyſtem no leſs than two hundred and ſeventy-three ſpecies, diſtinguiſhed by clavated antennæ, popularly known by the names of butterflies and moths, though the moth is claſſed under a diſtinct genus by Linnæus. See Phalæna.

For the ſeveral parts of the butterfly, ſee Feelers, Wing, Trunk, &c. and Insects.

Their arrangement into genera and claſſes is in a great meaſure taken from theſe ſeveral parts, and from the great uſes which they make of them. The general diſtinction is that which divides them into the day and night kinds; we have among the birds ſome few that fly abroad only by night, but theſe bear only a ſmall proportion in number to the day-fliers: on the contrary, the number of butterflies which we ſee fluttering about the fields and gardens, are ſcarce ſo many as thoſe which fly abroad only by night. We often meet with theſe even in our houſes, flying about the candles, and the hedges ſwarm with them: in the day-time we find them hid under the leaves of plants, and often, as it were, in a torpid ſtate. In this condition they remain till evening, but they are ſo cunning in hiding themſelves at this time, that it is difficult to ſee one even in places where there are a great number. The way to diſcover them is to beat and diſturb the buſhes, or ſhake the branches of trees in places where they are ſuſpected to be, and they will often be driven out in ſwarms. In this caſe, they never fly far, but ſettle again upon the firſt tree or buſh they come to, and in ſummer, if any one goes out into the fields or gardens, with a candle, in a calm ſtill night, there will numbers of different kinds of them almoſt immediately gather about it. Theſe are called by naturaliſts *night-butterflies*, *phalænæ*, and *moths*.

The ſeveral kinds of butterflies that have thoſe various inclinations, have alſo external characters by which they may be diſtinguiſhed; all thoſe which have buttoned antennæ, or club antennæ, are of the diurnal kind, and are never ſeen flying about candles in the night. There are other forms of the antennæ alſo, which are peculiar to the day butterflies; and the night ones are diſtinguiſhed by their having the plumoſe, the priſmatic, or the conic ones. See Feelers.

Thoſe which fly about our candles are always of one of theſe three kinds. It is not, indeed, to be wholly affirmed, that no one of theſe kinds is ever ſeen flying by day-light, ſince in woods and thickets we often ſee them fluttering about without having been diſturbed; but all that are thus caught flying are males, and are at that time ſeeking after the females to couple with them, theſe being all fixed immoveably under the leaves and on the branches of trees.

The common kind that we ſee fly about from flower to flower are all of the day kind; a few ſpecies of the *phalænæ* ſometims flutter about the thiſtle flowers, and ſeem to ſuck them; but theſe are ſeldom ſeen; and among the moths or night kinds, as we call them, there are a great many that never fly about by night any more than by day, and, indeed, make no uſe of their wings at all.

It is alſo a ſingular obſervation, that the moths which fly about our candles, whether in the houſe or abroad in the gardens, are all males; the females never do it. The male of the glow-worm flies in the ſame manner at a candle, thinking it is the light of his female; and it is poſſible, that the female moths may, in the night, yield a light that affects the eyes of the male of the ſame ſpecies, though it be inſenſible to our view. See *Tab. of Inſects*, N° 10.

The great general diſtinctions of the butterflies into day and night kinds being made, it is neceſſary to have recourſe to numbers of other ſub-diſtinctions, in order to arrange them in any method; and theſe can by no means be taken from them in their prior ſtate of caterpillars, many of them being in that ſtate alike in all their general characters, though of different genera in their flying ſtate.

As the antennæ ſerve for diſtinctions of the butterflies into claſſes, ſo do their trunks into genera; but theſe are only capable of diſtinguiſhing a few, the flat and the round being their principal diſtinction. Mr. Reaumur has obſerved, that the day butterflies all have theſe trunks, but that many of the night kinds want them. The wings, however, give the greateſt variety of generical characters among theſe animals. The ſhape of theſe, and the manner in which theſe creatures carry them, when walking and at reſt, ſerve as great and eſſential diſtinctions.

The difference in the manner of the butterflies carrying their wings have been more conſidered by Reaumur than by any author who went before him. He obſerves, that ſome of the ſpecies carry their wings perpendicular to the thing they ſit upon; others carry them plain or level with the horizon; and others let them fall below that level; theſe are called the drooping-wing kind. Some others form a ſort of canopy with them, to cover their bodies; and others make them as it were embrace their bodies. The colours of the wings make excellent diſtinctions for the ſeveral ſpecies; but they are not at all fit for generical diſtinctions.

It has been already obſerved, that there are three kinds of antennæ which are peculiar to the day butterfly, but the diſtribution under theſe alone would be too large; the ſpecies of the button-horned ones being alone greatly too numerous to be held together. It is neceſſary, therefore, to take in with theſe the poſitions of the wings, according to the preceding differences, and the day butterflies, or *papilios*, are thus diſtinguiſhed into ſeven claſſes.

Claſs 1. Contains thoſe *papilios*, whoſe antennæ are terminated by buttons, and whoſe wings, when at reſt, are placed in a perpendicular direction to the thing the creature ſits upon, the under edges of which embrace the lower part of the body, and whoſe ſix legs are all employed in ſuſtaining the body, and in walking. The black-ſpotted white butterfly, produced from the beautiful cabbage caterpillar, is one of the *papilios* of this claſs.

Claſs 2. Contains the *papilios* of the ſame characters with the former in all reſpects, except that they uſe only four of their legs in ſuſtaining the body and in walking. The two anterior legs in the flies of this claſs are held in a bent poſture, and are furniſhed with a downy part at their ends, and ſeem to ſerve as a ſort of arms. Theſe *papilios* in general are produced from the prickly caterpillars. The ſolitary nettle kind gives us an inſtance in its *papilio*.

Claſs 3. Contains thoſe *papilios* which agree in all reſpects with the former, except that their two anterior legs, which they uſe as arms, and never in walking, are not terminated by downy ends, but are faſhioned like the other legs at the extremity, only ſo ſmall, that it requires a microſcope to diſtinguiſh them. There is an inſtance of this claſs in a common grey and yellow *papilio*, that is found in paſtures among the graſs in June, July, and Auguſt.

Claſs 4. Contains thoſe *papilios* which have buttoned antennæ, as the others, and which carry their wings, when at reſt, in a perpendicular direction to the thing they ſit upon; but as the former have the inferior edge of their wings bent round the under part of their body, ſo in theſe the inferior edge is bent upwards in both pair of wings, and embraces and covers the upper part of the body. However obvious this diſtinction may be, there is another yet more plain one than this, that all of this claſs have one of the jaggs of the wing ſo far extended beyond the reſt of the verge, that it forms a kind of tail, and they are called the tailed *butterflies*. They uſe all their ſix legs in walking.

Claſs 5. Contains thoſe *papilios* which have ſix real legs, which they uſe as ſuch, and their horns terminated by buttons as the others; but whoſe wings, when they are in repoſe, are not elevated perpendicularly to the thing they ſit on, as in the four preceding claſſes, but are held in an horizontal direction, or at the utmoſt never meet in an angle over the back. We have an inſtance of this claſs in a butterfly bred from a ſmooth caterpillar of the marſhmallow.

Claſs 5. Contains thoſe *papilios* which have club antennæ that is, ſuch antennæ as gradually increaſe in thickneſs from their origin to their extremity. See FEELERS

Theſe are that claſs of *papilios* which are always upon the wing, and buzz about flowers without ever ſettling upon them. They dart their trunks into the flower while they ſuſtain themſelves in the air, and have a way of holding themſelves in poize, like a kite or other bird of prey; but when they are buſy about the flowers, they have their wings in continual motion, and make a humming noiſe, like the humble bees. Mad. Merian has called all theſe *phalænæ*, or night-butterflies, but they are all truly of the day kind. The French, from their poizing themſelves on the wing, and making that humming noiſe, call them *eperviers*, and *papilions-bourdons*. Of this claſs are thoſe ſmall ſpecies called the fly-butterflies, whoſe wings are only covered in part with duſt or ſcales, the remainder being tranſparent and glaſſy, as ſome expreſs it.

Claſs 7. In this laſt claſs are comprehended thoſe *papilios* whoſe antennæ are large at their origin, ſmaller afterwards, and finally terminated by an oval head; and which differ from the club antennæ in having no pencils of hairs at the end. This claſs is not very numerous; and the moſt frequent inſtance we have of it is in a painted kind, which we frequently find on blades of graſs, in meadow, in July. This flies little in the day-time, but is uſually found fixed to a plant, as the moths are. Mad. Merian and others have thence called it a *phalæna*, or *night-fly*; but the truth is, that it flies no more by night than by day-light, but is a lazy creature, which makes very little uſe of its wings.

There is ſome appearance from one of Mad. Merian's tables, viz. the twentieth, that an eighth claſs of theſe day-*papilios* ſhould be found, ſhe having figured one with conic granulated antennæ, common to ſome of the moths. If this obſervation be juſt, or if any new ones of a like kind ſhould demand it, the claſſes may be eaſily enlarged.

Linnæus has diſtributed the genus of *papiliones* into five claſſes; viz. 1. The *equites*, with the fore-wings, whoſe length is greater than their breadth at the baſe, and whoſe antennæ are moſt commonly filiform; under this claſs he comprehends the *troes*, with ſanguineous or black ſpots on the breaſt, and the *achivi*, without ſuch ſpots, but having an ocellus (ſee INSECTS) at the anus; ſome of which have faſciæ, or bands, on the wings, and ſome without any. 2. The *heliconii*, with narrow entire wings, that are moſt commonly denudated; the fore-wings being oblong, and the hind ones very ſhort. 3. The DANAI, with entire wings, to which claſs belong the *candidi*, with whitiſh wings, and the *feſtivi*, with variegated wings. 4. The *nymphales*, with denticulated wings, comprehending the *gemmati*, with ocelli in all the wings, in the fore-wings, or in the poſterior ones; and the *phalerati*, whoſe wings have no ocelli. 5. The ſmall *plebeii*, the larva of which is commonly contracted, comprehending the *rurales*, with dark ſpots in the wings; and the *urbicolæ*, which have commonly pellucid ſpots in them.

The world is well acquainted with the beauties of this part of the animal creation; but Mr. Reaumur has given accounts of ſome very ſingular ſpecies, which deſerve a peculiar regard.

One ſpecies of theſe he has called the *bundle of dry leaves*. This, when it is in a ſtate of reſt, has wholly the appearance of a little cluſter of the decayed leaves of ſome herb. The poſition and colour of its wings greatly favour this reſemblance; and they have very large ribs, wholly like thoſe of the leaves of plants, and are indented in the ſame manner at their edges, as the leaves of many plants are. This ſeems to point out the care of nature for the animal, and frequently may preſerve it from birds, &c.

The ſkull butterfly is another ſingular ſpecies, ſo called from its head reſembling, in ſome degree, a death's head, or human ſkull. This very remarkable appearance is terrible to many people, but it has another yet greater ſingularity attending it; which is, that, when frighted, it has a mournful and harſh voice. This appeared the more ſurpriſing to Mr. Reaumur, as no other known butterfly had any the leaſt voice at all; and he was not ready of belief that it was a real voice, but ſuſpected the noiſe, like that of the cicadæ, to be owing to the attrition of ſome part of the body; and, in fine, he, by great pains, diſcovered that this noiſe, was not truly vocal, but was made by a hard and briſk rubbing of the trunk againſt two hard bodies between which it is placed.

Another butterfly there is, ſo ſmall, that it might be miſtaken for a very ſmall fly. This is certainly the extreme in degree of ſize of all the known butterflies, and cannot but have been proportionably ſmall in the ſtate of a caterpillar and chryſalis: this creature ſpends its whole life in all the three ſtages of caterpillar, chryſalis, and butterfly, on the leaf of the celandine. It lives on the under ſide of the leaf; and though in the caterpillar ſtate it feeds on it, yet it does no damage. It does not eat the ſubſtance of the leaf, but draws from it only a fine juice, which is ſoon repaired again, without occaſioning any change in the appearance of the leaf. This ſpecies is very ſhort lived, and paſſes through its three ſtates in ſo ſhort a time, that there are frequently ten generations of it in one year; whereas in all the other butterflies, two generations in the year are all that are to be had. Theſe two generations are ſufficient to make a prodigious increaſe; in a large garden, if there are twenty caterpillars in ſpring, theſe may be overlooked, and there may be eaſily concluded to be none there, even on a narrow ſearch; but if theſe twenty caterpillars afterwards become twenty butterflies, ten of which are male and ten female, and each female lay the ſame number of eggs that the common ſilk-worm does, that is, four hundred, if all the caterpillars hatched of theſe become butterflies, and theſe lay eggs in the ſame proportion, which remain the winter, and come to be hatched in the ſucceeding ſpring; then from theſe twenty, in only one year, you will have eight hundred thouſand; and if we add to this the increaſe of theſe in a ſucceeding year, the account muſt appear terrible and ſuch as no art could guard againſt. The great Ruler of the world has put ſo many hindrances in the way of this over-abundant production, that it is very rare ſuch years of deſtruction happen. Some ſuch have happened, however, and much miſchief has been dreaded from them, not only from their eating all the herbage, but from themſelves being eaten with herbs in ſallads, and otherwiſe; but experiments have proved this an erroneous opinion, and they are found to be innocent, and eatable as ſnails or oyſters. Reaumur.

The butterfly, whoſe whole life in that ſtate is employed only in the propagation of its ſpecies, gives the curious obſerver much cauſe of wonder in the manner of it. In all the ſpecies, the male, in the time of coupling, throws out from the laſt ring of his body a part which enters into the hinder part of the female. This organ may be ſeen on preſſing lightly with the fingers, the body of a male butterfly. The end of the body where this is ſituated is extremely flexile, and the creature turns it with great facility, upward or downward, or to either ſide; and to this it is owing, that there are many different attitudes in the generation of different butterflies. In many ſpecies the male lays his body in a parallel beſide the body of the female, and their wings being ſpread horizontally, make a ſort of cloſe covering for both their bodies; and the hinder part of the body of the male being capable of turning ſideways, is now able to perform all its functions. In other ſpecies the male gets upon the body of the female, and the work is then performed by means of his power of bending the end of his body downwards. In this ſtate, if any thing diſturbs them, the female ariſes from her ſeat, and flies away with the male upon her back; and this ſeems almoſt the only uſe the female has for wings, for ſhe is too heavy to fly with any pleaſure. The power the male has of bending this part of his body upwards, is of uſe when he meets the female on the wing; but this is ſeldom the caſe, and that only in a few ſpecies. But beſides all theſe forms of generation, they are not unfrequently ſeen joined tail to tail, with their bodies in a ſtrait line, and their heads ſtanding oppoſite ways. The act of generation in moſt ſpecies of butterflies, paſſes without any emotion, and ſeemingly in a ſtate of reſt and perfect tranquillity; but this is not the caſe in all; for in the butterfly bred of the ſilk-worm caterpillar, the male raiſes and falls his wings all the time with great celerity. Mr. Malpighi has had the patience to count the number of theſe vibrations of the wings of the butterfly of this ſpecies, and found them a hundred and thirty in number; after this the creature falls into a langour and faintneſs, which laſts about a quarter of an hour, and ſometimes ſeparates himſelf from the female; if not, at the end of this time, he recovers himſelf, and renews the agitations of his wings, but for a leſs number of times. The ſame author uſually counted at this latter time thirty-ſix; and after this he becomes languid again, and afterwards revives ſeveral other times, but the intervals are longer, and the clappings of the wings leſs numerous. Memoirs. Acad. Scienc. Par. 1736. See Aurelia.

Caterpillars, in general, are by ſome ſuppoſed poiſonous to the touch. Mr. Reaumur has proved, by repeated experiments, that all the ſmooth ones are perfectly clear from this accuſation, and may be handled with perfect ſafety; but the hairy ones are capable of producing great pain and itching after the touching them. Theſe pains are not only felt in the hands, but alſo in the face, or any other part; and that even though the animal have not been touched, if it have only been brought near the part. The ſpolia, or caſt ſkin of theſe animals, have alſo the ſame effect; but then it is abſolutely neceſſary they ſhould be touched. This unqueſtionably carries the appearance of the effect of a poiſon to vulgar eyes; but the caſe will appear otherwiſe to thoſe who will examine into the whole more nearly. The miſchief occaſioned by theſe creatures comes on very quick, and ſometimes continues many hours, ſometimes even three or four days.

The explication of this by Mr. Reaumur, is only this: that theſe caterpillars have, beſide their coarſe and large hairs which we ſee them covered with, a vaſt number of others, which are ſo extremely ſmall and fine, as to be inviſible to our eyes. Theſe are ſharp-pointed, very rigid, and are looſely faſtened to the creature's body: ſo that they ſeparate from it on the lighteſt touch: theſe make a ſort of atmoſphere of fine darts ſurrounding them every way: and many of the ſpecies of hairy caterpillars have evidently a method of darting theſe out in great numbers. When the hand of any one is put toward this creature, ſo as to come within the reach of theſe ſmall darts, it immediately diſcharges a whole ſhower of them, and of theſe a great number enter the pores of the ſkin, and a great number more lie along upon it, ready to enter, as ſoon as any accident changes their poſture. If while the hand be thus covered with theſe weapons, whoſe ſmallneſs, though it makes them inviſible, yet does not incapacitate them from being very troubleſome, be moved up to the face, or the cheeks, or eyes, rubbed with it, it is eaſy to conceive, that many of theſe little darts may be made to lodge in the ſkin on which the hand where they lie is rubbed; and the conſequence muſt be a greater itching, pain, and ſwelling, in theſe tender parts, than on the hand; and thus is produced by ſimple means, what is by many eſteemed the effect of a piercing and penetrating poiſon; and thus are the ſtrangeſt appearances often explained by the moſt ſimple means. Many of the ſpecies are great devourers, and feed on one another; but they have all much more deſtructive enemies; theſe are reptiles like themſelves, a ſort of worms, in a ſtate of paſſage, at the end of which they are to paſs through the chryſalis ſtate into that of flies or beetles. Even the ſmall ſpecies of butterfly, which lives on the celandine, has its enemies proportioned to its own ſize; and the ſame leaf of the plant is uſually covered at the ſame time with theſe butterflies, their chryſaliſes, and their caterpillars, and with theſe ſmall beetles, their chryſaliſes and worms all confuſedly together; and by their ſmallneſs they are not eaſily diſtinguiſhed one from another. The caterpillars of this ſmall ſpecies are very unhappily circumſtanced; they have not only an open war to carry on with the worms of theſe beetles, which are continually attacking them, and piercing their bodies, and ſucking their juices, but they have much more terrible inteſtine enemies, a ſort of ſmall worms which they carry within their bodies, and which eat away their fleſh within the ſkin. See Caterpillar, and *Tab. Inſects*.

Papilio-*muſca*, in *Natural Hiſtory*, a name given by ſome authors to a ſeries of ſmall inſects, which ſeem to be of a middle nature, between the fly and the butterfly claſſes. Its wings are in part covered with thoſe ſcales in form of duſt, which render the wings of the butterfly kinds opake, and in part are tranſparent and glaſſy. Reaumur has called the wings *alies vitrées*, *glaſſy wings*. Reaumur's Hiſt. of Inſects.

PAPILION-*bourdon*, in *Natural Hiſtory*, a name given by the French authors to a ſort of butterflies, which while they feed keep upon the wing with a humming noiſe like that of the humble-bee. Reaumur. See Eperviers and Papilio.

Papilion-*a-queue*, *tailed butterflies*, a name given by the French naturaliſts to a ſort of butterfly, of which there are ſeveral ſpecies. The ſides of the wings of theſe butterflies are jagged, and one of the jags run out ſo far beyond the reſt as to repreſent a ſort of tail iſſuing from the creature. Reaumur.

PAPILLA, in *Anatomy*. See Nipple.

Papillæ *pyramidales* are little eminences ariſing from the ſubcutaneous nerves.

Under the cutis lies a thick congeries of nerves, woven into a kind of membrane; together with arteries, veins, and lymphatics: theſe nerves, ſtanding out above the level, form little *papillæ*, which, laying aſide the outer coat given them by the dura mater, form the corpus reticulare, firſt obſerved by Malpighi in the feet, hands, and tongue; and ſince ſhewn by Ruyſch, throughout the whole body. See *Tab. Anat.* (*Myol.*) *fig.* 8. *lit. a a*, &c. *b b*.

Theſe *papillæ* are always the moſt numerous and conſpicuous in the places of moſt acute ſenſe, as the tongue, glans of the penis, vagina, labia, œſophagus, ventricle, ſmall inteſtines, and tips of the fingers and toes, where the cutis they are covered with is extremely thin.

In the other parts of the body the cutis is thicker, and the *papillæ* are much fewer, ſmaller, &c.

Theſe *papillæ* are ſuppoſed to be the immediate organ of *feeling*.

Papillæ *of the tongue*, are little eminences of the tongue, ſo called from their reſemblance to the *papillæ* of the breaſt.

From the papillary tunic of the tongue ariſe numerous nervous *papillæ*, which, penetrating the viſcous ſubſtance over them, terminate under the ſurface of the tongue.

It is by means of theſe *papillæ*, that the tongue is ſuppoſed to have its faculty of taſting.

Papillæ, or *Carunculæ* Papillares, *of the Kidney's*. See Carunculæ.

They end in ſhort tubulous bodies, or larger pipes, anſwering in number to the *papillæ*, which are uſually twelve, and are called *fiſtulæ membranaceæ*; being only productions of the membraneous cell called the *pelvis*.

The *papillæ* ſerve to diſtill the urine ſeparated from the arteries, and brought them by the urinary pipes into the pelvis.

PAPILLARIS, in *Botany*, a name uſed by ſome authors for the common *lampſana*, or nipple-*wort*.

PAPILLARY, *papillaris*, in *Anatomy*, an epithet given to a tunic or membrane of the tongue, called *papillary tunic*, *papillary membrane*, or *papillary body*.

The *papillary* tunic, or body, is the third tegument, placed beneath the exterior membrane which lines the tongue, and the viſcous ſubſtance next under the ſame. It is full of nerves, derived from the fifth and ninth pair. From this tunic ariſe little eminences, called papillæ, or *papillary eminences*.

The ſalts and juices of bodies, ſtriking againſt theſe prominences, occaſion undulations therein, which are immediately communicated to the ſpirits contained in the nerves, and theſe carry them to the brain &c.

PAPILLARY *proceſſes*, is a name which the ancients gave to the olfactory nerves, from the place of their origin, to the os cribroſum.

Dr. Drake thinks this name becomes them better in this place than that of nerves, in regard they rather appear as productions of the medulla oblongata, whence the olfactory nerves ariſe, than as diſtinct nerves; againſt which their manifeſt cavities, and their communication with the ventricles, argue.

PAPILIONACEOUS, in *Botany*. See FLOWERS.

PAPILLOSE, among *Botaniſts*. See LEAF.

PAPIO, in *Zoology*, the name of thoſe ſpecies of monkies which we call *baboons*. The word ſeems not yet properly determined as to the ſpecies which are to be comprehended under it; but what we uſually acknowledge for *papiones* or BABOONS, are ſuch as have ſhort tails, to diſtinguiſh them from the common MONKIES, which have very long ones. Theſe are all ſpecies of the SIMIA in the Linnæan ſyſtem. Of theſe Pennant deſcribes the *ribbed-noſe baboon*, or *ſimia maimon* of Linnæus, which inhabits Guinea; the *little baboon*, or *ſimia apedia* of Linnæus, inhabiting India, and the *pig-tail baboon*, or *ſimia nemeſtrina* of Linnæus, found in the Iſland of Sumatra and Japan. Synopſis of Quadrupeds, p. 103—106.

PAPIRIAN *Code*, a collection of imperial conſtitutions, &c. made by a private lawyer, whoſe name was *Papirius*. See CODE.

PAPISTS, in *Eccleaſtical Hiſtory*, are thoſe who acknowledge the POPE to be ſupreme head of the church, or who profeſs the popiſh religion. See POPERY.

The ſtate of the penal laws now in force againſt the *papiſts*, is compriſed from the following ſummary of them. Beſides the penalties to which they are liable as NONCONFORMISTS, for not frequenting their pariſh-church, they are obliged at the age of twenty-one, to regiſter their eſtates, under the penalty of forfeiture, and to inroll all future conveyances and wills relating to them; they are incapable of preſenting to any advowſon, or granting to any other perſon avoidance of the ſame, in prejudice of the two univerſities; they are liable alſo in ſome inſtances to pay double taxes; and if they willingly ſay or hear maſs, they forfeit the one two hundred, the other a hundred marks, and each ſhall ſuffer a year's impriſonment. Beſides, if any perſon ſends another abroad to be educated in the popiſh religion, or to reſide in any religious houſe abroad for that purpoſe, or contributes any thing to their maintenance when there; the ſender, the ſent, and the contributor, are diſabled to ſue in law or equity, to be executor or adminiſtrator to any perſon, or take any legacy or deed of gift, and to bear any office in the realm, and ſhall forfeit all their goods and chattels, and likewiſe all their real eſtate for life. If any perſon defends the pope's juriſdiction in this realm, it is, for the firſt time, a high miſdemeanor, and if the offence be repeated, high treaſon. If any natural born ſubject be withdrawn from his allegiance, and reconciled to the pope or ſee of Rome, or any other prince or ſtate, both he and all ſuch as procure ſuch reconciliation, ſhall incur the guilt of high treaſon; and if any popiſh parent ſhall refuſe to allow his proteſtant child a fitting maintenance, with a view to compel him to change his religion, the lord chancellor ſhall, by order of court, conſtrain him to do what is juſt and reaſonable. Farther, popiſh recuſants, convicted in a court of law of not attending the ſervice of the church of England, are ſubject to the following diſabilities, penalties, and forfeitures, over and above thoſe already mentioned. They can hold no office or employment; they muſt not keep arms in their houſes, but the ſame may be ſeized by the juſtices of the peace; they may not come within ten miles of London, on pain of 100*l.*; they can bring no action at law, or ſuit in equity; they are not permitted to travel above five miles from home unleſs by licence, upon pain of forfeiting all their goods; and they may not come to court, under pain of 100*l.* No marriage or burial of ſuch recuſant, or baptiſm of his child, ſhall be performed otherwiſe than by the miniſters of the church of England, under other ſevere penalties. A married woman, when recuſant, ſhall forfeit two thirds of her dower or jointure, may not be executrix or adminiſtratrix to her huſband, nor have any part of his goods, and during the coverture, may be kept in priſon, unleſs her huſband redeems her at the rate of 10*l.* a month, or the third part of all his lands. And as a feme-covert recuſant may be impriſoned, ſo all others muſt, within three months after conviction, either ſubmit, and renounce their errors, or, if required ſo to do by four juſtices, muſt abjure and renounce the realm; and if they do not depart, or return without the king's licence, they ſhall be guilty of felony, and ſuffer death as felons. There is alſo an inferior ſpecies of recuſancy (refuſing to make the DECLARATION againſt popery, when tendered by the proper magiſtrate) which if the party reſides within ten miles of London, makes him an abſolute recuſant convict; or if at a greater diſtance, ſuſpends him from having any ſeat in parliament, keeping arms in his houſe, or any horſe above the value of five pounds. Any popiſh prieſt born in the dominions of the crown of England, who ſhall come over hither from beyond ſea, or that ſhall be in England three days, without conforming and taking the oaths, is guilty of high treaſon; and all perſons harbouring him are guilty of felony, without the benefit of clergy. 1 Geo. ſtat. 2. cap. 55. 3 Geo. cap. 18. 10 Geo. cap. 4. 3 Jac. cap. 5. 1 Wil. cap. 26. 12 Ann. ſtat. 2. cap. 14. 11 Geo. II. cap. 17. Yearly land-tax acts. 23 Eliz. cap. 1. 27 Eliz. cap. 2. 1 Jac. cap. 4. 3 Jac. cap. 5. 3 Car. cap. 2. 25 Car. II. cap. 2. 11 & 12 W. cap. 4. 5 Eliz. cap. 1. 3 Jac. cap. 4. cap. 5. 1 W. cap. 1. cap. 15. 35 Eliz. cap. 2.

Moreover, the following farther proviſions were made againſt *papiſts*, by 10 & 11 W. cap. 4. viz.

1. If any perſon ſhall apprehend any popiſh biſhop, prieſt, or Jeſuit, and proſecute him till he be convicted of ſaying maſs, or exerciſing any other part of the office or function of a popiſh biſhop or prieſt, he ſhall receive 100*l.* reward.

2. If any popiſh biſhop, prieſt, or Jeſuit, ſhall ſay maſs, or exerciſe any other part of the office or function of a popiſh biſhop or prieſt (except in foreign miniſters houſes); or if any *papiſt*, or perſon making profeſſion of the popiſh religion, ſhall keep ſchool, or take upon himſelf the education or government, or boarding of youth, he ſhall be adjudged to perpetual impriſonment.

3. If any perſon educated in the popiſh religion, or profeſſing the ſame, ſhall not within ſix months after he ſhall be eighteen years of age, take the oaths of allegiance and ſupremacy, and ſubſcribe the declaration of the 30 Car. II. in the chancery, king's bench, or quarter ſeſſions, he ſhall (in reſpect of himſelf, but not of his heirs) be incapable to inherit or take any lands, by deſcent, deviſe, or limitation; but the next of kin, being a proteſtant, ſhall have the ſame.

4. And every *papiſt*, or perſon making profeſſion of the popiſh religion, ſhall be diſabled to purchaſe any lands, or profits out of the ſame, in his own name, or in the name of any other to his uſe, or in truſt for him; but the ſame ſhall be void. But by the 18 Geo. III. cap. 66. all theſe clauſes are repealed; provided that nothing in this ſame act of 18 Geo. III. ſhall extend to any perſon but ſuch who ſhall within ſix calender months after paſſing of the act, or of accruing of his title, being of the age of twenty-one years, or being of unſound mind, or in priſon, or beyond the ſeas, then within ſix months after ſuch diſability removed, take and ſubſcribe an oath in the words following.

“ I A. B. do ſincerely promiſe and ſwear, that I will
“ be faithful and bear true allegiance to his majeſty king
“ George the Third, and will him defend to the ut-
“ moſt of my power, againſt all conſpiracies and at-
“ tempt whatever that ſhall be made againſt his perſon,
“ crown, or dignity. And I will do my utmoſt endea-
“ vour to diſcloſe and make known to his majeſty, his
“ heirs and ſucceſſors, all treaſons and traiterous con-
“ ſpiracies which may be formed againſt him or them.
“ And I do faithfully promiſe to maintain, ſupport, and
“ defend to the utmoſt of my power, the ſucceſſion of
“ the crown in his majeſty's family, againſt any perſon
“ or perſons whatſoever; hereby utterly renouncing and
“ abjuring any obedience or allegiance unto the perſon
“ taking upon himſelf the ſtyle and title of prince of
“ Wales in the life-time of his father, and who, ſince
“ his death, is ſaid to have aſſumed the ſtyle and title of
“ king of Great Britain, by the name of Charles the
“ Third, and to any other perſon claiming or pretend-
“ ing a right to the crown of theſe realms. And I do
“ ſwear, that I do reject and deteſt, as an unchriſtian
“ and impious poſition, that it is lawful to murder or
“ deſtroy any perſon or perſons whatſoever, for or un-
“ der pretence of their being heretics; and alſo that un-
“ chriſtian and impious principle, that no faith is to be
“ kept with heretics. I further declare, that it is no ar-
“ ticle of my faith, and that I do renounce, reject, and
“ abjure, the opinion, that princes excommunicated by
“ the pope aud council, or by any authority of the ſee of
“ Rome, or by any authority whatſoever, may be de-
“ poſed or murdered by their ſubjects, or any perſon
“ whatſoever. And I do declare, that I do not believe
“ that the pope of Rome, or any other foreign prince,
“ prelate, ſtate, or potentate, hath or ought to have,
“ any temporal or civil juriſdiction, power, ſuperiority
“ or pre-eminence, directly or indirectly, within this
“ realm. And I do ſolemnly, in the preſence of God,
“ profeſs, teſtify, and declare, that I do make this de-
“ claration,

“ claration, and every part thereof, in the plain and or-
“ dinary ſenſe of the words of this oath; without any
“ evaſion, equivocation, or mental reſervation whatever,
“ and without any diſpenſation already granted by the
“ pope, or any authority of the ſee of Rome, or any per-
“ ſon whatever; and without thinking that I am or can
“ be acquitted before God or man, or abſolved of this
“ declaration, or any part thereof, although the pope, or
“ any other perſons or authority whatſoever, ſhall diſ-
“ penſe with or annul the ſame, or declare that it was
“ null or void.”

Which oath ſhall be competent to the courts at Weſtminſter, or any general or quarter ſeſſions to adminiſter; of which a regiſter ſhall be kept in like manner as for the oaths required from perſons qualifying for officers. And provided alſo, that nothing herein ſhall extend to any popiſh biſhop, prieſt, Jeſuit, or ſchoolmaſter, who ſhall not have taken and ſubſcribed the above oath, before he ſhall have been apprehended, or any proſecution commenced againſt him.

PAPPOSE *plants*, ſuch whoſe ſeed is covered with a pappus or down.

PAPULÆ, a name uſed by many authors for eruptions of various kinds upon the ſkin but appropriated by Bontius to thoſe reddiſh and rough eruptions thrown out upon the body by ſweat in the Eaſt Indies. Theſe are thrown out all over the ſurface of the body, and at their firſt appearance are accompanied with an intolerable itching and deſire of ſcratching.

Strangers are more expoſed to theſe eruptions, at their firſt arrival in theſe countries, than the natives, or thoſe who have long reſided there; as they are alſo to the biting of the muſquitoes, than which they are not leſs frequent: hence a new comer into the country is diſtinguiſhed by theſe troubleſome maladies. The natives call him *organ bearon*, that is, a new-arrived man; and tell him theſe complaints are a tax upon him for conſuming the proviſions. They call themſelves *organ lamme*, or *veterans*, and honour with the ſame name ſuch ſtrangers as have lived long in the country.

The *papulæ* are in themſelves no way dangerous; but when they are raſhly and ignorantly treated, or when the ſkin is torn off from them by the nails, they often are the occaſion of malignant and very troubleſome ulcers, that are not eaſily cured.

Bontius, whoſe long reſidence in this part of the world gave him many opportunities of obſerving theſe *papulæ* in all their ſtages, adviſes people, to prevent danger, and remove their troubleſome itching, to foment all the parts where they appear with a mixture of vinegar, water, and ſaltpetre; or, if this be required yet more acrid, to add to it juice of lemons, and uſe it as before. The effect of this application is at firſt an intenſe pain, but this ſoon decreaſes ſo far, as to become leſs troubleſome than the intolerable itching of the part. He gives great caution alſo againſt purging medicines, however mild; for by theſe the matter which cauſes the *papulæ* is often carried to the bowels, and produces dyſenteries. The cure is either to be wholly left to nature, or aſſiſted by ſudorifics. Bontius, de Med. Ind.

PAPPUS, in *Botany*, that ſoft light down, which grows out of the ſeeds of ſome plants, as thiſtles, dandelion, hawkweed, &c. and which buoys them up ſo in the air, that they may be blown any were about with the wind. This diſtinguiſhes a claſs of plants, which are hence denominated *papposæ*, or *pappiferæ*.

PAPYRUS, in *Botany*. See PAPER.

PAR, in *Commerce*, an equality between different monies; or ſo much as a perſon muſt give of one kind of ſpecie, to render it juſt equivalent to a certain quantity of another.

The *par* differs from the courſe of exchange, in this, that the *par* of exchange ſhews what other nations ſhould allow in exchange; which is certain and fixed, by the intrinſic values of the ſeveral ſpecies to be exchanged; but the courſe ſhews what they will allow in exchange; which is uncertain and contingent, ſometimes more, ſometimes leſs. See EXCHANGE.

PAR, in *Anatomy*. See PAIR.

PAR *vagum*, or *the eighth pair*, is a very notable conjugation of nerves, of the medulla oblongata; thus called from their wide and vague diſtribution throughout the ſeveral parts of the body. See their origin, courſe, diſtribution, &c. under NERVE.

PAR, a term of nobility. See PEER.

PARABLE, παραϐολη, formed from παραϐαλλειν, *to oppoſe*, or *compare*, a fable, or allegorical inſtruction, founded on ſomething real, or apparent, in nature, or hiſtory; from which a moral is drawn, by comparing it with ſome other thing, wherein the people are more immediately concerned. Or, it is that FIGURE of ſentences, which illuſtates a thing by comparing it with ſome other, to which it bears a reſemblance.

Such are thoſe *parables* of the ten virgins, of Dives and Lazarus, of the prodigal ſon, &c. in the New Teſtament.

Ariſtotle defines *parable*, a ſimilitude drawn from form to form. Cicero calls it a collation, others a ſimile. F. de Colonia calls it a rational fable.

The Hebrews call it משל, from a word which ſignifies either *to predominate*, or *to aſſimilate*: the Proverbs of Solomon are by them alſo called משלים *parables*, or *proverbs*.

Glaſſius defines *parable* a ſimile wherein a fictitious thing is related as real, and compared with ſome ſpiritual thing, or accommodated to ſignify it.

Some make *parable* differ from fable; Grotius and others uſe the two terms promiſcuouſly. Kircher derives the uſe of *parables* from the Egyptians.

In the New Teſtament, the word *parable* is uſed variouſly. In Luke iv. 23. for a proverb, or adage; in Matth. xv. 15 for a thing darkly and figuratively expreſſed; in Heb. ix. 9. &c. for a type; in Luke xiv. 7, &c. for a ſpecial inſtruction; in Matth. xxiv. 32. for a ſimilitude or compariſon.

Parables, or ſimilitudes, are of two ſorts, ſimple and compound. Thoſe are called ſimple, in which one thing only is likened or compared to another in this manner: as ſwallows appear in ſummer, but in winter retreat; ſo falſe friends ſhew themſelves in proſperiety, but fly all away, when adverſity approaches. Compound ſimilitudes are ſuch wherein one thing is likened or compared to ſeveral others, as thus: what light is to the world, phyſic to the ſick, water to the thirſty, and reſt to the weary; that is knowledge to the mind. The more exact the agreement is between the things thus compared, they give the greater beauty and grace to the figure. Ward's Orat. vol. ii. p. 76.

PARABOLA, in *Geometry*, a figure ariſing from the ſection of a cone, when cut by a plane parallel to one of its ſides. See CONIC *Section*.

From the ſame point of a cone, therefore, only one *parabola* can be drawn; all the other ſections within thoſe parallels being ellipſes; and all without them hyperbolas. Wolfius defines the *parabola* to be a curve wherein $ax=y^2$, that is the ſquare of the ſemi-ordinate is equal to the rectangle of the abſciſſe, and a given right line called the *parameter* of the axis, or *latus rectum*: whence its name from παραϐαλλειν, *to equal*.

Hence, a *parabola* is a curve of the firſt order; and as the abſciſſes increaſe, the ſemi-ordinates increaſe likewiſe; conſequently the curve never returns into itſelf.

Hence alſo the abſciſſe is a third proportional to the parameter and ſemi-ordinate; and the parameter is a third proportional to the abſciſſe and ſemi-ordinate; and the ſemi-ordinate is a mean proportional between the parameter and the abſciſſe.

PARABOLA, *to deſcribe a.* The parameter A B, *Tab. Conics*, *fig.* 8. being given; continue it to C, and from B let fall a perpendicular to N. From centres taken at pleaſure in A C, with the compaſſes open to A, deſcribe arches cutting the right line B V in I, II, III, IV, V, &c. And the right line B C in 1, 2, 3, 4, 5, &c. Then will B 1, B 2, B 3, B 4, B 5, &c. be abſciſſes; and B I, B II, B III, B IV, B V, &c. ſemi-ordinates. Wherefore, if the lines B 1, B 2, B 3, &c be transferred from the line B C to B N, and in the points 1, 2, 3, 4, &c. perpendiculars be raiſed 1 I = B I, 2 II = B II, 3 III = B III, &c. the curve paſſing through the points, I, II, III, &c. is a *parabola*; and B N its axis.

Every point of the *parabola* may alſo be determined geometrically; e. gr. if it be enquired, whether the point M be in the *parabola* or point? from M to B N let fall a perpendicular, make P N = A B the parameter, and on the diameter B N deſcribe a ſemicircle. For if that paſs through M, the point M is in the *parabola*: becauſe from the nature of the circle PM is a mean proportional between B P and P N; i. e. between the abſciſſe and parameter; and conſequently muſt be an ordinate in the *parabola*.

In a *parabola* the diſtance of the focus from the vertex is to the parameter in a ſubquadruple ratio: and the ſquare of the ſemi-ordinate is quadruple the rectangle of the diſtance of the focus from the vertex, into the abſciſſe. See FOCUS.

PARABOLA, *to deſcribe a, by a continual motion.* Aſſuming a right line for an axis, let *f* A, *fig.* 9. $= AF = \frac{1}{4}a$. In A fix a ruler D B cutting the axis *f* D at right angles. To the extremity of another ruler E C, faſten a thread fixed at its other extreme in the focus F, which is to be $= AD + AF$. If then a ſtyle or point be fixed to the ruler E C, and the ruler be carried firſt to the right, then to the left, according to the direction of the other D B; the ſtyle will mark out a *parabola*. For, F M will be

conſtanty

conſtantly $=EM=x+\frac{1}{4}a$; and conſequently the point M is in a *parabola.*

PARABOLA, *Properties of the.* The ſquares of the ſemi-ordinates are to each other as the abſciſſes; and the ſemi-ordinates themſelves in a ſubduplicate ratio of the abſciſſes. For a being the parameter, x and X the abſciſſes, y and Y the correſponding ordinates: we have, from the definition of the curve, $ax=y^2$, and $aX=Y^2$, therefore, $Y^2:y^2\ (::aX:ax)::X:x$, and $Y:y::X^{\frac{1}{2}}:x^{\frac{1}{2}}$.

The rectangle of the ſum of two ſemi-ordinates into their difference, is equal to the rectangle of the parameter into the difference of the abſciſſes: the parameter therefore is to the ſum of the two ſemi-ordinates, as their difference to the difference of the abſciſſes. For $\overline{Y+y}\times\overline{Y-y}$ $(=Y^2-y^2=aX-ax)=a\times\overline{X-x}$: and $a:\overline{Y+y}::\overline{Y-y}:X-x$.

In a *parabola,* the rectangle of the ſemi ordinate into the abſciſſe, is to the ſquare of the abſciſſe as the parameter to the ſemi-ordinate. For $ax=y^2$, and $ax^2=x\times y^2$; therefore $xy:x^2::a:y$.

In a *parabola,* the ſquare of a parameter is to the ſquare of one ſemi-ordinate, as the ſquare of another ſemi-ordinate is to the rectangle of the abſciſſes. For $ax=y^2$, and $aX=Y^2$; therefore $a^2xX=Y^2\times y^2$, and $a^2:Y^2::y^2:x\times X$.

In a *parabola,* the ſubtangent is double the abſciſſe, and the ſubnormal ſubduple of the parameter. See SUBTANGENT.

For the other properties of the *parabola,* ſee CONIC *ſection*

It appears that the common *parabola,* whoſe property is $ax=y^2$, is only part of an ellipſe, whoſe diameter is infinite. For, let the diameter of the ELLIPSE be r, and we ſhall have $y^2=ax-\frac{axx}{r}$; but r being infinitely great in proportion to a and x, the term $\frac{axx}{r}$ muſt be $=0$, and the equation of the curve be $ax=y^2$, or that of the *parabola.*

PARABOLA, *quadrature of the.* See QUADRATURE.

PARABOLA, *rectification of the.* See RECTIFICATION.

PARABOLA, *center of gravity of a.* See CENTER *of gravity.*

PARABOLA, *center of oſcillation of the.* See CENTER *of oſcillation.*

PARABOLAS *of the higher kinds,* are algebraic curves, defined by $a^{m-1}x=y^m$. E. gr. by $a^2x=y^3$, $a^3x=y^4$, $a^4x=y^5$, $a^5x=y^6$, &c. See CURVE.

Some call theſe *paraboloids:* more particularly, if $a^2x=y^3$; they call it a *cubical paraboloid.* If $a^3x=y^4$, &c. they call it a *biquadratical paraboloid,* or a *ſurſolidal paraboloid.* And in reſpect of theſe, the *parabola of the firſt kind,* above explained, they call the *Apollonian,* or *quadratic parabola.*

Thoſe curves are likewiſe to be referred to *parabolas,* wherein $ax^{m-1}=y^m$; as e. gr. $ax^2=y^3$, $ax^3=y^4$, which ſome call *ſemi-parabolas.* They are all comprehended under the common equation, $a^m\times x^n=y^r$, which alſo extends to other curves, v. gr. to thoſe wherein $a^2x^2=y^4$, $a^2x^3=y^5$, $a^3x^4=y^7$.

Since in *parabolas* of the higher kinds, $y^m=a^{m-1}x$; if any other ſemi-ordinate be called v, and the abſciſſe correſponding thereto z, we ſhall have $v^m=a^{m-1}z$, conſequently $y^m:v^m::a^{m-1}x:a^{m-1}z$, i. e. $::x:z$. It is a common property, therefore, of theſe *parabolas,* that the powers of the ordinates are in the ratio of the abſciſſes. But in *ſemi-parabolas,* $y^m:v^m::ax^{m-1}:az^{m-1}::x^{m-1}:z^{m-1}$. Or the powers of the ſemi-ordinates are as the powers of the abſciſſes, one degree lower. E. gr. In *cubical ſemi-parabolas* the powers of the ordinates y^3 and v^3 are as the ſquares of the abſciſſes x^2 and z^2.

PARABOLA, *helicoid.* See HELICOID.

PARABOLA, *oſculatory,* in *Geometry,* is uſed particularly for that *parabola* which not only oſculates or meaſures the curvature of any curve at a given point, but alſo meaſures the variation of the curvature at that point.

See Mac Laurin's Appendix to his Algebra, p. 17. Cramer, Analyſ. des Lignes Courbes, p. 559. See CURVATURE.

A curve, ſtrictly ſpeaking, may have an indefinite number of *oſculatory parabolas* at any of its points; but the appellation may be reſtrained to that particular *parabola* which meets the curve ſo cloſely, that no other parabolic arc can be drawn between them; and this *parabala* will meaſure the variation of curvature of the curve at that point. See VARIATION *of curvature.*

PARABOLA, *reſiſtance of a.* See RESISTANCE.

PARABOLAN, PARABOLANUS, among the *Ancients,* was a ſort of gladiator, called alſo the CONFECTOR.

The name was given them from the Greek, παραϐολος, of *βαλλω, to throw, precipitate;* becauſe they threw themſelves on danger and death.

PARABOLANI, or PARABOLARII, is alſo uſed in *Church-Hiſtory,* for a ſet of people, eſpecially in Alexandria, who devoted themſelves to the ſervices of churches and hoſpitals. The *parabolani* were not allowed to withdraw themſelves from their function, which was the attendance on the ſick. They made a kind of fraternity, amounting ſometimes to ſix hundred perſons, dependent on the biſhop. The deſign of their inſtitution was, that the diſeaſed, eſpecially thoſe infected with the plague, might not be without attendance.

PARABOLIC *aſymptote,* in *Geometry,* is uſed for a *parabolic* line approaching to a curve, ſo that they never meet; yet by producing both indefinitely, their diſtance from each other becomes leſs than any given line.

There may be as many different kinds of theſe *aſymptotes* as there are parabolas of different orders.

When a curve has a common parabola for its *aſymptote,* the ratio of the ſubtangent to the abſciſſe approaches continually to the ratio of two to one, when the axis of the parabola coincides with the baſe; but this ratio of the ſubtangent to the abſciſſe approaches to that of one to two, when the axis is perpendicular to the baſe. And by obſerving the limit to which the ratio of the ſubtangent and abſciſs approaches, *parabolic aſymptotes* of various kinds may be diſcovered. See Mac Laur. Flux. art. 337.

PARABOLIC *conoid,* a ſolid figure generated by the rotation of a parabola about its axis.

The circles conceived to be the elements of this figure, are in an arithmetical proportion, decreaſing towards the vertex.

A *parabolic conoid* is to a cylinder of the ſame baſe and height as 1 to 2; and to a cone of the ſame baſe and height, as $1\frac{1}{2}$ to 1.

PARABOLIC *cuneus,* a ſolid figure, formed by multiplying all the DB's, *Tab. Conics, fig.* 10. into the DS's: or, which amounts to the ſame, on the baſe APB erect a priſm, whoſe altitude is AS: this will be a *parabolical cuneus,* which of neceſſity will be equal to the *parabolical* pyramidoid; in as much as the component rectangles, in one are ſeverally equal to all the component ſquares, in the other.

PARABOLIC *pyramidoid,* a ſolid figure, generated by ſuppoſing all the ſquares of the ordinate applicates in the *parabola,* ſo placed, as that the axis ſhall paſs through all their centres at right angles; in which caſe the aggregate of the planes will form the *parabolic parymidoid.*

The ſolidity hereof is had by multiplying the baſe, by half the altitude; the reaſon whereof is obvious; for the component planes being a ſeries of arithmetical proportionals beginning from 0, their ſum will be equal to the extremes multiplied by half the number of terms, that is, in the preſent caſe, equal to the baſe multiplied by half the height.

PARABOLIC *ſpace,* the ſpace or area contained between any entire ordinate, as VV. *Tab. Conic. fig.* 8. and the curve VBV of the *parabola.*

The parabolic ſpace is to the rectangle of the ordinate into the abſciſſe, as 2 to 3: to a triangle inſcribed in the ordinate as a baſe whoſe altitude is the abſciſſe, the *parabola ſpace* is as 4 to 3.

Segment of a PARABOLIC *ſpace,* is that ſpace included between two ordinates.

Quadrature of a parabolical ſegment. See QUADRATURE.

PARABOLIC *ſpeculum or mirror.* See MIRROR.

PARABOLIC *ſpindle.* See PYRAMIDOID.

PARABOLIC *ſpiral,* in *Conics.* See HELICOID *parabola.*

PARABOLIFORM *curves* a name ſometimes given to the parabolas of a higher kind.

PARABOLOIDES, in *Geometry,* parabolas of the higher kinds. See PARABOLAS *of the higher kinds.*

PARABOLOID, *centre of gravity, of a.* See CENTER.

PARABOLOID, *quadratic. Cubical paraboloid, ſurſolidal paraboloid.* See PARABOLAS *of the higher kinds*

PARABRAMA, is a name given to the firſt of the gods of India.

PARABYSTE was one of the five principal civil tribunals of Athens.

PARACELCISTS. See FIRE-*Philoſophers.*

PARACENTESIS, Παρακεντησις, formed from, παρα, *with,* and κεντειν, *to prick,* an operation in ſurgery, commonly called TAPPING.

PARACENTESIS is alſo a name applied by ſome authors to all operations either with the lancet, the needle, or punch; not excepting the operation of couching for cataracts: this ſenſe is founded on the etymology of the word. Others reſtrain it to apertures made in the head, breaſt, belly, and ſcrotum; and others to the ſingle operation of tapping in the dropſies.

PARACENTRIC *motion,* in *Aſtronomy,* a term uſed for ſo much as a revolving planet approaches nearer to, or recedes farther from, the ſun, or centre of attraction.

Thus if a planet in A, *Tab. Aſtronomy fig.* 24. move to B, then $SB-SA=bB$, is the *paracentric motion* of that planet.

PARACENTRIC *ſolicitation of gravity* amounts to the ſame with the *vis centripeta*; and in *Aſtronomy*, is expreſſed by the line A L, *fig*. 24. drawn from the point A parallel to the ray S B (infinitely nearer S A) till it interſect the tangent B L.

PARACLET, a name which the church has given to the Holy Spirit; from the Greek Παρακλητος, q. d. *comforter*, or *advocate*.

PARACME, Παρακμη, a Greek word ſignifying *declenſion*, or a thing's being paſt its height.

PARACOPE, a word uſed by Hippocrates to expreſs a ſlight delirium in ſevers.

PARACRUSIS, a word uſed by Hippocrates, and by many other writers; and expreſſing the ſame as *paracope*, a ſlight delirium in a fever.

PARACYNANCHE, in *Medicine*. See ANGINA.

PARADE, the ſhew, or expoſure of any thing to view, in all its advantages and ornaments.

Bed of *parade*, is that wherein a perſon lies in ſtate.

PARADE, in *War*, a place where troops aſſemble, or draw together, in order to exerciſe or go on any ſervice.

PARADE is more properly the appearance of the officers and ſoldiery at a poſt aſſigned them, to put themſelves under arms, in the beſt order they can; either to mount, or break up the guard, or to form a battalion, or on ſome other occaſion.

PARADE, in *Fencing*, is the action of parrying or turning off any puſh or ſtroke.

There are as many kinds of *parades*, as of ſtrokes and attacks; as the *parade* inward, outward, above, below, feigned, &c.

PARADE is uſed in France for a ſpecies of farce, which was merely deſigned to amuſe, and to excite mirth.

PARADIGM, PARADIGMA, formed from παραδειγμα, *exeamplar*, of παρα, and δεικνυμι, *oſtendo*, q. d. *juxta oſtendo*, an example, or inſtance, of ſomething ſaid or done. See EXAMPLE.

Grammarians have appropriated the word *paradigm* to examples of declenſion and conjugations, which may ſerve as models for other words of the like kind.

PARADIGRAMMATICE, is uſed by ſome for the art of making all ſorts of figures in plaiſter. The artiſts in this are called *gypſochi*.

PARADISE, a term primarily uſed for the place wherein Adam was ſeated, during his innocence; and from which he was expelled for diſobeying God: this is called, in a ſtricter manner, the *Terreſtrial Paradiſe*.

The word is formed of παραδεισος, *orchard*, a place ſtored with apples, and all kinds of fruit. Moſes calls it the *Garden of Eden*, q. d. garden of delight from עֵדֶן, ἡδονη, *voluptas*, *pleaſure*.

The critics are in diſpute about the preciſe place of *Paradiſe*. Some, as Hardouin, &c. will have it in Judea, in the place where now is the lake Geneſareth; others, as Le Clerc, &c. in Syria, towards the ſprings of the Orontes, and Chryſorrhoe: but in neither of thoſe places do we diſcover any track of the rivers wherewith the *Paradiſe* in Moſes's deſcription was watered. Calmet and ſome other ingenious critics have placed the terreſtrial *Paradiſe* in Armenia, near mount Ararat, where Noah's ark was left; and imagine they there diſcover the ſources of the four rivers which watered the garden of Eden, viz. Euphrates; Hiddekel, now the Tigris; Gihon, now Araxes; and Piſon, now Phazzo. But ſir J. Chardin aſſures us in his travels, that the Phazzo ſprings out of the mountains of Caucaſus, northward of the kingdom of Imereti, and far enough from mount Ararat: beſide, that in Armenia we have no ſigns of the countries of Havilah and Ethiopia, which thoſe rivers waſhed after their departure from Eden.

There are various other opinions, as to this point: Poſtellus will have *Paradiſe* placed under the north pole; grounding his notion upon an ancient tradition of the Egyptians and Babylonians, that the ecliptic or ſun's way was at firſt at right angles to the equator; and ſo paſſed directly over the north-pole. Others are againſt limiting it to any one place, and contend, that it included the whole face of the earth, which was then, as it were, one continued ſcene of pleaſures, till altered upon Adam's tranſgreſſion.

However, both theſe opinions are equally incompatible with the account in the book of Geneſis; others, as Origen, Philo, &c. interpret the ſcripture relation of *Paradiſe* allegorically.

But the moſt common and probable opinion is that of Hopkinſon, Huet, Bochart, &c. who place *Paradiſe* between the confluence of the Euphrates and Tigris, and their ſeparation. Theſe rivers are two of thoſe wherewith the garden of Eden was watered: Piſon was a branch ariſing out of one of them after their ſeparation; and Gihon another branch ariſing from the other, on the ſide of Armenia, or the weſt: accordingly Ethiopia, one of the countries which theſe rivers waſhed, was inconteſtibly Arabia Deſerta; for Moſes calls his wife, who was of this country, an Ethiopian; and Havilah, the other country, muſt have been the Chuſiſtan in Perſia; where were anciently found, gold, bdellium, the onyx, &c. mentioned in Moſes's deſcription.

The great difficulty in this ſyſtem is, that Moſes ſpeaks expreſly of four rivers, each of which had its ſource in the garden of Eden; whereas this gives us only two rivers, which were ſeparated into ſour branches.

PARADISE is alſo uſed in the New Teſtament, and by Chriſtian writers, for the final habitation of the bleſſed, or HEAVEN.

PARADISE, *bird of*, *paradiſæ*, in *Ornithology*, a bird called *manucodiata* by others. In the Linnæan ſyſtem this makes a diſtinct genus of birds of the order of the *picæ*, the diſtinguiſhing characters of which are, that they have two ſingular and extremely long feathers, which are neither inſerted in the wings nor rump; and that the beak is covered with a kind of woolly feathers. Of theſe he enumerates three ſpecies, the *apoda*, or *manucodiata major* of others, found in the Molucca iſlands; the *regia* or *manucodiata minor* of Briſſon, inhabiting Amboyna; and the *triſtis*, which is met with in the Phillppine iſlands.

Of this bird many fabulous accounts have been propagated, as that it had no legs, that it took in no food, and lived only on the dews; that it was always on the wing, and had no other way of reſting than as it hung in the air; that it was never taken alive, and that the male had a cavity in his back, which ſerved for the female to lay her eggs, and hatch her young in; all which are wholly fabulous. The bird is a bird of prey, but of a peculiar kind, the uſe of whoſe long feathers is not well known. See *Tab*. IV. *of Birds*, Nº 43.

There are ſeveral ſpecies of this beautiful bird: Mr. Ray has reckoned eleven, and others have mentioned more, which were unknown to that author; but it is much to be queſtioned whether many of theſe were not rather the varieties of age and ſex in the ſame ſpecies. The diſtinguiſhing characters of theſe birds is their extremely long feathers which they carry behind. It is well known now that they feed on ſmall birds and build in the woods, perching upon trees like other birds, moſt of thoſe now brought into Europe being killed while ſitting. Linnæus gives the name of *paradiſea* to a ſpecies of the upupa or HOOPOE, called by others the Oriental criſtated manucodiata.

PARADISIACA, in *Botany*, a name given by ſome authors to the *arbor vitæ*, or *thuya*.

PARADISUS, among *Ancient Church Writers*, denoted a ſquare court, before cathedrals, ſurrounded with piazzas, or porticos for walking under, ſupported by pillars. Matthew Paris calls it *parviſus*.

PARADOX, Παραδοξον, formed from παρα, *againſt*, and δοξα, *opinion*, in *Philoſophy*, a propoſition ſeemingly abſurd, becauſe contrary to the received opinions; but yet true in effect.

The Copernican ſyſtem is a *paradox* to the common people; but the learned are all agreed as to its truth.

Geometricians have of late been accuſed of maintaining *paradoxes*; and it muſt be owned, that ſome uſe very myſterious terms in expreſſing themſelves about aſymptotes, the ſums of infinite progreſſions, the areas comprehended between curves and their aſymptotes, and the ſolids generated from theſe areas, the length of ſome ſpirals, &c. But all theſe *paradoxes* and myſteries amount to no more than this: that the line or number may be continually acquiring increments, and thoſe increments may decreaſe in ſuch a manner, that the whole line or number ſhall never amount to a given line or number.

The neceſſity of admitting this is obvious from the nature of the moſt common geometrical figures: thus, while the tangent of a circle increaſes, the area of the correſponding ſector increaſes, but never amounts to a quadrant. Neither is it difficult to conceive, that if a figure be concave towards a baſe, and have an aſymptote parallel to the baſe (as it happens when we take a parallel to the aſymptote of the logarithmic curve, or of the hyperbola, for a baſe), that the ordinate in this caſe always increaſes while the baſe is produced, but never amounts to the diſtance between the aſymptote and the baſe. In like manner, a curvilinear area may increaſe while the baſe is produced, and approach continually to a certain finite ſpace, but never amount to it; and a ſolid may increaſe in the ſame manner, and yet never amount to a given ſolid. See *Logarithmic* CURVE.

A ſpiral may in like manner approach to a point continually, and yet in any number of revolutions never arrive at it; and there are progreſſions of fractions which may be continued at pleaſure, and yet the ſum of the terms ſhall be always leſs than a given nnmber. See Mac Laurin's Fluxions, book i. ch. 10. ſeq. where various rules are demonſtrated, and illuſtrated by examples, for determining the aſymptotes and limits of figures and progreſſions without having recourſe to thoſe myſterious expreſſions which have of late years crept into the writings of mathematicians. For, as that excellent author obſerves elſewhere, though philoſophy has, and probably always will have, myſteries to us, geometry ought to have none.

PARADOXES, *hydroſtatical.* See FLUID.

PARADOXI, or PARADOXOLOGI, among the *Ancients*, were a kind of mimes or buffoons, who diverted the people with their drolling.

They were alſo called *ordinarii*, for this reaſon apparently, that, as they ſpoke without ſtudy or preparation, they were always ready.

They had another denomination, viz. *nianicologi*, q. d. tellers of children's tales: and beſide were called *aretalogi*, of αρετη, *virtue*, or talking much of their own rare talents and qualifications.

PARÆA, in *Zoology*, the name of a ſpecies of ſerpent, called alſo *angulus Æſculapii.* It is a perfectly innocent and harmleſs creature, and is ſo little dreaded by the inhabitants, that it is common about their houſes, and even ſometimes gets into their beds. Its mouth is full of very ſmall teeth, and when much provoked, it is ſometimes known to bite, though without any bad ſymptoms attending the wound; it is a very long kind, and is of a yellowiſh green colour on the ſides, and blackiſh on the back; it has two ſmall eminences on the neck, and between them two ſmall ſinews. It is very common in Spain, Italy, and moſt other of the warm countries.

PARÆNESIS, ϖαραινεσις, formed of ϖαρα, and αινηω, *I praiſe*, a Greek term, ſignifying adoration or exaltation.

PARAGAUDÆ, among the Romans, a ſort of wreaths, either wholly of gold, or of ſilk adorned with gold, which were interwoven in garments and not ſewed to them. The garment was ſometimes of one colour, in which was woven one *paragauda*; others were of two colours, and had two *paragaudæ*; and ſome had three colours, and three *paragaudæ.* They were worn both by men and women.

PARAGE, PARAGIUM, in *Law*, an equality of blood or dignity, but more eſpecially of land, in the partition of an inheritance between coheirs.

PARAGE, PARAGIUM, is more properly uſed, in ancient cuſtoms, for an equality of condition among nobles, or perſons holding nobly.

Thus, when a fief is divided among brothers; in this caſe, the younger hold their part of the elder by *parage*, i. e. without any homage or ſervice.

This ſtill obtains, in ſome meaſure, in Scotland, where the huſbands of the younger ſiſters are not obliged to any faith or homage to the huſband of the elder; nor their children to the ſecond degree.

This *parage* being an equality of duty or ſervice among brothers and ſiſters, ſome have called it *fratriage* and *parentage*.

The Cuſtomary of Normandy defines tenure by *parage* to be, when a noble fief being divided among daughters, the eldeſt does homage to the chief lord for all the reſt, and the youngeſt hold their parts of the reſt by *parage*, i. e. without any homage or fealty.

Parage ceaſes at the ſixth degree incluſively. It likewiſe ceaſes when any of the ſharers ſell their part.

PARAGOGE, ϖαραγωγη, in *Grammar*, a figure whereby a word is lengthened out by adding a ſyllable at the end thereof: as in *dicier* for *dici*.

PARAGOGE is alſo a word uſed by medical writers to expreſs a reduction of luxated bones.

PARAGOGIC, formed of παραγω, *I prolong*, compounded of παρα and αγω, in *Grammar*, denotes ſomething added to a word without adding any thing to the ſenſe thereof.

In the Hebrew, the ה is frequently *paragogic*; as in אברכה, for אברך, *I will praiſe*.

The uſe of *paragogic* letters is only to give a more full and agreeable ſound to words, either for the ſake of the verſe, or the ſmoothneſs of the period.

PARAGONE, in *Natural Hiſtory*, the name given by many to the BASSALTES, a black marble, uſed as a touch-ſtone.

PARAGORICS. See PAREGORICS.

PARAGOUE'. See PARAGUAY.

PARAGRAPH, Παραγραφος, a term in *Juriſprudence*, ſignifying a ſection or diviſion of the text of a law: otherwiſe called an *article*.

Such a law is ſaid to be divided into ſo many *paragraphs* The character of a *paragraph* in quotation, is ¶.

Among the Greek poets, *paragraphs*, παραγραφοι, were a ſpecies of critical notes, ſerving to mark the couplets, ſtrophes, and other diviſions of odes, and other poetical compoſitions. This *paragraph*, as deſcribed by the ſcholiaſt of Ariſtophanes, was a ſhort line, with a dot at the extremity of it.

PARAGUA, in *Ornithology*, the name of a Braſilian parrot, of the ſize of our common green parrot; but its back is all black, and its breaſt and the forepart of its belly are of a beautiful red; its eyes are black, with a red circle round them; its beak brown, or a very duſky grey, and legs and feet grey.

PARAGUAY, or PARAGOUE', in *Natural Hiſtory*, a celebrated plant of the ſhrub kind, growing in ſome provinces in South America, eſpecially in that of *Paraguay*, whence its name, though better known among us under the denomination of *South-ſea tea*: being a ſpecies of the *caſſine* or CASSIOBURY *buſh.* In the Linnæan ſyſtem it is a ſpecies of the *ilex.*

This plant, which does not riſe above a foot and a half high, has very ſlender branches, and leaves ſomewhat like thoſe of ſena; it may be looked on as a kind of occidental tea, which, like the oriental, is taken infuſed in hot water, to which it communicates a colour and ſmell nearly like thoſe of the beſt tea ſeen in Europe.

There are two kinds of *Paraguay*, the one called ſimply *paraguay*; the other CAAMINI; by the Spaniards, *yerva-camini*; which laſt is moſt eſteemed, and ſold for a third more than the other.

The firſt the Spaniards called the *yerva-con-palos*, i. e. *herb with little ſticks*, becauſe full of broken branches: this is chiefly uſed by domeſtics and ſlaves: the latter is the drink of the richeſt. But both are of ſo much uſe, and eſteemed of ſuch abſolute neceſſity, that no body in that part of America will live without them. The works of the mines of Potoſi would ſtand ſtill, but that the maſters take care to ſupply the ſlaves that labour therein, with *paraguay*, which is their conſtant remedy againſt thoſe mineral ſteams, wherewith they would otherwiſe be ſuffocated. Nor will a ſervant engage himſelf with any maſter, but upon this among other conditions, that he have nothing but *paraguay* for drink.

The *paraguay* makes one of the moſt conſiderable articles of the South American commerce. At Peru, Chili, and Buenos Ayres, there are above two millions worth ſold per annum; which uſed to paſs almoſt altogether through the hands of the Jeſuits.

The preparation of the plant, and the making it into drink, is much the ſame with that of tea, except that they infuſe both the leaves and the wood, that they drink it immediately out of the veſſel it is made in, without letting it have time to infuſe, by reaſon of the black tincture it gives; and that, to prevent leaves and all from coming, they ſuck it through a ſilver or glaſs pipe, which goes round the company one after another. Frezier.

Beſide all the virtues which the eaſtern people aſcribe to their tea, as to be good in diſeaſes of the head, breaſt, and ſtomach againſt phlegm, and to reſtore ſleep; the Americans attribute to their's this likewiſe, of purifying all kinds of water, how foul and corrupt ſoever, by only infuſing it therein, either hot or cold. Thus, having always ſome of it with them, if they meet with none but the worſt waters in the vaſt deſarts to be croſſed in going from Buenos Ayres to Peru and Chili, they are not afraid to drink them, after ſteeping ſome of the plant a little while therein. It is alſo held ſovereign againſt the ſcurvy and putrid fevers.

PARALAMPSIS, a word uſed by medical writers to expreſs a cicatrix in the tranſparent part of the cornea of the eye.

PARALEPSIS, Παραλειψις, in *Rhetoric*, a pretence of omitting or paſſing over a thing, and yet expreſſing it by the way.

The deſign of this figure, according to Hermogenes, is to poſſeſs the minds of the audience with more than the words expreſs, and it is principally made uſe of on three occaſions: either when things are ſmall and yet neceſſary to be mentioned; or well known, and need not be enlarged on; or ungrateful, and therefore ſhould be introduced with caution, and not ſet in too ſtrong a light. When the imagination is warmed, and reaſons and arguments preſent themſelves in abundance, the orator would willingly lay them all down, in form; but for fear of wearying his audience, he only produces ſome of them *en paſſant*, and without dwelling on them: and this is called a *paralepſis*, by the Latins *præteritio*, by the Greeks *apoſiopeſis*.

For inſtance, I paſs over in ſilence the many injuries I have recived, &c. I won't inſiſt on this laſt outrage. See Ep. to Philemon, v. 19.

PARALIA, Παραλια, in *Antiquity*, a day kept in memory of an ancient hero, called Paralus.

PARALIA was alſo the name of one of the Athenian tribes.

PARALIPOMENA, Παραλειπομενα, a ſupplement of things omitted and forgot, in ſome preceding work, or treatiſe. The word is formed from the Greek ϖαραλειπω, *prætermitto*, *I paſs by.* Some authors uſe the word *ſubrelictum* inſtead of *paralipomenon*.

In the canon of Scripure, there are two books of *Paralipomena*,

lipomena, called in the Engliſh verſion, Chronicles; being a ſupplement to the four books of kings, the two firſt whereof are alſo called books of Samuel.

Quintus Calabar has a work, intitled, the Paralipomena of Homer.

PARALLACTIC *angle*, called alſo ſimply PARALLAX, is the angle made in the centre of a ſtar by two right lines, drawn, the one from the centre of the earth, T B (*Tab. Aſtron. fig.* 27.) the other from its ſurface, EB.

Or, which amounts to the ſame, the *parallactic* angle is the difference of the angles CEA, and BTA, under which the real and apparent diſtances from the zenith are ſeen.

The ſines of the *parallactic* angles ALT and AST, (*Tab. Aſtron. fig.* 30.) at the ſame or equal diſtances from the zenith S Z, are in a reciprocal ratio of the diſtances of the ſtars from the centre of the earth, TL and TS.

PARALLAX, Παραλλαξις, in *Aſtronomy*, an arch of the heavens intercepted between the true place of a ſtar, and its apparent place.

The true place of a ſtar is that point of the heavens B, (*Tab. Aſtron. fig.* 27.) wherein it would be ſeen by an eye placed in the centre of the earth as at T. The apparent place in that point of the heavens C, wherein the ſtar appears to an eye on the ſurface of the earth as at E. Now, as, in effect, we view the celeſtial bodies not from the centre, but from the ſurface of our earth, which is a ſemi-diameter diſtant from the centre; we ſee it by a viſual ray, which paſſing through the centre of the ſtar, and proceeding thence to the ſurface of the mundane ſphere, marks out another point C, which is its apparent place.

The difference of places, is what we call abſolutely the *parallax*, παραλλαξις, or the *parallax of altitude*; by Copernicus it is called the *commutation*; which, therefore, is an angle formed by two viſual rays, drawn the one from the centre, the other from the circumference of the earth, and traverſing the body of the ſtar; and is meaſured by an arch of a great circle intercepted between the two points of the true and apparent place, C and B.

PARRALLAX *of declination*, is an arch of a circle of DECLINATION SI *fig.* 28. whereby the *parallax* of altitude decreaſes or diminiſhes the declination of a ſtar.

PARALLAX *of right aſcenſion and deſcenſion* is an arch of the equator D*d*, *fig.* 28. whereby the *parallax* of altitude increaſes the aſcenſion, and diminiſhes the deſcenſion.

PARALLAX *of longitude*, is an arch of the ecliptic T*t*, *fig.* 29. whereby the *parallax* of altitude increaſes or diminiſhes the longitude.

PARALLAX *of latitude*, is an arch of a circle of latitude SI, whereby the *parallax* of altitude increaſes or diminiſhes the latitude.

PARALLAX, *menſtrual, of the ſun*, is an angle formed by two right lines, one drawn from the earth to the ſun, and another from the ſun to the moon, at either of their quadratures.

PARALLAX *of the annual orbit* of the earth, is the difference between the heliocentric and geocentric place of a planet, or the angle at any planet, ſubtended by the diſtance between the ſun and earth.

PARALLAX is alſo uſed for the angle made in the centre of the ſtar by two right lines, drawn, the one from the centre, the other from the ſurface of the earth.

This is alſo called PARALLACTIC *angle*. Hence the *parallax* diminiſhes the altitude of a ſtar, or increaſes its diſtance from the zenith; and has, therefore, a contrary effect to the REFRACTION.

The *parallax* of altitude CB, *fig.* 27. is, ſtrictly, the difference between the true diſtance from the zenith CA, and the apparent diſtance BA.

The *parallax* is greateſt in the horizon; in the zenith, or meridian, a ſtar has no *parallax* at all; the true and apparent places then coinciding.

The horizontal *parallax* is the ſame, whether the ſtar be in the true, or the apparent horizon.

The fixed ſtars have no ſenſible *parallax*, by reaſon of their immenſe diſtance, to which the ſemi-diameter of the earth is but a mere point.

Hence alſo, the nearer a ſtar is to the earth, the greater is its *parallax*, at an equal elevation above the horizon; and Saturn is ſo high, that it is difficult to obſerve in him any *parallax* at all.

The *parallax* increaſes the right and oblique aſcenſion, diminiſhes the deſcenſion; diminiſhes the northern declination and latitude in the eaſtern part, increaſes them in the weſtern; increaſes the ſouthern in the eaſtern and weſtern part; dimininiſhes the longitude in the weſtern part, increaſes it in the eaſtern. The *parallax*, therefore, has juſt oppoſite effects to the refraction.

Hence the *parallax* of the remoter ſtar S (*fig.* 30.) is leſs than the *parallax* of the nearer L, at the ſame diſtance from the zenith; as before obſerved.

The ſines of the *parallactic* angles M and S, of ſtars equally diſtant from the centre of the earth T, are as the ſines of the diſtances ſeen from the vertex ZM, and ZS. Hence, the diſtances from the vertex decreaſe, i. e. as the altitudes decreaſe, the *parallax* increaſes; and hence, alſo, the *parallax* affects the altitude of the ſtar, from the horizon to the zenith.

The doctrine of *parallaxes* is of the utmoſt importance, in aſtronomy, for determining the diſtances of planets, comets, and other phenomena of the heavens; for the calculation of eclipſes, and for finding the longitude. Methods of finding the *parallaxes* of the celeſtial phenomena are various: ſome of the principal and eaſier follow.

To obſerve the PARALLAX *of a celeſtial phenomenon.* Obſerve when the phenomenon is in the ſame vertical with a fixed ſtar which is near it, and menſure its apparent diſtance from the ſtar; obſerve, again, when the phenomenon and fixed ſtar are in equal altitudes from the horizon; and again meaſure their diſtance. The difference of thoſe diſtances will be, very nearly, the *parallax* ſought. The *parallax* of a phenomenon may be likewiſe found by obſerving its azimuth and altitude; and by marking the time between the obſervation, and its arrival at the meridian.

All required to find the *parallax* of the moon is, the *parallax* of right aſcenſion: to find the effect of the magnitude of the ſemi-diameter of the earth, with regard to the phenomena of its motion, it is ſufficient to know how far the meridian, to which the eye refers it, deviates from the true meridian. This is what M. Caſſini found and practiſed with regard to Mars; and what M. Maraldi has ſince practiſed, with regard to the moon. The whole myſtery here conſiſts in having the moon's true motion, which refers to the centre of the earth; and its apparent motion which refers to the place of obſervation: the difference of theſe, which is greateſt in the horizon, or horary circle of ſix o'clock, gives the horizontal *parallax* for that latitude; whence the general *parallax*, or that under the equator, is eaſily found: the *parallax* of any parallel being to that of the equator, as the ſemi-diameter of this parallel is to that of the equator. See the practice of this method exemplified in *finding* the PARALLAX *of Mars*.

PARALLAX, *to obſerve the moon's.* Obſerve the moon's meridian ALTITUDE, with the greateſt accuracy, and mark the moment of time: this time being equated (ſee EQUATION), compute her true longitude and latitude, and from theſe find her DECLINATION, and from her declination, and the elevation of the equator, find her true meridian altitude: if the obſerved altitude be not meridian, reduce it to the true altitude for the time of obſervation; take the refraction from the obſerved altitude, and ſubtract the remainder from the true altitude; and the remainder is the moon's *parallax*.

By this means Tycho, in 1583, Oct. d. 12 hor. 5. 19′. from the moon's meridian altitude obſerved, 13° 38′, found her *parallax* to be 54 minutes.

To obſerve the moon's PARALLAX *in an eclipſe.* In an eclipſe of the moon, obſerve when both horns are in the ſame vertical circle; in that moment take the altitudes of both horns; the difference of the two being halved, and added to the leaſt, or ſubtracted from the greateſt, gives nearly the viſible altitude of the moon's centre: but the true altitude is nearly equal to the altitude of the centre of the ſhadow at that time. Now we know the altitude of the centre of the ſhadow, becauſe we know the ſun's place in the ecliptic, and its depreſſion under the horizon, which is equal to the altitude of the oppoſite point of the ecliptic in which the centre of the ſhadow is: thus have we both the true and apparent altitude; the difference whereof is the *parallax*.

PARALLAX, *in order to find the moon's.* Let a graduated inſtrument, as DAE (the larger the better), *Tab.* III. *Aſtronomy fig.* 82. having a moveable index with ſight-holes, be fixed in ſuch a manner, that its plane ſurface may be parallel to the plane of the equator, and its edge AD in the meridian; ſo that when the moon is in the equinoctial, and on the meridian ADE, ſhe may be ſeen through the ſight-holes, when the edge of the moveable index cuts the beginning of the diviſions at o, on the graduated limb DE; and when ſhe is ſo ſeen, let the preciſe time be noted. Now, as the moon revolves about the earth from the meridian to the meridian again, in about 24 hours, 48 minutes, ſhe will go a fourth part round it in 6 hours, 12 minutes, as ſeen from C, or from the earth's centre or pole. But as ſeen from A, the obſerver's place on the earth's ſurface, the moon will ſeem to have gone a quarter round the earth when ſhe comes to the ſenſible horizon at O; for the index, through the ſights of which ſhe is then viewed, will be at *d*, 90° from D, where it was when ſhe was ſeen at E. Now, let the exact moment when the moon is ſeen at O, in or near the ſenſible horizon be carefully noted; that it may be known in what time ſhe has gone from E to O; which time ſubtracted from 6 hours 12 minutes, (the time of her going from E to L), leaves the time of her going from O to L, and affords an eaſy method for finding the angle O A L, or the moon's horizontal *parallax*, which is equal to the angle A L C, by the following analogy: as the time of the moon's deſcribing the arc E O is to 90°, ſo is 6 hours 12 minutes to the degrees of the arc D *d* E, which meaſures the angle E A L; from which ſubtract 90°, and there remains the angle O A L = A L C, under which the earth's ſemidiameter A C is ſeen from the moon.

Aſtronomers have propoſed the following method, though not yet practiſed, for more accurately determining the moon's *parallax*: let two obſervers be placed under the ſame meridian, one in the northern hemiſphere, and the other in the ſouthern, at ſuch a diſtance from each other, that the arc of the celeſtial meridian included between their two zeniths, may be at leaſt 80 or 90 degrees. Let each obſerver take the diſtance of the moon's centre from his zenith, by means of an exceeding good inſtrument, at the moment of her paſſing the meridian: add theſe two zenith diſtances of the moon together, and their exceſs above the diſtance between the two zeniths, will be the diſtance between the two apparent places of the moon. Then as the ſum of the natural ſines of the two zenith diſtances of the moon is to the radius, ſo is the diſtance between her two apparent places to her horizontal *parallax*. If the two places be not exactly under the ſame meridian, their difference of longitude muſt be accurately taken, that proper allowance may be made for the moon's declination, while ſhe is paſſing from the meridian of the one to the meridian of the other. Ferguſon's Aſtr. p. 307. quarto, 1773.

From the moon's PARALLAX A S T, *Tab. Aſtron. fig.* 30, *and altitude* S R, *to find her diſtance from the earth.* By her apparent altitude given, we have her apparent diſtance from the zenith, i. e. the angle Z A S; or, by her true altitude the angle A T S; wherefore, ſince at the ſame time, we have the *parallactic* angle S; and the ſemidiameter of the earth A T is reputed as 1; by plane trigonometry we ſhall have the moon's diſtance in ſemidiameters of the earth, thus: as the ſine of the angle S is to the oppoſite ſide given, ſo is the ſine of the other angle T, to the ſide AS: or ſo is the ſine of T A S ($= 180^\circ - T + S$) to the ſide T S, the diſtance from the centre.

Hence, according to Tycho's obſervation, the moon's diſtance at that time from the earth was ſixty-two ſemidiameters of the earth.

Hence, alſo, ſince, from the moon's theory, we have the ratio of her diſtances from the earth in the ſeveral degrees of her anomaly; thoſe diſtances being found by the rule of three in ſemidiameters of the earth, the *parallax* is thence determined to the ſeveral degrees of the true anomaly.

De la Hire makes the greateſt horizontal *parallax* 1° 1′ 25″, the ſmalleſt 54′ 5″. The moon's diſtance, therefore, when in her perigee, is, according to his calculation, $55\frac{97}{100}$, that is, almoſt 56 ſemidiameters; in her apogee $63\frac{57}{100}$, that is, $63\frac{1}{2}$ ſemidiameters of the earth.

M. le Monnier determined the mean *parallax* of the moon to be 57′ 12″. Others have made it 57′ 18″.

To obſerve the PARALLAX *of Mars.* 1. Suppoſe Mars in the meridian and equator, in H, *Tab. Aſtronomy, fig.* 31. and that the obſerver, under the equator in A, obſerves him culminating with ſome fixed ſtar. 2. If now the obſerver was in the centre of the earth, he would ſee Mars conſtantly in the ſame point of the heavens with the ſtar; and therefore, together with it, in the plane of the horizon, or of the ſixth horary; but ſince Mars here has ſome ſenſible *parallax*, and the fixed ſtar has none, Mars will be ſeen in the horizon, when in P, the plane of the ſenſible horizon; and the ſtar, when in R, the plane of the true horizon: obſerve, therefore, the time between the tranſits of Mars and of the ſtar through the plane of the ſixth hour. 3. Convert this time into minutes of the equator; by this means we ſhall have the arch P M, to which the angle P A M, and conſequently the angle A M D, is nearly equal; which is the horizontal *parallax* of Mars.

If the obſerver be not under the equator, but in a parallel I Q, that difference will be a leſs arch Q M: wherefore, ſince the little arches Q M and P M are as their ſines A D and I D; and ſince A D G is equal to the diſtance of the place from the equator, i. e. to the elevation of the pole; and therefore A D to I D, as the whole ſine to the co-ſine of the elevation of the pole; ſay, as the co-ſine of the elevation of the pole I D is to the whole ſine A D; ſo is the *parallax* obſerved in I, to the *parallax* to be obſerved under the equator.

Since Mars and the fixed ſtar cannot be commodiouſly obſerved in the horizon; let them be obſerved in the circle of the third hour: and ſince the *parallax* there obſerved, T O, is to the horizontal one P M, as I S to I D; ſay, as the ſine of the angle I D S, or 45° (ſince the plane D O is in the middle between the meridian D H and the true horizon D M), is to the whole ſine; ſo is the *parallax* T O to the horizontal *parallax* P M.

If Mars be likewiſe out of the plane of the equator, the *parallax* found will be an arch of a parallel; which muſt, therefore, be reduced, as above, to an arch of the equator.

Laſtly, If Mars be not ſtationary, but rather direct, or retrogade, by obſervations for ſeveral days; find out what his motion is every hour, that his true place from the centre may be aſſigned for any given time.

By this method Caſſini, to whom we owe this noble invention, obſerved the greateſt horizontal *parallax* of Mars to be twenty-five ſeconds, or a little leſs: but, by the ſame method, Mr. Flamſteed found it near thirty ſeconds. By the ſame method, the ſame author, Caſſini, obſerved alſo the *parallax* of Venus.

It muſt be here noted, that the obſervation is to be made with a teleſcope, in whoſe focus are ſtrained four threads, cutting each other at right angles, A, B, C, D, *fig.* 45. Nº 2. and the teleſcope is to be turned about, till ſome ſtar near Mars be ſeen to paſs over ſome of the threads, that the threads A B and C D may be parallel to the equator, and therefore A C and B D may repreſent circles of declination: thus, by means of the perpendicular threads, the ſituations of the ſtar, and of Mars, in the meridian, and circle of three o'clock, will be determined.

PARALLAX, *to find the ſun's.* The great diſtance of the ſun renders its *parallax* too ſmall to fall under even the niceſt immediate obſervation; indeed, many attempts have been made, both by the ancients and moderns, and many methods invented for that purpoſe. The firſt was that of Hipparchus, followed by Ptolemy, &c. this was founded on the obſervation of lunar eclipſes: the ſecond was that of Ariſtarchus, whereby the angle ſubtended by the ſemidiameter of the moon's orbit, ſeen from the ſun, was ſought from the lunar phaſes: but theſe both proving deficient, aſtronomers are now forced to have recourſe to the *parallaxes* of the planets nearer us, as Mars and Venus; for from their *parallexes* known, that of the ſun, which is inacceſſible by any direct obſervation, is eaſily deduced. For from the theory of the motions of the earth and planets, we know, at any time, the proportion of the diſtances of the ſun and planets from us; and the horizontal *parallaxes* are in a reciprocal proportion to thoſe diſtances: knowing, therefore, the *parallax* of a planet, that of the ſun may be found from it.

Thus Mars, when oppoſite to the ſun, is twice as near as the ſun is: his *parallax*, therefore, will be twice as great as that of the ſun; and Venus, when in her inferior conjunction with the ſun, is ſometimes nearer us than he is; her *parallax*, therefore, is greater in the ſame proportion. Thus, from the *parallaxes* of Mars and Venus, the ſame Caſſini found the ſun's *parallax* to be ten ſeconds; which implies his diſtance to be 22000 ſemidiameters of the earth.

The moſt accurate method of determining the *parallaxes* of theſe planets, and deducing from thence the true *parallax* of the ſun is, that of obſerving their tranſit: however Mercury, though frequently to be ſeen on the ſun, is not fit for this purpoſe; becauſe it is ſo near the ſun, that the difference of their *parallaxes* is always leſs than the ſolar *parallax* required. But the *parallax* of Venus, being almoſt four times as great as the ſolar *parallax*, will cauſe very ſenſible differences between the times in which ſhe will ſeem to be paſſing over the ſun at different parts of the earth. With a view of engaging the attention of aſtronomers to this method of determining the ſun's *parallax*, Dr. Halley communicated to the Royal Society, in 1691, a paper, containing an account of the ſeveral years in which ſuch a tranſit may happen, computed from the tables which were then in uſe: thoſe at the aſcending node occur in the month of November, O. S. in the years 918, 1161, 1396, 1631, 1639, 1874, 2109, 2117: and at the deſcending node in May, O. S. in the years 1048, 1283, 1291, 1518, 1526, 1761, 1769, 1996, 2004. Phil. Tranſ. Abr. vol. i. p. 435, &c.

Dr. Halley even then concluded, that if the interval in time between the two interior contacts of Venus with the ſun could be meaſured to the exactneſs of a ſecond, in two places properly ſituated, the ſun's *parallax* might be determined within its 500dth part. But this concluſion was explained more fully in a ſubſequent paper, (Phil. Tranſ. Nº 348. or Abr. vol. iv. p. 213.) concerning the tranſit of Venus in the year 1761. It does not appear that any of the preceding tranſits had been obſerved; except that of 1639, by our illuſtrious countryman

man Mr. Horrox, and his friend Mr. Crabtree, of Mancheſter. But Mr. Horrox died on the 3d of January, 1640-1, about the age of twenty-five, juſt after he had finiſhed his treatiſe, intitled Venus in Sole viſa, in which he diſcover a more accurate knowledge of the dimenſions of the ſolar ſyſtem than his learned commentator Hevelius.

In order to give our readers, not much converſant with ſubjects of this kind, a general idea of this method of determining the horizontal *parallax* of Venus, and from thence, by analogy, the *parallax* and diſtance of the ſun, and of all the planets from him; it may be briefly illuſtrated in the following manner: let D B A, *Tab.* III. *Aſtronomy*, *fig.* 83. be the earth, V Venus, and T S R the eaſtern limb of the ſun. To an obſerver at B the point *t* of that limb will be on the meridian, its place referred to the heaven will be at E, and Venus will appear juſt within it at S. But, at the ſame inſtant, to an obſerver at A, Venus is eaſt of the ſun, in the right line AVF; the point *t* of the ſun's limb appears at *e* in the heaven, and if Venus were then viſible, ſhe would appear at F. The angle C V A is the horizontal *parallax* of Venus; and is equal to the oppoſite angle F V E, meaſured by the arc FE. A S C is the ſun's horizontal *parallax*, equal to the oppoſite angle *e* S E, meaſured by the arc *e* E; and F A *e* or V A *v*, is Venus's horizontal *parallax* from the ſun, which may be found by obſerving how much later in abſolute time her total ingreſs on the ſun is, as ſeen from A, than as ſeen from B, which is the time ſhe takes to move from V to *v*, in her orbit O V *v*. If Venus were nearer the earth as at U, her horizontal *parallax* from the ſun would be the arch *f e*, which meaſures the angle *f* A *e*; and this angle is greater than the angle F A *e*, by the difference of their meaſures *f* F. So that as the diſtance of the celeſtial object from the earth is leſs, its *parallax* is the greater. Now it has been already obſerved, that the horizontal *parallaxes* of the planets are inverſely as their diſtances from the earth's centre, therefore as the ſun's diſtance at the time of the tranſit is to Venus's diſtance, ſo is her horizontal *parallax* to that of the ſun: and as the ſun's mean diſtance from the earth's centre is to his diſtance on the day of the tranſit, ſo is his horizontal *parallax* on that day, to his horizontal *parallax* at the time of his mean diſtance from the earth's centre. Hence his true diſtance in ſemidiameters of the earth may be obtained by the following analogy: as the ſine of the ſun's *parallax* is to radius, ſo is unity or the earth's ſemidiameter to the number of ſemidiameters of the earth in the ſun's diſtance from the centre; which number multiplied by 3985, the number of miles in the earth's ſemidiameter, will give the number of miles in the ſun's diſtance. Then from the proportional diſtances of the planets, determined by the theory of gravity (ſee DISTANCE), we may find their true diſtances. And from their apparent diameters at theſe known diſtances, their real diameters and bulks may be found. See PLANETS.

Mr. Short with great labour deduced the quantity of the ſun's *parallax* from the beſt obſervations that were made of the tranſit of June 6th, 1761, (for which ſee Phil. Tranſ. vol. li. and lii.) both in Britain and abroad, and found it to have been 8″.52 on the day of the tranſit, when the ſun was very nearly at his greateſt diſtance from the earth; and conſequently 8″.65 when the ſun is at his mean diſtance from the earth. See Phil. Tranſ. vol. lii. art. 100. p. 611, &c. Whence we ſhall have radius or 10.0000000−5.621914 or ſine of 8″.65 taken out of Gardiner's tables = 4.3780860 the logarithm of the number 23882.84 or the number of ſemidiameters of the earth contained in its diſtance from the ſun: and multiplying 23882.84 by 3985, the number of Engliſh miles contained in the earth's ſemidiameter, we ſhall have 95,173,127 miles for the earth's mean diſtance from the ſun. And from the analogies under the article DISTANCE, we ſhall find the mean diſtance of all the reſt of the planets from the ſun in miles to be as follows, viz. Mercury's diſtance, 36,841,468; Venus's diſtance, 68,891,486; Mars's diſtance, 145,014,148; Jupiter's diſtance, 494,990,976; and Saturn's diſtance, 907,956,130. In another paper, (Phil. Tranſ. vol. liii. p. 169.) Mr. Short ſtates the mean horizontal *parallax* of the ſun at 8″.69. Mr. Hornſby, from ſeveral obſervations of the tranſit of June 3d, 1769, (for which ſee Phil. Tranſ. vol. lix. &c.) deduces the ſun's *parallax* for that day equal to 8″.65, and the mean *parallax* 8″.78, whence he makes the mean diſtance of the earth from the ſun to be 93,726,900 Engliſh miles; Mercury's diſtance 36,281,700; Venus's diſtance, 67,795,500; Mars's diſtance 142,818,000; Jupiter's diſtance, 487,472,000; and Saturn's diſtance, 894,162,000 miles. Phil. Tranſ. vol. lxi. part ii. p. 579. Others, however, by taking the reſults of thoſe obſervations that were moſt to be depended on, have made the ſun's *parallax* at his mean diſtance from the earth to be 8″.6045; and others again make it 8″.54. According to the former of theſe, the ſun's mean diſtance from the earth, is 95,109,736 miles; and according to the latter, is 95,834,742 miles. Upon the whole, there ſeems reaſon to conclude, that it may be fairly reckoned at more than ninety-five millions of miles, and leſs than ninety-ſix. Ferguſon's Aſtr. p. 354. See PLANETS.

The PARALLAX *of the ſtars, with regard to the earth's natural orbit*; called their *annual parallax*. The ſtars have no *parallax*, with regard to the earth's ſemidiameter; yet with regard to the earth's annual orbit, it is juſtly expected, that ſome *parallax* be found.

The axis of the earth, in its natural motion, deſcribes a kind of cylinder, which being prolonged to the heaven of the fixed ſtars, there draws a circular circumference; each point whereof is the pole of the world for its reſpective day: ſo that the ſituation of the apparent pole, with regard to any of the fixed ſtars, changes very conſiderably in the courſe of a year.

Could this be found by obſervation, it would irrefragably evince the annual motion of the earth round the ſun, and remove that only objection which lies againſt it, urged by Ricciolus, from no ſuch *parallax* being obſerved.

Accordingly, Dr. Hook attempted to find it by obſerving the various diſtances of a fixed ſtar from the zenith, in different parts of the earth's orbit; and Mr. Flamſteed, from the acceſs and receſs of a fixed ſtar from the equator at different times of the year, and with imagined ſucceſs; the reſult of his obſervations being, that a fixed ſtar, near the pole, was found 40 or 45 ſeconds nearer it, at the winter ſolſtice, than at the ſummer one, for ſeven years ſucceſſively.

Mr. Caſſini the younger allows the obſervations of Flamſteed to agree with thoſe made at the Royal Obſervatory; but he denies the conſequences: he ſays, that the variations in the diſtance of the pole-ſtar are not ſuch as they ſhould be, ſuppoſing the motion of the earth. Fontenelle accounts for them from a ſuppoſition, that the ſtars, like the ſun, turn or revolve on their centres; and that ſome of them have their hemiſpheres equally luminous: whence, when the more ſhining hemiſphere is turned towards us, the ſtars appear bigger, conſequently nearer the neighbouring ſtars, than when the darker is towards us.

Dr. Bradley has accounted for this ſuppoſed *parallax* in another way; and conceives it to proceed from the progreſſive motion of the ſtar's light. See *Motion of the* EARTH and LIGHT.

PARALLAX is alſo uſed, in *Levelling*, for the angle contained between the line of true level, and that of apparent level.

PARALLAXIS, in the *Medical Writers*, expreſſes a natural change in the ſituation of the parts of a broken bone, as when the two fragments ſlip to the ſides of one another.

PARALLEL, in *Geometry*, is applied to lines, figures, and bodies, which are every-where equidiſtant from each other; or which, though infinitely produced, would never either approach nearer, or recede farther from, each other.

PARALLEL *right lines*, are thoſe which, though infinitely produced, would never meet.

Thus the line O P, *Tab.* III. *Geometry*, *fig.* 56. is *parallel* to Q R.

Parallel lines ſtand oppoſed to lines converging, and diverging.

Some define an inclining or converging line, that which will meet another at a finite diſtance; and a *parallel line*, that which will only meet it at an infinite diſtance.

A perpendicular is by ſome ſaid to be the ſhorteſt of all lines that can be drawn to another; and a *parallel* the longeſt.

Geometricians demonſtrate, that two lines, *parallel* to the ſame third line, are alſo *parallel* to one another; and that if two *parallels* O P and Q R, be cut by a tranſverſe line S T in A and B; 1. The alternate angles *x* and *y* are equal; 2. The external angle *u* is equal to the internal oppoſite one *y*; and, 3. That the two internal oppoſite ones *z* and *y* are alſo equal to two right ones.

It is ſhewn, on the principles of optics, that if the eye be placed between two *parallel* lines, they will appear to converge towards a point oppoſite to the eye, becauſe the apparent magnitudes of their perpendicular intervals are perpetually diminiſhed; for the ſame reaſon they appear to converge towards an imaginary line, drawn *parallel* to them from the eye: and if they run to ſuch a length, as that the diſtance between them be but as a point thereto, they will there appear to coincide.

This is the reaſon that the remoter parts of a walk or floor appear to aſcend gradually, and the ceiling to deſcend towards the horizontal line; and that the ſurface of the ſea ſeen from an eminence, appears to aſcend gradually in going from the ſhore; and that the upper parts of very high buildings ſeem to lean forward over the eye below.

Parallel lines are deſcribed by letting fall equal perpendiculars, and drawing lines through their extremes, by ſliding the compaſſes open to the deſired width along a line, &c.

Parallel *planes* are thoſe planes which have all the perpendiculars drawn betwixt them equal to each other.

Parallel *rays*, in *Optics*, are thoſe which keep at an equal diſtance in reſpect to each other, from the viſible object to the eye, which is ſuppoſed to be infinitely remote from the object.

Parallel *ruler*, called alſo *paralleliſm*, an inſtrument conſiſting of two wooden, braſs, or ſteel rulers, AB and CD, *Tab.* III. *Geom. fig.* 63. equally broad every-where, and ſo joined together by the croſs blades EF and GH, as to open to different intervals, and accede and recede, yet ſtill retain their *paralleliſm*. The uſe of this inſtrument is obvious; for one of the rulers being applied to RS, and the other withdrawn to a given point V; a right line AB, drawn by its edge through V, is a parallel to RS: and thus, having given only one line, and erected a perpendicular upon it, we may draw any number of *parallel* lines, or perpendiculars to them; by only obſerving to ſet off the exact diſtance of every line with the point of the compaſſes.

But the beſt *parallel* rulers are thoſe whoſe bars croſs each other, and turn on a joint at their interſection; one end of each bar moving on a centre, and the other ends ſliding in grooves as the rulers recede. See *fig.* 64.

Parallels, or *places of arms*, in a ſiege, are deep trenches fifteen or eighteen feet wide, joining the ſeveral attacks together; and ſerving to place the guard of the trenches in, to be at hand to ſupport the workmen when attacked. There are generally three in an attack; the firſt is about three hundred toiſes from the covert-way, the ſecond one hundred and ſixty, and the third near or on the glacis. They are ſaid to have been firſt invented or uſed by M. Vauban.

Thus, in *Tab.* VII. *Fortification*, *fig.* 38. let A, B be the baſtions to be attacked, whoſe capitals, as well as that of the ravelin C, being indefinitely produced towards the field, ſet off three hundred fathoms from the ſaliant angles *r*, *s* of the covert-way to the points *l*, *m*; and from the centre *o* of the place, deſcribe an arc of a circle through the points *l*, *m*, whoſe interſections with the capitals will terminate the ſeveral parts of the firſt *parallel* E, which is terminated at twenty fathoms beyond the faces produced of the two adjacent ravelins z, X, next to the front attacked. Take *l n*, *m q*, each equal to one hundred and forty fathoms, and deſcribe from the centre *o* another part of a circle through the points *n*, *q*; and its interſection with theſe capitals will terminate the ſeveral parts of the ſecond *parallel* F, which extends only ten fathoms beyond the faces of the ravelins z, X. Laſtly, draw lines through the ſaliant angles of the glacis, and they will give the third *parallel* G. When this is done, take the points *d*, *e*, in the capitals of the baſtions, at about eight hundred fathoms from the ſaliant angles *r*, *s* of the covert-way, and join them by a right line, which will expreſs the beginnings of the attacks. From the point *f* in *d e*, at about twenty-four or twenty-ſix fathoms from the point *e*, draw a line *f g* or H of any length, as one hundred and twenty or one hundred and twenty ſix fathoms, for the firſt approach, but ſo as when produced to fall ten or twelve fathoms from the fartheſt ſaliant angle of the covert-way: from the point *g* draw *g h*, ſo as to fall as much from the fartheſt ſaliant angle on the other ſide of the place: and the point *h* is taken ſo as to be nearly at the ſame diſtance from the capital *s e* as the point *g*: and from the point *h* drawn the line *h i*, ſo as to fall again as far from the fartheſt ſaliant angle in the firſt ſide, and that the point *i* be equally as diſtant from the capital *s e* as the point *h*; and thus continue the approaches to the third *parallel*. The approaches are traced after the ſame manner as the capital *d r*, and alſo on the capital of the ravelin C, from the ſecond *parallel* to the third: always obſerving that no part of them is to be ſeen or enfiladed from any part of the fortification, nor to defile too much, which would occaſion unneceſſary labour. As the approaches advance nearer the place, they become ſhorter, as they make ſmaller angles with each other. Between the ſecond and third *parallels*, at the returns of the approaches, are made places of arms, ſuch as I, about thirty or forty fathoms long, nearly **parallel** to the third *parallel*, which ſerve to receive the troops that are to cover the workmen till the third *parallel* is quite finiſhed. When the principal or outlines of the trenches are thus traced, *parallels* are drawn to them on the ſide towards the field, at twelve feet diſtance in the approaches, fifteen in the firſt and ſecond *parallels*, and at eighteen in the third; and the intervals between theſe and the former lines will expreſs the width of the trenches. At the ends of the ſecond *parallel* are made ſquare redoubts as K, K, of about ten or twelve fathoms on each ſide, to protect it more effectually from the ſallies of the beſieged. The firſt part *d e* of the trenches is an epaulement of about ten feet high to cover the horſe deſigned to guard the trenches. Muller's Attack and Def. of Fortified Places, p. 21, &c.

Parallels, or **Parallel** *circles*, in *Geography*, called alſo *parallels of latitude*, and *circles of latitude*, are leſſer circles of the ſphere, conceived to be drawn from weſt to eaſt through all the points of the meridian; commencing from the equator, to which they are *parallel*, and terminating with the poles.

They are called *parallels of latitude*, &c. becauſe all places lying under the ſame *parallel*, have the ſame LATITUDE.

Parallels *of latitude*, in *Aſtronomy*, are leſſer circles of the ſphere *parallel* to the ecliptic, imagined to paſs through every degree and minute of the colures.

They are repreſented on the globe by the diviſions of the quadrant of altitude, in its motion round the globe, when ſcrewed over the poles of the ecliptic.

Parallels *of altitude*, or *almucantars*, are circles *parallel* to the horizon, imagined to paſs through every degree and minute of the meridian between the horizon and zenith; having their poles in the zenith.

On the globe theſe are repreſented by the diviſions on the quadrant of altitude, in its motion about the body of the globe, when ſcrewed to the zenith.

Parallels *of declination*, in *Aſtronomy*, are the ſame with *parallels* of latitude in geography.

Parallels, *anti*. See ANTI-PARALLELS.

Parallel *ſphere*, that ſituation of the ſphere wherein the equator coincides with the horizon, and the poles with the zenith and nadir.

In this ſphere all the *parallels* of the equator become *parallels* of the horizon, conſequently no ſtars ever riſe or ſet, but all turn round in circles *parallel* to the horizon; and the ſun, when in the equinoctial, wheels round the horizon the whole day.

After his riſing to the elevated pole, he never ſets for ſix months; and after his entering again on the other ſide of the line, he never riſes for ſix months longer.

This poſition of the ſphere is their's who live under the poles, if any ſuch there be; their ſun being never above 23° 30′ high.

Parallel *ſailing*, in *Navigation*, is the ſailing under a *parallel* of latitude.

Of this there are but three caſes. 1. Given, the departure, and diſtance; required, the latitude. The canon for which is, as the difference of longitude is to the radius, ſo is the diſtance of the co-ſine to the latitude.

2. Given, the difference of longitude between two places under the ſame *parallel*; required, their diſtance. The canon is, as radius to difference of longitude, ſo is co-ſine of latitudes to diſtance.

3. Given, the diſtance between two places in the ſame latitude; required, their difference of longitude. The canon is, as the co-ſine of latitude to diſtance, ſo is radius to difference of longitude.

PARALLELA, a word uſed by medical writers to expreſs a ſort of ſcurf or leprous appearance, affecting only the palms of the hands. It is a ſymptom of the pox.

PARALLELEPIPED, in *Geometry*, one of the regular bodies, or ſolids, comprehended under ſix parallelograms, the oppoſite ones whereof are ſimilar, parallel, and equal: as in *Tab.* III. *Geometry*, *fig.* 65.

A *parallelepiped* is by ſome defined, a priſm, whoſe baſe is a parallelogram.

Parallelepiped, *properties of the*. All *parallelepipeds*, priſms, and cylinders, &c. whoſe baſes and heights are equal, are themſelves equal.

A diagonal plane divides the *parallelepiped* into two equal priſms: a triangular priſm, therefore, is half a *parallelepiped* upon the ſame baſe, and of the ſame altitude.

All *parallelepipeds*, priſms, cylinders, &c. are in a ratio compounded of their baſes and altitudes: wherefore, if their baſes be equal, they are in proportion to their altitudes; and converſly.

All *parallelepipeds*, cylinders, cones, &c. are in a triplicate ratio of the homologous ſides; and alſo of their altitudes.

Equal *parallelepipeds*, priſms, cones, cylinders, &c. are in the reciprocal ratio of their baſes and altitudes.

To meaſure the ſurface and ſolidity of a parallelepiped. Find the areas of the parallelograms ILMK, LMON, and OMKP (ſee PARALLELOGRAM); add theſe into one ſum, and multiply that ſum by 2: the product will be the ſurface of the *parallelepiped*.

If, then, the baſe ILMK be multiplied by the altitude MO, the product will be the ſolidity.

Suppoſe, v. gr. $LM=36$, $MK=15$, $MO=12$. Then

$LIKM = 36 \times 15 = 540$; $LMON = 36 \times 12 = 432$; $MOKP = 15 \times 12 = 180$. The ſum of which is $= 1152$, which multiplied by 2, gives the ſuperficies equal to 2304. And 540×12 gives the ſolidity equal to 6480.

The *parallelepiped* with oblique angles, is a figure very common to many kinds of ſtones, eſpecially of the ſofter ſort. The common cryſtallizations of grottos break naturally into fragments of this ſhape; and the ſtalactitæ which hang down from their roofs in form of iſicles, are originally ſmall hollow pipes formed by the water which continually trickles down drop by drop; and whoſe outer ſurfaces, fixing themſelves by their ſmall baſes, form by degrees a ſort of blunted pyramids, which like ſo many rays from the axis, which is the hollow pipe, grow hollow at laſt. This axis ſeems to be compoſed of plates, almoſt cylindrical, laid one over another; but, if broken, the whole divides into fragments of a *parallelepiped* figure: the blunted pyramids that are about the axis divide themſelves at firſt into other blunted pyramids; but afterwards almoſt all theſe fragments divide of themſelves into other fragments of a *parallelepiped* figure, this ſeeming every where the ultimate ſhape of the particles.

In the mountain of Berege there is found a vaſt quantity of aſbeſtos; the ſtone upon which this grows, though in itſelf of no determinate figure externally, always breaks into regular *parallepipeds*: nor is this peculiar to theſe ſtones found naturally concreted on the ſurface or within the bowels of the earth, but it is alſo found in ſuch as are concreted by means of art out of the water in which they are originally ſuſpended.

The water of the fountain de Salut, near Bagneres in Gaſcony, when evaporated to a certain degree, yields a ſcum on the ſurface, which alſo adheres to the ſides of the veſſel; and this ſcum, examined by the microſcope, is found to be compoſed of many regular *parellelepipeds*.

If the ſame waters, and thoſe of ſeveral other ſprings, be evaporated to a drineſs, there remains a white ſhining powder, out of which the microſcope can direct us to ſeveral the like regular figures. Phil. Tranſ. N° 472. p. 32.

PARALLELISM, the quality of a PARALLEL, or that which denominates it ſuch: or it is that whereby two things, v. gr. lines, rays, or the like, become equidiſtant from one another.

Thus, we ſay, remote objects are ſcarce perceptible, by reaſon of the *paralleliſm* of their rays.

PARALLELISM *of the earth's axis*, in *Aſtronomy*, or *motion of* PARALLELISM, is that invariable ſituation of the earth's axis, in its progreſs through its orbit, whereby it ſtill looks to the fame point of the heavens, viz. towards the pole-ſtar; ſo that if a line be drawn parallel to its axis, while in any one poſition; the axis, in all other poſitions or parts of the orbit, will always be parallel to the ſame line. This *paralleliſm* is the neceſſary reſult of the earth's double motion; the one round the fun, the other round its own axis. Nor is there any neceſſity to imagine a third motion, as ſome have done, to account for this *parallelіſm*.

It is to this *parallelіſm* that we owe the viciſſitudes of ſeaſons, and the inequality of day and night.

PARALLELISM *of rows of trees*. The eye placed at the end of an alley bounded by two rows of trees, planted in parallel lines, never ſees them parallel, but always inclining to each other, towards the farther extreme.

Hence mathematicians have taken occaſion to enquire, in what lines the trees muſt be diſpoſed, to correct this effect of the perſpective, and make the rows ſtill appear parallel? To this purpoſe parallel they muſt not be, but diverging; but according to what law muſt they diverge? The two rows, in fine, muſt be ſuch, as that the unequal intervals of any two oppoſite or correſponding trees may be ſeen under equal viſual angles.

On this principle, F. Fabry has aſſerted, without any demonſtration; and F. Tacquet, after him, has demonſtrated by a long and intricate ſyntheſis, that the two rows of trees muſt be two oppoſite ſemi-hyperbolas.

M. Varignon has ſince, in the Memoirs of the Royal Academy, ann. 1717, found the ſame ſolution by an eaſy and ſimple analyſis. But he renders the problem much more general, and requires not only that the viſual angles be equal, but to have them increaſe, or decreaſe, in any given ratio: provided the greateſt do not exceed a right angle. The eye he requires to be placed in any point, either juſt at the beginning of the ranges, or beyond, or on this ſide.

All this laid down, he ſuppoſes the firſt row to be a right line, and ſeeks what line the other muſt be, which he calls the *curve of the range*. This he finds muſt be an hyperbola, to have the viſual angles equal. The ſtrait and hyperbolical rows will be ſeen parallel to infinity; and if the oppoſite ſemi-hyperbola be added, we ſhall have three rows of trees (the ſtrait one in the middle), and all three parallel.

Nor is it required this ſecond hyperbola be the oppoſite of the firſt, i. e. of the ſame kind, or have the ſame tranſverſe axis: it is enough, if it have the ſame centre, its vertex in the ſame right line, and the ſame conjugate axis. Thus the two hyperbolas may be of all the different kinds poſſible; yet all have the ſame effect.

Again, the ſtrait row being laid down as before; if it be required to have the trees appear under decreaſing angles, Mr. Varignon ſhews, that if the decreaſe be a certain ratio, which he determines; the other line muſt be a parallel ſtrait line.

But he goes yet farther, and ſuppoſing the firſt row any curve whatever, he ſeeks for another that ſhall make the rows have any effect deſired, i. e. be ſeen under any angles equal, increaſing, or decreaſing.

Notwithſtanding the ingenuity of this ſpeculation, it has been ſatisfactorily demonſtrated by M. D'Alembert, and M. Bouguer, that in order to produce the effect propoſed, the trees are to be ranged merely in two diverging right lines. Encyclopedie.

PARALLELOGRAM, in *Geometry*, a quadrilateral right-lined figure, whoſe oppoſite ſides are parallel, and equal to each other.

A *parallelogram* is generated by the equable motion of a right line always parallel to itſelf.

When the *parallelogram* has all its four angles right, and only its oppoſite ſides equal, it is called a *rectangle*, or an *oblong*.

When the angles are all right, and the ſides are all equal, it is called a *ſquare*, which ſome make a ſpecies of *parallelogram*, others not.

If all the ſides are equal, and the angles unequal, it is called a *rhombus*, or *lozenge*,

If both the ſides and angles be unequal, it is called a *rhomboides*.

Every other quadrilateral whoſe oppoſite ſides are neither parallel nor equal, is called a *trapezium*.

PARALLELOGRAM, *properties of the*. In every *parallelogram*, what kind ſoever it be of, e. gr. ABCD, *Tab*. III. *Geometry*, *fig*. 66. a diagonal DA divides it into two equal parts; the angles diagonally oppoſite B, C, and A, D, are equal; the oppoſite angles of the ſame ſide, C, D, and A, B, &c. are, together, equal to two right angles; and each two ſides together are greater than the diagonal.

Two *parallelograms* ABCD, and ECDF, on the ſame, or on an equal baſe CD, and of the ſame height AC, or between the ſame parallels AF, CD, are equal. And hence two triangles CDA, and CDF, on the ſame baſe, and of the ſame height, are alſo equal.

Hence, alſo, every triangle CFD is half a *parallelogram* ACDB upon the ſame, or an equal baſe CD, and of the ſame altitude, or between the ſame parallels. Hence alſo a triangle is equal to a *parallelogram*, having the ſame baſe, and half the altitude, or half the baſe, and the ſame altitude.

Parallelograms, therefore, are in a given ratio, compounded of their baſes and altitudes. If then the altitudes be equal, they are as the baſes; and converſely.

In ſimilar *parallelograms* and triangles, the altitudes are proportional to the homologous ſides; and the baſes are cut proportionably thereby. Hence, ſimilar *parallelograms* and triangles are in a duplicate ratio of their homologous ſides, alſo of their altitudes, and the ſegments of their baſes: they are, therefore, as the ſquares of the ſides, altitudes, and homologous ſegments of the baſes.

In every *parallelogram*, the ſum of the ſquares of the two diagonals is equal to the ſum of the ſquares of the four ſides.

This propoſition, M. de Lagny takes to be one of the moſt important in all geometry; he even ranks it with the celebrated forty-ſeventh of Euclid, and with that of the ſimilitude of triangles; and adds, that the whole firſt book of Euclid is only a particular caſe hereof. For if the *parallelogram* be rectangular, it follows, that the two diagonals are equal; and of conſequence, the ſquare of a diagonal, or, which comes to the ſame thing, the ſquare of the hypothenuſe of a right angle, is equal to the ſquares of the ſides.

If the *parallelogram* be not rectangular, and of conſequence, the two diagonals be not equal, which is the moſt general caſe, the propoſition becomes of vaſt extent; it may ſerve, for inſtance, in the whole theory of compound motions, &c.

There are three ways of demonſtrating this propoſition; the firſt by trigonometry, which requires twenty-one operations; the ſecond geometrical and analytical, which requires fifteen. M. de Lagny gives a more conciſe one, in the Memoires de l'Acad. which only requires ſeven.

To find the area of the rectangled parallelogram. ABCD. Find the length of the ſides A B and A C; multiply AB into A C, the product will be the area of the *parallelogram.* Snppoſe, e. gr. A B to be 345; A C 123; the area will be 42435.

Hence, 1. rectangles are in a ratio compounded of their ſides A B and A C. 2. If, therefore, there be three lines continually proportional; the ſquare of the middle one it equal to the rectangle of the two extremes: and if there be four proportional lines, the rectangle under the two extremes is equal to that under the two middle terms.

Other *parallelograms,* not rectangular, have their areas found by reſolving them, by diagonals, into two triangles, and adding the areas of the ſeparate triangles into one ſum; or by multiplying their baſes into their altitudes.

PARALLELOGRAM, *complement of a.* See COMPLEMENT.

PARALLELOGRAM, *center of gravity of a.* See CENTER *of gravity* and CENTROBAYRC *method.*

PARALLELOGRAM, *Newtonian* or *Analytic,* in *Algebra,* an appellation uſed for an invention of ſir Iſiaac Newton, to find the firſt term of a infinite converging ſeries.

This is ſometimes called the method of the *parallelogram* and *ruler*; becauſe a ruler or right line is alſo uſed in it.

This *analytic parallelogram* is formed by dividing any *parallelogram* into equal ſquares or *parallelograms,* by lines drawn horizontally and perpendicularly through the equal diviſions of the ſides of the *parallelogram.* The cells, thus formed, are filled with the dimenſions of the ſpecies x and y, and their products.

The powers, $y^0=1$, y, y^2, y^3, y^4, &c. of y, for inſtance being placed in the loweſt horizontal range of cells, and the powers of x, or $x^0=1$, x, x^2, x^3, &c. in the vertical column to the left, or vice verſa; ſo that theſe powers and their products will ſtand as in *Tab.* II. *Analyſis, fig.* 58.

Thus, when any literal equation is propoſed, mark ſuch of the *parallelograms* or cells as correſpond to all its terms; and let a ruler be applied to two, or perhaps more of the *parallelograms* ſo marked, of which let one be the loweſt in the left hand column at A B, the other touching the ruler towards the right hand; and let all the reſt not touching the ruler lie above it. Then ſelect thoſe terms of the equation which are repreſented by the *parallelograms* that touch the ruler, and from them find the quantity to be put in the quotient.

This is ſir Iſaac Newton's famous rule, of the application of which he has left us ſome examples in his Method of Fluxions and infinite Series, p. 9 and 10, but without demonſtration; which has been ſince ſupplied by others. See Mr. Colſon's Comment on that treatiſe, p. 192, ſeq. Maclaurin's Algebra, p. 251, ſeq. and particularly Monſ. Cramer's Analyſ. des Lignes Courbes, chap. vii. p. 148, ſeq.

This learned author obſerves, that this invention, which is the true foundation of the method of ſeries, was but imperfectly underſtood, and not valued as it deſerved for a long time. He thinks it more convenient in practice to uſe the *analytic triangle* of the abbé de Gua, which takes in no more than the diagonal cells lying between A and C, and thoſe which lie between them and B.

PARALLELOGRAM, or **PARALLELISM,** alſo denotes a machine uſed for the ready and exact reduction or copying of deſigns, ſchemes, prints, &c. in any proportion; which is done hereby without any knowledge or habit of DESIGNING.

The *parallelogram* is alſo called *pentagraph.* See its deſcription and uſe under PENTAGRAPH.

PARALLELOGRAM *of the hyperbola,* in *Geometry,* is uſed for the *parallelogram* formed by the two aſymptotes of an hyberbola, and the parallels to them, drawn from any point of the curve. A *parallelogram* thus formed is of an invariable magnitude in the ſame hyperbola; and the rectangle of its ſides is equal to the power of the hyperbola. L'Hopital, Sect. Coniq. Art. 99—101. See POWER.

This *parallelogram* is the modulus of the logarithmic ſyſtem; and if we take it as unity, the hyperbolic ſectors and ſegments will correſpond to Napier's, or the natural logarithms. If the *parallelogram* be taken = 0.43429, &c. theſe ſectors and ſegments will repreſent Briggs's logarithms. See LOGARITHM.

Huygens has made uſe of this term, De Cauſ. Gravitat. in fin. See *Logarithmic* CURVE.

PARALLELOGRAM *protractor,* a mathematical inſtrument, conſiſting of a ſemicircle of braſs, with four rulers in form of a *parallelogram,* made to move to any angle: one of theſe rulers is an index, which ſhews on the ſemicircle the quantity of any inward or outward angle.

PARALLELOPIPEDIA, in *Natural Hiſtory,* the name of a genus of ſpars, thus called becauſe regularly of a *parallelopiped* form.

They are pellucid cryſtalline ſpars, externally of a determinate and regular figure, always found looſe, detached, and ſeparate from all other bodies, and in form an oblique *parallelopiped,* with ſix parallelogram ſides and eight ſolid angles, eaſily fiſſile, either in an horizontal or perpendicular direction, being compoſed of numbers of thin plates, and thoſe of very elegantly and regularly arranged bodies, each of the ſame form with the whole maſs, except that they are thinner in proportion to their horizontal planes; and naturally fall into theſe and no other figures, on being broken with a ſlight blow.

Of this genus there are four known ſpecies. 1. The hard pellucid and colourleſs one, called the iſland cryſtal of authors. See *Iſland* CRYSTAL. 2. A dull and whitiſh kind, found in France, Germany, and England, particularly in the Derbyſhire and Yorkſhire lead-mines, and about Scarborough. This has the ſame property with the former, of giving a double refraction; but it is ſo dull and opake, that it does not ſhew it ſo elegantly. 3. A ſoft, whitiſh, and very bright one, found principally in the lead-mines of Yorkſhire, and about the ſeaſhores of that county. And, 4. a dull, hard, and pale brown one: this is found in the lead-mines of the ſame county, and in ſome parts of Ireland. All theſe ſpecies have the ſame power of double refraction with the firſt, but are too opake to ſhew it ſo beautifully, and often have not tranſparence enough to make it at all diſtinguiſhable. Hill's Hiſt. Foſſ. p. 333.

PARALLELOPLEURON, a term uſed by ſome writers for an imperfect parallelogram, or a kind of trapezium, having unequal angles and ſides, but which obſerve a certain regularity and proportion.

PARALOGISM, ϖαραλογισμος, in *Logic,* a falſe reaſoning or a fault committed in demonſtration, when a conſequence is drawn from principles that are falſe, or, though true, are not proved; or when a propoſition is paſſed over, which ſhould have been proved by the way.

A *paralogiſm* differs from a *ſophiſm* in this, that the ſophiſm is committed out of deſign and ſubtlety; and *paralogiſm* out of miſtake, and for want of ſufficient light and application.

Yet Meſſieurs du Port Royal do not ſeem to make any difference between them.

PARALOPHIA, a word uſed by Keil, and ſome other anatomical writers, to expreſs the lower and lateral part of the neck.

PARALOURGES, ϖαραλουργες, among the ancients, a kind of garment, with a purple clavus on each ſide.—See CLAVUS.

PARALYSIS, in *Botany.* See PRIMROSE.

PARALYSIS, ϖαραλυσις, formed from ϖαραλυο, *I unbind,* this diſeaſe being ſuppoſed to unbind the nerves and muſcles, in *Medicine,* a diſeaſe popularly called PALSY.

The *paralyſis* only differs from the PARESIS, as the greater from the leſs.

Authors diſtinguiſh the *paralyſis* into a paraplegia or paraplexia, and a hemiplegia, and partial *paralyſis*

The firſt is the palſy of the whole body. See PARAPLEGIA.

The ſecond, of one ſide of the body. See HEMIPLEGIA.

The third of ſome particular member; which is the proper palſy. See PALSY.

PARALYTIC, a perſon afflicted with the paralyſis, or PALSY.

PARAMECIUM, in *Zoology,* a name given, by Dr. Hill, to a genus of animalcules of the gymnia kind, and of an irregular oblong figure. Of this genus authors deſcribe ſeveral ſpecies.

PARAMERIA, a word uſed by the ancients to expreſs the internal part of the thighs.

PARAMESE, ϖαραμεσην, in the *Ancient Muſic,* the ninth chord, or ſound in the diagramma, or ſcale of muſic.

The word is Greek, and ſignifies *juxta mediam, next to the middle*; its ſituation in the firſt ſtate of the ſcale, being next the meſe, or middle chord.

It was the note above the meſe, which anſwers to a-la-mi-re of Guido's ſcale. Hence, as the *parameſe* was the firſt of the diazeugmenon tetrachord, it will be equivalent to Guido's higheſt ♮ mi. See DIAGRAM.

PARAMESOS, a word uſed by ſome to expreſs the ring-finger, that next the little one.

PARAMETER, in *Geometry,* a conſtant right line in each of the three conic ſections; called alſo *latus rectum.*

In the parabola V B V, *Tab. Conics, fig.* 8. the rectangle of the *parameter* A B, and an abſciſſe, e. g. B 3, is equal to the ſquare of the correſpondent ſemi-ordinate 3 III. See PARABOLA.

In an ellipſis and hyperbola, the *parameter* is a third proportional to a conjugate, and tranſverſe axis. See Ellipsis and Hyperbola.

PARAMOUNT, in our *Law*, ſignifies the ſupreme lord of the fee.

There may be a tenant to a lord, who holdeth himſelf of another lord; in reſpect whereof, the former lord is called *lord* MESNE, and the latter *lord paramount*.

All honours, which have manors under them, have the lord *paramount*.

But even the term *lord paramount* is only comparative; for as one man may be great, compared to a leſs; and little, being compared with a greater; ſo none truly ſeems to be lord *paramount* but the king, who is patron *paramount* to all the benefices in England.

PARANETE, in the *Ancient Muſic*, was a name ſometimes uſed to ſignify the next note or chord to the nete, or laſt note of a TETRACHORD.

Hence it might be called the penultimate chord. It was otherwiſe, and more properly called LICHANOS, or index.

Paranete *diazeugmenon*, in the *Greek Muſic*, was the penultimate note of the *diazugmenon* tetrachord, and anſwers to Guido's de-la-ſol-re. See Diagram.

Paranete, *hyperbolæon* in the *Greek Muſic*, was the penultimate note of the *hyperbolæon* tetrachord, and anſwers to Guido's g-ſol-re-ut. See Diagram.

PARANOMASIA is a figure that occurs when two words, very near in ſound, but different in ſenſe, reſpect each other in the ſame ſentence; this uſually called a pun.

PARANYMPH, *paranymphus*, among the ancients, the perſon who waited on the bridegroom, and directed the nuptial ſolemnities; called alſo *pronubus* and *auſpex*, becauſe the ceremony began with taking auſpicia.

In ſtrictneſs the *paranymph*, ϖαρανυμφΘ, only officiated on the part of the bridegroom; on the part of the bride, it was a woman officiated, who was called *pronuba*.

The Jews had likewiſe a kind of *paranymphs*, which the Talmud and rabbins call שׁשבים *ſchuſchebim*, q. d. *companions of the ſpouſe*.

The fourth council of Carthage appoints, that when the married couple come to aſk the prieſt's bleſſing, they be preſented either by their fathers and mothers, or by their *paranymphs*.

PARAPET, *breaſtwork*, in *Fortification*, a defence or ſcreen, on the extreme of a rampart, or other work, ſerving to cover the ſoldiers, and the cannon from the enemy's fire. See *Tab. of Fortification*, *fig.* 15. Nº 2. *lit. xx.*

Borel gives us, from Joſ. Maria Subreſius, a curious collection of names, which the ancients and moderns have given to this kind of *parapet:* the Latins call them *ſubarræ*, and *baſtiæ*, whence the names baſtion and baſtile. They alſo call them *pagineumata*, *loricæ*, and *antemuralia*. The Spaniards call them *barbacanes*; the Italians, *parapetti*, becauſe of their defending the breaſt, *petto*; whence our *parapet*.

Parapets are raiſed on all works, where it is neceſſary to cover the men from the enemies fire; both within and without the place, and even in the approaches. See Fortification, *according to Mr. Vauban's method.*

The thickneſs of the *parapet* ſhould be about eighteen or twenty feet, in order to be cannon-proof, and it ſhould be about ſeven or eight feet high, when the enemy has no command above the battery; otherwiſe, it ſhould be raiſed high enough to cover the men, while they load the guns. Its length depends on the number of guns to be employed in the battery: for one gun, it is common to allow eight yards in length, and ſix yards more for every other gun. The *parapet* conſiſts of two parts, the wall contained in one piece from end to end and about two and a half or three feet high, and the MERLONS, which are detached pieces of the *parapet*, leaving openings, called EMBRASURES, through which the cannon deliver their ſhot.

The *parapet* of the wall is ſometimes of ſtone. The *parapet* of the trenches is either made of the earth dug up; or of gabions, faſcines, barrels, ſacks of earth, or the like.

Parapet is alſo a little wall, breaſt-high, raiſed on the brinks of bridges, quays, or high buildings; to ſerve as a ſtay, and prevent people's falling over.

PARAPH, a particular character, knot, or flouriſh, which people habituate themſelves to make always in the ſame manner at the end of their name, to prevent their ſignature from being counterfeited.

The *paraph* of the kings of France is a grate, which the ſecretaries always place before their own, in all letters, &c. Menage derives the word from *paragraphus*. See Paragraph.

PARAPHERNALIA, or Paraphernа, in the *Civil Law*, thoſe goods which a wife brought her huſband, beſides her dower, and which were ſtill to remain at her diſpoſal, excluſive of her huſband, unleſs there was ſome proviſion made to the contrary in the marriage-contract.

The word is formed from the Greek ϖαρα, *beyond*, or *over*, and φερνη, *dos*, *dower*. *In his rebus quas extra dotem mulier habet, & quas Greci* ϖαραφερνα *vocant*, *nullam, uxore prohibente, vir habeat communionem.* Cod. de Pactis.

The Grand Cuſtomary of Normandy gives a different ſenſe to the word; it calls *paraphernalia* the moveables, linen, and other female neceſſaries, which are adjudged to a wife, in prejudice to the creditors, when ſhe renounces the ſucceſſion of her huſband.

Some of our Engliſh lawyers give a ſtill different ſenſe to the word *paraphernalia*, defining it to be ſuch goods as a wife challengeth over and above her dower, or jointure after her huſband's death; as furniture for her chamber, wearing apparel, and jewels, which are not to be put in the inventory of her huſbad's goods.

PARAPHIMOSIS, παραφιμοσις, formed of ϖαρα, *much* and φιμοω, *I bind*, in *Medicine*, a diſorder of the penis, wherein the prepuce is ſhrunk, and withdrawn behind the glans, ſo as not to be capable of being brought to cover the ſame.

This happens ofteneſt in venereal diſorders, where the humours diſcharged frequently prove ſo ſharp, as to cauſe this retraction. There ſometimes ariſes a neceſſity, in this caſe, to ſnip or cut the prepuce open, otherwiſe the humours will be bent up under it, and do a great deal of miſchief.

The treatment of the PHIMOSIS and *paraphymoſis* is nearly the ſame with that of the virulent GONORRHOEA. In general, bleeding, purging, poultices, and emollient fomentations are ſufficient. If theſe fail of removing the ſtricture, and the parts indicate ſymptoms of a mortification, twenty or thirty grains of ipecacuanha, and one grain of emetic tartar, may be given for a vomit, and worked off with warm water, or thin gruel. If the inflammation ſtill increaſes, and mortification commences, the prepuce muſt be ſcarified with a lancet, and, if neceſſary, divided, in order to prevent a ſtrangulation, and ſet the confined glans at liberty. It will be alſo neceſſary to foment the parts frequently with cloths wrung out of a ſtrong decoction of chamomile-flowers and bark, and to give the patient a dram of the bark in powder, every two or three hours. Buchan.

PARAPHONIA, in *Muſic*, is that ſpecies of concord which reſults from different ſounds, as the fifth and fourth: and thus it differs from *homophonia*, which is produced by the ſame ſounds, as in the uniſon, and from *antiphonia*, or the replication of the ſame ſounds, as in the octave.

PARAPHORA, a word uſed by the ancients to expreſs a ſlight kind of delirium, or light-headedneſs in a fever: ſome have made it to ſignify a delirium in general.

PARAPHRASE, παραφρασις, an explanation of ſome TEXT in clearer and more ample terms, whereby we ſupply what the author might have ſaid or thought on the ſubject.

Colomeſius looks on Eraſmus's *Paraphraſe* on the New Teſtament as ſo extraordinary a work, that he makes no ſcruple to declare, he thinks the author to have been divinely inſpired when he penned it.

Paraphrase, *Chaldee*, is a phraſe frequent among the critics and divines, denoting an ancient verſion of the Bible, in Chaldee. There are three *Chaldee paraphraſes* on the Pentateuch: that of Onkelos, whom ſome take to be the ſame with Aquila, and whom others take to have been that Onkelos whom the Talmudiſts, in the Treatiſe *Gittin*, make a nephew of the emperor Titus. The ſecond is the *Paraphraſe* of *Jonathan*. The third is called the Targum of *Jeruſalem*.

The *Chaldee Paraphraſe* on the prophets is that of Jonatuan ſon of Uziel, whom ſome confound with Theodotio.

The author of the *Chaldee Paraphraſe* on the Hagiographers is unknown. Some attribute it to one Joſeph, ſurnamed the Squinter; others to rabbi Akiba. Others ſay, there is ſo much difference in the ſtyle, that no one perſon can have been the author of the whole.

The *Paraphraſe* of Onkelos is that which is moſt eſteemed by the modern Jews, and read in their ſynagogues.—See Walton Pref. Polyglott..

PARAPHRENESIS, or Paraphrenitis, παραφρενιτις, in *Medicine*, a ſecondary kind of PHRENZY, ſuppoſed by the ancients, to be owing not to any immediate diſorder of the brain, or meninges, but to an inflammation of the ventricle, and the liver, and eſpecially of the diaphragm, whereby the brain and meninges come to be affected by conſent of parts.

The ancients called it a *pſeudo-phreneſis*, *falſe phrenzy*, to diſtinguiſh it from the true one, which they made to conſiſt in an inflammation of the brain, and its meninges.

The moderns do not make any ſuch diſtinction in phrenſies: they determine that all come from the ſame cauſe; but that cauſe is neither an inflammation of the brain, nor of the diaphragma.

Signs of it. This is always attended with a moſt violent and painful cardialgia, or heart-burn; inſomuch, that the perſon cannot bear the leaſt touch of a finger on the region of the breaſt or ſtomach. It always brings on alſo a tumor of the præcordia, and often an alienation or roving of the mind, which is always ſenſible in the words and actions of the perſon, but is not ſo great as in the true *phrenitis*. The reſpiration is interupted by frequent ſighings; belchings are very frequent; as alſo the diſcharge of a black matter by vomit. The mouth is dry and parched, and the tongue very white and furred; and there is great thirſt. A convulſive laugh, or rather a kind of involuntary grin, is no uncommon ſymptom of this diſeaſe.

Cauſes of it. The moſt frequent cauſe of this is a ſudden tranſlation of the morbific matter in fevers to the diaphragm; a ſuppreſſion of natural hæmorrhages by the noſe, the hæmorrhoidal veſſels, or by the menſes; an omiſſion of habitual bleedings, and the drinking cold liquors when the blood is heated by exerciſe; and finally a tranſlation of the matter of a quinſey to this part.

Prognoſtics in it. This is a dangerous diſeaſe, but it has three ways of terminating, according to the diſpoſition of the patient's blood and humours. 1. Sometimes the matter which cauſed the obſtruction is eaſily diſcuſſed, and ſweats, happening on the critical days, carry off the diſtemper. 2. Sometimes the matter is reſolved, indeed, but not ſo happily; the reſolution takes longer time and the matter finally does not evacuate itſelf by ſweat, but is tranſlated to the ears, where it occaſions deafneſs, tumors, and other accidents; or to the joints, where it brings on either the gout or eryſipelatoſe diſorders. Or, 3. the matter comes to a ſuppuration; in which caſe the perſon dies either within ſeven days, or at the utmoſt within fourteen. The ſigns which preſage a gangrene, in this diſeaſe, are violent hiccoughs, coldneſs of the extremities, violent internal heat, and clammy ſweats.

Methods of cure. When, by a preceding error in the perſon's diet, the pecant matter remains in the primæ viæ, a gentle emetic is to be given, with the digeſtive medicines before it; and if the vomit does not operate, a few grains of emetic tartar are to be given afterwards. When the patient is of a plethoric habit, bleeding is extremely neceſſary; and ſometimes, where the ſymptoms require it, may be repeated to a third time. Twenty drops of a mixtura ſimplex may afterwards be given at a doſe, every four hours, in the morning; and, in the afternoon, powders of purified nitre, with vitriolated tartar and crab's eyes ſated with juice of lemons: beſides theſe, there may be externally applied, plaſters, with a large portion of camphor, to the breaſt and back; ſinapiſms, and other hot cataplaſms, to the ſoles of the feet; ſtimulating clyſters, and acrid ſuppoſitories, have alſo their uſe in this caſe; and the application of leeches to the hemorrhoidal veins, in people who have been ſubject to diſcharges from thence, are very often of ſingular ſervice. All the while there muſt be kept up a gentle tranſpiration, either by copious draughts of warm and weak liquors, or by light acidulating medicines. Junker.

In this diſeaſe the regimen and medicine are in all reſpects the ſame as in the PLEURISY. Emollient clyſters are peculiarly uſeful, as they relax the bowels, and by that means make a derivation from the part affected. Buchan.

PARAPHRENITIS, among *Modern Phyſicians*, is ſometimes uſed for an inflammation of the mediaſtinum, or pleura about the diaphragm, attended with a continual fever, and exquiſite pain in the parts affected on contracting the abdominal muſcles; as alſo a delirium, and a riſing of the hypochondria.

PARAPHROSYNE, a word uſed by ſome medical writers to expreſs a delirium, or an alienation of mind, in fevers, or from whatever cauſe.

PARAPLEGIA, or PARAPLEXIA, παραπληγια, or παραπληξια, from ϖαρα, *much*, and ϖλησσω, or ϖληττω, *I ſtrike*, in *Medicine*, a ſpecies of paralyſis, or PALSY, uſually ſucceeding an apoplexy.

The *paraplegia* is a general palſy, affecting the whole body the head alone excepted. Boerhaave defines it an immobility of all the muſcles below the head, that have nerves to the cerebrum and cerebellum.

Sometimes, all ſenſe, as well as motion, are deſtroyed hereby; ſometimes only the one of them is loſt.

Its original is uſually ſuppoſed to be ſome diſorder, or obſtruction, in the fourth ventricle of the brain, or in the beginning of the ſpinal marrow.

Etmuller diſtinguiſhes the *paraplegia* from the *paralyſis*. The paralyſis, according to him, is a relaxation or reſolution of the ligaments and members miniſtering to motion, not from any obſtruction of the nerves, but from a reſolution of the nervous parts. Whereas the *paraplegia* ariſes from ſome obſtruction of the nerves.

The latter uſually ſucceeds an apoplexy, epilepſy, convulſions, or vertigos; the former, the ſcorbutus, hypochondriacal diſeaſe, colic, &c.

PARAPLEXIA, in *Medicine*. See PARAPLEGIA.

PARAPOTAMIA, in the *Materia Medica of the Ancients*, a word uſed at firſt as an epithet of diſtinction for a kind of œnanthe, from which the œnanthine ointment of the Greeks was made; but afterwards uſed ſimply as the name of that plant. This kind of œnanthe was the moſt fragrant of all the kinds, and was therefore uſed for making the ointment preferably to the reſt.

Theophraſtus makes a very great difference in the œnanthe of different places, obſerving, that the Cyprian kind was fragrant, and fit for making this ſweet ointment; but that the Grecian had no ſmell at all: and thence it probably aroſe, that the Greeks uſed afterwards the flowers of the wild vine for this purpoſe, and called them by the ſame name.

Pliny's account of this ointment is by no means to be depended upon. The whole paſſage where he names it, and the others of the like kind, is taken from the account of Apollodorus, in Athenæus; but it is ſo careleſly tranſlated by Pliny, that the ruthor's ſenſe can ſcarce any where be made out.

PARAPROSDOCIA, ϖαραπροσδοκια, in *Rhetoric*, the ſame with PARADOX.

PARATHREMA, a word uſed by medical writers to expreſs a ſlight luxation.

PARARYTHMOS, an epithet uſed by the ancients to expreſs any kind of pluſe, which did not ſeem ſuitable to the age and ſtate of the perſon.

PARASANG, ϖαρασαγγης, an ancient Perſian meaſure different at different times, and in different places; being uſually thirty, ſometimes forty, and ſometimes ſixty ſtadia, or furlongs.

The word, according to Littleton, has its riſe from *paraſch angarius*, q. d. the ſpace a poſt-man rides from one ſtation, *angaria*, to another.

Caſaubon cites a fragment of the architect Julian, who ſays, that the moſt common meaſure of the *paraſang*, in his time, was forty ſtadia; and reckoning each ſtadium at one hundred and twenty-five geometrical paces, they would hereby avoid fractions in the computation of diſtances; forty ſtadia, of one hundred and twenty-five paces each, making five thouſand Roman paces.

The authors of the Univerſal Dictionary, vol. ii. p. 19. fol. aſcribe the introduction of this meaſure to Keykobad, one of the Perſian kings of the ſecond race, who employed his ſoldiers in making great roads through the empire, ſetting up public marks at the end, as they ſay, of every four thouſand paces, which ſpace was called by the Perſians, *pherſength*, and from thence, by the Greeks, *paraſang*.

PARASCENIUM, among the Romans, was a place behind the theatre, whither the actors withdrew to dreſs, undreſs, &c. more frequently called *poſtſcenium*.

PARASCEVE, ϖαρασκευη, the ſixth day of the laſt week of Lent, popularly called *Good Friday*.

St. John ſays, our Saviour was crucified on the *paraſceve* of the Paſſover, i. e. on the eve or day of *preparation* of the Paſſover: for Iſidore and Papias obſerve, that the word in the original Greek ſignifies *preparation*, and was applied among the Jews to Friday, becauſe on that day they uſed to prepare what was neceſſary for the celebration of the Sabbath. Exod. xv. 23. xxxv. 2, 3.

Hence, what our tranſlation of the New Teſtament renders preparation of the Sabbath, M. Simon, and ſome others call *paraſceve*.

PARASCHE, from פרש, *to divide*, a name which the Jews give to that portion of the Pentateuch which they read every Sabbath. They divide their five books of the law, not into chapters, as we do, but into fifty-four parts, which they call *paraſche*: and thus go through the whole in a year. To theſe they have added ſome verſes of the prophets, which they made uſe of under the perſecution of Antiochus Epiphanes, when they were prohibited the uſe of the law.

PARASCHIDES a word uſed by chirurgical writers to expreſs the ſplinters of fractured bones, or the fragments of bones corroded by ſharp humours.

PARASEISMA, a ſort of exerciſe preſcribed by the Greek phyſicians in many caſes. It was a general concuſſion of the body.

PARASELENE, formed from παρα, *near*, and σεληνη, *moon*, in *Phyſiology*, a mock moon: a meteor, or phenomenon encompaſſing or adjacent to the moon, in form of a luminous ring; wherein are ſometimes obſerved one, ſometimes two apparent images of the moon.

The *paraſelenes* are formed after the ſame manner as the parahelia, or mock-ſuns.

Pliny mentions three moons, which were ſeen in the year of Rome 632. Eutropius alſo informs us, that he ſaw three moons at Rimini, in the year 234 before Chriſt. Hevelius alſo ſaw three moons at Dantzick, in 1660. And ſimilar phenomena have been obſerved at different at times, by many others. See HALO and PARHELION.

PARASEMUM, παρασημον, among the ancients, a ſign painted or carved on the prow of ſhips, by which they were diſtinguiſhed from one another. This ſign was commonly the figure or picture of ſome animal, as the bull, lion, &c. or of any other thing, as a mountain, tree, flower, &c.

PARASIOPESIS, παρασιωπησις, in *Rhetoric*. See PARALEPSIS.

PARASITE, παρασιτος, among the Greeks, was originally a very reputable title: the *paraſites* being a kind of prieſts, or at leaſt miniſters of the gods; in the ſame manner, as at Rome were the epulones.

They took care of the ſacred corn; or the corn deſtined for the ſervice of the temples, and the gods; viz. ſacrifices, feaſts, &c. They had even the intendence over ſacrifices, and took care that they were duly performed. At Athens there was a kind of college of twelve *paraſites*; each people of Attica furniſhing one, who was always choſen out of one of the beſt families.

Polybius adds, that *paraſite* was alſo an honourable name among the ancient Gauls, and was given to their poets; but of late it has been made a term of reproach, and uſed for a flatterer and mean dependant.

PARASITES, PARASITICAL *plants*, in *Botany*, a kind of plants, growing on trees, and ſo called from their manner of living and feeding, which is altogether on others. Such is moſs, which was anciently ſuppoſed the effect of a diſcompoſure of the texture of the bark; or a kind of tuft, or, at moſt, little filaments ariſing from the bark; but from many obſervations of the moderns, it appears, that moſſes are real plants, whoſe ſeed is exceedingly fine, and encloſed in very little capſulæ; which burſting of themſelves, the ſeed is driven by the wind, and at length detained in the inequalities of the barks of trees, where it takes root, and is fed at the expence thereof.

Of theſe moſſes M. Vaillant reckons no leſs than a hundred and thirty-ſeven ſpecies common in the neighbourhood of Paris; which, with the lichens and other moſſes diſcovered ſince his time, make the family of *paraſite* plants very large.

The moſt pernicious of theſe *paraſites*, to the trees that ſupport them, are the lichens; which appear on the barks of trees in form of a cruſt, mixed with yellow and a dirty white.

M. de Reſſons gives us a remedy for this diſeaſe, in the French Memoirs of the Acad. Roy. It conſiſts in making an inciſion through the bark to the very wood, from the firſt branches to the earth; the bark cloſes again in a little time, and after this always preſerves itſelf clean and free from moſſes for the future.

This aperture renders the courſe of the ſap more free, and prevents the forming of thoſe inequalities ſo favourable to the production of moſſes. The inciſion, he adds, is to be made, from March to the end of April, and on that ſide turned moſt from the ſun. See MISTLETOE.

PARASITEUM, among the ancients, a granary or place where the ſacred corn, deſigned for religious purpoſes, was preſerved. See PARASITE.

PARASOL, a little moveable, in manner of a canopy, borne in the hand to ſcreen the head from the ſun, rain, &c. more uſually called *umbrella*.

It is made of leather, taffety, oil-cloth, &c. mounted on a ſtick, and opened or ſhut at pleaſure, by means of pieces of whalebone that ſuſtain it. The Eaſt Indians never ſtir without a *paraſol*.

The word is French; and that uſed againſt rains is ſometimes called *parapluie*.

PARASPHAGIS, a word uſed by ſome anatomical writers to expreſs that part of the neck which is contiguous to the clavicles.

PARASTATA, in the *Ancient Architecture*, a kind of pier, or piedroit, ſerving as a defence or ſupport to a column or arch.

Mr. Evelyn makes the *paraſtata* the ſame with pilaſter. Barbaro, and others, the ſame with anta; and Daviler, the ſame with piedroit. See PILASTER.

PARASTATÆ, in *Anatomy*, *epidydimidæ*, two tuberous, varicoſe bodies, lying upon, and adhering to, the upper part of the teſticles, whereof they properly appear to be a part, though different from the reſt in form and conſiſtence.

The *paraſtatæ* conſiſt, like the teſticles, of a convolution of ſeminal tubuli, mixed with blood-veſſels; the difference between them lying only in this, that in the *paraſtatæ* the tubuli are united into one; the various convolutions of which being more firmly bound together by a ſtrong membrane, ariſing from the tunica albuginea, they feel more compact than the teſticles.

The *paraſtatæ* and teſticles are ſaid to be encloſed in three proper membranes; the firſt muſculous, derived from the cremaſter muſcle: the ſecond, called the *vaginalia*; and the third the *albuginea*. See each under its proper head.

PARASTREMMA, a name given by medical writers to a convulſive diſtortion of the mouth, or of any part of the face.

PARASYNANCHE, from ϖαρα, συν, αγχειν, *to ſuffocate*, in *Medicine*, a kind of ANGINA or ſquinancy, wherein the exterior muſcles of the throat are inflamed.

PARATHENAR *major*, a pretty long muſcle forming part of the outer edge of the ſole of the foot. It is commonly called *hypothenar*, but very improperly, according to the proper ſignification of that word. It is fixed backward by a fleſhy body to the outer part of the lower ſide of the os calcis, from the ſmall poſterior external tuberoſity all the way to the anterior tuberoſity, where it joins the metatarſus; and at the baſis of the fifth metatarſal bone, ſeparates from it again, and forms a tendon which is inſerted in the outſide of the firſt phalanx of the little-toe near its baſis, and near the inſertion of the *parathenar minor*. Winſlow.

PARATHENAR *minor*, a fleſhy muſcle fixed along the poſterior half of the outer and lower ſide of the fifth bone of the metatarſus; it terminates under the head of that bone in a tendon which is inſerted in the lower part of the baſis of the firſt phalanx of the little toe.

The tendinous inſertion of this muſcle is very cloſely united to the cartilaginous ligament; and the ſame thing is to be obſerved of the other muſcles, which go to the baſis of the firſt and ſecond phalanges of the toes. In aged perſons, ſome part of theſe ligaments are often turned to bone, and thereby form thoſe bony portions which many have taken for diſtinct ſeſamoide bones. Winſlow.

This muſcle is more expreſſively named by Albinus, the *flexor brevis digiti minimi pedis*.

PARATHESIS, in the Greek *Church*, the prayer which the biſhop rehearſes over the catechumens, ſtretching his hands over them to give them benediction; and which they receive, bowing their heads under his hands.

PARATHESIS (popularly called *brackets* or *crotchets*) is alſo the name of kind of point or mark, as [ ] uſed in writing, chiefly to include ſynonyma, explicatives, and the like matters, not eſſential to the diſcourſe. See PARENTHESIS.

PARATHESIS, in *Grammar*, *appoſition*; or a figure whereby two or more ſubſtantives are put in the ſame caſe.

PARATI, in *Ichthyology*, the name of a Braſilian fiſh of the mullet kind, much reſembling that ſpecies called *curema*, or *taintra*, in all reſpects but ſize, and in the colour of its eyes, the iris of which, inſtead of the ſilvery colour it has in the *curema*, is of a fine yellow. Its fleſh alſo, when dreſſed, is drier than that of the CUREMA.

PARATILMUS, in the *Ancient Greek Juriſprudence*, a name given to a ſort of puniſhment impoſed on adulterers, who were poor, and unable to ſtand the common penalty.

It conſiſted either in making them run a horſe-radiſh up the anus, which they called αποῤῥαφανιδωσις; or in tearing up by the roots the hair about the pudenda, which they called ϖαρατιλμος, of ϖαρατιλλειν, *to tear*, *pluck up*.

PARATITLES, *paratitla*, in *Juriſprudence*, ſhort notes, or ſummaries of the titles of the Digeſt and Code; which have been made by ſeveral lawyers, in order to compare and examine the connexion of the ſeveral parts with one another.

We have *paratitles* of Cujas, of Maran, &c. Chaſſaneus has a ſecond comment on the *paratitles* of Cujas.

PARAVAIL, *paravaile*, in *Law*, the loweſt TENANT of a fee; or he that is immediate tenant to the land.

He is called *tenant paravail*, becauſe, it is preſumed, he hath profit and avail by the land.

PARAZONIUM, ϖαραζωνιον, or *Scipio*, among *Medaliſts*, a ſceptre, rounded at the two ends in manner of a truncheon, or commander's ſtaff; or a kind of poniard, or ſhort ſword, repreſented as worn at the girdle, on ſeveral ancient medals.

Antiquaries are much divided on the explication of the *parazonium*; as, indeed, the form and manner of bearing it are very different. It is ſometimes thrown acroſs the ſhoulders in manner of a quiver.

PARBOILING, in *Pharmacy*, &c. a term applied to fruits herbs, &c. which are boiled a little while, to draw out the firſt juices, in order to be afterwards inſpiſſated or thickened. See Boiling.

PARBUNCLE, or Parbuckle, in a *Ship*, the name of a rope almoſt like a pair of ſlings; it is ſeized both ends together, and then put double about any heavy thing that is be hoiſed in or out of the ſhip, having the hook of the runner hitched into it to hoiſe it up by.

PARCÆ, goddeſſes who, according to the ancient *Pagan Theology*, preſide over the periods or durations of human lives. Theſe the ancients frequently confounded with the Fates or Deſtinies; and, in effect, the *Parcæ*, according to Plato, were the daughters of Neceſſity and Deſtiny.

The *Parcæ* were three, Clotho, Lacheſis, and Atropos: becauſe, forſooth, all things have their beginning, progreſs, and end. Hence the poets tell us, the *Parcæ* ſpun the thread of men's lives; that Clotho held the diſtaff, and drew the thread; Lacheſis twirled the ſpindle and ſpun it; and Atropus cut it,

Clotho colum retinet, Lacheſis net, & Atropos occat

The ancients repreſent the *Parcæ* divers ways: Lucian, in the ſhape of three poor old women, having large locks of wool, mixed with daffodils, on their heads; one of which holds a diſtaff, the other a wheel, and the third a pair of ſciſſars, wherewith to cut off the thread of life. Others repreſent them otherwiſe; Clotho appearing in a long robe of divers colours, wearing a crown upon her head adorned with ſeven ſtars, and holding a diſtaff in her hand; Lacheſis in a robe beſet with ſtars, with ſeveral ſpindles in her hand; and Atropos, clad in black, cutting the thread with large ſciſſars.

The ancients imagined, that the *Parcæ* uſed white wool for a long and happy life; a black, for a ſhort and unfortunate one.

PARCEL-*makers*, two officers in the exchequer, who make *parcels* of the eſcheators accounts, wherein they charge them with every thing that they have levied for the king's uſe within the time of their office, and deliver the ſame to one of the auditors of the court to make their accompts therewith.

Parcels, *bill of*. See Bill.

PARCELLING, in *Ship-Building*, is caulking the ſeam of a ſhip, then laying over it a narrow piece of canvas, and then pouring on it hot pitch and tar. See Paying.

Parcelling is alſo a name given to long narrow ſlips of canvas, daubed with tar, and often bound about a rope, when it is intended to be ſewed. For this purpoſe the *parcelling* is laid in ſpiral turns as ſmoothly upon the ſurface as poſſible, that the rope may not be uneven, and full of ridges. It is alſo employed to raiſe the mouſes, which are formed on the ſtays and on the voyal, being firmly faſtened, by marling it from one end to the other.

PARCENERS, *quaſi* Parcellers. See Co-Parceners.

PARCHMENT, in *Commerce*, &c. ſheep, or goat's ſkin prepared after a peculiar manner, which renders it proper for ſeveral uſes, particularly for writing on, and for the covering of books, &c.

The word comes from the Latin *Pergamena*, the ancient name of this manufacture; which it is ſaid to have taken from the city Pergamos, to Eumenes, king whereof, its invention is uſually aſcribed; though, in reality, that prince appears rather to have been the improver than the inventer of *parchment*; for the Perſians of old, according to Diodorus, wrote all their records on ſkins; and the ancient Ionians, as we are told by Herodotus, made uſe of ſheep-ſkins and goat-ſkins in writing, many ages before Eumenes's time. Nor need we doubt that ſuch ſkins were prepared and dreſt for that purpoſe, after a manner not unlike that of our *parchment*; though, probably, not ſo artificially. Vide Diod. Sicul. lib. ii. p. 84. Herodot. lib. v. Prid. Connect. part i. lib. vii. p. 708.

Dr. Prideaux is a ſtrenuous advocate for the antiquity of *parchment*; and he imagines that the anthentic copy of the law which Hilkiah found in the Temple, and ſent to king Joſiah, was formed of this material; becauſe no other uſed for writing, *parchment* excepted, could be of ſo durable a nature as to laſt from the time of Moſes till that period, for eight hundred and thirty years. But it has been replied to this argument, that the Egyptians wrote on linen thoſe things which they deſigned for long duration; and thoſe who have examined mummies with attention, aſſure us, that the characters ſo written continue to this day. It is not, therefore, improbable, that a copy of the law of Moſes, written after this manner, might have laſted eight hundred and thirty years. Beſides, it is not very likely that thoſe ſkins which were uſed, according to the teſtimony of Diodorus and Herodotus, by the Perſians and Romans for writing, long before the time of Eumenes, were dreſſed like *parchment*. They muſt have been prepared in a much ruder manner, and have little reſembled the *parchment* of which Eumenes is ſaid to be the inventor; becauſe if it had been found out before, it would have rendered the want of the Egyptian papyrus no inconvenience to that prince. Such ſkins might do for records, and ſome occaſional writings, but would have been by no means proper for books. Hence ſome writers have concluded that *parchment* was of a later invention than the Egyptian paper.

Parchment conſtitutes a very conſiderable article in the French commerce; it is made in moſt of their cities; and, beſides the conſumption at home, they ſend vaſt quantities abroad, particularly to England, Flanders, Holland, Spain, and Portugal.

That called *virgin parchment* is a ſomewhat thinner and finer ſort than the reſt; and is moſt proper for certain purpoſes, as fans, &c. and made of the ſkin of an abortive lamb or kid.

Parchment, *manufacture of*. The ſkin having been ſtripped of its wool, and having paſſed the lime-pit (after the manner deſcribed under the article shammy), the ſkinner ſtretches it on a kind of frame, conſiſting of four pieces of wood, mortiſed into each other at the four angles, and perforated lengthways from diſtance to diſtance, with holes furniſhed with wooden pins that may be turned at pleaſure, like thoſe of a violin.

To ſtretch the ſkin on this frame, they make little holes all around it, and through every two holes draw a little ſkewer; to this ſkewer they tie a ſmall piece of packthread, and tie that over the pins; ſo that coming to turn the pins equally, the ſkin is ſtrained tight every way, like that of a drum.

The ſkin being thus ſufficiently ſtretched on the frame, the fleſh is pared off with a ſharp inſtrument for that purpoſe; this done it is moiſtened with a rag; and a kind of white ſtone or chalk, reduced to a fine duſt, is ſtrewed over it; then with a large pumice-ſtone, flat at bottom, much after the manner of a muller for grinding colours, they rub over the ſkin as if about to grind the chalk; and thus they ſcour off the remains of the fleſh. Then they go over it again with the iron inſtrument; again moiſten it as before, and again rub it with the pumice-ſtone without any chalk underneath; this ſmoothens and ſoftens the fleſh-ſide very conſiderably. They then drain it again, by paſſing over it the iron inſtrument as before.

The fleſh-ſide being thus drained, they paſs the iron on the wool or hair-ſide; then ſtretch it tight on the frame, by means of the pins, and go over the fleſh-ſide again with the iron; this finiſhes its draining; and the more the ſkin is drained, the whiter it always becomes.

They now throw on more chalk, ſweeping it over with a piece of lamb-ſkin that has the wool on; this ſmoothens it ſtill farther, and gives it a white down or knap. It is now left to dry, and when dried, it is taken off the frame, by cutting it all round.

The ſkin, thus far prepared by the ſkinner, is taken out of his hand by the *parchment*-maker, who firſt ſcrapes or pares it dry on the ſummer with an iron inſtrument like that above mentioned, only finer and ſharper; with this, worked with the arm from top to bottom of the ſkin, he takes away about one half of its thickneſs. The ſkin thus equally pared on both ſides, they paſs the pumice-ſtone over both ſides, to ſmoothen it. This laſt preparation is performed on a kind of form or bench covered with a ſack ſtuffed with flocks, and it leaves the *parchment* in a condition for writing on.

The paring of the ſkin dry on the ſummer is the moſt difficult preparation in the whole proceſs of *parchment*-making; for which reaſon the ſkinners ſeldom dare meddle with it, but uſually leave it to thoſe more experienced in it; the ſummer, whereon it is performed, is a calf-ſkin well ſtretched on a frame, ſerving as a ſupport to the ſkin, which is faſtened a-top of it with a wooden inſtrument, that has a notch cut in it. Laſtly, that the iron knife may paſs the eaſier between the ſummer and the ſkin to be pared, they put another ſkin, which they call the counter-ſummer. The parings, thus taken off the ſkin, are uſed in making glue, ſize, &c.

What we call *vellum* is only *parchment* made of the ſkins of abortive calves, or, at leaſt of ſucking calves; it is finer, whiter, and ſmoother, than the common *parchment*; but it is prepared in the ſame manner as that, except that it is not paſſed through the lime-pit.

Parchment, *to make a green tranſparent*. Waſh the *parchment* in cold ley, till it come clear from it; then ſqueeze out the liquor as much as poſſible; and if you would have it of a fine green colour, take diſtilled verdigriſe, ground with vinegar, and add a little ſap-green to it; temper it neither too thick nor too thin; then ſoak your *parchment* in this colour thoroughly a whole night; rinſe it afterwards in water, ſtrain it immediately on a frame, and ſet it to dry; take clear varniſh, lay it on both ſides, ſet it in the ſun to dry; after this cut the *parchment* out of the frame into leaves, as large as you pleaſe, and lay them in a book under preſs, to keep them fine and ſtrait. The effect of this *parchment* is, to make a ſmall letter, when put over it, appear as big again; and it is a great preſerver of the eyes, eſpecially to thoſe that read much by candle-light. The varniſh muſt be prepared of linſeed-oil, and boiled with frankincenſe, maſtich, and ſandarac. If you would have the *parchment* of a clear, tranſparent, and white colour, only waſh, ſtrain, and varniſh it, as above. If you would colour it yellow, ſteep your *parchment*, after it has been waſhed, in a yellow liquid, made of ſaffron; for which purpoſe tie ſaffron in a thin linen rag, hang it in a weak ley, and warm it over a ſlow fire, and when you ſee the ley tinctured yellow, it is fit for uſe.

For a tranſparent red. Take brazil, as much as you will: put it into a hot ley, which is clear, and not too ſtrong, and it will tincture the ley of a fine red; then pour to it about half an egg-ſhell full of clean wine; draw the *parchment* through the colour; and when it is as deep as you would have it, ſtrain it as before.

For a blue. Take Lombard indigo, grind it with vinegar on a ſtone, and mix ſal ammoniac among it, to the quantity of a pea; with this wet your *parchment*, and proceed as has been directed for the green.

For a violet or purple colour. Temper two-thirds of the above red, and one-third of the blue, and uſe it as before directed.

For a black colour. Take Roman alum, beat it into powder, and boil it in rain-water to a fourth part; add Roman vitriol, or atrament, with ſome Roman galls, and boil them together; with this ſtain your *parchment* twice or three times over, and, when dry, lay the Spaniſh varniſh over it.

N. B. With theſe tranſparent *parchments* you may make curious bindings. One ſort, uſed at Rome, is made thus: lay the board or paſteboard over with leaf-gold, leaf-ſilver, ſtanial, metal leaves, &c. then binding the *parchment* over it, it will give it an uncommon luſtre and beauty.

Dr. Lewis informs us, that, in order to render the ink durable on *parchment*, a thick piece of it ſhould be ſteeped in water, with ſome oak-bark, for three or four days, and then preſſed ſmooth and dried. When the ſurface of this *parchment* was pared off, and the internal part written upon, the characters continued of a good black, while thoſe made with the ſame ink, on unprepared *parchment*, were changed into a yellowiſh brown. Vellum may alſo be treated in the ſame manner.

It is ſaid, that writing upon *parchments* decayed by time, may be recovered, and rendered legible by dipping the obliterated *parchment* into a veſſel of cold water, freſh drawn from the well; let it be taken out in about a minute, and preſſed between two papers, in order to prevent its crumpling up in drying. As ſoon as it is moderately dry, if it be not legible, repeat the operation two or three times.

Parchment, *roll of.* See Roll.

PARCO *fracto*, in *Law*, a writ which lies againſt him who violently breaks open a POUND, and takes out beaſts thence, which, for ſome treſpaſs done, were lawfully impounded.

PARDALIS, in *Ornithology*, a name by which many authors call the bird more commonly known by the name of *pluvialis*, and called in Engliſh the *grey* and *green* PLOVER; birds of the ſize of the lapwing, and much eſteemed at table.

Pardalis is alſo uſed as the name for the LEOPARD, called alſo *pardus*, *panthera*, and *varia*, by ſome. It is diſtinguiſhed from the lion by its variegation of colour; and from the tyger by the diſpoſition of thoſe colours, which are in the back, ſides, and flanks of this creature, always in round ſpots like eyes, as in the tyger they are in long ſtreaks; and on the top of the back there is a row of oblong ſpots; the leopard is alſo leſs than the tyger, though next to it in ſize, cruelty, and general enmity to the animal creation. It inhabits Africa, from Barbary, to the remoteſt parts of Guinea. See *Tab.* IV. *Quadrupeds*, N° 47.

PARDON, in *Law*, a remiſſion or forgiveneſs of a felonious or other offence, againſt the king, or the laws.

This, our lawyers make twofold: the one, *ex gratia regis*; the other, *per cours de ley*. The firſt is that which the king, out of ſome ſpecial regard to the perſon, or ſome other circumſtance, grants, by his abſolute prerogative or power, either before conviction of the offender, or after.

A *pardon* may be pleaded in arreſt of judgment; in which caſe it has the ſame advantage, as when pleaded upon arraignment, viz. the ſaving the attainder, and of courſe the corruption of blood, which nothing can reſtore but parliament, when a pardon is not pleaded till after ſentence. And certainly, on all accounts, when a man hath obtained a *pardon*, he is in the right to plead it as ſoon as poſſible. With regard to the object of *pardon*, judge Blackſtone obſerves, that the king may *pardon* all offences merely againſt the crown, or the public; excepting, 1. That, to preſerve the liberty of the ſubject, the committing any man to priſon out of the realm is, by the HABEAS *corpus* act, made a præmunire, unpardonable even by the king. Nor, 2. Can the king *pardon*, where private juſtice is principally concerned in the proſecution of offenders; therefore, in APPEALS of all kinds (which are the ſuit, not of the king, but of the party injured) the proſecutor may releaſe, but the king cannot *pardon*. Neither can he pardon a common nuſance, while it remains unredreſſed, or ſo as to prevent an abatement of it; though afterwards he may remit the fine. Neither, laſtly, can the king *pardon* an offence againſt a popular or penal ſtatute, after information brought; for thereby the informer hath acquired a private property in his part of the penalty. Nor, farther, can the king's *pardon* be pleaded to any parliamentary impeachment, ſo as to impede the enquiry, and ſtop the proſecution of great and notorious offenders. But after the impeachment has been ſolemnly heard and determined, it is not underſtood that the king's royal grace is farther reſtrained and abridged. As to the manner of *pardoning*, it is a general rule, that wherever it may be reaſonably preſumed the king is deceived, the *pardon* is void; ſo that any ſuppreſſion of truth, or ſuggeſtion of falſhood, in a charter of *pardon*, will vitiate the whole; for the king was miſinformed. A *pardon* of all felonies will not *pardon* a conviction or attainder of felony, but theſe muſt be particularly mentioned. Nor will a *pardon* of felonies include piracy, which is not puniſhable at the common law. It is alſo enacted by 13 Ric. II. ſtat. 2. cap. 1. that no *pardon* for treaſon, murder, or rape, ſhall be allowed, unleſs the offence be particularly ſpecified; and in murder it ſhall be expreſſed, whether it was committed by lying in wait, aſſault, or malice prepenſe. A *pardon* may be conditional, or the king may extend his mercy upon what terms he pleaſes. It may be alſo obſerved, that a *pardon*, by act of parliament, is more beneficial than by the king's charter; for a man is not bound to plead it, but the court muſt *ex officio* take notice of it; neither can he loſe the benefit of it by his own laches or negligence, as he may of the king's charter or *pardon*. The effect of ſuch *pardon* by the king, is to make the offender a new man; to acquit him of all corporal penalties and forfeitures annexed to that offence for which he obtains *pardon*, and to give him a new credit and capacity. Blackſt. Com. book iv. p. 391, &c.

Pardon *by courſe of law*, is that which the king grants as the law and equity perſuades, for a ſlight offence; as homicide, caſual, &c.

Pardon, *charter of.* See Charter.

Pardon, in the *Canon Law*, is an indulgence which the pope grants to ſuppoſed penitents, for remiſſion of the pains of purgatory, which they have merited for the puniſhment of their ſins.

The grand time for the diſpenſation of *pardons* is the jubilee.

In this ſenſe, *pardon* is properly the angelic ſalutation ſaid to the Virgin at the ſound of three little ſtrokes of a bell rung in the morning, at noon, and night, in order for the perſon to be entitled to indulgences.

PARDONERS, in our *Ancient Cuſtoms*, were perſons who carried about the pope's indulgences, and ſold them to the beſt bidders.

PARDUS, in *Zoology*, a name uſed by many for the LEOPARD; the more accurate authors, however, uſe the word PARDALIS.

Pardus, in *Conchyliology*, a name given by authors to a kind of ſhells, of the genus of the volutæ. We have three kinds of this ſhell. 1. A voluta ſpotted with black. 2. Another ſpotted with yellow. And, 3. A very elegant one ſpotted with a reddiſh colour. They are called *pardi*, or *leopard-ſhells*, from their diſtinct ſpots reſembling thoſe on the ſkin of a leopard.

PARE, in the *Manege*. To pare a horſe's foot is to cut his nails; i. e. the horn and ſole of his foot; which is done with a BUTTRESS in order to ſhoe him.

In England, the ſmith or farrier holds the horſe's foot between his knees; in which poſture he *pares* the foot, ſets on the ſhoe, drives the nails, and rivets them, and this all alone, without any aſſiſtance from the groom.

PARECBASIS, παρεκϐασις, in *Rhetoric*, is uſed to ſignify the exaggeration of a crime, and not a digreſſion from the queſtion in hand, as ſome have thought.

PARECHESIS, παρηχησις, in *Rhetoric*, the too frequent repetition of the ſame ſyllable, thus *perire me malis malim modis.*

PAREDRIA, a term uſed by Hippocrates to expreſs an aſſociation of two, or more diſeaſes in the ſame patient, making what we call a complicated illneſs..

PAREDRI, παρηδροι, among the *Athenians*. When the archon, baſileus, or polemarchus, by reaſon of their youth happened not to be ſo well ſkilled in the laws and cuſtoms of their country as might have been wiſhed, it was cuſtomary for each of them to make choice of two perſons of age, gravity, and reputation, to ſit with them upon the bench, and direct them as there was occaſion. And theſe aſſeſſors, or *paredri*, were obliged to undergo the ſame probation in the ſenate-houſe and public forum with the other magiſtrates; and like them too, to give an account how they had behaved themſelves in their reſpective truſts, when their office was expired.

PAREGORICS, παρηγορικα, formed of πραηγορεω, *I appeaſe*, or *mitigate*, in *Medicine*, remedies which aſſuage pain. The ſame with what we otherwiſe call *anodynes* and *opiates*.

Paregoric *elixir*. See Elixir *paregoricum*.

PAREIRA BRAVA, the root of a plant, which is a ſpecies of convolvulus, growing in the Weſt Indies, chiefly in Mexico and Braſil; eſteemed a ſpecific for the cure of the ſtone and gravel.

The name, which, in the original Portugueſe, ſignifies *wild vine*, or *baſtard vine*, bears a good deal of analogy to the plant which bears branches loaden with leaves perfectly like thoſe of the vine; and which, like them, creep along walls and trees. The Portugueſe value this root on an equal footing with the ipecacuanha. Some druggiſts call it, by corruption, *parada prava*.

M. Geoffroy attributes the efficacy of this root, in nephritic caſes, to its diſſolving the viſcid matters, whereby the particles of the ſand, &c. were cemented together; and hence he gives it with the ſame intention in jaundices, aſthmas, &c. It is adminiſtered in decoction. The Portugueſe hold it alſo a remedy for dyſenteries, quinſies, bites of venemous beaſts, &c.

Mr. Geoffroy examined its virtues carefully, and alſo its characters and diſtinctions; he found that there were properly two kinds of it; the one brown on the out ſide, and yellowiſh within. This is what was then moſt frequent in uſe; and the other white on the outſide, and of a paler yellow or lemon-colour within. This is ſaid to be of a fleſh-colour on the outſide, where recent, and to turn white in drying; both are of a ſpongy or porous texture, yet conſiderably hard and woody; of a bitter taſte, but with an admixture of a ſweetiſh flavour like that of liquorice; and their uſual ſize is from that of one's middle finger, to that of one's thumb.

The Portugueſe were informed of the virtues of this root by the natives of the Braſils; and on trial extolled it above all the medicines in uſe. Their account of its efficacy were too exaggerated to gain credit with the judicious part of the world; but Mr. Geoffroy's experiments, which ſet its virtues in a much modeſter light, yet ſhew them to be very great; and that the root deſerves to be for ever continued in uſe in medicine, and reckoned among the moſt valuable ſimples. The Portugueſe pretend that it diſſolves the ſtone in the bladder; but though this is not true, Mr. Geffroy found that it was admirable for breaking the common weaker ſabulous concretions in the kidneys and ureters; and that the taking it was always attended with the voiding of large quantities of gravel. He gave it alſo with great ſucceſs to perſons afflicted with ulcers in the kidneys and bladder, and whoſe urine was purulent, and at many times totally ſuppreſſed; theſe ſuppreſſions of urine were always cured by it, and their urine became leſs thick and purulent; many alſo were perfectly cured of theſe complaints by a courſe of it, with the addition of balſam of capivi towards the end of the courſe.

This property of the *pareira brava*, of diſſolving thick humours, gave Mr. Geoffroy an opinion of trying it in humorous aſthmas; and theſe obſtinate caſes often were greatly abated, and ſometimes perfectly cured by it. The uſual way of taking it is in decoction, ſweetening it in the manner of tea. Of the root in ſubſtance he preſcribes from twelve grains to half a dram, and in decoction or infuſion, two or three drams: this quantity of the root bruiſed he directs to be boiled in a pint and a half of water, till only a pint remains, which is to be ſtrained off, ſweetened with a little ſugar, divided into three portions, and drank as tea at intervals of half an hour. Mem. Acad. Par. 1710.

PARELCON, in *Grammar*, a figure, whereby a word or ſyllable is added to the end of another.

PARELIA, or rather Parhelia, in *Phyſiology*. See Parhelium.

PAREMBOLE, παρεμβολη, in *Rhetoric*, a figure wherein ſomething relating to the ſubject is inſerted in the middle of a period. All the difference between the *parembole* and *parentheſis*, according to Voſſius, is, that the former relates to the ſubject in hand, whereas the latter is foreign to it. An example of each we have in Virgil: and firſt of the *parembole*.

Æneas (neque enim patrius conſiſtere mentem
Paſſus amor) rapidum ad naves præmitit Achatem.

The following is an inſtance of the *parentheſis*:

——————*ipſique ſuos jam morte ſub ægrâ*
(Di meliora piis, erroremque hoſtibus illum)
Diſciſſos nudis laniabant dentibus artus.

See Parenthesis.

PARENCEPHALIS, a name given by ſome authors to the *cerebellum*.

PARENCHYMA, παρεγχυμα, *effuſion*, q. d. generated by a collection and condenſation of juice, in *Anatomy*, a peculiar kind of ſubſtance different from fleſh, whereof ſeveral parts of the body, as the heart, lungs, liver, ſpleen, kidneys, &c. were anciently ſuppoſed to be formed.

Eraſiſtratus firſt uſed the word; as imagining the ſubſtance of theſe parts not to be vaſcular like the reſt, but to conſiſt of a maſs or coagulum of blood, ſtagnated in the veſſels of the parts. But the moderns univerſally reject this opinion: the obſervations made by microſcopes, injections, &c. clearly ſhewing, that the heart is a true muſcle, the lungs and ſpleen, cluſters of membranous veſicles and veſſels, and the liver and kidneys, compoſitions of glands, through which the bile and urine are filtrated.

Beſides the veſſels and canals of the human body, the ancients ſuppoſed a ſimple homogeneous and firm matter, peculiar to each part, and thereby diſtinguiſhing the habit of one part from that of another. But ſome moderns have denied the exiſtence of a *parenchyma*, or pulpy matter, and have aſſerted, that the whole body is compoſed of veſſels and canals. The chief promoter of this opinion was Ruyſch, who having laid the injected parts of the body in rectified ſpirit of wine, and then dried them in the air; whatever was not injected, was thereby diſſipated, and the remainder conſiſted merely of veſſels; from whence he concluded, that the whole is compoſed of veſſels. But it ſeems certain, that a freſh muſcle can never be ſo injected, as to appear wholly compoſed of canals. If, indeed, after injection, it be ſuffered to dry, the parts not injected will exhale, and the more the muſcle is dried, the more it will appear compoſed of veſſels. What is here ſaid of a muſcle, holds true of all other parts of the body. Thus many veſſels run through the ſubſtance of a bone; but no one has yet been able to demonſtrate, that the whole bone is compoſed of veſſels. There always remains a ſubſtance peculiar to bones, which has never yet been ſhewn to be vaſcular. In the brain alſo there always remains ſomething which cannot be demonſtrated vaſcular.

The *parenchyma* is ſenſibly full of juices, ſo that very little of truly ſolid matter remains, when theſe juices are exhaled.

Parenchyma *of plants*. Dr. Grew gives the name *parenchyma*, to the pith or pulp, or that inner part of a fruit or plant, through which the juice is ſuppoſed to be diſtributed.

This, when viewed with a microſcope, appears to reſemble marrow, or rather a ſponge, being a porus, flexible, dilatable ſubſtance.

Its pores are innumerable, and exceedingly ſmall; receiving as much humour as is requiſite to fill and extend them; which diſpoſition of pores it is, that is ſuppoſed to fit the plant for vegetation and growth.

The *parenchyma* of roots is white at firſt; but it changes its colour, in proportion as the root grows thicker. Thus it becomes yellow in the root of the baſtard rhubarb, and red in that of the biſtort.

PARENT, *parens*, a term of relation, applicable to thoſe from whom we immediately receive our being. See Father and Mother.

The duties of *parents* to legitimate children conſiſt in three particulars; viz. their maintenance, their protection, and their education. It is a principle of law, as well as of nature, that every man is obliged to provide for thoſe deſcended from his own loins. By 43 Eliz. cap. 2. the father, mother, grandfather, and grandmother of poor impotent perſons, ſhall maintain them at their own charges, if of ſufficient ability, according as the quarter ſeſſions ſhall direct; and by 5 Geo. I. cap. 8. if a *parent* runs away, and leaves his children, the churchwardens and overſeers of the pariſh ſhall ſeize his rents, goods, and chattels, and diſpoſe of them towards their relief. But no perſon is bound to provide a maintenance for his iſſue, unleſs where the children are unable to work, through infancy, diſeaſe, or accident; and then is only obliged to find them with neceſſaries, the penalty or refuſal being no more than 20*s*. a month. (See Papist

PIST and JEWS). Our law has made no proviſion to prevent the diſinheriting of children by will; but by the cuſtom of London, formerly univerſal, the children of freemen, are entitled to one third of their father's effects, to be equally divided between them; of which he cannot deprive them. Farther, a *parent*, by our laws, may ſupport his children in their law-ſuits, without being guilty of the legal crime of maintaining quarrels: and a man may juſtify aſſault and battery in defence of the perſons of his children. With regard to the education of children, though our laws are defective, yet in one inſtance they have made a wiſe proviſion for breeding up the riſing generation; ſince by the ſtatutes for apprenticing poor children, ſuch children may be apprenticed out by the overſeer, &c. See APPRENTICE. And, in the caſe of religion, all parents are under peculiar reſtrictions. See PAPIST.

By the ancient Roman laws, the father had a power of life and death over his children; but the rigour of theſe laws was ſoftened by ſubſequent conſtitutions. By our Engliſh laws, parental authority is much more moderate, but ſtill ſufficient to maintain order and obedience. A *parent* may lawfully correct his child, being under age, in a reaſonable manner. The conſent or concurrence of the *parent* to the MARRIAGE of his child under age was alſo directed by our ancient law to be obtained; but now it is abſolutely neceſſary, and without it the contract is void. A father has no other power over his ſon's eſtate than as a truſtee or guardian; for, though he may receive the profits during the child's minority, yet he muſt account for them when he comes of age. He may, indeed, have the benefit of his children's labour while they live with him, and are maintained by him; but this is no more than he is intitled to from his apprentices or ſervants. Moreover, the legal power of a father (for a mother, as ſuch, is entitled to no power, but only to reverence and reſpect) over the perſons of his children ceaſes at the age of twenty-one. Yet, till that age arrives, this empire of the father continues even after his death; for he may by his will appoint a guardian to his children. He may alſo delegate part of his authority, during his life, to tutors and ſchoolmaſters. Blackſt. Comm. book i. chap. xvi. See CHILD.

PARENTALIA, in *Antiquity*, funeral obſequies: or the laſt duties paid by children to their deceaſed parents.

PARENTALIA is alſo uſed for a ſacrifice or ſolemn ſervice offered annually to the manes of the dead.

PARENTELA—*De parentela ſe tollere*, in *Ancient Cuſtoms*, ſignified a renunciation of one's kindred and family.

This was done in open court, before the judge, and in the preſence of twelve men, who made oath, they believed it was done for a juſt cauſe.

We read of it in the laws of Henry I. After ſuch abjuration, the perſon was incapable of inheriting any thing from any of his relations, &c.

PARENTHESIS, ϖαρενθεσις, formed of ϖαρα, *inter*, *between*, and ενθεσις, *poſition*, q. d. *putting between*, in *Grammar*, certain intercalary words inſerted in a diſcourſe, which interrupt the ſenſe or thread, but which ſeem neceſſary for the fuller underſtanding of the ſubject.

The politeſt of our modern writers avoid all *parentheſes*, as keeping the mind in ſuſpenſe, embarraſſing it, and rendering the diſcourſe leſs clear, uniform, and agreeable. Long and frequent *parentheſes* are intolerable, eſpecially in verſe, which they ever render dull and languid, and like to proſe.

The proper characteriſtic of a *parentheſis* is, that it may be either taken in, or left out, the ſenſe and grammar remaining entire.

In ſpeaking, *parentheſes* are to be pronounced in a different tone; and in writing they are incloſed between (), to diſtinguiſh them from the reſt of the diſcourſe.

The character itſelf, whereby they are diſtinguiſhed, is alſo called a *parentheſis*. See PAREMBOLE.

PARERGON. See PARERGA.

PARER, in the *Manege*, a term formerly uſed as a command to ſtop, but now exploded; all the riding-maſters, when they have a mind the ſcholar ſhould ſtop the horſe, calling out *hola*. See STOP.

PARERE, in *Commerce*, an Italian term, which begins to be naturaliſed. It ſignifies the advice or counſel of a merchant, or negociant; becauſe ſuch a perſon, being conſulted on any point, introduces his anſwer, in Italian, with *mi pare*, i. e. *I think*, *it ſeems to me*.

The method of negociating, eſpecially that of bills of exchange, being borrowed from the Italians, moſt trading cities, eſpecially Lyons, retain the uſe of *pareres*; which are the advices or opinions of merchants and negociants, and which ſerve as acts before notaries, when given by authority of a judge-conſervator, or at a particular conſultation, for maintaining the right of the conſulter.

M. Savary has an excellent treatiſe intitled, *Parere*, on Avis & Conſeils ſur les plus importantes Matieres du Commerce; containing the reſolution of the moſt difficult queſtions relating to bankrupts and failures, bills of exchange, orders without date, or expreſſion of value, bank-ſignings, renewing of bills of exchange, thoſe drawn or accepted by women in behalf of their huſbands, or during the minority of the drawer, &c.

PARERGA, ϖαρεργα, a term ſometimes uſed in architecture, for additions, or appendages, made by way of ornament to a principal work.

It is ſometimes alſo uſed in painting, for little pieces, or compartiments, on the ſides, or in the corners, of the principal pieces.

PARESIS, ϖαρεσις, in *Medicine*, a diſeaſe called alſo PARALYSIS, and PALSY.

PARETONIUM, in *Natural Hiſtory*, the name of an earth anciently found on the ſhores of Egypt, Cyrene, and the iſland of Crete; and uſed by the ancients in painting.

It had its name either from a part of Egypt, near which it was gathered, or from the name of a town in that kingdom, where it was uſually ſold.

Vitruvius is of the firſt opinion, and Volaternus of the other. Of late we have been taught to think it loſt; but it is ſtill common on the ſhores of moſt of the iſlands of the Archipelago, though not obſerved or regarded; and is truly a very heavy and tough clay of a fine white colour, found in maſſes of different ſizes, generally as ſoft as the ſofter clays within the ſtrata; and, by rolling about on the beach in this ſtate, it gathers up the ſand, ſmall ſhells, and other foulneſſes we always find about it. It is moſt probable, that there are ſtrata of it fine and pure in the cliffs there, and that the ſea waſhes off maſſes of them in ſtorms and high tides, which are what we find. Hill.

PARGET, in *Natural Hiſtory*, a name given to the ſeveral kinds of gypſum or plaiſter-ſtone, which, when ſlightly calcined, make what is called *plaiſter of Paris*, uſed in caſting ſtatues, in ſtuccoing floors and cielings, and many other like occaſions.

The word *parget*, though generally underſtood of all the gypſums, is, however, by the workman principally applied to the two ſpecies which make up the firſt genus of that claſs, called by Dr. Hill the *pholides*. Theſe are the Montmartre kind, and that of Derbyſhire. See PHOLIS.

PARGETTING, in *Building*, is uſed for the plaiſtering of walls; ſometimes for plaiſter itſelf.

Pargeting is of various kinds: as, 1. White lime and hair mortar laid on bare walls. 2. On bare laths, as in partitioning, and plain cieling. 3. Rendering the inſides of walls, or doubling partition-walls. 4. Rough-caſting on heart-laths. 5. Plaiſtering on brick-work, with finiſhing mortar, in imitation of ſtone-work; and the like upon heart-laths.

PARHELIUM, or PARHELION, formed from παρα, *near*, and ἥλιος, *ſun*, in *Phyſiology*, a mock ſun, or meteor, in form of a very bright light, appearing aſide of the ſun; and formed by the reflexion of his beams in a cloud properly poſited.

The *parhelia* uſually accompany the coronæ, or luminous circles, and are placed in the ſame circumference, and at the ſame height. Their colours reſemble thoſe of the rainbow; the red and yellow are on the ſide towards the ſun, and the blue and violet on the other. Though there are coronæ ſometimes ſeen entire, without any *parhelia*; and ſometimes *parhelia* without coronæ.

The apparent ſize of *parhelia* is the ſame as that of the true ſun; but they are not always round, nor always ſo bright as the ſun; and when ſeveral appear, ſome are more bright than others. They are tinged externally with colours like the rainbow, and many of them have a long fiery tail oppoſite to the ſun, but paler towards the extremity. Some *parhelia* have been obſerved with two, and others with three tails. Theſe tails appear for the moſt part in a white horizontal circle, which generally paſſes through all the *parhelia*; and, if it were entire, would go through the centre of the ſun. Sometimes there are arcs of leſſer circles, concentric to this, touching thoſe coloured circles which ſurround the ſun. They are alſo tinged with colours, and contain other *Parhelia*. *Parhelia* are generally ſituated in the interſections of circles; but Caſſini ſays, that thoſe which he ſaw in 1683, were on the outſide of the coloured circle, though the tails were in the circle that was parallel to the horizon. M. Æpinus apprehends, that *parhelia* with elliptical coronæ are more frequent in the northern regions, and thoſe with circular ones is the ſouthern. They have been viſible for one, two, three, and four hours together; and in North America they are ſaid to continue ſome days, and to be viſible from ſun-riſe to ſun-ſet. When the *parhelia* diſappear, it ſometimes rains, or there falls ſnow in the form of oblong ſpiculæ, as Maraldi, Weidler, Krafft, and others, have obſerved; and becauſe the air in North America abounds with ſuch frozen ſpiculæ, which are even viſible to the eye, according to Ellis and Middleton, ſuch particles have been thought to be the cauſe of all coronæ and *parhelia*. PARASELENÆ have alſo been ſeen accompanied with tails and coloured circles, like thoſe which attend the *parhelia*. An account of ſeveral, and a particular deſcription of a fine appearance of this kind, may be ſeen in Muſchenbroeck's Introductio, &c. p. 1046.

Parhelia are ſometimes double, triple, &c.

Ariſtotle obſerves, that two were ſeen in Boſphorus from morning to evening, though, in general, he obſerves, they are not ſeen, except when the ſun is near the horizon. Pliny relates under what conſuls this phenomenon was ever ſeen at Rome.

In the year 1629, was ſeen at Rome, by Scheiner, a *perhelion* of four ſuns; Gaſſendi ſays, that in 1635 and 1636, he often ſaw one mock ſun; in 1661, Hevelius obſerved at Dantzick one of ſeven ſuns; and 1666, another was ſeen at Arles, of ſix.

Phenomena of this kind have alſo been obſerved by M. de la Hire at Paris, in 1689, and by M. Caſſini, in 1693; by Mr. Grey, in 1700; by Halley, in 1702; and Maraldi, in 1721.

The Roman phenomenon obſerved by Scheiner, is repreſented *Tab.* V. *Optics*, *fig.* 86. in which A is the place of the obſerver, B his zenith, C the true ſun, A B a plane paſſing through the obſerver's eye, the true ſun, and the zenith. About the ſun C, there appeared two concentric rings, not complete, but diverſified with colours. The leſſer of them, D E F, was fuller, and more perfect; and though it was open from D to F, yet thoſe ends were perpetually endeavouring to unite, and ſometimes they did ſo. The outer of theſe rings was much fainter, ſo as ſcarcely to be diſcernible. It had, however, a variety of colours, but was very inconſtant. The third circle, K L M N, was very large, and all over white paſſing through the middle of the ſun, and every where parallel to the horizon. At firſt this circle was entire; but towards the end of the appearance it was weak and ragged, ſo as hardly to be perceived from M towards N.

In the interſection of this circle, and the outward iris G K I, there broke out two *parhelia*, or mock ſuns, N and K, not quite perfect; K being rather weak, but N ſhone brighter and ſtronger. The brightneſs of the middle of them was ſomething like that of the ſun, but towards the edges they were tinged with colours, like thoſe of the rainbow, and they were uneven and ragged. The *parhelion* N was a little wavering, and ſent out a ſpiked tail N P, of a colour ſomewhat fiery, the length of which was continually changing.

The *parhelia* at L and M, in the horizontal ring, were not ſo bright as the former, but were rounder, and white, like the circle in which they were placed. The *parhelion* N diſappeared before K; and while M grew fainter, K grew brighter, and vaniſhed the laſt of all.

It is to be obſerved, farther, that the order of the colours in the circles D E F, G K N, was the ſame as in the common halos, namely, red next the ſun; and the diameter of the inner circle was alſo about 45 degrees; which is the uſual ſize of a halo.

M. Mariotte accounts for the appearance of *parhelia* from an infinity of little particles of ice floating in the air, which multiply the image of the ſun, either by refracting or breaking his rays, and thus making him appear where he is not; or by reflecting them, and ſerving as mirrors.

The known laws of reflexion and refraction have given a handle for geometrizing on theſe phenomena; and M. Mariotte has determined the preciſe figure of the little icicles, and their ſituation in the air, the ſize of the coronæ, or circles, which accompany the *parhelia*, and the colours wherewith they are painted, by a geometrical calculus.

The hypotheſis of Des Cartes, to account for that horizontal circle, in which mock ſuns appear, has leſs probability than any of his conjectures. He ſuppoſes that a great quantity of frozen vapours, crouded together by contrary winds, form a prodigious cylinder, which reflects the light that falls from it on all ſides, ſo as to exhibit that lucid appearance in all the ſurrounding clouds.

M. Huygens, on applying his attention to theſe appearances, was ſoon ſenſible that they could not ariſe from ſuch globules as formed the HALOS; yet ſince *parhelia* are always attended with halos, he was ſatisfied that their cauſes muſt be much alike. Conſidering, then, what other figure hail-ſtones might poſſibly have, beſides a ſpherical one, he could find no other ſo ſimple as that of a cylinder; and, indeed, he had often obſerved, that ſnow did conſiſt of ſeveral ſlender oblong particles, mixed with thoſe of other ſhapes; and ſeeing that ſmall globules were ſufficient for the production of halos, he imagined that a great number of ſmall cylinders, floating in the air, might produce ſimilar appearances. He alſo remembered that Des Cartes had taken notice of certain ſmall columns, or cylinders, which he had ſeen lying on the ground, the extremites of which were bounded with flat ſtars, conſiſting of ſix rays or points.

The large and white horizontal circle, in the Roman phenomenon, M. Huygens ſuppoſed to be produced by the reflexion of the ſun's rays from the outſides of the upright cylinders; ſince, when the ſun ſhines upon a great number of ſuch cylinders, ſuſpended in the air, a white circle muſt neceſſarily appear to paſs through the ſun, paralled to the horizon, and of the ſame breadth with that of the ſun. This he ſhews very diſtinctly by a large figure of a cylinder, and by pointing out the progreſs of the ſun's rays reflected from it. For every point of the ſun's vertical diameter, as well as his centre, will illuminate a circle of cylinders, of the ſame apparent height as the illuminating point. It is obſervable that no thick clouds are ſeen in the air when theſe circles appear, but only ſuch as are very thin, and ſcarce viſible. For in moſt of theſe obſervations the ſky is ſaid to have been very clear and ſerene, which very well agrees with this hypotheſis; ſince thoſe minute cylinders muſt conſtitute a very thin cloud, uniformly extended; through which the ſun, and even the blue colour of the ſky, may be ſeen.

M. Huygens ſuppoſes that the *parhelia* at K and N are produced by the ſame upright cylinders, which produce the great white circle; but not in the ſame manner as that was cauſed, viz. by ſimple reflexion, but by means of two refractions, exactly in the ſame manner as halos are produced; the center of the cylinder being ſnow, and the outer part ice. The interval between theſe *parhelia*, he ſays, will be greater, as the cylinder of ſnow is thicker in proportion to the whole cylinder; and becauſe the ſun appears brighteſt through theſe cylinders which are on the outſydes of the arch K N; and as this brightneſs decays gradually to a certain diſtance, it exhibits the appearance of a *parhelion* with a tail, always tending towards the white circle, and making it brighter as far as it extends. The tail N P, of the *parhelion* at N, is drawn out of this circle; but this was a miſtake, as Hevelius obſerves; and though it is not ſaid that the *parhelion* at K had any tail, yet it is plain that a certain part of the white circle was its tail, though but a dull one; becauſe this *parhelion* is ſaid to have been fainter than the other; and it appears by the obſervations of Hevelius, and his own, that theſe *parhelia*, or mock ſuns, as well as *paraſelenæ*, or mock moons, always have tails. Laſtly, the extraordinary brightneſs of theſe *parhelia*, which was ſaid to rival that of the ſun, he ſuppoſed might eaſily be accounted for, by conſidering that every cylinder ſhines through its whole length; whereas the round grains in the halo, or the rainbow, emit but little light; ſo that the cylinder may probably afford more light than ten of thoſe round grains; and if there be great plenty of cylinders in the air, it is no wonder that thoſe images of the ſun ſhould appear ſo bright.

He then proceeds to demonſtrate his hypotheſis, by an accurate conſideration of the refraction of the rays of light through the ſides of ſuch cylinders as have been deſcribed; and he inveſtigates the diſtance at which the *parhelia* muſt appear from the ſun; ſhewing that it is ſo much the greater, as the internal cylinder of ſnow is thicker in proportion to the whole cylinder; and that this diſtance muſt become greater as the ſun riſes higher; and he ſubjoins a table of theſe diſtances, in proportion to any given altitude of the ſun; from which it appears, that if a ſufficient number of cylinders be placed one above another (ſome of which are melted more and ſome leſs) beſides the collateral *parhelia* next the ſun, two or more may appear farther from him, but ſtill in the ſame white circle, which was alſo confirmed by the obſervations of Hevelius in 1661, and of Scheiner in 1630. It appears alſo, from the ſame tables, that while the cylinders remain in the ſame ſituation, as the ſun riſes higher the intervals between him and the two *parhelia* will increaſe, which was the very thing which he himſelf had obſerved. But a greater alteration of theſe intervals may happen, if the cylinders be more melted; and from hence might ariſe that very remarkable phenomenon, which is ſaid to have appeared in the time of Auguſtus, when three ſuns were ſeen at the ſame time, all of which were ſoon contracted into one; which, he obſerves, would be effected by the warmth of the air melting the ſnow in the cylinders; by which means both the *parhelia* would draw nearer to the ſun, till they coincided with it; at which time all the cylinders would be melted, and changed into round drops.

In the next place our author proceeds to explain the cauſe of that corona in the Roman phenomenon, of which the ſun is the center. And here his former hypotheſis concerning halos, he acknowledges, will not anſwer the purpoſe. For though, when ſmall cylinders are produced in the air, it is probable that half-thawed globules are lodged there at the ſame time, for the production of coronas; yet it is difficult to conceive how they can be thawed in ſo exact a proportion, as to produce a corona that ſhall paſs preciſely through thoſe very *parhelia*.

Neither, as he obſerves, can this appearance be produced by cylinders obliquely ſituated, but only by the round ends of upright cylinders. And to ſuppoſe the above mentioned cylinders to be always terminated by plain baſes, he ſays, is by no means agreeable to nature; for, ſince their tops and bottoms will be thawed, as well as their ſides, and to the ſame degree quite round, the water at their extremities will neceſſarily aſſume a round figure; ſo that not only thoſe upright cylinders which lie on each ſide of the ſun, and produce the collateral *parhelia*, will tranſmit his rays to the eye; but alſo thoſe that lie quite round beyond him, to a certain diſtance, which will, therefore, produce a corona.

To verify this hypotheſis by experiment, he ordered a glaſs cylinder to be made with round ends; and, incloſing it in an opaque body of the ſame ſhape, he found that it did, in reality, refract the light in ſuch a manner as would produce this appearance. Conſidering, therefore, the neceſſity there is for the cylinders being of this particular ſhape, in order that the rays, paſſing through their extremities, may produce coloured circles, he did not doubt, but that theſe circles are thoſe very coronas. Otherwiſe ſome irregular and ill ſhaped circles would be ſeen.

Hevelius had remarked, that the circle which paſſes through the *parhelia*, frequently appears fainter above and below, and brighteſt next the *parhelia*. The reaſon of this M. Huygens thought to be very plain from his glaſs cylinder, ſince the rays which paſſed through the round tops and bottoms of them produced only a ſmall round image of the ſun, as round grains do; whereas thoſe which paſſed towards the ends of the cylindrical ſurfaces, where they juſt began to turn round, were formed into a broader and brighter pencil, like thoſe which produce the *parhelia*; and this muſt make the corona grow gradually brighter and brighter towards the *parhelia*, both above and below, and to be more intenſely coloured.

Having explained the cauſes of this corona, he proceeds to account for the two *parhelia* L and M, which appeared in the back part of the great white circle. And theſe, he thought, were produced, not by the reflexion, but by the refraction of the ſun's rays in the upright cylinders. The inner opaque cylinders, he obſerves, are ſo far from contributing to the production of theſe *parhelia*, that they ſometimes hinder their appearances. But yet this inner cylinder of ſnow is abſolutely neceſſary, whether the outward ſhell that contains it be made of water or of ice; for without the ſnow, the watery cylinders would be immediately changed into round drops, and the whole cylinders could not be ice, becauſe then they could not be every where tranſparent, without ſuppoſing them to have been quite liquid before they were frozen, which is inconſiſtent with a cylindrical figure.

He then ſhews, that theſe back *perhelia* muſt be in the large white circle; and determines, geometrically, that the diſtance between them muſt be ſixty degrees. Indeed in Scheiner's ſcheme, the diſtance of theſe *parhelia* exceeds ninety degrees; but it was neither meaſured, nor eſtimated; nor, indeed, ſo much as mentioned, and therefore M. Huygens does not doubt but that it is drawn much too large. In the Roman phenomenon theſe *perhelia* are ſaid to have been white, whereas, according to this hypotheſis, they ought to have been coloured. M. Huygens ſuppoſes that the whiteneſs aroſe from the weakneſs of their light; on which account halos ſometimes appear white, and ſometimes alſo the lateral *parhelia*, as appears by the accurate obſervations of Kechelius. But that theſe back *parhelia* do ſometimes appear coloured, is evident from the account we have of one in Mat. Paris's hiſtory; in which we are told that beſides the true ſun, four mock ſuns appeared red, in a great circle, of the colour of cryſtal. That two of theſe were back *parhelia* is evident from the figure, though it may be faulty in other reſpects.

The ſcarcity of cylinders, M. Huygens ſuppoſes, may be the reaſon that, in many obſervations, theſe *parhelia* have not appeared, though the white circle was plain enough to be ſeen. But there is another circumſtance which may hinder their appearance, viz. the inner cylinders of the back part of the white circle being too thick in proportion to the water that ſurrounds them. For then, the rays which ſhould produce the *parhelia* will be ſtopped; and he found by calculation, that when the ſun is twenty-five degrees high, if the diameter of the opaque cylinder bear a greater proportion to that of the whole, than 590 to 1000, no back *parhelia* can appear.

That the back *parhelia* in the Roman phenomenon appeared rounder than the lateral ones, M. Huygens ſuppoſes to ariſe from this circumſtance, that though ſome cylinders in the arch L M, which lie not far from L and M, do ſend ſome refracted rays to the eye, yet they are not ſo numerous as thoſe which come from the cylinders at L and M; and therefore that theſe *parhelia* can have no tails that are far extended, like the lateral ones. Beſides the refractions through the cylinders that produced the back *parhelia* are more regular; for the rays are not confined in their courſe by the opaque cylinders within, but receive their directions from the refractions at the moſt exact figure and poliſh of the outward watery ſurface of the cylinders. For the dark cylinders within, not being exactly equal to one another, are the cauſe of the irregular and inconſtant ſhape of the lateral *parhelia*.

The reaſon of the fluctuating motion of the tail of the *parhelion* N, he ſuppoſes to be, that, ſometimes fewer, and ſometimes more cylinders were carried into that place; which alſo accounts for the corona D E F being ſometimes entire, and ſometimes open below, and that the *parhelion* K grew brighter while N grew duller.

The phenomenon obſerved in 1661 by Hevelius, exhibited in *Tab.* V. *Optics, fig.* 87. ſeems to compriſe all the real varites of this magnificent ſpectacle, parts of which have often been ſeen ſeparately. The greateſt difference between this appearance and that at Rome, conſiſts in the arches Q G R and T H S, which are convex towards the ſun, and which Huygens accounts for by cylinders lying in a horizontal ſituation. The *parhelia* in theſe inverted arches, he ſays, are nothing more than the brighteſt parts of them; and therefore they never appear quite diſtinct nor much brighter than the adjoining parts of the arches. Accordingly, Hevelius, in all his obſervations of this kind, took notice, that they appeared rather dull, heavy, and faint; and he was not ſure whether there was a *parhelion* at H, or not. The reaſon why the middle part of the arch ſhould appear a little diſtinct from the reſt, he ſuppoſed to be this, that though there be great plenty of horizontal cylinders in the air, yet they may be ſo ſhort, as to have been little of a cylindrical ſurface, or perhaps may be like oblong ſpheroids. Beſides it is perfectly agreeable to the obſervations of Hevelius, that the higher the ſun or moon, and conſequently the more the coronas are elevated above the horizon, the flatter theſe inverted arches appear. It is confeſſed by M. Huygens, that the upper parts of theſe arches are repreſented by Hevelius as being much leſs than his calculations require them to be; but he imagines, that the ſight of the obſerver was impoſed upon, by the arches being ſo much elevated above the horizon; in conſequence of which they would appear to be parts of much leſſer circles than they really are.

M. Muſchenbroeck ſays, that nothing has been advanced concerning the cauſe of *parhelia*, more probable than the hypotheſis of M. Huygens, except that frozen cylinders or ſpiculæ are always found tranſparent, and are never opaque at the center. The coloured arcs that accompany *parhelia*, he thinks to be not at all different from the common coronæ, ſo that if there be a quantity of icy ſpiculæ in a thin fog, the whole of this appearance will be produced, the coronæ being formed in the fog, and the *parhelia* in the ſpiculæ.

See Huygens's Diſſertation on this ſubject in Smith's Optics, book i. chap. 11. See alſo Prieſtley's Hiſt. of Light, &c. p. 613, &c. and Muſchenbroeck's Introduction, &c. vol. ii. p. 1038, &c. quarto.

PARHOMOLOGY, παρομολογια, in *Rhetoric*, a figure wherein a part is yielded to the opponent, and the reſt denied: thus, *Sume hoc ab judicibus noſtrâ voluntate: neminem illi propiorem cognatum quam te fuiſſe, concedimus: officia tua nonnulla in illum exitiſſe, ſtipendia vos una feciſſe aliquamdiu nemo negat; ſed quid contra teſtamentum dicis, in quo ſcriptus hic eſt.* See CONCESSION.

PARIAN *marble*. See MARBLE.

PARIETALIA *oſſa*, in *Anatomy*, the third or fourth bones of the cranium; ſo called becauſe they form the *parietes* or ſides of the head.

They are alſo denominated *oſſa bregmatis*, and *oſſa ſincipitis*.

Their ſubſtance is finer and thinner than that of the coronal and occipital bones. The figure is ſquare; their ſize ſurpaſſes that of the other bones of the head; and their ſituation is in the lateral parts, which they poſſeſs entirely.

The ſagittal ſuture connects them at the upper part; the coronal joins their fore-part to the os frontis; the lambdoidal joins them by the hind part to the occipital bone; and, laſtly, the ſquammous ſuture joins them by the lower part of the oſſa petroſa.

The outer ſurface of theſe bones is very ſmooth and poliſhed; the inner rough and uneven, being full of impreſſions, which the arteries of the dura mater made, by their continual pulſation, before the bones were oſſified. They have each an external and convex ſide, and an internal and concave one, four edges, one ſuperior or ſagittal, one inferior or temporal, one anterior or frontal, and one poſterior or occipital. The ſuperior edge is the longeſt; the inferior the ſhorteſt; in this laſt there is a very ſquammoſe ſlope, which may be properly named the temporal ſlope; the upper and poſterior edges are indented through their whole length; the anterior edge is indented alſo, except at its lower part; and all the lower edge is ſquammous, except a ſmall portion next the os occipitis. It has four angles, the anterior and upper, the anterior and lower, the poſterior and upper, and the poſterior and lower: the anterior and lower angle ends in a ſquammous production, which from its ſituation may be called the *temporal angle*, or *apophyſis*. On the outſide, above the temporal ſlope, is ſeen the moſt conſiderable portion of the ſemicircular plane of the temporal muſcle; near the upper edge toward the poſterior angle, is a ſmall hole, called the *parietal hole*, which is ſometimes found only in one of the bones, ſometimes in the ſagittal ſuture, and in ſome ſubjects it is entirely wanting. In ſome, this hole goes only to the diploe, in others it perforates both tables.

Theſe bones are the weakeſt of all the eight that compoſe the ſkull. The diploe is found between the tables, through the whole length of the ſagittal and occipital edges, and through the upper half of the coronal ſuture. Theſe bones contain a large portion of the brain, form part of the temples, and ſerve for the inſertion of the temporal muſcles. Winſlow.

PARIETARIA, in *Botany*. See PELLITORY.

PARIETES, in *Anatomy*, a term uſed for the incloſures, or membranes, that ſtop up or cloſe the hollow parts of the body; eſpecially thoſe of the heart, the thorax, &c. The *parietes* of the two ventricles of the heart are of unequal ſtrength and thickneſs, the left exceeding the right, becauſe of its office, which is to force the blood through all parts of the body; whereas the right only drives it through the lungs.

PARIS, *herb*, *true love*, or *one berry*, in *Botany*, a genus of the *octandria tetragynia* claſs. Its characters are theſe: the empalement of the flower is compoſed of four leaves which expand in form of a croſs; the flower has alſo four leaves which ſpread open in the ſame manner; in the centre of the flower is ſituated a roundiſh four-cornered germen, ſupporting four ſpreading ſtyles, crowned by ſingle ſummits; this is attended by eight ſtamina, each having an oblong ſummit, faſtened by threads on each ſide of the ſtamina; the germen changes to a roundiſh berry, having four cells filled with ſeed. We know but one ſpecies, which grows wild in the woods. Miller.

Though this plant has been reckoned of a poiſonous nature; being ranked among the aconites; yet late authors attribute quite other properties to it: eſteeming it to be a counter poiſon, and good in malignant and peſtilential fevers. James.

PARIS, *herb of Canada*, or *of America*, *trillium*, in *Botany*, a genus of the *hexandria trigynia* claſs: the characters are, that it has a three-leaved ſpreading empalement, and three oval petals; it has ſix awl-ſhaped ſtamina, terminated by oblong ſummits, and a roundiſh germen with three ſlender recurved ſtyles, crowned by ſingle ſtigmas; the germen afterwards becomes a roundiſh berry, with three cells filled with roundiſh ſeeds. There are three ſpecies. Miller.

PARISH, the precinct, or territory, of a parochial church; or the circuit of ground within which the people belonging to any church, or under the care of one parſon or vicar, do inhabit.

The word comes from the Latin *parochia*, of the Greek παροικια, *habitation*; compounded of παϱα, *near*, and οικος, *houſe*. Accordingly, Du-Cange obſerves, that the name παϱοικια, was anciently given to the whole territory of a biſhop, and derives it from neighbourhood; becauſe the primitive Chriſtians, not daring to aſſemble openly in cities, were forced to meet ſecretly in neighbouring houſes.

In the ancient church, there was one large edifice in each city, for the people to meet in; and this they called *parochia*, *pariſh*. But the ſignification of the word was afterwards inlarged, and by *pariſh* was meant a dioceſe, or the extent of the juriſdiction of a biſhop, conſiſting of ſeveral churches; unleſs we will ſuppoſe as ſome do, that thoſe biſhops were only paſtors of ſingle churches.

Du Pin obſerves, that country pariſhes had not their origin before the fourth century; but that thoſe of cities are more ancient. The city of Alexandria is ſaid to have been the firſt that was divided into *pariſhes*. Baronius ſays, that in the time of pope Cornelius there were forty-ſix *pariſhes* in Rome.

How ancient the diviſion of *pariſhes* is it is not eaſy to aſcertain; for in the early ages of Chriſtianity in this iſland, *pariſhes* were unknown, or at leaſt ſignified the ſame that a dioceſe does now. There was then no appropriation of eccleſiaſtical dues to any particular church; but every man was at liberty to contribute his tithes to whatever prieſt or church he pleaſed, provided only that he did it to ſome; or if he made no ſpecial appropriation thereof, they were paid into the hands of the biſhop, whoſe duty it was to diſtribute them among the clergy, and for other pious purpoſes, according to his own diſcretion. Camden ſays England was divided into *pariſhes* by archbiſhop Honorius, about the year 630. Sir Henry Hobart maintains that *pariſhes* were firſt erected by the council of Lateran, held A. D. 1179. But Mr. Selden has ſhewn, that the clergy lived in common without any diviſion of *pariſhes*, long after the time mentioned by Camden; and it appears from the Saxon laws, that *pariſhes* were in being long before the council of Lateran, in 1179. The diſtinction of *pariſhes* occurs in the laws of king Edgar, about the year 970. It ſeems pretty clear and certain, ſays judge Blackſtone, Com. vol. i. p. 112, that the boundaries of *pariſhes* were originally aſcertained by thoſe of a manor or manors; becauſe it very ſeldom happens, that a manor extends itſelf over more *pariſhes* than one, though there are often many manors in one *pariſh*. The lords, he adds, as Chriſtianity ſpread itſelf, began to build churches upon their own demeſnes or waſtes, to accommodate their tenants in one or two adjoining lordſhips; and in order to have divine ſervice regularly performed therein, obliged all their tenants to appropriate their tithes to the maintenance of the one officiating miniſter, inſtead of leaving them at liberty to diſtribute them among the clergy of the dioceſe in general; and this tract of land, the tithes of which were ſo appropriated, formed a diſtinct *pariſh*; and this will account for the frequent intermixture of *pariſhes* one with another. For if a lord had a parcel of land detached from the main of his eſtate, but not ſufficient to form a *pariſh* of itſelf, it was natural for him to endow his newly-erected church with the tithes of ſuch lands. Extra-parochial waſtes and marſh-lands, when improved and drained, are by 17 Geo. II. cap. 37. to be aſſeſſed to all parochial rates in the *pariſh* next adjoining.

Camden reckons nine thouſand two hundred and eighty-four *pariſhes* in England. And Chamberlayne makes, at preſent, nine thouſand nine hundred and thirteen.

PARISH-*Prieſt*, the parſon or miniſter who holds a *pariſh* as a benefice.

If the predial tithes be appropriated, the parſon is called RECTOR. If they be impropriated, he is called VICAR.

PARISH-*clerk*. In every pariſh the parſon, vicar, &c. hath a *pariſh-clerk* under him, who is the loweſt officer of the church. Theſe were formerly clerks in orders, and their buſineſs at firſt was to officiate at the altar; for which they had a competent maintenance by offerings; but now they are laymen, and have certain fees with the parſon on chriſtenings, marriages, burials, &c. beſides wages for their maintenance.

The law looks upon them as officers for life: and they are choſen by the miniſter of the pariſh, unleſs there is a cuſtom for the pariſhioners or churchwardens to chuſe them; in which caſe the canon cannot abrogate ſuch cuſtom; and when choſen it is to be ſignified, and they are to be ſworn into their office by the archdeacon, for which the court of king's bench will grant a mandamus.

PARISH-*clerks*, *company of*. See COMPANY.

PARISIS, a French money of account, formerly a real coin ſtruck at Paris, at the ſame time with the Tournois, ſtruck at Tours.

The *Pariſis* exceeded the Tournois by one fourth; ſo that the livre, or pound *Pariſis*, was twenty-five ſols; and the livre Tournois twenty. The ſols and deniers *Pariſis*, &c. were in proportion. See COIN.

PARISTHIMA, a word uſed by ſome authors to expreſs the TONSILS.

PARK, *parcus*, a large incloſure, privileged for wild beaſts of chaſe, either by the king's grant, or by preſcription.

The word is originally Celtic; where it ſignifies an incloſure, or place ſhut up with walls.

Manwood defines a *park* a place of privilege for beaſts of venery, or hunt, and other wild beaſts of the foreſt, and of chaſe; *tam ſylveſtres, quam campeſtres*. A *park* differs from a foreſt, in that, Crompton obſerves, a ſubject may hold a *park* by preſcription, or the king's grant; which he cannot do with reſpect to a foreſt.

A *park* differs from a chaſe alſo; becauſe a *park* muſt be incloſed; if it lie open, it is a good cauſe of ſeizing it into the king's hand, as a free chaſe may be, if it be incloſed. Nor can the owner have any action againſt ſuch as hunt in his *park* if it lie open. See CHASE.

Du-Cange refers the invention of *parks* to king Henry I. of England; but Spelman ſhews, it is much more ancient; and was in uſe among the Anglo-Saxons. Zoſimus aſſures us alſo, that the ancient kings of Perſia had *parks*.

No man can now erect a *park*, without a licenſe under the broad ſeal; for the common law does not encourage matters of pleaſure, which brings no profit to the commonwealth. Wood's Inſt. 207.

But there may be a *park* in reputation, erected without lawful warrant; and the owner of ſuch *park* may bring his action againſt perſons killing his deer. Ibid.

To a *park* three things are required. 1. A grant thereof. 2. Incloſures by pale, wall, or hedge. 3. Beaſts of a *park*, ſuch as buck, doe, &c. and where all the deer are deſtroyed, it ſhall no more be accounted a *park*, for a *park* conſiſts of vert, veniſon, and incloſure; and if it is determined in any of them, it is a total diſ parking; and the king may by letters patent diſſolve his *park*.

Parks as well as chaſes are ſubject to the common law, and are not to be governed by the foreſt laws. 4 Inſt. 314. Offenders pulling down *park*-walls or pales, ſhall be liable to the ſame penalty as for killing deer, &c. by ſtatute. See DEER-*ſtealers*.

A *park* ought to have three ſorts of ground in it; 1. Mountainous and barren. 2. Hilly and yet fertile. And 3. Plains that are ſufficiently fruitful. The mountainous part ſhould be well covered with high woods over at leaſt a third part of it. The downs and hilly part ſhould have one third part coppices and low woods; and the plains ſhould be at leaſt one third part paſture ground, with ſome arable or corn land. There ſhould be a river contrived to run through ſome part of it, and a ſpring or brook to go through a great part, and at length fall into the river.

Theſe are the natural advantages to be wiſhed in a *park*; but when they are wanting, they are to be ſupplied as far as may be by art, as by ponds to preſerve rain water, to ſupply the place of rivers and ſprings, and proper plantations and expoſures for the reſt; only the perſon who is to make a *park* ſhould know what the natural advantages are, that he may take in as many as he can. When ponds are to be made to ſupply the place of natural brooks and rivers, they ſhould be made large enough; the extraordinary expence in this will be eaſily repaid, by breeding fiſh in them, and fowl may alſo be kept in plenty on them. The *park* ſhould alſo be well ſtored with trees; oaks ſhould not be wanting in it, but beech and cheſnut are the quickeſt of growth, and are eaſy to be had: theſe, therefore, ſhould be planted in conſiderable numbers. Apple-trees and plum-trees alſo ſhould be planted, as generally thriving very well, and affording good food to the deer, &c.

The beſt incloſure for a *park* is a brick or ſtone wall; but as the expence of this is very great, it may be done by paling; the pales muſt, in this caſe, be of ſound heart of oak; and ſo cloſe planted, that no animal of prey can make its way in between them; and for a farther defence, a good quick-ſet hedge is very proper, and ſhould be kept in good order. Some part of the mountain and high wood, may conveniently be made a heronry, and ſome part of the middle may be a warren for hares and rabbits. Colts and horſes may be bred at large in the *park*, and in the ſummer ſeaſon it will be proper to have cows in the paſture-ground on the plains.

There ſhould be at leaſt five or ſix incloſures in the *park*, that the deer may be ſhut out or let in as occaſion requires. In the coldeſt ſeaſons they ſhould always be kept altogether in the high woods, where they have good ſhelter, and are to be fed conſtantly with provender by the keepers. In the ſummer ſuch a number as are intended to be uſed may alſo be kept on the beſt ground, that they may thrive quicker than thoſe intended only for ſtore. Some artificial holes and caverns ſhould alſo be made for the deer to retire into in the hot weather, as well as in the cold.

PARK is alſo uſed for a moveable palliſade, ſet up in the fields to incloſe ſheep in to feed, and reſt in, during the night.

The ſhepherds ſhift their *park* from time to time, to dung the ground, one part after another.

PARK is alſo uſed for a very large net, diſpoſed on the brink of the ſea, with only one hole, which looks towards the ſhore: and which becomes dry after the flood is gone off; ſo that the fiſh once got in have no way left to eſcape.

PARK, in *War*. PARK *of Artillery*, a poſt in a camp, out of cannon-ſhot of the enemy, and fortified, to incamp the train of ARTILLERY, and to ſecure the magazines and ammunition, as well as the battalions of artillery, appointed for its ſervice and defence.

The figure of the *park* of artillery is commonly a parallelogram, unleſs the ſituation of the ground renders another neceſſary. The artillery is generally placed in the centre of the ſecond line of encampment, and ſometimes in the rear-line, or corps of reſerve. In both places the muzzles of the guns are in a line with the fronts of the ſearjeant's tents of the regiments of artillery and infantry. Some generals place the *park* about three hundred paces before the centre of the front line of the army: ſome place all the cannon and mortars in the front, together with their ſpare carriages; others are for dividing the equipage in brigades, and place the firſt in the front line, the ſecond in the next, &c. But the moſt approved method, ſays Mr. Muller, Artill. p. 281, is to divide the artillery into brigades; and to place the guns of the firſt to the right of the front line, and their ammunition behind them; then thoſe of the ſecond brigade next to the firſt in the front, leaving five paces between them, and their ammunition behind them; and all the reſt in the ſame order; the pontoons forming the laſt line. The artillery companies and miners are half encamped to the right, and the other half to the left of the *park*, with ſome of the lieutenants in the rear. At about twelve paces in the rear of the *park*, are encamped the civil liſt in one line; behind them, at the diſtance of thirty paces, is a line of the remaining lieutenants, and behind theſe the captains and commiſſaries. Oppoſite to the centre, and thirty paces behind the captain's line is the major's tent; and behind this at twenty paces, the colonel's to the right, and the comptroller's to the left. Oppoſite to the centre, and fifty paces before the *park*, is placed the army guard; and oppoſite to the right wing, the artillery guard at the ſame diſtance. In the middle of the front, two light pieces are advanced at a diſtance of twenty paces, loaded with powder for the alarm guns, which are ready to be fired when required. To the right of the *park* are placed the artificers with their tools, materials, and baggage, in a line from the front to the rear. To the left of the *park*, the commiſſaries and their baggage; to the right of the artificers is encamped the firſt battallion of artillery, with their baggage and officers behind them; and to the left of the commiſſaries the ſecond battallion in the ſame manner. The horſes are placed behind the firſt battallion, except thoſe of the picket in the rear of the *park*.

Every attack, at a ſiege, has its *park* of artillery.

PARK *of proviſions*, is a place in the camp, on the rear of every regiment, which is taken up by the ſuttlers, who follow the army with all ſorts of proviſions, and ſell them to the ſoldiers.

PARK-*bote*, in our *Old Writers*, ſignifies to be quit of incloſing a *park* or any part thereof. 4 Inſt. 308.

PARK-*leaves*. See St. JOHN's-*wort*.

PARKINSONIA, in *Botany*, the name of a genus of plants, of the *decandria monogynia* claſs, ſo called in honour of the Engliſh botaniſt, Parkinſon. Its characters are theſe; the empalement of the flower is of one leaf, indented in five parts at the top; the flower has five equal petals placed circularly; the four upper are oval, the under kidney-ſhaped; it has ten declining ſtamina, terminated by oblong ſummits; and a long taper germen, with ſcarcely any ſtyle; crowned by an obtuſe ſtigma; the germen becomes a long taper pod with the ſwelling joints, in each of which is lodged one oblong ſeed; we know but one ſpecies of this plant, which is very common in the Spaniſh Weſt Indies, but has of late years been introduced into the Engliſh ſettlements, for the beauty and ſweetneſs of its flowers. In the countries where it grows naturally, it riſes to be a tree of twenty or more feet high, and bears long ſlender bunches of yellow flowers; which have a moſt agreeable ſweet ſcent. Miller.

PARLEY, formed of the French *parler*, *to ſpeak*, *talk*, a conference with an enemy, &c.

Hence to beat or ſound a *parley*, is to give a ſignal for the holding ſuch a conference, by beat of drum, or ſound of trumpet. See CHAMADE.

PARLIAMENT, PARLIAMENTUM, in England, a grand aſſembly or convention, of the three eſtates of the kingdom, viz. lords ſpiritual, lords temporal, and commons, ſummoned to meet the king, to conſult of matters relating to the common-weal; and particularly to enact, and repeal, laws.

The word *parliament*, or *colloquium*, as ſome of our hiſtorians tranſlate it, is comparatively of modern date, derived from the French, and ſignifying the place where they met and conferred together. It was firſt applied to general aſſemblies of the ſtate under Louis VII. in France, about the middle of the twelfth century. The firſt mention of it in our ſtatute law is in the preamble to the ſtatute of Weſt. 1. 3 Edw. I. A. D. 1272.

The two houſes of *parliament* are the king's grand council.

Till the conqueſt, the great Council, conſiſting only of the great men of the kingdom, was called *magnatum conventus*, and *prælatorum procerumque concilium*, *aſſiſa generalis*, and ſometimes *communitas regni Angliæ*. The Saxons, in their own tongue, called it *wittenagemote*, i. e. *aſſembly of the wiſe*; and it hath ſubſiſted immemorially under theſe appellations and others, as *michel-ſynoth*, or *great council*, and *michel-gemote*, or *great meeting*.

We have inſtances of its aſſembling to order the affairs of the kingdom, to make new laws, and to amend the old, ſo early as the reign of Ina, king of the Weſt Saxons, Offa, king of the Mercians, and Ethelbert, king of Kent, in the ſeveral realms of the heptarchy. And after their union, the Mirror informs us, that king Alfred ordained for a perpetual uſage, that theſe councils ſhould meet twice in the year, or oftener if need be, to treat of the government of God's people: how they ſhould keep themſelves from ſin, live in quiet, and receive right. Our ſucceeding Saxon and Daniſh monarchs held frequent councils of this ſort, as appears from their reſpective codes of laws; the titles whereof ſpeak them to be enacted either by the king with the advice of his *wittenagemote* or wiſe men, or by thoſe ſages with the advice of the king, or by them both together. Theſe great councils were alſo, without doubt, held regularly under the firſt princes of the Norman line. Glanvil, who wrote in the reign of Henry II. ſpeaking of the particular amount of an amercement in the ſheriff's court, ſays, it had never yet been aſcertained by the general aſſize, or aſſembly, but was left to the cuſtom of particular countries. In Edward the Third's time, an act of *parliament*, made in the reign of William the Conqueror, was pleaded in the caſe of the abbey of St. Edmundſbury, and judicially allowed by the court. Hence it appears, that *parliaments* or general councils are co-eval with the kingdom itſelf. And this is a practice which ſeems to have been univerſal among the northern nations, particularly the Germans, and carried by them into the countries of Europe, which they over-ran at the diſſolution of the Roman Empire. Though the high antiquity of *parliaments* in this kingdom muſt be univerſally allowed, it does not ſo clearly appear how they were compoſed; and particularly whether the commons were ſummoned at all, or, if ſummoned, at what period they began to form a diſtinct aſſembly. Nevertheleſs it is generally agreed, that in the main the conſtitution of *parliament*, as it now ſtands, was marked out ſo long ago as the ſeventeenth year of king John, A D. 1215, in the great charter granted by that prince, wherein he promiſes to ſummon all archbiſhops, biſhops, abbots, earls, and greater barons, perſonally; and all other tenants in chief under the crown, by the ſheriff and bailiffs; to meet at a certain place, with forty days notice, to aſſeſs aids and ſcutages when neceſſary. And this conſtitution has ſubſiſted in fact at leaſt from the year 1266, 49 Hen. III. there being ſtill extant writs of that date, to ſummon knights, citizens, and burgeſſes to *parliament*.

Sir Walter Raleigh, in his Prerogative of *Parliament*, thinks the commons were firſt called in the 17th of Henry I. and Dr. Heylin fixes the time of their firſt admiſſion to the reign of Henry II.

Indeed, ſir Edward Coke, Dodderidge, Prynn, and others, have ſhewn, that the commons of England had always a ſhare in the legiſlature, and a place in the great aſſemblies; though not on the preſent footing, as making a diſtinct houſe, and as compoſed of knights, citizens, and burgeſſes.

Parliaments are to be ſummoned, prorogued, and diſſolved by the king alone: nor can a *parliament* begin without the king's preſence, or that of his commiſſioners. At firſt, new *parliaments* were called every year; by degrees their term grew longer. In the time of king Charles II. they were held a long time with great interruptions between. Both which methods were found of ſuch ill conſequences, that in the beginning of the reign of king William, an act was paſſed whereby the term of all *parliaments* was reſtrained to three ſeſſions, or three years; this was hence called the *triennial act*. Since that, from other views, the period of *parliaments* is lengthened to ſeven years.

A *parliament* is called by the king's writ, or letter directed to each lord, commanding him to appear; and by other writs directed to the ſheriffs of each county, to ſummon the people to elect two knights for each county, and one or two burgeſſes for each borough, &c.

This writ is iſſued out of chancery by advice of the privy council, at leaſt forty days before it begins to ſit. This right of ſummons is a branch of the royal prerogative; ſo that no *parliament* can be convened by its own authority, or by the authority of any, except the king alone. Nor is it an exception to this rule that by ſome modern ſtatutes, on the demiſe of a king or queen, if there be then no *parliament* in being, the laſt *parliament* revives, and is to ſit again for ſix months, unleſs diſſolved by the ſucceſſor; becauſe this revived *parliament* muſt have been originally ſummoned by the crown. There are, it muſt be acknowledged, two capital exceptions to this rule, which were juſtifiable on a principle of neceſſity, that ſuperſedes all law. The convention *parliament*, that reſtored king Charles II. met above a month before his return; the lords by their own authority, and the commons in purſuance of writs iſſued in the name of the keepers of the liberty of England by the authority of *parliament*; and this *parliament* ſat full ſeven months after the Reſtoration, and enacted many laws ſtill in force. But the firſt thing done after the king's return was to paſs an act declaring this to be a good *parliament*, notwithſtanding the defect of the king's writs. And it was thought farther neceſſary to confirm its acts in the next *parliament*, by 13 Car. II. cap. 7. and cap. 14. The other exception occurs at the time of the Revolution, A D. 1688, when the lords and commons by their own authority, and upon the ſummons of the prince of Orange (afterwards king William), met in a convention, and diſpoſed of the crown and kingdom. The throne at this time was vacant by the abdication of king James II. and it was declared by 1 W. and M. ſtat. 1. cap. 1. that this convention was really the two houſes of *parliament*, notwithſtanding the want of writs, and other defects of form.

As the king only can convoke a *parliament*, he is bound to do this every year, or oftener, if need be. And by 16 Car. II. cap. 1. it is enacted, that the ſitting and holding of *parliaments* ſhall not be intermitted above three years at the moſt: by 1 W. and M. ſtat. 2. cap. 2. it is declared to be one of the rights of the people, that for redreſs of all grievances, and for the amending, ſtrengthening and preſerving the laws, *parliaments* ought to be held frequently; and this indefinite frequency is reduced to a certainty by 6W. and M. cap. 2. which enacts, that a new *parliament* ſhall be called within three years, after the determination of the former.

As to the conſtituent parts of *parliament*, theſe are the king, who ſits there in his royal political capacity, and the three eſtates of the realm; the lords ſpiritual, the lords temporal, who ſit, together with the king in one houſe, and the commons, who ſit by themſelves in another. And the king and theſe three eſtates together, form the great corporation or body politic of the kingdom, of which the KING is ſaid to be *caput*, *principium*, and *finis*. For upon their coming together the king meets them, either in perſon or by repreſentation, without which there can be no beginning of a *parliament*; and he alſo alone has the power of diſſolving them.

The ſpiritual lords conſiſt of two ARCHBISHOPS and twenty-four biſhops, who are ſuppoſed to hold certain ancient baronies under the king, in right of which they obtain their ſeats in the houſe of lords: where they intermix in their votes with the temporal lords, ſo that in every effectual ſenſe they form one eſtate. The lords temporal conſiſt of all the PEERS of the realm, as dukes, marquiſes, earls, viſcounts, and barons. Some of theſe ſit by deſcent, as do all ancient peers; ſome by creation, as do all new made ones; others, ſince the union with Scotland, by election, which is the caſe of the ſixteen peers, who repreſent the body of the Scotch nobility. Their number is indefinite, and may be increaſed at will by the power of the crown.

The COMMONS conſiſt of all ſuch men of any property in the kingdom as have not ſeats in the houſe of lords; every one of whom has a voice in *parliament*, either perſonally, or by his repreſentative.

The number of Engliſh repreſentatives is five hundred and thirteen (viz. ninety-two knights of ſhires, fifty citizens for twenty-five cities, Ely ſending none, and London four, three hundred and thirty-four burgeſſes for one hundred and ſixty-ſeven boroughs, two each, five for five boroughs, one each, and twelve for twelve boroughs in Wales, Pembroke ſending two, and Merioneth none, four for the two univerſities, and ſixteen for the eight cinque ports), and of Scots forty-five; in all five hundred and fifty-eight.

The juriſdiction of *parliament* thus compoſed and conſidered as an aggregate body, is ſo tranſcendent, that it makes, enlarges, abrogates, repeals, and revives laws, and ſtatutes, concerning matters eccleſiaſtical, civil, criminal, martial, maritime, &c. And for making of laws, and in proceeding by bill, this ſupreme court is not confined either for cauſes or perſons within any bounds; nor is it tied down to any certain rules or forms of law, in proceedings and determinations: the court of *parliament* hath power to judge in matters of law; and redreſs miſchiefs and grievances that happen, eſpecially ſuch as have no ordinary remedy; to examine into the corruption of judges and magiſtrates, and illegal proceedings of other courts; to redreſs errors, and determine on petitions and appeals, &c. and from this high court there lies no appeal.

It can regulate or new model the ſucceſſion to the CROWN; as in the reign of Henry the VIII. and William III. It can alter the eſtabliſhed religion of the land, as was done in the reigns of king Henry VIII. and his three children. It can change and create afreſh even the conſtitution of the kingdom, and even of *parliaments* themſelves, as was done by the act of union, and the ſeveral ſtatutes for triennial and ſeptennial elections. And, therefore, ſome have not ſcrupled to call its power, by too bold a figure, the omnipotence of *parliament*. It is therefore, as judge Blackſtone obſerves, a matter moſt eſſential to the liberties of the kingdom, that ſuch members be delegated to this important truſt, as are moſt eminent for their probity, their fortitude, and their knowledge: for it was a known apophthegm of the great lord treaſurer Burleigh, "that England could never be ruined but by a *parliament*;" and as ſir Matthew Hale obſerves, this being the higheſt and greateſt court, over which none other can have juriſdiction in this kingdom, if by any means a miſgovernment ſhould any way fall upon it, the ſubjects of this kingdom are left without all manner of remedy. To the ſame purpoſe the preſident Monteſquieu preſages that as Rome, Sparta, and Carthage, have loſt their liberty and periſhed, ſo the conſtitution of England will in time loſe its liberty and periſh: it will periſh, whenever the legiſlative power ſhall become more corrupt than the executive.

Affairs of *parliament* are to be determined by the *parliament*; and though the *parliament* err, it is not reverſible in any other court: and not only what is done in the houſe of commons, but what relates to the commons during the *parliament*, and ſitting of the *parliament*, is no where elſe to be puniſhed but by themſelves, or a ſucceeding *parliament*. Every court of juſtice having laws and cuſtoms for its direction, the high court of *parliament* hath its own proper laws and cuſtoms, called the laws and cuſtoms of *parliament*; inſomuch that no judges ought to give any opinion of matters done in *parliament*, becauſe they are not to be decided by the common law: but the *parliament*, in their judicial capacity, are governed by the common and ſtatute laws, as well as the courts in Weſtminſter-hall.

The lords and commons in their reſpective houſes have power of judicature, and ſo have both houſes together: and in former times, both lords and commons ſat together in one houſe of *parliament*. The king cannot take notice of any thing ſaid to be done in the houſe of commons but by the report of the houſe; and every member of the houſe of *parliament* has a judicial place, and can be no witneſs.

The houſe of lords is a diſtinct court of judicature from the commons, to ſeveral purpoſes; they try criminal cauſes on impeachments of the commons, and have an original juriſdiction for the trial of peers upon indictments found by a grand jury: they alſo try cauſes upon appeals from the court of chancery, or upon writs of error to reverſe judgments in the king's bench, &c. Alſo the houſe of commons is a diſtinct court to many purpoſes; they examine the right of elections, expel their own members, and commit them to priſon, and ſometimes other perſons, &c. And the book of the clerk of the houſe of commons is a record.

In order to prevent the miſchief that might ariſe from repoſing ſuch extenſive authority with incompetent perſons, it is provided by the cuſtom and law of *parliament*, that no one ſhall ſit or vote in either houſe, unleſs he be twenty-one years of age. 7 and 8 W. III. cap. 25. No member ſhall ſit or vote in either houſe, till he hath in the preſence of the houſe, taken the oaths of allegiance, ſupremacy, and abjuration, and ſubſcribed and repeated the declaration againſt tranſubſtantiation, and invocation of ſaints, and the ſacrifice of the maſs. 30 Car. II. ſtat. 2. 1 Geo. I. cap. 13. No alien, even though he be naturalized, ſhall be capable of being a member of either houſe of *parliament*, 12 and 13 W. III. cap. 2. As to the qualifications of members of the houſe of commons, beſides the above qualifications, it is declared and required by the law of *parliament* or ſpecial ſtatutes, that they muſt not be any of the twelve judges, becauſe they ſit in the lords houſe, nor of the clergy, becauſe they ſit in convocation, nor perſons attainted of treaſon or felony becauſe they are unfit to ſit any where: that ſheriffs of counties, and mayors, and bailiffs of boroughs are not eligible in their reſpective juriſdictions, as being returning officers: that no perſons concerned in the management of any duties or taxes created ſince 1692, except the commiſſioners of the treaſury, nor any of the officers following, viz. commiſſioners of prizes, tranſports, ſick and wounded, wine licences, navy and victualling; ſecretaries or receivers of prizes, comptrollers of the army accounts, agents for regiments, governors of plantations and their deputies, officers of Minorca or Gibraltar, officers of the exciſe and cuſtoms, clerks or deputies in the ſeveral offices of the treaſury, exchequer, navy, victualling, admiralty, pay of the army or navy, ſecretaries of ſtate, ſalt, ſtamps, appeals, wine licences, hackney-coaches, hawkers and pedlars; nor any perſons that hold any new office under the crown, created ſince 1705, are capable of being elected members: that no perſon having a penſion under the crown during pleaſure, or for any term of years, is capable of being elected: that if any member accepts an office under the crown, except an officer in the army or navy accepting a new commiſſion, he vacates his ſeat, but is capable of being re-elected: and moreover, perſons in particular circumſtances have forfeited the right of choice, and have been declared ineligible for *that parliament* by a vote of the houſe of commons, or *for ever*, by an act of the legiſlature. It has been alſo required, in ſtrictneſs, that all members ſhould be inhabitants of the places for which they are choſen, but this is altogether diſregarded. For other qualifications, and for the qualifications of electors, ſee BURGESS and KNIGHTS *of the Shire*.

As for the method of proceeding in elections; when the *parliament* is ſummoned, the lord chancellor (or if a vacancy happens during *parliament*, the ſpeaker, by order of the houſe) ſends his warrant to the clerk of the crown in chancery; who iſſues out writs to the ſheriff of every county, for the election of all the members to ſerve for that county, and every city and borough in it. Within three days after the receipt of this writ, the ſheriff is to ſend his precept, under his ſeal, to the proper returning officers of the cities and boroughs, commanding them to elect their members: and the ſaid returning officers are to proceed to election within eight days from the receipt of the precept, giving four days notice of the ſame; and to return the perſons choſen, together with the precept, to the ſheriff. But elections of knights of the ſhire muſt be proceeded to by the ſheriffs themſelves in perſon, at the next *county* COURT that ſhall happen after the delivery of the writ. If this court falls upon the day of delivering the writ, or within ſix days after, the ſheriff may adjourn the court and election to ſome other time, not longer than ſixteen days, nor ſhorter than ten; but he cannot alter the uſual place without conſent of the candidates: and in all ſuch caſes, ten days public notice muſt be given of the time and place of election. In order to prevent all undue influence, as ſoon as the time and place of election, in counties or boroughs, are fixed, all ſoldiers quartered in the place, are to remove, at leaſt one day before the election, to the diſtance of two miles or more; and not to return till one day after the poll is ended. By vote of the houſe of commons, no lord of *parliament*, or lord lieutenant of a county, hath any right to interfere in the election of commoners; and by ſtatute, the lord warden of the cinque ports ſhall not recommend any members there. If any officer of the exciſe, cuſtoms, ſtamps, or other branches of the revenue preſumes to intermeddle in elections, by perſuading or diſſuading any voter, he forfeits 100*l.* and is diſabled to hold any office.

For the proviſions againſt bribery. See BRIBERY.

On the day of election, the returning officer firſt takes an oath againſt bribery, and for the due execution of his office; the candidates alſo, if required, muſt ſwear to their qualifications; and the electors, both in counties and boroughs, are compellable to take the oath of abjuration and that againſt bribery and corruption. When the election is cloſed, the returning officer in boroughs returns his precept to the ſheriff with the perſons elected by the majority: and the ſheriff returns the whole, together with the writ for the county, and the knights elected, to the clerk of the crown in chancery, before the day of meeting, if it be a new *parliament*; or within fourteen days after the election, if it be an occaſional vacancy; under penalty of 500*l.* If the ſheriff does not return ſuch knights only as are duly elected, he forfeits by the old ſtatutes of Henry VI. 100*l.* and the returning officer in boroughs for a like falſe return, 40*l.* and they are beſides liable to an action, in which double damages ſhall be recovered, by the later ſtatutes of king William: and any perſon bribing the returning officer ſhall alſo forfeit 300*l.* But the members returned by him are the ſitting members, until the houſe of commons, upon petition, ſhall adjudge the return to be falſe and illegal.

The privileges of *parliament* are very large and indefinite: the chief of theſe are privilege of ſpeech, of perſon, of their domeſtics, and of their lands and goods. Privilege of ſpeech is declared to be one of the liberties of the people, and it is declared by ſtatute 1 W. and M. ſtat. 2. cap. 2. that the freedom of ſpeech and debates, and proceedings in *parliament*, ought not to be impeached or queſtioned, in any court or place out of *parliament*.—And this freedom of ſpeech is particularly demanded of the king in perſon, by the ſpeaker of the houſe of commons, at the opening of every new *parliament*. So likewiſe are the other privileges, which are immunities as ancient as Edward the Confeſſor, and the old Gothic conſtitution. To aſſault by violence a member of either houſe, or his menial ſervants, is a high contempt of *parliament*, and there puniſhed with the utmoſt ſeverity: and there are alſo penalties annexed to it in the courts of law, by Hen. IV. cap. 6. and 11 Hen. VI. cap. 11. Neither can any member of either houſe be arreſted and taken into cuſtody, nor ſerved with any proceſs of the courts of law; nor can his menial ſervants be arreſted; nor can any entry be made on his lands; nor can his goods be diſtrained or ſeized; without a breach of the privilege of *parliament*. Theſe privileges laſt, however, only during the ſeſſion of *parliament*, excepting as they reſpect the freedom of perſon, which in a peer is always inviolable, and in a commoner for forty days after every prorogation, and forty days before the next meeting; and this is commonly as long as the *parliament* ſubſiſts. See farther, on this ſubject, under the article COMMONS.

As to the ſpecial privileges and claims of peers, we may obſerve, that, by the *charter of the* FOREST, confirmed in *parliament* 9 Hen. III. every lord ſpiritual or temporal, ſummoned to *parliament*, and paſſing through the king's foreſts, may, both in going and returning, kill one or two of the king's deer without warrant. They have alſo a right to be attended by the judges of the court of king's bench and common pleas, and ſuch of the barons of the exchequer as are of the degree of the coif, or have been made ſerjeants at law, and likewiſe by the maſters of the court of chancery, for their advice in point of law, &c. The ſecretaries of ſtate, the attorney and ſolicitor general, and the reſt of the king's learned counſel, being ſerjeants, were alſo uſed to attend the houſe of peers, and have, to this day, their regular writs of ſummons iſſued out at the beginning of every *parliament*: but as many of them have of late years been members of the houſe of commons, their attendance here is fallen into diſuſe. Every peer, by licence obtained from the king, may make another lord of *parliament* his proxy, to vote for him in his abſence; which no member of the houſe of commons can do, becauſe he is himſelf but a proxy for a multitude of other people. Each peer has alſo a right, by leave of the houſe, when a vote paſſes contrary to his ſentiments, to enter his diſſent on the journals of the houſe, with the reaſons for ſuch diſſent, which is uſually ſtyled his PROTEST. All bills, likewiſe, that may in their conſequences affect the rights of the peerage, are by cuſtom of *parliament* to have their commencement in the houſe of peers, and to ſuffer no amendment or changes in the houſe of commons. Moreover, the ſtatute 6 Ann. cap. 23. which regulates the election of the ſixteen repreſentative peers of North Britain, peculiarly relates to the houſe of lords.

The ſpecial privilege and right of the houſe of commons comprehend all grants of ſubſidies or parliamentary aids, which begin with them, and are firſt beſtowed in their houſe. See MONEY *bills*.

The place where the *parliament* meets is wherever the king pleaſes: of late it has been in the palace of Weſtminſter, the lords and commons each in a diſtinct apartment. In the lords houſe the princes of the blood are placed in diſtinct ſeats; the great officers of ſtate, dukes, marquiſes, and biſhops, on benches, and the viſcounts and barons on others acroſs the houſe; all according to their order of creation, place, &c.

The commons ſit promiſcuouſly, forty members conſtituting a houſe; only the ſpeaker has a chair at the upper end; and the clerk and his aſſiſtant at a table near him. See SPEAKER.

As to the manner of debating and paſſing bills in PARLIAMENT.

To bring a BILL into the houſe, if relief ſought by it is of a private nature, it is firſt neceſſary to prefer a petition; which muſt be preſented by a member, and uſually ſets forth the grievance deſired to be remedied. This petition (when founded on facts that may be in their nature diſputed) is referred to a committee of members, who examine the matter alledged, and accordingly report it to the houſe; and then (or otherwiſe upon the mere petition) leave is given to bring in the bill. In public matters the bill is brought in upon motion made to the houſe, without any petition at all. Formerly, all bills were drawn in the form of petitions, which were entered upon the *parliament rolls*, with the king's anſwer thereunto ſubjoined; not in any ſettled form of words, but as the circumſtances of the caſe required: and at the end of each *parliament* the judges drew them into the form of a ſtatute, which was entered on the *ſtatute rolls*. In the reign of Henry V. to prevent miſtakes and abuſes, the ſtatutes were drawn up by the judges before the end of *parliament*; and, in the reign of Henry VI. bills in the form of acts, according to the modern cuſtom, were firſt introduced.

The perſons directed to bring in the bill, preſent it in a competent time to the houſe, drawn out on paper, with a multitude of blanks, or void ſpaces, where any thing occurs that is dubious, or neceſſary to be ſettled by the *parliament* itſelf (ſuch, eſpecially, as the preciſe date of times, the nature and quantity of penalties, or of any ſums of money to be raiſed); being indeed only the ſkeleton of the bill. In the houſe of lords, if the bill begins there, it is (when of a private nature) referred to two of the judges, to examine and report the ſtate of the facts alledged, to ſee that all neceſſary parties conſent, and to ſettle all points of technical propriety. This is read a firſt time, and at a convenient diſtance a ſecond time; and after each reading the ſpeaker opens to the houſe the ſubſtance of the bill, and puts the queſtion, whether it ſhall proceed any farther.

The introduction of the bill may be originally oppoſed, as the bill itſelf may at either of the readings; and, if the oppoſition ſucceeds, the bill muſt be dropped for that ſeſſions: as it muſt alſo, if oppoſed with ſucceſs in any of the ſubſequent ſtages.

After the ſecond reading it is committed, that is, referred to a committee; which is either ſelected by the houſe in matters of ſmall importance, or elſe, upon a bill of conſequence, the houſe reſolves itſelf into a committee of the whole houſe. A committee of the whole houſe is compoſed of every member; and, to form it, the ſpeaker quits the chair (another member being appointed chairman), and may ſit and debate as a private member. In theſe committees the bill is debated clauſe by clauſe, amendments made, the blanks filled up, and ſometimes the bill entirely new modelled. After it has gone through the committee, the chairman reports it to the houſe with ſuch amendments as the committee have made; and then the houſe reconſider the whole bill again, and the queſtion is repeatedly put upon every clauſe and amendment. When the houſe have agreed or diſagreed to the amendments of the committee, and ſometimes added new amendments of their own, the bill is then ordered to be engroſſed, or written in a ſtrong groſs hand, on one or more long rolls (or preſſes) of parchment ſewed together. When this is finiſhed, it is read a third time, and amendments are ſometimes then made to it; and, if a new clauſe be added, it is done by tacking a ſeparate piece of parchment to the bill, which is called a rider. The ſpeaker then again opens the contents; and, holding it up in his hands, puts the queſtion whether the bill ſhall paſs. If this is agreed to, the title to it is then ſettled; which uſed to be a general one for all the acts paſſed in the ſeſſion, till, in the fifth year of Henry VIII. diſtinct titles were introduced for each chapter. After this, one of the members is directed to carry it to the lords, and deſire their concurrence; who, attended by ſeveral more, carries it to the bar of the houſe of peers, and there delivers it to their ſpeaker, who comes down from his woolſack to receive it.

It there paſſes through the ſame forms as in the other houſe (except engroſſing, which is already done), and if rejected, no more notice is taken, but it paſſes *ſub ſilentio*, to prevent unbecoming altercations. But, if it is agreed to, the lords ſend a meſſage, by two maſters in chancery (or ſometimes two of the judges), that they have agreed to the ſame: and the bill remains with the lords, if they have made no amendment to it. But if any amendments are made, ſuch amendments are ſent down with the bill to receive the concurrence of the commons. If the commons diſagree to the amendments, a conference uſually follows between members deputed from each houſe; who for the moſt part ſettle and adjuſt the difference: but, if both houſes remain inflexible, the bill is dropped. If the commons agree to the amendments, the bill is ſent back to the lords, by one of the members, with a meſſage to acquaint them therewith. The ſame forms are obſerved, *mutatis mutandis*, when the bill begins in the houſe of lords. But, when an act of grace or pardon is paſſed, it is firſt ſigned by his majeſty, and then read once only in each of the houſes, without any new engroſſing or amendment. And when both houſes have done with any bill, it always is depoſited in the houſe of peers, to wait the royal aſſent; except in the caſe of a money-bill, which, after receiving the concurrence of the lords, is ſent back to the houſe of commons.

The royal aſſent may be given two ways. 1. In perſon; when the king comes to the houſe of peers, in his crown and royal robes, and ſending for the commons to the bar, the titles of all the bills that have paſſed both houſes are read; and the king's anſwer is declared by the clerk of the *parliament* in Norman-French. If the king conſents to a public bill, the clerk uſually declares, "*le roy la veut*; *the king wills it ſo to be*;" if to a private bill, "*ſoit fait come il eſt deſirè*; *be it as it is de-*"*ſired*." If the king refuſes his aſſent, it is in the gentle language of "*le roy s' aviſera*; *the king will ad-*"*viſe upon it*." When a money-bill is paſſed, it is carried up and preſented to the king by the ſpeaker of the houſe of commons; and the royal aſſent is thus expreſſed, "*le roy remercie ſes loyal ſubjects, accepte lour* "*benevolence, et auſſi le veut*; *the king thanks his loyal* "*ſubjects, accepts their benevolence, and wills it ſo to be*."

In caſe of an act of grace, which originally proceeds from the crown, and has the royal aſſent in the firſt ſtage of it, the clerk of the *parliament* thus pronounces the gratitude of the ſubject; "*les prelates, ſeigneurs, et* "*commons, en ce preſen* parliament *aſſemblees, au nom de* "*touts vous autres ſubjects, remercient tres humblement* "*votre majeſte, et prient a Dieu vous donner en ſante bone* "*vie et longue*; *the prelates, lords, and commons, in this* "*preſent* parliament *aſſembled, in the name of all your other* "*ſubjects, moſt humbly thank your majeſty, and pray to* "*God to grant you in health and wealth long to live*."

2. By the ſtatute 33 Hen. VIII. cap. 21. the king may give his aſſent, by letters patent, under his great ſeal, ſigned with his hand, and notified, in his abſence to both houſes, aſſembled together in the high houſe. And when the bill has received the royal aſſent, in either of theſe ways, it is then, and not before, a ſtatute or act of *parliament*. A copy of which is uſually printed at the king's preſs, for the information of the whole land. See, on this article, Blackſt. Com. book i. chap. 2.

Parliament, *adjournment of*, is a continuance of the ſeſſion from one day to another, as the word ſignifies, which is done by the authority of each houſe ſeparately, every day, and ſometimes for a fortnight or a month together: but the adjournment of one houſe is no adjournment of the other.

Parliament, *diſſolution of*, is the civil death of the *parliament*, which may be effected either by the king's will, expreſſed in perſon, or by repreſentation: or by the demiſe of the crown, in which caſe it is enacted, by 7 & 8 Will. III. cap. 15. and 6 Anne, cap. 7. that the *parliament* in being ſhall continue for ſix months after the death of any king or queen, unleſs ſooner prorogued or diſſolved by the ſucceſſor; and that if, at the time of the king's death, it ſtands adjourned or prorogued, it ſhall aſſemble immediately; and that, if no *parliament* is then in being, the members of the laſt *parliament* ſhall aſſemble, and be again a *parliament*: or, laſtly, by length of time, which, by 6 W. and M. cap. 2. was three years; but, by 1 Geo. I. ſtat. 2. cap. 38. is now ſeven years; ſo that the *parliament* muſt expire or die a natural death at the end of every ſeventh year.

Parliament, *prorogation of*, is the continuance of it from one ſeſſion to another. This is done by the royal authority, expreſſed either by the lord chancellor, in his majeſty's preſence, or by commiſſion from the crown, or frequently by proclamation. Both houſes are neceſſarily prorogued at the ſame time: it not being a prorogation of the houſe of lords or commons, but of the *parliament*.

The difference between a prorogation and an adjournment is obvious: the former puts an end to the ſeſſion, and then ſuch bills as are only begun, and not perfected, muſt be reſumed *de novo* (if at all) in a ſubſequent ſeſſion: whereas, after an adjournment, all things continue in the ſame ſtate, and may be proceeded on without any freſh commencement.

Parliament-*houſe, porter of*. See Porter.

Parliament, *rolls of*. See Rolls.

Parliament, *ſeſſion of*. See Session.

Parliament is ſometimes alſo uſed for other aſſemblies beſide thoſe of the ſtates of the realm. Thus we read, that the abbot of Croyland was uſed to call *parliaments* of his monks, to conſult of the affairs of the monaſtery. And, at this day, an aſſembly of the two Temples, called to conſult of their common affairs, is called a *parliament*.

Parliaments *of France* are courts, or aſſemblies, eſtabliſhed by the king to judge of the differences between particular perſons, and to pronounce on appeals from ſentences given by inferior judges.

There are twelve of theſe *parliaments* in France: that of Tholouſe, eſtabliſhed in 1302; that of Dijon, in 1476; that of Grenoble, in 1453; that of Rouen, in 1499; that of Rennes, in Bretagne, in 1553; that of Bourdeaux, according to Du-Cange, in 1460; that of Aix, in 1501; that of Metz, in 1633; that of Pau, in Bearn, in 1519; that of Beſançon, in 1422; that of Doway, in 1668; and that of Paris, about 1254.

The *parliament* of Paris is the principal, and that whoſe juriſdiction is of the greateſt extent. This is the chief court of juſtice throughout the realm. It conſiſts of eight chambers: the grand chamber, where cauſes of audience are pleaded; the chamber of written law; the chamber of counſel; the Tournelle criminelle, for judging criminal affairs; the Tournelle civile, in aid of the grand chamber; and three chambers of inqueſts, where proceſſes are adjudged in writing: beſides theſe, there is alſo the chamber of vacations, and thoſe of requeſts.

In 1771, the king thought fit to branch the *parliament* of Paris into ſix different *parliaments*, under the denomination of ſuperior courts, each *parliament* having ſimilar juriſdiction.

Under their ſecond race of kings, this *parliament*, like that of England, was the king's council; it gave audience to ambaſſadors, and conſulted of the affairs of war and government.

The king, like our's, at that time preſided in them, without being at all maſters of their reſolution. But, in after-times, their authority has been abridged; the kings having reſerved the deciſion of the grand affairs of the public to their own councils; leaving none but private ones to the *parliaments*.

PARLIAMENTUM *indoctorum*, a denomination given to a *parliament*, held at Coventry, 6 Henry VI. whereunto, by ſpecial precept to the ſheriffs of the ſeveral counties, no lawyer, or perſon ſkilled in the law, was to be called.

Parliamentum *inſanum*, was a *parliament* held at Oxford, anno 41 Henry III. thus called, ſay our chronicles, becauſe the lords came with great retinues of armed men to it; and many things were violently tranſacted therein againſt the king's prerogative.

Parliamentum *diabolicum*, was a *parliament* held at Coventry, 38 Henry VI. wherein Edward, earl of March (afterwards king), and ſeveral others, were attainted.—The acts paſſed herein were annulled by the ſucceeding *parliament*.

Parliamentum *de la bande*, was a *parliament* in Edward II's time, whereto the barons came armed againſt the two Spencers, with coloured bands on their ſleeves, for diſtinction.

Parliament-*heel*, in *Sea-Language*, the ſituation of a ſhip, when ſhe is made to ſtoop a little to one ſide, ſo as to clean the upper part of her bottom on the other ſide, and to cover it with a new compoſition; and afterwards to perform the ſame office on that part of the bottom which was firſt immerſed. See Boot-*topping*.

PARLIAMENTARIAN is a term uſed to denote thoſe, who, in the time of the civil war, were attached to the *parliament*, in oppoſition to the royaliſts, devoted to the king.

PARLOUR, *parloir*, from the French *parler*, *to talk*, in nunneries, a little room or cloſet, where people talk to the nuns, through a kind of grated window.

Anciently there were alſo *parlours* in the convents of monks, where the novices uſed to converſe together at the hours of recreation; but there were liſtening places over, from whence the ſuperiors could hear every thing they ſaid. Such a one there ſtill ſubſiſts in the abbey St. German de Prez.

In the order of Feuillans, the *parlour* is a little room open on all ſides, placed at each end of the dormitory, where the monks talk together, it not being allowed them to ſpeak in the dormitory.

PARMA, among *Antiquaries*, a kind of ancient buckler. Polybius deſcribes the *parma* as very ſtrong, round, three feet in diameter, and big enough to cover the whole body; yet Servius on the Æneid, and even Virgil himſelf, mention it as a light piece of armour, in compariſon of the clypeus, though bigger than the pelta.

PARMASITTY, the popular name for *ſperma ceti*.

PARMENIDES'*s philoſophy*. See Eleatic.

PARMESAN. See Paduan.

Parmesan is a name given to cheeſe, much eſteemed among the Italians, and made at *Parmeſan*, whence it is conveyed to various parts of Europe.

The excellent paſture grounds of this country are watered by the Po; and the cows, from whoſe milk this cheeſe is made, yield a great quantity of it. Of this cheeſe there are three ſorts, the *fromaggio di forma*, about two palms in diameter, and ſeven or eight inches thick; and the *fromaggio di ribiole* and *di ribolini*, which are not ſo large. This cheeſe is of a ſaffron colour, and the beſt is kept three or four years.

PARNASSIA, in *Botany*. See Grass *of Parnaſſus*.

PARNASSUS, in *Geography* and *Mythology*, a mountain in Greece, conſecrated, by the poets, to the Muſes, thence called Parnaſſides, to Apollo and to Bacchus. It is deſcribed as having two ſummits, between which ariſes the Caſtalian fountain. The Greeks call this mountain Licaoura.

PARNOPS, in *Natural Hiſtory*, the name of a ſpecies of waſp, found very frequently in vineyards, and among the wine preſſes, eſpecially in hot countries. It is diſtinguiſhed from all the other waſps by the roundneſs of its body, which is not ſlender or flatted in the common way, but round and tumid.

PAROCHETEUSIS, from ϖαρα and οχετευω, from οχετος, *a canal*, a term uſed by Hippocrates to expreſs a derivation of the humours from one part, in order to the evacuating them by another not far diſtant. This is often a very happy turn for the cure of a diſeaſe.

PAROCHIAL, ſomething belonging to a pariſh. See PARISH and EXTRAPAROCHIAL.

Every church is either cathedral, collegiate, or *parochial*.

Cathedral is where there is a biſhop's ſee, or ſeat, called *cathedra*. Collegiate conſiſts either of regular clerks, profeſſing ſome religious order; or of a dean and chapter.

Parochial church is that inſtituted for the performing of divine ſervice to the people who dwell within a certain compaſs of ground. See PARISH.

PAROCHUS, among the Romans, one who provided mules, tents, and carriages, with all other neceſſaries, for the provincial magiſtrates in their journies, as alſo for ambaſſadors. For, in the early times of the republic, they had their charges borne by the public, that the allies or provincials might not be burthened.

PARODICAL, *degrees*, in an equation, the ſeveral regular terms in the quadratic, cubic, biquadratic, or other equation, the indices of whoſe powers aſcend or deſcend orderly in an arithmetical progreſſion.

Thus, $Z^3 + Z^2M + Z^1r = S$ is a cubical equation where no term is wanting, but having all its *parodic degrees*, the indices of the terms regularly deſcending thus, 3, 2, 1, 0. Harris.

PARODY, *parodia*, formed from ϖαρα, and οδος, *via*, *way*, as being trite, or paſſing among the people, a popular maxim, adage, or proverb.

PARODY, ϖαρῳδια, is alſo a poetical pleaſantry, conſiſting in applying the verſes written on one ſubject, by way of ridicule, to another; or in turning a ſerious work into burleſque, by affecting to obſerve, as nearly as poſſible, the ſame thymes, words, or cadences.

The *parody* was firſt ſet on foot by the Greeks; from whom we borrow the name. It comes near to what ſome of our late writers call *traveſty*.

Others have more accurately diſtinguiſhed between a *parody* and burleſque: and they obſerve, that the change of a ſingle word may *parody* a verſe; or of a ſingle letter a word. Thus, in the laſt caſe, Cato expoſed the inconſtant diſpoſition of Marcus Fulvius Nobilior, by changing *Nobilior* into *Mobilior*.

Another kind of *parody* conſiſts in the mere application of ſome known verſe, or part of a verſe, of a writer, without making any change in it, with a view to expoſe it.

A fourth inſtance is that of writing verſes in the taſte and ſtyle of authors, little approved.

The rules of *parody* regard the choice of a ſubject, and the manner of treating it. The ſubject ſhould be a known and celebrated work: as to the manner, it ſhould be by an exact imitation, and an intermixture of good-natured pleaſantry. Mem. de l'Acad. Belles Lettres, tom. vii. p. 39, &c.

PARŒMIA, ϖαροιμια, formed from ϖαρα and οιμος, *way*; *quaſi*, ϖαρα οιμον, *juxta viam*; i. e. *tritam*, a PROVERB.

PAROL, *parole*, in *Law*, is ſometimes uſed in ancient writers for a plea in court.

PAROL *evidence*. See EVIDENCE.

PAROL *demurrer*, in *Law*, is a privilege allowed to an infant who is ſued concerning lands, which came to him by deſcent: and the court thereupon will give judgment, *Quod loquela prædicta remaneat quouſque*, the infant comes to the age of twenty-one years. And where the age is granted on *parol demurrer*, the writ doth not abate, but the plea is put *ſine die*, until the infant is of full age; and then there ſhall be a reſummons.

The granting of a *parol demurrer* is in favour of an infant, and for his benefit, that he may not be prejudiced in his right, for want of well knowing his eſtate, &c.

PAROL, *leaſe*, or *per* PAROL, is a LEASE by word of mouth; thus called to diſtinguiſh it from one in writing.

PAROLE, in *War*, &c. when a priſoner of war is allowed to go into his own country, or to his own party, upon his word and promiſe to return at a time apppointed, if not exchanged, he is ſaid to be out upon *parole*, i. e. upon his word.

PAROLE, *paſs*. See PASS-PAROLE.

PAROLI, in *Gaming*, the double of what was laid at ſtake, before. Hence to offer the *paroli*, &c.

PARONOMASIA, ϖαρονομασια, formed from ϖαρα, *near*, and ονομα, *name*, q. d. proximity or reſemblance of two names, in *Rhetoric*, a pun, or figure, whereby words nearly alike in ſound, but of very different ſenſes, are affectedly or deſignedly uſed.

As, not *friends* but *fiends* were here. So Tully to Antony, *cum in gremio mimarum* mentem & mentum *deponeres*: and to Atticus, *conſul ipſe* parvo *animo* & pravo, facie *magis quam* facetiis *ridiculus*. And that of P. Chryſologus, *monochorum cellulæ jam non* eremiticæ *ſed* aromiticæ. And, in another place, *hoc agant in* cellis *quod angeli in* cœlis.

Among the Greeks the *paronomaſia* was very familiar. Thus Herodotus, ϖαθηματα, μαθηματα, *quæ nocent, docent*. And thus that inſcription of Apollodorus, a celebrated painter, on one of his pieces.

Μωμησεται τις μαλλον, η μιμησεται.
It will be eaſier to deride, than to imitate.

PARONYCHIA, *whitlow*, in *Medicine*. See WHITLOW.

PARONYCHIA, in *Botany*. See WHITLOW-*graſs*.

PARONYMA, in *Grammar*, are words which have ſome affinity in their etymology.

PAROTIDES, ϖαρωτιδες, formed from ϖαρα, *near*, and ους, *ear*, in *Anatomy*, two large glands, ſituate behind the two ears; and filling all the ſpace between the poſterior angle of the under jaw, and the maſtoidal apophyſis.

They are of a conglomerate kind, and by divers excretory ducts, which at laſt coaleſce into one trunk, they diſcharge a humour ſeparated in them from the arterious blood, called *ſaliva*, into the mouth, by two veſſels, formed of ſeveral branches, uniting at the iſſue of theſe glands, and which run along the cheek to the third grinder.

PAROTIDES, in *Medicine*, tumors or inflammations, ariſing behind the ears, on the *parotid* glands.

Parotides are very frequent after malignant and peſtilential fevers: children alſo are particularly liable to them. They are to be treated like buboes. See BUBO.

Alexander Trallianus lays down a very good rule, in relation to a *parotis*, that is, at firſt to be ſure to bleed, before any diſcuſſing or drawing application be made; as thoſe who have been forward in doing this without bleeding, have been the inſtruments of ſtrangling their patients: and upon the ſame principle he very juſtly explodes the uſe of ſtrong repellers and aſtringents; ſuch as ſolanum, alum, &c. he deſcribes the medicines, which are proper to made theſe *parotides*, yield to diſcuſſion: an application which ought always to be attempted, where the caſe is capable of being cured by it, rather than ſuppuration: but if upon this the tumor does not in the leaſt ſubſide, and the pain continues, all endeavours, he ſays, ſhould be uſed to bring it to ſuppurate; and it is a ſign that matter is forming if a rigor and fever, which were not before, come on unexpectedly, and the pain increaſes. And Hippocrates pronounces thoſe *parotides*, which ſucceed long fevers, mortal, unleſs they ſuppurate. When theſe are obſtinate, and cannot be ripened by external applications, there have been inſtances where burning has brought them to ſuppurate. And Severinus, and Valeſius before him, have given an account how they have tried this practice in malignant *parotides*, with ſucceſs. Freind's Hiſtory of Phyſic.

In a ſuppuration of theſe, one caution only is needful; namely, to open the abſceſs, as ſoon as it can be ſuppoſed to have formed matter, without waiting for a fluctuation, or even ſoftneſs of the tumor, that may never happen, the pus being here ſo very viſcid, that after it is ripe, the part will feel as hard as if the ſuppuration had not begun. Pringle, Obſerv. on the Diſeaſes of the Army, p. 277.

PAROXYSM, ϖαροξυσμος, formed from ϖαρα, *much*, and οξυς, *acute*, in *Medicine*, the ſevere fit of a diſeaſe, under which it grows higher, or exaſperates; as of the gout, &c.

PAROXYSM is ſometimes alſo uſed for the acceſs or return of a diſeaſe that intermits; as an ague.

PARRELS, in a ſhip, are frames made of trucks, ribs, and ropes, which, having both their ends faſtened to the yards, are ſo contrived as to go round about the maſts, that the yards by this means may go up and down upon the maſts. Theſe alſo, with the breaſt-ropes, faſten the yards to the maſts.

There are four different ſorts of *parrels*; one of which is formed of a ſingle rope; another of a rope communicating with an aſſemblage of ribs and trucks; a third of a rope paſſing through ſeveral trucks, without any ribs; and the fourth of a truſs, by which the yard may be at any time ſlackened from the maſt, or confined to it as cloſe as poſſible. Theſe laſt are peculiar to the lower yards. The third are calculated for the cheeks of a gaff. The ſecond are always uſed for the top-ſail yards, and frequently for the lower yards, in merchant ſhips. And the firſt are ſeldom employed but for the top-gallant yards.

PARRHESIA, in *Rhetoric*, a figure in which a perſon admoniſhes or reproves another with art and addreſs, and in ſuch circumſtances as render it difficult to diſpleaſe. See Revelation, chap. ii. 2—5.

PARRICIDE, Parricida, or Patricida, in ſtrictneſs, denotes the murder or murderer of a father: as matricide does of a mother.

Though the word *parricide* is alſo ordinarily extended to both. The Romans, for a long time, had no law againſt *parricides*, which was alſo the caſe at Athens; from an opinion, that nobody could be ſo wicked as to kill his parents. L. Oſtius was the firſt who killed his father, five hundred years after Numa's death; and then the Pompeian law was made, which ordained, that the perſon convicted of this crime, after he had been firſt whipped till the blood came, ſhould be tied up in a leathern ſack, together with a dog, an ape, a cock, and a viper, and ſo thrown into the ſea, or the next river. By the Engliſh laws, this crime is treated no otherwiſe than as ſimple murder, unleſs the child was alſo the ſervant of his parent.

Parricide is alſo extended to the murder of any near relation, as a huſband, wife, brother, ſiſter, child, grand-child, uncle, &c. and even to that of great or ſacred perſons, though no way allied in blood, as a king, &c.

PARROQUET. See Parrot *infra*.

PARROT, in *Ornithology*, the Engliſh name expreſſing in general the whole pſittacus kind, but appropriated by uſe to that claſs only of them, which is of a middle ſize between the macaw and parroquet.

The *parrot*, in the Linnæan ſyſtem of *Ornithology*, makes a particular and diſtinct genus of birds, of the order of the *picæ*; the diſtinguiſhing characters which are, that the beak is hooked; that the upper mandible is furniſhed with a moveable cere; that the noſtrils are in the baſe of the beak; that the tongue is fleſhy, obtuſe, and entire, and that the feet are formed for climbing. Linnæus enumerates forty-ſeven ſpecies.

The *parrot* is a very well known bird, of which there are ſeveral very beautiful ſpecies.

Its head is large, and beak and ſkull extremely hard and ſtrong.

It might ſeem a wonder why nature has deſtined to this, which is not naturally a bird of prey, but feeds on fruits and other vegetable ſubſtances, the crooked beak, allotted to the hawk and other carnivorous birds; but the reaſon ſeems to be, that the *parrot*, being a heavy bird and its legs not very fit for ſervice, it climbs up and, down trees by the help of this ſharp and hooked bill, with which it lays hold of any thing, and ſecures itſelf, before it ſtirs a foot; and beſides this, it helps itſelf forward very much, by pulling its body on with this hold.

Of all animals, the *parrot* and crocodile are the only ones which move the upper jaw: all creatures elſe moving the lower only. As ſome particular animals beſides are fond of particular foods, ſo the *parrot* loves nothing ſo much as the ſeeds of the carthamus, or baſtard ſaffron; and eats them without any hurt, though they are a purge when given to other creatures.

The *parrots* are common both in the Eaſt and Weſt Indies: they are a very briſk and lively bird in the warmer countries, but with us loſe much of their vigour. They lay two or three eggs in the hollow of a tree.

In all the known *parrots*, the noſtrils are round, and placed very high upon the beak, and very near one another.

Parrots are divided into three kinds. 1. The larger, which are as big as a moderate fowl, called *macaos* and *cocketoons*; theſe have very long tails. 2. The middle ſized ones, commonly called *parrots*, which have ſhort tails, and are little larger than a pigeon. And, 3. The ſmall ones, which are called *parroquets* or *peroquets*, and have long tails, and are not larger than a lark or blackbird. Ray.

PARRYING, in *Fencing*, the action of defending a man's ſelf, or of ſtaving off the thruſts, ſtrokes, &c. offered him by another. See Fencing.

Good fencers puſh and *parry* at the ſame time.

The Spaniards *parry* with the poinard. The ancients *parried* with their bucklers.

PARSLEY, in *Botany*. For the characters, ſee Apium.

The common *parſley* ſhould be ſown early in the ſpring, for the ſeeds remain a long time in the earth, the plants ſeldom appearing in leſs than ſix weeks after the ſeeds are ſown. It is generally ſown in drills, by the edges of the borders, in the kitchen-gardens, near London; becauſe it is much eaſier to keep it clear from weeds, than if the ſeeds were ſown promiſcuouſly on a border; and the *parſley* is much ſooner cut for uſe: but when the roots are deſired for medicinal uſe, then the ſeeds muſt be ſown thin; and, when the plants are come up, they ſhould be hoed out ſingle, as is practiſed for carrots, onions, &c. obſerving alſo to cut up the weeds: if this be obſerved, the roots will become fit for uſe by July or Auguſt.

The common *parſley* is, by ſome ſkilful perſons, cultivated in fields for the uſe of ſheep, it being a ſovereign remedy to preſerve them from the rot, provided they are fed twice a week, for two or three hours each time, with this herb; but hares and rabbits are ſo fond of it, that they will come from a great diſtance to feed upon it; and in countries where theſe animals abound, they will deſtroy it, if it is not very ſecurely fenced againſt them: ſo that whoever has a mind to have plenty of hares in their fields, by cultivating *parſley* will draw all the hares of the country to them. Miller.

The root of *parſley* is one of the five opening roots.

Parſley is eſteemed opening, attenuating, diuretic, but liable to produce flatulencies; and is uſed for obſtructions of the liver and ſpleen; it helps the jaundice; and is of ſervice againſt the ſtone, gravel, and ſtrangury. The ſeeds are ſaid to be carminative, reſolvent, and diuretic; and commended, in the German Ephemerides, for deſtroying cutaneous inſects in children.

A diſtilled water of *parſley*, which partakes of the virtues of the plant, is directed by the college to be kept in the ſhops. James.

Parsley, *baſtard*, *caucalis*, in *Botany*, a genus of the *pentandria digynia* claſs, one of the umbelliferous plants, with oblong ſeeds a little furrowed and prickly; the petals of the flower are unequal and heart-ſhaped.

There is no great uſe or beauty in this plant; it may ſuffice, therefore, to ſay, that whoſoever chuſes to cultivate them, ſhould ſow the ſeeds in autumn, ſoon after they are ripe. Miller. Linnæus enumerates ſeven ſpecies. They grow wild in England.

Parsley, *corn*, *field* Parsley, or *baſtard ſtone* Parsley, *ſiſon*, in *Botany*, a genus of the *pentandria digynia* claſs. The characters are, that it has an unbellated flower; the general umbel is compoſed of ſix thin rays, or unequal ſmall umbels; and the ſmaller have ten; the involucra of both are four-leaved and unequal; and the empalement of the flower is ſcarce diſcernible; the flowers have five equal pear-ſhaped and inflexed petals; and five hair-like ſtamina, terminated by ſingle ſummits; the oval germen, which ſupports two reflexed ſtyles, crowned by obtuſe ſtigmas, becomes an oval ſtreaked fruit, dividing into two parts, each containing one oval ſtreaked ſeed, convex on one ſide, and plain on the other. Miller enumerates four, but Linnæus ſix ſpecies.

Parsley, *fool's*. See Æthusa and Hemlock.

Parsley, *Macedonian*. See Bubon and Petroselinum *Macedonicum*.

Parsley, *milky*, *ſelinum*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: it has an umbellated flower; the general umbel is plain and ſpreading; the particular umbels are the ſame; the involucrum is compoſed of many linear ſpear-ſhaped leaves, which ſpread open: the umbel is uniform; the flowers have five inflexed heart-ſhaped petals, which are unequal, and five hair-like ſtamina, terminated by roundiſh ſummits; the germen is ſituated under the flower, ſupporting two reflexed ſtyles, crowned by ſingle ſtigmas; it afterward becomes a plain compreſſed fruit, channelled on both ſides, parting in two, containing two oblong elliptical plain ſeeds, channelled in the middle, and having membranes on both ſides. Miller enumerates two, and Linnæus four ſpecies.

Theſe plants are preſerved in botanic gardens for variety, but are rarely cultivated any where elſe; they are eaſily propagated by ſeeds, which ſhould be ſown in autumn, and the plants afterwards treated in the ſame way as angelica. Miller.

Parsley, *mountain*. See Spignel.

Parsley-*piert*. See Aphanes.

PARSLING, on ſhip-board. See Parcelling.

PARSNEP, *paſtinaca*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: it hath an umbellated flower; the principal umbel is compoſed of many ſmaller, and theſe are likewiſe compoſed of ſeveral rays; they have no involucrum; and the empalement is ſcarcely viſible; the umbel in uniform; the flowers have five ſpear-ſhaped incurved petals, and five hair-like ſtamina; the germen is ſituated under the flower, ſupporting two reflexed ſtyles; the germen afterward

ward becomes an elliptical, plain, compreſſed fruit, dividing into two parts, having two bordered elliptical ſeeds. There are three ſpecies.

The *paſnep* is to be propagated by ſowing the ſeeds in February or March, in a rich mellow ſoil, which muſt be deep dug, that the roots may be able to run deep without hindrance.

It is a common practice to ſow carrots at the ſame time, upon the ſame ground with the *parſneps*; and if the carrots are deſigned to be drawn young, there is no harm in it. The *parſneps*, when they are grown up a little, muſt be thinned to ten inches or a foot diſtance, and carefully kept clear of weeds. They are fineſt taſted juſt at the ſeaſon when the leaves are decayed; and ſuch as are deſirous to eat them in the ſpring, ſhould have them taken up in the beginning of February, and preſerved in ſand, where they will remain good till the middle of April or later. When the ſeeds are to be ſaved, ſome very ſtrong and fine plants ſhould be left for it, at two feet diſtance; and towards the end of Auguſt or the beginning of September, the ſeeds will be ripe: they muſt then be carefully gathered and dried on a coarſe cloth. They ſhould always be ſown the ſpring following, for they do not keep well.

The common wild *parſnep* is frequent by road-ſides and in dry paſtures; it flowers in June and July, and ripens its ſeeds in September. The ſeeds are warm and carminative, though not ſo violently hot as the carraway-ſeeds and others which we commonly uſe on theſe occaſions. They diſpel ſtatuſes, and are in great eſteem among the country people for curing the colic. They are alſo diuretic and aperient, and gently promote the menſes.

Haller reports, that, made into pills, with extract of liquorice, they were much uſed by Boerhaave againſt nephritic complaints and ulcerations of the bladder.

PARSNEP, *cow*, *ſphondylium* or *heracleum*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: it has an umbellated flower; the principal umbel is compoſed of many ſmaller, which are flat; the involucrum of the general umbel has many leaves, which decay; the particular ones have from three to ſeven leaves; the general umbel is deformed; the flowers in the middle of the diſk have five equal, crooked, inflexed petals; thoſe of the rays are unequal; they have five ſtamina which are longer than the petals, terminated by ſmall ſummits, and an oval germen ſituated under the flower, ſupporting two ſhort ſtyles, crowned by ſingle ſtigmas; the germen turns to an elliptical compreſſed fruit, furrowed on each ſide, containing two compreſſed leafy ſeeds. Miller enumerates five, and Linnæus ſix ſpecies.

The common *cow-parſnep*, which is frequent in our meadows and paſtures, and flowers in July and Auguſt, is recommended by Dr. Willis, and many others, as one of the beſt nervous ſimples our nation produces, and it is pity that it is not brought more into practice. The ſeed is the part in which its virtues are contained in greateſt perfection, and is a very good medicine in hyſteric caſes, given in powder or infuſion.

PARSNEP, *prickly*, *echinophora*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: it hath an umbellated flower, the flowers have five unequal petals; they have each five ſtamina, terminated by roundiſh ſummits; under the perianthium is ſituated an oblong germen, within the empalement, which turns to two ſeeds, which are encloſed in the empalement.—There are two ſpecies.

PARSNEP, *water*, the name of a ſpeciee of *ſium*. See SKIRRET..

PARSON, *perſona*, the rector or incumbent of a pariſh-church.

He is ſaid, by ſome, to be thus called by way of eminence; the revenues of a church being deſtined to maintain *magnum perſonam*; or, as ſome will have it, becauſe he is bound by virtue of his office, *in propria perſona ſervire Deo*; whence *imperſonare*, in old charters, is to put in poſſeſſion of a parſonage, &c. Or according to others, becauſe the original *parſons*, *perſonæ*, were, in reality, only dignitaries, and poſſeſſed benefices, which gave them ſome perſonal pre-eminences in the church or chapter, but no power. Or, laſtly, according to others, becauſe the *parſon*, for his time, repreſents his church, being in himſelf a body corporate, and ſuſtaineth the perſon thereof, as well in ſuing, as being ſued, in any action touching the ſame.

Some diſtinguiſh between a rector and *parſon*: the rector, ſay they, is where the vicarage is endowed; and the *parſon*, *perſona*, where the parſonage is without a vicarage; the diſtinction ſeems new and ſubtle. Bracton apparently uſes rector and *parſon* as ſynonymous terms.

For the difference between a *parſon* and vicar, ſee VICAR.

Formerly, he who had a church by inſtitution and induction, only for his own life, was called *parſon mortal*: but any collegiate or conventual body, to whom the church was for ever appropriated, was called *parſon immortal*.

Some, again, make a diſtinction between *parſon* ſimply, and *parſon imperſonee*, or imperſonated.

Parſon imperſonee is the rector or incumbent in poſſeſſion of a pariſh-church, whether preſentative or impropriate, and with whom the church is full: or a *parſon imperſonee* is a clerk preſented, inſtituted, and inducted into a rectory, and, therefore, in complete poſſeſſion.

Parſon ſimply, they contend, is properly the patron, or he that has the right of a preſentation: called *parſon*, becauſe, before the Lateran council, he had a right to the tythes, in reſpect of his liberality in erecting or endowing the church, *quaſi ſuſtineret perſonam eccleſiæ*.

It is certain, in the regiſter of writs, *perſona imperſonata* is uſed for the rector of a benefice preſentative: and, in Dyer, a dean and chapter are ſaid to be *parſons imperſonees* of a benefice appropriated to them. So that *perſonata* ſeems only changed into *imperſonata*, in reſpect of the poſſeſſion of the benefices. See Coke on Litt. fol. 300.

PARSONAGE, a rectory, or pariſh-church, endowed ordinarily with houſe, glebe, and tythe, for the maintenance of a miniſter, with cure of ſouls, within ſuch pariſh.

There may alſo be a rectory or *parſonage* without any glebe land, except the church and church-yard; and without any tythes, or other fixed income, except an annual payment, or pound rate.

PARSONAGE, in its original, and, at this day, in other countries, is a benefice, which gives ſome prerogative, or pre-eminence in a church or chapter, but without any juriſdiction.

The ancient *parſonages* gave a little honour and dignity as to the perſon, but they gave no power; whence, apparently, the name, intimating the effect of the dignity to be reſtrained to the perſon, *perſona*, *parſon*.

Such are ſtill the chantries in ſeveral churches, and the ſub-chantries in others.

Some, as Oldrade, &c. extend the word *parſonage* to dignitary, and comprehend under it the archdeacons, deans, &c. in cathedrals; but this ſeems to be ſtraining the ſenſe of the word.

In effect, the canoniſts uſe the term very differently; ſome applying it to all who have any prerogative in the choir or chapter, over the other canons, either in options, ſuffrages, elections, or barely in place and proceſſion; thus confounding it with dignity; while others apply it to ſimple rectors, &c.

PART, *pars*, a portion of ſome whole, conſidered as divided, or as diviſible.

Quantity is diviſible into an infinite number of *parts*; not equal *parts*, but proportional ones. Philoſophy is divided into four *parts*; viz. logics, ethics, phyſics, and metaphyſics.

The ſchoolmen uſually diſtinguiſh *parts* into logical and phyſical.

PART, *logical*, is that referring to ſome univerſal as its whole; in which ſenſe, the ſpecies are *parts* of a genus; and individuals or ſingulars are *parts* of the ſpecies.

PART, *phyſical*, is that which, though it enter the compoſition of a whole, may yet be conſidered apart, and under its own diſtinct idea; in which ſenſe, a continuum is ſaid to conſiſt of *parts*.

Phyſical parts, again, are of two kinds, homogeneous and heterogeneous; the firſt are thoſe of the ſame denomination with ſome other; the ſecond of a different one. See HOMOGENEOUS, &c.

Parts, again, are diſtinguiſhed into ſubjective, eſſential, and integrant.

PART, *ſubjective* or *potential*, is the ſame with logical *part*; viz. that contained in ſome univerſal whole, not in act, but only in power. As, man and horſe are in animal: Peter and Paul are in man.

PART, *eſſential*, is that, whereby, with the concurrence of ſome other, an eſſential whole is conſtituted. Thus, the body and ſoul are eſſential parts of men.

PART, *integrant*, or *integral*, is that which is neceſſary to the integrity of the whole. As, a head is of a man, &c.

Anatomiſts divide the *parts* of a human body into containing and contained; ſimilar, and diſſimilar; and the ſimilar again, into ſpermatic and ſanguineous, &c.

PARTS, *noble* or *eſſential*, are thoſe abſolutely neceſſary to life. As, the heart, lungs, liver, brain, &c.

PARTS, *natural* or *genital*, popularly called *privy parts*, are thoſe miniſtering to generation.

The fineſt writings of phyſicians are thoſe which treat of the uſe of the *parts*. Galen's works, *De Uſu Partium*, afford infinite arguments of the being and wiſdom of God.

Nature, we ſay, always diſcharges itſelf on the weak *part*, the diſeaſed *part*, the *part* affected, &c.

PARTS, *conſent of*. See CONSENT.

In chemiſtry, bodies are ſaid to be reſolved into their minute *parts*, their component *parts*, &c.

That art is ſaid to ſeparate the homogeneous *parts* from the heterogeneous; and the volatile, ſubtile, ſulphureous, mercurial, &c. *parts*, from the fixed, craſs, earthy, viſcid, &c. *parts*.

PART, in *Geometry* and *Aſtronomy*, is applied to the diviſions of lines and circles.

The ſemidiameter of the circle, called alſo the radius, and whole ſine, is divided into a hundred thouſand *parts*; and the circumference of the circle into three hundred and ſixty *parts* or degrees; in which two diviſions all the celeſtial computations are made.

PARTS, *aliquant* and *aliquot*. See the adjectives.

PART, *proportional*, is a *part* or number agreeable and analogous to ſome other *part* or number: or a medium to find ſome number or *part* unknown by proportion and equality of reaſon.

PARTS, *ſimilar*, are thoſe which are to one another as their wholes are to one another.

PART, *organical*. See ORGANICAL.

PART, in *Muſic*, denotes a piece of the ſcore or partition, written by itſelf, for the convenience of the muſician; or it is one or more of the ſucceſſions of ſounds which make the harmony, written apart.

Or, the *parts* are the ſounds made by ſeveral perſons ſinging or playing in a concert.

Muſic in *parts* was unknown to the ancients; they had but one *part*; all their harmony conſiſted in the ſucceſſion of notes, none in the conſonance.

There are four principal *parts*; the treble, baſs, tenor, and counter-tenor.

Some compare the four parts in muſic, to the four elements: the baſs, they ſay, repreſents the earth; the tenor, water; counter-tenor, air; and the treble, fire.

PART, in *Trigonometry*. In a rectangular ſpherical triangle, A B C, *Tab. Trigon. fig.* 22. that *part* lying between two others, conſidered as extremes, is called, by ſome authors, the middle *part*. Thus, if A B and B C be the extreme *parts*, the angle B will be the middle *part*.

If the *parts*, conſidered as extremes, be contiguous to the middle *part*, and one of the extremes; thoſe are called conjunct *parts*. Thus, if B be in the middle *part*, A B and B C will be in the conjunct *parts*.

If, between the extremes and the middle *part*, there lie another, beſides a right angle; then the *parts* are ſaid to be disjunct or ſeparate; e. g. if B be the middle term, A C and C will be disjunct *parts*; becauſe, between the middle *part* B, and the extreme C, there lies the hypothenuſe B C; and between the middle *part* B, and the other extreme A C, beſides the right angle, there lies the leg A B.

Thoſe *parts*, either joined to the middle *part*, or ſeparated from it, are called lateral *parts*. See CIRCULAR *parts*, TRIANGLE, and TRIGONOMETRY.

PARTS *of ſpeech*, in *Grammar*, are all the ſorts of words which enter the compoſition of diſcourſe.

The grammarians uſually admit of eight *parts of ſpeech*; viz. noun, pronoun, verb, participle, adverb, conjunction, prepoſition, and interjection. See each in its proper place, NOUN, PRONOUN, &c.

PART *of fortune*, in *Judiciary Aſtrology*, is the lunar horoſcope; or the point wherein the moon is, at the time when the ſun is in the aſcending point of the eaſt.

The ſun in the aſcendant is ſuppoſed, according to this ſcience, to give life; and the moon diſpenſes the radical moiſture, and is one of the cauſes of fortune. In horoſcopes the *part of fortune* is repreſented by a circle divided by a croſs.

PART, in the *Manege*, in French, *partir*, is uſed to ſignify the motion and action of a horſe when put on at full ſpeed. From the horſes *parting* to his ſtop there are commonly two hundred paces of ground. To make your horſe *part* with a good grace, you muſt put your bridle three fingers lower, and preſs gently with your heels, or only with the calves of your legs. See ECHAPER.

To PART *again*. See REPART.

PART *owners*, thoſe that are concerned in ſhip matters, and who have joint ſhares therein.

Art and PART, in *Law*. See ART.

Ex PARTE. See EX.

PARTERRE, in *Gardening*, that open part of the garden into which we enter, generally coming out of the houſe, uſually ſet with flowers, or divided into beds, encompaſſed with platbands, &c.

The *parterre* is a level diviſion of ground, which, for the moſt part, faces the ſouth and beſt beſt front of the houſe, and is generally well furniſhed with greens, flowers, &c.

There are divers kinds of *parterres*; as bowling-green or plain *parterres*; *parterres* of embroidery; and *parterres* cut in ſhell-work, in ſcroll-work, &c. with ſand-alleys between.

Plain *parterres* are moſt valuable in England, becauſe of the firmneſs of the Engliſh graſs turf, which is ſuperior to that of any other part of the world; and the *parterres* of embroidery are cut into ſhell and ſcroll-work, with alleys between them.

An oblong, or long ſquare, is accounted the moſt proper figure for a *parterre*; and a *parterre* ſhould, indeed, be always, at leaſt, twice or twice and a half as long as it is broad, becauſe, according to the known laws of perſpective, a long ſquare always ſinks to a ſquare; and an exact ſquare always appears leſs than it really is. As to the breadth of a *parterre*, it is to be proportionable to the front of the houſe: if the breadth of the houſe is a hundred feet, it ſhould be a hundred and fifty feet and if it be two hundred feet, it ſhould be fifty feet broader; but if the breadth of the front of the houſe is greater, the *parterre* may be made of the ſame dimenſion with the front.

PARTHENIUM, in *Botany*. See *Baſtard* FEVERFEW.

PARTI, PARTY, or PARTED, in *Heraldry*, is applied to a ſhield or eſcutcheon, denoting it divided, or marked out into partitions.

The French heralds, from whom we borrow the word, have but one kind of *parti*, the ſame with our *parti per pale*, which they ſimply call *parti*: but with us the word is applied to all the ſorts of partitioning: and is never uſed without ſome addition to ſpecify the particular kind intended.

Thus we have *parti*, or *parted per croſs*, *per chief*, *per pale*, *per feſs*, *per bend dexter*, *per bend ſiniſter*, *per chevron*, &c. See QUARTERING.

The humour of our anceſtors, Colombiere obſerves, turning much upon exploits of arms and chivalry, they uſed to preſerve their battered and hacked armour as honourable ſymbols of their hardy deeds; and thoſe who had been in the hotteſt ſervice were diſtinguiſhed by the moſt cuts and bruiſes that appeared on their ſhields. To perpetuate the memory hereof, ſays the ſame author, they cauſed them to be painted on their ſhields, and thus handed down to poſterity. And when heraldry grew into an art, and officers were appointed to direct the manner of bearing, and blazoning; they gave names to thoſe cuts, anſwerable to the nature thereof; appointing four, from which all the others proceed; theſe are *parti* (called by our heralds, *parti per pale*) *coupe* (*parti per feſs*), *tranche* (*parti per bend dexter*), and *taille* (*parti per bend ſiniſter*). See COUPED, TRANCHE, &c.

PARTI *per pale*. See PALE.

PARTI *per feſſe*. See FESSE.

PARTI *per bend dexter* is when the cut comes from the upper corner of the ſhield on the right hand, and deſcends athwart to the oppoſite lower corner.

PARTI *per bend ſiniſter* is when the cut coming from the upper left corner, deſcends acroſs to the oppoſite lower one.

From theſe four partitions have proceeded an infinite number of others of various and extravagant forms.

Spelman, in his Aſpilogia, obſerves, that the preſent diviſions of eſcutcheons were unknown in the reign of the emperor Theodoſius; and were brought up in the time of Charlemagne, or later; they were little uſed among the Engliſh in the days of king Henry II. but more frequently under Edward III.

The erect or upright ſection, he obſerves, is called in Latin *palaris*, from its reſemblance to a *palus*, or *ſtake*; and two coats are often entire on the ſides, the huſband's on the right, and the wife's on the left. The direct ſection acroſs, being in the place of a belt, is called *baltica*, &c.

When the ſhield is *parti*, and *coupée*, it is ſaid to be *ecartelé*.

It is ſaid to be *parti one from the other*, when the whole ſhield is charged with ſome honourable bearing divided by the ſame line that parts the ſhield. Here it is a rule, that one ſide be of metal, and the other of colour. Thus he bears ſable, *parti* d'argent, a ſpread eagle *parti* from one to the other.

PARTIAL *cauſe*. See CAUSE.

PARTIAL *eclipſe*. See ECLIPSE.

PARTICIPATION, *participatio*, that which gives us a part or ſhare in any thing, either by right or grace.

In Italy they diſtinguiſh *participating officers*, as prothonotaries, &c. which have a real function; from *honorary* ones, which have only a title, without any duty or employ.

Participationis *medium*. See **Medium**.

PARTICIPLE, *participium*, in *Grammar*, an adjective formed of a verb; ſo called becauſe it ſtill participates of ſome of the properties of the verb; retaining the regimen and ſignification thereof: whence moſt authors confound it with the verb.

Mr. Harris obſerves, that, as a complete **verb** is expreſſive of an attribute, of time, and of an aſſertion, if we take away the aſſertion, there will remain the attribute and the time, which make the eſſence of a *participle*.

There are two kinds of *participles*, the one called *active*, becauſe expreſſing the ſubject which makes the action of the verb; as *legens*, *audiens*, *reading*, *hearing*. The other, called *paſſive*, becauſe expreſſing the ſubject that receives the action of the verb; as *lectum*, *auditum*, *read*, *heard*.

As our adjectives are not declined, the *participles*, being real adjectives, are alſo not declined: in the Latin, &c. where the adjectives are declined, the *participles* active are declined likewiſe. Thus they ſay *audiens*, *audientis*, *audienti*, &c. and in the French the *participles* paſſive are declinable like their adjectives, as *j'ay lu*, *elle a lue*, *nous avons lus*, &c.

In our language, the *participles* and gerunds are not at all diſtinguiſhable.

The Engliſh grammar lays down a good rule with reſpect to its *participles* of the paſt, that they all terminate in *d*, *t*, or *n*; which analogy is liable to as few exceptions as any.

PARTICLE, Particula, in *Phyſics*, the minute part of a body, or an aſſemblage or coalition of ſeveral of the atoms whereof natural bodies are compoſed.

Particle, in the *New Philoſophy*, is frequently uſed in the ſame ſenſe with *atom* in the ancient Epicurean philoſophy; and *corpuſcle* in the later.

Some of the moſt accurate writers, however, diſtinguiſh them; making *particle* an aſſemblage or compoſition of two or more primitive, and phyſically indiviſible, corpuſcles or atoms, and *corpuſcle*, or little body, an aſſemblage or maſs of ſeveral *particles*, or ſecondary corpuſcles. Indeed the diſtinction is of no great moment; and, as to moſt purpoſes of phyſics, *particle* may be underſtood as ſynonymous with corpuſcle.

Particles are then, as it were, the elements of bodies; it is the various arrangement and texture of theſe, with the difference of the coheſion, &c. that conſtitute the various kinds of bodies, hard, ſoft, liquid, dry, heavy, light, &c. The ſmalleſt *particles* or corpuſcles cohere with the ſtrongeſt attractions, and always compoſe bigger *particles* of weaker coheſion; and many of theſe cohering, compoſe bigger *particles*, whoſe vigour is ſtill weaker; and thus on for diverſe ſucceſſions, till the progreſſion end in the biggeſt *particles*, whereon the operations in chemiſtry, and the colours of natural bodies, depend, and which, by cohering, compoſe bodies of ſenſible bulks.

The coheſion of the **Particles** *of matter*, the Epicureans imagined, was effected by means of hooked atoms; the Ariſtotelians by reſt, that is, by nothing at all. But ſir Iſaac Newton ſhews it is done by means of a certain power whereby the particles mutually attract, or tend towards each other.

By this attraction of the *particles* he ſhews that moſt of the phenomena of the leſſer bodies are effected; as thoſe of the heavenly bodies are by the attraction of gravity.

Particles *for the laws of this attraction of the*. See **Attraction** and **Coheſion**.

All bodies, the ſame great author ſhews, conſiſt of the ſame ſolid perfectly hard *particles* or corpuſcles.

Particle, in *Grammar*, denotes a little indeclinable word, conſiſting of one or two ſyllables at the moſt.

Thoſe are properly *particles* which are neither declined nor conjugated.

Brightland calls *particles*, *manners of words*, becauſe rather ſerving to expreſs the circumſtances and manners of other ideas and objects of the mind, than to repreſent any diſtinct objects of their own.

Particles may be reduced under three heads: the firſt ſhew the manners or qualities of words, by being added to them; called *adverbs*.

The ſecond denote ſome circumſtances of actions, and join words to words, ſentence to ſentence, &c. See **Conjunction**.

The third expreſs the emotions of the ſoul. See **Interjection**.

It is in the right uſe of *particles*, Mr. Locke obſerves, that more particularly conſiſts the clearneſs and beauty of a good ſtyle. To expreſs the dependence of his thoughts and reaſonings one upon another, a man muſt have words to ſhew what connection, reſtriction, diſtinction, oppoſition, emphaſis, &c. he gives to each reſpective part of his diſcourſe. This cannot be rightly underſtood, without a clear view of the poſtures, ſtands, turns, limitations, exceptions, and ſeveral other thoughts of the mind. Of theſe there is a great variety, much exceeding the number of *particles* that moſt languages have to expreſs them by; for which reaſon it happens that moſt of theſe *particles* have divers, and ſometimes almoſt oppoſite ſignifications. Thus the *particle* **but**, in Engliſh, has ſeveral very different ſignifications: as in, *but* to ſay no more, where it intimates a ſtop of mind in the courſe it was going, before it came to the end of it. I ſaw *but* two planets; here it ſhews, that the mind limits the ſenſe to what is expreſſed with a negation of all other. You pray, *but* it is not that God would bring you to the true religion, *but* that he would confirm you in your own: the former of theſe intimates a ſuppoſition in the mind, of ſomething otherwiſe than it ſhould; the latter ſhews, that the mind makes a direct oppoſition between that and what goes before. All animals have ſenſe, *but* a dog is an animal: here it ſignifies the connexion of the latter propoſition with the former.

Particles is alſo a term in *Theology*, uſed in the Latin church for the crumbs or little pieces of conſecrated bread, called μεριδες in the Greek church.

In the Greek church they have a particular ceremony, called των μεριδων, *of the particles*, wherein certain crumbs of bread not conſecrated, are offered up in honour of the Virgin, St. John Baptiſt, and ſeveral other ſaints. They alſo give the name ϖροσφορα, *oblation*, to theſe *particles*.

Gabriel, archbiſhop of Philadelphia, has a little treatiſe expreſs, ϖερι των μεριδων, wherein he endeavours to ſhew the antiquity of this ceremony, in that it is mentioned in the liturgies of St. Chryſoſtom and Baſil.

There has been a conſiderable diſpute on this head, between the reformed and the catholic divines. Aubertin and Blondel explain a paſſage in the theory of Germanus, patriarch of Conſtantinople, where he mentions the ceremony of the *particles* as in uſe in his time; in favour of the former: Meſſieurs de Port Royal conteſt the explanation: but M. Simon, in his notes on Gabriel of Philadelphia, endeavours to ſhew, that the paſſage itſelf is an interpolation; not being found in the ancient copies of Germanus: and conſequently that the diſpute is very ill grounded.

Particle *out of ſhare*, in *Aſtronomy*. See **Particula** *exſors*.

PARTICULA *exſors*, in *Aſtronomy*, the difference between the equatorial triangle L A C (*Tab. Aſtron. fig.* 32.) and its fellow B L Z.

To find the *particula exſors*, the menſtrual eccentricity A C, and the annual argument of the longitude H A D, being given; from the data in the triangle B C A, find the hypothenuſe A B to the angle C, and to the angle C A B find the ſubtenſe C B. Multiply C B into half the menſtrual eccentricity A C; the product is the area of the triangle A C B. Find likewiſe the area of a circle deſcribed by the radius of the eccentric B L. Then as the area of the circle is to 360° or 129600″; ſo is the area of the triangle A C B to its value in thoſe ſeconds: which value is the *particula exſors*.

PARTICULAR, *particularis*, a relative term referring to ſpecies, or individual; and oppoſed to general, or univerſal. See **General**, &c.

In the ſchools *particular* is defined to be ſomething included under an univerſal; as man under animal.

Though ſometimes it is alſo taken for an **individual**, as Peter.

There is a difference between *particular* and *ſingular*, that *particular* denotes a thing taken as a part; as Peter in reſpect of mankind. Whereas ſingular denotes the part taken after the manner of a whole; as Peter conſidered in himſelf.

Particular *averment*, *character*, *geography*, *gravity*, *maps*, *nature*, *propoſition*, *quality*, *rheumatiſm*, *tenant*, *theorem*, and *winds*. See the ſeveral ſubſtantives.

PARTICULARIST, among *Polemical Divines*, a perſon who maintains particular grace, i. e. who teaches or believes, that Chriſt died for the elect only; and not for mankind in general. See **Grace**.

PARTIES, in *Law*, are thoſe who are named in a deed, or fine, as *parties* to it; e. gr. thoſe who levy the fine, and to whom the fine is levied.

So they who make any deed, and they to whom it is made are both called *parties* to the deed.

PARTILE *aſpect*, in *Aſtrology*. See **Aspect**.

PARTING, in *Chemiſtry*, is an operation by which gold and ſilver are ſeparated from each other. The three agents employed for this purpoſe are the nitrous acid, marine acid, and ſulphur. The former is the moſt convenient and generally uſed by goldſmiths and coiners: and, therefore, the operation with this ſolvent is called ſimply *parting*: that made by the marine acid is made by cementation, and called *concentrated parting*: and *parting* by ſulphur is made by fuſion, and denominated *dry parting*. For the method of *parting* by aqua fortis, compare

pare the articles DEPART, and QUARTATION. See alſo ASSAYING and GOLD.

PARTING, *concentrated*. See CÆMENTATION.

PARTING, *dry*, or *parting* by fuſion, is performed by ſulphur, which has the property of uniting eaſily with ſilver, while it does not attack gold. The moſt advantageous method, ſays Dr. Lewis, of ſeparating a ſmall portion of gold from a large one of ſilver appears to be by means of ſulphur, which unites with and ſcorifies the ſilver without affecting the gold: but as ſulphurated ſilver does not flow thin enough to ſuffer the ſmall particles of gold diffuſed through it to reunite and ſettle at the bottom, ſome addition is neceſſary for collecting and carrying them down.

In order to the commixture with the ſulphur, fifty or ſixty pounds of the mixed metal, or as much as a large crucible will receive, are melted at once, and reduced into grains by lading out the fluid matter, with a ſmall crucible made red-hot, and pouring it into cold water ſtirred with a rapid circular motion. From an eighth to a fifth of the granulated metal, according as it is richer or poorer in gold, is reſerved; and the reſt well mingled with an eighth of powdered ſulphur. The grains enveloped with the ſulphur are again put into the crucible, and the fire kept gentle for ſome time, that the ſilver, before it melts, may be thoroughly penetrated by the ſulphur; if the fire was haſtily urged, great part of the ſulphur would be diſſipated, without acting upon the metal.

If to ſulphurated ſilver in fuſion pure ſilver be added, the latter falls to the bottom, and forms there a diſtinct fluid, not miſcible with the other. The particles of gold, having no affinity with the ſulphurated ſilver, join themſelves to the pure ſilver, wherever they come in contact with it, and are thus transferred from the former into the latter more or leſs perfectly according as the pure ſilver was more or leſs thoroughly diffuſed through the mixed. It is for this uſe that a part of the granulated metal was reſerved. The ſulphurated maſs being brought into perfect fuſion, and kept melted for near an hour in a cloſe-covered crucible, one third of the reſerved grains is thrown in; and as ſoon as this is melted, the whole is well ſtirred, that the freſh ſilver may be diſtributed through the mixed, to collect the gold from it. The ſtirring is performed with a wooden rod; an iron one would be corroded by the ſulphur, ſo as to deprive the the mixed of its due quantity of ſulphur, and likewiſe render the ſubſequent purification of the ſilver more troubleſome. The fuſion being continued an hour longer, another third of the unſulphurated grains is added, and an hour after this the remainder; after which the fuſion is farther continued for ſome time, the matter being ſtirred at leaſt every half hour from the beginning to the end, and the crucible kept cloſely covered in the intervals.

The ſulphurated ſilver appears in fuſion of a dark brown colour: after it has been kept melted for a certain time, a part of the ſulphur having eſcaped from the top, the ſurface becomes white, and ſome bright drops of ſilver, about the ſize of peas, are perceived on it. When this happens, which is commonly in about three hours after the laſt addition of the reſerved grains, ſooner or later, according as the crucible has been more or leſs cloſely covered, and the matter more or leſs ſtirred, the fire muſt be immediately diſcontinued; for otherwiſe more and more of the ſilver, thus loſing its ſulphur, would ſubſide and mingle with the part at the bottom in which the gold is collected. The whole is poured out into an iron mortar greaſed and duly heated; or if the quantity is too large to be ſafely lifted at once, a part is firſt laded out from the top with a ſmall crucible, and the reſt poured into the mortar. The gold, diffuſed at firſt through the whole maſs, is now found collected into a part of it at the bottom, amounting only to about as much as was reſerved unſulphurated. This part may be ſeparated from the ſulphurated ſilver above it by a chiſſel and hammer; or more perfectly, the ſurface of the lower maſs being generally rugged and unequal, by placing the whole maſs with its bottom upwards in a crucible: the ſulphurated part quickly melts, leaving unmelted that which contains the gold, which may be thus completely ſeparated from the other. The ſulphurated ſilver is eſſayed, by keeping a portion of it in fuſion in an open crucible, till the ſulphur is diſſipated; and then diſſolving it in aqua fortis. If it ſhould ſtill be found to contain any gold, it is to be melted again; as much more unſulphurated ſilver is to be added as was employed in each of the former injections, and the fuſion continued about an hour and a half.

The gold thus collected into a part of the ſilver may be farther concentrated into a ſmaller part, by granulating the maſs and repeating the whole proceſs. The operation may be again and again repeated, till ſo much of the ſilver is ſeparated, that the remainder may be parted by aqua fortis without too much expence.

The foregoing proceſs, according to Mr. Schlutter, is practiſed at Rammelſberg, in the Lower Hartz. The prevailing metal in the ore of Rammelſberg is lead: the quantity of lead is at moſt forty pounds in a quintal or hundred pounds of the ore. The lead worked off on a teſt or concave hearth yields about a hundred and ten grains of ſilver, and the ſilver contains only a three hundred and eighty-fourth part of gold; yet this little quantity of gold; amounting ſcarcely to a third of a grain in a hundred weight of the ore, is thus collected with profit. The author above mentioned confines this method of ſeparation to ſuch ſilver as is poor in gold, and reckons parting with aqua fortis more advantageous where the gold amounts to above a ſixty-fourth of the ſilver: he adviſes alſo not to attempt concentrating the gold too far, as a portion of it will always be taken up again by the ſilver. Mr. Scheffer, however, relates (in the Swediſh Memoirs for the year 1752), that he has by this method brought the gold to perfect fineneſs; and that he has likewiſe collected all the gold which the ſilver contained; the ſilver of the laſt operations, which had taken up a portion of the gold, being reſerved to be worked over again with a freſh quantity of gold-holding ſilver. The ſulphurated ſilver is purified by continuing it in fuſion for ſome time with a large ſurface expoſed to the air; the ſulphur gradually exhales, and leaves the ſilver entire. Lewis's Com. Phil. Techn. p. 161, &c. See GOLD and REFINING.

PARTING-*glaſſes* are uſed in the operation of *parting*: they have the form of truncated cones, the bottom being commonly about ſeven inches wide, the aperture about one or two inches wide, and the height about twelve inches. Theſe glaſs veſſels ought to have been well annealed, and choſen free from flaws; as one of the chief inconveniencies attending the operation is, that the glaſſes are apt to crack, by expoſure to cold, and even when touched by the hand. Some operators ſecure their glaſſes by a coating. For this purpoſe they ſpread a mixture of quicklime ſlaked with beer and whites of eggs upon linen cloth, which they wrap round the lower part of the veſſel, leaving the upper part uncovered, that they may ſee the progreſs of the operation; and over this cloth they apply a compoſition of clay and hair. Schlutter adviſes to put the *parting-glaſſes* in copper veſſels containing ſome water, and ſupported by trevets, with fire under them. When the heat communicated by the water is too great, it may be diminiſhed by adding cold water, which muſt be done very carefully by pouring againſt the ſides of the pan, to prevent too ſudden an application of cold to the *parting-glaſs*. The intention of this contrivance is, that the contents of the glaſſes, if theſe ſhould break, may be received by the copper veſſel. Into a glaſs fifteen inches high, and ten or twelve inches wide at bottom, placed in a copper-pan twelve inches wide at bottom, fifteen inches wide at top, and ten inches high, he uſually put about eighty ounces of metal, with twice as much aqua fortis.

PARTING, in *Sea Language*, denotes the ſtate of being driven from the anchors, when the ſhip has broke her cable by the violence of the wind, waves, or current, or of all of them together.

PARTISAN, in the *Military Art*, the commander of a *partiſan*-party.

PARTISAN-*party*, a ſmall body of infantry given to a *partiſan*, to make an incurſion upon the enemy, to lurk about their camp, to diſturb their foragers, and to interrupt their convoys.

PARTITION, the act of parting, dividing, or diſtributing, a thing.

The denomination *partitiones oratoriæ* is alſo given to a dialogue of Cicero's, between him and his ſon; in regard the diſcourſe is, as it were, parted or divided between them.

PARTITION, in *Architecture*, that which divides or ſeparates one room or apartment from another.

PARTITION, in *Heraldry*. See QUARTERING.

PARTITION, in *Huſbandry*. The *partitions* in land ſown with wheat by the drill, for the horſe-hoeing huſbandry, are different according as the wheat is ſown, in double, treble, or quadruple rows. The double row has but one *partition*, and this is beſt to be uſed in caſes where the land is ſuſpected to be full of the ſeed of weeds, which muſt be taken out with the hand-hoe. This *partition* ſhould be twelve or fourteen inches wide. Whole fields drilled in theſe rows may be hand-hoed at the expence of four ſhillings an acre; and when there is but one foot in ſix, the price of that work ought to be proportionable.

The common width of the two *partitions*, when the wheat is ſown in treble rows, is ſix or eight inches. Care is to be taken in this particular; for if they are planted cloſer, they will ſtarve one another before the intervals are hoed to give them a freſh ſupply of nouriſhment; and if they are planted too far aſunder, the two outer rows will thrive well, but the middle row will be ſtarved, and look worſe and weaker, becauſe of its being at ſo great a diſtance from the hoed intervals.

In quadruple rows the *partitions*, are beſt to be ſeven inches wide each: at this diſtance the plants will thrive, ſufficiently, and if they are ſet nearer, the whole will be worſe; and, if farther off the two outer rows will thrive, but the two inner ones will be ſtarved, by reaſon of their diſtance from the ploughed intervals. See Alley, and Husbandry.

Partition, in *Law*, a dividing of lands deſcended by common law, or cuſtom, among coheirs, where there are two at leaſt.

The *partition* is made ſeveral ways; whereof four are by agreement, and one by compulſion.

The firſt *partition* by agreement is, when the parceners divide the land equally themſelves into ſo many parts as there are coheirs: and each has a determinate part.

The ſecond is, when they agree to chuſe ſome of their friends to make the diviſion for them: and each takes a part according to ſeniority of age, or otherwiſe, as ſhall be agreed. In this caſe ſeniority is perſonal; ſo that if the eldeſt ſiſter be dead, the next ſiſter, and not the iſſue of the firſt, chuſes. However with reſpect to an advowſon, it is otherwiſe; the eldeſt and her iſſue, and even her huſband, or her aſſigns, ſhall preſent alone, before the younger.

The third method of *partition* is, when the eldeſt divides, but chuſes laſt.

The fourth is by drawing lots, thus: having firſt divided the land into as many parts as there are perſons, they write every part ſeverally in a diſtinct ſcroll, and, wrapping it up, throw each into a hat, or ſuch a thing; out of which each one draws according to ſuperiority; and ſo the land is ſeverally allotted.

The other *partition*, which is by compulſion, is, when one or more of the heirs, by reaſon of the refuſal of ſome other, ſues out a writ of partitione *facienda*, upon which the ſheriff ſhall go to the lands, and make *partition* thereof by a verdict of the jury there impanelled; and aſſign to each of the parceners her part in ſeveralty. In Kent, where land is of gavelkind nature, they call their *partition*, ſhifting.

Partition alſo may be made by joint-tenants, and tenants in common, by aſſent, by deed, or by writ.

Partition, in *Muſic*, is the diſpoſition of the ſeveral parts of a ſong, ſet on the ſame leaf; ſo as upon the uppermoſt ranges of lines are found the treble: in another the baſs; in another the tenor, &c. that they may be all ſung or played either jointly or ſeparately.

Partition, *partitio*, in *Rhetoric*, otherwiſe called enumeration, is that part in which the orator acquaints his hearers with the ſeveral parts of his diſcourſe upon which he deſigns to treat. Some alſo comprehend under this head ſeparation, in which the orator ſhews in what he agrees with his adverſary, and wherein he differs from him. The requiſites of a good *partition* are the following: it muſt be ſhort, ſo that each propoſition contains in it nothing more than what is neceſſary; it ought to be complete, no neceſſary part being omitted in the enumeration; and it ſhould conſiſt of as few members as is conſiſtent with the nature of the ſubject. The ancient rhetoricians preſcribe three or four at the moſt; and Cicero never exceeds that number. It may he afterwards convenient to divide theſe general heads of a diſcourſe, or at leaſt ſome of them, into ſeveral parts or members: and this is beſt done as the ſpeaker comes to each of them, in the order at firſt laid down. Inſtances of this kind occur in Cicero's oration for the Manilian law.

A good *partition* is attended with conſiderable advantages; it gives light and ornament to a diſcourſe, and affords great relief and aſſiſtance to the hearers. However ſome orations, particularly of the demonſtrative kind, do not require any particular propoſition, being little more than a continued narrative or illuſtration of the ſubject. Ward's Orat. vol. i. p. 210, &c.

Partitione *facienda*, in *Law*, a writ which lies for thoſe who hold lands or tenements *pro indiviſo*, and would ſever to every one his part, againſt them that refuſe to join in *partition*, as copartners, &c. F. N. B. 61. 31 H. VIII. cap. 1. Cowel.

PARTITURA, in the *Italian Muſic*, the ſame as partition.

PARTIUM *prece*. See Prece.

PARTNER, and **PARTNERSHIP**. See Company, Coparcener, and Fellowship.

Partners, in a *Ship*, are ſtrong pieces of timber nailed round the ſeveral ſcuttles or holes, in a ſhip's deck, wherein are contained the maſts and capſterns. They are uſed to ſtrengthen the deck, where it is weakened by ſuch breaches, but particularly to ſupport it when the maſt leans againſt it, as impreſſed by a weight of ſail, or when the capſtern bears forcibly upon it, whilſt charged with a great effort.

Some ſhips do not ſail well unleſs their maſts are looſe, and have leave to play in the *partners*; but in a ſtorm, this is dangerous, leſt the *partners* ſhould be wronged (as they ſay) i. e. forced out of their places; for then there is no help but to cut the maſt by the board.

Partners is alſo a name given occaſionally to the ſcuttles themſelves, wherein the maſts and capſterns are fixed.

PARTRIDGE, *perdix*, the TETRAO *perdix* of Linnæus, in *Ornithology*, a bird well known and eſteemed at table, of which ſome naturaliſts enumerate five ſpecies. 1. The common *partridge*. 2. The Braſilian *partridge*, called iambu, of a duſky yellow colour, ſpotted with brown: of this there are two ſpecies, a larger and a ſmaller. 3. The *perdix damaſcena* of Aldrovand, which reſembles our *partridge*, but its feet are yellow, and its beak longer. 4. The red-legged partridge, common in France and Italy, and called there *cotumo*. And, 5. The Grecian *partridge*, which is twice as large as our's, and not ſeeming to differ from the *cotumo* in any thing but ſize: they are all very finely taſted birds, but none are ſo delicate as the *cotumo*. Ray's Ornithol. p. 119.

The bill of the *partridge* is whitiſh; the crown of the heard is brown ſpotted with reddiſh white; behind each eye is a naked reddiſh ſkin; the chin, cheeks, and forehead are of a deep orange-colour, but much paler in the female than in the male; the neck and breaſt are prettily marked with narrow undulated lines of aſh-colour and black; and in the hind paet of the neck is a ſtrong mixture of ruſt-colour; on the breaſt of the male is a broad mark in form of a horſe-ſhoe, of a deep orange-hue; in the female it is leſs diſtinct; each feather on the back is finely marked with ſemicircular lines of a reddiſh brown and black; the ſcapulars with a narrow white line along their ſhafts, and with black and cinereous undulated lines on the webs, whoſe ſides are marked with a large ſpot of ruſt-colour; the greater quill-feathers are duſky, ſpotted on each web with pale red; it has eighteen feathers in the tail; the ſix outermoſt on each ſide are of a bright ruſt-colour, tipt with white; the others marked tranſverſely with irregular lines of pale reddiſh brown and black; the legs are of a whitiſh caſt. Pennant.

The *partridge* is a timorous and ſimple bird, and are ſo valuable at the table, that there are a great many ways of taking it invented by ſportſmen, all of which ſucceed from the folly and fear of the animal.

The places that *partridges* moſt delight in, are corn-fields, eſpecially while the corn grows; for that is a ſafe retreat, where they remain undiſturbed, and under which they uſually breed. They frequent the ſame fields after the corn is cut down, and that with another intent; for they then feed on the corn that has fallen from the ears, and find a ſufficient ſhelter for them under cover of the ſtalks, eſpecially thoſe of wheat ſtubble. When the wheat ſtubble is much trodden by men or beaſts, they retire to the barley ſtubble, and will there hide themſelves in coveys of twenty or thirty. When the winter comes on, and the ſtubble fields are trodden down or ploughed up, they can retire to the upland meadows, where they lodge in the high graſs, and among the ruſhes; ſometimes they reſort to the low coppice woods, eſpecially if there be corn lands near them.

In the harveſt-time, when the corn-fields are full of men, they are found in the fallow fields next to the corn-fields, where they lie lurking among the woods till evening, and then they get over into the corn, and feed late and early on the corn in the ſheaves. When the proper haunts are known, the next thing is to find the birds in them; this is done variouſly; ſome will do it by the eye only; and this art can never be taught, but can be had only from long obſervation: the colour of the birds being ſo like that of the earth at a diſtance, that no eye but a very converſant one could diſtinguiſh them. When they are once ſeen, the buſineſs is to keep an eye upon them, and then to keep in continual motion. They are a very lazy bird, and by this means will let a perſon almoſt tread upon them; though, if the perſon ſtands ſtill to eye them, they will riſe immediately, though they are at a conſiderable diſtance.

Another method of obſerving them is by going to their haunts very early in the morning, or at the cloſe of the evening, which is called jucking-time. The noiſe of the cock *partridge* is to be attended to at this time, and is very loud and earneſt. The hen will ſoon come up to the cock after her making the noiſe, which ſhe does by way of anſwer; and when they are got together, their chattering will diſcover them. Thus they may always be found at theſe times: but there is a yet better method of finding this bird, which is by the call. The buſineſs, in order to have ſucceſs in this way, is carefully to learn the notes of the *partridge*, and be able to imitate all the ſeveral ſounds. When perfect in this, the perſon is to go to the haunts morning and evening, and, placing himſelf in ſome place where he can ſee the birds without being ſeen by them, he is to liſten to their calling; and, when they are heard, he is to anſwer in the ſame notes, doubling again as they do: by continuing this, they may be brought ſo near, that the perſon, lying down on his back, may count their whole number. Having in this manner found where the birds are, the next care is to catch them.

They are ſo fooliſh, that it is extremely eaſy to take them in nets. In order to this, there needs no more than the going out, provided with two or three nets, with meſhes ſomewhat ſmaller than thoſe of the pheaſant nets, and walking round about the covey, a net is to be fixed ſo as to draw over them, on pulling a line at a diſtance. All this may be eaſily done; for ſo long as the ſportſman continues moving about, and does not fix his eyes too intently upon them, they will let him come near enough to fix the nets, without moving. If they lie ſo ſtraggling, that one net will not cover them, then two or three muſt be fixed in the ſame manner. The ſportſman may then draw the nets over them; and they will often lie ſtill with the nets upon them till he comes up to fright them, then they will riſe and be entangled in the net.

A ſecond method of taking them is with bird-lime: this is done by means of wheat ſtraws. Theſe muſt be large, and cut off between knot and knot; they muſt be well limed with the beſt and ſtrongeſt bird-line, and the ſportſman muſt carry a great number of them out with him. Having found a field where there are *partridges*, he is to call; and, if they anſwer, he is then to ſtick up the limed ſtraws in rows acroſs two or three lands, and, going backward, call again to them, leading them on in the road where the ſtraws are: they will follow one another like a flock of chickens, and come out to the call; and will in their way run upon the ſtraws, and liming themſelves, they will daub one another by crowding together, ſo that very few of them will be able to eſcape.

But there is yet a pleaſanter way of taking them than this, that is, by driving them: in order to this, an engine is to be made of canvas ſtuffed with ſtraw, to repreſent a horſe; this horſe and nets are to be taken to the haunts of the *partridges*, and the nets to be placed ſlanting or ſlopewiſe in the lower part of the field, the ſportſman is to take the wind in his back, and get above them, driving them downwards; his face is to be covered with ſome thing green or blue; and, placing the horſe before him, he is to go towards them ſlowly and gently; and by this means they will be raiſed on their legs, but not on their wings, and will run before the horſe into the nets. If in the way they go into a wrong path, the horſe is to be moved to face them; and they will be thus turned back again, and driven every way the ſportſman pleaſes.

Partridge, *Indian*, *coturnix Indica*, the name given by the Spaniards to a bird of the Weſt Indies, of which there are three or four ſpecies; all of which Nieremberg ſays, are properly of the *partridge* kind. See Colin, and Quauhtzonecolim.

Partridge, *red-legged*, a very delicate and valuable bird, called *cotumo* by the Italians.

It is diſtinguiſhed from the common *partridge* by the redneſs of its beak and legs; it is of a greyiſh aſh-colour on the back; its throat is white near the head, but has a ſmall black ſpot on each ſide, at the angle of the bill, and this white ſpace is ſurrounded by a black line; its breaſt is of a yellowiſh brown, and its wings are variegated with black, yellowiſh, and white. It is not found in England, but is ſometimes ſhot in the iſlands of Guernſey and Jerſey.

Partridge, *white*, *perdix alba*, a name given by many to the *lagopus*, a rough-footed bird of the gallinaceous kind, common on the ſnowy mountains, and by ſome called the *rabolanc*. See Ptarmigan.

Partridge, *ſea*, *perdix marina*, in *Ichthyology*, a name given by ſome authors to the ſoal-fiſh, from the firmneſs and delicacy of its fleſh.

PAR-TOUT. See Pass-*par-tout*.

PARTURITION, the act of bringing forth, or being delivered of young. See Delivery.

PARTUS, in *Medicine* and *Law*, the delivery of a woman, or the birth of a child.

Partus, *Cæſareus*, is that where the mother is cut open, and the child taken out at one ſide. See Cæsarean.

PARTY, or Partie, a faction, intereſt, or power, conſidered as oppoſite to another.

The French and Spaniards were always of oppoſite *parties*. England has, for upwards of a century, been divided into two *parties*. See Whig and Tory.

Party, in *Law*. See Parties and Charter-Party.

Party, in the *Military Senſe*, is uſed for a ſmall body of men, whether cavalry, infantry, or both, commanded out on any expedition.

By the French military law, thoſe who go out to *parties* muſt have an order in writing from the commanding officer, and be at leaſt twenty in number if foot, or fifteen if horſe, otherwiſe they are reputed as robbers.

Party *arches*, in *Building*, are arches built between ſeparate tenures, where the property is intermixed, and apartments over each other do not belong to the ſame eſtate.

Party *bleu*, in the *Military Art*, a name given to a *party* of robbers, who infeſted the roads in the Netherlands. They belonged to neither army, but robbed both ſides, without any regard to paſſes.

Party *china*, a name given by the Engliſh merchants, and others, to a ſort of porcelain or china-ware, which is elegantly painted on the outſide with ſome bright colour, and blotted or variegated with round or ſquare ſpots of a different tinge. The manner in which the Chineſe do this is a very ſimple and eaſy one, and many be imitated in our potteries with great eaſe.

They prepare as many pieces of paper as they intend to have ſpots on the veſſel, and cut them exactly into the ſhape of thoſe ſpots: they wet theſe, and then ſpread them ſmoothly on the places where the ſpots are to be. When this is done, they cover the veſſel with the brown and gold, or any other varniſh, and then take off the papers; in the places which they covered no varniſh has come; ſo that they are ſo many regular white ſpaces. Theſe they cover with ſome other colour, laying it on carefully with a pencil: when this is done, they varniſh over the whole veſſel with the common varniſh, and bake it. In ſome veſſels they lay on only plain blue, or plain black, in the ſpaces deſtined for ſpots; and after the firſt baking, they cover theſe with gold, and make them ſo many figures of ſquares, triangles, or globes, pure gold.

Party *walls*, in *Building*, are partitions of brick made between buildings in ſeparate occupations, for preventing the ſpread of fire.

By an act of 14 Geo. III. for better regulating buildings, and preventing miſchiefs by fire, within the cities of London and Weſtminſter, and pariſhes within the bills of mortality, it is enacted, in what manner buildings of all denominations ſhall be built; and ſurveyors are appointed to execute the directions of the act: the principal of which are as follows: buildings are of different rates, as, firſt, comprehending every church, chapel, or meeting-houſe; every building for diſtilling liquors, for making ſoap, melting tallow, dying, diſtilling turpentine, caſting braſs or iron, refining ſugar, making glaſs, or chemical preparations, for ſale; and all buildings, not being dwelling houſes, which exceed three clear ſtories above ground, or which are thirty-one feet high in either front; and dwelling houſes, exceeding the value of 850*l.* or more than nine ſquares on the ground plan. Second rate, warehouſes whoſe height exceeds twenty-two feet, and is not thirty-one feet, whoſe value is more than 300*l.* and which are more than five ſquares on the ground plan. Third rate, warehouſes not exceeding two clear ſtories, and more than one ſtory, more than thirteen feet in height; or dwelling houſes which contain three and a half ſquares on the ground plan, and not valued at more than 150*l.* Fourth rate, all warehouſes under thirteen feet high, and one clear ſtory; and all dwelling houſes under three and a half ſquares on the ground plan, and under the value of 150*l.* Thoſe of the fifth rate may be of any dimenſions, but muſt be ſixteen feet from any other building, not in the ſame poſſeſſion, &c. and four feet from any public way. Thoſe of the ſixth rate muſt be thirty feet from any other building not in the ſame poſſeſſion, and eight feet from the public way: theſe may be made of any dimenſions and materials. Thoſe of the ſeventh rate are under no reſtraint, excepting that they muſt not be covered with pitch or tar, &c. The following table ſhews the dimenſions of the *party* and external walls:

	firſt rate		2d rate		3d rate		4th rate	
	Party.	External.	Party.	External.	Party.	External.	Party.	External.
Foundation or footing	3½	2½	3½	2	3	2	2	2
Baſement	2½	2	2½	1½	2	1½	2½	1½
Ground floor	2	2	2	1½	1½	1	1	1
One pair floor	2	1½	2	1	1½	1	1	1
Second pair ditto	2	1½	2	1	—	—	—	—
Third pair ditto	2	1½	1½	—	—	—	—	—
Through the roof	1½	1	1½	—	—	—	—	—

Bricks in length.

No *party* wall is to be cut into without giving twenty-four hours notice to the ſurveyor, under penalty of 20*l.* on the maſter, and 50*s.* on the workman for every offence. See Building, and Fire-*cocks*.

PARTY *jury*, in *Law*. See MEDIETAS *linguæ*, and JURY.

PARTY, in *Heraldry*. See PARTI, PALE, and FESSE.

PARU, in *Natural Hiſtory*, the name of a very ſingular American fiſh.

It is broad, flat, and roundiſh; of no great thickneſs, and is uſually of about five or ſix inches long, and more than four broad: it has ſix fins, one large and long, one on the back, and another on the belly, behind the anus; each of theſe reaches to the tail, and has, toward the end, a long ſtring or cord, made of a ſingle filament; that on the back fin being longer than that on the belly; behind the gills it has alſo two fins, of two fingers breadth long, and one broad; and two others on the belly, which are very narrow; its head is ſmall, and its mouth elevated and ſmall, and furniſhed with ſmall teeth; its ſcales of a moderate ſize, and are half black and half yellow; ſo that the fiſh appears of a black colour, variegated with yellow half moons; its gills, and the beginning of its fins, are alſo yellow; and it has, on each ſide near the head, a yellow ſpot: it is an eatable fiſh.

PARUS, iu *Ornithology*. See TITMOUSE.

PARVISE. See PERVISE.

PARULIS, Παρȣλις, formed of παρα, *near*, aud ȣλὸν, *gum*, in *Surgery*, an inflammation of the gums, attended with a violent pain, and an impoſthume; ſometimes ending in an ulcer, and ſometimes a cancer, fiſtula, gangrene, &c.

Sennertus orders it to be cured by revulſion, derivation, and proper gargariſms. Care is to be taken in the beginning to prevent an impoſthumation. See GUM-*boils*.

PARVUM *cape*. See CAPE.

PARVUS *naſi muſculus*, in *Anatomy*, a name given by Caſſerius, and ſome others, to a ſmall muſcle of the noſe, called by Albinus, *compreſſor naris*; by Winſlow, *tranſverſalis*, or *inferior naſi*; and by Cowper, *elevator alæ naſi*.

PARVUS *et tenuis palpebræ*, in *Anatomy*, a name given by Fallopius to one of the muſcles of the face, called by Cowper and Douglas, APERIENS *palpebram rectus*; and by Albinus the *levator palpebræ ſuperioris*.

PARYPATE, in the *Ancient Muſic*, was the name of that note or chord of a tetrachord which lay next to the hypate.

As the hypate was the *principalis*, the firſt or principal ſound, according to Martianus Capello's tranſlation; ſo the *parypate* was, according to him, the *ſub principalis*. See TETRACHORD.

The name *parypate* was given to this ſecond note when a tetrachord was conſidered ſeparately from others; but, when combined, this chord ſometimes took the name *trite*. See DIAGRAM, and TRITE.

PARYPATE *hypaton*, in the *Ancient Greek Scale of Muſic*, was the ſecond note of the hypaton tetrachord, and anſwers to the C-fa-ut of Guido's ſcale. See DIAGRAM, and PARYPATE.

PARYPATE *meſon*, in the *Greek Muſic*, was the ſecond note of the *meſon* tetrachord, and anſwers to the F-fa-ut of the Guidonian ſcale. See DIAGRAM.

PAS *de ſouris*, in the *Military Art*, the ſame with LIZIERE.

PASCHAL, *paſchalis*, ſomething belonging to the Jewiſh Paſſover, or to the Chriſtian Eaſter.

The *paſchal* lamb was a lamb which the Jews eat with great ceremony, in memory of their having been brought out of ſlavery in Egypt. It ſhould be eaten ſtanding, their loins girt, the ſtaff in hand.

PASCHAL *canon*. See CANON.

PASCHAL *taper*. See TAPER.

PASCHAL *rents*, are rents or annual duties paid by the inferior clergy to the biſhop, or archdeacon, at their Eaſter viſitations.

They are alſo called *ſynodals*.

PASCHAL *letter*, in *Church Hiſtory*, a circular letter, which the patriarch of Alexandria firſt, and afterwards the pope, anciently wrote to all the metropolitans; to inform them of the day whereon the feaſt of Eaſter was to be celebrated.

PASHA. See BASHAW.

PASHAUNA *beady*, in *Natural Hiſtory*, a name given by the people of the Eaſt Indies to a kind of fibroſe talc, found in the ſides of the mountains, and uſed in medicine with them. They calcine it, and then powder and boil it in milk, and give half a dram for a doſe mixed in milk, for the gravel and ſtone.

PASPALUM, in *Botany*, a genus of the *triandria digynia* claſs. Its characters are, that the calyx is orbiculated, and has two valves; the corolla is of the ſame magnitude; and the ſtigmata are pencil-ſhaped. There are five ſpecies.

PASQUE *flower*, *pulſatilla*, in *Botany*. See CAMPANA *floræ*.

PASQUIN, a mutilated ſtatue, ſeen at Rome, in a corner of the palace of the Urſini. It takes its name from a cobler of that city, called *Paſquin*, famous for his ſneers and gibes; and whoſe ſhop was the reſort of a number of idle people, who diverted themſelves with bantering folks as they paſſed by.

After *Paſquin's* death, as they were digging up the pavement before his ſhop, they found a ſtatue of an ancient gladiator, well cut, but maimed, and half ſpoiled. This they ſet up, in the place where it was found, at the corner of the deceaſed *Paſquin's* ſhop; and, by common conſent, called it by the name of the defunct.

From that time all ſatires and lampoons are aſcribed to this figure, and are put in its mouth, or paſted againſt it; as if they came from *Paſquin redivivus*. *Paſquin* uſually adrreſſes himſelf to Marforio, another ſtatue in Rome; or Marforio to *Paſquin*, whom they then make reply.

The anſwers are uſually very ſhort, poignant, and unlucky. When Marforio is attacked, *Paſquin* comes to his aſſiſtance; and *Paſquin* is aſſiſted by Marforio in his turn; i. e. the people make the ſtatues ſpeak juſt what they pleaſe.

PASQUINADE, or PASQUIL, is properly a ſatirical libel, faſtened to the ſtatue of Paſquin.

Hence, by extenſion, the term becomes uſed for any ſatire, lampoon, or ſneer upon the public, or upon the ruling powers.

There is this difference between a *paſquinade* and a *ſatire*; that the end of the latter is to correct and reform; whereas that of the former is only to ſcoff and expoſe.

The Italians have publiſhed ſeveral books which they call *Paſquino in eſtaſi*, *Paſquin in an eeſtacy*.

PASS. See PASSPORT.

PASS, PASSADE, in *Fencing*, a leap, or advance upon the enemy.

Of theſe are ſeveral kinds; as *voluntary paſſes*, commencing from the left foot out of meaſure of the firm foot; as when the enemy is not expected.

Others, *neceſſary*, made after a puſh from the right foot; where, being ſo preſſed by the enemy as not to have time to retire, you endeavour to ſeize the guard of his ſword.

The meaſure of the *paſs* is, when the two ſmalls of the ſwords are ſo near, that they may touch one another.

There are *paſſes* within, above, beneath, to the right, the left; and *paſſes* under the ſword, over the line, &c.

PASS, among *Miners*, a frame of boards conſiſting of two or three bottom boards, and two ſide ones, ſet ſlopewiſe; through which the ore ſlides down into the coffer of the ſtamping-mill.

PASS *of arms*, in *Chivalry*, a place which the ancient knights undertook to defend, e. gr. a bridge, road, &c. which was not to be paſſed without fighting the perſon who kept it.

The knights who held the *paſs*, hung up their arms on trees, pales, columns, &c. erected for the purpoſe; and ſuch as were diſpoſed to diſpute the *paſs*, touched one of theſe armories with his ſword, which was a challenge the other was obliged to accept. The vanquiſhed gave the victor ſuch prize as was before agreed on.

PASSA, *Uva* PASSA, in *Pharmacy*, a term applied to thoſe dried grapes, which we call RAISINS.

Uvæ PASSÆ is ſometimes alſo uſed, with leſs propriety, for figs.

PASSACAGLIO, in the *Italian Muſic*, is properly no more than a CHACONE.

The only difference is, that the movement of the *paſſacaglio* is ſomewhat graver, the tune ſofter, and the expreſſion leſs lively: they are for the moſt part in the minor modes, or flat keys.

PASSADE, or PASSADO, in *Fencing*, a thruſt or PASS.

PASSADE is alſo a benevolence or alms given to poor paſſengers.

PASSADE, in the *Manege*, ſignifies a turn or courſe of a horſe backwards or forwards on the ſame plot of ground, paſſing or repaſſing from one end to the other.

This cannot be performed without changing the hand, or turning and making a demi-tour at each of the extremities of the ground. Hence it is, that there are ſeveral ſorts of *paſſades*, according to the different ways of turning, in order to part or put again, and return upon the ſame piſte, or tread; which we call cloſing the *paſſade*.

The *paſſades* are the trueſt proofs a horſe can give of his goodneſs. By his going off, you judge of his ſwiftneſs; by his ſtops, you diſcover the goodneſs or imperfection of his mouth; and by the readineſs with which he turns, you are enabled to decide upon his addreſs or grace.

A *paſſade of five times*, or a demivolt of five times, is a demitour made at the end of the ſtraight line, one hip in, in five times of a gallop upon the haunches; and, at the fifth time, he ought to have cloſed the demivolt, and to preſent upon the *paſſade* line ſtraight and ready to return. The demivolts of five times or periods are the moſt common airs of changing the hand, or turning, that are now practiſed.

A *perfect paſſade* is made in this manner: your horſe ſtanding ſtraight and true upon all his feet, you go off with him at once, you ſtop him upon his haunches, and in the ſame time or cadence in which he made his ſtop, being exactly obedient to the hand and heels, he ought to make the demivolt, balancing himſelf upon his haunches, and ſo waiting, till you give him the aid to ſet off again. It this caſe, it is neceſſary, that the leaſt motion or hint of the rider ſhould be an abſolute command to the horſe. If you would have him go off at full ſpeed, yield your hand, and cloſe the calves of your legs upon him: if he does not anſwer to this aid, give him the ſpurs, in ſuch a manner as not to remove them from the place where they were, and without opening or advancing your legs before you ſtrike.

Raiſed, or *high paſſades*, are thoſe which a horſe makes, when, being at the end of his line, he makes his demivolt in any air he has been taught, either in the mezoir, or in curvets. In high *paſſades*, let your horſe go off at full ſpeed; let your ſtop be followed by three curvets; let the demivolt conſiſt of the ſame number, and demand of him three more before he ſets off again. It is uſual to make nine curvets, when you work a horſe alone.

Furious, or *violent paſſades*, are when a horſe gallops at his utmoſt ſpeed ſtraight forward, and makes his half ſtop, bending, and playing his haunches two or three times before he begins his demivolt, which is made upon one line in three times; for at the third time he ſhould finiſh the demivolt, and be ſtraight upon the line of the *paſſade*, in order to go off again and continue it. This kind of *paſſade* was formerly uſed in private combats.

Paſſade of one time, is a demivolt or turn, made by the horſe, in one time, of his ſhoulders and haunches.

In all *paſſades* the horſe ſhould, in making the demivolt, gather and bring in his body, making his haunches accompany his ſhoulders, without falling back, or not going forward enough each time; and he ſhould go in a ſtraight line, without traverſing or turning his croupe out of the line. Berenger's Horſemanſhip, vol. ii. chap. 15.

PASSAGE, in *Sea Language*, denotes a voyage from one place to another by ſea; an outward or homeward bound voyage.

PASSAGE, in *Commerce*, or *Right* of PASSAGE, is an impoſition, which ſome princes exact by their officers or farmers, in certain narrow cloſe places of their territories, either by land or ſea, on all veſſels, vehicles, and carriages of all kinds; and even ſometimes on perſons as paſſengers coming in or going out of ports, &c.

The *paſſage* of the Sound (that famous ſtraight, which carries us out of the German into the Baltic ſea), is the moſt celebrated *paſſage* in Europe. The dues thereof belong to the king of Denmark, and are paid at Elſinore or Cronenburg.

PASSAGE, *birds of*, are ſuch as only come to us at certain ſeaſons, and then diſappear again; being ſuppoſed to paſs the ſea to ſome other climate.

Among the *birds of paſſage* are the ſtork, ſwallow, nightingale, martin, woodcock, quail, hooded crow, cuckoo, wry-neck, ſeveral ſpecies of the pigeon and thruſh, ſnipe, curlew, ſeveral ſpecies of ſand-piper, long-legged plover, land-rail, ſeveral ſpecies of grebe, divers, terns, merganſers, many ſpecies of ducks, &c.

Mr. Pennant remarks, that every ſpecies of the genera of curlews, woodcocks, ſand-pipers, and plovers, that forſake us in the ſpring, retire to Sweden, Poland, Pruſſia, Norway, and Lapland, to breed; and as ſoon as the young can fly, they return to us again: becauſe the froſts which ſet in early in thoſe countries, deprive them of the means of ſubſiſtence; and the dryneſs and hardneſs of the ground, in general, during our ſummer, prevents them from penetrating the earth with their bills in ſearch of worms, which are the natural food of theſe birds. Of the numerous ſpecies of migrating fowl, there are ſcarcely any that may not be traced to Lapland, a country of lakes, rivers, ſwamps, and alps, covered with thick and gloomy foreſts, that afford ſhelter during ſummer to theſe fowls, which in winter diſperſe over the greateſt part of Europe. In thoſe northern regions, by reaſon of the thickneſs of the woods, the ground remains moiſt and penetrable by the woodcocks, and other ſlender-billed fowl; and for the web-footed birds, the waters afford larvæ with numbers of the gnat. The days are long, and the nights are favourable to their collecting this food; to which we may add, that mankind are very ſparingly ſcattered over that vaſt northern waſte. Britiſh Zoology, vol. ii. Appendix. See MIGRATION.

Beſides the migratory birds, which live in different countries a whole winter, or a whole ſummer, there are ſome others which annually appear in particulur places, at the time of the ripening of particular kinds of grain which their own country is deſtitute of; and theſe depart after a ſhort ſtay, and are no more ſeen till that time the following year. Of this kind are the rice-bird, and bluewing of Carolina. Birds, like men, purſue their ſearches after food, or whatever elſe is neceſſary and agreeable, through diſtant climes; and, when they diſcover ſome new grain, or pleaſing food, they return and acquaint their community of the good fortune; and then, joining in numerous flights, make annual excurſions to ſolace themſelves on this exotic food.

Since the diſcovery of America, there have been introduced from Europe ſeveral ſorts of grain which were before unknown there, and which not before ſome length of time, were found out, and covered by birds of this migratory kind. Of this ſort there is a very beautiful ſpecies, which has very lately made its firſt appearance in Virginia; theſe arrive annually at the time that the wheat is ripe, or nearly ſo; and conſtantly ſince they found it out, have appeared in great droves every year, at the ſeaſon of its ripening: the inhabitants call them for this reaſon, *wheat-birds*. Phil. Tranſ. N° 483.

There are alſo fiſhes of *paſſage*, as herrings, mackarel, &c. See FISHERY.

PASSAGE, in the *Manege*, an action, wherein the horſe raiſes two legs together, a hind and a fore-leg, in form of St. Andrew's croſs; when ſetting thoſe two on the ground again, he raiſes the other two; and thus alternately, never gaining above a foot of ground at a time. The beauty of the *paſſage* conſiſts in keeping the legs a good while in the air: ſetting that aſide, the motion of the legs in the *paſſage* is the ſame as in pacing and trotting.

As the *paſſage* is the key which opens to us all the juſtneſs of the art of riding, and is the only means of adjuſting and regulating horſes in all ſorts of airs, it is neceſſary to obſerve, that there are many kinds of it. In that which is derived from the trot, the action of the horſe's legs is the ſame as in the trot; and this *paſſage* is diſtinguiſhed from the trot merely by the extreme union of the horſe, and by his keeping his legs longer in the air, and lifting them both equally high, and being neither ſo quick nor violent as in the action of the trot. In the *paſſage*, which is founded on the walk, the action of the horſe is the ſame as in the trot, with this difference, that he lifts his fore-feet a good deal higher than his hinder; that he makes a certain time or interval ſufficiently long between the motion of each leg: his action being much more together and ſhortened, more diſtinct and ſlow than the ordinary walk, and not ſo extended as in the trot, ſo that he is, as it were, kept together and ſupported upon himſelf. There is another ſort of *paſſage*, to which the trot likewiſe gives birth, and in which the action is ſo quick, ſo diligent, and ſo ſupported, that the horſe ſeems not to advance, but to work upon the ſame ſpot of ground. No horſe ſhould be put to *paſſage* till he has been well trotted out, is ſupple, and has acquired ſome knowledge of the UNION. Berenger's Horſemanſhip, vol. ii. chap. x.

To *paſſage* a horſe upon his own length, ſee LENGTH.

PASSAGE, or PASSO, in *Muſic*, a portion of an air or tune, conſiſting of ſeveral ſhort notes, as quavers, demi-quavers, &c. laſting one, two, or, at moſt, three meaſures. What the Italians call *contrapunto d'un ſol paſſo*, is a portion conſiſting of one, two, or three meaſures, compoſed in the firſt notes of a piece, and which is to be afterwards imitated on the other notes of the piece, not with the ſame chords or tones, but only by obſerving the ſame motion, number, and figure, as in the notes of the firſt *paſſage*. This makes one of the kinds of *contrapunto perfidiato*.

PASSAGERS. See ALBIGENSES.

PASSAGIO, in the *Italian Muſic*. See PASSAGE.

PASSAGO, in the *Glaſs Trade*, the inſtrument with which the workman makes the bowl of the drinking-glaſſes, or other the like veſſels.

PASSALORHYNCHITES, *Paſſalorhynchitæ*, a ſect of Montaniſts in the ſecond century, who made profeſſion of perpetual ſilence, and, the better to maintain it, kept the thumb continually upon the lips; founding their practice on that of the Pſalmiſt, *Set a guard, O Lord, on my mouth.*

St. Jerom mentions his having met with ſome of them in his time.

PASSAMEZZO, from *paſſer, to walk*, and *mezzo, the middle*, in *Muſic*, is a ſlow dance, differing little from the action of walking. As a GALLIARD conſiſts of five paces, or bars, in the firſt ſtrain, and is, therefore, called a cinque pace, the *paſſamezzo*, which is a diminutive of the galliard, has juſt half that number, and from that peculiarity takes its name.

PASSANT, in *Heraldry*, a term applied to an animal in a ſhield, appearing to walk leiſurely; or, to the ordinary poſture of terreſtrial animals.

Thus we ſay, he bears gules two lions *paſſant*, in pale. For moſt beaſts, except lions, they frequently uſe the word *tripping* inſtead of *paſſant*.

PASSARADO, or PASSAREE, in a *Ship*, is a rope whereby all the ſheet-blocks of the main and fore-ſails are haled down; the clew of the main-ſail to the cubbridge-head of the main-maſt, and the clew of the fore-ſail to the cat-head. This to be done when the ſhip goes large; and they are alſo kept firm down, and hindered from flying up, by this *paſſorado* rope.

PASSEPIED, from *paſſer*, *to walk*, and *pied*, a *foot*, in the *French Muſic*, an air like a MINUET, except that it is more briſk and lively, ſaid to be invented in Bretagne. The meaſure is $\frac{3}{8}$, and often $\frac{6}{8}$. It has three or more ſtrains, the firſt conſiſting of eight bars.

PASSER, in *Ichthyology*, the name of the common PLAISE.

Passer *aquaticus*, in *Ornithology*. See *Water*-SPARROW.

Passer *arundinaceus*, & *arundinaceous torquatus*. See *Reed* SPARROW.

Passer *aſper*, in *Ichthyology*. See DAB.

Passer *Britannicus*, a name given by Charleton to the SOAL-*fiſh*, and by ſome others to the TURBOT.

Passer *Canadenſis*, or *Canarius*, in *Ornithology*. See CANARY-*bird*.

Passer *faber*, in *Ornithology*, a name given by Nieremberg to a bird, the genus of which is not certainly known; it being alſo called *turdus chiappæ*. It is remarkable for perforating the bark of the pines, and lodging its acorns there, which it afterwards occaſionally eats.

Passer, *fluviatilis*, in *Ichthyology*. See FLOUNDER.

Passer *Indicus*, *macrouros alius* of Aldrovand, or the other long-tailed Indian ſparrow, is a very beautiful bird, with a blue beak, and a black head; the body being moſtly of a fine ſcarlet. See *Tab.* IV. *Birds*, N° 44.

Passer *moſquitus*, in *Ornithology*, a name by which ſome have called the *guainumbi*, or HUMMING-*bird*.

Passer *ſolitarius*, the *ſolitary ſparrow*, a name given by authors to a bird properly of the merula or black-bird kind, and of the ſame ſize and ſhape with the common black-bird, and not very different from it in colour. Its head and neck are large and thick; the upper part of its head of a duſky grey, and its back of a deep bluiſh black, but with a little whiteneſs at the end of the feathers; its tail is of a browniſh black, and its wings are variegated with brown, black, and a little white; its breaſt, throat, and belly, are beautifully variegated with black, white, and grey; its beak is long aad ſtrong, and its legs of a blackiſh brown, and very ſhort; it feeds on berries, and other vegetables; the male is more beautiful than the female, and has a caſt of purple in the blue of his back; it ſings very ſweetly, and loves the tops of old buildings; it builds in the ſame places, and is the bird mentioned in the book of Pſalms; it is much eſteemed for its ſinging, and will learn to imitate the human voice, and talk as the ſtarling, parrot, &c. Ray. See *Tab.* III. *Birds*, N° 29.

Passer *ſtultus*, in *Ornithology*, a name given by Nieremberg to a ſpecies of the *larus*, or SEA-GULL, ſo tame and fooliſh, that it will ſtand ſtill for any one to lay his hand upon it.

Passer *troglodites*, in *Ornithology*, the name by which authors call the WREN.

PASSERES, in the Linnæan ſyſtem of *Ornithology*, is the name of a whole order of birds, whoſe diſtinguiſhing characters are, that they have a conic, ſharp-pointed bill, and that the noſtrils are ovated, wide, and naked.

To this order belong fifteen genera, viz. the *columba* or PIGEON; the *alauda* or LARK, comprehending eleven ſpecies; the *ſturnus* or STARLING, including five ſpecies; the TURDUS, including twenty-eight ſpecies; the AMPELIS, including ſeven ſpecies; the LOXIA, comprehending forty-eight ſpecies; the EMBERIZA, comprehending twenty-four ſpecies; the TANAGRA, including twenty-four ſpecies; the FRINGILLA, including thirty-nine ſpecies; the *muſcicapa* or FLY-*catcher*, with twenty-one ſpecies; the *motacilla* or WATER-*wag-tail*, whoſe number of ſpecies is forty-nine; the PIPRA, with thirteen ſpecies; the *parus* or TITMOUSE, comprehending fourteen ſpecies; the *hirundo* or SWALLOW, including twelve ſpecies; and the *caprimulgus*, *goat-ſucker*, or *churn*-OWL, of which there are two ſpecies.

PASSERINA, in *Botany*. See SPARROW-*wort*.

PASSERINE, in *Botany*, a name by which Ruellius and ſome other authors have called the common *alſine* or *chickweed*.

PASSION, *paſſio*, ϖαθος, or ϖαθημα, is applied to the different motions and agitations of the ſoul, according to the different objects that preſent themſelves to the ſenſes. In propriety, all thoſe motions, whereby the ſoul is carried towards any thing; as love, ambition, revenge, &c. are rather actions than *paſſions*.

Thoſe motions, whereby the ſoul finds itſelf interrupted in its actions, as grief, &c. are the only real *paſſions*.

We find various modifications and impreſſions of pleaſure and pain inſeparably annexed by an eſtabliſhed law of nature, to the ſeveral judgments we form concerning good and evil: theſe judgments, with their reſpective modifications of pleaſure or pain annexed, according to the various appearances and relations of the object conſidered, either as good or evil, preſent or abſent, certain or uncertain, probable or improbable, poſſible or impoſſible, and affecting the machine in a certain manner peculiar to ſuch modifications, make what we call the *paſſions*.

How, or by what means, this mutual action and communication between ſoul and body is effected, we are, in a great meaſure, ignorant: we have but very obſcure and faint notions of any thing prior, or more ſimple, to reſolve it into, except the immediate will and agency of the firſt cauſe itſelf.

Malebranche defines the *paſſions* to be all thoſe emotions naturally ariſing in the ſoul, on occaſion of extraordinary motions of the animal ſpirits, and the blood: in oppoſition to thoſe motions of the ſoul, which are common to us with pure intelligences, and which he calls *natural inclinations*.

Though the *paſſions* be inſeparable from inclinations; and though a man be only capable of ſenſible love or hatred, becauſe he is capable of ſpiritual ones; yet does it appear juſt in that author to diſtinguiſh between them? *Paſſions* are much ſtronger and warmer than inclinations; their objects alſo are different, and ſo are their cauſes: in truth, *paſſions* and inclinations differ juſt as much as ſenſe and imagination.

In effect, the *paſſions* of the ſoul are the impreſſions of the Author of nature, which incline us to our bodies, and all things that may be of uſe to their preſervation: natural inclinations are the impreſſions of the Author of nature, which determine us primarily to love him, as our ſupreme good.

An ingenious writer has accurately diſtinguiſhed between our affections and our *paſſions*: the former, which we apply indiſcriminately to all reaſonable beings, may moſt properly ſignify the deſires and inclinations, founded in the reaſonable nature itſelf and eſſential to it; ſuch as ſelf-love, benevolence, and the love of truth. Theſe, when aided and ſtrengthened by additional, inſtinctive determinations, are, properly, *paſſions*. Thoſe tendencies within us, that are merely arbitrary and inſtinctive, ſuch as hunger and thirſt, and the deſires between the ſexes, we commonly call appetites or *paſſions*, indifferently, but ſeldom or never affections. Price's Rev. of Morals, p. 125, &c.

Paſſion, ſays another excellent writer, is a kind of medium between a ſimple affection of the mind, and the appetites and ſenſations of the body. *Paſſion* is an affection of the mind, which diſtinguiſhes it from the appetites of the body, hunger and thirſt, and from bodily ſenſations; and it is attended with a peculiar and extraordinary emotion of the animal ſpirits, by which it is diſtinguiſhed from pure affection, and from the ſeveral ſenſations; in all which, though there be ſome motion of the blood and ſpirits, yet that motion is natural and regular; whereas in the agitation, occaſioned by the *paſſions*, the ſpirits are moved after a more vehement and tumultuous manner. Grove's Syſtem of Moral Philoſophy, vol. i. chap. 7.

Philoſophers are not agreed about the number and diviſion of the *paſſions*: the ordinary diſtribution is into *paſſions of the concupiſcible appetite*, which are pleaſure and pain, deſire and averſion, love and hatred; and thoſe *of the iraſcible appetite*, which are anger, courage, fear, hope, and deſpair. See the authors on the ſubject of the *paſſions*; Des Cartes, who conſiders them phyſically; Coeffeteau, who gives us the tableau, or picture, of the *paſſions*; La Chambre, the characters of the *paſſions*; Senault, the uſes of the *paſſions*; and Hutcheſon, Watts, and others, who conſider them in a moral and religious view.

Some authors have diſtinguiſhed the *paſſions* into two claſſes, viz. *primitive* and *derivative*. The primitive *paſſions* are admiration, love, and hatred. If an object be rare or uncommon, either in its kind or qualities, it excites our admiration or wonder: if ſuch an object is preſented to us in a ſudden and unexpected manner, the *paſſion* is called ſurprize; and when our wonder riſes to a high degree, it is called aſtoniſhment. Moreover, admiration, according to the different character of its object, is denominated eſteem or contempt: though ſome writers make eſteem and contempt to be particular ſpecies of love and hatred. Eſteem is the admiration of an object, on account of its excellence; contempt, for its inſignificance or worthleſſneſs, whence proceed veneration, and ſlight or ſcorn.

If we look on any object as good, or in any reſpect agreeable to us, it may engage our LOVE; but if it be evil or diſagreeable, it excites our hatred, or an endeavour of the ſoul to diſunite itſelf from the apprehended evil. When the evil is preſent, it produces GRIEF, and a deſire of its removal; this deſire of eſcaping an evil may be conſidered as ſolitary, without deſiring it may befal another perſon, in which caſe it is called averſion; but when accompanied with ſuch a deſire, it is denominated malevolence. The ancient philoſophers meant much the ſame by their επιθυμια και θυμος, the concupiſcible and the iraſcible part.

The *paſſions* already enumerated are ſimple in their nature: there are others, called the mixed *paſſions*, of which ſome have admiration blended with them, and others are compounded only of the *paſſions* which fall under love and hatred. Thoſe *paſſions*, in which admiration is a principal ingredient, are AMBITION, glory (made up of joy, ſelf-love, and eſteem), ſhame, (compounded of ſorrow, ſelf-love, and contempt), EMULATION, HORROR, and CONSTERNATION. The other *paſſions*, compounded of love and hatred, may be diſtrihuted into ſuch as more immediately regard ourſelves, and ſuch as have others for their object: of thoſe which concern ourſelves, the principal, are the following, viz. fluctuation, conſiſting of deſire and grief; RESOLUTION, HOPE, FEAR; ſecurity, which is hope advanced beyond the fear of a diſappointment; deſpair, which is fear without any mixture of hope; JEALOUSY, and diſguſt. Of thoſe which expreſs our diſpoſitions towards others, the chief are the following; viz. irriſion, or that mirth which is excited in us by the ſight of another's abſurdities or misfortunes; commiſeration, which is a compound of love and ſorrow; congratulation, or that joy which our love to another makes us receive from the gifts of nature or Providence beſtowed upon him; ENVY, ANGER, GRATITUDE, and that which the Latins call *deſiderium*, or fondneſs for the memory of perſons and things that have been greatly beloved by us, ſpringing from the reflection on a paſt good, which we deſpair of enjoying again.

Dr. Cheyne conſiders the *paſſions* as either ſpiritual or animal. *Spiritual paſſions* he defines to be thoſe ſentiments produced in the ſoul by external objects, either ſpiritual ones, immediately; or material ones, by the mediation of the organs of the body.

Animal paſſions he defines to be thoſe effects produced by ſpirits, or bodies, immediately on the body.

Hence, as outward objects may be conſidered either as goods or evils, the moſt natural diviſion of the *paſſions*, whether ſpiritual or natural, as they regard thoſe objects, is into *pleaſurable* and *painful*.

And, in this ſenſe, all *paſſions* may be reduced to love and hatred; of which joy and ſorrow, hope, and fear, are only ſo many modifications or complexions, according to the various appearances, poſitions, &c. of the object.

In effect, all the *paſſions* may not only be reduced to two, viz. love and hatred, but, perhaps, to one, love; and even that may be all reſolved into ſelf-love; and this into a principle of ſelf-preſervation, or neceſſary invincible deſire of pleaſure and happineſs. The reſt are only rivulets from this ſource, or ſpecial applications of this principle to particular occaſions.

Thus, the deſire of any thing, under the appearance of its goodneſs, ſuitableneſs, or neceſſity to our happineſs, conſtitutes the *paſſion* of love; the deſire of eſchewing or avoiding any thing apprehended to be miſchievous, hurtful, or deſtructive, conſtitutes hatred or averſion; the deſire of a good, which appears at the ſame time probable, and in our power, conſtitutes hope, but, if the good appear improbable, difficult, or impoſſible, it conſtitutes fear or deſpair; the unexpected gratification of deſire is joy; the deſire of happineſs to another under pain, or ſuffering, is compaſſion; and the deſire of another's puniſhment, is revenge or malice, &c.

The ſingle deſire of happineſs, then, is the ſpring or motive of all our *paſſions*, as thoſe are of all our actions. Some wiſe and reaſonable motive, or end of action, ſays Dr. Morgan, is certainly neceſſary to all wiſe and reaſonable action: to act without a motive, would be the ſame thing as not to act at all, that is, ſuch an action could anſwer no farther or better end than not acting; and conſequently the action, as well as the agent, would be ſo far inſignificant and uſeleſs. He, who ſhould have no object at all of his love or averſion, hope or fear, joy or grief, muſt be ſimply and purely indifferent to all action; and, conſequently, he muſt either be in a ſtate of perfect reſt and inaction, or in a ſtate equivalent thereto; wherein the action of ſuch a being could be of no more ſignificancy than the uncertain fluctuation of an atom, or the quivering of a feather in the air.

But we can by no means approve the opinion of thoſe, who will allow no ultimate object of deſire, or motive to action, beſides private good. It is juſtly obſerved by a writer already cited, that this opinion ſprung from not carefully diſtinguiſhing between deſire, and the pleaſure implied in the gratification of it. The latter is ſubſequent to the former, and founded in it; that is, an object ſuch as fame, knowledge, or the the welfare of a friend, is deſired, not becauſe we foreſee, that, when obtained, it will give us pleaſure, but *vice verſa*; the obtaining it gives us pleaſure, becauſe we previouſly deſired it, or had an affection carrying us immediately to it, and reſting in it. And if there were no ſuch affections, the foundations of private enjoyments and happineſs would be deſtroyed. Of our ſeveral *paſſions* and appetites, ſome are ſubordinate to ſelf-love, and given with a view to the preſervation and welfare of individuals: others are ſubordinate to BENEVOLENCE, and given in order to ſecure and promote the happineſs of the ſpecies; and both the one and the other are eſſentially diſtinct parts of our intelligent frame. Price's Rev. p. 127, &c.

The natural or occaſional cauſe of all the *paſſions*, Malebranche makes to be the motion of the animal ſpirits, which are diffuſed through the body, to produce and preſerve a diſpoſition therein ſuitable to the object perceived; to the end that the body and mind may mutually aſſiſt each other on this occaſion, it being the order of the Creator, that our wills be followed by motions of the body proper to execute them; and that the motions of the body, mechanically excited in us by the view of external objects, be accompanied with a *paſſion* of the ſoul, which inclines to will or nill what appears ſerviceable or noxious to the body.

It is a continual impreſſion of the will of the Creator, that unites us thus intimately to a piece of matter, and occaſions this reciprocation of motions aud ſenſations; were this impreſſion of the Creator's will ſuſpended a moment, we ſhould be delivered from all dependence, all *paſſion*, &c. For what people uſually imagine of a neceſſary connection between the motions of the ſpirits and blood, and the emotions of the ſoul, is wholly inconceivable.

Certain little parts of the bile, ſay they, move with ſome violence among the fibres of the brain; therefore, the ſoul muſt neceſſarily be agitated by ſome *paſſion*, and this *paſſion* muſt be anger rather than love. What relation can we conceive between the faults of an enemy, a *paſſion* of contempt or hatred, and a bodily motion of the parts of the blood ſtriking againſt certain parts of the brain? How can the union or alliance of two things ſo different as ſpirit or matter be effected but ſolely by the omnipotent will of the Author of nature?

There has been much controverſy about the ſeat of the *paſſions*; but when we conſider that *paſſion* ſignifies a ſenſation of the ſoul, it muſt be lodged there, and not in any part of the body. As this ſenſation is joined with a tumult or agitation of the ſpirits, the *paſſion* muſt go along with the ſpirits moved. Thoſe in admiration, which ſeems to be a more ſpeculative *paſſion*, on being employed chiefly about the novelty or grandeur of objects, are in the brain, the great inſtrument or condition rather of thought and contemplation. In other *paſſions*, which, reſpecting the good or evil of objects, proceed from a principle of ſelf-preſervation, the ſpirits agitated are in the heart, the fountain of life, and fitteſt reſidence of thoſe motions of the animal ſpirits, which are intended for the benefit and preſervation of life.

It is a point, about which the divines and philoſophers can never agree, whether this relation and connection of thoughts of the mind, and motions of the body, be the gift of nature, or the puniſhment of the firſt ſin; and whether the *paſſions* be the inſtitution of nature, or the corruption thereof. Indeed, conſidering the good and wiſe purpoſes the *paſſions* ſerve, with regard to knowledge, virtue, and happineſs, and that abſolute neceſſity they are of, it is ſurpriſing it ſhould ever be doubted that they are eſſential to human nature.

This union or relation is found in all men, but in different degrees, and of different extent, according to the different temperaments, conditions, ages, ſexes, occaſions, objects, &c.

In every *paſſion* there may ſeven things be diſtinguiſhed: the firſt, the judgment the mind makes of an object, or the view of the relation the object bears to us. The ſecond, a new determination of the will towards that object, ſuppoſing it to appear as good or evil. The third, the peculiar ſenſation of modification, which accompanies them; as the ſenſation of love, hatred, deſire, or joy, which ſenſations are always different in the different *paſſions*, and are, as it were, the characteriſtics thereof. The fourth, a new determination of the courſe of the blood and ſpirits towards the ſeveral parts of the body: before the ſight of the object of the *paſſions*, the animal ſpirits were pretty equally diffuſed throughout the body; but the preſence of the new object diſturbs the whole œconomy; and the greateſt part of the ſpirits are ſent into the muſcles of the arms, legs, face, &c. The fifth

is,

is, the ſenſible emotion of the ſoul, which finds itſelf ſhaken by this ſudden overflowing of ſpirits. The ſixth is, the different ſenſation of love, hatred, &c. cauſed not by the intellectual view of good or evil, but by the different ſhakes or movements the animal ſpirits occaſion in the brain. The laſt is, a certain ſenſation of joy, or an inward ſatisfaction, which detains the ſoul in its *paſſion*, and atteſts its being in the ſtate it ought to he in with regard to that object.

Passions, in a view to *Medicine*, make one of the ſix non-naturals, and are of the utmoſt conſequence with reſpect to health or diſeaſe.

In conſequence of the ſeveral judgments we form concerning objects, as either good or evil, the organs of ſenſation and motion, i. e. the nervous fibres are variouſly impreſſed or ſtimulated; whence ariſe certain ſenſations, and certain modifications of motion, which, it is apparent, are reciprocal, and follow mutually from each other, whether the impreſſion be ſuppoſed firſt made on the body, or on the mind; that is, any ſtrong, violent motion, made on the organs, will excite a painful ſenſation in the mind; or any ſuch painful ſenſation firſt excited in the mind, from the bare conſideration of an object, will impreſs a violent motion on the organs; and, on the contrary, an eaſy and placid undulation, impreſſed originally by the actual impulſe of objects, will excite a pleaſurable ſenſation in the mind; or a pleaſurable ſenſation excited in the mind, from the mere contemplation of an object, will be followed with a like eaſy, placid undulation of the organs.

The painful *paſſions* then, as well as bodily pain, impreſs the nervous fibres with a violent motion, which brings them alternately into forcible contractions and dilatations, or ſtrengthens and increaſes their muſcular force and action. While then this pain or uneaſineſs of deſire, annexed to the *paſſions*, and impreſſed on the nerves, is moderate, and reſtrained within the bounds of nature, ſuch ſtimulating deſires have a good effect, as they ſtrengthen muſcular motion, keep up the circulation of the blood, promote the natural ſecretions, and excite a man to thoſe actions and exerciſes wherein animal life, health, and vigour, conſiſt. But where the uneaſineſs, annexed to the *paſſion*, is too violent, ſuch a continued ſtimulus will gradually derive a too great proportion of blood to the ſtimulated organs, by which the veſſels will be overſtretched and diſtended, their muſcular force will he gradually impaired, and the equilibrium of the blood and juices will be interrupted. And hence, from a mere painful ſenſation will ariſe a complicated train of bodily illneſſes and pains, in conſequence of the eſtabliſhed laws of the union and communication of ſoul and body.

Again, while we are wearing off the uneaſineſs of deſire annexed to any *paſſion*, we feel a ſenſible pleaſure, or agreeable emotion; and the organs, hereupon, falling into eaſy, uniform, placid undulations, the too great current of the blood towards them is diverted, and the equilibrium is reſtored. As ſoon as the uneaſineſs is all gone, the pleaſure ceaſes, and terminates in mere indolence, which diſpoſes the perſon to reſt and inaction, till the return of ſome freſh deſire, ſtimulating to farther action, renews the ſame ſucceſſion and interchangeable ſeries of pain and pleaſure.

And this is the circle of animal life; as the ſtimulus of deſire throws off the indolence of reſt, and excites to action; ſo the gratification moderates the pain of deſire, creates a pleaſure at firſt, and then terminates in the former indolence and inaction, till freſh deſires returning, ſtimulate to farther action, and continue the ſame round.

Dr. Cheyne divides the *paſſions* into acute and chronical, after the ſame manner, and for the ſame reaſon, as diſeaſes are ſo divided.

The acute *paſſions*, whether pleaſurable or painful, he obſerves, have much the ſame effect, and operate after much the ſame manner as diſeaſes do. They produce a briſk circulation of the fluids, and conſtringe the ſolids for ſome ſhort time. Thus, ſudden guſts of joy, or of grief, ſtimulate the nervous fibres, and the coats of the animal tubes, and thereby give a greater celerity to their included fluids; and the functions of the heart and lungs being involuntary, they have their more neceſſary and immediate effects on them. Thus, both ſudden joy and grief make us breathe ſhort and quick, and render the pulſe ſmall and frequent; though retaining our breath ſome time, to reflect more intenſely on a painful object, forces at length a ſtrong expiration, which becomes a ſigh. Thus, a ſudden painful idea, making a quick circulation, and thereby throwing a great quantity of blood upwards, makes it appear in the ſuperficial veſſels of the face, neck, and breaſt, and ſo produces a bluſh. The ſame principles will account for the effects of fear and anger, which make us change colour, and look red or pale, as the blood is accelerated or retarded in its courſe. Sudden and great fear doth ſo convulſe the nervous ſyſtem, that it ſometimes alters the poſition of the parts: thus, the hair ſhall ſtand on end in a fright, and the nerves be rendered ſo ſtiff and rigid, as to ſtop at once the animal functions; whence fainting, and ſometimes even death.

Chronical paſſions waſte the nervous ſyſtem gradually. Thoſe nerves employed in conſidering, brooding over, and fixing ſuch a ſet of ideas in the imagination, muſt be at length worn out and impaired; and the reſt, by diſuſe, rendered reſty and inactive, lifeleſs, and deſtitute of a ſufficient flux of warm blood, and due nouriſhment. Thus, do long grief, dark melancholy, hopeleſs love, over-weening pride, &c. impair the habit, and ſometimes, when long indulged, terminate in madneſs: the reaſon is, that a conſtant habit of fixing one thing in the imagination begets a ready diſpoſition in the nerves to produce again the ſame image, till the thought of it become ſpontaneous and natural, like breathing, or the motion of the heart. Thus the Faquirs in India fix one or both hands by long holding them up, ſo as that they cannot bring them down again. Eſſay on Health, &c.

Dr. Morgan ſeems to have gone beyond any body in explaining the origin and effects of the *paſſions*. From a courſe of actual obſervations on the ſeveral phenomena in the body, which attended the ſeveral *paſſions*, viz. the ſtate of the pulſe, reſpiration, warmth, digeſtion, &c. that author draws theſe general concluſions:

1. That all the grateful or pleaſurable *paſſions* raiſe the vital tide, ſtrengthen and quicken the pulſe, diffuſe the natural heat, and take off any antecedent ſtimulus, or preſſure upon the abdomen and inferior organs: and, on the contrary, the painful *paſſions* ſink and depreſs the blood, weaken the pulſe, recall and concentre the natural heat, and fix a ſtimulus or compreſſion on the inferior organs.

2. All the *paſſions* impreſs their characteriſtic ſenſations, or modifications of pleaſure and pain, eſpecially upon the œſophagus, and upper orifice of the ſtomach.

3. That they impreſs the different modifications on the muſcles of the larynx, and thus diſcover themſelves, by the different modulation and tone of the voice.

And hence he infers, that the nerves of the eighth conjugation, or par vagum, are the principal inſtruments of the *paſſions*; by means whereof they are variouſly impreſſed, modified, and organized; theſe, therefore, which are diſperſed to all parts of the breaſt and abdomen, particularly to the heart, lungs, ſtomach, liver, œſophagus, diaghragm, inteſtines, the organs of generation, &c. he conſiders as *pathetics of the firſt order*; the intercoſtal, which accompany all the diviſions of the par vagum, he calls *pathetics of the ſecand order*; the nerves, which ſerve the muſcles employed in reſpiration, and have the neareſt communication with thoſe of the par vagum, by means of the intercoſtal, he calls *pathetics of the third order*; and the nerves, which immediately diſpenſe ſenſe and motion to the ſeveral parts of the head, and have a remoter communication with the par vagum, *pathetics of the fourth order*.

According to this gradation, then, the organs, which are immediately ſupplied with nerves from the par vagum. or *pathetics of the firſt order*, will be firſt affected in the *paſſions*, and that with the ſmalleſt degree of impreſſed motion; with which the parts communicating immediately with the intercoſtal, *or ſecond order of pathetics*, keep pace, and are affected almoſt at the ſame time, and with the ſame motion; then the organs ſupplied with the *third order of pathetics*, or the nerves employed in the muſcles of reſpiration, are affected; and, laſtly, the organs of ſenſe and motion in the brain itſelf, by which ſenſation and imagination are performed, are put in a forcible emotion; by which the ordinary operations of ſenſe, judgment, &c. are much diſturbed.

This gradual riſe and progreſs of the *paſſions* is confirmed by fact, obſervation, and experience; but how they are generated, and by what ſteps they make theſe advances, requires ſome farther conſideration.

It may be obſerved then, that the quantity of motion impreſſed on the pathetic nerves in any *paſſion* is always proportional to the ſtrength of the deſire; but ſuch impreſſed motion is not always uniform, or equally diffuſed through the whole pathetic ſyſtem; for as the largeſt and moſt numerous branches of the pathetic nerves are ſpent on thoſe parts which derive their blood from the deſcending trunk of the aorta, viz. the ſtomach, ſpleen, kidneys, &c. upon any emotion too forcibly impreſſed, or too long continued, theſe inferior organs are the firſt and greateſt ſufferers; whence the blood flowing impetuouſly and irregularly to the parts thus ſtimulated, they become overſtretched; and hence ariſes a ſenſe of pain, weight, and oppreſſion. By theſe means alſo the head and ſuperior parts being deprived of their due ſhare of blood, the pulſe muſt ſink, the natural heat diminiſh and retire, and a ſenſe of cold and conſtriction be felt about the œſophagus, where the branches of the par vagum are very numerous; and hence the patient will be excited to ſigh, groan, moan, cry out, and complain, and will diſcover it in the tone of the voice, and modulation of the muſcles of the larynx, the characteriſtics of the prevailing *paſſion.*

Such is the ſtate of nature under the painful *paſſions*, where the ſtrong deſire of good is attended with an appearance of difficulty, or improbability: where the ſame deſire is attending with a ſeeming probability of obtaining or effecting it, this appearance, by moderating the intenſeneſs of the pain of the deſire, and taking off the too violent action of the pathetic nerves on the inferior organs, puts the pathetic ſyſtem in an eaſy, natural, uniform undulation; by which, the equilibrium of the blood being reſtored, the pleaſurable *paſſions* of love, joy, hope, &c. will be raiſed; and, in this caſe, the pulſe will riſe, and the natural heat will be diffuſed, and, by the action of the pathetic nerves on their proper organs, the ſeveral ſymptoms will be produced, which diſcover their placid emotions. Where the deſire is very keen and intenſe, we ſee what a prodigious force it will impreſs on the nerves, by the actions of madmen, and men in a fright. In this caſe, the ſtimulus of deſire being exceeding ſtrong, and the impreſſed motion univerſal, the pathetic nerves of the fourth or laſt order come to be affected; that is, the organs of ſenſation and imagination in the brain are brought into ſuch violent vibrations, as to diſturb the operations of reaſon.

From this violent perturbation of the pathetic nerves in the brain, madmen have their imagination as ſtrong and vivid as ſenſation itſelf.

Hence alſo we may obſerve the heights, or extremes, of the two contrary painful and pleaſurable *paſſions*; the one riſing at length into a mania, or raving madneſs, and the other ſinking into a hypochondriacal melancholy. The principal ſeat of the one is the brain; and of the other, the viſcera of the abdomen, eſpecially the ſpleen and meſentery. The one inflames and overheats, the other chills and freezes the imagination: the one hangs over the underſtanding like a glaring dazzling light, which animates and leads us on with zeal and vehemence; the other like a thick, black, and diſmal cloud, that ſinks all the powers of nature in the depths of miſery and deſpair. See on this ſubject Buchan's Dom. Med. chap. x.

PASSION, *cœliac.* See COELIAC.

PASSION, *hypochondriac.* See HYPOCHONDRIAC.

PASSION, *hyſteric.* See HYSTERIC.

PASSION, *iliac.* See ILIAC.

PASSIONS, in *Poetry*, denote the *paſſionate* ſentiments, geſtures, actions, &c. which the poet gives his perſons.

The *paſſions* are as it were, the life and ſpirit of the longer poems. Their neceſſity in tragedy and comedy is obvious; nor can the epopœia ſubſiſt without them.

It is not enough that the epic narration be ſurpriſing; it muſt likewiſe be moving and *paſſionate*, hurrying away the reader's mind, and filling it with anxiety, joy, terror, or ſome other violent *paſſion*, and this for ſubjects which it knows are feigned. Though *paſſions* be always neceſſary, yet all are not equally neceſſary, or ſuitable to all. Comedy has joy, and agreeable ſurprizes, for its part: tragedy, on the contrary, has terror and compaſſion. The proper *paſſion* of the epopœia is admiration; though the epopœia, as a medium between the two others, takes in both their kinds of *paſſions*; as we ſee in the griefs of the fourth book of the Æneid, and the games and diverſions of the fifth. Admiration, in effect, is conſiſtent with each; we admire with joy the things that ſurpriſe us agreeably, and with terror and grief thoſe that amaze and afflict us.

Beſides the general *paſſion*, which diſtinguiſhes the epic from dramatic poems, each epopœia has its peculiar *paſſion*, which diſtinguiſhes it from other epic poems. This peculiar *paſſion* ſtill follows the character of the hero. Thus wrath and terror reign in the Iliad, becauſe Achilles is wrathful, and ϖαντων εκ ϖαγλοτατ᾽ ανδρων, *the moſt terrible of men.* And, on the contrary, the Æneid is all in the tender, ſofter *paſſions*; ſuch being the character of Æneas. The prudence of Ulyſſes not allowing theſe exceſſes, we find none of them in the Odyſſey.

As to the conducting of the paſſions, to make them have their effect, there are two things required; viz. that the audience be prepared or diſpoſed to receive them; and that ſeveral incompatible *paſſions* be not mixed together.

The neceſſity of diſpoſing the audience is founded on the natural neceſſity of taking up things where they are, in order to remove them elſewhere. The application of this maxim is eaſy; a man is calm and at eaſe, and you would put him in a *paſſion* by a diſcourſe made on purpoſe. You muſt begin, then, in a calm manner; by this means you join yourſelf to him; and afterwards, walking together, he will not fail to follow you in all the *paſſions*, to which you lead him inſenſibly.

If you ſhew your anger at firſt, you will be as ridiculous, and will have as little effect, as Ajax in the Metamorphoſes; in whom the ingenious Ovid gives a fine example of this failing. He begins his harangue in the height of *paſſion*, and with the moſt violent figures, before his judges, who are in the deepeſt tranquillity.

> ———————*Sigeia torvo,*
> *Litora proſpexit, claſſemque in litore, vultu;*
> *Protendenſque manus, Agimus, proh Jupiter! inquit,*
> *Ante rates cauſam, & mecum confertur Ulyſſes.*

The neceſſary diſpoſitions ariſe from ſome preceding diſcourſe, or, at leaſt, from ſome action, which has already begun to raiſe the *paſſions* before they are mentioned. The orators themſelves ſometimes uſe this laſt means; for though ordinarily they do not raiſe the *paſſions* till the end of their diſcourſe, yet when they find their audience already moved, it would be ridiculous in them, by an unſeaſonable tranquillity, to lay them again.

Thus, the laſt time Catiline came to the ſenate, the fathers were ſo ſhocked at his preſence, that thoſe near the place where he ſat down, roſe up, retired, and left him alone. On this occaſion, Cicero had too much ſenſe to begin his oration with the uſual tranquillity and coolneſs of exordiums: by this means, he would have palled and abated the indignation of the ſenators againſt Catiline, which it was his buſineſs to ſpirit up and inflame; and he would have eaſed the parricide of that conſternation the behaviour of the ſenators had given him, and which it was Cicero's buſineſs and deſign to aggravate. Omitting therefore, the firſt part of this oration, he takes his auditors in the condition he finds them, continues and augments their *paſſions*: *Quouſque tandem abutere, Catilina, patientia noſtra? Quamdiu nos etiam furor iſte tuus eludet? Quem ad finem ſeſe effrænata jactabit audacia? Nihilne te nocturnum præſidium palatii, nihil urbis vigilæ, nihil timor populi, nihil,* &c.

The poets are full of inſtances of this kind, where the *paſſion* is prepared or kept up by actions. Dido, in Virgil, begins a diſcourſe like Ajax: *Proh Jupiter, ibit hic, ait,* &c. But then the motions are here well diſpoſed; Dido is before repreſented under terrible apprehenſions of Æneas's quitting her, &c.

Seneca's conduct, indeed, is quite oppoſite to this rule. If he has a *paſſion* to raiſe, he is ſure firſt to take from his audience any diſpoſition they might have to be affected. If they be in grief, fear, or the expectation of ſomething horrible, &c. he will begin with ſome fine deſcription of the place, &c. In the Troades, Hecuba and Andromache being prepared to hear the violent and barbarous death of their ſon Aſtyanax, whom the Greeks precipitated from the top of a tower; of what avail was it to tell them, that, of the ſpectators that crouded from all quarters to ſee the execution, ſome placed themſelves on ſtones, which the ruins of the walls made to project; that others ſhook their legs, as being placed too high, &c.

> *Alta rupes, cujus e cacumine*
> *Erecta ſummos turba libravit pedes.*

The ſecond thing required in the management of the *paſſions* is, that they be found pure, and diſengaged from any thing that might prevent their effect.

Polymythy, therefore, i. e. a multiplicity of fables, actions, or hiſtories, muſt be avoided; all adventures much broken, and hard to be retained, and all intrigues intricate, and difficult to conceive, are at once to be excluded. Theſe embarraſs the mind, and require ſo much attention, that there is none to ſpare for the *paſſions.* The ſoul muſt be free and diſengaged to feel; on the contrary, we divert ourſelves even from our real ſorrows, by an application to other things.

But, of all others, the greateſt enemies to the *paſſions* are the *paſſions* themſelves: they oppoſe and deſtroy each other; and if two oppoſite ones, e. gr. joy and ſorrow, meet in the ſame object, they will neither of them ſtand it. It is the nature of theſe habits that impoſe this law: the blood and ſpirits cannot move gently and equally, as in a ſtate of tranquillity, and, at the ſame time, be ſtopped and ſuſpended with a violence occaſioned by admiration. Nor can they be in either of thoſe ſituations, while fear calls them from the outer parts of the body, to aſſemble them about the heart, or rage ſends them into the muſcles, and makes them act there with violences very oppoſite to the operations of fear.

The cauſes and effects, therefore, of the *paſſions* in the ſoul are to be ſtudied, in order to be able to manage them with all their force. Virgil furniſhes two examples of what we have ſaid about the ſimplicity and engagement of each *paſſion*, in the deaths of Camilla and Pallas. See the Æneid.

Passion, in *Heraldry*. *Croſs of* Passion is a croſs thus called becauſe in ſhape of that whereon our Saviour ſuffered; i. e. not croſſed in the middle, but nearer the top; with arms ſhort, in proportion to the length of the ſhaft.

Passion *flower*, *paſſiflora*, in *Botany*, a genus of the *gynandria pentandria* claſs. Its characters are theſe: the flower has a plain coloured empalement of five leaves, and five half ſpear-ſhaped petals, which are large, plain, and obtuſe; the nectarium has a triple crown; the outer, which is longer, is faſtened to the inſide of the petal, but is larger and compreſſed above; it has five awl-ſhaped ſtamina, faſtened at their baſe to the column of the ſtyle annexed to the germen; the ſtyle is an erect cylindrical column, upon whoſe top ſits an oval germen, with three ſmaller ſtyles, which ſpread out; the germen afterward becomes an oval fleſhy fruit, with one cell, ſitting at the end of the ſtyle, filled with oval ſeeds, faſtened longitudinally to the ſkin or ſhell. Miller reckons nineteen, and Linnæus twenty-ſix ſpecies.

The different ſpecies of this plant cultivated in the gardens of the curious are very numerous, and moſt of them very beautiful.

The three more common kinds, which are what we ſee in moſt gardens, are very hardy, and bear all the ſeverities of our climate as well as if natives of it; for though the tender branches, and ſometimes even the main ſtem, are deſtroyed in our ſevere winters, yet it always ſhoots up again from the root.

Theſe are propagated by laying down their branches, which in one year's time will take good roots, and may be removed to the places where they are deſigned to remain. The beſt ſeaſon for tranſplanting them is the latter end of March, or the beginning of April: they ſhould be planted againſt a wall, or other building, which faces the ſouth-eaſt, or ſouth-weſt; or elſe mixed among the flowering ſhrubs in quarters of large gardens: in this caſe they muſt be trained up to poles fixed in the earth for that purpoſe, and thus will flower well, and appear extremely beautiful. The beſt ſeaſon for pruning them is in the ſpring, and it is a good cuſtom to lay a foot thickneſs of mulch at the roots, which will effectually preſerve them from the ſeverity of the winter, and is neceſſary when they are planted in open quarters, and have not the defence of a wall behind them. The manner of pruning is to cut entirely off all the weak ſhoots, and ſhorten the ſtrong ones to about three feet in length. When they are planted againſt high buildings, they may be left ſomething longer than this, to fill up the wall; but this is not very neceſſary, for they are very quick-growing plants, and in open quarters they ſhould be always pruned much ſhorter than this, to bring their flowers nearer the ground.

The moſt common kind with us never bearing fruit in this climate can never be propagated any way but this; but there is another ſpecies which has by ſome been miſtaken for the ſame, though really very different, which conſtantly bears fruit with us; and the plants of this may be raiſed from ſeeds in the common way.

Passion *week*, the week next preceding Eaſter.

It thus called from our Saviour's *paſſion*, i. e. his crucifixion, &c. which happened on the Friday of this week, now called *Good Friday*.

PASSIONATO, in the *Italian Muſic*, intimates that the part to which it is annexed ought to be played paſſionately, or in a moving or affecting manner.

PASSIVE, a term of relation, implying a thing to ſuffer, or undergo the action of ſome other; which in reſpect hereof, is denominated *active*.

In all generations, philoſophers conceive an *active* power, and a *paſſive*.

In civil life, we ſay, ſuch a perſon, in ſuch an election, has both an active voice, and a *paſſive*, i. e. he is both capable of electing, and of being elected.

Some alſo uſe the term *paſſive debt*, for a debt which we owe another, in contradiſtinction to an active debt, which is owing to us.

The chemiſts divide their principles, or elements, into active and *paſſive*. *Paſſive* are ſuch as have no active force inherent in themſelves, and which only act by being joined with ſome of the others.

Such are phlegm and earth; ſome ſay alſo ſalt, and, in effect, all but ſulphur, or fire, which they will have the only principles of action and motion in the univerſe.

Passive *obedience*, a doctrine held by the NONJURORS, or high-churchmen, who maintained, that it was never lawful for the people, under any provocation or pretext whatever, to reſiſt their ſovereign. This doctrine has been warmly oppoſed by many, who think it both lawful and neceſſary, in certain circumſtances, and in caſes of an urgent and momentous nature, to reſiſt the prince for the happineſs of the people. In the preſent advanced ſtate of civil and religious liberty, this doctrine is now almoſt exploded in our country.

Passive *qualities*. See Quality.

Passive *underſtanding*. See Understanding.

Passive *prayer*, in the *Language of Myſtic Divines*, is a total ſuſpenſion or ligature of the intellectual faculties, in virtue whereof, the ſoul remains, of itſelf, and as to its own power, impotent with regard to the producing of any effects. See Prayer.

The *paſſive* ſtate, ſays Fenelon, is only *paſſive* in the ſame ſenſe as contemplation is ſo, i. e. it does not exclude peaceable, diſintereſted acts, but only unquiet ones, or ſuch as tend to our own intereſt.

In the *paſſive* ſtate, the ſoul has not properly any activity, any ſenſation of its own: it is a mere infinite flexibility of the ſoul, to which the feebleſt impulſe of grace gives motion. Id.

Passive, in *Grammar*, denotes a ſecond voice or inflexion of verbs, which, of active, becomes *paſſive*, by aſſuming in the modern languages new auxiliary verbs; and in the ancient by new terminations. See Verb, Voice, &c.

The Engliſh verbs become *paſſive*, by taking the auxiliary verb *I am*, in lieu of *I have*, wherewith the active are conjugated; the French, by *Je ſuis*, in lieu of *J'ay*; the Italian, by *Io ſo*, for *Io ho*, &c.

Latin verbs become *paſſive*, by changing their terminations: as *amor* for *amo*, &c. *amari* for *amare*, &c.

Engliſh verbs *paſſive* are nothing elſe, in effect, but the verb *I am* in all its inflexions, joined to the participle *paſſive*; as, *I am praiſed*, in Latin, *laudor*; in French, *Je ſuis loué*; I have been praiſed, *J'ay été loué*, *laudatus ſum*, &c.

Mr. Harris, who conſiders all verbs, that are ſtrictly ſo called, as energies, diſtinguiſhes active and *paſſive* verbs in the following manner. Every energy, he ſays, is naturally ſituate between two ſubſtantives, an energizer, which is active, and a ſubject, which is *paſſive*. Hence then, if the energizer lead the ſentence, the energy follows its character, and becomes what we call a verb ACTIVE. Thus we ſay *Brutus amat*, *Brutus loves*. On the contrary, if the *paſſive* ſubject be principal, it follows the character of this too; and becomes what we call a verb *paſſive*. Thus we ſay, *Portia amatur*, *Portia is loved*.

Neuter Passive is a verb, that has a *paſſive* conjugation, but a neuter ſignification.

Of theſe there are a very ſmall number in Latin, more in French, and fewer in Engliſh: as *I am entered*, *ingreſſus ſum*, *Je ſuis entré*, &c.

Grammarians are frequently miſtaken here, taking verbs for neuters *paſſives*, which, in effect, are actives, and only differ in that they act on themſelves, by adding the pronoun perſonal; and which, on that footing, ſhould rather be neuters active than neuters *paſſive*.

Some admit of no genuine *paſſive* verbs in the modern tongues; ſuch, we mean, as anſwer to the notion of *paſſives* in the ancient, where all is done by different terminations. On which footing, there ſhould be none but actives *paſſive*, and neuters *paſſive*.

Passive *vaſſalage*. See Vassalage.

PASSO. See Passage.

PASSOVER, ϖασχα a ſolemn feaſt, celebrated among the Jews, on the fourteenth day of the moon next after the vernal equinox.

This feaſt was called by the ancient Latins and Greeks, *paſcha*, not from ϖασχω, *I ſuffer*, as Chryſoſtom, Irenæus, and Tertullian, weakly imagine, but from the Hebrew פסח *peſahh*, *paſſage*, *leap*; the deſign of the feaſt being to commemorate the deſtroying angel's *paſſing over* the houſes of the Iſraelites, when he entered in, and deſtroyed the firſt-born in thoſe of the Egyptians. Exod. xii. 27.

Many erroneouſly imagine, that it was in memory of their *paſſing* the Red Sea that the *paſſover* was inſtituted; though it is certain the feaſt was held, and had its name, before the Iſraelites took a ſtep of their way out of Egypt, and conſequently ſeveral days before their paſſing the Red Sea.

Beſides the *paſſover* celebrated on the fourteenth of the firſt month, there was a ſecond *paſſover* held on the fourteenth of the ſecond month after the equinox, inſtituted by God in favour of travellers, and ſick perſons, who could not attend at the firſt, nor be at Jeruſalem on the day.

The Greeks, and even ſome of the catholic doctors, from the thirteenth, eighteenth, and nineteenth chapters of St. John, take occaſion to conclude, that Jeſus anticipated the day marked for the *paſſover* in the law; but the authority of the three evangeliſts ſeems to evince the contrary. See Whitby's Diſſertation on this ſubject, in an appendix to the fourteenth chapter of St. Mark.

F. Lamy is of opinion, that he did not attend at the *paſſover* the laſt year of his life; which ſentiment has drawn upon him abundance of oppoſers.

F. Hardouin maintains, that the Gallileans celebrated the *paſſover* on one day, and the Jews on another.

PASS-PAROLE, a command given in the head of an army, and thence communicated to the rear, by paſſing it from mouth to mouth.

PASS-PAR-TOUT, a maſter-key; or key that opens indifferently ſeveral locks belonging to the ſame lodge or apartment.

PASSPORT, a licence or letter from a prince or governor, granting liberty and ſafe-conduct to travel, enter, and go out of his territories, freely, and without moleſtation.

The *paſſport* is properly given to friends, and the SAFE-CONDUCT to enemies.

For the proviſion by *Magna Charta*, in favour of merchandize, ſee MERCHANT.

The violation of ſafe-conducts, or *paſſports*, expreſly granted by the king or his ambaſſadors to the ſubjects of a foreign power in time of mutual war, or committing acts of hoſtility againſt ſuch as are in amity, league, or truce with us, who are here under a general implied ſafe-conduct, are breaches of the public faith, without which there can be no intercourſe or commerce between one nation and another; and ſuch offences may, according to the writers upon the law of nations, be a juſt ground of a national war. And it is enacted by the ſtatute 31 Hen. VI. cap. 4. now in force, that if any of the king's ſubjects attempt, or offend, upon the ſea, or in any port within the king's obeyſance, or againſt any ſtranger in amity, league, or truce, or under ſafe-conduct, and eſpecially by attacking his perſon, or ſpoiling him, or robbing him of his goods; the lord chancellor, with any of the juſtices of either of the king's bench or common pleas, may cauſe full reſtitution and amends to be made to the party injured.

Paſquier takes *paſſport* to have been introduced for *paſſe-par-tout*. Balzac mentions a very honourable *paſſport* given by an emperor to a philoſopher in theſe terms: "If there be any one on land, or ſea, hardy enough to moleſt Potamon, let him conſider whether he be ſtrong enough to wage war with Cæſar."

PASSPORT is alſo uſed for a licence granted by a prince for the importing or exporting merchandizes, moveables, &c. without paying the duties.

Merchants ſometimes procure ſuch *paſſports* for certain kinds of commodities; and they are always given to ambaſſadors and miniſters, for their baggage, equipage, &c.

PASSPORT is alſo a licence obtained for the importing or exporting of merchandizes deemed contraband, and declared ſuch by tariffs, &c. as gold, ſilver, precious ſtones, ammunition of war, horſes, corn, wool, &c. upon paying duties.

PASSPORT, or PASS, in *Sea Language*, denotes a permiſſion granted by any ſtate to navigate in ſome particular ſea, without hindrance or moleſtation from it. It contains the name of the veſſel, and that of the maſter, together with her tonnage, and the number of her crew, certifying that ſhe belongs to the ſubjects of a particular ſtate, and requiring all perſons at peace with that ſtate to ſuffer her to proceed on her voyage without interruption.

PASSULATUM, a name given by the ancients to a medicine compoſed of the pulp of raiſins paſſed through a ſieve, ſometimes alone, ſometimes with other ingredients.

PASSUM, a name given by the ancients to a kind of wine made of grapes, which had been ſuffered to remain on the vines till much withered and dried up: it is hence uſed alſo by ſome of the moderns to expreſs raiſin wine.

PASS-VOLANT, or PASSE-VOLANT. See FAGGOT.

In France, the *paſſe-volants* are condemned to be marked on the cheek with a fleur-de-lys.

PASTE, in *Cookery*, a ſoft compoſition of flour, wrought up with proper fluids, as water, milk, or the like, to ſerve for cakes or coffins, therein to bake meats, fruits, &c.

Paſte is the baſis or foundation of pies, tarts, patties, paſties, and other works of paſtry.

PASTE is alſo uſed in *Confectionary*, &c. for a preparation of ſome fruit, made by beating the pulp thereof with ſome fluid, or other admixture, into a ſoft pappy conſiſtence, ſpreading it into a diſh, and drying it with ſugar, till it becomes as pliable as an ordinary *paſte*. See CONFECTS.

It is uſed occaſionally for making the cruſts and bottoms of pyes, &c.

Thus, with proper admixtures, they make almond *paſtes*, apple *paſtes*, apricot *paſtes*, cherry, currant, lemon, plum, peach, and pear *paſtes*.

PASTE is alſo uſed for a preparation of wheaten flour, boiled up, and incorporated with water; uſed by various artificers, as upholſterers, ſaddlers, bookbinders, &c. inſtead of glue or ſize, to faſten or cement their cloths, leathers, papers, &c.

When *paſte* is uſed by bookbinders, or for paper-hangings to rooms, it is uſual to mix a fourth, fifth, or ſixth, of the weight of the flour of powdered reſin; and where it is wanted ſtill more tenacious, gum arabic, or any kind of ſize, may be added. *Paſte* may be preſerved, by diſſolving a little ſublimate, in the proportion of a dram to a quart, in the water employed for making it, which will prevent not only rats and mice, but any other kinds of vermin and inſects, from preying upon it.

PASTES, in the *Glaſs Trade*, a ſort of compoſition of the glaſs kind, made from calcined cryſtal, lead, and metallic preparations, to imitate the ſeveral natural gems. Theſe are no way inferior to the native ſtones when carefully made and well poliſhed, in brightneſs and tranſparence, but want their hardneſs.

The general rules to be obſerved in making them, are theſe: 1. That all the veſſels in which they are made are firmly luted, and the lute left to dry before they are put into the fire. 2. That ſuch veſſels are choſen for the work as will bear the fire well. 3. That the powders be prepared on a porphyry ſtone, not in a metal mortar, which would communicate a tinge to them. 4. That the juſt proportion in the quantities of the ſeveral ingredients be nicely obſerved. 5. That the materials be all well mixed; and if not ſufficiently baked the firſt time, to be committed to the fire again, without breaking the pot; for, if this be not obſerved, they will be full of bliſters and air-bladders. 6. That a ſmall vacuity be always left at the top of the pot, to give room to the ſwelling of the ingredients.

To make a *paſte* of extreme hardneſs, and capable of all the colours of the gems, with great luſtre and beauty, take of prepared cryſtal ten pounds; ſalt of polverine, ſix pounds; ſulphur of lead, two pounds: mix all theſe well together, into a fine powder; make the whole, with common water, into a hard *paſte*; and make of this *paſte* ſmall cakes, of about three ounces weight each, with a hole in them, made in their middle: dry theſe in the ſun, and afterwards calcine them in the ſtraighteſt part of a potter's furnace; after this powder them, and levigate them into a perfect fineneſs on a porphyry, and ſet this powder in pots in a glaſs furnace to purify for three days; then caſt the whole into water, and afterwards return it into the furnace, where let it ſtand fifteen days; in which time all foulneſs and bliſters will diſappear, and the *paſte* will greatly reſemble the natural jewels. To give this the colour of the emerald, add to it braſs thrice calcined: for a ſea-green, braſs ſimply calcined to redneſs; for a ſapphire, add zaffer, with mangancſe; and for a topaz, manganeſe and tartar. All the gems are thus imitated in *paſte*, by the ſame way of working as the making of the coloured glaſſes; and this is ſo hard, that they very much approach to the natural gems.

The colours in all the counterfeit gems made of the ſeveral *paſtes*, may be made deeper or lighter, according to the works for which the ſtones are deſigned; and it is a neceſſary general rule, that ſmall ſtones for rings, &c. require a deeper colour, and large ones a paler. Beſides the colours made from manganeſe, verdigriſe, and zaffer, which are the ingredients commonly uſed, there are other very fine ones, which care and ſkill may prepare: very fine red may be made from gold, and one not much inferior to that from iron; a very fine green from braſs or copper, and a ſky-colour from ſilver; and a much finer one from the common ſmall garnets of Bohemia, which are of little value. The gems alſo afford glorious colours like their own.

The fine blue from ſilver is, probably, only from the ſmall quantity of copper uſed in the alloy.

A very ſingular and excellent way of making the *paſte* to imitate the coloured gems, is this: take a quantity of ſaccharum ſaturni, or ſugar of lead, made with vinegar in the common way; ſet it in ſand, in a glaſs body well luted from the neck downwards; leave the mouth of the glaſs open, and continue the fire twenty-four hours; then take out the ſalt, and if it be not red, but yellowiſh, powder it fine, and return it into the veſſel, and keep it in the ſand-heat twenty-four hours more, till it becomes as red as cinnabar. The fire muſt not be made ſo ſtrong as to melt it, for then all the proceſs is ſpoiled. Pour diſtilled vinegar on this calcined ſalt, and ſeparate the ſolution from the dregs: let the decanted liquor ſtand ſix days in an earthen veſſel, to give time for the finer ſediment to ſubſide: filter this liquor, and evaporate it in a glaſs body, and there will remain a moſt pure ſalt of lead; dry this well, then diſſolve it in fair water; let the ſolution ſtand ſix days in a glazed pan; let it ſubſide, then filter the clear ſolution, and evaporate it to a yet more pure white and ſweet ſalt; repeat this operation three times; put the now perfectly pure ſalt into a glaſs veſſel, ſet it in a ſand-heat for ſeveral days, and it will be calcined to a fine impalpable powder, of a lively red. This is called the ſulphur of lead. Neri's Art of Glaſs. Take all the ingredients as in the common compoſition of the *paſtes* of the ſeveral colours, only inſtead of red lead, uſe this powder, and the produce will well reward the trouble of the operation, as experience has often proved.

A *paſte* proper for receiving colours may be readily made by well pounding and mixing ſix pounds of white ſand, cleanſed, three pounds of red lead, two pounds of purified pearl-aſhes, and one pound of nitre. A ſofter *paſte* may be made, in the ſame manner, of ſix pounds of white ſand cleanſed; red lead, and purified pearl-aſhes, of each three pounds; one pound of nitre, half a pound of borax, and three ounces of arſenic. For common uſe, a pound of common ſalt may be ſubſtituted for the borax. This glaſs will be very ſoft, and will not bear much wear, if employed for rings, buckles, or ſuch imitations of ſtones as are expoſed to much rubbing; but for ear-rings, ornaments worn on the breaſt, and thoſe little uſed, it may laſt a conſiderable time.

In order to give *paſte* different colours, the proceſs is as follows.

PASTE *reſembling amethyſt*. Take ten pounds of either of the compoſitions deſcribed under *colouring of* GLASS; one ounce and a half of mangane∫e, and one dram of zaffer; powder and fuſe them together. See AMETHYST.

PASTE *perfectly black*. Take ten pounds of either of the compoſitions juſt referred to, one ounce of zaffer, ſix drams of mangane∫e, and five drams of iron, highly calcined; and proceed as before.

PASTE, *blue*. Take of the ſame compoſition ten pounds; of zaffer, ſix drams; and of mangane∫e, two drams; and proceed as with the foregoing.

PASTE *reſembling the chryſolite*. Take of either of the compoſitions for *paſte* above deſcribed, prepared without ſalt-petre, ten pounds, and of calcined iron five drams; and purſue the ſame proceſs as with the reſt. See CHRYSOLITE.

PASTE *reſembling the red cornelian*. Take of the compoſitions mentions under *colouring of* GLASS, two pounds; of glaſs of antimony, one pound; of the calcined vitriol, called ſcarlet oker, two ounces; and of mangane∫e, one dram. Fuſe the glaſs of antimony and mangane∫e with the compoſition; then powder them, and mix them with the other, by grinding them together, and fuſe them with a gentle heat.

PASTE *reſembling white cornelian*. Take of the compoſition juſt referred to, two pounds; and of yellow oker, well waſhed, two drams; and of calcined bones, one ounce. Mix them, and fuſe them with a gentle heat.

PASTE *reſembling the diamond*. Take of the white ſand, ſix pounds; of red lead, four pounds; of pearl-aſhes, purified, three pounds; of nitre, two pounds; of arſenic, five ounces; and of mangane∫e, one ſcruple. Powder and fuſe them.

PASTE *reſembling the eagle-marine*. Take ten pounds of the compoſition under GLASS; three ounces of copper, highly calcined with ſulphur; and one ſcruple of zaffer. Proceed as before.

PASTE *like emerald*. Take of the ſame compoſition with the laſt, nine pounds; three ounces of copper, precipitated from aqua fortis, and two drams of precipitated iron. See EMERALD.

PASTE *like garnet*. Take two pounds of the compoſition under GLASS; two pounds of the glaſs of antimony, and two drams of mangane∫e. For vinegar garnet, take of the compoſition for *paſte*, deſcribed in this article, two pounds; one pound of glaſs of antimony, and half an ounce of iron, highly calcined; mix the iron with the uncoloured *paſte*, and fuſe them; then add the glaſs of antimony, powdered, and continue them in the heat till the whole is incorporated. See GRANATE.

PASTE, *gold*, or *full yellow colour*. Take of the compoſition for *paſte* ten pounds, and one ounce and a half of iron, ſtrongly calcined; proceeding as with the others.

PASTE, *deep purple*. Take of either of the compoſitions for *paſte*, ten pounds; of mangane∫e, one ounce; and of zaffer, half an ounce.

PASTE, *reſembling ruby*. Take one pound of either of the compoſitions for *paſte*, and two drams of *calx caſſii*, or precipitation of gold by tin; powder the *paſte*, and grind the calx of gold with it in a glaſs, flint, or agate mortar, and then fuſe then together. A cheaper ruby *paſte* may be made with half a pound of either of the above compoſitions, half a pound of glaſs of antimony, and and one dram and a half of the calx of gold: proceeding as before.

PASTE *reſembling ſapphire*. Take of the compoſition for *paſte*, ten pounds; of zaffer, three drams and one ſcruple; and of the *calx caſſii*, one dram. Powder and fuſe them. Or the ſame may be done, by mixing with the *paſte* one-eighth of its weight of ſmalt. See SAPPHIRE.

PASTE *like topaz*. Take of the compoſition under GLASS, ten pounds, omitting the ſalt-petre; and an equal quantity of the *gold-coloured hard* GLASS. Powder and fuſe them. See TOPAZ.

PASTE *like turquoiſe*. Take of the compoſition for *blue paſte*, already deſcribed, ten pounds; of calcined bone, horn, or ivory, half a pound. Powder and fuſe them.

PASTE, *opake white*. Take of the compoſition for *paſte*, ten pounds; and one pound of calcined horn, ivory, or bone; and proceed as before.

PASTE, *ſemi-tranſparent white, like opal*. See OPAL.

PASTE *for angling*. There are many receipts which particular people are fond of; but the following compoſition ſeems one of the beſt: take equal quantities of freſh butter and ſheep's ſuet, about half as much of good old cheeſe, and the crumb of an old ſtale white loaf, as much as will, when they are all beaten in a mortar, make the whole into a *paſte*; add a little wool or tow, that it may keep the better on the hook. The place ſhould be baited with blood and grains over night, and in the morning this *paſte* will be found an excellent bait. See FISHING.

PASTE *for birds*, a general ſort of food made by the people who breed up birds from the neſt, and ſuiting almoſt all kinds.

It is made in the following mauner: grind half a peck of large beans, well dried, to a very fine meal: take of this meal two pounds; of the beſt ſweet almonds blanched, one pound; theſe muſt be well beat together in a mortar, till perfectly mixed; then to a quarter of a pound of freſh butter, in a ſaucepan well tinned, add the *paſte*, and mix all well together over a charcoal-fire, ſtirring it as it boils with a wooden ſpoon; then add the yolks of four eggs, and a little ſaffron, and finally a ſmall quantity of the fineſt virgin honey. When theſe are well incorporated, and are tolerably thin and without lumps, the whole is to be poured into a colander, made with ſuch holes as will let the compoſition paſs through: if any of it is ſo ſtiff that it will not go through, it muſt be beat again in a mortar, and by that means made fit to paſs the holes, and mix with the reſt. When the whole is done, it is to be put into a pot, and a little clarified honey being melted and poured on it, it will keep very well for ſix months, or longer.

PASTEBOARD, a kind of thick paper, formed of ſeveral ſheets paſted together.

There is alſo a coarſe kind of *paſteboard*, made of old paper and old *paſteboard*, beaten in a mortar with water, and reduced into a kind of pulp; to which is added a little paſte, to give the maſs a conſiſtence; after which, it is formed in a mould; and, to finiſh it, laid in a preſs, to ſqueeze out all the water, and reduce it to its proper thickneſs.

Each kind is diſtinguiſhed by numeroes, which expreſs the fineneſs and value: the fineſt is covered on both ſides with a very white, ſmooth paper; others only on one ſide; and others on both ſides with common paper.

The chief uſe of *paſteboard* is in the binding of books, and the making of letter-caſes, hat-caſes, gloves, &c. See BOOK-BINDING.

For the duty on *paſteboard*, ſee PAPER.

PASTEL. See PASTIL.

PASTERN of a horſe, the diſtance between the fetlock or joint next the foot and the coronet of the hoof.

This part ſhould be ſhort, eſpecially in the middle-ſized horſes; becauſe long *paſterns* are weak, and cannot ſo well endure travel.

PASTERN *joint* is the joint above the *paſtern*.

The *paſtern joint*, after travelling, is very apt to be crowned, i. e. to have a ſwelling round it, beneath the ſkin, in form of a circle, a third of an inch broad.

PASTIL, or PASTEL, among *Painters*, &c. a ſort of paſte, made of ſeveral colours, ground up with gum-water, either together or ſeparately, in order to make crayons to paint with on paper or parchment. See CRAYON.

PASTIL, *paſtillus*, is alſo uſed for a dry compoſition, yielding a fragrant ſmell when burnt in a perfuming pan, to clear and ſcent the air of a chamber.

It is compoſed of odorous reſins, mixed with aromatic woods or drugs pulveriſed, and incorporated with mucilages of gum tragacanth. Some call theſe compoſitions oſſelets of Cyprus.

There are alſo *paſtils* for the mouth, chewed to procure a ſweet breath. Theſe have ſeveral names, and conſiſt of ſeveral preparations, as muſcadines, conſerves, &c.

PASTIL, or PASTEL, is ſometimes alſo uſed for the plant otherwiſe called WOAD.

PASTIL, in *Confectionary*, is a preparation of ſugar with lemon-water, &c. boiled up with gum-water, ſtrained, beat up, and, by the addition of more dry ſugar, worked nto a pliable paſte, and thus formed into round or oblong figures, and dried in a ſtove. See LOZENGE.

PASTINACA, in *Botany*. See PARSNEP.

PASTINACA *marina*, in *Ichthyology*, the name of a fiſh, called in Engliſh the *poiſon-fiſh*, *fire-flaire*, or *ſting-ray*. It is one of the flat cartilaginous fiſhes, and ſomething like the common ſkate. It is a ſpecies of the raia, or ray-fiſh, and diſtinguiſhed by Artedi from the other ſpecies, by the name of the ſmooth-bodied ray, with no fins to the tail, but with a long, bony, ſerrated ſpine in it.

This fiſh is the τρογων of Ariſtotle and Oppian, and is called by the modern Italians, banco.

Its tail, in which all its poiſon is ſaid to be lodged, is long, ſmooth, and round, with a thorn, or dart, of a finger's length, toothed on each ſide like a ſaw, with the teeth ſtanding upwards, or toward the head. This is placed at the diſtance of about one third of the length of the tail; and that from this place grows very ſlender, and ends in a very ſlender point. It grows, ſometimes, to ten pounds weight; and when the tail is cut off, is commonly ſold in the markets of Italy, and elſewhere. See *Tab*. III. *of Fiſhes*, N° 35.

Authors give us many remarkable accounts of the poiſon of this fiſh, which it communicates to animals by the ſtroke of its tail. They mention alſo two kinds of it; that is, beſide the ordinary ſpecies, which is ſmooth, another called the *paſtinaca marina aſpera*, which is rough and prickly.

Mr. Pennant obſerves, that there is no credit due to the generally received opinion of its venomous qualities, though even Linnæus has adopted it. The ſpine is the weapon of offence belonging to the fiſh, which is capable of giving a very bad wound, attended with dangerous ſymptoms, when it happens on a tendinous part, or to a perſon with a bad habit of body. Pennant's Britiſh Zool. vol. iii. p. 95. See TORPEDO.

PASTINATION, a term ſometimes uſed in *Agriculture* for the act of opening, looſening, and preparing the earth for planting.

PASTOPHORI, παϛοφοροι, among the ancients, prieſts whoſe buſineſs it was, at ſolemn feſtivals, to carry the ſhrine of the deity, when they were to pray to him for rain, fair weather, or the like.

PASTOPHORIA, in *Antiquity*, the apartments, near the temples, where the *paſtophori* were lodged.

Clemens Alexandrinus, deſcribing the temples of the Egyptians, ſays, that, after having paſſed through magnificent courts, you are conducted to a temple, which is at the farther end of theſe courts, and then a *paſtophorus* gravely lifts up the veil, which is the door, to ſhew you the deity within; which is nothing but a dog or a cat, or ſome other animal. Theſe *paſtophori* alſo ſupported the ſhrine, or niche of theſe ridiculous divinities, when they were carried in proceſſion. Apuleius ſpeaks of the *paſtophori* that carried the Syrian goddeſs.

In the temple of Jeruſalem there were two courts ſurrounded with galleries, and all round about were ſeveral lodging rooms for the prieſts, and to lay up wood, wine, oil, ſalt, meal, ſpices, incenſe, veſtments, valuable veſſels, and proviſions neceſſary for the ſacrifices and lamps, as alſo for the ſupport and maintenance of the prieſts. See 1 Chron. ix. 26, 33. Ezek. xl. 17, 18. 1 Chron. xxvi. 16.

PASTOR, originally ſignifies one that (*paſcit*) feeds. Hence it was anciently uſed for a *ſhepherd*, or *advocate*; and is now appropriated to a *miniſter*, or one that has the cure of ſouls.

PASTOR *piſcis*, in *Ichthyology*, the name of a fiſh of the mullet kind, caught in the American ſeas and rivers, and eſteemed a very well taſted one.

It is the uſual ſize of our river trout, and not unlike that fiſh in ſhape; its ſcales are large, and of a ſilvery white, and are ranged in the ſame order with thoſe of the perch, with greyiſh lines between the ſeveral arrangements; it has ſeven fins, all very large, eſpecially that on the back, and its tail is remarkably forked; all the fins are white, and the covering of the gills are ſcaly, not bony, as in moſt other fiſhes; whence it has been ſuppoſed to have no gills.

PASTORAL, ſomething that relates to ſhepherds, *paſtores*. The poets repreſent the innocence of a *paſtoral* life, and *paſtoral* manners in the moſt agreeable light. We muſt not imagine them ſo beautiful in nature as in their deſcriptions.

PASTORAL, in *Poetry* denotes a compoſition, the ſubject whereof is ſomething in the *paſtoral*, or at leaſt in rural life, and the perſons ſhepheds, or at leaſt ruſtics.

Moſt authors, except the Engliſh, eſteem *paſtoral* of the dramatic kind; and define it a dramatic piece, wherein the perſons are clad like nymphs and ſhepherds, and act their own amours. The ſcene is always in the fields or the woods; whence Taſſo calls *paſtoral*, favola boſcareccia. Such are the Paſtor Fido, of Guarini; the Aminta, of Taſſo; the Sylvia, of Mairet, the French poet; and the Comus, of Milton, &c. Taſſo aſſumes to himſelf the honour of having invented *paſtoral*; but the firſt idea of this kind of drama ſeems to be Beccari's, who made the firſt attempt of this kind in 1552. But Taſſo's Aminta, which did not appear till the year 1573, effacing what had been done by Beccari, the firſt author was forgot, and Taſſo left as the inventor.

It is certain this kind of *paſtoral* fable, compoſed according to the rules of the ſtage, was unknown among the ancients. The Greeks and Latins have indeed introduced ſhepherds in their eclogues; but theſe eclogues had nothing theatrical in them; nor were the ſhepherds ever brought upon the ſtage.

This kind of dramatic *paſtoral* is as yet but little known among us: nor have we any thing conſiderable under the title of *paſtorals*, but country pieces after the manner of the eclogues or idyllions of the ancients.

Every *paſtoral*, even in this laſt view, ſhould have a little plot or fable, which may deſerve the title of a *paſtoral ſcene*. It muſt be ſimple, and but one; yet, not ſo as to refuſe all digreſſions, provided they be but ſhort. This rule of the plot is every where obſerved by Virgil.

PASTORAL, in the *Italian Muſic*, an air compoſed after a very ſweet, eaſy, gentle manner, in imitation of the airs ſhepherds are ſuppoſed to play.

PASTORAL *column*. See COLUMN.

PASTORAL *ſtaff*. See CROSIER.

PASTRY, that branch of cookery, which teaches the preparation of *paſte*, with ſeveral ſavory ingredients of fleſh, fruits, ſpices, ſugar, butter, &c.

Paſtry is chiefly converſant in the making of pies, paſties, patties, cakes, biſcuits, &c.

PASTURE, *paſtura*, in our law-books, is any place where cattle are occaſionally fed.

By which it differs from *paſcua*, which is a place ſet wholly apart for feeding, and never plowed.

Paſtura *omne genus paſcendi ſignifica, ſive in pratis, ſive in ſtipula, ſive in agris, ſive in campis: ſed* paſcua *eſt locus principaliter deputatus pecoribus paſcendis, ut puta in montibus, moris, mariſcis, & planis non cultis nec aratis.* Linwood.

PASTURE *ground*, is properly that which is not cultivated; that is, it is neither meadow, nor arable; but reſerved for the feeding of cattle.

The beſt domains are thoſe conſiſting in *paſture*; they need no tilling. Holland is a country abounding much in *paſture*.

Paſture-land is of ſuch advantage to huſbandry, that many prefer it even to corn-land, becauſe of the ſmall hazard and labour that attend it, and as it lays the foundation for moſt of the profit that is expected from the arable-land; becauſe of the manure the cattle afford which are fed upon it. Where dung is not to be bought, as is often the caſe in places diſtant from large towns, the farmer is forced to proportion his arable to his *paſture*-land, in ſuch manner, that the cattle fed on the latter may be ſufficient for a ſupply of dung, ſo neceſſary for producing the fruits of the former.

Paſture-lands are of three kinds. 1. The uplands: theſe lie ſo high as not to be over-flowed by rivers or land-floods. 2. Thoſe low lands which lie near rivers and fens. And, 3. Thoſe that lie near the ſea. See UPLAND, MARSH-LAND, MEADOW, and LAND.

Paſture-land requires the refreſhment of dung, as well as the arable or corn-land; but there is to be a difference made in the laying it on and ſpreading it. A harrow performs the office of ſpreading the dung on ploughed lands; but the beſt contrivance for *paſtures* is to lay the dung into ſmall heaps, and draw over it a gate ſtuck full of buſhes. All dung that is laid on *paſture*-land muſt be laid on in winter, that the rains may waſh its fatneſs into the ground before the ſun ſcorches it, or evaporates its goodneſs. Fine mould mixed with the dung, and ſpread with it over the land, is very good for *paſtures*: for it is waſhed down to the very roots of the graſs, and gives them a new and fine ſoil juſt in thoſe places where it is moſt wanted.

The beſt manure for *paſture*-land is the rotten bottoms of old hay-ſtacks; for theſe moulder away into a very rich ſoil, and are always full of vaſt quantities of ſeeds, fallen at times from the hay, which all grow when ſpread on the ground: and thus new nouriſhment, and a new ſet of plants are given at once to the exhauſted ground. But as particularly uſeful as this is for *paſture*-ground, it is as improper for corn-land, and ſhould by no means ever be ſuffered to mix with the manure of thoſe grounds; as it will then raiſe graſs and other plants, which though of uſe in *paſture*, are weeds among the corn. Mortimer's Huſbandry.

In order to lay down land that has been in tillage, with graſs for *paſture*-ground, the beſt method is, to plough it well, and clean it from weeds, and to ſow the graſs-ſeeds about the middle of September, or a little ſooner in cold lands, and if there be a proſpect of rain. The beſt ſeeds are the upland hay-ſeeds, taken from the cleaneſt *paſtures*, where there are no bad weeds, of which three or four buſhels will ſuffice for an acre. White Dutch clover, or white honey-ſuckle graſs is very proper: and eight pounds of it would be enough for an acre. They ſhould be ſown ſeparately; the graſs-ſeed firſt, and then the Dutch clover. After they are ſown, the ground ſhould be lightly harrowed, and in two or three days rolled to break the clods, ſmooth the ground, and fix the ſeeds. When they grow up, they ſhould be carefully weeded and well rolled, in order to preſs down the graſs, and form a thick bottom and ſward. After the ground has been thus ſown, and brought to a good ſward, the method of preſerving it good is conſtantly to roll the ground with a heavy roller, every ſpring and autumn; to cut up the weeds, at the ſame ſeaſons; to dreſs theſe paſtures, every third year: and to mow one ſeaſon, and feed the next. Miller.

Pasture, *artificial.* As to the difference of the quantity of *artificial paſture* made by dung without tillage, and that made by tillage without dung, the latter is many times greater, as has been proved by repeated experiments on unplowed land, whereon a dunghill had lain for two or three years, and being then removed was planted with turneps: and at the ſame time a tilled land contiguous thereto, was drilled with turneps, and horſe-hoed. The other being hand-hoed, ſeemed to proſper beſt at the firſt, but in fine it did not amount to a fifth part of the tilled and horſe-hoed land, either in bigneſs or in crops; ſo that the benefit of the dung and hand-hoe was inconſiderable in compariſon of the plough and horſe-hoe. The little quantity of *artificial paſture* raiſed to the other, was only near the ſurface, and did not reach deep enough to maintain the turneps till they arrived at the fifth part of the growth of thoſe which were placed in an *artificial paſture*, that reached to the bottom of the common bed of mould.

Another proof of the ſame kind is, that ſeveral lands of turneps, drilled on the level, and at three-feet rows, plowed, and doubly dunged, and alſo horſe-hoed, did not produce nearly ſo good a crop of turneps as ſix-feet ridges adjoining horſe-hoed, though no dung had been laid on them for many years.

In this caſe, there was no other difference but that the three-feet rows did not admit the hoe-ploughs to raiſe half the *artificial paſture* as the ſix-feet rows did. The dung plowed into the narrow intervals before drilling, could operate no farther with any great effect than the hoe-plough could turn it up and help its pulverization. Upon the whole, dung without tillage can do very little; with ſome tillage, it does ſomething; with much tillage it pulverizes the ſoil in much leſs time than tillage alone can do it in; but tillage alone, in more time, can pulverize it as well. Much of the dung commonly uſed on fields is to be ſaved on this principle; a little more hoeing between the rows of the plants ſupplies the place of it, and is done at much leſs expence than that of ſo much manure, of the hands neceſſary to lay it on, and the carriage. Tull's Horſe-hoeing Huſbandry.

Pasture *of plants.* See Plant.

Pasture, *admeaſurement of.* See Admeasurement.

Pasture, *common of.* See Common.

PASTUS, the procuration or proviſion, which the king's or lord's tenants are bound to make for them at certain days or ſeaſons, or as often as they make a progreſs to their lands.

This, in many places, has been converted into a pecuniary fee; as in the procurations of the clergy.

PASTY, in *Cookery*, a work of paſtry; being a preparation of ſome proper meat, as beef, veniſon, lamb, or the like, well boned, beaten up to a pulp, and highly ſeaſoned; put up in a paſte, and then baked in an oven. They alſo make veal *paſties*, umbel *paſties*, kidney *paſties*, marrow *paſties*, &c.

PATA, in *Ornithology*, the name by which the Portugueſe in Braſil call a large and very beautiful American duck, known among others by its Braſilian name, IPECATI-*apoa*.

PATÆCI, in *Mythology*, images of certain gods carried by the Phœnicians on the prows of their gallies.

Herodotus, lib. iv. calls them παταικοι. The word is Phœnician, and derived from *pethica*, i. e. *titulus*. See Bochart's Chanaan, lib. ii. cap. 3. But Scaliger does not agree. Morin derives it from πιθηκος, *monkey*, this animal having been an object of worſhip among the Ægyptians, and hence might have been honoured by their neighbours.

Mr. Elſner has lately obſerved, that Herodotus does not call the *patæci* gods; but that they obtained this dignity from the liberality of Heſychius and Suidas, and other ancient lexicographers, who place them at the ſtem of ſhips, whereas Herodotus placed them at the prow.

Scaliger, Bochart, and Selden, have taken ſome pains about this ſubject.

Mr. Morin has alſo given us a learned diſſertation on this head, in the Memoires de l'Acad, des Inſcript. & Belles Lettres, tom. i. but Mr. Elſner thinks it defective in point of evidence.

PATAGONULA, in *Botany*, the name of a genus of plants of the *pentandria monogynia* claſs; the characters of which are theſe: the cup is an extremely ſmall perianthium, divided into five ſegments, and remains after the flower is fallen; the flower conſiſts of a ſingle petal, with ſcarce any tube, the margin of which is divided into five acute oval ſegments; the ſtamina are five filaments of the length of the flower; the antheræ are ſimple; the germen of the piſtil is oval and pointed; the ſtyle is ſlender, and ſlightly bifid, its ramifications are alſo bifid again: this is of the ſame length with the ſtamina, and remains when the flower is fallen; the ſtigmata are ſimple; the fruit is an oval and pointed capſule, ſtanding on a large cup, made up of five long ſegments emarginated, or rimmed round their edges; the ſeeds of this plant are yet unknown; but the conſtruction of the cup, in which the capſule ſtands, is alone a ſufficient diſtinction for this genus. There is only one ſpecies.

PATANGHII, in *Botany*, a name by which ſome authors have called the tree whoſe wood is the Logwood, uſed in dying and in medicine.

PATARINS. See Albigenses and Paulicians.

PATAVINITY, *Patavinitas*, among *Critics*, a fault objected to Titus Livy, which he derived from his country Padua, by the ancients called Patavium.

Aſinius Pollio, as we are informed by Quintilian, taxed Livy with *Patavinity*. But what this *Patavinity* conſiſted in, the critics have been much puzzled to find out.

Morhof believes it to be a certain turn of expreſſion, and ſome phraſes peculiar to the Paduese. All we know for certain is, that it was a fault in the language of Livy, not in the ſentiments or manners. In all probability it is one of thoſe delicacies that are loſt in a dead language.

Dan. Georg. Morhof. has an expreſs treatiſe, De *Patavinitate* Liviana, printed at Kiel, in 1685, where he explains, very learnedly, the urbanity and peregrinity of the Latin tongue.

PATE, in *Fortification*, a kind of platform, like what they call a Horse-shoe; not always regular, but generally oval, encompaſſed only with a parapet, and having nothing to flank it. It is uſually erected in marſhy grounds, to cover a gate of a town, or the like.

PATEE, or **Pattee**, a term, in *Heraldry*, for a croſs, ſmall in the centre, and widening towards the extremes See *Tab.* II. *Herald. fig.* 75. The field, ſable, a croſs *patee*, argent; by the name of Croſs.

This form of a croſs is alſo called *formé*.

It is alſo a term uſed by ſome to expreſs a ſort of irregular line, differing from the indented, ingrailed, and all the other regular and common lines, and called by ſome the dove-tail line.

It is ſomewhat like the joint called by our joiners by this laſt name, but it is not in general uſe, and is by ſome reckoned among what the French call the Clatte.

Patees, *petty*, See Petty.

PATELLA, in *Anatomy*, a bone which covers the fore-part of the joint of the knee; called alſo *mola*, *rotula*, and popularly the *knee-pan.* See *Tab. Anat.* (*Oſteol.*) *fig.* 3. *n.* 21. *fig.* 7. *n.* 25.

It is divided into a baſis, apex, and two ſides, one convex, the other concave. The baſis is the ſuperior and thickeſt part of the bone, and is marked with a very conſiderable muſcular impreſſion, which runs down for a little way on the convex ſide; the apex is obtuſe, and ſerves for the inſertion of a ſtrong ligament, which ties the *patella* to the ſpine of the tibia; the anterior ſide is convex, with ſome ſmall inequalities and furrows upon it; the poſterior ſide is concave, covered with a cartilage, reaching near the apex, and terminating at an unequal cavity or foſſula, which is an impreſſion for the ligament already mentioned. This cartilaginous ſide is parted in two by a ridge which goes between the baſis and apex, and the two parts are exactly ſuited to the pulley of the os femoris, the external part being broader than the internal, which is likewiſe obſervable in the pulley. The *patella* remains long cartilaginous, and in oſſifying it becomes entirely cellular, except the ſurfaces of its two ſides and the impreſſions. It is connected with the tuberoſity of the tibia, by a thick ſhort ligament; and indeed it may be looked upon as belonging in a particular manner to the tibia, or as a moveable olecranum: which again muſt be looked upon as a fixed *patella*. Winſlow.

Over this bone ſlide the tendons of the muſcles, which extend the leg, as on a trochlea or pulley.

But its more immediate uſe is to hinder the leg from being bent forwards in extenſion; which would of neceſſity be the caſe of this articulation, did not this bone, like a bolſter, check its rolling forwards; in the ſame manner as the olecranum does the ſwing of the cubitus backwards.

In an erect poſture, when one foot is ſet forwards, the whole weight of the body bears on the *patella*; which, in this ſituation, hinders the knee from bending backwards, and ſtraining the muſcles that inflect it behind. Hence it was, that Galen's wreſtler, who had diſlocated his *patella*, found ſo much pain in going down hill.

PATELLA, *fracture of the.* The *patella*, or knee-pan, is much more ſubject to a tranſverſe fracture than to one in any other direction. The longitudinal fracture of this bone happens more rarely, but when it does, is much more eaſily cured; becauſe the fragments of the bone, in this caſe, generally keep in their right places; but when the bone is broken, not only tranſverſely, but into ſeveral pieces, the caſe is yet more difficult and dangerous. The cure of this fracture muſt be attempted in this manner: in a longitudinal or perpendicular fracture, the patient muſt be laid upon his back, and, extending the foot, the ſurgeon muſt replace the fragments on both ſides with the preſſure of his hands, binding them up carefully with the uniting bandage; which muſt be applied, in this caſe, in the ſame manner with that uſed in large wounds in the belly or forehead. But when the *patella* is broken tranſverſely, or into ſeveral pieces, the patient, being laid in the ſame poſture, and extending his foot as before, the ſurgeon is, with great care, to endeavour, with the palms of both hands, aſſiſted by his fingers and thumbs, to bring together and replace the fragments in their natural ſituation; and when that is done, they muſt be retained firmly together, by means of a plaſter made in form of a half-moon, or properly perforated, and then the foot and leg are to be bound up, and placed ſo that they cannot be eaſily moved: but to prevent the bone from being diſplaced again, the patient muſt not uſe his leg till after the ninth or tenth week. Heiſter.

PATELLA, *luxated.* The *patella* is moſt uſually luxated either on the internal or external ſide of the joint, though phyſicians give accounts of its being ſometimes luxated both above and below it. Whenever the knee itſelf is perfectly luxated, the *patella* can ſcarce avoid being diſplaced at the ſame time, becauſe of its ſtrong connection to the thigh and to the tibia.

The reduction of a luxated *patella* is uſually no great difficulty, the patient is to be laid flat on his back upon a table or bed, or upon an even floor, ſo that this leg may be pulled out ſtrait by an aſſiſtant; when this is ſufficiently extended, the ſurgeon muſt graſp the *patella* with his fingers, and afterwards, by the aſſiſtance of his hand, preſs it ſtrongly in its proper place. This may be alſo poſſibly effected while the patient ſtands upright. When this is done, there remains nothing but carefully to bind up the part, and let the patient reſt for ſome days; ſometimes gently bending and extending his leg, in the mean while, that it may not become ſtiff.—Heiſter.

PATELLA, in *Natural Hiſtory*. See LIMPET.

PATELLA, in the *Hiſtory of Inſects*, a name given by Liſter, and ſome others, to a certain little huſk or ſhell, found on the bark of the cherry, plum, and roſe trees, and ſome others, containing an animal within, and uſeful in colouring. Theſe *patellæ* are of a globular form, except when they adhere to the tree, and are of a ſhining cheſnut colour in moſt kinds. The huſk itſelf ſtrikes a very fine crimſon colour on paper, and within it is found a white maggot of no value: this, in time, hatches into a very ſmall but beautiful bee. The whole ſize of this bee is not more than that of half the body of an ant. They have the ſting of bees, and the three ſpots placed in a triangle on the forehead, which are ſuppoſed to be eyes. They are black, and have a large round whitiſh or pale yellow ſpot upon the back. The upper pair of wings are ſhaded and ſpotted, but the other pair are clear.

The ſhells or huſks deſerve a trial, to find whether the colour they yield might not be brought to uſe; it is to be obſerved, that the deepeſt coloured huſks afford the fineſt and deepeſt purple: they muſt be alſo uſed while the creature contained in them is in the maggot form; for when it is changed into the bee ſtate the ſhell is dry and colourleſs. Dr. Liſter, who had obſerved theſe *patellæ*, went ſo far, on comparing them with the common kermes, as to declare that they were of the ſame nature with that production; but this hiſtory of their being the workmanſhip of a bee to preſerve her young maggot in, is not agreeable to the true hiſtory of the kermes; for that is an inſect of a very peculiar kind. This author has been too juſtly cenſured for his precipitancy of judging of things, and perhaps has fallen into an error by means of it here.

It is very poſſible that theſe *patellæ* may be the ſame ſort of animals with the kermes, but then it produces its young within this ſhell or huſk, which is no other than the ſkin of the body of the mother animal; but as there are many flies, whoſe worms or maggots are lodged in the bodies of other animals, it may be, that this little bee here deſcribed may love to lay its egg in the body of the proper inſect here deſcribed, and the maggot hatched from that egg may eat up the proper progeny, and, undergoing its own natural changes there, iſſue out at length in form of the bee. This may have been the caſe in ſome few which Dr. Liſter examined, and he may have been miſled by this to ſuppoſe it the natural change of the inſect. Phil. Tranſ. N° 72.

PATELLA *fera*, the *wild limpet*, a name very improperly given by Rondeletius and Aldrovand to the *auris marina*, or *concha Veneris*. This is by no means of the *patella* kind. See EAR-*ſhell*.

PATENA, in the *Romiſh Church*, the cover or lid of the chalice, made of the ſame metal therewith, ſerving to hold the particles of the hoſt, and give the people to kiſs, when they make an offering.

It has its name *patena*, *a patendo*; and this is a general name, in Columella, for any broad flat veſſel.

PATENTS, or *Letters* PATENT, in *Law*, the king's letters, ſealed with the great ſeal, ſerving to convey the title or property of ſome grant, favour, privilege of a new eſtabliſhment, or the like. See LETTERS *Patent*.

They have their name from their being delivered open, *ut pateant omnibus*; by way of contradiſtinction from *letters de cachet*, or *literæ clauſæ*, or CLOSE *rolls*, which are ſealed.

Grants or *letters patent* muſt firſt paſs by bill; which is prepared by the attorney or ſolicitor-general, in conſequence of a warrant from the crown; and is then ſigned, that is, ſuperſcribed at the top, with the king's own ſign manual, and ſealed with his privy ſignet, which is always in the cuſtody of the principal ſecretary of ſtate; and then ſometimes it immediately paſſes under the great ſeal, in which caſe the *patent* is ſubſcribed in theſe words, "*per ipſum regem*; *by the king himſelf*." Otherwiſe the courſe is to carry an extract of the bill to the keeper of the privy ſeal, who makes out a writ or warrant thereupon to the chancery: ſo that the ſign manual is the warrant to the privy ſeal, and the privy ſeal is the warrant to the great ſeal: and in this laſt caſe the *patent* is ſubſcribed, "*per breve de privato ſigillo*; *by writ of privy ſeal*."

It is to be noted, that *patents* differ from writs: a coroner is made by WRIT, not by *patent*.

To this office, enacted 18 Jac. I. belongs a clerk, &c.

PATENT *of peerage*. See PEER.

PATENT *of pecedence*. See PRECEDENCE.

PATENT *leaf*, in *Botany*. See LEAF.

PATENTEE, is he to whom the king grants LETTERS *patent*.

PATER *patratus*, among the Romans, the firſt and principal perſon of the college of heralds, which formed a kind of board or council, to examine the differences that aroſe between neighbouring ſtates, and endeavour amicably to accommodate the ſame.

PATERA, among *Antiquaries*, a goblet, or veſſel, uſed by the Romans in their ſacrifices, wherein they received the blood of their victims, offered their conſecrated meats to the gods, and wherewith they made libations.

The word is formed from *pateo*, *I am open*, *quod pateat*, becauſe it had a great aperture; in contradiſtinction to bottles, &c.

On medals, the *patera* is ſeen in the hands of ſeveral deities; and frequently in the hands of princes, to mark the ſacerdotal authority joined with the imperial, &c.

Hence F. Joubert obſerves, that beſides the *patera*, there is frequently an altar, upon which the *patera* ſeems to be pouring its contents.

The *patera* was of gold, ſilver, marble, braſs, glaſs, or earth; and they uſed to encloſe it in urns with the aſhes of the deceaſed, after it had ſerved for the libations of wine and liquors at the funeral.

The *patera* is an ornament in architecture, frequently introduced in friezes, faſcias, and impoſts, over which are hung feſtoons of huſks or flowers: and they are ſometimes uſed by themſelves, as O (*Tab. Archit. fig.* 40.) to ornament a ſpace; and in this caſe it is common to hang a ſtring of huſks or drapery over them; ſometimes they are much inriched with foliage, and have a maſk or a head in the centre.

PATERERO. See PEDRERO.

PATERNITY, the quality of a FATHER.

PATER-NOSTER, the Lord's prayer, a form ſo called from the two initial words thereof in Latin.

PATER-NOSTER is alſo uſed for a chaplet or ſtring of beads; becauſe ſerving to number the rehearſals of that prayer.

PATER-NOSTER, in *Architecture*, a ſort of ornaments cut in form of beads, either round, or oval; uſed on baguettes, aſtragals, &c.

PATER-NOSTRE', in *Heraldry*. A croſs *pater-noſtré* is a croſs made of beads; as repreſented in *Tab.* II. *Her. fig.* 76. This croſs is to be ſhadowed in drawing, as that the ſphericity of the beads may appear, to diſtinguiſh them from beſants.

PATETHISÆ *uvæ*, a name given by the ancients to grapes which were ſuffered to remain on the vine till they were greatly dried and withered. They were alſo called *patetæ uvæ*, and were ſuffered to hang thus to make a peculiar wine called *paſſum*.

PATH *of the Vertex*, a term frequently uſed by Mr. Flamſteed, in his doctrine of the ſphere, ſignifying a circle, deſcribed by any point of the earth's ſurface, as the earth turns round its axis.

This point is conſidered as vertical to the earth's centre; and is the ſame with what is called the vertex or zenith in the Ptolemaic projection.

The ſemidiameter of this *path* of the vertex is always equal to the complement of the latitude of the point or place that deſcribes it; that is, to the place's diſtance from the pole of the world.

PATH-*fly*, the name given by us to the fly called in Latin HUMISUGA; it is found in foot-paths, and ſuppoſed to live by ſucking the ground; it is of a grey colour, ſtreaked with duſky white.

PATHETIC, ϖαθητικος, from ϖαθος, *paſſion*, *emotion*, ſomething that relates to the paſſions; and particularly that is proper to awake or excite them.

The *pathetic* and ſublime have a near affinity. See STYLE.

PATHETIC, in *Muſic*, ſomething very moving, expreſſive, or paſſionate; capable of exciting pity, compaſſion, anger, or the like. In this ſenſe, we ſay the the *pathetic* ſtyle, a *pathetic* figure, *pathetic* ſong, &c.

The chromatic genus, with its greater and leſſer ſemitones, either aſcending or deſcending, is very proper for the *pathetic*; as is alſo an artful management of diſcords: with a variety of motions, now briſk, now languiſhing, now ſwift, now ſlow.

Nieuwentyt tells us of a muſician at Venice, who excelled in the *pathetic* to that degree, that he was able to play any of his auditors into diſtraction; he adds, that the great means he made uſe of was the variety of motions, &c.

PATHETICI, in *Anatomy*, the fourth of the ten pair of nerves, which ariſe from a ſmall medullary chord that is behind the teſtes: they paſs down on the ſides of the medulla oblongata, and proceeding under the dura mater, by the ſides of the cella turcica, they go through the foramen lacerum, and are wholly ſpent on the obliquus major. See *Tab. Anat.* (*Oſteol.*) *fig.* 5. *litt. m m.*

The *pathetici*, are the ſmalleſt nerves of the brain; and have their name, *pathetic*, from their ſerving to move the eyes in the various paſſions; and they are by ſome alſo called *amatorii*, from the great uſe made thereof by lovers, in ogling, &c.

PATHOGNOMONIC, ϖαθογνωμονικος, in *Medicine*, an eſſential ſign or characteriſtic; or a ſymptom peculiar to, and inſeparable from, ſome diſeaſe, and every ſtage thereof.

Thus Blancard, and after him Harris, &c. But the truth is, there is nothing in all medicine that anſwers to the idea of a *pathognomonic* diſeaſe; and ſymptoms are too complicated. And we are to judge of the former not by any one ſign, but by the concurrence of ſeveral.

PATHOLOGY, ϖαθολογια, formed from ϖαθος, *paſſion*, *ſuffering*, and λογος, *diſcourſe*, that part of medicine which conſiders diſeaſes, both thoſe of the body and thoſe of the mind, their natures, cauſes, ſymptoms, &c. See NOSOLOGY.

PATHOS, ϖαθος, *paſſion*, a term frequently uſed in ſpeaking of the movements which the orator excites in his audience.

We ſometimes alſo uſe the word for energy or ſtreſs.

PATIENCE, in *Botany*, the name by which ſome people call the monk's rhubarb; but the French, from whom we have borrowed the word, mean by it all the ſpecies of the *lapathum* or dock kind. See DOCK.

PATIENCE, in *Ethics*, is that virtue which preſerves the mind firm and unbroken, under the evils of life; ſo that the ſpirits are kept from becoming tumultuous, and precipitating the ſufferers into indecent or repining thoughts, words, or actions; and by which he is diſpoſed to pay calm attention to the reaſons of ſacred philoſophy, and to obſerve them.

PATIENT, among *Phyſicians*, a perſon under the direction of a phyſician, or ſurgeon, to be cured of ſome diſeaſe.

Agent and PATIENT. See AGENT.

PATIENTIÆ *muſculus*, in *Anatomy*, a name given by Spigelius to a muſcle of the ſhoulder, which he alſo calls by the more expreſſive name of *ſcapulum attollens*. The French call it the *releveur propre de l' omoplate*, and Albinus, Morgagni, Cowper, and others, LEVATOR *ſcapulæ*.

PATIN *ſhoe*, in the *Manege*, a kind of horſe-ſhoe, under which is ſoldered a ſort of half ball of iron, hollow within. It is uſed for hip-ſhot horſes, and put upon a ſound foot, to the end that the horſe, not being able to ſtand upon that foot without pain, may be conſtrained to ſupport himſelf upon the lame foot, and ſo hinder the ſinews to ſhrink, and the haunch to dry up. *Patin ſhoes* are likewiſe uſed for horſes that are ſprained in the ſhoulders.

PATIS, in *Ornithology*, the name of a ſmall ſea-bird, deſcribed by Oviedus, and ſeeming to be the ſame with the ſtormſink, deſcribed by Hoier, in his epiſtle to Cluſius. It is a little larger than our ſparrow, and ſkims the ſurface of the water very nimbly, and is ſuppoſed a forerunner of ſtorms.

PATLAHOCA, in *Botany*, the name given by ſome authors to a tree which produces the reſin, commonly called *gum copal*.

PATONCE, in *Heraldry*. A croſs *patonce* is a croſs flory at the ends; from which it only differs in this, that the ends, inſtead of turning down like a fleur de lis, are extended ſomewhat in the patee form. See *Tab.* II. *Herald. fig.* 77. He bears gules; a croſs *patonce*, argent, by the name of Latimer.

PATRES *conſcripti*, in *Antiquity*, a denomination given to the ſenators of Rome.

The firſt hundred ſenators, appointed by Romulus, were called ſimply *patres*, *fathers*; another hundred being added by Romulus and Tatius, upon the union of the two people, theſe latter were called *patres minorum gentium*, and the former *majorum gentium*.

At length Tarquinius Priſcus, making up the number three hundred, the two latter claſſes were called *patres conſcripti*, becauſe *adſcripti*, or written down to the former.

Livy gives a different account of their origin. See CONSCRIPT.

Thoſe afterwards choſen from among the knights were called *patres adlecti*.

PATREZ, a name for a ſort of vermicelli, a paſte made of flour and water, and formed inte beads. This and all other kinds of vermicelli are often ſtained with ſaffron.

PATRI, *gloria*. See GLORIA.

PATRIS, *dower ex aſſenſu*. See DOWER.

PATRIARCH, *patriarcha*, formed of ϖατρια, *family*, and αρχων, *chief*, one of thoſe firſt fathers who lived towards the beginning of the world; and who became famous by a long line of deſcendants.

Abraham, Iſaac, and Jacob, and his twelve ſons, are the *patriarchs* of the Old Teſtament. Seth, Enoch, &c. were antediluvian *patriarchs*.

Long life and a number of children were the bleſſings of the *patriarchs*.

The *patriarchal* government conſiſted in the fathers of families, and their firſt-born after them, exerciſing all kinds of eccleſiaſtical and civil authority, in their reſpective houſholds: and to this government, which continued till the time of the Iſraelites dwelling in Ægypt, ſome have aſcribed an abſolute and deſpotic power, extending even to the puniſhment by death. In proof of this, they alledge the curſe pronounced by Noah upon Canaan, Gen. ix. 25. but it is replied that in this affair Noah ſeems to have acted rather as a prophet than a *patriarch*. Another inſtance of ſuppoſed deſpotic power is Abraham's turning Hagar aud Iſhmael out of his family, Gen. xxi. 9, &c. but this furniſhes no evidence of any ſingular authority veſted in the *patriarchs* as ſuch, and peculiar to thoſe ages. The third inſtance alledged to the ſame purpoſe is that of Jacob's denouncing a curſe upon Simeon and Levi, Gen. xlix. 7. which is maintained by others to be an inſtance of prophetic inſpiration more than of *patriarchal* authority. The fourth inſtance is that of Judah with regard to Tamar, Gen. xxxvii. 24. with regard to which it is obſerved, that Jacob the father of Judah, was ſtill living, that Tamar was not one of his own family; and that ſhe had been guilty of adultery, the puniſhment of which was death by burning, and that Judah on this occaſion might ſpeak only as a proſecutor. Jennings's Jewiſh Antiq. vol. i. p. 1, &c.

Patriarch is alſo uſed, in Chriſtendom, for the biſhops in poſſeſſion of ſome of the grand ſees, independent of the papal juriſdiction.

The patriarchate has been always eſteemed the ſupreme dignity in the church: ſo that, to riſe by degrees, the biſhop had only under him the territority of the city whereof he was biſhop; the metropolitan commanded a province, and had for ſuffragans the biſhops of his province; the primate was the chief of a dioceſe, and had ſeveral metropolitans under him; and the *patriarch* had under him ſeveral dioceſes, and the primates themſelves were under him. But this order was not always obſerved.

Uſher, Pagi, De Marca, and Morinus, attribute the eſtabliſhment of the grand patriarchates to the apoſtles. They ſuppoſe that the apoſtles according to the deſcription of the world then given by geographers, pitched on the three principal cities in the three parts of the known world; viz. Rome, in Europe; Antioch, in Aſia; and Alexandria, in Africa: and thus formed a trinity of *patriarchs*.

Others, far from attributing this inſtitution to the apoſtles, maintain that the name *patriarch* was unknown at the time of the council of Nice; and that, for a long time afterwards, *patriarchs* and primates were confounded together; as being all equally chiefs of dioceſes, and equally ſuperior to metropolians, who were only chiefs of provinces. Hence it is that Socrates gives the title *patriarch* to all the chiefs of dioceſes, and reckons ten of them. In effect, it does not appear, that the dignity of *patriarch* was appropriated to the five grand ſees of Rome, Conſtantinople, Alexandria, Antioch, and Jeruſalem, till after the council of Chalcedon, in 451. For when the council of Nice regulated the limits and prerogatives of the three *patriarchs* of Rome, Antioch, and Alexandria, it did not give them the title of *patriarchs*, though it allowed them the preeminence and privileges thereof. Thus, when the council of Conſtantinople adjudged the ſecond place to the biſhop of Conſtantinople, who, till then, was only a ſuffragan of Heraclea, it ſaid nothing of the partiarchate.

Nor is the term *patriarch* found in the decree of the council of Chalcedon, whereby the fifth place is aſſigned to the biſhop of Jeruſalem; nor did theſe five *patriarchs* govern all the churehes.

There were ſtill many independent chiefs of dioceſes, who, far from owning the juriſdiction of the grand *patriarchs*, called themſelves *patriarchs*: ſuch as that of Aquileia: nor was Carthage ever ſubject to the *patriarch* of Alexandria.

Moſheim ſuppoſes, that thoſe prelates, who enjoyed a certain degree of pre-eminence over the reſt of the epiſcopal order, were diſtinguiſhed by the Jewiſh title of *patriarchs* in the fourth century. Eccl. Hiſt. vol. i. p. 284.

The authority of the *patriarchs* grew by inſenſible degrees, till at length we find, that about the cloſe of the fifth century, all affairs of moment, within the compaſs of their *patriarchate*, came before them; either at firſt hand, or by appeals from the metropolitans.

They conſecrated biſhops, aſſembled yearly in council the clergy of their reſpective diſtricts; pronounced a deciſive judgment in thoſe caſes where accuſations were brought againſt biſhops; and appointed vicars or deputies, clothed with their authority, for the preſervation of order and tranquillity in the remoter provinces.

Nothing, in ſhort, was done without conſulting them; and their decrees were executed with the ſame regularity and reſpect as thoſe of the princes.

It muſt, however, be obſerved, that the authority of the *patriarchs* was not acknowledged through all the provinces without exception. Several diſtricts, both in the eaſtern and weſtern empires, were exempted from their juriſdiction.

The Latin church was unacquainted with *patriarchs* till the ſixth century; and the churches of Gaul, Britain, &c. were never ſubject to the authority of the *patriarch* of Rome, whoſe authority only extended to the ſuburbicary provinces. There was no primacy, no exarchate nor *patriarchate*, owned here; but the biſhops, with the metropolitans, governed the church in common.

Indeed, after the name *patriarch* became frequent in the Weſt, it was attributed to the biſhops of Bourges, and Lyons; but it was only in the firſt ſignification, viz. as heads of dioceſes. Du-Cange adds, that there have been ſome abbots, who have borne the title of *patriarchs*.

Patriarch, is alſo applied to the chief of ſeveral churches in the Eaſt, who live out of communion with the Roman church: ſuch are the *patriarch* of the Armenians, reſiding in the monaſtery of St. Gregory; the *patriarch* of the Abyſſinians, called *Abuna*; the *patriarchs* of the Cophti, the Jacobites, &c. See Armenians, Cophti, Jacobites, &c. See alſo *Greek* Church.

PATRIARCHAL, in *Heraldry*. A *patriarchal croſs*, is that where the ſhaft is twice croſſed; the lower arms or traverſes being longer, and the upper ſhorter. Such a croſs is ſaid to belong to *patriarchs*, as the triple croſs does to the pope.

PATRICIAN, *patricius*, in ancient Rome, a title given to the deſcendants of the hundred, or, according to others, of the two hundred firſt ſenators choſen by Romulus, and by him called *patres*, *fathers*.

Romulus eſtabliſhed this order in imitation of the Athenians, who were divided into two claſſes, viz. the ευπατριδας, *patricios*, and δημοτικους, *populares*.

Patricians, therefore, were originally the ancient nobility; in oppoſition to the plebeians.

They were the only perſons whom Romulus allowed to aſpire after the magiſtracy; and they exerciſed all the functions of the prieſthood till the year of Rome 495.

But the cognizance and character of theſe ancient families being almoſt loſt and extinguiſhed, by a long courſe of years, and frequent changes in the empire; a new kind of *patricians* were at length ſet on foot, who had no pretenſions from birth, but whoſe title depended wholly on the emperor's favour.

This new *patriciate*, Zoſimus tells us, was erected by Conſtantine, who conferred the quality on his counſellors, calling them *patricii*, not becauſe deſcended from the ancient fathers of the ſenate, but becauſe they were the fathers of the republic, or of the empire.

This dignity, in time, became the higheſt of the empire. Juſtinian calls it *ſummam dignitatem*: in effect, the *patricians* ſeem to have had the precedence of the *conſulares*, and to have taken place before them in the ſenate: though F. Faber aſſerts the contrary. What embroils the queſtion is, that the two dignities often met in the ſame perſon; becauſe the *patricate* was only conferred on thoſe who had gone through the firſt offices of the empire, or had been conſuls.

Pope Adrian made Charlemagne take the title of *patrician* before he aſſumed the quality of emperor; and other popes have given the title to other kings and princes, by reaſon of its eminence.

Patrician, *patricius*, is alſo a title of honour frequently conferred on men of the firſt quality in the time of our Anglo-Saxon kings. See Thane.

Patrician *deities*, *patricii dii*, in *Mythology*, were Janus, Saturn, the Genius, Pluto, Bacchus, the Sun, the Moon, and the Earth.

PATRICIANS, in *Eccleſiaſtical Writers*, denote ancient ſectaries who diſturb the church in the beginning of the third century; thus called from their founder *Patricius*, preceptor of a Marcionite called Symmachus.

His diſtinguiſhing tenet was, that the ſubſtance of the fleſh is not the work of God, but that of the devil; on which account his adherents bore an implacable hatred to their own fleſh; which ſometimes carried them ſo far as to kill themſelves.

They were alſo called Tatianites; and made a branch of the Encratitæ.

PATRICIDE, *patricidium*. the ſame with PARRICIDE.

PATRII *dii*. See Dii.

PATRINI *and* **Matrini**, among the Romans, children whoſe father and mother were both living.

It was by a certain number of theſe that hymns were ſung to ſupplicate the gods.

PATRIMONY, *patrimonium*, a right or eſtate, which a perſon inherits from his anceſtors.

The name *patrimony*, was alſo anciently given to the effects or revenues, wherewith a church or religious houſe was endowed. In which ſenſe authors ſtill ſay the *patrimony* of the church of Rimini, of Milan, &c.

The church of Rome at the time of the fall of the Roman empire, acquired conſiderable territories, partly by purchaſe, and partly by the generoſity of princes, &c. not only in Italy, but alſo in Sicily and other remoter parts of Europe. Theſe were called the *patrimony of St. Peter*, which were afterwards augmented by the benefactions of Pepin, king of France, who added the exarchate of Ravenna: and by Charlemagne, who gave to the pope ſeveral towns and provinces, which belong at this time to the eſtate of the church, over which the pontiff exerciſes ſovereign authority.

To make what belonged to the churches the more reſpected, they uſually gave their *patrimonies* the names of the ſaints they held in the higheſt veneration.

Thus the church of Ravenna called its inheritance the *patrimony of St. Apollinarius*; that of Milan the *patrimony of St. Ambroſe*, as is obſerved by Fra. Paolo.

PATRIOT is a denomination given to a perſon, who, under a free government, loves his country, and exerts all his power for promoting its glory and welfare. Whence *patriotiſm* is uſed to denote the love of one's country. Rome, Athens, and Lacedæmon, owed their exiſtence and glory to *patriotiſm*, founded on noble principles, and ſupported by diſtinguiſhing virtues. But the moſt perfect *patriotiſm* is that which comprehends the rights of mankind in general. The author of the Spirit of Laws ſeems to have been actuated by ſentiments of univerſal *patriotiſm*.

PATRIPASSIANS, Patripassiani, a name given to the Sabellians, becauſe they did not believe it was the Son, but the Father himſelf that ſuffered and was crucified.

The council of Antioch, held by the Euſebians, in 345, ſays, that thoſe whom the Romans call *Patripaſſians*, the eaſtern people called *Sabellians*: it adds the reaſon of the name *Patripaſſians* in their condemnation; viz. that by the incarnation of the Father they rendered him comprehenſible and paſſible.

The *Patripaſſian* hereſy was firſt broached by Praxeas, who was ſeconded by Victorinus, at the beginning of the third century. They confeſſed Chriſt to be God, and that God ſuffered and died for us; but they confounded the divine perſons, and denied in effect the Trinity; meaning by Father, Son, and Spirit, not three perſons, but one perſon under three names. So that he who ſuffered for us, was according to them, as much Father as Son. Tertullian wrote expreſly aganſt Praxeas.

Hermogenes eſpouſed the error of the *Patripaſſians*, whence they came to be denominated alſo *Hermogenians*. Afterwards Noetius gave into it, which occaſioned them the name of *Noetians*. His diſciple Sabellius the Libyan followed about the year 250, whence they were called *Sabellians*. Laſtly, becauſe Sabellius was of Pentapolis, and the hereſy ſpread much there, it was called the *Pentapolitan doctrine*.

PATROL, or Patrouille, anciently Patoul, in *War*, a round, or march, made by the guards, or watch, in the night-time, from the beating of the tattoo till the reveille, to obſerve what paſſes in the ſtreets, and to ſecure the peace and tranquillity of a city or camp.

The *patrol* conſiſts generally of a body of ſix or twelve men, detached from a *corps de guard*, and commanded by a ſerjeant.

When the enemy is near at hand, *patrols* conſiſt of an officer and thirty or forty men as, well infantry as cavalry.

PATRON, Patronus, a term uſed in various acceptations, though all reducible to the relation of a protector, or guardian.

In the church of Rome, a ſaint, whoſe name a perſon bears, or under whoſe protection he is put, and whom he takes particular care to invoke; or a ſaint in whoſe name a church or order is founded; or a perſon who firſt eſtabliſhed it, and who is choſen protector of it; are called the *patrons* thereof. Thus St. Peter and St. Paul are the *patrons* of the church of St. Genevieve, St. Dionyſius the *patron* of the city of Paris, St. George of England, St. Benedict the *patron* of the Benedictines, St. Michael of the armourers, St. Ignatius of the Jeſuits, &c.

Patron, Patronus, among the Romans, was an appellation given to a maſter, who had freed his ſlave.

Hence, as the right and relation of maſter expired, that of *patron* commenced.

For the Romans, in giving their ſlaves their freedom, did not deſpoil themſelves of all rights and privileges in them: the law ſtill ſubjected the freed-men to conſiderable ſervices and devoirs toward their *patrons*, the neglect of which was always very ſeverely puniſhed.

The principal right which *patrons* had was that of being the legal heirs of their freed-men, if they died without lawful iſſue, born after their enfranchiſement, and inteſtate.

By the Papian law it was farther provided, that if the eſtate of the freed-man were one hundred thouſand ſeſterces, and he had three children, the *patron* ſhould have a child's portion.

Patron was alſo a name which the people of Rome gave to a perſon of power, under whoſe protection they put themſelves.

The common people uſually choſe ſome perſon of eminence and authority, to whom they paid all kind of honour and reſpect; denominating themſelves his *clients*: and the *patron* on his ſide granted them his credit and protection.

By this reciprocal relation was the *patron* bound to his client, and the client to his *patron*.

Hence the appellation *patroni* was given to thoſe lawyers who defended the cauſe of their clients in matters of law, in contradiſtinction to the procuratores: they were called *advocati*. See Advocate.

Patron, in the *Canon* and *Common Law*, denotes a perſon who founds or endows a church or benefice, and reſerves to himſelf the right of patronage.

The king is *patron paramount* of all eccleſiaſtical benefices in England.

Patron, in *Navigation*, is a name given in the Mediterranean to a perſon who commands the veſſel and ſeamen; ſometimes the perſon who ſteers it; the former, in other places, being called master; the ſecond, pilot.

PATRONAGE, *patronatus*, the right of giving or diſpoſing of a church or benefice, properly belonging to the founder or endower there. See Advowson

The right of *patronage* was introduced among Chriſtians towards the cloſe of the fourth century, with no other view than to encourage the opulent to erect a great number of churches, by giving them the privilege of appointing the miniſters that were to officiate in them.

Patronage conſiſts in having the nomination, or preſentation to the benefice by him founded or endowed; in having the honourable rights of the church; in being interred in the chancel, &c.

Of *patronages*, ſome are *lay*, others *eccleſiaſtical*.

Patronage, *lay*, is a right attached to a perſon, either as founder, or as heir of the founder; or as poſſeſſor of a fee to which the *patronage* is annexed.

Patronage, *eccleſiaſtical*, is that which a perſon is intitled to by virtue of ſome benefice which he holds.

If an eccleſiaſtic have a right of *patronage* on his own account, independent of his eccleſiaſtical capacity; this is ſtill *lay patronage*. *Lay patronage*, again is *real* or *perſonal*.

Patronage, *real*, is that attached to the glebe, or to certain lands and hereditaments.

Patronage, *perſonal*, is that belonging immediately to the founder of the church, and tranſmiſſible to his children and family; without being annexed to any fee.

Perſonal *patronage* cannot be alienated or ſold; *real* may, together with the glebe to which it is annexed. There muſt ever be ſome body or matter to fix to it, in order to its being transferred to another.

The origin of the right of *patronage*, we find in the tenth canon of the council of Orange: where it is expreſſed, that a founder may preſent to the dioceſan the clerks he thinks proper for his church. And by a law of Juſtinian it is ordained, that the founders of churches may not put clerks in them on their own authority, but only preſent them to the biſhop.

Some canoniſts look on the right of *patronage*, as a kind of eccleſiaſtic ſervitude. The right of *patronage*, ſleeps, but is not loſt, while a perſon is out of the communion of the church.

Patronage, *diſturbance of*, is an hindrance or obſtruction of a patron to preſent his clerk to a benefice. Diſturbers of a right of advowſon may be the pſeudo-patron by preſenting to a church to which he has no right, and thereby making it litigious or diſputable; his clerk, by demanding or obtaining inſtitution; and the ordinary, by refuſing to admit the real patron's clerk, or admitting the clerk of the pretender. Theſe diſturbances are vexatious and injurious to him who hath the right; and, therefore, the law (beſides the writ of the right of advowſon, which is a final and convulſive remedy) hath given him two inferior poſſeſſory actions for his relief; an assise of *darrein preſentment*, and a writ of quare *impedit*, in which the patron is always the plantiff, and not the clerk.

Patronage, *arms of*, in *Heraldry*, are thoſe, at the top of which are ſome marks of ſubjection and dependence. Thus the city of Paris bears three fleurs-de-lis in chief, to ſhew her ſubjection to the king.

The cardinals on the top of their arms bear thoſe of the pope, who gave them the hat, to ſhew that they are his creatures. See Arms.

PATRONYMIC, Πατρονυμικος, formed from πατηρ, *father*, and ονομα, *name*, among *Grammarians*, is applied to thoſe names which the Greeks gave to the race, or lineage; and which were taken from him who was the founder thereof.

Thus the deſcendants of Æacus were called Æacidæ; and thoſe of Hercules, Heraclidæ.

Theſe *patronymic* names the Romans called *gentilitia*, which amount to much the ſame with our *ſur-names*.

Thus, thoſe of the preſent reigning family in France, we call the Bourbons; thoſe of the late in England, the Stuarts, &c.

PATROON-*galley*. See Galley.

PATROUILLE. See Patrol.

PATTALIA, in *Natural Hiſtory*, a word uſed by Ariſtotle and the reſt of the old Greek writers, to expreſs a ſtag or deer of two years old.

PATTES, in *Heraldry*, the paws of a beaſt. See Paw.

PAVAGE, *pavagium*, in our *Old Law Books*, money paid towards the paving of ſtreets, or high-ways.

PAVAN, or PAVANE, a grave kind of dance, borrowed from the Spaniards; wherein the performers made a kind of wheel or tail before each other, like that of *pavo*, *a peacock:* whence the name.

The *pavane* was anciently in great repute; and was danced by gentlemen with cap and ſword; by thoſe of the long robe with their gowns, by princes with their mantles, and by the ladies with their gown-tails trailing on the ground.

It was called the *grand ball*; from the ſolemnity wherewith it was performed. To moderate its gravity, it was uſual to introduce ſeveral flouriſhes, paſſades, capers, &c. by way of epiſodes. Its tablature or ſcore is given at large by Thoinot Arbeau in his Orcheſographia.

PAVANA, in *Botany*, the name of the plant which produces the *grana tiglia* of the ſhops. It is a ſpecies of RICINUS.

PAVANA-*wood*, when freſh, operates very violently, both by vomit and ſtool: when dried, it is much more gentle, never vomiting at all; but at preſent it is ſcarce heard of in the ſhops.

PAVEMENT, a layer or ſtratum of ſtone, or other matter, ſerving to cover and ſtrengthen the ground of divers places, for the more commodious walking on, or for the paſſage of carriages.

The word is formed from the Latin *pavimentum*, of *pavire*, to beat down the earth, in order to make it firm and ſtrong.

In England, the *pavements* of the grand ſtreets, &c. are uſually of flint or rubble-ſtone; courts, ſtables, kitchens, halls, churches, &c. are paved with tiles, bricks, flags, or fire-ſtone; ſometimes with a kind of free-ſtone, and rag-ſtone.

In ſome cities, e. gr. of Venice, the ſtreets, &c. are *paved* with brick; churches ſometimes are paved with marble, and ſometimes with moſaic work, as the church of St. Mark at Venice. In France, the public roads, ſtreets, courts, &c. are paved with gres or grit, a kind of free-ſtone.

In Amſterdam, and the chief cities of Holland, they call their brick *pavement* the *burgher-maſter's pavement*, to diſtinguiſh it from the ſtone or flint *pavement*, which uſually takes up the middle of the ſtreet, and which ſerves for carriages; the brick which borders it being deſtined for the paſſage of people on foot.

Pavement of free-ſtone, flint, and flags, in ſtreets, &c. are laid dry, i. e. in a bed of ſand; thoſe of courts, ſtables, ground-rooms, &c. are laid in a mortar of lime and ſand; or in lime and cement, eſpecially if there be vaults or cellars underneath. Some maſons, after laying a floor dry, eſpecially of brick, ſpread a thin mortar over it; ſweeping it backwards and forwards to fill up the joints.

The ſeveral kinds of *pavement* are as various as the materials of which they are compoſed, and whence they derive the name by which they are diſtinguiſhed: as, 1. *Pebble-paving*, which is done with ſtones collected from the ſea-beach, moſtly brought from the iſlands of Guernſey and Jerſey; they are very durable, indeed the moſt ſo of any ſtone uſed for this purpoſe. They are uſed of various ſizes, but thoſe which are from ſix to nine inches deep, are eſteemed the moſt ſerviceable. When they are about three inches deep they are denominated bolders, or bowlers; theſe are uſed for paving court-yards, and other places not accuſtomed to receive carriages with heavy weights; when laid in geometrical figures they have a very pleaſing appearance.

2. *Rag paving* was much uſed in London, but is very inferior to the pebbles; it is dug in the vicinity of Maidſtone, in Kent, from whence it has the name of Kentiſh rag-ſtone; there are ſquared ſtones of this material for paving coach-tracks, and footways.

3. *Purbeck pitchens*; ſquared ſtones uſed in footways; they are brought from the iſland of Purbeck, and alſo frequently uſed in court-yards; they are in general from ſix to ten inches ſquare, and about five inches deep.

4. Squared *paving*, for diſtinction by ſome called Scotch *paving*, becauſe the firſt of the kind paved in the manner that has been and continues to be paved, came from Scotland; the firſt was a clear cloſe ſtone, called blue wynn, which is now diſuſed, becauſe it has been found inferior to others ſince introduced in the order they are hereafter placed.

5. *Granite*, a hard material, brought alſo from Scotland, of a reddiſh colour, very ſuperior to the blue wynn quarry.

6. *Gurnſey*, which is the beſt, and now almoſt the only ſtone in uſe; it is the ſame ſtone with the pebble before ſpoken of, but broken with iron hammers, and ſquared to any dimenſions required of a priſmoidical figure, ſet with its ſmalleſt baſe downwards. The whole of the foregoing *paving* ſhould be bedded and paved in ſmall gravel.

7. *Purbeck-paving*, for footways, is in general got in large ſurfaces about $2\frac{1}{2}$ inches thick; the blue ſort is the hardeſt and the beſt of this kind of *paving*.

8. *Yorkſhire-paving*, is an exceeding good material for the ſame purpoſe, and is got of almoſt any dimenſions of the ſame thickneſs of the Purbeck; this ſtone will not admit the wet to paſs through it, nor is it affected by the froſt.

9. *Rygate*, or *fire-ſtone paving*, is uſed for hearths, ſtoves, ovens, and ſuch places as are liable to great heat, which does not affect this ſtone if kept dry.

10. *Newcaſtle flags*, are ſtones about two feet ſquare, and $1\frac{1}{2}$ or two inches thick; they anſwer very well for *paving* out-offices; they are ſomewhat like the Yorkſhire.

11. *Portland paving*, with ſtone from the iſland of Portland; this is ſometimes ornamented with black marble dots.

12. *Sweedland paving*, is a black ſlate dug in Leiceſterſhire, and looks well for *paving* halls, or in party-coloured *paving*.

13. *Marble paving*, is moſtly variegated with different marbles, ſometimes inlaid in moſaic.

14. *Flat brick paving*, done with brick laid in ſand, mortar, or groute, as when liquid lime is poured into the joints.

15. *Brick on edge paving*, done with brick laid edgeways in the ſame manner.

16. Bricks are alſo laid flat or edgeways in herring-bone.

17. Bricks are alſo ſometimes ſet endways in ſand, mortar, or groute.

18. *Paving* is alſo performed with *paving* bricks.

19. With ten-inch tiles.

20. With foot tiles.

21. With clinkers for ſtables and outer offices.

22. With the bones of animals, for gardens, &c.

And 23. We have *knob-paving*, with large gravel-ſtones for porticoes, garden-ſeats, &c.

Pavements of churches, &c. frequently conſiſt of ſtones of ſeveral colours; chiefly black and white, and of ſeveral forms, but chiefly ſquare, and lozenges, artfully diſpoſed. Indeed, there needs no great variety of colours to make a ſurpriſing diverſity of figures and arrangements. M. Truchet, in the Memoirs of the French Academy, has ſhewn by the rules of combination, that two ſquare-ſtones, divided diagonally into two colours, may be joined together chequerwiſe ſixty-four different ways: which appears ſurpriſing enough; ſince two letters, or figures can only be combined two ways.

The reaſon is, that letters only change their ſituation with regard to the firſt and ſecond; the top and bottom remaining the ſame: but in the arrangement of theſe ſtones, each admits of four ſeveral ſituations, in each whereof the other ſquare may be changed ſixteen times, which gives ſixty-four combinations.

Indeed, from a farther examination of theſe ſixty-four combinations, he found there were only thirty-two different figures; each figure being repeated twice in the ſame ſituation, though in a different combination; ſo that the two only differed from each other by the tranſpoſitiou of the dark and light parts.

PAVEMENT *of terrace*, is that which ſerves for covering in manner of a platform; whether it be over a vault, or a wooden floor.

Thoſe over vaults are uſually ſtones ſquared, and bedded in lead. Thoſe on wood called by the Latins, *pavimenta contignata*, are either ſtones with beds for bridges, tiles for cieling of rooms, or lays of mortar made of cement and lime, with flints or bricks laid flat: as is ſtill practiſed by the eaſtern and ſouthern people a-top of their houſes.

All thoſe *pavements* which lie open were called by the Latins *pavimenta ſubdialia*.

PAVEMENT, *moſaic*. See MOSAIC *work*.

PAVEMENT, *teſſellated*. See TESSELLATED.

PAVEMENT, *projection*, or *perſpective of a*. See PERSPECTIVE.

PAVETTA, in *Botany*, a genus of the *tetrandria monogynia* claſs: its characters are, that the corolla is funnel-ſhaped, and has one petal; the ſtigma is crooked, and the fruit is a berry with two ſeeds. There is only one ſpecies.

PAVIA, in *Botany*. See *Scarlet Horſe* CHESTNUT.

PAVICULA, among the Romans, a rammer, or inſtrument for beating down and levelling a ſpot of ground.

It conſiſted of a block of wood one foot long and half a foot thick, with a long handle.

PAVILION, in *Architecture*, ſignifies a kind of turret, or building uſually inſulated, and contained under a ſingle roof; ſometimes ſquare, and ſometimes in form of a dome; thus called from the reſemblance of its roof to a tent.

The word comes from the Italian *padiglione*, *tent*; and that from the Latin *papilio*.

Pavilions are ſometimes alſo projecting pieces, in the front of a building, marking the middle thereof. Sometimes the *pavilion* flanks a corner, in which caſe it is called an *angular pavilion*. The Louvre is flanked with four *pavilions*. The *pavilions* are uſually higher than the reſt of the building.

There are *pavilions* built in gardens, popularly called ſummer-houſes, pleaſure-houſes, &c. Some caſtles or forts conſiſt only of a ſingle *pavilion*.

PAVILION, in *Heraldry*, denotes a covering in form of a tent, which inveſts, or wraps up, the armories of divers kings and ſovereigns depending only on God, and their ſword.

The French heralds hold, that none but ſovereign monarchs may bear the *pavilion* entire, and in all its parts.

The *pavilion* conſiſts of two parts: the top, which is the chapeau, or coronet; and the curtain which makes the mantle. Thoſe who are elective, or have any dependence, ſay the heralds, muſt take off the head, and retain nothing but the curtains.

The uſe of *pavilions* and mantles in armories is derived from the ancient lambrequins, which are ſometimes found ſtretched out in form of coverings; and tucked back on either ſide.

Others will have it derived from the ancient tournaments, wherein were expoſed the arms of the knight, in rich tapeſtry-work, on tents and *pavilions*, which the chiefs of the quadrils planted to ſhelter themſelves in, till the time of entering the liſts.

PAVILION, in *War*, denotes a TENT raiſed on poſts to lodge under in the ſummer time.

PAVILION is alſo ſometimes applied to flags, colours, enſigns, ſtandards, banners, &c. all which authors uſually confound with one another.

The cuſtom of bearing *pointed pavilions*, as at preſent, firſt came from the Mahometan Arabs, at the time when they conquered Spain. Till then, all colours were ſtretched on croſs pieces like church-banners; whence they were called in Latin, *vexilla quaſi velilla*, a diminutive of *vela*, *ſails*.

The pirates all along the coaſts of the Atlantic, and Barbary, bear hexagonal *pavilions*, gules, charged with a little Turk, dreſſed in his turban; though contrary to their law, which prohibits the making any image of a man; from an opinion that thoſe who make the figure here will be obliged to furniſh a ſoul for it at the day of judgment, or, in default thereof, be damned.

But this portrait, it ſeems, is that of Hali Sulficar, Mahomet's ſon-in-law, to whoſe party the Africans adhere: and who appointed his picture to be repreſented on their banners; imagining himſelf ſo terrible to the Chriſtians, that the mere ſight of his image would put them to flight; as we are told by Leunclavius.

PAVILIONS, among *Jewellers*, the under ſides and corners of the brilliants, lying between the GIRDLE and the COLLET.

PAUL's *art*. See ART.

St. **PAUL**, *hermits of*. See HERMIT.

PAUL, an Italian coin, worth almoſt ſix pence Engliſh.

PAUL, in *Sea Language*, is a ſhort bar of wood, or iron, fixed cloſe to the CAPSTERN or WINDLASS of a ſhip, to prevent thoſe engines from rolling back, or giving way, when they are employed to heave in the cable, or otherwiſe charged with any great effort.

PAULA *gumda*, in *Natural Hiſtory*, a name given by the people of the Eaſt Indies to a ſpecies of foſſil of the *oſteocolla* kind, found in ſome ſprings, the waters of which are loaded with ſpar. Theſe people uſed it in medicine, giving it in milk for gonorrhœas, and that with good ſucceſs.

PAULADADUM, a name given by ſome authors to the medicinal earth of the iſland of Malta, called *terra Melitenſis*, and *gratia ſancti Pauli*. Some have given this name alſo to a ſpecies of white bole found in ſome parts of Italy, which is made into cakes, and ſealed, and ſerves in the place of this and other white earths.

PAULIANISTS, **PAULIANISTÆ**, a ſect of heretics, ſo called from their founder Paulus Samoſatenus, a native of Samoſata, elected biſhop of Antioch in 262.

His doctrine ſeems to have amounted to this: that the Son and the Holy Ghoſt exiſt in God in the ſame manner as the faculties of reaſon and activity do in man; that Chriſt was born a mere man; but that the reaſon or wiſdom of the Father deſcended into him, and by him wrought miracles upon earth, and inſtructed the nations; and finally, that, on account of this union of the divine word with the man Jeſus, Chriſt might, though improperly, be called God. It is alſo ſaid, that he did not baptize in the name of the Father and the Son, &c. For which reaſon the council of Nice ordered thoſe baptized by him to be rebaptized.

Being condemned by Dionyſius Alexandrinus in a council, he abjured his errors, to avoid depoſition; but ſoon after he reſumed them, and was actually depoſed by another council in 269.

PAULICIANS, a branch of the ancient Manichees; ſo called from their chieftain, one Paulus, an Armenian, in the ſeventh century: who with his brother John, both of Samoſatena, formed this ſect; though others are of opinion that they were thus called from another Paul, an Armenian by birth, who lived under the reign of Juſtinian II. A certain zealot, called Conſtantine, revived, in the ſeventh century, under the government of Conſtans, this drooping faction, which had ſuffered much from the violence of its adverſaries, and was ready to expire under the ſeverity of the imperial edicts, and of thoſe penal laws which were executed againſt its adherents with the utmoſt rigour. However, the *Paulicians*, by their number, and the countenance of the emperor Nicephorus, became formidable to all the Eaſt.

But the cruel rage of perſecution, which had for ſome years been ſuſpended, broke forth with redoubled violence under the reigns of Michael Curopalates, and Leo the Armenian, who inflicted capital puniſhment on ſuch of the *Paulicians* as refuſed to return into the boſom of the church.

The empreſs Theodora, tutoreſs of the emperor Michael, in 845, would oblige them either to be converted, or to quit the empire: upon which, ſeveral of them were put to death, and more retired among the Saracens; but they were not all exterminated.

Upon this, they entered into a league with the Saracens, and, chuſing for their chief an officer of the greateſt reſolution and valour, whoſe name was Carbeas, they declared againſt the Greeks a war which was carried on during this whole century, with the greateſt vehemence and fury. During theſe commotions, ſome *Paulicians*, towards the concluſion of this century, ſpread abroad their doctrines among the Bulgarians: many of them, either from a principle of zeal for the propagation of their opinions, or from a deſire of getting rid of the perſecution and oppreſſion they ſuffered under the Grecian yoke, retired, about the cloſe of the eleventh century, from Bulgaria and Thrace, and formed ſettlements in other countries. The firſt migration was into Italy, from whence, in proceſs of time, they ſent colonies into almoſt all the other provinces of Europe, and formed gradually a conſiderable number of religious aſſemblies, who adhered to their doctrine, and who were afterwards perſecuted with the utmoſt vehemence by the Roman pontiffs. In Italy they were called Patarini, from a certain place called Pataria, being a part of the city of Milan, where they held their aſſemblies; and CATHARI or Gazari, from Gazaria, or the Leſſer Tartary. In France they were called ALBIGENSES. The firſt religious aſſembly the *Paulicians* had formed in Europe, is ſaid to have been diſcovered at Orleans, in 1017, under the reign of Robert; many of whom were condemned to be burnt alive. The ancient *Paulicians*, according to Photius, expreſſed the utmoſt abhorrence of Manes and his doctrine. The Greek writers compriſe their errors under the ſix following particulars. 1. They denied that this inferior and viſible world is the production of the ſupreme Being, and they diſtinguiſh the Creator of this world, and of human bodies, from the moſt high God, who dwells in the heavens: and hence ſome have been led to conceive, that they were a branch of the GNOSTICS, rather than of the MANICHÆANS. 2. They treated contemptuouſly the Virgin Mary, or, according to the uſual manner of ſpeaking, among the Greeks, they refuſed to adore and worſhip her. 3. They refuſed to celebrate the inſtitution of the Lord's Supper. 4. They loaded the croſs of Chriſt with contempt and reproach; by which we are only to underſtand, that they refuſed to follow the abſurd and ſuperſtitious practice of the Greeks, who paid to the pretended wood of the croſs a certain ſort of religious homage. 5. They rejected, after the example of the greateſt part of the Gnoſtics, the books of the Old Teſtament, and looked upon the writers of that ſacred hiſtory, as inſpired by the creator of this world, and not by the ſupreme God. 6. They excluded preſbyters and elders from all part in the adminiſtration of the church. Moſheim's Eccl. Hiſt. vol. ii. p. 178, 8vo.

PAULLINIA, in *Botany*, a genus of the *octandria trigynia* claſs. Its characters are theſe: the flower has a permanent empalement, compoſed of four ſmall oval leaves; it has four oblong oval petals, twice the ſize of the empalement; and eight ſhort ſtamina with a turbinated germen, having three ſhort ſlender ſtyles, crowned by ſpreading ſtigmas; the germen turns to a large three-cornered capſule with three cells, each containing one almoſt oval ſeed. Linnæus reckons ſeven, and Miller nine ſpecies, natives of the Weſt Indies.

PAUNCH, or **PANCH**, on *Ship-board*, a ſort of thick and ſtrong mat, formed by interweaving twiſts of rope-yarn as cloſe as poſſible. See MATTS.

PAVO, *peacock*, in *Aſtronomy*, a conſtellation of the ſouthern hemiſphere, unknown to the ancients, and not viſible in our northern parts of the world, containing fourteen ſtars: the ſituation, longitudes, and latitudes of which are as follow:

Names and ſituations of the ſtars.	Signs.	Longitud °	′	″	Latitude South. °	′	″	Magnitude.
The eye of the peacock	♑	20	0	3	36	11	18	2
In the breaſt		24	41	51	46	56	21	3
In the right wing		18	41	38	45	52	34	3
In the middle		13	42	28	44	29	8	3
In the root of the tail, firſt		3	53	24	44	6	13	5
5.								
ſecond		2	42	11	41	37	9	5
third		3	55	22	39	3	23	4
fourth		5	11	3	37	10	46	6
fifth		0	49	34	38	54	14	5
ſixth	♐	29	39	17	38	3	36	4
10.								
ſeventh		27	22	54	40	9	28	5
laſt		24	7	44	41	28	2	4
In the right foot	♑	1	22	11	48	6	3	4
In the left foot		9	43	7	50	49	7	4

Pavo, in *Ichthyology*. See Peacock-*fiſh*.

Pavo, in *Ornithology*. See Peacock.

PAVONIUS-*lapis*, the *peacock-ſtone*, a name given by Ludovicus Dulcis, and other writers of his time, to a ſtone of which they ſay many idle things, ſuch as its having the virtue of gaining a perſon's love to another, and the like. They have left us no deſcription of it, but probably it was one of the variegated agates.

PAUPER, in *Law*. See Forma *pauperis*, and Poor.

PAURAEDRASTYLÆ, in *Natural Hiſtory*, the name of a genus of cryſtals. The word is derived from the Greek *παυρος*, *a few*, *εδρα*, *a ſide*, or *plane*, the privative particle *α*, *not*, and *ϛυλος*, *a column*, and expreſſes a foſſil compoſed of but a few ſides or planes, and having no column.

The bodies of this genus are cryſtals, compoſed of two pyramids joined baſe to baſe, without the intervention of a column; theſe being both hexangular, and conſequently the whole body compoſed only of twelve planes; the others of the ſame ſtructure being compoſed of ſixteen. Of this genus there are only four known ſpecies. See *Tab. of Foſſils, Claſs* 3.

PAUSANIA, Παυσανεια, in *Antiquity*, a feſtival in which were ſolemn games, wherein freeborn Spartans only contended. It had its name from Pauſanias, the Spartan general, under whoſe conduct the Grecians overcame Mardonius in the famous battle at Plateæ, there being always an oration in praiſe of him.

PAUSARY, Pausarius, in ancient Rome, an officer who, in the ſolemn pomps or proceſſions of the goddeſs Iſis, directed the ſtops, or pauſes.

In theſe ceremonies, there were frequent ſtands at places, prepared for the purpoſe, wherein the ſtatues of Iſis and Anubis were ſet down; much after the manner of reſting-places in the proceſſion of the holy ſacrament in the Romiſh church.

Theſe reſts were called *manſiones*: the regulation whereof was the office of theſe *pauſarii*.

From an inſcription quoted by Salmaſius it appears, that the Romans had a kind of college or corporation of *pauſaries*.

Pausary, *pauſarius*, was alſo a name given to an officer in the Roman galleys, who gave the ſignal to the rowers, and marked the times and pauſes; to the end they might act in concert, and row all together.

This was always done with a muſical inſtrument. Hyginus ſays, that, in the ſhip Argo, Orpheus did the office with his lyre.

PAUSE, a ſtop or ceſſation of ſpeaking, ſinging, playing, or the like.

The word is formed from the Latin *pauſa*, which we find uſed in Lucretius and Plautus in the ſame ſenſe.

The uſe of pointing in grammar is, to make the proper *pauſes* in certain places.

The uſe of theſe *pauſes* is equally neceſſary to the ſpeaker and to the hearer: to the ſpeaker, that he may take breath, without which he cannot proceed far in his delivery, and that he may relieve the organs of ſpeech by theſe temporary reſts, which otherwiſe would be ſoon tired by continued and uninterrupted action: to the hearer, that the ear alſo may be relieved from the fatigue which it would otherwiſe endure from a continuity of ſound, and that the underſtanding may have ſufficient time to mark the diſtinction of ſentences, and their ſeveral members. *Pauſes* in common diſcourſe, and in moſt compoſitions in proſe, have, beſides the duration, marks of a ſurer kind annexed to them to point out their nature: and theſe are certain notes of the voice, which declare of what kind the *pauſes* are, at the inſtant they are made; and inform the mind what it is to expect from them; whether the ſenſe is ſtill to be continued in the ſame ſentence; whether the preceding one is to be the laſt member of the ſentence; or whether the ſentence is cloſed, and a new one is to begin. By means of theſe notes or tones, the ſpeaker may proportion his *pauſes* to the importance of the ſenſe, and not merely to the grammatical ſtructure of words in ſentences. A propoſition or ſentiment of peculiar moment, may be preceded or cloſed by a longer *pauſe* than uſual: a *pauſe* may be alſo made before ſome very emphatical word, but this is a liberty that ſhould be uſed with great caution. An ingegious writer on this ſubject obſerves, that *pauſes* in general depend upon Emphasis: words are ſufficiently diſtinguiſhed from each other by accent; but to point out their meaning when ranged in ſentences, emphaſes and *pauſes* are neceſſary. Accent, ſays this writer, is the link which connects ſyllables together, and forms them into words: emphaſis is the link which connects words together, and forms them into members of ſentences; but that there may be no miſtake to which emphaſis the words belong, at the end of every ſuch member of a ſentence, there ought to be a perceptible *pauſe*. Sheridan's Lectures, p. 75, &c. See Comma, Colon, Points, &c.

There is a *pauſe* in the middle of each verſe: in an hemiſtich it is called the reſt, or repoſe.

Pauſes, or ſilences, are the ſame in poetry as the odd-reſts in muſic, which ſerve to make the odd notes even. St. Auſtin inſtructs us how the *pauſes* are to be made according to the laws of muſic.

Pause, in *Muſic*, a character of ſilence, and reſt; called alſo, by ſome, a *mute figure*; becauſe it ſhews, that ſome part or perſon is to be ſilent, while the others continue the ſong.

Pauſes are uſed either for the ſake of ſome fugue or imitation, or to give a breathing time, or to give room for another voice, &c. to anſwer what this part ſung; as in dialogues, echoes, &c.

The ancients had two kinds of *pauſes*; the one called by the Italians, *initial pauſes*, becauſe firſt placed at the beginning of the piece, though ſometimes after: and regularly before the circle O, or the ſemicircle C. They had alſo *pauſes* to mark ſilences, after the characters of the meaſure, and in the courſe of the piece.

Pause, *general*, denotes a general ceſſation, or ſilence, of of all the parts.

Pause, *demi*, a ceſſation for the time of half a meaſure.

They alſo ſay, *pauſe of a minim*, *pauſe of a ſemibreve*, *long pauſe*, and *pauſes of a croma* and *ſemi-croma*; which are names given by the Italians to expreſs the different values or durations of *pauſes*.

For the ſigns or characters of *pauſes*, ſee Character.

PAUSEBASTOS, in *Natural Hiſtory*, the name of a beautiful ſtone dedicated to Venus, and called alſo *pancros*. It ſeems to have been a beautiful agate.

PAUSICAPE, Παυσικαπη, among the Athenians, a kind of puniſhment. A round engine was put about the neck in ſuch a manner, that the ſufferer could not lift his hand to his head.

PAUSIS, a word uſed by the old phyſicians for a remiſſion in acute diſeaſes.

PAUXI, in *Ornithology*, the name of an American bird deſcribed by Nieremberg, and ſeeming to be the ſame with the mitu of the Braſilians, deſcribed by Marggrave, and with the *tepetototl* of Nieremberg: the whole difference is, that this, inſtead of a creſt, has a fleſhy protuberance at the baſis of its bill; this is of the ſhape of a pear, and as hard as a ſtone, and is of a beautiful turcois colour, or fine pale blue.

PAW patté, in *Hearldry*, the fore-foot of a beaſt cut off ſhort. If the whole leg be cut off, it is called *gambé*. Lion's *paws* are much uſed in armoury.

Paw, in the *Manege*. A horſe is ſaid to *paw* the ground when his leg being either tired or painful, he does not reſt it upon the ground, and ſears to hurt himſelf as he walks.

PAWLE, in a *Ship*. See Paul.

PAWN, *pignus*, a pledge or gage for ſurety of payment of money lent. It is ſaid to be derived, *a pugno, quia res quæ pignori dantur, pugno vel manu traduntur*. Lit. Dict.

The party that *pawns* goods hath a general property in them; they cannot be forfeited by the party that hath them in *pawn*, for any offence of his, nor be taken in execution for his debt; neither may they otherwiſe be put in execution till the debt for which they are *pawned* is ſatisfied. Litt. Rep. 332.

If the *pawn* is laid up, and the pawnee robbed, he is not anſwerable; though if the pawnee uſe the thing, as a jewel, watch, &c. that will not be the worſe for wearing, which he may do, it is at his peril; and if he is robbed, he is anſwerable to the owner, as the uſing occaſioned the loſs, &c. Ibid.

If the *pawn* is of ſuch a nature that the keeping is a charge to the pawnee, as a cow, or a horſe, &c. he may milk the one, and ride the other, and this ſhall go in recompence for his keeping. Ibid.

Things which will grow the worſe by uſing, as apparel, &c. he may not uſe.

PAWN, among *Miners*, is a pledge of money put into the bar-maſter's hand, at the time when the plaintiff cauſes the bar-maſter to arreſt the mine.

PAWN-*broker*. See BROKER.

PAWNAGE. See PANNAGE.

PAX *dei*. See PEACE *of God*.

PAX *eccleſiæ*. See SANCTUARY.

PAX *regis*. See PEACE *of the king*.

Longe debet eſſe pax regis *a parte ſua, ubi reſidens fuerit, a quatuor partibus loci illius, hoc eſt quatuor milliaria & tres quarentenæ, & novem acræ latitudine, & novem pedes, & novem palmæ, & novem grana hordei*, &c. Leg. Edv. Confeſſ.

Ad PACEM *redire*, to reſtore to the peace, is to reverſe an outlawry; whereby a perſon is reſtored to the benefit of the king's peace.

Rex poteſt dare quod ſuum eſt, hoc eſt, pacem *ſuam quam utlagatus amiſit*. Bracton, lib. iii.

PAY of the *army* and *navy*, is the ſtipend or ſalary allowed for each individual ſerving in the army or navy; for which we refer the reader to the Regiſters publiſhed annually, and in almoſt every body's hands.

PAY-*maſter*, is the perſon intruſted with the money, and that has the charge of paying it. The payment of the land-forces is under the direction of an office, the buſineſs of which is conducted by the *pay-maſter general*, his deputy, caſhiers, clerks, &c. The payment of the navy is under the direction of the treaſurer of the NAVY, a *pay-maſter*, and accomptant, clerks, &c. There is alſo a *pay-maſter* of the penſions, &c.

To PAY, in *Sea Language*, is to daub or anoint the ſurface of any body, in order to preſerve it from the injuries of the water, weather, &c. Thus the bottom of a ſhip is *paid* with a compoſition of tallow, ſulphur, reſin, &c. The ſides of a ſhip are uſually *paid* wirh tar, turpentine, or reſin, or with a compoſition of tar and oil, to which is ſometimes added red oker, &c. in order to protect the planks from being ſplit by the ſun or wind. The lower maſts are, for the ſame reaſons, *paid* with the materials of the ſame ſort, if we except thoſe along which their reſpective ſails are frequently hoiſted and lowered; ſuch are the maſts of ſloops and ſchooners, which are always *paid* with tallow for this purpoſe: for the ſame reaſon, all top-maſts and top-gallant-maſts are alſo *paid* with hog's-lard, butter, or tallow. Falconer. See SHIP and WOOD.

PAYING-*off*, in *Sea Language*, denotes the movement by which a ſhip's head falls to leeward of the point where it was previouſly directed: particularly when, by neglect of the helmſman, ſhe had inclined to windward of her courſe, ſo as to make the head-falls ſhiver in the wind, and retard her velocity.

PAYING *off* is likewiſe uſed to ſignify the payment of the ſhip's officers and crew, and the diſcharge of the ſhip from ſervice, in order to be laid up at the moorings.

PAYING-*out*, or PAYING-*away*, is the act of ſlackening a cable, or other rope, ſo as to let it run out of the veſſel for ſome particular purpoſe. See CABLE.

PAYMENT, the diſcharge of a debt, either by money really told, or by bills of exchange, &c. See DEBT, &c.

PAYMENT, *prompt*, a popular term, in England and Amſterdam. It is when a debtor acquits what he owes, before the expiration of the term granted by the creditor. The ordinary diſcount for *prompt payment* on moſt merchandizes, is 1 per cent.

PAYMENTS, *equation of*. See EQUATION *of payments*.

PEA, *piſum*, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are theſe: the flower hath an empalement cut into five points, the two upper being broadeſt; it hath four petals, and is of the butterfly kind; the ſtandard is broad, heart ſhaped, reflexed, and indented, ending in a point; the two wings are ſhorter, roundiſh, and cloſe together; the keel is compreſſed, half-moon ſhaped, and ſhorter than the wings; it hath ten ſtamina in two bodies, the upper ſingle one is plain and awl-ſhaped, the other nine are cylindrical below the middle, and awl-ſhaped above, and cut; theſe are joined together; it has an oblong compreſſed germen, with a triangular riſing ſtyle; the germen afterward becomes a large long taper pod, terminated by a ſharp riſing point, opening with two valves, having one row of roundiſh ſeeds. Miller enumerates ſix, and Linnæus four ſpecies.

We have ſeveral ſorts of *peas* cultivated for uſe in the gardens about London and elſewhere; and as many people are deſirous of having them very early, it is a common practice to raiſe them on hot beds. The method of doing this is, to ſow the *peas* under warm hedges or walls. In the middle of October, when the plants are come up, their ſtalks are to be kept earthed up, and thus they are to remain till the end of January, or beginning of February, covering them againſt the ſevere froſts with *peas*-haulm, or other light covering. In January or February, there muſt be made a moderate hot-bed; the dung muſt be laid about two feet thick, and carefully beat down, and covered about ſix or eight inches deep with light freſh earth; and when the frames have been ſet on about four days, the plants muſt be planted in the earth, at about two feet diſtance, in rows, and placed in each row at about an inch one from another. They muſt be watered and ſhaded till they have taken root, and then they muſt have as much air as may be; and when they begin to fruit, they ſhould be watered more frequently than before, which will occaſion their producing a larger quantity of fruit.

The common dwarf *pea* is the ſort always uſed on this occaſion, as all the reſt ramble too much in their ſtalks. The firſt ſort of *pea* to be ſown to ſucceed thoſe on the hot-beds, is the hotſpur; of which the gardeners reckon three or four ſorts, which differ very little from each other; but thoſe called the golden and Charlton hotſpur are uſually preferred to the reſt. Theſe are to be ſown in October, as thoſe intended for the hot-bed, and treated every way in the ſame manner; but in ſpring they are ſubject to be deſtroyed by ſlugs and other vermin; the beſt method of deſtroying which is, to ſlake a little lime, and throw over the earth among the plants. For fear of this crop miſcarrying by the ſeverity of weather, it is always proper to ſow two others after this, at the diſtance of a fortnight each: and after this there ſhould be no others ſowed till the beginning, middle, and end of January. To ſucceed theſe, which will ſupply the table with early *peas*, the Spaniſh morotto, which is a large *pea*, and a very plentiful bearer, ſhould be ſowed about the middle of February, in rows on a clear plat of ground; the rows ſhould be three feet aſunder; and the *peas* dropt at an inch from each other: theſe muſt be all very carefully covered two inches deep with earth, and the rooks, mice, &c. prevented from getting at them. A fortnight after this another ſpot ſhould be ſowed with this or ſome other larger *pea*, and this continued every fortnight till the latter end of May: obſerving to allow the marrow-fats, and other large ſorts of *peas*, at leaſt $3\frac{1}{2}$ feet, or four feet between row and row: and the roſe *pea* ſhould be allowed at leaſt eight or ten inches from plant to plant in the rows. The dwarf-*peas* need not have more room than two feet, row from row, and an inch diſtance in the row.

The ſickle *pea*, which is the ſort moſtly cultivated in Holland, is rarely propagated in England: this ſhould be planted in rows about $2\frac{1}{2}$ feet aſunder, well guarded from birds, and in other reſpects managed as the other ſorts. There ſhould be continued a ſucceſſion of the hotſpur *peas*, by ſowing ſome every week or ten days; but thoſe which are ſown late in the ſeaſon, ſhould have a ſtrong moiſt ſoil. The beſt of all the large kinds is the marrow-fat, which, planted on a ſtrong ſoil, will continue good through the month of Auguſt. The grey and other large winter *peas* are ſeldom cultivated in gardens, but are uſually ſown in fields in moſt parts of England: the beſt time for ſowing them is about the beginning of March, when the weather is dry; and they ſhould be allowed at leaſt three feet diſtance from row to row, and ſown thin in the rows.

PEAS, *field*. The common white *pea* ſucceeds beſt in a light ſandy land, or in a rich looſe ſoil: the time of ſowing them is in the latter end of March, or beginning of April, on warm land: but in cold ground they ſhould be ſown a fortnight or three weeks later. Three buſhels are the common allowance for an acre; and they kill the weeds a land is ſubject to better than any other crop. The uſual method of ſowing theſe *peas* is with a broad caſt, and by harrowing them in: but if they are ſet in drills, half the quantity of ſeed will ſerve for an acre, and the ground may be ſtirred with a hoe to deſtroy the weeds, and the *peas* earthed up, which will greatly improve them, and render the cutting of them more eaſy in autumn, when they are ripe. In Staffordſhire they ſow the garden rowncivals in fields, and they grow and yield very well, though they are left trailing on the ground without any ſupport of ſticks.

The green and maple rowncivals require a ſtronger ſoil than the white; and ſhould be ſown later in the ſpring: the rows ſhould be in drills, $2\frac{1}{2}$ or three feet aſunder, and the ground between the rows ſhould be ſtirred two or three times with a hoe. The grey *peas* thrive beſt on a ſtrong clayey land, and are commonly ſown under ſurrow, but they would ſucceed beſt in drills. Theſe may be ſown towards the end of February; by drawing a drill with a hoe, by a line, about two inches deep, and ſcattering the ſeed therein; then the earth ſhould be drawn over them with a rake, ſo that they may be equally covered. In large fields, a ſhallow furrow is commonly made with the plough, the ſeeds are ſcattered in it, and the earth is harrowed over them. If a horſe-hoe be drawn between the rows, it will eradicate the weeds, ſtir the ſoil under it mellow, and greatly promote the growth of the plants. Miller.

The common quantity of ſeed is two buſhels to an acre. The blue *pea* is the beſt kind for light ſandy land, and is to be early ſown; all *peas* love land manured with lime or with marle. In Suffolk they plough up their lays in the beginning of March, and turning the turf well, they have a croſs ſtick, ſet with iron pegs, which they ſtrike down with their feet: theſe pegs make holes at an even diſtance; into which they have boys and girls following to put the *peas* ſingly, till all the land is ſet. As ſoon as this crop is cut, they plough the land acroſs, and harrowing it well, they plough it again, and ſow it about Michaelmas with wheat, the next year with barley, then with oats; after which the land requires new improvement. Mortimer's Huſbandry.

In order to obtain good ſeed, ſome rows ſhould be left ungathered; and when the *peas* are in flower, all thoſe plants, which are not of the right ſort, ſhould be drawn out. The others muſt remain till their ſeeds begin to ſplit, and then ſhould be gathered up with the haulm, and either be laid up in ſtalks till winter, or threſhed as ſoon as they are dry, and the *peas* put up in ſacks for uſe. It is moſt adviſeable to change the ſeed every year, or every two years at leaſt. Miller.

Pea, *chich*, *cicer*, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are theſe: the empalement is cut into five ſegments; the flower is of the butterfly kind; the ſtandard large, roundiſh, and plain; the wings are much ſhorter and obtuſe, the keel is ſhorter than the wings, and is ſharp-pointed; it hath ten ſtamina, nine of them being joined, and the tenth ſeparate; it has an oval germen, which becomes a turgid ſwelling pod of a rhomboidal figure, incloſing two roundiſh ſeeds, with a protuberance on their ſide. There is but one ſpecies of this plant; though there is indeed a variety of it with red ſeed, but they differ only in colour. The *chich pea* is much cultivated in Spain, being an ingredient in their dyes, and is there called garavance. It is cultivated in France alſo, but in England it is rarely ſown; and unleſs the ſeaſon proves warm and dry, the plants decay before the ſeeds ripen. Miller.

The ancient Hebrews made uſe of *chich peas* as their common proviſions, when they took the field. They parched them to eat. At this day in Egypt, when people undertake a journey, they lay in a good ſtock of *chich peas*, parched in a frying-pan. Bellonius aſſures us, that at Grand Cairo, and Damaſcus, there are abundance of ſhops, where people do nothing elſe but fry *peas*, it being a ſort of proviſions with which they furniſh travellers. In Ethiopia they take barley with them, roaſted in the ſame manner. In Turkey they lay in a ſtock of rice on theſe occaſions, which they prepare and ſhell. The Hebrew term קָלִי, ſignifies properly any thing roaſted in general, and by it is underſtood roaſted *peas*, rice, or barley; ſome will have even coffee to be meant by it. Bellon. lib. ii. cap. 53. Calm. Dict. Bibl.

Pea, *everlaſting*, or *earth nut* Pea, names ſometimes given to the *lathyrus*. See *Chichling* Vetch.

Pea, *heart*, or *bladder*-Pea, *cardioſpermum*, or *corindum*, in *Botany*, a genus of the *octandria trigynia* claſs. Its characters are theſe: the flower which hath a permanent empalement of four concave leaves, has four obtuſe petals, which are alternately larger; and a ſmall four leaved nectarium encompaſſing the germen; with eight ſtamina, three and three ſtanding oppoſite, the other two on each ſide; the germen is three-cornered, and becomes a roundiſh ſwollen capſule, with three lobes divided into three cells opening at the top, each having one or two globular ſeeds, marked with a heart. Linnæus reckons two and Miller three ſpecies.

Theſe plants grow naturally in both the Indies, where they climb upon whatever ſhrubs are near them, to the height of eight or ten feet, but will not thrive in the open air in England. They are annual plants.

The *corindum* is ſaid to be uſed as an emollient, boiled as food; the ſeeds, which are a ſort of *pea*, are alſo boiled and eaten.

Pea, *Indian*, or *heath*, the name by which a ſpecies of *orobus* is ſometimes called. See *Bitter* Vetch.

Pea, *painted lady*. See *Chichling* Vetch.

Pea, *pigeon*, a name ſometimes given to the *cytiſus*, or *ſhrub* TREFOIL.

Pea, *ſcarlet*, in *Botany*, the Engliſh name of a genus of plants, called by Linnæus *glycine*. See *Liquorice* Vetch.

Pea, *ſweet-ſcented* and *Tangier*. See *Chichling* Vetch.

Pea, *winged*, a name by which ſome call the *lotus*. See *Bird's foot* Trefoil.

Pea, *wild-winged*, a ſpecies of the *piſum*, or common pea.

Pea, *wood*. See *Bitter* Vetch.

PEACE, Pax, in its general ſignification, ſtands in oppoſition to *war*.

Peace, in *Mythology*. See Pacalia.

Peace, in our *Law Books*, &c. is reſtrained to a quiet and inoffenſive carriage towards the king, and his people. Lamb. Eirenarch.

Where any man ſtands in danger of harm from another, and makes oath thereof before a juſtice of the peace, he muſt be ſecured by good bond, which is called *binding to the peace*.

Any juſtice of the peace may, *ex officio*, bind all thoſe to keep the *peace*, who, in his preſence, make any affray; or threaten to kill or beat another; or contend together with hot and angry words; or go about with unuſual weapons or attendance, to the terror of the people; and all ſuch as he knows to be common barrettors; and ſuch as are brought before him by the conſtable for a breach of the *peace* in his preſence, and all ſuch perſons, as, having been before bound to the *peace*, have broken it and forfeited their recognizances. Alſo, wherever any private man hath juſt cauſe to fear that another will burn his houſe, or do him a corporal injury, by killing, impriſoning, or beating him; or that he will procure others ſo to do; he may demand ſurety of the *peace* againſt ſuch perſon; and every juſtice of the peace is bound to grant it, if he who demands it will make oath, that he is actually under fear of death or bodily harm; and will ſhew that he has juſt cauſe to be ſo, by reaſon of the other's menaces, attempts, or having lain in wait for him; and will alſo farther ſwear that he does not require ſuch ſurety out of malice or mere vexation. This is called *ſwearing the peace* againſt another; and if the party does not find ſureties, as the juſtice in his diſcretion ſhall require, he may immediately be committed till he does. A Recognizance for keeping the *peace*, when given may be forfeited by any actual violence, or even an aſſault, or menace, to the perſon of him who demanded it, if it be a ſpecial recognizance; or, if the recognizance be general, by any unlawful action whatſoever, that either is or tends to a breach of the *peace*. Blackſt. Com. b. iv. p. 251, &c. See Good-*abearing*.

Peace, *time of*, is when the courts of juſtice are open, and the judges and miniſters of the ſame may by law protect men from wrong and violence, and diſtribute juſtice to all. See Coke on Litt.

Peace *of the king*, *pax regis*, mentioned in the ſtat. 6 Ric. II. &c. is that ſecurity which the king promiſes his ſubjects, and others taken into his protection, both for life and goods.

Peace *of God and the church*, *pax Dei & eccleſiæ*, mentioned in our *Ancient Law Books*, is that reſt and ceſſation which the king's ſubjects had from trouble and ſuit of law, between the terms.

Peace *of the plough*, that whereby the plough, plough-tackle, and plough-cattle, are ſecured from diſtreſſes.

Thus fairs may be ſaid to have their *peace* becauſe no man may be troubled in them for any debt contracted elſewhere.

Peace, *clerk of the*. See Clerk *of the peace*.

Peace, *commiſſion and juſtice of*. See Justices *of Peace*.

Peace, *conſervator of the*. See Conservator.

Peace, *homage of the*. See Homage.

PEACH-*tree*, *perſica*, or *amygdalus*, in *Botany*, a genus of the *icoſandria monogynia* claſs. Its characters are theſe: the flower has a tubulous empalement of one leaf, cut into five obtuſe ſegments; it hath five obtuſe oblong petals, which are inſerted in the empalement, and about thirty erect ſlender ſtamina, which are ſhorter than the petals, and are alſo inſerted in the empalement; it hath a roundiſh hairy germen, which afterwards becomes a roundiſh, woolly, large, ſucculent fruit, with a longitudinal furrow, incloſing an oval nut, with a netted ſhell, having many punctures. Linnæus enumerates four ſpecies of the *amygdalus*.

The curious in fruits account thirty-one ſorts of *peaches*, but many of them ſeem very trifling diſtinctions. Mr. Miller principally recommends the early purple, the groſſe mignon, the belle chevreuſe, the red magdalen, the chancellor, the bellegarde, the bourdine, the roſſanna, the rambouillet, and nivette.

The fineneſs of this fruit, in general, depends on the firmneſs of the pulp, the delicacy of the flavour, and the thinneſs of the ſkin. A fine *peach* ſhould be of a fine deep red next the ſun, and of the yellowiſh caſt next the wall; and the pulp ſhould be of a yellowiſh caſt, and very juicy; and the ſtone ſhould be ſmall, though the fruit in general be large.

The varieties of the *peach* are produced like thoſe of the finer flowers, by ſowing the ſeeds; and though many raiſed this way will be of little value, as is alſo the caſe in flowers, yet probably among a parcel of ſtones, ſaved from the finer kinds of *peaches*, there would be ſome new kinds produced; which, as they were raiſed here, would be eaſily kept up in their perfection; which is not to be expected of thoſe brought from other countries.

The beſt method of ſaving the ſtones is, to let ſome of the fineſt *peaches* of the beſt kinds hang till they drop of themſelves from the tree, and then the ſtones ſhould be immediately planted on a bed of light dry earth, planting them about three inches deep in the earth, and at about four inches aſunder. The beds ſhould be covered, to preſerve them in the winter; and in ſpring, when the plants come up, they muſt be cleared of weeds, and well watered. The next ſpring they ſhould be carefully taken up, and planted in the nurſery, in rows three feet aſunder, and one foot diſtant from each other; laying a little mulch upon the ſurface of the ground about their roots, and in a dry ſpring watering them once in a week; and after one or two years ſtanding here, they may be removed to the places where they are to remain; or they may at that time, when the condition of their fruit is known, be grafted on other ſtocks, which is the common way now uſed to propagate theſe trees.

The common method of propagating the *peach* is by grafting. In order to this, ſome good ſtocks ſhould be provided, which ſhould be of the muſcle, or white pear-plum. When theſe ſtocks are two years old, they will be ſtrong enough to bud; and the common ſeaſon for doing this is about Midſummer. The buds ſhould be choſen from a healthy tree, which produces a great deal of well taſted fruit: they muſt be taken from the trees, either in a cloudy day, or elſe in the morning or evening, when the ſun has not much power: they ſhould be then inoculated on the ſtocks as ſoon as poſſible, and the ſtocks treated with the uſual care afterwards. See INOCULATION.

When theſe are to be tranſplanted where they are to remain, the moſt proper ſoil for them is, a light rich paſture-land, ſuch as is called hazel loam, taken up with the turf, and rotted together, before it is to be uſed; and the borders to be made with this cannot be too wide, being never leſs than ſix or eight feet broad, and ought to be raiſed at leaſt a foot, or in very wet land two feet above the level of the ground; but if the ground be dry, ſix or eight inches will be ſufficient, and they ſhould not be more than 2½ feet in depth. They muſt be tranſplanted in autumn, as ſoon as the leaves are fallen off; and ſhould never be ſet at leſs than twelve, and in good ground fourteen feet diſtance from one another. The heads of the trees are then to be raiſed up againſt the walls, to keep the roots from being moved by the wind; and they ſhould be watered at times with a noſe on the watering-pot, and the water ſprinkled all over them. They ſhould alſo be guarded from froſt by mulch, laid on the ſurface of the ground about their roots. In the beginning or middle of March, the heads of the new planted trees muſt be cut off, leaving only four or five eyes above the bud; the earth of the borders ſhould be gently looſened to admit the fibres of the roots; the mulch laid in autumn, if it be rotten, may be dug into the border at ſome diſtance from the roots of the trees; and in dry weather, the ſurface of the border near the roots may be covered with the parings of turf from a paſture ground. In the middle of May, the new ſhoots are to be nailed to the wall, training them horizontally; and the fore-right ſhoots are to be rubbed off: in October the new branches ſhould be pruned, ſhortening them according to the ſtrength of the tree; if ſtrong, they may be left eight inches long; if weak, they ſhould only be left four or five; and the ſame care is to be taken of them for the ſucceeding years.

There are two general rules always to be obſerved in the pruning of *peach* and nectarine trees, which are, 1. Always to have enough bearing wood. And 2. Not to lay in the branches too cloſe to one another. All *peach* trees produce their fruit from the young wood either of the ſame, or at the moſt, of the former years ſhoot; for this reaſon the branches are to be ſo pruned as to encourage them to throw out new ſhoots in every part of the tree; and this is to be done in May; when by pinching, or ſtopping the ſtrong ſhoots, there may be new wood forced out in any part of the tree.

This is the method of the ſummer pruning; the winter pruning is uſually done in February or March, but is much better done at Michaelmas, as ſoon as their leaves begin to fall; and the wounds will then have time to heal before the ſevere froſts come on.

In pruning of theſe trees it muſt always be obſerved alſo, that it is beſt done under a wood bud, not a bloſſom bud; which may be diſtinguiſhed by the wood bud's being leſs turgid, and longer and narrower than the bloſſom bud; for if the ſhoot have not a leading bud where it is cut, it will commonly die down to the leading bud. In nailing the ſhoots to the wall, they ſhould be placed at as equal diſtances as poſſible; and ſo far apart that the leaves may have room; and they muſt always be trained as horizontally as poſſible, that the lower part of the tree may be well wooded, which it will not be if the branches are ſuffered to run upright.

When the fruit is ſet and grown to the ſize of a ſmall nut, it ſhould be thinned, and left five or ſix inches aſunder: by this management the fruit will be larger and better taſted, and the trees in a condition to bear well the ſucceeding year. The quantity of fruit to be left on large full grown trees, ſhould never be greater than five dozen upon each; but on middling trees, three or four dozen will be enough. If the ſeaſon ſhould prove hot and dry, it will be proper to draw up the earth round the ſtem of each tree, to form a hollow baſon of about ſix feet in diameter, and cover the ſurface of the ground in this baſon with mulch; and once in a week or fortnight, according to the drought of the ſeaſon, to pour down eight or ten gallons of water to the root of each tree; or the water may be ſprinkled by an engine over the branches of the trees, which, ſhaking down to the roots, will promote the growth of the fruit and prevent its falling off the trees. This, however, ſhould be continued only while the fruit is growing. Miller.

The *peach-tree*, as well as the roſe-tree, are very ſubject to be over-run with the aphides; which may be eaſily deſtroyed by fumigating the houſe in which the plants are kept with tobacco, by dreſſing the infected plants with ſnuff or tobacco duſt, or by a decoction or infuſion of tobacco. Soap-ſuds effectually deſtroy the different ſpecies of inſects that infeſt fruit trees growing againſt walls, and particularly the *peach*, cherry, and plum. For this purpoſe, a perſon on a ladder ſhould pour them from a watering-pot over both trees and wall, beginning at the top of the wall, and bringing it on in courſes from top to bottom. The ſuds contribute likewiſe to preſerve the wood of the delicate and tender kinds of *peaches*.

PEACH-*colour*, the pale red colour of the bloſſoms of the *peach*-tree.

To give this beautiful colour to glaſs, add at different times, and in ſmall quantities, the powder of prepared mangeneſe to the maſs for the making of LATTIMO, or milk-white glaſs, while in fuſion. This alone gives the *peach*-colour; but the metal muſt be immediately worked when of a right tinge, for the colour is very apt to go off.

PEACH-*colour*, in the *Manege*. See BLOSSOM.

PEACH, *wolf's*. See LYCOPERSICON.

PEACH-*flowers*. Theſe are uſed as a purge for children made into a ſyrup, and are by ſome recommended as great deſtroyers of worms; but there is a circumſtance attending them which is little taken notice of, and yet greatly alters their virtue. The cuſtom of gardeners is, to graft the *peach* upon the almond or the plum-tree, and the flowers partake of the nature of the ſtock; thoſe which are produced on *peach*-trees grafted on plum-ſtocks being much more purgative than thoſe from almonds; the reaſon of which ſeems plainly, that the plum is a purgative fruit, the almond not at all ſo. The flowers of the leaſt eſteemed ſorts of *peaches* are alſo uſually found to be the beſt for medicinal uſe.

In examining theſe flowers, they are found to contain more than three-fourths of a ſuperfluous humidity. The buds contain a little leſs than the blown flowers; which is very natural to ſuppoſe, becauſe it is their being afterwards charged with a larger portion of humidity which makes them open. The buttons, or buds of the flowers, are found on experiment, however, to be ſomewhat more purgative than the flowers when open.

If four pounds of theſe flowers are diſtilled in a *balneum Mariæ*, they yield twelve or thirteen ounces of a whitiſh liquor, ſweet to the taſte, and of an agreeable ſmell, reſembling that of bruiſed *peach* kernels; and this is ſo ſtrong in the water, that a few drops of it will very agreeably ſcent a large quantity of any thing. If the buds are uſed to this purpoſe, inſtead of the open flowers, the ſame ſort of liquor is drawn over; but it is of a ſomewhat coarſer and more earthy ſmell. The reſiduum of theſe diſtillations put into a retort, and diſtilled by a reverberatory fire, gradually raiſed to its ſeveral degrees, yields both acid and alkaline ſubſtances; and, finally, a red ſpirit comes over, full of fuliginous particles, and containing ſome oil, part of which ſwims at the top of the liquor, and the other part, which is heavier, ſinks to the bottom. This is what a chemical analyſis ſhews in theſe flowers, different from other vegetable matters. Spirits of wine draw a very weak tincture from theſe flowers;

It is indeed much weaker than an infuſion of them in common water. An infuſion in water of half an ounce of freſh *peach*-flowers, or of a dram of dry ones, (for, as before obſerved, they contain three-fourths of ſuperfluous moiſture) is a very gentle and agreeable purge, and it is ſaid, when ſweetened with ſugar, to prove an uſeful purgative and anthelmintic for children.

This method of infuſion is much better for theſe and all other purgative flowers, than the taking of the expreſſed juice; for in that caſe there is always a large quantity of purgative matter remaining in the reſiduum; which water in a warm infuſion is able to take out. The infuſion of roſe or *peach*-flowers keeps alſo better than their expreſſed juice.

The juice always turns ſour very ſoon; but the infuſion, with the common caution of pouring a little oil on the ſurface, will keep good even for years.

When oil is uſed for this purpoſe, there ſhould always be care taken that it be ſuch as does not freeze eaſily; for in that caſe the air gets in between the cake of frozen oil, and the ſides of the veſſel, and ſpoils the liquor. Oil of almonds is greatly to be preferred to oil of olives on theſe occaſions; as it freezes with much more difficulty. Another way of preſerving the infuſions is, the evaporating about half the liquor; and thus they will often keep a long time: infuſions keeping better than the juices of plants, ſeems to ſhew, that the former contain more of the principles than the latter.

The young leaves of the *peach*, made into an infuſion in the ſame manner as the flowers, are more purgative than they, but leſs agreeable; they are to be taken in the ſame manner. Mem. Acad. Par. 1714.

Peach *gall-inſect*, in *Natural Hiſtory*, a ſmall *gall-inſect*, found in great plenty on the *peach*-tree. It is of an oblong figure, flat at the belly, and prominent on the back; pointed, and not unaptly reſembling in miniature a ſmall boat turned bottom upwards: their longer diameter is uſually extended in the ſame direction with the length of the branch; ſometimes a little obliquely, but ſcarce ever perpendicular to that direction.

Their colour is uſually a faint brown, ſometimes it approaches to a coffee-colour, ſometimes to a bright cheſnut, but more frequently it has ſomething reddiſh in it. This inſect lives but a little while after it has laid its eggs, and its dried body makes an excellent covering and defence for them; and what is very remarkable is, that as this inſect is now immoveable, and cannot draw itſelf over its eggs, they are not thrown out behind its body, as the eggs of other animals; but as they are laid, are drawn under the belly, and evenly arranged there.

The eggs are ten or twelve day's before they hatch, and when hatched, the young animals remain quiet under the cover of their mother's carcaſe for ſeveral days.

It is uſually about the beginning of June that the young inſects get at liberty from under the body of their parent; they may then be found running very nimbly all over the branches of the tree, but are not diſtinguiſhable otherwiſe than by examining the branches with a microſcope. The branches, thus covered with theſe young animals, are in a few days cleared again, and the inſects found in form of ſmall ſcales, covering the leaves, and now large enough to be ſeen by the naked eye.

Not only the *gall-inſects* of the *peach*, but all the other ſpecies, after a certain time, become immovably fixed to the place where they are, and no longer able to uſe their legs. Their growth is very ſlow from the time of their hatching, through the months of July, Auguſt, September, and October: at the beginning of November they are found ſomewhat enlarged in breadth, but they are yet no thicker, and at this time they are all become of the ſame colour, which is ſomewhat reddiſh. In the beginning of March they begin to ſwell and be filled with the growing eggs; their backs become a little convex, and, viewed with a microſcope, appear covered with little tubercles; and one may, at this time, perceive ſeven or eight long threads, which run from ſeveral parts of their bodies: theſe faſten themſelves to the branch at a diſtance from the creature, and fix it immoveably in its place. In the beginning of April they become much more convex, and though they can no longer walk about, they yet have at this time ſufficient motion to ſhew an animal life. At this time, by very ſlow motions, they change their ſkin; and it is after this change that they aſſume ſo exactly the figure of galls, and grow ſo very quickly to their full ſize. Seven or eight days now make ſuch a change in them, that they are not to be known for the ſame animal; but it is not till the beginning of May, that they arrive at their utmoſt ſize. About the 15th of May they are in a condition to lay, and as the eggs are diſcharged, the belly is puſhed cloſer and cloſer to the back; and when all are laid, becomes the ſhell before deſcribed, and the young ones are hatched under it, and become full of eggs, and do the ſame office afterwards to their young.

In the end of April the branches of the *peach* and other trees, covered with theſe inſects, will be found to be greatly frequented by a ſort of ſmall flies, beautiful enough to demand attention; their head, breaſt, body, and legs are all of a deep red; they have only two wings, but thoſe very large, being nearly twice as long as their bodies: theſe, in the fly's common poſture, are croſſed on the back, and the upper almoſt entirely hides the under one; they are leſs tranſparent than thoſe of the common flies, and are of a duſky white, bordered with an edge of a fine bright and beautiful red: but what chiefly diſtinguiſhes them from all other ſpecies is, that they have two long white threads which run from their hinder part, and are of twice the length of their wings; between theſe there is alſo a remarkable part, a ſort of tail made like a piercer, and of a third or fourth part of the length of theſe threads. This is, like all other ſtings, thicker at its baſe than at its point, and is bent a little downwards. The antennæ of this fly are adorned with long bodies, hairy, and larger at their extremities than at their inſertions on the antennæ. It is eaſy at firſt ſight to conceive, that theſe are the flies that had been produced of worms fed in the bodies of the *gall inſects* of a former year, and that they were now ſearching an opportunity to depoſit their eggs in the bodies of theſe little creatures, to be hatched into worms there, and thence to come out in flies, as they themſelves before had done.

The flies examined on the branches with a glaſs will alſo be found to introduce this ſeeming piercer always at the ſame place into the body of the *gall-inſect*, and this is that cleft in the hinder part of the body, out of which the young ones, when hatched, afterwards find their way. The flies, which lodge their eggs or young worms in the bodies of other inſects, if cruſhed at that ſeaſon, will be always found to contain ſuch eggs or ſmall worms; and the microſcope never fails to diſcover them in the matter cruſhed out of flies even ſmaller than theſe, but in theſe no obſervation ever ſhews any ſuch. See. *Tab. of Inſects*, Nº 29. See Gall-*inſect fly*.

Notwithſtanding that the *peach gall-inſect* is the only ſpecies in which the male fly has been obſerved, there is no room to doubt but that the other ſpecies all have males of the ſame kind.

The orange *gall-inſect* has been obſerved not univerſally fecundated, but that there is only a part of the animals that lays eggs; probably the others are thoſe which hatch into the male flies: and the kermes, the nobleſt and moſt valuable of all the *gall inſects*, is known often to produce a white winged fly, very like that of the *peach gall-inſect*. And Brennius, who gave ſome time ſince a hiſtory of the ſcarlet grain of Poland, the *coccus Polonicus*, a kind of *pro-gall-inſect*; though in the firſt account he gave into the opinion of both ſexes being included in each of theſe animals, and that each was in itſelf ſufficient for the propagation of its ſpecies: yet afterwards, to his very great honour, added an account of his having deſcovered the male of this ſpecies, which he deſcribes to be a ſmall fly, with a red body and white wings bordered with red; a fly in all reſpects like the male of the *peach gall-inſect*. Reaumur's Hiſt. Inſ. tom. iv. p. 1. to 44.

Peach *water*. See Water.

PEACOCK, *pavo*, in the Linnæan ſyſtem of *Zoology*, a diſtinct genus of birds of the order of *gallinæ*; the diſtinguiſhing characters of which are, that the head is adorned with an ornament of feathers reverſed, in form of a plume; and that the tail-feathers are long and ocellated. Linnæus reckons three ſpecies.

Peacocks were firſt brought from India, where they are ſtill found, in the wild ſtate, in vaſt flocks, in the iſlands of Ceylon and Java. From India they were removed to Greece, and being the bird ſacred to Juno, were preſerved about the temple of this deity at Samos: it is therefore probable, that they were brought here originally for the purpoſes of ſuperſtition, and afterwards cultivated for the uſes of luxury.

Peacock's creſts were anciently worn among the ornaments of the kings of England.

Peacock, in *Aſtronomy*. See Pavo.

Peacock's *tail*. See Tail.

Peacock-*fiſh*, in *Ichthyography*, one of the larger ſpecies of the *turdus*, or *wraſſe*, but of a middle nature between the long and the flat-bodied kinds; its uſual ſtandard, as to ſize, is about three pounds weight; and its colour on the back a mixture of blackiſh and a duſky blue; the blue is diſpoſed in three or four longitudinal parallel lines, on a duſky blackiſh ground; about the head and gills the blue lines are more bright and numerous; its lower jaw is almoſt wholly blue, and its belly is of a fine ſaffron colour or reddiſh yellow; it has thick lips, and very ſharp, though not very large teeth; its back fin is, on the anterior part, of a fine deep blue, with an edge of purple, and ſometimes of yellow; and the reſt of the fin is red at the bottom and yellow at the top, and in the middle is finely variegated with blue ſpots; the foremoſt nerves of the black fin are rigid and prickly, and have ſoft and flexile rays accompanying them beyond the limb or edge of the fin, and of more than their own length; its gill-fins are a mixed red and yellow, and its belly-fin behind the anus of a pale fleſh colour, with a variegation of blue and yellow; the other belly-fins are of the ſame colours, and the tail is wholly blue; it is a moſt remarkably beautiful fiſh, and from the ſpots and variegations of its fins has obtained its name. See *Tab.* III. *of* Fiſh, N° 36.

PEAN, in *Heraldry*, is when the field of a coat of arms is ſable, and the powderings or. See *Tab.* II. *Heraldry*, *fig.* 78.

PEANTIDES, the name of a ſtone to which the ancients attributed great virtues for promoting delivery.

Theſe ſtones were found in Macedonia and other places; and all the deſcription we have of them is, that they reſembled water congealed by froſt. Probably the ancients meant by this name the *ſtalactitæ*, or ſtony icicles, which, as they hang from the roofs of caverns, greatly reſemble the droppings of water from the eves of houſes congealed in froſty weather.

Pear-*tree*, *pyrus*, in *Botany*, a genus of the *icoſandria pentagynia* claſs. Its characters are theſe: the flower has a permanent empalement of one leaf, which is divided into five parts at the top; it hath five roundiſh concave petals, which are inſerted in the empalement; and about twenty awl-ſhaped ſtamina, ſhorter than the petals, inſerted in the empalement, and terminated by ſingle ſummits; the germen is ſituated under the flower, ſupporting three or four ſtyles, crowned by ſingle ſummits; it becomes a pyramidal fleſhy fruit, indented at the top, but produced at the baſe, having five membranaceous cells, each containing one ſmooth oblong ſeed, pointed at the baſe. Miller reckons eighty varieties. Linnæus makes five diſtinct ſpecies, joining the apple and quince to this genus.

The *pear* and quince may be joined together with more propriety, than the apple with either; for the fruit of the two former are produced at their baſe, whereas the apple is indented; nor will the apple grow upon either of the other two, or thoſe upon the apple; but the quince or *pear* will grow upon each other; ſo that there is a natural boundary between theſe and the apple.

All the ſorts of *pears*, propagated in gardens, are produced by budding, or grafting them upon ſtocks of their own kind; which are commonly called *free ſtocks*, or elſe upon the quince or white thorn ſtocks; but the laſt are now generally diſuſed, the fruit produced this way being apt to be dry and ſtony. The quince-ſtocks are, however, in great eſteem for the trees deſigned for dwarfs or for walls; becauſe they do not let the ſhoots grow ſo faſt and luxuriant. But there are objections againſt even theſe, which are of ſome conſequence, for there are many kinds of *pears* which will not thrive upon them, but will die, or become weak and good for nothing after three or four years; and the hard-breaking *pears* are rendered very unpleaſant by being grafted on theſe ſtocks, while the buttery or melting ones are meliorated by them. And it is to be added, that no ſort of *pear* will thrive upon a quince-ſtock in a poor or gravelly ſoil.

Pear-trees planted either againſt walls, or in eſpaliers, muſt not be placed nearer to one another than thirty feet, but the diſtance of forty feet is better.

As for the ground in which *pear-trees* are planted, if it is a ſtrong ſtiff land, and ſubject to wet in the winter, the borders ſhould be raiſed above the level of the ground as much as poſſible. And if under the good ſoil, there is a ſufficient quantity of lime, rubbiſh, or ſtones laid to prevent the roots of the trees from running downward, it will be of great ſervice to the trees. The borders for theſe ſhould not be leſs than eight feet broad, but if they are twelve, it will be ſtill better. If the ſoil is ſhallow, and the bottom gravel or chalk, there muſt be a ſufficient depth of good earth laid upon the borders, ſo as to make them 2½ feet deep.

The manner of preparing theſe trees for planting, is to cut off all the ſmall fibres from the roots, to ſhorten ſome of the longeſt roots, and cut off all the bruiſed ones, or ſuch as ſhoot downright. The beſt time for planting them, upon a middling or dry ſoil, is in October or November; laying ſome mulch upon the ſurface of the ground, about their roots; and in the beginning of March their heads ſhould be cut off; but in wet ground, the trees may be planted in February or the beginning of March. In the firſt ſummer after planting, the branches ſhould be trained horizontally to a wall or eſpalier; and in the following Michaelmas, ſome of the ſhoots ſhould be ſhortened down to five or ſix eyes, in order to obtain a ſufficient quantity of branches, to furniſh the lower part of the wall or eſpalier. The diſtance at which the branches ſhould be trained muſt be proportioned to the ſize of the fruit. Thoſe, whoſe fruit is ſmall, may be allowed five or ſix inches, but the larger ſorts muſt not be leſs than ſeven or eight inches aſunder.

Pear-trees commonly produce their bloſſom-buds firſt, at the extremity of their laſt year's ſhoots, the common way of pruning is very prejudicial, therefore, as it takes off the part which ſhould bear the fruit, and occaſions new ſhoots from the ſame branch, which will over-fill the tree with wood; the trees ſhould always be carefully looked over in ſummer, and all the foreright ſhoots taken off, by which means the fruit will not be over-ſhaded, and the trees will need but little winter-pruning.

The ſeaſon for pruning theſe trees is any time after the fruit is gathered, until the beginning of March; but the ſooner it is done after the fruit is gathered, the better.

The ſeveral ſorts of ſummer *pears* all ripen beſt in eſpaliers, but the winter *pears* require a ſouth-eaſt or ſouthweſt, or elſe an eaſt wall: though, in general, moſt ſorts of them will ripen extremely well in all warm ſituations, when they are planted in eſpaliers; and the fruit will be better flavoured than that which grows againſt walls, and will keep much longer good. After the fruit is ſet and growing, the ſurface of the borders, in all ſtrong land, ſhould be now and then forked over to looſen the earth: and if the ſoil at ſeaſons be hot and dry, there ſhould be large hollows made round the ſtems of the trees to hold water, and into each of theſe ſhould be poured eight or nine pots of water, which ſhould be repeated once in a week or ten days during the months of June and July. There ſhould be alſo ſome mulch laid over the ſurface of theſe hollows to prevent the ſun and air from drying the ground. Where this is practiſed, the fruit will be kept conſtantly growing, and prove large and plump; whereas if this is omitted, it will be often ſmall, grow crooked, crack, and fall off from the trees. It will be neceſſary alſo to apply ſome dreſſing to the ground near the fruit-trees, which ſhould be laid on in autumn, after the trees are pruned. If the land is warm and dry, this dreſſing ſhould be very rotten dung, the beſt of which is neat's or hog's dung, mixed with loam ſix or eight months before it is laid on: but in cold ſtiff land, rotten horſe dung, mixed with light ſandy earth, or ſea-coal aſhes, will be the moſt proper. Theſe dreſſings ſhould be repeated every other year, otherwiſe the trees will not thrive ſo well, nor will the fruit be ſo good. In the gathering of *pears*, care ſhould be taken to preſerve the bud which is formed at the bottom of the foot-ſtalk, for the next year's bloſſoms. The ſeaſon for gathering all ſummer *pears* is juſt as they ripen, for none of theſe will remain good above a day or two after they are taken from the tree; nor will many of the autumn *pears* keep good above ten days or a fortnight after they are gathered. But the winter fruit ſhould hang as long upon the trees as the ſeaſon will permit, ſo that they may not receive the froſt: if the weather continues mild, the end of October will be a proper ſeaſon; and they ſhould be gathered in dry weather, with care that none be bruiſed: after they are ſorted and laid up in a cloſe heap in a dry place, open for admiſſion of the air, in order to ſweat for ten or fourteen days; they ſhould be wiped ſingly with a woollen cloth, and packed up in cloſe baſkets, with wheat ſtrew; between which and the *pears* ſome ſoft thick paper may be laid to prevent their imbibing any muſty taſte from the ſtraw. The baſkets ſhould be kept in a cloſe room, where they may be guarded from moiſture and froſt. Miller.

It is ſaid that crabs and wild *pears*, ſuch as grow in the wildeſt and moſt barren clifts, and on hills, may make the richeſt, ſtrongeſt, moſt pleaſant, and laſting wines that England yields. See Phil. Tranſ. N° 477. ſect. 4. See Perry.

Pear, *avocado*, or *alligator*, a ſpecies of *laurus*, or BAY.

Pear, *batchelor's* a ſpecies of the *ſolanum* or NIGHTSHADE.

Pear, *garlic*. See Crateva.

Pear, *Indian*, a name given by ſeveral writers to the fruit of a large tree in the Eaſt Indies. The bark of this tree is reddiſh without and white within, and very ſmooth: the leaves are ſmall, thick, and of a pale green; the flower conſiſts of three long triangular leaves, which, when ſhut up, form a ſort of triangular pyramid; this is of a very diſagreeable ſmell; the fruit is alſo of a conic figure, its broad part being joined to the pedicle; this is of a woody texture, and of the thickneſs of one's finger; it divides itſelf into ſeveral filaments, which run through the whole body of the fruit. When the fruit is ripe, its rind or ſkin is red, very ſmooth and thin, which is contrary to the common courſe of nature in the Indian fruits; to which nature has given very thick rinds, in order to make them able to bear the great heats they are expoſed to. The inſide of this fruit is full of a white, ſoft, and ſweet ſubſtance, which is uſually ſcooped out with a ſpoon, and is of a very pleaſant taſte: within this fruit there are ſeveral ſmooth black kernels, like thoſe of our common *pears*. When this fruit is mellow, the pulpy part of it falls away from the fibres, and they remain hanging to the pedicle for a long time.

PEAR, *prickly*, or *Indian fig*, *opuntia*, in *Botany*. This in the Linnæan ſyſtem is a ſpecies of *cacus*. See *Melon* THISTLE. Its characters are theſe: the flower is compoſed of ſeveral petals, which are obtuſe, concave, and placed in a circular order, ſitting upon the germen; it has a great number of awl-ſhaped ſtamina, which are inſerted in the germen; the germen, which is ſituated under the flower, ſupports a cylindrical ſtyle, of the length of the ſtamina, crowned by a multifid ſtigma; the germen afterwards turns to a fleſhy umbilicated fruit, with one cell incloſing many roundiſh ſeeds. Miller reckons nine ſpecies.

Theſe plants are all of them natives of America, though the firſt ſort is found growing wild on the ſides of the roads about Naples, in Sicily, and Spain, but it is probable that the plants may have been brought from America thither, at firſt; this has been long in the Engliſh gardens; the joints or branches are oval or roundiſh, compreſſed on their two ſides flat, and have ſmall leaves coming out in knots on their ſurface, as alſo on their upper edges, which fall off in a ſhort time; and at the ſame knots there are three or four ſhort briſtly ſpines, which do not appear unleſs they are cloſely viewed, but on being handled they enter the fleſh, and ſeparate from the plant, and thus are troubleſome and often very difficult to get out.

PEARCH, or PERCH, in the Linnæan ſyſtem of *Zoology*, the name of a genus of fiſh of the order of thoracici. The characters of theſe are, that the membrane of the gills has ſeven bones, and the back has one or two fins; the firſt ſpiny, the ſecond ſoft; the body is covered with rough ſcales, and the edges of the gill-covers are ſcaly and ſerrated. Linnæus enumerates thirty-ſix ſpecies.

The name *perca* is of Greek origin, and is derived from the word περκος, which ſignifies variegated with black or duſky ſpots; a character common to moſt of the ſpecies of this fiſh.

The common *pearch*, or *perca fluviatilis* of Linnæus, is much admired as a firm and delicate fiſh; and the Dutch are particularly fond of it when made into a diſh called water-ſouchy.

Mr. Pennant mentions a ſingular variety of the *pearch*, the back of which is quite hunched, and the lower part of the back bone, next the tail, ſtrangely diſtorted: in colour and other reſpects it reſembles the common kind. It is found in a lake called *Llyn Raithlyn*, in Merionethſhire, and alſo in the Thames near Marlow.

The common *pearch* affords good ſport for the angler. The beſt time for their biting is, when the ſpring is over, and before the heats of ſummer come on. At this time they are very greedy, and the angler, with good management, may take at one ſtanding all that are in the hole, be they ever ſo many.

The *pearch* will bite all day long, if the weather be cloudy; but the beſt time is from eight to ten in the morning, and from three till ſix in the afternoon. The *pearch* is very abſtemious in winter, and will ſeldom bite in this ſeaſon of the year; if he does at all, it is in the middle of the day: at which time indeed all fiſh bite beſt at that ſeaſon. See FISHING.

PEARCH, *gilded*, in *Ichthyology*. See RUFFE.

PEARCH, *ſea*, *perca marina* of Linnæus, in *Ichthyology*, the name of a ſea fiſh, much reſembling the common freſh water *pearch* in ſhape, ſize and colours, but ſomething thinner in proportion to its length, and more variegated; its back is variegated with ſix or ſeven blackiſh tranſverſe lines, like thoſe of the *pearch*, and the intermediate ſpace is of a ſomewhat reddiſh hue, eſpecially toward the head; its whole head, and part of its belly, are very elegantly variegated with red and blue ſtreaks; its back-fin is of pale yellow, with ſeveral reddiſh yellow ſpots, is very long, and furniſhed with fifteen ſtrong ſpiny rays, and fourteen ſoft; its mouth is extremely wide, and almoſt always gapes open; its teeth are ſharp, and its eyes very large; it is very common in the Mediterranean, and is a well-taſted fiſh.

PEARL, PERLA, or MARGARITA, in *Natural Hiſtory*, a hard, white, ſmooth, ſhining body, uſually roundiſh, found in a teſtaceous fiſh, reſembling an oyſter; and is ranked in the number of gems.

The fiſh, wherein the *pearls* are found, is three or four times the ſize of the common oyſters; and is called, by naturaliſts, the *concha margaritifera*.

This fiſh is common on the coaſt of Perſia, near Ormus, about Cape Comorin, and on the coaſt of the iſland of Ceylon.

The ancients called theſe *pearls* uniones, apprehending that there never was but one in an oyſter; but there have been ſometimes found ſeven in a ſhell; and an author, who treats well of their production, pretends to have ſeen a hundred and fifty in the ſame fiſh, but thoſe in different degrees of perfection. The moſt perfect drop out firſt; the reſt remaining longer at the bottom of the ſhell.

The formation of *pearls* has puzzled both ancient and modern naturaliſts, and given occaſion to a great number of hypotheſes, many of them wild and extravagant enough. Pliny, and from him Solinus, &c. will have them to be formed of the dew: the fiſh, ſay they, riſes every morning to the ſurface of the water, and there opens its ſhell, to imbibe the dew of heaven; which, like a liquid *pearl*, inſinuating into the body of the *pearl*-oyſter, fixes by its ſalts, and there aſſumes the colour, hardneſs, and form of *pearl*; as ſome other liquors are converted into cryſtals in the earth, or the juice of flowers into honey and wax in the body of the bee; but the *pearl*-oyſters grow faſt to the rocks, and nobody ever yet ſaw any of them appear on the ſurface of the water.

Others will have *pearls* to be the eggs of the fiſhes they are found in; but neither does this conſiſt with the phenomena: for *pearls* are found throughout the whole ſubſtance of the oyſter; in the head, the coat that covers it, the circular muſcles that terminate it in the ſtomach, and, in general, all the fleſhy and muſculous parts; ſo that there is no appearance that *pearls* ſhould be in the oyſters, what the eggs and ſpawn are in fowls and fiſhes. For beſide that there is no particular place deſtined for their formation, anatomiſts have not been able to find any thing about them that bears any relation to what paſſes in this reſpect in other animals.

Others with M. Geoffroy the younger, rank *pearls* among the bezoars; as comprehending, under that claſs, all ſtones formed in layers or ſtrata in the bodies of animals. See BEZOAR.

M. Reaumur has a very curious piece on the ſubject of the formation both of the ſhells and *pearls*, in the Memoirs of the French Academy, anno 1717. He obſerves, that *pearls* are formed like other ſtones in the animals; as thoſe, e. gr. in the bladder, kidneys, &c. and that they are apparently the effects of a diſeaſe of the fiſh. In effect, they are all formed of a juice extravaſated out of ſome broken veſſels, and detained, and fixed, among the membranes.

To evince the poſſibility of this, he ſhews that the ſhells of ſea-fiſh, as well as thoſe of ſnails, &c. are wholly formed of a glutinous ſtony matter, ouſing out of the body of the animal. Now it is no wonder that an animal, which has veſſels wherein circulates a ſufficient quantity of ſtony juice to build, thicken, and extend a ſhell, ſhould have enough to form ſtones alſo, in caſe the juice, deſtined for the growth of the ſhell, ſhall chance to overflow, and burſt forth in any cavity of the body, or among the membranes.

To confirm this ſyſtem, he obſerves, that the inner ſurface of the common *pearl* muſcle, found on the coaſts of Provence, is of a *pearl*, or mother of *pearl* colour, from one part of its extent, which he determines, to another; after which it becomes reddiſh: now there are *pearls* of two colours found in the ſhell; and the colours of the *pearls* are preciſely the ſame with thoſe of the ſhell; nay, more, each kind of coloured *pearl* is found in the correſponding coloured part of the ſhell; which ſhews, that, in the ſame place wherein the tranſpiration of a certain juice had formed, and would have continued to form, a coat or layer of ſhell of a certain colour; the veſſels which conveyed that juice being broken, there is formed a little maſs or collection of the juice, which, hardening, becomes a *pearl* of the ſame colour with the part of the ſhell to which it correſponds.

Add to this, that the ſilver or *pearl*-coloured part of the ſhell is formed of ſtrata, or layers, over one another, like an onion; and the reddiſh part of little cylindrical ſhort fibres applied againſt one another. The *pearls* of the two colours have alſo this difference of texture; not but they are both compoſed of concentric couches; but thoſe of the reddiſh *pearls* are much leſs ſenſible; and, beſides, they have threads, which like radii, proceed from their centre to their circumference. Theſe circumſtances ſeem effectually to determine the formation of *pearls*, and to eſtabliſh the new ſyſtem beyond contradiction.

As to the formation of the *pearl-fiſh*, though it is the moſt natural opinion, that this fiſh, like all others, produces eggs or ſpawn, whoſe exterior ſurface at firſt is ſoft and viſcous, but changes, and hardens, by degrees, into a ſhell; yet we muſt not leave unmentioned the popular, though erroneous hypotheſis of the Paravas; viz. that in rainy weather, the brooks of the neighbouring lands that empty themſelves all along the coaſts, run near two leagues on the ſurface of the ſea without mixing therewith.

with. For a while the ſuſpended water, they ſay, retains its natural colour and ſweetneſs: but, at length, the heat of the ſun, condenſing it, forms it into a kind of light tranſparent froth; this done, it preſently divides into an infinity of parts, each whereof appears as if animated; moving this way and that like little inſects. The fiſhes ſometimes catch at them as they paſs by; but they ſoon abandon them. By degrees their ſkin thickening, and hardening, they at length become heavy enough to ſink to the bottom, and aſſume the figure of *pearl* oyſters.

The perfection of *pearls*, whether round, in form of pears or olives, or irregular, conſiſts chiefly in the luſtre and clearneſs of the colour, which jewellers call the *water*. There are ſome whoſe water is white, which are thoſe moſt eſteemed in Europe; the water of others border on the yellow, which ſome Indians and Arabs prefer to the white; others are of a lead colour; others border on black; and others are quite black. They are all liable to change with wearing: in eighty or a hundred years they uſually become of little value, eſpecially the white ones, which often turn yellow, and ſpoil in forty or fifty years time.

The difference of colours, doubtleſs, ariſes from the different parts of the oyſter wherein they are formed. When the ſeed happens to be thrown into the meſentery or liver, or the parts correſponding thereto, it is no wonder if the impurities of the blood change the natural white.

The oriental *pearls* are the fineſt, on account of their largeneſs, colour, and beauty, being of a ſilver white; whereas the occidental *pearls* ſeldom exceed the colour of milk.

In Europe, *pearls* are ſold by the carat-weight, the carat containing four grains. In Aſia, the weights uſed for *pearls* are different, in different ſtates.

The value of *pearls* increaſes as the ſquare of their weight: thus, the price of a *pearl* of one carat being ſettled at 8*s*. to find the price of a *pearl* weighing ſix carats; firſt find the ſquare of 6, viz. 36; which multiplied by 8 gives 288 ſhillings, or 14*l*. 8*s*. the price required.

The term *pearl* is only properly applied to what grows independent of the ſhell. The ſhell itſelf is rather called *naker of pearl*: thoſe pieces which have grown thereto, and have been ſince ſeparated by the addreſs of the workman, are called *wens of pearls*; which are, in effect, nothing but roundiſh excreſcences, or pieces of the ſhell, though frequently uſed for real *pearl*.

Pearls, F. Bouhours obſerves, have this advantage over precious ſtones dug out of rocks, &c. that the latter owe their luſtre to the induſtry of men; nature only, as it were, hews them out, and leaves the finiſhing of them to art: but the former are born with that beautiful water which gives them their value. They are found perfectly poliſhed in the abyſſes of the ſea; and nature has put the laſt hand to them before they are ſeparated from their mother.

Pearls of unuſual figures, i. e. neither round, nor in the pear form, are called *baroguas*, and ours *Scotch pearls*: thoſe of unuſual ſizes are called *parangons*; ſuch as were that of Cleopatra, valued by Pliny at centies HS or 80000*l*. ſterling; that brought in 1574 to Philip II. of the ſize of a pigeon's egg, valued at 14400 ducats; that of the emperor Rudolph, mentioned by Boetius, called *la peregrina*, or *the incomparable*, of the ſhape of a muſcade pear, and weighing thirty carats; and that mentioned by Tavernier, in the hands of the emperor of Perſia, in 1633, bought of an Arab for 32000 tomans, which, at 3*l*. 9*s*. the toman, amounts to 110400*l*. ſterling.

Pearls are of ſome uſe in medicine; but they are only the ſmalleſt ſort, called *ſeeds of pearls*, that are uſed. The quality required is, that they be white, clear, and tranſparent; and truly oriental. They ſerve to make cordial potions, formerly much valued, but now fallen from their ancient reputation; and ſcarce ordered by any but charlatans.

The ladies alſo uſe certain preparations of *pearls*, as they are made to believe, for their complexions: ſuch as the whites of *pearls*; flowers, eſſences, ſpirits, tinctures, &c. of *pearl*; but they are all apparently deceits.

PEARLS, *ounce*. See OUNCE.

PEARL-*fiſheries*. *Pearls* are caught in the ſeas of the Eaſt Indies, in thoſe of America, and in ſome parts of Europe.

PEARL-*fiſheries of the Eaſt are*, 1. the iſland of Bahren, or Baharem, in the Perſian gulf; this the Portugueze were maſters of while they held Ormus and Maſcati; but it has been returned to the ſophi of Perſia, ſince the time that prince, with the aſſiſtance of the Engliſh, took from them Ormus, and the Arabs Maſcati.

2. The fiſhery of Catiſa, on the coaſt of Arabia Felix, over-againſt Bahren.

3. That of Maner, a ſea-port in the iſle of Ceylon. The *pearls* here fiſhed are the fineſt in all the Eaſt for their water and roundneſs; but they ſeldom exceed two carats.

Laſtly, there are *pearls* fiſhed on the coaſt of Japan; but they are coarſe and irregular, and little valued.

The *pearls* of Bahren and Catiſa are thoſe commonly ſold in the Indies; they border a little on the yellow, but the Eaſtern people do not value them the leſs for it: they eſteem it the ſign of their being ripe, and mature; and are perſuaded, that thoſe which have this yellowiſh tincture naturally never change their colour; and that, on the contrary, thoſe of the white water do not hold above thirty years before the *pearl* aſſumes a filthy yellow colour, by reaſon of the heat of the climate, and the ſweat of the perſons who wear them.

PEARL, *American*, *fiſheries* are all in the great gulf of Mexico, along the coaſt of the Terra Firma. There are five of them.

1. The fiſhery of Cubagna, an iſland five leagues from New Andaluſia, in 10½ deg. north lat.
2. That of the iſland Marguerites, or *Pearl iſland*.
3. That of Comogote near the Terra Firma.
4. That of the river De la Hach, called *La Reneheria*.
5. That of St. Martha, ſixty leagues from the river De la Hach.

The *pearls* of theſe three laſt fiſheries are uſually of a good weight, but ill formed, and of a livid water. Thoſe of Cubagna ſeldom exceed five carats, but are found in abundance. But the greateſt quantity, and the fineſt, both with regard to weight and water, are thoſe of the iſland Marguerites.

PEARL *fiſhery*, in Chineſe Tartary, is near the city Nipehoa, ſituate on a lake of the ſame name: the *pearls* here are leſs beautiful than thoſe of Baharem, and the fiſhery leſs plentiful. It was this fiſhery that occaſioned the war between the Chineſe and Muſcovites, terminated towards the end of the laſt century, by the Jeſuits Pereira and Gerbillon; when the lake, which is of great extent, was divided between the two nations, each whereof had pretended to the whole.

There are ſome *pearl fiſheries* alſo in the South-Sea, but they are very inconſiderable.

PEARL *fiſheries* of Europe are in ſome places on the coaſts of Scotland, and in a river of Bavaria, but the *pearls* found here are no ways comparable to thoſe of the Eaſt Indies, or of America; though they ſerve for necklaces, which are ſold ſometimes for a thouſand crowns, and upwards. See an account of *pearl* fiſhing, in the north of Ireland, Philoſ. Tranſ. Nº 198.

PEARLS, *manner of fiſhing for, in the Eaſt Indies*. There are two ſeaſons of *pearl* fiſhing in the year; the firſt in March and April, the ſecond in Auguſt and September. The more rain there falls in the year, the more plentiful are the fiſheries. In the opening of the ſeaſon, there appear ſometimes two hundred and fifty barks on the banks: in the larger barks are two divers; in the ſmaller, one. Each bark puts off from ſhore before ſun-riſe, by a land breeze, which never fails; and returns again by a ſea breeze, which ſucceeds it about noon.

As ſoon as the barks are arrived at the place where the fiſh lie, and have caſt anchor, each diver binds a ſtone, ſix inches thick, and a foot long, under his body; which is to ſerve him as ballaſt, and prevent his being driven away by the motion of the water, and to enable him to walk more ſteady among the waves.

Beſides this, they tie another very heavy ſtone to one foot, whereby they are ſoon ſunk to the bottom of the ſea: and as the oyſters are uſually ſtrongly faſtened to the rocks, they arm their fingers with leathern mittens, to prevent their being wounded in ſcraping them violently off; and ſome even carry an iron rake, for the purpoſe.

Laſtly, each diver carries down with him a large net, in manner of a ſack, tied to his neck by a long cord, the other end whereof is faſtened to the ſide of the back. The ſack is intended for the reception of the oyſters gathered from the rock, and the cord is to pull up the diver, when his bag is full, or when he wants air.

In this equipage he precipitates himſelf, ſometimes above ſixty feet under water. As he has no time to loſe there, he is no ſooner arrived at the bottom than he begins to run from ſide to ſide, ſometimes on ſand, ſometimes on a clayey earth, and ſometimes among the points of rocks; tearing off the oyſters he meets with, and cramming them into his budget.

At whatever depth the divers be, the light is ſo great that they eaſily ſee whatever paſſes in the ſea, with the ſame clearneſs as on land. And, to their conſternation, they ſometimes ſee monſtrous fiſhes, from which all their addreſs in mudding the water, &c. will not always ſave them; but they become their prey: and of all the perils of fiſhery, this is one of the greateſt and moſt uſual.

The beſt divers will keep under water near half an hour; the reſt does not ſtay leſs than a quarter. During which time, they hold their breath without the uſe of oils, or any other liquors; only acquiring the habit by long practice.

When they find themſelves ſtreightened, they pull the rope to which the bag is faſtened, and hold faſt by it with both hands; when the people in the bark, taking the ſignal, heave them up into the air, and unload them of their fiſh, which is ſometimes five hundred oyſters, ſometimes not above fifty.

Some of the divers need a moment's reſpite to recover breath; others jump in again inſtantly, continuing this violent exerciſe, without intermiſſion, for many hours.

On the ſhore they unload their barks, and lay their oyſters in an infinite number of little pits, dug four or five feet ſquare, in the ſand; raiſing heaps of ſand over them to the height of a man, which, at a diſtance, look like an army ranged in battle.

In this condition they are left, till the rain, wind, and ſun have obliged them to open, which ſoon kills them. Upon this the fleſh rots and dries, and the *pearls*, thus diſengaged, tumble into the pit upon taking the oyſters out.

The fleſh of the fiſh is excellent; and if what ſome naturaliſts maintain be true, viz. that the *pearls* are ſtones formed there by the ill conſtitution of the body, as ſometimes happen in men, this diſeaſe does not alter the humours: at leaſt, the Paravas, who eat them, do not find any difference between thoſe that have *pearls*, and thoſe that have none.

After clearing the pits of the groſſer filth, they ſift the ſand ſeveral times, to ſeparate the *pearls*. But what care ſoever they take herein, they always loſe a great many.

After cleaning and drying the *pearls*, they are paſſed through a kind of ſieve according to their ſizes. The ſmalleſt are ſold as ſeed *pearls*; the reſt are put up by auction, and ſold to the higheſt bidder.

Pearl, *manner of fiſhing for, in the Weſt-Indies*. The ſeaſon for fiſhing there is uſually from October to March. In this time there ſet out from Carthagena ten or twelve barks, under the convoy of a man of war called l'Armadilla. Each bark has two or three ſlaves for divers.

Among the barks there is one called Capitana; to which all the reſt are obliged to bring at night what they have caught in the day, to prevent frauds. The divers never live long, by reaſon of the great hardſhips they ſuſtain; continuing ſometimes under water above a quarter of an hour. The method is the ſame as in the Eaſt India fiſheries.

The Indians eſteemed *pearls* before the diſcovery of America; and when the Spaniards arrived there, they found great quantities ſtored up, which the Americans ſet great value on. But they were almoſt all imperfect, and their water yellow and ſmoaky, becauſe they uſed fire in opening the fiſhes.

As to *pearls* in form of pears, though equally perfect, and of equal weight with the round ones, their value is much inferior: however, when two are found that match well, their value is leſs but by one third.

Pearls, *to blanch and cleanſe*. Firſt ſoak and cleanſe them in bran-water, then in milk-warm water, and laſt of all ſteep them in mercurial water, then ſtring and hang them in a glaſs, cloſe it well and ſet them in the ſun to dry.

The bran-water is made thus: boil two good handfuls of wheaten bran, in a quart of water, till all the ſtrength of the bran is drawn out, which uſe thus: take a new glazed earthen pan, in which put your *pearls* on a ſtring, and pour the third part of the bran water upon it; when they have ſoaked, and the water is juſt warm, rub your *pearls* gently with your hands, to clean them the better, and continue this till the water is cold; throw off that, and pour on another third part of the bran-water, that is boiling, proceed with this as you did before, and when cold throw it away, and pour on the remainder of the water, ſtill proceeding as before. After this heat fair water, and pour it on your *pearls*, to refreſh them, and to waſh away the remains of the bran, by ſhifting them and pouring on freſh warm water: this do thrice, without handling your *pearls*: then lay them on a ſheet of clean white paper, and dry them in a ſhade; after which dip them into mercurial water, to bring them to perfection. Poſtl. Dict. Com.

Other methods in blanching of *pearls*. Pound alabaſter to an impalpable powder, rub the *pearls* therewith, very gently: this will not only cleanſe them, but if you let them remain in this powder, twenty-four hours afterwards, they will ſtill be the better for it. White coral has the ſame effect, uſed in the like manner. White tartar calcined and diveſted of all its moiſture is very good for the ſame purpoſe.

Salt diſſolved, filtered, coagulated, well dried, and ground, is as effectual as any of the former things, for cleanſing of *pearls*, by rubbing them therewith; and if afterward you lay them up in ſome coarſe ground millet, it will contribute to their brightneſs.

Pearls, *falſe*, are counterfeit or fictitious *pearls*, reſembling the true ones in water or colour; popularly called BEADS.

Theſe anciently were only made of glaſs; with a kind of coating of quickſilver withinſide; afterwards they uſed wax, covered over with a fine brilliant fiſh-glue.

There has ſince been invented in France another manner of making them, ſo near the natural ones in luſtre and water that they deceive a good eye. Theſe are what the ladies now generally wear in defect of true *pearl*; ſmall necklaces whereof they deſpiſe, and the large ones are generally too dear.

Pearls, *falſe, method of making*. Take of thrice diſtilled vinegar two pounds; Venice turpentine, one pound; mix them together into a maſs, and put them in a cucurbit; fit a head and receiver to it, and after you have luted the joints, ſet it, when dry, on a ſand furnace, to diſtill the vinegar from it; do not give it too much heat, leſt the ſtuff ſwell up: after this put the vinegar into another glaſs cucurbit, in which there is a quantity of ſeed *pearl*, wrapped in a piece of thin ſilk, but ſo as not to touch the vinegar; put a cover or head upon the cucurbit, lute it well, and put it in *bal. Mariæ*, where you may let it remain a fortnight. The heat of the *balnæum* will raiſe the fumes of the vinegar, and they will ſoften the *pearls* in the ſilk, and bring them to the conſiſtence of a paſte, which being done, take them out, and mould them to what bigneſs, form, and ſhape you pleaſe. Your mould muſt be of fine ſilver, the inſide gilt; you muſt alſo refrain from touching the paſte with your fingers, but uſe ſilver gilt utenſils, with which fill your moulds. When they are moulded, bore them through with a hog's briſtle, or gold wire, and let them dry a little; then thread them again on gold wire, and put them into a glaſs; cloſe it up and ſet them in the ſun to dry: after they are thoroughly dry, put them in a glaſs matraſs into a ſtream of running water, and leave them there twenty days; by that time they will contract the natural hardneſs and ſolidity of *pearls*: then take them out of the matraſs and hang them in mercurial water, where they will moiſten, ſwell, and aſſume their oriental beauty; after which ſhift them into a matraſs hermetically cloſed up, to prevent any water coming to them, and let it down into a well, to continue there about eight days: then draw the matraſs up, and in opening it, you will find *pearls* exactly reſembling oriental ones.

The mercurial water is thus prepared: take plate-tin of Cornwall, calcine it, and let the calx be pure and fine; then, with one ounce of the calx and two ounces of prepared murcury, make an amalgama; waſh it with fair water, till the water remains inſipid and clear; then dry the amalgama thoroughly, put it into a matraſs over the furnace, giving it ſuch a heat as is requiſite for ſublimation. When the matter is well ſublimated, take off the matraſs, and let it cool. Take out that ſublimate, add one ounce of Venice ſublimate to it, and grind them together on a marble; put this into another matraſs, cloſe it well, and ſet it upſide down in a pail of water, and the whole maſs will diſſolve itſelf, in a little time, into mercurial water: this done, filter it into a glaſs receiver, ſet it on a gentle aſh fire to coagulate, and it will turn into a cryſtalline ſubſtance: beat this in a glaſs mortar, with a glaſs peſtle, to a fine powder; ſtrain it through a fine ſieve, and put it into a matraſs, ſtop it cloaſe up, and place it in *balneo Mariæ*; there let it remain till it reſolves again into water, which will be fit for the above mentioned uſe. Poſtl. Dict. Com.

The ſieur Janin having obſerved, that the ſcales of a little fiſh called the *bleak*, found plentifully in the river Marne, had not only all the luſtre of the real *pearl*, but that, after beating them to powder in water, they returned to their former brilliance upon drying; he bethought himſelf of ſetting a piece, or little maſs thereof in the cavity of a bead, or grain of giraſol, which is a kind of a counterfeit opal made of glaſs, and bordering much on the colour of *pearl*. The difficulty was, to get it in there, and when in to ſpread it equally throughout the bead.

A little glaſs tube, ſix or ſeven inches long, and a line and half in diameter, but very ſharp at one end, and a little crooked, ſerved for the introducing of the matter, by blowing it with the mouth, after having taken up a drop of this mixture with the pointed extremity of the tube; and to ſpread it throughout the inner circumference, he contented himſelf to ſhake it gently a long time, in a little oſier baſket lined with paper.

The pulverized ſcales, faſtened by this motion in the inſide of the bead, reſume their luſtre as they dry. To increaſe this luſtre, in winter, they lay the beads in a hair ſieve, or a bolting cloth, which they ſuſpend to the ceiling, and under it, at ſix feet diſtance, they lay heaps of hot aſhes. In ſummer they ſuſpend them in the ſame manner, but without any fire.

The *pearls*, thus well dried, become very brilliant; and nothing remains but to ſtop up the aperture, which is done by melting wax, conveyed into it with a tube like that uſed in introducing the powdered ſcales.

After clearing off the ſuperfluous wax, they perforate the *pearls* with a needle, and ſtring them; and thus they form a necklace.

PEARL, *mother of*, is the ſhell not of the *pearl* oyſter, but of another ſea fiſh of the oyſter kind.

The ſhell withinſide is very ſmooth and poliſhed, and of the whiteneſs and water of *pearl* itſelf; and it has the ſame luſtre withoutſide, after the firſt laminæ or leaves, which make the outer coat of this rich ſhell-fiſh, have been cleared off, with aqua fortis, and the lapidary's mill. It is uſed in inlaid works, and in ſeveral toys, as ſnuff-boxes, &c.

PEARL, *wens of*, are certain excreſcences, or prominent places, in form of half-pearls; ſometimes found in the bottoms of *pearl* ſhells.

The lapidaries have the addreſs to ſaw off theſe protuberances, to join them together, and to uſe them in ſeveral works of jewelry, as if they were really *pearls*.

PEARL, in *Heraldry*, is uſed by ſuch as blazon with precious ſtones inſtead of colour and metals, for argent, or white.

PEARL, in *Ichthyology*, a name given by us in the parts about London, to that fiſh which is called in Cornwall, and other parts of the weſt of England, LUG-*a-leaf*; it is the *rhombus lævis* of the generality of authors; and, according to the new ſyſtem of Artedi, it is a ſpecies of the *pleuronectes*, diſtinguiſhed by the author by the name of the *ſmooth bodied pleuronectes*, with the eyes on the left ſide; and the *pleuronectes rhombus* of Linnæus. This fiſh is often found in London markets; but is inferior to the turbot in goodneſs as well as ſize.

PEARL-*aſhes* is a kind of fixed alkaline ſalts, prepared chiefly in Germany, Ruſſia, and Poland, by melting the ſalts out of the aſhes of burnt wood; and having reduced them again to dryneſs, evaporating away the moiſture, and calcining them for a conſiderable time in a furnace moderately heated. See POT-*aſhes*.

The goodneſs of *pearl-aſhes* muſt be diſtinguiſhed by the uniform and white appearance of them: they are ſubject, however, to a common adulteration, not eaſily diſtinguiſhable by the appearance, which is done by the addition of common ſalt. In order to diſcover this fraud, take a ſmall quantity of the ſuſpected ſalt, and after it has been ſoftened by lying in the air, put it over the fire in a ſhovel: if it contains any common ſalt, a crackling and kind of ſlight exploſion will take place, as the ſalt grows hot.

The *pearl-aſhes* are much uſed in the manufacture of glaſs, and require no preparation; except where very great tranſparency is required, as in the caſe of looking-glaſs, and the beſt window-glaſs. For this purpoſe diſſolve them in four times their weight of boiling water: when they are diſſolved, let the ſolution be put into a clean tub, and ſuffered to remain there twenty-four hours or longer. Let the clear part of the fluid be then decanted off from the ſediment, and put back into the iron pot, in which the ſolution was made: in this let the water be evaporated away till the ſalts be left perfectly dry again. Keep thoſe that are not deſigned for immediate uſe in ſtone jars, well ſecured from moiſture and air.

PEARL-*barley*. See BARLEY. This affords, to a microſcopic obſerver, a peculiar kind of mite worthy attention, and very different from the common ſpecies. The bodies of theſe have ſome brown marks upon them, and have not ſuch long hairs as the common mites have; the hinder part of the body alſo is of a different make. They have eight legs; and before the head there ſtand two weapons twice as thick as the legs, and of about half their length: theſe are divided towards their ends with joints like fingers, and thoſe have at their ends a ſort of nails formed with ſharp and crooked claws; and one of the longeſt joints is ſerrated at the edge like a ſaw. Theſe weapons ſerve not only as arms and hands to ſeize hold of things, but they alſo ſerve as a defence; for as ſoon as any danger threatens the creature's head, it erects them both, and makes them meet and fold into one another over the head, as we can join our hands and fingers together in the ſame erect poſture.—Phil. Tranſ. No 222.

PEARL *colour*, in glaſs. This beautiful colour is given to glaſs in the following manner: put tartar calcined to a whiteneſs into purified cryſtal, while in fuſion, at ſeveral times, in ſmall quantities, mixing it well every time, till the glaſs is become of the deſired colour; and when it is, work it as quick as can be, for it is a colour that is quickly gone. See GLASS.

PEARL *ſhell* or *gaper*. See MYA.

PEARL, *pin*, or *web*, in *Medicine*, an unnatural ſpeck, or thick film over the eye. See PANNUS.

PEARL, *white*, is the powder of *pearls*, or the finer parts of oyſter-ſhells, much uſed in miniature paintings. The method of preparing it is to take the oyſters as they are found on the ſea-coaſt, calcined by the ſun, or otherwiſe to dry freſh ones by the fire, till they may be eaſily powdered; to ſcrape off from theſe ſhells all the external or other parts that are not of the moſt perfect whiteneſs; and to levigate them well with water on the ſtone, and waſh the powder over till it is thoroughly fine.

PEARLED *crowns*. See CROWN.

PEASE, in *Botany*. See PEA.

PEASE-*bloom-damp*, in *Natural Hiſtory*. See DAMP.

PEAT. See MORASS.

PEAUCIER, in *Anatomy*, a name given by Winſlow in his Treatiſe on the Head, and by other of the French writres, to the muſcle, called by Albinus *latiſſimus colli*; and the others *detrahens quadratus*, and *quadratus genæ*. Santorini has called the part of this which ariſes from the cheek, *muſculus riſorius novus*; and ſome call the whole *platiſma myoides*.

PEBBLES, *calculi*, in *Natural Hiſtory*, the name of a genus of foſſils, diſtinguiſhed from the flints and homochroa, by their having a variety of colours. Theſe are defined to be ſtones, compoſed of a cryſtalline matter, debaſed by earths of various kinds in the ſame ſpecies, and then ſubject to veins, clouds, and other variegations; uſually formed by incruſtations round a central nucleus, but ſometimes the effect of a ſimple concretion, and veined like the agates, by the diſpoſition which the motion of the fluid they were formed in gave their differently coloured ſubſtances.

The variety of *pebbles*, of England alone, is ſo great, that a haſty deſcriber would be apt to make almoſt as many ſpecies as he ſaw ſpecimens. A careful examination will teach us, however, to diſtinguiſh them into a certain number of eſſentially different ſpecies, to which all the reſt may be referred, as accidental variations. When we find the ſame ſubſtances and the ſame colours, or thoſe reſulting from a mixture of the ſame, ſuch as nature frequently makes in a number of ſtones, we ſhall eaſily be able to determine that theſe are all of the ſame ſpecies, though in different appearances; and that, whether the matter be diſpoſed in one or two, or in twenty cruſts laid regularly round a central nucleus, or thrown without a nucleus into irregular lines, or finally blended into a ſort of uniform maſs.

Theſe are the three ſtates in which we are liable to find every ſpecies of *pebble*; for if it hath been moſt naturally and regularly formed by incruſtation round a central nucleus, we find that ever the ſame in the ſame ſpecies, and the cruſts not leſs regular and certain. If the whole has been more haſtily formed, and has been the reſult only of one ſimple concretion, if that has happened while its different ſubſtances were all moiſt and thin, they have blended together and made a mixed maſs of the joint colour of them all; but if they have been ſomething harder when this has happened, and too far concreted to diffuſe wholly among one another, they are found thrown together into irregular veins. Theſe are the natural differences of all the *pebbles*; and having regard to theſe in the ſeveral variegations, all the known *pebbles* may be reduced to thirty-four ſpecies. Hill's Hiſt. of Foſſ. p. 512, ſeq.

In all the ſtrata of *pebbles* there are conſtantly found ſome which are broken, and whoſe pieces lie very near one another; but as bodies of ſuch hardneſs could not be broken without ſome conſiderable violence, their preſent ſituation ſeems to imply, that they have ſuffered that great violence in or near the places where they now lie. Beſide theſe, there are others alſo found which have as plainly had pieces broken off from them, though thoſe pieces are no where to be found; whence it ſeems equally plain, that whatever has been the cauſe of their fracture, they have been brought broken, as we find them, from ſome other place, or elſe that the pieces broken from them muſt at ſome time or other have been carried from this place to ſome other diſtant one.

Several of theſe broken *pebbles* have their edges and corners ſo ſharp and even, that it ſeems evident they never can have been toſſed about or removed ſince the breaking; and others have their ſides and corners ſo rounded, blunted, and worn away, that they ſeem to have been roughly moved and rolled about among other hard bodies, and that too either with great violence, or for a very long continuance; ſince ſuch hard bodies could not have been reduced to the condition we now ſee them in without long friction.

It may be ſuppoſed by ſome, that theſe ſtones never were broken, but have been naturally formed of this ſhape; but it will be eaſily ſeen, by any one who accurately ſurveys their veins or coats, which ſurround the nucleus, like the annular circles of a tree, that they muſt have been originally entire; and this will be the more plain if they are compared with a ſtone broken by art. Such *pebbles* as are found in ſtrata, that lie near the ſurface of the earth, are much more brittle than thoſe which lie in deeper ſtrata.

The more clear and tranſparent the ſand is, which is found among *pebbles*, the more beautiful the *pebbles* are generally obſerved to be.

The uſe of theſe ſtones, and their diſpoſition in the earth, is a ſubject of great admiration; and may ſerve as one of the numerous proofs of an over-ruling Providence in the diſpoſition of all natural bodies. The ſurface of the earth is compoſed of vegetable mould, made up of different earth mixed with the putrid remains of animal and vegetable bodies; and is of the proper texture and compages for conducting the moiſture to the roots of trees and plants: and under this are laid the ſands and *pebbles* which ſerve as a ſort of drain to carry off the redundant moiſture deeper into the earth, where it may be ready to ſupply the place of what is conſtantly riſing in exhalations; and leſt the ſtrata of ſand ſhould be too thick, it is common to find thin ones of clay between, which ſerve to put a ſtop to the deſcent of the moiſture, and keep it from paſſing off too ſoon; and leſt theſe thin ſtrata of clay ſhould yield and give way, and by their ſoftneſs, when wetted, give leave to the particles of ſand to blend themſelves with, and even force their way through them, there are found in many places thin coats of a poor iron ore, placed regularly above and below the clay; and by that means not only ſtrengthening and ſupporting the clay, but effectually keeping the ſand from making its way into it. Phil. Tranſ. N° 483.

PEBBLES, *ridged*. It is not uncommon to meet with *pebbles*, in our gravel-pits, which have one or more ridges, or white lines, ſtanding above the ſurface of the reſt of the ſtone, in form of a rib or zone, laid on the ſtone after its formation. This, however, is not the caſe; but the line or zone always goes through the whole body of the *pebble*: the matter forming this ridge is always harder than the reſt of the ſtone: and it ſeems probable, that at firſt it was not elevated, but level with the reſt of the ſurface; but being not ſo eaſily worn away by accidents, and when the whole *pebble* came in the way of rubbing among harder bodies, this would be leſs rubbed away, and conſequently would be left more elevated than the reſt. We daily ſee on the ſeaſhores numbers of ſtones rounded by the continual rolling and toſſing among the waves, and in theſe the ſofter parts have given way firſt and been worn into holes, while the harder have been left prominent. It ſeems probably to have been the caſe with theſe *pebbles* alſo; but they are not found on the ſhores; but in our gravel-pits, at a great diſtance from the ſea: and it is evident, that theſe have had their ſurfaces thus ground and worn down between the time of their being formed by concretion, and their being depoſited where we now find them.

The ſmoothneſs of the ſurfaces of ſome *pebbles* and flints, which we find with their natural coats or cruſts worn off, is another proof of the ſame thing. Theſe *pebbles*, in this unnaturally naked ſtate, as well as the ribbed and lineated ones, are found in our pits, under the ſtrata of earth; and yet they are in exactly the ſame condition with thoſe which have been toſſed about and rounded on the ſea ſhores.

PEBBLES, *ſwallowing of*. There are many people of opinion, that the ſwallowing of *pebbles* is very beneficial to health, in helping the ſtomach to digeſt its food, and a *pebble*-poſſet is an old woman's medicine in the colic, in many parts of England. They uſually order the ſmall white ſtones to be picked out of gravel walks for this purpoſe, and eat them in large quantities in ſome ſort of ſpoon meat, of which milk is an ingredient.

The thing that has given occaſion to this practice ſeems to have been, that people obſerve the birds to pick up the gravel, and that they are never well unleſs they have frequent recourſe to this to help their digeſtion: but this is no ſimilar caſe at all, for the gizard or ſtomach of a bird is made very ſtrong, becauſe the creature hath no teeth to chew its food; and this gizard is lined with a rough coat, by the help of which, and theſe ſtones, the food they ſwallow whole is ſo ground, as to yield its juices to the nouriſhment of the animal. But the ſtomach of man is formed ſo very differently, that it can never require thoſe aſſiſtances to the comminution of food. Many people have, however, accuſtomed themſelves to ſwallow not only theſe ſmall white ſtones, but large *pebbles*, even to the ſize of a walnut each; and theſe will often paſs ſafely, and people who have long accuſtomed themſelves to ſwallow them, boaſt of receiving no injury from them: we can never know, however, that the death of ſuch perſons is not owing to them at laſt; and as they can do no good, it is beſt always to avoid them. There is one inſtance on record, of much miſchief done by them, in our Philoſophical Tranſactions, N° 253, p. 190.

PECARY, in *Zoology*. See TAJACU.

PECCANT, in *Medicine*, an epithet given to the humours of the body, when they offend either in quantity or quality, i. e. when they are either morbid, or in too great abundance.

Moſt diſeaſes ariſe from *peccant* humours, which are either to be corrected by alteratives and ſpecifics, or elſe to be evacuated.

PECHEM, in the *Materia Medica*, a name given by the modern Greek writers to the root called *behem* by Avicenna and Serapion. Many have been at a loſs to know what this root *pechem* was; but the virtues aſcribed to it are the ſame with thoſe of the *behem* of the Arabians; its deſcription the ſame, and the diviſion of it into white and red, is alſo the ſame as that of the *behem*. Nay, the word *pechem* is only formed of *behem*, by changing the *b* into a *p*, which is very common, and the aſpirate into χ, or *ch*, which is as common.

Myrepſus, who treats of this root, ſays the ſame thing, that the Arabian Avicenna ſays of *behem*, namely, that it was the fragments of a woody root, much corrugated and wrinkled on the ſurface, which was owing to its being ſo moiſt whilſt freſh, that it always ſhrunk greatly in the drying.

PECHYAGRA, a name given by authors to the gout affecting the elbow.

PECHYS, a name uſed by ſome anatomical writers for the elbow.

PECHYTYRBE, an epithet uſed by ſome medical writers for the ſcurvy.

PECK, a meaſure, or veſſel uſed in meaſuring grain, pulſe, and the like-dry ſubſtances.

The ſtandard, or Wincheſter *peck*, contains two gallons; each gallon of corn weighing about eight pound troy.

Four *pecks* make a buſhel; four buſhels a comb, or carnock.

Beſides the general, or Wincheſter *pecks*, there are local *pecks*, containing ſome more, ſome leſs; as the Lancaſter *peck*, containing ſix gallons, &c.

PECORA, in the Linnæan ſyſtem of *Zoology*, a claſſical term, comprehending a whole order of quadrupeds. The characters of this order are, that the creatures have *dentes inciſores*, or *cutting teeth*, in their under-jaw, but none in the upper: they have no *canini*, or *dog-teeth*, and have five molares each way. The paps of this order of animals are ſituated in the groin, and their feet have hoofs. Of this order Linnæus enumerates ſix genera; viz. the CAMEL, MOSCHUS, *cervus* or STAG, the *capra* or GOAT, the *ovis* or SHEEP, and BOS or *ox*; and thirty-five ſpecies.

PECQUET's *duct*, in *Anatomy*, the THORACIC *duct*; thus called from its diſcoverer *Pecquet*.

PECTE, in *Botany*, a name given by ſome of the old Greek writers to the *great comfry*, called alſo *oſſipagina*, from its agglutinating broken bones.

PECTEN *arboris*, in *Botany*, is the grain of the wood of any tree.

PECTEN, in *Anatomy*, is uſed by ſome authors for the PUBES, or lower part of the hypogaſtrium; uſually covered with hair.

PECTEN, in *Natural Hiſtory*, the name of a genus of ſhell-fiſh, the characters of which are theſe: it is a bivalve ſhell, ſhutting cloſe in all parts, of a flatted ſhape, ſtriated in the manner of a comb, and often auriculated, ſometimes only ſemiauriculated, and in ſome ſpecies not auriculated at all. There are alſo ſome few ſpecies which are elate, not flat as the others.

This genus of ſhells has had its name, *pecten*, from the longitudinal ſtriæ with which its ſurface is covered, which reſemble the teeth of a comb. According to the general character of this ſhell, it will be eaſy to perceive that it is meant to include the cockles as well as the ſcallops; theſe being the *pectens* without ears, and with leſs flat or elated ſhells. Theſe are called by all authors by a name which is only a diminutive of *pec-*

ten, *pectunculus*. And though the having ears is the common mark of diſtinction between the *pectens* and the *cockles*, which laſt uſually have none, yet the general are not diſtinct, as ſome have ſuppoſed; for there are ſhells allowed to be *pectens*, or ſcollops, which have yet no ears, and others univerſally allowed to be *pectuncles*, or cockles, which have ears. Hence appears the error of Liſter, who made theſe two diſtinct genera, and gave the ears and the equal convexity of both ſhells as the great characters of them: theſe, though good marks to diſtinguiſh the ſpecies by, are by no means unalterable enough to found different genera upon.

The genus of *pectuncles*, or cockles, has been made by all authors a very extenſive one, but the reader will find all the ſuppoſed ſpecies of it very aptly received into the genus of the *cordiformis*, or heart-ſhell, and the *pectens*.

According to this eſtabliſhment of the genus of the *pecten*, the ſpecies are to be enumerated under ſeveral diſtinct heads. Thus, ſome *pectens* are auriculated on both ſides: of theſe we have ſeventeen ſpecies.

Of thoſe *pectens* which are ſemiauriculated, we have ſix ſpecies.

Of thoſe *pectens* which have no ears at all, we have ſeven ſpecies.

This ſhell-fiſh is one of the ſpinners of the ſea, having power of ſpinning or forming threads like the muſcle; but they are much ſhorter and coarſer even than thoſe of that fiſh, ſo that they can never be wrought into any ſort of work, in the manner of the longer and finer threads of the *pinna marina*. The uſe of theſe threads, which the *pecten* or ſcallop ſpins, is to fix the creature to any other body that is near, whether it be a ſtone, a piece of coral, or another ſhell. All theſe threads proceed as in the muſcle, from one common trunk; they make their way out of the ſhell in thoſe *pectens* which have only one ear, a little below that ear; in the others, probably they iſſue out on both ſides. It is an evident proof, that the fiſh has a power of fixing itſelf at pleaſure, to any ſolid body by means of theſe threads, that after ſtorms the ſcollops are often found toſſed upon rocks, where there were none the day before; and yet theſe are fixed by their threads, as well as thoſe which had remained ever ſo long in their place. They form their threads in the very ſame manner with the muſcle, only their organ which ſerves for ſpinning is ſhorter, and has a wider hollow, whence the threads are neceſſarily thicker and ſhorter. See Muscle.

PECTINATION, *combing of the head*. Frequent *pectination* is recommended by many phyſicians to women, and men who wear their hair, as an exerciſe; and, at the ſame time, a kind of friction.

PECTINEUS, or Pectinæus, in *Anatomy*, the third of the fifteen muſcles of the thigh; ſo called, becauſe it has its origin in the fore-part of the os pectinis. See *Tab. Anat.* (*Myol.*) *fig.* 2. *n.* 35.

Its inſertion is in the thigh, under the left trochanter.

The *pectineus*, with the pſoas and iliacus, draw the thigh forwards, and, of conſequence, bend it.

PECTINIS *os*, in *Anatomy*, the ſame with *os* pubis.

PECTIS, in *Botany*, a genus of the *ſyngeneſia polygamia ſuperflua* claſs. Its characters are, that the receptacle is naked; the down bearded; the empalement cylindric and compoſed of five leaves; and that it has five floſculous radii. There are four ſpecies.

PECTORAL, ſomething relating to the breast, *pectus*. In the Romiſh church, biſhops, and regular abbots, wear a *pectoral croſs*, i. e. a little croſs of gold, hanging from the neck down to the breaſt.

Pectoral *medicines*, or ſimply pectorals, are remedies proper to ſtrengthen and relieve the breaſt: or medicines intended againſt diſeaſes of the breaſt and lungs.

Their ordinary intention is either to attenuate, or to thicken the humours of thoſe parts, which cauſe coughing, &c. and render them fit to be expectorated, or ſpit out.

Pectoral *Syrup*. See Syrup.

Pectoral *wine*. See Wine.

PECTORALE, or Pectoral, in the *Jewiſh Law*. See Rationale.

PECTORALIS *internus*, in *Anatomy*, a name given by Riolan and others to a muſcle of the breaſt, now generally known by the name of the triangularis *ſterni*; called by the older writers *ſextus thoracis*. See Pectoralis *minor*.

Pectoralis *major*, in *Anatomy*, a large, thick, and fleſhy muſcle, covering the breaſt from the ſtomach, where it is very broad, to the axilla, where it contracts in its paſſage to the arm, and uſed for moving the arm forwards. It is naturally divided into two portions, one ſuperior and ſmall, and the other inferior and large; the firſt may properly be called the *clavicular portion*, the other the *thoracic*.

The *clavicular portion*, is fixed by a fleſhy inſertion in almoſt half the clavicle next the ſternum, ending under the inſertion of the ſterno-maſtoidæus; from thence it runs obliquely down towards the axilla, contracting by ſmall degrees, and finally ending in a flat tendon or tendinous band. The *thoracic* portion is broad, and in ſome meaſure radiated. It is fixed by its anterior circumference in the lateral part of the outſide of the ſternum, in the outſide of the cartilages, and in a ſmall part of the bones of all the true ribs, and of the firſt and ſometimes the ſecond falſe rib; all theſe inſertions are like ſo many digitations. The inſertions in the ſternum end by a great number of very ſhort tendons, which run toward the middle of the bone, meeting and decuſſating thoſe from the ſame muſcle on the other ſide.

This muſcle, together with the deltoides, ſends off an aponeuroſis, which, joining that of the biceps, is ſpread over the muſcles of the arm: it partly covers the pectoralis minor, and ſerratus major; and by its broad tendon covers tranſverſely the brachial channel, and the tendon of the biceps lodged there. Laſtly, it forms the anterior border of the hollow of the axilla, as the poſterior is formed by the latiſſimus dorſi. Winſlow.

Naturaliſts obſerve a ſpecial mark of Providence in the ſize and ſtrength of the *pectoral* muſcle in different animals. It is the action of this muſcle, that the flying of birds is chiefly performed: accordingly it is much larger and ſtronger in birds than in any animals not made for flight.

Borelli obſerves, that in men the *pectoral* muſcles are ſmall; ſcarce the fiftieth or ſeventieth part of all the other muſcles; but in birds they are vaſtly large, equalling, nay exceeding, in bulk and weight, all the other muſcles of the bird together.

Pectoralis *minor*, a muſcle called alſo triangularis. It is ſmall and fleſhy, ſomething of a triangular ſhape, and is ſituated at the ſuperior, lateral, and anterior part of the thorax. By its baſis it is inſerted into the external labium of the upper edge of the ſecond, third, fourth, and fifth true ribs, near their union with the cartilages, by the ſame number of digitations, or ſeparate fleſhy portions, between the intervals of the ribs; and for that reaſon it has been called the *ſerratus minor atticus*. From hence theſe portions run up more or leſs obliquely toward the ſhoulder, and form a fleſhy belly, which contracts as it paſſes before the two firſt ribs; and then becoming a ſhort, flat, and broad tendon, is inſerted in the upper part of the apophyſis coracoides of the ſcapula, reaching all the way to the point of that proceſs. This muſcle is covered by the *pectoralis major*, and adheres very cloſely to the external intercoſtal muſcles. The digitations commonly taken notice of, cover and hide ſeveral others, by which the number of fibres and thickneſs of this muſcle is increaſed. Its tendon unites a little at the apex of the coracoide apophyſis, with the inſertion of the coracobrachialis, and with that of one portion of the biceps.

PECTOREL, in our old writers, armour for the breaſt, a breaſt-plate, or *petral* for a horſe. It is mentioned ſtat. 14 Car. II. cap. 3.

PECTORIS *os*, the ſame as sternum.

Pectoris *hydrops*. See Dropsy *of the breaſt*.

Pectoris *oſſa*, in fiſh. The bones of the breaſt and belly are beſt ſought after in the cetaceous and ſpinoſe kinds. In the ſpinoſe kinds they are theſe; the clavicles, the ſternum, the ſcapulæ, or bones to which the *pinnæ pectorales* are affixed at their baſis, the bones at the roots of the *pinnæ ventrales*.

The number, ſituation, and figure of theſe differ greatly in the ſeveral kinds of fiſh, and make very eſſential characters.

Pectoris *triangularis*. See Triangularis and Pectoralis *minor*.

PECUARII, among the Romans, thoſe who farmed the public paſtures, in order to let them again to advantage.

PECULATE, *peculatus*, in the *Civil Law*, the crime of embezzling the public money, by a perſon who has the management, receipt, or cuſtody thereof: ſo called *quaſi pecuniæ ablatio*.

Civil lawyers uſe *peculate* for any theft of a thing, either ſacred, religious, public, or fiſcal. *Peculate* in the caſe of public money, is proſecuted even on the criminal's heir.

The Julian law, among the Romans, puniſhed this crime with death in a magiſtrate; and with deportation, or baniſhment, in a private perſon. With us it is not a capital crime, but ſubjects the committer of it to a diſcretionary fine and impriſonment.

PECULIAR, in the *Canon Law*, a particular pariſh, or church, which hath juriſdiction within itſelf, for probate of wills, &c. exempt from the ordinary of the dioceſe, and the biſhops courts.

There are royal *peculiars*, and archbiſhops *peculiars*.

The king's chapel is a royal *peculiar*, exempt from all ſpiritual juriſdiction, and reſerved to the viſitation and immediate government of the king himſelf, who is ſupreme ordinary.

Peculiars of the archbiſhops are excluſive of the biſhops and archdeacons.

It is an ancient privilege of the ſee at Canterbury, that whereſoever any manors or advowſons do belong to it, they forewith become exempt from the ordinary, and are reputed *peculiars*. In the province of Canterbury, there are more than a hundred ſuch *peculiars*. In theſe *peculiars* juriſdiction is adminiſtered by ſeveral commiſſaries; the chief of whom is the dean of the ARCHES for the thirteen *peculiars* within the city of London.

There are alſo *peculiars* of biſhops, excluſive of the juriſdiction of the biſhop of the dioceſe in which they are ſituated: of theſe the biſhop of London hath four pariſhes within the dioceſe of Lincoln; and every biſhop, who hath a houſe in the dioceſe of another biſhop, may therein exerciſe epiſcopal juriſdiction.

There are alſo *peculiars* of biſhops in their own dioceſe, excluſive of archidiaconal juriſdiction.

The *peculiars* of dean, deans and chapters, prebendaries, &c. are places wherein, by ancient compoſitions, the biſhops have parted with their juriſdiction, as ordinaries to thoſe ſocieties. See COURT *of peculiars*.

PECULIARS, *court of*, is a court where the affairs of *peculiars* are tranſacted. See COURT.

PECULIUM, the ſtock which a perſon in the power or property of another, as a ſlave, minor, or the like, may acquire by his own induſtry, without any advance or aſſiſtance from his father or maſter; but merely by their permiſſion.

The word is uſually derived *a pecunia & pecoribus*; becauſe the whole eſtate anciently conſiſted in money and cattle.

PECULIUM is alſo uſed, among the Romaniſts, for what each monk or religious reſerves, and poſſeſſes to himſelf.

Some ſay, that the *peculium* of a religious, when preferred to a cure, does not ceaſe to belong to the monaſtery; and that the property thereof never abſolutely reſides in the religious himſelf.

PECUNIA, *money*. See MONEY.

PECUNIA, in our old law-books, is ſometimes uſed for cattle, and ſometimes for other goods, as well as money.

In the emendation of the laws of Edward the Confeſſor, by William the Firſt, it is ordered, that no *viva pecunia*, *living money*, i. e. cattle, be bought or ſold, except within cities, and that before three ſufficient witneſſes.

So in Domeſday Book, *pecunia* is frequently uſed, *pro pecude*; as paſture *ad pecuniam villæ*.

PECUNIA *eccleſiæ*, was anciently uſed for the eſtate of the church.

PECUNIA *ſepulchralis* was money formerly paid to the prieſt at the opening of the grave, for the good and behoof of the deceaſed's ſoul; and which our Saxon anceſtors called *ſoul-ſcot*, and *animæ ſymbolum*.

PEDAGE, *pedagium*, *toll*, or a local due exacted on perſons, goods, and carriages, paſſing through certain places.

Pedage is uſually levied for the repairing of roads, bridges, and cauſeways, the paving of ſtreets, &c.—Anciently, thoſe who had the right of *pedage*, were to keep the roads ſecure, and anſwer for all robberies committed on the paſſengers between ſun and ſun; which is ſtill obſerved in ſome parts of England and in Italy, where there were guards, called *ſtationarii*, eſtabliſhed for the ſecurity of merchants, particularly at Terracina, on the road between Rome and Naples.

PEDAGOGUE, or PÆDAGOGUE, ϖαιδαγωγος, formed from ϖαιδων αγωγος, *puerorum ductor*, *leader of boys*, a tutor or maſter, to whom is committed the diſcipline and direction of a ſcholar, to be inſtructed in grammar, and other arts.

M. Fleury obſerves, that the Greeks gave the name *pedagogues* to ſlaves appointed to tend their children, lead them, and teach them to walk, &c. The Romans alſo gave the ſame denomination to the ſlaves who were entruſted with the care and inſtruction of their children.

PEDALES. See ABBOT.

PEDALIUM, in *Botany*, a genus of the *didynamia angioſpermia* claſs. Its characters are, that the empalement is divided into five ſegments; that the flower is a little gaping, and terminated by a limb, which is cut into five ſegments. The fruit is a four-cornered nut, with two cells, containing two ſeeds. There is only one ſpecies.

PEDALS, the large pipes of an ORGAN, ſo called becauſe played and ſtopped with the foot.

The *pedals* are the largeſt pipes in the machine; they are made ſquare, and of wood; they are uſually thirteen in number. They are of modern invention, and ſerve to carry the ſounds an octave deeper than the reſt.

PEDANEUS, in the *Civil Law*, a petty judge, who has no formal ſeat of juſtice, but hears cauſes ſtanding, and without any tribunal.

The word ſeems formed from *ſtans in pedibus*: and is uſed among the ancients by way of oppoſition to thoſe magiſtrates who were ſeated in the curule chair, *in ſella curuli*, or had a tribunal or bench raiſed on high.

The Roman *pedanei*, therefore, were ſuch as had no tribunal, nor pretorium; but rendered juſtice *de plano*, or *plano pede*.

From the eighty-ſecond Novel, it appears, that the emperor Zeno eſtabliſhed theſe *pedanei*, in the ſee of every province; and that Juſtinian erected ſeven of them at Conſtantinople, in manner of an office; granting them power to judge in any ſum as high as three hundred crowns.

PEDANT, a ſchoolmaſter, or pedagogue, who profeſſes to inſtruct and govern youth, and teach them the humanities and the arts.

PEDANT is alſo uſed for a rough unpoliſhed man of letters, who makes an impertinent uſe of the ſciences, and abounds in unſeaſonable criticiſms and obſervations.

Dacier defines a *pedant*, a perſon who has more reading than good ſenſe.

Pedants are people ever armed with quibbles and ſyllogiſms; they breathe nothing but diſputation and chicanery, and purſue a propoſition to the laſt limits of logic.

Malebranche deſcribes a *pedant* as a man full of falſe erudition, who makes a parade of his knowledge, and is ever quoting ſome Greek or Latin author, or hunting back to a remote etymology.

St. Evremont ſays, that to paint the folly of a *pedant*, we muſt repreſent him as turning all converſation to ſome one ſcience or ſubject which he is beſt acquainted with.

There are *pedants* of all conditions, and of all robes. Wicquefort ſays, an ambaſſador, always attentive to formalities and decorums, is nothing elſe but a political *pedant*.

PEDANTRY, or PEDANTISM, the quality or manner of a PEDANT.

To ſwell up little and low things, to make a vain ſhew of ſcience, to heap up Greek and Latin without judgment, to tear thoſe to pieces who differ from us about a paſſage in Suetonius, or the etymology of a word, to ſtir up all the world againſt a man for not admiring Cicero enough, to be intereſted for the reputation of an ancient as if he were our next of kin, form what we properly call *pedantry*.

PEDARIAN, in *Antiquity*, thoſe ſenators who ſignified their votes by their feet, not their tongues; that is, ſuch as walked over to the ſide of thoſe whoſe opinion they approved of, in diviſions of the ſenate.

The origin of the word Dr. Middleton thinks owing to this, that though the magiſtrates of Rome had a right to a place, and vote in the ſenate, as well during their office as after it, and before they were put upon the roll by the cenſors, yet they had not probably a right to ſpeak or debate there on any queſtion, at leaſt in the earlier times of the republic. For this ſeems to have been the original diſtinction between them and the ancient ſenators, as it is plainly intimated in the formule of the conſular edict, ſent abroad to ſummon the ſenate, which was addreſſed to all ſenators, and thoſe who had a right to vote in the ſenate. From which diſtinction, theſe laſt, who had only a right to vote, were called, by way of ridicule, *pedarian*; becauſe they ſignified their votes by their feet, not their tongues, and, upon every diviſion of the ſenate, went over to the ſide of thoſe whoſe opinion they approved. It was in alluſion to this old cuſtom, which ſeems, however, to have been wholly dropt in the later ages of the republic, that the mute part of the ſenate continued ſtill to be called by the name of *pedarians*, as we learn from Cicero, who, in giving an account to Atticus of a certain debate and decree of the ſenate upon it, ſays, that it was made with the eager and general concurrence of the *pedarians*, though againſt the authority of all the conſulars. Vide Feſtus in voc. Senatores, A. Gell. lib. iii. 18. Feſt. in

Pedarius. Cicero ad Attic. I. 19. Middlet. of Rom. Sen. p. 86. ſeq.

PEDATURA, in *Roman Antiquity*, was uſed for a ſpace or proportion of a certain number of feet ſet out.

The word occurs frequently in writers about military affairs: thus in Hyginus; de Caſtrametatione, we meet with *meminerimus itaque ad computationem cohortis equitatæ milliaria* pedaturam *ad milletrecentos ſexaginta dari debere*; which is to be thus explained: the *pedatura*, or ſpace allowed for a COHORS *equitata* or provincial cohort, conſiſting of both horſe and foot, could not be the ſame as the *pedatura* of an uniform body of infantry, of the ſame number, but muſt exceed it by 360 feet; for the proportion of the room of one horſeman to one foot ſoldier, he aſſigns as two and a half to one. Vide Phil. Tranſ. N° 482. ſect. 3.

PEDESTAL, formed from *pes*, *pedis*, *foot*, and ϛυλος, *column*, in *Architecture*, the loweſt part of an order of columns; being that which ſuſtains the column, and ſerves it as a foot to ſtand on. See *Tab. Architecture*, *fig*. 40. T.

The *pedeſtal*, called by the Greeks *ſtylobates*, and *ſtereobates*, conſiſts of three principal parts; viz. a ſquare trunk, or dye, which makes the body, a cornice, the head; and a baſe, the foot of the *pedeſtal*.

The *pedeſtal* is properly an appendage to a column; not an eſſential part thereof; though M. le Clerc thinks it is eſſential to a complete order.

The proportions or ornaments of the *pedeſtal* are different in the different orders: Vignola, indeed, and moſt of the moderns, make the *pedeſtal*, and its ornaments, in all the orders, one third of the height of the column, including the baſe and capital: but ſome deviate from this rule.

M. Perrault makes the proportion of the three conſtituent parts of *pedeſtals*, the ſame in all the orders; viz. the baſe one fourth of the *pedeſtal*; the cornice an eighth part; and the ſocle, or plinth, of the baſe, two thirds of the baſe itſelf. The height of the dye is, what remains of the whole height of the *pedeſtal*.

PEDESTAL, *Tuſcan*, is the ſimpleſt and the loweſt of all. Palladio and Scamozzi make it three modules high; Vignola five. Its members, in Vignola, are only a plinth, for a baſe; the dye; and a talon crowned, for a cornice. This has rarely any baſe.

PEDESTAL, *Doric*, Palladio makes four modules five minutes high; and Vignola five modules four minutes.

In the antique, we not only do not meet with any *pedeſtals*; but even not with any baſe, in the Doric order.

The members in Vignola's Doric *pedeſtal*, are the ſame with thoſe in the Tuſcan, with the addition of a mouchette in its cornice.

PEDESTAL, *Ionic*, in Vignola and Serlio, is ſix modules high; in Scamozzi five; in the temple of Fortuna Virilis it is ſeven modules twelve minutes. Its members and ornaments are moſtly the ſame with thoſe of the Doric, only a little richer. The *pedeſtal* now uſually followed, is that of Vitruvius, though we do not find it in any work of the antique. Some, in lieu hereof, uſe the Attic baſe, in imitation of the ancient.

PEDESTAL, *Corinthian*, is the richeſt and moſt delicate of all. In Vignola it is ſeven modules high; in Palladio, five modules one minute; in Serlio, ſix modules fifteen minutes; in the coliſeum, four modules two minutes.

Its members, in Vignola, are as follow; in the baſe are a plinth, for a ſocle: over that a tore carved; then a reglet, a gula inverted and enriched, and an aſtragal. In the dye are a reglet, with a conge over it; and near the cornice a reglet, with a conge underneath. In the cornice is an aſtragal, a frize, fillet, aſtragal, gorge, and a talon. See each under its proper article.

PEDESTAL, *Compoſite*, in Vignola, is of the ſame height with the Corinthian, viz. ſeven modules; in Scamozzi, ſix modules two minutes; in Palladio ſix modules ſeven minutes; in the Goldſmith's arch, ſeven modules eight minutes.

Its members, in Vignola, are the ſame with thoſe of the Corinthian; with this difference, that, whereas theſe are moſt of them enriched with carvings in the Corinthian, they are all plain in the Compoſite. Nor muſt it be omitted, that there is a difference in the profiles of the baſe and cornice, in the two orders.

The generality of architects, Daviler obſerves, uſe tables or panels, either in relievo, or creux, in the dyes of *pedeſtals*, without any regard to the character of the order. Thoſe, in relievo, he obſerves, only fit the Tuſcan and Doric; the three others muſt be indented: but this, he adds, is a thing the ancients never practiſed, as being contrary to the rules of ſolidity and ſtrength.

PEDESTAL, *ſquare*, is that whoſe height and width are equal; as that of the arch of the lions at Verona, of the Corinthian order; and ſuch ſome followers of Vitruvius, as Serlio, Philander, &c. have given to their Tuſcan orders.

PEDESTAL, *double*, is that which ſupports two columns, and is larger in width than height.

PEDESTAL, *continued*, is that which ſupports a row of columns without any break or interruption; ſuch is that which ſuſtains the fluted Ionic columns of the palace of the Thuilleries on the ſide of the garden.

PEDESTALS *of ſtatues*, are thoſe ſerving to ſupport figures or ſtatues.

Vignola obſerves, there is no part of architecture more arbitrary, and wherein more liberty may be taken, than in the *pedeſtals* of ſtatues; there being no laws preſcribed for them by antiquity; nor any even ſettled by the moderns.

There is no ſettled proportion for theſe *pedeſtals*; but the height depends on the ſituation, and the figure they ſuſtain. Yet, when on the ground, the *pedeſtal* is uſually two thirds, or two fifths, of that of the ſtatue; but always the more maſſive the ſtatue, the ſtronger muſt be the *pedeſtal*.

Their form, character, &c. are to be extraordinary and ingenious, far from the regularity and ſimplicity of the *pedeſtals* of columns. The ſame author gives us a great variety of forms, oval, triangular, multangular, &c.

PEDESTRIAN *ſtatue*. See STATUE.

PEDETICHE, in *Natural Hiſtory*, a name given by ſome of the Greek writers to the CHAMOIS goat, the creature whoſe ſkin affords us the chamois or SHAMMY leather.

PEDIÆAN, ϖεδιαιος, in *Antiquity*. The city of Athens was anciently divided into three different quarters; one on the deſcent of a hill; another on the ſea-ſhore; and a third in a plain between the other two.

The inhabitants of the middle region were called Πεδιαοι, *Pediæons*, formed from ϖοδιον, *plain* or *flat*: or, according to Ariſtotle, *Pediaci*: thoſe of the hill, Diacrians: and thoſe of the ſhore, Paralians.

Theſe quarters uſually compoſed ſo many different factions. Piſiſtratus made uſe of the *Pediæans* againſt the Diacrians.

In the time of Solon, when a form of government was to be choſen, the Diacrians would have it democratic: the *Pediæans* demanded an ariſtocracy; and the Paralians a mixed government.

PEDIÆUS, in *Anatomy*, is the ſecond of the extenſor muſcles of the foot, *pes*; whence its name.

It has its origin in the lower part of the perone, and annular ligament; and is divided into four tendons, which are inſerted into the external part of the firſt articulation of the four toes. Its uſe is to extend the foot, together with the firſt of the extenſors, called *extenſor communis*.

PEDICLE, *pediculus*, a diminutive of *pes*, *foot*, in *Botany*, *foot-ſtalk*; that little ſtalk whereby the leaf, fruit, or flower, is ſuſtained, and connected to its branch or ſtem.

Flowers will keep freſh a long time after gathering, by immerging their *pedicles* in water. The great ſecret of preſerving fruits for the winter is to ſeal up their *pedicles* with wax. Cherries with the ſhorteſt *pedicle* are eſteemed the beſt. The PISTIL of the flower ſometimes becomes the *pedicle* of the fruit.

PEDICULARIS, in *Botany*. See LOUSEWORT.

PEDICULARIS *morbus*, from *pediculus*, *louſe*, in *Medicine*, the louſy diſtemper, a diſeaſe ariſing from ſome uncommon corruption in the body, which generates infinite quantities of lice on the ſkin.

Herod is ſaid to have died of the *pedicular* diſeaſe. See PHTHIRIASIS and LOUSE.

PEDICULUS, in *Zoology*. See LOUSE.

PEDIGREE, a DESCENT, or GENEALOGY.

PEDILUVIUM. See *Bathing of the* FEET, art. FOOT.

PEDIMENT, in *Architecture*, a kind of low pinnacle; ſerving to crown porticos, or finiſh a frontiſpiece; and placed as an ornament over gates, doors, windows, niches, altars, &c. See *Tab. Architect. fig*. 24.

The pinnacles of the ancient houſes, Vitruvius obſerves, gave architects the firſt idea of this noble part; which ſtill retains the appearance of its original.

The parts of the *pediment* are, the tympanum and its cornice. The firſt is the pannel naked, or area of the *pediment*, repreſented by A, in *Tab. Architect. fig*. 40. incloſed between the cornice, which crowns it, and the entablature, which ſerves it as a baſe, or ſocle.

Architects have taken a great deal of liberty in the form of this member; nor do they vary leſs as to the proportion of the *pediment*. The moſt beautiful, according to Daviler, is that where its height is about one-fifth of the length of its baſe.

It is deſcribed thus: divide the line *a b* (*Tab. Architect. fig*. 40.) which is the length of the baſe, into two equal parts, in the point *c*, by means of the perpendicular *f d*; in this perpendicular take the part *e d* equal to *a c*; and ſrom the point *d*, as a centre, deſcribe the arch *a e b*. The point of the perpendicular, cut in *e*, will be the top of the pediment *a e b*; and the cornice, and the triangular ſpace included therein, the tympanum.

The *pediment* is uſually triangular, and ſometimes an equilateral triangle; this is alſo called a *pointed pediment*. Sometimes it is circular; though Felibien obſerves, that we have no inſtance of round *pediments* in the antique, beſide thoſe in the chapels of the Rutundo. Sometimes its upper cornice is divided into three or four ſides, or right lines; ſometimes the cornice is cut, or open a-top, which is an abuſe introduced by the moderns, particularly by Michael Angelo. For the deſign of this part, at leaſt over doors, windows, &c. being chiefly to ſhelter thoſe underneath from the rain, to leave it open in the middle is to fruſtrate its end.

Sometimes the *pediment* is formed of a couple of ſcrolls, or wreaths like two conſoles joined together. See CONSOLE.

Sometimes, again, the *pediment* is without baſe, or its lower cornice is cut out, all but what is beſtowed on two columns, or pilaſters, and on theſe an arch, or ſweep, raiſed in lieu of an entablature: of which Serlio gives an inſtance in the antique, in a Corinthian gate at Foligny in Umbria; and Daviler a more modern one, in the church of St. Peter at Rome.

Under this kind of *pediments* do alſo come thoſe little arched cornices which form *pediments* over doors and windows, ſupported by two conſoles, in lieu either of entablature or columns.

Sometimes the *pediment* is made double, i. e. a leſs *pediment* is made in the tympanum of the larger, on account of ſome projecture in the middle; as in the frontiſpiece of the church of the Great Jeſus at Rome: but this repetition is an abuſe in architecture, though authorized by ſome very good buildings; as the large pavilion of the Louvre, where the caryatides ſupport three *pediments*, one in another.

Sometimes the tympanum of the *pediment* is cut out, or left open, to let in light; as we ſee under the portico of the capitol at Rome. Laſtly, this open *pediment* is ſometimes triangular, and enriched with ſculpture, as roſes, leaves, &c. as we find in moſt of the Gothic churches.

M. le Clerc obſerves, that the modillions in the cornice of the *pediment* ſhould always anſwer exactly over thoſe of the entablature. Indeed Vitruvius ſays, the ancients did not allow any modillions at all in *pediments*.

The ſame M. le Clerc obſerves, that the cornice which ſerves the *pediment* as a baſe, ſhould have no cymatium; by reaſon of the cymatium of the reſt of the entablature, when it meets the *pediment*, paſſes over it.

This change of determination occaſions a conſiderble difficulty; the cymatium, in this caſe, appearing too broad in the turn of the angle: to remedy which, the architects have recourſe to ſeveral expedients.

A *pointed pediment* may crown three arches; but a *circular pediment* can only crown one agreeably.

One would never uſe above two *pediments* over each other in the ſame frontiſpiece; and even where there are two, it would be proper to have the lower circular, and the upper pointed.

PEDIS *abſciſſio*, *cutting off a foot*, a puniſhment anciently inflicted among us: as appears by the laws of William the Conqueror. *Interdicimus ne quis occidatur, vel ſuſpendatur, pro aliqua culpa, ſed eruantur oculi*, abſcindantur pedes, *vel teſticuli, vel manus, &c.* Leg. Will. cap. I. So Ingulphus, *ſub pæna perditionis dexteri ſui pedis, &c.*

PEDIS *minimi digiti abductor*. See ABDUCTOR.

PEDIS, *adductor pollicis*. See ABDUCTOR.

PEDIS, *dorſum*. See DORSUM.

PEDIS, *flexor pollicis*. See FLEXOR.

PEDIS *interroſſei, perforans, perforatus*, and *tranſverſalis*. See the reſpective articles.

Tranſcriptio PEDIS *finis*. See TRANSCRIPTIO.

PEDITUM *arraiatio*. See ARRAIATIO.

PEDLAR. See HAWKER.

PEDO, in *Natural Hiſtory*, a name given by ſome writers to the *tipula*, or father-long-legs; called alſo by others *gruina*, or the crane-fly.

PEDOMETER, or PODOMETER, formed from πȣς, *pes*, *foot*, and μετρον, *meaſure*, way-wiſer; a mechanical inſtrument, in form of a watch; conſiſting of various wheels, with teeth, catching in one another, all diſpoſed in the ſame plane; which, by means of a chain, or ſtring, faſtened to a man's foot, or to the wheel of a chariot, advance a notch each ſtep, or each revolution of the wheel; ſo that the number being marked on the edge of each wheel, one may number the paces, or meaſure exactly the diſtance from one place to another.

PEDOMETER is ſometimes alſo uſed for the common ſurveying wheel, an inſtrument chiefly uſed in meaſuring roads; popularly called the *way-wiſer*. See PERAMBULATOR.

PEDRERO, PETERERO, or PATERERO, a ſmall piece of ORDNANCE, uſed on board ſhips, for the diſcharging of nails, broken iron, or partridge ſhot, on an enemy attempting to board.

They are generally open at the breech, and their chamber made to take out, to be loaded that way, inſtead of at the muzzle.

PEDRO *de porco*. See *Hog* BEZOAR.

PEDUNCLE, among *Botaniſts*, expreſſes that little ſtalk which grows from the trunk or branches of a plant, and ſupports the parts of fructification, the flower and the fruit, or either: when this is produced from the ſtalk, it is called *caulinus*; when from the alæ of the leaves, *alaris*; when it terminates the plant or its branches, *terminalis*.

PEDUNCULARIA, in *Botany*, a name by which ſome authors have called the *ſtaphiſagria*, or ſtaveſacre: a plant whoſe ſeeds are uſed to kill vermin.

PEDUNCULI *cerebelli*, in *Anatomy*, two medullary proceſſes of the CEREBELLUM, whereby that part is joined to the medulla oblongata.

Willis, who firſt gave them that name, obſerved in them three diſtinct proceſſes on either ſide; the two firſt whereof go to the teſtes: the ſecond directly from the cerebellum to the medulla oblongata, decuſſating the former, and faſtening the proceſſus annularis; the third ſpringing from the hinder proceſs of the cerebellum, is inſerted into the medulla oblongata, looking like an additional chord to it.

PEE, in *Mining*, is uſed for the place where two veins meet and croſs one another, thus +.

PEEK, in the *Sea-Language*, a term uſed in various ſenſes; e. g. an anchor is ſaid to be *a-peek*, when the ſhip, being about to weigh, comes over her anchor, ſo that the cable hangs perpendicularly between the hawſe and the anchor; the bringing of a ſhip into which poſition they call *heaving a-peek*.

A ſhip is ſaid to ride *a-peek*, when, lying with her main and fore-yards hoiſed up, one end of her yards is brought down to the ſhrouds, and the other raiſed up on end; which is chiefly done when ſhe lies at reſt in rivers, leſt other ſhips, falling foul of her, ſhould break her yards.

PEEK, *to ride a broad*, denotes much the ſame, excepting that the yards here are only raiſed to half the height.

To PEEK *the mizzen*, is to put the mizzen yard perpendicular by the maſt.

PEEK is a name given to the upper corner of all thoſe ſails which are extended by a gaff, or by a yard which croſſes the maſt obliquely, as the mizzen yard of a ſhip, the main yard of a bylander, &c. The upper extremity of thoſe yards and gaffs is alſo called the *peek* or peak.

PEEK is alſo uſed for the room in the hold, from the bitts forward to the ſtem: in this place men of war keep their powder, and merchantmen their victuals.

PEEK-*haliards*, are the ropes or tackles by which the outer end of the gaff is hoiſted as oppoſed to the throat haliards, which are applied to the inner end.

PEER, *par*, primarily denotes an equal, or one of the ſame rank and condition. Hence, in ſome councils, or aſſemblies, we find, "With the conſent of our *peers*, biſhops, abbots, &c."

PEER, afterwards, was applied to the vaſſals, or tenants of the ſame lord, who were obliged to ſerve and attend him in his courts.

They were called *peers, pares*, becauſe equal in function: and *peers in fiefs*, or *fees*, becauſe holding fees of the lord; or becauſe their buſineſs in court was to ſit and judge, under their lord, of diſputes ariſing concerning fees.

The number of *peers* required to ſit in a court, was at leaſt four; and when there happened to be too many *peers* in the ſame lordſhip, the lord uſually choſe out twelve, who had the titles of *peers*, by way of diſtinction and eminence.

There are alſo inſtances of women who have aſſiſted at judgment, on account of their tenements, not of their being wives of *peers*. The origin of theſe *peers* of fees, is as ancient as that of the fees they were appointed to judge of: from theſe we derive our common juries, and our *peers* of the realm.

PEER *of the realm*, denotes a noble lord, or perſon who has a ſeat and vote in the upper houſe of parliament; which is hence called the *houſe of peers*. See NOBILITY.

The right of peerage ſeems to have been originally territorial; that is, annexed to lands, honours, caſtles, manors, and the like; the proprietors and poſſeſſors of which were (in right of thoſe eſtates) allowed to be *peers* of the realm, and were ſummoned to parliament to do ſuit and ſervice to the king: and when the land was alienated, the dignity paſſed with it as an appendant.

Thus, the BISHOPS ſit in the houſe of lords, in right of ſucceſſion to certain ancient baronies annexed, or ſuppoſed to be annexed, to their epiſcopal lands: and though they are lords of parliament, they are not properly of the degree of nobility, their blood is not ennobled, nor their peerage hereditary: and, therefore, they are tried not by *peers*, but by a common jury: and when one of the nobility is tried by his *peers* in parliament, the ſpiritual lords muſt withdraw, and make their proxies.

But afterwards, when alienations became frequent, the dignity of peerage was cônfined to the lineage of the party ennobled, and inſtead of territorial, became perſonal.

Peers are now created by writ or patent. The creation by writ, or the king's letter, is a ſummons to attend the houſe of *peers*, by the ſtyle or title of that barony which the king is pleaſed to confer; that by patent, is a royal grant to a ſubject of any dignity or degree of peerage. The creation by writ is the more ancient, but a man is not ennobled thereby, unleſs he takes his ſeat in the houſe of lords; and, therefore, the moſt uſual, becauſe the ſureſt way, is to grant the dignity by patent, which enſures to a man and his heirs, according to the limitations thoreof, though he never makes uſe of it. Creation by writ, however, has one advantage over that by patent; for a perſon created by writ holds the dignity to him and his heirs, without any words to that purport in the writ: but in letters patent, there muſt be words to direct the inheritance; or elſe the dignity endures only to the grantee for life.

A *peer* cannot loſe his nobility but by death or attainder; and though ſome have ſaid, that if a baron waſte his eſtate, ſo that he is not able to ſupport the degree, the king may degrade him; yet it is expreſly held by later authorities, that a *peer* cannot be degraded but by act of parliament.

Peers of the realm are by their birth hereditary counſellors of the crown, and may be called together by the king, to impart their advice, in all matters of importance to the realm, either in time of parliament, or when there is no parliament in being; and it is uſually conſidered as the right of each particular *peer* of the realm to demand an audience of the king, and to lay before him, with decency and reſpect, ſuch matters as he ſhall judge of importance to the public weal. The claims of peerage may be hereafter eaſily ſettled, ſince by a ſtanding order of the houſe of lords, May, 1767, the heralds are directed to take exact accounts, and preſerve regular entries of all *peers* and peereſſes of England, and their reſpective deſcendants; and it is required that an exact pedigree of each *peer*, and his family, ſhall, on the day of his firſt admiſſion, be delivered to the houſe, by Garter, the principal king at arms.

As to the privileges of *peers*, ſee NOBILITY and PARLIAMENT.

The houſe of lords have a right to take cognizances originally of all public accounts, and to enquire into any miſapplication, or default in the diſtribution of public monies; or of any other miſmanagement whatſoever.

Towards the latter end of the reign of king Charles the Firſt, the houſe of lords aſſerted their juriſdiction of hearing appeals from the chancery, which they do upon a paper petition, without any writ directed from the king; and for this their foundation is, that they are the great court of the king, and that therefore the chancery is derived out of it, and by conſequence that a petition will bring the cauſe and record before them. This was much controverted by the commons, in the reign of Charles the Second, but is now pretty well ſummitted to, becauſe it has been thought too much, that the chancellor ſhould bind the whole property of the kingdom without appeal.

PEERS, *pares of France*, are the twelve grand lords of that kingdom. The inſtitution of theſe *peers* is very uncertain; ſome refer it to Hugh Capet, at the time when the dukes and counts changed the offices they then held of the king into perpetual fiefs: but this is impoſſible; Champagne, one of the titles, not being then erected into a county. Indeed, Paſquier obſerves, that it is an old tradition, that there have been twelve *peers* in all ages. Of theſe *peers*, ſix are dukes, and ſix counts, *comtes*; of theſe, again, ſix are eccleſiaſtics, and ſix laymen.

The archbiſhops of Rheims, and the biſhops of Laon, and Langres, are dukes and *peers*; and the biſhops of Noyons, Chalon on the Marn, and Beauvais, are counts and *peers*.

The dukes of Burgundy, Normandy, and Aquitain, are lay *peers* and dukes; and the counts of Flanders, Champagne, and Thoulouſe, lay *peers* and counts. Theſe lay *peers* ſtill aſſiſt at the coronation of the kings in ceremony, and by way of repreſentatives; where each performs the functions attached to his reſpective dignity: though their peerſhips be, in reality, all, except that of Flanders, reunited to the crown. Six lords of the firſt quality are choſen to repreſent them. The eccleſiaſtic *peers* uſually aſſiſt in perſon. At preſent the title *peer*, in France, is beſtowed, as in England, on every lord, or perſon, whoſe fee is erected into a lordſhip, or peerſhip.

The word *peer*, according to Paſquier, is derived from *patricius*, the firſt dignity in the eaſtern empire; on the model whereof he ſuppoſes theſe *peers* to have been inſtituted. But others, with more probability, derive the title from the *pares curiæ*, or *peers of fees*, becauſe of their being equal to each other.

Theſe *pares curiæ*, on whoſe model they ſuppoſe the *peers* of realms to have been erected, were a kind of vaſſals, depending all on the ſame lord, whom they were obliged to attend and aſſiſt in court.

All feudal matters, or diſputes, among vaſſals, relating to their fees or dependencies, were terminated by the ſuperior lord of the two contending parties, and by their *peers* in fee.

If the proceſs were between the lord and the vaſſal, the lord took no cognizance of it, and the *peers* alone judged it.

Hence all lords or nobles, being *pares nobilitate*, i. e. all equally intitled to the privileges of nobility, are denominated *pares regni*, *peers of the realm*.

Some authors attribute the firſt inſtitution of *peers* of the realm to Charlemagne, but with little probability; ſince moſt of the fiefs, which bear the names of duchies, &c. or give titles to the *peers*, were not erected into duchies, &c. till long after; the dukes, &c. in thoſe days, being no more than ſimple governors of provinces, without any other title or privileges.

The more probable opinion is, that *peers* were firſt inſtituted by Philip the Young, of France, about the year 1179, and that they firſt acted in capacity of *peers* at the coronation of his ſon.

PEER, in *Building*. See PIER.

PEERAGE, the dignity of a PEER attached to a duchy, earldom, barony, or the like.

The kings of England and France confer *peerage* at pleaſure. King George the Firſt offered his parliament to reſign that branch of his prerogative, and to have the number of *peers* limited.

The reaſon, inſiſted on, was the inconvenience accruing to the ſtate from an arbitrary and immoderate uſe thereof; the prince having it in his power to throw what number of his creatures he pleaſes into the upper houſe of parliament.

The twelve *peers*, created at once in a late reign, was a main argument in behalf of the *peerage* bill. It is recorded as a ſaying of king Charles, that if his friends could but ſecure him a houſe of commons, he would put his whole troop of guards into the upper houſe, but he would have the *peers*.

PEERAGE, *to hold land in*, in the *Ancient Cuſtoms*, was a tenure which obliged the perſon to aſſiſt the lord's bailiff in his judgments; as all the ancient vaſſals, called *peers*, did.

PEERESS. As we have noblemen of ſeveral ranks, ſo we may have noblewomen, and theſe may be by creation, deſcent, or marriage; and firſt, king Hen. VIII. made Anne Bullen, marchioneſs of Pembroke; king James I. created the lady Compton, wife to ſir Thomas Compton, counteſs of Buckingham, in the life-time of her huſband, without any addition of honour to him; and alſo the ſame king made the lady Finch viſcounteſs of Maidſtone, and afterwards counteſs of Winchelſea, to her and the heirs of her body: and king George I. made the lady Schulenberg, ducheſs of Kendal.

A woman noble by creation or deſcent, marrying one under the degree of nobility, ſtill remaineth noble, but if ſhe be noble by marriage only, ſhe loſeth her dignity if ſhe marry afterward a commoner; though not if the ſecond huſband is noble, and inferior in dignity to the firſt huſband; and by the courteſy of England, women noble by marriage, always retain their nobility. 1 Inſt. 16. 1 Inſt. 50. 6 Rep. 53.

A counteſs or baroneſs may not be arreſted for debt or treſpaſs; for though in reſpect of their ſex, they cannot ſit in parliament, they are nevertheleſs peers of the realm, and ſhall be tried by their peers, &c.

PEEVIT, in *Ornithology*, a bird of the larus kind, with a black head, and a grey-coloured body. See GULL.

PEGANELÆON, a word uſed by the ancients to expreſs oil, in which the leaves and flowers of rue had been infuſed and inſolated.

PEGANERON, a name given by ſome old authors to a plaſter in which rue was a principal ingredient, from *peganon*, the Greek name of rue.

PEGANON, or PEGANUM, a name uſed by ſome authors for the *ruta ſylveſtris*, or wild rue; called *harmala*, or *harmel*, in the ſhops. See *Wild Aſſyrian* RUE.

PEGASUS, in *Ichthyology*, is a genus of the *amphibia nantes*; the characters of which are, that the mouth is furniſhed with a retractile proboſcis, the upper jaw is denticulated, and the ſnout is linear and ſword-ſhaped; the opening of the gills is before the pectoral fins, the body is articulated by bony joints, and the ventral fins are abdominal. There are three ſpecies, inhabitants of the Indian ſeas.

PEGASUS, among the *Poets*, a horſe imagined to have wings, being that whereon Bellerophon was fabled to be mounted when he engaged the Chimera.

The opening of the fountain Hippocrene, on mount Helicon, is aſcribed to a blow of *Pegaſus's* hoof. It is feigned to have flown away to heaven; where it became a conſtellation. Hence,

PEGASUS, in *Aſtronomy*, the name of a conſtellation of the northern hemiſphere, figured in form of a flying horſe. The ſtars in this conſtellation, in Ptolemy's Catalogue, are twenty, in Tycho's nineteen, in Hevelius's thirty-eight, in the Britannic Catalogue eighty-nine. Their longitudes, latitudes, magnitudes, &c. are as follow:

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longitud.	Latitude. North.	Magnitude.
			° ′ ″	° ′ ″	
Preced. } In the triangle over	e	♒	25 58 39	33 18 39	4
Nor. } Pegaſus's mouth	f		29 49 57	36 09 30	4.5
			24 43 41	19 38 14	6
			24 36 55	18 46 05	6
			29 49 32	31 28 35	6.7
5.					
			23 37 56	15 21 40	6
			25 21 11	18 21 36	6
Pegaſus's mouth	ı		27 33 32	22 07 16	3
Poſter. and ſouth. in the triangle	g	♓	0 41 04	29 02 49	4.5
In the heel of the preced. foot.	κ		4 37 10	36 39 05	4
10.					
		♒	25 39 21	15 06 59	6
		♓	3 34 17	34 05 10	6
			2 04 04	28 28 58	6
			8 25 13	40 15 40	6
			8 19 10	38 46 07	6
15.					
			6 54 27	36 07 07	6
			1 35 20	23 01 46	6
			0 16 21	17 46 20	5
			1 06 39	19 06 36	6
			3 01 42	23 37 20	6
20.					
			2 51 41	21 47 57	5
South of two in the head	ν		0 58 06	15 42 01	5
			11 39 57	37 40 34	6
In the preced. knee	ι		10 04 09	34 16 48	4
			8 31 30	30 51 42	6.7
25.					
North in the head	θ		2 28 46	16 21 48	4
			15 04 15	41 03 45	5
In the heel of the hind foot			8 48 51	29 57 44	6.7
	π		15 15 13	40 59 52	4.5
Small one againſt the ear			4 48 30	15 01 47	6
30.					
North in the ear, or rather inform			7 37 52	20 51 42	4.5
			15 10 56	35 34 03	6
			11 55 46	28 35 31	6.7
In the top of the main proced. of little Δ			5 42 45	13 09 56	6
North of the triangle			6 08 55	13 21 09	6
35.					
			8 11 57	17 18 51	6.7
Poſter. and ſouth. in the ſame			6 33 16	12 53 28	6
			19 41 51	38 29 08	6
		♓	13 48 43	27 09 30	6.7
			15 0 29	25 54 02	6
40.					
			15 17 33	25 56 59	6.7
Preced. of the con. ſtars in the neck	ζ		11 49 06	17 42 03	3
South in the hind knee	υ		20 35 43	34 25 43	5
North in the ſame knee	η		21 24 12	35 07 01	3
			16 29 36	25 05 48	6.7
45.					
Laſt of the contig. in the neck	ξ		13 37 19	18 27 18	5
Preced. of two in the breaſt	λ		18 43 48	28 48 12	4
Subſeq.	μ		20 03 20	29 23 32	4
North of two in the mane	σ		13 57 01	15 43 34	6
South of the ſame			14 14 06	14 30 06	6
50.					
			19 56 37	25 11 47	6
	S		16 21 59	16 46 18	6
In the riſe of the hind leg Scheat.	β		25 02 13	31 08 06	2
In the ſhould. of the wing Markab	α		19 09 13	19 24 37	2
Preced. of the north in the ſmall □ of the neck	l		17 14 16	13 53 52	5
55.					
That under Scheat.			24 28 48	28 28 30	5.6
Preced. of ſouth in □ of neck	m		17 31 19	12 58 10	6
Laſt of north	n		18 06 39	13 57 58	6
Laſt of ſouth	p		18 03 32	12 47 24	6.5
			26 16 4	29 13 48	6
60.					
			27 53 40	30 05 17	6
North of two under the wing in the body	τ		26 44 08	25 33 57	6
		♈	0 10 38	31 31 39	6
Preced. of five in the belly			1 11 12	32 39 01	6
		♓	25 50 08	22 44 22	6
65.					
Preced. of two behind Markab.			22 10 23	14 57 25	6
Second and north in the belly		♈	02 15 3	33 1 19	6.7
South of two under the wing	υ	♓	27 38 15	24 47 52	6
			29 01 51	26 09 20	6
That behind Markab.	q		23 45 06	14 45 25	5.6
70.					
That in the right line with the 69th and 63d	y		29 04 02	23 10 09	6
Third and middle in the belly		♈	03 35 42	31 01 57	6
			4 56 31	32 53 00	6
		♓	27 25 39	17 37 36	7
Preced. in the middle of the wing	ς		28 12 34	19 00 48	6
75.					
			28 23 55	16 40 02	6
			26 00 19	11 07 40	6
Fourth in the belly		♈	4 46 00	28 18 05	5.6
South of five in the belly			5 45 24	27 16 20	6
		♓	27 24 45	9 24 26	6
80.					
Middl. in the mid. wing	φ	♈	1 49 59	18 13 41	6
		♓	28 22 33	10 45 59	6
North in the mid. wing.	r	♈	3 03 01	20 35 00	6
North in the extreme of the wing	ψ		5 45 50	23 09 16	6
			7 37 33	24 34 42	6
85.					
			2 22 00	11 42 38	5.6
	u		5 09 17	15 46 15	6
Tip of the wing, Algenib	γ		4 49 50	12 35 12	2
South in the extrem. of the wing	χ	♓	7 15 42	17 01 40	6

PEGEMUS, one of the many names by which the chemiſts have called mercury.

PEGMA, among the Romans, a wooden machine, uſed in theatrical entertainments, which was raiſed and let down by ſecret engines, whence it was ſaid to grow. See PEGMATES.

PEGMATES, or rather PEGMARES, in *Antiquity*, a name given to certain gladiators, as well as artificers among the Romans.

The ancients ſometimes exhibited ſhews of a ſort of moving machine, called *pegmata*: theſe were ſcaffolds variouſly adorned, ſomewhat after the manner of thoſe now raiſed for fire-works.

Theſe ſcaffolds, being made to play, and riſe aloft, either threw up into the air the matters wherewith they were charged; and, among the reſt, men, who were thus ſacrificed to afford the people diverſion; or elſe they precipitated them into holes dug in the ground, where they lighted their funeral piles; or finally into the dens of wild beaſts.

Both the miſerable people thus ſacrificed, and the workmen that made and played the machines, were called *pegmates*, or *pegmares*.

According to Caſaubon, fire was ſet to the ſcaffold: and the *pegmates* were to ſave themſelves through the flames, and the wreck of the machine.

Lipſius only ſays, that the *pegmates* were ſuch gladiators as fought on ſcaffolds erected for that purpoſe. They were alſo called *petauriſtæ*, q. d. *fliers in the air*.

PEGOMANTIA, Πηγομαντεια, in *Antiquity*, a ſpecies of divination, which was performed with fountain water. See HYDROMANCY.

PEGORELLA, in *Ichthyology*, a name by which ſome have called a fiſh of the truttaceous kind, caught in the Mediterranean, and more uſually called CALLARIAS.

PELADA, a kind of ALOPECIA, or diſtempered ſtate of the body, occaſioning the ſhedding of the hair, ariſing from a venereal cauſe.

PELÆAS, Πελειας, in *Ornithology*, the name by which the ancients called that ſpecies of pigeon now known by the name of the LIVIA, and *ſaſſarolla*; a grey pigeon, of a very ſmall ſize, and with ſome variegations of purple and green.

PELAGIÆ, formed of ϖελαγος, *marine*, or belonging to the ſea, in *Natural Hiſtory*, a term uſed to expreſs ſuch ſea ſhells and fiſhes, as never, or very rarely, are found near the ſhores; but always reſide in the deep, or in thoſe parts of the bottom of the ſea which are moſt remote from land.

PELAGIA, in *Natural Hiſtory*, a name by which Pliny, and other of the ancient naturaliſts, have uſually called the PURPURA.

PELAGIANS, *Pelagiani*, in *Eccleſiaſtical Hiſtory*, the denomination of a ſect, well known in the church by the writings of St. Auguſtine.

The author of this ſect, *Pelagius*, properly called *Morgan*, was a monk of Bangor: but the learned are at a loſs whether it was of the monaſtery of Bangor in Wales, or that of the ſame name and order in Ireland. But he was a cotemporary with St. Jerom, and St. Auguſtine; and quitted his country to go and live in the Eaſt, according to the cuſtom of the monks of thoſe days, who were not attached to particular houſes like thoſe of our own time.

Cæleſtius, as ſome ſay, a native of Ireland, according to others, of Scotland, and again, as others ſay, of Campania, in Italy, was the colleague of *Pelagius*, in forming this ſect. They both lived at Rome in great reputation, and were univerſally eſteemed on account of their extraordinary piety and virtue. About the year 410, they publiſhed their doctrine, firſt in Sicily, and afterwards in Africa. From Africa *Pelagius* paſſed into Paleſtine, and Cæleſtius remained at Carthage, whence, his errors being condemned in a council, A D. 412, he went into the Eaſt. The former, under the protection of John, biſhop of Jeruſalem, made a public profeſſion of his opinions, and formed diſciples in ſeveral places. Soon after the controverſy was brought to Rome, and referred by *Pelagius* and Cæleſtius to the deciſion of Zozimus, who was raiſed to the pontificate, A. D. 417; and he pronounced in their favour: however he was prevailed upon by the remonſtrance of the Africans to change his mind, and he ſeverely condemned thoſe two perſons, whom he had honoured with his approbation, and covered with his protection. They were alſo condemned by the council of Epheſus, A. D. 431; and, in ſhort, the Gauls, Britons and Africans, by their councils, and emperors, by their edicts and penal laws, demoliſhed this ſect in its infancy.

Pelagius abſolutely denied all original ſin, which he held to be the mere invention of St. Auguſtine; and taught that men are entire maſters of their actions, and perfectly free creatures; in oppoſition to all predeſtination, reprobation, election, &c.

He owned, indeed, that the natural power of man needed to be aſſiſted by the grace of God, to enable him to work out his own ſalvation; but, by this grace, he only meant outward aſſiſtance, viz. the doctrines of the law, and of the goſpel.

Though, when preſſed by thoſe words of St. Paul, *Deus eſt enim, qui operatur in nobis*, &c. he owned that it is God, in effect, that makes us will what is good, when he warns and excites us by the greatneſs of the glory we are to obtain, and by the promiſes of rewards; when he makes us love him by revealing his wiſdom, &c.

Theſe are *Pelagius's* own words, as cited by St. Auguſtine; who confutes him, and ſhews, that, beſides theſe exterior graces, there are required other real and interior ones.

He owned, that the will of man is indeed aided by a real grace; but he added, that this grace is not abſolutely neceſſary in order to live well; but that it only helps us to do well with the more eaſe.

Julian, one of his adherents, went farther yet; and owned that the aſſiſtance of grace was abſolutely neceſſary to enable us to do perfect works.

In effect, the grand doctrine of the *Pelagians* was, that a man might accompliſh all the commands of God by the mere power of nature; and that the gifts of grace were only neceſſary to enable him to act well more eaſily, and more perfectly.

PELAGIANS, *ſemi*. See SEMI-PELAGIANS.

PELAMYS, in *Ichthyology*, a name by which the ancients expreſſed the young brood of the *thynnus*, or tunny fiſh, at a certain age and ſize; but later writers have appropriated the word for the name of a diſtinct ſpecies of fiſh of the ſame genus, called by others *ſarda*; and by ſome by the two names joined into one, *pelamys-ſarda*.

It is a ſea-fiſh, of the ſhape of the tunny; but of a ſmooth ſkin, and free from ſcales every where, except about the gill-fins; its teeth are large, long, and crooked. Theſe are the only external marks by which it is to be known from the young brood of the tunny; but when brought to the table, it is eaſily diſtinguiſhed by the hardneſs of its fleſh.

PELAMYS *vera*, a name given by Rondeletius, and ſome other authors, to the fiſh more diſtinctly known by the name of AMIA.

PELANI, Πελανοι, among the Athenians, a kind of cakes uſed in their libations.

PELATÆ, Πεκαλαι, in *Antiquity*, a particular kind of ſervants among the Athenians.

The *pelatæ* were free-born citizens, who by reaſon of their indigence, were forced to ſerve for wages. They had no ſuffrage in public affairs, as not being maſters of an eſtate proper to qualify them for giving their votes; but this reſtriction was not perpetual. They were otherwiſe called *thetes*, and continued in the condition of ſervants only during their own pleaſure and neceſſities; for they had power either to change their maſters, or (if they became able to ſubſiſt themſelves) wholly to releaſe themſelves from ſervitude.

PELECAN, in *Ornithology*. See PELICAN.

PELECANUS, a name given by ſome authors to the *platea*, or ſpoon-bill; a bird very different from the pelican, being of the ſtork or heron kind.

PELECINUS, in *Botany*, the name given by Tournefort to the BISERRULA.

PELECOID *angle*. See ANGLE.

PELECOIDES, from πελεκυς, *hatchet*, and ειδος, *form*, in *Geometry*, a figure in form of a hatchet.

Such is the figure B C D A, *Tab.* III. *Geometry*, *fig.* 67. contained under the two inverted quadrantal arcs A B and A D, and the ſemicircle B C D.

The area of the *pelecoides* is demonſtrated to be equal to the ſquare A C; and that, again, to the rectangle E B. It is equal to the ſquare A C, becauſe it wants of the ſquare on the left hand, the two ſegments A B and A D, which are equal to the two ſegments B C and C D, by which it exceeds on the right hand.

PELICAN, in the Linnæan ſyſtem of *Ornithology*, makes a diſtinct genus of birds of the order of the *anſeres*; the characteriſtic of which is to have a ſtrait beak, with a hooked point, and furniſhed with a large bag or purſe beneath. There are eight ſpecies.

The common *pelican*, called *onocrotalus*, is of the ſize of a gooſe, or larger, and is of a greyiſh white all over, except that the neck looks a little yellowiſh, and the middles of the back feathers are blackiſh; the bill is remarkably long, and hooked at the end, and has under it a lax membrane, extended alſo to the throat, which makes a bag or ſack capable of holding a very large quantity; its feet are webbed as in the duck and gooſe, all the toes being joined by the membrane. There is one very ſingular thing in this bird, which is, that its bones are ſolid, containing no marrow, and are all pellucid.

PELLA, in *Ornithology*, a name by which many have called the common grey HERON.

PELLACK, the name of a young ſpout whale, often found in Zetland; where they run into creeks, and ſo entangle themſelves among the rocks, that they are caſt on ſhore, or eaſily taken. Phil. Tranſ. N° 473, ſect. 8.

PELLAGE, in our *Old Writers*, a cuſtom or duty paid for ſkins or leather.

PELLETS, in *Heraldry*, a name given thoſe roundlets which are black, called alſo *ogreſſes* and *gun-ſtones*.

PELLICAN, or PELECAN, among the *Chemiſts*, a kind of double veſſel, ordinarily of glaſs: uſed in working on liquors, by circulation.

It has a tubulated capital, from which two oppoſite and crooked beaks paſs out, and enter again at the belly of the cucurbit. Two matraſſes, the mouth of one of which is inſerted into the mouth of the other, anſwer the ſame purpoſe with this veſſel.

PELLICAN alſo denotes an inſtrument uſed by ſurgeons, &c. to draw teeth.

PELLICAN, again, is the name of an ancient piece of ordnance, carrying a ball of ſix pounds; by the French made eight feet and a half, and by the Dutch nine feet long. See CANNON.

PELLICLE, *pellicula*, a diminutive of *pellis*, *ſkin*, a thin, film or fragment of a membrane or ſkin.

The epidermis, or cuticula, is a little *pellicle*, covering the derma, cutis, or ſkin. See CUTICULA.

The valves of the veins and arteries are inſenſible *pellicles*, which open and ſhut to promote the circulation.

When any chemical ſolution is evaporated in a gentle heat, till a thin ſkin or film ariſes a-top, it is called an evaporation to a *pellicle*: in this caſe there is but juſt liquor enough left to keep ſalts in fuſion.

PELLITORY *of Spain*, in *Botany*: for the characters ſee CHAMOMILE.

This is a perennial plant with a long taper root, like a carrot, and grows naturally in Spain and Portugal, from whence its roots are brought to England. The branches trail upon the ground, and ſpread a foot or more on every ſide, having five winged leaves like thoſe of the common chamomile; at the extremity of each branch is plaſter in which rue was a principal ingredient, from *peganon*, the Greek name of rue.

PEGANON, or PEGANUM, a name uſed by ſome authors for the *ruta ſylveſtris*, or wild rue; called *harmala*, or *harmel*, in the ſhops. See *Wild Aſſyrian* RUE.

PEGASUS, in *Ichthyology*, is a genus of the *amphibia nantes*; the characters of which are, that the mouth is furniſhed with a retractile proboſcis, the upper jaw is denticulated, and the ſnout is linear and ſword-ſhaped; the opening of the gills is before the pectoral fins, the body is articulated by bony joints, and the ventral fins are abdominal. There are three ſpecies, inhabitants of the Indian ſeas.

PEGASUS, among the *Poets*, a horſe imagined to have wings, being that whereon Bellerophon was fabled to be mounted when he engaged the Chimera.

The opening of the fountain Hippocrene, on mount Helicon, is aſcribed to a blow of *Pegaſus's* hoof. It is feigned to have flown away to heaven; where it became a conſtellation. Hence,

PEGASUS, in *Aſtronomy*, the name of a conſtellation of the northern hemiſphere, figured in form of a flying horſe. The ſtars in this conſtellation, in Ptolemy's Catalogue, are twenty, in Tycho's nineteen, in Hevelius's thirty-eight, in the Britannic Catalogue eighty-nine. Their longitudes, latitudes, magnitudes, &c. are as follow:

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longitud	Latitude. North.	Magnitude.
			° ′ ″	° ′ ″	
Preced. In the triangle over	e	♒	25 58 39	33 18 39	4
Nor. Pegaſus's mouth	f		29 49 57	36 09 30	4.5
			24 43 41	19 38 14	6
			24 36 55	18 46 05	6
			29 49 32	31 28 35	6.7
5.					
			23 37 56	15 21 40	6
			25 21 11	18 21 36	6
Pegaſus's mouth	ε		27 33 32	22 07 16	3
Poſter. and ſouth. in the triangle	g	♓	0 41 04	29 02 49	4.5
In the heel of the preced. foot.	κ		4 37 10	36 39 05	4
10.					
		♒	25 39 21	15 06 59	6
		♓	3 34 17	34 05 10	6
			2 04 04	28 28 58	6
			8 25 13	40 15 40	6
			8 19 10	38 46 07	6
15.					
			6 54 27	36 07 07	6
			1 35 20	23 01 46	6
			0 16 21	17 46 20	5
			1 06 39	19 06 36	6
			3 01 42	23 37 20	6
20.					
			2 51 41	21 47 57	5
South of two in the head	ν		0 58 06	15 42 01	5
			11 39 57	37 40 34	6
In the preced. knee	ι		10 04 09	34 16 48	4
			8 31 30	30 51 42	6.7
25.					
North in the head	θ		2 28 46	16 21 48	4
			15 04 15	41 03 45	5
In the heel of the hind foot			8 48 51	29 57 44	6.7
	π		15 15 13	40 59 52	4.5
Small one againſt the ear			4 48 30	15 01 47	6
30.					
North in the ear, or rather inform			7 37 52	20 51 42	4.5
			15 10 56	35 34 03	6
			11 55 46	28 35 31	6.7
In the top of the main proced. of little Δ			5 42 45	13 09 56	6
North of the triangle			6 08 55	13 21 09	6
35.					
			8 11 57	17 18 51	6.7
Poſter. and ſouth. in the ſame			6 33 16	12 53 28	6
			19 41 51	38 29 08	6
		♓	13 48 43	27 09 30	6.7
			15 0 29	25 54 02	6
40.					
			15 17 33	25 56 59	6.7
Preced. of the con. ſtars in the neck	ζ		11 49 06	17 42 03	3
South in the hind knee	υ		20 35 43	34 25 43	5
North in the ſame knee	η		21 24 12	35 07 01	3
			16 29 36	25 05 48	6.7
45.					
Laſt of the contig. in the neck	ξ		13 37 19	18 27 18	5
Preced. of two in the breaſt	λ		18 43 48	28 48 12	4
Subſeq.	μ		20 03 20	29 23 32	4
North of two in the mane	σ		13 57 01	15 43 34	6
South of the ſame			14 14 06	14 30 06	6
50.					
			19 56 37	25 11 47	6
	S		16 21 59	16 46 18	6
In the riſe of the hind leg Scheat.	β		25 02 13	31 08 06	2
In the ſhould. of the wing Markab	α		19 09 13	19 24 37	2
Preced. of the north in the ſmall □ of the neck	l		17 14 16	13 53 52	5
55.					
That under Scheat.			24 28 48	28 28 30	5.6
Preced. of ſouth in □ of neck	m		17 31 19	12 58 10	6
Laſt of north	n		18 06 39	13 57 58	6
Laſt of ſouth	p		18 03 32	12 47 24	6.5
			26 16 4	29 13 48	6
60.					
			27 53 40	30 05 17	6
North of two under the wing in the body	τ		26 44 08	25 33 57	6
		♈	0 10 38	31 31 39	6
Preced. of five in the belly			1 11 12	32 39 01	6
		♓	25 50 08	22 44 22	6
65.					
Preced. of two behind Markab.			22 10 23	14 57 25	6
Second and north in the belly		♈	02 15 3	33 1 19	6.7
South of two under the wing	υ	♓	27 38 15	24 47 52	6
			29 01 51	26 09 20	6
That behind Markab.	q		23 45 06	14 45 25	5.6
70.					
That in the right line with the 69th and 63d	χ		29 04 02	23 10 09	6
Third and middle in the belly		♈	03 35 42	31 01 57	6
			4 56 31	32 53 00	6
		♓	27 25 39	17 37 36	7
Preced. in the middle of the wing	s		28 12 34	19 00 48	6
75.					
			28 23 55	16 40 02	6
			26 00 19	11 07 40	6
Fourth in the belly		♈	4 46 00	28 18 05	5.6
South of five in the belly			5 45 24	27 16 20	6
		♓	27 24 45	9 24 26	6
80.					
Middl. in the mid. wing	φ	♈	1 49 59	18 13 41	6
		♓	28 22 33	10 45 59	6
North in the mid. wing.	r	♈	3 03 01	20 35 00	6
North in the extreme of the wing	ψ		5 45 50	23 09 16	6
			7 37 33	24 34 42	6
85.					
			2 22 00	11 42 38	5.6
	u		5 09 17	15 46 15	6
Tip of the wing, Algenib	γ		4 49 50	12 35 12	2
South in the extrem. of the wing	χ	♓	7 15 42	17 01 40	6

PEGEMUS, one of the many names by which the chemiſts have called mercury.

PEGMA, among the Romans, a wooden machine, uſed in theatrical entertainments, which was raiſed and let down by ſecret engines, whence it was ſaid to grow. See PEGMATES.

PEGMATES, or rather PEGMARES, in *Antiquity*, a name given to certain gladiators, as well as artificers among the Romans.

The ancients ſometimes exhibited ſhews of a ſort of moving machine, called *pegmata*: theſe were ſcaffolds variouſly adorned, ſomewhat after the manner of thoſe now raiſed for fire-works.

Theſe ſcaffolds, being made to play, and riſe aloft, either threw up into the air the matters wherewith they were charged; and, among the reſt, men, who were thus ſacrificed to afford the people diverſion; or elſe they precipitated them into holes dug in the ground, where they lighted their funeral piles; or finally into the dens of wild beaſts.

Both the miſerable people thus ſacrificed, and the workmen that made and played the machines, were called *pegmates*, or *pegmares*.

According to Caſaubon, fire was ſet to the ſcaffold: and the *pegmates* were to ſave themſelves through the flames, and the wreck of the machine.

Lipſius only ſays, that the *pegmates* were ſuch gladiators as fought on ſcaffolds erected for that purpoſe. They were alſo called *petauriſtæ*, q. d. *fliers in the air*.

PEGOMANTIA, Πηγομαντεια, in *Antiquity*, a ſpecies of divination, which was performed with fountain water. See HYDROMANCY.

PEGORELLA, in *Ichthyology*, a name by which ſome have called a fiſh of the truttaceous kind, caught in the Mediterranean, and more uſually called CALLARIAS.

PELADA, a kind of ALOPECIA, or diſtempered ſtate of the body, occaſioning the ſhedding of the hair, ariſing from a venereal cauſe.

PELÆAS, Πελειας, in *Ornithology*, the name by which the ancients called that ſpecies of pigeon now known by the name of the LIVIA, and *ſaſſarolla*; a grey pigeon, of a very ſmall ſize, and with ſome variegations of purple and green.

PELAGIÆ, formed of ϖελαγος, *marine*, or belonging to the ſea, in *Natural Hiſtory*, a term uſed to expreſs ſuch ſea ſhells and fiſhes, as never, or very rarely, are found near the ſhores; but always reſide in the deep, or in thoſe parts of the bottom of the ſea which are moſt remote from land.

PELAGIA, in *Natural Hiſtory*, a name by which Pliny, and other of the ancient naturaliſts, have uſually called the PURPURA.

PELAGIANS, *Pelagiani*, in *Eccleſiaſtical Hiſtory*, the denomination of a ſect, well known in the church by the writings of St. Auguſtine.

The author of this ſect, *Pelagius*, properly called *Morgan*, was a monk of Bangor: but the learned are at a loſs whether it was of the monaſtery of Bangor in Wales, or that of the ſame name and order in Ireland. But he was a cotemporary with St. Jerom, and St. Auguſtine; and quitted his country to go and live in the Eaſt, according to the cuſtom of the monks of thoſe days, who were not attached to particular houſes like thoſe of our own time.

Cæleſtius, as ſome ſay, a native of Ireland, according to others, of Scotland, and again, as others ſay, of Campania, in Italy, was the colleague of *Pelagius*, in forming this ſect. They both lived at Rome in great reputation, and were univerſally eſteemed on account of their extraordinary piety and virtue. About the year 410, they publiſhed their doctrine, firſt in Sicily, and afterwards in Africa. From Africa *Pelagius* paſſed into Paleſtine, and Cæleſtius remained at Carthage, whence, his errors being condemned in a council, A D. 412, he went into the Eaſt. The former, under the protection of John, biſhop of Jeruſalem, made a public profeſſion of his opinions, and formed diſciples in ſeveral places. Soon after the controverſy was brought to Rome, and referred by *Pelagius* and Cæleſtius to the deciſion of Zozimus, who was raiſed to the pontificate, A. D. 417; and he pronounced in their favour: however he was prevailed upon by the remonſtrance of the Africans to change his mind, and he ſeverely condemned thoſe two perſons, whom he had honoured with his approbation, and covered with his protection. They were alſo condemned by the council of Epheſus, A. D. 431; and, in ſhort, the Gauls, Britons and Africans, by their councils, and emperors, by their edicts and penal laws, demoliſhed this ſect in its infancy.

Pelagius abſolutely denied all original ſin, which he held to be the mere invention of St. Auguſtine; and taught that men are entire maſters of their actions, and perfectly free creatures; in oppoſition to all predeſtination, reprobation, election, &c.

He owned, indeed, that the natural power of man needed to be aſſiſted by the grace of God, to enable him to work out his own ſalvation; but, by this grace, he only meant outward aſſiſtance, viz. the doctrines of the law, and of the goſpel.

Though, when preſſed by thoſe words of St. Paul, *Deus eſt enim, qui operatur in nobis*, &c. he owned that it is God, in effect, that makes us will what is good, when he warns and excites us by the greatneſs of the glory we are to obtain, and by the promiſes of rewards; when he makes us love him by revealing his wiſdom, &c.

Theſe are *Pelagius's* own words, as cited by St. Auguſtine; who confutes him, and ſhews, that, beſides theſe exterior graces, there are required other real and interior ones.

He owned, that the will of man is indeed aided by a real grace; but he added, that this grace is not abſolutely neceſſary in order to live well; but that it only helps us to do well with the more eaſe.

Julian, one of his adherents, went farther yet; and owned that the aſſiſtance of grace was abſolutely neceſſary to enable us to do perfect works.

In effect, the grand doctrine of the *Pelagians* was, that a man might accompliſh all the commands of God by the mere power of nature; and that the gifts of grace were only neceſſary to enable him to act well more eaſily, and more perfectly.

PELAGIANS, *ſemi*. See SEMI-PELAGIANS.

PELAMYS, in *Ichthyology*, a name by which the ancients expreſſed the young brood of the *thynnus*, or tunny fiſh, at a certain age and ſize; but later writers have appropriated the word for the name of a diſtinct ſpecies of fiſh of the ſame genus, called by others *ſarda*; and by ſome by the two names joined into one, *pelamys-ſarda*.

It is a ſea-fiſh, of the ſhape of the tunny; but of a ſmooth ſkin, and free from ſcales every where, except about the gill-fins; its teeth are large, long, and crooked. Theſe are the only external marks by which it is to be known from the young brood of the tunny; but when brought to the table, it is eaſily diſtinguiſhed by the hardneſs of its fleſh.

PELAMYS *vera*, a name given by Rondeletius, and ſome other authors, to the fiſh more diſtinctly known by the name of AMIA.

PELANI, Πελανοι, among the Athenians, a kind of cakes uſed in their libations.

PELATÆ, Πεκαται, in *Antiquity*, a particular kind of ſervants among the Athenians.

The *pelatæ* were free-born citizens, who by reaſon of their indigence, were forced to ſerve for wages. They had no ſuffrage in public affairs, as not being maſters of an eſtate proper to qualify them for giving their votes; but this reſtriction was not perpetual. They were otherwiſe called *thetes*, and continued in the condition of ſervants only during their own pleaſure and neceſſities; for they had power either to change their maſters, or (if they became able to ſubſiſt themſelves) wholly to releaſe themſelves from ſervitude.

PELECAN, in *Ornithology*. See PELICAN.

PELECANUS, a name given by ſome authors to the *platea*, or ſpoon-bill; a bird very different from the pelican, being of the ſtork or heron kind.

PELECINUS, in *Botany*, the name given by Tournefort to the BISERRULA.

PELECOID *angle*. See ANGLE.

PELECOIDES, from πελεκυς, *hatchet*, and ειδος, *form*, in *Geometry*, a figure in form of a hatchet.

Such is the figure B C D A, *Tab*. III. *Geometry*, *fig*. 67: contained under the two inverted quadrantal arcs A B and A D, and the ſemicircle B C D.

The area of the *pelecoides* is demonſtrated to be equal to the ſquare A C; and that, again, to the rectangle E B. It is equal to the ſquare A C, becauſe it wants of the ſquare on the left hand, the two ſegments A B and A D, which are equal to the two ſegments B C and C D, by which it exceeds on the right hand.

PELICAN, in the Linnæan ſyſtem of *Ornithology*, makes a diſtinct genus of birds of the order of the *anſeres*; the characteriſtic of which is to have a ſtrait beak, with a hooked point, and furniſhed with a large bag or purſe beneath. There are eight ſpecies.

The common *pelican*, called *onocrotalus*, is of the ſize of a gooſe, or larger, and is of a greyiſh white all over, except that the neck looks a little yellowiſh, and the middles of the back feathers are blackiſh; the bill is remarkably long, and hooked at the end, and has under it a lax membrane, extended alſo to the throat, which makes a bag or ſack capable of holding a very large quantity; its feet are webbed as in the duck and gooſe, all the toes being joined by the membrane. There is one very ſingular thing in this bird, which is, that its bones are ſolid, containing no marrow, and are all pellucid.

PELLA, in *Ornithology*, a name by which many have called the common grey HERON.

PELLACK, the name of a young ſpout whale, often found in Zetland; where they run into creeks, and ſo entangle themſelves among the rocks, that they are caſt on ſhore, or eaſily taken. Phil. Tranſ. N° 473, ſect. 8.

PELLAGE, in our *Old Writers*, a cuſtom or duty paid for ſkins or leather.

PELLETS, in *Heraldry*, a name given thoſe roundlets which are black, called alſo *ogreſſes* and *gun-ſtones*.

PELLICAN, or PELECAN, among the *Chemiſts*, a kind of double veſſel, ordinarily of glaſs: uſed in working on liquors, by circulation.

It has a tubulated capital, from which two oppoſite and crooked beaks paſs out, and enter again at the belly of the cucurbit. Two matraſſes, the mouth of one of which is inſerted into the mouth of the other, anſwer the ſame purpoſe with this veſſel.

PELLICAN alſo denotes an inſtrument uſed by ſurgeons, &c. to draw teeth.

PELLICAN, again, is the name of an ancient piece of ordnance, carrying a ball of ſix pounds; by the French made eight feet and a half, and by the Dutch nine feet long. See CANNON.

PELLICLE, *pellicula*, a diminutive of *pellis*, *ſkin*, a thin, film or fragment of a membrane or ſkin.

The epidermis, or cuticula, is a little *pellicle*, covering the derma, cutis, or ſkin. See CUTICULA.

The valves of the veins and arteries are inſenſible *pellicles*, which open and ſhut to promote the circulation.

When any chemical ſolution is evaporated in a gentle heat, till a thin ſkin or film ariſes a-top, it is called an evaporation to a *pellicle*: in this caſe there is but juſt liquor enough left to keep ſalts in fuſion.

PELLITORY *of Spain*, in *Botany*: for the characters ſee CHAMOMILE.

This is a perennial plant with a long taper root, like a carrot, and grows naturally in Spain and Portugal, from whence its roots are brought to England. The branches trail upon the ground, and ſpread a foot or more on every ſide, having five winged leaves like thoſe of the common chamomile; at the extremity of each branch is produced one large ſingle flower, like *chamomile*, but much larger; the rays of which are of a pure white within, but purple on their outſide; it flowers in June or July, and the ſeeds are ripe in September; but unleſs the ſeaſon is warm and dry, they will not ripen in England.

The druggiſts ſell us indiſcriminately two kinds; the one the root of a corymbiferous plant, called by authors *pyrethrum flore Bellidis*, or the daiſy-flowered *pellitory* of Spain; the other, the *pyrethrum umbelliferum*, or *umbelliferous pellitory*: and it is a diſpute among the learned, which of the two is the genuine and proper kind. The deſcription left us of it by Dioſcorides, as it is differently written, ſerving as well to prove the one ſo as the other.

They are both uſed in the tooth-ach, and are preſcribed by ſome in diſeaſes of the head and nerves, and are found to be diuretic and violently ſudorific, but they are very ſeldom given.

Pellitory, *double*, in *Botany*. See Achillea, and Yarrow.

Pellitory *of the wall*, *parietaria*, in *Botany*, a genus of the *polygamia monoecia* claſs. Its characters are theſe: it hath hermaphrodite and female flowers upon the ſame plant; there are two hermaphrodite flowers contained in a four-leaved involucrum: they have no petals, but four permanent awl-ſhaped ſtamina, with an oval germen, ſupporting a ſlender coloured ſtyle, crowned by a pencil-ſhaped ſtigma; the germen afterwards turns to an oval ſeed, wrapped up in the empalement: the female flowers have no ſtamina, but in other reſpects are the ſame as the hermaphrodite. Linnæus enumerates ſix, and Miller two ſpecies.

The *pellitory* of the ſhops is a plant of a long time famous in medicine. It is cooling and abſtergent; decoctions, and the expreſſed juice of the leaves are preſcribed in ſtranguries, and in caſes of gravel or ſmall ſtones in the kidneys; and are an ingredient in many of the ſhop-compoſitions intended for thoſe purpoſes; they are ſometimes made an ingredient in decoctions for clyſters, to be given in nephritic caſes, and externally are much recommended in the eryſipelas, and for the ſoftening of hard tumors.

PELLS, *clerk of the* Pells. See Clerk *of the Pells*.

Pells, *comptrollers of the*. See Comptroller.

PELLUCID, formed of *pelluceo*, or *perluceo*, *I ſhine through*, a term of the ſame import with diaphanous, or tranſparent.

Pellucid ſtands oppoſed to opake.

PELLUCIDITY, diaphaneity, or transparency, &c.

PELOPIA, ϖολοπεια, in *Antiquity*, a feſtival celebrated by the Eleans, in honour of Pelops, for whom that nation had more veneration than for any other hero.

PELORIA, ϖελωρια, in *Antiquity*, a feſtival not unlike the Roman Saturnalia, celebrated by the Theſſalonians.

PELORIDES, in *Natural Hiſtory*, a name given by ſome to a peculiar ſpecies of chama. Bellonius who firſt uſed the word, never gives it alone as the name of the ſhell, but only uſes it as an epithet derived from *peloro*, the name of the place where a particular ſpecies of chama was very frequent.

PELT-*wool*, wool ſtripped of the ſkin or *pelt* of a dead ſheep.

PELTA, ϖελτη, in *Antiquity*, a kind of buckler, uſed among the ancients.

The *pelta* was ſmall, light, and more manageable than the parma.

It appears from Virgil, and other authors, that the *pelta* was the buckler uſed by the Amazons: and Xenophon obſerves that the *pelta* of the Amazons was ſhaped like a leaf of ivy. Pliny, ſpeaking of the Indian fig-tree, ſays its leaves are of the width of the Amazonian *pelta*. Servius on the Æneid ſays, the *pelta* reſembled the moon in her firſt quarter.

PELTÆ, in *Botany*, are the fructification of the lichen, and are really the petals of the flower; they are flat, and for the moſt part faſtened to the edges of the leaves.

PELTARIA, in *Botany*, a genus of the *tetradynamia ſiliculoſa* claſs: its characters are, that the fruit is an entire, almoſt orbicular, compreſſed pod. There is only one ſpecies.

PELTASTES, ϖελταϛης, among the *Ancients*, one who uſed the buckler called pelta.

PELTATED-*leaf*, Peltatum *folium*, among *Botaniſts*. See Leaf.

PELVIS, in *Anatomy*, the lower part of the cavity of the abdomen; thus called from its reſemblance to a baſon, or ewer, called in Latin *pelvis*.

The *pelvis* is always much larger in women than in men, to give room for the growth, &c. of the fœtus.

It is well fortified with bones, to ſcreen the contents from external injuries. The oſſa ilia, coxendicis, pubis, and the ſacrum, comprehend or environ the *pelvis*.

The *pelvis* is the third and loweſt part of the trunk, conſiſting chiefly of two large pieces, called *oſſa innominata*; (ſee Os), which being united anteriorly by a cartilaginous ſymphyſis, and poſteriorly to the two ſides of the os ſacrum, repreſent a kind of baſon. When conſidered ſeparately, they are of no determinate figure; being of different breadths in different parts, and unequally convex on the outſide, and unequally cancave within. Each bone is but one piece in adults, but in children each conſiſts of three pieces, joined together by a cartilage; which afterwards perfectly oſſifies, leaving commonly no veſtige of the firſt diviſion. Anatomiſts conſider it, however, even in adalts, as made up of three portions; and diſtinguiſh them by different names, as if they were three different bones. Of theſe three bones, the largeſt is ſuperior and poſterior, and is called *os ilium*. The ſecond inferior called *os iſchium*; and the third and ſmalleſt anterior called *os pubis*. Without entering on the particular deſcription of theſe (which, ſee under their proper heads), it is to be obſerved, that there are in the entire bone ſeveral common parts, or parts which belong to more portions of it than one, viz. a deep cartilaginous cotyloide cavity, called in Latin *acetabulum*: this is formed by all the three portions: a large opening, called the *foramen ovale*, formed by the *os iſchium* and *os pubis*: a large poſterior notch or ſinus, called the *iſchiatic* notch, and formed by the *os iſchium* and *os ilium*: an oblique eminence, or protuberance, above the *acetabulum*, toward the *foramen ovale*, made by the *os ilium* and *os pubis*: and to theſe may be added, a ridge on the inſide of the *pelvis*, which divides the wide upper part from the bottom, to which alone the ancients gave the name *pelvis*. Winſlow.

Pelvis *of the kidneys* is a large membraneous ſinus, or cell, in the concave part of the kidneys. See *Tab. Anat.* (*Splanch.*) *fig.* 4. *lit. e*, *dd*, &c.

From the twelve papillæ of the kidneys, there ariſe twelve canals, called *fiſtula membranacea*. Theſe, at length, are collected into three large branches, which, being at laſt united into one, form the *pelvis*; and this again, contracting itſelf, terminates in a membranaceous pipe, called the *ureter*.

The urine, then ſeparated from the blood by the urinary pipes, conveyed to them by the papillæ, and taken up by the fiſtulæ membranaceæ, is brought into the *pelvis*; and thence is diſcharged into the ureter; thence into the bladder, &c. See Urine.

PELUS *armena*, in the *Materia Medica*, a name given by ſome of the old writers to the drug that we at preſent call bole *armoniac*. This was the original name, and the term *bolus armena* is not to be found, but in the later writers.

PEMPHINGOIDES, an epithet beſtowed by Hippocrates on fevers by flatulencies and inflations, in which the patient feels a kind of wind paſſing along under the ſkin, and the phyſician may perceive it in the ſame places riſing againſt the preſſure of his finger, called by ſome an inflative fever.

PEMPTÆUS, a word uſed by medical writers, as the name of an ague, the fits of which return always on the fifth day.

PEN, according to Camden, originally ſignifies a high mountain, which was thus called among the ancient Britons, and even the Gauls. And hence, that tall range which parts Italy and France is called *Apennines*.

Pen is alſo a little inſtrument, uſually formed of a quill, and ſerving to write withal.

Pens, *Dutch*, are thoſe made of quills which have been paſſed through hot aſhes, to take off the groſſer fat and moiſture thereof.

Pen, *fountain*. See Fountain *pen*.

Pen, *ſea*, *pennatula*, in *Natural Hiſtory*, a genus of zoophyte, which, though it ſwims about freely in the ſea, approaches near to the gorgonia. This genus hath a bone along the middle of the inſide, which is its chief ſupport; and this bone receives the ſupply of its oſſeous matter by the ſame polype mouths that furniſh it with nouriſhment. Linnæus reckons ſeven ſpecies.

Pen *ſtock*, a ſort of ſluice or flood-gate placed in the water of a mill-pond, or the like, to retain or let it go at pleaſure.

PENÆA, in *Botany*, a genus of the *tetrandria monogynia* claſs: its characters are, that the empalement conſiſts of two leaves; that the flower is bell-ſhaped; the ſtyle is quadrangular; and the fruit is a four-cornered capſule, containing four cells and eight ſeeds. There are three ſpecies.

PENAL *action*. See Action.

PENALTIES *negative*. See Negative.

PENANCE, *pænitentia*, is properly the exerciſe of *penitence*; and may be defined a puniſhment, either voluntary, or impoſed by legal authority, for the faults a perſon has committed.

The Romaniſts define *penitence*, a ſacrament wherein a perſon, who has the requiſite diſpoſitions, receives abſolution at the hand of the prieſt, of all ſins committed ſince baptiſm.

To a legitimate *penance* they require three things, contrition, abſolution, and ſatisfaction.

Their prieſts receive a power of adminiſtering the ſacrament of *penance*, when they receive the prieſthood; but to exerciſe this power, it is required they have the juriſdiction of an ordinary, i. e. that they have a benefice, either original or delegated; with the approbation of the biſhop to hear confeſſions. See POPERY.

PENANCE is particularly uſed in the Romiſh church, for the penalty which a confeſſor impoſes, for the ſatisfaction of the ſins whereof a perſon is abſolved.

The ancient diſcipline, Du-Pin obſerves, was very ſevere on the head of *penance*: for great crimes, people were excluded the communion of the church, expelled the aſſemblies of the faithful, obliged to faſt, and to mortify themſelves publicly, even at the church-door, cut their hair, go always on foot, &c.

He adds, that thoſe who had done public *penance* were never admitted into the clergy; and that public *penance* was never granted more than once. Thoſe, who fell a ſecond time, were never to be reconciled to the church, and were to look for pardon only at the hands of God.

PENANCE, in our *Canon Law*, is an eccleſiaſtical puniſhment, chiefly adjudged to the ſin of fornication.

The puniſhment is thus deſcribed by the canons: the delinquent is to ſtand in the church-porch on ſome Sunday, bare-head and bare-foot, in a white ſheet, with a white wand in his hand; here bewailing himſelf, and begging every one to pray for him; then to enter the church falling down, and kiſſing the ground; and, at laſt, to be placed on an eminence in the middle of the church, againſt the miniſter, to declare the foulneſs of his crime, odious to God, and ſcandalous to the congregation.

If the crime be not notorious, the canons allow the puniſhment to be commuted at the parties requeſt, for a pecuniary mulct, for the benefit of the poor, &c.

PENATES, in the *Ancient Mythology*, a term applied to all the domeſtic gods, whom the ancients adored in their houſes: whence they are ordinarily confounded with the LARES.

Authors are not all agreed about the origin of the *dii penates*, who were properly the tutelary gods of the Trojans, and were only adopted by the Romans, who gave them the title of *penates*.

De Meziriac, in his notes on Dido's Epiſtle to Æneas, relates at large what he has met withal in the ancient writers on this ſubject: Dionyſius Halicarnaſſeus tells us, that Æneas firſt lodged theſe gods in the city Lavinium; and that his ſon Aſcanius, afterwards, upon building the city Alba, tranſlated them thither; but that they returned twice miraculouſly to Lavinium. The ſame author adds, that in Rome there is ſtill ſeen a dark temple, ſhaded by the adjacent buildings, wherein are the images of the Trojan gods, with the inſcription, Denas, which ſignifies *penates*.

Theſe images repreſent two young men ſitting, each of which holds a lance. I have ſeen, adds Dionyſius, ſeveral other ſtatues of the ſame gods in ancient temples; who all appear like young men dreſſed in habits of war.

Varro fetches theſe *penates* from Samothrace to Phrygia, to be afterwards tranſported by Æneas into Italy. Macrobius, who relates this from Varro, adds alſo, that they were called *penates*, from the Latin words *per quos penitus ſpiramus*, which ſeems a mere ſubtilty. But the real etymology muſt be ſought in the Phrygian, not the Latin tongue.

Cicero, in Aulus Gellius, derives the name hence, *quod penes nos nati ſunt*. Yet in his book de Nat. Deor. he ſays, it is formed from *penus*, *proviſion*; or, perhaps, adds he, *quod penitus inſident*; others ſay, *quia coluntur in penetralibus*.

Roſinus diſtinguiſhes among the *penates*: he makes an order of *penates* of the heavens, ſuch as Pallas in the ethereal region, Jupiter in the middle region, and Juno in the loweſt; beſides *penates* of cities, *penates* of private families, &c. On which footing the *dii penates* were the guardians or tutelary gods of every thing.

It is a popular queſtion among the learned, who who were the *penates* of Rome? Some ſay, Veſta; others, Neptune and Apollo; Vives ſays, Caſtor and Pollux; with whom agrees Voſſius, who adds, that the reaſon of their chooſing Caſtor and Pollux in quality of *penates*, might be the important ſervice they did the Romans in the war againſt the Latins.

Nor are authors more unanimous on the ſubject of the *penates*, which Æneas brought into Italy. Some ſay they were Neptune and Apollo, who built the walls of Troy; others, Jupiter, Juno, and Minerva; and others, Cœlus and Terra.

Dionyſius Halicarnaſſeus, lib. i. ſpeaking of the *dii penates* tells us, that that the hiſtorian Timæus has wrote, that the figure, ſtatue, or effigy of the *denates*, or *penates*, was nothing but a crooked iron, or copper rod, and a Trojan veſſel from potters ware: and that this was all Æneas brought to Troy. But, for himſelf, he uſſures us, he had ſeen a temple at Rome, near the forum, where thoſe gods were repreſented ſitting, under the form of two young men, having each of them a dart in his hand: he adds, that the inſcription was DENATES, for that the ancients, before the invention of the letter P, uſed a D inſtead thereof: but Dionyſius might be miſtaken: for the bottom of the P is frequently ſo very ſmall on medals, that there is no ſenſible difference between a P and a D; which might be the caſe in the inſcription that author mentions; for that the ancient inhabitants of Italy had no P, is a miſtake ſufficiently refuted by many proper names ſtill remaining of the moſt early ages, e. gr. Capys, Capetus, Picus, Pallas. Nor were the Trojans without the ſame, witneſs Palinurus, Paris, Priamus, &c.

PENCE, *Peter*-PENCE. See PETER-*pence*.

PENCE, *pitching*. See PITCHING-*pence*.

PENCIL, from *peniculus*, *penicillus*, or *penicillum*, which ſignify the ſame, formed by diminution of *penis*, an inſtrument uſed by painters, for the application of their colours.

There are *pencils* of various kinds, and made of various matters: the moſt uſual are of badgers and ſquirrels hair, thoſe of ſwans down, and thoſe of boars briſtles; which laſt are bound to a ſtick bigger, or leſs, according to the uſes they are deſtined for; and when large, are called *bruſhes*. The others are incloſed in the barrel of a quill.

The ancients, M. Felibien obſerves, had *pencils* made of little pieces of ſponge; whence, doubtleſs, the ſtory of the painter, who not able to expreſs the foam of a horſe, ſucceeded by throwing the ſponge at the picture.

PENCIL, *black lead*. See *Black* LEAD.

PENCIL-*caſe*. See PORT-*craion*.

PENCIL, in *Electricity*. See BRUSH, and *Experiments, &c. in* ELECTRICITY, *Exp.* 10.

PENCIL *of rays*, in *Optics*, is a double cone, or pyramid of rays, joined together at the baſe; one of which hath its vertex in ſome part of the object, and has the cryſtalline humour, or the glaſs GLS (*Tab.* V. *Optics*, *fig.* 88.) for its baſe; and the other has its baſe in the ſame glaſs, or cryſtalline, but its vertex in the point of convergence; as at C.

Thus BGSC is a *pencil* of rays; and the line BLC is called the AXIS *of that pencil*.

PENDANT, *ear-ring*, an ornament of gold, or ſome precious ſtone, worn by the ladies; hung by a hole made for that purpoſe through the ear; and frequently enriched with diamonds, pearls, and other precious ſtones.

The *pendants* of the European ladies are nothing in compariſon of thoſe worn by the Eaſt Indians, both men and women; among whom it is the faſhion to lengthen out the ears, and to enlarge the hole, by putting in *pendants* of the ſize of ſaucers, ſet with ſtones.

In the Weſt Indies, Columbus named a certain coaſt Oreja, becauſe he found people with holes in their ears big enough to paſs an egg through.

They make holes too in their lips and noſtrils, and hang *pendants* at them: which is alſo practiſed by the Mexicans, and other nations.

PENDANT, in *Heraldry*, a term applied to the parts hanging down from the label, to the number of three, four, five, or ſix at moſt. Theſe muſt be ſpecified in blazoning, when there are more than three. They reſemble the drops at the bottom of the trigliphs in the Doric frieze.

PENDANT *barometer*. See BAROMETER.

PENDANT *feathers*, in *Falconry*, are thoſe feathers which grow behind the thighs of a hawk.

PENDANT *gardens*, in *Antiquity*. See PENSILES *Horti*.

PENDANTS, among *Floriſts*, a kind of globules, growing on ſtamina, or chives. Such are thoſe in the middle of tulips, lilies, &c. See APICES, and STAMINA.

PENDANTS *of a ſhip*, are thoſe long colours, or ſtreamers, cut pointing towards the end, and there divided into two parts; hung out at the head of maſts, or at the yard-arm ends.

The *pendants* are chiefly uſed for ſhew, though ſometimes for diſtinction of ſquadrons, and for ſignals. See *Tab. of Flags and Ship*, *fig.* 1. *n.* 80.

PENDANT, or **PENNANT**, is alſo uſed for a ſhort rope, which at one end is faſtened to the head of the maſt, or to the yard, or to the clue of the ſail; and at the other end, hath a block and ſhiver, to reeve ſome running rope into.

The *pendant* of the tackles is made faſt to the head of the maſt; and the *pendants* of the back ſtays are faſtened to and hang down on, the inſide of the ſhrouds. All the yard-arms, except the mizen, have of theſe *pendants*, into which the braces are reeved.

PENDENTIVE, in *Architecture*, the whole body of a vault, ſuſpended out of the perpendicular of the walls, and bearing againſt the arc boutants.

Daviler defines it, a portion of a vault between the arches of a dome, uſually enriched with ſculpture: Felibien, the plane of the vault contained between the double arches, the forming arches, and the ogives.

The *pendentives* are uſually of brick, or ſoft ſtone; and care muſt be taken, that the joints of the maſonry be always laid level, and in right lines proceeding from the ſweep whence the riſe is taken.

The joints too muſt be made as ſmall as poſſible, to ſave the neceſſity of filling them up with ſlips of wood, or of uſing much mortar.

PENDULOUS, *hanging down*; a name which botaniſts give to thoſe heads of flowers which hang downwards; the ſtalk not being able to ſuſtain them upright.

PENDULOUS *roots*, among *Botaniſts*, ſuch as are fixed to the ends of fibres, whence they ſeem to hang.

PENDULUM, in *Mechanics*, any heavy body, ſo ſuſpended as that it may ſwing backwards and forwards, about ſome fixed point, by the force of gravity.

Theſe alternate aſcents and deſcents of the *pendulum*, are called its vibrations, or its OSCILLATIONS.

The point round which the *pendulum* vibrates, is called its CENTRE *of motion*, or *point of ſuſpenſion*; and a ſtraight line drawn through the centre of motion, parallel to the horizon, and at right angles with the plane in which the *pendulum* moves, is called the AXIS *of oſcillation*.

There is one certain point within every *pendulum*, into which, if all the matter that compoſes the *pendulum* was condenſed, the lines in which the vibrations would be performed, would not be altered by ſuch condenſation; this point is called the CENTRE *of oſcillation*; and the length of the *pendulum* is always eſtimated by the diſtance of this point from the centre of motion.

The length of a *pendulum* that will vibrate ſeconds in the latitude of London, has been generally ſet at three feet three inches, and two tenths of an inch; but by ſome very ingenious and accurate experiments, the late celebrated Mr. George Graham found the true length to be three feet three inches, and one hundred and twenty-eight thouſand parts of an inch.

The length of a *pendulum* vibrating ſeconds at Paris, was formed by Varin, Des Hayes, de Glos, and Godin, to be $440\frac{5}{9}$ lines; by M. Picard, to be $440\frac{1}{2}$ lines; and by M. Mairin in 1735, to be $440\frac{17}{30}$ lines.

Galileo was the firſt who made uſe of a heavy body annexed to a thread, and ſuſpended by it for meaſuring time, in his experiments and obſervations: according to Strumius, the firſt perſon who obſerved the iſochroniſm of *pendulums*, and made uſe of them in meaſuring time, was Ricciolus; after him, Tycho, Langrenus, Wendeline, Merſenne, Kircher, and others, obſerved the ſame thing; though without any intimation of what Ricciolus had done. But Mr. Huygens was the firſt who demonſtrated the properties of the *pendulum*, and probably the firſt who applied them to clocks. He demonſtrated, that if the point to which a *pendulum* is ſuſpended, was perfectly fixed or immoveable, and all manner of friction and reſiſtance removed, that a *pendulum*, once ſet in motion, would for ever continue to vibrate without diminution of motion, and that all its vibrations (ſubject to theſe conditions) would be perfectly iſochronal. Hence the *pendulum* has univerſally been conſidered as the beſt chronometer: and as all *pendulums* of the ſame length perform their vibrations in the ſame time, without regard to their different weight, it has been ſuggeſted, by means of them, to eſtabliſh an univerſal ſtandard meaſure for all countries. On this principle, M. Mouton, canon of Lyons, has a treatiſe, De Menſura poſteris tranſmittenda. See *Univerſal* MEASURE.

Mr. Poleni ſeems to think, that if a long *pendulum* were made to ſwing in the plane of the meridian, and another of equal length in a plane perpendicular to the meridian, ſome difference might be found in their vibrations from the centrifugal force ariſing from the earth's rotation about its axis. See Phil. Tranſ. N° 468. ſect. 1.

The *pendulum* is either *ſimple*, or *compound*.

PENDULUM, *a ſimple*, in *Theory*, conſiſts of a ſingle weight, as A, conſidered as a point, and an inflexible right line, AC, ſuſpended from, and moveable round a fixed point, or centre C, and ſuppoſed void of gravity. *Tab.* V. *Mechanics*, *fig.* 85.

PENDULUM, *compound*, in *Theory*, is a *pendulum* conſiſting of ſeveral balls or weights moveable round one common centre of motion, and retaining the ſame diſtance both from one another, and from the centre about which they vibrate. However, among artiſts, theſe terms are differently underſtood, as will appear in the ſequel of this article.

PENDULUMS, *doctrine and laws of*. 1. A *pendulum* raiſed to B, through the arc of the circle BA, will fall, and again raiſe, through an equal arc, to a point equally high, D; and thence will fall to A, and again raiſe to B; and thus continue riſing and falling perpetually.

For ſuppoſe HI a horizontal line, and BD parallel to it; if the ball A, which we here conſider as a point, be raiſed to B; the line of direction BH, being perpendicular from the centre of gravity B to the horizontal line AI, falls withoutſide the point C. The ball therefore cannot reſt, but muſt deſcend.

But being retained by the thread BC, from falling perpendicularly through BH; it will fall through the arc BA. Conſequently, when the centre of gravity arrives at the bottom, A has the ſame force, it would have acquired in falling from K; and will therefore be able to riſe equally high as if it had; i. e. in deſcending through the firſt half of its vibration, it acquires a velocity by the continual acceleration of its fall; and as this velocity is always proportionable to the height whence it falls, as being in ſome meaſure the effect thereof; it is ſtill able to make it remount to the ſame height, ſuppoſing, according to the ſyſtem of Galileo, that the velocities are always the ſquare roots of the heights.

Since then the thread prevents the *pendulum* going off in the tangent AI, it muſt aſcend through the arc AD, equal to that of AB.

All the force therefore which it had acquired by falling, being exhauſted; it will return by the force of gravity through the ſame arc AD, and again will riſe from A to B; and thus continually.

Experience confirms this theorem, in any finite number of oſcillations; but if they be ſuppoſed infinitely continued, there will ariſe a difference. For the reſiſtance of the air, and the friction about the centre C, will take off part of the force acquired in falling; whence it will not riſe preciſely to the ſame point whence it fell.

Thus the aſcent continually diminiſhing; the oſcillation will be at laſt ſtopped, and the *pendulum* will hang at reſt in its natural direction, which is perpendicular to the horizon.

2. Let ATC (*Tab.* III. *Mechanics*, *fig.* 33.) be a ſemicycloid, having its baſe EC parallel to the horizon, and its vertex A downwards: ſuppoſe a ſtring, with a *pendulum*, of the length of the ſemicycloid, ſuſpended at C, and applied to the ſemicycloid CTA, the body P, by its gravity, will gradually ſeparate the ſtring from the ſemi-cycloid CTA, and will deſcribe an equal ſemicycloid APV, having its vertex in V, and its axis perpendicular to the horizon. On the axis AE deſcribe the generating ſemicircle AGE, draw AB cutting the vertical line CV in D, and on DV, taken equal to AE, deſcribe the ſemicircle DHV. Then, ſince the ſemicycloid CTA is equal to 2AE or CV, (ſee CYCLOID), the body P will come to V, when the ſtring CTP comes to a vertical ſituation. Through T and P draw TG and PH parallel to AD, meeting the ſemicircles in G and H; and ſince the ſtraight part of the ſtring TP is equal to the curve TA to which it was applied, therefore $TP = 2AG = 2TK$ (ſee CYCLOID), and conſequently TK and KP are equal, and the points G and H muſt be equally diſtant from the line AD; and therefore, the arc AG will be equal to DH, and conſequently the angle $GAD = ADH$, and the chords GA and DH are parallel. But TP, being a tangent to the cycloid in T, is parallel to GA, (ſee CYCLOID); therefore DKPH is a parallelogram, and $DK = PH$. But the arc AG is equal to GT, (ſee CYCLOID), and, therefore, the arc $AG = AK$; and ſince $AD = AGE$, it follows, that DK or $PH = GE$ or HV: and if PH be produced till it meet the axis in R, then ſhall the ordinate PR be equal to the ſum of the arc HV, and its right ſine HR; and, therefore, the point P (ſee CYCLOID), muſt be in a ſemicycloid, whoſe generating circle is DHV, its axis DV, and vertex V. If another ſemicycloid equal to CTA, or C*t*B, be placed in a contrary ſituation, it is plain, that by means of theſe ſemicyloids, a *pendulum* may be made to deſcribe the cycloid AVB in its oſcillations.

Farther, let VL, perpendicular to DV, be equal to any arc of the cycloid VML; deſcribe with the radius VL the ſemicircle LZ*l*; and ſuppoſing the *pendulum* to begin an oſcillation from L, the velocity acquired at M, in the cycloid, will be as MX the ordinate of the circle at the correſponding point M in the ſtraight line VL: and the force by which the motion of the *pendulum* is accelerated in M, is as the arc of the cycloid VM that remains to be deſcribed. Let LR, MS, be perpendicular to the axis DV, meeting the generating circle in O and Q, and draw the chords VO, VQ: then, the velocity of the *pendulum* at M will be the ſame as would have been acquired by a body directly falling from R to S, and the velocity acquired at V, will be the ſame as would have been acquired by a body falling directly from R to V (ſee *Inclined* PLANE); but theſe velocities are to one another as $\sqrt[2]{RS}$ to $\sqrt[2]{RV}$, (ſee ACCELERATION); and ſince $RV : SV :: VO^2 : VQ^2$, and $RV : RV - SV (= RS) :: VO^2 : VO^2 - VQ^2 :: VL^2 : VL^2 - VM^2$, becauſe $VL = 2VO$ and $VM = 2VQ$ (ſee CYCLOID), it follows that the velocity of the *pendulum* acquired in M is to the velocity acquired in V, as $\sqrt[2]{VL^2 - VM^2}$ to $\sqrt[2]{VL^2}$, or as MX to VZ. For the demonſtration of the ſecond part of this propoſition, ſee CYCLOID.

Again, ſuppoſe that the circle L Z *l* is deſcribed by the body X with an uniform motion, by the velocity acquired by the *pendulum* in V; and any arc of the cycloid, as M N, will be deſcribed by the *pendulum*, in the ſame time as the arc of the circle X Y by that uniform motion; taking V N on the ſtraight line V L, equal to V N in the cycloid, and drawing N Y parallel to V Z, meeting the circle in Y. Let *x m* be an ordinate very near to X M, and draw X *r* parallel to the diameter L *l*, meeting X M, in *r*; then ſince the triangle X *r x* and V X M are ſimilar, it follows that $Xx : Mm (= Xr) :: VX : MX$, that is, as the velocity of the body X to that of the body M: and conſequently the ſpaces X *x* and M *m* will be deſcribed in the ſame time by theſe bodies, the times being always equal when the ſpaces are taken in the ſame ratio as the velocities. After the ſame manner, the other correſponding parts of the lines M N and X Y will be deſcribed in the ſame time; and, therefore the whole ſpace M N will be deſcribed in the ſame time as the arc X Y. Hence it appears, that the *pendulum* will oſcillate from L to V in the ſame time as the body X will deſcribe the quadrant L Z.

Laſtly; the time of a complete oſcillation in the cycloid is to the time in which a body would fall through the axis of the cycloid D V, as the circumference of a circle to its diameter. The time in which the ſemicircumference L Z *l* is deſcribed by the body X, is to the time in which the radius L V could be deſcribed with the ſame velocity, as the circumference of a circle to its diameter. But the ſame time, in which the ſemi-circumference L Z *l* is deſcribed by the body X, is equal to the time of the complete oſcillation L V P in the cycloid. The time in which a body falls from O to V, along the chord O V, is equal to the time in which L V (= 2 O V) could be deſcribed by the velocity acquired at the point V, (ſee ACCELERATION, and *Inclined* PLANE); and the time of the fall through the chord O V is equal to the time of the fall through the diameter D V (ſee *Inclined* PLANE): conſequently the time in which L V could be deſcribed by a velocity equal to that of the body X, is equal to the time of a fall through the diameter D V. It follows, therefore, that the time of the entire oſcillation L V P is to the time of a fall through the diameter D V as the circumference of a circle to its diameter.

Hence it appears, that the oſcillations in the cycloid are all performed in equal times; for they are all in the ſame ratio to the time in which a body falls through the diameter D V. If, therefore, a *pendulum* oſcillates in a cycloid, the time of the oſcillation in any arc is equal to the time of the oſcillation in the greateſt arc B V A, and the time in the leaſt arc is equal to the time in the greateſt. Moreover, as the cycloid may be conſidered as coinciding, in V, with any ſmall arc of a circle deſcribed from the centre C, paſſing through V; and the time in a ſmall arc of ſuch a circle will be equal to the time in the cycloid; the times in very little arcs are equal, becauſe theſe little arcs may conſidered as portions of the cycloid as well as of the circle. Farther, the time of a complete oſcillation in any little arc of a circle being to the time in which a body would fall through half the radius, as the circumference of a circle to its diameter; and ſince the latter time is half the time in which a body would fall through the whole diameter, or any chord; it follows, that the time of an oſcillation in any little arc is to the time in which a body would fall through its chord, as the ſemicircle to the diameter. Suppoſe N V a ſmall arc of the circle deſcribed from the centre C; then the time in the arc N V is ſo far from being equal to the time in the chord N V, even when they are ſuppoſed to be evaneſcent, that the laſt ratio of theſe times is that of the circumference of the circle to four times the diameter. See Maclaurin's View, &c. book ii. chap. 5.

Hence, alſo, the longer the *pendulums* are, that oſcillate in arcs of a circle, the more oſcillations are iſochronal; which agrees with experiment: for in two *pendulums* of equal lengths, but oſcillating in unequal arcs, provided neither arc be very great, you will ſcarce diſcern any inequality in a hundred oſcillations.

Hence, alſo, we have a method of determining the ſpace which a heavy body, falling perpendicularly, paſſes over in a given time. For the ratio which the time of one oſcillation has to the time of the fall through half the length of the *pendulum*, being thus had; and the time wherein the ſeveral vibrations of any given *pendulum* being found; we have the time of the fall through half the length of the *pendulum*; and hence may collect the ſpace it will paſs over in any other time.

Thus Mr. Huygens demonſtrates, that falling bodies, by their gravity only, deſcribe fifteen Paris feet and one inch, in a ſecond of time.

The whole doctrine of *pendulums* oſcillating between two ſemicycloids, both theory and practice, we owe to the great Huygens; who firſt publiſhed the ſame in his Horologium Oſcillatorium, ſive Demonſtrationes de Motu Pendulorum, &c.

Every thing that regards the motion of *pendulums*, has been demonſtrated in different ways, ſince the time of Huygens; and the celebrated ſir Iſaac Newton has given us, in his Principia, an admirable theory on this ſubject, in which he has extended to epicycloids the properties which Huygens had demonſtrated in relation to the cycloid.

3. The action of gravity is leſs in thoſe parts of the earth where the oſcillations of the ſame *pendulum* are ſlower, and greater where they are ſwifter.

For the time of oſcillation in the cycloid is to the time of perpendicular deſcent through the diameter of the generating circle, as the periphery of the circle to the diameter.

If then the oſcillations of the ſame *pendulum* be ſlower, the perpendicular deſcent of heavy bodies is likewiſe ſlower, i. e. the motion is leſs accelerated, or the force of gravity is leſs, and converſely.

Hence, as it is found by experiment, that the oſcillations of the ſame *pendulum* are ſlower near the equator than in places leſs remote from the pole; the force of gravity muſt alſo be leſs towards the equator than towards the poles. And conſequently, the *figure of the* EARTH is not a juſt ſphere, but a ſperoid.

This M. Richer found, by an experiment made in the iſland Cayenna, about four degrees from the equator; where a *pendulum* three feet, eight lines $\frac{2}{5}$ long, which at Paris vibrates ſeconds, was to be ſhortened a line and a quarter, to reduce its vibrations to ſeconds.

M. des Hayes, in a voyage to America, confirms the obſervation of Richer; but adds, that the diminution eſtabliſhed by the author, appears too little.

M. Couplet the younger, upon his return from a voyage to Braſil and Portugal, falls in with M. des Hayes, as to the neceſſity of ſhortening the *pendulum* towards the equator more than Richer has done. He obſerved, that even at Liſbon the *pendulum* which ſwings ſeconds, muſt be two lines $\frac{1}{2}$ ſhorter than that of Paris; which is ſhorter than that of Cayenna, as fixed by Richer: though Cayenna be in twenty-four degrees leſs latitude than Liſbon.

But theſe obſervations of M. Couplet did not appear to ſir Iſaac Newton to be ſufficiently exact. Principia, prop. 20. lib. iii.

The truth is, this diminution does not proceed regularly: Meſſ. Picart and de la Hire found the length of the *pendulum* which beats ſeconds exactly the ſame at Bayonne, at Paris, and at Uranibourg, in Denmark, though the firſt be in $43\frac{1}{2}°$ of latitude, and the laſt in the latitude 55° 3′.

Hence M. de la Hire takes occaſion to ſuſpect, that the diminution is only apparent; and that, e. gr. the iron rod, wherewith M. Richer meaſured his *pendulum*, might be lengthened by the great heats of the iſle of Cayenna: not the *pendulum* ſhortened by the approach towards the line.

To confirm this, he tells us he found, by very careful experiments, that an iron bar, which, expoſed to the froſt, was ſix feet long, was lengthened two-thirds of a line by the ſummer's ſun.

To this it might be replied, that, according to the table which ſir Iſaac Newton has given of the length of the *pendulum* in different latitudes, the difference of the length at $43\frac{1}{2}°$ and 35° is ſo ſmall, that it cannot be eaſily perceived; becauſe this difference is not above $\frac{3}{10}$ of a line; and, therefore, the difference of Bayonne and Paris muſt be ſtill more inſenſible. With reſpect to the contraction of *pendulums* by cold, and their dilatation by heat, Newton replies, that in the experiment related by M. de la Hire, the heat of the rod was greater than that of the human body, whereas that of the rod of the *pendulum*, which is not always expoſed to the ſun, could not be ſo great; whence he concludes, that the rod of the *pendulum* about three feet long, might be, in reality, a little longer in ſummer than in winter, and at the equator than in our climates, if we regard merely the heat; but that its dilatation could not be ſo conſiderable as to produce the whole difference obſerved in the length of the *pendulum*.

In comparing the different obſervations of the French aſtronomers, Newton apprehends that two lines may be taken for the length by which a ſecond *pendulum* ought to be increaſed at the equator.

From ſome obſervations made by Mr. Campbell, in 1731, at Black-river, in Jamaica, 18° nort. lat. it is collected, that if the length of a ſingle *pendulum* that ſwings ſeconds in London, be 39.126 Engliſh inches, the length of one at the equator, would be 39.00, at the poles 39.206. Phil. Tranſ. Abr. vol. viii. part i. p. 238, or N° 432.

A TABLE, ſhewing how much a *pendulum* that ſwings ſeconds at the equator would gain every twenty-four hours in different latitudes; and how much the *pendulum* would need to be lengthened in theſe latitudes, in order to make it ſwing ſeconds therein.

Latitude of the Place.	Time gained in one Day.	Lengthening of the *Pendulum* to ſwing Seconds.		Latitude of the Place.	Time gained in one Day.	Lengthening of the *Pendulum* to ſwing Seconds.	
Deg.	Seconds.	Inch.	Part.	Deg.	Seconds.	Inch.	Parts.
5	1 .7	0	.0016	50	134 .0	0	.1212
10	6 .9	0	.0062	55	153 .2	0	.1386
15	15 .3	0	.0138	60	171 .3	0	.1549
20	26 .7	0	.0246	65	187 .5	0	.1694
25	40 .8	0	.0369	70	201 .6	0	.1826
30	57 .1	0	.0516	75	213 .0	0	.1927
35	75 .1	0	.0679	80	221 .4	0	.2033
40	94 .3	0	.0853	85	226 .5	0	.2050
45	114 .1	0	.1033	90	228 .3	0	.2065

4. If two *pendulums* vibrate in ſimilar arcs, the times of the oſcillations are in the ſubduplicate ratio of their lengths.

For the time of the oſcillation in the arc LVP (*fig.* 33.) is in a given ratio to the time of the fall through DV, which time is in the ſubduplicate ratio of the ſpace DV, or of its double CV the length of the *pendulum*.

Hence the lengths of *pendulums* vibrating in ſimilar arcs are in a duplicate ratio of the times wherein the oſcillations are performed.

5. The numbers of iſochronal oſcillations performed in the ſame time by two *pendulums*, are reciprocally as the times wherein the ſeveral oſcillations are performed.

Hence the lengths of *pendulums* vibrating in ſimilar and ſmall arcs are in the duplicate ratio of the numbers of oſcillations performed in the ſame time, but reciprocally taken.

6. The lengths of *pendulums* ſuſpended between cycloids, are in a duplicate ratio of the times wherein the ſeveral oſcillations are performed.

And hence they are in a duplicate ratio of the numbers of oſcillations performed in the ſame time, but reciprocally taken: and the times of oſcillations in different cycloids, are in a ſubduplicate ratio of the lengths of the *pendulums*.

7. If the bodies that oſcillate be acted upon by unequal acceleratting forces, then the oſcillations will be performed in times that are to one another in the ratio compounded of the direct ſubduplicate ratio of the lengths of the *pendulums*, and inverſe ſubduplicate ratio of the accelerating forces: becauſe the time of the fall through DV is in the ſubduplicate ratio of the ſpace DV directly, and of the force of gravity inverſely; and the time of the oſcillations is in a given ratio to that time. Hence it appears, that if oſcillations of unequal *pendulums* are performed in the ſame time, the accelerated gravities of theſe *pendulums* muſt be as their lengths: and thus we conclude, that the force of gravity decreaſes as you go towards the equator; ſince the lengths of *pendulums* that vibrate ſeconds are always leſs at a leſs diſtance from the equator.

8. To find the length of a *pendulum*, which ſhall make any aſſigned number of vibrations in any given time.

Let the number of vibrations required be 50 in a minute, and the length of the ſtring, counted from the point of ſuſpenſion, to the centre of oſcillation, be required: it is a fixed rule, that the length of *pendulums* are to each other, as the ſquares of their vibrations, and contrariwiſe: now it is agreed, that a *pendulum* vibrating ſeconds (or 60 times in a minute) is 39.128 inches: ſay therefore, as the ſquare of 50 (which is 2500) to the ſquare of 60 (which is 3600); ſo is 39.128 to the length of the *pendulum* required: which will be found 56.34 inches.

Note, in practice, ſince the product of the mean terms will always be 140860.8 (that is, the product of the ſquare of 60, multiplied by 39.128) that is, 3600 × 39.128, you need only divide that number by the ſquare of the number of vibrations aſſigned; and the quotient will give the length of a *pendulum*, which ſhall vibrate juſt ſo many times in a minute.

9. The length of a *pendulum* being known, to find the number of vibrations it will make in a given time.

This being the reverſe of the former; ſay, as the length given, ſuppoſe 56.34, is to the length of the ſtandard *pendulum* ſwinging ſeconds, viz. 39.128; ſo is the ſquare of the vibrations of the ſtandard *pendulum* in the given time, v. gr. a minute, to the ſquare of the vibrations ſought: that is, as 56.34 : 39.128 : : 3600 : 2500. And the ſquare root of 2500 will be 50, the number of vibrations ſought. But for uſe, here (as in the former problem) you need only divide 140860.8 by the length; and it gives the ſquare of the vibrations, as there you divided by the ſquare of the vibrations to find the length.

On theſe principles, Dr. Derham has conſtructed a table of the vibrations of *pendulums* of different lengths in the ſpace of a minute.

Pend. length in inches.	Vibrat. in a minute.	*Pend.* length in inches.	Vibrat. in a minute.
1	375.7	30	68.6
2	265.6		
3	216.9	39.2	60.0
4	187.6		
5	168.0	40	50.5
6	153.3	50	52.1
7	142.0	60	48.5
8	132.8	70	44.9
9	125.2	80	42.0
10	118.8	90	39.6
20	84.0	100	37.5

Mr. Ferguſon has calculated the following TABLE, ſhewing what the length of a *pendulum* muſt be, to make any given number of vibrations in a minute, from 1 to 300, in the altitude of London.

Vibrations.	Length.			Vibrations.	Length.		Vibrations.	Length.	Vibrations.	Length.	Vibrations.	Length.
	Yards.	Feet.	Inches.		Feet.	Inches.		Inches.		Inches.		Inches.
1	3922	2	4.40	61	3	1.95	121	9.65	181	4.31	241	2.43
2	980	2	1.00	62	3	0.73	122	9.49	182	4.26	242	2.41
3	435	2	7.34	63	2	11.58	123	9.33	183	4.22	243	2.39
4	245	0	4.25	64	2	10.47	124	9.18	184	4.17	244	2.37
5	156	2	8.80	65	2	9.43	125	9.04	185	4.13	245	2.35
6	108	2	10.78	66	2	8.41	126	8.89	186	4.08	246	2.33
7	80	0	2.04	67	2	7.45	127	8.75	187	4.04	247	2.31
8	61	0	10.56	68	2	6.54	128	8.62	188	3.99	248	2.29
9	48	1	3.46	69	2	5.67	129	8.49	189	3.95	249	2.27
10	39	0	6.20	70	2	4.83	130	8.36	190	3.91	250	2.25
11	32	1	3.11	71	2	4.02	131	8.23	191	3.87	251	2.23
12	27	0	6.99	72	2	3.25	132	8.10	192	3.83	252	2.21
13	23	0	7.62	73	2	2.50	133	7.97	193	3.79	253	2.19
14	20	0	0.51	74	2	1.78	134	7.85	194	3.75	254	2.18
15	17	0	3.64	75	2	1.10	135	7.74	195	3.71	255	2.17
16	15	0	11.56	76	2	0.45	136	7.63	196	3.67	256	2.15
17	13	1	8.65	77	1	11.82	137	7.52	197	3.63	257	2.13
18	12	0	3.86	78	1	11.21	138	7.41	198	3.59	258	2.11
19	10	2	7.16	79	1	10.63	139	7.30	199	3.56	259	2.10
20	9	2	5.05	80	1	10.07	140	7.20	200	3.53	260	2.09
21	8	2	8.23	81	1	9.53	141	7.10	201	3.49	261	2.07
22	8	0	3.78	82	1	9.09	142	7.00	202	3.46	262	2.05
23	7	1	2.95	83	1	8.49	143	6.90	203	3.43	263	2.03
24	6	2	5.17	84	1	8.01	144	6.80	204	3.39	264	2.02
25	6	0	9.95	85	1	7.55	145	6.71	205	3.36	265	2.01
26	5	2	4.88	86	1	7.10	146	6.62	206	3.33	266	1.99
27	5	1	1.71	87	1	6.66	147	6.53	207	3.29	267	1.97
28	5	0	0.13	88	1	6.23	148	6.44	208	3.26	268	1.96
29	4	1	11.92	89	1	5.82	149	6.35	209	3.23	269	1.95
30	4	1	0.91	90	1	5.45	150	6.27	210	3.20	270	1.94
31	4	1	2.95	91	1	5.05	151	6.19	211	3.17	271	1.92
32	3	2	5.91	92	1	4.69	152	6.11	212	3.14	272	1.90
33	3	1	9.68	93	1	4.33	153	6.03	213	3.11	273	1.89
34	3	1	2.16	94	1	3.98	154	5.95	214	3.08	274	1.88
35	3	0	7.28	95	1	3.64	155	5.87	215	5.05	275	1.87
36	3	0	0.97	96	1	3.32	156	5.80	216	3.02	276	1.85
37	2	2	7.15	97	1	3.01	157	5.73	217	2.99	277	1.83
38	2	2	1.71	98	1	2.70	158	5.66	218	2.96	278	1.82
39	2	1	8.84	89	1	2.41	159	5.59	219	2.94	279	1.81
40	2	1	4.26	100	1	2.12	160	5.52	220	2.92	280	1.80
41	2	1	0.01	101	1	1.84	161	5.45	221	2.89	281	1.78
42	2	0	8.06	102	1	1.57	162	5.38	222	2.86	282	1.77
43	2	0	4.27	103	1	1.31	163	5.31	223	2.83	283	1.76
44	2	0	0.94	104	1	1.05	164	5.24	224	2.81	284	1.75
45	1	2	9.73	105	1	0.81	165	5.18	225	2.79	285	1.74
46	1	2	6.74	106	1	0.57	166	5.12	226	2.77	286	1.72
47	1	2	3.92	107	1	0.34	167	5.06	227	2.74	287	1.71
48	1	2	1.29	108	1	0.11	168	5.00	228	2.71	288	1.70
49	1	1	10.82	109	0	11.80	169	4.94	229	2.69	289	1.69
50	1	1	8.49	110	0	11.68	170	4.88	230	2.67	290	1.68
51	1	1	6.29	111	0	11.47	171	4.82	231	2.64	291	1.66
52	1	1	4.23	112	0	11.25	172	4.77	232	2.62	292	1.65
53	1	1	2.31	113	0	11.05	173	4.72	233	2.60	293	1.64
54	1	1	0.43	114	0	10.86	174	4.66	234	2.58	294	1.63
55	1	0	10.68	115	0	10.68	175	4.61	235	2.56	295	1.62
56	1	0	9.03	116	0	10.49	176	4.56	236	2.53	296	1.60
57	1	0	7.46	117	0	10.31	177	4.51	237	2.51	297	1.59
58	1	0	5.95	118	0	10.14	178	4.45	238	2.49	298	1.58
59	1	0	4.54	119	0	9.97	179	4.40	339	2.47	299	1.57
60	1	0	3.20	120	0	9.81	180	4.35	240	2.45	300	1.56

Note, Theſe laws, &c. of the motions of *pendulums* can ſcarce hold ſtrictly, unleſs the thread that ſuſtains the ball be void of weight, and the gravity of the whole weight be collected in a point.

In practice, therefore, a very fine thread, and a ſmall ball, but of a very heavy matter, are to be uſed. A thick thread, and a bulky ball, diſturb the motion ſtrangely; for in that caſe, the ſimple *pendulum* becomes compound; it being much the ſame as if ſeveral weights were applied to the ſame inflexible rod in ſeveral places.

The uſe of *pendulums* in meaſuring time in aſtronomical obſervations, and on other occaſions where a great degree of preciſeneſs is required, is too obvious to need a deſcription. Either the length of the *pendulum* may be adjuſted before its application, and made to vibrate the deſired time, v. gr. ſeconds, half-ſeconds, &c. by article VI. or it may be taken at random, and the times of the vibrations afterwards determined from article IX.

For the uſe of the *pendulum* in meaſuring remote inacceſſible diſtances, &c. by means of ſound, &c. ſee SOUND.

PENDULUM, *ſimple*, in *Mechanics*, an expreſſion commonly uſed among artiſts to diſtinguiſh ſuch *pendulums* as have no proviſion for correcting the effects of heat and cold from thoſe that have. *Simple pendulum*, or *detached pendulum*, are terms ſometimes applied to ſuch *pendulums* as are unconnected with clocks.

PENDULUM, *compound*, in *Mechanics*, a *pendulum*, whoſe rod is compoſed of two or more wires or bars of metal, that undergo different degrees of expanſion and contraction, when expoſed to the ſame heat or cold, and whoſe *difference of expanſion* is made to act in ſuch manner as to preſerve conſtantly the ſame diſtance between the *point of ſuſpenſion*, and *centre of oſcillation*, although expoſed to very different and various degrees of heat or cold. Great as is the diverſity of conſtructions for anſwering this purpoſe, they are all reducible to the *gridiron*, the *mercurial*, and the *lever pendulum*.

We ſhall here only obſerve, that the vulgar method of remedying the inconvenience ariſing from the extenſion and contraction of the metalline rods of *pendulums*, is by applying the bob with a ſcrew, by which means the *pendulum* is at any time made longer or ſhorter, as the bob is ſcrewed downwards or upwards, and thus the time of its vibration is continually the ſame.

The *gridiron pendulum* was the invention of Mr. John Harriſon, a very ingenious artiſt, and famous for his invention of the clock for finding the difference of LONGITUDE at ſea, about the year 1725. It conſiſts of five rods of ſteel, and four of braſs, placed in an alternate order, the middle rod being of ſteel, and ſuſpending the *pendulum* ball; theſe rods of braſs and ſteel, thus placed in alternate order, and ſo connected with each other at their ends, that while the expanſion of the ſteel rods has a tendency to lengthen the *pendulum*, the expanſion of the braſs rods acting upwards tends to ſhorten it; and thus when the lengths of the braſs and ſteel rods are duly proportioned, their expanſions and contractions will exactly ballance and correct each other, and preſerve the *pendulum* invariably of the ſame length; the ſimplicity of this ingenious contrivance is much in its favour, and the difficulty of adjuſtment ſeems the only objection to it.

Mr. Harriſon, in his firſt machine for meaſuring time at ſea, applied this combination of wires of braſs and ſteel, to prevent any alterations by heat or cold; and in the machines or clocks he has made for this purpoſe, a like method of guarding againſt the irregularities ariſing from this cauſe is uſed.

The *mercurial pendulum* was the invention of Mr. Graham, in conſequence of ſeveral experiments relating to the materials of which *pendulums* might be formed, in 1715. Its rod is made of braſs, and branched towards its lower end, ſo as to embrace a cylindric glaſs veſſel thirteen or fourteen inches long, and about two inches diameter, which being filled about twelve inches deep with mercury, forms the weight or ball, of the *pendulum*; if, upon trial, the expanſion of the rod be found too great for that of the mercury, more mercury muſt be poured into the veſſel; if the expanſion of the mercury exceeds that of the rod, ſo as to occaſion the clock to go faſt with heat, ſome mercury muſt be taken out of the veſſel, ſo as to ſhorten the column; and thus may the expanſion and contraction of the quickſilver in the glaſs be made exactly to ballance the expanſion and contraction of the *pendulum* rod, ſo as to preſerve the diſtance of the centre of oſcillation from the point of ſuſpenſion invariably the ſame. Thus, if a glaſs or metalline tube, uniform throughout, filled with quickſilver, and 58.8 inches long, were applied to a clock, it would vibrate ſeconds; becauſe it would vibrate in the ſame time with a ſimple *pendulum*, whoſe length is $\frac{2}{3}$ of $58.8 = 39.2$ (ſee CENTRE *of oſcillation*); and ſuch a *pendulum*, it is evident, admits of a two-fold expanſion and contraction, viz. one of the metal, and the other of the mercury, which at the ſame time will be contrary, and correct each other. For the metal extending with heat, the *pendulum* muſt vibrate ſlower on that account; the mercury alſo expanding with heat, and the length of its column increaſing, the centre of oſcillation will be raiſed, and its diſtance from the point of ſuſpenſion diminiſhed; and on this account the *pendulum* will vibrate quicker. Therefore, if the circumſtances of the tube and mercury are ſkilfully adjuſted, the time of the clock might, by theſe means, for a long courſe of time, continue the ſame, without any ſenſible loſs or gain. Mr. Graham, who made a clock of this ſort compared it with one of the beſt of the common ſort for three years together, and found the errors of the former about one-eighth part of the latter. Phil. Tranſ. N° 392.

The *lever pendulum*. From all that we can collect reſpecting this conſtruction of a *pendulum*, we are inclined to believe, that the idea, of making the difference of the expanſion of different metals operate by means of a lever, originated with Mr. Graham, who, in the year 1737, conſtructed a *pendulum*, whoſe rod was compoſed of one bar of ſteel between two of braſs, and acting upon the ſhort end of a lever, to the other end of which, the ball or weight of the *pendulum* was ſuſpended: this *pendulum* was, upon trial, found to move by jerks, and laid aſide by Mr. Graham, to make way for the mercurial *pendulum*.

Mr. Short (Phil. Tranſ. vol. xlvii. art. 88.) informs us, that Mr. Frotheringham, a quaker in Lincolnſhire, cauſed a *pendulum* of this kind to be made, conſiſting of two bars, one of braſs, and the other of ſteel, faſtened together by ſcrews, with levers to raiſe or let down the bob; and that theſe levers were placed above the bob. M. Caſſini, in the Hiſtory of the Royal Academy of Sciences at Paris, for 1741, alſo deſcribes two ſorts of *pendulums* for clocks, compounded of bars of braſs and ſteel, and in which he applies a lever to raiſe or let down the bob of the *pendulum*, by the expanſion or contraction of the bar of braſs.

Mr. John Ellicott, in the year 1738, conſtructed a *pendulum* on the ſame principle, but differing from Mr. Graham's in many particulars: the rod of Mr. Ellicott's *pendulum* was compoſed of two bars only, the one of braſs, the other of ſteel; it had two levers, each ſuſtaining its half of the weight or ball, and a ſpring under the lower part of the ball, to relieve the levers from a conſiderable part of its weight, ſo as to render their motion more ſmooth and eaſier: the one lever in Mr. Graham's conſtruction was above the ball; both the levers in Mr. Ellicott's were within the ball, and each lever was furniſhed with an adjuſting ſcrew, in order to lengthen or ſhorten the lever, ſo as to render the adjuſtment the more perfect. Phil. Tranſ. vol. xlvii. p. 479, &c. where Mr. Ellicott's methods of conſtruction are deſcribed and illuſtrated by figures.

Great ingenuity has been diſplayed by theſe very eminent artiſts on this conſtruction; but we muſt farther obſerve, in the hiſtory of improvements of this nature, that Mr. Cumming, another eminent artiſt, has given, in his Eſſays on the Principles of Clock and Watch-work, London, 1766, an ample deſcription, with plates, of a *conſtruction of a pendulum with levers*, in which he ſeems to have united the properties of Mr. Graham's and Mr. Ellicott's, without any of the defects of either. The rod of his *pendulum* is compoſed of one flat bar of braſs, and two of ſteel, ſteadily ſupporting each other, but in ſuch manner, that each bar has its whole ſurface expoſed to the air, ſo as to feel each change in its temperature at the ſame inſtant. He uſes *three levers* within the ball of the *pendulum*, with a tranſparent glaſs before, and a ſilvered glaſs behind the levers, by which they are ſecured from duſt, &c. and the back pivots, and other back parts of the lever, are conſtantly expoſed to view, as well as the front ſide, one of the levers ſerving to render the preſſure of the ball on each of the other two perfectly equal, notwithſtanding any imperfections of execution, or inequalities that may take place in the length of thoſe levers, if the one adjuſting ſcrew ſhould happen to be more turned than the other: by means of this third lever the ball of the *pendulum* is always enabled to accommodate itſelf to the ſides of the rod in which it moves, ſo as to ſlip freely thereon, without the poſſibility of jamming, or moving by jerks; the adjuſting ſcrews are ſo conſtructed, that no bad effect can ariſe from any bending of the ſcrew, or from irregularity of its threads; nor can they be moved by any accident, after they have been properly adjuſted. In this conſtruction alſo, the ſpring, which relieves the levers from the preſſure of the ball, is upward of twenty inches long, in a ſpiral form, and contained in a cylindric cavity within the ball, when it can, after all the parts of the *pendulum* are put together, and applied to the clock, be brought to ſuch a degree of tenſion as to ſuſtain any deſired part of the weight of the ball, and render the motion of the lever perfectly free; the levers alſo are ſo diſpoſed of, as to admit of their being much longer than Mr. Ellicott's conſtruction, by which means their angular motion and friction on the pivots are proportionably diminiſhed; and for the more accurate adjuſting of this *pendulum* to the mean time, it is provided with a ſmall ball and ſcrew below the principal ball or weight, one entire revolution of which on its ſcrew will only alter the rate of the clock's going one ſecond per day; and its circumference divided into 30, one of which diviſions will alter its rate of going one ſecond in a month.

PENDULUM *clock*, a clock which has its motions regulated by the vibration of a *pendulum*.

It is controverted between Galileo and Huygens, which of the two firſt applied the *pendulum* to a clock. For the pretenſions of each, ſee CLOCK.

After Huygens had diſcovered, that the vibrations made in arcs of a cycloid, however unequal they were in extent, were all equal in time; he ſoon perceived, that a *pendulum* applied to a clock, ſo as to make it deſcribe arcs of a cycloid, would rectify the otherwiſe unavoidable irregularities of the motion of the clock; ſince, though the ſeveral cauſes of thoſe irregularities ſhould occaſion the *pendulum* to make greater or leſs vibrations, yet, in virtue of the cycloid, it would ſtill make them perfectly equal, and the motion of the clock, governed thereby, would therefore be preſerved perfectly equable.

But the difficulty was to make the *pendulum* deſcribe arcs of a cycloid; for, naturally, the *pendulum* being tied to a fixed point, can only deſcribe arcs of circles about the ſame.

Here Mr. Huygens contrived to fix the iron rod or wire, which bears the bob or bottom, at the top to a ſilken thread, placed between two cycloidal cheeks, or two little arcs of a cycloid made of metal. Hence the motion of vibration, applying inceſſantly from one to the other of thoſe arcs, the thread, which is extremely flexible, eaſily aſſumes the figure thereof; and by means hereof it is demonſtrated, that the weight ſuſpended at the other end of the rod will deſcribe a juſt arc of a cycloid.

This is doubtleſs one of the moſt uſeful and ingenious inventions many ages have produced: by means whereof, we have clocks that will not err a ſingle ſecond in ſeveral days.

It is true the *pendulum* is ſtill liable to its irregularities, how minute ſoever they may be; and M. de la Hire thinks there is ſtill room to improve it.

The ſilk thread by which it is ſuſpended, he obſerves, ſhortens in moiſt weather, and lengthens in dry; by which means the length of the whole *pendulum*, and conſequently the times of the vibrations, are ſomewhat varied.

To obviate this inconvenience, M. de la Hire, in lieu of a ſilk thread, uſed a little fine ſpring; which was not indeed ſubject to ſhorten and lengthen, but which he found grew ſtiffer in cold weather, and then made its vibrations faſter than in warm.

He had therefore recourſe to a ſtiff wire or rod, firm from one end to the other. Indeed, by this means he renounced the advantages of the cycloid; but he found as he ſays, by experience, that the vibrations in arcs of circles are performed in times as equal, provided they be not of too great extent, as thoſe in cycloids. But the experiments of ſir John Moor and others have demonſtrated the contrary.

The ordinary cauſes of the irregularities of *pendulums* Dr. Derham aſcribes to the alterations in the gravity and temperature of the air, which increaſe and diminiſh the weight of the ball, and by that means make the vibrations greater and leſs; an acceſſion of weight in the ball being found by experiment to accelerate the motion of the *pendulum*.

A weight of ſix pound added to the ball, Dr. Derham found, made his clock gain 13 ſeconds every day.

A general remedy againſt the inconveniences of *pendulums* is to make them long, the bob heavy, and to vibrate but a little way; this is the uſual means in England; the cycloidal cheeks being generally overlooked. See the preceding article.

Pendulum clocks reſting againſt the ſame rail have been found to influence each other's motions. See the Phil. Tranſ. Nº 453, ſect. 5 and 6, where Mr. Ellicot has given a very curious and exact account of this phenomenon.

PENDULUM *clocks, to correct the motion of*. The uſual method is to ſcrew and let down the ball; but a very ſmall alteration here having a very great effect, Dr. Derham prefers Huygens's method, which is to have a ſmall weight or bob to ſlide up and down the rod above the ball, which is to be immoveable; though he improves on the method, and recommends having the ball to ſcrew up and down, to bring the *pendulum* near its gage; and the little bob to ſerve for the nicer corrections, as the alteration of a ſecond, &c.

Mr. Huygens orders the weight of this little corrector to be equal to that of the wire, or 50' of that of the great ball; he adds a table of the alterations the ſeveral ſhiftings thereof will occaſion in the motion of the *pendulum*; wherein it is obſervable, that a ſmall alteration towards the lower end of the *pendulum*, makes as great an alteration in time, as a greater riſing or falling does when higher.

PENDULUM *royal*, a name given among us to a clock, whoſe *pendulum* ſwings ſeconds, and goes eight days; ſhewing the hour, minute, and ſecond.

The numbers of ſuch a piece are thus calculated: firſt caſt up the ſeconds in twelve hours which are the beats in one turn of the great wheel; and you will find them to be $43200 = 1260 \times 60$. The ſwing-wheel muſt be 30 to ſwing 60 ſeconds in one of its revolutions; now let $\frac{1}{2}\ 43200 = 21600$ be divided by 30, and you will have 720 in the quotient, which muſt be broken into quotients; the firſt of them muſt be 12 for the great wheel, which moves round once in twelve hours. 720 divided by 12, gives 60, which may alſo be conveniently broken into two quotients, as 10 and 6, or 5 and 12, or 8 and $7\frac{1}{2}$; which laſt is moſt convenient; and if you take all your pinions 8, the work will ſtand thus:

$$\begin{array}{l} 8)\ 96\ (12 \\ 8)\ 64\ (\ 8 \\ 8)\ 60\ (\ 7\frac{1}{2} \\ \hline \qquad 30 \end{array}$$

According to this computation, the great wheel will go about once in twelve hours, to ſhew the hour; the ſecond wheel once in an hour, to ſhew the minutes; and the ſwing-wheel once in a minute, to ſhew the ſeconds. See CLOCK-WORK.

PENDULUM *level*. See LEVEL.

PENDULUM *watch*. See WATCH.

PENETRABILITY. See IMPENETRABILITY.

PENETRALE, among the Romans, properly denoted the chapel conſecrated to the PENATES, or houſhold gods.

PENETRATION, *penetratio*, the act whereby one thing enters another, or takes up the place already poſſeſſed by another.

The ſchoolmen define *penetration* the co-exiſtence of two or more bodies, ſo that one is preſent, or has its extenſion in the ſame place as the other.

Philoſophers hold the *penetration* of bodies abſurd, i. e. that two bodies ſhould be at the ſame time in the ſame place; and accordingly, impenetrability is laid down as one of the eſſential properties of MATTER.

What we popularly call *penetration* only amounts to the matter of one body's being admitted into the vacuity of another. Such is the *penetration* of water through the ſubſtance of GOLD.

PENGUIN, in *Ornithology*, a name given by ſailors of different nations to two different ſpecies of water-fowl, both web-footed, and both wanting the hinder toe.

The *penguin* of the Engliſh is the bird more commonly known by the name of the *goirfugel*, or the *alca impennis* of Linnæus.

It grows to the ſize of a common tame gooſe, and is black on its back, or upper part, and white on the belly; its wings are very ſmall, and by no means fit for flying; its beak is ſomewhat broad and long, compreſſed on the ſides and back, and has toward the extremity ſeveral furrows, ſeven or eight on the upper ſide, and about ten on the under; and the lower chap ſwells into a protuberance downward; its head has two white lines reaching from the beak to the eyes; its tail is very ſhort, and it has no hinder toe.

This bird is obſerved by ſeamen never to wander beyond ſoundings; and, according to its appearance, they direct their meaſures, being then aſſured that land is not very remote. This bird breeds in the iſland of St. Kilda, appearing there in the beginning of May, and retiring in the middle of June. It lays one egg, about ſix inches long, of a white colour. See *Tab.* IV. *Birds*, Nº 46.

The *penguin* of the Dutch is the *anſer Magellanicus* of Cluſius. See PINGUIN.

PENGUIN, or *wild* ANANAS, *karatas*, in *Botany*. Its characters are theſe: it hath a tubulous bell-ſhaped flower, divided into three parts at the mouth, from whoſe calyx ariſes the pointal, fixed like a nail in the hinder part of the flower, which afterward becomes a fleſhy, almoſt conical fruit, divided by membranes into three cells, which are full of oblong ſeeds. Linnæus has joined the *karatas* and *ananas* to the *bromelia*.

This plant is very common in the Weſt Indies, where the juice of its fruit is often put into punch, being of a ſharp acid flavour. There is alſo a wine made of the juice of this fruit, which is very ſtrong, but it will not keep good long, ſo is only for preſent uſe. This wine is very intoxicating, and heats the blood, therefore ſhould be drank very ſparingly. In England this plant is preſerved as a curioſity; for the fruit ſeldom ariſes to any degree of perfection for uſe in this country, though it often produces fruit in England, which has ripened pretty well; but if it were to ripen as thoroughly here as in its native country, it will be little valued, on account of its great auſterity, which will often take the ſkin off from the mouths and throats of thoſe people who eat it incautiouſly. Miller.

PENICILLA, thus called from *penicillus*, a *pencil*, which it is ſuppoſed to reſemble in ſhape, in *Pharmacy*, a LOZENGE; or form of medicine made round by rolling.

PENICILLI *marini*, in *Natural Hiſtory*, a ſort of marine tubuli, or caſes of ſea-worms, making a diſtinct genus of thoſe ſhells. They are defined to be ſhelly tubes, very ſlender, and terminating in the ſhape of a painter's pencil; many of them in their native ſhape adhering to ſtones, &c. on the ſea-ſhores, by means of a ſoft and lax ſubſtance. Some of theſe are white and pellucid, others yellowiſh or brown; and the more common ſort are about a finger's length, and about the thickneſs of a wheaten ſtraw; and ſome are of a ſort of funnel-like ſhape, and have their mouths ſurrounded by a ſort of hairs, or filaments. Theſe are called by ſome *proboſciplectani*, others are called *cadi*, and others *entalia*.

PENICILLUS, among *Surgeons*, is uſed for a TENT, to be put in wounds, or ulcers.

PENIDIUM, in *Pharmacy*, *barley*-SUGAR.

Dr. Quincy uſes the word *penidium*, for a kind of clarified ſugar, with a mixture of ſtarch, made up into little lumps.

PENINSULA, in *Geography*, a portion or extent of land, joining to the continent by a narrow neck or iſthmus; the reſt being encompaſſed with water.

The word is compounded of the Latin *pene* and *inſula*, q. d. *almoſt iſland*, which the French pertinently enough render *preſque iſle*.

Such is Peloponneſus, or the Morea; ſuch alſo are Africa, Jutland, &c.

Peninſula is the ſame with what is otherwiſe called CHERSONESUS.

PENIS, in *Anatomy*, a part of the body, called, by way of eminence, the *member*, or *virile member*, as being one of the principal organs of generation in the male kind. See *Tab. Anat. (Splanch.) fig.* 1. *lit.* z. *fig.* 8. *litt.* e b, &c. *fig.* 10. *lit.* d. *fig.* 15. *litt.* e e, n n. *(Angeiol.) fig.* 1. *n.* 67.

It is faſtened to the lower part of the os pubis, and the upper part of the iſchion; its body conſiſts of the two corpora cavernoſa, the corpus cavernoſum urethræ, and the urethra itſelf.

The *corpora* CAVERNOSA *of the penis*, called alſo *corpora nervoſa & ſpongioſa*, &c. have two diſtinct origins in the os pubis; whence they proceed, growing both in bulk and thickneſs, till they meet the *corpus* CAVERNOSUM of the urethra, where they join; leaving an interſtice or channel for its paſſage along them; and thus they continue their progreſs, connected together by a membranous body called the *ſeptum*, and terminating at length in the glans.

The *cavernous body of the urethra* includes the urethra or urinary paſſage. Its form, contrary to that of the other cavernous bodies, is largeſt at the two extremes, and ſmalleſt in the middle. That part included between the two origins of the cavernous bodies of the *penis*, Mr. Cowper calls the *bulb of the urethra*; its other extremity, being dilated, forms the body called the *glans*.

The *penis* receives arteries from the internal iliac branches, and umbilical arteries; and theſe at length ſubdividing into innumerable branches, from the capillary extremities thereof ariſe ſo many veins, in whoſe channels are apertures correſponding to ſo many cells, which, communicating with each other, empty themſelves into larger venous ducts, running on the ſuperior ſurface of the *penis*: ſome whereof joins the veins of the prepuce; others make one large trunk, called *vena penis*, which, marching on the dorſum *penis* to the proſtatæ, there divides, and enters the internal iliac on either ſide.

The *penis* has nerves from a trunk compoſed of a coaleſcence of the third of the os ſacrum, and a branch of the great crural: theſe, aſcending the cavernous bodies, expand themſelves over the upper ſurface thereof, and are thence diſtributed to all parts of the *penis*.

It has lympheducts very numerous on its ſurface under the ſkin, which diſcharge themſelves into the glandulæ inguinales.

The *penis* has two pair of muſcles, and an odd one; the odd muſcle is called ACCELERATOR *urinæ*.

The firſt pair of muſcles are called the *erectores penis*. By their action the *penis* is ſuſtained, and drawn towards the pubes; and, by the aſſiſtance of the ſuſpenſory ligament of the *penis*, the *vena penis* is applied to the tranſverſe ligament of the oſſa pubis, and the refluent blood hindered from paſſing that way, whereby the corpora cavernoſa become diſtended.

The laſt pair of muſcles are the *tranſverſales penis*, which vary in various ſubjects, and are ſometimes wanting: their uſe is to dilate that part of the cavernous body of the urethra, to which they are faſtened.

The *penis* has alſo three glands, firſt diſcovered by Mr. Cowper; theſe all empty themſelves into the urethra, and, from the tenacity of the liquor they ſeparate, are called the MUCOUS *glands*. See alſo *Odoriferous* GLANDS.

The whole compages of the *penis* is inveſted with a celluloſe membrane, of admirable texture; which again is covered with a firm nervous coat, and that with a cuticula and cutis: the duplicature of the cutis on the glans makes the prepuce.

It is tied to the lower part of the glans by a ligament called the FRÆNUM. By another ligament, called *ſuſpenſorium*, the *penis* is held up to the oſſa pubis.

The uſe of the *penis* is for evacuating the ſeed and urine. Indeed, Dr. Drake, from a view of its ſtructure, thinks it originally intended for the former only; and that the conveyance of the urine was not conſidered by nature in the mechaniſm of this part.

He adds another uſe, viz. the incitement to venery, and the propagation of the ſpecies. In effect, without ſuch an inſtrument, the ſeed of the moſt perfect animals could not be conveyed to the place of prolification: add to this, that an alternation of erection and flaccidity is abſolutely neceſſary; the firſt for the performance of its office, the ſecond for the ſecurity of the part. See ERECTION.

The cavernous body of the urethra is erected by the muſculi acceleratores, embracing the veins of its bulb.

Bleeding in the vena dorſalis of the *penis* is uſually found to ſurpaſs all remedies whatever in abating inflammatory diſorders of this member. This large vein, which runs along the back or upper ſide of the *penis*, being generally pretty much diſtended and conſpicuous in an inflammation of this part, may be opened about the middle, and kept bleeding till the member becomes flaccid, and a ſufficient quantity of blood be diſcharged proportionably to the urgency of the caſe; which done, a compreſs muſt be applied, and kept on by bandage. There muſt, however, be great caution in this operation not to injure the arteries or nerves which enter the *penis* near this vein, as alſo not to make the bandage too ſtrict, by which the inflammation and ſymptoms may become worſe than before. Heiſter's Surgery, p. 284.

PENIS *primus muſculus*, in *Anatomy*, a name given by Veſalius and others, to a muſcle of the *penis*, now generally known by the name of ACCELERATOR.

PENITENCE, *penitentia*, is ſometimes uſed for a ſtate of repentance, and ſometimes for the act of repenting. See REPENTANCE, and IMPENITENCE.

PENITENCE is alſo uſed for a diſcipline, or puniſhment attending repentance; more uſually called PENANCE.

PENITENCE alſo gives the title to ſeveral religious orders, conſiſting either of converted debauchees, and reformed proſtitutes; or of perſons who devote themſelves to the office of reclaiming them. Of this latter kind is the

Order of PENITENCE *of St. Magdalen*, eſtabliſhed about the year 1272, by one Bernard, a citizen of Marſeilles, who devoted himſelf to the work of converting the courtezans of that city.

Bernard was ſeconded by ſeveral others; who, forming a kind of ſociety, were at length erected into a religious order by pope Nicholas III. under the rule of St. Auguſtine.

F. Geſnay adds, that they alſo made a religious order of the *penitents*, or women they converted, giving them the ſame rules and obſervances which they themſelves kept.

Congregation of PENITENCE *of St. Magdalen at Paris*, owed its riſe to the preaching of F. Tiſſeran, a Franciſcan, who converted a great number of courtezans about the year 1492. Louis, duke of Orleans, gave them his houſe for a monaſtery; or rather, as appears by their conſtitutions, Charles VIII. gave them the hotel, called Bochaigne, whence they were removed to St. George's chapel, in 1572. By virtue of a brief of pope Alexander, Simon, biſhop of Paris, in 1497, drew them up a body of ſtatutes, and gave them the rule of St. Auguſtine.

To qualify a woman for admiſſion, it was required, that ſhe had committed the ſin of the fleſh. None were admitted who were above thirty-five years of age.

Till the beginning of the laſt century, none but *penitents* were admitted; but ſince its reformation by Mary Alvequin, in 1616, none have been admitted but maids, who, however, ſtill retain the ancient name *penitents.*

Penitents, an appellation given to certain fraternities, or ſocieties of perſons who aſſemble together for prayers, make proceſſions bare-footed, their faces covered with linen, and give themſelves diſcipline, &c.

There are *White Penitents* in Italy, at Avignon, and at Lyons. There are alſo *Blue Penitents*, and *Black Penitents*, which laſt aſſiſt criminals at their death, and give them burial.

Penitents, or *Converts of the name of Jeſus*, a congregation of religious at Seville, conſiſting of women, who had led a licentious life, founded in 1550.

This monaſtery is divided into three quarters: one for profeſſed religious; another for novices; a third for thoſe under correction.

When theſe laſt give ſigns of a real repentance, they are removed into the quarter of the novices, where, if they do not behave themſelves well, they are remanded to their correction. They obſerve the rule of St. Auguſtine.

Penitents *of Orvieto*, are an order of nuns, inſtituted by Antony Simoncelli, a gentleman of Orvieto. The monaſtery he built was at firſt deſtined for the reception of poor girls, abandoned by their parents, and in danger of loſing their virtue.

In 1662 it was erected into a monaſtery, for the reception of ſuch as, having abandoned themſelves to impurity, were willing to take up, and conſecrate themſelves to God by ſolemn vows. Their rule is that of the Carmelites.

Theſe religious have this in peculiar, that they undergo no noviciate. All required is, that they continue a few months in the monaſtery in a ſecular habit; after which they are admitted to the vows.

PENITENTIAL, *Pœnitentiale*, an eccleſiaſtical book, retained among the Romaniſts; wherein is preſcribed what relates to the impoſition of penance, and the reconciliation of *penitents.*

In the Capitulars of Charlemagne, the prieſts are enjoined to ſtudy well their *Penitential.* There are various *Penitentials:* the Roman *Penitential*, that of Venerable Bede, that of pope Gregory III. &c.

PENITENTIARY, *pœnitentiarius*, an office, or tribunal, in the court of Rome, wherein are examined, and delivered out, the ſecret bulls, graces, or diſpenſations, relating to conſcience, confeſſion, &c.

The expeditions of the *penitentiary* are ſealed up with red wax, and ſent cloſe; directed to the confeſſors.

Penitentiary is alſo an officer or dignitary, in ſome cathedrals, veſted with power from the biſhop to abſolve in caſes reſerved to him; on which account he is alſo called the *biſhop's ear.*

In ſome places there is a *grand penitentiary*, and a *ſub-penitentiary.* Anaſtaſius ſays, that pope Simplicius choſe ſome among the Roman prieſts to preſide over penances.

At preſent the pope has his *grand penitentiary*, who is a cardinal, and the chief of the other *penitentiary prieſts* eſtabliſhed in the patriarchal churches of Rome, who conſult him in all difficult caſes.

He preſides in the *penitentiary*, diſpatches diſpenſations, abſolutions, &c. and has under him a regent, and twenty-four proctors, or advocates of the ſacred *penitentiary.*

PENITENTS, in the church of Rome. See Pœnitentes.

PENNANT, or Pendant, in a *Ship.* See Pendant.

PENNATA *folia*, winged leaves, among *Botaniſts*, are ſuch leaves of plants as grow directly one againſt another, on the ſame rib or ſtalk: as thoſe of aſh, walnut-tree, &c. See Leaf.

PENNATULA, in *Natural Hiſtory.* See *Sea*-Pen.

PENNEVISCH, in *Ichthyology*, a name given by ſome to the moſt common ſpecies of the fiſh called bagre, caught in the Eaſt and Weſt Indies.

PENNON, or Penon, a ſtandard with a long tail, anciently belonging to a ſimple gentleman; properly uſed as a guidon, to place over a tent.

It is oppoſed to the *banner*, which was ſquare; and hence, when any one was to be made a banneret, the ceremony conſiſted in cutting off the tail of his *pennon*, and thus converting it into a banner.

PENNY, or Peny, in *Commerce*, an ancient Engliſh coin, which had formerly conſiderable courſe; but is now dwindled into an imaginary money, or money of account.

It is derived by Camden from *pecunia*; but others ſuppoſe that the word is formed from *pendo, to weigh*, and it was ſometimes written according to this origin, *pending.*

The ancient Engliſh *penny, penig*, or *pening*, was the firſt ſilver coin ſtruck in England; nay, and the only one current among our Saxon anceſtors; as is agreed by Camden, Spelman, Dr. Hickes, &c.

With them it was always the 240th part of their pound, and the true weight ſhould have been about 22½ Troy grains. Some writers affirm, that the Saxons had likewiſe a half-penny and farthing, both of them probably of ſilver. Clarke on Coins, p. 248.

The *penny*, which in Ethelred's time was the 20th part of the Troy ounce, was equal in weight to our threepence; five of them made one ſhilling, or ſcilling Saxon; and thirty a mark or mancuſe, equal to our 7*s.* 6*d.* It was the largeſt ſilver coin in England, and retained this value till the reign of Edward III.

Till the time of king Edward I. the *penny* was ſtruck with a croſs ſo deeply indented in it, that it might be eaſily broke, and parted, on occaſion, into two parts; thence called *half-pennies*; or into four, thence called *fourthings*, or *farthings.* But that prince coined it without indenture; in lieu of which he firſt ſtruck round *half-pence* and farthings.

Stow, in his Annals, p. 200, obſerves, that *half-pennies* were firſt coined round, A. D. 1279, in the reign of Edward I. But hiſtorians have ſince diſcovered, that *half-pennies* of this kind were coined by Henry I. and that though the uſual way in the reign of the two firſt Williams was to cut the *penny* into two for making of *half-pennies*, &c. yet it has been ſuppoſed that ſome few *half-pennies* might even then be coined round. Some few pieces of this kind are preſerved in the cabinets of the curious. See Mr. Pegge's remarks on this ſubject in Gent. Mag. vol. xxviii. p. 64, &c.

Edward I. alſo reduced the weight of the *penny* to a ſtandard; ordering that it ſhould weigh thirty-two grains of wheat, taken out of the middle of the ear. Stat. 13 Edw. I. This *penny* was called the *penny ſterling.* Twenty of theſe pence were to weigh an ounce; whence the *penny* became a weight, as well as a coin.

By 9 Edw. III. it was diminiſhed to the twenty-ſixth part of the Troy ounce; by 2 Hen. VI. it was the thirty-ſecond part; by 5 Edw. IV. it became the fortieth, and alſo by 36 Hen. VIII. and afterwards the forty fifth; but by 2 Eliz. ſixty *pence* were coined out of the ounce, and during her reign ſixty-two, which proportion is obſerved in our times.

The *penny ſterling* is now diſuſed as a coin; and ſcarce ſubſiſts, but as a money of account, containing the twelfth part of a ſhilling, or the two hundred and fortieth part of a pound.

The courſe of exchange between England and France is ſettled on the foot of ſo many pence ſterling, for a French crown of three livres.

The French *penny*, or denier, is of two kinds; the Paris *penny*, called *denier Pariſis*; and the *penny* of Tours, *denier Tournois.* See Denier.

The Dutch *penny*, called *penning*, or *pening*, is a real money, worth about one fifth more than the French *penny Tournois.* The *penning* is alſo uſed as a money of account, in keeping books by pounds, florins, and patards; twelve *pennings* make the patard; and twenty patards the florin.

At Hamburg, Nuremberg, &c. the *penny* or *pfennig* of account is equal to the French *penny Tournois.* Eight of them make the krieuk; and ſixty the florin of thoſe cities; and ninety the French crown, or 4*s.* 6*d.* ſterling. See Coin.

Penny, in *Ancient Statutes*, &c. is uſed for all ſilver money.

And hence the *ward-penny, aver-penny, hundred-penny, tithing-penny*, and *brothal-penny.* See Pence, &c.

Penny-*earth*, in *Agriculture*, a term uſed by the farmers for a hard, loamy, or ſandy earth, with a very large quantity of ſea-ſhells intermixed in it; ſome of which being round and flat, and in ſome meaſure reſembling pieces of money, have occaſioned the earth's being called by this name. It is an earth not eaſily dug, but is uſually undermined with pick-axes, and then falls in large lumps: which, with the froſts, break to pieces, and leave the ſhells looſe. It is prepared by breaking and mixing well with water, and then makes very deſirable floors. The Jerſey combers comb-pots are alſo made of it, and the ſides and roofs of ovens are plaiſtered with it; and being rightly managed, it combines into a floor almoſt as ſtrong as plaiſter of Paris.

Penny, *bord, half.* See Bord *half-penny.*

Penny, *half.* See Half-*penny.*

Penny, *rete.* See Rete-*penny.*

Penny, *ſchar.* See Schar-*penny.*

Penny, *ward.* See Ward-*penny.*

Penny *poſt.* See Post

Penny-*royal, pulegium*, in *Botany.* Its characters are theſe: the empalement of the flower is permanent, cut into five parts; the flower is of the lip-kind; it hath one petal, with a ſhort tube, divided at the brim into four parts; the helmet, or upper lip of the flower, is entire; the lower is cut into three equal ſegments; it hath four ſtamina, two being longer than the other, terminated by roundiſh ſummits, and a four-pointed germen, ſupporting an erect ſtyle, crowned by a bifid ſtigma; the germen afterward becomes four ſmall ſeeds, ſitting in the empalement of the flower. Miller enumerates three ſpecies.

Tournefort and Linnæus make the *penny-royal* a ſpecies of *mentha*, or MINT.

The ſeveral ſorts of *penny-royal* all propagate themſelves very faſt by their trailing branches, which take root at every joint; ſo that no more is required in their culture and propagation than to cut off and plant out theſe rooted branches: they ſhould be planted at a foot diſtance every way, that they may have room to grow. The beſt ſeaſon for this is in September, that the plants may be rooted before winter. They love a moiſt ſoil, and generally grow very faſt.

Penny-royal is among the firſt plants in eſteem in the preſent practice, as well as in former ages, as an attenuant and uterine. It promotes the menſes, and forwards delivery. It is good in flatulencies and ſuppreſſions of urine, and by many is greatly recommended in dropſies, jaundices, and other chronic diſtempers. It communicates its virtues very readily to water in infuſion: and its ſimple water, drawn by the alembic, has, perhaps, more virtue than any other kept in the ſhops. Its eſſential oil is ſometimes, though rarely, uſed in the ſame intentions with the water.

The oil and a ſimple and ſpirituous water ſtrongly impregnated with it, by drawing off a gallon of water, or proof ſpirit, from a pound and a half of the dry leaves, are kept in the ſhops.

Penny-*royal*, *Virginian*, a ſpecies of *ſatureia*. See Savory.

Penny-*weight*, a Troy WEIGHT, containing twenty-four grains; each grain weighing a grain of wheat gathered out of the middle of the ear, well dried.

The name took its riſe hence, that this was actually the weight of one of our ancient ſilver *pennies*.

Twenty of theſe *penny-weights* make an ounce Troy. A *penny-weight* of gold bullion, ſtandard, is worth four ſhillings; and of ſilver bullion, three pence. See Gold and Silver.

Penny-*wort*. See Navel-*wort*.

Penny-*wort*, *marſh* and *water*, *hydrocotyle*, in *Botany*, the name of a genus of plants of the *pentandria digynia* claſs; the characters of which are theſe: the flowers are diſpoſed into ſmall umbels, and are of the roſaceous kind, being compoſed of ſeveral petals, arranged in a circular order upon a cup, which afterwards becomes a fruit compoſed of two plain and ſemi-orbicular ſeeds.

The ſpecies of *hydrocotyle*, enumerated by Linnæus, are five.

PENON. See Pennon.

PENSA *libra*, in our *Ancient Cuſtoms*, a pound of money paid by weight, not by tale.

PENSILES *horti*, in *Antiquity*, gardens raiſed on arches by Nebuchadnezzar, king of Babylon, in order to gratify his wife Amyctis, daughter of Aſtyages, king of Media. Q. Curtius makes them equal in height to the walls of the city, viz. fifty feet. They contained a ſquare of four hundred feet on every ſide, and were carried up into the air in ſeveral terraſſes, laid above one another, and the aſcent from terraſs to terraſs was by ſtairs ten feet wide. The arches ſuſtaining the whole pile were raiſed above one another, and it was ſtrengthened by a wall, ſurrounding it on every ſide, of twenty-two feet in thickneſs. The floors of each of the terraſſes were laid in the following manner: on the top of the arches were firſt laid large flat ſtones ſixteen feet long and four broad, and over them was a layer of reed, mixed with a great quantity of bitumen, over which were two rows of bricks cloſely cemented together by plaiſter, and over all were laid thick ſheets of lead; and, laſtly, upon the lead was laid the mould of the garden. The mould, or earth, was of ſuch a depth, as to admit the largeſt trees to take root and grow; and it was covered with various kinds of trees, plants, and flowers. In the upper terraſs there was an aqueduct or engine, whereby water was drawn up out of the river, for watering the whole garden. Diod. Sic. lib. ii. Strab. lib. xvi. Q. Curtius, lib. v. cap. 1. or Prid. Conn. vol. i. p. 144.

PENSION, *penſio*, a yearly appointment, or ſum of money paid any one for ſervices or conſiderations already paſt.

That which in the two Temples is called a *parliament*, and in Lincoln's Inn a *council*, is in Gray's Inn termed a *penſion*; viz. an aſſembly of the members of the ſociety, to conſult of the affairs of the houſe.

Pensions alſo denote certain annual payments of each member to the houſe, for certain occaſions.

When a *penſion writ* is iſſued, none ſued thereby in the inns of court ſhall be diſcharged, or permitted to come into commons, till all duties be paid.

Hence *a penſion order*, in the ſame inn, is a peremptory order againſt ſuch of the ſociety as are in arrear for *penſions*, and other duties.

PENSIONARY, or **Pensioner**, a perſon who has a *penſion*, appointment, or yearly ſum, payable during life, by way of acknowledgment: charged on the eſtate of a prince, company, particular perſon, or the like.

In the Romiſh countries it is frequent to have *penſions* on benefices: theſe were anciently granted with a great deal of eaſe, under pretence of infirmities, poverty, &c. But ſince the twelfth century, theſe pretences were carried ſo far, that the incumbents, or titularies, of benefices, were little more than farmers.

This obliged the ſpiritual powers to fix the cauſes, and the quantities, of *penſions*. *Penſions* are now only creatable by the pope, and are never to exceed one third of the revenue; two-thirds being ſtill to remain to the incumbent.

Pensionary is alſo the appellation of the firſt miniſter of the ſtates of the province of Holland.

The *penſionary* is chairman in aſſemblies of the ſtates of that province; he propoſes the matters to be conſulted on, collects the votes, forms and pronounces the reſolutions of the ſtates; he alſo opens letters, confers with foreign miniſters, &c.

He is charged with inſpecting the finances, preſerving the rights of the province, maintaining the authority of the ſtates, and ſeeing to the obſervation of the laws, &c. for the good of the ſtate. He aſſiſts in the college of deputy-counſellors of the province, who repreſent the ſovereignty in the abſence of the ſtates; and he is perpetual deputy of the ſtates-general of the United Provinces. His commiſſion is only given for five years; after which it is deliberated whether or no it ſhall be renewed. Indeed there is no inſtance of its having been revoked. Death only puts a period to the functions of this important miniſter. Formerly he was called the *advocate of the province*: the title *penſionary* was only given at the time Barnevelt had the office. Grotius calls him in Latin *adſeſſor juriſperitus*; Merula, *advocatus generalis*; and Matthæus, profeſſor at Leyden, *conſiliarius penſionarius*, which is the quality the ſtates give him in their inſtruments.

Pensionary is alſo the firſt miniſter of the regency of each city, in the province of Holland.

His office is, to give his advice in matters relating to the government, either of the city in particular, or of the ſtate in general; and in aſſemblies of the ſtates of the province he is ſpeaker in behalf of his city.

Yet the function of theſe *penſionaries* is not alike every where: in ſome cities they only give their advice; and are never found in aſſemblies of the magiſtrates, except when expreſly called thither: in others they attend conſtantly; and in others they even make the propoſitions on the part of the burgher-maſters, draw up their concluſions, &c. They are called *penſionaries*, becauſe they receive an appointment or *penſion*.

Pensioners, *gentlemen*, a band of gentlemen, whoſe buſineſs it is to guard the king's perſon in his own houſe; and who for that end wait in the preſence-chamber.

They were firſt ſet on foot by king Henry VII. the number is forty; and each is obliged to keep three double horſes, and a ſervant, who is to be armed; ſo that they properly make a troop of guards, and have accordingly been muſtered by their own officers; but this part of duty, to which they are ſworn, the king uſually diſpenſes with.

Their officers are a captain, whoſe ſalary is 1000*l.* a year lieutenant, with 500*l.* a year, ſtandard-bearer, with 310*l.* a year, and clerk of the cheque, whoſe annual appointment is 120*l.* Their ordinary arms are gilt pole-axes, with which they attend the king to and from the chapel-royal; receiving him in the preſence-chamber, or coming out of his private lodging; as alſo at all great ſolemnities. Their *penſion* 100*l. per annum.*

To this band belong alſo a pay-maſter, harbinger, axe-keeper, and meſſenger.

Pensions *of churches*, are certain ſums of money paid to clergymen in lieu of tithes; and ſome churches have ſettled on them annuities, *penſions*, &c. payable by other churches: which *penſions* are due by virtue of ſome decree made by an eccleſiaſtical judge upon a controverſy for tithes, by which the tithes have been decreed to be enjoyed by one, and a *penſion* inſtead thereof to be paid to another; or they have ariſen by virtue of a deed made by the conſent of the parſon, patron, and ordinary; and if ſuch *penſion* hath been uſually paid for twenty years, then it may be claimed by preſcription, and be recovered in the ſpiritual court; or a parſon may proſecute his ſuit for a *penſion* by preſcription, either in that court, or at common law, by a writ of annuity; but if he takes his remedy at law, he ſhall never afterwards ſue in the ſpiritual court. If the preſcription be denied, that muſt be tried by the common law. F. N. B. 51. Hard. 230 Ventr. 120.

PENSTOCK. See Pen.

PENTACEROS, in *Natural Hiſtory*, a name given by Linkius, and ſome other authors, to a kind of *ſtella marina*, or *ſea ſtar-fiſh*, compoſed of five principal rays, with ſeveral tranſverſe hairy or downy proceſſes.

PENTACHORD, compounded of πεντε, *five*, and χορδη, *ſtring*, an ancient muſical inſtrument with five ſtrings.

The invention of the *pentachord* is referred to the Scythians; the ſtrings were of bullocks leather, and they were ſtruck with a plectrum made of goats horn.

PENTACROSTIC, a ſet or ſeries of verſes ſo diſpoſed, as that there are always found five ACROSTICS of the ſame name, in five diviſions of each verſe.

PENTACTINODOS, in *Natural Hiſtory*, a name given by ſome authors to thoſe ſpecies of ſtar-fiſh which are compoſed of a body divided into five rays.

PENTADACTYLON, *five-fingers*, in *Botany*, a name given by ſome authors to the *ricinus*, or *palma Chriſti*, from the figure of its leaf.

PENTADACTYLOS *piſcis*, the *five-fingered fiſh*, in *Ichthyology*, the name of a fiſh common in all the ſeas about the Eaſt Indies, and called by the Dutch there *viif vinger viſch*.

It has this name from five black ſtreaks which it has on each ſide, reſembling the prints of five fingers. It grows to about a foot and a half long; its head is ſmall in proportion to its body; its ſnout is long, and its fins large, and reaching almoſt to its tail; its general colour is very bright and elegant, a yellow with an admixture of purple, and of a ſilvery gloſs it has no ſcales, and is a dry but not ill-taſted fiſh.

PENTADACTYLOS-ASTER, in *Natural Hiſtory*, a name given by Linkius, and ſome other authors, to a ſpecies of *ſtar-fiſh*, compoſed of a ſmall body, and five principal rays, which have each ſeveral proceſſes coming from them, covered with down.

PENTAEDROSTYLA, in *Natural Hiſtory*, the name of a genus of ſpars.

The word is derived from the Greek πεντε, *five*, ἑδρα, *ſides*, and ϛυλος, a *column*.

The bodies of this genus are ſpars, in form of pentangular columns, terminated by pentangular pyramids at one end, and irregularly affixed at the other to ſome ſolid body.

Of this genus there are three known ſpecies.

PENTAGON, from πενταγονος, *quinquangulus*, compounded of πεντε, *five*, and γωνια, *angle*, in *Geometry*, a figure of five ſides and five angles.

If the five ſides are equal, the angles are ſo too; and the figure is called a *regular pentagon*, as *fig.* 69 *Tab.* III. *Geometry*. Moſt citadels are regular *pentagons*.

The moſt conſiderable property of a *pentagon* is, that one of its ſides, v. gr. D E, is equal in power to the ſides of a hexagon and a decagon inſcribed in the ſame circle A B C D E; that is, the ſquare of the ſide D E is equal to the ſum of the ſquares of the ſides D *a* and D *b*.

Pappus has alſo demonſtrated, that twelve regular *pentagons* contain more than twenty triangles inſcribed in the ſame circle, lib. v. probl. 45.

The dodecahedron, which is the fourth regular body, conſiſts of twelve *pentagons*.

Pentagon, *projection*, or *perſpective of a*. See Perspective.

PENTAGON-ASTER, in *Natural Hiſtory*, a name given by Linkius, and other authors, to a kind of *ſtella marina*, or *ſtar-fiſh*, compoſed of five rays, with a number of tranſverſe proceſſes iſſuing from them, covered with a hairyneſs.

It is one of the general claſſes of the *ſtellæ crinitæ*, ſo called from this hairyneſs.

PENTAGONOTHECA, in *Botany*, the name given by Vaillant to the plant called by Linnæus, Plumier, Houſton, and others, PISONIA.

PENTAGRAPH, an inſtrument whereby deſigns, prints, &c. of any kind, may be copied in any proportion, without a perſon's being ſkilled in drawing.

The inſtrument is otherwiſe called a *parallelogram*.

The common *pentagraph* (repreſented *Tab.* II. *Miſcel. fig.* 27.) conſiſts of four braſs or wooden rulers, two of them from fifteen to eighteen inches long, the other two half that length. At the ends, and in the middle, of the longer rulers, as alſo at the ends of the ſhorter, are holes, upon the exact fixing whereof the perfection of the inſtrument chiefly depends. Thoſe in the middle of the long rulers are to be at the ſame diſtance from thoſe at the end of the long ones, and thoſe of the ſhort ones; ſo that, when put together, they may always make a parallelogram.

The inſtrument is fitted together for uſe by ſeveral little pieces, particularly a little pillar, Nº 1. having at one end a ſcrew and nut, whereby the two long rulers are joined; and at the other a little knot for the inſtrument to ſlide on. The piece, Nº 2. is a rivet with a ſcrew and nut, wherewith each ſhort ruler is faſtened to the middle of each long one. The piece, Nº 3. is a pillar, one end whereof, being hollowed into a ſcrew, has a nut fitted to it. At the other end is a worm to ſcrew into the table; when the inſtrument is to be uſed, it joins the ends of the two ſhort rulers. The piece, Nº 4. is a pen, portcraion, or pencil, ſcrewed into a little pillar. Laſtly, the piece, Nº 5. is a braſs point, moderately blunt, ſcrewed likewiſe into a little pillar.

Uſe of the Pentagraph, or *parallelogram*. 1. To copy a deſign in the ſame ſcale or bigneſs as the original: ſcrew the worm, Nº 3. into the table: lay a paper under the pencil, Nº 4. and the deſign under the point, Nº 5. This done, conducting the point over the ſeveral lines and parts of the deſign, the pencil will draw or repeat the ſame on the paper.

2. If the deſign be to be reduced—e. gr. into half the ſpace, the worm muſt be placed at the end of the long ruler, Nº 4. and the paper and pencil in the middle. In this ſituation conduct the braſs point over the ſeveral lines of the deſign, as before; and the pencil at the ſame time will draw its copy in the proportion required; the pencil here only moving half the lengths that the point moves.

Hence, on the contrary, if the deſign be to be enlarged by one half, the braſs point, with the deſign, muſt be placed in the middle, at Nº 3. the pencil and paper at the end of the long ruler, and the worm at the other.

3. To enlarge or reduce in other proportions, there are holes drilled at equal diſtances on each ruler: viz. all along the ſhort ones, and half way of the long ones, in order for placing the braſs point, pencil, and worm, in a right line therein; i. e. if the piece carrying the point be put in the third hole, the two other pieces muſt be put in its third hole.

If then, the point and deſign be placed at any hole of the great rulers, and the pencil with the paper at any hole of the ſhort ruler, which forms the angle therewith, the copy will be leſs than half the original. On the contrary, if it be placed at one of the holes of that ſhort ruler, which is parallel to the long ruler, the copy will be greater than half the original.

The conſtruction of this inſtrument requires a degree of accuracy, which moſt of our inſtrument-makers are ſtrangers to; for which reaſon there are very few of the inſtruments that ſucceed. Few will do any thing tolerably but ſtrait lines; and many of them not even thoſe.

In order to prove that the figure deſcribed by a *pentagraph* is ſimilar to the given figure; let C, *fig.* 28. be the fixed centre of motion; P the pencil, for tracing the given figure P P, and *p* the pencil, which traces the other figure *p p*; *p*, &c. muſt be ſo adjuſted, that *p*, C, and P, may lie in one ſtrait line; then, ſince B*p* : A*p* : : B P : A C, whatever be the ſituation of the *pentagraph*, the angles P C P and *p* C *p*, are vertical, and, therefore, P C*p* will in every poſition of the inſtrument be a right line: but P C : *p* C : : B A : A*p*, in each of the two poſitions in the figure, and conſequently the triangles PCP, *p*C*p*, are ſimilar; and P P : *pp* (: : P C : *p*) : : B A : A*p*, or in a given ratio. Hence it appears, that by moving the pencil *p*, A*p* may be equal to BA, or leſs in any proportion; and conſequently *p p* may be equal to PP, or leſs, in the ſame proportion.

PENTAMETER, derived from πενταμετρος, q. d. *five meaſures*, in *Poetry*, a kind of verſe, conſiſting of five feet or metres.

The two firſt feet of a *pentameter* may be either dactyls or ſpondees; the third muſt be always a ſpondee; and the two laſt anapæſts.

It is uſually joined to hexameters, in elegies, epiſtles, epigrams, and other little pieces. There is no work extant of *pentameters* alone.

PENTANDRIA, formed of πεντε, *five*, and ανηρ, *male*, in *Botany*, the fifth claſs of plants, which have hermaphrodite flowers, with five ſtamina or male parts in each. See *Tab.* I. *of Botany*, *Claſs* 5. and *Tab.* III. *Claſs.* 5.

Of this claſs of plants, which comprehend ſix orders, diſtinguiſhed by the number of ſtyles, are the primroſe, willow-herb, bindweed, &c.

PENTANGLE, in *Geometry*, a figure with five angles.

PENTAPETALOUS *plants*, are ſuch whoſe flowers conſiſt of five leaves.

PENTAPETES, in *Botany*, a genus of the *monadelphia dodecandria* claſs. Its characters are theſe: the flower has a double empalement, the outer being ſmall, and compoſed of three leaves; the inner cut into five parts, which are reflexed; it has five oblong petals, which ſpread open, and fifteen narrow ſtamina joined in a tube at their baſe, with long coloured ſummits that are erect and barren; between each of theſe are three ſtamina, terminated by oblong, erect ſummits; it has a roundiſh germen, with a cylindrical ſtyle the length of the ſtamina, crowned by a thick ſtigma; the germen becomes an oval, ligneous capſule, with five cells, filled with oblong ſeeds. Miller mentions one ſpecies, a native of India. Linnæus enumerates three ſpecies.

PENTAPHARMACUM, a medicine conſiſting of five ingredients: it has alſo been applied in the ſame ſenſe to aliments. Adrian the emperor was, as we are informed, particularly fond of a diſh of five ingredients, called by this name. The ingredients were the udder of a ſow, ham, peacock, brawn, and a ſort of paſte.

PENTAPHYLLOIDES, in *Botany*. See CINQUEFOIL.

PENTAPLEURUM, a name given by ſome botanical writers to the common ſmall plantain, uſually called *ribwort* and *plantago quinquenervia*, from its leaves always having juſt five ribs running along them.

PENTAPOLIS, Πενταπολις, in *Geography*, &c. a country wherein are five cities.

The moſt celebrated was the *Pentapolis Cyrenaica*, or *Pentapolis* of Egypt, whoſe five cities were Berenice, Arſinoe, Ptolemais, Cyrene, and Apollonia.

Among the ancient geographers and hiſtorians we likewiſe read of the *Pentapolis* of Lybia, now called *Meſtrata*; the *Pentapolis* of Italy; and the *Pentapolis* of Aſia Minor.

PENTAPTEROPHYLLUM, in *Botany*, a name by which Dillenius has called the MERIOPHYLLUM of other authors, characteriſed under that name in the Genera Plantarum of Linnæus, p. 459.

PENTAPTOTON, in *Grammar*, a noun which has only five caſes.

PENTASTICH, *pentaſtichon*, in *Poetry*, a ſtanza, or diviſion of a poem conſiſting of five verſes.

PENTASTYLE, in *Architecture*, a work wherein are five rows of columns.

Such was the portico begun by the emperor Gallienus, and which was to have been continued from the Flaminian gate to the bridge Milvius, i. e. from the Porto del Popolo, to the Porte Mole.

PENTATEUCH, in the *Sacred Learning*, the five books of Moſes at the head of the Old Teſtament; viz. Geneſis, Exodus, Leviticus, Numbers, and Deuteronomy. The word is formed from ϖεντατευχος, which ſignifies the ſame; compounded of ϖεντε, *five*, and τευχος, *volume*.

Pere Simon, in his Hiſt. Crit. du V. Teſt. produces a great number of paſſages to prove, that Moſes was not wholly the author of the *Pentateuch*, as we now have it. Indeed, thoſe apparent interpolations at the end are ſufficient to determine that point; it being abſurd to ſuppoſe Moſes the author of the account of his own death and burial, and of the compariſon between him and the ſucceeding prophets in Iſrael.

Theſe interpolated paſſages are uſually attributed to Eſdras; who, on his return from the Babyloniſh captivity, is ſuppoſed to have publiſhed the Old Teſtament, or at leaſt a part of it, corrected and enlarged.

There are two famous *Pentateuchs*, or editions of the *Pentateuch*, which have a long time diſputed the preference, both as to antiquity, and as to character; viz. that of the Jews, called the *Jewiſh*, or *Hebrew Pentateuch*, written in the Chaldean or Aſſyrian character; and that of the Samaritans, written in the Samaritan or Phœnician character. Each is maintained to be the ancient Hebrew; though the generality of the critics give it in behalf of the latter.

Indeed, as to the point of matter, they are generally pretty conformable to each other; each has all the interpolated paſſages above mentioned, though the Samaritan has one or two more which are not in the Hebrew: the firſt a paſſage in Deut. xxvii. 4. where an altar is enjoined to be built, and ſacrifices to be offered, on mount Ebal, or rather mount Gerizim; which paſſage was doubtleſs foiſted in to countenance the Samaritan worſhip, and repreſent it of equal antiquity with that of the temple of Jeruſalem. See SAMARITANS.

Dr. Kennicott (State of the Hebrew Text, vol. ii. p. 320.) has offered ſeveral obſervations to prove, or at leaſt towards rendering it highly probable, that this memorable corruption was made by the Jews, and that the word in diſpute was originally Gerizim; the mount on which God commanded the Iſraelites to write the law and erect the altar.

But the grand difference is in the letter or character: the Jewiſh being in the Chaldean or Aſſyrian character, and the Samaritan in the Phœnician, i. e. the Cannanitiſh character; this latter ſeems to have an advantage over the vulgar Jewiſh *Pentateuch*. Yet Prideaux is of opinion, that the latter is only a tranſcript from the former out of the Chaldean into the old Hebrew character.

One great reaſon he gives, is, that there are many variations in the Samaritan, manifeſtly occaſioned by miſtaking the ſimilar letters in the Hebrew alphabet; which letters having no ſimilitude in the Samaritan character, it is evident the variations muſt have ariſen in tranſcribing from the vulgar Hebrew into the Samaritan; and not the contrary way.

Add to this, that Simon, Allix, and many other learned men, take the Chaldean or Aſſyrian character to have been the character always in uſe among the Jews; and the Samaritan or Canaanitiſh, or, as it is alſo called, the *old Hebrew* character, to have never been uſed by the Jews before the captivity, in any manner, either on books or on medals.

Hence the *Pentateuch* muſt have been tranſcribed into that character; and that, probably, to render it legible to the inhabitants of Samaria, who, upon their introduction of the *Pentateuch*, might probably be verſed in no other character.

Uſher takes the Samaritan *Pentateuch* to have been compiled by Doſitheus, a Samaritan, mentioned by Origen to have adulterated the *Pentateuch*. Dupin ſuppoſes it the work of ſome modern Samaritan, whom he imagines to have compiled it chiefly out of the different copies of the Paleſtinian and Babylonian Jews, and the Septuagint, becauſe it ſometimes agrees with one, and ſometimes with another.

The Jews read the whole *Pentateuch* every year; and for this purpoſe they divide it into paragraphs or ſections, which they diſtinguiſh into great and ſmall. The great are thoſe which they read in a week, of which there are fifty-four (ſee PARASCHE); and the ſmall regard particular matters. Each greater ſection, which is denominated by the word with which it begins, is divided into ſeven parts, becauſe they are read by ſo many different perſons: the prieſt begins, afterwards a Levite; and in the choice of the other readers, reſpect is paid to the rank of the people. After the text of Moſes, they read a paragraph of the PARAPHRASE of Onkelos. The books of the prophets are alſo divided in the ſame manner.

PENTATHLON, ϖενταθλον, in *Antiquity*, the five exerciſes performed at the Grecian games, and for which prizes were propoſed.

Theſe exerciſes were wreſtling, darting, leaping, running, and quoit-playing. He who bore away the prize in them all was called *pentathlus*; by the Latins, *quinquertio*; as the five exerciſes themſelves were by thoſe latter people called *quinquertium*.

PENTATONON, in the *Ancient Muſic*, a concord, by us called the redundant ſixth.

It conſiſts of four tones, and a major and minor ſemitone; whence the name, *pentatonon*, q. d. *five tones*.

PENTAUREA, a name given by ſome fabulous authors to a ſtone ſaid to have been firſt found by Apollonius Tyaneus, and to poſſeſs the virtues of all the other ſtones, and to attract them all to it, as the magnet does iron.

PENTECONTARCHA, among the *Ancients*, the captain or commander of a galley, called PENTECONTEROS.

PENTECONTEROS, ϖεντηκοντορος, a veſſel with fifty oars.

PENTECOST, Πεντηκος, Whitſuntide; a ſolemn feaſt of the church, held in commemoration of the deſcent of the Holy Ghoſt on the Apoſtles; as deſcribed in the Acts. See WHITSUNTIDE.

It has its name from the Greek, ϖεντηκοστος, q. d. *quinquageſimus*, *fiftieth*, becauſe held on the fiftieth day after EASTER.

In the ancient church, *Pentecoſt* finiſhed the Paſchal time, or Eaſter ſeaſon; wherein, as Tertullian, St. Jerom, &c. obſerve, Hallelujah was ſung every where, the office celebrated ſtanding, no faſting allowed, &c.

The Jews likewiſe had a feaſt they called *Pentecoſt*, or *Quinquageſimus*, ſolemnized in memory of the law's being given to Moſes, fifty days after their departure out of Egypt.

This was the ſecond of the three grand feſtivals in the eccleſiaſtical year, at which all the males were to appear before the Lord at the national altar. It is called by ſeveral names in the Old Teſtament; as the Feaſt of Weeks, becauſe it was celebrated ſeven weeks, or a week of weeks, after the Paſſover, or rather, after the firſt day of the feaſt of unleavened bread; the feaſt of Harveſt, according to Mede and Bochart, becauſe, as the harveſt begun at the Paſſover, it ended at *Pentecoſt*: or, according to others, becauſe at this feaſt the firſt fruits of their wheat harveſt were brought and offered to God; and the Feaſt of Firſt Fruits.

PENTECOSTALS, *Pentecoſtalia*, anciently were pious oblations made at the feaſt of *Pentecoſt*, by the pariſhioners to their pariſh-prieſt; and ſometimes by inferior churches or pariſhes to the principal or mother church.

Theſe pariſh *Pentecoſtals* were alſo called *Whitſun-farthings*; and their ſum was divided into four parts, of which one went to the prieſt, one to the poor, one towards the repair of the church, and one to the biſhop of the dioceſe.

Theſe are paid ſtill in ſome few dioceſes; being now only a charge on particular churches, where by cuſtom they have been paid.

PENTELASMIS, in the *Hiſtory of Shell-fiſh*, the name of the *conchæ* ANATIFERÆ of ſome writers.

The *pentelaſmis*, is a genus of animals, compoſed of a ſhelly body, affixed to a fleſhy and ſoft pedicle; the body is compoſed of five valves, and the pedicle is ſometimes ſhort, and ſometimes long. The animal itſelf belongs to the TRITONS.

PENTELICUM, *marmor*, in the *Works of the Ancients*, a name given to a very beautiful and gloſſy ſpecies of white marble, of which many of the columns and ſtatues of larger ſize of the ancients were made: the Parian marble, from certain cracks and fiſſures in the ſtrata, ſeldom affording blocks of more than five feet in length.

PENTESYRINGUS, in *Antiquity*, a ſort of pillory, with five holes; wherein were faſtened the legs, arms, and heads of criminals, to prevent their ſtirring.

PENTEXOCHE, a name given by authors to a ſpecies of echinites, reſembling the ripe fruit of the medlar, and thence called alſo *meſpileus lapis*.

PENTHEMIMERIS, ϖενθημιμερις, compounded of ϖεντε, *five*, ημισυς, *half*, and μερος, *part*, in the Greek and Latin *Poetry*, part of a verſe, conſiſting of two feet and one long ſyllable.

PENTHORUM, in *Botany*, a genus of plants of the *decandria pentagynia* claſs, the characters of which are theſe: the cup is very ſmall and permanent; it is compoſed of one leaf divided into five ſegments at the edges; there is no flower; the ſtamina are ten ſetaceous filaments of double the length of the cup; theſe are permanent; the antheræ are roundiſh, and fall off very quickly; the germen of the piſtil is divided into five parts, and terminates in five ſtyles, which are conic, erect, and of the length of the ſtamina; the ſtigmata are obtuſe; the fruit is a capſule divided into five parts, and containing five cells; the ſeeds are numerous, ſmall, and compreſſed. There is only one ſpecies.

PENTODRYON, in *Botany*, a name given firſt by the Greek writers, and after that by the Romans, to a kind of *ſtrychnum* or *nightſhade*, which cauſed madneſs in thoſe who eat of it. This was called by others *manichum ſtrychnum*, and by ſome ſimply *manicum*.

PENTOPHTHALMOS, in *Ichthyology*, the name of an Eaſt Indian fiſh, approaching to the European *liparis*, or *butterfiſh*, but larger, and called by the Dutch there *viifoog*. It has theſe names from five round ſpots in the tail-fin, reſembling five eyes; it is of a yellowiſh colour, and is covered with a ſmooth ſkin, having no ſcales; its body is thick, its head ſmall, its beak long; it has two red fins, and its tail is bluiſh; it is an inhabitant of the freſh waters, and is a very well taſted fiſh.

PENULA. See PÆNULA.

PENULTIMA, or PENULTIMATE, formed from *pene*, and *ultimus*, *almoſt laſt*, in *Grammar*, denotes the ſyllable, or foot, immediately before the laſt.

Hence *antepenultimate* is that before the *penultimate*, or the laſt but two.

PENULTIMATE, in *Muſic*. M. Broſſard will have it the ſame with what the Greeks call *paranete*; though others will not allow the *paranete* to be the *penultimate* chord, but the next to it.

PENULTIMATE *of the ſeparate, paranete diazeugmenon*, is a name the ancients gave to one of the chords of their lyre or ſyſtem; correſponding to the *d*, *la*, *re*, of the third octave of the modern ſyſtem.

PENULTIMATE *of the acute, paranete hyperboleon*, a chord of the ancient ſyſtem, anſwering to the *g*, *re*, *ſol*, of the third octave of the modern ſyſtem.

PENUMBRA, in *Aſtronomy*, a faint or partial ſhade, obſerved between the perfect ſhadow and the full light in an eclipſe.

The *penumbra* ariſes from the magnitude of the ſun's body; were he only a luminous point, the ſhadow would be all perfect; but by reaſon of the diameter of the ſun, it happens that a place which is not illuminated by the whole body of the ſun, does yet receive rays from a part thereof.

Thus, ſuppoſe S the ſun (*Tab. Aſtron. fig.* 43.) and T the moon, and the ſhadow of the latter to be projected on a plane, as GH. The true proper ſhadow of T, viz. GH, will be encompaſſed with an imperfect ſhadow, or *penumbra*, HL and GE, each portion whereof is illuminated by an entire hemiſphere of the ſun.

The degree of light or ſhadow of the *penumbra* will be different in different parts, as thoſe parts lie open to the rays of a greater or leſſer part of the ſun's body; thus from L to H, and from E to G the light continually diminiſhes; and in the confines of G and H, the *penumbra* becomes loſt and confounded with the total ſhade; as, near E and L, it is confounded with the total light.

A *penumbra* muſt be found in all eclipſes, whether of the ſun, the moon, or the other planets, primary or ſecondary; but it is moſt conſiderable with us in eclipſes of the ſun; as in the caſe here referred to.

In eclipſes of the moon, the earth is encompaſſed indeed with a *penumbra*; but it is only ſenſible to us on the earth near the total ſhadow: an obſerver placed on a plane, whereon the ſhadow falls, might obſerve the whole *penumbra*, as in eclipſes of the ſun. Thus an eye placed at I or F, would only ſee the ſemidiameter of the ſun; the reſt being hid behind the moon. Going from I towards H, more and more of the ſun is hid, till it be loſt in the ſhadow itſelf, &c.

Hence we have eclipſes of the ſun when the ſhadow never touches the earth, provided the *penumbra* do but reach it: and hence there is a difference obſerved in eclipſes of the ſun, as the ſhadow itſelf, or a greater or leſs degree of the *penumbra*, paſſes over a place. But eclipſes of the moon appear the ſame in all places where they are viſible.

When the ſhadow itſelf falls on the earth, the eclipſe is ſaid to be total or central; when only the *penumbra* falls on it, the eclipſe is ſaid to be partial.

The *penumbra* extends infinitely in length, inaſmuch as to each point of the diameter of the ſun, there anſwers a ſpace infinite in length, into which no rays enter from that point, though there do from others. Two rays drawn from the two extremities of the earth's diameter, and which proceed ſtill diverging, form the two edges of the *penumbra*; which, of conſequence, is continually growing in width, and is infinite alſo in this ſenſe. All that infinite ſpace is the *penumbra*; except the triangle of the ſhadow included in it.

The figure of this ſpace comprehending the ſhadow, is a trapezium, one of whoſe ſides is the diameter of the earth; the oppoſite ſide parallel thereto is an infinite line, i. e. the width of the *penumbra* projected to infinity and the two other ſides are two rays drawn from the two extremities of the diameter of the ſun, through thoſe of the diameter of the earth, and which, prolonged back beyond the ſun, will interſect in a certain point, making an angle equal to the apparent diameter of the ſun; which angle may be called the *angle of the penumbra*.

Now the *penumbra* will be the greater, as this angle, or, which is the ſame thing, as the ſtar is greater, the planet remaining the ſame; and if the diameter of the planet be increaſed, the ſtar remaining the ſame, it will be the ſame as if the diameter ſtill receded from the angle of the *penumbra*.

In order to determine how much of the ſurface of the earth can be involved in the *penumbra*, let us ſuppoſe the apparent ſemidiameter of the ſun to be the greateſt, or about $16' 23''$, which is when the earth is in her perihelion. Let ABD (*Tab. Aſtronomy, fig.* 44.) be the earth, L the moon, and AMB half the angle of the cone, which is equal to $16' 23''$; whence we ſhall find its height $LM = 58\frac{1}{2}$ ſemidiameters of the earth (ſee SHADOW.) Let the moon be in her apogee, and therefore, at her greateſt diſtance from the earth, which is 64 ſemidiameters of the earth, and $TM = TL + LM = 122\frac{1}{2}$ ſemidiameters. But $TB : TM ::$ ſine of TMB : ſine of MBN or MBT; and $TB : TM :: 1 : 122\frac{1}{2}$, and the angle $TMB = 16' 23''$, therefore the angle $MBN = 35^\circ 42' = TMB + MTB$. Conſequently $MBN - TMB = (35^\circ 42' - 16' 23'' =) MTB = 35^\circ 25\frac{1}{2}'$, which is the meaſure of the arc AB; whoſe double $70^\circ 51'$ is equal to the arc CAB, or about 4900 Engliſh miles. See ECLIPSE.

M. de la Hire examines the different degrees of the *penumbra*, and repreſents them geometrically by the ordinates of a curve, which ſhall be among themſelves, as the ſeveral parts of the ſun's diſc, wherewith a body placed in the *penumbra* is enlightened.

PENY. See PENNY.

PEONY, in *Botany*. See PIONY.

PEP and PEPIA. See PIP.

PEPASMUS, ϖεπασμος, in *Medicine*, the digeſting and ripening of morbid humours.

PEPASTIC, or PEPTIC, ϖεπαςικος, or ϖεπτικος, formed from ϖεπαινειν, *to digeſt*, or *ripen*, in *Medicine*, a kind of medicament of the conſiſtence of a plaſter; proper to bring vitious and corrupt humours to a head, and diſpoſe them for ſuppuration.

Butter, roots of mallows, of fleurs-de-lys, onions, and leaves of oxylapathum, are eſteemed good *pepaſtics*, or maturatives.

The word is alſo uſed for ſuch medicines as promote the digeſtion of food in the ſtomach.

PEPITA, in the *Materia Medica*, a name given by ſome authors to the *faba ſancti Ignatii*, or *St. Ignatius's bean*.

PEPLION, or PEPLOS, names given by the ancients to medicines which they uſed as briſk cathartics to purge off the bile and other humours.

PEPLIS, in *Botany*. See *Water* PURSLANE.

PEPLIUM, in *Botany*, a name given by the ancient Greek writers to a ſhrub which had pinnated leaves and papilionaceous flowers. It is tranſlated by many *ſena*; but this does not appear certainly to be right; the ſeveral ſpecies of *colutea* agree as well with this deſcription as the *ſena*, and they have indeed been called *ſena* by many; probably it was one of theſe.

PEPLUS, πεπλος, among the ancients, a kind of garment worm by women.

The *peplus* was a long robe that reached to the feet, without any ſleeves, and ſo exceeding fine, that the ſhape of the body could eaſily be diſcovered through it.

The *peplus* of Minerva is very famous among ancient mythologiſts. The Athenians uſed a great deal of ceremony in making the *peplus*, and dreſſing the ſtatue of this goddeſs with it.

PEPLUS, in *Botany*, a name given by ſome authors to the ſmaller round-leaved ſpecies of *tithymal*, or SPURGE, as they call the narrow-leaved ones *eſula*.

PEPO, in *Botany*. See PUMPKIN.

PEPPER, or *Lizard's Tail*, in *Botany*, *piper*, a genus of the *diandria trigynia* claſs. Its characters are, that the flowers are cloſely faſtened to a ſingle ſtalk, and have no complete ſheath; theſe have no petals nor ſtamina, but have two ſummits oppoſite to the root of the germen, which are roundiſh; they have a large oval germen, but no ſtyle, crowned by a prickly triple ſtigma; the germen afterwards becomes a roundiſh berry, with one cell, containing one globular ſeed. Miller enumerates fourteen, Linnæus twenty ſpecies. From a ſpecies of this genus is obtained the black *pepper*, which is an aromatic fruit of a hot dry quality, chiefly uſed in the ſeaſoning of meats.

It is the product of a ſhrub, growing in ſeveral parts of the Eaſt Indies, chiefly Java, Sumatra, Malacca, and the coaſts of Malabar. The plant is very weak, and of the reptile kind; and for that reaſon uſually planted at the foot of the larger trees, as the areca, cocoa, &c.

Pepper grows in bunches or cluſters, at firſt green; as the grains ripen, they grow reddiſh; and, at laſt, after being expoſed a while to the ſun, and, probably, gathered before perfect maturity, they become black, in the condition we ſee them.

The fruit is gathered in November. It muſt be choſen large, full, not wrinkled, without duſt, with a good many white grains in it; and care muſt be taken the largeſt berries have not been picked out, as is often done, to make white *pepper*.

PEPPER, *white*, *piper album*, is the fruit of the ſame plant with the black, and is prepared from it by moiſtening it with the ſea-water, and then expoſing it in the ſun, and caſting away the outer bark, which, abandoning the grains, leaves them white.

Indeed M. Dellon, a late traveller, ſays, they ſtrip off the ſkin, by beating it before it be quite dry; or by ſoaking it in water after it has dried, and then beating it.

Many authors, and among the reſt Pomet, will have the *white pepper* to be natural, and the fruit of a different plant from the black: but M. Dellon, who expreſly declares the contrary from his own long experience, ſeems to put the matter paſt doubt.

White pepper muſt be choſen after the ſame manner as black; with this farther care that it hath not been dyed white.

Pepper that is ſold ground, is very apt to be ſophiſticated; the black with burnt cruſt of bread, &c. the white with beaten rice.

Of theſe pungent ſpecies the black ſort is the hotteſt and ſtrongeſt, and moſt commonly uſed for medicinal, as well as culinary purpoſes. *Pepper*, infuſed in water, impregnates the menſtruum pretty ſtrongly with its flavour, but weakly with its taſte: the eſſential oil, which riſes to the ſurface of the water in boiling it, is thin, light, and limpid; in ſmell, ſtrong and agreeable; and in taſte, mild. The quantity of extracts from both kinds of *pepper* is nearly the ſame; that by rectified ſpirit amounting to about one-eighth, and the watery to near one half their weight. But thoſe of the white are weaker than the other ſort.

PEPPER, *long*, *piper longum*, is thus denominated from its form, which is cylindrical and about an inch and a half in length; it conſiſts of an aſſemblage of grains, or ſeeds, joined cloſe to one another, of a browniſh colour, bordering without on red, and within on black; and grows by a long pedicle to a plant, like that of the black *pepper*, and of the ſame genus, but lower, and its leaves ſmaller and greener. Its taſte reſembles that of the former, but it is hotter and more pungent; and its ſpirituous extract is proportionably more fiery: in its pharmaceutic properties, it entirely agrees with the former.

There are three kinds of this *pepper*, that of the Eaſt Indies, that of America, and that of Ethiopia, called alſo grain of Zelim; though the firſt alone is the proper *long pepper*, the reſt reſembling it but little.

It muſt be choſen new, large, heavy, well filled, hard to break, and without duſt or mixture: its chief uſe is in medicine, where it enters ſeveral Galenical compoſitions; among the reſt Venice treacle.

PEPPER, *Barbary*, *bell*, *bird*, and *bonnet*. See CAPSICUM.

PEPPER, *Guinea*, *piper Indicum*, obtained from a ſpecies of the CAPSICUM, is a reddiſh pod, of a coral colour, much eſteemed by the Americans, from among whom it is brought, and by them called *chile*, and by the French, *garden coral*.

It is a native of the Eaſt and Weſt Indies, and raiſed in ſome of our gardens.

It is now cultivated pretty commonly in France, eſpecially in Languedoc, where it is uſed in making vinegar, and is likewiſe comfitted with ſugar. It muſt be choſen new, in large pods, dry, entire, and red.

In taſte it is extremely pungent and acrimonious; it gives out its pungency to rectified ſpirit, together with a pale yellowiſh red tincture. It is ſometimes given, in ſmall quantities, as one of the higheſt ſtimulants in cold phlegmatic temperaments, in ſome paralytic caſes, in relaxations and inſenſibility of the ſtomach, and for promoting the effieacy of aloetic medicines, and the deobſtruent gums in uterine diſorders.

It is uſed principally at table: a ſpecies of it, called in the Weſt Indies *bird-pepper*, is the baſis of the powder brought from thence under the name of *Cayenne pepper*. See CAPSICUM.

There are four kinds of this: the firſt called by the Americans *chilchotes*; the ſecond, very ſmall, *chilterpin*; both of a very pungent taſte; the third, *tonalchiles*, moderately hot, and eaten by the natives like other fruit with bread; the fourth, *chilpelagua*, moderately pungent, ſometimes uſed by the Spaniards in the preparation of chocolate; there is alſo a fifth kind, called *agy*, growing in Peru

PEPPER, *Jamaica*, called by the Dutch *amomi*, by the Spaniards *pimienta de Jamaica*, is the fruit of a tree, the *myrtus foliis alternis* of Linnæus, growing plentifully in Jamaica, and other American iſlands.

It is a real aromatic, and may ſupply the defect of cloves, nutmeg, and cinnamon; whence it is called alſo by the Engliſh, *all-ſpice*. The French call it the *round clove*, from its round ſhape, and its taſte reſembling that ſpice. See PIMENTO.

PEPPER, *Ciapa*, *pimienta de Ciapa*, a name given by the Spaniards to a ſort of ſpice which they diſcovered in Ciapa, a province of Guatimala, in New Spain, and of which they were at firſt very fond, both in food and medicine.

In medicine it is a very good cephalic and ſtomachic. It is recommended very ſtrongly alſo by ſome of the Spaniſh writers, as a cure for the epilepſy and gutta ſerena; but thoſe who tried it in theſe caſes do not confirm ſuch accounts.

The deſcriptions we have of it are, that it has the taſte of cloves, *pepper*, cinnamon, and ginger, all blended together; and Redi is of opinion, that it is no other than our PIMENTO, or Jamaica *pepper*.

PEPPER, *Indian*. See *Guinea* PEPPER and CAPSICUM.

PEPPER, *poor-man's*, a name ſometimes given to the *lepidium*. See DITTANDER.

PEPPER, *wall*, a name ſometimes given to a ſpecies of SEDUM, or *leſſer houſe-leek*.

PEPPER, *water*, a ſpecies of *polygonum*, or KNOT-*graſs*, in the Linnæan ſyſtem. Miller and others make it a ſpecies of the *perſicaria*, or ARSMART.

PEPPER-*graſs*. See PILULLARIA.

PEPPER-*mint*, the name of a ſpecies of MINT.

PEPPER-*wort*, a name by which ſome call the *lepidium*, or DITTANDER.

PEPPER-*bird*, the Engliſh name of the *rhamphaſtis*, with a yellow rump, otherwiſe called TOUCAN.

PEPPER-*muſhroom*, in *Botany*, a name given by Dr. Liſter to a new ſpecies of fungus, diſcovered by him in the woods of Yorkſhire, whoſe juice is acrid and hot as *pepper*. This is ſomewhat larger than the common eſculent muſhroom, but of the ſame ſhape with that, having a round head and open gills underneath. The head is very fleſhy, and the pedicle alſo is ſolid, not hollow, as in moſt other of the large funguſes: any part of this muſhroom being cut or broken, it bleeds very freely a white milky juice, like that of the tithymals. This juice taſtes like *pepper*, only that it is much hotter. It is not viſcous or clammy to the touch, and the air does not much diſcolour it; nor does it render the blade of the knife, with which it is cut, black, as moſt other vegetable juices do. When let out of the plant it very ſoon concretes into a firm and dry maſs; making a ſort of cake; and when thus dried into a ſolid ſubſtance, it retains its white colour and pungent taſte. It is very remarkable, that this muſhroom, though ſo hot to our tongues as not to be endured, yet is ſo well ſuited to the palates and nature of certain inſects, that they can not only feed on it, but live comfortably in the midſt of it. The yellow naked ſnail feeds greedily on the plant while growing, and the ſtalks of it at ſuch times as the juice is ſharpeſt of all, that is, while it is growing to the full ſize, are full of the maggots and worms hatched from the eggs of flies, depoſited there for a nidus and food for them in that ſtate. The juice has a great affinity with euphorbium, and may be brought into medicinal uſe, perhaps, to very good purpoſe.

John Bauhine deſcribes a muſhroom much reſembling this, but ſmaller and leſs fleſhy; and the Pruſſians and Polanders have a ſort of great muſhroom, which they call GROOZDISHYS, which agrees with this in many particulars; but it is larger and thicker. Phil. Tranſ. N° 89.

PEPPER-*water*, a liquor prepared by the curious for examination by the microſcope, as always affording a great number of ſmall animals.

The method of preparing it is this: put common black *pepper*, groſsly powdered, into an open veſſel, ſo as to cover the bottom of it half an inch thick, and put to it rain or river water, till it covers it an inch, ſhake or ſtir the whole well together, at firſt mixing, but never diſturb it afterwards: let the veſſel be expoſed to the air, uncovered; and in a few days there will be ſeen a pellicle or thin ſkin ſwimming on the ſurface of the liquor, appearing of ſeveral colours.

This is a congeries of multitudes of ſmall animals; and being examined by the microſcope, will be ſeen all in motion: the animals, at firſt ſight, are ſo ſmall as not to be diſtinguiſhable, unleſs to the greateſt magnifiers; but they grow daily till they arrive at their full ſize. Their numbers are alſo continually increaſing, till the whole ſurface of the liquor is full of them, to a conſiderable depth. When diſturbed, they will ſometimes all dart down to the bottom, but they ſoon after come up to the ſurface again. The ſkin appears ſooneſt in warm weather, and the animals grow the quickeſt; but in the ſevereſt cold it will ſucceed, unleſs the water freezes.—Baker's Microſcope, p. 71.

About the quantity of a pin's head of this ſcum, taken upon the nib of a new pen, or the tip of a hair-pencil, is to be laid on a plate of clear glaſs; and if applied firſt to the third magnifier, then to a ſecond, and finally to the firſt, will ſhew the different animalcules it contains, of ſeveral kinds and ſhapes as well as ſizes. Phil. Tranſ. N° 284.

The animalcules diſcoverable in this liquor, are principally of ſix kinds. 1. The largeſt kind of all is in length about the diameter of a hair, and of ſcarce a fourth part of that meaſure in breadth; they are very thin and tranſparent, but their back is darker than their belly; they turn about very frequently and nimbly in the water: their ſides are fringed with a great number of minute feet, which are ſeen principally at the two ends; and at one end there are alſo ſome briſtles longer than the feet, which make a ſort of tail. They are very nimble, and walk as well as ſwim, and will climb up a hair, if put in among them.

2. There is a ſmaller ſort, whoſe length is about a third of a hair breadth; but their tail is five or ſix times as long as their body. This they either carry ſtrait, or in a ſpiral form; and at the other end they thruſt out a ſort of bearded tongue: theſe make a conſtant current of water towards them.

3. There is a ſmaller ſort than theſe, which are ſometimes ſeen of an oval figure, and ſometimes long and flat like a flounder: theſe alſo have feet, which are plainly ſeen when the water is evaporating.

A fourth kind appear like ſlender worms, fifty times as long as bread: their thickneſs is not above the hundredth part of a hair's breadth; and they move with equal eaſe either forward or backward. There are a fifth ſort extremely minute and round; and a ſixth kind which are longer than theſe, but not larger; and probably there may be yet many kinds not diſcovered. Theſe ſmall animals are eaſily deſtroyed; a little diſſolved ſalt or ſugar, or ſpirit of vitriol, or even ſpittle, will kill them; and in the drying away of the waters many of them burſt. Phil. Tranſ. N° 203.

PEPSIS, πεψις, which ſignifies *boiling*, in *Medicine*, the COCTION or DIGESTION of foods or humours in the body.

PEPTIC, in *Medicine*. See PEPASTIC.

PEPUZIANS, a ſect of ancient heretics; otherwiſe called PHRYGIANS, or CATAPHRYGIANS.

They had their name *Pepuzians*, from a pretence that Jeſus Chriſt appeared to one of their propheteſſes in the city of Pepuza in Phrygia, which was their holy city.—See QUINTILIANS.

PER *accidens*. See ACCIDENS.

PERACUTUM *menſtruum*. See MENSTRUUM.

PERÆQUATORES, among the Romans, aſſeſſors appointed to regulate the *cenſus* according to every man's circumſtances, by eaſing thoſe that were overcharged, and raiſing the taxation if too low.

PERAMBULATION *of the foreſt*, the ſurveying, or walking about a foreſt, or the limits of it, by juſtices or other officers thereto appointed, to ſet down the metes and bounds thereof, and what is within the foreſt, and what without.

PERAMBULATION *of pariſhes* is annually performed in order to preſerve thoſe bounds of pariſhes which have been long ſettled by cuſtom; and becauſe theſe *perambulations* were performed in the rogation week, the rogation days were anciently called *gange*-days, from the Saxon *gan*, or *gangan, to go*.

In the *perambulation* of a pariſh, no refreſhments can be claimed by the pariſhioners, as due of right from any houſes or lands in virtue of cuſtom.

Theſe *perambulations* were, in the times of popery, accompanied with great abuſes, viz. with feaſtings and ſuperſtition; being performed in the nature of proceſſions, with banners, hand-bells, lights, ſtaying at croſſes, and the like: and, therefore, when proceſſions were forbidden, in the reign of queen Elizabeth, it was required, that, for the retaining of the *perambulation* of the circuits of pariſhes, the people ſhould, once in the year, at the uſual time, with the curate and the ſubſtantial men of the pariſh, walk about the pariſhes, and at their return to church make their common prayers, &c.

PERAMBULATIONE *facienda*, is a writ commanding the ſheriff to make *perambulation*, and ſet down the bounds of two or more manors, whoſe limits are not ſo well known.

The writ *de perambulatione facienda* is only iſſued where the lords of both manors agree to have ſuch perambulation. If one of them refuſe, the other muſt ſeek his remedy by a writ *de* RATIONABILIBUS *diviſis*.

PERAMBULATOR, in *Surveying*, an inſtrument for the meaſuring of diſtances; called alſo PEDOMETER, *way-wiſer*, and *ſurveying wheel*.

Its advantages are its handineſs and expedition: its contrivance is ſuch, that it may be fitted to the wheel of a coach; in which ſtate it performs its office, and meaſures the road without any trouble at all.

There is ſome difference in its make: that now moſt uſual, and moſt convenient, is as follows.

PERAMBULATOR *or way-wiſer, conſtruction of the.* The *perambulator* (repreſented *Tab.* II. *Survey. fig.* 33.) conſiſts of a wheel two feet ſeven inches and a half in diameter; conſequently half a pole, or eight feet and three inches in circumference. On one end of the axis is a nut, three quarters of an inch in diameter, divided into eight teeth, which, upon moving the wheel round, fall into the eight teeth of another nut *c*, fixed on one end of an iron rod Q, and thus turn the rod once round, in the time the wheel makes one revolution. This rod, lying along a groove, in the ſide of a carriage of the inſtrument, has at its other end a ſquare hole, into which fits the end *b* of the little cylinder P. This cylinder is diſpoſed under the dial-plate of a movement, at the end of the carriage B, in ſuch manner as to be moveable about its axis. Its end *a* is cut into a perpetual ſcrew; which falling into the thirty-two teeth of a wheel perpendicular thereto, upon driving the inſtrument forward, that wheel makes a revolution, each ſixteen pole. On the axis of this wheel is a pinion with ſix teeth, which, falling into the teeth of another wheel of ſixty teeth, carries it round every hundred and ſixtieth pole, or half a mile.

This laſt wheel then carrying a hand or index round with it, over the diviſions of the dial-plate, whoſe outer limb is divided into one hundred and ſixty parts, correſponding to the one hundred and ſixty poles, points out the number of poles paſſed over. Again, on the axis of this laſt wheel is a pinion containing twenty teeth, which, falling into the teeth of a third wheel that has forty teeth, drives it once round in three hundred and twenty poles, or a mile. On the axis of this wheel is a pinion of twelve teeth, which, falling into the teeth of a fourth wheel, that has ſeventy-two teeth, drives it once round in twelve miles.

This fourth wheel carrying another index over the inner limb of the dial-plate, divided into twelve, for miles, and each mile ſubdivided into halves, quarters, and furlongs, ſerves to regiſter the revolutions of the other hand, and to keep account of the half-miles and miles paſſed over, as far as twelve miles.

Perambulator, or *way-wiſer*, *uſe of the*. The application of this inſtrument is obvious from its conſtruction. Its proper office is in the ſurveying of roads, and large diſtances, where a great deal of expedition, and not much accuracy, is required. It is evident, that driving it along, and obſerving the hands, has the ſame effect as dragging the chain, and taking account of the chains and links. See Chain.

PERANEMA, in *Ichthyology*, the name of a Braſilian fiſh, of the ſize of the pearch, being ten or eleven fingers in length, and about three fingers broad in the broadeſt part.

Its mouth is large and round, and has no teeth, but ſeveral very rough and ſharp prominences; its eyes are large, and it has one long fin running down the back, which is ſupported by rigid and prickly rays; its tail is not forked; its whole body is a ſilvery white, with a faint bluſh of red; its ſcales are extremely ſmall, and of a triangular figure, and its belly is very white; it is a ſea-fiſh, and is wholeſome and well-taſted.

PERANITES, the name of a ſtone mentioned with many idle ſtories of its origin, by the writers of the middle ages.

It ſeems originally to have been only a corruption of the word *peantides*, a name by which the ancients ſeem to have called our *ſtalactites* or *dropſtone*.

PER ARSIN, and *theſin*, in *Muſic*. *Per* is a Latin prepoſition, ſignifying *by*, *during*; *arſis* and *theſis* are Greek words, the firſt whereof ſignifies elevation or riſing: the ſecond poſition, or ſetting down.

Per theſin, then, ſignifies in falling, or during the latter time of the meaſure: *per arſin*, in riſing, or in the firſt time of the meaſure. A ſong, counter-point, fugue, &c. are ſaid to be *per theſin*, when the notes deſcend from acute to grave: on the contrary, they are *per arſin*, when the notes aſcend from grave to acute. See Arsis.

Fugue per Arsin and *theſin*. See Fugue.

PERCA, in *Ichthyology*. See Pearch.

Perca *Amboinenſis*, in *Ichthyology*, the name of a freſh water fiſh, ſomewhat reſembling our pearch, but differing in that it is of a brown colour, and has ſeveral blue lines under its ſnout, and ſome blueneſs in the adjoining fins, but its back and belly fins are green. It is caught in the lakes and rivers of freſh-water, at Amboyna, and is a very delicately taſted fiſh.

PERCEPTION, *perceptio*, in *Logic*, the act of *perceiving*, or apprehending a thing, without making any affirmation, or negation. See Apprehension and Conception.

Some writers have confounded idea and *perception*, whereas theſe are clearly diſtinguiſhable as the cauſe and effect; the one is an operation of the mind, and the other the reſult of that operation.

The faculty or power of *perception*, conſtitutes what we call the understanding.

The faculty of *perception* ſeems to be that which conſtitutes the diſtinction between the animate and inanimate parts of the creation. Vegetables, ſome of them, have ſome degree of motion, and upon different applications of other bodies, alter their figures and motions; ſo as hence to obtain the name of *ſenſitive* plants; which, however, is the reſult of mere mechaniſm, and no otherwiſe produced than the ſhortening of a rope by the effuſion of water. But *perception* is a metaphyſical principle, and is found in ſome degree in all animals; and in them alone.

PERCH, *pole*, or *rod*, a long meaſure, much uſed in ſurveying and meaſuring of land.

Among the old Romans, and ſtill among geometricians, the *pertica*, *perch*, is ten feet; and they otherwiſe call it the *catena*, *funis*, and *decempeda*.

In England, the ſtatute *perch* contains ſixteen feet and a half; and for coppice-woods, &c. eighteen feet. Forty ſquare *perches* make a rod, and one hundred and ſixty an acre.

The cuſtomary *perch* is various in various counties: in Staffordſhire it is twenty-four feet; in the foreſt of Sherwood twenty-one, the foot there being eighteen inches, the meaſure whereof is marked in the chancel wall of Edwyndſtow, and in the church of St. Mary in Nottingham.

In Herefordſhire, a *perch* of walling is ſixteen feet and a half; a *perch* of ditching twenty-one feet, &c. In France, the *perch* is from eighteen to twenty-three, and even twenty-ſeven, of their feet.

Perch, or Pole, of a wheel carriage, is faſtened to the middle of the hind axle-tree, and paſſes between the fore axle-tree and its bolſter, being ſecured hy the pole-pin, ſo as to move about it, and connecting the fore and hind carriages together. Thus, A B *Tab.* II. *Miſcellany*, *fig.* 29.) repreſents the *perch* paſſing under the body of a coach, and faſtened to the hinder axle at C. D E repreſents the fore axle, and W, W, the ſections of the wheels. It is plain, that in turning a carriage of this conſtruction, the larger the wheel, the ſooner it will ſtrike againſt the *perch*; and in the caſe repreſented in the figure, the wheel ſtrikes againſt the *perch* when the axle makes the angle deſcribed by the dotted lines D, D. On this account, the fore-wheels are uſually made ſmaller than the hind ones; and notwithſtanding this diminution of ſize, the turning of ſuch carriages is attended with great inconvenience. In order to remedy this, many expedients have been adopted, particularly in coaches, chariots, and other light vehicles, to which the crane-necked *perch* could be conveniently applied. But as this could not be adapted to the heavier kinds of carriages, and is, beſides, attended with a very conſiderable expence, Mr. Jacob has contrived a more ſimple and leſs expenſive method of attaining the propoſed end. For this purpoſe, inſtead of fixing the pin, paſſing through the *perch* at F, in the centre of the axle, he brings a projection backwards from it, as in *fig.* 30. and makes the axle with the wheels turn round the pin paſſing through that projection at P; in which caſe the angle, which the wheel makes with the *perch*, becomes conſiderably leſs, before the wheel ſtrikes againſt it. So that a larger wheel, in a carriage of this conſtruction, will not touch the *perch* ſo ſoon as a ſmaller wheel in a carriage of the ordinary conſtruction; and whatever be the ſize of the wheels, the carriage will turn ſhorter than if it were conſtructed in the former method, with the centre-pin in the centre of the axle. This conſtruction is attended with no additional expence, is applicable to all kinds of carriages, and is ſtronger than the uſual mode of conſtruction. Jacob's Obſ. on the Structure and Draught of Wheel Carriages, 4to. 1773. p. 79.

PERCHANT, among *Fowlers*, a decoy-*bird*, which the fowler has faſtened by the foot, and which flutters about the place where it is tied, to draw other birds to it, and give the fowler an occaſion of catching them.

PERCOLATION. See Filtration.

Many have attempted the condenſing of wines by *percolation*, or ſeparating from them that ſuperfluous moiſture or water, which dilutes them below the true ſtandard of vinous liquors, in order to make them richer, and fitter for keeping; but it does not appear that ſuch attempts have as yet ſucceeded.

PERCUNOS, the name of an ancient Pruſſian idol. See Potrimpos.

PERCUSSION, in *Phyſics*, the impreſſion a body makes in falling or ſtriking upon another; or the ſhock or colliſion of the two moving bodies; which meeting, alter each other's motion. See Motion.

Percuſſion is either *direct* or *oblique*. See Direct and Oblique.

In bodies either perfectly hard, or perfectly ſoft, and ſo void of all elaſticity, the laws of *percuſſion* are eaſily determined; but ſince even the hardeſt bodies have their ſhare of elaſticity, and in elaſtic bodies the laws are very different, and much more intricate, having been firſt aſcertained in the Philoſophical Tranſactions, by Sir Chr. Wren, Dr. Wallis, and Mr. Huygens, we ſhall lay down each apart.

Percussion, *laws of*, *in bodies not elaſtic*. 1. If a body in motion, as A (*Tab.* V. *Mechanics*, *fig.* 86) ſtrike directly againſt another at reſt, B, the firſt will loſe juſt as much of its motion as it communicates to the ſecond; ſo that the two will proceed thence with an equal velocity, as if collected into one maſs.

If A therefore be triple of B, A will loſe one fourth of its motion; ſo that if before it moved through a line of twenty-four feet in a minute, it will now only move eighteen.

2. If a moving body A ſtrike againſt another already in motion, B; the firſt will increaſe the velocity of the latter, but will loſe leſs of its own motion than if the latter had been at reſt; ſince all here required is, that ſome degrees of motion be added to thoſe the latter already had, to make them both proceed with an equal velocity.

Suppoſe, e. gr. the body A, with twelve degrees of motion, to ſtrike againſt the other B, leſs by half, and at reſt, the firſt will transfer four degrees of its motion to the latter, and retain eight to itſelf: but if it ſtrike with twelve degrees of motion on the other already moving with three degrees, it will only communicate two degrees; for A being double of B, this needs only half the motion to make it proceed with the ſame velocity.

3. If a moving body A, ſtrike on another B, either at reſt, or moving more ſlowly, and either in the ſame direction or in a contrary one; the ſum of the momenta, if the bodies move in the ſame direction, or their difference, if they move in a contrary one, will be the ſame after the *percuſſion* as before.

4. If two equal bodies, A and B, meet each other with equal velocities; after the congreſs, they will both remain at reſt.

5. If a body A ſtrike directly on another at reſt B; its celerity after the ſtroke is to its celerity before it, as the weight of A is to the ſum of the weights of A and B: if, therefore, the weights were equal, the celerity after the ſhock will be half of what it was before it.

Thus if $A=Q$, and its velocity before the ſtroke be denominated C, and $B=q$, then QC will expreſs the whole quantity of motion before and after the ſtroke, and $\frac{QC}{Q+q}$, or, the quantity of motion divided by the weights or quantities of matter, will be equal to V the common velocity: hence we ſhall have $QC=V\times\overline{Q+q}$; and, therefore $C:V::Q+q:Q$. If $Q=q$, it will be $C:V\ (::2Q:Q)::2:1$.

6. If a body in motion A ſtrike directly on another moving more ſlowly, but in the ſame direction; the velocity, after the ſhock, will be equal to the ſum of the momenta, divided by the ſum of the weights.

For the ſum of the momenta both before and after the ſtroke is $QC+qc$, c being the velocity of q or B; therefore $V=\frac{QC+qc}{Q+q}$. Hence if $Q=q$, $V=\frac{Q\times\overline{C+c}}{Q\times 2}=\frac{C+c}{2}$, or half the ſum of the former velocities.

7. If two equal bodies, moving with different velocities, ſtrike directly againſt each other; after the conflict, they will proceed with the ſemi-difference of the velocities wherewith they were moved before it.

For the quantity of motion is $QC-qc$, and, therefore, $V=\frac{QC-qc}{Q+q}$: and if $Q=q$, $V=\frac{QC-Qc}{2Q}=\frac{C-c}{2}$. And if C alſo $=c$, $V=0$, and, therefore, the quantity of motion is not always the ſame, as the CARTESIANS maintain.

8. If two bodies, A and B, meet directly with velocities that are reciprocally as their weights; after the conflict, they will both remain at reſt: i. e. if $Q:q::c:C$, $QC=qc$, and $V=\frac{QC-qc}{Q+q}=0$.

9. If two bodies, A and B, meet directly with the ſame velocity; the celerity, after the impulſe, will be to that before it, as the difference of the weights to their ſum For $QC-qC=V\times\overline{Q+q}$; therefore, $V:C::\overline{Q-q}:\overline{Q+q}$.

10. If two bodies meet directly, with any velocity whatever; the celerity after the ſtroke will be equal to the difference of the momenta, divided by the ſum of the weights. For $V=\frac{QC-qc}{Q+q}$.

To determine the momentum loſt by the conflict: multiply the celerity which the body had before the conflict, into its maſs; thus you have the momentum before the conflict. In like manner, multiply the celerity after the conflict into the maſs; thus have you the momentum after the conflict. The latter momentum therefore, being ſubtracted from the former, leaves the loſs. And hence may the magnitudes of the ſtrokes be eſtimated.

Thus in the three caſes already recited, the momentum before the conflict is QC, $QC+qc$, and $QC-qc$; and V, or the celerity after the conflict, will be reſpectively $\frac{QC}{Q+q}$, $\frac{QC+qc}{Q+q}$, and $\frac{QC-qc}{Q+q}$, and the momenta of Q in the ſeveral caſes $\frac{Q^2C}{Q+q}$, $\frac{Q^2C+Qqc}{Q+q}$, and $\frac{Q^2C-Qqc}{Q+q}$: therefore the quantities of motion loſt by Q will be reſpectively $QC-\frac{Q^2C}{Q+q}=\frac{QqC}{Q+q}$, $QC-\frac{Q^2C+Qqc}{Q+q}=\frac{QCq-Qcq}{Q+q}$; and $QC-\frac{Q^2C-Qqc}{Q+q}=\frac{QqC+Qqc}{Q+q}$.

Hence it appears in the firſt caſe, that the magnitude of the ſtroke, which is as the motion loſt, will be as the celerity of the ſtriking body; for if its celerity were C, the motion loſt would be $\frac{QCq}{Q+q}$; but if it were c, the motion loſt would be $\frac{Qcq}{Q+q}$; and $\frac{QCq}{Q+q}:\frac{Qcq}{Q+q}::C:c$.

In the ſecond caſe, the magnitude of the ſtroke will be the ſame as if q had been at reſt, and Q had ſtruck it with the difference of their celerities; for the motion loſt is $\frac{QCq-Qcq}{Q+q}$; but in the caſe now ſuppoſed, the motion loſt would be $\frac{Qq\times\overline{C-c}}{Q+q}=\frac{QCq-Qcq}{Q+q}$.

In the third caſe, the magnitude of the ſtroke will be the ſame as if either body as q had been at reſt, and the other, as Q, had ſtruck it with the ſum of their celerities: for the motion loſt is $\frac{QqC+Qqc}{Q+q}$, and in the caſe now ſuppoſed it would be $\frac{Qq\times\overline{C+c}}{Q+q}$ equal to the former. Hence it appears, that the magnitude of the ſtroke between two given bodies is always proportional to their relative, and not to their abſolute celerities.

11. A direct or perpendicular ſtroke is to an oblique one as the whole ſine is to the ſine of the angle of incidence. For let B C (*Tab.* V. *Mechanics, fig.* 87.) be the body ſtruck, A the ſtriking body, A C the oblique ſtroke, aC the perpendicular ſtroke; and the magnitude of the perpendicular ſtroke aC will be to that of the oblique ſtroke in the direction A C as aC to A B, or as A C : A B. For reſolving the force in A C into A B perpendicular to B C and A D parallel to it; and it is evident that the force in the direction A B is the only part of A C that ſtrikes B C, the other part A D being parallel to it. But the magnitude of a perpendicular ſtroke of the ſame body moving with the ſame force is to be meaſured by the line $aC=AC$; and therefore it is to the magnitude of the oblique ſtroke as aC to A B, i. e. as A C to A B, or as radius to the ſine of the angle of incidence.

PERCUSSION, *laws of, in elaſtic bodies.* In bodies perfectly elaſtic, the force of elaſticity is equal to the force wherewith they are compreſſed; that is, the colliſion of two ſuch bodies on each other is equivalent to the motion which either of them would acquire, or loſe, by mere ſimple impulſe. This force exerting itſelf contrary ways, a motion equivalent thereto muſt be ſubtracted from the motion in the impelling body, and added to that in the body impelled by mere impulſe, to find their velocities after *percuſſion.* See ELASTICITY.

12. If a body ſtrike directly on an immoveable obſtacle, either one or both of them being elaſtic; the body will be reflected with the ſame velocity wherewith it ſtruck, and in the ſame line. For if the elaſticity were away, the whole force of the ſtriking body would be ſpent in overcoming the reſiſtance of the obſtacle; and conſequently all the motion would ceaſe: it follows, that the whole force is employed in compreſſing the elaſtic body; by which means it acquires an elaſtic force equal thereto: ſince then the elaſticity, when the compreſſing force is ſpent, reduces the body into its former ſtate, it repels the other with the ſame force wherewith it ſtruck; conſequently, it will rebound with the ſame velocity. And becauſe an elaſtic body reſtores itſelf in the ſame direction wherein it was compreſſed (there being no reaſon why it ſhould change its direction) the body will rebound in the ſame right time.

13. If an elaſtic body ſtrike obliquely on an immoveable obſtacle, it will rebound in ſuch manner as to make the angle of reflection equal to the angle of incidence. See this demonſtrated with regard to light, by a method which applies to all impinging elaſtic bodies, under REFLECTION.

14. If an elaſtic body A ſtrike directly againſt another at reſt B equal to it; after *percuſſion* A will remain at reſt, and B will proceed with the ſame velocity which A had before the ſhock, and in the ſame direction.

For if the bodies were not elaſtic, each would proceed, after the ſtroke, in the ſame direction, and with half the velocity; but ſince the elaſtic force acts in the ſame direction wherein the compreſſion is made, and is equal to the compreſſing force; it repels A with half its velocity, and therefore ſtops its motion: but it drives B farther with half its velocity, and therefore accelerates its motion. It is therefore carried after the ſhock, with the whole celerity wherewith A was carried before it, and A remans at reſt. The quantity of motion before the ſtroke is QC, and the motion loſt by *percuſſion*, being the double of that loſt between non-elaſtic bodies is $\frac{2CQq}{Q+q}$; therefore the momentum after the ſtroke will be $QC-\frac{2CQq}{Q+q}=\frac{Q^2C-QCq}{Q+q}$: and $V=\frac{QC-Cq}{Q+q}$: and the velocity of q, whoſe motion is equal to that loſt by Q, is equal to $\frac{2QCq}{Q+q}\div q=\frac{2QC}{Q+q}$. If $Q=q$, $V=\frac{QC-CQ}{Q+q}=0$; and $v=C$.

Hence, ſince A (*Tab.* V. *Mechan. fig.* 88.) tranfers all its force to B; B in like manner will tranſfer it to C, C again to D, and D to E. Wherefore if there be ſeveral equal elaſtic bodies, mutually touching each other, and A be ſtruck againſt B, all the intermediate ones remaining at reſt, the laſt alone, E, will be moved, and that with the velocity wherewith A ſtruck againſt B.

15. If an elaſtic body, A, ſtrike directly on another at reſt, B; its velocity, after *percuſſion*, will be to its velocity before it, as the difference of weights is to their ſum:

but the velocity it communicates to B, is to the ſame, as double the weight of A to the ſum of the weights. After *percuſſion*, therefore, the velocity of A is to the velocity of B, as the difference of weights to the double of A.

Thus, $V = \frac{QC - Cq}{Q+q} = \frac{\overline{Q-q} \times C}{Q+q}$; therefore, $V \times \overline{Q+q} = \overline{Q-q} \times C$, conſequently, $V : C :: Q-q : Q+q$. And becauſe $v = \frac{2QC}{Q+q}$, $v : C :: 2Q : Q+q$. Conſequently $V : v :: Q-q : 2Q$.

16. If a greater body ſtrike a leſs body at reſt, the velocity given to it will be leſs then the double of its own velocity. If $Q \urcorner q$, let $Q = mq$, then $v = \frac{2QC}{Q+q}$ will be equal to $\frac{2mqC}{mq+q} = \frac{2C}{1+\frac{1}{m}} \angle 2C$.

17. The velocity which a greater body gives to a leſs body at reſt, is to that which the leſs body moved with the ſame velocity would communicate to the greater body at reſt, as the magnitude of the greater to the magnitude of the leſs body. If $Q \urcorner q$ ſuppoſed to be at reſt, then $v = \frac{2QC}{Q+q}$; but if Q be at reſt, and q ſtrike it with the celerity C, the velocity of Q after the ſtroke would be $\frac{2qC}{q+Q}$; therefore the velocity given by the greater body is to that given by the leſs as $\frac{2QC}{Q+q} : \frac{2qC}{q+Q} :: Q : q$.

18. If a greater body ſtrikes againſt a leſs, the greater body will not come to reſt, but move more ſlowly: for ſince $Q \urcorner q$, $Q-q$ will be poſitive, and therefore, in the proportion $Q+q : Q-q :: C : V$, V will be poſitive but leſs than C, becauſe $Q-q \angle Q+q$.

19. Again, if an elaſtic body ſtrike a larger elaſtic body at reſt, the ſmaller body will always rebound, and move in a contrary direction to what it did at firſt, and alſo give the larger body a greater quantity of motion than what was orginally in the ſmaller body. For as $q \urcorner Q$, $Q-q$ will be a negative quantity, and therefore, V will be negative, or Q will move backwards. And this quantity of motion communicated, may be greater than the original motion in any ratio leſs than that of 2 to 1. For ſuppoſing the ſmall body and its velocity, to be denoted by unity, and the larger body at reſt by x, the velocity of x after the ſhock will be $\frac{2}{1+x}$, and its quantity of motion will be $\frac{2x}{1+x}$. But though the proportion of $2x$ to $1+x$ increaſes when x increaſes, yet its limit will be the proportion of 2 to 1; which is the limit to which the motion of x may approach indefinitely near.

Hence it follows, that if the force of moving bodies be meaſured by their quantity of motion, a body may, by *percuſſion*, immediately communicate a greater force than itſelf has to another, and this in any proportion leſs than double.

But if other elaſtic bodies be interpoſed, a body may mediately communicate a greater force than its own to another larger body x, in any proportion leſs than that of $x\sqrt{x}$ to 1. Thus if $x = 1000000$, the body 1 with the velocity 1, may, by the means of intermediate bodies, give it the force 999000000; and the ſum of the abſolute forces of all theſe bodies taken together, ariſing from the *percuſſion*, may exceed the force of the firſt or unity, in any ratio leſs than $2x\sqrt{x}$ to 1, or 2000000000 to 1, although the relative force in all caſes remains as at firſt $= 1$.

Theſe are paradoxes which cannot be urged againſt thoſe who maintain the forces of bodies to be meaſured by their maſſes and the ſquares of their velocities.

It is alſo to be obſerved, that thoſe who meaſure force by the quantity of motion, muſt deny that there is any force loſt by the impreſſions, made on ſoft bodies, or by the bending of elaſtic bodies; for if any were loſt from ſuch cauſes, the ſum of the quantities of motion of bodies moving the ſame way, could not remain the ſame before, during, and after the ſhock, which is an univerſal rule admitted by the Newtonians. But they admit that a ſpring bent between two bodies may, by unbending itſelf, generate motion in theſe bodies. Hence it follows that, according to this doctrine, though a ſpring may give motion to bodies, it cannot, by a contrary action, take it away; which ſeems no ſmall paradox. See FORCE.

20. If a body A moves towards the body C, at reſt, and an intermediate body B of a mean magnitude be placed at reſt between them, ſo that A firſt impels B, and then B impels C, a greater motion will be given to C than if A had ſtruck it directly. And if B be a mean proportional between A and C, the velocity communicated to C will be the greateſt that can be. Huygens, de Mot. Corp. ex Percuſſ. prop. 12.

In the preceding ſeries of proportional magnitudes, $B + \frac{AC}{B} \angle A+C$. For $A : B :: B : C$, therefore $A-B : B :: B-C : C$, and $A-B : B-C :: B : C$; but $C \angle B$, therefore $B-C \angle A-B$; and therefore $B \angle A-B+C$, and $2B \angle A+C$: but $B = \frac{AC}{B}$; therefore $B + \frac{AC}{B} \angle A+C$. The ſame propoſition might be demonſtrated, if C were the greateſt body and A the leaſt.

Now it is plain, that the velocity of the body C ſtruck only by A would be $\frac{2Aa}{A+C} = \frac{4Aa}{2A+2C}$, a denoting the velocity of A: the velocity of B, ſtruck immediately by A, would be $\frac{2Aa}{A+B} = b$, b denoting the velocity of B: and, therefore, the velocity of C ſtruck by B moved with the velocity b would be $\frac{2Bb}{B+C} = \frac{2B \times 2Aa}{\overline{B+C} \times \overline{A+B}} = \frac{4BAa}{BA+BB+CA+CB} = \frac{4Aa}{A+B+\frac{CA}{B}+C}$. But $\frac{4Aa}{A+B+\frac{CA}{B}+C} : \frac{4Aa}{2A+2C} :: 2A+2C : A+B+\frac{CA}{B}+C$. And the ſecond antecedent is evidently greater than the ſecond conſequent; therefore the firſt antecedent is greater than the firſt conſequent. But if B were a mean proportional between A and C, $B + \frac{AC}{B}$ would be leſs than in any other caſe. For if $B = m$ the mean proportional, $B + \frac{AC}{B} = m + \frac{m^2}{m} = 2m$; but if $B = m \pm D$, then $B + \frac{AC}{B} = m \pm D + \frac{AC}{m \pm D}$; i. e. $m^2 \pm 2mD + D^2 + AC\,(= m^2) \urcorner 2m^2 \pm 2mD$.

If more bodies be interpoſed between A and C, the motion of C will be greater; and it will be the greateſt when the bodies interpoſed conſtitute a ſeries of mean proportionals between A and C. Ibid. Prop. 13.

21. If there be a ſeries of a hundred bodies in the proportion of 1, 2, 4, 8, 16, &c. and the motion begins by the greateſt body, the velocity communicated to the ſmalleſt will be to that with which the greateſt moved nearly as 2,338,500,000,000 to 1. And, if the motion begins by the leaſt body, the quantity of motion will be increaſed on the whole nearly as 1 to 4,677,000,000,000. But it is to be obſerved, that there is a miſtake in the impreſſion of Huygens's book as to the firſt number, which is there printed 14,760,'000,000, inſtead of 2,338, &c. ſo that the velocity thus given to the ſmalleſt body is 150 times greater than what the printed copy of Huygens aſſigns. Bernoulli, Diſc. ſur. le Mouv. Oper. tom. iii. p. 34. and s'Graveſande, Pref. ad Huygen. Oper. Poſt. tom. ii. Amſt. 1728.

This ſtupendous augmentation of the quantity of motion is a remarkable inſtanee of the falſity of the Carteſian principle, that the ſame quantity of motion is always preſerved in the world.

Some have thought this augmentation no ſmall difficulty againſt thoſe who maintain the moving force or power of action in bodies, to be proportional to their quantities of motion. This difficulty does not preſs the Leibnitians; for it is to be obſerved, that notwithſtanding the prodigious increaſe of motion here aſſigned, yet there is no increment of the *vis viva* of this ſyſtem of bodies. See FORCE and VIS *viva*.

A learned author has urged, that if the force of bodies were in proportion to their quantities of motion, the increaſe in the motion here mentioned might be employed to reſtore the motion of the firſt body, and hence make a perpetual motion. But it is anſwered, that as the motion of the laſt is increaſed in the ſame direction with the firſt, the motion of all the reſt will be in the contrary direction, and equal to that of the laſt diminiſhed by unity: hence the ſum of the motions in the ſame direction remains as it did, equal to that of the firſt and ſmalleſt body, which we ſuppoſe unity. See Maclaurin's Demonſtrat. de Loix du Choc des Corps, p. 21. Paris 1724, and s'Graveſand. Rem. ſur la Poſſibilité du Mouvement perpetuel, in Journ. Liter.

It is to be obſerved, that there is a limit which the velocity communicated to the laſt body never amounts to (ſuppoſing the firſt and laſt bodies, and the velocity of the firſt before the ſtroke, to be given) but to which it approaches continually, while the number of ſuch bodies

dies interpoſed between the firſt and laſt is always increaſed. And this limit is to the velocity of the firſt body before the ſtroke, in the ſubduplicate ratio of the firſt body to the laſt.

Mr. Huygens has not mentioned this limit, but the curious may ſee the determination of it in Mr. Maclurin's Fluxions, art. 514.

22. If two equal elaſtic bodies, A and B, meet directly, and with equal velocity; each will rebound with the ſame velocity wherewith it ſtruck, and alſo in the ſame direction.

For ſetting aſide the elaſticity, both would remain at reſt: their whole force therefore is ſpent in the compreſſion; but their elaſtic force whereby they rebound in the former direction is equal thereto; this force therefore acting equally on each body A and B, will produce the ſame celerity in each; and that equal to the former. So that they will rebound with the celerity wherewith they ſtruck.

23. If two equal elaſtic bodies, A and B, ſtrike directly againſt each other with unequal velocities: after the ſhock they will rebound with interchanged velocities.

For ſuppoſe the bodies to concur with the velocities $C+c$ and C: if they meet with the ſame velocity C, after the ſhock, they would both move with the ſame velocity C. If B were at reſt, and A ſhould ſtrike upon it with the celerity c after the ſhock, A would remain at reſt, and B be moved with the celerity c. Therefore the exceſs of the celerity c, wherewith A is carried, is transferred wholly by the conflict to B: A therefore is moved with the celerity C, and B with the celerity $C+c$.

Hence, after *percuſſion*, they recede from each other with the ſame velocity as before they concurred.

The two propoſitions in theſe two laſt articles may be proved otherwiſe thus: the momentum of Q before the ſtroke is QC; the motion loſt by it is $\frac{2QCq+2Qcq}{Q+q}$; therefore, its quantity of motion after the ſtroke will be $QC-\frac{2QCq+2Qcq}{Q+q}=\frac{Q^2C-QCq-2Qcq}{Q+q}$ Conſequently $V=\frac{QC-Cq-2qc}{Q+q}$.

The quantity of motion in q before the ſtroke is $-qc$, and that loſt by Q and acquired by q is $\frac{2QCq+2Qcq}{Q+q}$; and, therefore, its momentum after the ſtroke will be $-qc+\frac{2QCq+2Qcq}{Q+q}=\frac{2QCq-q^2c+Qcq}{Q+q}$: and $v=\frac{2QC-qc+Qc}{Q+q}$. But when $Q=q$, $V=\frac{QC-QC-2QC}{2Q}=-c$, and $v=\frac{2QC-Qc+Qc}{2Q}=C$.

24. If two elaſtic bodies, A and B, ſtrike directly on each other with velocities that are reciprocally proportional to their weights; after colliſion they will rebound with the ſame velocity wherewith they met.

For $Q:q::c:C$, therefore $CQ=cq$; and $V=\frac{QC-2QC-Cq}{Q+q}=-\frac{QC-Cq}{Q+q}=\frac{\overline{Q+q}\times -C}{Q+q}=-C$; and $v=\frac{2qc-qc+Qc}{Q+q}=\frac{qc+Qc}{Q+q}=+c$.

25. If an elaſtic body A ſtrike on another equal one, indued with a leſs degree of motion B; after *percuſſion*, both will proceed in the ſame, viz. in the former direction, and with interchanged velocities.

For ſuppoſe A to ſtrike with the velocity $C+c$, upon B moving with the velocity C. Since by reaſon of the equal velocities C and C, there ariſes no impulſe; it is the ſame thing as if A ſtruck on B, with the ſole celerity c, on B at reſt. But in that caſe A would remain at reſt, and B would move with the velocity c: therefore, after *percuſſion*, A will move with the ſole celerity C, and B with the celerity $C+c$, both according to the former direction, there being nothing to change that direction.

For in this caſe, the quantity of motion in Q before the ſtroke is QC, the motion loſt by it is $\frac{2QCq-2Qcq}{Q+q}$, and the quantity of motion after the ſtroke will be $QC-\frac{2QCq-2Qcq}{Q+q}=\frac{Q^2C+2Qcq-QCq}{Q+q}$: and therefore $V=\frac{QC+2cq-Cq}{Q+q}$.

The momentum of q before the ſtroke is qc, that loſt by Q and acquired by q is $\frac{2QCq-2Qqc}{Q+q}$; therefore the momentum of q after the ſtroke will be $qc+\frac{2QCq-2Qqc}{Q+q}=\frac{q^2c+2QCq-Qqc}{Q+q}$; and $v=\frac{2QC+qc-Qc}{Q+q}$.

In the caſe here ſuppoſed $Q=q$, therefore $V=\frac{QC+2Qc-CQ}{2Q}=c$, and $v=\frac{2QC+Qc-Qc}{2Q}=C$.

26. if a moving body A ſtrike on another B; the ſtroke will be the ſame as would be made by the body A ſtriking on B at reſt, with the difference of their velocities.

Hence, ſince the elaſtic force is equal to the *percuſſion*; it acts on the bodies A and B with the difference of the velocities they had before the congreſs.

27. *To determine the velocities of any two elaſtic bodies,* A *and* B, *after ſtriking directly on each other with any velocities.* If the elaſtic body A ſtrike on B, either at reſt, or moving faſter than A; the velocity, v. gr. of A after *percuſſion*, is found thus: as the ſum of the weights is to double of either of them, ſuppoſe, in this caſe, of B, ſo is the difference of the velocities before the congreſs, to a velocity, which ſubtracted from the velocity of A before the impulſe (in the other caſe added to it) leaves the velocity of A after the congreſs.

If the two elaſtic bodies, A and B, meet each other; the velocity of A, after the impulſe, is found thus: as the ſum of the weights is to the double of either of them, ſuppoſe of B, ſo is the ſum of the velcoities before colliſion, to a velocity which ſubtracted from the velocity of A before colliſion, leaves its celerity after colliſion.

28. In the direct colliſion of bodies the ſame reſpective velocity is preſerved, i. e. in a direct concurrence, the difference of velocities is the ſame before and after the ſhock; and in a direct mutual encounter, the difference of velocities after the ſhock is the ſame with their ſum before it.

Hence they retire from each other, after the impulſe, with the ſame velocity wherewith they met.

Thus $v-V=C\mp c$. For $v=\frac{2QC\pm qc\mp Qc}{Q+q}$, and $V=\frac{QC\pm 2qc-Cq}{Q+q}$; therefore $v-V=\frac{2QC\pm qc\mp Qc-QC\mp 2qC+Cq}{Q+q}=\frac{QC\mp qc\mp QC+Cq}{Q+q}=\frac{\overline{Q+q}\times\overline{C\mp c}}{Q+q}=C\mp c$.

29. In the colliſion of elaſtic bodies there is not always preſerved the ſame momentum, or, as the Carteſians expreſs it, the ſame quantity of motion; but this is ſometimes increaſed, and ſometimes diminiſhed.

It is a miſtake, therefore, of Des Cartes, and his followers, that the ſame quantity of motion is ſtill preſerved in the world.

Thus, let q at reſt be greater than the impinging body Q; and the quantity of motion will be increaſed by colliſion: let $q=Q+x$, and C the velocity of Q: the velocity of the body q after the ſtroke will be $\frac{2QC}{Q+q}=\frac{2QC}{2Q+x}=C-\frac{xC}{2Q+x}$; but the velocity of the body Q will be $\frac{QC-Cq}{Q+q}=\frac{-x}{2Q+x}$; therefore the abſolute momentum of q after the ſtroke will be $=q\times C-\frac{xC}{2Q+x}=\overline{Q+x}\times C-\frac{xC}{2Q+x}$.

But the momentum of the body Q is $=Q\times-\frac{xC}{2Q+x}$; and the quantity of motion in both bodies will be $=\frac{2Q^2C+2QxC+QxC}{2Q+x}=\frac{2Q^2C+3QxC}{2Q+x}=QC+xC-\frac{x^2C}{2Q+x}$; but the quantity of motion before the ſtroke was QC, which is leſs than the former quantity, becauſe $\frac{x^2C}{2Q+x}\angle xC$; for $\frac{x^2C}{x}=xC$. If the bodies return to a ſecond ſtroke with the velocities acquired by the firſt, they will recover their firſt velocities, in which caſe the quantity of motion will be diminiſhed.

30. If two elaſtic bodies, A and B, meet or overtake each other directly; the ſum of the factums of the maſſes into the ſquares of the velocities remains the ſame, before and after the congreſs; hence the ſame quantity of force is likewiſe preſerved in the congreſs.

31. *To determine the motion of two bodies,* A *and* B (*fig.* 42.) *ſtriking obliquely againſt each other, whether they be elaſtic, or not elaſtic.* The motion of the body A along AC is reſoluble into two others, in the directions AE and AD;

A D; and the motion of B along B C into two others according to B F and B G: and the velocities through A D and B F are to the velocities through A C and B C as the right lines A D, B F, A C, B C: now ſince the right lines A E and B G are parallel, the forces acting according to theſe directions are not mutually oppoſite, and muſt therefore be conſidered in the congreſs.

But ſince the lines A D and B F, or, which is the ſame, E C and G C, conſtitute the ſame right line perpendicular to D C; it is the ſame as if the bodies A and B ſhould meet directly with velocities that are as E C and G C. Find therefore, the velocity of A and B according to the rules above laid down.

Suppoſe, e. gr. the velocity of the rebounding body A to he as C H; ſince the motion along A E is not changed by the congreſs, make C K = A E, and complete the parallelogram H C K I; the diagonal C I will repreſent the motion of A after the congreſs: for, after *percuſſion*, the body will move according to the direction C I, and with a velocity as C I. In the ſame manner it will be found, that the rebounding body B will move along the diagonal of the parallelogram C M; in which L M = B G. The velocities, therefore, after *percuſſion*, are as C I to C M.

Percussion, *centre of*. See Center *of Percuſſion*.

PER *deliquium*. See Deliquium.

Per *deſcenſum*, by deſcent, in *Chemiſtry*, a particular manner of DISTILLATION.

PERDICIUM, in *Botany*, a genus of the *ſyngeneſia polygamia ſuperflua* claſs: its characters are, that it has a naked receptacle; the down is ſimple; and the corollulæ bilabiate. There are three ſpecies.

PERDIX, in *Ornithology*. See Partridge.

Perdix, in *Conchyliology*, a name given by authors to a genus of ſhells, ſuppoſed to reſemble the partridge in the ſhades and diſpoſition of the colours.

The partridge-ſhell is of the DOLIUM, or *concha globoſa* claſs, and is ſtriated and ſpotted in a peculiarly elegant and regular manner.

PERDONATIO *ut lagariæ*, in *Law*, a pardon for one who is outlawed.

PERDONIUM, a term, invented by Paracelſus, to expreſs wine medicated with herbs.

PERDUE, a ſoldier placed in a dangerous, and almoſt deſperate poſt. Thus we ſay, *enfans perdues*, for the forlorn hope of an army.

The word is French, and literally ſignifies *loſt*.

To lie *perdue*, is to lie flat on the belly, or to lie cloſely in wait.

PEREGRINARY, *peregrinarius*, in the *Ancient Monaſteries*, a monk to whom was committed the care of receiving and entertaining ſtrangers, or viſitors.

PEREGRINATORES, in *Botany*, a name for ſuch ſtudents in that ſcience as have taken long journeys, and viſited the remoteſt regions, in ſearch of plants.

PEREGRINE, *peregrinus*, a term applied among *Aſtrologers*, to a planet, when found in a ſign where it has none of its five eſſential dignities.

PEREMPTORY, in *Law*, an epithet applied to an action, exception, &c. ſignifying them to be abſolute, final, and determinate; and not to be altered, renewed, or reſtrained.

Thus in our law books we find *peremptory action*, *peremptory nonſuit*, *peremptory exemption*, &c.

PERENNIAL, in *Botany*, is applied to thoſe plants whoſe roots will endure many years.

Perennials are of two kinds: the one retain their leaves all the winter, called *evergreens*.

The other caſt the leaves in winter, called *deciduous*, or *perdefols*.

Perennial *winds*. See Wind.

PERESKIA, in *Botany*. See *Melon* Thistle.

PERETERION, a name given by chirurgical writers to the perforating part of the trepan.

PERFECT, ſomething to which nothing is wanting; or that has all the requiſites of its nature and kind.

Perfect *number* in *Arithmetic*. See Number.

Perfect, *Perfecti*, in *Church Hiſtory*, a deſignation which the followers of Valentinus aſſumed to themſelves.

Perfect, in *Grammar*. Preter or preterit-*perfect* tenſe, is an inflection, marking a time perfectly paſt; as *I have heard*: pluſquam-*perfect*, is an inflection, expreſſing the time more than perfectly paſt; as *I had heard*, &c. See Tense.

Perfect, in *Muſic*, denotes ſomething that fills and ſatisfies the mind, and the ear. In which ſenſe we ſay, *perfect* cadence, *perfect* conchord, &c.

The ancients had two kinds of modes, the major and minor; and each of theſe, again, was either *perfect* or *imperfect*.

The word *perfect*, when joined with the words *mode*, and *time*, uſually expreſſes triple time, or meaſure; in oppoſition to double time, which they call *imperfect*. See Time.

Perfect, in *Phyſiology*. A *perfect* animal is uſed, by ſome writers, for that which is born by univocal generation; in oppoſition to inſects, which they protend to be produced by equivocal GENERATION.

Perfect *flowers* are ſuch as have petala, piſtil, ſtamina, and apices. See Flower.

Perfect *mixts*. See Mixts.

Perfect *plants*. See Plants.

PERFECTION, the ſtate or quality of a thing PERFECT.

This is of divers kinds: *phyſical*, *moral*, and *metaphyſical*.

Perfction, *phyſical*, or *natural*, is that whereby a thing has all its powers, or faculties, and thoſe too in their full vigour; and all its parts both principal and ſecondary, and thoſe in their due proportion, conſtitution, &c. In which ſenſe a man is ſaid to be *perfect*, when he has a ſound mind in a ſound body.

This *perfection* is by the ſchoolmen frequently called ενεργητικη, becauſe a thing is hereby enabled to perform all its operations.

Perfection, *moral*, is an eminent degree of virtue, or moral goodneſs; to which men arrive by often repeated acts of piety, beneficence, &c.

This ſome ſubdivide into abſolute or *inherent*, which is actually in him to whom we attribute it; and *imputative*, which exiſts in ſome other and not in him it is attributed to.

Perfection, *metaphyſical*, or *tranſcendental*, or *eſſential*, is the poſſeſſion of all the eſſential attributes, or of all the parts neceſſary to the integrity of a ſubſtance: or it is that whereby a thing has, or is provided of, every thing belonging to its nature.

This is either *abſolute*, where all imperfection is excluded; ſuch is the *perfection* of God: or *ſecundum quid*, and in its kind.

PERFECTISSIMATE, *perfectiſſimatus*, a quality, or dignity, whereof we find mention made in the Code. *Perfectiſſimi* were thoſe to whom the emperors truſted the preſidentſhip of any province. Alciat imagined the name had been only given to the governors of Hiſpania Tarraconenſis, and Noricum; but Calvin has ſhewn the contrary, in his Lexicon Juridicum.

The *perfectiſſimi* were inferior to the *clariſſimi*, though the former word imply moſt perfect.

PERFIDIA, in *Muſic*, a term borrowed from the Italians, ſignifying an affectation of doing always the ſame thing, of purſuing the ſame deſign, continuing the ſame motion, the ſame ſong, the ſame paſſage, and the ſame figures, of notes.

Such are the ſtiff or conſtrained baſſes; as thoſe of chacones, and many others, becauſe depending wholly on the caprice of the compoſer.

PERFOLIATA, the ſame with bupleurum, or HARE'S *ear*.

PERFOLIATE-*leaf*, among *Botaniſts*. See Leaf.

PERFORANS *manus*, in *Anatomy*, a muſcle of the hand; called alſo, from its action, *flexor tertii internodii digitorum manus*. See *Tab. Anat.* (*Myol.*) *fig.* 2. *n.* 18.

It ariſes fleſhy from the fore and upper part of the ulna, and the ligament which joins that and the radius; and, after forming a pretty thick fleſhy body, it is ſplit into four round tendons; which paſſing under the annular ligament, and through the ſlits in the tendons of the former, are inſerted into the third bone of each FINGER.

Perforans *pedis*, in *Anatomy*, a muſcle of the foot, called alſo *profundus*; and, from its action, *flexor tertii internodii digitorum pedis & flexor magnus*.

It riſes from the upper and back part of the tibia, and, paſſing under the inner ankle, and ligament that ties the tibia and os calcis together, it divides into four tendons, which paſſing the holes of the perforatus, are inſerted into the third phalanx of the leſſer toes.

There is a maſſa carnea, or fleſhy ſubſtance, that ariſes from the os calcis, and which joins the tendons of this muſcle where the lumbricales begin.

PERFORATA, in *Botany*, a name given by ſome authors to the *hypericum*, or *St. John's wort*, from the ſmall holes ſeen all over its leaves, if held up to the light.

PERFORATIVE. See Trepanum.

PERFORATUS *brachii*, in *Anatomy*, a name given by Placentini to a muſcle of the arm, now generally known by the name of the CORACO-*brachialis*. It has been by many diſputed not to be a diſtinct muſcle. Veſalius calls it only *pars interioris principii cubitum flectentium primi carnoſa*, eſteeming it only a part of that muſcle. Many of the writers who followed Veſalius have given it alſo the name of *pars* and *portio*, not eſteeming it a diſtinct muſcle: and Caſſerius, who wrote after Placentini, calls it only *portio carnioſa*, and cenſures that author for thinking it a diſtinct muſcle, and calling it *perforatus*.

Perforatus *manus*, in *Anatomy*, a muſcle of the fingers, thus called from the *perforations* of its tendons by thoſe of the perforans: it is alſo called, ſometimes, *flexor ſecundi internodii*, from its action; and ſometimes *ſublimis*, from its ſituation. See *Tab. Anat. (Myol.) fig.* 2. *n.* 17.

It ariſes tendinous from the internal protuberance of the humerus, and the upper part of the radius before; and, being parted into four, paſſes under the annular ligament; whence it ſends ſeveral tendons into the upper part of the phalanx of each finger: every tendon having at the firſt internode, a ſlit or perforation for the admiſſion of the tendons of the perforans.

Perforatus *pedis*, in *Anatomy*, a muſcle of the foot; called alſo *flexor pedis & ſublimis*.

It ariſes from the inner and lower part of the calcaneum, and ſends a tendon to every bone of the ſecond phalanx of each of the four leſs toes. In this, as alſo in the *perforatus* of the hand, there is a ſlit in each tendon about the firſt joint, which lets through the tendon of the perforans.

PERFUME, an agreeable artificial odour, ſtriking the ſenſe, or organ of ſmelling.

The generality of *perfumes* are made or compoſed of muſk, ambergriſe, civet, roſe, and cedar-woods, orange-flowers, jaſmin, jonquils, tuberoſes, and other odoriferous flowers.

Therein alſo enter ſtorax, frankincenſe, benzoin, cloves, mace, and other like drugs, commonly called *aromatics*. Some *perfumes* are alſo compoſed with aromatic herbs, or leaves, as lavender, marjoram, ſage, thyme, hyſſop, &c.

Perfumes were anciently much in uſe, particularly thoſe wherein muſk, ambergriſe, and civet enter; but they are now generally diſuſed, ſince people have become ſenſible of the harm they do the head. In Spain and Italy, however, they are ſtill very common.

Perfumes, *ſuffitus*, in *Pharmacy*, &c. are topical or external medicines, compoſed of certain powders and gums, which, being mixed together, and thrown on the coals, produce a vapour or ſmoke, ſalutary in the ſeveral diſeaſes. See Suffitus.

Fits of the mother are cured by the fume of partridge-feathers, old leather, &c. Burnt mercury is ſometimes applied by way of *ſuffitus*, called fumes of cinnabar.

There are dry *perfumes*, made up in troches, pills, &c. of olibanum, maſtic, aloes, &c. and moiſt viſcous ones mixed with the juices of herbs, &c.

PERGULARIA, in *Botany*, a genus of the *pentandria digynia* claſs: its characters are, that it is contorted; that the nectarium is formed of five parts like the points of arrows; and that the flower is monopetalous, and ſhaped like a cup or ſalver. There are two ſpecies.

PERIAGOGE, περιαγωγη, in *Rhetoric*, the ſame with PERIBOLE.

PERIAGUA, in *Sea-Language*, a ſort of large CANOE, uſed in the Leeward Iſlands, South America, and the Gulf of Mexico.

This is compoſed of the trunks of two trees hollowed and united together; and thus differs from the CANOE, which is formed of one tree.

PERIAMMA, a word uſed by ſome medical writers to expreſs an amulet.

PERIANTHIUM, or Periantheum, formed from περι, *about*, and ανθος, *flower*, in *Botany*, the little green leaves which compaſs the bottom of a flower, called, by Dr. Grew, the *empalement*, and by others the *calyx*.

The uſe of the *perianthium* is to be a ſupport, ſecurity, and as it were bands, to the other parts of the flower. Mr. Ray obſerves, that flowers, whoſe leaves or petala are ſtrong, as tulips, have no *perianthium*, as needing none. Carnations, &c. whoſe petala are long and ſlender, have their *perianthium* of one piece; others, as the knap-weed, &c. have it of ſeveral pieces, and found in divers rounds, and all with a counterchangeable reſpect to each other, for the greater ſtrength and ſecurity of themſelves, and the petala, which they include.

If it includes the ſtamina and not the germen, it is the *perianthium* of the flower; if the germen, but not the ſtamina, it is the *perianthium* of the fruit; but if it includes both, it is the *perianthium* of the fructification.

PERIAPTON, περιαπτον, a kind of medicine, otherwiſe called *periamma*, or *amulet*; which, being tied about the neck, is ſuppoſed to prevent, or cure diſeaſes.

PERIBOLE, a word uſed very frequently by Hippocrates, and, in different places, in very different ſenſes. Sometimes it ſignifies a tranſlation of the humours from one part to another; ſometimes only the dreſs or garments of a patient. In the firſt of theſe ſenſes, the word is frequently uſed to expreſs a tranſlation of the morbific matter from the centre to the ſurface, in the termination of a diſeaſe, by the breaking out of puſtules all over the body.

Peribole, περιϐολη, in *Rhetoric*, is uſed where many things are accumulated into one period; which might have been divided into ſeveral. We have an inſtance in Cicero's defence of Flaccus: *Quod ſi eſſet aliquando futurum ut aliquis de L. Flacci pernicie cogitaret; nunquam tamen exiſtimavi, judices, Decium Lælium, optimi viri filium, optimâ ipſum ſpe prææditum, ſummæ dignitatis, eam ſuſcepturum accuſationem, quæ ſceleratorum potius civium odia, & furori, quam ipſius virtuti, atque inſtitutæ adoleſcentiæ, conveniret.*

Now this long period might very well have been divided into the three following: 1. *Quod ſi eſſet aliquando futurum, ut aliquis de L. Flacci pernicie cogitaret; nunquam tamen exiſtimavi, judices, Decium Lælium, eam ſuſcepturum accuſationem.* 2. *Eſt enim is optimi viri filius, optimâ ipſe ſpe præditus, ſummæ dignitatis.* 3. *Accuſatio vero hæc ſceleratorum potius odio et furori, quam ipſius virtuti atque inſtitutæ adoleſcentiæ, conveniret.* See Punctuation.

PERICALAMITES, in the *Materia Medica of the Ancients*, a name given by ſome to the *adarce*.

We find the word *pericalamitis* in a preſcription recorded in Galen, and it has generally been underſtood to mean *ſtyrax*, that being called *calamita*: but the ADARCE is the thing ſignified by the name, which expreſſes its manner of formation, it being always found concreted about the ſtalks of reeds that grow on the edeges of waters.

PERICARDIARY, an epithet given to worms generated in the pericardium, or capſula of the heart.

M. Andry makes theſe one of the twelve kinds of worms engendered in the human body: they ſometimes occaſion convulſions, the paroxyſms whereof laſt but a little while, but return inceſſantly.

Theſe worms are accompanied with a frightful paleneſs of the face, a low pulſe, and violent pains of the ſtomach and breaſt.

They ſometimes occaſion a palpitation of the heart. M. Andry adds, that they have been known to occaſion ſudden death.

PERICARDIUM, περικαρδιον, formed from περι, *about*, and καρδια, *heart*, in *Anatomy*, a membraneous capſule, or pouch which includes the heart.

The *pericardium* conſiſts of three laminæ; the inner ariſing from the coats of the veſſels of the heart; the outer from the mediaſtinum; and the middle, which is the chief, is compoſed of very fine tendinous filaments, cloſely interwoven and croſſing each other in different directions. Its figure reſembles that of the heart, being conoidal; and it embraces the heart laxly, allowing room for its pulſation.

It is connected either immediately, or by veſiculæ emitted from it, to the ſternum, back, and jugulum; and in human bodies to that part of the diaphragm which anſwers to the flat or lower ſide of the heart, whereas in brutes it is looſe.

The adhering portion is in ſome meaſure of a triangular ſhape, anſwering to that of the lower ſide of the heart, but the reſt of the bag lies upon the diaphragm, without any adheſion.

Its uſe is ſuppoſed to be to defend the heart; as likewiſe to contain a ſoft ſerous humour, which tranſudes through an infinite number of very ſmall holes, by which the internal lamina is perforated, and ſerves to lubricate and moiſten the heart, and to prevent any inflammation that might probably ariſe from the dry friction of the heart and its capſula.

But this latter uſe is controverted; for ſome take the humour found in it to be unnatural; and will have it forcibly ſeparated by the convulſive agonies ſupervening in the article of death.

In effect, anatomiſts are puzzled to find whence it ſhould come, or from what veſſels it is ſecreted.

Dr. Keil, in his Treatiſe of Animal Secretion, ſhews, that the liquor in the *pericardium* muſt be the moſt fluid of any ſeparated from the blood, becauſe its particles unite firſt, and are ſecreted firſt. For thoſe particles which unite firſt will have the greateſt attractive force; conſequently their particles muſt be the moſt ſpherical, and moſt ſolid; and therefore their contact will be the leaſt of any, and they the moſt fluid.

In the Memoirs of the French Academy, M. de Mortal gives an inſtance of a *pericardium*, which being opened, the liquor contained therein was found congealed into a conſiſtence fit to be cut with a knife, and lay two fingers thick about the heart.

We read of a *pericardium* of a monſtrous ſize, out of which above three pounds of coagulated blood and ſerum were taken. See Medic. Eſſ. Edinb. vol. v. art. lvi.

The *pericardium* is ſubject to inflammation, the ſymptoms and cure of which are much the ſame with thoſe of the PLEURISY.

PERICARPIA, περικαρπια, compounded of περι, *about*, and καρπος, *the wriſt*, a name ſometimes given to medicines that are applied to the wriſt: otherwiſe called EPICARPIA.

PERICARPUS, or **Pericarpium**, formed of περὶ, *about*, and καρπος, *fruit*, in *Botany*, a pellicle, membrane, or other ſubſtance, encompaſſing the FRUIT or SEED of a plant.

It is the germen of the piſtil enlarged; or, as Linnæus defines it, it is an entrail of the plant big with ſeed, which it diſcharges when ripe. There are no leſs than nine ſpecies of *pericarpia*. 1. A capſule. 2. A conceptaculum. 3. A pod. 4. A legume. 5. A nut. 6. A drupe. 7. An apple or pomum. 8. A berry. 9. A ſtrobilus. See Capsule, Conceptaculum, &c.

PERICHAREIA, a word uſed by the ancients to expreſs a ſudden ſurprize of joy, ſuch as has been frequently known to occaſion death.

PERICHORESIS. See Circumincession.

PERICHORUS, formed from περι, and χωρα, *country*, in *Antiquity*, a name given by the Greeks to their profane games and combats, i. e. to ſuch as were not conſecrated to any of the gods. See Games.

Perichorus, in the original, ſignifies *near*, or *neighbouring*; apparently becauſe none of the people of the neighbourhood attended at theſe obſcure exerciſes. The champions here did not fight in honour of any god, or hero, as in the others; but only for the prize-ſake.

PERICHRISIS, a word uſed by the ancients for a liniment principally of the oleaginous or ſpirituous kinds, and as thin and fluid as oil.

PERICLASIS, a word uſed by the ancients for a fracture of a limb, attended with a large wound, by which the broken ends of the bone, or part of it, are laid bare.

PERICLYMENUM, in *Botany*. See Honey-*ſuckle*.

PERICNEMIA, a word uſed by ſome medical writers for the parts aboot the calf of the leg.

PERICRANIUM, Περικρανιον, formed from περι, *about*, and κρανιον, *head*, or *ſkull*, in *Anatomy*, a thick, ſolid coat or membrane, covering the outſide of the cranium, or ſkull. Some call it by the general ame of *perioſteum*, becauſe of its adhering to the bone: others divide it into two membranes; the under whereof, immediately inveſting the ſkull, they call *perioſteum*, and the upper the *pericranium*. In effect, it is one double membrane, conſiſting, as moſt others do, of two coats.

It is ſuppoſed to have its origin from the dura mater; which, paſſing through the ſutures of the ſkull, by means of ſeveral filaments forms this thick membrane: at leaſt, it is found connected to the dura mater by fibres tranſmitted from it to the membrane through the ſutures.

About the origin of the temporal muſcles the two coats of the *pericranium* part; the outer paſſing over thoſe muſcles, and the inner ſtill adhering cloſe to the cranium.

PERIDONIUS *lapis*, in *Natural Hiſtory*, a name given by ſome of the writers of the middle ages to the *pyrites*, which they call alſo *pyrithe*.

PERIDROME, *peridromus*, in the *Ancient Architecture*, the ſpace or an iſle in a PERIPTERE, between the columns and the wall.

Salmaſius obſerves, that the *peridromes* ſerved for walks among the Greeks.

PERIDROMIDES, Περιδρομιδες, in *Antiquity*. See Xysti.

PERIDROMOS, a word uſed by the old Greek writers to expreſs the extreme edge of the hairs of the head, when hanging down in their natural form.

PERIEGETES, Περιηγετης, a Greek term, ſignifying a perſon who leads or conducts another about a thing, to ſhew it him, &c.

It is applied in antiquity to geographers; eſpecially to thoſe who deſcribed the ſea-coaſts: thus Dionyſius is ſtyled *periegetes*, for publiſhing a geography in hexameter verſes, which Euſtathius has commented on, both in Greek.

The name *periegetes* was alſo given to thoſe who conducted ſtrangers about in cities, to ſhew them the antiquities, monuments, curioſities, &c. thereof. Theſe were the ſame with what they now call the antiquaries in Italy.

PERIESTECOS, in *Medicine*, an epithet for diſeaſes, ſigns, and ſymptoms, which are ſalutary, and prognoſticate the future better health of the patient.

PERIGÆUM, **Perigee**, formed of περὶ and γη, *earth*, in *Aſtronomy*, that point of the ſun's or moon's orbit, wherein they are at their leaſt diſtance from the earth.

In which ſenſe *perigee* ſtands oppoſed to Apogee.

Perigee, in the *Ancient Aſtronomy*, denotes a point in a planet's orb, wherein the centre of its epicycle is at the leaſt diſtance from the earth.

PERIGRAPHE, a word uſually underſtood to expreſs a careleſs or inaccurate delineation of any thing: but in Veſalius it is uſed to expreſs the white lines or impreſſions that appear in the muſculus rectus of the abdomen.

PERIHELIUM, formed from περι, and ηλιος, *ſun*, in *Aſtronomy*, that point of the orbit of a planet, or comet, wherein it is at its leaſt diſtance from the ſun.

Perihelium ſtands oppoſed to APHELIUM. The ancient aſtronomers, inſtead of this term, uſed *perigæum*; becauſe they placed the earth in the centre.

PERILEUCOS, in the *Natural Hiſtory of the Ancients*, a name given to an agate; but not of a diſtinct ſpecies, but only a particular appearance of the lead-coloured agate, more uſually known among them by the name of PHASSACHATES.

PERILLA, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs: its characters are, that the upper ſegments of the empalement are the ſhorteſt; the ſtamina are diſtant; and the ſtyles are two and connected. There is only one ſpecies.

PERIMETER, formed from περι, and μετρον, *meaſure*, in *Geometry*, the ambit or extent that bounds a FIGURE, or body.

The *perimeters* of ſurfaces, or figures, are lines: thoſe of bodies are ſurfaces.

In circular figures, &c. inſtead of *perimeter*, we ſay circumference or periphery.

PERINÆUM, or **Perineum**, περιναιον, or περινεον, formed of περι, and ναιειν, *to inhabit*, in *Anatomy*, the ſpace between the pudendum and the fundament; properly the ligamentous ſeam which connects thoſe two parts, called by the Latins, *interfæmineum*.

The part is ſubject to laceration in a difficult birth: and in this part an operation is performed, called the puncture of the *perineum*. But the principal diſorders to which this part is ſubject, are abſceſſes and fiſtulas. See FISTULA.

PERINDE *valere*, in the *Canon Law*, a diſpenſation granted a clerk, who being legally incapable of a benefice, or other eccleſiaſtical function, is *de facto* admitted to it.

The *perinde valere* is a kind of writ, thus called from two words therein ſignifying the diſpenſation to be equivalent or tantamount to a legal capacity.

PERINENEUCOS, an epithet given to a peculiar ſort of irregular pulſe common in hectic patients, in which the artery beats more ſtrongly in ſome parts than in others. See Epineneucos.

PERIOCHA, Περιοχη, an argument, indicating the ſum of diſcourſe.

PERIOD, Περιοδος, in *Aſtronomy*, the time taken up by a ſtar or planet in making a revolution; or the duration of its courſe, till it return to the ſame point of the heavens.

The ſun's, or properly the earth's *period*, is three hundred and ſixty-five days, five hours, forty-nine minutes. That of the moon is twenty-ſeven days, ſeven hours, forty-three minutes, &c. The periods of the comets are now many of them pretty well aſcertained. See Comet.

There is a wonderful harmony between the diſtances of the planets from the ſun, and their *periods* round him; the great law whereof is, that the ſquares of the periodic times are ever proportional to the cubes of their mean diſtances from the ſun.

The ſeveral *periods* and mean diſtances of the ſeveral planets are as follow:

	Days	h.	′	″	mean diſt.
Saturn	10579	6	36	26	953800
Jupiter	4332	12	20	35	520110
Mars	686	23	27	30	152369
Earth	365	6	9	30	100000
Venus	224	16	49	24	72333
Mercury	87	23	15	53	36710

See Planets.

Period, in *Chronology*, denotes an epocha, or interval of time, by which the years are accounted; or a ſeries of years, whereby, in different nations, and on different occaſions, time is meaſured.

Such are the *Calippic* and *Metonic periods*, two different corrections of the Greek calendar: the *Julian period*, invented by Joſeph Scaliger; the *Victorian period*, &c.

Period, *Calippic*. See Calippic *period*.

Period, *Conſtantinopolitan*. See *Julian* Period.

Period, *Dionyſian*. See *Victorian* Period.

Period, *Hipparchus's*, is a ſeries of three hundred and four ſolar years, returning in a conſtant round, and reſtoring the new and full moons to the ſame day of the ſolar year; according to the ſentiment of Hipparchus.

This *period* ariſes by multiplying the *Calippic period* by four. Hipparchus aſſumed the quantity of the ſolar year to be 365 days, 5 hours, 55′ 12″; and hence concluded, that in one hundred and four years Calippus's *period* would err a whole day. He therefore multiplied the *period* by four, and from the product caſt away an entire day. But even this does not reſtore the new and full moons to the ſame day throughout the whole *period*: but they are ſometimes anticipated 1 day, 8 hours, 23′ 29″ 20‴.

Period, *Julian*, ſo called as being adapted to the *Julian* YEAR, a ſeries of ſeven thouſand nine hundred and eighty Julian years; ariſing by the multiplication of the cycles

cycles of the moon, the ſun, and indiction, viz. 28, 19, 15, into one another; commencing from the firſt day of January in the Julian year.

The *Julian period* is alſo produced by multiplying the *Victorian period* by fifteen. Since every year in the *Julian period* has its particular cycles of the moon, ſun, and indiction: e. gr. only the firſt has the moon's cycle one, the ſun's cycle one, and cycle of indiction one; all the years of this *period* are accurately diſtinguiſhed from each other.

This *period* was invented by Scaliger, as a common receptacle of epochas, to facilitate the reduction of years of a given epocha to thoſe of another epocha likewiſe given. It agrees with the Conſtantinopolitan epocha, or *period*, uſed by the Greeks, except in this, that the cycles of the ſun, moon, and indiction, are reckoned differently: and in that the firſt year of the Conſtantinopolitan *period* differs from that of the *Julian period.*

To find the year anſwering to any given year of the *Julian period*, and *vice verſa.* See Epocha.

Period, *metonic*, or *cycle.* See Cycle *of the Moon.*

Period, *Victorian*, an interval of five hundred and thirty-two Julian years; which elapſed, the new and full moons return on the ſame day of the Julian year, according to the ſentiment of the inventor Victorinus, or Victorius, who lived in the time of pope Hillary.

Some aſcribe this *period* to Dionyſius Exiguus, and hence call it the *Dionyſian period:* others call it the *great paſchal cycle*; becauſe it was invented for computing the time of Eaſter.

The *Victorian period* is produced by multiplying the lunar cycle nineteen, by the ſolar circle eighteen; the product of which is five hundred thirty-two. But neither does this reſtore the new and full moons to the ſame day throughout its whole duration, by 1 day, 16 hours, 58′ 59″ 40‴.

Period, *Chaldaic.* See Saros.

Period, in *Grammar* and *Rhetoric*, denotes a little compaſs of diſcourſe, containing a perfect ſenſe; diſtinguiſhed at the end by a point or full ſtop (.); and its members or diviſions marked by commas, colons, &c.

De Colonia defines *period*, a ſhort, but perfect ſentence, conſiſting of certain parts or members, depending one on another, and connected together by ſome common vinculum.

The celebrated definition of Ariſtotle is, a *period* is a diſcourſe which has a beginning, a middle, and an end, all viſible at one view.

Rhetoricians conſider *period*, which treats of the ſtructure of ſentences, as one of the four parts of COMPOSITION.

The *periods* allowed in oratory are three: a *period* of two members, called by the Greeks *dicolos*, and the Latins *bimembris:* a *period* of three members, *tricolos*, *trimembris*; and a *period* of four, *quadrimembris*, *tetracolos.*

A ſtrict oratorial *period* does not allow of either more or fewer than theſe: it is poſſible indeed to introduce a *period* of one member, called by Ariſtotle *monocolos*, or ſimple *period*; but it will be reputed a flaw, and is a thing never practiſed by the maſters.

The period may be likewiſe prolonged to five or ſix members; but then it changes its name, and, inſtead of *period*, commences what they call a *periodical diſcourſe.*

A *period* of two members Cicero ſupplies us with: *Ergo & mihi meæ priſtinæ vitæ conſuetudinem, C. Cæſar, intercluſam aperuiſti: & his omnibus ad bene de republica ſperandum quaſi ſignum aliquod ſuſtuliſti.*

A *period* of three members the ſame Cicero gives us in the exordium of his *Manilian oration: Nam cum antea per ætatem hujus auctoritatem loci contingere non auderem; ſtatueremque nihil huc niſi perfectum ingenio, elaboratum induſtria, afferri oportere; omne meum tempus amicorum temporibus tranſmittendum putavi.*

A *period* of four members he gives us in that admirable deſcription of puniſhment of parricides: *Ita vivunt, ut ducere animum de cœlo non queant: ita moriuntur, ut eorum oſſa terra non tangant: ita jactantur fluctibus, ut nunquam abluantur: ita poſtremo ejiciuntur, ut ne ad ſaxa quidem mortui conquieſcant.*

The laws and meaſures of *periods* are pretty ſtrictly regarded by orators, at leaſt they are ſo by the ancient ones: in ordinary diſcourſe, and in the modern tongues, authors are much leſs ſevere. In oratory, the members of *periods* are to be equal, or nearly equal; that the pauſes or reſts of the voice at the cloſe of each member may be nearly equal: but in writing not intended for rehearſal, this is diſregarded.

Common diſcourſe allows of *periods* both longer and ſhorter than oratory; which admits of none leſs than two members, nor greater than four. Short mutilated *periods* break the ſtream, and check the courſe of the ſublime; and long ones embarraſs and keep the mind too long in ſuſpence; and even ſtrain the voice, which is never to ſtop but at the ends of *periods.* Philareus, Hermogenes, Terence, &c. confine the juſt *period*, called by the Latins, *ambitus* and *circuitus*, to four members: agreeable to the diſtich:

> *Quatuor e membris plenum formare videbis*
> *Rhetora* circuitum, *ſive* ambitus *ille vocetur.*

Of which ſentiment is Cicero, who in his Orator ſays, *Conſtat ille ambitus & plena comprehenſio e quatuor fere partibus, quæ membra dicuntur, ut & aures impleat, & ne brevior ſit quam ſatis ſit neque longior.* An inſtance of a periodical diſcourſe the ſame author gives us in the opening of his oration for Archias the poet: *Si quid in me ſit ingenii, judices, quod ſentio quam ſit exiguum; aut ſi qua exercitatio dicendi, in qua me non inficior mediocriter eſſe verſatum; aut ſi hujuſce rei ratio aliqua ab optimarum artium ſtudiis & diſciplina profecta a qua ego confiteor nullum ætatis meæ tempus abhorruiſſe; earum rerum omnium vel in primis hic A. Licinius fructum a me repetere prope ſuo jure debet.*

In the formation of theſe *periods* two things are chiefly to be regarded, their length and cadence. As the length ought to be ſuited to the breadth of the ſpeaker, the ancient rhetoricians ſcarce admit of more than four colons. As to the cadence, what Cicero has obſerved is found true by experience, that the ears judge what is full, and what is deficient; and direct us to fill up our *periods*, that nothing be wanting of what they expect. When the voice is raiſed at the beginning of a ſentence, they are in ſuſpence till it be finiſhed; and are pleaſed with a full and juſt cadence, but are ſenſible of any defect, and are diſpleaſed with redundancy. Care muſt, therefore, be taken, that *periods*, be neither deficient, and as it were maimed, that is, that they do not drop before their time, and defraud the ears of what ſeemed to be promiſed to them; nor, on the other hand, offend them by too long and immoderate excurſions. This riſe and cadence of the voice in pronunciation depend on the nature and ſituation of the members. In a *period* of two members, the turn of the voice begins with the latter member. If a ſentence conſiſt of three members, the inflexion is beſt made at the end of the ſecond member. But a *period* of four members is reckoned the moſt complete and perfect, where the inflection begins at the middle, that is, with the third member. An equality of the members ſhould likewiſe be attended to in the compoſition of a *period*, the better to adjuſt their riſe and cadence. And for this reaſon in ſentences of three members, where the cadence begins with the third; or in thoſe of four members where it begins at the fourth, it promotes the harmony to make the laſt member the longeſt. Ward's Or. vol. i. lect. 22.

Periods are ſaid to be either *rotundi*, *round*, or *quadrati*, *ſquare*, according to their different œconomy and cadences.

Period, *ſquare*, is that conſiſting of three or four equal members, formally diſtinguiſhed from each other: as that of Cicero on the puniſhment of parricides.

Period, *round*, is that whoſe members or parts are ſo connected, and fitted into each other, as that the junctures or commiſſures are ſcarce ſeen; but the whole ſlides equally round, without any notable ſtops or inequalities. Such are the dicolos and tricolos of Cicero above mentioned.

Period is alſo uſed for the character (.) wherewith the *periods* of diſcourſe are terminated and expreſſed; this is popularly called a *full ſtop*, or *point.* See Punctuation. Father Buffier obſerves two difficulties in the uſe of the *period*, or point: i. e. in diſtinguiſhing it from the colon, or double point; and in determining juſtly the end of a *period*, or perfect ſentence.

It is obſerved, that the ſupernumerary numbers of a *period*, ſeparated from the reſt by colons and ſemicolons, uſually commence with a conjunction. Yet it is certain theſe ſame conjunctions ſometimes rather begin new *periods*, than ſupernumerary members of old ones. It is the ſenſe of things, and the author's own diſcretion, that muſt make the proper diſtinction which of the two in effect it is. No rules will here be of any ſervice, unleſs this be admitted as one, that when what follows the conjunction is of as much extent as what precedes it, it is uſually a new *period:* otherwiſe not.

The ſecond difficulty ariſes hence, that the ſenſe appears perfect in ſeveral ſhort detached phraſes, wherein it does not ſeem there ſhould be *periods:* a thing frequent in free diſcourſe; as, *We are all in ſuſpence: make your propoſals immediately: you will be to blame for detaining us longer.* Where it is evident, that ſimple phraſes have perfect ſenſes like *periods*, and ought to be marked accordingly; but that the ſhortneſs of the diſcourſe making them eaſily comprehended, the pointing is neglected.

Period, *ſemi.* See Semi-*period.*

Period, in *Numbers*, is a diſtinction made by a point or comma, after every ſixth place, or figure: and is uſed in numeration, for the readier diſtinguiſhing and naming the ſeveral figures or places, which ſee under Numeration.

Period, in *Medicine*, is applied to certain diſeaſes which have intervals, and returns, to denote an entire courſe or circle, of ſuch diſeaſe; or its progreſs from any ſtate through all the reſt till it return to the ſame again.

Galen deſcribes *period* as a time compoſed of an intenſion and remiſſion; whence it is uſually divided into two parts, the paroxyſm or exacerbation, and remiſſion.

In intermitting fevers, the *periods* are uſually ſtated and regular; in other diſeaſes, as the epilepſy, gout, &c. they are vague or irregular.

Period is alſo uſed, by ſome writers, for the ſtate of a diſtemper, or diſeaſe.

Period *of the blood*, *periodus ſanguinis*, the circle of the blood, or the tour it makes round the body, for the ſupport of life. See Circulation.

PERIODEUTA, Περιοδευτης, a church officer among the Greeks, eſtabliſhed by the council of Laodicea, in towns, &c. where there were no biſhops.

The *periodeutæ* were a kind of rural deans; ſo called according to Zonaras, becauſe always on the road, going from one quarter to another, to keep the people in their duty.

Hence Gregory of Theſſalonica calls them *ambulantes*, *walkers*. Balſamon calls them *exarchæ*; by which name they are known among the Greeks at this day.

PERIODIC, Periodical, ſomething that terminates and comprehends a period.

Periodical *month*. See Month.

Periodical *diſeaſes*, are ſuch as decline and riſe again with ſimilar ſymptoms alternately.

In the Philoſophical Tranſactions, Dr. Muſgrave gives us an inſtance of *periodic* palſy; and Dr. Cole an inſtance of a *periodical* convulſion.

Periodic, in *Grammar*, is applied to a ſtyle, or diſcourſe, that has numbers, or which conſiſts of juſt and artful periods.

Periodical *winds*. See Wind.

PERIŒCI, Περιοικοι, formed from περι, *about*, and οικεω, *I inhabit*, in *Geography*, ſuch inhabitants of the globe as have the ſame latitudes, but oppoſite longitudes; or live under the ſame parallel, and the ſame meridian, but in different ſemicircles of that meridian, or oppoſite points of the parallel.

Theſe have the ſame common ſeaſons throughout the year, and the ſame phenomena of the heavenly bodies; but their hours, or times of the day, are oppoſite to each other. When, v. gr. with the one it is mid-day, with the other it is midnight.

PERIOPHTHALMIUM, compounded of περι, *about*, and οφθαλμος, *eye*, in *Natural Hiſtory*, a thin ſkin, which birds can draw over their eyes to defend them, without ſhutting their eye-lids; otherwiſe called the nictitating *membrane*.

PERIOSTEUM, or Periostium, Περιοστεον, formed of περι, *about* and οστεον, *bone*, in *Anatomy*, a membrane pretty tough, and extremely ſenſible, covering the whole exterior ſurface of all the bones of the body; the teeth only excepted. See *Tab. Anat. (Splanch.) fig.* 13. *litt. g g.* See Bone.

The *perioſteum* is derived from the dura mater, and conſiſts principally of fibres detached thence; beſides which it receives other fibres from the membrana communis of the muſcles; or, as Dr. Havers imagines, from the fleſhy fibres of the belly of the muſcles, which interſect the former. That part of it which covers the cranium, or ſkull, is by a peculiar name called the pericranium. This membrane is extended over the cartilages and ligaments alſo, as well as the bones; but when it covers the cartilages, it is called *perichondrium*, when the ligaments, *perideſmium*.

The *perioſteum* in general is a fine ſtrong membrane, or membranous expanſion, not equally thick in all its parts, more or leſs tranſparent, of a very cloſe texture, not eaſily yielding, extremely ſenſible, and compoſed of ſeveral planes of fibres differently diſpoſed, and mixed with a great number of fine veſſels and nervous filaments.

This membrane does not immediately ſurround thoſe portions of bones which are covered by cartilages, nor thoſe in which ligaments or tendons are inſerted; neither does it cover thoſe portions of cartilages which are expoſed to friction, as in the moveable articulations, channels, &c. and, laſtly, it does not cover thoſe portions of the teeth which lie out of the ſockets and gums. The innermoſt plane of the fibrous texture of the *perioſteum*, or that which immediately adheres to the ſurface of the bones, is fixed thereto by an infinite number of ſmall fibrous extremities, brought from all the planes, and which enter the pores of the bones. Theſe extremities are accompanied by capillary veſſels and nervous filaments, which having run for ſome ſpace between the different planes of the *perioſteum*, perforated the innermoſt at the orifices of the pores of the bones. The *perioſteum* is of different thickneſſes, but this difference of thickneſs does not appear near ſo much on the outer ſurface, as on the inner; which is marked in many places with impreſſions, owing to the ſulci, depreſſions, lines, and inequalities on the ſurface of the bones.

Some anatomiſts have been of opinion, that this membrane was not only united to, but cloſely braced round, the bones; and that therefore it might ſet bounds to their growth. It is probable they had only examined a few bones on this occaſion, for, had they conſidered thoſe which have concave ſurfaces, depreſſions, and inequalities, they would there have found only a ſimple adheſion of the *perioſteum*, without any tenſion.

In places where it is only fixed to the bone by the filaments of its innermoſt plane, it is eaſily pulled off from the bones; but where the fibres of the other planes likewiſe penetrate the bones, eſpecially when theſe planes are very numerous, and where the inſertions of tendons and ligaments mingle with theſe fibres, the ſeparation is much more difficult.

The *perioſteum* in general ſerves to ſupport that admirable texture of an infinity of capillary veſſels, by which the bones and all the parts belonging to them are nouriſhed: it likewiſe ſupports a vaſt number of nervous filaments, by which ſenſation is communicated not only to this and to the internal membrane of the bones, but even, in ſome degree, to ſome portions of the bones themſelves. Winſlow.

Indeed this laſt uſe is controverted; ſome of the lateſt anatomiſts maintaining, that the *perioſteum* is wholly inſenſible.

The *perioſteum* is liable to inflammation from a variety of cauſes, and particularly the venereal diſeaſe and the ſcurvy: this generally terminates in an abſceſs or gangrene; if not ſpeedily removed, the bones will be injured. The cure is, in general, the ſame as in other inflammations; but the particular intention will be to carry the peccant matter outwards by fomentations and inciſions. Caſes of this kind generally terminate in amputation.

PERIPATETIC *philoſophy*, the ſyſtem of philoſophy taught and eſtabliſhed by Ariſtotle, and maintained by his followers, the *Peripatetics*.

A ſpecimen of the *Peripatetic* philoſophy, ſee under Ariſtotelian.

PERIPATETICS, Περιπατετικοι, a ſect of philoſophers, the followers of Ariſtotle, or the maintainers of the *Peripatetic* philoſophy: called alſo Ariſtotelians.

Cicero tells us, that Plato left two excellent diſciples, Xenocrates and Ariſtotle, who founded two ſects, which only differed in name; the former taking the appellation of Academics, who were thoſe that continued to hold their conferences in the Academy, as Plato had done before: the others, who followed Ariſtotle, were called *Peripatetics*; from περιπατεω, *I walk*; becauſe they diſputed walking in the Lyceum.

Ammonius fetches the name *Peripatetic* from Plato himſelf, who only taught walking; and adds, that the diſciples of Ariſtotle, and thoſe of Xenocrates, were equally called *Peripatetics*; the one *Peripatetics* of the Academy, the other *Peripatetics* of the Lyceum: but that, at length, the former quitted the title *Peripatetic*, for that of Academic, on occaſion of the place where they aſſembled: and the latter retained ſimply that of *Peripatetic*.

The greateſt and beſt part of Ariſtotle's philoſophy, he borrowed from his maſter Plato: Serranus affirms confidently, and ſays he is able to demonſtrate it, that there is nothing exquiſite in any part of Ariſtotle's philoſophy, dialectics, ethics, politics, phyſics, or metaphyſics, but is found in Plato. And of this opinion are many of the ancient authors, Clemens Alexandrinus, &c.

Gale endeavours to ſhew, that Ariſtotle borrowed a good deal of his philoſophy, both phyſical, about the firſt matter, and metaphyſical about the firſt being, his affections, truth, unity, goodneſs, &c. from the ſacred books; and adds, from Clearchus, one of his (Ariſtotle's) ſcholars, that he made uſe of a certain Jew, who aſſiſted him therein.

Ariſtotle's philoſophy preſerved itſelf *in puris naturalibus* for a long time: in the earlier ages of Chriſtianity, the Platonic philoſophy was more generally preferred; but this did not prevent the doctrine of Ariſtotle from forcing its way into the Chriſtian church. Towards the cloſe of the fifth century, it roſe into conſiderable credit: the Platonics, interpreting, in their ſchools, ſome of the writings of Ariſtotle, particularly his dialectics, and recommending them to young perſons. This ſeems to have been the firſt ſtep to that univerſal dominion, which

Ariſtotle afterwards obtained in the republic of letters; which was alſo very much promoted by the controverſies which Origen had occaſioned: he was zealouſly attached to the Platonic ſyſtem: and, therefore, after his condemnation, many, to avoid the imputation of his errors, and to prevent their being counted among the number of his followers, openly adopted the philoſophy of Ariſtotle. Nor was any philoſophy ſo proper for furniſhing thoſe weapons of ſubtle diſtinctions and captious ſophiſms, which were uſed in the Neſtorian, Arian, and Eutychian controverſies. About the cloſe of the ſixth century, the Ariſtotelian philoſophy, as well as ſcience in general, was almoſt univerſally decried; and it was chiefly owing to Boethius, who explained and recommended it, that it obtained a higher degree of credit among the Latins than it had hitherto enjoyed. Towards the end of the ſeventh century, the Greeks, abandoning Plato to the monks, gave themſelves up entirely to the direction of Ariſtotle, and in the ſucceeding century, the *Peripatetic* philoſophy was taught every where in their public ſchools, and propagated in all places with conſiderable ſucceſs. John Damaſcenus very much contributed to its credit and influence, by compoſing a conciſe, plain, and comprehenſive view of the doctrines of the Stagirite, for the inſtruction of the more ignorant, and in a manner adapted to common capacities. Under the patronage of Photius, and the protection of Bardas, the ſtudy of philoſophy, having for ſome time declined, revived again about the end of the ninth century. About the year 1050, a revolution in philoſophy commenced in France; when ſeveral eminent logicians, who followed Ariſtotle as their guide, took nevertheleſs the liberty of illuſtrating and modelling anew his philoſophy, and extending it far beyond its ancient limits. In the twelfth century, three methods of teaching philoſophy were practiſed by different doctors; the firſt was the ancient and plain method, which confined its reſearches to the philoſophical notions of Porphyry, and the dialectic ſyſtem, commonly attributed to St. Auguſtine, and in which were laid down this general rule, that philoſophical inquiries were to be limited to a ſmall number of ſubjects, leſt, by their becoming too extenſive, religion might ſuffer by a profane mixture of human ſubtilty with its divine wiſdom. The ſecond method was called the Ariſtotelian, becauſe it conſiſted in explications of the works of that philoſopher, ſeveral of whoſe books, being tranſlated into Latin, were almoſt every where in the hands of the learned. The third was termed the free method, employed by ſuch as were bold enough to ſearch after truth, in the manner the moſt adapted to render their inquiries ſucceſsful, without rejecting the ſuccours of Ariſtotle and Plato.

A reformed ſyſtem of *Peripateticiſm* was firſt introduced into the ſchools, in the univerſity of Paris, from whence it ſoon ſpread throughout Europe; and has ſubſiſted in the univerſities to this day, under the name of *ſchool philoſophy.*

The foundation hereof is Ariſtotle's doctrine, frequently miſunderſtood, and oftener miſapplied: whence the retainers thereto may be denominated *Reformed Peripatetics.* Out of theſe have ſprung, at ſeveral times, ſeveral branches; the chief are, the THOMISTS, SCOTISTS, and NOMINALISTS.

The *Peripatetic* ſyſtem, after having prevailed with very great and very extenſive dominion for many centuries, began rapidly to decline towards the cloſe of the ſeventeenth century, when the diſciples of Ramus attacked it on the one hand, and it had ſtill more formidable adverſaries to encounter in Des Cartes, Gaſſendi, and Newton. See ARISTOTELIAN.

PERIPETIA, Περιπετεια, in the *Drama*, that part of a tragedy wherein the action is turned, the plot unravelled, and the whole concludes.

The word is formed from the Greek περιπετης, ſomething falling into a different ſtate; formed of περι, *about*, and πιπτω, *cado*, *I fall.*

The *peripetia* is properly the change of condition, whether happy or unhappy, which the principal perſon or perſons undergo; ariſing from ſome diſcovery, or incident, which gives a new turn to the action.

The *peripetia*, therefore, concludes with the cataſtrophe, or unravelling; unleſs we make the *peripetia* to depend on the cataſtrophe, &c. as an effect on its cauſe.

The *peripetia* is ſometimes induced by remembrance, or diſcovery; as in the Œdipus, where the meſſenger ſent from Corinth to invite Œdipus to the crown, informs him, that Polybus and Merope were not his father and mother; which begins a diſcovery, that Laius, whom he had killed, and Jocaſta, whom he had then to wife, were his father and mother, and throws him into the deepeſt diſtreſs. This inſtance Ariſtotle calls a *double peripetia.*

The qualities of the *peripetia* are, that it be probable and neceſſary; in order to which it muſt be the natural reſult, at leaſt the effect, of the foregoing action, or of the ſubject itſelf; and muſt not ſtart out from any foreign, or collateral cauſe.

Sometimes the *peripetia* is occaſioned without any diſcovery; as in the Antigone of Sophocles, where the change in Creon's fortune is produced by the effect of his own obſtinacy; and ſometimes by a mere change of the will, which, though the leaſt artful, yet, Mr. Dryden obſerves, may be ſo managed, as to become exceedingly beautiful.

Theſe two caſes Ariſtotle calls *ſimple peripetias*; in theſe the change only conſiſts in a paſſage out of trouble and action into tranquillity and reſt. See FABLE, ACTION, &c.

PERIPHALLIA, Περιφαλλια, in *Antiquity*, the ſame with *phallagogia.* See PHALLAGOGIA and DIONYSIA.

PERIPHERY, formed from περιφερω, *I ſurround*, of περι, *about*, and φερω, *I bear*, or *carry*, in *Geometry*, the circumference or bounding-line, of a circle, ellipſis, parabola, or other regular curvilinear figure.

The *periphery* of every circle is ſuppoſed to be divided into three hundred and ſixty degrees; which are again ſubdivided, each into ſixty minutes, the minutes into ſeconds, &c.

The diviſion of degrees, therefore, are fractions, whoſe denominators proceed in a ſexagecuple ratio; as, the minute, $\frac{1}{60}$, ſecond $\frac{1}{3600}$, third $\frac{1}{216000}$. See SEXAGESIMAL.

But theſe denominators being troubleſome, in their ſtead are uſed the indices of their logarithms; hence the degree, being the integer, or unit, is marked by o, the minute by ′, ſecond by ″, &c. See CIRCLE, and CIRCUMFERENCE.

PERIPHERY, *angle at the.* See ANGLE.

PERIPHRASIS, Περιφρασις, *circumlocution*, formed of περι, *about*, and φραζω, *I ſpeak*, in *Rhetoric*, a circuit, or tour of words, much affected by orators, to avoid common and trite manners of expreſſion.

The *periphraſis* is of good uſe on many occaſions: and we are frequently forced to have recourſe to it, to make things be conceived which are not proper to name.

It is often a piece of politeneſs to ſuppreſs the names, and only intimate, or deſign them. Theſe turns of expreſſion are alſo particularly ſerviceable in oratory; for, the ſublime admitting of no direct citations, there muſt be a compaſs taken to inſinuate the authors whoſe authority is borrowed. A *periphraſis*, by turning round a proper name to make it underſtood, amplifies and raiſes the diſcourſe; but care muſt be taken it be not too much ſwelled, nor extended *mal à propos*; in which caſe it becomes flat and languid. See CIRCUMLOCUTION.

PERIPLOCA, in *Botany*. See *Virginian* SILK.

PERIPLUS, Περιπλȣς, a voyage, or navigation, round a certain ſea, or ſea-coaſt.

Arrian has deſcribed all the coaſts of the Black Sea, after having inſpected them in quality of general of the emperor Adrian; to whom he dedicates the deſcription, under the title *Periplus of the Euxine ſea.*

PERIPLYSIS, a name given by ſome authors to a diarrhœa, in which the ſtools are extremely thin and watery, and very frequent, and large in quantity.

PERIPNEUMONY, Περιπνευμονια, formed from περι, *about*, and πνευμων, *lungs*, in *Medicine*, an inflammation of ſome part of the thorax, properly of the lungs; attended with an accute fever, and a difficulty of breathing.

This diſeaſe is very frequently confounded with the PLEURISY, and then one is miſtaken for the other, ſometimes even by phyſicians. As this, however, is a diſorder of the lungs, and the other of the pleura, there are ſymptoms attending them, by which they may be certainly diſtinguiſhed.

In the *peripneumony*, the pulſe is more ſoft and the pain leſs acute; but the difficulty of breathing, and oppreſſion of the breaſt, are greater. The pleuriſy and *peripneumony* are often complicated, in which caſe the diſeaſe is called a *pluro-peripneumony.*

The *peripneumony* is diſtinguiſhed into *vera*, or *true*; and *notha*, or *ſpurious.*

The *true* PERIPNEUMONY is a real inflammation of the ſubſtance of the lungs, attended with a ſymptomatical fever, and a cough; by the former of which it is diſtinguiſhed from an aſthma, and by the latter from a pleuriſy.

Its uſual cauſes are, want of exerciſe, hard ſtudy, ſuppreſſion of natural evacuations, a moiſt air, or the like. And the perſons moſt ſubject to it are thoſe who abound with thick blood, whoſe fibres are tenſe and rigid, who feed upon groſs aliment, and drink ſtrong viſcid liquors. It is generally fatal to thoſe who have a flat breaſt, or narrow cheſt, and to ſuch as are afflicted with an aſthma, eſpecially in the decline of life. Sometimes the inflammation reaches to one lobe of the lungs only; at other times the whole of this organ is afflicted; in which caſe, the diſeaſe can hardly fail to prove fatal. It is often occaſioned by an obſtructed perſpiration, from cold, wet cloaths, &c. or by an increaſed circulation of the blood by violent exerciſe, the uſe of ſpiceries, ardent ſpirits, &c. When it ariſes from a phlegmon, the patient ſpits pure blood; when it is eryſipelatous, the ſputum is yellow, and not much tinged with red: in this laſt the breaſt is not ſo much contracted, but the fever is more violent.

The *peripneumonia* is more dangerous, though leſs painful, than the pleuriſy: its uſual way of going off, is by expectoration of well concocted, reddiſh, yellow, or white matter. The flowing of the menſes, or any hæmorrhage, or diarrhœa, abſceſſes about the ears, or other parts, are alſo good prognoſtics. The medicines preſcribed are moſtly the ſame that obtain in aſthmatic and pleuritic caſes. See Pleurisy.

Peripneumony, *ſpurious*, or *baſtard*, is a diſeaſe of the lungs, ariſing from a heavy pituitous matter, generated throughout the whole maſs of blood, and diſcharged upon the lungs.

It is known by the viſcidity, paleneſs, and ſlowneſs of the blood, ropineſs of the ſaliva, paleneſs, and want of ſcent of the urine, ſwellings, and obſtructions in the minuter veſſels, ſhort breath, oppreſſion in the thorax, &c. Worn out, phlegmatic, cold, phthiſical, catarrhous conſtitutions, are moſt liable to it. It begins with a feebleneſs, indolence, wearineſs, difficulty of breathing, oppreſſion of the breaſt, and feveriſhneſs; and goes on without any great appearance of danger, to death itſelf, without any certain prognoſtic thereof in the urine, pulſe, &c. It is cured by blood-letting, clyſters, thin diet, diluters, abſtergents, and aperients.

When an inflammation of the breaſt does not yield to bleeding, bliſtering, and other evacuations, it commonly ends in a ſuppuration; when this happens in the pleura, it ſometimes breaks outwardly, and the matter is diſcharged by the wound. When it happens within the ſubſtance of the lungs, the matter may be diſcharged by expectoration; but if it floats in the cavity of the breaſt, between the pleura and the lungs, it can only be diſcharged by an inciſion made betwixt the ribs. If the patient's ſtrength does not return after the inflammation is apparently removed; if his pulſe continues quick, though ſoft, his breathing difficult and oppreſſed, if he has cold ſhiverings at times, his cheeks fluſhed, his lips dry, and if he complains of thirſt and want of appetite, there is reaſon to fear a ſuppuration, and that a phthiſis, or consumption of the lungs will enſue. Buchan.

PERIPTERE, Περιπτερος, formed of περι, *about*, and πτερων, *wing*; q. d. winged on every ſide, in the *Ancient Archiecture*, a building encompaſſed on the outſide with a ſeries of inſulate columns, forming a kind of iſle, or portico, all around.

Such were the baſilica of Antonine, the ſeptizon of Severus, the portico of Pompey, &c.

Peripteres were properly temples which had columns on all the four ſides; by which they were diſtinguiſhed from *proſtyles*, and amphiproſtyles, the one of which had no columns before, and the other none on the ſides.

M. Perrault obſerves, that *periptere*, in its general ſenſe, includes all the ſpecies of temples which have porticoes of columns all around, whether the columns be diptere, or pſeudo-diptere, or ſimple *periptere*; which is a ſpecies that bears the name of the genus, and whieh has its columns diſtant from the wall by the breadth of an intercolumnation. For the difference between *periptere* and periſtyle, See Peristyle.

PERIPYEMA, a word uſed by chirurgical writers to expreſs a collection of matter wholly ſurrounding any part.

PERIRRHANTERION, περιῤῥαντηριων, in *Antiquity*, a veſſel, uſually of ſtone or braſs, filled with holy water, with which all thoſe that were admitted to the ſacrifices were ſprinkled, and beyond which it was unlawful for any one that was βεβηλος, or *profane*, to paſs. Some ſay it was placed in the αδυτον, or inmoſt receſs of the temple, into which none entered but the prieſt; but Caſaubon will have it to be placed at the door of the temple, which opinion ſeems more probable, becauſe all perſons who were αβεβηλοι, or *unpoluted*, were permitted to paſs beyond it.

PERISCII, περισκιοι, q. d. *circumumbres*, of περι, *about*, and σκια, *ſhadow*, in *Geography*, thoſe inhabitants of the earth, whoſe ſhadow do, in one and the ſame day ſucceſſively turn to all the points of the horizon.

Such are the inhabitants of the frozen zones, or thoſe who live within the compaſs of the arctic and antarctic circles; for, as the ſun never goes down to them after he is once up, but moves always round about, ſo do their ſhadows; inſomuch that, in the ſame day, they have their ſhadows on all ſides.

PERISCYLACISMUS, περισκυλακισμος, a method of purification in frequent uſe among the Greeks. It was done by drawing a whelp round the perſon to be purified.

The word comes from σκυλαξ, a *whelp*.

PERISKYTISM, *periſkyphiſm*, formed from περις and σκυτιζειν, *to flay*, or *cut the ſkin*, in *Surgery*, an operation performed by the ancients on the cranium.

The *periſkytiſm* is an inciſion which they made under the coronal ſuture, reaching from one temple croſs to the other, and penetrating to the bone of the cranium: its intention was to ſeparate the pericranium from the ſkull.

PERISSACHOREGIA, a term found in the Code, about the meaning whereof authors are much divided.

Alciat, and ſome others, will have it to be the name of an office; viz. that of curator of the annona, or proviſions, from περισσεια, *abundance*, and χορηγεω, *to lead*, or *bring*. Others take it to be the office of a magiſtrate, who was to look to the augmentation of the annona, and the diſtribution of the ſame Dom. Macri will have it to ſignify a donative, or diſtribution made to the ſoldiers, over and above their pay. See Donative.

PERISSON, in *Batany*, a name given by the ancient Greeks, and afterwards by the Romans, in the time of Pliny, to a kind of nightſhade, which made thoſe people who took it internally run mad. It was alſo called *pentadryon* and *anhydron*, and by ſome *manicum* strychnum, or ſimply *manicon*.

PERISSOSIS, a word uſed by Hippocrates to expreſs a redundance of humours.

PERISSOLOGY, περισσολογια, in *Rhetoric*, a quality of ſtyle directly oppoſitee to *braehylogy*, and is otherwiſe called *macrology*. See Macrology, Brachylogy, and Diction.

PERISTALTIC, περιςαλτικος, formed from περιςελλω, and literally implying ſomething driven, or preſſed all around, in *Medicine*, a motion proper to the intestines, wherein their ſeveral parts are ſucceſſively contracted from above downwards, or from the pylorus to the anus; in a manner ſomewhat reſembling the creeping of a worm: whence it is called the *vermicular motion*.

The *periſtaltic* motion is performed by the contraction of the circular aud longitudinal fibres, whereof the fleſhy coat of the inteſtines is compoſed. It is by means hereof that the chyle is driven into the orifices of the lacteal veins, and the excrements are preſſed downwards, and at laſt expelled.

When this motion comes to be depraved, and its direction changed, ſo as to proceed from below upwerds, it produces what we call the iliac *paſſion*.

M. Perrault, in an expreſs treatiſe on the *periſtaltic* motion, obſerves, that though it is ordinarily only attributed to the inteſtines, yet it is really an action common to all thoſe parts of the body which alter, prepare, concoct the ſeveral humours and ſpirits, which are the matter and inſtruments of animal action. In effect, he gives the name to all the motions whereby the cavities of the body are preſſed, or compreſſed.

PERISTAPHYLINUS, in *Anatomy*, a name which ſome give to a muſcle of the uvula, more properly denominated pterygostaphylinus.

PERISTERION, in *Botany*, a name given by ſome authors to the *ſcabioſa minor*, or ſmall ſcabious.

PERISTERITES, the *pigeon-ſtone*, in *Natural Hiſtory*, a name giren by ſome whimſical people to an odd conformation of a pebble, which they ſuppoſe to repreſent very exactly a pigeon without its wings. It ſeems to have been a mere *luſus naturæ*, in the formation of a common pebble. The variations of figure in the common pebbles are ſo infinite, that a perſon of a fertile imagination might find reſemblances to all the parts of the creation in the ſtones of a ſingle gravel-pit. The giving names to ſuch accidental things is not only unneceſſary, but miſchievous, as it cauſes great confuſion in natural hiſtory.

PERISTERNA, in *Anatomy*, is uſed for the latteral parts of the thorax.

PERISTIARCHUS, περιςιαρχος, in *Antiquity*, a name given to the perſon that officiated in a luſtration.

The word comes from περιςια, another name for καθαρματα.

PERISTOMA, in *Anatomy*, a word uſed by authors to expreſs the villous coat of the inteſtines.

PERISTYLE, περιςυλος, formed from περις, *about*, and ςυλος, *column*, in the *Ancient Architecture*, a place or building, encompaſſed with a row of columns on the inſide; by which it is diſtinguiſhed from the periptere, where the columns are diſpoſed withoutſide.

Such was the hypæthre temple of Vitruvius; and ſuch are now ſome baſilicas in Rome, ſeveral places in Italy, and moſt cloiſters of religious.

Peristyle is alſo uſed by modern writers, for a range of columns, either within or without a building.

Thus we ſay, the Corinthian *periſtyle* of the portal of the Louvre, &c.

PERISTYLION, περιςυλιον, among the Athenians, a large ſquare place, though ſometimes oblong, in the middle of the *gymnaſium*, deſigned for walking, and the performance of thoſe exercifes which were not to be performed in the *palæſtra*.

PERISYSTOLE, περισυςολη, in *Medicine*, the pauſe or interval between the two motions of the heart, or pulſe; viz. that of the ſyſtole, or contraction; and that of the diaſtole, or dilatation.

PERITEXIS, a word uſed by the old medical writers to expreſs a colliquation.

PERITHE, a name hy which ſome of the writers of the middle ages have called the *pyrites*; they ſay it has great virtues againſt the gout; ſome of ihem alſo have called it the *lapis peridonius*.

PERITONÆUM, or PERITONEUM, περιλοναιον, or περιλοαιον, derived from the verb περιλινω, *I ſtretch all round*, in *Anatomy*, a thin ſoft membrane, adherieg to the inner ſurface of the muſculi tranſverſi, covering and containing all the viſcera of the lower belly. See *Tab. Anat. (Splanch.) fig. 1. lit. u u. fig. 3. lit. b b.*

The figure and ſize of the *peritonæum* anſwer to thoſe of the lower belly, which it lines throughout; its internal ſurface is ſmooth, and lined with an unctuous humour, ſerving to prevent its wounding the inteſtines, and other parts it touches, as well as to lubricate and facilitate their motion. When the glands which furniſh it are obſtructed, the *peritonæum* grows thick; as is frequently found in dropſies.

The external ſurface is fibrous and unequal, that it may adhere more firmly to the muſcles of the abdomen, linea alba, oſſa pubis, iſchium, ilium, ſacrum, and the vertebræ lumbares, to which it is faſtened; and from the laſt whereof many ſuppoſe it to have its origin.

The *peritonæum*, in general, is a membrane of a pretty cloſe texture, and yet capable of a very great extenſion; after which it can recover itſelf, and be contracted to its ordinary ſize, as we ſee in pregnancy, dropſies, corpulency, and repletion.

It is alſo connected to the inferior, or convex ſurface of the liver, which it ſuſpends; and the part employed in this action is called the *ligamentum ſuſpenſorium hepatis*.

The *peritonæum* is double every where, but moſt apparently ſo from the navel to the os pubis, and near the lumbar vertebræ, as appears, not only from its extraordinary thickneſs in both, but from its ſpontaneous parting in the latter, to receive the kidneys. But though it ſeems to be made up of two portions, one internal, the other external, which many anatomiſts have conſidered as a duplicate of two diſtinct membranous laminæ, yet, properly ſpeaking, the internal portion alone deſerves the name of a membranous lamina, as being the main body of the *peritanæum*. The external portion is no more than a kind of fibrous or follicular apophyſis of the internal, and may properly enough be called the cellular ſubſtance of the *peritonæum*. It is perforated in the npper part to give paſſage to the œſophagus, aorta, and cava; in the under, for the fundament, the neck of the matrix, and the veſſels that go to the thighs: and in the fore-part to give paſſage to the umbilical veſſels.

Its cellular ſubſtance has two proceſſes, which, in men, falls down into the ſcrotum, wrap up the ſpermatic veſſels, and, dilating, make the tunica vaginalis of the teſticles; in women, they form a cover for the round ligament of the womb.

There are other two elongations, which paſs under the ligamentum Fallopii, with the crural veſſels, which they involve, and are gradually loſt in their courſe downward. To theſe we may add a fifth, which is ſpread on the neck of the bladder; and, perhaps, a ſixth, which accompanies the inteſtinum rectum. The great blood-veſſels, that is, the aorta and vena cava, are likewiſe involved in the cellular ſubſtance of the *peritonæum*. The true lamina, or membranous portion of the *peritonæum*, is connected by the intervention of the cellular ſubſtance, with the inner ſurface of the cavity of the abdomen; and has productions peculiar to itſelf, and very different from thoſe of the cellular ſubſtance. Some of theſe are ſimply folded, like a duplicature; ſuch as the membranous ligaments of the liver, colon, &c. ſome are expanded like inverted bags, to contain ſome viſcus, as the external membrane of the liver; ſome begin by a ſimple duplicature, and are afterwards expanded into a cavity, which contains ſome organ, as in the meſentery; ſome are alternately extended in the form of ſimple duplicatures and of cavities, as in the meſocolon; and ſome form only a ſmall eminence on the inner ſurface of the great cavity of the *peritonæum*, as the kidneys and ureters.

The *peritonæum* receives veins and arteries from the mammariæ, diaphragmaticæ, epigaſtricæ, ſacræ, and lumbares; nerves from the os ſacrum and loins. Ol. Rudbeckius pretends to have likewiſe diſcovered lymphatics; but theſe being ſcarce viſible, except in hydropic caſes, are not much taken notice of.

In morbid caſes, great quantities of ſerum have been found between the duplicatures of this membrane, when there was none in the cavity of the abdomen: this conſtitutes the true tympany.

The uſe of the *peritonæum*, is to contain, and keep in their place, the viſcera of the abdomen, and to ſupply them with particular coats, &c. This is ſo manifeſt, that, whenever this membrane happens to be broken, or extraordinarily dilated, ſome of the parts are apt to fall down, and to form thoſe tumors called *herniæ* or *ruptures*. See HERNIA.

In the fiſh kind, the *peritonæum*, or membrane ſurrounding the abdomen, is very variouſly coloured. In ſome it is of a ſhining ſilvery whiteneſs, as in the cyprini, pearch, eſoces, &c. In others it is of a fine pale fleſh-colour, as in the ſalmon; and in ſome it is wholly black, or elſe variegated with very numerous black ſpots, as in the clupeæ, gadi, cotti, and ſpari.

PERITROCHIUM, in *Mechanics*, a wheel or circle, concentric with the baſe of a cylinder, and moveable together with it, abont an axis. Such is the wheel A B, *Tab.* III. *Mechanics, fig.* 44. moveable on the axis E F.

The axis, with the wheel and levers fixed therein to move it, make that mechanical power, called *axis in peritrochio*.

Axis in PERITROCHIO, in *Mechanics*, one of the ſix mechanical powers, or ſimple machines, contrived for the raiſing of weights. See its ſtructure, doctrine, application, &c. under AXIS *in peritrochio*. See alſo MECHANICAL *powers*.

PERJURY, *perjurium*, in *Law*, the crime of ſwearing wilfully, abſolutely, and falſely, in a lawful oath, adminiſtered in ſome judicial proceeding, by one who has authority, in any matter relating to an iſſue, or cauſe in queſtion; whether it be of the perſon's own accord, or by ſubornation of another. If a man calls me *perjured*, I have my action upon the caſe. If he calls me *forſworn*, no action lies, becauſe the forſwearing may be extrajudicial.

Perjury is uſually excepted out of general acts of grace. At common law, the puniſhment of *perjury*, and ſubordination of *perjury*, was anciently death; afterwards baniſhment, or cutting out the tongue; then forfeiture of goods; and now it is fine and impriſonment; and the offender is ever afterwards incapable to be a witneſs. 3 Inſt. 163. By ſtatute, perſons committing wilful and corrupt *perjury*, in any cauſe depending concerning lands or goods, &c. in any of the courts of record, ſhall forfeit 20*l.* and be impriſoned ſix months, and their oaths ſhall not be received in any court of record, until the judgment is reverſed; and if the offenders have not goods or chattels to the value of 20*l.* they ſhall be ſet on the pillory in ſome market-place, and have both their ears nailed to it; and unlawful and corrupt procuring and ſuborning a witneſs to give falſe teſtimony in any court of record, &c. or corruptly procuring any witneſs to teſtify *in perpetuam rei memoriam*, incurs a forfeiture of 40*l.* And if the offender be not worth 40*l.* he ſhall ſuffer ſix months impriſonment, and ſtand on the pillory in ſome open market, near the place where the offence was committed; and ſhall not be received as a witneſs till ſuch judgment be reverſed, the party grieved ſhall recover damages againſt the proſecutor by action on the caſe, &c. 5 Eliz. chap. 9. and not only in a court of record, but in any other lawful court, as a court baron, &c. *perjury* may be committed.

The ſtatute 2 Geo. II. cap. 25. ſuperadds a power for the court to order the offender to be ſent to the houſe of correction for ſeven years, or to be tranſported for the ſame period; and makes it felony, without benefit of clergy, to return or eſcape within the time. Our ancient law inflicted the puniſhment of deliberate MURDER on wilful *perjury*, when it was the cauſe of the death of an innocent perſon; and by the laws of France it is univerſally capital.

PERIWINKLE, in *Natural Hiſtory*, the Engliſh name of a ſpecies of ſhells, beng the TURBO *littoreus* of Linnæus. It has five ſpires; the firſt ventricoſe; in younger ſubjects ſtriated ſpirally; in the old, ſmooth and of a duſky colout. This abounds on moſt rocks, far above lower-water mark, and is eaten in great plenty by the poor. The Swediſh peaſants believe, that when theſe ſhells creep high up the rocks, they indicate a ſtorm from the ſouth.

PERIWINKLE, *pervinca*, or *vinca*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the empalement of the flomer is permanent, and cut into five parts at the top; the flower has one ſalver-ſhaped petal, whoſe tube is longer than the empalement; the brim is broad, ſpreading open, and ſlightly cut into five obtuſe ſegments; it has five very ſhort inflexed ſtamina, terminated by erect, obtuſe ſummits; and two roundiſh germina, which have two roundiſh corpuſcles on their ſide, ſupporting one common ſtyle, the length of the ſtamina, crowned by two ſtigmas; the germen afterward turns to fruit, compoſed of two taper acute-pointed huſks, opening lengthways, with one valve, and filled with oblong cylindrical ſeeds. Miller reckons three, and Linnæus four ſpecies.

This plant deſerves a place in the ſtove as much as any of the exotic plants we have in England; becauſe the flowers are very beautiful, and there is a conſtant ſucceſſion of them all the ſummer. Miller.

The *periwinkles* are eaſily known, even when not in flower or ſeed, by their branches being long and trailing, and their leaves ſmooth and gloſſy, and approaching to the ſhape of bay-leaves. Theſe plants ſeldom ripen their fruit; and the way to make them do it is, to plant them in a ſmall pot, and cut off all the trailing branches; by which means the nouriſhment will be carried up to the ripening of the fruit.

PERMANENT *air* and *quantity*. See the ſubſtantives.

PERMEABLE denotes a body conſidered as its pores are capable of letting ſomewhat paſs through them. See Pore.

PER MINIMA, in *Medicine*, denotes a perfect mixture of the ſmalleſt particles of ſeveral bodies, or ingredients.

Per minima, in *Pharmacy*, denotes an intimate and perfect mixture of natural bodies; wherein their very *minima*, i. e. their atoms, or firſt component particles, are ſuppoſed to be accurately blended together.

If ſilver and lead be melted together, they will thus mingle *per minima*.

PERMISSION, *permiſſio*, in *Rhetoric*, a figure which differs in nothing from CONCESSION, except that the latter relates only to argument and pleading, but the former to action. E. gr. *Quoniam, omnibus rebus ereptis, ſolum mihi ſupereſt animus et corpus: hæc ipſa, quæ de multis relicte ſunt, vobis et veſtræ condono poteſtati. Vos me quo pacto vobis videtur, utamini, atque abutamini; licebit impune. In me quicquid libet ſtatuite*, &c.

PERMISSIVE *waſte*. See Waste.

PERMIT, a certificate granted by exciſe officers, and ſigned by them, expreſſing the quantity of liquor, the name of buyer and ſeller, and that the duty hath been paid, or that it hath been condemned as forfeited.

PERMITIT—*quare non* Permittit. See Quare.

PERMUTATION, the truck, or exchange, of one thing for another. See Exchange.

Permutation, in the *Canon Law*, a real and actual exchange of two benefices.

Permutation is a means of bringing benefices into commerce without ſimony.

The conditions required to a canonical *permutation*, are, 1. That there be benefices *permuted* on either ſide, though the revenues be unequal; and, in caſe of inequality, no compenſation is to be made in money, but only a penſion is to be charged on the greater. 2. That each of the *permutants* quit their benefices, and make a procuration *ad reſignandum*. 3. That the *permutation* be followed by a collation of the ordinary. 4. That the ordinary be informed of the cauſe of the *permutation*. 5. That thoſe, to whom the preſentation or election to the benefices belongs, give their conſent; or, in caſe of their refuſal, that the conſent of the dioceſan be had.

The chief rules of *permutation* are, that if one of the *compermutants* cannot enjoy, he re-enters, with full right into the benefice he has quitted; and that, if he die before he have accompliſhed the *permutation*, on hit part, by the taking of poſſeſſion, the *compermutant*, who has accompliſhed, retains both benefices, unleſs they fall into the regale.

Permutations *of quantities*, in *Algebra*, the CHANGES, ALTERNATIONS, or different COMBINATIONS, of any number of quantities.

Permutatione *archidiaconitus, & eccleſiæ eidem annexa cum eccleſia & prebenda*, is a writ iſſued to an ordinary, commanding him to admit a clerk to a benefice upon exchange made with another. *Reg. of Writs.*

PER MY & *per tout*—A joint-tenant is ſaid to be ſeized of the land he holds jointly, *per my & per tout*, i. e. he is ſeized by every parcel, and by the whole, *totum tenet, & nihil tenet; ſeu totum conjunctim, & nihil ſeparatim.* Bract.

PERNANCY, from the French *prendre, to take*, in *Law*, the taking or receiving any thing.

Tithes, in *pernancy*, are tithes taken, or which may be taken in kind.

PERNIO, in *Medicine*, a diſeaſe afflicting the hands and feet in the winter-time, popularly called a *kibe* or CHILBLAIN.

PERNOR *of profits*, he who takes or receives the profits of any thing. From the French *preneur, taker.*

PERONE, in *Anatomy*, a bone of the leg, more uſually called FIBULA.

PERONES, in *Roman Antiquity*, a kind of high ſhoes formed rudely of raw hides, and reaching up to the middle of the leg; though in the more ancient times of the commonwealth, the ſenators uſed them, yet in later ages they were only uſed by the ploughmen and labourers. Hence *Peronatus Arator*. Perſius, Sat. v. ver. 192. and Juvenal, Sat. 14. ver. 186.

PERONÆUS *anticus*, *longus*, or *primus*, a muſcle of the leg, ariſing fleſhy and tendinous from the head to the middle of the perone; whence, running as in a pulley, through the channel on the hind part of the outer ankle-bone, it is inſerted into the upper end of the bone of the metatarſus, which joins the great toe. The office of this muſcle is, to draw the foot upwards. See *Tab. Anat. (Myol.) fig.* 1. *n.* 65. *fig.* 2. *n.* 46. *fig*, 6. *n.* 43. *fig.* 7. *n.* 28.

Peronæus *maximns*, a muſcle of the leg, commonly called PERONÆUS *poſticus*.

Peronæus *medius*. This is commonly called *peronæus antieus*. See Peronæus *anticus*.

Peronæus *minimus*, a ſmall muſcle, vulgarly thought to be a porrion of the extenſor dignitorum longus, though it is eaſily ſeparable from it.

It is fixed by fleſhy fibres in the lower half of the inſide of the fibula, between two oblique bony lines, on one ſide of the lower part of the extenſor dignitorum longus, to which muſcle it is ſimply contiguous; from thenee it runs down, contracting in breadth, and paſſes, with the extenſor longus, through the common annular ligament, forming a flat tendon, which ſoon ſeparates from thoſe of the extenſor, and is inſerted near the baſis of the fifth metatarſal bone. It is diſtinguiſhed from the other two *peronæi* by a ſeptum, or production of the ligamentary aponeuroſis of the tibia. Winſlow.

Peronæus *poſticus*, *brevis* or *ſecundus*, a muſcle ſometimes alſo called *ſemifibulæus*, and *peronæus maximus*, ariſing fleſhy and ſharp on the back-part of the perone; whence continuing down the outer ſide of the bone till below the middle, it forms a ſmooth, ſtrong, flat tendon, which runs through the ſame channel at the bottom of the malleolus externus, with the longus, to the outſide of the os metatarſi of the little toe. Its office is ro pull the foot upwards. See *Tab. Anat. (Myol.) fig.* 1. *n.* 76. *fig.* 6. *n.* 44. *fig.* 7. *n.* 28.

PEROQUETTE, in *Ornithology*, the name of a ſmall ſpecirs of the *pſittacus* or parrot-kind, with a long tail. See Parrot.

There are ſeveral kinds of this bird. 1. The common, which is green, red, and yellowiſh, and was the firſt ſpecies of parrot brought into Europe, and well known among the ancients. 2. The *peroquette*, which is green all over, without any variegation. 3. The pale, green, and red kind. 4. The red and green-creſted kind. 5. The red kind, with wings variegated with black and green.

Beſide theſe, Margrave has deſcribed ſeven other Braſilian kinds, called the *tuiaputejuba*, *tuitirica*, *jendaya*, *tuiete*, *tuipara*, *anaca*, and *quijubatui*, and two others, to which no particular name has been given; one of the ſize of a ſwallow, all over green, with a black beak, and a very long tail; and the other of the ſize of a ſtarling, of a deep green on the back, and paler green on the belly, and with a ſhorter tail. Ray.

PERORATION, *peroratio*, in *Rhetoric*, the epilogue, or laſt part, of an oration; wherein, what the orator had inſiſted on through his whole diſcourſe, is urged afreſh, with greater vehemence and paſſion.

The *peroration* conſiſts of two parts: 1. Recapitulation, wherein the ſubſtance of what was diffuſed throughout the whole ſpeech, is collected briefly and curſorily, and ſummed up with new force and weight.

2. The moving the paſſions; which is ſo peculiar to the *peroration*, that the maſters of the art call this part *ſedes affectuum*.

The PASSIONS, to be raiſed in the *peroration*, are various, according to the various kinds of orations; in a panegyric, love, admitation, emulation, joy, &c. In an invective, hatred, contempt, &c. In a deliberation, hope, confidence, or fear.

The qualities aequired in the *peroration* are, that it be vehement and paſſionate; and that it be ſhort; becauſe, as Cicero obſerves, tears ſoon dry up.

The *peroration* was Cicero's maſter-piece: here that great orator not only ſet his judges and auditors on fire, but even ſeemed to burn himſelf; eſpecially when he was to raiſe pity and commiſeration towards the accuſed; where, as he himſelf tells us, he frequently filled the forum with weeping and lamentation. He adds, that, where there were ſeveral orators to ſpeak for the ſame perſon, the *peroration* was always reſerved to him; and ſubjoins, that if he excelled herein, it was nor owing to genius, but the grief himſelf ſhewed. This is abundantly evident in his Milonian *peroration*, where he ſays, *ſed finis ſit: neque enim præ lacrymis jam loqui poſſum, & hic ſe lacrymis defendi vetat*—and in that for Rabirius Poſthumus: *Sed jam, quoniam, ut ſpero, fidem quam potui, tibi præſtiti, Poſthume, reddam etiam lacrymas quas debeo—jam indicat tot hominum fletus, quam ſis carus tuis & me dolor debilitat, includitque vocem.*

PERPENDICULAR, in *Geometry*, a line falling directly on another line, ſo as to make equal angles on each ſide; called alſo a *normal* line.

Thus the line IG (*Tab.* III. *Geometry*, *fig.* 70.) is *perpendicular* to the line KH: i. e. makes right and equal angles therewith.

From the very notion of a *perpendicular*, it follows, 1. That the *perpendicularity* is mutual; i. e. if a line, as IG, be *perpendicular* to another, K H; that other is alſo *perpendicular* to the firſt.

2. That only one *perpendicular* can be drawn from one point in the ſame place.

3. That if a *perpendicular* be continued through the line it was drawn *perpendicularly* to; the continuation will alſo be *perpendicular* to the ſame.

4. That if there be two points of a right line, each of which is at an equal diſtance from two points of another right line; that line is *parallel* to the other.

5. That a line, which is *perpendicular* to another, is alſo *perpendicular* to all the parallels of the other.

6. That a *perpendicular* line is the ſhorteſt of all thoſe which can be drawn from the ſame point to the ſame right line.

Hence the diſtance of a point from a line, is a right line drawn from the point *perpendicular* to the line or plane; and hence the altitude of a figure is a *perpendicular* let fall from the vertex to the baſe.

To erect a **Perpendicular** G I on any given point G, in a right line M L; one foot of the compaſſes being in G, with any inrerval at pleaſure, cut off equal parts on each ſide G H and G K; from the points K and H, with an interval greater than the half of K H, ſtrike two arcs interſecting in I; the right line G I is perpendicular to M L.

Perpendiculars are beſt deſcribed in practice by means of a ſquare: one of whoſe legs is applied along that line, to or from which the *perpendicular* is to be let fall or raiſed.

To erect a **Perpendicular** on the end of a given line, ſuppoſe at P; open your compaſſes to any convenient diſtance, and, ſetting one foot in C, deſcribe the arc R P S: lay a ruler from S through C, it will find the point R in the arc, whence draw P R, which is *perpendicular* to P S.

To let fall a **Perpendicular** on a given line, M P, from a given point L; (*fig.* 71.) ſet on foot of the compaſſes in L, and with the other croſs the given line in the points M and G. Then, ſetting the compaſſes in G and M, ſtrike two arcs interſecting each other in *a*: then lay a ruler from L to *a*, and the line K L, deſcribed thereby, is the *perpendicular* required.

A line is ſaid to be *perpendicular* to a plane, when it is *perpendicular* to more than two lines drawn in that plane.

A plane is ſaid to be *perpendicular* to another plane, when a line in one plane is *perpendicular* to the other plane.

Perpendicular to a curve, is a right line cutting the curve in the point in which any other right line touches it, and is alſo itſelf *perpendicular* to that tangent.

Perpendicular, in *Fortification*. See Fortification, *according to M. Vauban's method, and according to count Pagan's method.*

Perpendicular, in *Geometry*, is a ſmall inſtrument uſed for finding the centre line of a piece in the operation of pointing it to a given object. See *Pointing of a* Gun.

PERPENDICULARITY *of plants* is a curious phenomenon in natural hiſtory, firſt obſerved by M. Dodart, and publiſhed in an eſſay on the affectation of *perpendicularity* obſerved in the ſtems or ſtalks of all plants, in the roots of many, and even in their branches, as much as poſſible.

The matter of fact is, that, though almoſt all plants riſe a little crooked, yet the ſtems ſhoot up *perpendicularly*, and the roots ſink down *perpendicularly*: even ſuch as, by the declivity of the ſoil, come out inclined, or ſuch as are diverted out of the *perpendicular* by any violent means, again redreſs and ſtraiten themſelves, and recover their *perpendicularity*, by making a ſecond and contrary bend or elbow, without rectifying the firſt. A common eye looks upon this affectation without any ſurprize: but a man that knows what a plant is, and how formed, finds it a ſubject of aſtoniſhment.

In effect, each ſeed contains in it a little plant, already formed, and needing nothing but to be unfolded: the little plant has its little root; and the pulp, which is uſually ſeparated into two lobes, is the foundation of the firſt food the plantule draws, by its root, when it begins to germinate.

Now if a ſeed in the earth be ſo diſpoſed, as that the root of the little plant be turned downwards, and the ſtem upwards, and even *perpendicularly* upwards, it is eaſy to conceive, that the little plant coming to unfold itſelf, its ſtalk and root need only follow the direction they have, to grow *perpendicularly*. But it is known, the ſeeds of plants, whether ſown of themſelves, or by the help of man, fall in the ground at random; and among an infinite number of ſituations with regard to the ſtalk of their plant, the *perpendicular* one upwards is but one.

In all the reſt, therefore, it is neceſſary the ſtalk redreſs or rectify itſelf, in order to get out of the ground: but what force is it, that effects this change, which is certainly a violent action? Is it, that the ſtalk, finding a leſs load of earth above it, goes naturally that way where it finds the leaſt obſtacle? Where this ſo, the little root, when it happens to be uppermoſt, muſt, for the ſame reaſon, follow the ſame direction, and mount on high.

M. Dodart, therefore, to account for two ſuch different actions, has recourſe to another ſyſtem; he ſuppoſes that the fibres of the ſtalks are of ſuch a nature, as that they contract and ſhorten by the heat of the ſun, and lengthen out by the moiſture of the earth; and, on the contrary, that the fibres of the roots contract by the moiſture of the earth, and lengthen by the heat of the ſun.

When, then, the plantule is inverted, snd the root is at the top, the fibres, which compoſe one of the branches of the root, are not equally expoſed to the moiſture of the earth; the lower part is more expoſed than the upper. The lower, therefore, muſt contract the moſt; which contraction is again promoted by the lengthening of the upper, whereon the ſun acts with the greateſt force. Of conſequence, therefore, this branch of the root muſt recoil towards the earth, and, inſinuating through the pores thereof, muſt get underneath the bulb, &c. By inverting this reaſoning, it is eaſy to ſhew how the ſtalk comes to get uppermoſt.

In a word, we may imagine, that the earth attracts the root to itſelf, and that the ſun contributes to its deſcent; and, on the contrary, that the ſun attracts the ſtem, and the earth, in ſome meaſure, ſends it towards the ſame.

As to the ſecond ſtraitening, viz. that of the ſtalks in the open air, he takes it to ariſe from the impreſſion of external cauſes, particularly the ſun and rain. For the upper part of a ſtalk, that is bent, is more expoſed to the rain, dew, and even the ſun, &c. than the under. Now both theſe cauſes, in a certain ſtructure of the fibres, tend equally to ſtraiten the part moſt expoſed, by the ſhortening they ſucceſſively occaſion in it; for moiſture ſhortens hy ſwelling, and heat by diſſipating. Indeed, what that ſtructure is, which gives the fibres ſuch different qualities, or whereon it depends, is ſtill a myſtery.

M. de la Hire accounts for the *perpendicularity* of the ſtems or ſtalks of plants, thus: he imagines that, in plants, the root deaws a coarſer and heavier juice: and the ſtem and its branches a finer and more volatile one. And, in effect, moſt naturaliſts conceive the root as the ſtomach of the plant, where the juices of the earth are ſubtilized, ſo as to become able to riſe through the ſtem to the extremity of the branches. This difference of juices ſuppoſes larger pores in the roots than the ſtalk, &c. and, in a word, a different contexture; which difference muſt be found even in the little inviſible plant encloſed in the ſeed: in this plantule, therefore, we may conceive a point of ſeparation; ſuch as that all on one ſide, e. gr. the root, ſhall be unfolded by the groſſer juices, and all on the other ſide, by the more ſubtile juices.

Suppoſe, now, the plantule, when its parts begin to unfold, to be entirely inverted; the root atop, and the ſtalk below: the juices which enter the root will ſtill be coarſeſt, and when they have opened and enlarged the pores, ſo as to admit juices of a determinate weight, thoſe juices, ſtill preſſing the root more and more, will drive it downwards; and this the more as the root is more extended or enlarged; for the point of ſeparation being conceived as the fixed point of a lever, they will act by the longer arm. At the ſame time, the volatile juices, having penetrated the ſtalk, will attend to give it a direction from below upwards; and, by reaſon of the lever, will give it more and more every day. Thus is the little plant turned on its fixed point of ſeparation, till it be perfectly erect.

The plant thus erected, the ſtalk, we know, ſhould continue to riſe *perpendicularly*, to give it the more firm biding, and enable it to withſtand the effort of wind and weather.

The manner wherein this is effected, M. Parent lays down thus: the nutritious juice being arrived at the extremity of a riſing ſtalk, if it evaporate, the weight of the air which encompaſſes it on all ſides, will make it aſcend vertically; and, if it do not evaporate, but congeal, and remain fixed to that extremity whence it was ready to go off, the weight of the air will give it the ſame direction; ſo that the ſtalk will have acquired a very little new part, vertically laid over it: juſt as in a candle held in any way obliquely to the horizon, the flame ſtill continues vertical, by the preſſure of the atmoſphere. The new drops of juice that ſucceed will follow the ſame direction; and, as all together form the ſtalk, that muſt of courſe be vertical, unleſs ſome particular circumſtance intervene.

As to the branches, which are at firſt ſuppoſed to proceed laterally out of the ſtalk in the firſt embryo of the plant; though they ſhould even come out in an horizontal direction, yet muſt they raiſe themſelves upwards by the conſtant direction of the nutritious juice, which at firſt ſcarce meets any reſiſtance in a tender ſupple branch; and even afterwards, though the branch grow more firm, yet will it act with the more advantage; ſince the branch, being become longer, furniſhes it with a longer arm or lever. The ſlender action of a little drop becomes very conſiderable, by its continuity, and by the aſſiſtance of ſuch favourable circumſtances. Hence may be accounted for that regular ſituation and direction of the branches, which all, and always nearly, make the ſame conſtant angle of 45° with the ſtem, and with one another.

M. Aſtruc accounts for the *perpendicularity* of the ſtems, and their redreſſing themſelves on theſe two principles: 1. That the nutritious juice ariſes from the circumference of the plant, and terminates in the pith. 2. That fluids, contained in tubes either parallel or oblique to the horizon, gravitate on the lower part of the tubes, and not at all on the upper.

From hence it eaſily follows, that, in a plant poſited either obliquely or parallel to the horizon, the nutritious juice will act more on the lower part of the canals than the upper, and, by this means, inſinuate more into the canals communicating therewith, and be collected more copiouſly therein: thus the parts on the lower ſide will receive more accretion, and be more nouriſhed, than thoſe on the upper; the conſequence whereof muſt be, that the extremity of the plant will be obliged to bend upwards.

The ſame principle brings the ſeed into its due ſituation at firſt: in a bean, planted upſide down, the plume and radicle are eaſily perceived with the naked eye, to ſhoot, at firſt, directly, for about an inch; but thenceforth they begin to bend, the one downward, and the other upward. The like is ſeen of a heap of barley to be made into malt, or in a quantity of acorns laid to ſprout in a moiſt place, &c. each grain of barley, in the firſt caſe, and each acorn, in the ſecond, has a different ſituation; and yet all the ſprouts tend directly upward, and the roots downward, and the curvity or bend they make, is greater or leſs, as their ſituation approaches more or leſs to the direction wherein no curvature at all would be neceſſary. Now, two ſuch oppoſite motions cannot ariſe without ſuppoſing ſome conſiderable difference between the two parts: the only one we know of is, that the plume is fed by a juice imparted to it by tubes parallel to its ſides; whereas the radical imbibes its nouriſhment at all the pores in its ſurface. As oft, therefore, as the plume is either parallel or inclined to the horizon, the nutritious juice, feeding the lower parts more than the upper, will determine its extremes to turn upward, for the reaſons already aſſigned. On the contrary, when the radicle is in the like ſituation, the nutritious juice penetrating more copiouſly through the upper part than the under, there will be a greater accretion of the former than the latter; and, conſequently, the radicle will be bent downwards; and this mutual curvity of the plume and radicle muſt continue, till ſuch time as their ſides are nouriſhed alike, which cannot be till they are perpendicular. Memoires de l'Acad. Royale des Scienc. an. 1708.

PERPENDICULAR *roots*. See FIBROSE *roots*.

PERPETUAL, ſomething that endures always, or that laſts for ever.

PERPETUAL is ſometimes alſo uſed for a thing that laſts, or holds, during a perſon's life.

Thus offices, &c. held *durante vita*, are ſometimes called *perpetual* offices. In this ſenſe, M. Fontenelle was ſaid to be *perpetual* ſecretary of the Royal Academy of Sciences. Hence the French call him abſolutely, *M. le Perpetuel.*

PERPETUAL *action*. See ACTION.

PERPETUAL *curate*. See CURATE.

PERPETUAL *glands*, in *Anatomy*, are thoſe which are natural; thus diſtinguiſhed from the adventitious ones. See GLANDS.

PERPETUAL *lamp*. See LAMP.

PERPETUAL *motion*, in *Mechanics*. See MOTION.

Circle of **PERPETUAL** *occultation* and *apparition*. See CIRCLE.

PERPETUAL *pills*, *pilulæ* PERPETUÆ, among *Phyſicians*, are pills made of regulus of antimony; which, being ſwallowed and voided fifty times, will purge every time with undiminiſhed force.

PERPETUAL, or *endleſs ſcrew*. See SCREW.

PERPETUAL *virginity*. See VIRGIN.

PERPETUITY, in *Annuities*, is always the quotient of unity divided by the intereſt of 1 *l.* for a year, or 100 *l.* divided by the rate of intereſt. Thus, the *perpetuity* is 33.33, 28.57, 25, 20, or 16.666, according as intereſt is reckoned at 3, 3½, 4, 5, or 6 *per cent.* See ANNUITIES and ASSURANCES.

PERPETUITY, *perpetuitas*, in the *Canon Law*, the quality of a benefice that is irrevocable, or whoſe incumbent cannot be deprived, except in certain caſes determined by law.

It is aſſerted, with reaſon, that the *perpetuity* of benefices is eſtabliſhed by the ancient canons; and that prieſts are inſeparably attached to their churches, as by a ſpiritual marriage. It is true, by the corruption of the times, the ſecular prieſts being fallen into great diſorder, and even contempt, the biſhops anciently called the religious to their aſſiſtance, and committed to them the cure of ſouls, and the adminiſtration of pariſhes; ſtill remanding them back again to their cloiſters, when they thought fit, and again revoking them *ad nutum*.

But this vague and uncertain adminiſtration only laſted to the twelfth century, when benefices returned to their eſſential *perpetuity*.

PER QUÆ *ſervitia* is a writ judicial, iſſuing on the note of a fine; and lies for the cognize of a manor, ſeignory, chief rent, or other ſervices, to compel the tenant of the land, at the time of the fine levied, to attourn to him.

PERQUISITE, *perquiſitum*, any thing gotten by a man's own induſtry, or purchaſed with his own money—In contradiſtinction to that which deſcends to him from his father or his anceſtors.

PERQUISITES *of courts*, are thoſe profits which ariſe to a lord of a manor, by virtue of his court-baron, over and above the certain yearly profits of his lands: as fines of copyholds, heriots, amerciaments, waifes, ſtrays, &c.

PER QUOD *conſortium amiſit*: or **PER QUOD** *ſervitium amiſit*, are words neceſſary in declarations for treſpaſs, &c. where a man's wife or ſervant is beaten or taken from him, and he loſes their ſervice, &c. 2 Lill. Abr. 595, 596.

PERRIWIG. See PERRUKE.

PERRIWINKLE. See PERIWINKLE.

PERRON, in *Architecture*, a ſtaircaſe lying open, or withoutſide the building: properly, the ſteps before the front of the building, which lead into the firſt ſtory when raiſed a little above the level of the ground.

Perrons are made of different forms and ſizes, with regard to the ſpace and height they are to lead to. Sometimes the ſteps are round, or oval; more uſually they are ſquare.

PERRUKE, or PERRIWIG, was anciently uſed for a long head of natural hair: ſuch, particularly, as there was care taken in the adjuſting and trimming of.

Menage derives the word, by a long detour, from the Latin *pilus*, *hair*. The ſeveral ſtages of its paſſage, according to the critic, are *pilus*, *pelus*, *pelutus*, *peluticus*, *pelutica*, *perutica*, *peruca*, *perruque*.

The Latins called it *coma*; whence part of Gaul took the denomination of *Gallia Comata*, from the long hair which the natives wore as a ſign of freedom. An ancient author ſays, that Abſalom's *perruke* weighed two hundred ſhekles.

PERRUKE is now uſed for a ſet of falſe or borrowed hair, curled, buckled, and ſewed together on a frame, or cawl; anciently called *capillamentum*, or falſe *perruke*.

It is doubted, whether or no the uſe of *perrukes* was known among the ancients. It is true, they uſed falſe hair. Martial and Juvenal make merry with the women of their time, for making themſelves look young with their borrowed hair; with the men who changed their colours according to the ſeaſons; and with the dotards, who hoped to deceive the Deſtinies by their white hair. But theſe ſeem to have ſcarce had any thing in common with our *perrukes*; and were, at beſt, only compoſed of hair painted, and glued together. Nothing can be more ridiculous than the deſcription Lampridius gives of the emperor Commodus's *perruke*: it was powdered with ſcrapings of gold, and oiled (if we may uſe the expreſſion) with glutinous perfumes for the powder to hang by. In effect, the uſe of *perrukes*, at leaſt in their preſent mode, as he himſelf tells us, he frequently filled the forum with weeping and lamentation. He adds, that, where there were ſeveral orators to ſpeak for the ſame perſon, the *peroration* was always reſerved to him; and ſubjoins, that if he excelled herein, it was nor owing to genius, but the grief himſelf ſhewed. This is abundantly evident in his Milonian *peroration*, where he ſays, *ſed finis ſit: neque enim præ lacrymis jam loqui poſſum, & hic ſe lacrymis defendi vetat*—and in that for Rabirius Poſthumus: *Sed jam, quoniam, ut ſpero, fidem quam potui, tibi præſtiti, Poſthume, reddam etiam lacrymas quas debeo—jam indicat tot hominum fletus, quam ſis carus tuis & me dolor debilitat, includitque vocem.*

PERPENDICULAR, in *Geometry*, a line falling directly on another line, ſo as to make equal angles on each ſide; called alſo a *normal* line.

Thus the line IG (*Tab.* III. *Geometry*, *fig.* 70.) is *perpendicular* to the line KH: i. e. makes right and equal angles therewith.

From the very notion of a *perpendicular*, it follows, 1. That the *perpendicularity* is mutual; i. e. if a line, as IG, be *perpendicular* to another, KH; that other is alſo *perpendicular* to the firſt.

2. That only one *perpendicular* can be drawn from one point in the ſame place.

3. That if a *perpendicular* be continued through the line it was drawn *perpendicularly* to; the continuation will alſo be *perpendicular* to the ſame.

4. That if there be two points of a right line, each of which is at an equal diſtance from two points of another right line; that line is *parallel* to the other.

5. That a line, which is *perpendicular* to another, is alſo *perpendicular* to all the parallels of the other.

6. That a *perpendicular* line is the ſhorteſt of all thoſe which can be drawn from the ſame point to the ſame right line.

Hence the diſtance of a point from a line, is a right line drawn from the point *perpendicular* to the line or plane; and hence the altitude of a figure is a *perpendicular* let fall from the vertex to the baſe.

To erect a PERPENDICULAR G I on any given point G, in a right line M L; one foot of the compaſſes being in G, with any inrerval at pleaſure, cut off equal parts on each ſide G H and G K; from the points K and H, with an interval greater than the half of K H, ſtrike two arcs interſecting in I; the right line G I is perpendicular to M L.

Perpendiculars are beſt deſcribed in practice by means of a ſquare: one of whoſe legs is applied along that line, to or from which the *perpendicular* is to be let fall or raiſed.

To erect a PERPENDICULAR on the end of a given line, ſuppoſe at P; open your compaſſes to any convenient diſtance, and, ſetting one foot in C, deſcribe the arc R P S: lay a ruler from S through C, it will find the point R in the arc, whence draw P R, which is *perpendicular* to P S.

To let fall a PERPENDICULAR on a given line, M P, from a given point L; (*fig.* 71.) ſet on foot of the compaſſes in L, and with the other croſs the given line in the points M and G. Then, ſetting the compaſſes in G and M, ſtrike two arcs interſecting each other in *a*: then lay a ruler from L to *a*, and the line K L, deſcribed thereby, is the *perpendicular* required.

A line is ſaid to be *perpendicular* to a plane, when it is *perpendicular* to more than two lines drawn in that plane.

A plane is ſaid to be *perpendicular* to another plane, when a line in one plane is *perpendicular* to the other plane.

PERPENDICULAR to a curve, is a right line cutting the curve in the point in which any other right line touches it, and is alſo itſelf *perpendicular* to that tangent.

PERPENDICULAR, in *Fortification.* See FORTIFICATION, *according to M. Vauban's method, and according to count Pagan's method.*

PERPENDICULAR, in *Geometry*, is a ſmall inſtrument uſed for finding the centre line of a piece in the operation of pointing it to a given object. See *Pointing of a* GUN.

PERPENDICULARITY *of plants* is a curious phenomenon in natural hiſtory, firſt obſerved by M. Dodart, and publiſhed in an eſſay on the affectation of *perpendicularity* obſerved in the ſtems or ſtalks of all plants, in the roots of many, and even in their branches, as much as poſſible.

The matter of fact is, that, though almoſt all plants riſe a little crooked, yet the ſtems ſhoot up *perpendicularly*, and the roots ſink down *perpendicularly*: even ſuch as, by the declivity of the ſoil, come out inclined, or ſuch as are diverted out of the *perpendicular* by any violent means, again redreſs and ſtraiten themſelves, and recover their *perpendicularity*, by making a ſecond and contrary bend or elbow, without rectifying the firſt. A common eye looks upon this affectation without any ſurprize: but a man that knows what a plant is, and how formed, finds it a ſubject of aſtoniſhment.

In effect, each ſeed contains in it a little plant, already formed, and needing nothing but to be unfolded: the little plant has its little root; and the pulp, which is uſually ſeparated into two lobes, is the foundation of the firſt food the plantule draws, by its root, when it begins to germinate.

Now if a ſeed in the earth be ſo diſpoſed, as that the root of the little plant be turned downwards, and the ſtem upwards, and even *perpendicularly* upwards, it is eaſy to conceive, that the little plant coming to unfold itſelf, its ſtalk and root need only follow the direction they have, to grow *perpendicularly*. But it is known, the ſeeds of plants, whether ſown of themſelves, or by the help of man, fall in the ground at random; and among an infinite number of ſituations with regard to the ſtalk of their plant, the *perpendicular* one upwards is but one.

In all the reſt, therefore, it is neceſſary the ſtalk redreſs or rectify itſelf, in order to get out of the ground: but what force is it, that effects this change, which is certainly a violent action? Is it, that the ſtalk, finding a leſs load of earth above it, goes naturally that way where it finds the leaſt obſtacle? Where this ſo, the little root, when it happens to be uppermoſt, muſt, for the ſame reaſon, follow the ſame direction, and mount on high.

M. Dodart, therefore, to account for two ſuch different actions, has recourſe to another ſyſtem; he ſuppoſes that the fibres of the ſtalks are of ſuch a nature, as that they contract and ſhorten by the heat of the ſun, and lengthen out by the moiſture of the earth; and, on the contrary, that the fibres of the roots contract by the moiſture of the earth, and lengthen by the heat of the ſun.

When, then, ihe plantule is inverted, snd the root is at the top, the fibres, which compoſe one of the branches of the root, are not equally expoſed to the moiſture of the earth; the lower part is more expoſed than the upper. The lower, therefore, muſt contract the moſt; which contraction is again promoted by the lengthening of the upper, whereon the ſun acts with the greateſt force. Of conſequence, therefore, this branch of the root muſt recoil towards the earth, and, inſinuating through the pores thereof, muſt get underneath the bulb, &c. By inverting this reaſoning, it is eaſy to ſhew how the ſtalk comes to get uppermoſt.

In a word, we may imagine, that the earth attracts the root to itſelf, and that the ſun contributes to its deſcent; and, on the contrary, that the ſun attracts the ſtem, and the earth, in ſome meaſure, ſends it towards the ſame.

As to the ſecond ſtraitening, viz. that of the ſtalks in the open air, he takes it to ariſe from the impreſſion of external cauſes, particularly the ſun and rain. For the upper part of a ſtalk, that is bent, is more expoſed to the rain, dew, and even the ſun, &c. than the under. Now both theſe cauſes, in a certain ſtructure of the fibres, tend equally to ſtraiten the part moſt expoſed, by the ſhortening they ſucceſſively occaſion in it; for moiſture ſhortens hy ſwelling, and heat by diſſipating. Indeed, what that ſtructure is, which gives the fibres ſuch different qualities, or whereon it depends, is ſtill a myſtery.

M. de la Hire accounts for the *perpendicularity* of the ſtems or ſtalks of plants, thus: he imagines that, in plants, the root deaws a coarſer and heavier juice: and the ſtem and its branches a finer and more volatile one. And, in effect, moſt naturaliſts conceive the root as the ſtomach of the plant, where the juices of the earth are ſubtilized, ſo as to become able to riſe through the ſtem to the extremity of the branches. This difference of juices ſuppoſes larger pores in the roots than the ſtalk, &c. and, in a word, a different contexture; which difference muſt be found even in the little inviſible plant encloſed in the ſeed: in this plantule, therefore, we may conceive a point of ſeparation; ſuch as that all on one ſide, e. gr. the root, ſhall be unfolded by the groſſer juices, and all on the other ſide, by the more ſubtile juices.

Suppoſe, now, the plantule, when its parts begin to unfold, to be entirely inverted; the root atop, and the ſtalk below: the juices which enter the root will ſtill be coarſeſt, and when they have opened and enlarged the pores, ſo as to admit juices of a determinate weight, thoſe juices, ſtill preſſing the root more and more, will drive it downwards; and this the more as the root is more extended or enlarged; for the point of ſeparation being conceived as the fixed point of a lever, they will act by the longer arm. At the ſame time, the volatile juices, having penetrated the ſtalk, will attend to give it a direction from below upwards; and, by reaſon of the lever, will give it more and more every day. Thus is the little plant turned on its fixed point of ſeparation, till it be perfectly erect.

The plant thus erected, the ſtalk, we know, ſhould continue to riſe *perpendicularly*, to give it the more firm biding, and enable it to withſtand the effort of wind and weather.

The manner wherein this is effected, M. Parent lays down thus: the nutritious juice being arrived at the extremity of a riſing ſtalk, if it evaporate, the weight of the air which encompaſſes it on all ſides, will make it aſcend vertically; and, if it do not evaporate, but congeal, and remain fixed to that extremity whence it was ready to go off, the weight of the air will give it the ſame direction; ſo that the ſtalk will have acquired a very little new part, vertically laid over it: juſt as in a candle held in any way obliquely to the horizon, the flame ſtill continues vertical, by the preſſure of the atmoſphere. The new drops of juice that ſucceed will follow the ſame direction; and, as all together form the ſtalk, that muſt of courſe be vertical, unleſs ſome particular circumſtance intervene.

As to the branches, which are at firſt ſuppoſed to proceed laterally out of the ſtalk in the firſt embryo of the plant; though they ſhould even come out in an horizontal direction, yet muſt they raiſe themſelves upwards by the conſtant direction of the nutritious juice, which at firſt ſcarce meets any reſiſtance in a tender ſupple branch; and even afterwards, though the branch grow more firm, yet will it act with the more advantage; ſince the branch, being become longer, furniſhes it with a longer arm or lever. The ſlender action of a little drop becomes very conſiderable, by its continuity, and by the aſſiſtance of ſuch favourable circumſtances. Hence may be accounted for that regular ſituation and direction of the branches, which all, and always nearly, make the ſame conſtant angle of 45° with the ſtem, and with one another.

M. Aſtruc accounts for the *perpendicularity* of the ſtems, and their redreſſing themſelves on theſe two principles: 1. That the nutritious juice ariſes from the circumference of the plant, and terminates in the pith. 2. That fluids, contained in tubes either parallel or oblique to the horizon, gravitate on the lower part of the tubes, and not at all on the upper.

From hence it eaſily follows, that, in a plant poſited either obliquely or parallel to the horizon, the nutritious juice will act more on the lower part of the canals than the upper, and, by this means, inſinuate more into the canals communicating therewith, and be collected more copiouſly therein: thus the parts on the lower ſide will receive more accretion, and be more nouriſhed, than thoſe on the upper; the conſequence whereof muſt be, that the extremity of the plant will be obliged to bend upwards.

The ſame principle brings the ſeed into its due ſituation at firſt: in a bean, planted upſide down, the plume and radicle are eaſily perceived with the naked eye, to ſhoot, at firſt, directly, for about an inch; but thenceforth they begin to bend, the one downward, and the other upward. The like is ſeen of a heap of barley to be made into malt, or in a quantity of acorns laid to ſprout in a moiſt place, &c. each grain of barley, in the firſt caſe, and each acorn, in the ſecond, has a different ſituation; and yet all the ſprouts tend directly upward, and the roots downward, and the curvity or bend they make, is greater or leſs, as their ſituation approaches more or leſs to the direction wherein no curvature at all would be neceſſary. Now, two ſuch oppoſite motions cannot ariſe without ſuppoſing ſome conſiderable difference between the two parts: the only one we know of is, that the plume is fed by a juice imparted to it by tubes parallel to its ſides; whereas the radical imbibes its nouriſhment at all the pores in its ſurface. As oft, therefore, as the plume is either parallel or inclined to the horizon, the nutritious juice, feeding the lower parts more than the upper, will determine its extremes to turn upward, for the reaſons already aſſigned. On the contrary, when the radicle is in the like ſituation, the nutritious juice penetrating more copiouſly through the upper part than the under, there will be a greater accretion of the former than the latter; and, conſequently, the radicle will be bent downwards; and this mutual curvity of the plume and radicle muſt continue, till ſuch time as their ſides are nouriſhed alike, which cannot be till they are perpendicular. Memoires de l'Acad. Royale des Scienc. an. 1708.

PERPENDICULAR *roots*. See FIBROSE *roots*.

PERPETUAL, ſomething that endures always, or that laſts for ever.

PERPETUAL is ſometimes alſo uſed for a thing that laſts, or holds, during a perſon's life.

Thus offices, &c. held *durante vita*, are ſometimes called *perpetual* offices. In this ſenſe, M. Fontenelle was ſaid to be *perpetual* ſecretary of the Royal Academy of Sciences. Hence the French call him abſolutely, *M. le Perpetuel*.

PERPETUAL *action*. See ACTION.

PERPETUAL *curate*. See CURATE.

PERPETUAL *glands*, in *Anatomy*, are thoſe which are natural; thus diſtinguiſhed from the adventitious ones. See GLANDS.

PERPETUAL *lamp*. See LAMP.

PERPETUAL *motion*, in *Mechanics*. See MOTION.

Circle of PERPETUAL *occultation* and *apparition*. See CIRCLE.

PERPETUAL *pills*, *pilulæ* PERPETUÆ, among *Phyſicians*, are pills made of regulus of antimony; which, being ſwallowed and voided fifty times, will purge every time with undiminiſhed force.

PERPETUAL, or *endleſs ſcrew*. See SCREW.

PERPETUAL *virginity*. See VIRGIN.

PERPETUITY, in *Annuities*, is always the quotient of unity divided by the intereſt of 1 *l.* for a year, or 100 *l.* divided by the rate of intereſt. Thus, the *perpetuity* is 33.33, 28.57, 25, 20, or 16.666, according as intereſt is reckoned at 3, 3½, 4, 5, or 6 *per cent.* See ANNUITIES and ASSURANCES.

PERPETUITY, *perpetuitas*, in the *Canon Law*, the quality of a benefice that is irrevocable, or whoſe incumbent cannot be deprived, except in certain caſes determined by law.

It is aſſerted, with reaſon, that the *perpetuity* of benefices is eſtabliſhed by the ancient canons; and that prieſts are inſeparably attached to their churches, as by a ſpiritual marriage. It is true, by the corruption of the times, the ſecular prieſts being fallen into great diſorder, and even contempt, the biſhops anciently called the religious to their aſſiſtance, and committed to them the cure of ſouls, and the adminiſtration of pariſhes; ſtill remanding them back again to their cloiſters, when they thought fit, and again revoking them *ad nutum*.

But this vague and uncertain adminiſtration only laſted to the twelfth century, when benefices returned to their eſſential *perpetuity*.

PER QUÆ *ſervitia* is a writ judicial, iſſuing on the note of a fine; and lies for the cognize of a manor, ſeignory, chief rent, or other ſervices, to compel the tenant of the land, at the time of the fine levied, to attourn to him.

PERQUISITE, *perquiſitum*, any thing gotten by a man's own induſtry, or purchaſed with his own money—In contradiſtinction to that which deſcends to him from his father or his anceſtors.

PERQUISITES *of courts*, are thoſe profits which ariſe to a lord of a manor, by virtue of his court-baron, over and above the certain yearly profits of his lands: as fines of copyholds, heriots, amerciaments, waifes, ſtrays, &c.

PER QUOD *conſortium amiſit*: or PER QUOD *ſervitium amiſit*, are words neceſſary in declarations for treſpaſs, &c. where a man's wife or ſervant is beaten or taken from him, and he loſes their ſervice, &c. 2 Lill. Abr. 595, 596.

PERRIWIG. See PERRUKE.

PERRIWINKLE. See PERIWINKLE.

PERRON, in *Architecture*, a ſtaircaſe lying open, or withoutſide the building: properly, the ſteps before the front of the building, which lead into the firſt ſtory when raiſed a little above the level of the ground.

Perrons are made of different forms and ſizes, with regard to the ſpace and height they are to lead to. Sometimes the ſteps are round, or oval; more uſually they are ſquare.

PERRUKE, or PERRIWIG, was anciently uſed for a long head of natural hair: ſuch, particularly, as there was care taken in the adjuſting and trimming of.

Menage derives the word, by a long detour, from the Latin *pilus*, *hair*. The ſeveral ſtages of its paſſage, according to the critic, are *pilus*, *pelus*, *pelutus*, *peluticus*, *pelutica*, *perutica*, *peruca*, *perruque*.

The Latins called it *coma*; whence part of Gaul took the denomination of *Gallia Comata*, from the long hair which the natives wore as a ſign of freedom. An ancient author ſays, that Abſalom's *perruke* weighed two hundred ſhekles.

PERRUKE is now uſed for a ſet of falſe or borrowed hair, curled, buckled, and ſewed together on a frame, or cawl; anciently called *capillamentum*, or falſe *perruke*.

It is doubted, whether or no the uſe of *perrukes* was known among the ancients. It is true, they uſed falſe hair. Martial and Juvenal make merry with the women of their time, for making themſelves look young with their borrowed hair; with the men who changed their colours according to the ſeaſons; and with the dotards, who hoped to deceive the Deſtinies by their white hair. But theſe ſeem to have ſcarce had any thing in common with our *perrukes*; and were, at beſt, only compoſed of hair painted, and glued together. Nothing can be more ridiculous than the deſcription Lampridius gives of the emperor Commodus's *perruke*: it was powdered with ſcrapings of gold, and oiled (if we may uſe the expreſſion) with glutinous perfumes for the powder to hang by. In effect, the uſe of *perrukes*, at leaſt in their preſent mode is little more than a hundred and fifty years old; the year 1629 is reckoned the epocha of long *perrukes*; at which time they began to appear in Paris; whence they ſpread, by degrees, throughout the reſt of Europe. At firſt it was reputed a ſcandal for young people to wear them, becauſe the loſs of their hair at that age was attributed to a diſeaſe, the very name whereof is a reproach; but at length the mode prevailed over the ſcruple, and perſons of all ages and conditions have worn them; foregoing, without any neceſſity, the conveniences of their natural hair.

However, it was ſome time time before eccleſiaſtics came into the faſhion: the firſt who aſſumed the *perruke* were ſome of the French clergy, in the year 1660; nor is the practice yet well authorized. The cardinal Grimaldi, in 1684, and the biſhop of Lavaur, in 1688, prohibited the uſe of the *perruke* to all prieſts, without a diſpenſation, or neceſſity. M. Thiers has a treatiſe expreſs, to prove the *perruke* indecent in an eccleſiaſtic, and directly contrary to the decrees and canons of councils. A prieſt's head, embelliſhed with an artificial hair curiouſly adjuſted, he eſteems a monſter in the church; nor can he conceive any thing ſo ſcandalous as an abbot with a florid countenance, heightened with a well-curled *perruke*.

PERRY, a drink made of pears, after the like manner as cyder is made from apples.

The beſt fruit, for this uſe, are ſuch as are leaſt fit for eating; e. gr. the boſbury-pear, horſe-pear, bareland-pear, and ſquaſh-pear. The boſbury and ſquaſh kind, ſo called in Glouceſterſhire, have been frequently known to yield in one ſeaſon, from one to four hogſheads of perry. The buſbury-pear is thought to yield the moſt laſting and vinous liquor; the john, the harpary, the drake, the mary, and the lullum-pear, and ſeveral others of the harſheſt kinds, are eſteemed the beſt for *perry*; and always the redder they are, the better.

The method of preparing *perry* is perfectly the ſame with that of cyder. Only note, that the fruit muſt be perfectly ripe. Some mix crabs with them, to mend the liquor. For the duty on *perry*, ſee CYDER.

PER SE, in the *Schools*, is ſometimes oppoſed to *per accidens*. In which ſenſe, a thing is ſaid to agree with another *per ſe*, when the agreement is not owing to any accidental event, but is found in the intrinſic principles of things themſelves.

PER SE is ſometimes alſo oppoſed to *per aliud*. In which ſenſe, God alone is ſaid to have a being *per ſe*, as not deriving it from any other, but having it neceſſarily, and of himſelf

PER SE, again, ſometimes ſignifies as much as, of its own nature, or in virtue of its own entity. Thus the ſun is ſaid to give light *per ſe*; aud thus quantity is extended *per ſe*.

PER SE, among *Logicians*. A thing is ſaid to be known *per ſe*, *per ſe notum*, when we immediately perceive it upon the firſt propoſing of the terms. As, that the whole is greater than its parts.

Philoſophers go ſo far as to conſider the mode of a thing exiſting *per ſe*, or that which conſtitutes its exiſtence ſuch; which they call *perſeity*, *perſeitas*.

Object PER SE. See OBJECT.

PET SE, in *Chemiſtry*. When a body is diſtilled ſingly, and without the uſual addition of any other matter to raiſe it, it is ſaid to be diſtilled *per ſe*.

The genuine ſpirits of hartſhorn are thoſe raiſed *per ſe*, in oppoſition to thoſe diſtilled with the addition of lime.

PERSEA, in *Botany*. See BAY.

PERSECUTION, *perſecutio*, literally imports any pain, affliction, or inconvenience, which a perſon deſignedly inflicts on another.

PERSECUTION more particularly denotes that tyranny which the ſovereign power of any country exerciſes, or permits to be exerciſed, againſt thoſe who adopt different opinions from its own in matters of religion. This kind of *perſecution* is no leſs contrary to reaſon and ſound policy than to the forbearing, comprehenſive ſpirit of Chriſtianity, and the laws of humanity. See HERESY.

PERSECUTION, as a term, is reſtrained to the ſufferings of Chriſtians, in behalf of their religion; particularly to thoſe of the primitive Chriſtians, under the heathen emperors, Nero, &c. See MARTYR.

We uſually reckon ten of theſe *perſecutions*: Nero ſet on foot the firſt, A.D. 65; the ſecond happened under Domitian, A.D. 90; the third began under Trajan, A.D. 100; the fourth under Adrian, A.D. 126; which was continued under Antoninus Pius, A.D. 140; the fifth under Marcus Aurelius, A.D. 162; the ſixth under Severus, A.D. 203; the ſeventh under Maximinus, A.D. 236; the eighth under Decius, A.D. 251; the ninth under Valerian, A.D. 258; and the tenth under Diocleſian, A.D. 303.

Lactantius has written the hiſtory of the deaths of *perſecutors*, though ſome queſtion whether that work be really his, or not; but biſhop Burnet, who has tranſlated it into Engliſh, makes no great doubt of it.

PERSEES. See GABRES, MAGI, and ZEND.

PERSEVERANCE, in *Theology*, a Chriſtian virtue, whereby we are enabled to perſiſt in the way of ſalvation to the end.

The final *perſeverance* of the ſaints is an article much controverted between the ARMINIANS and CALVINISTS, the latter of whom maintain it impoſſible for grace to be loſt; and therefore make *perſeverance* to the end, a neceſſary conſequence thereof, which the former deny; eſteeming the moſt confirmed believers never to be out of a poſſibility of falling.

PERSEUS, in *Aſtronomy*, a conſtellation of the northern hemiſphere; whoſe ſtars, in Ptolemy's Catalogue, are 29; in Tycho's as many; in Hevelius's, 46; and in the Britannic Catalogue, 59: the longitudes, latitudes, magnitudes, &c. whereof are as follow.

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longitud.			Latitude. North.			Magnitude.
			°	′	″	°	′	″	
		♉	14	19	13	40	13	16	6
In the middle of the ſword	g		11	52	1	36	18	37	6
			12	09	56	34	26	1	6.7
			15	39	10	38	57	36	6
			19	1	27	41	12	23	6
5.									
	b		15	44	57	35	9	43	6
South, in hilt of ſword againſt the hand	χ		19	56	48	40	43	21	7.6
North			20	12	35	41	3	22	7
Small one under the hand	i		19	44	43	38	57	41	6
			20	39	22	39	28	45	7
10.									
			22	47	40	37	6	22	7
North of inform. before Meduſa's head	q		16	31	53	23	13	6	6
In the preced. ſhould.	θ		20	19	23	31	56	7	4
			18	25	57	26	57	27	6
In upper arm			21	32	0	31	48	10	6
15.									
South of inform. before Meduſa's head	p		17	29	13	20	55	32	4
Pre. of inform. under Meduſa's head	r		16	36	35	17	46	8	6.5
In Perſeus's head	τ		23	35	30	34	20	12	5
			23	52	40	34	14	2	6
Subſeq. and leſſ. before Meduſa's head	p		18	8	11	20	44	43	6
20.									
			16	51	8	14	24	27	4.5
Prec. in Meduſa's head	π		19	34	35	21	42	15	4.5
In the hind ſhould.	γ		25	42	7	34	30	5	3
	ς		19	11	16	18	5	0	
South. in Meduſa's head	ϱ		20	34	32	20	33	13	4
25.									
Bright one in Meduſa's head	β		21	50	42	22	23	47	2.3
In lower part of the arm	κ		23	21	12	26	4	21	4
Next the bright one	ω		22	1	40	20	55	58	4.5
			26	52	44	30	42	12	6.7
			24	38	48	24	49	51	6
30.									
			26	54	44	30	33	42	6
Againſt preced. and ſouth ſide	l		25	7	56	23	58	4	5.6
A lucid one againſt hind. part	α		27	46	4	30	5	20	2
			28	32	35	29	30	32	6
Preced. the lucida of hind. part	σ		28	17	42	28	00	25	5
35.									
			28	3	15	26	3	48	6
Midd. of three in the ſide	ψ		29	25	56	27	55	18	5
	o		25	6	12	12	21	33	6
Another foll. thoſe againſt the hip	δ	♊	0	29	6	27	15	22	3
Over heel of inner foot	o	♉	26	48	50	13	52	0	6
40.									
In lower thigh	ν		29	30	20	22	7	3	4
In heel of ſame foot	n		28	7	41	12	53	18	6
In upper thigh	A	♊	3	46	47	29	32	53	5
In extrem. of ſouth. foot	ζ	♉	28	47	44	11	17	53	3
In ſouth. knee	ε	♊	1	21	25	19	4	53	3
45.									
In ſouth. leg	ξ		0	39	15	14	54	5	5
Prec. againſt north. knee	λ		5	26	22	28	50	59	5
Prec. in upper leg	c		5	10	53	26	12	7	4.5
			2	56	49	16	16	26	6
			3	3	44	16	44	24	6.7
50.									
Subſeq. in upper leg	μ		6	29	0	26	40	9	5
That foll. ſouth. knee	f		4	49	30	8	53	20	5
In calf upper leg	d		7	17	47	24	34	59	6
			4	51	11	12	51	49	6.5
			5	37	6	12	17	48	7
55.									
			5	37	19	12	7	43	7
In heel of upper foot	m		8	55	46	20	49	10	6
In ſole of ſame foot	e		9	16	20	18	58	00	5
			10	48	5	20	53	2	6

PERSIAN *monarchy*. See MONARCHY.

PERSIAN, or **PERSIAN** *tongue*, one of the living oriental languages, ſpoken in the empire of Perſia.

The *Perſian* has two particularities not found in any of the other eaſtern tongues: the one, that it has an auxiliary verb, anſwering to the verb ειμι of the Greeks; the other that it has no aoriſtus. Both theſe it borrowed from the Macedonians, after the conqueſt of Alexander.

PERSIAN *wheel*, in *Agriculture*, is a machine for raiſing a quantity of water ſufficient to overflow lands bordering on the banks of rivers, &c. where the ſtream is too low to do it alone.

Such a wheel is repreſented in *Tab.* V. *Hydraulics and Hydroſtatics*, *fig.* 52. with which water may be raiſed by means of a ſtream A B turning a wheel C D E, according to the order of the letters, with buckets, *a*, *a*, *a*, *a*, &c. hung upon the wheel by ſtrong pins *b*, *b*, *b*, *b*, &c. fixed in the ſide of the rim: but the wheel muſt be made as high as the water is intended to be raiſed above the level of that part of the ſtream in which the wheel is placed. As the wheel turns, the buckets on the right hand go down into the water, and are thereby filled, and go up full on the left hand, until they come to the top at K; where they ſtrike againſt the end *n* of the fixed trough M, and are thereby overſet, and empty the water into the trough; from which it may be conveyed in pipes to the place which it is deſigned for: and as each bucket gets over the trough, it falls into a perpendicular poſition again, and goes down empty, until it comes to the water at A, where it is filled as before. On each bucket is a ſpring *r*, which going over the top or crown of the bar *m* (fixed to the trough M) raiſes the bottom of the bucket above the level of its mouth, and ſo cauſes it to empty all its water into the trough.

Sometimes this wheel is made to raiſe water no higher than its axis; and then inſtead of buckets hung upon it, its ſpokes C, *d*, *e*, *f*, *g*, *h*, are made of a bent form, and hollow within; theſe hollows opening into the holes C, D, E, F, in the outſide of the wheel, and alſo into thoſe at O in the box N upon the axis. So that, as the holes C, D, &c. dip into the water, it runs into them; and as the wheel turns, the water riſes in the hollow ſpokes *c*, *d*, &c. and runs out in a ſtream P from the holes at O, and falls into the trough O, from whence it is conveyed by pipes. And this is a very eaſy way of raiſing water, becauſe the engine requires neither men nor horſes to turn it. See OVERFLOWING *of land*.

PERSIAN, or **PERSIC**, in *Architecture*, a name common to all ſtatues of men, ſerving inſtead of columns, to ſupport entablatures. See *Tab. Archit. fig.* 37.

They only differ from CARYATIDES, in that thoſe repreſent ſtatues of women.

The *Perſian* is a kind of order of columns, firſt practiſed among the Athenians, on occaſion of a victory their general Pauſanias obtained over the *Perſians*. As a trophy of this victory, the figures of men dreſſed in the *Perſian* mode, with their hands bound before them, and other characters of ſlavery, were charged with the weight of Doric entablatures, and made to do the office of Doric columns.

Perſian columns, M. le Clerc obſerves, are not always made with the marks of ſlavery; but are frequently uſed as ſymbols of virtues, vices, joy, ſtrength, valour, &c. as when made in the figures of Hercules, to repreſent ſtrength; and of Mars, Mercury, fauns, ſatyrs, &c. on other occaſions.

PERSIAN *æra*, and *year*. See EPOCHA and YEAR.

PERSIAN *bibles* and *coins*. See the ſubſtantives.

PERSICA, in *Botany*. See PEACH-*tree*.

PERSICA *concha*, in *Natural Hiſtory*, a name given to a very remarkable and beautiful ſea-ſhell, which authors have long been at a loſs to reduce to any genus.

Aldrovand has thrown it to the end of his work, and ſays, it would be of the turbinated kind, if it did not want the turba. It is truly of the genus of the *concha globoſa*, or DOLIUM.

PERSICA *terra*, in *Natural Hiſtory*, an earth of the ochre kind, known in the colour ſhops of London by the name of *Indian red*.

It is a very fine purple ochre, of a conſiderably compact texture, and great weight; while in the earth it is of a pure blood-colour, and is not to be cut with the ſpade, but is dug with iron crows, and falls in irregular maſſes. It is of a rough duſty ſurface, and full of conſiderably large, bright, glittering particles: theſe are white and of a fine luſtre. It adheres firmly to the tongue, is rough and harſh to the touch, ſtains the hands very deeply, and is of a rough aſtringent taſte, and makes a very violent efferveſcence with acid menſtruums.

It is dug in the iſland of Ormuz, in the Perſian gulf, and in ſome parts of the Eaſt Indies.

PERSICARIA, in *Botany*. See ARSMART.

PERSIMON, in *Botany*. See JOB'*s tears*.

PERSOLATA, in *Botany*, a word uſed by Pliny, as the name of a kind of burdock, different from the *perſonata*. He has, in the beginning of the chapter, ſpoken of the arcium of the Greeks, which he ſays the Latins ſometimes called *perſonata*, and afterwards adds this *pèrſolata*; which, he ſays, was a plant vulgarly known, and called by the Greeks *arcium*.

He ſeems to allow, that the Greeks called both theſe plants by the ſame name; but he diſtinguiſhes the *perſolata* from *perſonata*, by ſaying that the former has leaves like thoſe of the great gourd, but larger and more hairy. It is probable, therefore, that he diſtinguiſhes, under theſe two names, the two different ſpecies of the great burdock common with us, the one with ſimple, the other with woolly heads.

PERSON, *perſona*, an individual ſubſtance of a rational or intelligent nature.

The father and ſon are reputed in law, as the ſame *perſon*; an ambaſſador repreſents the *perſon* of his prince.

The word *perſon*, *perſona*, is ſaid to be borrowed *a perſonando*, from perſonating or counterfeiting; and is ſuppoſed to have firſt ſignified a maſk: by reaſon ſays Boethius, *in larva concava ſonus volvatur*: and hence the actors who appeared maſked on the ſtage, were ſometimes called *larvati*, and ſometimes *perſonati*.

The ſame author adds, that as the ſeveral actors repreſented each their ſingle individual *perſon*, viz. Œdipus, or Chremes, or Hecuba, or Medea; for this reaſon, other people, who were alſo diſtinguiſhed by ſomething in their form, character, &c. whereby they might be known, came alſo to be called, by the Latins, *perſonæ*; and, by the Greeks, ϖροσωπα.

Again, as theſe actors rarely repreſented any but great and illuſtrious characters, the word came, at length, to import the mind; as being a thing of the greateſt regard and dignity among human matters. And thus men, angels, and even God himſelf, were called *perſons*. Things merely corporeal, as a ſtone, a plant, or a horſe, were called by them, *hypoſtaſes*, or *ſuppoſita*, but never *perſons*.

Hence alſo the learned imagine, the ſame name *perſon* came to be uſed to ſignify ſome dignity, whereby a *perſon* is diſtinguiſhed from another; as a father, huſband, judge, magiſtrate, &c.

In which ſenſe we are to underſtand that of Cicero: Cæſar never ſpeaks of Pompey but in terms of honour and reſpect; but he does many hard and injurious things againſt his *perſon*.

This for the name *perſon*. As for the thing, we have already defined *perſon*, an individual ſubſtance of a reaſonable nature; which is the ſame as Boethius's definition.

Now a thing may be individual two ways. 1. Logically, as it cannot be predicated of any other; as Cicero, Plato, &c. 2. Phyſically; in which ſenſe a drop of water, ſeparated from the ocean, may be called an individual. *Perſon* is an individual nature in each of theſe ſenſes: logically, ſays Boethius, ſince *perſon* is not ſpoken of univerſals, but only of ſingulars and individuals; we do not ſay the *perſon* of an animal, or a man, but of Cicero and Plato: and phyſically, ſince Socrates's hand or foot are never conſidered as *perſons*.

This laſt kind of individual is denominated two ways: poſitively, as when the *perſon* is ſaid to be the whole principle of acting; for whatever thing action is attributed to, that do the philoſophers call a *perſon*: and negatively, as when we ſay, with the Thomiſts, &c. that a *perſon* conſiſts in this, that it does not exiſt in another as a more perfect being.

Thus, a man, though conſiſting of two very different things, viz. body and ſpirit, is not two *perſons*; ſince neither part alone is a whole principle of action, but one *perſon*, ſince the manner of his conſiſting of body and ſpirit is ſuch as conſtitutes one whole principle of action; nor does he exiſt in any other as a more perfect being; as, e. g. Socrates's foot does in Socrates, or a drop of water in the ocean.

PERSON, in *Grammar*, is a term applied to verbs and pronouns, which being conjugated, are applicable to three different *perſons*.

I love, is a verb uſed in the firſt *perſon*; *thou loveſt*, deſigns the ſecond *perſon*; *he loveth*, makes the third: and thus in the plural number.

I, *thou*, *he*, are pronouns of the firſt, ſecond, and third *perſons*.

Verbs agree with their nouns, in number and *perſon*.

PERSON, *perſona*, in *Dramatic Poetry*, the name and part of an actor; or of him preſented by the comedian.

At the head of dramatic pieces come the *dramatis perſonæ*, the liſt of actors, and characters that are to appear on the ſtage.

The ancient tragedy was only a ſimple chorus: Theſpis was the firſt who introduced a *perſon* to relieve the chorus; and Æſchylus added a ſecond.

F. Boſſu obſerves, that, in the epic and dramatic poem, the ſame *perſon* muſt reign throughout; i. e. muſt ſuſtain the chief part throughout the whole piece, and the characters of all the other *perſons* muſt be ſubordinate to him.

Quod PERSONA *nec præbendarii*, &c. See QUOD.

PERSON, *perſona*, in *Law*. See PARSON.

PERSONABLE, *perſonabilis*, in *Law*, implies the being able to hold or maintain a plea in court.

That is, as the civilians would expreſs it, *habere perſonam ſtandi in judicio*.

Thus they ſay the defendant was judged *perſonable* to maintain this action. Old Nat. Brev. 142.

The tenant pleaded, that the demandant was an alien, born in Portugal, without the ligeance of the king; and judgment was aſked, Whether he ſhould be anſwered? The plaintiff ſaid, he was made *perſonable* by parliament. Kitch. fol. 124.

PERSONABLE is alſo uſed to ſignify a capacity to take any thing granted or given.

PERSONAL, ſomething that concerns, or is reſtrained to, the *perſon*.

In diſputes among the learned, there is ever ſomething *perſonal* intermixed; in ethics, it is a maxim, that all faults are *perſonal*; i. e. they do not paſs to our deſcendants.

PERSONAL *action*, in *Law*. See ACTION.

PERSONAL *goods*, or *eſtate*, is that conſiſting of money, moveables, &c. which every perſon has in his own diſpoſal (ſee CHATTELS), in oppoſition to lands and tenements, which are called *real* ESTATE.

PERSONAL *chattels*, *covenant*, *diſtreſs*, *hiſtory*, *liberty*, *patronage*, *privilege*, *ſervice*, and *tithes*. See the ſubſtantives.

PERSONAL, *pronoun*, or *verb* PERSONAL, in *Grammar*, a verb or pronoun conjugated in all the three perſons.

They are thus called, in oppoſition to *imperſonals*, which have only the third perſon.

PERSONALITY, *perſonalitas*, in the ſchools, the quality of a perſon; or that which conſtitutes an individual in the quality of a perſon.

The philoſophers being uſed to conſider matter and form in every other thing, do the ſame in perſon. The matter of perſon, according to them, is a ſingular ſubſtance, endued with reaſon: for ſubſtance may, at the pleaſure of God, either be, or not be, a perſon; inaſmuch as the human nature in Chriſt is not a perſon. The form of perſon, which they call *ſubſiſtency*, *ſuppoſitality*, and *perſonality*, is that by which the foreſaid ſubſtance becomes individual.

The ſchool-divines are divided about what it is that diſtinguiſhes the ſeveral *perſonalities* in the Trinity.—Some will have it to be only the different relations: others, as Floraventius, contend for ſome incommunicable ſubſtance: St. Bonaventure, and St. Thomas, take it to be different origins that diſtinguiſh the *perſonalities*; which opinion is the moſt followed.

PERSONALITY, or PERSONALTY, in *Law*. An action is ſaid to be in *perſonality*, when it is brought againſt the right perſon.

PERSONATA, in *Botany*. See BURDOCK.

PERSONATI, among *Botaniſts*, denote ſuch flowers as expreſs the gaping mouths of certain living creatures.

PERSONIFYING, or PERSONALIZING, the feigning a perſon; or attributing a perſon to an inanimate being; or giving it the figure, ſentiments, and language of a perſon. See PROSOPOPOEIA.

The poets have *perſonified* all the paſſions; and even made divinities of them, which were worſhipped by the heathens; as the goddeſs Perſuaſion, the god Sleep, the Furies, Envy, and Diſcord, and Fame, Fortune, Victory, &c.

Perſonifying is eſſential to poetry, eſpecially to the epopœia.

PERSPECTIVE, the art of delineating viſible objects on a plain ſurface, ſuch as they appear at a given diſtance, or height, upon a tranſparent plane, placed perpendicular to the horizon, between the eye and the object. This we particularly call

PERSPECTIVE, *linear*, as regarding the poſition, magnitude, form, &c. of the ſeveral lines, or contours of objects, and expreſſing their diminution.

This is a branch of mathematics: ſome make it a part of optics; others a ſcience and art derived therefrom: its operations are all geometrical.

PERSPECTIVE, *hiſtory of*. The art of *perſpective* owes its birth to painting, and particularly to that branch of it which was employed in the decorations of the theatre, where landſcapes were principally introduced, and which would have looked unnatural and horrid, if the ſize of the objects had not been pretty nearly proportioned to their diſtance from the eye. The ancients muſt, therefore, have had conſiderable knowledge of this art; though the only ancient author from whom we can obtain any information, relative to its antiquity, is Vitruvius; who, in the proem to his ſeventh book, informs us, that Agatharcus, at Athens, was the firſt who wrote on this ſubject, on occaſion of a play exhibited by Æſchylus, for which he prepared a tragic ſcene; and that afterwards the principles of the art were more diſtinctly taught in the writings of Democritus and Anaxagoras, the diſciples of Agatharcus, which are no longer extant.

The *perſpective* of Euclid and of Heliodorus Lariſſeus contains only ſome general elements of optics, that are by no means adapted to any particular practice; though they furniſh ſome materials that might be of ſervice even in the linear *perſpective* of painters.

Geminus, of Rhodes, who was a celebrated mathematician, in the time of Cicero, hath likewiſe written on this ſubject.

We may alſo infer, that the Roman artiſts were acquainted with the rules of *perſpective*, from the account which Pliny, Nat. Hiſt. lib. xxxv. cap. 4. gives of the repreſentations on the ſcene of thoſe plays given by Claudius Pulcher; by whoſe appearance, he ſays, the crows were ſo deceived, that they endeavoured to ſettle on the fictitious roofs. However, of the theory of this art among the ancients we know nothing; as none of their writings have eſcaped the general wreck of ancient literature in the dark ages of Europe. *Perſpective* muſt, without doubt, have been loſt, when painting and ſculpture no longer exiſted. Nevertheleſs we have reaſon to believe, that it was practiſed much later in the Eaſtern empire.

John Tzetzes, who lived in the twelfth century, ſpeaks of it as if he was well acquainted with its importance in painting and ſtatuary: and the Greek painters, who were employed by the Venetians and Florentines, in the thirteenth century, ſeem to have brought ſome optical knowledge with them into Italy: for the diſciples of Giotto are commended for obſerving *perſpective* more regularly than any of their predeceſſors in the art had done; and they lived in the beginning of the fourteenth century.

The Arabians were not ignorant of this art; as we may preſume from the optical writings of Alhazen, who lived about the year 1100, cited by Roger Bacon, when treating on this ſubject.

Vitellus, a Polander, about the year 1270, wrote largely and learnedly on optics.

Our own friar Bacon, as well as John Peckham, archbiſhop of Canterbury treated this ſubject with ſurpriſing accuracy, conſidering the times in which they lived.

The moſt ancient authors, who profeſſedly laid down rules of *perſpective*, were Bartolomeo Bramantino, of Milan, whoſe book, intitled Regole di *Perſpectiva*, e Miſure delle Antichita di Lombardia, is dated 1440; and Pietro del Borgo, likewiſe an Italian, who was the moſt ancient author met with by Ignatius Danti, and who is ſuppoſed to have died in 1443. This laſt writer ſuppoſed objects to be placed beyond a tranſparent tablet, and endeavoured to trace the images, which rays of light, emitted from them, would make upon it. But his work is not now extant. However, Albert Durer conſtructed a machine upon the principles of Borgo, by which he could trace the *perſpective* appearance of objects.

Leon Battiſta Alberti, in 1450, wrote his treatiſe De Pictura, in which he treats principally of *perſpective*.

Balthazar Peruzzi, of Siena, who died in 1536, had diligently ſtudied the writings of Borgo; and his method of *perſpective* was publiſhed by Serlio, in 1540. To him, it is ſaid, we owe the diſcovery of points of diſtance, to which all lines that make an angle of 45° with the ground line are drawn.

Guido Ubaldi, another Italian, ſoon after diſcovered, that all the lines that are parallel to one another, if they be inclined to the ground line, converge to ſome point in the horizontal line; and that through this point, alſo, a line, drawn from the eye, parallel to them, will paſs.

His *perſpective* was printed at Peſaro in 1600, and contained the firſt principles of the method afterwards diſcovered by Dr. B. Taylor.

In 1583, there was publiſhed a book, written by Giacomo Barozzi, of Vignola, commonly called Vignola, intitled The two Rules of *Perſpective*, with a learned Comment, by Ignatius Danti. In 1615, the work of Marolois was printed, in Latin, at the Hague, and engraved and publiſhed by Hondius. And in 1625, Sirigatti publiſhed a treatiſe of *perſpective*, which is little more than an abſtract of Vignola's.

The art of *perſpective* has been gradually improved by ſubſequent geometricians, particularly by profeſſor s'Graveſande, and, in a much greater degree, by Dr. Brook Taylor, whoſe principles are in a conſiderable meaſure new, and far more general than thoſe of any of his predeceſſors. He did not confine his rules, as his predeceſſors had done, to the horizontal plane only, but made them general, ſo as to affect every ſpecies of planes and lines, whether they were parallel to the horizon or not; and thus his principles were made univerſal. Farther, from the ſimplicity of his rules, the whole tedious progreſs of drawing out plans and elevations for any object is rendered entirely uſeleſs, and therefore avoided; for by this method, not only the feweſt lines imaginable are required to produce any *perſpective* repreſentation, but every figure, thus drawn, will bear the niceſt mathematical examination. Moreover, his ſyſtem is the only one calculated for anſwering every end of thoſe, who are practitioners in the art of deſign; becauſe from hence they may be enabled to produce the whole, or only ſo much of an object as is wanted, and by fixing it in its proper place, may determine its apparent magnitude in an inſtant. It explains alſo the *perſpective* of ſhadows, the reflections of objects from poliſhed planes, and the inverſe practice of *perſpective*.

His Linear *Perſpective* was firſt publiſhed in 1715; and his New Principles of Linear *Perſpective* in 1719, which he intended as an explanation of his firſt treatiſe. In 1738, Mr. Hamilton publiſhed his Stereography, in 2 vols. fol. after the manner of Dr. Taylor. But the moſt complete ſyſtem of *perſpective*, both as to theory and practice, on the ſame principles, is that of Mr. Kirby, the third edition of which was publiſhed in 1768, fol. We have alſo treatiſes on this ſubject, by the Jeſuit, originally written in French, at Paris, tranſlated by Mr. Chambers, and printed at London, in 1726, Highmore, Ware, Cowley, Prieſtley, Ferguſon, &c.

The inſtruments neceſſary for drawing according to the rules of *perſpective* are a *tee* SQUARE, a PARALLEL *ruler*, a drawing board (which is only a ſmooth board made exactly ſquare), a SECTOR, a PROTRACTOR; to which may be added a drawing pen, and a black-lead pencil.

But to return to the doctrine of linear *perſpective*: ſuppoſe a glaſs plane HI (*Tab. Perſpect. fig.* 3.) raiſed perpendicular on a horizontal plane: and the ſpectator S, directing his eye O, to the triangle ABC: if now we conceive the rays AO, OB, OC, &c. in their paſſage through the plane, to leave their traces or veſtigia in *a*, *b*, *c*, &c. on the plane; there will appear the triangle *a b c*; which as it ſtrikes the eye by the ſame rays *a* O, *b* O, *c* O, by which the reflected particles of light from the triangle ABC are tranſmitted to the ſame; it will exhibit the true appearance of the triangle ABC, though the object ſhould be removed, the ſame diſtance and height of the eye being preſerved.

The buſineſs of *perſpective*, then, is to ſhew by what certain rules the points *a*, *b*, *c*, &c. may be found geometrically: and hence, alſo, we have a mechanical method of delineating any object very accurately.

Hence it appears, that *a b c* is the ſection of the plane of the picture with the rays, which proceed from the original object to the eye: and, therefore, when this is parallel to the picture, its repreſentation will not only be parallel to the original, but ſimilar to it, though ſmaller in proportion, as the original object is farther from the picture. If the original is brought to coincide with the picture, the repreſentation will be equal to the original; but as the original is removed farther and farther from the picture, the image of it will become ſmaller and ſmaller, and alſo riſe higher and higher in the picture, till at laſt, when the original is ſuppoſed to be at an infinite diſtance, its image, or repreſentation, will vaniſh into an imaginary point, exactly as high above the bottom of the picture as the eye is above the ground or original plane, upon which the ſpectator, the picture, and the original object are ſuppoſed to ſtand.

This may be familiarly illuſtrated in the following manner; ſuppoſe a perſon at a window looks through an upright pane of glaſs at any object beyond it; and, keeping his head ſteady, draws the figure of the object upon the glaſs with a black-lead pencil, as if the point of the pencil touched the object itſelf; he would then have a true repreſentation of the object in *perſpective*, as it appears to his eye. In order to this, it is neceſſary, firſt, that the glaſs be laid over with ſtrong gum-water, which, when dry, will be fit for drawing upon, and will retain the traces of the pencil; and, ſecondly, that he looks through a ſmall hole in a thin plate of metal, fixed about a foot from the glaſs, between it and his eye, and that he keeps his eye cloſe to the hole, otherwiſe he might ſhift the poſition of his head, and conſequently make a falſe delineation of the object. Having traced out the figure of the object, he may go over it again, with pen and ink; and when that is dry, put a ſheet of paper upon it, and trace it in this with a pencil; then taking away the paper, and laying it on a table, he may finiſh the picture, by giving it the colours, lights, and ſhades, as he ſees them in the object itſelf; and thus he will have a true reſemblance of the object. See DESIGNING.

Perſpective is either employed in repreſenting the *ichnographies* and ground-plots of objects, as projected on *perſpective* planes; or in *ſcenographies* and repreſentations of the bodies themſelves.

From this general view of *perſpective*, the neceſſity of it in the art of painting is obvious. Accordingly Leonardo de Vinci obſerves, that the practice of painting ought always to be built upon a rational theory, of which *perſpective* is the guide and gate; and without which it is impoſſible to ſucceed, either in deſigning or in any of the arts depending upon it.

In order to underſtand the practice of *perſpective*, it will be neceſſary to premiſe ſome definitions, and general principles, upon which its various operations depend. Several of theſe occur in the courſe of this work but it may be convenient and uſeful to give, in this place, a brief and connected view of them.

The *point of ſight*, in *perſpective*, is that point E (*fig.* 4.) where the ſpectator's eye ſhould be placed to view the picture. The *point of ſight*, in the picture, is the ſame with the centre of the picture, or the point directly oppoſite to the eye, and the neareſt to it, called alſo the principal point.

If from the point of ſight E, a line, EC, be drawn perpendicular to the picture O *b g* I; the point C, where the line interſects the picture, is called the *centre of the picture*; and EC the principal ray.

The *diſtance of the picture* is the length of the line EC, which is the common ſection of the vertical and horizontal planes; and if this diſtance be transferred to the horizontal line on each ſide of the point C, as is ſometimes the caſe, the extremes are called the *points* of diſtance: for the points of diſtance are ſet off from the point of ſight, ſometimes on the horizontal line, and ſometimes on the perpendicular EC.

As the beauty of *perſpective* depends on the point of diſtance, the eye ought never to be placed too near the object, nor too far from it. It ſhould never be nearer to the object than half of its largeſt dimenſion, for in this ſituation the viſual angle will be 90°; and this is the largeſt angle which the eye can well diſcover at one caſt. If it be made leſs than 45°, the object will be too much contracted, and the viſual angle ſo ſmall, that the returns in buildings would not be diſtinguiſhed, and the whole would appear confuſed. And, therefore, when the viſual angle is about 60°, or when the diſtance of the eye from the extremities of the object is nearly equal to its longeſt dimenſion, the object will be ſeen with the greateſt advantage. However, in ſome caſes, ſuch as in painting deceptions, or for pictures with curvilineal objects, the diſtance ſhould be taken as great as poſſible: and in drawing agreeable *perſpective* views of ſmall objects, the obſerver ſhould be conſidered as viewing them under an angle not exceeding 30° at moſt.

The real object, whoſe repreſentation is ſought, whether it be a line, point, or plain figure, is the *original object*; and the *original plane*, called alſo the *geometrical plane*, is that plane upon which the real object is ſituated: thus the ground or bottom plane KL is the original plane, and ABGD is the original object. The line OI, in which the ground plane cuts the bottom of the picture, is called the ſection of the original plane, *ground* LINE, *line of the baſe*, or *fundamental line*.

If an original line AB be continued, ſo as to interſect the picture, the point of interſection R is called the interſection of that original line, or its *interſecting point*.

The *horizontal plane*, is the plane *a b g d*, which paſſes thorough the eye, parallel to the horizon, and cuts the *perſpective* plane or picture at right angles; and the *horizontal* line *b g* is the common interſection of the horizontal plane with the picture.

The *vertical plane* is that which paſſes through the eye at right angles to the ground plane, and perpendicular to the picture, as ECSN; and the *vertical line* is the common ſection of the vertical plane and the picture, as CN.

The *line of ſtation* SN is the common ſection of the vertical plane with the ground plane, and perpendicular to the ground line OI.

The *line of the height of the eye* is a perpendicular, as ES, let fall from the eye on the ground plane. This height, which determines that of the horizontal line from the bottom of the picture, ſhould never be ſo great as the diſtance of the eye. In EASEL-*pieces*, or moveable pictures, the height of the eye is left entirely to the diſcretion of the artiſt; but it is obſerved in general, that low horizons have a much better effect than high ones; for which reaſon the height of the horizontal line ſhould never exceed one half of the height of the picture; and perhaps the moſt proper height would be one third part. However, if the picture be a fixed one, then the height of the horizontal line muſt be exactly level with the ſpectator's eye. The ſize of the picture is to be regulated by the diſtance and height of the eye.

The *vaniſhing line* of the original plane, is that line where a plane paſſing through the eye, parallel to that original plane cuts the picture: thus H *g*, *fig*. 5. is the vaniſhing line of A B G D. It is plain that no point in the original plane can have its image in the picture above the line H *g*, as long as the poſition of the picture and eye remain the ſame: and that if the original plane A B G D were infinitely extended beyond the picture, yet its *perſpective* appearance, in this caſe, would be a finite ſpace, bounded by the vaniſhing line H *g*. It is alſo plain, from this definition, that if two or more planes, A B G D and T, are parallel to each other, they will have the ſame vaniſhing line H *g*.

The *vaniſhing point* of the original line is that point where a line drawn from the eye, parallel to that original line interſects the picture: thus C and *g* are the vaniſhing points of the line A B, K I. Hence it follows, that the vaniſhing points C and *g* of the lines A B. K I, in any original plane A B G D, are in the vaniſhing line of that plane.

If from the point of ſight a line be drawn perpendicular to any vaniſhing line, the point where that line interſects the vaniſhing line, is called the centre of that vaniſhing line: and the *diſtance of a vaniſhing line* is the length of the line which is drawn from the eye, perpendicular to the ſaid line.

Meaſuring points are points from which any lines in the *perſpective* plane are meaſured, by laying a ruler from them to the diviſions laid down upon the ground line. The *meaſuring point* of all lines parallel to the ground line is either of the points of diſtance on the horizontal line, or point of ſight. The *meaſuring point* of any line perpendicular to the ground line, is in the point of diſtance on the horizontal line; and the *meaſuring point* of a line oblique to the ground line is found by extending the compaſſes from the vaniſhing point of that line to the point of diſtance on the perpendicular, and ſetting it off on the horizontal line.

Having explained the principal terms that occur in *perſpective*, we ſhall farther premiſe ſome general propoſitions, from which the practical operations reſult.

I. *The repreſentation a b, fig* 6. *of a line* A B *is part of a line* S C, *which paſſes through the interſecting point* S, *and the vaniſhing point* C, *of the original line* A B. For the plane B D E N, paſſing through the eye E and the original line A B, will paſs through the interſecting point S, and the vaniſhing point C, and cut the picture in the line S C. And ſince the viſual rays A E, B E, drawn from the extremities of the line to the eye, are in the plane B D E N, and conſequently their ſections *a*, *b*, with the picture, are in the ſection S C of that plane with the picture *a b*, muſt be the projections of A, B. But B E A is a plane of rays which form the projection *a b* of the whole line A B, and as B E A is in the plane B D E N, the ſection *a b* muſt be a part of the ſection S C, which paſſes through S and C. Hence it follows, that, whatever be the ſituation of any original line, its repreſentation upon the picture will always be in that line which is drawn through its interſection and vaniſhing point. For let the oblique line A D. *fig*. 7. be in the plane G F E O M, whoſe ſection with the picture is V O. Continue D A to cut the picture in V, and draw its parallel E O to cut the picture in O, which will be the vaniſhing point of A D. From the extremes of the line A D produce the rays A E, D E, to the eye E, and *a d*, the image of A D, is part of the line V O, which paſſes through the interſecting point V, and the vaniſhing point O.

II. *If the original plane is parallel to the picture, it can have no vaniſhing line upon it; conſequently the repreſentation will be parallel*; becauſe a parallel plane, that paſſes through the eye, can never cut the picture, and conſequently can produce no vaniſhing line upon it. Nor can lines parallel to the picture have any vaniſhing points upon it; but their images will be parallel to the originals. If the original is perpendicular to the ground line, as A B, *fig*. 6. then its vaniſhing point will be in C, the centre of the picture, or point of ſight; becauſe E C is perpendicular to the picture, and, therefore, parallel to A B. All lines, which are parallel to each other, but not parallel to the picture, will have the ſame vaniſhing point; becauſe a line which paſſes through the eye, being parallel to one of them, is parallel to all the reſt; and, therefore, they can have but one vaniſhing point, whatever be their number.

III. *The image of a line bears a certain proportion to its original*. In this propoſition there are three caſes; for the original line may be perpendicular, parallel, or oblique to the plane of the picture. In the firſt caſe, let A B, *fig*. 8 be the original line, conſiſting of three equal parts of which E C contains two; then E C + A B = E S = five parts. Divide A C into five equal parts, and the ray B E will paſs through *b*; and A *b* : A C : : B A : B A + C E (= B S), i. e. the image is to the diſtance between the vaniſhing point C and the interſecting point A, as the original object is to its own length added to the diſtance of the eye from the picture. See Simpſon's Geometry, th. 12 book vii. Hence it follows that $AC - Ab = C\overline{b : AB +} CE - AB = CE :: AC : AB + CE$, or C *b* : A C CE : : AB + C E, i. e. the diſtance between the vaniſhing point of a line and any point *b* in its image is to the diſtance between the vaniſhing point and the interſecting point as the diſtance E C is to A B + C E. From a view of the figure it is alſo evident, that A *b* : E S : : A B : B S, i. e. the height of the point *b* in the picture is to the height of the eye as the diſtance of the objective point from the picture is to the ſum of the ſame diſtance and that of the eye from the picture.

In the ſecond caſe, when the original line is parallel to the plane of the picture, the image *a b* of a line A B, *fig*. 9. parallel to the picture is to its original A B, as the diſtance E C of the image is to the diſtance E D of the original line. Suppoſe the figure conſtructed, and it is plain that the triangles E B D, E C *b*, and E C *a*, E D *a*, are reſpectively equiangular, becauſe *a b* is parallel to A B: and, therefore, C *b* : D B : : E C : D E, and C *a* : D A : : E C : D E; conſequently *a b* : A B : : E C : ED.

In the third caſe, when the original line is oblique to the picture, the image A *b* of the oblique line A B, *fig*. 10. is to the diſtance A V between its vaniſhing point V, and interſecting point A, as the length of the line A B is to the ſum of A B and E V, the diſtance of the vaniſhing point V from the eye. The lines A B and E V are parallel by conſtruction; therefore the triangles E V *b* and A B *b* are equiangular; therefore, V *b* : A *b* : : E V : A B, i. e. the diſtance between the vaniſhing point of an oblique line and any point of its image is to the remaining part of A V as the diſtance of the vaniſhing point is to the original line: and A *b* : A *b* + *b* V = A V : : A B : A B + E V.

IV. *The image of a line may be determined by transferring the length or diſtance of the given line to the interſecting line; and the diſtance of the vaniſhing point to the horizontal line; i. e. by bringing both into the plane of the picture*. Let A B be the original line, whoſe vaniſhing point is V, and produce the ground line F A, and the vaniſhing line H V, and draw A V. From the interſecting point A transfer the line A B to D, and from V transfer E V to L, then draw the lines B E and D L, which will both paſs through the ſame point *b*, and give A *b* for the image of A B. See Simpſon's Geom. book vii. th. 12. cor.

Having premiſed the general principles of *perſpective*, we ſhall now ſubjoin ſome examples of the practice of *ichnographic perſpective* in the following problems.

1. *To find the repreſentation of an objective point* A.—From A, *fig*. 11. draw any line at pleaſure, as A 1, interſecting the bottom of the picture in 1; and from the eye E draw E H parallel to A 1, interſecting the horizontal line in H; which will be the vaniſhing point of A 1; draw H 1, and from A a line to E, interſecting H 1 in *a*; and *a* will be the repreſentation of the original point A. Otherwiſe, draw A 1, A 2. *fig*. 12. N° 2, at pleaſure, interſecting the bottom of the picture in 1 and 2; and from the eye E draw E H, parallel to A 1, and E L parallel to A 2; then draw H 1 and L 2, which will interſect each other in *a*, the repreſentation of A.

There is alſo another method of reſolving this problem, or of exhibiting the *perſpective* appearance *h*, of an objective point H (*fig*. 13.) From the given point draw H I perpendicular to the fundamental line D E. From the fundamental line D E cut off I K = I H: through the point of ſight F draw a horizontal line F P; and make F P equal to the diſtance of the eye S L: laſtly, from the point I to the point of ſight F, draw F I; and from K to the point of diſtance P, the line P K. The interſecting *h* is the appearance of the objective point. For O F is parallel to H I, therefore F is the vaniſhing point of H I; and ſince the repreſentation of H I is in the line I F, and conſequently the image of the point I is in the ſame line: and ſince O P is parallel to H K, becauſe the triangles O F P and H I K are iſoſceles and right angled, and conſequently equiangular; and O F being parallel to H I, F O H = O H I, therefore P O H = O H K;

= O H K; P will be the vaniſhing point of H K, and the image of the point H will be found ſomewhere in the line K P; conſequently it muſt be exhibited in *b*, the common interſection of L F and K P.

Hence, 1. ſince the appearance of the extreme points of a right line being given, the apperance of the whole line is given; the *ichnographic* projection of any rectilinear figure may be had by this method. And, 2. ſince any number of points of a curve line may by this means be projected on the *perſpective* plane; the projection of curve lines may likewiſe be effected after the ſame manner. And, 3. therefore, this method will ſuffice for mixtilinear figures; and is conſequently univerſal.

II. *To find the repreſentation of a line* A B (*fig.* 14.) *which is perpendicular to the ground line of the picture.* The point C, where E C interſects the horizontal line, is the vaniſhing point of A B; and, therefore, if A C be drawn, and from B be drawn B E, interſecting A C in *b*; A *b* will be the image of A B.

Otherwiſe; from B, *fig.* 15. draw B 1 at pleaſure, interſecting the ground line in 1; and from the eye E draw E H parallel to B 1, interſecting the horizontal line in H; then H is the vaniſhing point of B 1; and, therefore, drawing A C and 1 H. the point *b* of their interſection will determine the required image A *b*.

III. *To determine the image of a line* A B *parallel to the ground line.* Draw A 1, B 2 (*fig.* 16.) perpendicular to the ground line, and C will be the vaniſhing point of thoſe lines; draw 1 C, 2 C, and B E interſecting 2 C in *b*; then draw *a b* parallel H L, and it will be the image of A B.

Otherwiſe, by two vaniſhing points: draw A 2 (*fig* 17.) at pleaſure, interſecting the ground line in 2; and draw E H parallel to A 2, then H is the vaniſhing point of A 2: draw 2 H interſecting 1 C in *a*; and the parallel line *a b* will be the image required.

IV. *To exhibit the image of a line* A B *oblique to the picture.* Produce A B (*fig.* 18) to the picture, and draw E H parallel to it; from 1 draw 1 H, and from the extremities A and B draw lines to E, which will interſect 1 H in *a* and *b* and *a b* is the image of A B.

Otherwiſe; from A B (*Tab.* II. *Perſpect. fig.* 22.) draw A 1, B 1, parallel to each other: and from E draw E L parallel to A 1, B 1; then draw 1 L, 1 L interſecting 2 H in *a* and *b*; and *a b* is the repreſentation of A B.

The problems now laid down will ſerve for determining the ſituation of all objects that are ſuppoſed to lie upon the ground.

V. *To find the* perſpective *appearance of a triangle* A B C, (*fig.* 23.) *whoſe baſe* A B *is parallel to the fundamental line* D E. To the fundamental line D E draw a parallel at an interval equal to the altitude of the eye. Aſſume a fundamental point V, oppoſite to this either directly or obliquely, as the caſe requires. Transfer the diſtance of the eye from V to K. From the ſeveral angles of the triangle A C B, let fall perpendiculars, A 1, C 2, B 3; ſet off theſe perpendiculars upon the fundamental line D E oppoſite the point of diſtance K. From 1, 2, 3, draw right lines to the fundamental or principal point V 1, V 2, V. 3. From the points A, B, and C, of the fundamental line D E draw other right lines A K, B K, C K, to the point of diſtance K.

Since *a*, *b* and *c* are the appearances of the points A, B and C; the right lines *c a*, *a b*, *b c*, being drawn, *a c b* will be the appearance of the triangle A C B.

After the ſame manner is a triangle projected on a plane where the vertex C is oppoſed to the eye: all here required is, that its ſituation on the geometrical plane be changed, and the vertex C be turned towards the fundamental line D E.

Otherwiſe produce D A and D B (*fig.* 24) to the ground line, and draw E L parallel to A D, and E H parallel to B D; then draw 1 L and 2 H interſecting each other in *d*; and *d* will be the repreſentation of the angular point D. From B draw B 1 parallel to A 1, and L will be its vaniſhing point; therefore draw 1 L interſecting 2 H in the point *b*, and *b* will be the repreſentation of the angular point B; and ſince A B is parallel to the bottom of the picture, from the point *b* draw *b a* parallel to the ground line, and the image of the triangle will be completed: or, it may be done by drawing A 3 perpendicular to the bottom of the picture, and then 3 C cutting 1 L in the point *a*, &c. If this triangle be equilateral, it may be eaſily divided into two equal parts, by deſcribing from E, with any radius, one arc O P, biſecting it in X, and drawing E C: from C draw a line through *d*, interſecting *a b* in *e*. This is evident, becauſe C is the vaniſhing point of D F.

The triangle may be alſo projected by having only one ſide *a d* (*fig.* 25) given: let this be produced to its vaniſhing point L, and draw L E; then at L, with the diſtance L E, deſcribe the arc H E, interſecting the horizontal line in H, and H is the vaniſhing point of the other ſide *b d*; and by drawing *a b* parallel to the horizontal line, the repreſentation will be completed.

This method furniſhes a very uſeful rule for ſhortening the operations in *perſpective*. For ſuppoſe *a* L to be a line given in *perſpective* (that is to be drawn upon the picture) to any vaniſhing point L; and let it be required to cut off a part *a d*, of the line *a* L, to repreſent a given length. From the end *a* of the line *a d*, draw *a b* parallel to the horizontal line H L, and call *a b* the repreſentation of a parallel line upon the picture; then from L the vaniſhing point of *a d* transfer the diſtance L E to H: from H draw a line to *b*, interſecting *a* L in *d*, then will *a d* repreſent the length of the line *a b*. Or, if *a d* be a line given in *perſpective*, and it be required to find the length of the parallel line *a b*, the ſame proceſs will ſerve; for a line, drawn from H through *d*, will cut off *a b* to repreſent a length (in *perſpective*) equal to *a d*; becauſe, the whole figure *a b d* being the repreſentation of an equilateral triangle, its ſides are all equal in the original figure; conſequently, in either of the above caſes, *a b* and *a d* muſt repreſent lines which are equal to each other.

VI. *To exhibit the* perſpective *appearance af a ſquare* A B D C (*fig.* 26) *ſeen obliquely, and having one of its ſides* A B *in the fundamental line.* The ſquare being viewed obliquely, aſſume the principal point V in the horizontal line H R, in ſuch manner as that a perpendicular to the fundamental line may fall without the ſide of the ſquare A B; at leaſt may not biſect it; and make V K the diſtance of the eye. Transfer the perpendiculars A C and B D to the fundamental line D E; and draw the right lines K B, K D, as alſo A V, V C. Then will A and B be their own appearances; and *c* and *d* the appearances or the points C and D. Conſequently A *c d* B is the appearance of the ſquare A B D C. If the ſquare A C B D ſhould be at a diſtance from the fundamental line D E; which yet rarely happens in practice; the diſtances of the angles A and B muſt likewiſe be transferred into the fundamental line: as is evident from the preceding problem. And ſince, even the oblique view is not very common; in what follows, we ſhall always ſuppoſe the figure to be poſited directly oppoſite to the eye; unleſs where the contrary is expreſly mentioned. Thus: let the original ſquare be A B F D. (*fig.* 27.) Draw A C, B C to the vaniſhing point C of the perpendicular ſides A D, B F; from the eye E draw E H and E L parallel to the diagonals B D and A F: then from A and B draw lines to L and H, interſecting A C in *d*, and B C in *f*; then *d f*, being drawn, completes the repreſentation.

Having found the image of one ſquare, that of any other, *i k m n*, may be eaſily found, by ſuppoſing *i k* to be one ſide of the image, and drawing, from *i* and *k*, *i* C and *k* C; then from *i* draw *i* H, and from *k* draw *k* L, which will give the depth of the ſquare.

Or one diagonal only will be ſufficient. Thus: A L interſects B C in *f*; therefore, draw *f d* parallel to the horizontal line.

With reſpect to ſquares thus ſituated we may obſerve, that the vaniſhing points H and L of their diagonal, are exactly as far from the centre of the picture, or point of ſight as from the eye. For H C and L C are each equal to the diſtance C E; and, therefore, by ſetting off C H or C L equal to C E, the lines E H and E L may be omitted.

There are other methods of reſolving this problem: thus (in *fig.* 28.) if only the height A B of the ſquare be given; ſet off A D and A 1 equal to A B; from A and D draw lines to C, and make C L = C E; draw 1 L interſecting A C in *b*; then will A *b* be equal to A 1; draw *b d* parallel to the horizontal line, and the repreſentation will be completed. Or, if one ſide G I be given, draw lines from G and I to C; make C H = C E; from H draw H G, interſecting I C in *r*; and draw the parallel *r s*. Or, if the middle diameter *n p* be given, biſect *n p* in *o*; from C draw lines through the extremes *n*, *p*; from H produce a line through *o*, interſecting I C in *r*, and G C in G; laſtly from *r* and G draw the parallels G I, *r s*, which complete the figure.

VII. *To exhibit the appearance of a ſquare* A B C D (*fig.* 29.) *whoſe diagonal* A C *is perpendicular to the fundamental line.* Continue the ſides D C and C B till they meet the fundamental line in 1 and 2. From the principal point V ſet off the diſtance of the eye to K and L. From K to A and 1 draw right lines K A and K 1; and from L to A and 2, the right lines L A, L 2. The interſections of theſe lines will exhibit the appearance of the ſquare A B C D viewed angle-wiſe.

VIII. *To exhibit the appearance of a ſquare* A B C D, (*fig.* 30.) wherein another, I M G H, is inſcribed; the ſide of the greater, A B, being in the fundamental line;

the diagonal of the leſs, perpendicular to the fundamental. From the principal point V, ſet off, each way, on the horizontal line H R, the diſtances V L and V K; draw V A and V B; and K A and L B; then will A *c d* B be the appearance of the ſquare A C D B. Produce the ſide of the inſcribed ſquare I H, till it meets the fundamental line in 1; and draw the right lines K 1, and K M; then will *i h g* M be the repreſentation of the inſcribed ſquare I H G M. Hence is eaſily conceived the projection of any figures inſcribed in others.

IX. *To exhibit the* PERSPECTIVE *of a pavement, conſiſting of ſquare ſtones, viewed directly.* Divide the ſide AB *fig.* 31, transferred to the fundamental line D E into as many equal parts as there are ſquare ſtones in one row. From the ſeveral points of diviſion, draw right lines to the principal point V; and from A to the point of diſtance K, draw a right line A K; and from B to the other point of diſtance L, draw another L B. Through the points of the interſections of the correſponding lines draw right lines on each ſide, to be produced to the right lines A V and B V. Then will A *f g* B be the appearance of the pavement A F G B.

X. *To determine the repreſentation of a regular hexagon* A B D F G I, *(fig. 32.) when one of its ſides is parallel to the ground line.* Produce the ſeveral oblique ſides to interſect the ground line, and parallel to theſe draw E H and E L; then H will be the vaniſhing point of A I and D F, and L will be the vaniſhing point of B D and I G. Through the angular points A, F, B, and G, draw F 1, G 2, which being parallel to the ſides B D and A I, will have L and H for their vaniſhing points: from 1 draw 1 L, and from 2 draw 2 H, interſecting each other in *i*, then *i* will be the repreſentation of the corner I. From 1 draw 1 L, interſecting 2 H in *a*; and *a* will be the repreſentation of the corner A, and *a i* that of the ſide A I; then draw 1 L and 2 H, and *b* will be the repreſentation of B; and *a b*, being drawn, will be the image of A B, &c. In the ſame manner the image of an octagon may be determined. This method will likewiſe ſerve for the repreſentation of a circle; for having found eight points in the circumference, they will be ſufficient guides for drawing the figure. This problem may be reſolved by only having one ſide *b d (fig. 33.)* in the repreſentation given. Through the corner *b* draw a line *a n* parallel to the horizontal line; and produce *b d* to its vaniſhing point H; from H draw H E, and make H L = H E; then from L, draw a line through *d*, interſecting *a n* in *n*; then *b n* repreſents a line equal to the original of *b d*; make *a b* = *b n* and *a b* is the repreſentation of one parallel ſide; from *d* draw *d* L, and from *a* draw *a* H, cutting *d* L in *f*; then *f* is another corner; and *d f* repreſents another ſide. Again, from *d* draw *d i* parellel to the horizontal line, and *a* L cutting it in *i*; and *i* is another corner, and *a i* another ſide; laſtly, draw H *i* and the parallel *f g*, and the repreſentation is completed.

XI. *To exhibit the* PERSPECTIVE *of a circle.* If the circle be ſmall, circumſcribe a ſquare about it. Draw diagonals and diameters *h a* and *d e (fig. 34)* interſecting each other at right angles; and draw the right lines *f g* and *b c* parallel to the diameter *d e* through *b* and *f*; as alſo through *c* and *g* draw right lines meeting the fundamental line D E in the points 3 and 4. To the principal point V draw right lines V 1, V 3, V 4, V 2; and to the points of diſtance L and K, draw the right lines L 2 and K 1. Laſtly, connect the points of interſection, *a*, *b*, *d*, *f*, *h*, *g*, *e*, *c*, with arcs *a b*, *b d*, *d f*, &c. Thus will *a b d f h g e c a*, be the appearance of the circle.

If the circle be large on the middle of the fundamental A B *(fig. 35.)* deſcribe a ſemicircle; and from the ſeveral points of the periphery, C, F, G, H, I, &c. to the fundamental line, let fall perpendiculars C 1, F 2, G 3, H 4, I 5, &c. From the points A, 1, 2, 3, 4, 5, &c. draw right lines to the principal point V, alſo a right line from B to the point of diſtance L; and another from A to the point of diſtance K. Through the common interſections draw right lines as in the preceding problem; thus ſhall we have the points *c*, *f*, *g*, *h*, *i*, which are the repreſentations of C, F, G, H, I; and theſe, being connected as before, give the projection of the circle.

The eaſieſt and beſt method for putting a circle into *perſpective* ſeems to be the following; which admits alſo of univerſal application. Let *a b (fig. 36)* repreſent the diameter of the given circle: biſect it in *c* for the centre; make C H, C L, each equal to U W the breadth of the picture; divide C H, C L, each into five equal parts; and make C *h*, C *l*, each equal to two parts and one fourteenth. From H produce a line at pleaſure through the centre *c*; from *h*, draw two lines through the extremities *a*, *b*, interſecting H 4 in the points 3 and 4; do the ſame by the line L 5 with the point *l*; then draw a line from C through the centre *c*; from H draw lines through *a* and *b*, interſecting C 1 in 1 and 2; and having thus obtained eight points in the image of the circumference of a circle, the outline may be very accurately drawn through theſe points.

Hence appears, not only how any curvilinear figure may be projected on a plane; but alſo how any pavement, conſiſting of any kind of ſtones, may be delineated in *perſpective*.

Hence alſo appears what uſe the ſquare is of, in *perſpective*; for even in the ſecond caſe we uſe a ſquare divided into certain areolæ, and circumſcribed about the circle; though it be not delineated on the geometrical plane in the diagram.

XII. *To exhibit the* PERSPECTIVE *of a regular pentagon, having a broad limb, terminated by lines parallel thereto.* 1. From the ſeveral angles of the exterior pentagon A, B, C, D, E, *(fig. 37.)* to the fundamental line T S, let fall perpendiculars A 0, B 1, C 2, D 3, E 4; which, as in the former, transfer to the fundamental line. Connect the points 1, 2, 3, 4, to the principal point V; and the points 1, 2, 3, 4, to the point of diſtance K. Thus will the common interſections repreſent the appearance of the exterior pentagon. 2. If now, from the inner angles G, H, K, L, I, the perpendiculars G 0, H 5, K 6, I 7, L 8, be in the like manner let fall; and the reſt be done as in the former, we ſhall have the repreſentation of the inner pentagon. The pentagon A B C D E, therefore, with its limb, is repreſented in *perſpective*.

This problem is added for the ſake of an inſtance of the projection of a figure that has a broad limb, or edge.

It muſt be here obſerved that if the magnitude of the ſeveral parts of an object be given in numbers, together with the height and diſtance of the eye; its figure is to be firſt conſtructed by a geometrical ſcale; and the fundamental point, with the point of diſtance, to be determined by the ſame.

Nor is it always neceſſary, that the object be delineateed under the fundamental line: in the projection of ſquares and pavements it is beſt let alone. But where it is neceſſary, and ſpace is wanting, draw it apart; find the diviſions in it, and transfer them to the fundamental line in the plane.

Threads being hung in the principal point, and the point of diſtancce, and thence ſtretched to the points of the diviſions of the fundamental line; the common interſection of the threads will give the projection of the ſeveral points without confuſion; a thing much to be feared from the multiplicity of lines to be drawn.

XIII. *Having given the centre* C *of the picture, (fig. 38.) the vaniſhing line* H L, *and two vaniſhing points*, H, L, *of a ſquare b d o f; to find the diſtance of the picture.* Biſect H L in A; from A with the radius A H (or A L) deſcribe the arc L E H; from C draw the perpendicular C E to touch the arc L E H, and E C will be the diſtance of the picture. For drawing L E and H E, which will make a right angle at E, and E H, E L, are parallel to the originals of *b d*, *b f*, and conſequently C E is the true diſtance of the eye, &c.

XIV. *Having given the repreſentation of two lines* B *a*, D *f*, *(Tab. III. Perſpect. fig. 39) to find their originals* B A, D F. From the interſecting point B, draw B A parallel to C E; from E draw a line through *a* interſecting A B in A; then B A is the original of B *a*. Again, from the vaniſhing point H, draw E H; and from the interſecting point D, draw D F parallel to E H; then from E, draw F F through the point *f*, which gives D F for the original of D *f*. N. B. Theſe two laſt articles comprehend a part of what Dr. Taylor calls the *inverſe* practice of PERSPECTIVE.

Having in the preceding problems illuſtrated the principles and practice of *perſpective*, as it relates to objects ſituated upon the ground plane, we ſhall now give a brief account of the method of repreſenting objects that are perpendicular and oblique to it; obſerving, in general, that thoſe which are parallel to the ground plane may be drawn by the help of thoſe that are perpendicular to it; and that lines perpendicular to the ground plane muſt be repreſented by lines purpendicular to the ground line, wherever they are ſituated. In order to determine the vaniſhing lines and vaniſhing points of planes which are perpendicular to the ground, we may ſuppoſe theſe planes to be either perpendicular to the picture, or oblique to it. Let the ſquare plane B K I F *(fig. 40.)* be perpendicular to the picture, ſo that the top and bottom of it vaniſh into C, its centre. Draw the line E V through C, and perpendicular to H L, and E V will be the vaniſhing line of the plane B K I F. And ſince C H is perpendicular to the vaniſhing line E V, C is the centre of that vaniſhing line; and as C H is equal to the diſtance of the eye, H will be the tranſpoſed place of the eye, and H C the diſtance of the vaniſhing line E V. But if the plane *a b c d (fig. 41.)* is oblique to the picture, then the top and bottom of it will not vaniſh into its centre C, but into the point L, on one ſide of the centre.

Draw a line through the vaniſhing point L, perpendicular to the horizontal line; then V U is the vaniſhing line of the plane $abcd$. And becauſe C L is perpendicular to the vaniſhing line V U, L will be the centre of that vaniſhing line. Again, draw E L, and this will be the diſtance of the eye E from the vaniſhing line V L; and this diſtance transferred to H, will give H for the tranſpoſed place of the eye, and H L for the tranſpoſed diſtance of the vaniſhing line V U.

XV. *To find the repreſentations of planes, whoſe baſes are perpendicular to the ground line of the picture.* E. gr. Let one corner A of the plane A B F D (*fig.* 42.) be at the bottom of the picture; and let it be required to draw the repreſentation of a plane ten feet high, and four feet wide. From A, upon the ground line, make a ſcale of equal parts, repreſenting feet at pleaſure; from A draw A D perpendicular to this line, and produce it at pleaſure: upon A D ſet ten feet from A upwards, and draw D C to the centre C, and from A draw A C; make C H=C E, and draw H 4 interſecting A C in B; then A B=4 feet; therefore, from B draw B F parallel to A D, and A B F D will be the repreſentation required.

Let the plane, whoſe repreſentation $efgh$ is required be four feet wide, and five feet high, and its neareſt corner e be one foot from the bottom of the picture. Draw C N at pleaſure; make C L=C E; and ſet off one foot from N to 9, and draw L 9 interſecting C N in e; and e will be one foot from the bottom. Take 4 feet more, as 9 5, and draw 5 L interſecting C N in f, and ef is equal to 4 feet; draw N O perpendicular to the bottom of the picture, and make it equal to 5 feet; draw eg, fh, parallel to N O, and draw O C, which will complete the propoſed repreſentation. Otherwiſe: from e draw ex parallel to N A, interſecting L 5 in x; then ex will be 4 feet; make eg to ex as 5 is to 4, and draw g C.

In the ſame manner we may determine the image $abcd$ of a plane, 4 feet ſquare, removed five feet into the picture, and whoſe lower edge is in the line A C. From A, where C A interſects the ground line, ſet off 5 feet for its diſtance, as A 5, and 4 feet for its breadth, as 5 9; draw H 5 and H 9, interſecting A C in a and b; then ab is the repreſentation of its depth: draw ad, bc, parallel to A D, and make A Q four feet; then draw Q C which completes the figure.

Ex. 2. Having B given as one angular point of a ſquare plane, and B M for its height and breadth upon the picture; thence to determine the repreſentation of the whole plane B F I K (*fig.* 40.) From the corner B, draw the perpendicular B F; make B F=B M, and draw M L interſecting A C in K; draw K I parallel to B F; then F C completes the figure. If the repreſentation be determined, and it be required to find the length and breadth of the original. Produce C B to A; at A erect a perpendicular A D; from L produce lines through B and K, interſecting the bottom of the picture in N and 2. The ſpace 2 N comprehends eight feet, and therefore, B K repreſents eight feet. For the height B F, produce C F to D, and the ſpace A D contains eight feet. N. B. The vaniſhing lines of planes perpendicular to the ground are perpendicular to the horizontal line, and always paſs through the vaniſhing point of thoſe planes: thus, the vaniſhing line E V paſſes through C; and E V is the vaniſhing line of the plane B F I K, as is evident by turning the figure, and conſidering E V as the horizontal line, H as the eye, H E as its diſtance, and B F I K as the repreſentation of a ſquare lying upon the ground; ſo that in this example we have the vaniſhing line H L of planes parallel to the ground, and alſo the vaniſhing line E V of planes perpendicular to the ground, connected together.

XVI. *To determine the repreſentations of planes that are parallel to the picture.* E. gr. Let the plane $abcd$ (*fig.* 43.) five feet wide, and eight feet high, be removed two feet from the bottom of the picture. From A and 5, draw A C and 5 C; make C H=C E, and draw 7 H, interſecting 5 C in b; then 5 b repreſents a length equal to 5 7 or 2 feet; draw ab parallel to the ground line, cutting A C in a, which will give the length of the lower ſide; erect the perpendicular ac, bd; make bd equal to 8 feet, and draw the parallel dc. If the plane $ghik$ be 9 feet high, and 3 feet wide, and 6 feet from the bottom of the picture; draw a line at pleaſure from C, as C 9; take 3 feet, and draw another line from B to C; from L draw L 9, interſecting B C in e; then e B repreſents three feet; from e draw the parallel ef, and from L produce L f, interſecting e C in g, which gives eg for a *perſpective* length repreſenting ef. Now gf and f B are the repreſentations of two ſquares, whoſe ſides are all equal in the original figures; and therefore all the ſides ef, eg, &c. repreſent equal lines, and, conſequently, 9 h repreſents the depth of 6 feet, and hg the parallel width of 3 feet. Draw the perpendiculars hk, gi; and make gi three times the length of gh; and draw ik parallel to gh.

XVII. *To find the repreſentations of planes, that are oblique to the ground line or bottom of the picture.* Let $abdc$, (*fig.* 41.) be eight feet high, eight feet wide, and two feet from the bottom of the picture; let L be its vaniſhing point, and A L the line in which the plane is to ſtand. Draw A B perpendicular to the bottom of the picture; ſet 8 feet upon it, and draw B L, transferring L E to H; take A 2=2 feet, and from 2 produce 2 H, interſecting A L in A; then A a repreſents a line equal to A 2=2 feet. Again, from 2 feet ſet off 8 feet, and draw D H interſecting A L in b; then ab repreſents the length of 8 feet; draw ac and bd parallel to A B.

When the repreſentation is not to be of any particular dimenſion, the operation is exceeding ſimple. Let A B (*fig.* 42.) be one ſide given, and A D its height; from A and B draw A D, B F, perpendicular to the bottom of the picture; and from C draw C F. N. B. The vaniſhing point C of the line A B is the vaniſhing point of every line Q d, mk, &c. parallel to A B. For the application of theſe operations in determining the *perſpective* of ſolid figures, ſee SCENOGRAPHY.

As to objects that are inclined to the ground, ſuch as pediments, roofs of houſes, &c. it is proper to obſerve, that this part of *perſpective* was little, if at all, underſtood by any authors before Dr. Taylor; who has ſhewn that inclined objects have their proper vaniſhing lines and points, as well as thoſe which lie flat upon the ground, or are perpendicular to it; and that the method for determining the appearance of objects in either caſe is exactly the ſame. For the illuſtration of this method, let $adcgfi$ (*fig.* 44.) repreſent the body of a houſe; the ſide $cigf$ being parallel, the other ſide $adci$ hath its vaniſhing line V U, which paſſes through the centre of the picture, and is perpendicular to the horizontal line; and it is evident, that the roof is formed by two inclined planes, one leaning towards the eye, the other from it.

Theſe inclined planes have their proper vaniſhing lines and vaniſhing points upon the picture, as well as thoſe which are either parallel or perpendicular to the ground. It has been already ſhewn (ſee *fig.* 40.) that V U, continued, is the vaniſhing line of all the lines which can be drawn within the plane $adci$; however, let us here turn the figure, and call C the centre of the picture, C E the diſtance of the eye, and V U the horizontal line; $adci$ the repreſentation of a parallelogram, and abi a triangle joined to the end of it. Let us next ſuppoſe the line fr to be the bottom of the ſquare $fibr$, whoſe vaniſhing point is V, and the vaniſhing points of its diagonals are D and F; let $cifg$ repreſent a parallellogram even with the eye, which will complete the repreſentation of a ſolid body, like the model of a houſe, laid upon that ſide, which by workmen is called the gable end. If this be a true repreſentation, that is, if V U be the vaniſhing line of $abicd$, and D F the vaniſhing line of $fibr$, then turning the figure in any poſition cannot make any alteration in the *perſpective*, becauſe V U and D F will be invariably the vaniſhing lines of $abicd$, $bifr$, &c. The planes abi, $brfi$, are joined by the line ib, the vaniſhing point of which is V; and becauſe the original of fr is parallel to the original of ib, both ib and fr will vaniſh into the ſame point V; or into that point where the vaniſhing lines V U and D F croſs each other; for the vaniſhing point V muſt be in the line V U, which is the vaniſhing line of the plane $adcib$, and it muſt be alſo in the vaniſhing line D F of the inclined plane bf; for the line ib is the common ſection of both planes; therefore its vaniſhing point muſt be the interſection of the vaniſhing line of thoſe planes.

XVIII. *To find the vaniſhing line of the inclined plane, $bifr$; and alſo the centre and diſtance of it.* Let E L be the horizontal line; C the centre of the picture, C E its diſtance, $adcgfi$ the body of a houſe, and U V the vaniſhing line of its ſide $adci$. Upon the horizontal line or parallel to it, draw st, then the figure $stomn$ will be a ſmall module of the perpendicular plane $adcib$; or, in other words, let om be the inclination of the inclined plane with nm ſuppoſed to be 45°. From the eye E draw E V parallel to mo, interſecting the vaniſhing line V U in V; through V draw D F parallel to the horizontal line E L; then is D F the vaniſhing line required, V its centre, and E V its diſtance. In order to find the repreſentation of the plane $bifr$, ſuppoſing it to be a perfect ſquare, &c. let ib be the repreſentation of one ſide of the ſquare, whoſe vaniſhing point is V. Produce the perpendicular C V at pleaſure; make V D, V K, V F, each equal to the diſtance E V of the vaniſhing line D F; then is V K the diſtance E V, tranſpoſed to K; and becauſe V D, V F, are each equal to V K; therefore D and F are the vaniſhing points of the diagonals

diagonals *i r* and *f b*. From the points *i* and *b* draw *i f*, *b r*, parallel to the vaniſhing line D F; from D draw *D i* cutting *b r* in *r*; then *r b* is cut off to repreſent another ſide of the ſquare; from V draw a line through *r*, interſecting *i f* in *f*, which completes the *perſpective* of a ſquare in this poſition. This may alſo be done by merely giving the inclination of the plane; ſuppoſe it 45°; at the eye E make an angle with the line E C of 45°, and draw E V interſecting U V in V; make V F, V D, each equal to V E; then V is the vaniſhing point of the ſides *i b*, *f r*; and D F the vaniſhing points of the diagonals; from whence the figure may be completed as before. The vaniſhing line, its centre, and the diſtance of the oppoſite inclined plane, are determined in the ſame manner.

XIX. *To find the vaniſhing line of a roof i b r f*, &c. (*fig.* 45.) *when the gable end a b i is parallel to the picture, and to determine the whole repreſentation.* Having drawn the body of the building *a g*, and alſo the gable end *a b i*; obſerving that the inferior part, *i f*, of the roof vaniſhes into C, the centre of the picture, and conſequently the upper part *b r* will vaniſh into the ſame point, both being ſuppoſed parallel in the original figure; draw *b* C, and from *f* the line *f r* parallel to *i b*, which completes the ſide of the roof *i b r f*, without the vaniſhing line propoſed. But ſince the roof *i b r f* has an inclination with reſpect to the picture, in order to determine its proper vaniſhing line, through the vaniſhing point C draw F D parallel to *i b* or *r f*; then F D is the vaniſhing line of the inclined plane *i b r f*. From C, the centre of the vaniſhing line F D, produce C K perpendicular to F D; make C K = C E, the diſtance of the eye; and C K is the diſtance of the vaniſhing line F D, and K the tranſpoſed place of the eye. E. gr. Having given *i b* for one ſide of a ſquare root, and found its vaniſhing line F D, and its diſtance C K, to complete the repreſentation of the roof. Make C F, C D, each equal to the diſtance of the eye C K; then F and D are the vaniſhing points of the diagonals of a ſquare. From *i* and *b* produce lines to C; and from the ſame points draw lines to F and D, interſecting *b* C, *i* C, in *r* and *f*; draw *r f*, which will be parallel to *i b*, and complete the repreſentation required.

XX. *Having given the vaniſhing line of any inclined plane, and one vaniſhing point of that plane, together with the centre and diſtance of the picture, to determine the vaniſhing line of another plane, making a given angle with the plane, whoſe vaniſhing line is* V L. Let V L (*fig.* 46.) be the vaniſhing line of any inclined plane, V one vaniſhing point, C the centre, C E the diſtance of the picture, and *a b i* the angle of inclination of the two original planes; if this be a right angle, from V draw a line through C, as V D; make C I perpendicular to V D, and C I = C E; draw V I, and at I make V I *c* = *a b i*, the given angle, and draw I *c* interſecting V D in *c*; through *c* draw L U parallel to I C, interſecting V L in L, and U L is the vaniſhing line required. If the plane, whoſe vaniſhing line is V U; were inclined at an angle of 60°, and it were required to find its vaniſhing line; through the centre of the picture draw V D, and find the vaniſhing line L U of a plane perpendicular to that plane whoſe vaniſhing line is V U; produce C D, and make *c* D = I C, the diſtance of L U; draw D U, which makes an angle at D of 60°, and draw D P; laſtly, draw P V, which is the vaniſhing line required. In order to find the centre and diſtance of the vaniſhing line U L; from C draw C D perpendicular to U L, and C I perpendicular to C D, and make C I = C E, and C I is the diſtance of U L; make *c* D = *c* I, which is the diſtance to be uſed for determining the repreſentations of any planes that vaniſh into the line U L. Suppoſe L the vaniſhing point of one ſide of a ſquare, draw D U at right angles with D L, and U will be the other vaniſhing point of the ſaid ſquare. For the farther illuſtration and application of theſe rules, we muſt refer to Mr. Kirby's comprehenſive work, entitled, Dr. Brook Taylor's Method of *Perſpective* made eaſy, &c. 3d edit. 1768.

XXI. *To fix points in* perſpective *lines, or to divide theſe lines ſo as to intercept any lengths that may be required in them.* Lines parallel to the ground line may be divided, by dividing the ground line, and either laying a ruler from theſe diviſions to the point of diſtance in the horizon, or drawing lines to them from the point of ſight D. Lines perpendicular to the ground line are divided, by ſetting off diviſions from the place where they meet the ground line, and drawing other lines from them to the point of diſtance. Lines oblique to the ground line may be divided, by ſetting off on the ground line any number of diviſions from the point where the line to be divided interſects it; as from C to *b* (*fig.* 47.); taking the diſtance from the vaniſhing point *i* of the line to the point of diſtance E in the perpendicular D E, and ſetting it off along the horizontal line to *y*; and from the point thus determined, drawing a line *y b* to the point in the ground line bounding the number of diviſions: this line will interſect C *i*, the repreſentation of the given oblique line in *h*, the point required. See articles XV. XVI. XVII. above.

If a ſingle point in a given ſituation upon the ground plane be required, its place in the *perſpective* plane may be found by ſuppoſing it to be the interſection of two lines, the ſituation of which is given: as by ſuppoſing one of them to be drawn through it perpendicular to the ground line, and the other to be a line drawn from the point of diſtance, and interſecting it at a given diſtance from the ground line: or, it might be found by drawing lines making any given angle with the perpendicular, and interſecting them at proper diſtances from the ground line. To divide lines, not lying in the ground plane, but perpendicular to it, let *a c* (*fig.* 48.) be the image of a line perpendicular to the ground plane, and let a number of diviſions, e. gr. five, be cut off from the point *a*. Take at pleaſure (generally beyond the bounds of the picture) any point *d* in the horizontal line; from thence draw a line *d e* to any point *e* in the ground line; ſet off five diviſions from *e* to *f* in the perpendicular *e k*, and draw the line *f d*; draw a line from the foot *a* of the object, parallel to the ground line, interſecting *d e* in *i*; and raiſing a perpendicular from *i* to *d f*, find *h*, and the line *i h* contains the five meaſures required, which are to be ſet off from *a* to *b* in the given line *a c*; and thus *a b* will be equal to *f e*. The lines *d e* and *e k* will ſerve to meaſure any other lines perpendicular to the ground plane, always drawing a line parallel to the ground line from the foot of the object to be meaſured to the line *d e*, and proceeding as above. It is evident, that any row of objects of the ſame height, ſtanding upon the ground plane, on a line perpendicular, or oblique to the ground line, muſt appear to diminiſh, till they vaniſh in the horizontal line; conſequently, the triangle *d f e* will contain in it perpendicular lines equal to the apparent heights of all objects that are of the height of *f e*; and this will be the caſe wherever the point *d* is taken in the horizontal line; for it will be invariably *i h* : *e f* (: : *d i* : *d e* : : *d m* : *d l*) : : H *a* : H I.

To meaſure a line oblique to the ground plane: let the line be C *g* (*fig.* 47.) and let eight diviſions be cut off from C. For this purpoſe draw C N parallel to *y g*, and C N being conſidered as a new ground line, ſet off the given number of diviſions from C to *a*; join *a* and *y* with a line interſecting the given line in *k*; and C *k* will be the part required; or from the vaniſhing point *g* of the given line C *g*, take *g γ* parallel to the ground line A B, and equal to *g y*; on the ground line ſet off the given length from C to a, and a line joining a and y will cut off the required part C *k*. In the firſt method, the triangles *k g y*, and *k* C *a*, are ſimilar; whence *g k* : *k* C : : *g y* : C *a*; but *g y* is equal to *g a*, the diſtance of the eye from the vaniſhing point *g*, and C *a* is equal to the given oblique line by conſtruction: therefore the extreme point of it will be repreſented by *k*. See Propoſition III. above. In the ſecond method, ſince *g* y is drawn parallel to C a, we have *g k* : *k* C : : *g* y : C a; but *g* y and C a are equal to *g y* and C *a*, and conſequently equal to *g a*, and the given oblique line reſpectively. If the line C *g* does not ſtand upon the ground line, but is an indefinite line ſtanding on the ground plane at C (*fig.* 49.) and it is propoſed to cut off a part of it from C, equal, e. gr. to ten diviſions; find the point y as above; from C, parallel to the ground line, draw C *b*, from which cut off (art. 21.) a part C *a*, equal to ten diviſions, and a line joining y and *a* will cut the given line C *g* in *k*, the point ſought. If ſeveral other diviſions in C *g* be required, make C *b* equal to the abſolute length of ten diviſions, and through *k* draw *b k* cutting *g* y produced in *d*; and *d* will be a meaſuring point for the line C *g*; ſo that the diviſions themſelves may be ſet upon C *b* at once, and lines drawn from thence to *d* will cut the given line C *g* in the deſired points. The point *d* may be found at once, by taking *g d* to *g* y as the height of the eye is to the perpendicular C L.

In the foregoing explication of the theory and practice of *perſpective*, regard has been merely had to the appearance of objects upon an upright picture, which is generally choſen for *perſpective* repreſentations; but there are ſome caſes in which the ſituation of the picture is parallel or inclined to the ground, ſuch as cielings, inclined walls, &c. The repreſentation of objects upon ſuch kind of ſurfaces is deducible from the ſame principles, and determined after the ſame manner. The rules for drawing the appearance of objects upon the parallel picture are exactly the ſame as thoſe for drawing the appearance of objects upon the perpendicular picture; obſerving, that thoſe objects, which in the parallel picture are to be repreſented as erect, muſt be determined as thoſe which lie flat upon the ground in the perpendicular picture; thoſe which are parallel in one picture as thoſe which are parallel in the other; and thoſe which are oblique, after the ſame manner: or more generally, however original planes are ſituated, the vaniſhing lines of thoſe planes muſt always be determined by imagining a plane to paſs through the eye parallel to thoſe planes, &c. for by this means all their repreſentations may be completed. The inclined picture is ſeldom uſed; but thoſe who wiſh to acquaint themſelves with this kind of *perſpective*, may find ample information in Mr. Kirby's elaborate work, already cited, and much uſed in the compilation of this article.

PERSPECTIVE *of building*, &c. In the practice hereof, great regard is had to the height of the horizontal line; all above the horizontal being ſeen in the upper part, and all below it in the under part; whence *perſpective* becomes divided into the *high* and *low ſight*; both which may be illuſtrated by what follows.

To repreſent a building (v. gr. palace, college, &c.) *in* PERSPECTIVE.

1. Take the ichnography, or ground-plat of the building; its lengths, breadths, and depths, by actual meaſuring; and take its altitude with a quadrant.

2. Make a ſcale divided into two or three hundred equal parts; either actually, or ſo as that each diviſion ſignify ten parts: by this ſcale lay down the ground-plat; as in *fig.* 50.

This done, having a long rule, and a ſquare, which by ſliding on the rule helps you to draw your perpendiculars eaſier, reduce it into *perſpective*, in its ſcenographic appearance.

Then having drawn a line towards the bottom of the paper for the front or baſe line, as F (*fig.* 51.) divide it into as many equal parts as you find the building has in the ichnography, or more, if you pleaſe: this will ſerve for a ſcale to determine the ſeveral heights, &c. and to theſe diviſions, with a black lead pencil, draw lines from the centre, when you have choſen it; which choice requires judgment on two accounts.

3. For if the centre be too nigh the front-line, then the depth of the whole building will be fore-ſhortened too much; and if too far off, it will not be fore-ſhortened enough. This may be illuſtrated thus: ſet an open tankard, or the like, on a ſtand, ſo as that it be a little lower than your eye; if you be at a great diſtance from it, you can ſee very little or nothing into it; if you come nigher to it by degrees, you will perceive the farther edge ſeem to be raiſed a little higher than that next you, ſo that you may ſee a little way into it; if you come very nigh it, you ſee too deep into it, or more than can be well expreſſed in picture. We ſhall therefore find ſome one place, which we muſt conclude the moſt convenient for the draught, and which may be in general determined to be as far off the front-line as the front is long: this rule, though it has juſt grounds, yet we ſometimes diſpenſe with *pro re nata*, that we may expreſs things with the better appearance.

4. Conſider how to place this centre with ſuch advantage as that you may expreſs thoſe things moſt, which are chiefly deſigned; for as to the bottom and top lines of the ſides of the building that run from us in or nigh the direct lines to the centre, though you ſee the upper part very well, yet the ſides that fall between the ground-line and top fall ſo very near one another, that it would be very difficult to expreſs particulars in them; ſo that the centre muſt be well choſen in reference to this.

Thoſe buildings, therefore, which you would ſee moſt of, muſt be placed as far off as you think convenient from the direct line that runs to the centre; and the farther they are, the plainer they will be.

Place then thoſe things you would ſee leaſt of, nigheſt the direct line; and ſee whether the others fall according to your mind; but this muſt be done after you have drawn your diagonal, which is the next thing.

5. Having pitched on your centre, and having from it drawn lines to every diviſion of the front-line, you are to determine your diagonal, A R, thus: having, with a pair of compaſſes, meaſured the length of the front-line, take your compaſſes, and putting one foot in the centre, ſee where the other will reach in the horizon (on both ſides, if you pleaſe); where it reſts, from that point draw a thwart line to the laſt diviſion of the front; and this will be truly drawn, or pretty nigh to the truth. That it is ſo, you may conſider how it falls in reſpect of the two laſt centre-lines; for if where the next line from the laſt is interſected by the diagonal, you draw a parallel to the front between them, as at A 10, you will have a rhombus; if then all the ſides be pretty equal, you may be ſure you are nigh the right; but if the ſides that run towards the centre be too long, then things will not be fore-ſhortened enough; and if the ſides be not long enough, they will be fore-ſhortened too much.

6. After the front-line is thus divided, the centre fixed, and the diagonal placed, take the breadth of the chapel A B, which in the ichnography is ſhewn to be twenty parts: becauſe this line is perpendicular, it muſt run toward the centre: therefore reckon twenty in the diagonal, and the rule laid parallel to the front in that point will give you a point in the centre-line, which will give the breadth of the chapel; and conſequently a line drawn from A to B puts it into the ichnographic *perſpective*. The length of the chapel being ſeventy diviſions in the front-line, reckon ſeventy from B, parallel to the front-line, and there you will have a point at C.

The depth of the building from the chapel northward being one hundred and fifteen from the chapel, I reckon from D (where it cuts the diagonal at ten) onwards in the diagonal; and at one hundred and fifteen in the diagonal with my rule, as before, parallel in this place in the front, I have the point Z in the central line. Its breadth being thirty, I reckon three diviſions, and there is the juſt breadth there; and ſo on in every particular part.

Having placed the ichnography in *perſpective*, you may then give every thing its proper height thus:

7. The height of the chapel being thirty, I reckon thirty on the front-line; and with this length, by a ſquare applied to the front-line, I drop a perpendicular to that height; and ſo where the other ſide of the chapel is placed, having reckoned the height upon a ſuppoſed parallel, there I draw another line in that height; then joining theſe ſeveral heights by ſeveral lines, you have the profiles of each building.

To diverſify theſe ſeveral lines, that they confound you not, make the ichnography, when you lay it into *perſpective*, in diſcontinued crooked lines, the heights in pricked lines, and the tops of each building in continued lines, as the centre-lines are in the table. You will likewiſe find the centre, though it is not here expreſſed, as likewiſe the point of diſtance, by continuing the diagonal up to the ſuppoſed horizon, where it and the eye are placed.

Having done thus, your art muſt be employed for the particular expreſſions of things, by drawing and ſhadowing, which is the life of this half formed figure, which we leave to the painter. It remains that we ſpeak of the low ſight; and here, we ſuppoſe the horizontal line juſt the height of the eye, about five feet from the baſis; though it is generally placed higher, even to a third part of the height of the building, that the ſide building may be expreſſed the more gracefully.

The diagonal is beſt determined by dividing the laſt diviſion of the baſis-line into five parts at G, taking four of theſe, ſometimes the whole five, becauſe we determined before, that the length of the front-line was the diſtance of the eye in the horizon from the point of diſtance; but here we take four, and then make this the diſtance in the horizon between the eye and the point of diſtance. You may then either graduate the plan at the ſeveral interſections of the diagonal with the centre-lines, or elſe ſuppoſe it ſo; and then raiſe the buildings as you will find by *perſpectives* enough of this ſort every where to be met with.

PERSPECTIVE is alſo uſed for a kind of picture or painting, frequently ſeen in gardens: and at the ends of galleries; deſigned expreſly to deceive the ſight by repreſenting the continuation of an alley, a building, landſcape, or the like.

PERSPECTIVE, *aerial*, is ſometimes uſed as a general denomination for that which more reſtrictedly is called AERIAL *perſpective*, or the art of giving a due diminution or degradation to the ſtrength or light, ſhade, and colours of objects: according to their different diſtances, the quantity of light which falls upon them, and the medium through which they are ſeen; the *chiaro obſcuro*, or CLAIR *obſcure*, which conſiſts in expreſſing the different degrees of light, ſhade, and colour of bodies, ariſing from their own ſhape, and the poſition of their parts with reſpect to the eye and neighbouring objects, whereby their light or colours are affected; and KEEPING, which is the obſervance of a due proportion in the general light and colouring of the whole picture; ſo that no light or colour in one part may be too bright or ſtrong for another.

A painter who would ſucceed in *aerial perſpective*, ought carefully to ſtudy the effects which diſtance, or different degrees or colours of light have on each particular original colour, to know how its hue or ſtrength is changed in the ſeveral circumſtances that occur, and to repreſent it accordingly. As all objects in a picture take their meaſures in proportion to thoſe placed in the front, ſo in *aerial perſpective*, the ſtrength of light, and the brightneſs of the colours of objects cloſe to the picture, muſt ſerve as a meaſure, with reſpect to which all the ſame colours at ſeveral diſtances muſt have a proportional degradation in like circumſtances.

Perspective, *alley in*. See Alley.

Perspective, *architecture in*. See Architecture.

Perspective, *bird's eye view in*, is that which ſuppoſes the eye to be placed above any building, &c. as in the air at a conſiderable diſtance from it: this is applied in drawing the repreſentations of fortification, when it is neceſſary not only to exhibit one view as ſeen from the ground, but ſo much of the ſeveral buildings as the eye can poſſibly take in at one time from any ſituation. In order to this, we muſt ſuppoſe the eye to be removed a conſiderable height above the ground, and to be placed as it were in the air, ſo as to look down into the building like a bird that is flying. In repreſentations of this kind, the higher the horizontal line is placed, the more of the fortification will be ſeen, and *vice verſâ*.

Perspective, *diagonal*. See Opera *glaſs*.

Perspective, *graphical*. See Graphical.

Perspective *machine*, is a machine by which any perſon may delineate the true *perſpective* figures of objects, without the help of the rules of this art. Mr. Ferguſon has deſcribed a machine of this kind, the invention of which he aſcribes to Dr. Bevis. The plane of this inſtrument is exhibited in *fig*. 52, and *fig*. 53. is a repreſentation of it when made uſe of in drawing diſtant objects in *perſpective*. *a b e f* (*fig*. 52. is an oblong ſquare board, repreſented by A B E F in *fig* 53; *x* and *y* (X and Y) are two hinges on which the part *c l d* (C L D) is moveable. This part conſiſts of two arches or portions of circles *c l m* (C L M) and *d n l* (D N L) joined together at the top *l* (L) and at bottom to the croſs bar *d c* (D C) to which one part of each hinge is fixed, and the other part to a flat board, half the length of the board *a b e f* (A B E F) and glued to its uppermoſt ſide. The centre of the arch *c m l* is at *d*, and the centre of the arch *d n l* is at *c*.

On the outer ſide of the arch *d n l* is a ſliding piece *n* (much like the nut of the quadrant of altitude belonging to a common globe) which may be moved to any part of the arch between *d* and *l*: and there is ſuch another ſlider *o* on the arch *c m l*, which may be ſet to any part between *c* and *l*. A thread *c p n* (C P N) is ſtretched tight from the centre *c* (C) to the ſlider *n* (N), and ſuch another thread is ſtretched from the centre *d* (D) to the ſlider *o* (O); the ends of the threads being faſtened to theſe centres and ſliders.

Now it is plain, that by moving theſe ſliders on their reſpective arches, the interſection *p* (P) of the threads may be brought to any point of the open ſpace within the arches. In the groove *k* (K) is a ſtrait ſliding bar *i* (I) which may be drawn farther out, or puſhed farther in at pleaſure.

To the outer end of this bar I (*fig*. 53.) is fixed the upright piece H Z, in which is a groove for receiving the ſliding piece Q. In this ſlider is a ſmall hole *r* for the eye to look through in uſing the machine: and there is a long ſlit in H Z, to let the hole *r* be ſeen through when the eye is placed behind it at any height of the hole above the level of the bar I.

In delineating a *perſpective* repreſentation, e. gr. of the houſe, *q s r p*, a great way off, place the machine on a ſteady table, with the end E F of the horizontal board A B E F toward the houſe, ſo that when the Gothic-like arch D L C is ſet upright, the middle part of the open ſpace (about P) within it may be even with the houſe when you place your eye on Z, and look at the houſe through the ſmall hole *r*. Then fix the corners of a ſquare piece of paper with four wafers on the ſurface of that half of the horizontal board which is neareſt the houſe; and all is ready for drawing.

Set the arch upright, as in the figure; which it will be when it comes to the perpendicular ſide *t* of the upright piece *s t* fixed to the horizontal board behind D. Then place your eye at Z, and look through the hole *r* at any point of the houſe, as *q*, and move the ſliders N and O till you bring the interſection of the threads at P directly between your eye and the point *q*: then put down the arch flat upon the paper on the board, as at S T, and the interſection of the threads will be at W. Mark the point W on the paper with the dot of a black lead pencil, and ſet the arch upright again, as before: then look through the hole *r*, and move the ſliders N and O till the interſection of the threads comes between your eye and any other point of the houſe, as *p*: then put down the arch again to the paper, and make a pencil mark thereon at the interſection of the threads, and draw a line from that mark to the former one at W; which line will be a true *perſpective* repreſentation of the corner *p q* of the houſe.

Proceed in the ſame manner, by bringing the interſection of the threads ſucceſſively between your eye and other points of the outlines or the houſe as *r*, *s*, &c. and put down the arch to mark the like points on the paper at the interſection of the threads: then connect theſe points by ſtraight lines, which will be the *perſpective* outlines of the houſe. In like manner find points of the corners of the door and windows, top of the houſe, chimnies, &c. and draw the finiſhing lines from point to point: then ſhade the whole, making the lights and ſhades as you ſee them on the houſe itſelf, and you will have a true perſpective figure of it. Great care muſt be taken, during the whole time, that the poſition of the machine be not ſhifted on the table; and to prevent ſuch an inconvenience, the table ſhould be very ſtrong and ſteady, and the machine fixed to it, either by ſcrews or clamps.

In the ſame way, a landſcape, or any number of objects within the field of a view through the arch, may be delineated, by finding a ſufficient number of *perſpective* points on the paper, and connecting them by ſtraight or curved lines as they appear to the eye.

The arch ought to be at leaſt a foot wide at bottom, that the eye at Z may have a large field of view through it; and the eye ſhould then be, at leaſt, 10½ inches from the interſection of the threads at P when the arch is ſet upright. For if it be nearer, the boundaries of view at the ſides near the foot of the arch will ſubtend an angle at Z of more than ſixty degrees, which will not only ſtrain the eye, but will alſo cauſe the outermoſt parts of the drawing to have a diſagreeable appearance. To avoid this, it will be proper to draw back the ſliding bar I, till Z be 14½ inches diſtant from P; and then the whole field of view, through the foot-wide arch, will not ſubtend an angle to the eye at Z of more than forty five degrees; which will give a more eaſy and pleaſant view, not only of all the objects themſelves, but alſo of their repreſentations on the paper whereon they are delineated. So that, whatever the width of the arch be, the diſtance of the eye from it ſhould be in this proportion: as 12 is to the width of the arch, ſo is 14½ to the diſtance of the eye (at Z) from it.

If a pane of glaſs, laid over with gum water, be fixed into the arch, and ſet upright when dry, a perſon who looks through the hole *r* may delineate the objects upon the glaſs which he ſees at a diſtance through and beyond it, and then transfer the delineation to a paper put upon the glaſs. Ferguſon's Perſpective, chap. 3.

Mr. Kirby has alſo contrived and deſcribed an inſtrument that will be uſeful in taking extenſive views, &c. The ruler A B (*fig*. 54.) is nineteen inches long, and is graduated into nineteen equal parts; it has a dove-tail groove on its upper edge to receive the perpendicular ruler G, which has one end fitted to it, ſo as to ſlide very eaſily; this ruler is fourteen inches long, and is divided into fourteen equal parts, and upon the back ſide of it F is a line drawn exactly in the middle, to which is fixed a ſilken line with a ſmall plummet at the end. The ruler A B is fixed by two ſcrews *a*, *c*, to two pieces of thin braſs; and theſe pieces of braſs are fixed at the other ends by two ſcrews *d*, *e*, to a ſtronger piece of braſs *b f*, which goes cloſe to the ruler A B, and has a joint at X turning upon a ſcrew: below this joint is a piece of round braſs about ſix inches long, which goes into a hole made in the top of the ſtaff, and may be raiſed higher or lower, by means of a ſcrew *S*: C D E repreſents part of this ſtaff, the whole length of which is about three feet, and at the bottom is a rank ſcrew made of iron and fixed to the ſtaff. H I is a wire twenty-two inches long, with a ſcrew at *h* to go into the hole *b*; the piece of braſs wire bent into the form *i k*, is fixed to the wire H I by the ſcrew *k*; and the part *i* goes into the hole *f* in the braſs-piece *b f*. The ſmall wire K L is about twelve inches long, and flatted at K, at which place is a little hole above one-eighth of an inch in diameter; this wire K L is fitted to the holes *l*, *m*, *n*, *o*, which are made in the larger wire H I, and it may be placed higher or lower by means of a ſmall ſcrew. This inſtrument is uſed in the following manner: fix a paper upon a drawing board, as in *fig*. 55. and divide the paper lengthways into nineteen equal parts, and perpendicularly into fourteen equal parts; making theſe diviſions greater or ſmaller according to your deſign. Then take the ſtaff, and fix it ſtrongly in the ground by means of a ſcrew at bottom, and at a convenient diſtance from the proſpect which you intend to take. After this, put the inſtrument together as in *fig*. 56. and fix the ruler A B exactly horizontal by means of the plummet on the perpendicular ruler and the braſs joint X; then fix the wire K L, ſo as to have the eye-hole exactly level with the horizon or equal to the height of the eye, and take care to have the greateſt diſtance of the eye-hole from the ruler equal to the whole length of the longeſt ruler A B, and never leſs than the diſtance *h l*. Having thus fixed the inſtrument, proceed to make the drawing; look through the eye-hole, and then move the perpendicular ruler in the groove, till you get one edge exactly againſt ſome principal object; then will the parts upon the ruler ſhew how high the object is from the bottom of the ruler, i. e. from the bottom of the picture, and you will alſo know its apparent height; therefore transfer this to the paper in thoſe ſquares which correſpond with the diviſions upon the rulers. For the breadth of objects, move the perpendicular ruler ſo as to be even with the ſides of an object, and the diviſions upon the lower ruler will ſhew their apparent breadths. After the ſame manner, get the places and apparent ſizes of as many principal objects as are neceſſary for aſſiſting you, in completing the whole drawing, which may be done by this method with great exactneſs. When the drawing is finiſhed, the inſtrument may be taken to pieces and put into a box, which may ſerve as a drawing board; the top M may be ſcrewed into the ſtaff, which will ſerve as a walking ſtick, and the ſtool to ſit on may be made very portable; ſo that every part of this apparatus may be carried by one perſon without any inconvenience. Kirby, ubi ſupra, b. ii. p. 65, &c.

PERSPECTIVE, *military*, is that wherein the eye is ſuppoſed to be very remote from the table or plane. See *Bird's Eye View*, in PERSPECTIVE.

PERSPECTIVE, *plan*, *plane*, is a glaſs, or other tranſparent ſurface ſuppoſed to be placed between the eye and the object, perpendicular to the horizon, unleſs the contrary be expreſsly mentioned.

Such is the plane H I (*fig.* 3.) between the eye O, and the object, A B C, cutting the optic rays in *a b c*.

This, ſome call the *ſection*, ſome the *table*, others the *picture*, and others the *glaſs*.

PERSPECTIVE *ſcenographic*. See SCENOGRAPHY.

PERSPECTIVE *of ſhadows*. See SHADOW.

PERSPECTIVE, *ſpecular*, is that which repreſents the objects, in conical, ſpherical, or other mirrors, erect and clear, whereas on other planes they appear confuſed and irregular. See MIRROR and ANAMORPHOSIS.

PERSPICUITY, *perſpicuitas*, in *Rhetoric*, is a principal excellence of ſtyle, to which all the ornaments and beauties of ſpeech ought to give way; as it is neceſſary to render a diſcourſe intelligible, and forms one of the conſtituent parts of ELEGANCE. *Prima eſt eloquentiæ virtus perſpicuitas*, ſays Quintilian, lib. viii. cap. 2. There are three different ways in which *perſpicuity* in a compoſition may be violated; viz. by obſcurity, ambiguity, and unintelligible expreſſion. The common ſources of obſcurity are ſome defect in the expreſſion, ariſing from ellipſes in language, the affectation of conciſeneſs, or rapidity of thought in writers, or a bad choice of words; a bad arrangement of the words, ſo that the conſtruction is not ſufficiently clear; the uſe of the ſame word in different ſenſes in the ſame ſentence, an uncertain reference in pronouns and relatives; too complicated or artificial a ſtructure of the ſentence, ſo that the ſenſe is too long ſuſpended by parentheſis; the injudicious introduction of technical words and phraſes; and, laſtly, very long ſentences. Ambiguity may be occaſioned either by uſing ſome expreſſion which is equivocal, or by ranging the words in ſuch an order that the conſtruction is rendered equivocal. The laſt fault proceeds either from great confuſion of thought, which is commonly accompanied with intricacy of expreſſion, or from affectation of excellence in the diction, evidenced by the injudicious uſe of figures, or from a total want of meaning. In theſe ſeveral ways, a ſpeaker may expreſs himſelf obſcurely, and ſo convey his meaning imperfectly to the mind of the hearer; or expreſs himſelf ambiguouſly, and ſo along with his own, convey a meaning entirely different; or expreſs himſelf unintelligibly, and ſo convey no meaning at all. Dr. Campbell in his Philoſophy of Rhetoric, vol. ii. book 2. chap. 6. has well exemplified and expoſed theſe offences againſt *perſpicuity*. It is juſtly obſerved by Quintilian, ubi ſupra, that by *perſpicuity*, care is taken, not that the hearer *may* underſtand, if he will; but that he *muſt* underſtand, whether he will or not.

PERSPIRATION, *perſpiratio*, in *Medicine*, the action of evacuating the ſuperfluous juices of the body through the pores of the ſkin.

When this evacuation is copious enough to be perceived by the ſenſes, as in ſweat, the *perſpiration* is ſaid to be *ſenſible*; where it eſcapes the notice of the ſenſes, as is the caſe in the ordinary ſtate of the body, the *perſpiration* is ſaid to be *inſenſible*.

The word *perſpiration*, uſed ſimply, and without any adjective, is to be underſtood of inſenſible *perſpiration*.

This evacuation was indeed known to the ancients, Hippocrates, Galen, &c. but it was Sanctorius, the famous Paduan phyſician, who firſt brought it under any ſtated rules. To him we owe both the invention and perfection of the doctrine of *inſenſible perſpiration*.

The veſſels through which the *perſpiration* is performed, lie obliquely open under the ſquamæ or ſcales of the cuticle or ſcarf-ſkin. They are inconceivably ſmall: from a calculation of Leewenhoeck it appears, that the mouths of one hundred and twenty-five thouſand of them may be covered with a common grain of ſand.

The moſt conſiderable of theſe pores are the orifices of the ducts ariſing from the miliary glands.

Through theſe veſſels there is continually tranſuding a ſubtle humour, from every point of the body, and throughout the whole expanſe of the cuticle.

The matter evacuated this way is found by certain experience to be more than equal to that evacuated all the other ways, i. e. by ſtool, urine, &c. Sanctorius found in Italy, under the circumſtances of a moderate diet, middle age, and eaſy life, that the matter inſenſibly perſpired was $\frac{5}{8}$ of that taken in for food: ſo that there only remained $\frac{3}{8}$ for nutrition, and for the excrements of the noſe, ears, inteſtines, bladder, &c.

The ſame author ſhews, that as much is evacuated by inſenſible *perſpiration* in one day, as by ſtool in fourteen days; particularly, that in the ſpace of a night's time, about ſixteen ounces are ordinarily diſcharged by urine, four ounces by ſtool; and above forty ounces by *inſenſible perſpiration*.

He alſo obſerves, that if a man eat and drink eight pounds in a day, five pounds of it are ſpent in *inſenſible perſpiration*; and adds, as to the times, that within five hours after eating, there is perſpired about one pound; from the fifth to the twelfth hour about three pounds; and from the twelfth to the ſixteenth ſcarce half a pound.

M. Dodart, from a number of experiments made for thirty-three years ſucceſſively, aſſures us, that we perſpire much more in youth than in age. In ſome perſons the *perſpiration* is ſo copious, that they void very little of the coarſer excrements, though they eat very heartily.

The benefits of *inſenſible perſpiration* are ſo great, that without it, Borelli ſays, animal life could not be preſerved.

The general cauſe of *perſpiration* is the circulation and heat of the blood.

The great ſubtilty, equability, and plenty of the matter, thus perſpired, its increaſe after ſleep, &c. conſtitute the grand ſymptoms of a perfect ſtate of health; and the chief means of preſerving the ſame. On the contrary, the departing from theſe is the firſt ſure ſign, and, perhaps, the original cauſe, of diſeaſes.

Perſpiration is performed, preſerved, and increaſed, the viſcera, veſſels, and fibres; by motion or exerciſe as far as the firſt appearance of ſweat; by moderate uſe of venery; by ſleep of ſeven or eight hours, the body well covered, yet not loaded with bed-cloaths; chearfulneſs; light, fermented, yet ſolid food, not fat; pure, not heavy air, &c. The contraries of all theſe, as alſo the increaſe of the other excretions, diminiſh, prevent, and deprave it.

Hence we ſee the cauſe, effect, &c. of this perſpirable matter, its uſe in preſerving the parts ſoft and flexible, and in ſupplying what is loſt, but chiefly in preſerving the nervous papillæ moiſt, freſh, lively, and fit to be affected by objects, and to tranſmit their impreſſions.

Perſpiration is alſo abſolutely neceſſary, in the animal œconomy, for purifying the maſs of blood, and diſcharging it of a number of uſeleſs heterogeneous particles, which might corrupt it. Hence it is, that upon a ſtoppage of the uſual *perſpiration* there ariſe ſo many indiſpoſitions, particularly fevers, agues, rheums, &c.

Too much *perſpiration* occaſions weakneſs, ſwoonings, ſudden death; too little, or none at all, occaſions the capillary veſſels to dry, wither, and periſh. Hence alſo the larger emunctories come to be obſtructed; hence the circulation is diſturbed, ſharp humours retained; and hence putridity, crudity, fevers, inflammations, and impoſthumes.

Cold prevents *perſpiration*, by conſtringing the pores of the ſkin and thickening the liquors circulating in the cutaneous glands; heat, on the contrary, augments it, both by opening the excretory ducts of the glands, and by increaſing the fluidity and velocity of the humours.

To determine the ſtate and conditions of the *perſpiration*, ſo neceſſary for judging of thoſe of the body, Sanctorius invented a weighing chair, whereby he examined the quantity, degree, &c. of *perſpiration* in ſeveral circumſtances of the body, under ſeveral temperatures of the air, and in the ſeveral intervals of eating, drinking, ſleeping, &c.

Some of the more extraordinary phenomena obſerved herewith, are, that for ſome time after eating the *perſpiration* is leaſt of all: that between the fifth and twelfth hour after meals *perſpiration* is greateſt: that riding either on horſeback, in a coach or ſhip, &c. briſk motion on the ice, &c. but above all, a briſk friction of the ſkin, promote *perſpiration* ſurpriſingly: and that *perſpiration* is naturally always much leſs in women than in men.

Perſpiration is influenced by the paſſions of the mind. Thus anger and joy increaſe, and fear and ſadneſs leſſen, both *perſpiration* and urine. Anger cauſes a ſtrong motion in the membranes of the heart, and quickens its contraction and dilatation, and thereby quickens the contraction and dilatation of the blood-veſſels and ſecerning ducts, and of conſequence increaſes the diſcharges of *perſpiration* and urine; and that more or leſs, in proportion to the ſtrength or continuance of the paſſion.

Joy affects theſe diſcharges in like manner as anger. In the paſſions of fear and ſorrow, *perſpiration* and urine are leſſened, by the depreſſion of the activity of the ſoul under thoſe paſſions. Dr. Bryan Robinſon of the Food and Diſcharges of Hum. Bodies, p. 77, ſeq.

The proportion of *perſpiration* to urine is increaſed by all thoſe exerciſes which increaſe the motion of the blood, and warm the ſkin.

We have an account of a perſon, who by paſſing many nights in aſtronomical ſpeculations, had his *perſpiration* ſo obſtructed by the cold and damp of the air in Holland, that a ſhirt he had worn for five or ſix weeks was as clean as if it had been worn but one day. The conſequence of this was, that he gathered ſubcutaneous waters, but was cured in time. Phil. Tranſ. N° 8. p. 138.

We have ſeveral obſervations, experiments, and tables, relating to the quantity of *perſpiration*, urine, and ſtool, in South Carolina, by Dr. John Lining. See Philoſ. Tranſ. N° 470 and 475.

Some have ſuppoſed that the *perſpiration* of animal bodies, in a healthy ſtate, has the ſame effect upon air that breathing it has, viz. phlogiſticating and making it noxious; this is an opinion which Dr. Ingenhouſz has deduced from ſome experiments; and Dr. Macbride, Eſſays, p. 257. informs us, that having collected about two drams of ſweat, and mixed it with ſix drams of lime-water, he found that the mixture immediately became turbid, and in a ſhort time depoſited a light ſediment, like that afforded in ſimilar circumſtances by urine, and which effervesced as violently when ſpirit of vitriol was added. Whence he concludes, that air is thrown off from the fluids by *perſpiration* as well as by urine. But Dr. Prieſtley obſerving, that there is nothing we know of in the human frame which would lead any perſon to ſuſpect that air ever iſſues from the ſkin, from various experiments maintains, that perſpirable matter has no ſuch effect upon the air, leaving it as wholeſome or as fit for reſpiration as ever, as he concludes from the teſt of nitrous air. Hence he infers that it is only RESPIRATION, and not the *perſpiration* of the body, that injures common air. Exper. and Obſ. vol. v. ſect. 10.

PERSPIRATION *of plants*. See PLANTS.

PERTICA, a ſort of comet, being the ſame with VERU.

PERTICA, among the Romans, a long rod for beating the fruit from trees. It was likewiſe uſed for a long meaſure. See PERCH.

PERTICATA, or PARTICATA *terræ*, in our *Old Law Books*, is the fourth part of an acre, or a piece of ground containing one perch in breadth, and forty in length. See ROOD, and PERCH.

Continet in integra ſuperficie 40 perticas.

PERTICULAS, poor ſcholars of the iſle of Man. The king granted to *L. Macguin de inſula de Man, ſcholari, quandam eleemoſynam vocatam* Perticulas, *ad ſuſtentationem cujuſdam pauperis ſcholaris, de inſula prædicta ad exercend. ſcholas, per progenitores noſtros quondam reges Angliæ datam & conceſſam.* Pat. Hen. IV.

PERU, *balſam of*. See BALSAM.

PERVIGILIA, in *Antiquity*, an appellation given to nocturnal feſtivals, celebrated in honour of ſeveral deities, as Ceres, Venus, Fortune, &c. They were ſo called becauſe the nights were ſpent in waking.

PERVIGILIUM, in *Medicine*, exceſſive waking, or WATCHING.

PERVINCA, in *Botany*. See PERIWINKLE.

PERVISE, or PARVISE, a term in our *Old Law-Books*, ſignifying, according to Selden in his notes on Forteſcue, an afternoon's exerciſe, or moot, which the pleaders held for the inſtruction of the younger ſtudents; bearing originally the ſame name with the parviſiæ in Oxford. See MOOT.

Mr. Somner ſays, that PERVISE ſignifies *palatii atrium, vel area illa a fronte aulæ Weſtmonaſterienſis, hodie*, the *Palace-yard:* and Spelman thinks, that the lawyers turned thither to meet their clients, not to hold moots.

PERUVIAN *bark*. See CORTEX *Peruvianus*.

PERUVIAN *emerald*. See EMERALD.

PERYGUA, in *Botany*, a name given by ſome authors to a plant of the caſſine kind, called the *caſſioberry* buſh, and by ſome the *Paraguay tea*.

PERYSIAS, a word uſed by authors to expreſs wine of the laſt year's vintage.

PERYSTAPHYLO *pharyngæi*, in *Anatomy*, are two ſmall muſcles inſerted between the uvula and lower extremity of the internal ala of the apophyſis pterygoides, and running obliquely backwards on the ſides of the pharynx.

PES, a long meaſure, in Engliſh called FOOT.

PES *foreſtæ*. See FOOT *of the Foreſt*.

PES *leonis*, in *Botany*, a name by which ſome authors expreſs the *alchymilla*, or ladies mantle.

PES *monetæ*, in *Ancient Records*, ſignifies a true and reaſonable adjuſtment of the real value of all current coin.

PESA, an old law-term for a WEIGH, or certain weight of cheeſe, wool, &c.

PESADE, or PESATE, in the *Manege*, that action taught a horſe, wherein he riſes with his fore feet, and bends them up to his body, without ſtirring the hind feet.

The *peſade* takes its name from the motion of the horſe, which, in this action, leans and lays all the weight of his body upon his haunches. To be perfect, the hinder feet, which ſupport the whole, ought to be fixed and immoveable, and the fore-part of the horſe more or leſs raiſed according as the creature will allow; but the fore-legs, from the knee to the feet, muſt always be extremely bent and brought under him.

The *peſade* is the firſt leſſon taught a horſe, in order to bring him to curvets, &c. unleſs he performs this well, he will never go well in any air; yet he is not to be taught it at the firſt riding.

This is the foundation of all the AIRS, and is neceſſary to diſpoſe and prepare the horſe for all ſorts of maneges: however, great eaution ſhould be uſed not to teach a horſe to riſe up, or ſtand upon his haunches, unleſs he is quite exact and obedient to the hand and heel: for in this caſe he would be thrown into diſorder, his mouth would be ſpoiled, the appuy falſified, and he would become reſtive. When he is fit for this exerciſe, work him upon the walk, the trot, and the gallop; ſtop him in the hand, keep him firm and moderately together; aid with the tongue, the ſwitch, and your legs; and when he begins to comprehend what you would have him do, encourage and careſs him; working him gently and by degrees. Sluggiſh and heavy horſes require, in the beginning, ſtronger and ſharper aids. There are other horſes, which are apt to riſe of themſelves; this ſhould be prevented, by driving them forward. Berenger's Art of Horſemanſhip, vol. ii. chap. 16.

PESAGE, *peſagium*, a cuſtom or duty paid in certain markets, &c. for weighing of merchandizes, or wares.

PESATE. See PESADE.

PESCE *vacca*, the *cow-fiſh*, a name given by Auguſtino Scilla, to a kind of dog-fiſh, not deſcribed by any author before his time, but accurately drawn by him in his book on petrifactions, on occaſion of its teeth: many ſpecies of the *gloſſopetræ* of the iſland of Malta, and other places, being plainly the ſame with the teeth in the jaws of this fiſh.

PESSARY, or PESSUS, formed from ϖεσσαριον or ϖεσσος, which ſignifies the ſame, in *Medicine*, a ſolid medicament of the length and thickneſs of a finger, but of a pyramidal form; conveyed into the natural parts of a woman, to provoke, or to put a ſtop to the menſes, to prevent a deſcent of the matrix, or on other occaſions in diſorders of thoſe parts.

The *peſſary* conſiſts of a piece of cork, or light wood, or of a little linen-bag full of powders, incorporated with wax, oil, and cotton, crammed cloſe together, to make it ſolid enough for intromiſſion.

At one end it is faſtened to a little ribband, by which it may be drawn out at pleaſure.

PESSOMANTIA, Πεσσομαντεια, in *Antiquity*, the ſame with CLEROMANCY.

PESTERABLE, in our *Old Writers*, an epithet for ſuch wares as *peſter*, or take up much room in a ſhip. Stat. 32 Hen. VIII. cap. 14.

PESTILENCE, formed from *peſtis*, which ſignifies the ſame, in *Medicine*, an epidemical, malignant, and contagious diſeaſe, uſually mortal; popularly known under the name of PLAGUE.

PEST-*houſe*, a lazaretto, or infirmary, where goods, perſons, &c. infected, or ſuſpected to be infected with ſome contagious diſeaſe, are diſpoſed, and provided for.

PESTILENCE-*wort*, in *Botany*. See BUTTER-*bur*.

PESTILENTIAL *carbuncle*. See CARBUNCLE.

PESTILENTIAL *diſeaſes*. See DISEASE.

PESTILENTIAL *fevers*, among *Phyſicians*, are ſuch as do not only afflict the patient with a vehement heat, but alſo with ſome malignant and venomous quality, and in ſome approach to the nature of the plague.

PESTIS. See PLAGUE.

PETALA, *petals*, in *Botany*, the leaves of a flower; ſo called to diſtinguiſh them from the folia, or leaves of the plant.

The word is formed from the Greek ϖεταλον, *a leaf*; which, in that language ſerves indifferently for the leaves of the plant, and thoſe of the flower.

By flower is properly meant that aſſemblage of parts, called *petala*, *ſtamina*, *apices*, and *piſtil*, which ſerve for the propagation of the kind.

The coloured leaves, called *petala*, which encompaſs the other parts, are in reality no more than caſes or covers, to ſecure and ſcreen the generative organs; unleſs, as Mr. Bradley conjectures, they may alſo ſerve to ſecrete ſome fine juice for the nouriſhment of the ſeed.

The *petal* is that part of the flower which conſtitutes the corolla; it generally diſtinguiſhes itſelf by its ſingular colour.

The *petal* is defined by Linnæus to be a corollaceous covering to the flower, meaning that it incloſes and defends it in the manner of a corolla, or wreath.

When the COROLLA conſiſts only of one *petal*, its lower tubular part is called the *tube*; its upper expanded part the *limb*: when ſeveral *petals* go to make up the flower, the narrow part where they are inſerted is called *unguis*; their broader part towards the end, *bractea* or *lamina*.

The moſt eaſy diviſion of flowers, in regard to the matter of generation, is into ſimple ones; i. e. thoſe formed of ſtamina and piſtil only; and compound flowers, whoſe ſtamina and piſtil are encompaſſed with *petala*, called by Dr. Grew the *foliation*, and by Mr. Ray *folia*.

Compound flowers again, are either encompaſſed with a ſingle *petalum*, or piece; or with ſeveral pieces; the firſt of which are called *monopetalous*, the ſecond *polypetalous* flowers.

Again, from the regular or irregular configuration of the *petala*, Mr. Juſſieu makes another diviſion of flowers into claſſes; as regular and irregular *monopetalous*; regular and irregular *polypetalous*, &c.

That great botaniſt, the late Mr. Pitton Tournefort, fixed upon the moſt ſtriking and ſhewy parts of vegetables, as the foundation of his method and generical diviſion of the vegetable world, which he has accordingly ranged into twenty-two-claſſes.

The firſt is of the plants with a *monopetalous* or one-leaved flower, formed like a bell: and the flowers of this claſs he afterwards ſubdivides into four kinds; firſt, the *bell-faſhioned* flowers properly ſo called, as being very nearly of the regular ſhape of a bell; ſecondly, the *tubulate bell-faſhioned* flowers which are narrow and oblong; thirdly, the *expanded*, which open in form of a wide baſon; and, fourthly, the *globoſe*, the mouth of which is narrower than the body. In this claſs he comprehends the *mandrake*, *lily of the valley*, &c.

The ſecond claſs is of the plants with *monopetalous funnel-faſhioned*, and *rotated*, or wheel-like flowers. The flowers of this claſs he divides into two kinds only; the one repreſenting at its mouth, the bottom of an inverted cone, the other a ſalver or ſaucer; and theſe he diſtinguiſhes by the names of *funnel-faſhioned* and *ſalver-like* flowers: of this claſs are the *tobacco*, *henbane*, &c.

The third claſs is of what he calls the plants with *anomalous*, *monopetalous* flowers; of theſe he makes the variouſly-ſhaped *monopetalous* flowers of *birth-wort*, *fox-glove*, *fig-wort*, and ſome others; ſome of which repreſent a face, and others the ſnout of an animal: to diſtinguiſh the plants of this claſs the author, however, is obliged fairly to confeſs the imperfection of the method of claſſing by the *petals* alone, and call in the aſſiſtance of the different ſtructure of the ſeed-veſſels. In this claſs he comprehends the *toad-flax*, *butter-wort*, &c.

The fourth claſs is of the plants which have a *monopetalous*, *labiated*, or lipped flower; which he defines to be ſuch a one as is narrow, like a pipe within, and expanded; and in form of lips at the mouth. In this claſs are comprehended the *ſage*, *clary*, *deadnettle*, *mint*, *baum*, &c.

The fifth claſs is of the plants with a *polypetalous cruciform* flower: that is, ſuch a one as is compoſed of a number of leaves, diſpoſed in form of a croſs; and theſe he afterwards more nicely defines to be ſuch as are always compoſed of four *petala*, or leaves only, and thoſe ever diſpoſed in form of a croſs. Of this claſs are the *creſſes*, *muſtard*, *ſcurvy-graſs*, &c.

The ſixth claſs is of the plants which have a *roſaceous*, or roſe-like flower. This he defines to be ſuch a one as is compoſed of many leaves or *petals*, diſpoſed like thoſe of the roſe into a round figure: the number of *petals*, he adds, is uncertain, and indeterminate in this claſs; and that they are frequently five, and more rarely four than two. Of this claſs are the *chickweed*, *orpine*, *ſaxifrage*, *rue*, &c.

The ſeventh claſs is of the plants with *umbelliferous* flowers. Theſe he defines to be *polypetalous roſaceous* flowers, whoſe cup goes off into a fruit compoſed of two ſeeds, cohering firmly together while green, but naturally ſeparating when ripe: and obſerves, that in this claſs the flowers are generally diſpoſed in great numbers together, and in the form of what the ladies call an *umbrella*, uſed to be carried over them to keep off the ſun; but he does not make this a neceſſary character of the claſs. The plants comprehended under this are *carrots*, *parſnips*, *earth-nuts*, *chervel*, *fennel*, &c.

The eighth claſs is of the plants with a *caryophyllous*, or pink-like flower, which he defines to be ſuch a one as is compoſed of many *petals*, diſpoſed in an orbicular form, and ariſing each from the bottom of the cup, as from a tube, in the ſame manner as they do in the common pink. Of this claſs are the *catchfly*, *ſea-lavender*, *flax*, &c.

The ninth claſs is of the plants, which have a *liliaceous*, or lily-like flower, which he defines to be ſuch a one as is compoſed of ſix *petals*, ſometimes indeed but three, but always divided, however, into ſix at the end. Here the author alſo again acknowledges the imperfection of claſſing by the *petals*, ſince he here takes in the aſſiſtance of the figure and diviſion of the ſeed-veſſel, which he ſays muſt always in this caſe be tricapſular, or divided into three cells; and plants which have this ſeed-veſſel, though their flowers are not ſtrictly of the lily-ſhape, are allowed to be truly of the claſs. Of this are the *aſphodel*, *ſaffron*, *flower-de-luce*, *tulip*, *crown imperial*, &c.

The tenth claſs is of the plants with a *polypetalous papilionaceous* flower, or one that is compoſed of many *petals*, and in form reſembling a butterfly. Theſe flowers the author defines to be compoſed of four diſſimilar *petals*, which iſſue from a one-leaved cup, which is hollow, and like the conic paper-caſes people twiſt up to put ſpices, &c. in; and divided into many ſegments at the rim; and from this cup ariſes alſo the *piſtil* of the flower. The upper leaf in theſe flowers, which in ſome ſort repreſent the colours carried by ſoldiers in battle, he calls the *vexillum* or *enſign*; the lower, which is hollowed, and in form of a boat, the *hulk*; and the two ſide ones the *wings*. The plants comprehended under this claſs are the *liquo*, *rice*, *peas*, *fenugreek*, &c.

The eleventh claſs is of plants with an *anomalous* or irregular *polypetalous* flower. Among theſe he comprehends ſuch of the *polypetalous* flowers as are of various ſhape, and compoſed of diſſimilar or irregular *petals*, and could not well be comprehended under any one expreſſive or determinate character. Of this claſs are the *violet*, *fumitory*, *dyer's weed*, *wolfsbane*, &c.

The twelfth claſs is of the plants with a *floſculous* flower. This he defines to be one compoſed of a number of ſmall flowers, crowded cloſe together, and comprehended in the ſame general *calyx*, or cup; theſe flowers, which together compoſe this complex one, he obſerves, are generally compoſed of only one *petal*, which is wider at the mouth than at the other end, and generally notched or divided there into many ſegments. He alſo has recourſe to the other parts of the flower for farther deſcriptions; and comprehends under it the *thiſtle*, *knapweed*, *bluebottle*, &c.

The thirteenth claſs is of the plants with a *ſemifloſculous* flower. Theſe he defines to be compoſed of a multitude of half-flowers, each compoſed of one *petal*, hollow in its lower part, but in its middle and upper part flat and plain; and diſpoſed into a ſingle or manifold circle. He here alſo deſcribes the fructification of the plants of this claſs, and comprehends in it the *lettuce*, *dandelion*, *hawkweed*, &c.

The fourteenth claſs is of the plants with a *radiated* flower. Theſe flowers the author deſcribes to have two parts, a middle or *diſk*, compoſed of ſmall *fiſtular* flowers, and a *rim*, or *edge*, called the corona, which is made up of half-flowers; and ſometimes, though ſeldom, of plain flat *petals*. Under this claſs are comprehended the *ſtar-wort*, *ragwort*, *golden-rod*, *ſunflower*, &c..

The fifteenth claſs is of the plants which have flowers compoſed of *ſtamina* or *threads*, ſuſtaining the *apices* or *capſules* of the fecundating farina. The author diſtinguiſhes theſe alſo by their *piſtil* changing into a ſingle ſeed enveloped in a huſk, and of this claſs makes the *ſorrel*, *arſmart*, *orrach*, the *graſſes*, *horſetails*, &c.

The ſixteenth claſs is of thoſe plants which the author ſuppoſes to have no flower at all; and yet to produce ſeeds. Of this claſs he determines the *fern*, *liverwort*, and *adder's tongue*, to be.

The ſeventeenth claſs is of thoſe plants whoſe flowers and fruit he ſays are both ordinarily wanting. Theſe he afterwards divides into the earth and water-plants; among the firſt he reckons the *moſſes*, *muſhrooms*, &c. And among the others the *fucuſes*, *algas*, *corallines*, &c. the flowers and ſeeds of which he obſerves we are as yet at leaſt ignorant of.

The eighteenth claſs is of the trees and ſhrubs which have *apetalous* flowers, or flowers without *petals* or leaves at all. Of this claſs are the *aſh*, *box*, &c.

The nineteenth claſs is of the trees and ſhrubs which have *catkins* or *juli* for their flowers. Theſe the author ſays conſiſt either of *ſtamina* and *apices* alone, that is, of the threads or capſules of the farina; or they are compoſed of theſe with ſome little leaves affixed to a long ſlender axis: theſe *catkins* he obſerves are always in a different place from the fruit; and that, ſometimes on the ſame, ſometimes on different trees. Of this claſs are the *walnut*, *oak*, *beech*, &c.

The twentieth claſs is of trees and ſhrubs, which have a *monopetalous* flower; and of this are the *elm*, *lilac*, *ſtorax*, *olive*, &c.

The twenty-firſt claſs is of the trees and ſhrubs which have a *roſaceous* flower; and among theſe are comprehended the *lime*, *ſumach*, *ivy*, *vine*, &c.

And the twenty-ſecond, or laſt claſs, is of the trees and ſhrubs with a *papilionaceous* flower; among which are reckoned the *broom*, *bean*, *trefoil*, *judas-tree*, &c. See BOTANY, and FLOWER; and *Tables* VIII. IX. and X. *of Botany*.

It is very eaſily ſeen, that this is far from a ſtrictly accurate method; the author has indeed aſſiſted it with figures, which are very uſeful and inſtructive; and, as the judicious Linnæus obſerves, more is in reality to be learned from them than from all the author has ſaid. Linnæus has well obſerved, that this method is neither perfect nor ſufficiently diſtinctive; the glory of inſtructing the botaniſt with truth and certainty was indeed reſerved for that author alone, who, when he had ſhewn the imperfection and uncertainty of all the before eſtabliſhed methods, planned out an abſolutely new one, founded on the unalterable parts of plants, their organs of FRUCTIFICATION.

Nature exhibits peculiar art in the folding up of the *petala* in the perianthium, before they begin to blow or expand: of theſe foldings Dr. Grew notes the following varieties; viz. the cloſe couch, as in roſes; the concave couch, as in blattaria flore albo; the ſingle plait, as in peas bloſſoms; the double plait, as in blue-bottles; the couch and plait together, as in marigolds, &c. the rowl, as in ladies-bower; the ſpire, as in mallows: and laſtly, the plait and ſpire together, as in convolvulus doronici folio.

The calyx, or perianthium, ſometimes ſerves plants in lieu of *petala*.

PETALISM, *petaliſmus*, ϖεταλμισμος, in *Antiquity*, a kind of EXILE or BANISHMENT, for the term of five years.

The *petaliſm* at Syracuſe was nearly the ſame thing as the *oſtraciſm* at Athens, except that the latter was for ten years, and the former only for five.

The *petaliſm* was performed by the people's writing the name of the perſon condemned, on a leaf: whence the term from ϖεταλον, *leaf*.

PETALODES, πεταλιωδης, a name given to urine, when it ſeems to have little leaves, flakes, or ſcales in it.

PETAMINARIUS, in *Antiquity*, a name given to certain perſons who performed extraordinary feats of activity; took perilous leaps, vaults, &c.

The word is formed from the Greek, πεταμαι, *volo*, *I fly*. Some authors write it *petiminarius*: and derive it from *petimen*, which, according to Servius, ſignifies the bunch of a camel: alluding to the manner wherein theſe operators bend the body in exhibiting poſtures, &c.

PETARD, in *War*, a kind of engine of metal, ſomewhat in ſhape of a high crowned hat, or truncated cone; ſerving to break down gates, barricades, draw-bridges, or the like works which are intended to be ſurpriſed.

The *petard* may be conſidered as a piece of ordnance, very ſhort, narrow at the breech, and wide at the muzzle made of copper mixed with a little braſs; or of lead with tin; uſually about 8.5 inches within at the bottom; the diameter at the beginning of the round part is ſix, and diſtant from the lower baſe nine inches: the circular part is deſcribed from the point where the perpendicular to the ſides meets the middle line or axis; the thickneſs of metal is 1.6 inches: there is a brim at the bottom that projects the metal by two inches, and is one inch thick, in which are ſix holes of half an inch diameter, which ſerve for ſcrews to faſten the *petard* on a board in a firm manner; there is a cavity within at the bottom, half an inch deep, and as much in height to fix a board, in order to keep the charge in the *petard* before it is fixed to the board or plank. There are likewiſe two handles of about three inches from the flat ring, five inches long, $\frac{7}{10}$ thick, and 1.8 from the outſide to the metal. Laſtly a hole of an inch diameter is made either at the top, or on the ſide, to ſcrew in an iron fuſe by which the powder is fired, which fuſe is filled with a ſlow compoſition, in order that when it is lighted, the pretardier may have time to retire out of danger. See the ſection of a *petard* in *Tab.* II. *Gunnery*, *fig.* 13.

Petards are made of various dimenſions: but the biggeſt ſhould not weigh above ſeventy pounds when loaded and fixed to its plank, and the leaſt not leſs than forty-five or fifty. The common and beſt way of loading the *petard* is to fill it gradually with powder, and between every layer of two or three inches thick, to put a wooden mould into the *petard*, which ſhould be beat upon with a mallet, ſo as to preſs the powder as cloſe together as poſſible, without bruiſing the grains; and when it is quite full, the board is put upon the powder, and over this a cloth with roſin, and bound round the brim with packthread, to keep the charge and board together till the *petard* is ſcrewed on the plank or board; then the part that exceeds the brim is cut off, and the other being preſſed by the brim prevents any air from coming to the powder. The board to which the *petard* is fixed has two iron bands on the back, placed croſs-ways, and a hook to hang it up againſt the gate or door by means, of a ſcrew, when it is to be uſed. Some moiſten the powder with ſpirits of wine, and dry it in the ſun, in order to make it ſtronger, and then ſprinkle every layer of powder of two inches in thickneſs with mercury, upon which they lay powder again, and preſs it down, ſprinkling it with mercury, till the petard is filled.

Its uſe is in a clandeſtine attack, to break down gates, bridges, barriers, &c. to which it is hung: which it does by means of the wooden plank. It has been alſo uſed in countermines, to break through the enemies galleries, and give vent to their mines: but in later years the uſe of *petards* has been diſcontinued.

Petards are ſometimes alſo made of wood, bound round with iron hoops.

The invention of *petards* is aſcribed to the French Huguonots in the year 1579. Their moſt ſignal exploit was the taking the city Cahors by means hereof, as we are told by d'Aubigné.

PETARDIER, in the *Military Art*, is he who loads, fixes, and fires the *petard*.

PETASITES, *butterburr*, in *Botany*. See BUTTER *Bur*.

PETASUS, among the *Romans*, a covering for the head, not unlike our hats; it had a broad brim, and was uſed in journeys to ſave the face from being ſun-burnt.

The PILEUS differed from the *petaſus*, as having no brim.

The *petaſus* is obſerved upon the head of ancient figures of Mercury; who wore it in the quality of the god of travellers and merchants.

PETECHIÆ, ſpots in the ſkin, like flea-bites, which come out in ſome fevers, which are hence called *petechial* or *ſpotted fevers*. See FEVER.

PETECHIAL, an appellation given to a malignant epidemical kind of fever; wherein the ſkin breaks out in *petechiæ*, or purple ſpots.

The *petechial* FEVER is alſo called *febris lenticularis*, and *pulicaris*.

PETELMA, in the *Turkiſh Military Orders*, is the procurator-general of the effects of the Janizaries. When any one dies under the protection of this body, he ſeals up their houſes, to ſecure the tenth part of their effects; which are due to the Janizaries.

PETERERO. See PEDRERO.

PETER-*pence*, an ancient levy, or tax, of a penny on each houſe throughout England, paid to the pope.

It was called *Peter-pence*, becauſe collected on the day of St. *Peter ad vincula*; by the Saxons it was called *Rome-feoh*, i. e. the fee of Rome. and alſo *Rome-ſcot*, and *Rome-pennying*, becauſe collected and ſent to Rome: and laſtly, it was called *hearth-money*, becauſe every dwelling houſe was liable to it, provided there were thirty pence *vivæ pecuniæ* belonging to it, nay, and every religious houſe; the abbey of St. Alban's alone excepted.

This *Peter-pence* was at firſt given as a penſion or alms, by Ina king of the Weſt Saxons, in the year 727, being then in pilgrimage at Rome: and the like was done by Offa, king of the Mercians, throughout his dominions, in 794: and afterwards by Ethelwulph, through the whole kingdom, in the year 855.

It was not intended as a tribute to the pope, but chiefly for the ſupport of the Engliſh ſchool or college at Rome: the popes, however, ſhared it with the college; and at length found means to appropriate it to themſelves.

At firſt it was only an occaſional contribution; but it became at laſt a ſtanding tax; being eſtabliſhed by three laws of king Canute, Edward the Confeſſor, the Conqueror, &c.

The biſhops who were charged with the collecting it, employed the rural deans and archdeacons therein.

Edward the Third firſt forbad the payment, but it ſoon after returned, and continued till the time of king Henry VIII. when Polydore Virgil reſided here as the pope's receiver-general.

It was aboliſhed under that prince, and reſtored again under Philip and Mary; but it was finally prohibited under queen Elizabeth.

St. PETER'S-*wort*, *aſcyrum*, in *Botany*, a genus of the *polyadelphia polyandria* claſs. Its characters are theſe: the empalement of the flower is four-leaved; and the flower has four oval petals, the two outer are large, and placed oppoſite, the two inner ſmall; in the centre is ſituated an oblong germen, attended by a great number of briſtly ſtamina, which are reduced at their baſe to four bodies; the germen becomes an oblong pointed ſeed-veſſel, filled with ſmall round ſeeds. Miller enumerates four, and Linnæus three ſpecies.

PETESIA, in *Botany*, a genus of the *tetrandria monogynia* claſs: its characters are, that the corolla has a ſingle petal, and is funnel-ſhaped; the ſtigma is bifid, and the fruit a polyſpermous berry. There are two ſpecies.

PETIA, a word uſed by medical writers in different ſenſes. It is commonly underſtood to mean a piece of rag, uſed to tie medicinal ingredients in, to be uſed by infuſion in liquors; but *petia oculi* ſignifies an hæmorrhage of the eye.

PETICULÆ, the ſame as *petechiæ*, purple ſpots appearing on the fleſh in malignant fevers.

PETIGO, a word uſed by ſome authors for IMPETIGO.

PETILIUS *flos*, a name uſed by ſome botanical authors for the African marygold.

PETIMBUARA, in *Ichthyography*, the name of a fiſh caught in the American ſeas, and called by ſome, in Engliſh, the *tobacco-pipe fiſh*; a name more commonly uſed for the ACUS *Ariſtotelis*.

It grows to the length of three or four feet; its body is like that of an eel, long and ſlender; and its mouth without teeth; the length of the noſe is conſiderable, and the upper jaw is ſhorter than the lower; its eyes are remarkably large, not ſmaller than a hazel nut, and ſomething of the ſame figure; its ſkin is ſmooth, like that of the eel, and of a liver-colour on the back and ſides, with ſeveral rows of blue ſpots diſpoſed in three rows on the back, two on the head, and one on each ſide; there are alſo ſome green ſpots every where interſperſed among the blue ones. The belly is white, but has ſomething of a browniſh-red caſt, and is flat. It is a well-taſted fiſh.

PETIOLATE *leaf*, among *Botaniſts*. See LEAF.

PETIOLE, *petiolum*, among *Botaniſts*, expreſſes that ſtalk which ſupports the leaves of a plant, as the peduncle does the fructifications.

Some uſe the word *petiolum* to denote the whole middle rib of a leaf of any plant, which is the ſtrongeſt part of it, and runs from the ſtalk, by which the leaf adheres to the tree or plant, to its extremity, and from which the lateral fibres or nerves, as they are uſually called, commonly ariſe.

The authors, who have written on the ſubject of the anatomy of leaves, have had occaſion to be accurate about the diſtinctions of the ſeveral parts; and they have called this main or middle rib, the *petiolus*. The ſide-branches going off from this, they call *rami*; and the ſubdiviſions of theſe into more minute fibres, *ſurculi*: theſe generally are interwoven into a reticular plexus one with another, and make up the ſubſtance of the leaf, with the bladders of a liquid matter, which are contained in their interſtices. All theſe ſolid parts of leaves, the *ſurculi* and *rami* as well as the *petiolus*, are congeries of oblong fibres extended evenly together, and collected into one body; and the fibres in all parts of plants are divided into two kinds; the one containing juices, and called *ſucciferæ*; the other giving paſſage only to air, and therefore called *tracheæ*.

Leewenhoeck has diſtinguiſhed the ſucciferous veſſels into two kinds, which he calls veins and arteries: the latter, he obſerves, receive the ſap from the root, where it is firſt collected, and carry it up to the reſt of the plant, and the others bring it back again from thence, in the manner of veins.

Perralt has joined a great number of experiments to Leewenhoeck's, in order to prove this ſyſtem of the juice-veſſels, but Fontenelle, and ſome others, have doubted either the exiſtence, or at leaſt the uſe, of the TRACHEÆ or air-veſſels, ſuppoſing them either imaginary veſſels, or deſtined for other purpoſes. The vine-branches, however, examined either by a microſcope, or by a good eye in a good light, will ſhew evidently that ſuch veſſels exiſt, and that in very great numbers; and the veſſels in the *petiole* and *ſurculi* of leaves, when ſtrictly examined, are found to be of both theſe kinds. Act. Erudit. 1722.

PETIOLUS, a word uſed by botanical writers to expreſs the ſtalk of a fruit.

PETIT, *cape*, *jury*, *larceny*, *ſerjeanty*, *ſeſſion*, *treaſon*. See the ſubſtantives.

PETITE *guerre*, Fr. in *Military Language*, is carried on by a light party, commanded by an expert partiſan, conſiſting of between one and two thouſand men, ſeparated from the main army, in order to ſecure the camp on a march, to reconnoitre the enemy or the country, to ſeize their poſts, convoys, or eſcorts, to plant ambuſcades, and to practiſe every ſtratagem for ſurpriſing or diſturbing the enemy.

PETITA *terra*. See SUMMONS.

PETITIO *induciarum*, in the *Civil Law*, the ſame as IMPARLANCE in common law.

PETITIO *principii*, in *Logic*, a begging the queſtion, or precarious ſuppoſing a thing to be true, or taking it for granted, when it really remains either dubious, or elſe expreſly denied.

PETITION, *petitio*, a ſupplication in form, made by an inferior to his ſuperior; eſpecially to one having ſome juriſdiction.

To ſubſcribe a *petition* to the king to frighten him into change of his meaſures, intimating, that if he denied, many thouſands of his ſubjects will be diſcontented, &c. is included among the contempts againſt the king's perſon and government, tending to weaken the ſame, and is puniſhable by fine and impriſonment. 1 Hawk. P.C. 60.

The right of *petition* is, however, unqueſtionable; provided care be taken, that under the pretence of petitioning, the ſubject be not guilty of any riot or tumults for preventing which, it is provided by the ſtat. 13 Car. II. ſtat. 1. cap. 5. that no *petition* to the king, or either houſe of parliament, for any alterations in church or ſtate, ſhall be ſigned by above twenty perſons, unleſs the matter thereof be approved by three juſtices of the peace, or the major part of the grand jury, in the country; and in London by the lord mayor, aldermen, and common council: nor ſhall any *petition* be preſented by more than ten perſons at a time, on pain in either caſe, of incurring a penalty not exceeding 100*l.* and three months impriſonment. But, under theſe regulations, it is declared by the ſtatute 1 W. and M. ſtat. 2. cap. 2. that the ſubject hath a right to *petition*; and that all commitments and proſecutions for ſuch petitioning are illegal.

PETITION *of appeal* to the houſe of lords is the dernier reſort of any ſubject who thinks himſelf aggrieved by any interlocutory order or final determination in the court of chancery. This juriſdiction of the houſe of peers is ſaid to have begun in 18 Jac. I. and the firſt *petition*, which appears in the records of parliament, was preſented in that year; and the firſt that was heard and determined was preſented in a few months after; both levelled againſt the lord keeper Bacon, for corruption and other miſbehaviour. It was afterwards warmly controverted by the houſe of commons, in the reign of Charles II. But the diſpute has long ſince terminated. We may obſerve that no new evidence is admitted in the houſe of lords, upon any account, for this is a diſtinct juriſdiction.

PETITION *of bankruptcy*, is a *petition* preſented to the lord chancellor by one creditor, to the amount of 150*l.* or by three or more to the amount of 200*l.* upon which he grants a COMMISSION to certain perſons, who are then ſtyled commiſſioners of banrupts. The petitioners muſt be bound in a ſecurity of 200*l.* to make the party amends, in caſe they do not prove him a BANKRUPT. And if they receive any money or effects from the bankrupt, as a recompence for ſuing out the commiſſion, ſo as to receive more than their rateable dividends of his eſtate, they forfeit not only what they have ſo received, but their whole debt.

In conſequence of this *petition*, and when the commiſſion is awarded and iſſued, the commiſſioners are to meet, at their own expence, and to take an oath for the due execution of their commiſſion, and to be allowed a ſum not exceeding 20*s.* per diem each, at every ſitting. When the commiſſioners have received proof of a perſon's being a trader, and of his having committed an act of bankruptcy, they declare him a bankrupt, giving notice thereof in the Gazette, and appointing three meetings. At one of theſe meetings ASSIGNEES ſhall be choſen; and at the third meeting, at fartheſt, which muſt be on the forty-ſecond day after the advertiſement in the Gazette, the bankrupt, upon notice ſerved upon him or left at his uſual place of abode, muſt ſurrender himſelf perſonally to the commiſſioners, and conform to the ſtatutes of bankruptcy; or, in default thereof, be guilty of felony, and ſhall ſuffer death, and his goods and eſtate ſhall be diſtributed among his creditors. The bankrupt is to be examined by the commiſſioners, who may alſo ſummon and examine his wife or any other perſon; and if he refuſe to anſwer fully to any lawful queſtion, or to ſubſcribe his examination, they may commit him to priſon without bail, till he makes and ſigns a full anſwer. The bankrupt is alſo to make a full diſcovery of all his eſtate and effects, and in caſe he conceals or embezzles any to the amount of 20*l.* or with-holds any books or writings, with intent to defraud his creditors, he ſhall be guilty of felony without benefit of clergy. After the time allowed to the bankrupt for ſuch diſcovery is expired, any other perſon voluntarily diſcovering any part of his eſtate, before unknown to the aſſignees, ſhall be intitled to five per cent. out of the effects ſo diſcovered, and ſuch reward as the commiſſioners and aſſignees ſhall think proper: but any truſtee wilfully concealing the eſtate of any bankrupt, after the expiration of the forty-two days, ſhall forfeit 100*l.* and double the value of the eſtate concealed, to the creditors. For the farther proceſs in a caſe of BANKRUPTCY, ſee CERTIFICATE.

We ſhall only here obſerve farther, that by ſtatute 19 Geo. II. cap. 32. no money paid by a bankrupt to a *bona fide* or real creditor, in a courſe of trade, even after an act of bankruptcy done, is liable to be refunded: nor by 1 Jac. I. c. 15. ſhall any debtor of a bankrupt, that pays him his debt, without knowing of his bankruptcy, be liable to account for it again.

PETITION *of right*, was a parliamentary declaration of the liberties of the people, aſſented to by king Charles I. in the beginning of his reign: in which it is enacted, that none ſhould be compelled to make or yield any gift, loan, benevolence, tax, and ſuch like charge, without conſent by act of parliament; nor upon refuſal ſo to do, be called to make anſwer, take any oath not warranted by law, give attendance, or be confined, or otherwiſe moleſted concerning the ſame, &c. And that the ſubject ſhould not be burthened by the quartering of ſoldiers or mariners; and all commiſſions for proceeding by martial law to be annulled, and none of like nature iſſued thereafter, leſt the ſubject (by colour thereof) be deſtroyed or put to death, contrary to the laws of the land, &c. See ſtat. 3 Car. I. cap. 1.

PETIVERIA, in *Botany*. See *Guinea* HENWEED.

PETOLA, in *Zoology*, a ſpecies of coluber, the ſcuta of whoſe abdomen are two hundred and nine; and the ſquamæ of the tail ninety. See COLUBER.

PETOLIN, in *Natural Hiſtory*, the French name for a ſhrub of the piſtachia kind, famous for affording bladders or tubercles on its leaves and tender branches, in the manner of the common turpentine-tree; which are found full of inſects. Theſe inſects are always found to be of the puceron kind, and ſome of them are winged, others not, as is known to be the caſe in that genus of animals Theſe bladders, and thoſe of the turpentine-tree, called its *horns*, have been by ſome ſuppoſed to be the natural production of the trees, but they are in reality only a peculiar ſpecies of bladder-galls, formed by theſe animals, one female of which making her way into the leaf, while the young raiſes its covering membrane into a bladder, in which ſhe produces her young ones; which by ſucking its ſides, derive the juices to it, and occaſion its increaſe. See PUCERON.

PETRARIA, in *Ancient Writers*, is ſometimes taken for a quarry of ſtone.

In other places *petraria* is uſed for a ſort of engine of war, wherewith ſtones were caſt on the enemy; chiefly uſed in ſieges, &c.

PETRE *oil*, Πετρελαιον, the ſame as petroleum. See PETROL.

PETREA, in *Botany*, a genus of the *didynamia angioſpermia* claſs. Its characters are theſe: the flower hath an empalement of one leaf, cut into five acute ſegments; it has one petal, with a ſhort tube, cut above into five almoſt equal ſegments, which are expanded; it has four ſhort ſtamina ſituated in the tube, two of which are a little longer than the other, terminatd by ſingle ſummits; and four germina ſuppporting a ſhort ſtyle, crowned by an obtuſe ſtigma; the germina become four ſeeds, wrapped in a fringed cover. There is but one ſpecies, a native of La Vera Cruz, in New Spain.

PETREL, the name of a very remarkable bird, called *procellaria*, by authors. See FULMER, SHEAR-*water*, and STORM-*fink*.

PETRIDIA, in *Natural Hiſtory*, the name of a genus of foſſils of the SCRUPI kind, of a plain uniform ſtructure, of no great variety of colours, and emulating the external form of pebbles.

Of this genus there are twelve known ſpecies Hill.

PETRIFACTION, or PETRIFICATION, formed from ϖετρα, *ſtone*, and *fio* or *facio*, *to become*, or *to make*, in *Phyſiology*, the act of converting fluids, woods, and other matters, into ſtone.

The faculty of *petrifying* wood is aſcribed to ſeveral ſprings, lakes, &c. and the ancient naturaliſts mention a river whoſe waters turned bodies into marble, by mere contact; nay, which, being drunk, *petrified* the viſcera of the drinker.

> *Flumen habent Cicones, quod potum ſaxea reddit*
> *Viſcera, quod tactis inducit marmora rebus.*

Seneca relates, that the mud of this river was of ſuch a nature as to harden and glue together the parts of bodies. As, ſays he, the duſt of Puzzuoli, by barely touching water, becomes ſtone: ſo this water, by touching any ſolid, penetrates and grows to it; whence things caſt into it are immediately taken out ſtones. Pliny obſerves very well, that wood caſt into this river is preſently found covered with a ſtony bark or rind; and ſubjoins the names of ſeveral other rivers which do the ſame: particularly the river Silarus, near Tarentum, whoſe waters are nevertheleſs found very wholeſome. To Pliny's liſt we might add many more among ourſelves; particularly the Loch Lohmond, in Scotland, Loch Neagh, in Ireland, &c. But, in effect, there does not ſeem any real tranſmution of the woody nature into the nature of ſtone, in any of theſe caſes: all that is done is this; the ſtony particles, which before floated in the liquor, are now lodged on the ſurface, or depoſited in the pores of theſe ſubſtances, in ſuch manner, and in ſuch plenty, as to leave little elſe but the appearance of a ſtone.

Petrifactions are moſt frequently nothing elſe but incruſtations of ſtony particles, which ſurround the bodies immerged, and, as ſalts, ſhoot upon and adhere to them.

Varenius has a conjecture, that waters only petrify woods by means of certain minute, ſharp, and pointed particles lodged therein, which cut the longitudinal fibres of the wood in any infinite number of points, and thus deſtroy the form by which they were diſtinguiſhed from ſtone.

The knowledge of this part of natural hiſtory is but of very late years arrived at any degree of perfection. Dr. Hooke, Steno, Boerhaave, and Auguſtino Scilla, have been among the firſt who treated judiciouſly of theſe things; but great honour is to be done to Fabius Columna, who, before the time of any of them, publiſhed two admirable diſcoveries upon the parts of aquatic and terreſtrial animals, and of plants buried in the earth, and which he had himſelf ſeen dung up in the mountains of Andria, Apulia, and other places. He boldly declares, that theſe could be depoſited there by no other means but by the general deluge in the days of Noah; and enters into the reaſons why, in ſome places, theſe remains of animal and vegetable bodies are found perfect and entire, and in others corrupted or altered; and obſerves, that they anſwer ſo exactly in every lineament to the recent bodies of the ſame kind, that there can be no doubt of their having once been alſo ſuch.

It is a very remarkable obſervation, in regard to the really and certainly determining the origin of *petrified* ſhells, that they are not all alike altered by lying in the earth, but that they differ according to the matter among which they have lain to *petrify*. Thus the ſame ſpecies of ſhell *petrified* in a looſe ſand-ſtone is never nearly ſo hard as when *petrified* in a ſolid quarry, or in a hard lime-ſtone; ſo that it is evident they were brought into the places where they now lie, in the ſtate of ſhells; and that the ſtone in which they are depoſited, having imparted to them its own nature, they are harder or ſofter, in proportion to its hardneſs. We find in pits where the ſhells are depoſited in looſe earth, that they are often not *petrified* at all, but render it more ſoft and friable than before.

In places where the incruſtations of moſſes and other vegetables happen, *ivy* is one which very frequently undergoes the ſame fate. The beauty and elegance of the *petrified ivy* of Derbyſhire with us has been long famous. In the mountains near Matlock-baths, in that county, there are many grottos which afford great quantities of this *petrified ivy*, as it is called, and of other incruſtations of the ſame kind. The beauty of theſe caverns is ſcarce to be conceived; their roofs are hung with ſtalactitæ and ſtalagmitæ, in form of cluſters of grapes, and the incruſted plants are many of them ſo delicate and tender that they fall to pieces under the touch. It is very common in theſe places to ſee *ivy* creeping along the rock; in ſome parts the ſame branch will be found only incruſted in the common way; in other parts the ſtony matter will ſo penetrate its pores, that the wood and leaves ſhall appear wholly petrified, and in others the ſame branch ſhall be yet freſh and vegetating.

Hazel trees often make a part of theſe incruſtrated matters, and appear in this ſtate very beautiful, their roots and branches being in ſome parts only thinly incruſtrated, in others more thickly and firmly petrified. Among theſe alſo, as in the *ivy*, there are continually ſhooting up a number of young branches, which after a time will all ſhare the ſame fate. Philoſ. Tranſ. Nº 456. p. 353.

Nothing can give a more lively and beautiful idea of the whole buſineſs of *petrification* than this appearance of the ſeveral ſtates or ſtages of it in the IVY, and other vegetables in theſe places. It is evident, that in theſe places not only the water diſtilling out of the rocks is able to depoſit ſtony matter on the vegetables, &c. in form of incruſtations, but even the ſteams and exhalations, being highly ſated with theſe ſtony particles, are capable of working the ſame effect. This is evidently the caſe in regard to ſeveral pieces of the incruſtated *ivy*, which have never been in the way of water, and yet are as completely covered with ſtone as the reſt; and this is the only method in which the ſtony matter is conveyed into the internal parts of the plants that are really petrified in theſe places. For experience ſhews in regard to theſe, that they are not petrified firſt, and afterwards incruſted, but it is plain, that the incruſtation is made firſt, and that afterwards, when in a long ſpace of time the vegetable matter within is periſhed and waſted away, the cavity that it leaves by this means is filled up with the ſame ſtony matter. It is evident, that this inner part of the *petrifaction* was not formed while the vegetable yet exiſted by the inſinuation of ſtony matter into its pores, but that it is a mere maſs of ſtone added afterwards, ſince it has never any the leaſt trace of the inner ſtructure of the vegetable: and this ſtony matter, though uſually much more firm and ſolid than the outer cruſt, muſt in many caſes have been formed merely by vapours, as it is in places where water is never found to come on any occaſion. The water of ſome ſprings may be ſo loaded with ſtony matter, as perhaps by penetrating the pores of wood, and other lax bodies, to increaſe greatly their ſpecific gravities, yet ſurely it is contrary to the laws of matter to ſay, that there are any hidden properties in that water capable of changing the bodies put into it, into other bodies ſpecifically different. A piece of wood put into one of theſe ſprings may in time loſe its texture and coherency, by the admittance of heterogeneous particles of different attractions; but the cauſe of coherency in the parts of the original body muſt ceaſe and be diſſolved, before it can be ſaid to become a part of any other body whatever. Afterwards, indeed, the ſpace that was poſſeſſed by the parts of the original body may be ſupplied by thoſe of the new one, ſo as to make in time an uniform ſtone in the ſhape of the original plant; but if this petrified plant be ſtill kept in the place, where the ſame petrifying quality continues to act upon it, it will loſe even that ſhape, and become a part of that body which is contiguous to it, and ſo a great number of theſe plants thus petrified, arranged near to one another, will compoſe large maſſes, and perhaps whole ſtrata of ſtone. This is clearly the caſe in regard to many of the lime-ſtone rocks about the places where the *petrified ivy* is found; and perhaps it might be carried ſo far as to ſtrengthen our conception about the general formation of the ſtrata of lime-ſtone and marble; that appearing to be every where (notwithſtanding that Dr. Woodward diſpatches them much more expeditiouſly) but eſpecially in the Peak of Derbyſhire, ſuch a *petrifaction* as has been deſcribed, only perfectly finiſhed. Philoſ. Tran. N° 456. p. 356.

The echini marini, and other ſuch hollow and open-mouthed ſhells, are very often found filled up with earth or ſtone, the ſame with that in which they lie; and refuſe matter is ſometimes found among this, ſuch as the fragments of other ſhells, and the ſpines of ſome other echini. All theſe ſerve to prove that the ſhell, in its recent ſtate, was ſuſpended in water among ſuch ſubſtances as theſe. And it is not to be ſuppoſed, with ſome authors, that they are found originally as foſſils within the ſhell; ſince, in this caſe, they would be ſometimes doubtleſs found of ſuch a ſize as could not have got in at the mouth of the living animal; but this is never the caſe. And upon the whole it appears very plain, that after the membranes, which covered the mouths of theſe ſhells in their recent ſtate, were decayed or waſhed away, theſe extraneous bodies found entrance at them along with the marle, chalk, ſtone, or whatever other ſubſtance they were among, which was evidently all ſoft and fluid at that time. The *petrified* vertebræ of fiſhes cannot be ſuppoſed real foſſile productions, but are plainly remains of animals; and when examined ever ſo accurately, they are found to agree with the ſame bones in the recent animal in every lineament.

Scilla mentions a foſſile lobſter's claw preſerved in his muſæum, and found in the hills near Meſſina, in which a piece of a ſcallop-ſhell was found clenched juſt in the manner in which that animal ſeizes its prey. Thoſe who ſuppoſe theſe foſſils to be really produced in the earth ſurely cannot ſuppoſe that there could be any ſeminal principle only for the claw of an animal. In Poland there is a kind of ſtone called *niec kammi*, which they bring from a place called by the ſame name. This ſtone has very much the appearance of the grain of wood, and is probably wood *petrified*. Rzaczinſki, in his hiſtory of Poland, mentions the place, and tells us, that there are many roots and parts of the trunks of trees *petrified* there. He tells us alſo of an old beech-tree in Podolia, whoſe lower part is not only *petrified*, but that into the hardeſt and pureſt of the common ſtones; it being converted wholly into flint, and ſerving the country people thereabout for their common uſes as ſuch.

The author tells us, indeed, that the lower parts of trees become *petrified* there as they ſtand, and while the upper parts continue growing; but this ſeems ſcarce credible. We have indeed ſome other accounts of the ſame nature, but not from authors of ſufficient authority to build our faith on, in ſo ſeemingly unnatural a caſe. This author in particular, ſeems too credulous in many inſtances; among other things, giving us an account of ſome earthen veſſels found at conſiderable depths in the earth, which he ſuppoſes to have been formed there by nature. We have other accounts beſides this of foſſile urns, but the authors of them all have either miſtaken the cruſtated ferruginous bodies for urns, or elſe they have ſuppoſed things natural which are certainly artificial. Rzaczinſki's Hiſt. Polan.

Mr. Boyle mentions a kind of ſandy earth, found in England, which turns wood into ſtone, though there be no *petrifying* ſpring near the place: and this, he ſays, is done in a better manner than by any water he ever ſaw. See Works Abr. vol. i. p. 161.

PETRIFACTIONS, *animal*, a term uſed to expreſs ſuch *petrifactions* as are found in the ſeveral parts of the bodies of living creatures.

Of theſe the human body affords many, which are the occaſions of very terrible and generally incurable diſeaſes. The Philoſophical Tranſactions afford us two very ſingular inſtances of this ſort of *petrifactions*; the one in a woman, whoſe whole left kidney was entirely *petrified*, not being filled up in its cavity with a ſtony concretion, as frequently happens in nephritic caſes, but its whole ſubſtance converted into abſolute ſtone, only covered with a thin ſkin.

The other inſtance is the caſe of a conſumptive perſon, whoſe lungs were found, on diſſection, full of ulcers, and thoſe having, almoſt all of them, more or leſs gravel in them; but this was not all, for ſeveral large pieces of the lungs were found, as the kidney in the other inſtance, wholly concreted into ſtone, only covered with a thin ſkin. Phil. Tranſ. N° 71. See *Foſſile* BONES, *Foſſile* SHELLS, MARINE *remains*, and *Foſſile* IVORY. See alſo FOSSILS.

PETRIFYING *waters*. Alonſo Barba gives an account of ſome *petrifying waters* of Peru, which greatly exceed all thoſe we have in Europe in the quantity of ſtony matter they contain. He tells us, that they ſoon choak up their own paſſage by the ſtony matter they depoſit there; and that all the cattle that drink of them die. He adds another ſtory, which he probably took a little too haſtily upon credit, which is, that they have moulds of the ſhape of our brick, which they fill with this water, and that on being expoſed to the ſun a few days, the water is wholly converted into a ſtone of the ſame ſhape; and that they build their houſes and other buildings with theſe ſtones.

PETROBRUSSIANS, a religious ſect, which aroſe in France, and the Netherlands, about the year 1110; ſo called from their leader *Peter Bruys*, a Provençal, who made the moſt laudable attempt to reform the abuſes and remove the ſuperſtitions that diſgraced the beautiful ſimplicity of the goſpel: and after having engaged in his cauſe a great number of followers, during a laborious miniſtry of twenty years continuance, was burnt in 1130, by an enraged populace, ſet on by the clergy. The chief of Bruys's adherents was a monk, one Henry; from whom the *Petrobruſſians* were alſo called HENRICIANS.

Peter the Venerable, abbot of Clugny, has an expreſs treatiſe againſt the *Petrobruſſians*; in the preface to which, he reduces their opinions to five heads.

1. They denied that children before the age of reaſon can be juſtified by baptiſm; in regard it is our own faith that ſaves by baptiſm. 2. They held, that no churches ſhould be built, but that thoſe that already are ſhould be pulled down; an inn being as proper for prayers as a temple, and a ſtable as an altar. 3. That the croſs ought to be pulled down, and burned, becauſe we ought to abhor the inſtrument of our Saviour's paſſion. 4. That the real body and blood of Chriſt are not exhibited in the euchariſt, but merely repreſented by their figures and ſymbols. 5. That ſacrifices, alms, prayers, &c. do not avail the dead.

F. Langlois objects Manicheiſm to the *Petrobruſſians*; and ſays, they maintained two gods, the one good, the other evil: but this we rather eſteem an effect of his zeal for the catholic cauſe, which determined him to blacken the adverſaries thereof, than any real ſentiment of the *Petrobruſſians*.

PETROCOSSYPHUS, in *Ornithology*, a name given by ſome authors to the bird more uſually called from its colour the CÆRULEUS.

It lives among the rocks, in woody mountains, and ſings very ſweetly.

PETROJOANNITES, the followers of Peter John, or Peter Joannis, i. e. Peter the ſon of John, who lived in the twelfth century; whoſe doctrine was not known till after his death; when his body was taken out of his grave, and burnt. His opinions were, that he alone had the knowledge of the true ſenſe wherein the apoſtles preached the goſpel; that the reaſonable ſoul is not the form of man; that there is no grace infuſed by baptiſm; and that Jeſus Chriſt was pierced with a lance on the croſs before he expired.

PETROL, *petroleum*, q. d. *petræ oleum*, oil of petre, or rock oil, an oleaginous juice, iſſuing out of the clefts of rocks; and found floating on the waters of certain ſprings.

Beſide artificial and vegetable oils, i. e. thoſe drawn from plants, &c. by expreſſion, there are alſo natural and mineral oils iſſuing of themſelves from the entrails of the earth, called by a common name *petrols*, or *petrolea*.

The more fluid *petrolea*, ſays Dr. Lewis, have been diſtinguiſhed by the name of NAPHTHA; and the thicker by thoſe of PISSASPHALTHUM and PISSELÆUM.

Theſe, according to all appearance, muſt be the work of ſubterraneous fires, which raiſe or ſublime the more ſubtile parts of certain bituminous matters that lie in their way.

Theſe parts, being condenſed into a liquor by the cold of the vaults of rocks, are there collected, and ooze thence through clefts and apertures, with which the diſpoſition of the ground furniſhes them.

Petrol, then, is a liquid bitumen, only differing by its liquidity from other bitumens, as aſphaltum, jet, amber, and the like ſubſtances.

The naphtha, which is either a liquid, or at leaſt a very ſoft bitumen, is nearly allied to *petrol*.

Hitherto there has been little *petrol* found, exeept in hot countries. Olearius ſays, he ſaw above thirty ſprings of it near Scamachia, in Perſia: there are alſo *petrols* in the ſouthern provinces of France; but the beſt are thoſe in the duchy of Modena, firſt diſcovered by Arioſto, a phyſician, in 1640, in a very barren valley, twelve leagues from the city of Modena.

Three canals are there dug with great expence in the rock; by which three different kinds of *petrol* are diſcharged into little baſons or reſervoirs: the firſt, as white, clear, and fluid as water, of a briſk penetrating ſmell, and not diſagreeable; the ſecond of a bright yellow, leſs fluid, and of a leſs briſk ſmell than the white; the third of a blackiſh red, of thicker conſiſtence, and a ſmell more approaching that of bitumen.

There are many varieties of theſe oils in regard to colour, fluidity, ſubtility, and the pungency of their ſmell, and taſte; the moſt fluid are, in general, the moſt ſubtile and pungent. With us they are commonly ſophiſticated.

Mr. Boulduc made ſeveral experiments with the *petroleum* of Modena, an account of which he gave to the Paris Academy.

It eaſily took fire on being brought near a candle, and that without immediately touching the flame; and when heated in any veſſel, it will attract the flame of a candle, though placed at a great height above the veſſel, and the vapour it ſends up taking fire, the flame will be communicated to the veſſel of heated liquor, and the whole will be conſumed. It burns in the water, and when mixed with any liquor, ſwims on the ſurface of it, even of the higheſt rectified ſpirit of wine, which is $\frac{1}{7}$ heavier than pure *petroleum*. It readily mixes with all the eſſential oils of vegetables, as oil of lavender, turpentine, and the reſt, and ſeems very much of their nature: nor is this very ſtrange, ſince the alliance between theſe bodies is probably nearer than is imagined, as the eſſential oils of vegetables may have been originally mineral ones, and drawn up out of the earth into the veſſels of the plant. Mem. Acad. Par. 1715.

Petroleum, when ſhaken, yields a few bubbles; but they ſooner ſubſide than in almoſt any other liquor, and the liquor reſumes its clear ſtate again almoſt immediately. This ſeems owing to the air in this fluid being very equally diſtributed to all its parts, and the liquor being compoſed of particles very evenly and nicely arranged.

The extenſibility of this oil is alſo amazing. A drop of it will ſpread over ſeveral feet of water, and in this condition it gives a great variety of colours, that is, the ſeveral parts of which this thin film is compoſed, act as ſo many priſms.

The moſt ſevere froſt never congeals *petroleum* into ice, and paper wetted with it becomes tranſparent, as when wetted with oil; but it does not continue ſo, the paper becoming opake again in a few minutes, as the oil dries away.

Spirit of wine, which is the great diſſolvent of ſulphur, has no effect upon *petroleum*, not even with ever ſo long a digeſtion. It will not take fire with the dephlegmated acid ſpirits, as oil of cloves and other of the vegetable eſſential oils do: and in diſtillation, either by balneum Mariæ, or in ſand, it will neither yield phlegm nor acid ſpirit; but the oil itſelf riſes in its own form, leaving in the retort only a little matter, thick as honey, and of a browniſh colour. Whoever, therefore, would uſe this oil in medicine, muſt take it as nature has prepared it, art having no power to make any alteration in it. Mem. Acad. Paris, 1715.

Alonſo Barba, in his Book of Metals, gives a very melancholy inſtance of the power of *petroleum* of takin gfire at a diſtance: he tells us, that a certain well, yielding *petroleum* on the ſurface of its water, being to be repaired, the workman took down into the well with him a lantern and a candle in it; there were ſome holes in the lantern, through which the *petroleum*, at a conſiderable diſtance, drew out the flame of the candle, and, taking fire, burſt up with the noiſe of a cannon, and tore the man to pieces.

The people of Mount Ciaro, in Italy, have ſome years ſince found out a much eaſier way of finding *petroleum* than they formerly had been uſed to.

This mountain abounds with a ſort of greyiſh ſlate, which lies in large horizontal beds, mingled with ſtrata of clay, and large quantities of a ſpar of that kind called by the Germans *ſelenites*; which is the common ſort, that ferments with acids, and readily diſſolves in them, and calcines in a ſmall fire. They pierce theſe ſlates in a perpendicular direction till they find water, and the *petroleum*, which had been diſperſed among the cracks of thoſe ſlates, is then waſhed out by the water, and brought from all the neighbouring places to the hole or well which they have dug, on the ſurface of the water on which it ſwims after eight or ten days. When there is enough of it got together, they lade it from the top of the water with braſs baſons, and it is then eaſily ſeparated from what little water is taken up with it. It is remarkable, that all the *petroleum* got by this means is white, whereas that of Modena is yellow, and that of Parma brown. Theſe wells or holes continue to furniſh the oil in different quantities for a conſiderable time, and, when they will yield no more, they pierce the ſlates in ſome other place. Mem. Acad. Scienc. Par. 1736. See NAPHTHA.

Petroleum is never uſed among us; but the French give it internally in hyſteric complaints, and to their children for worms: ſome alſo give it from ten to fifteen drops in wine, for ſuppreſſions of the menſes. This, however, is rather the practice of the common people than of the faculty.

It has alſo been ſometimes recommended to be taken internally in nervous complaints, and as a diuretic; but it is chiefly uſed as an external ſtimulant, againſt rheumatic pains, palſies, chilblains, &c. See *Britiſh* OIL.

PETROLEUM *Barbadenſe*. See BARBADOES *tar*.

PETROMARULA, in *Botany*, a name given by ſeveral authors to the pyramidal RAPUNCULUS of the iſland of Crete, called, by Mr. Tournefort, *rapuncalus Creticus ſeu pyramidalis alter*.

PETROMYZON, the *ſtone-ſucker*, in the Linnæan ſyſtem of *Zoology*, the name of a genus of AMPHIBIA *nantes*, comprehending the LAMPREY, &c.

The name is originally Greek, and is derived from the words ϖετρον, *a ſtone*, and μυζαω, *to ſuck*; this fiſh being uſually found in rivers, adhering to the ſtones by ſucking, and ſo keeping its place.

The characters of this genus, according to Artedi, are theſe: the foramina, or apertures of the branchiæ, or lungs, are ſeven on each ſide; they are placed longitudinally; and beſide theſe, there is one ſingle aperture in the head, placed immediately between the eyes; the body is long, and nearly of a cylindric figure; it is ſmooth, and has only two fins, and thoſe are both placed on the back. The ſpecies of this genus, enumerated by Artedi and Linnæus, are three.

PETRONEL, a ſort of HARQUEBUSS, or hand-gun.

PETRONELLUS, in *Ornithology*, a name under which ſome have deſcribed the BUNTING.

PETRONIA *marina*, in *Ornithology*, the name of a ſmall bird of the œnanthe kind, or nearly allied to that genus. Its beak is ſtrong and ſharp, like that of the chaffinch; its head is a browniſh-grey, but has uſually a long whitiſh ſtreak running along it; its neck is aſh-coloured, and at the bottom is variegated with black; the rump is of a browniſh-green; the long wing-feathers are blackiſh, with edges and tips of green, and are white underneath; the breaſt is of a duſky white, and the tail browniſh, variegated with yellow. It is, however, diſtinguiſhed from all oter birds by a fine large yellow ſpot, which it has on the middle of its throat.

PETRO *pharengæi*, in *Anatomy*, are muſcles of the PHARYNX, inſerted in the lower part of the extremity of the apophyſis petroſa. Theſe ſerve, with the ſpheno-pharyngæi and pterygo pharyngæi, to draw the middle portion or great cavity of the pharynx upward.

PETROSA *oſſa*, in *Anatomy*, a denomination given to the fifth and ſixth bones of the ſkull, called alſo *oſſa temporum*, becauſe they ſhew the age of man, the hairs hereon turning grey before any of the reſt.

The upper part of each is ſquamous, or ſcaly: the lower is *petrous*, i. e. hard or ſtony: and hence they come here to be more particularly denominated *petroſa*.

The *oſſa petroſa* are the ſmalleſt proper bones of the cranium; their upper part is ſemicircular, and their lower is of a firm ſtructure. They are ſituated in the lateral and lower parts of the head; bounded at top by the ſquamous ſuture, which joins them to the parietalia; and behind by the lambdoides, which joins them to the occipital, and connects them to the os ſphenoides. Each has two ſinuſes, before and behind the ſphenoides: the exterior lined with a cartilage, receiving the proceſs of the lower jaw; the interior receives the lower part of the ſinus lateralis of the dura mater.

Each, again, has four proceſſes; three external, and one internal: of the external, the firſt is called *zygomaticus*, or *os jugale*; the ſecond *maſtoides* or *mammillares*; the third *ſtyloides*: each whereof ſee under its proper article. The internal proceſs is properly called the *os petroſum*: this is pretty long and large, containing the whole meatus auditorius, and cavity of the tympanum.

The chief uſes of theſe bones are to complete the globe of the ſkull, to ſerve for the articulation of the lower jaw, and for the inſertion of many muſcles, and laſtly, to contain the organ of hearing.

PETROSELINI *radix*, *parſley-root*. See PARSLEY.

PETROSELINUM *Macedonium* in the *Materia Medica*, the name of a ſeed uſed in medicine. The plant which produces it is a native of the warm countries; and the ſeed ſhould be choſen for uſe, clean, well fed, longiſh, and of a browniſh green colour, and well taſted, and aromatic; in quality it reſembles the common PARSLEY, but is weaker and leſs grateful; it is aperitive, provokes urine and the menſes, and expels wind; and, in form of a cataplaſm, is ſaid extremely to help the gout: it is an ingredient alſo in the Venice treacle. See BUBON.

PETROSUM *ſal*, in *Natural Hiſtory*, a name given by ſome of the old writers to the nitre of Ægypt, uſed in the ancient times; and by others to the common nitre, which we uſe at preſent, and call by a ſimilar name, *ſalt petre*.

PETTEIA, Πεττεια, in the *Ancient Muſic*, a Greek term to which we have no correſponding one in our language.

The melopœia, i. e. the art of arranging ſounds in ſucceſſion, ſo as to make melody, is divided into three parts, which the Greeks call *lepſis*, *mixis*, and *chreſis*; the Latins *ſumptio*, *mixtio*, and *uſus*; and the Italians *preſa*, *meſcolamento* and *uſo*. The laſt of theſe is called by the Greeks πεττεια, *petteia*, and by the Italians *pettia*.

Petteia or *pettia*, then, is the art of making a juſt diſcernment of all the manners of ranging or combining ſounds among themſelves, ſo as they may produce their effect, i. e. may expreſs the ſeveral paſſions intended to be raiſed, thus: e. gr. it ſhews what ſounds are to be uſed, and what not; how often any of them are to be repeated; with which to begin, and with which to end; whether with a grave ſound to riſe, or an acute one to fall, &c.

It is the *petteia* that conſtitutes the manners of the muſic; it being this that chooſes out this or that paſſion, this or that motion of the ſoul, to be awakened; and whether it be proper to excite it on this or that occaſion. The *petteia*, therefore, is in muſic much what the manners are in poetry.

We do not ſee whence the denomination ſhould have been taken by the Greeks, unleſs from πεττεια, their game of cheſs; the muſical *petteia* being a ſort of combination and arrangement of ſounds, as cheſs is of pieces called πεττοι, calculi, or cheſs-men.

PETTY *bag*, an office in chancery; the three clerks whereof record the return of all inquiſitions out of every ſhire, and make all patents of cuſtomers, gaugers, comptrollers, &c. See CLERK.

PETTY-*chaps*, in *Ornithology*, the MOTACILLA *hippolais*, in the Linnæan ſyſtem: the inſide of the mouth is red; the head, neck, back, and wings, are of an olivaceous aſh-colour; the quill-feathers darker, edged with olive; the inner coverts of the wings yellow; the breaſt white, tinged with yellow; the belly of a ſilvery white; the tail duſky; and the legs bluiſh. This bird is called in Yorkſhire the *beam-bird*, from its neſting under beams in out-buildings, &c. Pennant.

PETTY *conſtables*. See CONSTABLE.

PETTY-*fogger*, formed from the French, *petit*, *little*, and the Saxon, *fogere*, *ſuitor*, or *wooer*, a little ſtickling ſolicitor or jobber in law-diſputes, without either ſkill or conſcience.

PETTY, or PETIT *larceny*, in *Law*. See LARCENY.

PETTY *orders*. See ORDERS.

PETTY *patees*, among *Confectioners*, a ſort of ſmall pies, made of a rich cruſt, and filled with ſweet meats.

PETTY-*ſingles*, among *Falconers*, are the toes of a hawk.

PETTY *tally*, in the *Sea Language*, a competent allowance of victuals, according to the number of the ſhip's company.

PETTY, or PETIT *treaſon*, in *Law*. See TREASON.

PETTY-*whin*. See FURZE, and REST-*harrow*.

PETULANTIUM *feſtum*, in *Antiquity*, a feſtival celebrated by the Athenians and Lacedæmonians in honour of the moon, under the name of Venus: at which the men aſſiſted, dreſſed in women's cloaths; and the women in the habits of men.

PETUNTSE, or, as it is uſually called *petunſe*, one of the two earths or foſſile ſubſtances of which the porcelain ware of China is made. The other is named KAOLIN.

The *petuntſe* is ſprinkled all over with bright glittering particles; it is beaten to powder, and afterwards made up into a ſort of bricks, and in that form it is ſent to the places where it is to be wrought; it is of a hard texture, and of a ſomewhat greeniſh colour. Mr. Reaumur, of the Academy of Sciences of Paris, who was extremely induſtrious in ſearching into the nature of porcelain, obtained ſome ſpecimens of the *petuntſe*; both in its native ſtate, and in form of the brick, which is given it after it is powdered and reduced to a paſte.

M. Reaumur found that the *petuntſe* was ſo far from being an earth, as uſually ſuppoſed, that it was truly of the nature of the European flint or pebble, as he eſtabliſhes the character of that body: but to underſtand this rightly, it is to be obſerved, that this author makes the flints and pebbles a very large claſs of bodies, ſome of which are more, ſome leſs tranſparent; and that this *petuntſe* is of the nature of the coarſer, or leſs tranſparent kind, the ſurface of which, when broken, is not ſo ſmooth and poliſhed as that of the ordinary flint. This ſubſtance is probably a ſpecies of GYPSUM rather than of flint or talc. By ſome experiments of Mr. Scheffer, in the Swediſh Tranſactions, for the year 1753, it appears to be a glittering, flaky, ſemi-tranſparent maſs, like the *lapis ſpecularis*, of a light greeniſh-grey colour, and remarkable heavy. It was not acted upon by acids, and in the fire it burſt and fell in pieces, and calcined into a white powder, interſperſed with a red ferrugineous matter. Calcined in contact with the fuel, it emitted ſtrong ſulphureous vapours, like the other gypſa, and became quite white, conſiderably firm and coherent, and ſemi-tranſparent.

The great character of theſe ſtones for the porcelain manufactures is, however, that they are very eaſily vitrified without the aſſiſtance of any ſalt, and without the immediate contact of the fire, the operation ſucceeding in a crucible, which is not at all the caſe in regard to the Europe an flints, they very differently melting alone in a crucible, and then only into a whitiſh opake glaſs.

It being certain from hence, that one of the two ingredients of the china-ware is eaſily vitrifiable, it follows, from the experiment of the whole mixture, or china-ware not being reducible into a glaſs in a large fire, that it is a compoſition of a vitrifiable and a not vitrifiable (or at leaſt not eaſily vitrifiable) ſubſtance; and conſequently, that the kaolin is a ſcarce vitrifiable body, and that the reſult of the action of fire on a mixture of theſe two is a ſemivitrification; which is what we call the china-ware.

If we, therefore, could, in Europe, provide the materials of China, or ſuch as were like them, we might reaſonably hope to ſucceed; and this appears far from improbable. The *petuntſe* is eaſily ſupplied by many of our own earths, ſtones, and ſands, as nothing is required in it more than a property of running eaſily into a white glaſs. The kaolin ſeems moſt to be reſembled by our European talcs. Mem. Acad. Par. 1727.

PEUCEDANUM, *hog's-fennel*, in *Botany*. See *Hog's* FENNEL.

PEVET. See PIVOT.

PEVETS, in a *Watch*, the ends of the ſpindle of a wheel in a WATCH. The holes into which they run, are called *pevet-holes*.

PEWIT, in *Ornithology*, the Engliſh name of a common bird of the *larus*, or ſea-gull kind, called by ſome authors *larus cinereus*, and by other *cepphus*, and in ſome of the counties of England the *black-cap*, and *ſea-crow*: this is the *larus ridibundus* of Linnæus.

It is about the ſize of a pigeon; its beak and legs are red; its head and throat of a greyiſh black, and its neck, tail, breaſt, and belly white; the middle of its back grey; it has its Engliſh name from its note, which ſeems to expreſs the word *pewit*, and is a kind of hoarſe laugh. It is affirmed by many, that the head of this bird is only black at a certain ſeaſon of the year.

Pewits are birds of paſſage, reſorting to pools and fens in ſome of the inland counties, particularly Staffordſhire, in the ſpring, and after the breeding ſeaſon diſperſing to the ſea-coaſts. The young were formerly much eſteemed and fattened for the table. Plot relates, that at the death of the lord of the ſoil, they ſhift their quarters for a certain time. There was a piece of ground near Portſmouth, which formerly produced 40*l.* a year to the owner, by the ſale of *pewits*. Ray and Pennant.

PEWIT is alſo a name given to the baſtard plover or LAPWING.

PEWTER, a factitious metal uſed in domeſtic utenſils: its baſis is tin, and it conſiſts of three different ſtandards: viz. that which is called plate-metal, of which plates and diſhes are made, which is formed of tin and regulus of antimony, in the proportion of one hundred and twelve pounds of the former to ſix or ſeven pounds of the latter: the next metal inferior to this is called trifling metal, and is lowered one half-penny per pound in worth, by alloying it with lead; of this metal ale-houſe pots are made: the lower ſort of metal is ſtill farther alloyed by lead, ſo as to reduce the value two-pence in a pound lower than plate-metal: of this, which is called lay-metal, wine-pots are made.

Pewter has occaſionally ſerved for money. In the Philoſophical Tranſactions, M. Putland informs us that king James II. turned all the *pewter* veſſels, &c. of the proteſtants in Ireland he could ſeize, into money; half-crowns were ſomewhat bigger than half-pence, and other pieces in proportion.

He ordered it to be current in all payments: whence, our author obſerves, people abſconded for fear of being paid their debts: he alſo mentions crown-pieces of this metal, with this legend on the rim, *melioris teſſera fati.*

PEZIZA, *cup-muſhroom*, in *Botany*, a genus of the claſs of *criptogamia*, and order of *fungi*. This *muſhroom* is bell-ſhaped and ſeſſile. Linnæus enumerates eight ſpecies.

PHACA, in *Botany*. See *Baſtard Milk* VETCH.

PHACOIDES, a word uſed by the ancient phyſicians to expreſs any thing that in ſize and ſhape approached to a lentil. Thus the cryſtalline humour of the eye was ſo called.

PHACOPTISANA, a medicine often mentioned by the ancient writers as a nouriſhing and ſtrengthening thing: it was a ptiſan with lentils.

PHACOSIS, a word uſed by the ancients to expreſs a diſorder of the eye, appearing in form of a black ſpot, of the ſize and round figure of the lentil.

PHÆCASIA, in *Antiquity*, a kind of ſhoes.

PHÆNICOPTERUS. See FLAMINGO.

PHÆNOMENON, or PHENOMENON, φαινομενον, formed from φαινομαι, *I appear*, ſtrictly an appearance in phyſics, an extraordinary appearance in the heavens or on earth; either diſcovered by obſervation of the celeſtial bodies, or by phyſical experiments; and whoſe cauſe is not obvious. Such are meteors, comets, uncommon appearance of ſtars and planets, earthquakes, &c. Such alſo are the effects of the magnet, phoſphorus, &c.

The *phenomena* of comets are inconſiſtent not only with the ſolidity of the heavens, ſuppoſed in the Ptolemaic hypotheſis, but equally with the plenitude of the heavens, aſſerted by the Carteſians.

That hypotheſis is beſt which ſolves moſt *phenomena*. Sir Iſaac Newton ſhews, that all the *phenomena* of the heavenly bodies follow from the attraction of gravity, which intercedes thoſe bodies; and almoſt all the *phenomena* of the leſſer bodies from the attraction and repulſion between their particles; ſo ſimple is nature.

PHENOMENON, *parallax of a.* See PARALLAX.

PHAETON, in *Ornithology*, a genus of the *anſeres*, in the Linnæan ſyſtem. Its characters are, that the bill is ſharp, ſtrait, and pointed; the noſtrils oblong, and the hinder toe turned forward. There are two ſpecies, viz. the PINGUIN, and TROPIC *bird*.

PHAGEDÆNA, φαγεδαινα, formed of φαγειν, *to eat*, in *Surgery*, &c. a deep, bloated ulcer, which eats and corrodes the neighbouring parts.

PHAGEDÆNIC *medicines*, ſuch as are uſed to eat off fungous or proud fleſh.

PHAGEDÆNIC *ulcer*. See PHAGEDÆNA, and ULCER.

The Ephemerides of the academy of the Curioſi Naturæ relate, that *phagedænic* ulcers have been frequently cured only with ſheeps dung.

PHAGEDÆNIC *water*, in *Chemiſtry*, denotes a water made from quick-lime and ſublimate; ſo called from its efficacy in the cure of *phagedænic* ulcers.

To prepare this water, they put two pounds of freſh quick-lime in a large earthen pan, and pour upon it about ten pounds of rain-water; theſe they let ſtand together two days, ſtirring them frequently: at laſt leaving the lime to ſettle well, they pour off the water by inclination, filtrate it, and put it up in a glaſs bottle, adding to it an ounce of corroſive ſublimate in powder; which, of white, becomes yellow, and ſinks to the bottom of the veſſel. The water, being ſettled, is fit for uſe, in the cleanſing of wounds and ulcers, and to eat off ſuperfluous fleſh, and eſpecially in gangrenes; in which caſe may be added to it a third or fourth part of ſpirit of wine.

PHAGESIA, φαγησια, in *Antiquity*, a feſtival in honour of Bacchus, celebrated during the DIONYSIA.

It was otherwiſe called *phageſipoſia*, φαγησιποσια; which names come from φαγειν, *to eat*, and πινειν, *to drink*; becauſe it was a time of good cheer.

PHAGON, φαγων, in *Antiquity*, a feſtival of the ſame nature with that called PHAGESIA.

PHAGRUS, the *ſea-bream*. The Artedian ſyſtem of ichthyology does not allow this fiſh a peculiar generical name, but makes it a ſpecies of the large genus of the *ſpari*: the author diſtinguiſhes this from the others by the name of the *reddiſh* SPARUS, with the ſkin hollowed into a ſinus at the roots of the back fins.

PHAGUS, in *Botany*, a name given by many authors to the eſculus, or ſweet and eſculent oak, found in Greece and Dalmatia.

PHALACRA, a word uſed by Hippocrates to expreſs all the blunt inſtruments uſed in ſurgery; ſuch as probes and others, with buttons at the ends.

PHALACROCEPHALUS *Indicus*, in *Ichthyology*, the name of an anadromous fiſh of ths Eaſt Indies. Its neck and head appear naked and bald, as it were; it is all over of a greyiſh white in colour, and is variegated with red ſpots about the mouth; the eyes are large and very prominent, and their iriſes yellow; its uſual ſize is about a foot and a half in length, and it lives part of its time in the ſea, and part in rivers; it is an extremely delicate taſted fiſh, and eſteemed one of the fineſt of that part of the world. It is called by the Dutch *kaelkop*.

PHALÆNA, in *Zoology*, a genus of the *lepidoptera* order of inſects; the characters of which are, that the antennæ are ſetaceous, ſenſibly attenuated from the baſe to the apex; the wings are moſt commonly deflexed. Linnæus enumerates four hundred and ſixty ſpecies, under the ſeveral titles of *phalæna*, *attacus*, *bombyx*, *noctua*, *geometra*, *tortrix*, *pyralis*, *tinea*, and *alucita*. See PAPILIO.

PHALAIA, a word invented by Baſil Valentine, and uſed as the name of a *panacæa*, or univerſal medicine; but Rolfink has ſince uſed it to expreſs a tincture of jalap.

PHALANGER. See OPOSSUM.

PHALANGIUM, in the *Hiſtory of Inſects*, the name of a peculiar genus of *ſpiders*, the characters of which are theſe: they do not move regularly and evenly as other *ſpiders*, but hop in the manner of fleas. This was a character recorded of them by Pliny and the ancients, and is found at this time in all ſpecies. They have a ſquare forehead; and in this are placed eight eyes of different ſizes, and diſpoſed in form of a part of a circle; they have alſo the fore-legs greatly longer and ſtronger than any of the others. Of theſe there are four principal kinds. See OPILLIO.

PHALANGIUM *Apulum*, the *Apulian phalangium*, a name given by authors to that large and poiſonous ſpecies of ſpider, called by the vulgar the TARANTULA, from the name of a city of Calabria, Tarantum; near which it is very common.

PHALANGIUM in *Botany*. See SPIDER-*wort*.

PHALANGOSIS, in *Surgery*, the name of a tumor and relaxation of the eye-lids, which is often ſo great as to deform the eye, and very much impede viſion. Sometimes the relaxed eye-lid ſubſides or ſinks down, occaſioned either by a palſy of the muſcle which ſuſtains and elevates the eye-lid, or elſe from a relaxation of the cutis above, from various cauſes. Sometimes alſo an œdematous or aqueous tumor is formed on the eye-lids, ſo as almoſt entirely to exclude viſion; but this laſt caſe ſhould be well diſtinguiſhed from the other, and may be remedied without much difficulty, by the uſe of internal and topical medicines; ſuch as purges and diuretics given inwardly, and a compreſs dipped in warm ſpirit of wine and lime-water.

But in the paralytic or relaxed caſe, the uſe of cordial and nervous medicines muſt be propoſed internally; and outwardly, balſam of Peru and Hungary water are to be employed. If all theſe fail, the remaining method is to extirpate a ſufficient quantity of the relaxed cutis; and then, after healing up the wound, the remainder will be ſufficiently ſhortened. Heiſter.

PHALANX, φαλαγξ, in *Antiquity*, a huge, ſquare compact battalion, formed of infantry, ſet cloſe to one another, with their ſhields joined, and pikes turned croſs-ways; inſomuch that it was almoſt impoſſible to break them.

It conſiſted of eight thouſand men: Livy ſays, that this ſort of battalion was invented by the Macedonians, and that it was peculiar to them; whence, among writers, it is ſometimes called the *Macedonian phalanx*.

St. Evremont obſerves, that the Macedonian *phalanx* had the advantage in valour and ſtrength over the Roman legion.

PHALANX, *phalanges*, is alſo applied, by anatomiſts, to the three rows of ſmall bones which form the FINGERS.

PHALANX, in *Natural Hiſtory*, a term uſed by Dr. Woodward, and ſome other writers of foſſils, to expreſs an arrangement of the columns of that ſort of foſſile coraloide body found frequently in Wales, and called *lithoſtrotion*.

In the great variety of ſpecimens which are found of this, ſome have the whole *phalanx* of columns cracked through, and others only a few of the external ones; but theſe cracks never remain empty, but are found filled up with a white ſpar, as the ſmaller cracks of ſtone uſually are. This is not wonderful, as there is much ſpar in the compoſition of this foſſil; and it is eaſily waſhed out of the general maſs to fill up theſe cracks, and is then always found pure, and therefore of its natural colour, white. The *lithroſtrotion*, or general congeries of theſe phalanges of columns, is commonly found immerſed in a grey ſtone, and found on the tops of the rocky cliffs about Milford in Wales. Is is uſually erect, though ſomewhat inclining in ſome ſpecimens, but never lies horizontal. It ſeems to have been all white at firſt, but to have been ſince gradually tinctured with the matter of the ſtone in which it lies. The ſingle columns which form each phalanx are uſually round or cylindric, though ſometimes flatted and bent; ſome of them are alſo naturally of an angular figure; theſe, however, are not regular in the number of their angles, ſome conſiſting of three ſides, ſome of five, and ſome of ſeven; ſome are hexangular alſo, but theſe are ſcarce. They are from five or ſix to ſixteen inches in length; and the largeſt are near half an inch over, the leaſt about a quarter of an inch; the greater number are very equal to one another in ſize; but the ſides of the columns being unequal, the ſame column meaſures of a different thickneſs when meaſured different ways; the phalanges or congeries of theſe are ſometimes of a foot or more in diameter.

The columns are often burſt, as if they had been affected by external injuries; and it is evident, that they were not formed before ſeveral other of the extraneous foſſils; for there are found ſometimes ſhells of ſea-fiſhes and entrochi immerſed and bedded in the bodies of the columns. It appears plainly from hence, that when theſe bodies were waſhed out of the ſea, and toſſed about in the waters which then covered the tops of theſe cliffs, this elegant foſſil, together with the ſtony bed in which it is contained, were ſo ſoft, that theſe other bodies found entrance into their very ſubſtance, and they were formed, as it were, upon them. This foſſil takes an elegant poliſh, and makes in that ſtate a very beautiful appearance, being of the hardneſs of the common white marble, and carrying the elegant ſtructure viſible in the ſmalleſt lineaments. Woodward's Coll. of Foſſ. p. 11.

PHALARIS, *Canary graſs*, in the Linnean *Syſtem of Botany*, the name of a peculiar kind of graſs called *phalaroides* by Scheuhzer and others; and with this author making a diſtinct genus of plants of the *triandria digynia* claſs; the characters of which are, that the cup is a glume, containing only one flower; this glume is large, bivalve, obtuſe, and compreſſed, each of the valves being of a boat-like ſhape, flatted, obtuſe above, with ſtrait edges meeting one another in parallel lines; the flower is alſo bivalve, and is ſmaller than the cup, the exterior valve of it being oblong, pointed, and folded, the interior much ſmaller; the ſtamina are three capillary filaments ſhorter than the cup; the antheræ are oblong; the germen of the piſtil is roundiſh; the ſtyli are two in number, and are capillary ones; the ſtigmata are hairy; the flower ſerves for a cloſe covering to the ſeed, not at all gaping from it; the ſeed is ſingle, ſmooth, and roundiſh, but pointed at both ends. There are nine ſpecies.

PHALARIS'S *Bull*, in *Ancient Hiſtory*, was a brazen bull for tormenting criminals, conſtructed by Perillus the Athenian, in order to flatter the cruelty of *Phalaris*, tyrant of Agrigentum. The artiſt, demanding too great a reward for his contrivance, was the firſt who ſuffered in it. Some have treated this fragment of ancient hiſtory as a fable; but we learn from Diodorus Siculus, lib. xiii. cap. 13. that Scipio Africanus, when he razed Carthage, about two hundred and ſixty years after the deſtruction of Agrigentum, found among other things this bull, and reſtored it to the inhabitants of Agrigentum, where it was to be ſeen when Diodorus wrote his hiſtory, viz. in the reign of Auguſtus.

PHALAROPE, in *Ornithology*, is a ſpecies of the TRINGA in the Linnæan ſyſtem. Mr. Pennant gives the following general characters of this ſpecies: the bill is ſtrait and tender; the noſtrils minute; the body and legs like thoſe of the ſand-piper, and the toes furniſhed with ſcalloped membranes. He alſo more particularly deſcribes the grey *phalarope*, or *tringa lobata* of Linnæus, and the red or *tringa hyperborea* of the ſame author.

PHALERA, the name of a bandage for the noſe, deſcribed by Galen in his Treatiſe on Bandages.

PHALERÆ, among the *Ancients*, *horſe*-TRAPPINGS.

PHALEUCUS, or PHALÆCIUS, in *Poetry*, a kind of verſe, in uſe among the Greeks and Latins; conſiſting, like the Sapphic, of five feet; the firſt a ſpondee, the ſecond a dactyl, and the three laſt trochees

The *phaleucus* is very proper for epigrams. Catullus, excelled in it. Its original author is not known; though ſome have ſaid it derives its name from its inventor.

PHALLICA, φαλλικα, in *Antiquity*, feaſts or ſacrifices celebrated at Athens, in honour of Bacchus..

The *Phallica* were inſtituted on the following occaſion: one Pegaſus, a citizen of Eleutheris, having carried ſome ſtatues of Bacchus to Athens, drew on himſelf the laughter and contempt of the Athenians. Soon after this, the people were ſeized with an epidemic diſeaſe; and, upon conſulting the oracle how to get free of it, were anſwered, that there was no way but to receive Bacchus in pomp: they did it, and thus inſtituted the *Phallica*; wherein, beſides the ſtatues and trophies of the god, they bore figures of the parts affected, tied to thyrſi.

PHALLOPHORI, φαλλοφοροι, in *Antiquity*, a name given at Sicyon to certain mimes, who ran about the ſtreets ſmutted with black, and clothed in ſheep ſkins, bearing baſkets full of various herbs, as chervil, brancha urſina, violet, ivy, &c.

The word is formed from φαλλος, a *pole*, at the end of which was faſtened the figure of a human penis made of leather; and φερω, *I bear*.

They danced in cadence, and were crowned with ivy, in honour of Bacchus; carrying the *phallus* before them as the enſign of their office.

PHALLUS, *ſtink-horns*, in *Botany*, a genus of the *cryptogamia* claſs, and *fungi* order; the fungus of which is reticulated on the upper ſide, and ſmooth on the lower. There are two ſpecies.

PHALLUS *marinus*, a name given by ſome authors to a ſpecies of *canalis* or *tubulus marinus*, found about Amboyna, and called by the French writers *priape* and *arroſoir*. It is an oblong ſhell, with a large head, which is pierced full of holes; ſo that it at once reſembles the *glans penis*, and the noſe of a watering-pot, uſed by gardeners.

PHANATIC, *phanaticus*, commonly written *fanatic*, a viſionary; one who fancies or thinks he ſees ſpectres, ſpirits, apparitions, or other imaginary objects, even when awake; and takes them to be real.

Such are phrenetics, necromancers, hypocondriac perſons, lycanthropi, &c. See PHRENZY, HYPOCONDRIAC, LYCANTHROPY, &c.

Hence the word is alſo applied to enthuſiaſts, pretenders to revelation, new lights, prophecies, &c. See FANATIC.

PHANTASM, φαντασμα, *phantom*, a ſpecies of an object perceived by an external ſenſe, and thence retained in the phantaſy.

PHANTASTIC, in *Muſic*. *Phantaſtic ſtyle* is a free, eaſy manner of compoſition; proper for inſtruments. See STYLE.

PHANTASTICAL *colours*, is a denomination given by the Peripatetics to thoſe colours exhibited by the rainbow, or a priſm; they erroneouſly ſuppoſing them not to be real colours, but only phantoms, or deceptions of the ſight.

But many experiments of the moderns, and particularly thoſe of ſir Iſaac Newton, demonſtrate the contrary, and prove them as real as any other colours in nature. See EMPHATICAL.

PHANTASY, or FANCY, the *imagination*; the ſecond of the powers of faculties of the ſenſitive or rational ſoul; by which the ſpecies of objects received by the common ſenſe, are retained, recalled, farther examined, and either compounded, or divided.

Others define the *fantaſy* to be that internal ſenſe or power, whereby the ideas of abſent things are formed, and preſented to the mind, as if they were preſent.

The ſeat or organ of this ſenſe is vulgarly ſuppoſed to be the middle part of the brain; and its objects, all the ſpecies communicated to it by the common ſenſe, by the comparing of which it frames infinite others to itſelf.

In melancholic and mad men this faculty is very ſtrong, repreſenting many extravagant and monſtrous things, and framing its images as lively as thoſe of ſenſation, whence naturally ariſe the viſions and deceptions thoſe perſons are liable to.

In poets and painters the ſame faculty ought to be the predominant one; to enable them to feign, and purſue, and execute their fictions or fables with more ſtrength, conſiſtency, and beauty.

In men it is ſuppoſed to be ſubject to reaſon, but in brutes it has no ſuperior; this being the *ratio brutorum*, or what we call reaſon in brutes.

The *phantaſy* is free from the ligature, or ſuſpenſion of ſleep; witneſs our dreams, &c.

Some philoſophers uſe the word *phantaſy* in a more general ſignification, viz. for what we uſually call *ſenſus communis*, the *common* SENSE. See IMAGINATION.

PHARAON, the denomination of a game of chance. The principal rules of this game are, that the banker holds a pack of fifty-two cards; that he draws all the cards one after the other, and lays them down at his right and left hand alternately; that the ponte may at his choice ſet one or more ſtakes upon one or more cards, either before the banker has begun to draw the cards, or after he has drawn any number of couples; that the banker wins the ſtake of the ponte, when the card of the ponte comes out in an odd place on his right hand, but loſes as much to the ponte when it comes out in an even place on his left hand; that the banker wins half the ponte's ſtake, when it happens to be twice in one couple; that when the card of the ponte being but once in the ſtock, happens to be the laſt, the ponte neither wins nor loſes; and that the card of the ponte being but twice in the ſtock, and the laſt couple containing his card twice, he then loſes his whole ſtake. Mr. De Moivre has ſhewn how to find the gain of the banker in any circumſtance of cards remaining in the ſtock, and of the number of times that the ponte's cards is contained in it. Of this problem he enumerates four caſes; i. e. when the ponte's card is once, twice, three, or four time's in the ſtock. In the firſt caſe, the gain of the banker is $\frac{1}{n}$, n being the number of cards in the ſtock. In the ſecond caſe, his gain is $\frac{\overline{n-2}\times y}{n\times n-1}+\frac{2}{n\times n-1}$, or $\frac{\frac{1}{2}n+1}{n\times n-1}$, ſuppoſing $y=\frac{1}{2}$. In the third caſe, his gain is $\frac{3y}{2\times n-1}$, or $\frac{3}{4\times n-1}$, ſuppoſing $y=\frac{1}{2}$. In the fourth caſe, the gain of the banker, or the loſs of the ponte, is $\frac{2n-5}{n-1\times n-3}\,y$, or $\frac{2n-5}{2\times n-1\times n-3}$, ſuppoſing $y=\frac{1}{2}$. Mr. De Moivre has calculated a table, exhibiting this gain or loſs, for any particular circumſtance of the play; and he obſerves, that at this play, the leaſt diſadvantage of the ponte, under the ſame circumſtances of cards remaining in the ſtock, is when the card of the ponte is but twice in it, the next greater when three times, the next when once, and the greateſt when four times. He has alſo demonſtrated, that the whole gain *per cent.* of the banker, upon all the money that is adventured at this game, is 2*l.* 19*s.* 10*d.* De Moivre's Doctrine of Chances, p. 77, &c. p. 105, &c. See BASSETTE.

PHARI, among the *Ancients*, a kind of candleſtick. See BRANCH.

PHARICUM, the name of a famous poiſon among the ancients: it was ſaid to be compoſed of many ingredients, but we know nothing of it at this time.

PHARISEES, a celebrated ſect among the ancient Jews; ſo called, ſay ſome, becauſe ſeparated from the reſt by the auſterity of their life, and by their profeſſing a greater degree of holineſs, and a more religious obſervation of the law.

This is the import of the word פרם; in the Hebrew, or rather Chaldee tongue; whence is formed the Greek Φαρισαιος, and the Latin *Phariſæus.* St. Jerom, and ſeveral of the rabbins, maintain this etymology; which is very agreeable to the ſtate and character of the *Phariſees*; who were not only diſtinguiſhed from the reſt by their manner of life, but by their habit. However, others, with leſs probability, have derived the name from פרש, *expoſuit*, becauſe the *Phariſees* were in the higheſt reputation for expounding the law.

It is very difficult to fix the preciſe origin of the *Phariſees.* The Jeſuit Serrarius places their firſt riſe about the time of Eſdras, becauſe it was then that the Jews firſt began to have interpreters of their traditions. Maldonat on the other hand, will not have this ſect to have ariſen among the Jews till a little before the time of Chriſt. Others, perhaps with more probability, refer the origin of the *Phariſees* to the time of the Maccabees.

Dr. Lightfoot thinks, that *Phariſaiſm* roſe up gradually, from a period which he does not aſſign, to the maturity of a ſect. It is certain, from the account given by Joſephus, that in the time of John Hyrcanus, the high-prieſt and prince of the Aſmonean line, about a hundred and eight years before Chriſt, the ſect was not only formed, but made a conſiderable figure; and that it had advanced to a high degree of popularity and power about eighty years before Chriſt. Joſ. Ant. lib. xiii. cap. 10. § 5, 6. cap. 15. § 5. & cap. 16. § 1. According to Baſnage, Hiſt. of the Jews, book ii. cap. 9. § 2. one Ariſtobulus, an Alexandrian Jew, and a Peripatetic philoſopher, who flouriſhed about a hundred and twenty-five years before Chriſt, and wrote ſome allegorical commentaries on the Scripture, was the author of thoſe traditions, by an adherence to which the *Phariſees* were principally diſtinguiſhed from other ſects.

Be this as it will, *Phariſaiſm* is ſtill the prevailing doctrine in the Jewiſh religion; that vaſt number of traditions in the Talmud, which bear ſo great a ſway among the Jews, coming all from the *Phariſees*, which they aſcribed to God, and received as of equal authority with the ſacred writings. See MISCHNA.

Joſephus, who deſcribes their dogmata, ſays, that they attributed all to deſtiny, and to God; ſo, however, as not to deprive man of his free agency, which Sixtus of Sienna thus explains: the *Phariſees* believed, that all things were done by deſtiny, i. e. with God's foreknowledge, and in conſequence of his immutable decree; the will of man ſtill remaining free and unaffected: *Fato, hoc eſt, Dei præſcientia, & immobili decreto, omnia geri; manente tamen libero humanæ libertatis aſſenſu.*

They owned the immortality of the ſoul, a reſurrection, and a future ſtate; but they admitted, at the ſame time, as ſome have ſuppoſed, a kind of metempſychoſis, or tranſmigration of ſouls. They alſo held the doctrine of angels, and ſeparate human ſpirits.

The *Phariſees* were great ſticklers for the allegorical or myſtical ſenſe of the Scriptures; whence moſt of the converts made to Chriſtianity among the Jews were of the number of the *Phariſees.*

In effect, the *Phariſees* were in every thing directly oppoſite to the Sadducees.

PHARMACEUTICA, Φαρμακευτικη, that part of phyſic which directs the preparation and application of medicines. See PHARMACY.

PHARMACI, Φαρμακοι, among the Greeks, an appellation uſed for two perſons who were employed in the LUSTRATION or purification of cities.

Theſe were two men, according to ſome; but others ſuppoſe them to have been a man and woman, to repreſent the male and female ſex, for each of which they offered a ſacrifice. It was uſual for the man to carry about his neck figs, called ισχαδες, of a blackiſh colour; and the women ſuch as were white. Pott. Archæol. Græc. tom. i. p. 400, ſeq.

PHARMACIA, Φαρμακεια, in *Antiquity*, denotes the art of effecting ſtrange and wonderful things, by means of medicated and enchanted compoſitions of herbs, minerals, &c. Theſe things themſelves were called *pharmaca*, ſome of which, being taken inwardly, were ſaid to cauſe blindneſs, madneſs, love, &c. Such were the medicaments by which Circe transformed Ulyſſes' ſoldiers: others infected by touch; ſuch was the garment Medea ſent to Creuſa: others ſpread their venom afar off, and operated upon perſons at a great diſtance

There were alſo *pharmaca ſoteria*, Φαρμακα σωτηρια, which were amulets againſt the former; ſuch was the herb moly, which preſerved Ulyſſes from Circe's enchantments; the laurel, the ſallow-tree, the rhamnus or Chriſt-thorn, flea-bane, the jaſper-ſtone, and many others mentioned by Albertus Magnus, and Orpheus, in his book De Lapillis. Pott. Archæol. Græc. lib. ii. cap. 18. tom. i. p. 353. See AMULET.

PHARMACITIS *terra*, in the *Materia Medica*, a name which ſome authors have given to the common AMPELITES, or canal-coal.

PHARMACOCHEMIA, a term uſed to expreſs that part of the chemical art which treats of the preparation of medicines.

It is thus called by way of diſtinction from that chemiſtry which is wholly employed about the tranſmutation of metals by means of the philoſopher's ſtone; this being called *ſpagirico-chemia.*

PHARMACOLOGY, a treatiſe of medicines, or the art of preparing them, judging of them, &c.

PHARMACOPŒIA, formed from φαρμακον, *remedy*, and ποιειν, *to make*, a diſpenſatory, or a treatiſe deſcribing the preparations of the ſeveral kinds of medicines, with their uſes, manner of application, &c.

We have various *pharmacopæias*; as thoſe of Bauderon, Quercetan, Zwelfer, Charas, Bates, Salmon, Lemery, &c. The lateſt, and moſt in eſteem, are the Edinburgh and London Diſpenſatories; but the moſt univerſal is Quincy's *Pharmacopæia.*

PHARMACOPOLA, or PHARMACOPOEIUS, an *apothecary*; or a perſon who prepares and ſells medicines. See APOTHEKARY.

The word is ſeldom uſed but by way of ridicule. It is formed from φαρμακον, and πωλειν, *to ſell.* See Horace, Satire 2 lib. i. verſ. 1.

PHARMACUM, Φαρμακον, a medicament, or medicine; whether of ſalutary, or poiſonous quality.

PHARMACY, Φαρμακεια, derived from φαρμακον, *remedy*, that branch of medicine, which teaches the choice, preparation, and mixture of medicines.

Moſt of the natural bodies being ſome way or other employed as ſubjects of *pharmacy*, the materia medica is extremely large, and its operations various. Its materials in the earlieſt ages, indeed, were very few, and the ways of managing them very ſimple: ſubjects afterwards multiplied, operations increaſed, and at preſent we ſeem abundantly ſtocked with both ſimple and compound medicines.

Diſeaſes muſt have been very early, if the firſt inhabitants of the earth experienced the ſame changes of ſeaſons, breathed the ſame kind of air, and uſed a like kind of diet and regimen of life with ourſelves; but ſoon after the diſeaſe afflicts, the patient ſeeks a remedy; and this appears to have been the foundation of *pharmacy* in different parts of the world.

Experiments being thus multiplied, and the preparations of ſimples better made, *pharmacy* became at length an art. Hippocrates, however, when he came to compile a kind of ſyſtem of phyſic from the obſervations of antiquity, deſcribed but few, and thoſe generally ſimple.

Succeeding phyſicians then enlarged the MATERIA *medica*; Galen conſiderably ſwelled the catalogue, and the Arabians much more; and when learning began to revive in Europe, the materia medica was again enlarged, and great changes wrought upon it by chemiſtry.

The art of *pharmacy* muſt be conſidered under the management of phyſicians, apothecaries, trading chemiſts, and druggiſts. To the phyſician it belongs to direct the medicines, and to give the rules of extracting and managing the ſimples. To the apothecary belongs the reduction of the materia medica into certain forms of medicines, according to the direction of the phyſician. And the deſign of trading chemiſts, and druggiſts, is to furniſh medicinal matters to the apothecary, who cannot always detect an artificial counterfeit, or a dexterous ſophiſtication; and perhaps many remedies, well deſigned by the phyſician, have failed, or had miſchievous effects on this account. Shaw's Lectures, p. 195.

Pharmacy is divided into Galenical and chemical.

PHARMACY, *Galenical*, called alſo ſimply *pharmacy*, is that derived to us from the ancients; conſiſting in the knowledge and managements of the ſeveral parts of the materia medica, now in the hands of the apothecaries. See GALENIC.

PHARMACY, *chemical*, called alſo *ſpagirical* and *hermetical*, is that introduced by Paracelſuls, who calls it *ars diſtillatoria*; conſiſting in the reſolving of mixed bodies into their component parts, in order to ſeparate the uſeleſs and ill, and collect and exalt the good. See CHEMISTRY.

One of the chief obſtacles in the way of the improvement of phyſic, is the phyſicians neglecting of *pharmacy*. Simples, vulgar, familiar, eaſily prepared, and readily procured, Pliny well obſerves, were the only remedies intended by nature: when fraud was got into the world, and men began to live by their wits, ſhops were ſoon ſet up; and life offered every man to ſale. Soon after this, innumerable compoſitions, and endleſs, inexplicable mixtures, were cried up; the product of Arabia and India were crouded into a draught; and a plaſter for a little ulcer fetched from the Red Sea; whereas the proper remedies are thoſe the poor every day meet with. Hiſt. Nat. lib. xxiv. cap. 1.

PHARMACY, *characters in*. See CHARACTER.

PHARMUTHI, in the *Ægyptian Chronology*, one of the months of their year, which anſwered to the month of April among the Romans.

PHARNACEUM, in *Botany*, a genus of the *pentandria trigynia* claſs. Its characters are, that the empalement is compoſed of five leaves; it has no corolla; and the fruit is a three-celled, polyſpermous capſule. There are four ſpecies.

PHAROS, *phare*, a *light-houſe*, a pile raiſed near a port, where a fire is kept burning in the night, to guide and direct veſſels near at hand.

The *pharos* of Alexandria, built in a ſmall iſland at the mouth of the Nile, was anciently very famous, inſomuch as to communicate its name to all the reſt. It was ſo magnificent a ſtructure, being built by the famed architect Soſtrates, a native of Cnidos, or, as ſome ſay, by Deiphanes, the father of Soſtrates, that it coſt Ptolemy Philadelphus eight hundred talents. It had ſeveral ſtories raiſed one over another, adorned with columns, balluſtrades, galleries of the fineſt marble and workmanſhip, to which, ſome add, that the architect had contrived to faſten ſome looking-glaſſes, ſo artificially againſt the higheſt galleries, that one could ſee in them all the ſhips that ſailed in the ſea for a great way; inſtead of which noble ſtructure, one ſees now only a kind of irregular caſtle, without ditches or outworks of any ſtrength, the whole being accommodated to the inequality of the ground on which it ſtands, and which it ſeems is no higher than that which it ſhould command. Out of the midſt of this clumſy building riſes a tower, which ſerves for a light-houſe, but which hath nothing of the beauty and grandeur of the old one. The COLOSSUS of Rhodes alſo ſerved as a *pharos*.

Ozanam ſays, *pharos* anciently ſignified a ſtreight; as the *pharos* or *pharo* of Meſſina. See LIGHT-*houſe*.

PHARSANG, or PARASANG. See PARASANG.

PHARUS, in *Botany*, a genus of the *monoecia hexandria* claſs. Its characters are, that it has male and female flowers; the empalement of the male is a glume, with two valves, and a ſingle flower, and the corolla is a bivalve glume; the empalement of the female flower is the ſame with that of the other; the corolla is a ſingle valved long glume; it has one ſeed. There is only one ſpecies.

PHARYNGÆUM *ſal*, a name given by authors to an artificial ſalt, of uſe in the quinſey, and caſes of the like kind, when the *pharynx*, or fauces, are incommoded by a diſcharge of ſerous or other humours.

It is prepared of cream of tartar and nitre, each an ounce, with half an ounce of burnt alum; all theſe are to be diſſolved in vinegar, and coagulated according to art. This ſalt mixed with honey, and diſſolved in plantain-water, makes an excellent gargle.

PHARYNX, Φαρυνξ, in *Anatomy*, the upper opening of the œſophagus or gullet, ſituate at the bottom of the mouth; called alſo the *fauces*.

The *pharynx* is that part more particularly called the *gula*, or gullet; in which the action of deglutition commences, and where it is chiefly performed.

The *pharynx* is a muſcular and glandular bag, the outer ſurface of which is cloſely joined to the inner ſurface of all that ſpace which is at the bottom of the mouth, behind the poſterior nares, uvula, and larynx, and which reaches from the anterior apophyſis of the os occipitis to the œſophagus, which is the continuation of the *pharynx*.

It may be divided into three parts; one ſuperior, which is the arch of the *pharynx*; one middle, which is the body or great cavity; and one inferior, which is the bottom, narrow portion, or ſpincter. There are in it likewiſe three openings, that of the arch towards the nares, that of the body towards the mouth, and that of the bottom towards the œſophagus.

It is aſſiſted by three pair of muſcles, which principally compoſe the *pharynx*. The firſt, called the *ſtylopharyngæus*, ſerves to draw up and dilate the *pharynx*: the ſecond, the *pterygopharyngæus*, ſerves to conſtringe it; the third, which is called the *æſophægus*, ſerves to cloſe it. See each under its proper article.

The muſcles of the *pharynx* are reduced by Mr. Winſlow to three general claſſes, with regard to their inſertions: the firſt claſs comprehends thoſe which are inſerted in the baſe of the cranium; and they are the CEPHALO-*pharyngæi*, the PETRO-*pharyngæi*, the SPHENO-*pharyngæi*, the PTERIGO-*pharyngæi*, and STYLO *pharyngæi*. The ſecond claſs includes thoſe which are inſerted towards the mouth; viz. the PERISTAPHILO-*pharyngæi*, the GLOSSO-*pharyngæi*, the HYPERO *pharyngæi*, which is a general denomination for thoſe on each ſide that are inſerted in the os hyoides, and may be reckoned three pairs, the *baſio-pharyngæi*, *kerato-pharyngæi minores*, and the *majores*; and the GENIO-*pharyngæi*. The third claſs comprehends thoſe inſerted in the lateral parts of the larynx, viz. the SYNDESMO-*pharyngæi*, the THYRO-*pharyngæi*, the CRICO-*pharyngæi*, the OESOPHAGÆUS, and the ADENO-*pharyngæus*.

The particular uſes of all theſe muſcles are very difficultly determined. It is certain, that thoſe of the middle and lower portion of the *pharynx* ſerve chiefly for deglutition: thoſe of the upper portion, and ſome of thoſe of the middle portion, may, among other functions, be uſeful in modifying the voice, according to the opinion of M. Santorini. Winſlow.

PHASCUM, in *Botany*, a genus of the claſs of *cryptogamia*, and order of *muſci*, or moſſes. Its characters are, that the anthera is covered, and guarded at the margin by parallel briſtles, and that the calyptra, or veil, is ſmall. There are four ſpecies.

PHASEOLUS, in *Botany*. See *Kidney*-BEAN.

PHASES, Φασεις, formed from φαινω, *I appear*, in *Aſtronomy*, the ſeveral appearances, or quantities of illumination of the moon, Venus, Mercury, and the other planets; or the ſeveral manners wherein they appear illuminated by the ſun.

The variety of *phaſes* in the moon is very remarkable: ſometimes ſhe increaſes, ſometimes wanes, ſometimes is bent into horns, and again appears like a ſemicircle; at other times ſhe is gibbous, and preſently again reſumes a full circular face. For the theory of the *lunar phaſes*, ſee MOON.

As to the *phaſes* of Venus, the naked eye does not diſcover any diverſity in them; but the teleſcope does. Copernicus anciently propheſied, that after-ages would find that Venus underwent all the changes of the moon which prophecy was firſt fulfilled by Galileo, who, directing his teleſcope to Venus, obſerved the *phaſes* to emulate thoſe of the moon; being ſometimes full, ſometimes horned, and ſometimes gibbous.

Mercury alſo does the ſame; all the difference between theſe and thoſe of the moon, is, that when theſe are full, the ſun is between them and us; whereas, when the moon is full, we are between her and the ſun.

Saturn puzzled the aſtronomers a long time with his ſtrange variety of *phaſes*. Hevelius and others found him, 1. Monoſpherical. 2. Triſpherical. 3. Spherico-anſated. 4. Elliptico-anſated. 5. Spherico-cuſpidated. But Huygens ſhews, that theſe monſtrous *phaſes* were principally owing to the imperfections of their teleſcopes. That great author, aſſiſted by the beſt teleſcopes, noted three principal *phaſes*; viz. Jan. 16, 1656, he was round; Octob 13, brachiated; and Decem. 17, 1657, anſated. See SATURN.

PHASES *of comets*. See COMET.

To determine the PHASES *of an eclipſe for any given time.*—Find the moon's place in her viſible way for that moment; and thence, as a centre, with the interval of the moon's ſemidiameter, deſcribe a circle. Find in like manner the ſun's place in the ecliptic, and thence, with the ſemidiameter of the ſun, deſcribe another circle; the interſection of the two circles ſhews the *phaſes* of the eclipſe, the quantity of obſcuration, and the poſition of the cuſps or horns.

PHASIANUS, in *Ornithology*. See PHEASANT.

PHASMATA, in *Phyſiology*, certain appearances ariſing from the various tinctures of the clouds, by the rays of the heavenly luminaries, eſpecially the ſun and moon.

Theſe are infinitely diverſified by the different figures and ſituations of the clouds, and the appulſes of the rays of light; and, together with the occaſional flaſhings and ſhootings of different meteors, they have, no doubt, occaſioned thoſe prodigies of armies fighting in the air, &c. of which we have ſuch frequent accounts in moſt ſorts of writers. Vide 2 Maccab. xi. 8. Malancth. Meteor. 2. Shel. de Comet. ann. 1618.

Kircher, and his imitator Schottus, have erroneouſly endeavoured to explain the phenomenon from the reflection of terreſtrial objects made on opake and congealed clouds in the middle region of the air, which, according to them, have the effect of a mirror. So that, according to theſe authors, the armies pretended by ſeveral hiſtorians to have been ſeen in the ſkies, were no other than the reflection of the like armies placed on ſome part of the earth. Vide Hiſt. Acad. Roy. Scienc. ann. 1726, p. 405, & ſeq.

PHASSACATES, in the *Natural Hiſtory of the Ancients*, the name of a ſpecies of *agate*, which, in its different appearances, they ſometimes called alſo LEUCACHATES and PERILEUCOS. It is found in the Eaſt Indies, and in Bohemia, and ſome other parts of Europe.

PHAUSINGES, a name given by the ancients to red circles on the legs, occaſioned by fire: it is by ſome alſo extended to ſeveral other ſpots and blemiſhes on the ſkin.

PHEANTIDES, in *Natural Hiſtory*, a name given by ſome to the ſtone called *encymonites*; it was of the nature of our ſparry incruſtrations on the roofs of ſubterraneons caverns. It was ſuppoſed to have great virtues in promoting delivery, and was given to women when they fell in labour.

PHEASANT, *phaſianus*, in *Ornithology*, a genus of birds, of the gallinæ order.

The diſtinguiſhing characteriſtic of this genus of birds, is, that the area or ſpace about the eyes is naked, and that they have no wattles.

The ſpecies are theſe: 1. The common *pheaſant*, with a blackiſh purple-coloured breaſt. 2. The red, or ſcarlet-breaſted *pheaſant*; this is nearly of the ſize of the common *pheaſant*, and its breaſt is of a high ſcarlet, and the belly red, but not ſo bright. 3. The Eaſt India *pheaſant*; this is an extremely beautiful bird, the whole body of which is variegated with a profuſion of the brighteſt colours, yellow, red, bluiſh-green, and almoſt every other tinge.

Linnæus enumerates three other ſpecies; viz. the motmot, or brown *pheaſant* of Guinea; the nycthemerus, or white *pheaſant* of China; and the argus, or yellow *pheaſant*, ſpotted with black, of Chineſe Tartary, beſides ſeveral varieties of the common ſort. *Pheaſants* were firſt brought into Europe from the banks of the Phaſis, a river of Colchis. Martial, lib. xiii. ep. 72.

The *pheaſant* is ſo nearly allied to our common poultry, that it would naturally appear a very eaſy thing to breed them up from young; but the proper food of them is not ſufficiently enquired into. Though they eat corn when full grown and in health, yet they have recourſe, in their younger ſtate, and when ſick, to another ſort of food, preying on ſeveral inſects, and that in a very voracious manner.

The young *pheaſant* and partridges prey upon ants; and they will never ſucceed with us, if they havenot a proper quantity of ants to have recourſe to, as ſoon as they leave their rooſt in a morning. When muſty corn, or want of due care in cleaning their houſes, has made them ſick, a repaſt of ants will often recover them. When that fails, they may be offered millepedes or ear-wigs, or both together, which will always do much better than either ſingly. To this medicine muſt be added a proper care that their common food of corn be very ſweet, their habitation be kept nicely clean, and their water ſhifted twice a day. They muſt not be let out of the houſe in a morning till the dew is off the ground; and after ſun-ſet they muſt be immediately taken in again: in the heat of the day they muſt be allowed to baſk in the ſun in a dry ſandy place. With theſe regulations, the birds of this kind will ſucceed much better than they uſually do. The *pheaſant* it a bird of a ſullen diſpoſition; and when the coupling time is over, there are ſeldom found more than one in a place. Phil. Tranſ. N° 23.

The way of taking *pheaſants* is, firſt, to be acquainted with their haunts and breeding-places; which are uſually young, thick, and well-grown coppices, free from the diſturbances of cattle, and having no path-way through them; for the *pheaſant* is an extremely timorous bird. When the haunts are diſcovered, the next thing to be attempted is, to find where the eye or brood is. In order to this, it is to be conſidered, that the *pheaſant* comes out of the wood three times a day to feed in green corn, freſh paſtures, or the like places. The times of coming out are in the morning ſoon after ſun-riſe, at noon, and at ſun-ſet. The ſide of the wood where they are ſuppoſed to come out, are to be carefully watched on this occaſion, and the young ones will be ſeen following the female juſt as a flock of chickens ſollow the hen. The wood may be alſo well watched in the evenings, and the noiſe of the cock and hen calling the young ones together, will ſoon be heard; and the ſportſman is on this occaſion to get as near as he can to the place, and being very ſtill and ſilent, he may obſerve their numbers and diſpoſition, and learn how to ſpread his nets ſo as to take the whole brood with great eaſe; but if his leaſt motion when near them diſcover him, they will all take to their legs, and run to a great diſtance: they ſeldom riſe on the wing, except very cloſe frighted indeed. Practice will make ſome people ſo expert at imitating the voice of the old *pheaſant*, that he will be able to call the young ones together to any place that he pleaſes, when the haunts are once found out, and by this means they are eaſily led into the nets.

The beſt time for uſing the call is in the morning or evening; and the note imitated ſhould be that by which the old ones call them out to feed; but by learning to imitate the other notes, they will be brought together at any time of the day. The ſportſman who can make this call, muſt ſhelter himſelf in ſome cloſe place, and begin by very ſoftly making the note; then, if none are near enough to be within hearing, he is to raiſe it to more and more loudneſs, and at length he will be anſwered as loud, if any are within hearing, though at a conſiderable diſtance; whereas, if he ſhould ſet up the call too loud at firſt, and any of the birds ſhould happen to be very near, they will be frighted away.

As ſoon as a *pheaſant* anſwers, the ſportſman is to creep nearer and nearer, ſtill calling, though not ſo loud; he will ſtill be anſwered, till at length he will be led by the bird's voice within ſight of it. As ſoon as this is the caſe, he is to ſpread his net, and then begin to call again, keeping in ſome cloſe and well ſheltered place behind the net; in this place he is to call till the bird approaches; and when he has drawn it under the net, he is to appear ſuddenly, and the bird, riſing up, will be caught in the net.

Another method of taking *pheaſants* much quicker than by this means is, the having a live cock *pheaſant* to uſe as a ſtale: this bird is to be fixed under the net, and by his crowing he will ſoon entice others in. The ſportſman muſt lie concealed; and as ſoon as another *pheaſant* comes in, he is to draw the net over him. Many people have a method of taking *pheaſants* in ſpringes or horſe-hair ſnares: the ſucceeding in this depends on the carefully ſearching out their haunts, and the places by which they go out of the woods into the fields. When theſe are found, a peg is to be fixed in the ground at each, and at each peg two ſpringes are to be laid open; the one to take in the legs, the other the head. As ſoon as the ſpringes are ſet, the ſportſman is to go into the woods, and getting behind the birds, he is to fright them with ſome little noiſe, ſuch as ſhall not be enough to raiſe them to the wing, but only to ſet them a-running. They will naturally make their way out of the wood, through their accuſtomed paſſes, and be then caught in the ſpringes.

There is another method of taking theſe birds in the winter, provided that there is no ſnow. This is to be done with a net made like a caſting net, but with the meſhes much wider; they may be five inches wide. Some peas or wheat are to be taken out; and the path of the *pheaſant* being diſcovered, which may eaſily be done by their dung, a pint or thereabout of corn is to be thrown down in the path in a place marked, ſo that the ſportſman can come to it again. This is to be done ſor ſeveral days, till at length the *pheaſants* are expecting it every day regularly; and all the birds of this kind that frequent the place, are brought together to feed there, and then the net is to be fixed over the place; its top being tied up to ſome bough of a tree, and its bottom fixed down all around, except in one place, where the walk of the *pheaſants* lies. In this place it is to be raiſed in form of an arch, and the entrance is to be lined with ſeveral rods of hazel; the thick ends of which are to be tied to the net, and the thin ones let into the ſpace covered by it; and thus the *pheaſants* will eaſily get in by parting the ſmall ends of the ſticks, as fiſh into a wheel, but they will not eaſily get out again. The nets are to be dyed of a ruſſet-colour, by laying them in a tan-pit; and they muſt, when planted for this purpoſe, be covered with boughs, ſo that the birds do not diſcover them, and then they will eaſily run into them, and be all taken at once.

PHEASANT's *eye*, *flos Adonis*, in *Botany*, a genus of the *polyandria polygynia* claſs. Its characters are theſe: the flower has a five-leaved empalement, and five, twelve, or fourteen petals, without any nectaria, which expand in form of a roſe; in the centre there are many germina collected in a head, attended by a great number of ſhort ſtamina, crowned by oblong, inflexed ſummits; after the flower is paſt, the germina becomes ſo many naked ſeeds, cloſely adhering to the pedicle, and forming an obtuſe ſpike. Miller enumerates three, and Linnæus four ſpecies.

The common Adonis grows naturally on the ſides of the river Medway in Kent; and for ſome years paſt great quantities have been ſold in London under the name of red Moroccos.

PHEASANT's *eye pink*. See PINK.

PHEASANT, *ſea*. See *Pintail* DUCK.

PHECOS, in *Botany*, a name uſed by ſome authors for the *ſagittaria*, or *water-arrow-head*.

PHELLANDRIUM, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are, that the floſculi of the diſc are ſmall, and that the fruit is ovated, ſmooth, and crowned with a perianthium and piſtil. There are two ſpecies.

PHELLOS, in *Botany*, a name uſed by ſome authors for the cork-tree.

PHELLOS, Φελλος, in *Antiquity*, a feſtival in honour of Bacchus, being a preparative to the DIONYSIA.

PHENGITES, in the *Natural Hiſtory of the Ancients*, the name of a very beautiful ſpecies of alabaſter. It is a very rude and irregular maſs, very ſhattery and friable, yet of a brightneſs ſuperior to that of moſt of the other marbles, and excelling them all in tranſparence; it is in colour of an agreeable pale, yellowiſh, white, or honey colour; the yellowiſh is more intenſe in ſome places than in others, and ſometimes makes an obſcure reſemblance of veins. It is very weak and brittle in the maſs; and when reduced to ſmall pieces, eaſily crumbled between the fingers into looſe but conſiderably large angular pieces, ſome perfect, others complex, irregular, or mutilated, and all approaching to a flat ſhape.

The ancients were very fond of this ſpecies in their public buildings; and the Temple of Fortune, built wholly of it, has long been famous. Its great beauty is its tranſparence, from which alone this temple was perfectly light when the doors were ſhut, though it was built without a window, and had no other light but what was tranſmitted through the ſtone its walls were built with. It was anciently found in Cappadocia, and is ſtill plentiful there: we have it alſo in Germany and France, and in our own kingdom in Derbyſhire, and ſome other counties. It takes an excellent poliſh, and is very fit for ornamental works, where there is no great ſtrength required. Hill's Hiſt. of Foſſ. p. 490. See GLASS.

PHEONS, in *Heraldry*, the barbed heads of darts, arrows, or other weapons.

Pheons are repreſented as in *Tab* II. *Herald. fig.* 79.— Sable, a feſſe ermine between three *pheons*, by the name of Egerton.

PHEOS, in *Botany*, a name given by Theophraſtus, Dioſcorides, and others, to a plant uſed by the fullers in dreſſing their cloths, and of which there were two kinds, a ſmaller, called ſimply *pheos*, and a larger, called *hippopheos*.

The name of this plant is ſometimes written *phleos*; and it is by that confounded with a kind of marſh-cudweed, or *gnaphalium*, called alſo by that name; but it may be always found which of the two plants an author means, by obſerving the ſenſe in which the word is uſed, and the uſe to which the plant was put. The *phleos*, properly ſo called, that is, the cudweed, was uſed to ſtuff beds and other ſuch things, and to pack up with earthen veſſels to prevent their breaking; but the *pheos*, improperly called *phleos*, only about cloths; this was, however, alſo called *ſtæbe* and *cnaphon*

PHEREPHATTIA, Φερεφαττια, in *Antiquity*, a feſtival at Cyzicum, wherein a black heifer was ſacrificed to Verephatta or Proſerpine.

PHIAL, *phiala*, formed of φιαλη, which ſignifies the ſame, a ſmall thin glaſs bottle, popularly called a *vial*.

PHIAL, *Leyden*. See LEYDEN.

PHIDITIA, or PHILITIA, in *Antiquity*, feaſts inſtituted by Lycurgus, and celebrated with great frugality at Lacedæmon.

The *Phiditia* were held in the public places, and in the open air: rich and poor aſſiſted at them alike, and on the ſame footing; their deſign being to keep up peace, friendſhip, and a good underſtanding and equality among all the citizens, great and ſmall. Bernegger ſays, they who attended at this feaſt, brought each a buſhel of flour, eight meaſures of wine, called chorus, and five minæ of cheeſe, and as much figs.

The *Phiditia* of the Greeks were much the ſame with the CHARISTIA at Rome.

PHILA, in *Mythology*, one of the attributes of Venus, which diſtinguiſhes her as the mother of love, from φιλειν, *to love*.

PHILADELPHIA, in *Antiquity*, were games inſtituted at Sardis, to celebrate the union of Caracalla and Geta, the ſons of Septimius Severus.

PHILADELPHIA *ſtones*, a name given by ſome authors to what are called by others *Chriſtian's bones*, found in the walls of that city. It is a common error, that theſe walls are built of bones, and the tradition of the country is, that when the Turks took the place they fortified it for themſelves, and built their walls of the bones of the Chriſtians whom they killed there. Dr. Smyth, in one of his epiſtles, mentions this wall as an inſtance of the Turkiſh barbarity: but this is an idle opinion, what paſſes for bone being only a looſe and porous ſtone, of the ſparry kind, found in an old aqueduct, which is ſtill in the wall. Sir Paul Rycaut brought home pieces of theſe ſtones, which he alſo ſuppoſed to have been bones, but on examination they proved to be no other than various bodies, chiefly vegetable, incruſted over and preſerved in a ſpar of the nature of that which forms incruſtations in Knareſborough ſpring, and other places with us. Theſe bodies are often cemented together in great numbers by this matter, and their true ſhape loſt in the congeries, till a diligent and judicious eye traces them regularly.

HILADELPHIAN *Society*, in *Eccleſiaſtical Hiſtory*, an obſcure and inconſiderable ſociety of myſtics, formed towards the cloſe of the laſt century, by an Engliſh female fanatic, named Jane Leadley, who, ſeduced by her viſions, predictions, and doctrines, ſeveral diſciples, among whom were ſome perſons of learning. This woman apprehended, that all diſſenſions among Chriſtians would ceaſe, and the kingdom of the Redeemer become a ſcene of charity and felicity, if Chriſtians, without regarding the forms of doctrine or diſcipline that diſtinguiſh particular communions, would all join in committing their ſouls to the care of the internal guide, to be inſtructed, governed, and formed by his divine impulſe and ſuggeſtions. Nay, ſhe pretended a divine commiſſion to proclaim the approach of this glorious communion of ſaints; and imagined that the ſociety eſtabliſhed by herſelf was the true kingdom of Chriſt. One of her leading doctrines was, that of the final reſtoration of all intelligent beings to perfection and happineſs.

PHILADELPHUS, Φιλαδελφος, in *Antiquity*, a title or ſurname, borne by ſeveral ancient kings; formed from the Greek φιλος, *friend*, *lover*, and αδελφος, *brother*; q. d. one who loves his brother, or brethren.

Ptolemy *Philadelphus* erected a library at Alexandria, and furniſhed it with four hundred thouſand, others ſay with ſeven hundred thouſand volumes, by the advice, and with the aſſiſtance, of Demetrius Phalereus. See ALEXANDRIAN *Library*.

It was the ſame *Philadelphus* that procured the Greek verſion of the books of Moſes, called the SEPTUAGINT.

Father Chamillart has a medal of the queen of Comagene, which bears the title of *Philadelpha*, without any other name. M. Vaillant tells us, that Philip king of Syria, had alſo the title *Philadelphus*.

PHILADELPHUS, *mock-orange*, or *pipe-tree*, in *Botany*, a genus of the *icoſandria monogynia* claſs. Its characters are, that it hath a permanent empalement of one leaf, cut into five acute parts; it hath four or five roundiſh petals, which ſpread open; the germen is ſituated under the flower, ſupporting a ſlender ſtyle, divided into four parts, each being crowned by a ſingle ſtigma; the germen

men afterwards becomes an oval, acute-pointed capſule, having four or five cells, which are filled with ſmall oblong ſeeds. Linnæus reckons two, and Miller three ſpecies.

PHILANDER, in *Zoology*. See Didelphis and Opossum.

PHILANTHROPOS, in *Botany*, a name uſed by ſome authors for the common *aparine*, *cleavers*, or *gooſe-graſs*.

PHILANTHROPY, Φιλανθρωπια, *love of mankind*, a general benevolence towards the ſpecies.

PHILARMONICI, is the denomination of a literary ſociety eſtabliſhed at Verona in 1543. See Academy.

PHILAUTIA, φιλαυτια, formed from φιλος, *amicus*, and αυτος, *ipſe*, in the *Schools*, self-love, a vicious fondneſs and complaiſance for a man's ſelf.

PHILELIA, the name of a ſong among the ancient Greeks, in honour of Apollo. Athenæus, lib. xiv. cap. 3.

PHILETERIUM, in *Botany*, a name uſed by ſome authors for the *behen album*, the common white-flowered bladder-campion, called *white ben*.

PHILIPPICS, *Philippicæ*, φιλιππικοι λογοι, in *Literature*, a name given to the orations of Demoſthenes againſt Philip king of Macedon.

The *Philippics* are eſteemed the maſter-pieces of that great orator: Longinus quotes abundance of inſtances of the ſublime from them; and points out a thouſand latent beauties therein. In effect, that pathetic wherein Demoſthenes excelled, the frequent interrogations and apoſtrophes wherewith he attacked the indolence of the Athenians, where could they be better employed? Howmuch delicacy ſoever there be in the oration againſt Leptines, the *Philippics* have yet the advantage over it, were it only on account of the ſubject, which gives Demoſthenes ſo fair a field to diſplay his chief talent, we mean, with Longinus, that of moving and aſtoniſhing.

Dionyſius Halicarnaſſeus ranks the oration on the Haloneſe among the *Philippics*, and places it the eighth in order; but though the authority of that great critic be of no ſmall weight, yet that force and majeſty, wherein Cicero characterizes the *Philippics* of Demoſthenes, ſeem to exclude the oration on the Haloneſe out of the number; and authorize the almoſt univerſal opinion of the learned, who reject it as ſpurious.

Libanius, Photius, and others, but above all the languidneſs of the ſtyle, and the lowneſs of the expreſſions, which reign throughout the whole, father it on Hegeſippus.

Philippic is alſo applied to the fourteen orations of Cicero againſt Marc Antony. It was Cicero himſelf that gave them this title in his epiſtle to Brutus; and poſterity have found it ſo juſt, that it has been prepetuated to our times.

Juvenal, Sat. x. calls the ſecond the *divine Philippic*, and witneſſes it to be of great fame, *conſpicuæ divina Philippica famæ*. That orator's intitling his laſt and moſt valued orations after the *Philippics* of Demoſthenes ſhews the high opinion he had of them.

Cicero's *Philippics* coſt him his life; Marc Antony having been ſo irritated with them, that when he arrived at the triumvirate, he procured Cicero's murder, cut off his head, and ſtuck it up in the very place whence the orator had delivered the *Philippics*.

PHILIPPISTS, a ſect or party among the Lutherans; the followers of Philip Melancthon.

That reformer having ſtrenuouſly oppoſed the Ubiquists, who aroſe in his time; and the diſpute growing ſtill hotter after his death, the univerſity of Wittemberg, who eſpouſed Melancthon's opinion, were called, by the Flacians, who attacked it, *Philippiſts*.

PHILITIA. See Phiditia.

PHILIZERS, or Philazers. See Filazer.

PHILLYREA. See *Mock* Privet.

PHILO, a term originally Greek, formed of φιλος, *amicus*, *friend*, or *lover*; now uſed in compoſition in ſeveral words in our language: as,

PHILELEUTHERUS, φιλελευθερος, formed of φιλος, and ελευθερος, *free*, a lover of liberty.

PHILOLAUS, formed of φιλος, and λαος, *people*, in *Mythology*, a denomination under which Eſculapius was honoured in a temple at Aſopus, in Laconia.

PHILOLOGY, φιλολογια, formed from φιλος, and λογος, *lover of diſcourſe*; a ſcience, or rather aſſemblage of ſeveral ſciences, conſiſting of grammar, rhetoric, poetry, antiquities, hiſtory, and criticiſm.

Philology is a kind of univerſal literature, converſant about all the ſciences, &c. their riſe, progreſs, authors who have cultivated them, &c.

Philology makes what the French call the *belles lettres*. In the univerſities it is alſo called *humanities*, or *humaniores literæ*.

Anciently, *philology* was only a part of grammar.

Eratoſthenes, library-keeper at Alexandria, was the firſt who bore the ſplendid title of *Philologus*, according to Suetonius; or that of *critic*, acooding to Clemens Alexandrinus. He lived under Ptolemy Philadelphus, and died in the 146th Olympiad.

PHILOMATHES, φιλομαθης, formed from φιλος, *lover*, and μανθανω, *I learn*, a lover of learning or ſcience.

PHILONIUM, in *Pharmacy*, an opiate, or electary whereof there are two kinds, the Roman, and the Perſian.

The Roman, called alſo the great *philonium*, took its name from the phyſician Philo, who invented it. It conſiſts of the ſeeds of henbane, pepper, opium, and other ingredients. It is uſed to promote ſleep, and againſt colds, colics, &c.

The Perſian *philonium* conſiſts of ſeveral ingredients, among which are opium, terra ſigillata, lapis hæmatites, caſtor, and ſaffron. It is uſed to ſtop hæmorrhages, dyſenteries, &c.

Philonium *Londinenſe*, the name by which the medicine commonly called *philonium Romanum*, is called in the late London Diſpenſatory. The compoſition is alſo much altered, as well as the name, and is now ordered to be made thus: take white pepper, ginger, caraway-ſeeds, of each two ounces, opium ſix drams, ſyrup of diacodium boiled to the conſiſtence of honey, three times the weight of all the reſt. The opium is to be diſſolved in a little wine, and then mixed with the ſyrup; after which the powders are to be ſtirred in, and the whole made into an electary.

PHILOPATOR, φιλοπατωρ, formed from φιλος, *lover*, and πατηρ, *father*, in *Antiquity*, a title or ſurname, aſſumed by ſeveral of the kings of Egypt and Syria, importing, lover of one's father.

Ptolemy *Philopator* ſucceeded Ptolemy Euergetes; and had for his ſucceſſor Ptolemy Philometer. The Syrians had their Seleucus *Philopator*, Antiochus *Philopator*, &c.

PHILOSEBASTUS, φιλοσεβαστος, i. e. *a friend of Auguſtus*, was a title aſſumed by ſeveral princes and cities, as a public teſtimony of their attachment to any emperor. This title is found on the marbles of Cyzicum and in other inſcriptions.

PHILOSOPHER, φιλοσοφος, a perſon well verſed in philoſophy; or who makes profeſſion of, or applies himſelf to, the ſtudy of nature and morality.

The ſects of *philoſophers* are very numerous; and their dogmata or tenets very contradictory.

Helmont, and ſome of the chemiſts, denominate themſelves *philoſophers by fire*.

The alchemiſts, and adepti, are frequently denominated *the philoſophers*, by way of eminence.

Philosophers *lotion*. See Lotion.

Philosophers *ſtone*, the greateſt object of alchemy, is a long-ſought-for preparation, which, when ſound, is to tranſmute or exalt impurer metals, as tin, lead, and copper, into gold and ſilver.

Some of the Greek writers, in the fourth and fifth centuries, ſpeak of an art, as being then known, of tranſmuting the baſer metals into gold; and towards the end of the thirteenth century, when the learning of the Eaſt had been brought hither by the Arabians, the ſame pretenſions began to ſpread through Europe. It is ſuppoſed that this art, called alchemy, was of Egyptian original; and that, when the ancient Greek philoſophers travelled into Egypt, they brought back ſome of the allegoric language of this Egyptian art, ill underſtood, which afterwards paſſed into their mythology. Alchemy was the earlieſt branch of chemistry, conſidered as a philoſophical ſcience: in the other parts of chemical knowledge, facts preceded reaſoning or ſpeculation; but alchemy was originally ſpeculative. See Transmutation.

The alchemiſts ſuppoſed the general principles of metals to be chiefly two ſubſtances, which they called mercury and ſulphur; they apprehended alſo, that the pure mercurial, ſulphureous, or other principles of which they imagined gold to be compoſed, were contained, ſeparately, in other bodies: and theſe principles, therefore, they endeavoured to collect, and to concoct and incorporate by long digeſtions; and by thus conjoining the principles of gold, if they could be ſo procured and conjoined, it might be expected that gold would be produced. But the alchemiſts pretend to a product of a higher order, called the elixir, the medicine for metals, the tincture, the *philoſopher's ſtone*; which, by being projected on a large quantity of any of the inferior metals in fuſion, ſhould change them into fine gold: which being laid on a plate of ſilver, copper, or iron, and moderately heated, ſhould ſink into the metal, and change into gold all the parts to which it was applied: which, on being properly heated with pure gold, ſhould change the gold into a ſubſtance of the ſame nature and virtue with itſelf, ſo as thus to be ſuſceptible of perpetual multiplication; and which, by continued coction, ſhould have its power more and more exalted, ſo as to be able to tranſmute greater and greater quantities of the inferior metals, according to its different degrees of perfection.

There are three ways whereby the alchemiſts have attempted to arrive at the making of gold: the firſt by ſeparation; for it is affirmed, that every metal yet known contains ſome quantity of gold: only, in moſt, the quantity is ſo little, that it will not defray the expence of getting it out.

The ſecond is by maturation; for the alchemiſts hold mercury to be the baſis and matter of all metals; that quickſilver purged from all heterogeneous bodies would be much heavier, denſer, and ſimpler, than the native quickſilver; and that by ſubtilizing, purifying, and digeſting it with much labour, and long operations, it may be converted into pure gold.

This method of maturation is only for mercury: the other metals it is ineffectual for, on two accounts: 1. Becauſe their matter is not pure mercury, but has other heterogeneous bodies adhering to it: and, 2. Becauſe the digeſtion, whereby mercury is turned into gold, would not ſucceed in other metals, in regard theſe had not been long enough in the mines.

Weight is the individual and inimitable character of gold, &c. Now mercury, they ſay, has ever ſome impurities in it; and thoſe impurities are lighter than mercury. Could thoſe be purged quite out, as it does not appear to them impoſſible but they might, mercury would be as heavy as gold: and what is as heavy as gold is gold, or at leaſt might very eaſily be made gold. See *Fixing of* Mercury.

The third method is, that of tranſmuting, or of turning all metals readily into pure gold, by melting them in the fire, and caſting a little quantity of a certain preparation into the fuſed matter; upon which the fæces immediately retire, are volatilized and burnt, and ſo carried off; and the reſt of the maſs is turned into pure gold. That which works this change in the metals is called the *philoſopher's ſtone*. See Transmutation.

Whether this third method be poſſible or not, is very hard to ſay. We have ſo many teſtimonies of it from perſons, who on all other occaſions ſpeak truth, that it is ſomewhat hard to ſay they are guilty of falſhood, even when they ſay, that they have been maſters of the ſecret. All required is, they ſay, to do that by art, which nature does in many years and ages. For that as lead and gold do but differ little in weight, therefore there is not much in lead beſide mercury and gold. Now, if I had any body which would ſo agitate all the parts of lead, as to burn all that is not mercury therein; and had alſo ſome ſulphur to fix the mercury; would not the maſs remaining be converted into gold? There is nothing in nature ſo heavy as lead, gold and mercury alone excepted. It is evident, therefore, there is ſomething in lead that comes very near to gold. But in lead there is alſo ſome heterogeneous matter different both from mercury and gold. If now nineteen ounces of lead be diſſolved by the fire, and eight ounces be thus deſtroyed, they argue that we ſhall have the reſt good gold; the ratio of lead to gold being as eleven to nineteen. If then the *philoſopher's ſtone* can purify the mercurial matter in lead, ſo as that nothing ſhall remain but the pure mercurial body, and you can fix and coagulate this, by means of ſulphur, out of nineteen ounces of lead you will have eleven of gold. Or, if you reduce the lead from eighteen to fourteen, you will then have converted it into mercury; and if you farther purify this mercury to its proper ſtandard, you will have gold; provided you have but a ſulphur with which to fix and coagulate it. Such is the foundation of the opinion of the *philoſopher's ſtone*; which the alchemiſts contend to be a moſt ſubtile, fixed, concentrated fire, which, as ſoon as it melts with any metal, does, by a magnetic virtue, immediately unite itſelf to the mercurial body of the metal, volatilizes and cleanſes off all that is impure therein, and leaves nothing but a maſs of pure gold. Many frauds and artifices have undoubtedly been practiſed in this operation; and there might be political reaſons why princes and others ſhould encourage thoſe who pretended a power of furniſhing this inexhauſtible ſource of wealth: but it would be wrong to cenſure as impoſtors, all thoſe who have declared themſelves convinced, from their own experiments of the tranſmutability of baſe metals into gold. However there are ſtrong reaſons to believe that the authors have been deceived themſelves by fallacious appearances. Mr. Boyle gives an account of a proceſs, by which he imagines part of the ſubſtance of gold to have been tranſmuted into ſilver. See Menstruum *peracretum*. He alſo relates a very extraordinary experiment, under the title of the degradation of gold by an anti-elixir, which was publiſhed in his own life-time, and ſince reprinted in 1739. Hence many have been led to conclude in favour of the alchemical doctrine of the tranſmutability of metals. See an account of this experiment with remarks upon it by Dr. Lewis, in his Commerce of Arts, ſect. 12. p. 297, &c.

King Henry VI. granted letters patent to certain perſons, who undertook to find out the *philoſopher's ſtone*, and to change other metals into gold, &c. to be free from the penalty of the ſtat. 5 Hen. IV. made againſt the attempts of chemiſts of this nature. Pat. 34 Hen. VI. 3 Inſt. 74.

Philosophers *tree*, a chemical preparation, called alſo Arbor *Dianæ*, *Diana's tree*.

PHILOSOPHICAL, ſomething that relates to Philosophy.

Philosophical *æther*. See Æther.

Philosophical *chemiſtry*. See Chymistry.

Philosophical *criticiſm*. See Criticism.

Philosophical *egg*, among the *Chemiſts*, is a thin glaſs body, or bubble, of the ſhape of an egg, with a long neck or ſtem; uſed in digeſtions.

Philosophical *month*. See Menstruum, and Month.

Philosophical *ſin*. See Sin.

Philosophical *Tranſactions*. See Transactions.

PHILOSOPHIZING, the act of conſidering ſome object of our knowledge, examining its properties, and the phenomena it exhibits, and enquiring into their cauſes or effects, and the laws thereof; the whole conducted according to the nature and reaſon of things, and directed to the improvement of knowledge.

Philosophizing, *rules of*, *regulæ* Philosophandi, as eſtabliſhed by ſir Iſaac Newton, are, 1. That no more cauſes of a natural effect be admitted than are true, and ſuffice to account for the phenomena thereof.

This agrees with the ſentiments of moſt philoſophers, who hold that nature does nothing in vain; and that it were vain to do that by many things, which might be done by fewer.

2. Natural effects, therefore, of the ſame kind, proceed from the ſame cauſes. Thus, e. gr. the cauſe of reſpiration is one and the ſame in man and brute; the cauſe of the deſcent of a ſtone, the ſame in Europe as in America; the cauſe of light the ſame in culinary fire, and in the ſun; and the cauſe of reflexion the ſame in the planets as the earth.

3. Thoſe qualities of bodies which are not capable of being heightened, and remitted, and which are found in all bodies, where experiments can he made, muſt be looked on as univerſal qualities of all bodies.

Thus the extenſion of body is only perceived by our ſenſes, nor is it perceivable in all bodies: but ſince it is found in all that we have perception of, it may be affirmed of all. So we find, that ſeveral bodies are hard; and argue that the hardneſs of the whole only ariſes from the hardneſs of the parts: whence we infer, that the particles, not only of thoſe bodies which are ſenſible, but of all others, are likewiſe hard. Laſtly, if all the bodies about the earth gravitate towards the earth, and this according to the quantity of matter in each; and if the moon gravitates towards the earth alſo, according to its quantity of matter; and the ſea again gravitates towards the moon; and all the planets and comets gravitate towards each other: it may be affirmed univerſally, that all bodies in the creation gravitate towards each other. This rule is the foundation of all natural philoſophy.

PHILOSOPHY, Φιλοσοφια, the knowledge or ſtudy of nature and morality, founded on reaſon and experience.

Philoſophy owes its name to the modeſty of Pythagoras, who refuſed the title σοφος, *wiſe*, given to his predeceſſors, Thales, Pherecydes, &c. as too aſſuming; and contented himſelf with the ſimple appellation of φιλοσοφος, *quaſi* φιλος της σοφιας, *a friend or lover of wiſdom*.

Chauvin rather derives the name from φιλια, *deſire*, or *ſtudy*, and σοφια, q. d, *ſtudium ſapientiæ*; and ſays, that Pythagoras, conceiving that the application of the human mind ought rather to be called *ſtudy* than *ſcience*, ſet aſide the appellation *wiſe*, and in lieu thereof took that of *philoſopher*. For having diſcourſed with great judgment and learning before Leontius, king of the Phliaſii, that prince aſked him what art he profeſſed; or in what points his wiſdom chiefly lay? To which he anſwered, that he neither underſtood any art, nor was he σοφος, but φιλοσοφος. Which title, St. Auguſtine obſerves, took ſo well with other authors, that whoever excelled in any thing relating to wiſdom or knowledge had afterwards no other appellation. Accordingly Socrates, Plato, &c. ever refrained from the ſwelling title of *ſophos*.

By *philoſophy* we mean the knowledge of the reaſons of things, in oppoſition to hiſtory, which is the bare knowledge of facts: or to mathematics, which is the knowledge of the quantity of things or their meaſures.

Theſe three kinds of knowledge ought to be joined as much as poſſible. Hiſtory furniſhes matter, principles, and practical examinations; and mathematics complete the evidence. *Philoſophy* being the knowledge of the reaſons of things, all arts muſt have their peculiar *philoſophy* which conſtitutes their theory: not only law and phyſic, but the loweſt and moſt abject arts are not deſtitute of their reaſons, which might uſefully employ the time of the ſtudious. It is true, thoſe who call themſelves *philoſophers* and learned men have as yet done little towards forwarding the intelligence of arts: but we ſpeak not of what is done, but of what ought to be done.

One great obſtacle to the progreſs of arts and ſciences has been the neglect of practice in ſpeculative men, and the ignorance and contempt of theory in mere practical men. What chimeras and abſurdities the neglect of experience and practice has produced, need not be mentioned; the miſchiefs ariſing from a neglect of theory are not ſo obvious: yet certainly it retards the progreſs of arts. All invention or improvement muſt be either caſual or rational, including analogy or inference from ſimilar caſes, under the term rational. Now, although the foundations of arts have often been owing to ſome caſual diſcovery, as gunpowder, or the loadſtone, yet is this not to be truſted to alone. Improvements do not always flow from this ſource, but rather from the reflexions of artiſts; and, if theſe reflexions were rendered more diſtinct, more communicable, and eaſier to be retained, by the proper uſe of ſigns and other *philoſophical* helps, great advantages might be expected: it being certain, that *philoſophical* knowledge is more extenſive, and more ſure in the application; and, beſides, gives a pleaſure to the mind not to be expected from that which is merely hiſtorical.

It is to be obſerved, that the bare intelligence and memory of *philoſophical* propoſitions, without any ability to demonſtrate them, is not *philoſophy*, but hiſtory only. However, where ſuch propoſitions are determinate and true, they may be uſefully applied in practice, even by thoſe who are ignorant of their demonſtrations. Of this we ſee daily inſtances in the rules of arithmetic, practical geometry, and navigation; the reaſons of which are often not underſtood by thoſe who practiſe them with ſucceſs. And this ſucceſs in the application produces a conviction of mind, which is a kind of medium between *philoſophical*, or ſcientifical, and hiſtorical knowledge.

The ingenious author of the Analyſt has gone ſo far as to ſuggeſt, that mathematicians have no other conviction of the truth of the doctrine of fluxions.

We have ſaid that *philoſophy* is the knowledge of the reaſons of things. It may be aſked, what are the reaſons of things, or what is the explication of phenomena or facts? An ingenious author tells us, that the explication conſiſts only in ſhewing the conformity any particular phenomenon hath to the general laws of nature; or, which is the ſame thing, in diſcovering the uniformity there is in the production of natural effects. This he thinks evident to any one whoever ſhall attend to the ſeveral inſtances wherein philoſophers pretend to account for appearances. By a diligent obſervation of the phenomena within our view, we may diſcover the general laws of nature, and from thence deduce, though not demonſtrate, other phenomena; all deductions of this kind depending on a ſuppoſition that the Author of Nature always operates uniformly, and in a conſtant obſervation of thoſe rules we take for principles; which we cannot evidently know.

If we take a view of the ſeveral phenomena, and compare them together, we may obſerve ſome likeneſs and conformity between them. For example, in the falling of a ſtone to the ground, in the riſing of the ſea towards the moon, in coheſion and cryſtallization, there is ſomething alike, namely, an union or mutual approach of bodies: ſo that any one of theſe, or the like phenomena, may not ſeem ſtrange or ſurpriſing to a man who has nicely obſerved and compared the effects of nature: for that only is thought ſo which is uncommon, or a thing by itſelf, and out of the ordinary courſe of our obſervation. That bodies ſhould tend towards the centre of the earth is not thought ſtrange, becauſe it is what we perceive every moment of our lives; but that they ſhould have a like gravitation towards the centre of the moon, may ſeem odd and unaccountable to moſt men, becauſe it is diſcerned only in the tides; but a philoſopher, whoſe thoughts take in a larger compaſs of nature, having obſerved a certain ſimilitude of appearances, as well in the heavens as the earth, that argue innumerable bodies to have mutual tendency towards each other, which he denotes by the general name attraction, whatever can be reduced to that, he thinks juſtly accounted for. Thus he explains the tides by the attraction of the terraqueous globe towards the moon, which, to him, doth not appear odd or anomalous, but only a particular example of a general rule or law of nature.

If, therefore, we conſider the difference there is betwixt natural philoſophers, and other men, with regard to their knowledge of the phenomena, we ſhall find it conſiſts not in an exacter knowledge of the efficient cauſe that produces them, for that can be no other than the will of a ſpirit; but only in a greater largeneſs of comprehenſion, whereby analogies, harmonies, and agreements are deſcribed in the works of nature, and the particular effects explained; that is, reduced to general rules, which rules grounded on the analogy and uniformneſs obſerved in the production of natural effects, are more agreeable, and ſought after by the mind; for that they extend our proſpect beyond what is preſent, and near to us, and enable us to make very probable conjectures, touching things that may have happened at very great diſtances of time and place, as well as to predict things to come; which ſort of endeavour towards omniſcience is much affected by the mind. Berkeley, Princ. of Hum. Knowledge, ſect. 104, 105.

PHILOSOPHY is a term uſed in various ſignifications among ancient and modern writers. In its laxer ſenſe, it ſignifies the love of truth: thus Plato frequently calls it *philalethia.*

In other places it ſignifies the knowledge of many things; thus Zeno calls *philoſophy*, καταληψις, *comprehenſion*, becauſe comprehending all truth. Agreeable to which is Cicero's definition of philoſopher, that he is one who ſtudies to know the natures and cauſes of all things human and divine, and to attend to every good rule and method of life.

PHILOSOPHY, in a narrower ſenſe, is frequently confined to ſome one ſcience, or branch of ſcience: v. gr. to logic, as we find it in Plato and Ariſtotle: to phyſics, or the knowledge of nature; in which ſenſe it was chiefly uſed in the Ionic ſchool: and to ethics, or the rules of morality: thus it is Clemens of Alexandria relates, that among the Greeks there are philoſophers who hold diſputes about virtue.

Agreeable to this laſt application, Pythagoras defines *philoſophy* a meditation on death: by which, according to Plato and Clemens, is meant an abſtraction or retirement from the body: which Apuleius thus explains: a philoſopher is to ſtudy nothing ſo much as to ſet his ſoul at liberty from its correſpondence with the body: thus Cicero calls *philoſophy*, *ars vitæ*, and Seneca, *lex vitæ*: and thus Plutarch. Conſtancy, fidelity, and a ſound mind, are the real *philoſophy*; all the other parts of wiſdom, tending any other way, are prettineſſes and curioſities: and in this ſenſe it was that *philoſophy* chiefly flouriſhed in the ſchools of Socrates, afterwards called the *Academic ſchool*, and among the Stoics.

PHILOSOPHY, again, is frequently uſed by Pythagoras and Plato for metaphyſics, or the knowledge of God: which Plato calls the *true philoſophy*, others the *prima philoſophia*; and in reſpect whereof, the Platoniſts call all other *philoſophy*, *nocturnal*, νυκτερινη φιλοσοφια.

Gale includes the ſeveral notions hitherto delivered, under this one general definition: *philoſophy* is the knowledge of things natural, moral, ſupernatural, and notional; originally granted by God to our firſt parents, and tranſmitted to us for the honour of the Creator, and the good of the univerſe.

That definition of Epictetus is alſo pretty comprehenſive: *philoſophy*, he ſays, conſiſts in three things; the practice of precepts, the reaſon of precepts, and the proof of precepts.

Some having given the following appellations to the ancient *philoſophy*, under its ſeveral ſtages: *philoſophy*, ſay they, became *impious* under Diagoras; *vitious* under Epicurus; *hypocritical* under Zeno; *impudent* under Diogenes; *covetous* under Demochares; *voluptuous* under Metrodorus; *fantaſtical* under Crates; *ſcurrilous* under Menippus; *licentious* under Pyrrho; and *quarrelſome* under Cleanthes.

The ſeveral dogmata maintained by the ſeveral philoſophers are infinite: Cicero makes no ſcruple to aver, that there is nothing in the world, how abſurd ſoever, but has been maintained by one *philoſopher* or other.

From the firſt broachers of new opinions, and the firſt founders of ſchools, *philoſophy* is become divided into innumerable ſects; ſome ancient, others modern: ſuch are the Platoniſts, Peripatetics, Epicureans, Stoics, Pyrrhonians, and Academics; and ſuch are the Carteſians, Newtonians, &c. See the riſe, doctrines, &c. of each ſect under PLATONISM, PERIPATETICS, EPICUREANS, STOICS, PYRRHONIANS, ACADEMICS, CARTESIAN, NEWTONIAN, &c.

Philoſophy may be divided into two branches, or it may be conſidered under two habitudes, *theoretical* and *practical.*

PHILOSOPHY, *theoretical*, or *ſpeculative*, is that employed in mere contemplation, and which terminates therein. Such is phyſics, which is a bare contemplation of nature, and natural things.

Theoretical philoſophy, again, is uſually ſubdivided into three kinds; viz. pneumatics; phyſics, or ſomatics; and metaphyſics, or ontologia.

The firſt conſiders being, abſtracted from all matter: its objects are ſpirits, their natures, properties, and effects. The ſecond conſiders matter and material things: its objects are bodies, their properties, laws, &c.

The third extends to each indifferently: its objects are either body or ſpirit.

In the order of our diſcovery, or arrival at the knowledge of them, phyſics is firſt, then metaphyſics; the laſt ariſes from the two firſt conſidered together: after an acquaintance with God, ourſelves, and natural bodies, we come to conſider what is natural to them all, or the attributes that agree to all: and thus form a ſort of univerſal *philoſophy*, or doctrine *de ente* in general.

But in teaching, or laying down, theſe ſeveral branches to others, we obſerve a contrary order; beginning with the moſt univerſal, and deſcending to the more particular. And hence we ſee why the Peripatetics call metaphyſics, and the Carteſians pneumatics, the *prima philoſophia*.

Others prefer the diſtribution of *philoſophy* into four parts, viz. 1. Pneumatics, which conſiders and treats of ſpirits. 2. Somatics, of bodies. The third compounded of both, anthropology, which conſiders man, in whom both body and ſpirit are found. 4. Ontoſophy, which treats of what is common to all the other three.

Philoſophy may be divided into three parts; intellectual, moral, and phyſical; the intellectual part compriſes logic and metaphyſics; the moral part obtains the laws of nature and nations, ethics and politics; and, laſtly, the phyſical part comprehends the doctrine of bodies, animate or inanimate: theſe, with their various ſubdiviſions, will take in the whole of *philoſophy*.

Wolfius makes the three parts of *philoſophy* to be the doctrine of God, the human ſoul, and of bodies. However when he ſubdivides, and comes to treat the ſeveral branches ſeparately, his diviſions readily come under the three heads, intellectual, moral, and phyſical, before mentioned. The doctrine of God, and the human ſoul, may be ranged under the ſame head, metaphyſics, the notion of the divine nature being formed from that of the human ſoul, excluding limitations and imperfections.

Muſchenbroek divides *philoſophy* into ſix parts, viz. Pneumatics, or the doctrine of ſpirits; phyſics, whoſe object is the univerſe and the bodies contained therein; teleology, which explores the deſign and end of the exiſtence of all bodies, and of all their actions and changes, as far as human ſagacity can diſcover them; metaphyſics, which comprehends the general and abſtract natures and qualities of objects, containing ontology and coſmology; practical or moral *philoſophy*, which lays down rules for the right conduct of life, and the attainment of true happineſs; and logic, which unfolds the powers and directs the exerciſe of the intelligent and reaſoning faculty of the human mind.

PHILOSOPHY, *practical*, is that which lays down the rules of a virtuous and happy life; and excites us to the practice thereof.

Practical philoſophy is properly ethics alone, or the method of leading a virtuous and happy life. Yet moſt authors divide it into two kinds, anſwerable to the two ſorts of human actions to be directed thereby; viz. 1. LOGIC, which governs the operations of the underſtanding.

2. ETHICS, properly ſo called, which direct thoſe of the will.

PHILOSOPHY, *natural*. See NATURAL.

PHILOSOPHY, *moral*. See MORAL.

PHILOSOPHY is alſo frequently uſed for the particular doctrine or ſyſtem of opinions, broached by ſome conſiderable philoſopher, and eſpouſed, and adhered to by his followers.

In this ſenſe we ſay,

PHILOSOPHY, *Arabian*, *Ariſtotelian*, *Carteſian*, *Epicurean*, *Hermetical*, *Leibnitzian*, *Newtonian*, *Oriental*, *Platonic*, and *Socratic*. See PERIPATETIC, &c.

PHILOSOPHY is alſo uſed for a certain manner of philoſophizing; or certain principles, upon which all the enquiries thereby made do turn.

In this ſenſe we ſay,

PHILOSOPHY, *corpuſcular* or *atomical*, *mechanical*, and *experimental*. See the adjectives.

PHILOSOPHY, again, is conſidered with regard to the age, or the place, wherein it was taught.

In this ſenſe we ſay,

PHILOSOPHY, *new*, &c. See MECHANICAL *Philoſophy*.

PHILOSOPHY, *ſcholaſtic*, or *ſchool*. See SCHOLASTIC.

PHILTER, PHILTRE, PHILTRUM, in *Pharmacy*, &c. a ſtrainer, or FILTER.

PHILTER, Φιλτρον, formed of φιλεω, *I love*, is alſo uſed for a drug, or preparation, or charm, which it is pretended will excite love.

Philters are diſtinguiſhed into true and ſpurious: the ſpurious are ſpells or charms, ſuppoſed to have an effect beyond the ordinary laws of nature, by ſome magic virtue; ſuch are thoſe ſaid to be given by old women, witches, &c.

The true *philters* are ſuppoſed to work their effect by ſome natural and magnetical power. There are many enthuſiaſtic authors who believe the reality of theſe *philters*; and alledge matter of fact in confirmation of their opinion: among the reſt is Van Helmont, who ſays, that, upon holding a certain herb in his hand for ſome time, and taking afterwards a little dog by the foot with the ſame hand, the dog followed him wherever he went, and quite deſerted his former maſter.

He accounts for the phenomena of love tranſplanted by the touch of an herb: by aſſerting, that the heat communicated to the herb, not coming alone, but animated by the emanations of the natural ſpirits, determines the herb towards the man, and identifies it to him: having then received this ferment, it attracts the ſpirit of the other object magnetically, and gives it an amorous motion.

But all this is mere cant; and all *philters*, whatever facts may be alledged in their favour, are mere chimeras.

Naturaliſts aſcribe an effect, ſomewhat of kin to that of a *philter*, to cantharides taken inwardly: theſe, it is true, tend to excite love, or rather luſt; but it is luſt in the general, not determined to any particular object; and they do it no otherwiſe than by irritating the fibres of the nerves and muſcles, by whoſe action the emiſſio ſeminis is effected. See FILTER.

PHILTRATION, or FILTRATION. See FILTRATION.

PHILYRA, in *Natural Hiſtory*, a name given to the ſubſtance on which ſome of the moſt ancient books are written. It is the inner bark of the *tilia*, or common lime-tree. The emperor's library at Vienna has a book, written by Tully, never yet publiſhed, which is written on this ſubſtance.

PHIMOSIS, Φιμωσις, properly ſignifying a ligature with packthread, (φιμωσις denoting packthread,) in *Medicine*, a diſeaſe of the penis, wherein the præputium is by a violent inflammation glued, or ſtrongly conſtringed, upon the glands; ſo as not to be capable of being drawn back, to uncover the glans.

Sometimes a *phimoſis* conceals chancres on or about the glans; and ſometimes it is ſo violent, as to prevent the flowing out of the matter; whence it cauſes an inflammation or mortification of the part. When the prepuce is detained behind the glans, the caſe is called a PARAPHIMOSIS.

This diſorder is uſually communicated by commerce with unclean women, whereby the virulent matter lodged in the ſinuſes of the vagina inſinuates itſelf betwixt the glans and præputium, where remaining, it occaſions an inflammation, with the *phimoſis*: however, inſtances have occurred of a natural ſtricture in the præputium, ſo that the glans cannot at all or with great difficulty be denudated. When the *phimoſis* does not proceed from infection, it will be ſufficient to bathe the parts in warm water: but if it be a venereal caſe, proper internal medicines are to be exhibited at the ſame time, whilſt the pain and other ſymptoms are mitigated, by waſhing out the virulent matter with warm water, and frequently repeating an injection of decoction of barley and honey.

To diſperſe the tumor, a diſcutient fomentation or cataplaſm may be afterwards applied to the penis.

The cure of a paraphimoſis in no-wiſe differs from that of a *phimoſis*, except in the uſe of injections; and in both caſes, if they ſtill prove obſtinate, the prepuce muſt be cut, in order to reduce it to its natural ſtate or ſituation. See GONORRHOEA.

PHIMOSIS is alſo uſed for a diſeaſe of the eyes, wherein the eye-lids are ſo bound together by the mediation of ſome glutinous matter, that they are not to be opened.

PHLEBOTOMY, Φλεϐοτομια, compounded of φλεψ, *vein*, and τεμνειν, *to cut*, in *Medicine* and *Surgery*, *bleeding*; or the art or operation of letting blood. See BLEEDING.

PHLEGM, Φλεγμα, in *Chemiſtry*, an aqueous and inſipid fluid, ſuppoſed to be found in all natural bodies; coinciding with what the other philoſophers call *water*.

Phlegm makes the fourth of the chemical elements, or elementary principles.

In the diſtillation of vinegar, as alſo of all minerals and inodorous vegetables, *phlegm* comes out firſt; in that of wine, laſt.

This *phlegm* is ſuppoſed to be the common vehicle and diluter of all ſolid bodies; and in proportion to its quantity in their mixture are the other parts more languid and diſabled in their attraction: yet, on the chemiſt's ſyſtem, *phlegm* ſhould be a principle of action, as being neceſſary to the diſſolution of the ſalt in bodies, and without which the ſalt muſt remain inactive.

It is much to be queſtioned, whether this *phlegm* can ever be procured without ſome mixture of other matters; that, which has the leaſt of them, muſt come neareſt to the nature of a principle; and, on that account, rain-water ſhould afford it moſt.

Phlegm, Boerhaave obſerves, drawn by diſtillation from vegetables, always carries with it ſomewhat of the ſmell of the vegetable, which it derives partly from the oil, and partly from the ſpirit reſiding therein. The ſame *phlegm*, by frequently reiterated diſtillations, lays aſide moſt of its ſmell, and approaches nearer to pure water; but it never becomes perfectly ſuch. Add, that the pureſt diſtilled water, if expoſed a few days to the ſun, is much changed and rendered turbid.

That *phlegm* is not an elementary body, Mr. Boyle argues from its different powers and properties: the *phlegm* of wine, and that of moſt liquors, have qualities that make them differ from mere water, and alſo from each other: the *phlegm* or vitriol, that author obſerves, is an effectual remedy againſt burns, and a valuable noſtrum for diſcuſſing hard tumors; and that of vinegar will extract a ſaccharine ſweetneſs out of lead, and even diſſolve corals with long digeſtion; and that of ſugar of lead is ſaid to diſſolve even pearls.

In effect, the characters which ſerve to denominate a fluid, *phlegm*, or water, among the chemiſts, are inſipidity, and volatility; yet quickſilver has both theſe, which nobody pretends to be *phlegm*. Add, that it appears, from ſeveral experiments, that water itſelf, by repeated diſtillations, may be converted into earth: yet water, the ſame author obſerves, has a much fairer pretence to be an element, than any other of the *tria prima*.

Add, that, as to the qualities which occaſion that name to be given any viſible ſubſtance; viz. its being fluid, inſipid, and inodorous, we have never yet ſeen any of theſe ſeparated ſubſtances, which the chemiſts call *phlegm*, which were perfectly deſtitute both of taſte and ſmell.

Common ſalt, and ſeveral other ſaline bodies, diſtilled ever ſo dry, will each yield a large quantity of *phlegm*; which can no other way be accounted for but from this, that among the various operations of the fire on the matter of a concrete, ſeveral particles of that matter are reduced to a ſhape and ſize, requiſite to compoſe ſuch a liquor as the chemiſts call *phlegm*, or water.

PHLEGM, in the *Animal Oeconomy*, is one of the four humours, whereof the ancients ſuppoſed the maſs of blood to conſiſt.

Phlegm is the ſame that is otherwiſe called PITUITA.

PHLEGMAGOGUE, Φλεγμαγωγος, formed from *φλεγμα*, *pituita*, and *αγειν*, *to drive* or *draw*, a medicine proper to purge *phlegm*, or *pituita*.

Agaric, hermodactyls, turbith, and jalap, are reputed *phlegmagogues*.

PHLEGMASIA, a word uſed by ſome of the medical writers for an inflammation. Hippocrates alſo ſometimes uſes it to expreſs the violent heat in fevers.

PHLEGMATIC, Φλεγματικος, a temperament, wherein *phlegm* or *pituita*, is the prevailing humour.

Phlegmatic conſtitutions are ſubject to rheums, defluxions, &c.

PHLEGMON, Φλεγμονη, formed from *φλεγειν*, *to burn*, or *inflame*, in *Surgery*, a general name for all hot or inflamed tumors, formed in the fleſhy or bloody parts of the body.

An INFLAMMATION, attended with a conſiderable ſwelling of the parts, conſtitutes a *phlegmon*.

If the blood be good and laudable, and only peccant in quality, it is called a *true phlegmon*.

When corrupted and adulterated with bile, or pituita, it is called a *baſtard phlegmon*; in which caſe, it participates of the eryſipelas, œdema, or ſcirrhus.

The blood, here extravaſated, produces a heat, redneſs, tenſion, renitency, pulſation, and great pain. The bubo, carbuncle, furuncle, puſtules, and other tubercles ariſing from the blood, are all reducible to the *phlegmon*, &c. The ophthalmia, parotides, ſquinancy, and even pleuriſy and penipneumony, are ſpecies of the *phlegmon*.

If the proximate cauſe of theſe tumors be enquired into, we ſhall find it generally riſes from too thick or viſcid a ſtate of the blood, ſtagnating in the anaſtomoſes of the ſmalleſt veins and arteries; ſo that the blood being propelled in larger quantities than can paſs through thoſe veſſels, it muſt of conſequence excite the ſymptoms that are the attendants of this tumor, and occaſion great diſorder at every part where ſuch ſtagnation is made.

No part of the body, whether external or internal, is perfectly exempt from this ſort of tumor, not even the bones themſelves; but it is more common in the fat and glands than elſewhere.

The cauſes of this ſtagnation of the blood are either external or internal.

Among the external, are all wounds, fractures, luxations, contuſions punctures, by thorns and ſplinters, with a too great compreſſion of the veſſels, whether by too ſtrict a bandage, or by other means; each of which obſtructing the paſſage of the blood through its minute veſſels, either by dividing, bruiſing, compreſſing, or diſtorting them, may give riſe to this tumor.

And to theſe may be added burns of all kinds, with too violent cold, the too great motion of the body, the external application of ſharp and ſtimulating ſubſtances to the ſkin, and others which ſtop the pores of the ſkin, and impede the circulation of the blood.

Among the internal cauſes, are to be reckoned the too great acrimony of the blood, as in ſcorbutic habits, the blood's abounding in too great quantities, or being of too thick a conſiſtence, or, laſtly, its circulating in the body with too violent a motion; for by this laſt means the groſſer particles of the blood are protruded, and wedged in, as it were, in the ſmaller veſſels, through which they cannot find a paſſage; and this is eſpecially the caſe, when a ſudden cold is given to the body from a ſtate of extreme heat. In ſhort, every thing will produce an obſtruction that makes either the particles of the blood too large, or the mouths of the veſſels too ſmall and narrow to receive them.

The reſolution or diſperſion of a tumor of this kind is only practicable when the tumor is of a milder kind; when it is in a ſound habit of body, and when the blood is not yet too viſcid, or too violent in its motion: but ſuppuration follows when the inflammation is more violent, the circulation more rapid; but yet the maſs of blood ſomewhat temperate and free from acrimony. That is, when the blood becoming more inſpiſſated, and its larger particles ſticking in the more minute veſſels, can find no paſſage; but the ſmall veſſels are burſt by the preſſure and impulſe of the obſtructed blood, ſo that their contents are extravaſated in the fat, fleſh, and adjacent parts. Upon this extravaſation, the more ſubtle and fluid parts of the blood putrefy, by means of the great heat, and become fœtid and acrimonious, and corrode the adjacent parts: the fluids thus changed or corrupted, are, by the ſurgeons, called matter or pus; and this of ſeveral kinds, according to its conſiſtence and colours: it is either white, yellow, greeniſh, reddiſh, or party-coloured.

When the forementioned ſymptoms are much more violent, and the blood at the ſame time more acrimonious than it ought to be, this inflammation generally terminates in a gangrene: for, in that caſe, the ſmalleſt arteries and veins are corrupted, burſt, and broke; and hence the adjacent parts are diſſolved and corrupted by theſe extravaſated acrimonious humours, and particularly the ſkin is very ſubject to be filled with puſtules, when its cuticle has been ſeparated, as in burns.

The ſanies contained in theſe puſtules and elſewhere is uſually termed ichor, and is generally of a pale reddiſh caſt, and ſometimes brown or livid, which is much worſe; for unleſs the patient in this caſe is timely aſſiſted, the ſymptoms of inflammation all go off, the tumor, reſiſtance, heat, redneſs, pain, and pulſation, gradually diſappear, and the limb becomes flaccid and cold; it afterwards turns pale, and becomes dead and inſenſible, and the inflammation creeps to ſome other part.

If this caſe be treated with medicines too hot, too aſtringent, cooling, fat, acrimonious, or narcotic; or if the parts be bound too tight, the fleſh quite dies, its paleneſs turns to a livid lead-colour; and the incloſed ſanies, finding no vent, becomes more acrimonious, and ſo greatly corrodes the adjacent parts, as to deſtroy all ſenſe and motion, and brings on an entire ſphacelation of the whole limb. But if the inflamed part be full of glands, and the blood very thick, glutinous, and tough, the ſmall veſſels are then ſtrongly ſtuffed up with it, and impacted together; and the parts loſing their ſenſation, become changed into a hard tumor called a ſcirrhus. The cure of *phlegmons* is by diſperſing or ſuppuration: the methods for bringing on theſe, ſee under INFLAMMATION and SUPPURATION. Heiſter.

PHLEOS, in *Botany*. See PHEOS.

PHLEUM, in the Linnæan ſyſtem of *Botany*, a graſs called *typhoidea*, or *cat's-tail graſs* by Scheuhzer, which makes, with this author, a diſtinct genus of plants, of the *triandria digynia* claſs: the characters of which are that the cup is a glume, containing one flower; it is bivalve, oblong, ridged, and compreſſed, and opens into a double-pointed ſummit; the valves are erect, hollowed, compreſſed, equal in ſize, and bearded; the flower is compoſed of two valves, ſhorter than thoſe of the cup, the outer one, which is the larger, ſurrounding the inner or ſmaller one; the ſtamina are three capillary filaments, longer than the cup; the antheræ are oblong, and divided into two at the ends; the germen of the piſtil is roundiſh; the ſtyles are two in number, ſmall and bent; and the ſtigmata are plumoſe; the cup and flower incloſe the ſeed, which is ſingle, and of a roundiſh form. There are five ſpecies.

PHLOGIDIAUGIA, formed from *φλογιζω*, *I inflame*, and *αυγη*, *tranſparence*, in *Natural Hiſtory*, the name of a claſs of inflammable foſſils, of a pure texture, and in ſome degree tranſparent, Of this claſs are the ſulphurs, orpiments, zornics, and amber.

They are by this name diſtinguiſhed from the PHLOGISCIERIA. Hill.

PHLOGINOS, the name of a ſtone found in Egypt, and called by ſome *chryſitis*, from its colour reſembling gold.

PHLOGISCIERIA, derived from φλογιζω, and σκιερος, *opake*, in *Natural Hiſtory*, the name of a claſs of foſſils, the characters of which are, that the bodies contained in it are inflammable, of a courſe and impure texture, and not pellucid.

The bodies of this claſs are divided into two general orders, and under thoſe, into five genera. Thoſe of the firſt order are ſuch as are found looſe, and in detached maſſes: thoſe of the ſecond, ſuch as are found conſtituting whole ſtrata. The genera of the firſt order, are ambergriſe, jet, and the aſphalta; and thoſe of the ſecond, canal and common coal.

PHLOGISTON, formed of φλογιζω, *I am inflamed*, in *Chemiſtry*, is defined to be the moſt pure and ſimple inflammable principle. That ſuch a principle exiſts in various degrees, and modes of combination, in different bodies, is a fact which has been long and generally acknowledged. Some bodies have been obſerved to be capable, by expoſure to fire with the concurrence of air, of being kindled, of producing flame, of augmenting the fire, and of maintaining and ſupporting it; while other bodies, by expoſure to fire did, indeed, become hot, red, and luminous, but were incapable of producing flame, and of maintaining fire. Hence chemiſts have been always led to diſtinguiſh theſe two kinds of bodies, calling the former combuſtible, and the latter incombuſtible; and they ſuppoſed, that the inflammability of combuſtible bodies was the effect of a principle, which did not exiſt in thoſe that were incombuſtible. However ſome late writers have controverted this hypotheſis, and the diſtinction founded upon it. Dr. Prieſtley conjectures, that the difference between the ſubſtances which are called inflammable, and others which alſo contain *phlogiſton*, may be this, that in the former heat, or the vibration occaſioned by the emiſſion of their own *phlogiſton*, may be ſufficient to occaſion the emiſſion of more till the whole be exhauſted; that is till the body be reduced to aſhes. Whereas in bodies which are not inflammable, the heat occaſioned by the emiſſion of their own *phlogiſton* may not be ſufficient for this purpoſe, but an additional heat *ab extra* may be neceſſary.

M. Senebier, another ingenious author who has treated of this ſubject, does not ſeem willing to allow, that there is any body to be found which is incombuſtible, or proof againſt fire; and he obſerves, that even if ſuch a body were found, it would not be reaſonable to conclude, that it had no *phlogiſton*, but only that *phlogiſton* adheres moſt tenaciouſly to thoſe bodies which reſiſt the impreſſion of fire; and he adds, that there is no body which remains incombuſtible, if *phlogiſton* be added to it, to facilitate the diſperſion of that which it already contains. This inflammable principle cannot be ſeparated from the other principles of bodies and obtained pure; and, conſequently, as it is impoſſible to diſcover all the properties which are peculiar to it, and which diſtinguiſh it from all other ſubſtances, its preciſe nature has been very imperfectly underſtood. Hence the ancient chemiſts confounded it with oil and ſulphur, which are only ſubſtances into the compoſition of which a great quantity of this principle enters: nor did they ſeem to know, that only one inflammable principle exiſts, always the ſame, always ſimilar to itſelf, in oils, ſulphur, coals, and all other bodies which the modern chemiſts, ſince the time of Stahl, have ſufficiently aſcertained: ſo that it is now generally allowed, that *phlogiſton* is the ſame in the three great claſſes of natural bodies, i. e. in the animal, vegetable, and mineral kingdoms. That which is extracted from minerals is preciſely the ſame with that of the charcoal of animal and vegetable ſubſtances; *phlogiſton* may alſo be tranſmitted from bodies of one claſs to thoſe of another, and it produces, in this caſe, the ſame effects as if it had been taken immediately from the bodies of the claſs to which it is tranſmitted. After all the combinations, through which it may have paſſed, it remains invariably the ſame, and always comes forth with its primitive characters. Beccher calls this principle inflammable earth, and Stahl called it the principle of inflammability or *phlogiſton*.

Some philoſophers diſlike the term *phlogiſton*, and call the inflammable principle the elementary fire of bodies: but there ſeems to be no juſt objection againſt giving that or any other name to a real ſomething, the preſence or abſence of which makes ſo remarkable a difference in bodies as that of metallic calces and metals, oil of vitriol and brimſtone, &c. and which may be transferred from one ſubſtance to another, according to certain known laws; or, as one and the ſame unknown cauſe of certain well known effects. Whereas the term fire, uſed to denote a conſtituent principle of natural bodies, is more ambiguous, becauſe in common acceptation it includes heat, which has no more proper connection with *phlogiſton* than it has with water or any other conſtituent part of bodies; and it will be neceſſary to recur perpetually to the diſtinction of fire in a ſtate of action and fire inactive or quieſcent.

It has been controverted among writers on this ſubject, whether *phlogiſton* be pure elementary fire in its ſtate of combination with the bodies in which it is found, if in this ſtate it be ſuſceptible of combining without any intermediate ſubſtance; or whether, in order to this combination, it be neceſſary that this element ſhould be previouſly combined with ſome other ſubſtance, and conſequently, that it is only a ſecondary principle. In favour of the former opinion it is urged, that the inflammable principle of bodies cannot be ſeparated and procured from bodies in any other ſtate than that of free and active fire, and that it is deprived of its activity by the union which it contracts with other ſubſtances. If this be the caſe, *phlogiſton* has no other property than thoſe which ariſe from the union of pure fire with the ſeveral ſubſtances to which it is united. But it is alledged on the contrary, that when *phlogiſton* is taken from one body by means of another applied to it, it unites with this as ſoon as it is diſengaged from the former; and, therefore, the advocates of this opinion maintain, that it is not procured pure and alone, becauſe it only quits one combination to enter at the ſame time into another.

Senebier maintains, that the *phlogiſton*, which falls under our obſervation, ſeems to be always united to an acid; and that which appears to be the moſt generally combined with it is the vitriolic acid, which, at leaſt, abounds in all combuſtible bodies. But he conjectures, that it is not always the ſame vitriolic acid, that is united to *phlogiſton*; and that the difference in the effect produced by *phlogiſton* in the bodies, where it is found, proceeds from the different acids with which it is combined in them. Thus, when it is united with the vitriolic acid, it forms ſulphur; when it is combined with ſea-ſalt, it produces, as he ſays, phoſphorus; and joined with nitre, it loſes its qualities and concentrates itſelf in bodies by means of that union. Although *phlogiſton*, ſays this writer, exhibits itſelf almoſt always under an oily form, and more eſpecially in charcoal, which is its proper mine or matrix, nevertheleſs it is not oil, but is poſſeſſed of qualities that are peculiar to it. The flame of charcoal has not the acidity of the flame produced by oil; the former has rather a bluiſh caſt; the latter of a whitiſh colour. The flame of charcoal leaves behind it neither ſmoke nor ſoot; the flame of oil produces both in quantities that depend upon the nature of the oil; the ether itſelf is more or leſs impregnated with a fuliginous vapour; burning charcoal exhales a portion of ſubtile matter, which does not appear under a burning form, ſuch as the gas; and the reſult of this obſervation ſeems to be, that *phlogiſton* is not enveloped with a ſubſtance of ſufficient denſity to let the fuliginous particles eſcape like oils which waſte away. The malignant vapour, which is formed by burning charcoal, bears ſeveral characters of *phlogiſton*; like this latter, it is not coagulable; it has the ſame affinity with acids; it produces the ſame effects that reſult from the vapours of bodies in putrefaction, with this exception, that the vapour of charcoal appears more diſengaged than that which ariſes from putrified bodies; but nothing ſeems to aſcertain more fully the reſemblance of theſe three vapours than their affinity with the acid; and accordingly we find that the only method of removing their pernicious effects, is to make an acid evaporate in all places where theſe effects are apprehended: in the uſe of this method, the acid, probably, envelopes the *phlogiſton*, and diminiſhes its activity and volatility. Thus alſo acids diminiſh the effects of intoxication from drinking, becauſe they act upon the *phlogiſton* of wine, which attacks the nerves, in the ſame manner as they act upon that of charcoal, when it is diffuſed through a chamber. Although *phlogiſton* is eſſentially volatile, it is nevertheleſs fixed, when it is not expoſed in the air to the action of fire. Senebier is inclined to conſider flame as the conductor of *phlogiſton*; and this notion ſeems to be confirmed by an experiment of M. de Buffon.

However the queſtion concerning the nature of *phlogiſton* be determined, the power which chemiſts have of transferring the inflammable principle from one combination to another, by combuſtion and diſſipation, has furniſhed them with the means of making many important obſervations on the effects which it produces in chemical operations, and of diſcovering the properties which it communicates to the ſeveral ſubſtances with which it unites. Some of theſe we ſhall collect together, and recite in the ſequel of this article.

The union of *phlogiſton* with an uninflammable ſubſtance produces a new compound, which becomes inflammable and capable of producing heat and light more or leſs eaſily, according to the quantity of *phlogiſton* united with it, and the manner of its combination. This principle, united with bodies naturally ſolid, diminiſhes their hardneſs, and renders them more fuſible; and it likewiſe diminiſhes the fixedneſs of the body in which it is combined. It increaſes the abſolute gravity, and frequently the ſpecific gravity of bodies into which it enters; and, in ſome caſes, renders them opake. Subſtances which have neither ſmell nor colour, acquire generally one or the other, and frequently both, by their union with the inflammable principle; and hence chemiſts have been inclined to conſider it as the principle of colours and ſmells; although ſome bodies which contain *phlogiſton* in a ſmall quantity have neither any ſenſible colour nor ſmell. It is obſerved that *phlogiſton* is not equally diſpoſed to unite with all ſubſtances; that it combines very difficultly with fluid, volatile, and light matters, ſuch as air and water; but it may be eaſily combined with ſolid, fixed, and heavy ſubſtances, as earths. And it ſerves as a kind of intermediate ſubſtance for uniting together bodies that are either incapable of uniting, or that unite with difficulty without it. The combination of *phlogiſton* with different kinds of air and alſo with water, has been illuſtrated and evinced by a variety of experiments by Dr. Prieſtley: all the kinds of air, he ſays, that appear to be eſſentially diſtinct from each other, are fixed air, acid, and alkaline; becauſe theſe and another principle called *phlogiſton*, which he has not been able to exhibit in the form of air, and which has never yet been exhibited by itſelf in any form, ſeem to conſtitute all the kinds of air with which he is acquainted. See on this ſubject a Treatiſe on the various kinds of Gaſes, by the ingenious author of the Chemical Dictionary, in the Appendix, chap. 17.

Dr. Prieſtley has alſo ſhewn how common air is depraved and rendered unfit for the purpoſes of reſpiration, combuſtion, &c. by uniting with the *phlogiſton* diſcharged from the lungs of animals, from burning bodies, from calcined metals, from putrifying ſubſtances, &c and in ſome caſes being ſaturated with it, ſo as hereby to become phlogiſticated. And as a variety of cauſes contributes to the releaſe and diſcharge of *phlogiſton* from bodies in which it is combined, and from which by certain proceſſes it is diſengaged, which by uniting with the air diminiſhes it, precipitates its fixed air, and renders it noxious, he has diſcovered that vegetating plants purify the air by imbibing its *phlogiſton*, and that the agitation of water is alſo conducive to the ſame beneficial purpoſe.

A general abſtract of his diſcoveries may be found under the articles AIR and BLOOD. See FIRE and HEAT. It is obſerved, that there is no claſs nor kind of ſalts, that do not contain *phlogiſton*, and that have not affinities with it. It has the greateſt affinity with acids, inſomuch that ſome writers have contended that there is no *phlogiſton* without an acid. Of all the acids, the nitrous is that which has the greateſt affinity with the inflammable principle: its volatility, colour, and ſmell, its inferiority of ſtrength compared with vitriolic acid, its inflammability, and total decompoſition by inflammation, prove that *phlogiſton* is one of the conſtituent parts of that acid; and beſides, it is known to act more ſtrongly in general than vitriolic acid upon all bodies that contain the inflammable principle, and more effectually deprives them of this principle, as is the caſe in the ſolutions of metals. In a dry ſtate it unites with *phlogiſton* in the moſt intimate manner, and forms a kind of ſulphur that may be called nitrous ſulphur, which is ſo inflammable, that it kindles as ſoon as it is formed, and can never, therefore, be obtained alone and uninflamed.

The marine acid is that which is moſt difficult to combine with *phlogiſton*; for, though it is lighter and more volatile than the vitriolic acid, it is incapable of acting upon many inflammable matters, as oils, or at leaſt acts upon them in a very feeble manner, and takes little of the *phlogiſton* from metals. Beſides Macquer ſays, that there is no immediate combination of marine acid with *phlogiſton*, or marine ſulphur; the PHOSPHORUS of Kunckel not being, he ſays, of this kind, as Stahl and other chemiſts have apprehended. The union of *phlogiſton* with the vitriolic acid, in a dry ſtate, is known to produce ſulphur, the inflammability of which is cauſed by the *phlogiſton* contained in it, and which is decompoſed by the burning of its *phlogiſton*. Some have even ſuppoſed, that the different combination of *phlogiſton* with different acids may be one of the cauſes of the different affinities of bodies to each other.

Phlogiſton alſo unites itſelf with alkalis; and this union is manifeſt in putrid exhalations. Moreover, volatile alkalis produce the ſame effects that ariſe from the *phlogiſton*; they render the blood more fluid, increaſe its circulation, and excite perſpiration; and the odours of both are equally ſuffocating to thoſe who breathe the air that is impregnated with them. The fixed alkalis ſaturate themſelves with *phlogiſton*, when they are calcined in cloſe veſſels with charcoal or ſimilar ſubſtances. Nevertheleſs theſe alkalis ſeem to have leſs affinity with *phlogiſton* than the vitriolic and nitrous acids, or even than the metallic earths. *Phlogiſton* alſo unites itſelf with earthy ſubſtances under a dry form, and which are much attenuated, ſuch as clays, to which it adheres with great force: and it ſeems to be moſt diſpoſed to unite with theſe earths when it is in the ſtate of oil, of ſoot, or of vapour. The coals of vegetable and animal matters are nothing elſe than ſingular combinations of the earthy part of theſe organiſed bodies with the inflammable principle of their oils or fat: and yet this principle does not ſo much adhere to the earth of coals as not to quit it, in order to combine with other ſubſtances with which it has a ſtronger affinity, as with the vitriolic, nitrous, and phoſphoric acids, and with metallic earths.

Moreover, *phlogiſton* appears to be intimately combined with metals; without it they loſe their metallic properties, and with it they recover them. This is a truth which has been long known and demonſtrated. The difference of weight between a metal and its calx has been a phenomenon which has much puzzled the chemiſts and philoſophers. Some, in order to account for this difference, have aſcribed abſolute levity to *phlogiſton*, which, by being combined with the calx under the form of metal, diminiſhes its weight. The true cauſe of this difference was firſt ſuggeſted by Jean Rey, in the beginning of the laſt century (ſee *Potential* HEAT), but for many years it was little known or regarded: however, it has been ſufficiently aſcertained by the late experiments of Hales, Prieſtley, Lavoiſier, &c. on *fixed* AIR. See CALCINATION.

The diſtinguiſhing characters of *phlogiſton* are moſt clearly diſcerned by comparing the properties of metals with thoſe of their calces. The latter are generally harder, more ſolid, more fixed, leſs denſe, leſs fuſible, and leſs opake than the former. Thus lead and tin are very ſoft metals; nevertheleſs, when lead is calcined, and afterwards melted, a glaſs is formed much harder than the lead from which it was produced. Tin, which calcines ſtill more completely than lead, is eaſily changeable into white earth, the parts of which, though very fine, are ſo hard, that they are employed to poliſh very hard bodies, as ſteel, glaſs, &c. See PUTTY.

The moſt volatile ſemi-metals, as regulus of antimony and zinc, are changed by burning their *phlogiſton* into perfectly fixed earths. Regulus of antimony and tin are fuſible with a gentle heat; yet the calces of theſe metals are juſtly conſidered among the moſt refractory bodies. The denſity, opacity, and ductility which metals receive from their *phlogiſton*, evidently proceed from the particular manner in which the parts of the *phlogiſton* are applied to thoſe of the metallic earths.

Many facts have been lately urged to evince the identity of *phlogiſton* and the electric matter: they reſemble one another in the light and ſmell they afford, and in the effects they produce in animals and vegetables; they both accelerate the circulation of the blood, and of the ſap; they augment the fluidity of both; they alike occaſion cutaneous eruptions, remove obſtructions in the veſſels, irritate the muſcles, and act upon them when all other ſtimulants are ineffectual. They concur in developing the parts of animals and vegetables; in promoting their growth; animals, that are killed by lightning or by the electrical ſpark, ſeem to be affected in the ſame manner with thoſe that are ſuffocated by mephitic or phlogiſtic vapours. The ſame cauſes which diſſipate the electric fluid, ſeem alſo to diſſipate the *phlogiſton*, and to occaſion a ſtate of bodily inquietude in perſons who are valetudinary, by depriving them of too large a quantity of *phlogiſton*: thus, a moiſt and humid air affects both the one and the other in the ſame manner. The moments preceding thunder-ſtorms are burthenſome and oppreſſive, becauſe they accumulate on the nerves too great a quantity of *phlogiſton*, or electrical fluid. This, like *phlogiſton*, melts and calcines metals, and revivifies their calces.

Phlogiſton and the electrical fluid are known to promote evaporation; the electrical ſpark infects the air, juſt as *phlogiſton* does where it abounds; they both depoſit fixed air, diminiſh common air, and form a precipitate in lime-water.

From theſe and other ſimilar effects, it is concluded, and not without reaſon, that the electric matter either is, or contains *phlogiſton*. See *Theory of* ELECTRICITY.

Light is alſo ſuppoſed to be a modification of *phlogiſton*; and this ſuppoſition is rendered probable, not only by many electrical phenomena, if the identity of the electric matter and *phlogiſton* be admitted, but by the known fact, that no other ſubſtances beſides thoſe which contain *phlogiſton* are capable of ignition, and of becoming luminous. For an account of ſeveral curious obſervations and experiments relating to *phlogiſton*, in its connection with heat. See HEAT.

Modern chemiſts and philoſophers have aſcribed a very extenſive operation and uſe to *phlogiſton*, in the whole oeconomy of nature. See AIR, BLOOD, COMBUSTION, CONDUCTORS, METALS, MUSCULAR *Motion*, NUTRITION, PLANTS, PUTREFACTION, VEGETATION, &c.

A late author, however, in a Diſcourſe on *Phlogiſton*, has attacked the generally recieved doctrine concerning *phlogiſton*; and he concludes with ſaying, that nothing true and certain is known concerning the nature of this principle. See on the ſubject of this article, Chemical Dict. Eng. edit. art. *Phlogiſton*. Senebier's Mem. ſur le Phlogiſtique, &c. publiſhed in the abbé Rozier's Journal; and Prieſtley's Obſervations, &c. on Air, in 5 vols. 8vo. paſſim. The ingenious and indefatigable Dr. Prieſtley informs the editor, that from ſome late experiments, not yet publiſhed, he has reaſon to conclude, that *phlogiſton* is ſimply *inflammable* AIR, in a ſtate of combination with any ſubſtance, juſt as fixed air is contained in chalk, &c. With a view of aſcertaining the nature and reality of *phlogiſton*, he threw the focus of a burning lens on ſome calx of lead, out of which all air had been expelled, when it was confined in inflammable air. The conſequence was, that the air was rapidly abſorbed, lead was formed, and what remained of the air was juſt as inflammable as at firſt. From about forty ounce meaſures of the air, obtained from iron by oil of vitriol, he got about five penny-weights of lead.

PHLOGITES, in *Natural Hiſtory*, a name given by Pliny and other authors to a ſtone, which they ſay had the appearance of flames of fire, bubbling up and riſing to ſeveral points within it. It is ſometimes called alſo *phlogonites*.

Some have ſuppoſed that the ancients meant no more by this diſtinction than to expreſs a fire-colour lodged in the ſtone.

Pliny ranks the *phlogites* among the gems, but Sabinus and others place it among the larger ſtones: and we have from ſome parts of Germany, a ſpar, with radiations of a fiery red in a white ground, which looks as like flames as any thing one could expect in a ſtone; but whether this, or ſome other, be the ſtone called petrified flames of fire by the collectors of that nation, we are not aſſured.

PHLOGONIÆ, in *Natural Hiſtory*, the name of a claſs of foſſils, uſually included by author with many others of a very different kind, under the general name pyritæ. Theſe are defined to be compound, inflammable, metallic bodies, found in ſmall maſſes, and of determinately angular figures. Of this claſs of bodies there are three genera, viz. the *pyrocubia*; the *pyroctagonia*; and the *pyropoligonia*. See PYRICUBIUM, &c.

PHLOGOSIS, Φλογωσις, in *Surgery*, ſometimes denotes a ſlight degree of the OPHTHALMIA: in general it denotes a diſpoſition to inflammation.

When the inflammation of the eye is light and gentle, it is called a *phlogoſis*; when very ſevere, a CHEMOSIS.

PHLOGUS, in *Botany*, a name given by ſome of the ancients to ſeveral ſpecies of the *iris* and *gladiolus*, and by ſome to the *flammula jovis*, a ſort of clematitis, ſo called becauſe of the violent heat of its leaves to the taſte.

PHLOMIS, in *Botany*. See SAGE *tree*.

PHLOMON *ſtephanomaticon*, in the *Botanical Writings of the Ancients*, a name given to the common white mullein. The upper part of the thyrſus, or ſpike of flowers of this plant, was frequently uſed in the garlands and coronæ of the ancients; and it is named by Dioſcorides and others among the yellow flowers in general uſe on that occaſion.

PHLOX, *lychnidea*, or *baſtard lychnis*, in *Botany*, a genus of the *pentandria monogynia* claſs: its characters are, that the corolla is hypocrateriform, the filaments unequal, the ſtigma trifid, the calyx priſmatic, and the fruit a capſule containing three cells, and a ſingle ſeed. There are ten ſpecies.

PHLYACOGRAPHIA, formed from *φλυαζειν*, *to trifle*, or *φλυαξ*, *trifler*, of *φλυω*, among the *Ancients*, a merry and burleſque imitation of ſome grave and ſerious piece; particularly a tragedy traveſted into a comedy.

The *plyacographia* was the ſame thing with the HILARODIA, or *hilarotragedy*.

There were ſeveral kinds of *phlyacography*, which had their ſeveral names. See Salmaſius on Solin.

The parodies, which have been made of ſome parts of the beſt poets, as the Virgil Traveſty of Scarron and Cotton; the Rival Queens of Cibber, from the Rival Queens of Lee; and ſome pieces of operas, the muſic whereof is applied to low and ridiculous words, are comprehended under the notion of *phlyacographies*.

PHLYCTÆNÆ, Φλυκταιναι, formed of *φλυω*, *I am hot*, little white itching pimples, or veſiculæ, ariſing on the ſkin, chiefly between the fingers, and about the wriſt; and full of a limpid ſerum.

Theſe ſometimes degenerate into the itch, and ſometimes into tetters. They are cured like other cutaneous eruptions.

PHLYCTÆNÆ alſo denote little ulcerous veſicles, ariſing ſometimes on the adnata, and ſometimes on the cornea of the eye, like ſo many little bladders full of water: they are popularly called *bliſters in the eyes.*

They appear like grains of millet; and, when produced by a ſharp corroding humour, occaſion violent pain: the puſtules on the adnata are red; thoſe on the cornea are blackiſh, if near to the ſurface; but whiter, if deeper. They are cured by diſcutients and driers.

PHLYSIS, a term uſed by the ancients to expreſs an eruption on the ſkin, from a redundance of humours.

PHLYSTÆNÆ, formed from *φλυω*, *φλυζω*, *ebullio*, *I boil*, *bubble*, &c. in *Medicine*, a diſeaſe which produces buboes, or tumors, full of a ſerous humour.

The *phlyſtæna* is a virulent diſeaſe. The buboes it occaſions are ſometimes large, livid, pale, black, or of any colour different from that of the natural fleſh; and, when pierced, the fleſh frequently appears ulcerated under them.

They are uſually occaſioned by hot, ſharp humour, and ariſe on all parts of the body; put they are moſt dangerous on the cornea of the eye.

PHLYZATION, a puſtule or inflammation on the ſkin, or the bliſters ariſing on it after beng burnt or ſcalded with a hot liquor.

PHOBOS, *Fear*, in *Mythology*, was perſonified by the Greeks, and repreſented with the head of a lion. See FEAR.

PHOCA, in *Zoology*, a genus of the order of *feræ*, and claſs of *mammalia*, in the Linnæan ſyſtem: its characters are, that the number of fore-teeth in the upper jaw is ſix, which are parallel, the exterior being larger than the others; in the lower jaw there are four, parallel, diſtinct, equal, and a little obtuſe; there is one canine tooth in each jaw, though Pennant reckons two; the grinders are five or ſix, which have three points; there are no external ears, and the hind feet are palmated. To this genus belong three ſpecies, viz. the SEA-*bear*, the SEA-*lion*, and SEA-CALF.

Dr. Parſons derives the generic name *phoca*, from *φωκη*, or, according to Dr. Charleton, from *βωκη*, ſignifying a noiſe or kind of grunting made by theſe animals. He alſo reduces to this genus the MANATI, the SOIL or SEAL, and the WALRUS or *morſe*. Phil. Tranſ. vol. xlvii. 109, &c.

PHOCÆNA. See PORPESSE.

PHŒBUS, in *Mythology*, a name given to APOLLO.

PHŒNICIAN *character*. See CHARACTER.

PHŒNICOPTERUS, in *Ornithology*, a genus of the *grallæ*, in the Linnæan claſs of birds; of which there is one ſpecies. See FLAMINGO.

PHŒNICOPUS *gallinula*, in *Ornithology*, a name by which ſome authors have called a bird, more uſually known by the name TRINGA.

PHŒNICURUS, Φοινικυρος, in *Ornithology*, a name by which the ancient naturaliſts called the *ruticilla*, or REDSTART.

PHŒNIGMUS, Φοινιγμος, formed from *φοινιξ*, *red*, a medicine which produces redneſs, with bliſters, on the places it is applied to.

Such are muſtard-ſeed, pepper, veſicatories, &c.

Phœnigmi are uſed to draw the humour to the part they are applied on, and to divert it from the part affected.

PHŒNIX, Φοινιξ, in *Aſtronomy*, a conſtellation of the ſouthern hemiſphere; unknown to the ancients, and inviſible in our northen parts.

The number of ſtars in this conſtellation is thirteen; the ſituation, longitude, latitude, and magnitude of which are as follow:

Names and ſituations of the ſtars.	Signs.	Longitud.			Latitude.			Magnitude
		°	′	″	°	′	″	
In the bright head	♓	11	35	32	40	33	45	2
In the neck		10	38	26	41	15	41	4
In the corner of the right wing		5	46	10	41	54	38	3·4
S. of three in right wing	♒	29	47	46	38	49	11	4
Middle.	♓	1	3	35	36	5	3	4
5.								
North		3	23	40	31	39	55	5
In the end of the left wing		24	14	17	47	33	17	3
In the root of the ſame		11	54	14	45	14	6	4
At the right foot		7	41	33	46	31	5	4
Under the left wing S.		19	38	31	52	34	22	3
10.								
N.		16	22	28	48	14	27	3
Under the right wing 1ſt		1	24	0	54	24	16	3·4
2d		8	27	38	55	5	23	4

This conſtellation took its name and form from that of a bird famous among the ancients; but generally looked upon by the moderns as fabulous.

The naturaliſts ſpeak of this bird as ſingle, or the only one of its kind: they deſcribe it as of the ſize of an eagle; its head finely creſted, with a beautiful plumage; its neck covered with feathers of a gold-colour, and the reſt of its body purple; only the tail white, intermixed with carnation; and its eyes ſparkling like ſtars. They hold, that it lives five or ſix hundred years in the wilderneſs; that, when thus advanced in age, it builds itſelf a funeral pile of ſweet wood, and aromatic gums; then it fires it with the waſting of its wings, and thus burns itſelf; and from its aſhes ariſes a worm, which, in time, grows up to be another *phœnix*.

Hence the Phœnicians gave the name *phœnix* to the PALM-*tree*; becauſe, when burnt down to the very root, it naturally riſes again fairer than ever.

Ancient hiſtorians reckon four appearances of the *phœnix*, the firſt, in the reign of Seſoſtris; the ſecond, in that of Amaſis; the third, in that of the third Ptolemy; and the fourth, according to Dion Caſſius, as a preſage of the death of Tiberius, but Tacitus refers it to Eygpt under the empire of Tiberius, and Pliny to the conſulate of Quintus Plancius, which took place A. D. 36.

The ancients however, ſpeak of the *phœnix* as a fabulous bird.

The ancient Chriſtians refer to the *phœnix* in ſome of their accounts of the reſurrection.

PHOENIX, in *Botany*, a name given by medicinal writers to the graſs called *lolium rubrum*, and in Engliſh, *ray-graſs*.

PHOENIX is alſo the name given by Kæmpfer and Linnæus to a genus of plants in Linnæus's Appendix. called by others *elate* and *katovindel*. The characters are theſe: it produces ſeparate male and female flowers, in both the whole ſpatha ſerves for a cup which is divided into three parts, and the petals are three in both; in the male the petals are of an oval figure and concave; the ſtamina are three ſlender filaments, and the antheræ are very ſhort; in the female flower the germen of the piſtil is of a roundiſh figure; the ſtyle is ſhort and pointed, and the ſtigma is acute; the fruit is an oval drupe, having only one cell; this contains one ſeed, which is of a bony hardneſs; and of an oval figure, with a deep longitudinal furrow reaching from one end to the other. There is only one ſpecies. See PALM-TREE.

PHOENIX, φοινιξ, among the *Ancients*, a muſical inſtrument not unlike the CITHARA.

PHŒOPUS, in *Ornithology*, a name uſed for two different birds; the one called by the Germans *brachvogel*, and the other the *whimbrell*, or *aquata minor*, the ſmall curlew of authors.

The firſt of theſe or the *brachvogel*, is of a deep black colour, ſpotted with a yellowiſh and reddiſh brown; its beak is long, ſlender, and black, and is moderately bent; its neck is grey, tending to reddiſhneſs towards the bottom, and its belly is white. Mr. Ray ſuſpects this not eſſentially to differ from the other, but the ſight of the bird alone can determine that.

PHOLAS, in *Natural Hiſtory*, the name of a genus of ſhells belonging to the *teſtacea* order in the claſs of worms, in the Linnæan ſyſtem; the characters of which are theſe: its animal is an aſcidia; the ſhell is bivalve, opening wide at each end, with ſeveral leſſer ſhells at the hinge; the hinges fold back and are united by a cartilage; beneath the hinge in the inſide there is an incurvated tooth. Linnæus enumerates ſix ſpecies. See *Tab. of Shells*, N° 29.

The word *pholas* is derived from the Greek φωλεω, and ſignifies no more than any thing which is hidden; the name was given to this genus of ſhell-fiſh from their cuſtom of making themſelves holes in earth, ſand, ſtones, or wood, and living hidden in them. Many being of opinion, that theſe could not work themſelves into the ſubſtance of hard ſtones, have thought that they were hatched in holes accidentlly formed in ſtones, and that the ſhells naturally grew of ſuch a ſhape as was neceſſary to fill the cavity. Nor is this the only error propagated concerning the *pholas*; for as all that was ſignified by the name being only that the ſhell was hidden in ſome ſolid ſubſtance, whenever an author found a ſhell-fiſh of whatever kind thus buried in ſtone, he deſcribed it under the name of *pholas*.

There are many ſpecies of the ſhell-fiſh, and theſe of ſeveral different genera, which thus hide themſelves in ſtone; and theſe have therefore been called by different authors *pholades*; and hence it has been ſaid, that the *phalos* was in ſome ſpecies a bivalve, and in others a multivalve ſhell. The true *pholas*, which Liſter has very well deſcribed, is a genuine multivalve, being compoſed of five pieces; but this is a very ſcarce fiſh, and ſeveral of the muſcles and of the chamæ being often found in ſtone, they have all been called bivalve *pholades*; and ſuch as have found the chamæ thus immerſed, and found them really to conſiſt of only two ſhells, have cenſured the authors of error who have deſcribed the *pholas* as having five. Hiſt. Nat. Eclairc. p. 362.

All the ſpecies of ſhell-fiſh which are found in ſtone have certainly been the means of making the holes in which they are found: the fact is inconteſtible, but the means yet wholly unknown. Perhaps, when ſome accurate obſerver ſhall have an opportunity of examining the fiſh alive, the myſtery will be cleared up. All that we know at preſent is, they are firſt buried in the ſtone while very ſmall; ſince the aperture on the ſurface of the ſtone is uſually much ſmaller than the diameter of the ſhell contained within, and only ſerves to admit the ſea-water, or to give paſſage to the proboſcis of the incloſed fiſh.

As to the luminous quality of this ſpecies of ſhell-fiſh, obſerved by Pliny and by modern naturaliſts, ſee DACTYLUS.

For an account of a particular ſpecies of *pholas*, called by Dr. Parſons *pholas conoides*, by others *pholas lignorum*, and in Dutch wood-muſcle, becauſe it is found burrowed in timber, ſee Phil. Tranſ. vol. lv. p. 1, &c.

PHOLIS, in *Natural Hiſtory*, the name of a genus of foſſils of the claſs of the gypſums or plaiſter ſtones, the diſtinguiſhing characters of which are, that the bodies of it are conſiderably hard, compoſed of ſomewhat broad particles, and of a bright cryſtalline luſtre.

The word is derived from φολις, *a ſcale*, or *ſmall flake*, from theſe bodies being compoſed of particles of that form.

The ſpecies of this genus are the moſt valuable of all the gypſums, as burnning to the beſt and fineſt plaiſter, but ſo far as is yet known there are but two of them: the fine plaiſter-ſtone of Montmartre in France, called by us *plaiſter of Paris ſtone*, and *parget*; and the other the coarſer and ſomewhat reddiſh kind, common in many parts of England, and called *hall plaſter*. Hill. See PARGET.

PHOLIS, in *Ichthyology*, the name of a ſmall anguilliform fiſh, the back of which is brown, the belly white, and the whole back and ſides ſpotted, and the ſkin ſoft and not covered with ſcales, but with a tough mucilaginous matter like the eel.

This moſt of all approaches to the *alauda*, and though uſually ſomewhat larger, yet Mr. Ray doubts whether it really differs from it in any thing eſſential; its great diſtinction being its colour, which though a very obvious, is a very precarious one.

PHOLLIDES, a word uſed by the ancient phyſicians for ſoft and fungous tumors of the legs, ſuch as thoſe of people in an anaſarca, or leucophlegmacy.

PHOLLIS, as a *coin*. See FOLIS.

PHONASCIA, Φωνασκια, derived from φωνε, *voice*, the art of forming the human voice.

In ancient Greece, there were combats or conteſts eſtabliſhed for the voice, as well as other parts of the gymnaſtice.

The combats continued to be held in the time of Galen; and they were theſe that brought the *phonaſcia* into vogue. Hence the maſters of this art and thoſe who taught the art of managing the voice, were called *phonaſci*, φωνασκοι; and under their tutorage were put all thoſe deſtined to be orators, ſingers, comedians, &c.

PHONICS, Φωνικη, derived from φωνη, *voice*, or *ſound*, the doctrine or ſcience of SOUNDS; otherwiſe called ACOUSTICS.

Phonics may be conſidered as an art analogous to optics; and may be divided, like that into *direct*, *refracted*, and *reflected*. Theſe branches the biſhop of Ferns, in alluſion to the parts of optics, denominates *phonics*, *diaphonics*, and *cataphonics*.

Phonics is improveable, both with regard to the object, the medium, and the organ.

As to the object, ſound, it may be improved, both with regard to the production and the propagation of ſounds. The firſt, in ſpeaking or pronouncing, in whiſtling or ſinging, or hallooing, or luring, which are all diſtinct arts, and all improveable. The ſecond, by the poſition of the ſonorous body.

With regard to the medium, *phonics* may be improved by the thinneſs and quieſcency thereof, and by the ſonorus body being placed near a ſmooth wall, either plane or arched, eſpecially cycloidally or elliptically: whence ariſes the theory of wiſpering places.

Add to theſe, that by placing the ſonorous body near water, its ſound is molified; that by placing it on a plain, the ſound is conveyed to a greater diſtance than on uneven ground, &c.

As to the organ, which is the ear, it is helped by placing it near a wall, eſpecially at one end of an arch, the ſound beginning at the other), or near the ſurface of water, or that of the earth.

And alſo by inſtruments, as the ſtentorophonicon, or ſpeaking-trumpet.

Alſo by an inſtrument to help weak ears as ſpectacles do eyes; by an inſtrument to take in vaſtly remote ſounds, as teleſcopes do objects; by a microphone, or magnifying ear-inſtrument; and by a polyphone, or multiplying ear-inſtrument.

Cataphonics, or reflected hearing, may be improved by ſeveral kinds of artificial echoes; for, in general, any ſound falling, either directly or obliquely, on any denſe body of a ſmooth ſurface, whether plain, or arched, is beat back again, or reflected; i. e. it echoes more or leſs. See ECHO

PHONICUM, *centrum*. See CENTRUM.

PHONOCAMPTICUM *centrum* See CENTRUM.

PHORBÆA, or PHORBEIA, in the *Muſic of the Ancients*, a name given to a ſort of *frenum*, or *bandage*, applied to the mouths of people who played on the pipe.

It was a ſort of leather band, which went firſt acroſs the forehead, then behind each ear, and from thence making one or two turns round the head, it paſſeth over the mouth, where its office was to reſtrain the lips from emitting too much breath at once, and cauſe them to diſcharge only juſt ſo much as would ſerve to inflate the pipe.

Simonides, deſcribing the trial of ſkill between Marſyas and Apollo, mentions this *phorbeia* or *capiſtrum*; and ſome antique gems, yet remaining among us, have the figure of a Marſyas's head, with the *phorbeia* upon it.

By the different ſtructure of the *phorbeia*, as expreſſed on the different coins, we find, however, that there were two ſpecies of it; the one was leſs complex, conſiſting only of a perpendicular piece down the cheek, and a tranſverſe one, running acroſs the lips, and covering the whole orifice of the mouth, only leaving a hole cut through it, at which the mouth-piece of the pipe was to be put in. The other conſiſted of ſeveral bandages, as at firſt deſcribed, and the lower tranſverſe piece of theſe did not come over the mouth, but only bore up the lower lip in a forcible manner, againſt the upper.

The old Greek writers diſtinguiſhed theſe by two different names added to the original word *phorbeia*; the firſt, or ſimple one, was called *monomeres*, and the other, or more complex one, *diemeres*: they were both called alſo by Soranus, and others, *epideſma*, and ſometimes ſimply *deſma*. Soranus de Epideſmis.

PHORIMOS, a name given by ſome authors to *roch* ALLUM.

PHORINE, a word uſed by ſome authors to expreſs the ſkin of a hog; ſome alſo underſtand it to mean a ſkin of any kind, extending it even to the human cutis.

PHORMIX, among the *Ancients*, the ſame with CITHARA

PHORMORAPHIS, in the *Materia Medica*, a name often uſed by the later Greek writers, and generally looked on as one of their unintelligible words, or the name of ſome drug not known at this time. See CARPESIA.

PHORONOMIA, derived from φορα, *motion*, and νομος, *law*, is a ſcience comprehending the laws of motion, both of ſolids and fluids. The work of Hermannus, printed at Amſterdam in quarto, in 1715, under this title, is well known.

PHOS, a word uſed by ſome medical writers to expreſs a diſtemperature of the eye, in which there is ſeen a black circle wholly ſurrounding the pupil.

PHOSCAS, in *Ornithology*, the name of a freſh-water fowl of the duck kind, and of the ſize of the common wigeon. Its body is remarkably flat; its beak and legs are blue; its head and neck are of a browniſh colour, variegated all over with numerous triangular black ſpots.

PHOSPHORIA, Φωσφορια, in *Antiquity*, a feſtival in honour of Phoſphorus or Lucifer.

PHOSPHORICAL *column*. See COLUMN.

PHOSPHORUS, Φωσφορος, formed from φως, *light*, and φερω, *I bear*, a matter, which ſhines, or even burns, ſpontaneouſly, and without the application of any ſenſible fire.

Phoſphori are either *natural*, or *artificial*.

PHOSPHORI, *natural*, are matters, which become luminous at certain times, without the aſſiſtance of any art or preparation.

Such are the glow-worms, frequent in our colder countries; lantern-flies, and other ſhining inſects, in hot countries; rotten wood; the eyes, blood, ſcales, fleſh, ſweat, feathers, &c. of ſeveral animals; diamonds, when rubbed after a certain manner, or after having been expoſed to the ſun or LIGHT; ſugar and ſulphur, when pounded in a dark place; ſea-water, and ſome mineral waters, when briſkly agitated; a cat's or horſe's back, duly rubbed with the hand, &c. in the dark; nay, Dr. Croon tells us, that upon rubbing his own body briſkly with a well-warmed ſhirt, he has frequently made both to ſhine; and Dr. Sloane adds, that he knows a gentleman of Briſtol, and his ſon, both whoſe ſtockings will ſhine much after walking.

All natural *phoſphori* have this in common, that they do not ſhine always; and that they never give any heat.

The natural *phoſphori* are either foſſile, vegetable, or animal.

The foſſile are, though very different in degree, ſome ſorts of earths, white ſand, lime-ſtones, ſtalactites, and ſeveral other figured ſtones, iſland cryſtals, flints, ſome ſpecies of agates, white arſenic; but no ſort of metals, metallic or ſulphureous bodies, as jet, amber, except the before mentioned arſenic.

On the other hand, ſalts imbibe light, provided they are diveſted of every metallic principle; otherwiſe not, though as pellucid as poſſible. For this reaſon none of the vitriols will imbibe light; but other ſalts will though with a conſiderable difference as to quantity: for ſal gem and rock ſalt imbibe very little; ſea ſalt, if dry, and in cryſtals, much more; and, in like manner, ſal ammoniac, ſal catharticum, and nitre yet more. This power is weak in the natron of the ancients, and alum; but brighteſt of all in borax.

In the vegetable kingdom we find very few *phoſphori*; that of dry rotten wood is weak and not laſting; it appears chiefly upon the edges and inequalities of the ſurface. But this is moſt remarkable in the rotten wood of the fir-tree, and ſome others, where, in the dark, you ſee ſhining ſpots as big as tares; whereas in full light the whole ſurface appears alike. Some few barks are luminous, but not conſiderably ſo; but no fruits, ſeeds, or their meals. Cotton, and the cryſtals of tartar, appear very bright, but fine loaf-ſugar appears the moſt luminous of all, both without and within: gums and reſins retain no light.

There is a vaſt variety of *phoſphori* in the animal kingdom, ſuch as the bones and teeth; to theſe may be added the ſhells of fiſh, egg-ſhells, the human calculus, bezoar, and thoſe parts of animals in which the terreſtrial principle is very predominant. But where there is a conſiderable quantity of oily matter, as in the hoofs, horns, and feathers, no light is manifeſt, or at leaſt in a ſmall degree. Light is viſibly retained by the ſkins of ſeveral living animals. Water cannot be made to imbibe light, though ice does exceedingly well, and eſpecially ſnow.

Beccarius propoſes ſome queries concerning the natural *phoſphori*, of which the firſt is, in what and how great a light the object ought to be placed? He tried different *phoſphori*, in different degrees of light, and found them imbibe moſt light from the ſun itſelf; next in quantity when the ſky was clear; and the leaſt in foggy weather. Theſe experiments ſhould be made in the open air, and not in a houſe with the glaſs-windows ſhut; becauſe many bodies appear luminous when the light has come directly to them, which will not have that appearance when the light has paſſed through the glaſs. He laſtly tried what light they would imbibe from very bright flame, and found that alabaſter itſelf, which is ſaturated more than any ſubſtance by the ſun's rays, imbibed exceedingly little. The next query is how long theſe bodies ſhould remain in the light to be ſufficiently ſaturated? Four or five ſeconds were found the utmoſt length of time required for that purpoſe. The other query is, how long the received light will continue in theſe *phoſphori*? It does not laſt the ſame time in all; but continues more or leſs, from two ſeconds to eight, in proportion to the ſtrength of the *phoſphorus*, and the quantity of light received.

But that which, of all natural *phoſphori*, has occaſioned the greateſt ſpeculation, is the

PHOSPHORUS, *barometrical*, or *mercurial*. M. Picard firſt obſerved, that the mercury of his barometer, when ſhaken in a dark place, emitted light; with this circumſtance, that, in ſhaking the mercury with rapidity, ſometimes above, and ſometimes below its equilibrium with the air, the light was only ſeen when below it, where it appeared as if adhering to the upper ſurface.

But this light is not found in the mercury of all barometers; which occaſions a great difficulty.

M. Bernoulli, upon examining the circumſtances of this phenomenon, invented a ſolution of the ſame: he imagines, that upon the mercury's deſcending, the vacuum in the tube increaſing, there iſſues out of the mercury to fill up this exceſs of vacuity, a very fine ſubtile matter, before diſperſed throughout the pores of this mineral; and that, at the ſame time, there enters through the pores of the tube another fine matter: thus, the firſt matter emitted from the mercury, and collected over its ſurface, ſtriking impetuouſly againſt that received from without, has the ſame effect with Deſcartes' firſt element againſt the ſecond; that is, it produces the motion of light.

But why, then, is not the phenomenon common to all barometers? To this he anſwers, that the motion of the ſubtile matter out of the mercury may be weakened, and prevented, by any heterogeneous matter collected on its upper ſurface, into a kind of pellicle, ſo that the light ſhould never appear, but when the mercury is perfectly pure. This reaſoning ſeemed confirmed from the experiments of ſeveral barometers, which he made according to this plan; but the Royal Academy of Sciences, repeating experiments with barometers made after the ſame manner, did not meet with the ſame ſucceſs; the light being ſound in ſome, but not in others.

M. Homberg, therefore, conjectured, that the difference conſiſted in the different qualities of the quickſilver: in ſome, he obſerved, they uſed quick-lime to purify it; in others, ſteel-filings. The mercury, then, riſing in the diſtillation, and paſſing through the lime, might take away ſome parts thereof, capable, by their extreme ſmallneſs, of lodging in its interſtices.

Hence, as quick-lime always retains ſome fiery particles, it is poſſible, in a place void of air, where they ſwim at liberty they may produce this luſtre.

Mr. Haukſbee has ſeveral experiments on the mercurial *phoſphorus*. Paſſing air forcibly through the body of quickſilver, placed in an exhauſted receiver, the parts were violently driven againſt the ſide of the receiver, and gave all round the appearance of fire; continuing thus till the receiver was half-full again of air.

From other experiments he found, that though the appearance of light was not producible by agitating the mercury in the ſame manner in the common air, yet that a very fine medium, nearly approaching to a vacuum, was not at all neceſſary.

And, laſtly, from other experiments he found, that mercury incloſed in water, which communicated with the open air, by a violent ſhaking of the veſſel wherein it was incloſed, emitted particles of light in great plenty, like little ſtars.

By including the veſſel of mercury, &c. in a receiver, and exhauſting the air, the phenomenon was changed; and, upon ſhaking the veſſel, inſtead of ſparks of light, the whole maſs appeared one continued circle of light. Farther, if mercury be incloſed in a glaſs tube, cloſe ſtopped, that tube is found, on being rubbed, to give much more light, than when it had no mercury in it. When this tube has been rubbed, after raiſing ſucceſſively its extremities, that the mercury might flow from one end to the other, one ſees a light creeping in a ſerpentine manner all along the tube; that is to ſay, the mercury is all luminous. The mercury, being made to run along the tube afterwards without rubbing it, was found to emit ſome light, though much leſs than before; this proves that the friction of the mercury againſt the glaſs, in running along, does in ſome meaſure electrify the glaſs, as the rubbing it with the hand does, only in a much leſs degree. This is more plainly proved by laying ſome very light down near the tube, for this will be attracted by the electricity raiſed by the running of the mercury, and will riſe to that part of the glaſs along which the mercury runs; and it is very plain from this, that what has been long known in the world under the name of the *phoſphorus* of the barometer is not a *phoſphorus*, but merely a light raiſed by electricity, the mercury electrifying the tube. Phil. Tranſ. N° 484. See Electricity and Mercury

Phosphori, *artificial*, are ſuch as owe their luminous quality to ſome art or preparation.

Phoſphori are, it is well known, often produced by art; ſome are made by the maceration of plants alone, and without any fire; ſuch as thread, linen cloth, but above all paper. The luminous appearance of this laſt, which is now known to be an electrical phenomenon, is greatly increaſed by heat. This is confirmed by two experiments; the firſt is, by expoſing the paper, ſpread upon an iron grate, to the naked fire, yet not near enough to reſcorch it, and then laying a warm brick thereon to retain the heat; by which means it was obſerved, that where the paper was not ſcreened by the iron grate, it was moſt luminous; ſo that by the lights and ſhades you might diſtinguiſh in the dark the image of the iron-grate a conſiderable time. The other experiment is, the application of the paper, to a plate of warm braſs; from which, when in the dark, you might very eaſily, by its being leſs luminous, diſtinguiſh the margin of the paper that had not been warmed by the braſs.

However Beccarius, though he acknowledges that paper, after having been made red-hot and cooled again, is an excellent *phoſpohrus*, found, that it was much injured by being expoſed to the light of the ſun. He made experiments to the ſame purpoſe with a great variety of ſubſtances, mineral, vegetable, and animal; and obſerved, that the effects were the ſame, and that the ſtronger the light was, and the longer they were expoſed to it, the more injury they received: and he found alſo, that the injury they received was laſting.

The ſame author takes notice alſo of thoſe *phoſphori* which become ſo by the aſſiſtance of fire; but the fire here ſpoken of is not great enough to diſſolve their conſtituent parts, but only ſuch as may affect the external parts of their texture, and that but gently; ſo that the proceſs here mentioned is only drying or roaſting. For it is not the watery or the ſaline parts in bodies which are torrified, but the oleaginous, wherewith many vegetables, and moſt animals abound. The white fleſh of animals, ſuch as that of chickens, become a *phoſphorus* by roaſting, as well as the tendons; and whatever parts of animals become glutinous by boiling, ſuch as carpenters glue, iſingglaſs, &c. to theſe may be added cheeſe. Bones, though they imbibe light without any preparation, have that property in a much greater degree when burnt, and their luminous appearance is much more lively. But roaſting has not this effect upon feathers, hoofs, horns, and only in a ſmall degree on whites of eggs, though the yolk when dry eaſily became a *phoſphorus*.

The ſame operation which produces ſeveral *phoſphori* from the animal kingdom, gives alſo ſeveral from the vegetable. Thus, by gently toaſting gums, as myrrh, gum tragacanth, and others, they appear luminous, though different in degrees; and this light is clear in proportion to the gentle evaporation of their aqueous parts. By this treatment nuts of every kind, pulſe, corn, coffee-berries, meal, bread, and wafers, alſo become *phoſphori*. Turpentine, amber, and ſome reſins, require more fire before they imbibe light; ſo that you muſt diveſt them of their acid, and their light etherial oil, to make them appear luminous. But here great care muſt be taken that they boil no longer than from being white they turn yellow; for, if you proceed longer, your labour is loſt. Thoſe *phoſphori* produced by torrefaction ſoon looſe their power, which, perhaps, neither time, nor a thorough diſſolution of their parts, can deprive the natural ones of. In general, as long as the *phoſphori* gained by torrefaction, preſerve their power, their light is more ſharp and ſtriking, but the natural more weak. Thoſe that are gained by calcination, and Baldwin's *phoſphorus*, ſeem to poſſeſs both the ſtriking light of thoſe gained by torrefaction, and the weaker light of the natural *phoſphori*: the laſt they preſerve a long time, but the former is loſt by degrees much ſooner. The well calcined aſhes of plants, or rather their terreſtrial parts, remaining after the ſolution of their fixed ſalts by waſhing, and neutral ſalts, continue *phoſphori* after many years: ſo that, as far as we can judge, the luminary power which is gained by calcination, though not ſo intenſe, continues perpetual; whereas that gained by torrefaction always decreaſes, and in a very little while is no longer viſible. Some, even by this method, continue to imbibe light much longer than others. Gum arabic, which continues longeſt, laſts ſix days; bread not one, and coffee only a few minutes. However, at any time, by a freſh torrefaction, you may recover theſe languid *phoſphori*; in which property they have great likeneſs to the Bolognian ſtone, and other *phoſphori* prepared by art.

Almoſt all bodies, by a proper treatment, have that power of ſhining in the dark, which, at firſt, was ſuppoſed to be the property of one, and afterward only of a few. How this is brought about is not eaſy to ſolve. If we ſuppoſe, with ſome, that the light from a luminous body, enters and abides in the *phoſphori*; we ſhall find ſomewhat new to admire in light itſelf. It is no new opinion, that this fluid conſiſts of very fine particles, which are continually darted forth from a luminous body in all directions, with a very great velocity: but it has by no body been laid down hitherto, that theſe particles are not diſſolved by the violence of their agitation, nor diſperſed, nor immediately ceaſe to exiſt; but ſubſiſt ſtill, and adhere to what bodies come in their way, as heat does. If therefore the particles of light are not diſſolved as ſoon as they are emitted from a radiant body, but continue ſome time, what elſe is required but that we allow its atmoſphere to every lucid appearance? If the *phoſphori* ſhine with a borrowed light, but not with their own, and that only when put in motion, and fired by the rays of a ſhining body, which ſome experiments ſeem to confirm, then other new doctrines will ariſe. There muſt be then a hidden, a ſecret principle in bodies, to be lighted up by this moſt ſubtle fire. There will be in the univerſe a certain perpetual fire from theſe *phoſphori*; the matter of which, though conſtantly diſſipated by burning, does not waſte enough to be obvious to our ſenſes. See Phil. Tranſ. N° 478. in vol. xliv. art. 17. p. 83. and Beccarii Com. p. 52. 91, &c. See Light, Light *from Diamonds*, and *Bolognian* Phosphorus, *infra*.

Of artificial *phoſphori* there are three principal kinds: the firſt *burning*, which conſumes every combuſtible it touches; the other two have no ſenſible heat; and are called the *Bononian* and *Hermetic phoſphorus*, to which claſs others of a ſimilar kind may be reduced.

PHOSPHORUS, *the burning*, which is a combination of phlogiſton with a peculiar acid, and, conſequently, a ſpecies of ſulphur, tending to decompoſe itſelf, and ſo as to take fire on the acceſs of air only, may be made of urine, blood, hairs, and generally of any part of an animal, that yields an oil by diſtillation. The matter it is moſt eaſily drawn from is human urine. It is of a yellowiſh colour, and of the conſiſtence of hard wax, in the condition it is left by the diſtillation; and, in this ſtate, is called *phoſphorus fulgurans*, from its coruſcations; and *phoſphorus ſmaragdinus*, becauſe its light is frequently green or blue, eſpecially in places that are not very dark.

It is alſo called *ſolid phoſphorus*, from its conſiſtence.

It diſſolves in all kinds of diſtilled oils; and, in that ſtate, is called the *liquid phoſphorus*.

It may be ground in all kinds of fat pomatums; in which caſe, it makes a luminous unguent.

So that the *phoſphorus fulgurans, ſmaragdinus, ſolid and liquid phoſphorus, and luminous unguent*, are all the ſame preparation, under different circumſtances. See FULGURATING *Phoſphorus*.

The diſcovery of this *phoſphorus* was firſt made in 1677, by one Brandt, a citizen of Hamburgh, in his reſearches for the philoſopher's ſtone. Brandt communicated the ſecret to one Kraaft, of Dreſden, but with-held it from Kunckel; upon which this chemiſt, knowing that urine was the ſubſtance employed, ſucceeded in his attempts of making *phoſphorus*; accordingly, this *phoſphorus* is commonly called *Kunckel's phoſphorus*, after his name. A ſimilar *phoſphorus* was alſo made by Mr. Boyle, after having ſeen a piece of it in the hands of Kraaft, who brought it to London in 1679, in order to ſhew it to the king and queen of England; having been only informed that this *phoſphorus* was produced from ſome matter belonging to the human body. Kraaft, indeed, told Stahl, that he had communicated the proceſs for making it to Mr. Boyle; but this is ſuch an imputation on the integrity and honour of our Engliſh philoſopher, as can by no means be admitted on the teſtimony of a man, who had been treacherous to Kunckel, who traded in the ſecret of making *phoſphorus*, and after ſelling it to many perſons, publiſhed the proceſs for making it in the Mercure Galont, for June 1683. Kunckel, and a German chemiſt called Godfreid Hantkwitz, to whom Boyle communicated the method of preparing it, were the only perſons who made it in any conſiderable quantities.

M. Hellot, in his Memoir upon this ſubject, Ac. Paris, 1737, enumerates all the proceſſes for making it, that were in uſe ſoon after the diſcovery of it: viz. that publiſhed by Mr. Boyle in 1680, in the Phil. Tranſ. N° 196. (See Phil. Tranſ. Abridg vol. iii. p. 346). that of Kraaft; that of Brandt, in a collection of experiments and obſervations of Dr. Hooke, publiſhed by Dr. Derham in 1726; that of M. Homberg, in the Ancient Memoirs of the Academy, in 1692; and thoſe found in the works of ſeveral chemiſts, particularly of Theickmeyer, Hoffman, and Niewentyt. However, the operation continued in a great degree a ſecret till the year 1737, when a ſtranger came into France, and obtained a reward from the miniſtry for communicating his proceſs, which was executed by Meſſ. Hellot, Du Fay, Geoffroy, and Duhamel. Since the publication of M. Hellot's Memoir, the operation has been no longer a ſecret; though ſeldom executed, becauſe it was rather curious than uſeful, and both troubleſome and expenſive.

PHOSPHORUS, *preparation of ſolid*, or PHOSPHORUS *of urine*. Evaporate a good quantity of urine of beer-drinkers to the conſiſtence of honey; cover it up in an earthen veſſel, and ſet it three or four months in a cellar, to ferment and putrefy. Mix two parts of ſand, or powder of pot-ſherds, with one part of this urine, and put it into a retort, fitted to a long-necked receiver, with two or three quarts of water in it. Diſtil it in a naked fire, in a reverberatory furnace; at firſt gently; after two hours, augment the fire gradually, till all the black fetid oil be drawn off. Raiſe the fire to the higheſt degree; upon which, white clouds will come into the receiver, and fix, by little and little, on one ſide, in form of a yellowiſh ſkin; and another part will precipitate to the bottom in powder. Keep the fire thus violent for three hours, till no more fumes ariſe. Let all cool, and unlooſe the veſſels; and, throwing more water into the receiver, ſhake all well about, to looſen what ſticks to the ſides. Pour the whole into a glaſs veſſel, to ſettle.

The volatile ſalt will now diſſolve in the water, and the *phoſphorus* and oil will ſink to the bottom; then pour off the water, and gathering the remaining part together, put it into a glaſs veſſel, with a little freſh water, and digeſt it in a ſand-heat, ſtirring it from time to time with a wooden ſpatula.

By this means, the *phoſphorus* will ſeparate from the oil, and ſink to the bottom: pour off the oil, and make up the *phoſphorus*, while hot, into ſticks for uſe.

Boerhaave gives us other ways of preparing *phoſphorus*. Recent urine, he obſerves, digeſted three or four days in a tall glaſs, with a heat no greater than that of a healthy man, grows ruddy, fetid, and cadaverous; this digeſted urine, being put to diſtil in a retort, yields a clear fetid liquor, then a yellow volatile ſalt, which, evaporated to the conſiſtence of a ſapo, and mixed with four times its weight of dry ſand, and the diſtillation continued in a covered retort, there ſucceſſively comes over, by greater and greater degrees of fire, a fetid brown oil, bluiſh fumes, and, finally, a groſs ſhining matter, which ſinks in water, and is the ſolid *phoſphorus*.

To make it more eaſily, and to the beſt advantage, it may be proper to take a ſufficient quantity of human urine, afforded by a perſon not much given to drink wine, and exhale it away in an open veſſel to a rob, or the conſiſtence of honey; then ſet it to putrefy for half a year, and, upon diſtillation, it will afford a large proportion of ſalt; after which, if ſix times its own quantity of ſand, or brick-duſt, be added to the remainder, and the diſtillation be continued, as in the caſe laſt mentioned, the *phoſphorus* will fall into the water. Or it may commodiouſly be prepared, by ſuffering the rob of urine to digeſt for two years in an open veſſel in the open air; during which time, a ſlimy, feculent, unctuous, earthy matter, will fall to the bottom; which, being frequently waſhed with pure water, wherein it will not diſſolve, will leave a white matter behind it, neither of an alkaline, acid, ſaline, or terreſtrial, nor ſcarce of an unctuous nature: and this is of itſelf a proper matter for the making of *phoſphorus* by diſtillation with ſand.

In order to preparing the *phoſphorus*, and indeed moſt of the other preparations of urine, the firſt ſtep is to reduce that liquor to the conſiſtence of a rob or thick extract; thoſe who have worked on this ſubject ſufficiently know how abominably nauſeous and diſagreeable a taſk this is. The operator alone is not the perſon who is almoſt poiſoned by it, but the whole neighbourhood is affected; and it is well known, that our Godfrey, who uſed to prepare large quantities of this ſubſtance, was always obliged to keep a houſe in the fields to perform this part of the proceſs in.

There is an eaſy and excellent method propoſed by Stahl for the performing this troubleſome buſineſs, by means of condenſation by cold or freezing. There needs no more than to expoſe the proper quantity of urine to ſome froſty nights in winter; or at any time of the year to our ice-houſes, or other places where ice is preſerved all the year round. The froſt will, in this caſe, affect a large part of the urine, but not the whole; and the liquid part being ſeparated from the ſolid ice, it will be found that the watery parts alone have ſuffered the freezing, and that all the unctuous and ſaline ones are left behind in the unfrozen part, which is, by repeated freezings of its yet remaining aqueous parts, at length reduced to that ſort of rob which is required for all the purpoſes of diſtillation, and that without any trouble or offenſiveneſs, either to the operator or any body elſe. The power of condenſation by freezing in this manner, extends to wine, vinegar, and all fermented liquors; but it operates differently on the ſeveral different ones, and is to be regulated according to their natures. The natural cold of our climate is ſeldom too great for any of the liquors we deſire to condenſe; that is, it is never ſo great as to condenſe the whole into ice. It often is not ſufficiently great to condenſe the aqueous part, even after ever ſo many repetitions. In this caſe, it may be proper to bring in the uſe of the common freezing mixtures, made with ice, or ſnow and ſalt. To ſuit the artificial degree of cold, in theſe caſes, requires care and experience, and is almoſt as nice a point as the ſuiting the degrees of heat in the operations of chemiſtry.

In 1743, Mr. Margraaf publiſhed, in the Memoirs of the Academy at Berlin, a new and excellent proceſs for obtaining more eaſily and expeditiouſly, and at leſs expence than has hitherto been done, a conſiderable quantity of *phoſphorus*. In his proceſs, a kind of plumbum corneum is previouſly prepared, by diſtilling a mixture of four pounds of minium with two pounds of powdered ſal ammoniac; the reſiduum after the diſtillation, or the plumbum corneum, is to be mixed with nine or ten pounds of extract of putrefied urine, boiled to the conſiſtence of honey. This mixture is to be made ſlowly in an iron cauldron ſet upon the fire, and by frequently ſtirring the contents. Half a pound of powdered charcoal is then to be added, and evaporation is to be continued till the whole is reduced into a black powder, which is to be put into a retort, in order to extract from it, by a moderate and gradual heat, all the volatile products of urine, that is, volatile alkali, fetid oil, and an ammoniacal matter which adheres to the neck of the retort. In this diſtillation the heat is only to be raiſed ſo as to make the matter red-hot. After the diſtillation a black and friable reſiduum is left, from which the *phoſphorus* is to be extracted by a ſecond diſtillation, and a ſtronger heat. Before it is expoſed to another diſtillation it may be tried by throwing ſome of it upon hot coals. If the matter has been well prepared, a ſmell of garlic exhales from it, and a blue phoſphorical flame is ſeen undulating along the ſurface of the hot coals. This matter is to be put into a good earthen retort, capable of ſuſtaining a violent fire, and which may be ſecured with a covering of clay and hair. Three quarters of the retort are to be filled with the matter which is to yield the *phoſphorus*. It is to be placed in the common furnace for diſtillation with a retort; excepting that inſtead of being terminated by an ordinary reverberatory or dome, this ought to be terminated by the upper piece of an air-furnace, to which a tube is to be applied, the diameter of which ought to be from four to ſix inches, according to the ſize of the furnace, and the height from eight to nine feet. This apparatus, which Mr. Beaumé uſes, is neceſſary for raiſing a ſufficient heat, and for the convenience of throwing in a ſufficient quantity of fuel through the door of the upper piece of the furnace. The retort ought to be well luted to a receiver of moderate ſize, pierced with a ſmall hole, and half full of water. For this purpoſe ordinary fat lute may be bound on with ſtrips of linen, dipped in a lute prepared with lime and whites of eggs. The hole in the furnace through which the neck of the retort paſſes ought to be well ſtopped with furnace-earth. Laſtly, a ſmall wall of bricks is raiſed betwixt the furnace and the receiver, to guard this veſſel againſt heat as much as is poſſible.

All theſe preparations being made the evening before the diſtillation is to be performed, we are then capable of proceeding to this operation, which is very eaſy. The retort is to be heated by ſlow degrees during an hour and a half; and then the heat is to be increaſed till the retort be red-hot, and the *phoſphorus* begin to paſs in luminous vapours: when the retort is almoſt of a white-red heat, the *phoſphorus* paſſes in drops, which fall and congeal in the water at the bottom of the receiver. This degree of heat is continued till no more paſſes into the receiver. When a retort contains eight pints or more, this operation continues about five hours.

Mr. Margraaf's apparatus is ſomewhat different from that above deſcribed. He divides the whole quantity of matter from which the *phoſphorus* is to be obtained into ſix ſmall retorts, which he places in a furnace that he deſcribes. The advantage of this diviſion is, that if any accident happens to one retort, the whole matter is not loſt; and as the retorts are ſmaller, a leſs heat is required. If indeed, much *phoſphorus* was to be made, this practice would be ſafe and excellent; but Macquer affirms, that the method above deſcribed of Mr. Beaumé is very convenient when a large quantity of *phoſphorus* is not wanted and that he has never ſeen it fail.

Phoſphorus does not paſs pure in this diſtillation, but is blackened by ſoot or coal, which it carries along with it: it may be eaſily purified and rendered white and fine by a ſecond diſtillation or rectification. This rectification is made in a ſmall glaſs retort, to which is adjuſted a ſmall receiver half full of water. A very gentle heat is ſufficient, becauſe *phoſphorus* once formed is very volatile: and as the fuliginous matters with which it is ſoiled were raiſed merely by the violence of the heat, they remain at the bottom of the retort in this diſtillation, and the *phoſphorus* paſſes very pure.

The *phoſphorus* is then uſually divided into ſmall cylindrical rolls, for the conveniency of uſing it. This is done by putting it in glaſs tubes immerſed in warm water. This very gentle heat is ſufficient to liquefy the *phoſphorus*, which is almoſt as fuſible as ſuet. It takes the form of the glaſs tubes, from which it may be taken out when it is cold and hardened. That it may be more eaſily taken out of the tubes, theſe muſt be ſomewhat of the form of fruſtums of cones. All theſe operations ought to be made under water, to prevent the inflammation of the *phoſphorus*.

Phoſphorus is a kind of ſulphur compoſed of a peculiar acid united with phlogiſton. It is extremely fuſible, and has, like ſulphur, two kinds of inflammation; one very weak, emitting a flame not powerful enough to kindle other combuſtible matters, but ſufficient for the gradual conſumption and burning of its own phlogiſton; the other is vivid, brilliant, and ſtrong, accompanied with decrepitation, and capable of inſtantly kindling any combuſtible matter. *Phoſphorus* reſembles vitriolic ſulphur in this reſpect, that all its phlogiſton may be burnt, even with rapidity, without any decompoſition of its acid: but it differs from ſulphur in being much more combuſtible. A heat from twelve to fifteen degrees is ſufficient to decompoſe *phoſphorus*, and to make its phlogiſton burn, with a ſenſible light, eſpecially in open air; and, therefore, to prevent this decompoſition, it muſt be preſerved in water; though in water it will be partly decompoſed, and fill the containing bottle with luminous vapours; its ſurface loſing its ſemi-tranſparency, and the water becoming more and more acid.

Phoſphorus, heated by fire or friction, violently inflames, burns fiercely, and emits many vapours. It does not ſeem to be ſo ſtrongly diſpoſed to unite with metals as ſulphur. *Phoſphorus* is ſoluble in oils and inflammable liquors, and forms balſams of *phoſphorus*; but in this ſtate of combination, it is more diſpoſed to decompoſe than when alone. The nature of the acid which enters into the compoſition of *phoſphorus* is not certainly known: Stahl and many others have ſuppoſed it to be the marine acid; and that nothing more was requiſite to produce it than to mix and combine properly marine acid with phlogiſton; but M. Margraaf, by many experiments found that the phoſphoric acid was different from that of common ſalt; and that it was contained in that ſingular kind of ſalt, which chemiſts call fuſible ſalt, or native ſalt of urine. When the inflammable principle of *phoſphorus* burns, and is thus ſeparated from the acid, we obtain a diſengaged ſubſtance, which is at firſt dry, but quickly and powerfully attracts the moiſture of air, and is ſoon reduced to a liquor that has an acid taſte, that converts the blue colour of vegetables to a red, and that combines to the point of ſaturation with alkaline ſubſtances. This ſubſtance, being deprived of its moiſture by heat, and rendered red-hot, may be thus converted into a ſolid and tranſparent matter, which has all the appearance of glaſs. Phoſphoric acid appears to be a very powerful ſolvent: it decompoſes nitre and common ſalt, uniting with their alkaline baſes, and when combined to the point of ſaturation with alkaline ſalts, forms neutral ſalts ſimilar to the fuſible ſalt of urine. This acid diſſolves neither gold nor ſilver; acts in a ſmall degree on filings of copper, but eaſily diſſolves the calx of copper; entirely diſſolves iron; weakly corrodes tin and lead; changes the colour of mercury precipitated *per ſe*, from a red to a yellow and white, and by a long digeſtion to a black; and entirely diſſolves white arſenic and zinc.

With regard to the effects of a phoſphoric acid on the ſolutions of metals by other acids, we may obſerve, that it produces no change in the ſolution of gold in aqua regia, but ſome time afterwards precipitates part of the gold in its metallic ſtate, and it affects the ſolution of ſilver nearly in the ſame manner: from the ſolution of mercury in nitrous acid, a copious white precipitate is formed by the phoſphoric acid, which is re-diſſolved by expoſure to the cold. A white precipitate is alſo obtained from a ſolution of lead in nitrous acid, by means of the phoſphoric acid. Such are the principal properties of this acid, enumerated by Margraaf, who found that it is not peculiar to animal urine, having been diſcovered in many vegetable matters, particularly farinaceous grains, when expoſed to great heat in cloſe veſſels. To which we may add, that M. Schloſſer perceived no farther effect than a diminution of weight by keeping it in hot and cold ſpirit of wine; that ſpirit of turpentine did not affect it; that no efferveſcence was perceivable by diſſolving it in water and adding fixed alkali; that an ounce of water was capable of diſſolving one hundred and eight grains of ſalt, when the thermometer was at 56°; that this ſalt cryſtallizes in ſmall parallel and equal priſms, with four oblong equal ſides, and two truncated extremities; that, when diſſolved, it did not affect gold, tin, lead, mercury, or ſilver; that filings of ſteel rendered the ſolution whitiſh, but clear; that copper was ſlightly corroded, biſmuth not touched, zinc ſlowly diſſolved by means of heat; that it precipitated ſilver from aqua fortis, in form of a black powder, and mercury from aqua fortis in a white maſs, and copper, iron, and tin, from aqua fortis; that it did not affect lead diſſolved in aqua fortis; that it precipitated biſmuth and antimony in form of a white powder; and that zinc diſſolved in aqua fortis remained undiſturbed. Dr. Prieſtley obſerves, that this acid may be eaſily procured from ſolid *phoſphorus* by expoſing it to the open air in the mouth of a phial, paſſing into a phial which receives the acid, as the *phoſphorus* gradually waſtes by this kind of accenſion; but it muſt be ſet in a place, neither very cold nor very warm. If it ſmokes, and is in danger of taking fire, it may be preſerved by plunging it inſtantly in water. This phoſphoric acid, he ſays, is ſoon ſaturated with nitrous vapour, and aſſumes a deep indigo blue colour; it yields no air by heat, even with ſubſtances containing phlogiſton, except that in the ſolution of iron, which it readily diſſolves, and by mixing it with minium, it yielded a ſtrong inflammable air.

Dr. Ingenhouſz obſerves that the phoſphoric acid, when hot, diſſolves glaſs. M. Scheele has lately diſcovered a curious and eaſy method of procuring the phoſphoric acid from bones by means of the oil of vitriol: the proceſs for this purpoſe has been ſince ſtated and explained, in the various circumſtances attending it, by other chemiſts.

Meſſ. de Morveau, Maret, and Durande, in the Elemens de Chemie, &c. lately publiſhed at Dijon, uſed twelve pounds of bone calcined to whiteneſs, finely powdered and ſifted, and added to them a ſufficient quantity of the common or ſtrong oil of vitriol, till an effervescence no longer appeared. They then added a little more of the acid, and afterwards a little water, in order to promote the action of the acid upon the earth.

An anonymous writer obſerves, that the effervescence appears to have no neceſſary connection with the expulſion of the phoſphoric acid from the bones, as it depends only on the expulſion of a certain quantity of fixed air contained in them: and, as the quantity of oil of vitriol is not ſtated by other writers, he adds, from his own experience, that in a proceſs of this kind, ten ounces in weight of the ſtrongeſt oil of vitriol were added to eight ounces of burnt hartſhorn, or the CCC. of the ſhops. The matter thus obtained, is boiled for a long time, with the addition of a large quantity of water, and afterwards filtered; and the matter remaining in the filtre repeatedly edulcorated with hot water. The whole quantity is then ſet to evaporate, firſt in earthen veſſels, and afterwards in capſules of glaſs or china ware. To expel the vitriolic acid from the liquor thus concentrated, M. Scheele directs that it ſhould be diſtilled to dryneſs in a glaſs retort, placed in a reverberatory furnace. The other authors effect this expulſion with leſs trouble in the glaſs capſules; and then put the dry matter into a crucible, where it was kept in fuſion till it ceaſed to yield ſulphureous vapours. It was then poured out of the crucible in a vitreous ſtate.

To procure the phoſphoric acid in a ſtate of greater purity, or more free from ſelenite, or earth, it is proper firſt to convert it into *phoſphorus*. For this purpoſe, the authors of the Elemens Chymie, &c. juſt cited, having reduced the whole of the vitreous ſubſtance into powder, and mixed it with one third of its weight of powdered charcoal, diſtilled the mixture in an earthen retort. From the quantity of calcined bones above mentioned, they obtained ſix ounces and ſeven drachms of excellent *phoſphorus*. From this, the acid may eaſily be afterwards obtained in the pureſt ſtate, by the uſual method of accenſion, &c. It is obſerved, that the phoſphoric acid may be procured in ſtill greater quantity from egg-ſhells; and that it has even been found in the mineral kingdom, and obtained from certain white lead ores. Monthly Review, vol. lxvi. p. 135, &c.

Dr. Prieſtley has made many experiments with *phoſphorus*, in different kinds of air; and has found, that it ſmoked and gave light in the acid air, juſt as it would have done in common air confined, without being ſenſibly waſted for twelve hours, and with a very inconſiderable diminution of the bulk of the air; in alkaline air it gave no light and made no laſting change in its dimenſions; in nitrous air, it gave no light, nor did it leſſen its power of diminiſhing common air, and the *phoſphorus* remained unchanged; and after having remained a day and two nights in vitriolic acid air, it produced no ſenſible effect, and gave no light.

Dr. Fordyce has ſuggeſted the following eaſy method of reducing *phoſphorus* to powder: take *phoſphorus* of urine two drachms; put it into a four-ounce phial; pour upon it three ounces of water; heat it gently by immerſion in warm water, till the *phoſphorus* melts; ſhut the phial with a cork; take it out of the water, and ſhake it briſkly till it be cold; and the *phoſphorus* will be found in powder. A receiver may be lined with this powder by adding a very ſmall quantity of water to it, and then making the powder to adhere to its internal ſurface, by gently inclining and turning the receiver round. Chem. Dict. art. *Phoſphorus*, and Prieſtley's Experiments and Obſervations on Air, &c. Phil. Tranſ. vol. lxi. part ii. p. 504, &c.

PHOSHHORUS, *properties of ſolid*. 1. With this *phoſphorus* one may write on paper, as with a pencil, and the letters will appear like flame in the dark; yet, in the light, nothing will appear but a dim ſmoke.

If the letters written with this *phoſphorus* are warmed by the fire, they preſently become dark lines, which continue upon the paper like ink.

2. A little piece, rubbed between two papers, takes fire inſtantaneouſly, and if care be not taken in the management of it, there is danger of burning the fingers, the *phoſphorus* being exceedingly inflammable.

3. Its burning is very vehement, and penetrates deeper into the fleſh than common fire; and it is very difficult to be extinguiſhed.

Dr. Slare, in order to determine whether air contains the pabulum of flame, as ſome have ſuppoſed, placed a large piece of *phoſphorus* in a receiver; but upon exhauſting it, he found that it became more luminous, and that upon admitting the air it returned to its former ſtate. This property was alſo aſcertained by ſeveral experiments of Mr. Haukſbee..

M. Caſſini happening to preſs a piece in a cloth between his fingers, the cloth immediately took fire; he endeavoured to put it it out with his foot; but his ſhoe caught the flame, and he was obliged to extinguiſh it with a braſs ruler, which caſt forth rays in the dark for two months after.

The ſolid *phoſphorus* ceaſes to ſhine and never ſpoils, provided it be kept in a phial full of water; but if any part of it emerge, it will ſhine, though the glaſs be hermetically ſealed; and will continue ſhining in a large glaſs without water for ſeveral days, with very little diminution of its light or weight; and even when immerſed in water, it will ſometimes make very bright and vigorous coruſcations in the air: that in form of an unguent, does not keep ſo well; and the liquid *phoſphorus* worſt of all.

The liquid *phoſphorus* is beſt made by digeſting in horſe-dung, a little bit, or ſome ſcrapings of the ſolid kind, for two days, in oil or eſſence of cloves, oil of turpentine, or the like. After diſſolution, the oil will be ſo impregnated with it, that, upon opening the bottle, the matter will appear on a flame.

PHOSPHORUS, *experiments with liquid*. By waſhing the face, hands, or the like, with liquid *phoſphorus*, Dr. Slare tells us they will be made to ſhine very conſiderably in the dark, and the luſtre thereof will be communicated to adjacent objects, yet without any offence to the ſkin.

As ſoon as the candle is brought in, the ſhining diſappears, and no change is perceivable.

This *phoſphorus* emits frequent flaſhes like lightning, even when cloſe ſtopped, eſpecially in warm water. Hence Mr. Boyle takes occaſion to draw a parallel between lightning and *phoſphorus*. Phil. Tranſ. Abr. vol. iii. p. 348, &c. Haukſbee's Phyſico Mech. Exper. p. 122.

In ſome caſes animal ſweat, which is ſimilar to urine, has been obſerved to be phoſphoraceous, without any preparation. An inſtance of this kind is related of a perſon who uſed to eat great quantities of ſalt, and who was a little ſubject to the gout, after ſweating with violent exerciſe. Stripping himſelf in the dark, his ſhirt ſeemed to be on fire, and a urinous ſmell was perceived, ſimilar to that which iſſues from cabbage much ſalted and ſtrongly fermenting. Act. Cæſarienſia, vol. v. p. 334.

PHOSPHORUS, *Bolognian*, or *Bononian*. The ſecond kind of artificial *phoſphorus* is a preparation of a ſtone called the *Bononian* ſtone, from *Bologna*, a city in Italy, near which it is found.

The firſt who undertook to make this ſtone luminous, was a chemiſt of that city, called Vicenzo Caſſiorolo. Poterus, Licetus, &c. have deſcribed the proceſs; but miſtakenly. M. Homberg, who made a journey to Italy, expreſly to learn the preparation, firſt communicated the ſame to M. Lemery, who publiſhed it in the ſeventh edition of his chemiſtry. See BONONIAN *ſtone*, and LAPIS *Bononienſis*. Under thoſe articles, the reader will find ſome account of the diſcovery of this ſtone, and of the method of preparing it. We ſhall here ſubjoin ſome farther particulars on this ſubject, chiefly extracted from the diſſertations of M. Margraaf. The Bolognian ſtone, he ſays, is ſoft, friable, heavy, cryſtallized, and incapable of efferveſcing with acids, before it has been calcined in contact with fuel, and with a free acceſs of air. Theſe qualities have induced him to claſs it among the heavy fuſible ſpars, which, by a preparation ſimilar to that for the Bolognian ſtone, are rendered phoſphoric. After analyſing theſe ſubſtances, he concludes that all contain a vitriolic acid, united to an alkaline or calcareous earth. In order to render theſe ſtones phoſphoric, ſuch of them ought to be choſen as are the cleareſt, but cryſtalized, moſt friable, moſt heavy, which exfoliate when broken, and which contain no hetrogeneous parts. They are to be made red-hot in a crucible, and reduced to a very fine powder in a glaſs mortar, or upon a porphyry, and not in a copper mortar, which will obſtruct the ſucceſs of the operation. The powder thus obtained, is to be formed into a paſte with gum tragacanth, and divided into cakes as thin as a knife. Theſe are to be dried by a gradual heat. An ordinary reverberatory furnace is to be filled to three quarters of its height with charcoal, and the fire to be kindled; upon this charcoal the flat ſurfaces of the cakes are to reſt; and more charcoal is to be placed above them, ſo as to fill the furnace, which is then to be covered with its dome, the tube remaining open: all the coal is to be conſumed, and the furnace left to cool. The cakes are then calcined, and are to be cleanſed from the aſhes by blowing upon them with bellows. He farther obſerves, that after this calcination, through the coals, if the ſtones be expoſed to a ſtronger calcination during a full half hour under a muffle, their phoſphoric quality will be rendered ſtronger. Ac. Berlin, 1749, and 1750.

This *phoſphorus* has not any ſenſible heat, and only becomes luminous after being expoſed to the ſun, or the day-light; in which ſtate it reſembles a burning coal, and preſerves its light five or ſix minutes in the dark, eſpecially if the perſon obſerving it has been ſome time in the dark, or has ſhut his eyes, that the pupils may be ſufficiently expanded; during which time, the light gradually dwindles; and, to recover the ſhining, it muſt be expoſed afreſh to the light.

Phosphorus, *the hermetic*, or **Phosphorus** *Balduini*, which makes the third kind, and properly belonging to the ſame claſs with the former, is a preparation of Engliſh chalk, with aqua fortis, or ſpirit of nitre, by the fire.

This makes a body conſiderably ſofter than the Bolognian ſtone; but it has all the qualities thereof. It has its name from its inventor Baldwin, a German chemiſt, called *Hermes*, in the ſociety of the Naturæ Curioſorum; whence its other name *Hermetic*. It was diſcovered a little before the year 1677.

This *phoſphorus* of Baldwin is exactly ſimilar to thoſe made with Bolognian ſtone and phoſphoric ſpars, differing only in the kind of acid which it contains. It is evidently a nitre with a calcareous baſis, and in calcination acquires its phlogiſton from the nitrous acid, the chalk alſo containing ſome of this inflammable principle. It is obſerved, however, that this is not ſo good a *phoſphorus* as the Bolognian; it is not ſo luminous, it does not retain the light ſo long, it ſoon loſes its virtue and never recovers it again. Acad. Par. 1693, p. 271.

The proceſs for making this *phoſphorus*, though Baldwin gave no directions for it, nor ſo much as mentioned the materials, was communicated to the Royal Society, in 1679, by Dr. Slare, and publiſhed by Grew, in his Muſ. Reg. Soc. p. 353; and is as follows: take good firm chalk, ignite it in a crucible, and then powder it; put into a pint, or half a pint of ſtrong ſpirit of nitre, *cochleatim*, as much of the powdered chalk as will ſerve well to ſatiate it, i. e. till it becomes ſweetiſh, and makes no effervescence upon the injection of the chalk. Then dilute this liquor with fair water, filtre it through a paper, and ſo evaporate it in a large glaſs, or glazed veſſel, or good Heſſian crucible, to a dry ſalt. The preparation may be performed in four hours.

To this claſs we may alſo refer ſome other *phoſphori*, enumerated in the ſequel of this article. As the

Phosphorus, *ammoniacal*, compoſed of ſal ammoniac and lime, which Mr. Homberg firſt diſcovered.

The method of preparing it is this: take one part of ſal ammoniac in powder, and two parts of lime extinguiſhed by lying in the air: mix them exactly together and fill a crucible with the mixture; ſet it in a ſmall melting heat. As ſoon as the crucible grows red hot, the matter in it will melt, and it muſt be ſtirred with an iron rod, leſt it ſwell over the edges of the crucible: as ſoon as the whole is melted, pour it into a copper baſon; it will appear of a greyiſh colour and vitrified, and if it be ſtruck upon with any hard body, there will be ſeen a fire all over the place where the blow was given. As this matter is brittle, however, and the ſame maſs will not ſerve often for the experiment, the beſt method is to dip iron rods in it while melting, and theſe will be covered with the matter, and will anſwer the purpoſe eaſily and often. Mem. Acad. Par. 1693.

This is a combination of quick-lime with the acid of ſal ammoniac, and receives its phlogiſton from the ſal ammoniac.

Phosphorus, *antimonial*, is the name of a ſubſtance having the qualities of the *phoſphorus* diſcovered by Mr. Geoffroy, in his experiments on antimony. This gentleman had prepared a ſoap from pot-aſhes, quick-lime, and oil, with which he made ſeveral experiments on antimony; among others, he was deſirous, by means of this, to reduce ſome diaphoretic antimony, which he had before made from two parts of the regulus of antimony, and three parts of nitre; but, inſtead of the reduction which he was labouring after, his operation afforded him a much more ſingular phenomenon: the reſult of them being a *phoſphorus*, which he had never thought of; a matter which, after having remained perfectly quiet while cloſe ſtopped down, took fire as ſoon as ever it was expoſed to the air; and that with a violent detonation, and darting every where a ſhower of fire.

It is eaſy to ſee, that there are in the preparation all the requiſites for ſuch an effect; nitre, charcoal furniſhed by the burnt ſoap, and ſulphur both from the ſoap and from the regulus of antimony; and to all theſe a ſort of calx, either from the ſoap, or from ſome earthy parts of the antimony. It is eaſy to conceive, that all theſe ſubſtances, coming to a mixture together, ſhould be ready to catch fire and blaze, upon a proper application; but it is not leſs difficult to account for the effect's being produced merely by the air, after the whole had been for a long time in a ſtate of reſt.

The method of preparing this new ſpecies of *phoſphorus* is this: Mr. Geoffroy mixed two ounces of his ſoap with one ounce of this diaphoretic antimony; this mixture being put by little and little into a red-hot crucible, took fire, and ſwelled very much; after it had done flaming, the maſs ſubſided, and became a red or fire-coloured ſubſtance, of an even ſurface, but ſtill throwing up a vaſt quantity of bluiſh-green luminous vapours: and all this regularly happened on every freſh throwing in of the matter, without the leaſt variety; when the whole quantity was thrown in, and had ceaſed to give any flame or luminous vapour, it remained in the crucible in the form of an inverted muſhroom, being hollow, very porous, and of a black colour. When the crucible was taken out of the fire, the edges of this ſubſtances were beaten down into the middle, and the whole covered with an ounce of freſh ſoap; when this laſt ſoap was burnt, and a ſmall bluiſh flame appeared upon the ſurface of the maſs, the crucible was covered with a lid, and a large quantity of charcoal laid upon it, and the fire blowed up very briſkly, by a hundred blaſts of the bellows, or thereabouts; but, notwithſtanding the fierceneſs of the fire, there was no fluid ſcoria formed, but the whole maſs remained ſpungy and porous; the fire was then ſuffered to go out, and the crucible placed in a corner of the elaboratory at reſt for five hours. In the evening when the crucible was perfectly cold, Mr. Geoffroy went to examine the matter, and a ſervant went to uncover the maſs, by removing its ſurface with an iron inſtrument; but the moment the air was admitted, the whole maſs took fire, burning with a very conſiderable noiſe, and darting its flames every way to a great diſtance.

Mr. Geoffroy repeated the proceſs ſeveral times, and always with the ſame ſucceſs, whether he uſed his own diaphoretic antimony, or that made in the common manner. The great caution to inſure the ſucceſs, ſeems to be taking care of not carrying the fire too far before the addition of the laſt quantity of ſoap. Mem. Acad. Scien. Par. 1736.

Phosphorus *of the Berne-ſtone*, is a name given to ſtone (which, when heated, becomes a ſort of *phoſphorus*) from Berne, in Switzerland, the place where it is found.

This ſubſtance was ſent to the members of the Royal Academy at Paris, by M. Bourguet, and referred by them to the examination of M. du Fay, whoſe account of it is publiſhed in Mem. Acad. Paris, 1724.

The *Berne-ſtone* is of a moderate hardneſs, conſiderably pellucid, and uſually colourleſs, or whitiſh, though ſometimes with a tinge of green, yellow, or ſome other colours: it is compoſed of a number of plates, or flakes, laid over one another, in the manner of the iſland cryſtal; and therefore, like that body, is plainly a ſpar. It breaks into ſeveral faces, and has different angles; but of a ſomewhat determinate meaſure, the acute ones being of ſixty degrees, and the obtuſe ones of one hundred and twenty.

This ſtone, when heated at one of its angles with the flame of a lamp or candle, ſplits by means of the flame's inſinuating itſelf into the interſtices of the plates that are leſs firmly united; and theſe ſeparate, and ſome fragments uſually fly off with conſiderable violence. One of theſe pieces, carried into an obſcure place, appears ſurrounded with a blue flame, which laſts about a minute. And it is to be obſerved, that theſe pieces which fly off have all the ſhape of an irregular pyramid, with an uneven baſe. If this ſtone be put into a crucible, and ſurrounded with coals, it becomes a very beautiful *phoſphorus*. The whole bottom of the crucible is ſeen, even though it be in broad day-light, ſhining with a bright and beautiful bluiſh white; and if it be carried into a dark place, the light is ſeen much more beautifully. If, after it is cold, it be again heated in a crucible, in the ſame manner it ſhews the ſame bright appearance. After this, if it be tried a third time, it does not ſhine at all. According to all theſe phenomena, the effects of fire upon this ſtone ſeem to depend on a ſulphur contained in it, probably of the ſame nature with that which enters the compoſition of the metals. This may, by means of a heat, ſuch as that given by the candle or in the crucible, diſengage itſelf ſo far from the body of the ſtone as to take fire; and when it has burnt ſo long as to conſume itſelf, the luminous property of the ſtone ſeems to ceaſe.

The coloured gems are cryſtals of a peculiar kind, tinged with the ſulphur or PHLOGISTON of metals: this ſulphur gives them their colour, and conſequently it ought to give them the properties of the *Berne-ſtone*, if it were not too fixed to be diſſipated in the ſame eaſy manner, and to take fire in the diſſipation. And it appears, on trial, that the baſtard emeralds of Auvergne and other places, the matrix of the amethyſt, the fragments of ſome of the accidental jaſpers, the hyacinths, and ſome ſort of rubies, are all *phoſphoruſes* of the nature of the *Berne-ſtone*, but with different degrees of brightneſs. The mother of the emerald, the yellow jaſper, the water ſapphire, the malachite, the opal, and the garnet, have none of them any of this property.

Since the ſame ſulphurs which take fire in the *Berne-ſtone* are what give colour to theſe other ſtones, it ſhould ſeem, that thoſe which are not of this *phoſphorus* kind, nor give a light after being heated, ſhould not loſe their colours in the fire; and this is found to be true in the garnet, which does not loſe any part of its colour, nor is it at all luminous; whereas the hyacinth, and ſome of the jaſpers and other ſtones, which loſe a part of their colour, not the whole, in the fire, become alſo in part luminous, or more ſo, in degree, according to the quantity of colour which they loſe. This, however, is no certain rule, ſince the mother of the emerald, the topaz, and ſome other ſtones, loſe all their colour, and yet are not at all luminous. The reaſon of this ſeems to be, that the ſulphurs are driven out of theſe ſtones ſo ſlowly, and in ſuch minute quantities, that they are not at any time collected into body enough to be capable of flame. There is nothing to be objected as to the *Berne-ſtone* ſhining: though they are uſually white, they may poſſeſs no ſmaller portion of ſulphurs than the coloured ſtones; only in thoſe the ſulphurs may be colourleſs, or white in themſelves. It may be poſſible alſo that the ſulphurs, in a ſtone of this kind, may be diſperſed in ſuch ſmall molecules, as not to form a body ſufficient to give any colour; but, when collected, in order to be driven off in the fire, they may then be ſufficient in quantity to give a blue tinge to the flame.

The iſland cryſtal, which is alſo a ſpecies of ſpar, and which greatly reſembles this *Berne-ſtone* in many particulars, flies to pieces alſo in the ſame manner, on being heated; and when carried into the dark, this alſo gives ſome ſparks of light, but they are few in number, and looſely ſcattered over the ſurface: when this ſtone is burnt a little in the crucible, there is ſome ſmall appearance of flame, with a ſmell of ſulphur, and the matter in the bottom of the crucible is found ſhattered to pieces; but all the pieces are regular parallelopipeds, as was the original maſs.

It is to be obſerved, that the *Berne-ſtone*, and others of the ſame kind, which only ſhine in the dark, and that only for a few minutes, when firſt taken out of the fire, are, properly ſpeaking, endued with no other luminous quality than that of a burning coal; but their light, having been generally unobſerved, and requiring darkneſs to ſhew it, has obtained for them the ſpecious title of *phoſphori*.

PHOSPHORUS, *Canton's*, is an artificial *phoſphorus*, the method of preparing which was diſcovered by the late ingenious Mr. Canton, and publiſhed in the Phil. Tranſ. for 1768, vol. lviii. p. 337, &c.

This is much ſuperior to any ſingle natural ſubſtance, and has the advantage of being very eaſily and cheaply prepared. The proceſs is as follows: calcine ſome common oyſter-ſhells, by keeping them in a good coal fire for half an hour; let the pureſt part of the calx be pulverized, and ſifted; mix with three parts of this powder one part of the flowers of ſulphur; let this mixture be rammed into a crucible of about an inch and a half in depth, till it be almoſt full; and let it be placed in the middle of the fire, where it muſt be kept red-hot for one hour at leaſt, and then ſet by to cool: when cold, turn it out of the crucible, and cutting, or breaking it to pieces, ſcrape off, upon trial, the brighteſt parts; which, if good *phoſphorus*, will be a white powder, and may be preſerved by keeping it in a dry phial with a ground ſtopple. The quantity of light which a little of this *phoſphorus* gives, when firſt brought into a dark room, after it has been expoſed for a few ſeconds, on the outſide of a window to the common light of the day, is ſufficient to diſcover the time by a watch, if the eyes have been ſhut, or in the dark, for two or three minutes before. By this *phoſphorus* celeſtial objects may be very well repreſented; as Saturn and his ring, the phaſes of the moon, &c. if the figures of them, made of wood, be wetted with the white of an egg, and then covered with the *phoſphorus*. And theſe figures appear to be as ſtrongly illuminated in the night by the flaſh from a near diſcharge of an electrified bottle, as by the light of the day. This *phoſphorus* receives no injury from being expoſed to the direct rays of the ſun, which is the caſe of ſome of the more delicate kinds, as Beccarius has remarked, and Lemery ſuppoſed with all. However, it cannot be expoſed to moiſture without loſing its property of imbibing and emitting light, and alſo its whiteneſs. Mr. Canton found, that it was more affected by mixture with ſpirit of wine than with ether. It had been long known, that heat promotes the expulſion of the light which has been formerly imbibed by theſe *phoſphori*: Mentzel, who wrote ſoon after the diſcovery of Baldwin's *phoſphorus*, aſſerted that it had the property of becoming luminous by heat only; the ſame fact was obſerved by M. Du Fay; but the principle on which it depended was diſcovered by Beccarius, M. Margraaf, and Mr. Canton, independently of one another. Beccarius was firſt of opinion with Mentzel, that the light was produced by heat; but finding by repeated trials, that, without previous expoſing to the light, heat had no effect, he relinquiſhed that opinion. M. Margraaf fell at firſt into the ſame miſtake with Beccarius; but he afterwards obſerved that the *phoſphorous* would not ſhine by being placed upon a hot furnace, unleſs it had been expoſed to the light two or three days before. Upon the whole, he concludes, that the light is held in this ſubſtance by attraction, and afterwards expelled by heat. Mr. Canton alſo, without any knowledge of the obſervations of Beccarius and Margraaf, found, by a variety of experiments, that, when his *phoſphorus* had imbibed light, and had emitted all that it could in the common ſtate of the atmoſphere, it would emit more upon the application of heat, but that a continuance of the ſame degree of heat would only make it luminous for a certain time. Whence he infers, that there is a ſtrong attraction between light and the particles of natural bodies: and that the ſtrong vibrations into which heat throws them compels them, as it were, to quit their hold of each other; and the light which this *phoſphorus* gives, by being heated to a certain degree, appears to be cauſed by its throwing off adventitious particles, and not by any of its own; ſince its light will decreaſe, and be entirely gone, before the *phoſphorus* be hot enough to ſhine of itſelf, or to emit particles of light from its own body. Lemery and Muſchenbroeck have obſerved that the Bolognian *phoſphorus* imbibes leſs light when hot than cold; becauſe it appears leſs bright when carried into a dark room; but this circumſtance is accounted for by Mr. Canton, by its parting with its light faſter when hot than when cold, and, therefore, parting with more in the time of the conveyance from one place to another: and this, he alſo ſays, ſeems to be the cauſe why the Bolognian *phoſphorus* never appears ſo bright after it has been illuminated, and, conſequently, in ſome meaſure heated, by the direct rays of the ſun, as after it has been only expoſed in the ſhaded open air, to the common light of the day. However, there is reaſon to imagine, that the ſame degree of heat, which diſpoſes the *phoſphorus* to throw off the light after it has been imbibed, muſt likewiſe render it indiſpoſed to receive it. For an account of the reſult of Mr. Canton's experiments on this ſubſtance in favour of the materiality of light, ſee LIGHT.

PHOSPHORUS *fæcalis*, a very fine kind of *phoſphorus*, exhibiting many wonderful phenomena, and prepared from human dung mixed with alum.

Mr. Homberg, who was the inventor of it, gives the method of preparing it in the following manner: take four ounces of human dung newly made, mix it with the ſame quantity of roach alum groſly powdered; put the mixture into a ſmall iron ladle, capable of holding about a pint; ſet it over the fire in a chimney, and it will melt together, and become as fluid as water; let it boil gently over a ſmall fire, continually ſtirring it with an iron ſpatula till it is dry; it will then be difficult to ſtir, but it muſt be kept ſtirring about, and all the lumps it runs into muſt be broken, and what adheres to the ſides of the ladle ſtirred in and blended with the reſt; this muſt be continued till it is perfectly dry, and the ladle muſt be now and then taken from the fire, and the matter ſtirred about in it, that it may now grow red-hot. When the whole is thus perfectly dried, it will ſtill be in little lumps, and when cold it muſt be rubbed to powder in a metal mortar; it muſt then be put into the ladle, and ſet over the fire again, it will then become a little moiſt again, and run into clods and grumes, but it muſt be again ſtirred till dry; when cold it is to be powdered again, and a third time put into the ladle; and when perfectly dried this time, it is to be laid by in a paper in a dry place; thus is the firſt or preparatory operation finiſhed.

Take two or three drams of this powder, put it into a ſmall matraſs, capable of holding an ounce and a half of water, and which has a neck ſix or ſeven inches long;

put a paper ſtopper lightly into the neck of the matraſs; then take a ſmall crucible of three or four fingers breadth high, put two or three ſpoonfuls of ſand into it, then, ſet the bottom of the matraſs on the ſand, and take care that no part of it touches the ſides of the crucible; fill up the reſt of the crucible with ſand, and let the whole body of the matraſs be covered with it; then ſet the crucible in one of the common little earthen furnaces, and make a charcoal fire about it; for the firſt half hour let the coals only reach up to the middle of the crucible, but afterwards lay them up to the rim of it; continue this fire about half an hour, or till the powder within the matraſs is red-hot; then pile up more charcoal above the rim of the crucible, and continue this fire an hour, after which let the whole cool. There will ariſe a large quantity of fumes during the operation, and they will often throw out the ſtopper of the matraſs; but this muſt be replaced, and the fire a little abated in that caſe: when theſe fumes ceaſe, the fire may be raiſed without hurting the proceſs, when the crucible is ſo cool that it may be taken out of the furnace without burning the hands. This is to be done, and the matraſs is to be half raiſed out of the ſand to make it bear the cold by degrees, and its mouth muſt then be ſtopped cloſely with a cork, inſtead of its paper ſtopper. If, on ſhaking the matraſs about, the matter falls into powder, it is a proof that the operation has been well performed; but, if it hang together in form of a cake, it is a ſign that the matter was not well roaſted in the ladle before the putting it into the matraſs.

When the operation has been well performed, and the matter is in powder in the matraſs, pour out a ſmall quantity of it on a piece of paper, and immediately ſtop the matraſs again; the powder upon the paper will immediately fume and take fire, burning the paper, and any other combuſtible matter that is in the way. If there has been too much of the powder poured out of the matraſs it muſt not be returned in again; for though that ſhould be done before it begins to ſmoak, yet it will certainly ſet fire to all that is in the matraſs; from this it may be eaſily ſeen alſo, that the matter cannot be emptied out of the matraſs into a phial, but muſt always be in the veſſel in which the calcination was made.

If too much alum be uſed, the powder will not take fire at all: it will be of different colours, according to the veſſel the firſt calcination was made in, and according to the degree of fire that was uſed; hence it is ſometimes black, ſometimes brown, ſometimes red, green, yellow, or white.

It takes fire equally well in the day-time and in the night, and that without the mixture of any other ſubſtance, or without the leaſt rubbing, or any other circumſtance beſide the mere expoſure to the air. In this it differs from all the other known artificial *phoſphori*; for that of urine requires a ſmall degree of heat, in order to its burning; the ſmaragdine *phoſphorus* requires a conſiderable degree; the Bononian ſtone does not ſhine, except after having been expoſed to the day light; and all the others require violent rubbing, or a ſmart blow, to produce their light.

If it be deſired to keep this powder good for any time, it muſt be put in a dry place where there is not too much heat; the mouth of the matraſs muſt be kept cloſe ſtopped, and its body covered with paper; and the place where it ſtands muſt not be in too ſtrong a light; for the open day-light has been often known to weaken its power, and, in fine, wholly to ſpoil it through the glaſs. Mem. Acad. Par. 1711. See Pyrophorus.

Phosphorus, *fulgurating*. See Fulgurating.

Phosphorus *metallorum*, a name given by ſome chemiſts to a preparation of a certain mineral ſpar, which is found in the mines of Saxony, and other places, where there is copper. The ſpar to be uſed on this occaſion is that kind which is tinged green, and from its, in ſome degree, reſembling the colour of the emerald, is called by ſome *pſeudoſmaragdus*, and by others *lapis ſmaragdi mineralis.* This is to be powdered very fine, and this powder is to be laid on a flat plate of copper, iron, or any other metal: this plate is then to be ſet over ſome lighted charcoal, and the whole placed in a dark place. The ſpar will receive its neceſſary degree of heat for ſhining long before the metal will, and, conſequently, as ſoon as it begins to ſhine, the fire is not to be made any briſker. While the plate of metal is held in this degree of heat, and does not appear at all red, the powder upon it will ſhine like a lighted coal, and will continue ſo for ſome time. If it be removed away, and ſuffered to cool, it will be fit to repeat the experiment a ſecond time with, but its light will not be ſo ſtrong as before. Phil. Tranſ. N° 244. p. 365.

Phosphorus *of ſulphur*, the name given by the French academicians to a new-diſcovered ſpecies of *phoſphorus*, which readily takes fire on being expoſed to the open air. See Pyrophorus. The invention was Mr. Le Fevre's, and the proceſs is this: the ingredients are two drams of common *ſulphur*, half an ounce of ſteel filings, ten grains of colophony, and ſix drams of common water. Theſe things being all weighed and ſet apart, powder about half a dram of the *ſulphur* in a ſmall mortar, then add the colophony, and afterwards the remainder of the *ſulphur*. When this is all reduced to a fine powder, put in the filings of ſteel, and rub the whole together till it is ſo thoroughly mixed, that the ſteel does not appear, but the colour of the whole looks every where uniform and regular; then add about twenty drops of the water; and after beating the whole together add as much more, and continue to do ſo till the maſs is of the ſubſtance of a paſte, but not too moiſt. Put this paſte into a ſmall matraſs that will contain about three ounces, and pour on it more of the water till it ſwim above the ſurface of the paſte near a quarter of an inch. The matter of the paſte will then break, and appear in form of a granulated powder under the water; put the matraſs on a ſand-furnace, but give it no greater heat than that the hand can bear to lie upon the matraſs. When it begins to heat, the mixture will ferment and ſwell, and become black; it is then to be ſtirred with an iron rod, and a little more water muſt be added every quarter of an hour, till the whole is uſed. The matter will then be very black and liquid; and it is to be then taken from the fire, and ſet by for the whole night. This is the firſt and moſt eſſential part of the operation, and in this great care is to be taken that the fire be not too violent; for if the *ſulphur* be burnt the operation will be ſpoiled, and the matter would ferment ſo high as to run over at the mouth of the veſſel.

To finiſh the operation, a little water muſt be added to the matter, ſo as to ſwim over it, and the veſſel muſt be again ſet in the ſand, and a ſtronger fire given than before; this is known to be ſtrong enough when there is any humid vapour obſerved to ariſe out of the mouth of the veſſel. This fire is to be continued about two hours, that the greater part of the humidity may be evaporated; which is known by the iron rod finding ſome reſiſtance when put into the veſſel, and the matter it brings up being granulated and ſolid, or no longer moiſt, it muſt then be immediately taken from the fire, and the whole is then finiſhed. It is neceſſary to be very exact in this laſt and critical minute; for a very little longer ſtanding on the fire will burn the *ſulphur*, and render all the former care of no effect. The black matter remaining in the matraſs is to be taken out, and the ſides ſcraped clean with an iron rod; any piece of this that happens to fall upon a paper takes fire in a very little time, and burns away like the other *phoſphorus*. The proceſs is a very nice one, but, by obſerving all the rules here laid down, ſeveral perſons have ſucceeded in making the *phoſphorus* to perfection: the whole intent of the operation ſeems to be to join together the minute particles of ſteel and *ſulphur*, which when thus joined cannot fail to be very inflammable, and to take fire on receiving the ſmalleſt humidity from the air to make them ferment.

It cannot but be obſerved, that this *phoſphorus* is founded on Lemery's experiments of ſteel and *ſulphur* taking fire together; but this is a much more nice and accurate operation, and a fine improvement on the original plan, which was only by mixing large quantities of ſteel filings and *ſulphur* together into a paſte with water, and burying this in the earth to make it take fire of itſelf, and thus repreſent the natural phenomena of volcanos, thunder, lightning, &c. Mem. Acad. Par. 1728.

Phoſphorus may be kindled by the effluvia of electricity. See Phil. Tranſ. N° 475. ſect. 14.

Phosphorus, *rationale of the effects of*. It may be obſerved, that in moſt of the natural *phoſphori*, there is a briſk attrition or friction concerned; which we may ſuppoſe either to give the minute parts of the ſubſtance the proper motion and agitation neceſſary to convert them into fire, if fire be ſo producible (as Bacon, Boyle, Newton, and the generality of the Engliſh philoſophers, have ſuppoſed that it is), or elſe to expel and emit the particles of fire naturally contained in them.

In the factitious ſorts, we may note, that a long proceſs by fire is uſually required, wherein the matter undergoes divers coctions, torrefactions, calcinations, diſtillations, &c. in the courſe whereof a conſiderable quantity of fire muſt neceſſarily be imbibed, and may poſſibly be retained therein.

In that, e. gr. prepared of the fecal matter, M. Homberg obſerves, that the aqueous part of the ſubſtance muſt neceſſarily have all been evaporated, with the greateſt part of the oil, and volatile ſalt, leaving pores or vacuities in the places they poſſeſſed; ſo that what remains is a ſpongeous plexus of earth, and fixed ſalt, having nothing in its loculi, or cavities, but ſome of the matter of the fire which has been ſtopped and detained therein, much as in quick-lime.

This being ſuppoſed, we know that the fixed ſalt, which s here pretty copious, will readily abſorb the moiſture of the contiguous air; and that the ſudden introduction of ſuch moiſture into the pores of the powder, muſt produce a friction, which may excite a ſmall degree of heat; and this joined with what fire was there already laid up, may make a heat ſufficient to give fire to the ſmall remains of oils too cloſely connected with the ſalt to have been carried off by the calcined fire; ſo that we have here every thing neceſſary to heat and light.

What confirms this doctrine is, that if the powder be kept in a veſſel not ſufficiently cloſe, the air, inſinuating by degrees, moiſtens and ſaturates it, but that ſo ſlowly, as not to produce friction enough to ſet it on fire; ſo that it is ſpoiled, and diſabled from taking fire ever after; much as is the caſe in quick-lime, which, after it has lain ſome time in the air, ceaſes to grow hot, even by the affuſion of water.

The reaſon why quick-lime, which contains a great quantity of particles of fire, as well as our powder, does not conceive heat by the acceſs of the air, or the ingreſs of its moiſture into the pores thereof, but that water muſt be thrown thereon, is, that the quick-lime, being more thoroughly calcined, retains too little fixed ſalt to imbibe the moiſture readily and copiouſly enough to excite the neceſſary friction.

And the reaſon why quick-lime does not produce a flame, as the powder does, even when water is caſt on it, is, that it did not retain enough of the oily matter to afford flame; for, if oil were mixed with it, a flame would readily enſue. Mem. de l'Acad. ann. 1711. See PYROPHORUS.

If we ſuppoſe with Mr. du Fay, that all calcareous ſtones are capable of being rendered luminous, without the concurrence of an acid, we may then ſuſpect that light is capable of adhering more to ſome bodies than to others, and that calcination gives to calcareous ſtones the property of retaining a greater quantity of light, and during a longer time, than other bodies can. This, however, as Mr. Macquer obſerves, is a vague conjecture, and not much ſupported by facts. But if we adopt M. Margraaf's opinion, which is more conformable to the reſult of experiments, that theſe ſtones cannot be rendered luminous without the concurrence of an acid, and the acid only contributes to give them, in a conſiderable degree, this property, we muſt conclude that acids have a principal ſhare in its production. M. Macquer reaſons on this general principle in the following manner: we know that acids in general, particularly the vitriolic and nitrous, have a ſtrong affinity with PHLOGISTON; and that when they are united with this principle, they form compounds poſſeſſed of the properties of ſulphur, or of *phoſphorus*. It is alſo certain, that ſulphur, *phoſphorus*, and probably other compounds of acid and phlogiſton, have two methods of burning; one, vivid and ſtrong, in which their phlogiſton forms a very ſenſible flame, and produces not only light, but heat ſufficient to kindle combuſtible bodies; the other ſlow and weak, capable only of producing a light much leſs vivid, without any ſenſible heat, or with a heat too ſmall to kindle the moſt combuſtible bodies. Hence, may we not with probability believe, that the acid contained in ſtones rendered *phoſphoric* by calcination combined with the phlogiſton of the coals, forming with it a ſulphureous compound; and that the phlogiſton of this kind of ſulphur or *phoſphorus* adhering but weakly to the acid, or exiſting there perhaps only ſuperabundantly, is very eaſily combuſtible; ſo that the mere action of the heat and light of the open air is ſufficient to inflame it, but not ſo ſtrongly as to produce heat and a total diſſipation of the phlogiſton, but ſo ſlowly and weakly, that only a faint light, obſervable in the dark, is produced? The Engliſh tranſlator of the chemical Dictionary adds, that the principal cauſe of the ſlow combuſtion which produces *phoſphoric* light, ſeems to be, that the union between the acid and the phlogiſton of *phoſphoric* ſubſtances is weakened by the preſence of ſome earth, to which the acid has alſo a diſpoſition to unite; and that the phlogiſton is thereby gradually diſengaged, eſpecially when it is in contact with air, to which it is at all times ſtrongly diſpoſed to unite, as we may perceive from the neceſſary concurrence of that fluid to maintain ordinary combuſtion, which is only a more rapid and copious diſengagement of phlogiſton from the burning ſubſtances. See Chem. Dict. art *Phoſphoric ſtones*, Eng. edit. and note z.

John Baptiſt Beccaria has ſhewn, Phil. Tranſ. vol. lxi. part i. art. 25. that the *phoſphorus* compoſed of ſulphur and calcareous earth, imbibed the peculiar coloured rays to which it had been expoſed. Thus, having expoſed different *phoſphoric* pieces to rays of the ſun tranſmitted through green, yellow, and red cryſtals, he obſerved, that each of them, when afterwards viewed in the dark, exhibited that colour to which it had been expoſed. This obſervation is deciſive in favour of the opinion, that *phoſphorus* of this kind emits the ſame light that it receives, and no other; and that the light is not produced, but expelled by heat.

This experiment, which has often failed, for want of employing good glaſſes, or on account of the weakneſs of the ſolar rays, has been repeated by profeſſor Allamand of Leyden: who ſays, that having expoſed a prepared (probably by calcining it with ſome ſulphureous ſubſtance) piece of the Bononian calcareous *phoſphorus* to the coloured rays of the ſun, after their being ſeparated by one of his priſms, and looking to it in the dark, he found the *phoſphorus* gave the colour of the ſeparated rays to which it had been expoſed.

PHOSPHORUS, *aquatic*, a name given by Dr. Leigh, in his Hiſtory of Lancaſhire, to a water found near Wigan in that county, which takes fire on holding a lighted candle to it. It is not properly the water, however, that takes fire in this caſe, but a ſteam which burſts out of the ground with it. The author alſo calls it a ſulphurated water; but that very improperly, for it contains no ſulphur, but only iſſues out with this bituminous vapour.

PHOSPHORUS, in *Aſtronomy*, is the morning ſtar, or the planet VENUS, when ſhe goes before the ſun.

The Latins call it LUCIFER; the French *etoile de berger*; the Greeks *phoſphorus*, from φως, *light*, and φερω, *I bear*, or *bring*.

PHOSSA, in *Ornithology*, a name underſtood by ſome to expreſs the whole genus of pigeons, but more properly it is the name of one ſpecies only, the *palumbes torquatus*, or RING-*dove*.

PHOTINX, Φωτιγξ, in *Antiquity*, a kind of flute in uſe among the Greeks. It was the ſame with the *plagiaula* of the Romans.

PHOTINIANS, in *Eccleſiaſtical Hiſtory*, a ſect of ancient heretics, in the fourth century, who denied the divinity of Jeſus Chriſt.

They took their name from *Photinus* their chief, who was biſhop of Sirmium, and a diſciple of Marcellus. This prelate publiſhed, in 343, his opinions concerning the Deity, which were equally repugnant to the orthodox and Arian ſyſtems. He maintained, that Jeſus Chriſt was born of the Holy Ghoſt and the Virgin Mary; that a certain divine emanation (which he called the Word) deſcended upon this extraordinary man; that on account of the union of the divine word with his human nature, Jeſus was called the ſon of God, and even God himſelf; and that the Holy Ghoſt was not a diſtinct perſon, but a celeſtial virtue proceeding from the Deity. He was condemned by both parties in the councils of Antioch and Milan, held in the years 345 and 347, and by the council at Sirmium in 351. He was afterwards degraded from the epiſcopal dignity, and died in exile, in the year 372 or 375. His opinion was afterwards revived by Socinus.

PHOTOSCIATERICA, a term which ſome authors uſe for the art of DIALLING.

The name is derived hence, that the art not only ſhews the hours by the ſhadow of a gnomon, whence it is called *ſciaterica*, from σκια, *ſhadow*; but ſometimes alſo by means of the ſun's light, as in ſpot dials, reflecting dials, &c. from φως, *lux*, *light*.

PHOXINUS, in *Ichthyology*. See ROACH and MINOW.

PHOXOS, Φοξος, one with an acuminated or faſtigiated head, that is, ſharpened toward the top; the eminences of the forehead or occiput, or both, being depreſſed, or one or both of thoſe parts beyond meaſure prominent. But *phoxoi* are properly thoſe who have the top of their head very much faſtigiated and turbinated, and conſequently deformed. Therſites is deſcribed in Homer with ſuch a head.

PHRÆNIAN, in the *Botanical Writings of the Ancients*, a name given to a kind of *anemone* uſed in making garlands and other ornaments.

PHRASE, *phraſis*, Φρασις, of φραζω, *I ſpeak*, in *Grammar*, an elegant turn or manner of ſpeech, peculiarly belonging to this or that occaſion, this or that art, or this or that language.

Thus we ſay, an Italian *phraſe*, an eaſtern *phraſe*, a poetical *phraſe*, or a rhetorical *phraſe*.

A few elegant *phraſes*, pertinently applied, are an ornament of diſcourſe; but, if they come too thick, they have an ill effect, and make the ſtyle ſavour of affectation.

PHRASE is ſometimes alſo uſed for a ſhort ſentence, or ſmall ſet or circuit of words, conſtructed together.

In this ſenſe, father Buffier divides *phraſes* into *complete* and *incomplete*.

PHRASES are *complete* where there are a noun and a verb, each in its proper function; i. e. where the noun expreſſes a ſubject, and the verb the thing affirmed of it.

Incomplete phraſes are thoſe, where the noun and the verb, together only do the office of a noun, as conſiſting of ſeveral

veral words, without aſſuming any thing, and which might be expreſſed in a ſingle word.

Thus, *that which is true* is an incomplete *phraſe*, which might be expreſſed in one word, *truth:* as, that which is true ſatisfies the mind; i. e. truth ſatisfies the mind.

Phrase, *phraſe*, Fr. in *Muſic*, denotes the continuance of an air or harmony, which forms, without interruption, a ſenſe more or leſs complete, and which is terminated by a cadence more or leſs perfect. In melody the *phraſe* is conſtituted by the air; but in harmony it is a regular ſeries of concords, united together by diſſonances expreſſed or underſtood.

PHRASEOLOGY, *phraſeologia*, Φρασεολογια, a collection of the *phraſes*, or elegant expreſſions, in any language.

PHREATIS, or Phreattium, in *Greek Antiquity*, a court pertaining to the civil government of Athens, which was ſituated upon the ſea-ſhore in the Piræus, and derived its name απο τȣ φρεατος, becauſe it ſtood in a *pit*, or, as others ſuppoſe, from the hero Phreatus. The cauſes heard in this court were ſuch as concerned perſons that had fled out of their own country for murder, or thoſe that fled for involuntary murder, and had afterwards committed a deliberate and wilful murder. The firſt perſon that was tried in this place was Teucer, upon a groundleſs ſuſpicion, that he had been acceſſory to the death of Ajax. The criminal was not permitted to come to land, or ſo much as to caſt anchor, but pleaded his cauſe in his bark, and if found guilty, was committed to the mercy of the winds and waves, or, as ſome ſay, ſuffered there condign puniſhment; if innocent, he was only cleared of the ſecond fact, and, according to cuſtom, underwent a twelve month's baniſhment for the former. Potter's Gr. Antiq. vol. i. p. 111.

PHRATRIARCHUS, Φρατριαρχος, among the Athenians, a magiſtrate that preſided over the *phratria*, or third part of a tribe. He had the ſame power over the *phratria*, that the PHYLARCHUS had over the tribe.

PHRENES, Φρενες, in *Anatomy*, the DIAPHRAGM.

It was thus called by the ancients, from φρην, *mind*; becauſe they imagined this to be the ſeat of the rational ſoul. Hence.

PHRENESIS, *phrenzy*, or diſtraction. See Phrensy and Paraphrenesis.

PHRENETIC *nerves*, called alſo *diaphragmatic* and *ſtomachic nerves*, are nervous branches derived from the cervical nerves, which, joining in a trunk, run through the mediaſtinum undivided, till, arriving near the diaphragm, they again divide, and ſend off divers branches, ſome into the muſcular, others into the tendinous part thereof.

PHRENIC *veſſels*, an appellation given to a vein and ſome arteries of the human body, from their paſſing through the DIAPHRAGM.

The *phrenic* artery ariſes out of the deſcending AORTA, and diſtributes itſelf into the diaphragm and pericardium See *Tab. Anat. (Angeiol.) fig.* 1. *n.* 40.

The *phrenic* veins, are two veins, which the deſcending cava receives immediately after its piercing the diaphragm. See *Tab. Anat. (Angeiol.) fig.* 6. *litt. q. q.*

PHRENITIS, *phreneſis*, from φρην, *mens*, the *underſtanding*, or, as ſome will have it, from φρην, the *diaphragm*, becauſe the ancients ſuppoſed it to have its ſeat in that part, in *Medicine*. See Phrensy.

PHRENSY, in *Medicine*, a conſtant and vehement delirium, or diſtraction; accompanied with an acute fever, raving, waking, &c.

It differs from the *mania* and *melancholy*, as theſe are without fevers.

Phyſicians generally make the *phrenitis* to conſiſt in an inflammation in the meninges of the brain; and diſtinguiſh it from the *paraphrenitis*, which they ſuppoſe to be an inflammation of the diaphragm.

Willis will have them the ſame diſeaſe, and both to conſiſt in an inflammation of the animal ſpirits. He only diſtinguiſhes them as the inflammation ariſes from the cerebrum alone, or from the cerebrum and cerebellum together; and concludes, that they both ariſe in a fever, from the boiling blood's throwing its aduſt recrements into the brain.

Boerhaave makes the *phrenitis* either *true*, wherein the cerebrum, or meninges, or both, are inflamed; or *ſymptomatic*, where the matter of a fever is tranſlated into the cerebrum.

The true one either kills on the third, fourth, fifth, or ſeventh day; or it changes into a mania, lethargy, comus, &c. tremors, gnaſhing of the teeth, and grumous blood diſtilling from the noſe in this caſe, are prognoſtics of death.

The diſeaſe is moſt frequently the effect of inflammatory or malignant fevers; though it ſometimes ariſes from a ſuppreſſion of the natural evacuations, as the menſes, &c. When it ſucceeds an inflammation of the lungs, of the inteſtines, or of the throat, &c. it is owing to a tranſlation of the diſeaſe from thoſe parts to the brain, and generally proves fatal.

The preceding ſymptoms of this diſorder are, long watchings, troubled ſleep, and very reſtleſs dreams, acute and terrible pains of the head, redneſs of the eyes, fluſhing of the face, an entire forgetfulneſs of every thing, and a wandering of the mind, diſcovering itſelf by inconſiſtent anſwers to queſtions, a ſmall deſire of liquors, though the heat of the mouth plainly indicates all that can occaſion the moſt intenſe thirſt; dryneſs of the ſkin; large and ſlow reſpiration, a weak and ſlow pulſe, ſinging of the ears, a ſmall dropping of blood from the noſe, coſtiveneſs, ſuppreſſion of urine, and an extreme ſenſibility of the nervous ſyſtem.

All theſe ſigns predict an approaching *phrenitis*; but when it has already ſeized the patient, the blood-veſſels of the head all ſwell, and the temporal arteries have ſo ſtrong a pulſation, that they ſeem to beat very forcibly; the eyes ſparkle and look wild and fierce; the talk is all wild and raving; and at certain times the patient has uſually violent fits of ſtruggling to get out of bed; the extremities are cold, and the urine thin, white, and pellucid. When the brain itſelf is inflamed, the pulſe is always ſoft and low; but when the inflammation only affects the integuments of the brain, viz. the dura and pia mater, it is hard. Though the tongue is often black and dry, yet the patient ſeldom complains of thirſt, and even refuſes drink. A conſtant trembling and ſtarting of the tendons is an unfavourable ſymptom; as are alſo a ſuppreſſion of urine, a total want of ſleep, a conſtant ſpitting, and a grinding of the teeth. The favourable ſymptoms are, a free perſpiration or ſweating, a copious diſcharge of blood from the noſe, the bleeding piles, and a plentiful diſcharge of urine, which lets fall a copious ſediment. Sometimes the diſeaſe is carried off by a looſeneſs, and in women by an exceſſive flow of the menſes.

The perſons moſt ſubject to a *phrenitis* are thoſe of a ſanguineous and plethoric habit, and much given to anger; ſuch as are addicted to a hot diet, and the uſe of ſtrong liquors; ſuch as are many hours together expoſed to the ſun in hot weather in their daily occupations; and ſuch as have been ſubject to violent head achs, or have had habitual hæmorrhages at the noſe ſtopped upon them, or have had the blood uſually diſcharged by the hæmorrhoids thrown up into the head; and women who have had the menſes ſtopped upon them, and the blood in the ſame manner thrown up into the head. Theſe perſons are from ſuch circumſtances and accidents, ſubject to the *phrenitis* as an idiopathic diſtemper, dependent on no other. But, beſides theſe, others are alſo very ſubject to it as a ſymptom in other diſeaſes. People in acute fevers are very often thrown into it by an incomplete critical congeſtion of blood about the head; and this principally happens to ſuch as have been treated by apothecaries in an improper and injudicious manner. From the ſudden checking of ſweats, many alſo have been thrown into it, and ſome from improper bleedings, and more than all theſe by a too hot regimen.

An inflammation of the brain is ſometimes the conſequence of hard ſtudy, anxiety, or grief; of repellents improperly uſed in an eryſipelas, and of external injuries in the head.

Method of cure. In the cure, two things are chiefly to be attended to, viz to leſſen the quantity of blood in the brain, and to retard the circulation towards the head. A clyſter is one of the firſt things to be preſcribed in this caſe; or, if this cannot be given, from the violence of the patient, the bowels muſt be gently relaxed by large draughts of warm emollient liquors, with a ſmall addition of nitre; after this bleeding is to be ordered, where, the pulſe and condition of the patient ſhew it to be neceſſary, and gentle alexipharmics are then to be given in repeated ſmall doſes, ſuch as the mixtura ſimplex highly camphorated, and the like; and, in the intermediate times, the violent emotions of the blood are to be quieted by the uſe of powders of nitre, tartar of vitriol, crabs eyes, and a ſmall portion of cinnabar; theſe are to be given with cooling emulſions; a placid regimen muſt be obſerved, and the patient kept in a gentle perſpiration; and external applications are ſometimes of great ſervice: ſuch are ſpirit of wine and camphor, rubbed on the forehead and temples, and frictions, cataplaſms of various kinds, and bliſters laid to the ſoles of the feet.

Others in this caſe apply epithems to the forehead, either of the abſolutely repellent kind, ſuch as vinegar of roſes, or of lavender; theſe are moſt proper in the beginning; and, if theſe do not ſucceed, the reſolvents are left afterwards to be tried; ſuch are ſpirit of wine and camphor, and ſpirit or tincture of ſaffron; bags of camphor and nitre in powder may alſo be applied; and if theſe fail, it is proper to put on leeches to the temples and behind

hind the ears; bleeding in the jugular vein is another method; and bliſters are to be applied to the legs and arms, and ſinapiſms to the feet, compoſed of yeaſt and ſtrong vinegar, with muſtard-ſeed, nitre, and other ingredients of that kind; and, finally, when all theſe fail, an irritation of the noſtrils to promote an hæmorrhage, and bleeding in the noſe, as practiſed in Egypt, and ſome other countries, is proper. A diſcharge of blood from the hæmorrhidal veins is likewiſe of great ſervice, and ought by all means to be promoted; natural or artificial evacuations ſhould be reſtored, if they have been ſtopped, or others ſubſtituted in their ſtead; and if the diſeaſe proves obſtinate, a bliſtering plaſter ſhould be applied to the whole head.

With regard to regimen, the patient ſhould be kept quiet, and amuſed and ſoothed as much as poſſible. His aliment ought to be light, conſiſting chiefly of farinaceous ſubſtances; and his drink ſmall, diluting, and cooling. Junker, Heiſter, and Buchan.

Dr. Freind has recommended bleeding at the jugular veins, in a *phrenitis* coming upon a fever; but Dr. Langriſh endeavours to prove the bleeding in this caſe to be rather hurtful; and he thinks the caſes quoted by Dr. Freind to prove his opinion, either do it not, or may be turned againſt him. See Med. Eſſ. abridg. vol. ii. p. 457.

PHRICODES, a term uſed by the ancients for a kind of fever, which is attended with a coldneſs and ſhivering, not only at the beginning of the fit, but at different intervals throughout its whole continuance. The ſemitertian fever is of this kind. The uſual ſymptoms of theſe fevers are a remarkable lowneſs of the pulſe, which is ſcarce to be felt, but recedes as it were from the finger; the belly is tumefied, and a rumbling noiſe is heard in it, and the tongue is very humid, and irrigated with a ſharp acid humour, as with the ſaliva.

PHRONTIS, a word uſed by Hippocrates as the name of a peculiar diſorder of the general nature of the melancholy affections. In this caſe the patient, he ſays, feels, as it were, a thorn pricking the abdominal viſcera; he is extremely reſtleſs and uneaſy, and always avoids light and company. He dreads being touched, and becomes timorous and afraid of every thing; he is moleſted with troubleſome dreams, and imagines that he frequently ſees ſpectres and frightful objects.

PHRYCTE, a word uſed by the ancient phyſicians as a name for common reſin.

PHRYGANEA, in *Natural Hiſtory*, a genus of the *neuroptera* order of INSECTS; the characters of which are, that the mouth is without teeth, the palpi are four, the ſtemmata three, the antennæ are longer than the thorax, and the wings are incumbent, the inferior being folded. Linnæus enumerates twenty-four different ſpecies. See CADE-*worm*.

PHRYGANICUS, in *Botany*, a term uſed by Dioſcorides, and many other of the ancient Greeks, to expreſs ſuch herbaceous plants as have hard and woody ſtalks; ſuch are the garden-thyme, and ſeveral others of that kind. They alſo called theſe plants *xylodes*, ξυλωδες, and ξυλωιδεα ϖοα.

PHRYGIAN *mode*, in *Muſic*. See MODE, and DIAPASON.

PHRYGIAN *ſtone*, *Phrygius lapis*, in *Natural Hiſtory*, the name of a ſtone deſcribed by the ancients, and uſed in their time in dying; probably from ſome vitriolic or aluminous ſalt contained in it, which ſerved to enliven or fix the colours uſed by the dyers.

It was a light ſpungy maſs, reſembling a pumice, and the whiteſt and lighteſt were eſteemed the beſt. Pliny gives us an account of their preparing it for uſe for dying, which was by moiſtening it with urine, and then heating it red-hot, and ſuffering it to cool again: this calcination was repeated three times, and the ſtone was then fit for uſe; and Dioſcorides recommends it in medicine after burning; he ſays it was drying and aſtringent.

PHRYGIANS, PHRYGES, or PHRYGASTES, as St. Epiphanius calls them, in *Church Hiſtory*, were a branch of the MONTANISTS; ſo called from *Phrygia*, a country where they abounded.

They eſteemed Montanus their prophet; and looked on Maximilla and Priſcilla as great propheteſſes.

This ſpirit of prophecy, or rather enthuſiaſm, was their diſtinguiſhing character. See CATAPHRYGIANS.

PHRYMA, in *Botany*, a genus of the *didynamia gymnoſpermia* claſs; the characters of which are, that it has only one ſeed. There is one ſpecies.

PHTHIRIASIS, φθειριασις, formed from φθειρ, *louſe*, in *Medicine*, the morbus pedicularis, or louſy diſeaſe, wherewith children, and even ſometimes adults, are afflicted.

Its cauſe is in the ſeeds or ova of that vermin laid in the cuticle, which here, happening to prove a proper nidus, cheriſhes and foſters the ſeed ſo as to hatch it.

The linen cloths, uſed by goldſmiths to wipe their veſſels with after gilding, are excellent againſt the *phthiriaſis* on account of the mercury they contain: they are to be applied by rubbing the child's head.

A good diet and cleanlineſs conduce much to the deſtruction of lice. When they are in the head, let it be combed every day, and, after combing, waſhed with the following lotion; viz. ℞ Staph. agr. vel. coc. Ind. contuſ. ℥ i. aq. font. ℔ i ß. & colaturæ adde ciner. clavel. ℥ ß; or, inſtead of this decoction, ſprinkle the pulv. ſem. ſtaph. agr. vel. coccul. Ind. among the hairs every night, and confine it with a night-cap. The body-lice are deſtroyed by any bitter, ſour, ſalt, or mercurial medicine, applied to the ſkin. The black ſoap, and the flowers called cardamine, or lady's ſmock, are ſaid to be ſpecifics in all caſes of lice on the human body.

PHTHIRION, in *Botany*, a name uſed by ſome authors for the *pedicularis*, or *red rattle*. See LOUSE-*wort*.

PHTHISIS, φθισις, in its general ſenſe, denotes any kind of conſumption of the body, in what part ſoever it be ſeated, or from what cauſe ſoever it ariſe.

Thus we have a nervous *phthiſis*, and renal *phthiſis*, dorſal *phthiſis*, pulmonary *phthiſis*, &c.

PHTHISIS, in its proper ſenſe, is reſtrained to a pulmonary conſumption, or a conſumption ariſing from an ulcer, or other diſorder of the lungs, accompanied with a ſlow hectic fever, which waſtes, extenuates, and conſumes the muſcular fleſh.

This diſeaſe is properly an ulcerous diſpoſition of the lungs, taking its origin from a ſtaſis of blood in that viſcus, which in time degenerates into matter, and which is attended with a very remarkable waſting of the fleſh, and loſs of ſtrength. A *phthiſis* in different perſons, and at different times, differs in degree; in ſome caſes it is only a tendency to ulceration in the lungs, but in others it is an actual ulceration in that part.

In the firſt of theſe caſes, where there is only a tendency to an ulceration, the lungs are only ſtuffed up with a quantity of tenaceous and viſcid matter, or of a mucous fluid, with a mixture of blood. This matter by degrees, becomes more and more hard and tough, by the diſſipation of its more fluid parts; and hence gives a ſcirrhous hardneſs to that part of the lungs where it is contained, but it is not eaſily changed into abſolute matter. In this caſe the patient may live many years, and often there is no ſuſpicion of his being in a *phthiſis*.

In the ſecond caſe, or an actual exulceration of the lungs the diſeaſe cannot long remain unknown, but the hectic fever, which is its conſtant attendant, readily diſcovers it; and the waſting of fleſh, and ſpitting of matter ſoon bring the patient to his end, if ſpeedy and efficacious remedies are not applied.

Many are very anxious about the diſtinguiſhing a true *phthiſis* from an abdominal hectic; but this is a diſtinction of very little uſe in practice, ſince both caſes require the ſame regimen: the gently reſolvent and diſcutient medicines, and balſamics, which have nothing acid in them, are the proper method in a *phthiſis*, and are equally neceſſary in this hectic. The principal differences, however, between them, are theſe: the abdominal hectic always is attended with a fever, whereas the *phthiſis* is often free from a fever, or at leaſt is not attended with one of any conſequence. If, in a ſtrong inſpiration, on drawing as much breath as may be into the lungs, the cough is always brought on, and there is a pain and ſtraitneſs in the breaſt, that alſo declares the ſeat of the diſorder to be in the lungs.

Atrophies are alſo much of the ſame nature with a *phthiſis*, differing only in regard to the part they affect, and to the age of the patient. An atrophy is an injury of the glands of the meſentery, pancreas, or liver, and is common to infants; whereas the *phthiſis* is a like diſtemperature of the lungs, and affects perſons nearer the time of their growing to man's eſtate.

A true *phthiſis* is, however, to be carefully diſtinguiſhed from that maraſmus which frequently affects old perſons: this ariſes from many different cauſes, but never from that of a *phthiſis*, or diſtemperature of the lungs. The vomica pulmonum is alſo by ſome confounded with a *phthiſis*, but improperly; for though theſe diſtempers are nearly allied to one another, and often degenerate into each other, yet their origin is different. The *phthiſis* takes its origin from an ulcer, properly ſo called; the vomica is an abſceſs, or impoſthumation. The ulcer in a *phthiſis* affects the humid parts of the lungs, where there is leaſt blood; the vomica, on the contrary, is always ſeated in thoſe parts where there is moſt abundance of blood; ſince it generally happens, that a vomica is a ſhorter diſeaſe in its period, and carries the patient off earlier; the *phthiſis* does it more ſlowly and gradually. When a vomica, indeed, does not carry off the patient at firſt, it uſually degenerates into a true *phthiſis*; and on the other hand, when the matter lodged in the lungs in a true *phthiſis* is ſo acrid as to corode the veſſels, then a vomica pulmonum often comes on in the courſe of that diſeaſe; but theſe are accidental degenerations of one diſeaſe into another; and though the firſt caſe is frequent, the other is more rare.

Phthisis, *ſigns of a.* This diſeaſe, when it begins ſlowly and gradually, has ſcarce any ſigns at all by which it may be known: the utmoſt ſymptom of it in this caſe, is a dry cough, which, though not violent, will not be cured. This cough, by degrees, increaſes, and afflicts the patient always, in ſpite of medicines: in ſome caſes it is moderate, but in others it becomes in a little time very violent. This cough is in ſome attended with a conſiderable ſpitting, in others with very little, and in ſome perſons, both at the beginning and end of the diſtemper, with no ſpitting at all.

It is, however, a vulgar error to ſuppoſe every cough attended with ſpitting to be a conſumption; for very frequently the faults of the firſt concoction will give origin to coughs more violent, and attended with a greater ſpitting than thoſe in a genuine *phthiſis*. Hence, for the proper diſtinguiſhing of a *phthiſis*, many other ſymptoms are neceſſary: theſe are, that the patient be of an age ſuited to this diſeaſe, in general between fifteen and thirty-five: the cough alſo, in a true *phthiſis*, is continual, and always becomes much more violent on being expoſed to the cold, as alſo on drawing the breath very deeply, or taking the effluvia of any acrid ſubſtances; and it is often accompanied with a diſpoſition to vomit after eating; when the matter ſeems fetched up from a great depth, and is ſtreaked with blood, of a ſaltiſh taſte, and of an ill ſmell, and approaching to the nature of matter, this alſo denotes the caſe to be a true *phthiſis*.

This diſeaſe is always attended alſo with a decay of ſtrength, a ſenſation of ſtraitneſs in the breaſt, eſpecially after motion, a more than uſual degree of heat, eſpecially in the palms of the hands, and a fluſhing of the face after eating, a want of appetite, or a deſire for nothing but cold foods and drinks. The ſleep in this caſe alſo rather tires and weakens than refreſhes the patient, and the mouth is dry, the ſaliva glutinous, and the temper uſually peeviſh, and affected ſtrongly at trifles; the body alſo becomes extremely ſenſible of all changes of the weather. The patient is apt to be ſad, his appetite is bad, and his thirſt great; the pulſe is generally quick, ſoft, and ſmall; though ſometimes pretty full, and rather hard. If theſe ſymptoms happen in a caſe where there is either an hereditary diſpoſition to a *phthiſis*, or where there has been any prior injury done to the lungs, there is no room to doubt but that the caſe is a true conſumption or *phthſiis*.

Theſe prior injuries of the lungs may be either from preceding diſeaſes, ſuch as a ſpitting of blood, a peripneumony, or the like; or from external contuſions or wounds of the breaſt; or, finally, from frequently being among the vapours of corroſive medicines; and when theſe are attended with hectic, or loſs of fleſh in the whole body, and particularly in the face, there is not the leaſt room to doubt but that the caſe is a dangerous *phthiſis*. The ſpitting of purulent matter is one of the moſt certain ſigns of a perfect *phthiſis*, but it is not an univerſal one; for there are ſome caſes in which the bronchia and membraneous portions of the lungs only are affected, in which a *phthiſis* may arrive at its greateſt degree without any ſuch ſpitting. It is alſo to be obſerved, that the common thick, yellowiſh, or greeniſh matter, which is frequently voided in large quantities in ſimple coughs, is not to be confounded with the purulent matter voided in a continued *phthiſis*.

The urine of people in this diſeaſe is uſually very like that of perſons in health, except that it retains its froth longer: this, however, is no certain ſymptom of the diſeaſe; for it frequently happens in caſes of ſimple colds, in people of phlegmatic habits.

If a vomica pulmonum comes on from a *phthiſis*, the fever, which before was a ſlow one, aſſumes the appearance of an acute one; and the pain that attends the cough becomes more violent, and reſpiration more difficult; finally, colliquative ſweats, and diarrhœas, and an exceſſive diſcharge of urine, are very fatal ſymptoms uſually appearing towards the laſt ſtages.

Phthisis, *perſons ſubject to a.* Theſe are principally young people of a plethoric habit, accuſtomed to perfect health, and of florid conſtitutions, particularly ſuch as live idle lives. Thoſe who labour hard, or are of a ſcorbuteic or phlegmatic habit, are more than all others free from this diſeaſe. Perſons who are ſubject to hæmorrhages of any kind, or to violent pains in the head, and thoſe who find their breath very ſhort after a little exerciſe, and partcularly ſuch as have had at any time ſpittings of blood, are moſt ſubject to this diſtemper; as thoſe on the contrary, who are ſubject to catarrhal defluxions, to ſimple coughs, or to diarrhœas, or cutaneous eruptions, or external ulcers, are uſually free from it. Women in general are much more expoſed to *phthiſes* than men; and that for this plain reaſon: the ſuppreſſion of any habitual hæmorrhage endangers the patient as to this diſeaſe; and women are well known to be more ſubject to evacuations of blood than men; and alſo to the ſuppreſſions of thoſe evacuations.

Old people are very ſeldom found to have *phthiſes*, unleſs they ariſe from violent external injuries; and very young perſons are as ſeldom liable to them, unleſs from ſuppreſſions of large and habitual hæmorrhages by the noſe.

Phthisis, *cauſes of a.* The remote cauſe of this diſeaſe is a plethoric habit; the proximate cauſe is a congeſtion of florid, rarely of ſerous blood, in the breaſt. The occaſional, or accidental cauſes, are either external injuries from blows, falls, or bruiſes on the breaſt, a violent cough in the autumn, at which ſeaſon the air is peculiarly bad for all perſons inclined to a *phthiſis*; confined or unwholeſome air, violent paſſions, great evacuations, the abuſe of ſpirituous liquors, the immoderate uſe of venery, the receiving the fumes of corroſive medicines, and, finally, the improper cure of other diſeaſes, particularly the ſuppreſſing of fevers and hæmorrhages by aſtringents, without any previous cautions. An hereditary diſpoſition is alſo frequently in fault; the cough which attends this diſeaſe is only an effort of nature to break through the congeſtion in the firſt ſtages, and, in the latter, to throw up the matter occaſioned by it; to which we may add, that particular occupations contribute to this diſeaſe.

Sydenham obſerves, that the hectical *phthiſis* uſually has its origin in the winter's cold; from a ſharp humour trickling down upon the lungs, where, like a catarrh, it irritates them ſo as to raiſe a cough.

This, by degrees, brings on other ſymptoms; as a ſpitting, firſt, of a viſcid pituita, then a heavy fetid pus, then of pure blood, and ſometimes of the very ſubſtance of the lungs, rotted by a long exulceration; with night-ſweats, falling off of the hair, and finally a colliquative flux, which is ſoon followed by death. The ſame author adds, that the *phthiſis* kills two thirds of thoſe who die of chronic diſeaſes.

Dr. Arbuthnot obſerves, that in his time conſumptions made up above one tenth part of the bills of mortality in and about London; and it is well known, that this ſpecies of diſeaſe prevails more in England than in any other part of the world; owing, perhaps, to the great uſe of animal food, and ſtrong liquors, the general application to ſedentary employments, and the great quantity of pit-coal which is burnt here; to which may be added the perpetual changes in the atmoſphere, or the variableneſs of the weather.

In the laſt ſtage of the *phthiſis*, the feet and legs ſwell, the noſe appears ſharp, the eyes hollow, the temples fallen, the ears cold and contracted, the ſkin about the forehead hard and dry, and the complexion greeniſh or livid, &c. This appearance is called the FACIES *Hippocratica*. See CONSUMPTION.

Among the cauſes of this diſeaſe may be reckoned intemperance, as it brings on a plethora or cacochymia, and alſo peripneumonies, aſthmas, pleuriſies, &c. Morton adds, that the *phthiſis* frequently ariſes from an ill conformation of the breaſt; which is either natural, as when the breaſt is too narrow, the neck too long, &c. or accidental, where there happens a curvity or diſtortion of the breaſt. And he reckons, among the ſpecies of *phthiſis* thoſe proceeding from the diarrhœa, dyſentery, gonorrhœa, hæmorrhage, and dropſy, and from many other diſeaſes; and perhaps there are many other remote cauſes which can produce a conſumption, without varying the common immediate cauſe of the diſeaſe, or the method of cure.

Prognoſtics in it. A true *phthiſis*, even in its beginning, is a dangerous diſeaſe, and admits but of a very dubious prognoſtic; but when in an advanced ſtate, it is always fatal. The reaſon of this is evident, becauſe there are in this caſe real ulcers in the lungs, and we well know that no ulcer can be cured till it is firſt perfectly cleanſed, and that is not eaſy in an internal part; and, after this, the healing up of a wound in the lungs is ſcarce to be expected, as thoſe parts are continually diſturbed by the very drawing in and voiding the breath, and greatly more ſo by the cough. There have been, however, inſtances of cures in the beginning of the *phthiſis*, in which there have been evident proofs of a reſtitution and cicatrization of the parts.

People of a dry habit are much ſooner carried off by it than thoſe of a moiſt one; as are alſo thoſe of a briſk diſpoſition than thoſe of a more languid temper; and, finally, younger perſons uſually die ſooner in it than thoſe who are more advanced in years. Women, as they are more ſubject to a *phthiſic* than men, ſo they are more eaſily cured. This diſtemper is often brought upon them merely from a ſuppreſſion of the menſes, and in that caſe it is often cured only by regularly bringing them again to their proper periods. The hectic fever in theſe caſes is what haſtens the death of the patient; ſo that the leſs of that fever the patient has, the longer he lives under it.

When the ſpitting of true purulent matter is come on, and is attended with colliquative ſweats and a diarrhœa, there is no farther hope for the patient; and, in general, what is reported of the curing of conſumptions, is founded on errors, and other caſes have been miſtaken for it. A catarrhal cough become habitual, and attended with a voiding of a thick, pulpy, greeniſh matter, is often miſtaken for a conſumption: as is alſo a ſlow fever, attended with copious ſweats, and an extenuation of the body; or a recent hectic, ariſing from a continued ſlow fever: or a merely aſthmatic diſorder of the breaſt; or, finally, an hæmoptyſis has been miſtaken for a *phthiſis*. In all the caſes ſaid to have been *phthiſes*, and perfectly cured, either one of theſe has been the caſe, or the mere ſtrength of nature, aſſiſted by happy circumſtances in the conſtitution, not to be expected from one perſon in a thouſand, have carried the patient through it.

Method of cure. The general method in a genuine *phthiſis*, is to reſpect firſt the reſolving, abſterging, and diſcuſſing the ulcerous matter in the lungs; and after this to attempt the cleanſing and healing of the ulcers; afterwards to reſtore the ſtrength by analeptics, and to give the weakened parts their due tone again; and during this, the ſeveral ſymptoms, ſuch as the cough, fever, &c. are to be palliated as much as may be.

To this end, in the beginning of the courſe, gentle laxatives are by all means to be given; ſuch as ſmall doſes of rhubarb, with manna, tamarinds, and the like; and in ſubjects abounding with bad humours, jalap, ſena, and, in ſome caſes, even mercurius dulcis, are found neceſſary; but this laſt medicine is only to be given with the utmoſt caution, for fear of a ſalivation. After a few doſes of the laxatives, the reſolvent, abſtergent, and diſcutient medicines, are to be given for ſeveral weeks together; ſuch are decoctions of pimpernel, elecampane, florentine, iris, birth-wort, and freſh arum-root, with maidenhair, horehound, hyſſop, and daiſy-leaves; the gum reſins are alſo to be given in ſmall doſes; ſuch as ammoniacum, ſagapenum, and the like, and mixtures of crabs eyes ſaturated with lemon juice, with vitriolated tartar diſſolved in the pectoral waters, are to be given every day three or four times; a little nitre, cautiouſly given in the intermediate times, will alſo be of great uſe in abating or taking off the fever.

The cough, in the firſt ſtage of a *phthiſis*, may ſometimes be appeaſed by bleeding, and the expectoration may be promoted by the following medicines. Take freſh ſquills, gum ammoniac, and powdered cardamom-ſeeds, of each a quarter of an ounce; beat them together in a mortar; and if the maſs proves too hard for pills, it may be ſoftened with any ſyrup. This may be formed into pills of a moderate ſize, and four or five of them taken twice or thrice a day. The lac ammoniacum is likewiſe a proper medicine in this ſtage of the diſeaſe. A mixture made of equal parts of lemon juice, fine honey, and ſyrup of poppies, may be uſed, by ſimmering four ounces of each of theſe over a gentle fire, and taking a table-ſpoonful of it, when the cough is troubleſome. Oily and balſamic medicines, though often recommended, are generally more injurious than beneficial. See BALSAMS, and Lond. Med. Obſ. vol iv. p. 231, and p. 289.

Acids ſeem to be peculiarly uſeful as well as grateful in this diſeaſe: and eſpecially thoſe of the vegetable kind, as apples, oranges, lemons, &c. The patient's drink may be infuſions of the bitter plants, as ground-ivy, the leſſer centaury, camomile flowers, or water-trefoil. But if he ſpits blood, he ought to uſe, for his ordinary drink, infuſions or decoctions of the vulnerary roots, plants, &c. and recourſe may be had to the uſe of nitre. See HÆMOPTYSIS.

We may obſerve in general, on the authority of Dr. Fothergill, that in the beginning of the diſeaſe, the moſt demulcent and cooling medicines are indicated; and when the ſymptoms of inflammation are abated, gentle anodynes will be uſeful. The common emulſion, made with good freſh ſweet almonds, is a very proper vehicle for the ſeveral remedies indicated in this complaint; or an excellent emulſion may be prepared with freſh white poppy-ſeeds, in the proportion of half an ounce to a pint of Briſtol or pure water. With regard to regimen, when a cough begins, to which every prudent and medical attention cannot be directed too ſoon, if the patient is very young, the quantity of diet, eſpecially of ſolid, muſt be leſſened, and the deficiency made up with warm ſuppings. Barley-water, milk and water, thin gruel, and the lighteſt broths, ſhould be uſed. The patient ſhould keep chiefly to the uſe of vegetables and milk. Aſſes milk ought to make a conſiderable part of his food; this ſhould be drank in its natural warmth, and by a grown perſon, in the quantity of half a pint, four times, or at leaſt thrice, in a day: and if it ſhould happen to purge, it may be mixed with old conſerve of roſes, or powder of crabs claws. Women's milk has been recommended in preference to any other. Butter-milk has alſo been of ſervice; and cow's milk, with the addition of an equal quantity of barley-water, or a table-ſpoonful of rum or brandy to half a pint, is proper, and may prove beneficial. Rice and milk, or barley and milk boiled, with a little ſugar, is very ſuitable too; ripe fruits roaſted, baked, or boiled, are likewiſe proper: the jellies, conſerves, and preſerves, &c. of ripe, ſubacid fruits, ought to be eat plentifully, as the jelly of currants, conſerve of roſes, preſerved plums, cherries, &c. Such a courſe of diet, with wholeſome air, and proper exerciſe, particularly on horſeback, or a ſea-voyage, is the moſt to be depended upon in an incipient conſumption. In the farther progreſs of this diſtemper, ſhould the courſe above recommended fail, medicines of a different claſs are found of advantage; ſuch as the bark, elixir of vitriol, Briſtol, and other waters, and a total abſtinence from animal food. When the ſpitting up of groſs matter, oppreſſion of the breaſt, and the hectic ſymptoms indicate an impoſthume formed in the lungs, an ounce of the Peruvian bark in powder may be divided into eighteen or twenty doſes, and one of them taken every three hours in the courſe of the day. If the bark ſhould purge, it may be made into an electary with the concerve of roſes. Thoſe who cannot take it in ſubſtance may infuſe it in cold water in the proportion of half an ounce of the powder to half a pint of water, and a common tea-cup full may be taken three or four times a day. The bark, however, ſhould not be uſed as long as there are any ſymptoms of an inflammation of the breaſt. After this, the healing the ulcerated parts is to be attempted by the more temperate balſamics; ſuch as boiled turpentine, maſtic, olibanum, balſam of Peru and Capivi, and Lucatellus's balſam; with theſe there always muſt be joined ſuch things as will nouriſh and give ſtrength; ſuch are emulſions made rich with ſweet almonds, with jellies, and conſerve of roſes.

If the violence of the diſorder is found to remit on this method, it will be proper to give a mixture of ſpirit of ſal ammoniac, with tincture of ſalt of tartar, in doſes of about twenty drops, three times a day: this is greatly ſerviceable in reſtoring the parts to their due tone; and if the cough ſtill continues violent, it will be proper to give ſmall doſes of the ſtorax-pill at night. If the diſeaſe is finally taken off by this method, it will be proper afterwards, by way of prevention, to bleed frequently in the foot every ſpring and autumn: to recall, by all poſſible means, any habitual diſcharges of blood that had been ſtopped or ſuppreſſed: and, particularly in men, to promote a diſcharge by the hæmorrhoidal veins, by applying leeches to the part: the patient is not to be loaded with medicines in this caſe, but it will be ſufficient always to keep the bowels moderately open, and to uſe moderate but not violent exerciſe, with diets that are ſoft and eaſy of digeſton.

M. de Sault endeavours to prove, that a conſumption of the lungs always depends on tubercles, and that an ulcer there is only an effect of theſe tubercles; and when the diſeaſe is in its laſt ſtadium, and incurable, it then only becomes contagious, by ſmall worms, which it communicates to others. The cure which he propoſes for the conſumption, before it comes to the laſt ſtage, is to reſolve the tubercles with mercury, ſteel, millepedes, and the aperient and antiſcorbutic plants. He remarks, that the liver is generally hard in this diſeaſe; and therefore he applies a warm mercurial plaſter to the right hypochondriac region, rubbing ſome mercurial ointment every night on the ſkin of that part; then continues in the uſe of tablets made with ſteel, millepedes, benzoin, coral and crabs eyes, of each half an ounce; cinnamon, three drachms; ſugar, half a pound; mix all with the mucilage of gum tragacanth, made with orange-flower water. The doſe of theſe tablets is two drachms, morning and evening, waſhing it down with a ptiſan made of the roots of nettles, two ounces of the juice of water-creſſes, and as much juice of chervil. Med. Eſſ. Edinb. He ſays, this method, with riding, has often been ſucceſsful.

Dr. Cheyne thinks that a total milk and ſeed diet, with frequent phlebotomies, vomits, bark in the morning, and rhubarb at night, will totally cure conſumptions.

This diſtemper, according to ſome, is principally to be cured by frequent bleedings in ſmall quantities. Med. Eſſ. Edinb.

Sydenham orders the defluxion on the lungs, in the firſt ſtage, to be abated by blood-letting, &c. and pectorals to be uſed, accommodated to the various ſtates of the diſeaſe, viz. incraſſants, attenuants to aſſuage the hectic, &c. with emulſions, aſſes milk, &c. and balſamics to cure the ulcer. But the chief aſſiſtance in this diſeaſe is to be expected from riding conſtantly on horſeback: he ſays, the patient need not confine himſelf to any laws of diet, &c. This alone, he adds, if uſed in time, is almoſt as ſure a cure for a *phthiſis*, as the cortex is for an intermitting fever.

Dr. Baynard recommends butter-milk as an admirable ſuccedaneum to aſſes milk. Silvius ſays, he knows of no medicine, either internal or external, ſo good againſt freſh ulcers of the lungs, as balſam of ſulphur, eſpecially when prepared with oil of aniſe.

Etmuller obſerves, that the cough of *phthiſical*, people is at firſt, only ſtomachical; but that at length it becomes pulmonary. He adds, that vomitaries are good in a beginning *phthiſis*, and that purgatives, by all means, are to be avoided; and commends the uſe of medicines made of tobacco, not only as they promote expectoration, but as they are vulnerary.

It is a common obſervation, that in thoſe countries where they burn turf, people are rarely affected with the *phthiſis*; which Willis aſcribes to the ſulphur abounding therein, and recommends tincture of ſulphur as the beſt remedy he knows of in any cough without a fever; adding, that a ſuffumigation, or ſmother, of ſulphur and arſenic has alſo frequently proved a cure in the moſt deſperate *phthiſis*.

Bonetus holds the *phthiſis* to be contagious; and that there are frequently inſtances of its being communicated by cloaths, linen, beds, &c.

Pitcairn recommends mercurius dulcis in the beginning of a *phthiſis*. And Berbrette and Colbatch aſſert, that, contrary to the opinion of moſt authors, they have frequently uſed acids, with great ſucceſs, in the *phthiſis*. See ULCER *in the lungs*.

PHU, in *Botany*, a name by which ſome authors call the great garden-valerian.

PHYCIS, in *Itchthyology*, the name of a fiſh of the truttaceous kind, more uſually called CALLARIAS or *aſſellus callarius*, and *tinca marina*, or ſea-tench.

PHYCIS, in *Ichthyology*, is alſo a name given by Artedi, after Ariſtotle, Pliny, and the reſt of the ancients, to a fiſh nearly allied to the genus of the *blenni*, and called by ſome *trebius* and *fuca*; and, according to Rondeletius, the TINCA *marina* of the Italians. Salvian, however, denies that it is the *tinca marina*, and the matter is yet undecided among the writers on this ſubject.

PHYCITES, in *Natural Hiſtory*, the name given by the ancients to a ſtone which had the impreſſion of a ſea-plant of the fucus or alga kind; probably in the manner in which our black coal ſlate is frequently found to contain the impreſſions of fern and other vegetables.

PHYGETHLON, Φυγεθλον derived from φυω, *I breed*, or *engender*, in *Medicine*, is defined by Celſus, a hard flat tumor, ſomewhat reſembling a puſtule; occaſioning an intenſe pain, and ſometimes a fever.

The *phygethlon* only differs from the PHYMA, in that it does not riſe ſo high; it ripens very ſlowly, and produces but little pus.

The Latins call it *panis*, or *panus*, and ſometimes *panicula*. Gorræus defines the *phygethlon* a phlegmon, ariſing on the glandulous parts, eſpecially about the neck, armpits, and inguen; in which laſt place it is called a *bubo*. The *phygethlon* has the ſame cauſes, and the ſame ſymptoms, with the common BUBO. It frequently ariſes after fevers, and pains of the belly; and is cured like other inflammatory tumors.

PHYLACISTÆ, among the *Ancients*, officers to whoſe keeping the ſlaves in priſons and work-houſes were committed.

PHYLACTERY, φυλακτηριον, in *Church Hiſtory*, a ſlip of parchment, wherein was written ſome text of holy Scripture, particularly of the Decalogue; which the more devout people among the Jews incloſed in leather caſes, and bound with thongs on the forehead, and on the left arm. See FRONTAL.

They derived their name from φυλαττω, *I keep*, either becauſe they were ſuppoſed to preſerve the law in memory, or rather, becauſe they were looked upon as a kind of amulets or charms to keep them from danger. They were called חפלין *tephillin* by the Jews.

PHYLACTERY, in the general, was the name given by the ancients to all kinds of charms, ſpells, or characters, which they wore about them, as amulets, to preſerve them from dangers or diſeaſes.

The primitive Chriſtians alſo gave the name *phylacteries* to the caſes wherein they incloſed the relics of their dead.

PHYLARCHUS, φυλαρχος, among the Athenians. The *phylarchi* were magiſtrates who had each of them the government of a tribe committed to his charge; and their buſineſs was to take care of the public treaſures belonging to each tribe, to manage all their concerns, and call them together as oft as any thing happened that required the preſence of the whole body.

PHYLATERIA, a name given by ſome botanical authors to the *polium*, or poly-mountain.

PHYLICA, *baſtard alaternus*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the perianthium is turbinated, and divided into five ſegments; it has no petals; the five ſtamina are defended by ſcales, and the fruit is a three-berried capſule. There are five ſpecies.

PHYLLANTHUS, in *Botany*, See *Sea-ſide* LAUREL.

PHYLLIS, *ſimpla nobla*, *baſtard hare's ear*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: the empalement of the flower is compoſed of two leaves ſitting on the germen; the flower has five obtuſe ſpear-ſhaped petals, which turn backward; it has five ſhort hair-like ſtamina, terminated by oblong ſummits; the germen, which is ſituated under the flower, has no ſtyle, but is crowned by two awl-ſhaped, reflexed, hairy ſtigmas, and turns to an oblong angular fruit, containing two parallel ſeeds, convex on their outſide, plain on the other, and broad at the top. We know but one ſpecies, which is a native of the Canary iſlands.

PHYLLITIS, in *Botany*. See HART'*s tongue*.

PHYLLITIS *marina*, in *Natural Hiſtory*. See HART'*s tongue*.

PHYLLOBOLIA, φυλλοϐολια, in *Antiquity*, a cuſtom that prevailed among the ancients to ſtrew flowers and leaves on the tombs of the dead. The Romans adopted this cuſtom from the Greeks, and added likewiſe wool. See BURIAL.

The *phyllobolia* was alſo uſed on occaſion of a victory obtained at any of the public games; when not only the victors, but likewiſe their parents, were ſtrewed with flowers and leaves.

PHYLOBASILES, φυλοϐασιλεις, among the Athenians, magiſtrates, who, with reſpect to particular tribes, had the ſame office that the *baſileus* had with reſpect to the commonwealth.

They were choſen out of the eupatridæ or nobility, had the care of public ſacrifices, and other divine worſhip peculiar to their reſpective tribes, and kept their court in the portico called *baſileion*, and ſometimes in the *bucoleian*.

PHYMA, φυμα, in *Medicine*, a roundiſh-pointed tumor, ariſing in the glandular parts, eſpecially under the lower jaw.

The *phyma* is ſmaller and ſmoother, leſs red and painful, than the PHYGETHLON.

It is eaſily cured in children, but more difficultly in adults; but in thoſe it is more rare. It is remedied by aſſiſting nature in the work of maturation, as, by a ſuppurating cataplaſm, &c. It is ſuppoſed to have its riſe from pituitous blood; and is moſt common in young children, where it frequently alſo ariſes from too tight bandages.

Gorræus obſerves, that ſome make *phyma* a general name for all tumors, or apoſthumes, that maturate and ſuppurate readily, of what kind ſoever, or in whatſoever glandulous part they ariſe.

PHYRAMA, in the *Materia Medica*, a name given by ſome of the old writers to the gnm ammoniacum, particularly to that part of it which was ſoft and ductile between the fingers. It is not clear that the gum ammoniacum of thoſe times was the ſame thing which we now know by that name; at leaſt it is certain, that the other kind of it, which they called *thrauma*, or *ammoniacum thrauſtum*, was not; for Diſcorides deſcribes this as being of a reddiſh-brown colour, and very friable; and Avicenna ſays, that it marked a fine yellow or gold colour upon paper. Theſe are properties by no means agreeing with our gum ammoniacum; and if juſtly applicable tothat, muſt prove that it could not be the ſame; and the characters given by Avicenna of its bitterneſs, and making a yellow ſtain upon paper, ſeem to make it the *gamboge*. This, however, by no means can agree with the other virtues attributed to it.

PHYSALIS, in *Botany*, ſee *Winter* CHERRY.

PHYSALUS, a name given by Rondeletius to a ſpecies of ſea-inſect, of the *ſcolopendra marina* kind, ſuppoſed by ſome to be the ſame with the *ſcolopendra marina*, or *centipes*, of the Iriſh ſea, deſcribed by Molyneux; but this does not appear to be the caſe, on a ſtrict enquiry. The *phyſalus* of Rondeletius has no mouth, whereas the ſea *centipes* of Ireland has a remarkably large one; that of Rondeletius is wider in the middle, and tapers at each end; but the Iriſh kind is largeſt at the head, and tapers from thence all the way to the tail. Rondeletius's has tubercles on the back, but the Iriſh one has only hairy ſtripes, and his is a poiſonous animal, whereas that of Ireland was found in the ſtomach of a cod-fiſh, which had eaten it as food. The figure given by Rondeletius agrees alſo very well with the account he gives, but not with the figure of that drawn upon the ſpot from the Iriſh fiſh, and given in the Philoſophical Tranſactions. On the whole, nothing is more plain than that theſe are two diſtinct ſpecies of animals, though of the ſame genus, Phil. Tranſ. Nº 225. See Scolopendra.

Physalus *balæna*, in *Ichthyology*. See Fin-*fiſh*.

PHYSETER, in *Ichthyology*, the name of a genus of fiſhes of the *plagiuri* kind, in the ſyſtem of Artedi, but of the order of *cete*, and claſs of *mammalia*, in the diſtribution of Linnæus, the characters of which are theſe: the teeth are crooked, and are placed only in the lower jaw; there is one high fin or ſpine on the back, and a fiſtula or hole in the forehead. Artedi reckons two ſpecies of this genus: theſe are, 1. The *phyſeter*, with the upper jaw longer than the under one, and with a long ſpine on the back. The head of this fiſh is ſo large, that it is half as long as the body, and thicker than the thickeſt part of it: the lower part of the upper jaw runs out two feet beyond the under one, and its upper part more than five feet; the eyes are remarkably ſmall, ſcarce larger than thoſe of a haddock; the fiſtula or pipe is placed a little above the centre of the head; it is divided into two channels, and covered with one common operculum; the teeth are in number forty-four, and all of the ſhape of a reaper's ſickle, roundiſh, and a little flatted, thickeſt and moſt arched in the middle, and at the end terminating in a cone very ſharp-pointed; the baſe is thinner than the middle of the tooth. This is the *phyſeter microps* of Linnæus, which, he ſays, purſues and terrifies the porpoiſes to ſuch a degree as often to drive them on ſhore. It is called the blunt-headed cachalot. 2. The *phyſete*, with a very high back-fin, with the tops of the teeth flat. This is a ſpecies of whale, deſcribed, as well as the former, by Sibbald. The head is very large, the fiſtula, or pipe, is in the middle of the head; the fin ſtands ſo high in the middle of the back, that it has been compared to the mizzen-maſt of a ſhip. This is the *phyſeter turſio* of Linnæas. Beſides theſe, Linnæus enumerates two other ſpecies, viz. the catodon, without a back-fin, and with the ſpout-hole at the extremity of the noſe; and the *phyſeter macrocephalus* or catodon without a back-fin, and the ſpout-hole in the head.

The name *phyſeter* is of Greek origin, and is derived from the verb φυσαω, *to blow*. It has this name from its quality of taking in a great quantity of ſea-water, and then blowing it out again with great force and violence.

PHYSIC, or Physick, φυσικη, the art of healing, properly called *medicine*.

The word is formed from φυσις, *nature*; becauſe medicine conſiſts principally in the obſervation of nature.

For the riſe, progreſs, diviſion, &c. of *Phyſic*, ſee Medicine.

Physic, *hermetical*. See Hermetical.

Physic, *bachelor of*. See Bachelor.

Physic *nut*, in *Botany*, the name of a ſpecies of the jatropha. See Cassada.

PHYSICAL, φυσικος, ſomething belonging to, or really exiſting in, nature.

In this ſenſe, we ſay, a *phyſical* point, in oppoſition to a mathematical one, which laſt only exiſts in the imagination.

Or a *phyſical* ſubſtance, or body, in oppoſition to ſpirit, or metaphyſical ſubſtance, &c.

Physical, or ſenſible horizon. See Horizon.

Physical *agent*, *cauſe*, *certitude*, *concrete*, *continuity*, *evidence*, *fate*, *good*, *liberty*, *neceſſity*, *part*, *perfection*, *poſſible*, *predetermination*, *premotion*, *qualities*, and *quantity*. See the ſeveral ſubſtantives.

PHYSICIAN, a perſon who profeſſes medicine, or the art of healing.

The ancients diſtinguiſhed their *phyſicians* into various claſſes or ſects; as,

Physicians, *rational*, thoſe who proceeded in a certain regular method, founded upon reaſon; deducing conſequences therefrom, to particular caſes.

Physicians, *methodical*. See Methodists.

Physicians, *dogmatical*, thoſe who laid down principles, and reaſoned from thoſe principles, and from experience. See Dogmatici.

Physicians, *empirical*, thoſe who kept wholly to experience, and excluded all uſe of reaſon in medicine. Such were Serapion, Apollonius, Glaucus, &c. See Empiric.

Physicians, *clinical*, were thoſe who viſited their patients in bed, to examine their caſes. They were thus called in oppoſition to the *empirics*, who ſold their medicines in the ſtreets, &c. See Clinic.

The ancients had alſo their aſtrological *phyſicians*, botanical *phyſicians*, anatomical *phyſicians*, chirurgical *phyſicians*, pharmaceutical *phyſicians*, &c. beſide gymnaſtical *phyſicians*, iatraliptæ, or thoſe who applied external unctions, and frictions, &c. coſmetic *phyſicians* for the complexion; ophthalmic *phyſicians* for the eyes; and vulnerary *phyſicians* for wounds, &c.

Among the moderns, the name *phyſician* includes almoſt all theſe ſeveral kinds. Regular *phyſicians* are contradiſtinguiſhed from empirical *phyſicians*, who preſcribe at random; having only ſome one or two remedies which ſerve in all diſeaſes.

Physicians, *Galenical*, are thoſe who preſcribe gentle, natural, and ordinary medicines. See Galenists.

Physicians, *ſpagirical*, or *chemical*, are thoſe who preſcribe violent medicines drawn from minerals, &c. by fire, and by means of chemiſtry.

Physicians, *college of*. See College.

No perſon within the city of London, or ſeven miles thereof, ſhall practiſe as a *phyſician* or ſurgeon, without a licence from the biſhop of London, or dean of St. Paul's; who are to call to their aſſiſtance four doctors of phyſic on examination of the perſons, before it is granted; and in the country, without a licence from the biſhop of the dioceſe, on pain of forfeiting 5*l*. a month. 3 Hen. VIII. cap. 11. By the 14 and 15 Hen. VIII. cap. 5. the king's charter for incorporating the college of *phyſicians* in London is confirmed: they have power to chuſe a preſident, and have perpetual ſucceſſion, a common ſeal, ability to purchaſe lands, &c. Eight of the chiefs of the college are to be called elects, who from among themſelves ſhall chuſe a preſident yearly: and if any ſhall practiſe phyſic in the ſaid city, or within ſeven miles of it, without the licence of the ſaid college, under their ſeal, he ſhall forfeit 5*l*. Alſo perſons practiſing phyſic in other parts of England are to have letters teſtimonial from the preſident, and three elects, unleſs they be graduate phyſicians of Oxford or Cambridge, &c. The ſtat. 32 Hen. VIII. cap. 10. ordains, that four *phyſicians* (called cenſors) ſhall be yearly choſen by the college of *phyſicians*, to ſearch apothecaries wares, and have an oath given them for that purpoſe by the preſident. Apothecaries denying them entrance into their houſes, &c. incur a forfeiture of 5*l*. and the *phyſicians*, refuſing to make the ſaid ſearch, are liable to a penalty of 40*s*. And every member of the college of *phyſicians*, is authoriſed to practiſe ſurgery in London, or elſewhere Perſons having a knowlege and experience in herbs and roots may practiſe and miniſter to outward ſores or ſwellings any herbs or ointments, according to their ſkill, and alſo drinks for the ſtone, ſtrangury, or agues, without licence, or incurring any penalties by the ſtatute 3 Hen. VIII. or on the ſtatute 34 and 35 Hen. VIII. cap. 8.

The four perſons, called cenſors, annually choſen by the preſident and college of *phyſicians*, calling to their aſſiſtance the wardens of the apothecaries company in London, or one of them, are empowered to enter into the houſes, ſhops, or warehouſes of apothecaries, &c. and ſearch and examine medicines; and to burn or deſtroy thoſe that are defective or decayed, or not fit for uſe: but ſubject to appeal to the college of *phyſicians*, &c. 10 Geo. I. cap. 20.

PHYSICO-*mathematics*, includes thoſe branches of *phyſic*, which, uniting obſervation and experiment to mathematical calculation, undertake to explain the phenomena of nature. See *Mixed* Mathematics.

PHYSICS, *phyſica*, φυσικη, derived from φυσις, *nature*, ſometimes alſo called *phyſiology*, and *natural* philosophy, is the doctrine of natural bodies, their phenomena, cauſes, and effects, with the various affections, motions, operations, &c. thereof.

Mr. Locke would likewiſe have God, angels, and ſpirits, come under *phyſics*; but theſe are more uſually referred to metaphysics,

The immediate and proper objects of *phyſics*, are body, space, and motion.

The origin of *phyſics* is referred, by the Greeks, to the Barbarians, viz. the brachmans, magi, and the Hebrew and Egyptian prieſts.

From theſe it was derived to the Greek ſages or ſophi, particularly to Thales, who is ſaid to have firſt profeſſed the ſtudy of nature in Greece.

Hence it deſcended into the Pythagoric, Platonic, and Peripatetic ſchools; whence it was propagated into Italy, and thence through the reſt of Europe: though the druids, bards, &c. had a ſort of ſyſtems of *phyſics* of their own.

Phyſics may be divided, with regard to the manner wherein it has been handled, and the perſons by whom, into

PHYSICS, *ſymbolical*, or ſuch as was couched in ſymbols: ſuch was that of the old Egyptians, Pythagoreans, and Platoniſts, who delivered the properties of natural bodies under arithmetical and geometrical characters, and hieroglyphics.

Peripatetical, or that of the Ariſtotelians, who explained the nature of things by matter, form and privation, elementary and occult qualities, ſympathies, antipathies, attractions, &c. See ARISTOTELIAN and PERIPATETICS.

Experimental, which inquires into the reaſons and natures of things from experiments, ſuch as thoſe in chemiſtry, hydroſtatics, pneumatics, optics, &c. See EXPERIMENTAL *philoſophy*.

And finally, *mechanical*, or *corpuſcular*, which explains the appearances of nature from the matter, motion, ſtructure, and figure of bodies, and their parts: all according to the ſettled laws of nature and mechanics. See MECHANICAL and CORPUSCULAR *philoſophy*.

PHYSIOGNOMICS, a term uſed by ſome phyſicians and naturaliſts, for ſuch ſigns as are taken from the countenance to judge of the ſtate, diſpoſition, &c. of the body and mind.

PHYSIOGNOMY, Φυσιογνωμια, formed from φυσις, *nature*, and γινωσκω, *I know*, the art of knowing the humour, temperament, or diſpoſition of a perſon, from obſervation of the lines of his face, and the characters of its members or features.

Baptiſta Porta and Robert Fludd are the beſt modern authors on *phyſiognomy*. The ancient ones are the ſophiſts Adamantius, and Ariſtotle: the *phyſiognomy* of which laſt we have tranſlated into Latin by de Lacuna.

With reſpect to *phyſiognomy*, this at leaſt, may be ſaid, that of all the fanciful arts of the ancients, diſuſed among the moderns, there is none has ſo much foundation in nature as this.

There is an apparent correſpondence between the face and the mind: the features and lineaments of the one are directed by the motions and affections of the other; there is even a peculiar arrangement of the members of the face, and a peculiar diſpoſition of the countenance, to each particular affection of the mind.

In effect, the language of the face, *phyſiognomy*, is as copious, nay, perhaps, as diſtinct and intelligable, as that of the the tongue, ſpeech.

The foundation of *phyſiognomy* is this: the different objects that preſent themſelves to the ſenſes, nay, the different ideas that ariſe in the mind, do each make ſome impreſſion on the ſpirits; and each an impreſſion correſpondent or adequate to its cauſe: therefore each makes a different impreſſion.

If it be aſked, how ſuch an impreſſion ſhould be effected, it is eaſy to anſwer, that it follows from the œconomy of the Creator, who has fixed ſuch a relation between the ſeveral parts of the creation, to the end that we may be apprized of the approach or receſs of things uſeful or hurtful to us.

The animal ſpirits, ſay the Carteſians, moved in the organ by an object, continue their motion to the brain; whence that motion is propagated to this or that particular part of the body, as is moſt ſuitable to the deſign of nature; having firſt made a proper alteration in the face, by means of its nerves, eſpecially the pathetici, and oculorum motorii.

The face, here, does the office of a dial-plate; and the wheels and ſprings, withinſide the machine, actuating its muſcles, ſhew what is next to be expected from the ſtriking part.

Now if, by repeated acts, or the frequent entertaining of a favourite paſſion, or vice, which natural temperament was hurried, or cuſtom dragged one to, the face is often put in that poſture which attends ſuch acts; the animal ſpirits will make ſuch patent paſſages through the nerves (in which the eſſence of an habit conſiſts), that the face is ſometimes unalterably ſet in that poſture (as the Indian religious are by a long continued ſitting in ſtrange poſtures in their pagods); or, at leaſt, it falls, inſenſibly and mechanically, into that poſture, unleſs ſome preſent object diſtort it therefrom, or ſome diſſimulation hide it; and this reaſoning, it has been ſaid, is confirmed by obſervation; which, by being a little more accurate and minute, would ſerve to diſtinguiſh not only habits and tempers, but even profeſſions. After all, this is a kind of ſcience, which muſt be very precarious and deluſive.

PHYSIOLOGI, in *Botany*, thoſe authors whoſe writings tend to ſet that ſtudy in its cleareſt light, by explicating and enumerating the various diſpoſitions of the male and female parts in the flowers of plants.

PHYSIOLOGY, Φυσιολογια, formed of φυσις, nature, and λογος, *diſcourſe*, or *reaſon*, the doctrine of nature, or natural bodies; called alſo PHYSICS, and *natural* PHILOSOPHY.

PHYSIOLOGY properly denotes only an internal reaſoning, or diſcourſing, which ſtops or terminates in the ſpeculation, or abſtract contemplation of its object, viz, natural appearances, their cauſes, &c. and does not direct or preſcribe rules for the making of natural things, e. gr. ſtones, plants, &c.

In which view, chemiſtry does not properly belong to *phyſiology*, but is a kind of counter part thereto, as in many caſes, imitating or mimicking nature, rather than conſidering and explaining her.

PHYSIOLOGY is more particularly uſed for a branch of medicine, which conſiders nature with regard to the cure of diſeaſes; particularly the human body, its parts, ſtructure, health, life, functions, œconomy, &c.

Phyſiology, in this ſenſe, amounts to much the ſame with what we otherwiſe call the doctrine of the *animal œconomy*.

PHYSOCELE, a word uſed by many authors to expreſs a *wind-rupture*. See PNEUMATOCELE.

PHYSTA, in *Ichthyology*, a name given by Geſner, and ſome others, to the fiſh called by the Greeks, and many of the later authors, BALLERUS and *balerus*. Artedi denies its right to any generical name, reducing it to the genus of the cyprini, to which it evidently belongs, and diſtinguiſhing it from the others of that numerous genus by the ſpecific name of the very broad and thin *cyprinus*, with forty rays in the pinna ani.

PHYSTE, in the *Writings in the Ancient Phyſicians*, a word uſed to expreſs a maſs of meal macerated in a cloſe veſſel with wine, but not left to ferment.

PHYTEUMA, in *Botany*. See RAMPIONS.

PHYTALIA, a word uſed by the ancients in two very different ſenſes; with ſome expreſſing the latter part of the winter ſeaſon, and with others a place where vines are planted, whether in ſtandard vineyards or otherwiſe.

PHYTOLACCA, in *Botany*. See *American* NIGHTSHADE.

PHYTOLOGI, *phytologiſts*, authors who have written any treatite on botany, or the hiſtory or uſes of vegetables.

PHYTOLOGY, Φυτολογια, compounded of φυτον, *plant*, and λογος, diſcourſe, of λεγο, *I deſcribe*, or *rehearſe*, a diſcourſe, upon plants; or a deſcription of their forms kinds, properties, &c.

PIA *mater*, in *Anatomy*, called alſo *mater tenuis* and *meninx tenuis*, a fine coat, or membrane, immediately inveſting the brain, and lying under the DURA *mater*. It is a fine thin membrane adhering ſo cloſely, and inſinuating itſelf in ſuch a manner, into all the folds and anfractuous parts of the brain, that it is ſcarce to be ſeparated from it. This membrane covers the whole brain, cerebellum, and medulla oblongata; and ſerves together with the other, for the defence of the BRAIN, and the ſupport of its veſſels. The *pia mater* is formed of two very fine laminæ, the outermoſt of which covers pretty uniformly all the convex ſurface of the brain, and lines in the ſame manner all the concave or inner ſurface of the DURA *mater*. The internal lamina forms a great number of plicæ, duplicatures, and ſepta, which inſinuate themſelves into all the folds and circumvolutions, and between the different ſtrata of the ceberum and cerebellum. Theſe two laminæ are connected only by a cellulous ſubſtance, which accompanies them through their whole extent, except in ſome parts of the baſis of the cerebrum, &c. where the whole internal lamina continuing its inſertions, the external remains uniformly ſtretched over the prominent parts, the interſtices of which are entirely ſeparated from the other lamina without any cellular ſubſtance between them. Theſe ſeparate portions of the external lamina have led ſome to conſider it as a third membrane of the brain, diſtinct from the *pia mater*, and it has been called membrana ARACHNOIDES. Winſlow. *Tab. Anat. (Oſteol.) fig.* 4. *litt. a a a.*

According to Mr. Le Cat, the *pia mater* gives three membranes to the eye; the firſt lines the ſclerotic coat, and is joined to it; the ſecond is the choroid coat, and the third is the villous mammary one, proceeding from the choroid, aud is commonly called *Kuyſche's coat*. Med. Eſſ. Edinb. Abr. vol. ii. p. 482.

PIABA, in *Ichthyology*, the name of a ſmall freſh-water fiſh, caught in all the rivers and brooks in the Braſils, and ſome other parts of America.

It is of the ſize of the common minow: is a well-taſted fiſh, and much eſteemed by the natives.

PIABUCU, in *Ichthyology*, the name of an American fiſh eaten by the natives in many places. It is a ravenous fiſh, and ſo greedy of blood, that if a man goes into the water with a wound in any part of his body, this fiſh will make up to it to ſuck the blood: it is a ſmall fiſh, ſeldom exceeding four inches in length.

PIACHE, PIAZZA, a covered arched walk, or portico. See PORTICO, and PIAZZA.

PIAFFEUR, in the *Manege*, is a proud, ſtately horſe, being full of mettle, or fire, reſtleſs and forward, with a great deal of motion, and an exceſſive eagerneſs to go forwards.

wards, makes this motion the more that you endeavour to keep him in, and bends his leg up to his belly. He ſnorts, traverſes if he can, and by his fiery action ſhews his reſtleſsneſs; whence ſome, though very improperly, ſay, he dances.

Such horſes as theſe, or ſuch as are bred to paſſage upon a ſtraight line, are much admired in carouſals and magnificent feſtivals. See SNORT, and PASSADE.

PIANISSIMO, in the *Italian Muſic*, is uſed to ſignify that the part to which it is added ſhould be played very ſoftly, and ſo as that the ſound may ſeem at a great diſtance, and almoſt loſt in air. See Corelli Concerto viii. in fine.

PIANO, in the *Italian Muſic*, ſignifies ſoft and ſweet, by way of an echo.

PIANO *forte*, is the name of a well known muſical inſtrument, reſembling the harpſichord.

PIANO PIANO, or PIU PIANO, in the *Italian Muſic*, is nearly the ſame with *pianiſſimo*, or rather a degree between it and *piano*.

PIANO, *piu*, in the *Italian Muſic*, ſignifies more ſlow or more ſoft, and is much the ſame with *piano piano*.

PIASTER, a Spaniſh money, more ordinarily called a PIECE *of eight*.

PIAZZA, in *Building*, popularly called *piache*, an Italian name for a portico, or covered walk, ſupported by arches. The word literally ſignifies a broad open place, or ſquare; whence it alſo became applied to the walks, or porticoes around them.

PIC, an Eaſt Indian weight, containing one hundred CATYS.

PICA, or PYE, was a term formerly uſed in the ſame ſenſe with ORDINAL, for a table or directory, pointing out the order in which the devotional ſervices appointed for different occaſions were to be performed. Accordingly ſome derive it from Πι, a contraction of πιναξ, *a table*; and others from *litera picata*, a great black letter at the beginning of ſome new order in the prayer. In much the ſame ſenſe the term was uſed by officers of civil courts, who called their calendars or alphabetical catalogues directing to the names and things contained in the rolls and records of their courts the *Pyes*.

PICA, in *Medicine*, *malacia*, or a depravation of appetite; which makes the patient abſurdly covet things unfit for food, or incapable of nouriſhing, as coals, aſhes, plaiſter, ſalt, lime, chalk, vinegar, pepper, &c.

The *pica* is frequent in girls, and in women with child; men are more rarely affected with it. The diſorder is ſeldom original, but is uſually an effect of an hypochondriacal infirmity in men; and of a chloroſis, ſtoppage of the menſes, or their eruption about the ſecond month of pregnancy in women: ſometimes it ſeems to be hereditary in children, from ſome cauſe affecting the mother. The diſeaſe is uſually ſuppoſed to have its riſe from a vicious ferment of the ſtomach; to which may be added, alſo, ſome diſorders of the imagination, occaſioned by ill examples, and ridiculous prejudices.

The uſual remedies in the *pica* are bleeding, purging, vomiting, and chalybeats.

PICA, in *Ornithology*. See MAGPYE.

PICA is alſo a name by which ſome have called the *lanius*, or BUTCHER *bird*.

PICA, in *Printing*. See PRINTING.

PICA *marina*, in *Ornithology*, the name of a bird called in Engliſh the *ſea-pie*, and by Bellonius and ſome others, the HÆMATOPUS. It is of the ſize of the common *magpie*; its beak is three fingers breadth long, ſtrait, and of a reddiſh, or a blackiſh colour, and ending in a point, and ſeeming well fitted for its buſineſs of rooting up the limpets from the rocks, the bodies of this fiſh being its common food; its legs are red; it has no hinder toe, and has its other toes ſo far connected by a membrane, as to ſeem almoſt of a middle nature between the web-footed and other birds; its head, neck, back, throat, and half its breaſt are black, as alſo its rump; its tail is half black, and half white, as are alſo its wings. It is common on the weſtern ſhores of England, and on the ſhores of Wales.

PICA *marina* is alſo uſed by Geſner very improperly for the bird commonly known by the name of *anas arctica Cluſii*. See PUFFIN.

PICA *naſi*, in *Medicine*, a name given by Cohauſen to the immoderate taking of ſnuff. It ſeems a whimſical term, but he chuſes to treat this habit as a diſeaſe, and has written an expreſs treatiſe concerning it. The word *pica*, in general, denotes an abſurd and unnatural appetite; and the deſire of taking the powder of tobacco in this manner is called a diſtempered appetite of the part into which it is taken, that is, the noſe.

The conſequences of the taking ſnuff immoderately, are, that the ſenſe of ſmelling is either entirely deſtroyed, or at leaſt greatly impaired: for the nervous tubercles of the noſtrils being continually vellicated by this powder, are by degrees clogged up, or wholly deſtroyed, and the ſenſible membrane, which lines the noſtrils, is rendered callous, and wholly unfit for the diſcharge of its office in ſmelling. The voice is next affected by this powder; for it cauſes a ſort of aſtriction at the bottom of the noſe, which affects the palate, and conſequently the ſpeech; this gives the perſon who takes it a continual deſire of taking more and more, to rid himſelf of that ſtoppage.

PICACIA, a name given by the ancients to that diſtempered eppetite of women with child, and maidens at a certain time of life, which makes them long for things not fit for food. It is more uſually called PICA.

PICACUROBA, in *Ornithology*, the name of a Braſilian ſpecies of pigeon, of a greyiſh colour, variegated with a reddiſh brown, and with very red legs and feet.

PICÆ, *pies*, in the Linnæan ſyſtem of *Ornithology*, is the name of one whole order of birds; the general character of which is, that they have a convex beak, flatted above. To this order belong twenty two genera, and two hundred and forty-three ſpecies. See PARROT, TOUCAN, CROW, *Bird of* PARADISE, ORIOLE, CUCKOW, KING's-FISHER, HOOPOE, CREEPER, &c.

PICARD, in our *Old Writers*, a kind of large boat, about fifteen tons or upwards, uſed on the river Severn. Stat 35 Hen. VIII. cap. 9. 13 Eliz. cap. 11.

PICARDS, a religious ſect, who aroſe in Bohemia in the fifteenth century; ſo called from their author, who, becauſe he originally came from Picardy, was called *Picard*. He drew after him, as it has been very unjuſtly ſaid, a great number of men and women, pretending he would reſtore them to the primitive ſtate of innocence wherein Adam was created: and accordingly himſelf aſſumed the title of the New Adam.

Under this pretence he taught his followers to abandon themſelves to all impurity; making them believe, that therein conſiſted the liberty of the ſons of God; and that all thoſe not of their ſect were in bondage.

He firſt began in Germany, and the Low Countries, perſuading many people to go naked, and giving them the name of ADAMITES. After this, ſeizing an iſland in the river Lauſnecz, a few leagues from Thabor, the head quarters of Ziſca, he fixed himſelf and his followers therein; appointing his women to be common, but allowed none to enjoy them without his permiſſion: ſo that when any man deſired a woman, he carried her to *Picard*, who gave him leave in theſe words, *Go, increaſe, multiply, and fill the earth*.

At length, Ziſca, the great general of the Huſſites, (ſo famous for his victories over the emperor Sigiſmund), ſtruck with their abomination, marched againſt them; and, making himſelf maſter of their iſland, put them all to death except two; whom he ſpared to inform himſelf of their doctrine.

Such is the very falſe and injurious account, which different writers, ultimately relying on the inſufficient authorities of Æneas Sylvius, and Varillas, have given of the *Pecards*, who ſeem to have been a party of the VAUDOIS, that fled from perſecution in their own country, and ſought refuge, about the beginning of the fifteenth century, in Bohemia. It is very doubtful, whether a ſect of this denomination, chargeable with the licentious principles and conduct above recited, ever exiſted; and we cannot forbear expreſſing our aſtoniſhment that Mr. Bayle, in his art. *Picards*, ſhould adopt the reproachful repreſentations of the writers juſt mentioned.

It is moſt probable, that the whole is a calumny invented and propagated, in order to diſgrace the *Picards*, becauſe they deſerted the communion and proteſted againſt the errors of the church of Rome. Laſitius relates, that *Picard* ſettled in Bohemia, in the year 1418, accompanied by forty other perſons, beſides women and children. The Jeſuit Balbinus, in his Epitome Rerum Bohemicarum, lib. ii. concurs in this account, and charges on the *Picards* none of the extravagancies or crimes aſcribed to them by Sylvius. Schlecta, ſecretary of Ladiſlaus, king of Bohemia, in his letters to Eraſmus, gives a particular account of the *Picards*; repreſenting them as perſons, who conſidered the pope, cardinals, and biſhops of Rome, as the true Antichriſts; who cenſured thoſe that adored the conſecrated elements in the euchariſt, as idolaters, and denied the corporal preſence of Chriſt, in this ordinance; who condemned the worſhip of ſaints, prayers for the dead, auricular confeſſion, the penance impoſed by prieſts, the feaſts and vigils obſerved in the Romiſh church; and confined themſelves to the obſervance of the ſabbath, and of the two great feaſts of Chriſtmas and Pentecoſt. From this abſtract of their ſentiments, it ſufficiently appears, that they were no other than the VAUDOIS; and M. de Beauſobre has plainly ſhewn that they were both of the ſame ſect under different denominations. Beſides, it is a certain fact, that the Vaudois were ſettled in Bohemia, in the year 1178, where ſome of them adopted the rites of the Greek church, and others thoſe of the Latin church. The former were generally adhered to till about the middle of the fourteenth century, when the eſtabliſhment of the Latin rites occaſioned great diſturbance. When the national troubles commenced in Bohemia, on occaſion of the oppoſition to the papal power (ſee MORAVIANS), the *Picards* appeared more publicly in the avowal and defence of their religious opinions; and they formed a conſiderable body in an iſland by the river Launitz or Lauſnecz, in the diſtrict of Bechin, and recurring to arms, were defeated by Ziſca. Encyclop. art. *Picards*.

PICATUM *vinum*. See VINUM.

PICICITLI, in *Ornithology*, the name of a bird in the Spaniſh Weſt Indies, deſcribed by Nieremberg. Its head and neck are black, and its whole body grey; it is a ſmall bird, and makes its appearance in Mexico after the rainy ſeaſons; it is a bird of paſſage, and it is not known where it breeds.

PICK, among *Miners*, is a tool with which they uſe to cut down the clifts and rocks of ſtone to make paſſages in the earth.

PICK-*axe*, in the *Military Art*, a tool carried by the pioneers to dig up ground that is too hard for the ſpade; they are of great uſe for mending the ways, and in fortification.

PICKS, *ear*. See EAR-*picks*.

PICKAGE, or PICCAGE, *piccagium*, an ancient cuſtom, or duty, paid at fairs and markets, for breaking the ground, and pitching up ſtalls, or ſtandings.

This profit of *pickage* was uſually given, or granted, in charters for holding a fair or market.

PICKEERING, or PICKEROONING. See PICQUEERING.

PICKER, or *horſe*-PICKER, in the *Manege*, an iron inſtrument five or ſix inches long, bent or crooked on one ſide, and flat and pointed on the other. It is uſed by grooms to cleanſe the inſide of the horſes feet, and to pick out the earth, ſand, or ſmall ſtones that get into them.

PICKERELL, in *Ichthyology*, an Engliſh name uſed by ſome authors for the JACK or PIKE.

PICKET, PICQUET, or PIQUET, in *Fortification*, a ſtake ſharp at one end, and uſually ſhod with iron; uſed in laying out the ground, to mark the ſeveral meaſures and angles thereof.

There are alſo larger *pickets*, driven into the earth to hold together faſcines, or faggots, in any work caſt up in haſte.

PICKETS are alſo ſtakes driven into the ground by the tents of the horſe, in a camp, to tie their horſes to; and before the tents of the foot, where they reſt their muſkets, or pikes about them, in a ring.

When a horſeman hath committed any conſiderable offence, he is often ſentenced to ſtand on the *picket*; which is to have one hand drawn up as high as it can be ſtretched, and thus to ſtand on the point of a *picket*, or ſtake, only with his oppoſite foot: ſo that he can neither ſtand nor hang well, nor eaſe himſelf by changing feet.

PICKETS are alſo ſtakes with notches toward the top, to which are faſtened the cordages of tents. Thus, to plant the *picket*, is to encamp.

PICKET, in *Gaming*. See PICQUET.

PICKLE, a brine, or liquor, ordinarily compoſed of ſalt, vinegar, &c. ſometimes with the addition of ſpices; wherein meats, fruits, and other things, are preſerved and ſeaſoned.

PICKLE is alſo uſed ſubſtantively, for a fruit, root, leaf, or other vegetable matter, prepared in *pickle*, to be uſed by way of ſauce, &c. See SALLET, &c.

They *pickle* artichoaks, muſhrooms, aſhen-keys, barberries, aſparagus, beans, &c. Broom-buds, capers, and olives, are pickled with oil and vinegar.

PICKLED *fiſh*. See FISH.

PICLE, (*pictellum*), a ſmall parcel of land encloſed with a hedge; a little cloſe. This word ſeems to come from the Italian *picciola*, i. e. *parvus*; and in ſome parts of England is called *pightel*.

PICOLOS, the name of an ancient Pruſſian idol, to which human ſacrifice was offered. See POTRIMPOS.

PICOTA, a name given by ſome authors to a diſtemper which they deſcribe as conſiſting wholly in an eruption of a number of very minute pimples upon the ſkin, all over the body; it is attended with no danger, unleſs they are ſtruck in.

PICQUEERING, PICKEERING, or PICKEROONING, a little flying war or ſkirmiſh, which the ſoldiers make when detached from their bodies to pillage, or before a main battle begins.

PICQUET, or PICKET, a celebrated game at cards, much in uſe throughout the polite world.

It is played between two perſons, with only thirty-two cards; all the duces, threes, fours, fives, and ſixes, being ſet aſide.

In reckoning, at this game, every card goes for the number it bears, as a ten for ten; only all court-cards go for ten, and the ace for eleven: and the uſual game is one hundred up. In playing, the ace wins the king, the king the queen, and ſo down. Twelve cards are dealt around, uſually by two and two; which done, the remainder are laid in the middle. If one of the gameſters finds he has not a court card in his hand, he is to declare he has *carte blanche*, and tell how many cards he will lay out, and deſire the other to diſcard, that he may ſhew his game, and ſatisfy his antagoniſt, that the *carte blanche* is real; for which he reckons ten.

Each perſon *diſcards*, i. e. lays aſide a certain number of his cards, and takes in a like number from the ſtock. The firſt, of the eight cards, may take three, four, or five; the dealer all the remainder, if he pleaſes.

After diſcarding, the eldeſt hand examines what ſuit he has moſt cards of; and, reckoning how many points he has in that ſuit, if the other have not ſo many in that, or any other ſuit, he tells one for every ten of that ſuit. He who thus reckons moſt is ſaid to win the *point*.

The point being over, each examines what *ſequences* he has of the ſame ſuit; viz. how many tierces, or ſequences of three; quarts, or fours; quintes, or fives; ſixiemes, or ſixes, &c. For a tierce they reckon three points, for a quarte four, for a quinte fifteen, and for a ſixieme ſixteen, &c. And the ſeveral ſequences are diſtinguiſhed in dignity by the cards they begin from: thus ace, king, and queen, are called *tierce major*; king, queen, and knave, *tierce to a king*; knave, ten, and nine, *tierce to a knave*, &c. and the beſt tierce, quarte, or quinte, i. e. that which takes its deſcent from the beſt card, prevails; ſo as to make all the others in that hand good, and deſtroy all thoſe in the other hand. In like manner, a quarte in one hand ſets aſide a tierce in the other.

The ſequences over, they proceed to examine how many aces, kings, queens, knaves, and tens, each holds; reckoning for every three, of any ſort, three; but here too, as in ſequences, he that with the ſame number of threes has one that is higher than any the other has, e. gr. three aces, has all his other made good hereby, and his adverſary's are all ſet aſide. But four of any ſort, which is called a *quatorze*, always ſet aſide three.

All the game in hand being thus reckoned, the eldeſt proceeds to play, reckoning one for every card he plays above a nine, and the other follows him in the ſuit: and the higheſt card of the ſuit wins the trick. Note, unleſs a trick be won with a card above a nine (except the laſt trick), nothing is reckoned for it; though the trick ſerves afterwards toward winning the cards; and that he who plays laſt does not reckon for his cards, unleſs he win the trick.

The cards being played out, he that has moſt tricks reckons ten for *winning the cards*. If they have tricks alike, neither reckons any thing. The deal being finiſhed, and each having marked up his game, they proceed to deal again as before; cutting afreſh each time for the deal.

If both parties be within a few points of being up, the carte blanche is the firſt thing that reckons; then the point, then the ſequences, then the quatorzes or threes, then the tenth cards.

He that can reckon thirty in hand by carte blanche, points, quintes, &c. without playing, before the other has reckoned any thing, reckons ninety for them; and this is called a *re-pique*. If he reckons above thirty, he reckons ſo many above ninety. If he can make up thirty, part in hand, and part in play, before the other has told any thing, he reckons for them ſixty. And this is called a *pique*. Whence the name of the game.

He that wins all the tricks inſtead of ten, which is his right, for winning the cards, reckons forty; and this is called a *capot*.

This game has in ſome caſes been the object of mathematical computation.

Thus Mr. de Moivre has propoſed and ſolved the following problems:

1. To find at *picquet* the probabilitity which the dealer has for taking one ace or more in three cards, he having none in his hand. He concludes from his computation, that it is 29 to 28 that the dealer takes one ace or more.

2. To find at *picquet* the probability which the eldeſt has of taking an ace or more in five cards, he having no ace in his hand. Anſwer; 232 to 91, or 5 to 2, nearly.

3. To find at *picquet* the probability which the eldeſt hand has of taking an ace and a king in five cards, he having none in his hand. Anſwer; the odds againſt the eldeſt hand taking an ace and a king are 331 to 315, or 21 to 20 nearly.

4. To find at *picquet* the probability of having twelve cards dealt to, without king, queen or knave: which caſe is commonly called *cartes blanches*. Anſwer; the odds againſt *cartes blanches* are 1791 to 1 nearly.

5. To find how many different ſets, eſſentially different from one another, one may have at *picquet* before taking

in. Anſwer; 28,967,278. This number falls ſhort of the ſum of all the diſtinct combinations, whereby twelve cards may be taken out of 32, this number being 225,792,840; but it ought to be conſidered, that in that number ſeveral ſets of the ſame import, but differing in ſuit, might be taken, which would not introduce an eſſential difference among the ſets.

Mr. Demoivre alſo gives ſome obſervations on this game which he had from an experienced player. See Doctrine of Chances, p. 179, &c.

M. de Monmort has alſo treated of *picquet* in his Analyſe des jeux de Hazard, p. 162.

Picquet *guard*. See Guard.

PICRA, *hiera*. See Hiera.

PICRIS, in *Botany*, the name given by Linnæus to a genus of plants of the *ſyngeneſia polygamia æqualis* claſs, called by Vaillant *helmintotheca*; the characters of which are theſe: the common cup is double; the outer cup is very large, and compoſed of five cordated leaves; the interior is imbricated and of an oval figure, and is not cloſe at the mouth, as the other, but open; the flower is of the compound kind, it is imbricated and uniform; and the ſmall flowers of which it is compoſed are equal and numerous; each is compoſed of one petal, and is narrow, ligulated and truncated at the end, where it is divided into five ſegments; the ſtamina are five capillary filaments, ſo ſhort that they are hardly ſeen; the antheræ are cylindric and tubulate; the germen of the piſtil ſtands under the flower; the ſtyle is of the length of the ſtamina, and the ſtygmata are two in number, and reflex; the cups both remain when the flowers are fallen, and ſerves as capſules for the ſeeds, which are ſingle, ventricoſe, obtuſe, and crowned with a plume or down; the receptacle is naked. There are three ſpecies.

In ſome of the ſpecies of this genus, the ſeeds are crooked, and have a ſeſſile down; in others they are ſtraight, and their down is placed on a pedicle.

PICTA *toga*. See Toga.

PICTS *wall*, in *Antiquity*, a famed piece of Roman work, begun by the emperor Adrian, A. D. 124, on the northern bounds of England, to prevent the incurſions of the Picts and Scots.

At firſt it was made only of turf, ſtrengthened with paliſadoes, till the emperor Severus, coming in perſon into Britain, repaired it, as ſome ſay, with ſolid ſtone, reaching eighty miles in length, from the Iriſh to the German ſea, through Carliſle and Newcaſtle; with watch-towers gariſoned, now called caſtle-ſteeds, at the diſtance of a mile from each other.

It does not appear, with ſufficient evidence that Severus's wall was formed of ſtone: Bede expreſly aſſerts the contrary, though Spartian intimates that Severus built both *murus*, i. e. a wall of ſtone, and a *vallum*, or a wall of turf. Bede's words are theſe: Severus, after ſeveral great and difficult engagements, thought it neceſſary to ſeparate that part of the iſland which he had recovered, from the other nations that were unconquered; not with a *murus*, as ſome think, but with a *vallum*: now a *murus*, ſays he, is of ſtone; but a *vallum*, ſuch as they made round a camp to ſecure it againſt the attacks on the enemy, is made of turf cut regularly out of the ground, and built high above ground like a wall, with the ditch before it, out of which the turf has been dug; and ſtrong ſtakes of wood all along the brink. Severus, therefore, drew a great ditch, and built a ſtrong earthen wall, fortified with ſeveral turrets from ſea to ſea. The learned Camden adopts this opinion; and adds, that Severus's wall is expreſſed by no other word than *vallum*, either in Antoninus or the Notitia. Camd. Brit. vol. ii. p. 1045. See Agger.

This wall was ruined ſeveral times by the *Picts*, and often repaired by the Romans. At laſt Ætius, a Roman general, ordered it to be rebuilt of ſtone, about the year 420; but the *Picts* ruining it in the year following, it was no longer regarded but as a boundary between the two nations. The wall was eight feet thick, and twelve high from the ground: it ran on the north ſide of the rivers Tyne and Irthing, up and down ſeveral hills: the tract, or remains, of it, are to be ſeen to this day in many places both in Cumberland and Northumberland.

The inhabitants of the country pretend, that there was a brazen trumpet or pipe, ſo artificially laid in the wall between each caſtle and tower, that upon the apprehenſion of danger at any one place, by the ſounding of it, notice might be given to the next, and then to the third, &c. whence it derived the ancient name Cornage: and in the inſide a ſort of fortified little town, now called Cheſter, the foundations of which appear, in ſome places, in a ſquare form.

PICTAVIENSIS, or Pictonum *colica*, the name of a kind of very terrible nervous colic, more uſually called *colica pictonum*; and by the natives in the Weſt Indies, where it rages, the *dry belly-ach*. It is ſo popular a diſeaſe in the Leeward Iſlands, that it may be very juſtly reckoned endemic among them, moſt of the people there having been at one time or other ſubject to it in all its fury. See Colica *Dammoniorum*.

PICTURE, *pictura*, a piece of painting, or a ſubject repreſented in colours, on canvas, wood, or the like; and incloſed in a frame.

Pictures or paintings in oil are preſerved by coating them with ſome tranſparent and hard ſubſtance, as a varniſh, in order to ſecure the colours from the injuries of the air or moiſture; and to defend the ſurface from ſcratches or any damages the painting might receive from ſlight violence. The ſubſtances, that have been, or may be uſed for this purpoſe, are gum arabic, diſſolved in water with the addition of ſugar or ſugar-candy, to prevent its cracking, glair or whites of eggs, mixed with a little brandy or ſpirit of wine in order to make it work more freely, and a lump of ſugar to prevent its cracking, iſinglaſs-ſize uſed as either of the former, or mixed with a fourth or fifth of its weight of honey or ſugar, and varniſhes formed of gum reſins diſſolved in ſpirit of wine, or oil of turpentine, which laſt are called *oil*-Varnishes.

Paintings in miniature are preſerved by plates of glaſs or the talc called iſinglaſs placed before them in the frame.

Paintings in diſtemper may be rendered more durable, and preſerved from foulneſs by varniſhing them with hot ſize, boiled to a ſtrong conſiſtence, in which a fifteenth or twentieth part of honey has been diſſolved. Crayons muſt be preſerved in the ſame manner with paintings in water colours, by plates of glaſs, or iſinglaſs.

When *pictures* are cut or torn, they may be repaired by laying them on an even board or table, carefully putting together the torn or divided parts with ſome of the matter of the Smush-*pot* laid as a cement, in and over the joint, and keeping them in the ſame ſituation till the cement is thoroughly dried. The protuberance of the cement may be eaſily reduced with a penknife, and the repaired part properly coloured ſo as to correſpond with the *picture*. When part of the cloth is deſtroyed, a piece of canvaſs ſomewhat bigger than the vacant ſpace is to be plaſtered over on the outſide of the cloth with the matter of the ſmuſh-pot, and when it is thoroughly dry, the inequality of the *picture* in this part is to be filled up with the ſame matter, and properly reduced and coloured.

The art of cleaning *pictures* and paintings is of great conſequence in order to their preſervation: in this operation great ſkill and care are requiſite, ſo that the menſtruum uſed for taking off any foulneſs may not diſſolve the oil in the painting itſelf or diſorder its colours, and that each ſort of varniſh with which paintings are coloured may be taken off without injury to the painting. The firſt and moſt general ſubſtance uſed for cleaning *pictures* is water, which will romove any foulneſs ariſing from many kinds of glutinous bodies, as ſugar, honey, glue, &c. and any varniſh of gum arabic, glair of eggs or iſinglaſs, without affecting the oil that holds the colours together. Olive oil or butter will diſſolve pitch, reſin, and other ſubſtances of a like kind, without injuring the oil of the painting. Pearl aſhes, diſſolved in water, form a proper menſtruum for moſt kinds of matter that foul paintings: but they muſt be very cautiouſly uſed, as they will corrode the oil of the painting, if there be no varniſh of the gum reſins over it. Soap is of the ſame nature, and ſhould be cautiouſly applied, and only to particular ſpots, that elude all other methods. Spirit of wine will diſſolve all the gums and gum reſins, except gum arabic, and is therefore very neceſſary for taking off from *pictures*, varniſhes compoſed of ſuch ſubſtances, but it alſo corrodes the oil of the painting. This is alſo the caſe with oil of turpentine, and eſſence of lemon, ſpirit of lavender, and roſe-mary, and other eſſential oils. With regard to paintings that are varniſhed with gum arabic, glair of eggs, or iſinglaſs, the varniſh ſhould be taken off when they are to be cleaned. This may be eaſily diſtinguiſhed by wetting any part of the painting, which will feel clammy, if varniſhed with any ſubſtance ſoluble in water. This kind of varniſh may be taken off with hot water and a ſpunge, or by gentle rubbing with a linen cloth dipped in warm water. If paintings, on this trial, appear to be varniſhed with the gum-reſins or ſuch ſubſtances as cannot be diſſolved in water, they may, in ſome caſes, be ſufficiently cleaned by a ſpunge with warm water; and any remaining foulneſs may be removed by rubbing the painting over with olive oil made warm, or with butter, which ſhould be wiped off with a woollen cloth; and if the *picture* require farther cleaning, wood-aſhes or pearl-aſhes may be uſed in the following manner: take an ounce of pearl-aſhes, and diſſolve them in a pint of water; or take two pound of wood-aſhes, and ſtir them well in three quarts of water, once or twice in an hour for half a day. Then pour off the clear fluid, and evaporate it to a quart or three pints; waſh the painting well with a ſpunge dipped in either of theſe leys, and rub gently any foul ſpots with a linen cloth till they diſappear. If this method fail, recourſe muſt be had firſt to ſpirit of wine, then to oil of turpentine, and if theſe are ineffectual, the eſſence of lemons; with either of which the foul ſpots ſhould be ſlightly moiſtened, and the part immediately rubbed gently with a linen cloth. After a little rubbing, if oil of turpentine or eſſence of lemons has been applied, olive oil ſhould be put upon the ſpot; and water, if ſpirit of wine has been uſed; which ſhould be taken off with a wollen cloth; rapeating the operation till the foulneſs be removed. When paintings appear to have been varniſhed with thoſe ſubſtances that will not diſſolve in water, and after the uſe of the above means retain their foulneſs, the following method will ſucceed: place the *picture* or painting in a horizontal ſituation; and moiſten, or rather flood, by means of a ſpunge, the ſurface with very ſtrong rectified ſpirit of wine: keep the painting thus moiſtened, by adding freſh quantities of the ſpirit, for ſome minutes; then flood the whole ſurface copiouſly with cold water; waſh off the whole without rubbing; and when the painting is dry, repeat the operation, till the whole varniſh is taken off. Handm. to the Arts, vol. i. p. 224. 245.

PICTURES, *method of takimg off decayed.* See PAINTING.

PICTURE, *magical.* See MAGICAL.

PICUIPINIMA, in *Ornithology*, the name of a Braſiliam ſpecies of pigeon, very ſmall, ſcarce exceeding the lark in ſize. Its head, neck, and wings, are all of a pale-lead colour, with a black ſemiluner mark at the extremity of each wing; but its long wing-feathers, which are ſeen when the wings are expanded in flying, are of a reddiſh-brown on one ſide, and blackiſh on the other, with black ends or tips; the tail is long, and is variegated with black, white, and brown; the belly is covered with white feathers, every one of which has a brown mark of the ſhape of a half moon at the end.

PICUS, or PICUS *martius*, in *Ornithology*, the name of a large genus of birds, of the wood-pecker kind, the characters of which are theſe: they have a ſtraight, very hard, ſtrong, and ſharp beak, proper for making holes in trees; and a very long cylindrical-ſhaped tongue, terminated by a rigid and ſharp bony ſpine, ſerrated or notched at each end, proper for the ſeizing on, and tearing to pieces, of worms and other inſects; and this they can, at pleaſure, thruſt out to a great length; and ſtriking it into the clefts of trees, faſten it into inſects that lie there, and draw them out with it; their thighs are very ſhort and ſtrong, and their toes four in number, placed two before and two behind; their tails are rigid, and bent downwards, and their feathers bare at the ends, the ſtumps aſſiſting the creature in climbing; they live only on inſects, and have only ten feathers in their tail. Ray. The *picus martius* in the Linnæan ſyſtem is a ſpeices of the PICUS.

Some underſtand the word *picus* in a larger ſenſe, making it take in the *ſitta*, *picus murarius*, *junco*, *certhia*, and all the birds that climb trees. In which caſe the characters of the genus are only, that they have very ſhort, thick, and ſtrong legs, adapted to the running up the bodies and branches of trees.

The *pica*, or wood-peckers, properly ſo called, however, are a very large and numerous family.

In the Linnæum ſyſtem of Ornithology, the *picus* makes a diſtinct genus of birds of the order of the pyes. The character of this genus, according to this author, are, that the bill is ſtraight and angular, and terminates in the form of a wedge; the noſtrils are covered with briſtly feathers reflected down; the tongue is long, cylindric, formed for ſeizing worms, ſharp-pointed, and jagged; the feet are ſormed for climbing. See PICUS above. Linnæus enumerates twenty-one ſpecies.

Of this genus are the black, green, and variegated wood-pecker, and the three-toed ſpecies, deſcribed in the Acta Literaria Suecia, in 1740. See WOOD-*Pecker*.

PICUS *imbrifœtus*, or *picus principalis*, of Linnæus, in *Ornithology*, the name of an American bird, deſcribed by Nieremberg, and called by the natives QUATOTOMIMI. It is of the ſize of the hoopoe, and is variegated with black and brown; it is of the wood-pecker kind, having a beak three fingers breadth long, with which it perforates trees; its head is ſmall and red, and has a fine red creſt; but the feathers are black on their upper ſide; it has on each ſide of the neck a broad white line, reaching to the breaſt; its legs and feet are of a bluiſh colour; it builds in high trees, and is principally found near the ſhores of the South Sea. It feeds on inſects. See IPECU.

PICUS *murarius*, in *Ornithology*, the name of a bird called in Engliſh the *wall-creeper*, and improperly ranked among the *pici*, as wanting many of the characters of that genus: and therefore claſſed in the Linnæan ſyſtem under the genus of CERTHIA, or CREEPER, which, beſides this, comprehends alſo twenty-four other ſpecies. It is about the bigneſs of the common ſparrow; its bill is black, ſlender, and long; its head, neck, and back grey; its breaſt white, and its wings partly grey and partly red; its tail is ſhort and black; its long wing-feathers alſo, and the lower part of its belly, and its legs, are of the ſame colour; its legs are ſhort, but its feet are not placed as in the wood-pecker; but are three before and one behind; it is very common in Italy, Germany, and ſome parts of France; it is a very lively and chearful bird, and as the common wood-pecker climbs trees and feeds on the inſects in their cracks, ſo this bird runs up old walls, and feeds on what it finds in the cracks of the ſtones.

PICUS *nidum ſuſpendens*, a name by which ſome authors have called the GALBULA; a yellow bird of the thurſh kind, very remarkable for its beauty, and for the ſtructure and manner of hanging its neſt.

PICUS *ſalutiferus*, in *Ornithology*, the name under which Nieremberg has diſcribed a Mexican bird, called by the natives *henquecholtototl*.

It is of the ſize of the common black-bird, and has a long and black beak: its head and a great part of its neck are red; its breaſt and belly are grey, and it has a creſt of red feathers upon its head: it is of the wood-pecker kind, and has its name from the ſuppoſed virtues of its feathers, particularly thoſe of the creſt, in curing the head-ach.

PIECE, in *Commerce*, ſignifies ſometimes a whole, and ſometimes only a part of the whole.

In the firſt ſenſe we ſay, a *piece* of cloth, of velvet, &c. meaning a certain quantity of yards, regulated by cuſtom, being yet entire, and not cut.

In the other ſignification we ſay, a *piece* of tapeſtry; meaning a diſtinct member wrought apart, which, with ſeveral others, make one hanging.

A *piece* of wine, of cyder, &c. is a caſk full of thoſe liquors.

PIECE, *chimney.* See CHIMNEY.

PIECE, *detached.* See DETACHED.

PIECE, *caſel.* See EASEL.

PIECE, *maſter.* See MASTER.

PIECE, in *Matters of Money*, ſignifies ſometimes the ſame thing with *ſpecies*: as when we ſay, this *piece* is too light, &c.

Sometimes, by adding the value of the *pieces*, it is uſed to expreſs ſuch as have no other particular name: as a *piece* of eight rials, a *piece* of twenty-five ſols, &c.

In England, the *piece*, abſolutely, is ſometimes uſed for twenty ſhillings ſterling, and ſometimes for a guinea.

By 6 Geo. II. cap. 25. *broad-pieces*, of five-and-twenty, or three-and-twenty ſhillings value, or any halves or quarters thereof, are called in. And all perſons are forbid to receive or utter them in payment by tale.

PIECE *of eight*, or *piaſtre*, is a ſilver money, firſt ſtruck in Spain, afterwards in other countries, and now current in moſt parts of the world.

It has its name *piece of eight*, or *rial of eight*, becauſe equal to eight ſilver rials.

Its value is nearly on the ſame foot with the late French crown, viz. four ſhillings and ſix pence ſterling. In 1687, the proportion of the ſimple rial to the piaſtre was changed; and in lieu of eight rials they gave ten. At preſent the reduction is on the ancient ſtandard.

There are two kinds of piaſtres, or Spaniſh crowns; the one ſtruck at Potoſi, the other at Mexico: theſe latter are a little heavier than the former; but, in return, they are not quite ſo fine.

The *piece of eight* has its diminutions; viz. the demi-paiſtre, or *piece of four rials*; the quarter, or *piece of two*; the half-quarter, and the ſixteenth. The EXCHANGE between Spain and England is made in *pieces of eight*. See COIN.

PIECE is alſo a kind of money of account, or rather a manner of accounting, uſed among the negroes on the coaſt of Angola, in Africa.

The price of ſlaves, and other commodities here negotiated, as alſo the duties paid the petty kings, are eſtimated on both ſides in *pieces*. Thus thoſe barbarians requiring ten *pieces* for a ſlave, the Europeans in like manner, value the money, or merchandize, to be given in exchange, in *pieces*.

PIECE, in *Heraldry*, denotes an ORDINARY, or CHARGE.

PIECES, in the *Military Art*, include all ſorts of great guns and mortars.

Theſe are alſo called *pieces of ordnance*, or *artillery*.

PIECES, *field.* See FIELD-*pieces*.

PIECES, *battery.* See *Great* GUNS.

PIECES, *garriſon.* See GARRISON.

PIECE, *poiſoning a.* See POISON.

PIECE, *ſoldier's*, See FIRELOCK.

PIECE, *elevation of a.* See ELEVATION.

Piece, *quadrating a.* See Quadrating.

PIEDOUCHE, *French*, formed from the Italian *peduccio*, *foot*, in *Architecture*, a little ſtand, or pedeſtal, either oblong or ſquare enriched with mouldings, ſerving to ſupport a buſt, or other little figure. This is called a bracket pedeſtal.

PIEDRA *de la hyada*, in *Natural Hiſtory*, the name given by the Spaniards to a ſtone found in many parts of America, particularly in New Spain; and famous among the Indians for curing the colic on being applied to the navel. It is green, and is a ſpecies of jaſper, approaching to the nature of the *lapis nephriticus*, and is called by many *colicus lapis*, from its virtues.

PIEDROIT, in *Architecture*, a pier, or a ſquare kind of pillar, part whereof is hid within a wall.

The only thing wherein it differs from a pilaster is, that the latter has a regular baſe and capital, which the other wants.

Piedroit is alſo uſed for a part of the ſolid wall annexed to a door or window; comprehending the door-poſt, chambranle, tableau, leaf, &c.

PIE-POUDER-*court*. See Court.

PIER, in *Building*, derived from the French *pierre*, *a ſtone*, denotes a maſs of ſtone, &c. oppoſed, by way of fortreſs, againſt the force of the ſea, or a great river, for the ſecurity of ſhips that lie at harbour in any haven, ſuch are the *pier* of Dover, deſcribed by Camden Brit. &c. the *pier* of Ramſgate, and the haven *pier* of Great Yarmouth, mentioned 22 Car. II.

Piers are alſo uſed in *Architecture* for a kind of *pilaſters*, or buttreſſes, raiſed for ſupport, ſtrength, and ſometimes for ornament.

Piers, *circular*, are called *maſſive* columns, and they are with or without caps, and are frequently ſeen in Saracenic architecture.

Piers *of a bridge*. See Bridge.

M. Belidor obſerves that, when the height of the *piers* is about ſix feet, and the arches are circular, it is ſufficient to make their thickneſs the ſixth part of the width of the arch, and two feet more; but when the arches become of a great ſpan, the thickneſs of the *piers* may be teduced to the ſixth part; but then the depreſſion of the two feet doth not take place at once; that is, in an arch of above forty-eight feet, three inches are taken off for every ſix feet of increaſe of the width of the arch. The thickneſs of the *piers* ſupporting elliptic arches is greater than in the former proportion: thus, in an arch of ſeventy-five feet wide, the thickneſs of the *piers*, whoſe height is about ſix feet, ſhould be 13.5 when the arch is circular, and fifteen feet when it is elliptical.

The ſame author makes the *abutments* one-ſixth part more than the *piers* of the largeſt arch.

Mr. Muller has calculated the following Table, containing the thickneſs of the *piers* of bridges.

TABLE, containing the thickneſs of the *piers of bridges.*

	6	9	12	15	18	21	24
20	4.574	4.918	5.165	5.350	5.492	5.610	5.698
25	5.490	5.913	6.216	6.445	6.645	6.801	7.930
30	6.386	6.816	7.225	7.513	7.746	7.939	8.102
35	7.258	7.786	8.200	8.532	8. 807	9.037	9.233
40	8.404	8.691	9.148	9.523	9.835	10.101	10.328
45	8.965	9.579	10.077	10.489	10.837	11.136	11.394
50	9.805	10.454	10.987	11.435	11.817	12.146	12.434
55	10.640	11.245	11.882	12.364	13.019	13.149	13.218
60	11.400	12.110	12.718	13.281	13.723	14.109	14.214
65	12.265	13.025	13.648	14.185	14.654	15.082	15.433
70	13.114	13.869	14.517	14.049	15.573	16.011	16.400
75	14.000	14.705	15.336	15.965	16.480	16.940	17.354
80	14.747	15.542	16.234	16.842	17.381	17.864	18.298
85	15.513	16.328	17.041	17.674	18.237	18.742	19.194
90	16.373	17.101	17.929	18.578	19.157	19.679	20.152
95	17.184	17.826	18.772	19.438	20.036	20.577	21.068
100	17.991	18.848	19.610	20.293	20.908	21.466	21.976

The firſt horizontal line expreſſes the height of the *piers* in feet, from 6 to 24 feet, each increaſing by 3: the firſt vertical column, the width of arches from 20 to 100 feet, for every 5 feet.

The other columns expreſs the thickneſs of *piers* in feet and decimals, according to the reſpective height at the head of the column, and the width of the arch againſt it in the firſt column.

Rectangular *piers* are ſeldom uſed but in bridges over ſmall rivers; in all others they project from the bridge by a triangular priſm, which preſents an edge to the ſtream, in order to divide the water more eaſily, to prevent the ice from ſheltering there, as well as veſſels from running foul againſt them: this edge is terminated by the adjacent ſurfaces at right angles to each other at *Weſtminſter* bridge, but thoſe of the *Pont-royal*, at Paris, make an acute angle of about 60°. However the French in their later conſtructions, make this angle to terminate by two cylindric ſurfaces, whoſe baſes are arcs of 60 degrees. Muller's Pract. Fortif. part iv. ſect. 1. p. 257, &c.

PIERCEA, the *ſolanoides* of Tournefort, and rivinia of Linnæus, in *Botany*, is made a diſtinct genus by Miller. The characters are theſe: the flower has no petals; the empalement which incloſes the parts of generation, is compoſed of four oblong, oval, coloured leaves; it hath four ſtamina which ſtand erect and cloſe together, terminated by ſmall ſummits; in the centre is ſituated a large roundiſh germen, ſupporting a ſhort ſtyle, crowned by an obtuſe ſtigma; the germen afterwards turns to a roundiſh berry, ſitting upon the reflexed empalement, having one cell, incloſing a rough ſeed of the ſame form. There are two ſpecies. Theſe plants grow naturally in moſt of the iſlands in the Weſt Indies. The juice of the berries of the plant will ſtain paper and linen of a bright red colour, and many experiments made with it to colour flowers have ſucceeded extremely well in the following manner: the juice of the berries was preſſed out, and mixed with common water, putting it into a phial, ſhaking it well together for ſome time, till the water was thoroughly tinged; then the flowers, which were white and juſt fully blown, were cut off, and their ſtalks placed into the phial; and in one night the flowers have been finely variegated with red; the flowers on which the experiments were made were the tuberoſe, and the double white narciſſus.

PIERCED, **Percé**, in *Heraldry*, is when an ordinary is perforated, or ſtruck through; ſhewing, as it were, a hole in it.

This *piercing* is ſaid to be expreſſed in blazon as to its ſhape: thus if a croſs have a ſquare hole, or perforation in the centre, it is blazoned, *ſquare-pierced*, which is more proper than *quarter-pierced*, as Leigh expreſſes it; and accordingly the French call it *percé en quarré*. When the hole, or perforation is round, it muſt be expreſſed *round-pierced*; which Gibbon in Latin calls *perforata*; becauſe all holes made with pierces, or augres, are round. If the hole in the centre be in the ſhape of a lozenge, it is expreſſed, *pierced lozenge-ways*.

All *piercings* muſt be of the colour of the field, becauſe *piercing* implies the ſhewing of what is under the ordinary, or bearing. And when ſuch figures appear on the centre of a croſs, &c. of another colour, the croſs is not to be ſuppoſed *pierced*, but that the figure on it is a charge, and muſt be accordingly blazoned.

PIERCING, among *Farriers*. To *pierce a horſe's ſhoe-lean*, is to pierce it too near the edge of the iron. To *pierce it fat*, is to pierce it farther in.

PIERIDES, among the *Ancients*, an epithet given to the Muſes, upon account of their having been born in that part of the country of Macedon which was called *Pieria*.

PIERRE *d' automne*, a French name tranſlated from the Chineſe. It is the name of a medicinal ſtone, famous throughout the Eaſt for curing all diſorders of the lungs. Many people ſuppoſe it had its name of the *autumn-ſtone*, from its being only to be made at that ſeaſon of the year, but it may be made equally at all times, and the origin of the name is to be farther ſearched into.

The Chineſe chemiſts, like thoſe of all other nations, delight in a ſort of gibberiſh. A part of this is, the referring the ſeveral parts of the body to the ſeveral ſeaſons of the year. The lungs are in this ſcheme referred to autumn. This appears in their writings; and thus the ſtone for diſeaſes of the lungs came to be called *autumn-ſtone*.

It is a tedious preparation of human urine, and made as follows: they put thirty pints of the urine of a ſtrong and healthy young man into a large iron pot, and ſet it over a gentle fire; and when it begins to boil, they add to it, drop by drop, about a large tea-cup full of rape-oil: it is then left on the fire till the whole is evaporated to a thick ſubſtance reſembling black mud; they then take it out of the pot, and laying it on a flat iron, they dry it ſo that it may be powdered very fine.

This powder they moiſten with freſh oil, and put the maſs into a double crucible, ſurrounded with coals, where it ſtands till thoroughly dried again. They finally powdered this again, and putting it into a china-veſſel, covered with ſilk cloth and a double paper, they pour on boiling water, which makes its way, drop by drop, through theſe coverings, till ſo much is got in as is ſufficient to reduce it to a paſte. This paſte is well mixed together in the veſſel it is kept in, and this is put into a veſſel of water, and the whole ſet over the fire. The matter thus becomes again dried in balneo Mariæ, and is then finiſhed. Obſerv. ſur les Cout. de l'Aſie, p. 258.

PIES, in our *Ancient Law-Books*. *Freres* Pies, were a ſort of monks, ſo called becauſe they wore black and white garments, like magpies; the ſame, we ſuppoſe with thoſe ſince called *Carmelites:* who, for a like reaſon, were anciently called by the French *Freres Barrez.*

They are mentiond by Walſingham, p. 124. *In quodam veteri cœmeterio, quod fuerat quondam fratrum, quos* Freres Pies *veteres appellabant.*

PIESMA, a word uſed by the ancients to expreſs the remaining maſs after the expreſſion of any fluid ſubſtance from among its moſt ſolid parts. Thus the cake remaining in the bag after the expreſſion of oils, is called by this name: but there are inſtances of authors calling the expreſſed juice, inſtead of the reſiduum, by this name. Thus Dioſcorides calls the expreſſed juice of the bay-berries, the *pieſma laurinum*; and others, the expreſſed juice of roſes, *pieſma roſarum*, paying no regard to the roſe-cake left behind.

PIESTER, the name uſed by the ancients for the preſs which they employed in preparing the ſeveral juices of plants, &c. hence the word *pieſma*, which ſee.

PIESTRON, a word uſed by Hippocrates to expreſs a ſort of forceps, which he recommends to be uſed in difficult labours, to break the bones of the cranium of the fœtus, when its head is too large to ſuffer it to paſs whole. It was alſo called *embryothlaſtes*.

PIETANTIA, or PITTANCE, a portion of victuals diſtributed to the members of a college, or other community, upon ſome great feſtivals.

PIETANTIARIUS. See PITANCIARIUS.

PIETERMAN, in *Ichthyology*, the name uſed by ſome for a fiſh of the *cuculus* kind, approaching to the nature of the *draco marinus*, or weaver; and more uſually called among authors by its Braſilian name NIQUI. See *Tab.* III. *of Fiſh*, N° 29.

PIETISTS, a religious ſect that ſprung up towards the cloſe of the ſeventeenth century, among the Proteſtants of Germany; ſeeming to be a kind of mean between the Quakers of England, and the Quietiſts of the Romiſh church.

This ſect originated in the zeal of certain perſons, who, with the beſt intentions, endeavoured to ſtem the torrent of vice and corruption, and to reform the licentious manners both of the clergy and of the people. However, many, deluded by the ſuggeſtions of an irregular imagination, and an ill-informed underſtanding, or guided by principles and views of a more criminal nature, ſpread abroad new and ſingular opinions, falſe viſions, unintelligible maxims, auſtere precepts, and imprudent clamours againſt the diſcipline of the church; all which excited the moſt dreadful tumults, and kindled the flames of contention and diſcord.

The learned Spener was at the head of the firſt reformers, who, by the private ſocieties he formedat Frankfort, with a deſign to promote vital religion, rouzed the lukewarm from their indifference, and exited a ſpirit of vigour and reſolution in thoſe who had been ſatisfied to lament in ſilence the progreſs of impiety. With this view he publiſhed a book, entitled Pious Deſires, in which he repreſented in an affecting manner the diſorders of the church, and propoſed the remedies that were proper to heal them. The religious meetings above mentioned, or colleges of piety as they were called, however well deſigned in their original eſtabliſhment, tended in many places to kindle in the breaſts of the multitude the flames of a blind and intemperate zeal, whoſe effects were impetuous and violent: ſo that theſe inſtitutions of *pietiſm* became objects of reproach and occaſions of complaint.

The tumult this produced was farther promoted by the commotions that aroſe at Leipſic in the year 1689, when certain pious and learned profeſſors of philoſophy, undertook to explain the Scriptures in their colleges, with a view of forming candidates for the miniſtry into a more accurate acquaintance with theſe ſources of religious knowledge. The novelty of this method of inſtruction excited attention, and the lectures that were delivered to this purpoſe were much frequented. Suſpicions and rumours of an unfavourable kind were ſoon induſtriouſly propogated, and the profeſſors were prohibited from purſuing the plan of religious inſtruction which they had undertaken. During theſe troubles and diviſions, the invidious denomination of *Pietiſts* was firſt invented; or at leaſt, before this period it was not commonly known. It was originally applied by ſome inconſiderate perſons to thoſe who frequented the Biblical colleges, and lived in a manner ſuitable to the inſtructions and exhortations that were there addreſſed to them; and afterwards it was uſed to characteriſe all who were diſtinguiſhed by the exceſſive auſterity of their manners, or who, regardleſs of truth and opinion, were only intent upon practice, and turned the whole vigour of their efforts towards the attainment of religious feelings and habits. At this time the denomination was alſo ſometimes applied to perſons whoſe motley characters exhibited an enormous mixture of profligacy and enthuſiaſm, and who better deſerved the title of delirious fanatics. The conteſt, thus begun, very ſoon ſpread through all the Lutheran churches in the different ſtates and kingdoms of Europe. Many perſons of various ranks and profeſſions, of both ſexes, learned and illiterate, pretended a divine impulſe for pulling up iniquity by the root, and reſtoring to is primitive luſtre the declining cauſe of piety and virtue, and for eſtabliſhing a better diſcipline in the Chriſtian church. Aſſemblies ſimilar to thoſe eſtabliſhed by Spener were introduced for this purpoſe into Leipſic and other places: but they were not all conducted with prudence and order. Into theſe aſſemblies there were introduced ſeveral extravagant and hot-headed fanatics, who foretold the deſtruction of Babel, i. e. the Lutheran church; who terrified the populace with fictitious viſions, aſſumed the authority of prophets honoured with a divine commiſſion, revived doctrines that had long before been exploded and condemned, declared the approach of the millennium, and were guilty of many outrages againſt order and peace. The governors of the church and of the ſtate were alarmed at the progreſs of the diviſions which theſe enthuſiaſts produced, and many ſevere laws were enacted againſt the *Pietiſts*. Theſe revivers of piety were of two kinds: one ſect, at the head of which was Spener, propoſed to carry on their plan without introducing any change into the doctrine, diſcipline, or form of government in the Lutheran church: the other party were for introducing conſiderable alterations both in doctrine and eccleſiaſtical polity. Many miſtakes have been occaſioned by confounding theſe two parties; the former of which were zealouſly intent upon a very important object, the revival of piety, and, with this view, the reformation of public ſeminaries, where miniſters were educated, both as to the mode of inſtruction and the extent of diſcipline: but the latter were, for the moſt part, totally deſtitute of reaſon and judgment; their errors were the reveries of a diſordered brain; and they were rather to be conſidered as lunatics than as heretics. Some among them were leſs extravagant, and tempered the ſingular notions they had derived from reading or meditation, with a certain mixture of the important truths and doctrines of religion. They were moſtly, however, of the myſtic kind. For a more particular account we muſt refer to Moſheim's Eccl. Hiſt. vol. iv. p. 454, &c. Eng. edit. 8vo.

Many groſs errors are charged on the *Pietiſts*, in a book intitled Manipuſus Obſervationum Antipietiſticarum; but they have too much the ſeverity of polemical exaggeration; at leaſt it is certainly ſo with regard to a great part of them.

In effect, there are *Pietiſts* of ſeveral kinds: ſome run into groſs illuſions, and carry their errors to the overturning a great part of the Chriſtian doctrine; others are only viſionaries; and others very honeſt and good people, who, diſguſted with the coldneſs and formality of other churches, and charmed with the fervant piety of the *Pietiſts*, are attached to their party, without giving into the groſſeſt of their errors.

PIETISTS, otherwiſe called the *brethern and ſiſters of the pious and chriſtian ſchools*, a ſociety formed in the year 1678, by Nicholas Barre, and obliged, by their engagements, to devote themſelves to the education of poor children of both ſexes.

PIETOSA, in the *Italian Muſic*, ſignifies to play or ſing in a ſoft manner, fit to move pity or compaſſion.

PIETRA *emboſcata*, in *Natural Hiſtory*, a name given by the Italians to the Florentine marble, ſo remarkable for its delineations.

This marble is found in thin ſtrata, and is full of cracks: in theſe cracks there is uſually found a black mineral matter, which, getting into the ſubſtance of the ſtone a little way on each ſide of the crack, forms there various delineations, or the figures of pieces of moſs, buſhes, and the like: the paler pieces of the marble uſually have theſe delineations; the darker coloured having the forms of trees and houſes, or the ruins of old buildings.

PIETY, *mounts of*. See MOUNT.

PIEXE-*gallo*, in *Ichythology*, a name given by the Portugueſe to a fiſh caught about the ſhores of the Braſils, and much reſembling our *doree* or *faber piſcis*; more uſually known among authors by its Braſilian name, ABACATUAIA.

PIEXE-*porco*, in *Ichthyology*, a name by which ſome authors have called the *monoceros*, or unicorn-fiſh of Cluſius. The name is Portugueſe, and ſignifies *hog-fiſh*, this little creature having a mouth like a hog.

PIG, *Guinea*. See GUINEA.

PIG *of lead*, the eighth part of a fother; amounting to about 250 *lb.* weight.

PIGAYA, in *Natural Hiſtory*. See PYGAYA.

PIGEON, *columba*, in the Linnæan ſyſtem of *Ornithology*, is a diſtinct genus of birds of the order of the PASSERES, the characters of which are that the tongue is whole and even; the beak ſtraight, and ſcurfy at the baſe; the noſtrils long, and covered externally with a tumid membrane. Linnæus enumerates forty ſpecies.

The tame *pigeon*, and all its beautiful varieties derive their origin from one ſpecies, the ſtock-dove. Varro obſerves, that they derive their Latin name *columba* from their voice or cooing. They were and ſtill are in moſt parts of our iſland, in a ſtate of nature; they breed in holes of rocks and hollows of trees. They are gregarious in their nature, lay only two eggs, and breed many times in the year, ſo that it is ſaid, fourteen thouſand ſeven hundred and ſixty may be produced in four years from a ſingle pair; they bill in their courtſhip; the male and female ſit by turns and feed their young; they caſt their proviſion out of their craw into the young ones mouths; they drink by continual draughts, like quadrupeds, and their notes are mournful or plaintive.

Many of them are obſerved to migrate into the ſouth of England not appearing with us till November, and retiring in the ſpring. Their ſummer haunts are probably in Sweden. The varieties produced from the domeſtic *pigeon* are very numerous and extremely elegant; they are diſtinguiſhed by names expreſſive of their ſeveral properties, ſuch as TUMBLERS, CARRIERS, JACOBINES, CROPPERS, POWTERS, RUNTS, TURBITS, OWLS, NUNS, &c. Pennant.

PIGEON, *Barbary*. See BARB.

PIGEON, *helmet*. See HELMET.

PIGEON-*holes*, in *Brick-Making*. See BRICK.

PIGEON-*pea*, in *Botany*. See *Shrub*-TREFOIL.

PIGEON, *laughing*. See LAUGHER.

PIGEON, *Mahomet*. See MAHOMET.

PIGEON-*houſe*, a houſe erected full of holes within, for the keeping, building, &c. of *pigeons*, otherwiſe called a dovecote. Any lord of a manor may build a *pigeon-houſe* on his land, but a tenant cannot do it without his lord's licence. When perſons ſhoot at, or kill *pigeons* within a certain diſtance of the *pigeon-houſe*, they are liable to pay a forfeiture.

PIGER *Henricus*, ſlothful Harry, a fantaſtical name for a ſlow diſtilling chemical furnace; called alſo an ATHANOR.

PIGMENTS, *pigmenta*, preparations in a ſolid form, uſed by painters, dyers, &c. to impart colours to bodies, or to imitate particular colours.

Theſe require to be mixed with ſome fluid, as a vehicle, before they can be employed as paints, except in the caſe of crayons, where they are uſed dry.

When glaſs is ſtained, or coloured, as in painting on glaſs, or for counterfeiting gems, or precious ſtones, the *pigment* is always of a metalline, or a mineral nature.

In the gilding of wood, *pigments* approaching as near as may be to the colour of gold itſelf, are both laid under the gold, and uſed alſo for the colouring of depreſſed parts, where gold-leaf cannot be conveniently applied. The ſubſtance chiefly employed for this purpoſe is yellow ochre, the colour of which may be improved by a ſmall addition of vermillion or other red powders. See GILDING.

PIGMY, or PYGMY. See PYGMY

PIGNE. See PINEA.

PIGNOLETTI, in *Ichthyography*, a name uſed by many for the APHUA *cobites*, a ſmall fiſh of the *gobius* or ſea-gudgeon kind, common in the Mediterranean, and brought to the markets of Rome and Venice.

PIG-*nut*, or EARTH-*nut*, *bunium*, in *Botany*, a genus of the *pentandria digynia* claſs. Its characters are theſe: the involucrum of the great umbel is compoſed of many ſhort narrow leaves; and the proper empalement of the flower, is ſcarcely diſcernible; the flowers have five heart-ſhaped petals which are equal and turn inward; and they have five ſtamina; the oblong germen is ſituated below the receptacle, which afterwards becomes an oval fruit dividing it into two parts, containing two oval ſeeds. Miller enumerates three ſpecies, which delight to grow among graſs, ſo cannot without difficulty be made to thrive long in a garden. Linnæus mentions only one ſpecies.

The root of this plant, which is the only part uſed, and either roaſted or raw, is of a pleaſant ſweetiſh taſte; it is accounted nouriſhing, and to be provocative of venery; it is commended againſt the ſtrangury, and bloody urine.

PIG-*nut*. See WALNUT-*tree*.

PIGUS, in *Ichthyology*, the name of a ſpecies of leather-mouthed fiſh, very much approaching to the nature of the carp.

It is of the ſame ſhape and ſize with the common carp, and its eyes, fins, and fleſhy palate wholly the ſame; from the gills to the tail there runs a crooked dotted line; its back and ſides are bluiſh, and its belly reddiſh; it is covered with large ſcales, from the middle of every one of which there riſes a fine, pellucid, and very ſharp prickle.

It is a finer fiſh than the carp for the table, and is in ſeaſon in the months of March and April. It is caught in lakes in ſome parts of Italy, and is mentioned by Pliny, though without a name.

It is a ſpecies of *cyprinus*, according to Artedi, and is diſtinguiſhed by that author under the name of the *cyprinus* called *piclo* and *pigus*. He adds, that the tail is forked, and the ſcales large; and that in ſpring and autumn there grow out of them white pyramidal prickles, which remain about five or ſix weeks, and then fall off; the back is of a blackiſh blue, and the belly white, with a faint caſt of red. It never grows to more than five or ſix pounds; the fleſh is well taſted. It is found in the lakes in the northern nations.

PIISKER, in *Ichthyology*, the name of a fiſh of the *muſtæla* kind, uſually called the *muſtela foſſilis*, or *piſcis foſſilis*, the *foſſile fiſh*.

This fiſh is uſually found of a hand's breadth long, and as thick as one's finger; but they grow ſometimes to be much longer; the back is of a grey colour, ſpotted with a great number of ſpots, and tranſverſe ſtreaks, partly black and partly blue; the belly is yellow, and is ſpotted with red and white and black; the white ones are the larger, the others look as made with the point of a needle; and there is on each of the ſides a longitudinal black and white line. There are certain fleſhy excreſcences at the mouth, which, in ſwimming, they expand; and when out of the water, they contract them. They run into caverns in the earth, in the ſides of rivers, in marſhy places, and penetrate a great way, and are frequently dug up at diſtances from waters, and often, when the waters of brooks and rivers ſwell beyond their banks, and they are again covered by them, they make their way out of the earth into the water; and when it deſerts them, they are left in vaſt numbers upon the ground, when they are eaten by the ſwine.

This ſeems very much of the kind of the *fiſgum* fiſh, and poſſibly is no other than the ſame ſpecies; and poſſibly alſo the pæcilia of Schonefeldt is the ſame.

PIKE, an offenſive weapon, conſiſting of a ſhaft of wood, twelve or fourteen feet long; headed with a flat-pointed ſteel, called the *ſpear*.

The name pike is ſaid to be derived from a bird called by the French *pic*, by us wood-pecker; whoſe bill is ſaid to be ſo ſharp as to pierce wood like an augre. Du Cange derives it from the baſe Latin *pica*, or *picca*; which Turnebus ſuppoſes to have been ſo called, *quaſi ſpica*, becauſe reſembling an ear of corn: Octavio Ferraro derives it *à ſpicula*. M. Fauchet ſays, it was the *pike* that gave name to the Picards, and to Picardy; which he will have to be modern, and to have been framed on occaſion of that people's renewing the uſe of the *pike*; the etymology whereof he fetches from the French *piquer*, *to prick*. But others will have the name *Picard* to have been given that people by reaſon of their readineſs to pick quarrels; called in French *piques*.

The *pike* was a long time in uſe in the infantry, to enable them to ſuſtain the attack of the cavalry; but it is now taken from them, and the bayonet, which is fixed to the muzzle of the firelock, is ſubſtituted in its place.

It is ſtill uſed by ſome officers of infantry under the name of ſpontoon.

Pliny ſays, the Lacedæmonians were the inventors of the *pike*. The Macedonian phalanx was evidently a battalion of *pike-men*.

PIKE, in *Ichthyology*, a name given by us to the fiſh called by authors the *lucius* and *eſox*, and by the old Greek writers *oxyrinchus*.

This is the *lucius* ESOX of Linnæus: its characters are, that the head is very flat; the upper jaw broad, and ſhorter than the lower, which turns up a little at the end; the body is long, ſlender, and compreſſed ſideways; the teeth are very ſharp, diſpoſed only in the front of the upper jaw, but in both ſides of the lower, in the roof of the mouth, and often the tongue; the ſlit of the mouth is very wide, and the eyes ſmall; the dorſal fin is placed very low on the back, and conſiſts of twenty-one rays; the pectoral of fifteen; the ventral of eleven; and the anal of eighteen; the tail is bifurcated. The *pike* is common in moſt of the lakes of Europe, but the largeſt are thoſe of Lapland, which are ſometimes eight feet long: they are there dried and exported for ſale. It is ſaid, that the *pike* was introduced into England in the reign of Henry VIII. in 1537, when a *pike* was ſold for double the price of a houſe-lamb in February. Beſides fiſh and frogs, which are its uſual food, it will devour the water-rat and young ducks. It is very fierce and voracious. This fiſh is very remarkable for its longevity: we read of one that was ninety years old, and of another, that was not leſs than two hundred and ſixty-ſeven years old.

Pennant. See *Feeding of* Fish, *Pike*-Fishing, and Huxing.

Pike, *land.* See Lucius *terraſtris.*

Pike-*pearch.* See Lucio-*perca.*

Pike, *ſea.* See Merlucius and Sudis.

Pike, in *Commerce.* To treat at the *pike*, or *pike's* end, *à la pique*, denotes a kind of commerce, which the Europeans hold with ſavage nations, wherein they are to keep on their guard, and, as it were, ſword in hand.

Treating at the pike alſo denotes a of kind prohibited traffick which the Engliſh, French, and Dutch, maintain in ſeveral parts in the Spaniſh Weſt Indies, near the colonies which thoſe nations have in the Caribbee iſlands.

Perhaps it ſhould rather be called *treating at pike*, i. e. with the veſſel at anchor; in regard this commerce, which is prohibited on pain of death, is only practiſed in roads where veſſels lie at anchor, waiting for the Spaniſh merchants, who ſometimes by ſtealth, though more frequently with the connivance of the governors, &c. come to exchange their gold, pieces of eight, cochineal, &c. for the European merchandizes.

Others will have it treating at the *pike*, i. e. at a *pike's length*, or *diſtance*; by reaſon of the diſtance ſtrangers are obliged to keep at.

Pike, is alſo the name of an Egyptian meaſure, of which there are two kinds, the large and the ſmall.

The larger *pike*, called alſo the *pike* of Conſtantinople, is $27\frac{920}{1000}$ Engliſh inches. They meaſure all foreign goods with this, except only ſuch as are made of flax and cotton: for theſe they uſe the ſmall *pike*, called *pike belledy*, or the *pike* of the country; becauſe they meaſure with it all the manufactures of the country. This *pike* conſiſts of about $25\frac{576}{1000}$ Engliſh inches.

Pike, *half*, in the *Military Art*, is the weapon carried by an officer of foot. It differs from a *pike*, becauſe it is but eight or nine feet long, and the ſpear is ſmaller and narrower. See Spontoon.

PILA. See Pile.

Pila, Pier, in *Building*, a maſs of maſon's work, in manner of a pillar; uſually hexagonal. See Pier.

The word comes from the Latin *pila*, uſed in the ſame ſenſe by Vitruvius; and this, probably, from *πιλοω*, *cogo*, *coarcto.*

Evelyn obſerves, that *pilæ* and their quadras, as we ſee them in ancient altars and monuments, were uſed for inſcriptions; but the ſhorter and more maſſy ſerved for arches and buttreſſes to ſolid work. They are ſometimes made ſemicircular; but the ancients preferred thoſe pointed at right angles; as beſt able to reſiſt the current.

Pila *marina*, the *ſea-ball*, in *Natural Hiſtory*, the name of a ſubſtance very common on the ſhores of the Mediterranean and in ſome other places. It is uſually found in form of a ball, about the ſize of the balls of horſe-dung, and compoſed of a multitude of fibrillæ, irregularly complicated.

Its origin has been very variouſly gueſſed at by different authors. John Bauhine ſays, that it conſiſts of ſmall hairy fibres, and ſtraws, ſuch as are found about the ſea-plant called *alga vitriariorum*; but he does not pretend to aſcertain what plant it owes its origin to. Imperatus judged it to conſiſt of the exuviæ both of vegetable and animal bodies. Mercatus doubts whether it be a congeries of the fibrillæ of plants, wound up into a ball by the motion of the ſea-water; or whether it be not the workmanſhip of ſome ſort of beetle living about the ſea-ſhore, and analagous to our common dung-beetles ball, which it elaborates from dung for the reception of its progeny. Schreckius will have it compoſed of the filaments of ſome plant of the reed kind: and Welchius ſuppoſes it compoſed of ths pappoſe part of the flowers of the reed. Maurice Hoffman thinks it the excrement of the hippopotamus: and others think it that of the phoca, or ſea-calf.

But Klein, who had thoroughly examined as well the bodies themſelves, as what authors had conjectured concerning them, is of opinion, that they are wholly owing to, and entirely compoſed of, the capillaments which the leaves growing to the woody ſtalk of the *alga vitriariorum* have, when they wither and decay. Theſe leaves, in their natural ſtate, are about the thickneſs of a wheat ſtraw, and they are placed ſo thick about the tops and extremities of the ſtalks, that they enfold, embrace, and lie over one another; and from the middle of theſe cluſters of leaves, and, indeed, from the woody ſubſtance of the plant itſelf, there ariſe ſeveral other very long, flat, ſmooth, and brittle leaves: theſe are uſually four from each tuft of the other leaves, and they have ever a common vagina, which is membranaceous and very thin. This is the ſtyle of the plant, and the *pila marina* ſeems a cluſter of the fibres of the leaves of this plant, which cover the whole ſtalk, divided into their conſtituent fibres; and by the motion of the waves, firſt broken and worn into ſhort ſhreds, and afterwards wound up together into a roundiſh or longiſh ball. Klein, de Tabul. Marin. p. 22.

PILARIS, or Pilaris *turdus*, in *Ornithology*, the name by which authors in general call the field-*fare.*

PILASTER, in *Architecture*, a ſquare column, ſometimes inſulated, but more frequently let within a wall, and only projecting with a fourth or fifth part of its thickneſs. See *Tab. Archit. fig.* 40. (E)

The *pilaſter* is different in different orders; it borrows the name of each order, and has the ſame proportions, and the ſame capitals, members, and ornaments with the columns themſelves.

The *pilaſters* in the Attic order are repreſented at Y *fig.* 40. They are ſometimes at equal diſtances, and ſometimes coupled; but this depends on the intercolumination of the order below. If the Attic order is ſtraight, and immediately over it, it muſt partake of the ſame diſtances, and ſtand over the column in the lower order.

Pilaſters are made uſually without either ſwelling or diminution, as broad at top as at the bottom; though ſome of the modern architects, as M. Manſard, &c. diminiſh them at top, and even make them ſwell in the middle, like columns; particularly when placed behind columns.

Pilaſters, M. Perrault obſerves, like columns, become of different kinds, according to the different manner wherein they are applied to the wall. Some are wholly detached, called by Vitruvius *paraſtatæ*; others have three faces clear out of the wall; and others two; and others only one; theſe are all called by Vitruvius *antæ.*

Inſulate *pilaſters* are but rarely found in the antique. The chief uſe they made of *pilaſters* was at the extremities of porticoes, to give the greater ſtrength to the corners.

There are four principal things to be regarded in *pilaſters*; viz. their projecture out of the wall, the diminution, the diſpoſition of the entablature when it happens to be common to them and to a column, and their flutings and capitals.

1. The projecture of *pilaſters* which have only one face out of the wall is to be one eighth of their breadth; at moſt, not above one ſixth. When they receive impoſts againſt their ſides, their projecture may be a quarter of their diameter.

They are made to project in different proportions to their diameters, as one-eighth, one-fourth, one-half, and three-fourths; but are never uſed gracefully quite a ſquare, except at angles; and then only in maſſive buildings, as the portico of St. Paul's Covent-garden.

2. *Pilaſters* are but ſeldom diminiſhed, when they have only one face out of the wall. Indeed where they ſtand in the ſame line with columns, and the entablature is continued over both, without any break, the *pilaſters* are to have the ſame diminution with the columns; that is to ſay, on the face reſpecting the column; the ſides being left without any diminution.

When they are diminiſhed, they have an ill effect: where it becomes neceſſary to make them correſpond with the lines of the columns at top, as is ſometimes the caſe in porticos and returns, then it is better for the architect to make them entirely of the ſmalleſt diameter of the column to which they are oppoſed.

3. *Pilaſters* are ſometimes fluted, though the columns they accompany be not ſo; and, on the other hand, the columns are ſometimes fluted, when the *pilaſters* that accompany them are not.

The flutings of *pilaſters* are always odd in number, except in half *pilaſters*, meeting at inward angles; where four flutings are made for three, &c.

4. The proportions of the capitals of *pilaſters* are the ſame as to height with thoſe of columns, but they differ in width, the leaves of the former being much wider, becauſe *pilaſters*, though of equal extent, have only the ſame number of leaves for their girt; viz. eight. Their uſual diſpoſition is to have two in each face in the lower row, and in the upper row one in the middle, and two halves in the angles, in the turns whereof they meet. Add to this that the rim of the vaſe, or tambour, is not ſtraight, as the lower part is, but a little circular, and prominent in the middle.

In *pilaſters* that ſupport arches, the proportions, Palladio ſhews, muſt be regulated by the light they let in; and at angles, by the weight they are to ſuſtain. For which reaſon, ſays ſir Henry Wotton, a ruſtic ſuperfices beſt becomes them.

Pilaster, *demi*, called alſo *membretto*, is a *pilaſter* that bears up an arch: it generally ſtands againſt a pier or column.

PILATIO, a word uſed by the ancients to expreſs a minute fiſſure in the cranium, when not larger than a ſingle hair of the head.

PILATRO, or Pilatro *di Levante*, a ſalt uſed in the glaſs trade in ſome particular caſes. It is extracted from the froth of the ſea, coagulated by heat in the hot countries.

PILCHARD, in *Ichthyology*, a fiſh much approaching to the nature of the common herring, but ſmaller and differing in ſeveral other particulars.

The diſtinguiſhing characters of it are theſe: the body of the *pilchard* is leſs compreſſed than that of the herring, being thicker and rounder; the noſe is ſhorter in proportion, and turns up; the under jaw is ſhorter; the back is more elevated; the belly leſs ſharp; the dorſal fin of the *pilchard* is placed exactly in the centre of gravity, ſo that when taken up by it, the body preſerves an equilibrium, whereas that of the herring dips at the head; the ſcales of the *pilchard* adhere very cloſely, whereas thoſe of the herring very eaſily drop off. Pennant.

It is generally found ſwimming in vaſt ſhoals, and is caught in many parts of the Engliſh ſhores. Its fleſh is better taſted than that of the herring. See *Pilchard* FISHERY.

PILE, in *Antiquity*, a pyramid built of wood, whereon were laid the bodies of the deceaſed, to be burnt.

PILE is alſo uſed in building, for a great ſtake rammed into the earth, for a FOUNDATION to build upon in marſhy ground.

Amſterdam, and ſome other cities, are wholly built upon *piles*. The ſtoppage of Dagenham-breach is effected by dove-tail *piles*; that is by *piles* mortiſed into one another, by a dove-tail joint.

To eſtimate the force of the rammer made uſe of to drive *piles*, its weight ought to be multiplied into the velocity it acquires in falling. Thus, if a rammer which weighs 500 lb. be let fall from four feet, it will fall that height in half a ſecond, and have at the time of percuſſion a velocity capable to carry it uniformly eight feet in half a ſecond, without any farther help from gravity; ſo that we muſt multiply 500 by 16, or its weight by the number of feet it would fall in a ſecond, and the product 8000 gives the momentum of the ſtroke. If a capſtan, pullies, or windlaſs, be made to raiſe the rammer to a conſiderable height, and then, by an eaſy contrivance, looſen it at once from its hook, the momentum of the ſtroke will always be as the ſquare root of the height from which the rammer fell.

But it is to be obſerved, that the effect of the blow of the rammer will be as the ſquare of its velocity; that is, as the height from whence it falls, and not as the ſquare root of that height. Thus if the blow of the rammer drive the *pile* ſix feet deep; a blow given with twice the velocity, will, *cæteris paribus*, drive it twenty-four feet deep. This follows from the nature of the force of bodies in motion. See FORCE. Deſag. Exp. Phil. vol. i p. 336, &c.

We have the figure and deſcription of a new machine for driving *piles*, invented by Mr. Valoue, in Deſaguliers' Experim. Philoſoph. vol. ii. p. 417, ſeq. and in Ferguſon's Lectures, p. 61, quarto.

As this is the moſt complete engine of this kind that has yet been conſtructed, though others have been deſcribed by Leopold, Deſaguliers, and Belidor, the following account, illuſtrated by a figure, may be agreeable: A (*Tab.* VI. *Mechanics. fig.* 90.) is the great upright ſhaft or axle, on which are the great wheel B and drum C, turned by horſes joined to the bars S, S. The wheel B turns the trundle X, on the top of whoſe axis is the fly O, which ſerves to regulate the motion, and to act againſt the horſes, and keep them from falling when the heavy ram Q is diſcharged to drive the *pile* P down into the mud in the bottom of the river. The drum C is looſe upon the ſhaft A, but is locked to the wheel B by the bolt Y. On this drum the great rope H H is wound; one end of the rope being fixed to the drum, and the other to the follower G, to which it is conveyed over the pulleys I and K. In the follower G is contained the tongs F that take hold of the ram Q, by the ſtaple R for drawing it up. D is a ſpiral or fuſee fixed to the drum, on which is wound the ſmall rope T that goes over the pulley U, under the pulley V, and is faſtened to the top of the frame at 7. To the pulley-block V is hung the counterpoiſe W, which hinders the follower from accelerating as it goes down to take hold of the ram: for, as the follower tends to acquire velocity in its deſcent, the line T winds downwards upon the fuſee, on a larger and larger radius, by which means the counterpoiſe W acts ſtronger and ſtronger againſt it; and ſo allows it to come down with only a moderate and uniform velocity. The bolt Y locks the drum to the great wheel, being puſhed upward by the ſmall lever 2, which goes through a mortiſe in the ſhaft A, turns upon a pin in the bar 3 fixed into the great wheel B, and has a weight 4, which always tends to puſh up the bolt Y through the wheel into the drum. L is the great lever turning on the axis *m*, and reſting upon the forcing bar 5, 5, which goes down through a hollow in the ſhaft A, and bears upon the little lever 2. By the horſes going round, the great rope H is wound about the drum C, and the ram Q is drawn up by the tongs F in the follower G, until the tongs come between the inclined planes E; which, by ſhutting the tongs at the top, open it at the foot, and diſcharge the ram, which falls down between the guides *b b* upon the *pile* P, and drives it by a few ſtrokes as far into the mud as it can go; after which the top part is ſawed off cloſe to the mud, by an engine for that purpoſe. Immediately after the ram is diſcharged, the piece 6 upon the follower G takes hold of the ropes *a*, *a*, which raiſe the end of the lever L, and cauſes its end N to deſcend and preſs down the forcing bar 5 upon the little lever 2, which, by pulling down the bolt Y, unlocks the drum C from the great wheel B; and then the follower, being at liberty, comes down by its own weight to the ram; and the lower ends of the tongs ſlip over the ſtaple R, and the weight of their heads cauſes them to fall outward, and ſhuts upon it. Then the weight 4 puſhes up the bolt Y into the drum, which locks it to the great wheel, and ſo the ram is drawn up as before.

As the follower comes down, it cauſes the drum to turn backward, and unwinds the rope from it, whilſt the horſes, great wheel, trundle and fly, go on with an uninterrupted motion: and as the drum is turning backward, the counterpoiſe W is drawn up, and its rope T wound upon the ſpiral fuſee D.

There are ſeveral holes in the under ſide of the drum, and the bolt Y always takes the firſt one that it finds when the drum ſtops by the falling of the follower upon the ram; until which ſtoppage, the bolt has not time to ſlip into any of the holes.

The peculiar advantages of this engine are, that the weight, called the ram, may be raiſed with the leaſt force; that, when it is raiſed to a proper height, it readily diſengages itſelf, and falls with the utmoſt freedom; that the forceps or tongs are lowered down ſpeedily, and inſtantly, of themſelves, again lay hold of the ram, and lift it up; on which account this machine will drive the greateſt number of *piles*, in the leaſt time, and with the feweſt labourers.

The theory of this engine depends on the following principles, viz. 1. If the reſiſtance of the ground, and the maſſes of the *piles* be equal, the depths to which they will be driven with a ſingle blow will be as the product of the weight of the ram into the height through which it falls.

2. If the maſſes of the ram, and heights through which it falls are both equal, the depths to which the *piles* will de driven, will be in the inverſe ratios of the maſſes of the *piles* into the ſuperficies of that part of them which is already immerſed in the earth.

3. If all theſe things be unequal, the depths will be in a ratio compounded of the direct ratio of the heights through which the ram falls into its maſs, and the inverſe ratio of the maſs of the *pile* into its immerſed ſuperficies.

4. If the weights of the ram be equal, and alſo the weights of the *piles*, the depths to which they will be driven will be as the heights through which the ram falls directly, and the immerſed ſuperficies of the *piles*. Or, becauſe the immerſed ſuperficies of the *piles* are as the depths through which they are already driven into the earth, theſe depths are ſimply as the ſquare roots of the heights through which the ram falls.

Theſe principles are founded on the general ſuppoſition that the ſpace through which the weight falls is eſtimated by the product of its maſs into the ſquare of its velocity, or into the height through which it falls.

Hence it is inferred, that the diſtance through which a *pile* will be driven by each ſucceeding blow will be leſs and leſs, as the ſuperficies of that part of the *pile* which is immerſed in the ground increaſes; and, conſequently, that there is a certain depth, beyond which a pile of a given maſs and ſcantling cannot be driven; the maſs of the ram and the height through which it falls at firſt being aſſigned. It appears alſo, that the loading the *pile* with weights, and thereby increaſing its maſs, will be ſo far from accelerating its deſcent, that it will abſolutely retard it. See ſome curious obſervations on the ſtructure and operation of this engine by Mr. Bugge, profeſſor of aſtronomy and mathematics in the academy of Copenhagen, &c. in the Phil. Tranſ. for 1779 vol. lxix. part i. art. 12.

PILE is alſo uſed, among *Architects*, for a maſs or body of building.

PILE, in *Artillery*, denotes a collection or heap of ſhot or ſhells which are uſually piled up by horizontal courſes into a pyramidal form, the baſe being either an equilateral triangle, a ſquare, or a rectangle. In the triangle and ſquare, the *pile* terminates in a ſingle ball; but in a rectangle, in a ſingle row of balls. In the triangle and ſquare *piles*, the number of horizontal rows, or the number counted on one of the angles from the bottom to the top, is always equal to the number counted on one ſide, in the bottom row. In triangular *piles*, each horizontal courſe is a triangular number, produced by taking the ſucceſſive ſums of the numbers 1 and 2; 1, 2, and 3; 1, 2, 3, and 4, &c. and the number of ſhot in a triangular *pile* is the ſum of all the triangular numbers taken as far, or to as many terms, as the number in one ſide of the bottom courſe. In order to obtain the number in a triangular *pile*, count the number in the bottom row, and multiply that number more two by that number more one; and the product multiplied by one-ſixth of the ſaid number will be the whole ſum required.

In ſquare *piles*, each horizontal courſe is a ſquare number, produced by taking the ſquare of the number in its ſide: and the number of ſhot in a ſquare *pile* is the ſum of all the ſquares, taken from one as far as the number in the ſides of the bottom courſe. To find the number, count the number in one ſide of the bottom courſe; to that number add one, and to its double add one; multiply the two ſums together, then their product being multiplied by one-ſixth of the ſaid number, will give the required number of ſhot in the *pile*.

From the exemplification of theſe rules, it would appear, that when room is wanted, it is moſt convenient to ſtow the ſhot in triangular *piles*; for on the equilateral triangle, which is leſs than half the area of a ſquare of one of its ſides, there can be piled a greater number than half of thoſe that can be raiſed on the ſquare: and the height of a ſquare *pile* is ſomewhat leſs than that of a triangular one; becauſe a ſhot will ſink lower in the ſpace between four others, than between three others, when they are of equal diameter.

In rectangular *piles*, each horizontal courſe is a rectangle, the upper one being one row of balls: and every ſuch oblong *pile* may be conſidered as conſiſting of two parts, one a ſquare pyramid, and the other a triangular priſm. To find the number of ſhot in a rectangular *pile*, take the difference between the number in length and breadth, in the bottom courſe; multiply the number in breadth, more one, by half the breadth; the product multiplied by the ſaid difference will give the number in the priſmatic *pile*; upon the ſquare of the breadth, find the number in a pyramidal *pile*; and the ſum of theſe two *piles* will give the number required. See CALIBER, and *Tab. Gunnery*, *fig.* 2.

PILE, PILA, in *Coinage*, denotes a kind of puncheon, which, in the old way of coining, with the hammer, contained the arms, croſs, or other figure and inſcription, to be ſtruck for the reverſe of the ſpecies.

Accordingly, we ſtill call the arms-ſide of a piece of money the *pile*, and the head the *croſs*; becauſe, in the ancient monies, a croſs uſually took the place of the head in our's.

Hence alſo the game of *croſs* and *pile*.

Some will have it called *pile*, *pila*, becauſe on this ſide, in our ancient coins, there was an impreſſion of a church built on *piles*. Scaliger, with more probability, derives it from the old French word *pile*, *a ſhip*. Vide prima Scaligerana, in voc. Nummus Raticus, p. 115.

In ſome ancient writings *pila* is uſed to ſignify the particular figure, or impreſſion of money. Thus Fleta; he who brings an appeal of robbery, or theft, againſt another, muſt ſhew the certain quantity, quality, price, weight, number, meaſures, value, and *pile*.

PILE, in *Heraldry*, is an ordinary, in form of a point inverted, or a ſtake ſharpened; contracting from the cheif, and terminating in a point towards the bottom of the ſhield, ſomewhat in manner of a wedge. See *Tab.* II. *Herald. fig* 80.

It is formed, probably, in imitation of the Roman pilum, which was a tapering dart, about five feet long, and ſharpened at the point with ſteel.

The *pile* is borne inverted, engrailed, &c. like other ordinaries; and iſſues indifferently from any point of the verge of the eſcutcheon. He beareth a *pile gules*, by the name of Chandois.

PILES, in *Medicine*, a diſeaſe by phyſicians called HÆMORRHOIDS.

PILES, *liniment for the.* See LINIMENT.

PILE-worms, are a kind of *worms* found in the *piles* of the ſea-dikes in Holland. Theſe worms are of various ſizes, ſome of the young ones are not above an inch or two in length; but others have been found thirteen or fourteen inches long.

The heads of theſe creatures were covered with two hard ſhells or hemicrania; which together form a figure reſembling an augre; and with which they bore the wood. The beſt remedy againſt them is, to perforate the *pile* with many ſmall holes, about an inch aſunder; then it muſt be done over with a varniſh in the hotteſt ſun; and while the varniſh is hot, brickduſt muſt be ſtrewed over it; and this being ſeveral times repeated, the *pile* will be covered with a ſtrong cruſt, impenetrable to all inſects. See a farther account of theſe creatures in Phil. Tranſ. N° 455. ſect. 5.

PILE-wort, in *Botany*. See RANUNCULUS.

PILEÆ, a name given by ſome authors to a genus of *echinodermata*. See CONULUS.

PILENTUM, among the Romans, an eaſy kind of chariot, uſed by the Roman ladies at games and religious proceſſions.

PILETTUS, in our *Ancient Foreſt Laws*, an arrow which had a round knob a little above the head, to hinder it from going far into the mark.

From the Latin *pila*, which ſignifies any round thing like a ball. *Et quod foreſtarii ſui non portabunt ſagittas barbatas, ſed* piletros. Charta Rogeri de Quincy.

PILEUS, in *Roman Antiquity*, was the ordinary cap or hat worn at public ſhews and ſacrifices, and by the freed-men. It was one of the common rewards aſſigned to ſuch gladiators as were ſlaves, in token of their obtaining their freedom. See RUDIS.

PILEUS *preſbyteri*, in *Botany*, a name given by ſome writers to the *euonymus* or *fuſanus*, a ſhrub which grows in our hedges, and bears a ſquare fruit ſomewhat reſembling the cap worn by ſome orders of preiſts.

PILGRIM, one who travels through foreign countries to viſit holy places, and to pay his devotion to the relics of dead ſaints.

The word is formed from the Flemiſh *pelgrim*, or Italian *pelegrino*, which ſignifies the ſame; and theſe originally from the Latin *peregrinus*, *a ſtranger*, or *traveller*.

The humour of going on pilgrimage anciently prevailed exceedingly; particularly about the time of the croiſades. *Pilgrimages* were moſt in vogue after the end of the eleventh century, when every one was for viſiting places of devotion, not excepting kings and princes themſelves; and even biſhops made no difficulty of being abſent from their churches on the ſame account. The places moſt viſited were Jeruſalem, Rome, Compoſtella, and Tours; but the greateſt numbers now reſort to Loretto, in order to viſit the chamber of the bleſſed Virgin, in which ſhe was born, and brought up her ſon Jeſus, till he was twelve years of age.

This chamber, it is pretended, was carried by angels into Dalmatia, about the year 1291, and afterwards in the ſame manner tranſported to Loretto, where a magnificent cathedral is built over it. In this chamber is the image of the bleſſed Virgin, almoſt covered with pearls and diamonds, and round the ſtatue there is a kind of rainbow, formed of precious ſtones of various colours. Five hundred thouſand *pilgrims* have ſometimes reſorted to this houſe in one year, in order to pay their devotions before this glorious image.

Several of the principle orders of knighthood were eſtabliſhed in favour of *pilgrims* going to the Holy Land, to ſecure them from the violences and inſults of the Saracens and Arabs, &c.

Such were the orders of the knights Templars, the knights Hoſpitalers, knights of Malta, &c.

The MAHOMETANS are commanded in the Koran to perform a *pilgrimage* to Mecca. This is one of the capital points of their religion, and therefore a prodigious cavalcade of *pilgrims* annually go thither, in the company of thoſe who are ſent with the grand ſeignor's preſents to the tomb of Mahomet.

PILHANNAW, a name givin by the Indians to a bird found in the foreſts on the back of ſome of our American plantations.

It is a bird of prey, very large and bold; it is deſcribed by Joſſelin as four times as big as our goſhawk, and having a remarkable large head. All the birds are terrified at its approach; but it principally feeds on quadrupeds, as young fawns, and the like.

PILIMICTIO, a word uſed by ſeveral authors to expreſs a diſcharge of ſmall and long filaments, which reſemble hairs, among the urine.

PILING. See PALLIFICATION.

PILL, *pilula*, in *Pharmacy*, a form of medicine, taken dry, reſembling a little ball; invented in favour of ſuch as cannot well take ill-taſted medicinal draughts; as alſo to keep in readineſs for occaſional uſe without decaying. No medicine, that is intended to operate quickly, ought to be made into *pills*, as they often lie for a conſiderable time in the ſtomach before they are diſſolved, ſo as to produce any effect.

Pills are of various kinds, anodyne, ſomniferous, laxative, aperitive, hyſteric, antinephritic, &c. but they are principally cathartic.

The baſis of cathartic *pills* is uſually aloes; with which are mixed agaric, turbith, hermodactyls, ſenna, rhubarb, colocynth. See EXTRACTUM *catharticum*.

Pills are uſually wrapped up in leaf-gold, wafer-paper, or the like, to prevent their ill taſte being perceived.

PILLS, *æthiopic*, are directed by the college of Edinburgh to be made of three parts of quickſilver, two parts of golden ſulphur of antimony, and two of reſin of guaiacum, with the addition of two of white ſoap to promote their diſſolution in the ſtomach, and as much common ſyrup as will reduce them into a maſs of due conſiſtence. If a dram of this maſs is made into twenty *pills*, the doſe may be increaſed from one to ſix or more, according to the operation.

PILLS, *aromatic*, *pilulæ aromaticæ*, a form of medicine in the New London Diſpenſatory, intended to ſtand in the place of the *pilulæ diambræ* of the former, and the *pilulæ alephanginæ*, or *alcophanginæ*, of that and ſome other diſpenſatories.

The compoſition is this: take Socotorine aloes, an ounce and half; gum guaiacum, an ounce; the aromatic ſpecies and balſam of Peru, of each half an ounce; let the aloes and gum guaiacum be powdered ſeparately, and afterwards mixed with the reſt, and formed into a maſs with ſyrup of orange-peel.

PILLS, *bechic*, a ſort of *pills* good againſt coughs, ſo called from the Greek, βηξ, *cough*. They are alſo called *hypoglottides*, becauſe left like lozenges to diſſolve under the tongue.

PILLS *de cochia*. See COCHIA.

PILLS *of colocynth with aloes*, *pilulæ e colocynthide cum aloe*, a name given in the New London Pharmacopœia, to the purging *pill*, commonly known by the name of *pilulæ cocoiæ minores*.

As this is originally a preſcription of Galen, and the manner of proportioning the ingredients has been altered for the worſe, ſince his time, by enlarging the quantity of that nauſeous ingredient the *colocynth*; the college have reduced it to its former proportions, and ordered it to be made in this manner: take Socotorine aloes and ſcammony, of each two ounces; pith of coloquintida, one ounce; oil of cloves two drams; let the dry ſpecies be reduced to powder ſeparately, the oil mixed among them, and the whole formed into a maſs, with ſyrup of buckthorn.

PILULÆ *e colocynthide ſimpliciores*, a name given in the late London Pharmacopœia, to the purging-*pill* commonly known by the name of *pil. ex duobus*. It is made of equal parts of colocynth and ſcammony, with a conſiderable proportion of oil of cloves; and is beat up to a conſiſtence with ſyrup of buckthorn.

PILLS, *compoſing*, are made by beating together ten grains of purified OPIUM and half a dram of Caſtile ſoap: the whole may be formed into twenty *pills*; and one, two, or three, may be taken as occaſion requires, when a quieting draught will not ſit upon the ſtomach.

PILLS, *fœtid*, are prepared by mixing half an ounce of ASSA FOETIDA with any ſimple ſyrup. In hyſteric complaints, four or five *pills* of an ordinary ſize may be taken twice or thrice a day. They will alſo be of ſervice to perſons afflicted with the aſthma; and they may be made opening, if neceſſary, by adding a proper quantity of rhubarb, aloes, or jalap, to the above maſs.

PILLS *of gamboge*. See GAMBOGE.

PILLS, *hemlock*, are made by taking any quantity of the extract of HEMLOCK, and adding to it about a fifth part its weight of the powder of the dried leaves, and forming it into *pills*.

PILLS *for the jaundice* are prepared by taking of Caſtile ſoap, Socotrine aloes, and rhubarb, of each one dram, and making them into *pills*, with a ſufficient quantity of ſyrup or mucilage. See JAUNDICE.

PILLS, *mercurial*, *pilulæ mercuriales*, a form of medicine preſcribed in the late London Pharmacopœia, and containing crude mercury mixed for internal uſe.

The compoſition is to be made as follows: take of pure quickſilver, five drams; of Straſburg turpentine, two drams; of the cathartic extract, four ſcruples; rhubarb in powder, one dram; grind the quickſilver with the turpentine till it makes one uniform maſs, and then add the other ingredients, and beat up the whole into *pills*. If the turpentine be too hard, it muſt be ſoftened with a little oil of olives.

The mercurial *pills* may alſo be prepared by grinding half a dram of quickſilver, with equal its weight of reſin of guaiacum, the ſame quantity of white ſoap, and a little common ſyrup or mucilage of gum arabic, which is to be added after the quickſilver is united with the others. In order to render the mercurial *pills* purgative, let the ſame quantity of mercury be firſt ground with half its weight of reſin of guaiacum, and then with the ſame quantity of rhubarb and extract of black hellebore.

Mercurial *pills* may likewiſe be made, by rubbing together of purified mercury and honey, of each half an ounce, in a mortar, till the globules of mercury are perfectly extinguiſhed; and adding two drams of Caſtile ſoap, and a ſufficient quantity of powdered liquorice or crumbs of bread to give the maſs a proper conſiſtence. Equal parts of this maſs, and powdered rhubarb formed into a maſs with ſyrup, will make mercurial purging *pills*.

Mercurial ſublimate pills are made by diſſolving fifteen grains of the corroſive ſublimate of mercury in two drams of the ſaturated ſolution of crude ſal ammoniac, and making this into a paſte, in a glaſs mortar, with crumb of bread. This maſs muſt be formed into one hundred and twenty *pills*. Theſe *pills* have been found effectual, not only in curing the venereal diſeaſe, but alſo in killing and expelling worms, after other powerful medicines had failed. For the venereal diſeaſe, four of theſe *pills* may be taken twice a day, as an alterant three, and for worms two.

PILLS, *Miſaubin's*. See *Calcined* MERCURY.

PILLS, *perpetual*, or *pilulæ perpetuæ*, are regulus of antimony made up in *pills*; thus called, becauſe being ſwallowed and voided fifty times, they will purge every time with undiminiſhed force.

PILLS, *Plummer's*. See PLUMMER's *Æthiops*.

PILLS, *purging*. See PILLS *of Colocynth*, &c. ſupra.

Purging *pills* may be made of Socotrine aloes and Caſtile ſoap, of each two drams, and a ſufficient quantity of ſimple ſyrup. Four or five of theſe will generally prove a ſufficient purge. For keeping the body open, one may be taken night and morning. They are reckoned both deobſtruent and ſtomachic, and will be found to anſwer all the purpoſes of Dr. Anderſon's *pills*, the principal ingredient of which is aloes. When aloetic purges are improper, let *pills* be formed of extract of jalap, and vitriolated tartar, of each two drams, and a ſufficient quantity of ſyrup of ginger; which may be taken as the above.

PILL, *Rudius's*. See EXTRACTUM *Catharticum*.

PILLS, *ſoap*, *pilulæ ſaponacea*, a form of medicine preſcribed in the late London Diſpenſatory, and ordered to be made in the following manner: take almond *ſoap*, four ounces; ſtrained opium, half an ounce; eſſence of lemons, a dram; ſoften the opium a little with wine, and beat that and the *ſoap* with the eſſence, till it be reduced to the form of a *pill*. See OPIUM.

This is intended to ſupply the place of the *pill*, commonly called *Matthew's pill*, and is very happily corrected in regard to the taſte of the *ſoap*, by the addition of the eſſence of lemons.

PILLS, *ſquill*, are formed of a dram and a half of powder of dried ſquills; gum ammoniac, and cardamom ſeeds in powder, of each three drams, and ſimple ſyrup. In dropſical and aſthmatic complaints, two or three of theſe *pills* may be taken twice a day.

PILLS, *ſtomachic*, are made of extract of gentian, two drams; powdered rhubarb and vitriolated tartar, of each one dram; oil of mint, thirty drops; and a ſufficient quantity of ſimple ſyrup. Three or four of theſe may be taken twice a day, for invigorating the ſtomach, and keeping the body gently open.

PILLS *of ſtorax*, are formed of ſixteen parts of ſtrained ſtorax, eight of ſaffron, and five of ſtrained OPIUM.

PILLS, *ſtrengthening*, are made of ſoft extract of the bark and ſalt of ſteel, of each half an ounce. In diſorders ariſing from exceſſive debility or relaxation of the ſolids, as the *chloroſis* or green ſickneſs, two of theſe *pills* may be taken three times a day.

PILL, *Ward's*. See WARD's *pill*.

PILLAGE, among *Builders*, is ſometimes uſed for a ſquare pillar, ſtanding behind a column to bear up the arches; having a round baſe and capital, as a pillar has.

PILLAR, in *Architecture*, a kind of irregular column, round and inſulate; but deviating from the proportions of a juſt column.

Pillars are always either too maſſive, or too ſlender, for a regular architecture. In effect, *pillars* are not reſtrained to any rules: their parts and proportions are arbitrary.

Such, e. gr. are the *pillars* which ſupport Saracenic vaults, and other buildings, &c.

A ſquare *pillar* is a maſſive work, called alſo PIER, or *piedroit*, ſerving to ſupport arches, &c.

Butting-pillar is a butment, or body of maſonry, raiſed to prop, or ſuſtain, the thruſt of a vault, arch, or other work. See BUTTRESS.

It ſeems not impoſſible for ſtone to be caſt into the ſhape of *pillars*. We find mention made in the Philoſophical Tranſactions, of two *pillars* of ſtone, at Fontevraud, in France, each about ſixty feet high, all of one ſolid piece, which are ſaid to have been run. Nº 481. p. 328. in Not.

Pillars of ſtone were anciently erected as ſepulchral monuments, near the highways; and alſo in memory of ſome victory. We find traces of this cuſtom in Cornwall and Wales, where theſe *pillars* are often found, and called *meinigwir*, a ſtone for play, perhaps in memory of funeral games; and ſometimes *llech*, that is *tabula ſaxea*. Phil. Tranſ. Nº 458. p. 471.

Pompey's pillar is a famous monument of antiquity, conſtructed of red granite, and ſituated on a rock, about a mile without the walls of Alexandria, in Egypt. By the menſuration of Edward Wortly Montagu, eſq. the capital of the *pillar* is nine feet ſeven inches; the ſhaft ſixty-ſix feet 1 ¼ inch, the baſe five feet nine ¾ inches, the pedeſtal ten feet five ½ inches, the height from the ground ninety-two feet; though Dr. Pococke, by the ſhadow determined the whole height to be one hundred and fourteen feet; and its diameter nine feet and an inch. This prodigious maſs ſtands, as on a pivot, on a reverſed obeliſk; and was erected, as many have ſuppoſed, either by Pompey, or to his honour. But as no mention is made of it by Strabo, or any other ancient writers, Mr. Montagu concludes that it was not known before the time of Veſpaſian, and that it was erected to his honour. In proof of this opinion, he found within the circumference of the *pillar* a medal of Veſpaſian in fine order. See Pococke's Deſcr. of the Eaſt, vol. i. p. 8. and Philoſ. Tranſ. vol. lvii. art. 42.

Pillar, in the *Manege*, ſignifies the centre of the volta, ring, or manege-ground, round which a horſe turns, whether there be a wooden *pillar* therein, or not.

There are alſo *pillars* in maneges on the circumference, or ſide, placed at certain diſtances, by two and two. To diſtinguiſh theſe from that of the centre, they are called the *two pillars*. When theſe latter are ſpoken of, it is uſual to ſay, *Work the horſe between the two* pillars. When the former, it is called, *Working round the* pillar.

The uſe of the *pillar* in the centre is for regulating the extent of the ground, that the manege upon the volts may be performed with method and juſtneſs, and that they may work in a ſquare, by rule and meaſure, upon the four lines of the volts; and alſo to break unruly high-mettled horſes, without endangering the rider.

The *two pillars* are placed at the diſtance of two or three paces one from the other. The horſe is put between theſe, to teach him to riſe before, and yerk out behind, and put himſelf upon raiſed airs, &c. either by the aids, or chaſtiſement.

It has been ſuppoſed, that the hint of uſing *pillars* in the manege was taken from a contrivance of Eumenes; who, as Plutarch relates it, being beſieged at the fort of Nora, by Antigonus, and fearing leſt his horſes ſhould ſuffer for want of action, contrived a method of working them, without removing them from their ſtalls. For this purpoſe he placed a pulley over their heads in the beams of the ſtables, with which, by means of running reins, he pulled up their fore-parts, cauſing at the ſame time people to ſtand behind them, who, urging and laſhing them with whips, put them into motion, made them yerk out behind, raiſing and moving their fore-legs, and work and chafe themſelves till they ſweat copiouſly; by theſe means he preſerved their health, kept them in wind, and ready for ſervice. The ſingle *pillar*, once ſo frequent in maneges, but now laid aſide, was firſt uſed in Naples, and owes its origin to the want of covered buildings for riding and breaking horſes: in lieu of which they dug trenches, for working their horſes; the ſides of the trenches ſupplying the want of walls, and producing in a certain degree the ſame effect. The famous Pignatelli, of Naples, having no covered manege, worked his horſes in the open air, and uſed to tie them to a tree, and work them round it. Pluvinal, of France, was one of his ſcholars; and returning to France, where he profeſſed horſemanſhip, he placed a poſt or *pillar* in his manege, in imitation of Pignatelli's tree, and made the ſame uſe of it: to this he ſoon added another of the ſame ſize and height; which two *pillars* were calculated to anſwer purpoſes different from thoſe for which the ſingle *pillar* had been erected: the two *pillars* are ſtill in uſe, and reckoned an eſſential piece of furniture in all riding-houſes. The ſingle *pillar* has been long diſcontinued, but may be employed to advantage upon certain occaſions; eſpecially where a horſeman undertakes to *longe* a horſe, without the aſſiſtance of another perſon. It ſhould be obſerved that no horſe ought to be put between the two *pillars* till he is well ſuppled, and has acquired the firſt principles of the union between the legs, which are the natural *pillars* that every horſeman ſhould employ. The horſe ſhould be gently worked at firſt, that he may not become furious, and he ſhould be made to go only from ſide to ſide by means of the ſwitch, or from fear of the chambriere. In a few days, when he is accuſtomed to the ſubjection of the *pillars*, try to make him inſenſibly go into the cords, and endeavour to get from him a ſtep or two exact, and in time of the *paſſage* or *piaffer*.

The worſt effect of the *pillars* is the hazard you run of entirely ruining the hocks of your horſe, if you do not diſtinguiſh very exactly between theſe parts and the haunches. Berenger's Hiſt. and Art of Horſemanſhip, vol. ii. p.60. and 164, &c.

Pillars, *ropes of two*. See Rope.

PILLE *of Foddray*, or **Pile** *Fouldrey*, in the county of Lancaſter; a defence built on a creek of the ſea, called *Pille*, by the idiom of the county, for a *pile*, or fort, built for the ſafeguard or protection of any place.

This *pile* was erected there by the abbot of Fourneſſe, in the firſt year of Edward III. Camd. Brit. *Rex.—Dedimus Henrico comiti Northum. inſulam, caſtrum*, pelam, & *dominium de Man*, &c. Rot. Par. 1 Hen. IV.

PILLORY was anciently a poſt erected in a croſs road, by the lord, as a mark of his ſeigniory, with his arms on it, and ſometimes with a collar to tie criminals to.

Pillory, at preſent, is a wooden machine, whereon certain criminals, as perjurers, &c. are faſtened, and expoſed to the public deriſion.

With us it is in the form of a frame erected on a pillar, and made with holes and folding boards, through which the heads and hands of criminals are put.

The etymology of this word has been variouſly aſſigned by different writers: Spelman derives it from the French *pilleur, depeculator*; Cowel from πυλη, *janua*, and οραω, *video*; but the etymology of Du-Cange is the moſt probable, who derives it from *pila, a pillar*.

In the laws of Canutus it is called *healſchang*. Sir Henry Spelman ſays it is *ſupplicii machina ad ludibrium, magis quam pœnam*. It was peculiarly intended for the puniſhment of bakers who ſhould be caught faulty in the weight, or fineneſs of their bread. In old charters it is called *colliſtrigium*.

The *pillory* in Paris is in the middle of a round tower, with openings on every ſide. It is moveable on an axis, or arbour; round which the executioner gives the criminal the number of turns appointed in court; ſtopping him at each opening, to ſhew him to the people. It was intended for ſeveral kinds of criminals, particularly for fraudulent bankrupts; and all thoſe who made a ceſſion, or ſurrender, of their effects to their creditors, were obliged to take ſome turns round the *pillory* on foot, with a green cap on.

PILLOW *of a plough*, a term uſed by the farmers to expreſs that part of a *plough* which ſerves to raiſe or ſink the beam, and with it the ſhare, as the land is to be *plowed* ſhallower or deeper.

This *pillow* is a croſs piece of wood, reaching from one of the crow-ſtaves, or uprights, to the other; and as they are bored with two rows of holes, this *pillow* can be ſlipped up or down to any height, and kept there by pegs or cords in the holes. See Plough.

Pillow, in a *Ship*, is that piece of timber whereon the bow-ſprit reſts at its coming out of the hull aloft, cloſe by the ſtem.

PILLVENKEGEN, in *Ornithology*, the name of a bird approaching to the ſnipe kind; deſcribed by Aldrovand, and ſuppoſed by ſome to be the bird we call the Knot.

PILOSE *leaf*, among *Botaniſts*. See Leaf.

PILOSELLA, in *Botany*, *creeping mouſe-ear*. See Hawkweed.

PILOT, the perſon who ſuperintends the navigation of a ſhip, either upon the ſea-coaſt, or on the main ocean; but it is more particularly applied to a perſon retained on board a ſhip to conduct it into a road or harbour, or over bars or ſands; or through ſerpentine and intricate channels, or the like.

Menage derives the word *pilot* from *prorita*; q. d. he who governs the prow, or head. Others fetch it from the old French *pile, a ſhip*.

Pilots are no conſtant and ſtanding officers on board our veſſels; but are moſtly called in occaſionally, on coaſts and ſhores unknown to the maſter. And, having done their parts in piloting the veſſel, they return to ſhore, where they reſide.

The regulations, with regard to *pilots* in the royal navy, are as follow: the commanders of the king's ſhips, in order to give all reaſonable encouragement to ſo uſeful a body of men as *pilots*, and to remove all their objections to his majeſty's ſervice, are ſtrictly charged to treat them with good uſage, and in equal reſpect with warrant-officers.

The purſer of the ſhip is always to have a ſet of bedding provided on board for the *pilots*, and the captain is to order the boatſwain to ſupply them with hammocks, and a convenient place to lie in, near their duty, and apart from the common men; which bedding and hammocks are to be returned when the *pilots* leave the ſhip.

A *pilot*, when conducting one of his majeſty's ſhips in *pilot*-water, ſhall have the ſole charge and command of the ſhip, and may give orders for ſteering; ſetting, trimming, or furling the ſails; tacking the ſhip; or whatever concerns the navigation: and the captain is to take care that all the officers and crew obey his orders. But the captain is diligently to obſerve the conduct of the *pilot*, and if he judges him to behave ſo ill as to bring the ſhip into danger, he may remove him from the command and charge of the ſhip, and take ſuch methods for her preſervation as ſhall be judged neceſſary; remarking upon the log-book the exact hour and time when the *pilot* was removed from his office, and the reaſons aſſigned for it.

Captains of the king's ſhips, employing *pilots* in foreign parts of his majeſty's dominions, ſhall, after performance of the ſervice, give a certificate thereof to the *pilot*, which being produced to the proper naval officer, he ſhall cauſe the ſame to be immediately paid; but if there be no naval officer there, the captain of his majeſty's ſhip ſhall pay him, and ſend the proper vouchers, with his bill, to the navy-board, in order to be paid as bills of exchange.

Captains of his majeſty's ſhips, employing foreign *pilots*, to carry the ſhips they command into or out of foreign ports, ſhall pay them the rates due by the eſtabliſhment or cuſtom of the country, before they diſcharge them; whoſe receipts being duly vouched, and ſent with a certificate of the ſervice performed, to the navy-board, they ſhall cauſe them to be paid with the ſame exactneſs as they do bills of exchange. Regulations and Inſtructions of the Sea Service, &c.

Pilots of ſhips taking upon them to conduct any ſhip from Dover, &c. to any place up the river Thames, are to be firſt examined and proved by the maſter and wardens of the Trinity-houſe, &c. or ſhall forfeit 10*l.* for the firſt offence, 20*l.* for the ſecond, and 40*l.* for every other offence; one moiety to the informer, the other to the maſter and wardens; but any maſter or mate of a ſhip may *pilot* his own veſſel up the river: and if any ſhip be loſt through the negligence of any *pilot*, he ſhall be for ever afterwards diſabled to act as a *pilot*. 3 Geo. I. cap. 13.

The lord wardens of the cinque-ports may alſo make rules for the government of *pilots*, and order a ſufficient number to ply at ſea to conduct ſhips up the Thames. 7 Geo. I. cap. 21.

No perſon ſhall act as a *pilot* on the Thames, &c. (except in collier ſhips) without licence from the maſter and wardens of Trinity-houſe, at Deptford, on pain of forfeiting 20*l.* *Pilots* are to be ſubject to the government of that corporation, and pay ancient dues not exceeding 1*s.* in the pound out of wages for the uſe of the poor thereof. 5 Geo. II. cap. 20. In charter parties of affreightment, the maſter generally covenants to find a *pilot*, and the merchant to pay him: and in caſe the ſhip ſhall miſcarry through the inſufficiency of the *pilot*, the merchant may charge either the maſter or the *pilot*; and if he charges the maſter, ſuch maſter muſt have his remedy againſt the *pilot*. Lex Mercator. 70.

Among the French *pilot* is alſo uſed for a ſteerſman, or an officer on board a ſhip, who always watches her courſe, and directs it.

There are among the French two kinds of *pilots*; the one a coaſting *pilot*, well acquainted with the coaſts, ports, roads, bars, ſands, &c. and who commands in ſight thereof.

The other an officer who makes obſervations, and takes altitudes out at ſea; uſes the quadrant and fore-ſtaff; and alſo watches the compaſs.

The *pilot* is always the ſecond perſon in the ſhip, whether it be a man of war, or merchant-man. In the former the captain is the firſt, the *pilot* the ſecond. In a merchant-ſhip, the maſter is the firſt, the *pilot* after him.

The *pilot* is alſo the ſteerſman, who ſtands at the helm, and manages the rudder.

PILOTING, in *Navigation*, is either common or proper: common *piloting* is that art which conſiſts in coaſting along ſhore, or ſailing within ſight of land. Proper *piloting* is the art of ſailing to diſtant places through the ocean, and out of ſight of land. See NAVIGATION, PILOT, and SAILING.

PILULARIA, *pepper-graſs*, in *Botany*, the name of a very remarkable little plant, of which Mr. Bernard de Juſſieu has given a very accurate account in the Memoirs of the Academy of Sciences of Paris, 1739. See *Tab.* XV. *Botany*, N° 21.

This is a genus of plants in the *cryptogamya* claſs of ferns in the Linnæan ſyſtem: the characters of which are, that the male flowers are numerous, and ſtand on the ſide of the leaves; and the female part of the fructification has no cup or petals, but conſiſts of a round quadrilocular fruit, which contains a vaſt number of roundiſh ſeeds.

PILUM, in *Roman Antiquity*, a maſſive weapon, which in charge they darted upon the enemy. It was commonly four-ſquare, but ſometimes round, compoſed of a piece of wood three cubits long, and a ſlip of iron of the ſame length, hooked and jagged at the end.

PILY *barry*. See BARRY *Pily*.

PIMENTO, in *Botany*, *all ſpice*, or *Jamaica* PEPPER. Miller claſſes this ſpecies under the genus of *caryophyllus*, or CLOVE-*tree*: but Linnæus makes it a ſpecies of the *myrtus* or MYRTLE.

It grows on the hilly parts of Jamaica, and is much cultivated there; becauſe of the great profit from the cured fruit ſent in great quantities yearly into Europe.

It flowers in June, July, and Auguſt, ſooner or later, according to its ſituation and the different ſeaſons for rain; and after it flowers, the fruit ſoon ripens.

There is little difficulty in curing and preſerving this fruit for uſe, which is done thus: the negroes climb the trees and pull off the twigs with the unripe green fruit, and afterwards carefully ſeparate the fruit from the twigs, leaves, and ripe berries; which done, they expoſe them to the ſun from its riſing to ſetting, for many days, ſpreading them thin on cloths, turning them now and then, and carefully avoiding the dews. By this management they become a little rugoſe or wrinkled, dry, and from a green change to a brown colour, and then they are fit for the market.

The ripe berries are very carefully ſeparated from thoſe to be cured; becauſe their wet and plenteous pulp renders them unfit for cure. See *Jamaica* PEPPER.

It is accounted the beſt and moſt temperate, mild, and innocent, of common ſpices, and fit to come into greater uſe, and to gain more ground than it hath yet done. It ſurpaſſes moſt of the Eaſt Indian aromatics in promoting the digeſtion of meat, attenuating tough humours, moderately heating, ſtrengthening the ſtomach, expelling wind, and doing thoſe friendly offices to the bowels we generally expect from ſpices. Phil. Tranſ. N° 192.

Diſtilled with water, it yields an elegant eſſential oil, ſo ponderous as to ſink in water, in taſte moderately pungent, in ſmell and flavour approaching to oil of cloves, or a mixture of thoſe of cloves and nutmegs: the remaining decoction, inſpiſſated, leaves an extract ſomewhat ungrateful but not pungent. To rectified ſpirit it imparts, by maceration or digeſtion, the whole of its virtue, together with a browniſh-green tincture. The college of London directs a ſimple water to be diſtilled from this ſpice, in the proportion of a gallon from half a pound; and a ſpirituous water, by drawing off two or three gallons of proof ſpirit from the ſame quantity of the ſpice. Lewis.

PIMP-*tenure*, a kind of *tenure* mentioned in our old writers, *Willielmus Hoppeſhort, tenet dimidiam virgatam terræ, per ſervitium cuſtodiendi ſex damiſellos ſcil. meretrices, ad uſum domini Regis.* 12 Ed. I.

PIMPERNEL, *anagallis*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower hath an empalement, which is cut into five ſharp ſegments; the flower is of one leaf, ſpread open, and cut into five parts; the germen afterwards becomes a globular veſſel with one cell, opening horizontally, in which are lodged ſeveral angular ſeeds. There are four ſpecies.

Pimpernel is a plant moderately warm and dry, with a little ſtypticity; and is therefore accounted by ſome a good vulnerary. The juice being given inwardly by itſelf, or mixed with cow's milk, is uſeful in conſumptions, and diſtempers of the lungs; it is often put in cordial waters as an alexipharmic, and is good againſt malignant diſtempers. It has been recommended by ſome writers of note as of ſingular advantage in maniacal caſes, and in delirious fevers. James.

Lewis obſerves, that the leaves of the *pimpernel* are not wholly deſtitute of medicinal powers; for the expreſſed juice, on being depurated by ſettling, and then inſpiſſated to the conſiſtence of an extract, affects the organs of taſte with a pungent ſaline auſterity: ſo that they have ſome claim to the reſolvent and detergent virtues aſcribed to them by ſome writers; though neither a decoction nor tincture of them, nor their juice in its dilute ſtate, and much leſs their diſtilled water, can exert thoſe virtues in any conſiderable degree.

PIMPERNEL, *water*, a ſpecies of *veronica*, or SPEEDWELL. See BROOK-LIME.

PIMPERNEL, *round-leaved water*. See SAMOLUS.

PIMPERNEL, *yellow, of the woods*. See LOOSE-STRIFE.

PIMPILIM, in *Botany*, a name by which ſome authors have called the plant which produces the long pepper, uſed in medicine.

PIMPILLO, in *Botany*. See *Prickly* PEAR.

PIMPINELLA. See *Burnet* SAXIFRAGE.

PIMPLE, in *Medicine*, a ſmall puſtule ariſing on the face.

By mixing equal quantities of the juice of houſe-leek, *ſedum minus*, paſſed through paper, and of ſpirit of wine rectified by itſelf, a white coagulum of a very volatile nature is formed, which Dr. Burghart commends for curing *pimples* of the face; and ſays, that the thin liquor ſeparated from it, with ſugar-candy, is an excellent remedy for thick viſcid phlegm in the breaſt. Satyr. Sileſiac. Spec. 4. Ob. 2.

PIN, in *Commerce*, a little neceſſary implement, chiefly uſed by the women in adjuſting their dreſs.

The form and application of this little moveable need no deſcription; but its conſumption, and the number of hands it employs, are too conſiderable to be paſſed by unnoticed.

Pins are now altogether made of braſs-wire, blanched; formerly they likewiſe made them of iron-wire, which, being blanched, like the others, paſſed for braſs: but the ill effect of thoſe *pins* has quite diſcarded their uſe. The French, however, could not be driven off from them without ſeveral arrets of parliament. By a ſentence of the lieutenant de police, July 1695, the ſeizure of ſome millions of thoſe *pins* was confirmed, and the *pins* condemned to be burnt by the common executioner.

The *pins* moſt eſteemed in commerce are thoſe of England; thoſe of Bourdeaux are next; then thoſe made at Rugle, Naigle, and ſome places in Normandy.

The perfection of *pins* conſiſt of the ſtiffneſs of the wire, and its blanching; in the heads being well turned, and the points filed.

The London pointing and blanching are in moſt repute; becauſe our *pin*-makers in pointing uſe two ſteel-mills, the firſt of which forms the point, and the latter takes off all irregularities, and renders it ſmooth, and as it were poliſhed; and, in blanching, uſe block tin, granulated; whereas in other parts they uſe a mixture of tin, lead, and quickſilver; which not only blanches worſe than the former, but is alſo dangerous, on account of the ill quality of that mixture, which renders a puncture with a pin thus blanched very difficult to be cured.

The conſumption of *pins*, and the number of artificers employed in the manufacture thereof, are incredible. In Paris alone there were anciently above one thouſand people employed in it; at preſent there are none; yet there is every year ſold above fifty-thouſand crowns worth of the *pin-wire* to the *pin*-makers of the neighbouring places, all brought thither from Stockholm. In the little town of Rugle, in Normandy, there are computed at leaſt five-hundred workmen employed in the *pin* manufacture; the whole town being peopled therewith.

Notwithſtanding that there is ſcarce any commodity cheaper than *pins*, there is none that paſſes through more hands before they come to be ſold. They reckon twenty-five workmen ſucceſſively employed in each *pin*, between the drawing of the braſs-wire, and the ſticking of the *pin* in the paper.

Pins are diſtinguiſhed by numeros; the ſmaller called from N° 3, 4, 5; thence to the 14th; whence they are only accounted by two to two, viz. N° 16, 18, and 20, which is the largeſt ſize.

Beſides the white *pins*, there are alſo black ones made for mourning, from N° 4, to N° 10. Theſe are uſually of iron-wire.

Laſtly, there are *pins* with double heads, of ſeveral numeros; uſed by the ladies to fix the buckles of their hair for the night, without danger of being diſturbed by their pricking, &c.

The firſt mention of *pins* that occurs in the Engliſh ſtatute-book is found in the ſtatute of Richard III. in 1483, prohibiting foreign manufactures; and it appears from the manner in which *pins* are deſcribed in a ſtatute of the 34th and 35th of Henry VIII. cap. 6. (A. D. 1543.) and the labour and time which the manufacture of them would require, that they were a new invention in this country, and probably but lately brought from France. However, in about three years time they fell into the preſent ingenious and expeditious manner of making them. One of the articles of the ſtatutes of the ancient *pin*-makers of Paris was, that no maſter ſhould open more than one ſhop for the ſale of his wares, except on new-year's day and the eve thereof; this we mention in an age of luxury and profuſion, to recollect the agreeable ſimplicity of our forefathers, who contented themſelves with giving *pins* for new-year's gifts.

Hence the cuſtom of ſtill giving the name *pins*, or *pin-money*, to certain preſents, which accompany the moſt conſiderable bargains; in which it is uſual to give ſomething towards the *pins* of the wife, or children, of the perſon with whom the bargain is ſtruck.

Pins, *hook*. See Hook.

Pins, *protracting*. See Protracting.

Pin *money*, the name given to that allowance uſually made by the huſband to his wife, for her own ſpending.

Ad Pinnas *bibere*, a method of drinking anciently uſed among the Danes in England. The cuſtom was, to fix a *pin* in the ſide of the wooden cup or waſſal-bowl; which *pin* each gueſt was to drink bare, upon penalty of forfeiting.

Pin *and web*, a horny induration of the membranes of the eye, not much unlike a cataract.

The *pin* and *web* is the ſame with what we otherwiſe call pannus, unguis, pterygium, &c.

Pin *wheel of a clock*, the ſame with the ſtriking wheel. See Wheel, and Clock.

PINACOTHECA, among the *Ancients*, a place where pictures, ſtatues, and other curioſities were kept.

PINACIA, Πινακια, among the Athenians, tablets of braſs, whereon the names of all the perſons in each tribe duly qualified, and willing to be judges, or ſenators of the areopagus, being ſeverally written, they were caſt into a veſſel provided on purpoſe; and into another veſſel were caſt the ſame number of beans, a hundred of which were white, and all the reſt black; then the names of the candidates and the beans were drawn, one by one; and thoſe whoſe names were drawn out together with the white beans, were received into the ſenate. See Probuleuma.

In Solon's time there were only four tribes, each of which elected a hundred ſenators; ſo that the areopagus conſiſted of four hundred members; but the number of tribes being afterwards increaſed, the number of ſenators was conſequently augmented by ſome hundreds; but the manner of election remained the ſame. See Areopagus.

PINARII, among the Romans, an order of prieſts belonging to Hercules, who offered ſacrifices to that God in a ſolemn manner every year. They were in this ſervice connected with the Potitii.

PINASTELLA, in *Botany*. See Hippuris.

PINASTER, in *Botany*. See Pine.

PINCH, in *Muſic*, a kind of grace proper for certain inſtruments, particularly the harpſichord: it is formed by ſtriking alternately the ſound of the written note with the ſound of the inferior note, and obſerving to begin and finiſh with the note which bears the *pinch*. The difference between the *pinch* and trill is this, that the latter is ſtruck with the ſuperior note, and the *pinch* with the inferior.

To Pinch, is to uſe the fingers inſtead of the bow, to make the chords of an inſtrument ſound. There are ſome chord inſtruments which have no bow, and which are played only by *pinching*, as the lute, guittar, &c. and ſometimes thoſe with which the bow is generally uſed are pinched, as the violin, and violincello; and this method of playing is marked in the Italian by the word *pizzicato*.

PINCHBECK. See Gold-*coloured metal*.

PINCHING, in *Gardening*, a ſort of pruning, performed by nipping or breaking off the branches or ſprings of a plant, or tree, between the nails of two fingers.

Moſt gardeners hold, that *pinching*, contributes to the abundance of the fruit, as well as of the branches; and they ſay, that young ſhoots, thus lopped, are leſs apt to grow black and die, than when cut with a pruning-knife.

The ſeaſon for *pinching* is chiefly in April or May; ſometimes it is alſo practiſed in June and July. The fruits, it is practiſed on, are chiefly melons, cucumbers, &c. Quintiny alſo preſcribes it for fruit-trees.

It is chiefly to be practiſed on the large branches towards the top of the plant, or tree, which are uſeleſs, and yet conſume a great quantity of good ſap. It muſt rarely be employed on the large branches below; which ought always to be preſerved for the winter's pruning, that they may yield others the following year, fit to fill the empty places. Nor muſt the operation of *pinching* be performed on the tender ſhoots; becauſe, having only juſt ſap enough for themſelves, when they come to put forth more branches in the place where they are *pinched*, the ſmall ſtock of ſap allotted them, being divided, will ſtarve them. The operation is to be performed within two or three eyes of the branch they grow out of.

The effect of *pinching* is, that, inſtead of one uſeleſs, and, perhaps, hurtful wood-branch, a vigorous tree will put forth two or three at the eyes remaining; and the ſap being thus divided, the branches will be leſs, and fit for both wood and fruit.

Pinching, in the *Manege*, is when, the horſe ſtanding, the rider holds him faſt with the bridle-hand, and applies the ſpurs juſt to the hairs of his ſides, without pricking him.

If the horſe is impatient under this, and draws himſelf up, and wants to go forward, it is a ſign of vigour and mettle. But the purchaſer ought to try the thing himſelf on the horſe's back; for the jockies have the art of making the dulleſt horſe ſeem to have mettle in theſe trials. The purchaſer muſt alſo diſtinguiſh between the reſtleſſneſs of the horſe under this treatment that ariſes from vigour, and that which ariſes from the horſe's being tickliſh, and which goes off immediately.

Pinching is accounted an aid, ſpurring a chaſtiſement, or correction.

PINDARIC, in *Poetry*, an ode formed in imitation of the manner of Pindar.

The *Pindaric* manner is diſtinguiſhed by the boldneſs and height of the flights, the ſuddenneſs and ſurpriſingneſs of the tranſitions, and the ſeeming irregularity, wildneſs and enthuſiaſm, of the whole.

Pindar, whence the manner takes its name, was of Thebes: he flouriſhed about four hundred and ſeventy-eight years before Chriſt, and was contemporary with Æſchylus. When Alexander the Great deſtroyed Thebes, he ordered the houſe in which Pindar had lived to be preſerved. What we have remaining of his is a book of odes, all in praiſe of the victors at the Olympian, Pythian, Nemæan, and Iſthmian, games; whence the firſt is entitled, the *Olympians*; the ſecond, the *Pythians*; the third, the *Nemæans*; and the fourth, the *Iſthmians*. Pindar is full of force and fire; his thoughts are ſententious, his ſtyle impetuous, his ſallies daring, and frequently running, as it were, at random; he effects a beautiful diſorder, which, yet, is ſaid to be the effect of the greateſt art.

The ſuppoſed irregularity of his numbers has made ſeveral of his imitators imagine themſelves *Pindaric* poets, by the mere wildneſs and irregularity of their verſes. None of our writers ſeem to have ſucceeded in the *Pindaric* character better than Cowley.

In a *Pindaric* ode, the plan of the whole ought to be drawn firſt, and the places marked out where the elegant ſallies and wanderings may beſt be, and how the returns may be juſtly made to the ſubject.

PINE, *pinus*, in *Botany*, a genus of the *monoecia adelphia* claſs. Its characters are theſe: the male flowers are collected in a ſcaly conical branch, without petals, having many ſtamina, which are connected at their baſe, terminated by erect ſummits, included in the ſcales, which ſupply the want of petals and empalement; the female flowers are collected in a common oval cone, and ſtand at a diſtance from the male on the ſame tree; under each ſcale of the cone are produced two flowers, which have no petals, but a ſmall germen, ſupporting an awl-ſhaped ſtyle, crowned by a ſingle ſtigma; the germen afterward becomes an oval, oblong nut, crowned with a wing, included in the rigid ſcale of the cone. Linnæus reckons twelve, and Miller fourteen ſpecies.

The *pine*-tree, with five rough leaves in each ſheath, the commonly called lord Weymouth's *pine*, and the *pine* with ſmall whitiſh cones, called the Scotch *pine* or fir, the wood of which is the red or yellow DEAL, are the beſt worth cultivating of all the kinds for the ſake of the wood; the others may be planted for variety in parks, &c. where they make a good appearance in winter, when other trees are deſtitute of leaves.

All the ſorts of *pines* are propagated by ſeeds, which are produced in hard woody cones; the way to get the ſeeds out of thoſe cones which are cloſe, is to lay them before a gentle fire, which will cauſe the cells to open, and then the ſeeds may be eaſily taken out. If the cones are kept entire, the ſeeds will remain good ſome years. The beſt time for ſowing the ſeeds of *pines*, is about the end of March; when the ſeeds are ſown, the place ſhould be covered with nets to keep off birds, otherwiſe, when the plants begin to appear with the huſk of the ſeed on their tops, the birds will pick off the heads of the plants, and deſtroy them.

When the plants apear, they muſt be conſtantly kept clean from weeds; and in every dry ſeaſon, if they are now and then gently refreſhed with water, it will forward their growth; but this muſt be done with great care and caution; for if they are haſtily watered, it will waſh the tender plants out of the ground, or lay them down flat, which often rots their ſhanks; and when this is too often repeated, it will have the ſame effect. If the plants come up too cloſe, they may be thinned about the beginning of July.

The beſt ſeaſon to tranſplant all the ſorts of *pines* is about the latter end of March, or the beginning of April, juſt before they begin to ſhoot; for although the Scotch *pine*, and ſome of the moſt hardy ſorts, may be tranſplanted in winter, eſpecially when they are growing in ſtrong land, where they may be taken up with balls of earth to their roots; yet this is frequently attended with bad conſequences; but thoſe which are removed in the ſpring rarely fail.

When theſe trees are planted in expoſed ſituations, they ſhould be put pretty cloſe together, that they may ſhelter each other; and when they have grown a few years, part of the plants may be cut down, to give room for the others to grow; but this muſt be gradually performed, leſt by too much opening the plantation at once, the air, by being let in among the remaining trees too freely, ſhould ſtop their growth.

As the upright growth of theſe trees renders their wood the more valuable, they ſhould be left as before obſerved, not too open; by this means they will draw each other up, and grow very tall. If they are left eight feet aſunder each way, it will be ſufficient room for their growth. The firſt diſtance of their planting being therefore about four feet, if at the firſt thinning a fourth part of the trees are taken away, the reſt may ſtand twelve or fourteen years longer; by which time they will be of a ſize for making ladders and ſtandards for ſcaffolding, beſide many other purpoſes they will then anſwer; ſo that from this ſale as much may be made, as will defray not only the whole expence of the planting, but the rent of the land, with intereſt; while the ſtanding trees may remain for the fortunes of younger children.

From the wild *pine*, or pineaſter, is procured the common turpentine, which is chiefly uſed by farriers: and from it diſtilled the oil of turpentine. The finer and more valuable part, which comes firſt, is called the ſpirit; what is left at the bottom of the ſtill is the common reſin.

The kernels of the nuts of the manured or ſtone *pine*, are of a balſamic and nouriſhing nature; good for conſumptions, coughs, and hoarſeneſs, reſtorative, and of ſervice after long illneſs. Miller's Gard. Dict.

The leaves and tender tops of *pine* and FIR are uſed for diet-drinks, and allowed to be antiſcorbutic and diuretic. See CHOWDER-*beer*.

The reſinous exudations of *pines* and firs are an important branch in the materia medica, and not only uſeful in the preſcriptions of phyſicians, but have alſo been thought otherwiſe conducive to health. Pliny tells us, that wines, in the time of the old Romans, were medicated with pitch and reſin. And Jonſtonus, in his Dendrographia, obſerves, that it is wholeſome to walk in groves of *pine*-trees, which impregnate the air with balſamic particles. It is known that all turpentines and reſins are good for the lungs, againſt gravel alſo, and obſtructions; and it is ſaid, that the medicinal properties of thoſe drugs are found in TAR-*water*, which operate without heating the blood or diſordering the ſtomach.

Pitch, tar, roſin, and turpentine, are all made from theſe trees by a very familiar proceſs. In the ſpring time, when the ſap is moſt free in running, they pare off the bark of the *pine*-tree, to make the ſap run down into a hole which they cut at the bottom to receive it; in the way, as it runs down, it leaves a white matter like cream, but a little thicker; this is very different from all the kinds of reſin and turpentine in uſe, and it is generally ſold to be uſed in the making of flambeaux, inſtead of white bees-wax. The matter that is received in the hole at the bottom, is taken up with ladles, and put into a large baſket; a great part of this immediately runs through, and this is the common turpentine. This is received into ſtone or earthen pots, and is ready for ſale. The thicker matter, which remains in the baſket, they put into a common alembic, and adding a large quantity of water, they diſtil this ſo long as any oil is ſeen ſwimming upon the water; this oil they ſeparate from the ſurface in large quantities, and this is the common oil or ſpirit of turpentine; the remaining matter at the bottom of the ſtill is common yellow reſin. When they have thus obtained all that they can from the ſap of the tree, they cut it down, and hewing the wood into billets, they fill a pit dug in the earth with theſe billets; and ſetting them on fire, there runs from them, while they are burning, a black thick matter; this naturally falls to the bottom of the pit, and this is the tar. The top of the pit is covered with tiles, to keep in the heat; and there is at the bottom a little hole, out of which the tar runs like oil; if this hole be made too large, it ſets the whole quantity of the tar on fire; but if ſmall enough, it runs quietly out.

The tar, being thus made, is put into barrels; and if it be to be made into pitch, they put it into large boiling veſſels, without adding any thing to it; it is then ſuffered to boil a while, and being then let out, is found, when cold, to be what we call pitch. Phil. Tranſ. Nº 243. p. 291.

PINE, *ground*, in *Botany*, a ſpecies of GERMANDER.

PINE, *ſtinking ground*. See CAMPHOROSMA.

PINE, *heath low*. See CORIS.

PINE, *ſilver*, in *Botany*. A branch of this tree being brought from the Cape of Good Hope, by Mr. Goddard, and preſented to the Royal Society, Dr. Sloane gave the following account of it; the twig of this tree had a great many leaves ſet round it, very cloſe to one another, ſo as to hide the twig itſelf there where they grow; each of the largeſt being about four inches long, and three quarters of an inch broad in the middle where broadeſt, from whence they decreaſe towards both extremes, ending in a point; being like thoſe of the oſier willow, only broader, and all covered over with the thickeſt, fineſt, and longeſt, white ſilken hair, or down, of any plant the doctor remembers to have ſeen. The cones are of the bigneſs of thoſe of the cedars of Lebanon, and of the ſame ſhape; the cuticula, or ſmall ſkin of each ſcale, being covered over with a white ſhort down or wool, ſhining alſo like ſilk. Between the ſcales is lodged the ſeed, which is almoſt as large as the *pine* nut, near the ſame ſhape, of a dark brown colour, and having a riſing eminent line or belly running through the middle of it from end to end. This ſeed lies in a thin, reddiſh brown membrane, which has on its top four feathers, like thoſe belonging to the ſeed of the clematitis; which being between the ſcales, and riſing above them, adds a very great beauty to the cone, and may likewiſe ſerve for wings, by means of the wind, to looſen or carry the ſeed to diſtant places, thereby propagating itſelf. Dr. Plunkenet calls it *leucodendros*. Phil. Tranſ. N° 198.

Pine, *ſpunge-leaved*, in *Botany*. A branch of this tree being brought from the Cape of Good Hope by Mr. Goddard, and preſented to the Royal Society, Dr. Sloane gave the following deſcription of it: the bark was of a brown colour and ſmooth; its wood whitiſh and hard, with only a ſmall pith; the leaves were round it, without any order, very thick ſet, having no foot-ſtalks; being about two inches and a half long, and about one-third of an inch broad near the farther end, where broadeſt; ſmooth, hard, and of a browniſh or dirty green colour: on the top of the branch comes the fruit, which is ſurrounded by three or four twigs overtopping it, and with their leaves almoſt hid in it; it is about five inches long, and is made up of many ſcales, hard and red, incloſing one another; the lowermoſt and outwardmoſt being very ſhort, the innermoſt four inches long, each of them ending in a point; ſome ſcales having on their outſides a gummy piece. In the middle of theſe ſcales were the firſt rudiments of many ſeeds, the ſame not being fully ripe; each of which is ſet about with a great quantity of yellow, fine, ſilken down, about three quarters of an inch long, having a ſtylus, or ſtring, two inches long, and yellowiſh membranes incloſing the ſtylus and tomentum; being feathered at top for their better diſperſion, in order to propagate themſelves. Phil. Tranſ. N° 198.

Pine, *wild*. See PENGUIN.

Pine-*apple*, a delicious fruit, called by authors ANANAS. In the Linnæan ſyſtem, this is a ſpecies of the BROMELIA; to which he has alſo added the KARATAS, making that genus include ſeven ſpecies. Its botanical characters are theſe; the flower conſiſts of three oval petals, produced from the protuberance of the pyramidal fruit, which have ſix awl-ſhaped ſtamina, crowned with ſpear-ſhaped ſummits; the german is ſituated below the flower, which becomes a cell, in which are lodged ſeveral angular ſeeds. Miller enumerates ſix varieties, and probably there might, by proper management in the ſowing, be raiſed as many as we have of apples and pears in our orchards.

The fruit is produced from an herbaceous plant, which has leaves reſembling thoſe of aloe, and, for the moſt part, ſawed in their edges, but much thinner, and not ſo juicy as the aloe; the fruit reſembles the cones of the *pine*-tree, whence it is ſuppoſed to have its name.

The plant grows wild in vaſt abundance in many parts of Africa, and has been long cultivated in the hotter iſlands of the Weſt Indies, where they are now very plentiful and very fine. It is now ſome time alſo ſince it has been introduced into the gardens of Europe, where, with proper management, it ſucceeds very well. There is an opinion, that there are none raiſed ſo good from the American plants, as from thoſe originally propagated by M. la Cour of Leyden, the firſt who ever ſucceeded in the bringing it to fruit in Europe; but this is an error, occaſioned by ſome of the indifferent kinds having been at firſt frequently ſent over from America; but of late we have had much finer from thence than ever M. la Cour knew.

The firſt ſort, or the oval ſhaped *pine-apple*, with a whitiſh fleſh, is the moſt common in Europe; but the ſecond, or pyramidal *pine apple*, with a yellowiſh fleſh, called the ſugar loaf *pine* is greatly preferable to it, being much larger and better flavoured, and the juice being leſs aſtringent, the fruit may be eaten with leſs danger in large quantities. This uſually produces ſix or ſeven ſuckers alſo under the fruit, from whence it may be propagated, and therefore is the moſt fit for culture of any. The third ſort, or *pine-apple* with ſmooth leaves, is propagated merely as a curioſity, the fruit being much inferior to that of the others. The ſixth ſort, or green *pine apple*, is the moſt rare of all, and is had from Barbadoes and Montſerrat. The fourth, or that with very ſmooth graſs-green leaves, is what is called in America the *king-pine*. Theſe plants are propagated by planting the crowns or ſuckers: theſe, after having been laid to dry in a warm place four or five days, are to be ſet in pots of five or ſix inches over at the top, filled with good freſh light earth, mixed with a little rotten dung; this mixture muſt be often turned, for eight or twelve months, to make it mix the more perfectly. The moſt proper compoſt mould for the *pine* plant, ſays Mr. Speechly, is prepared by paring off the turf of a paſture, where the ſoil is a ſtrong rich loam, and of a reddiſh colour, about two inches thick; and laying it with the graſs ſide downwards, and one courſe thick in the pens of ſheep-paſtures, where it may continue two, three, or more months, being enriched by their urine and dung, and reduced by the treading of their feet. When it has lain in the pens till the quantity of ſheep's dung conſtitutes about one-third part, it may be laid in a heap for at leaſt ſix months, being often turned in that time: three wheel-barrows of this ſoil, one barrow of vegetable mould from decayed oak-leaves, and half a barrow of coarſe ſand, make a compoſt mould for crowns, ſuckers, and young plants. Three wheel-barrows of the above ſwarth, two barrows of vegetable mould, one of coarſe ſand, and one-fourth of a barrow of ſoot, make a compoſt mould for fruiting plants. The plants, when ſet, muſt have a little water, to ſettle the earth to their roots; and the pot then plunged into a well-tempered bed of tanner's bark. See HOT-BED.

In the ſummer ſeaſon they ſhould be gently watered about twice in a week; and once a week over their leaves, in order to waſh the filth from them, and to promote the growth of the plants. Some perſons frequently ſhift their plants from pot to pot; but it is not adviſable to remove them oftener than twice in a ſeaſon; firſt about the end of April, and again in the beginning of Auguſt. At each of theſe times the bark-bed ſhould be ſtirred, and new bark added; and the plants, when they are plunged into it, ſhould be gently watered over their leaves. Here they may remain till the beginning of November; and in the winter ſeaſon they ſhould not be watered more than once a week. Thoſe plants which ſhew their fruit ſhould never be removed; becauſe ſhifting them at this period will ſtint their growth, and retard their ripening. It is now the practice of thoſe who are deſirous of propagating this fruit, to erect low ſtoves, with pits in them, for the hot-bed. Some build them with upright glaſſes in front, about four feet high, and ſloping glaſſes over theſe, which riſe about ſix feet high, ſo that there is juſt height enough for perſons to walk upright on the back ſide of the bark-bed. Others make only one ſlope of glaſſes from the top of the ſtove down to the plate, which lies about ſix or eight inches above the bark-pit in the front of the ſtove; but this ſtove is ſubject to an inconvenience, as there is no walk in the front between the bark-pit and the glaſſes. One of theſe ſtoves, about twenty five feet long in the clear, with the pit for the tan reaching from end to end, and ſix feet and a half wide, will contain about a hundred plants. But it will be neceſſary to have a bark-pit under a deep frame, in order to raiſe the young plants: in this bed the ſuckers, when they are taken from the old plants, and the crowns which come from the fruit, ſhould be plunged, ſo that this frame will ſerve to raiſe the young plants for ſupplying the ſtove. Theſe young plants, unleſs the frame is built with brick-work, and flues for warming the air, ſhould be removed, in October, into the ſtove. In the beginning of March, if there be no nurſery for them, they muſt be removed into the hot-bed, which ſhould be prepared a fortnight before, that the tan may have acquired a proper heat; care being taken that it be not too hot. In cold nights, the glaſſes ſhould be covered with mats. A proper diſtance ſhould be allowed to the pots in this frame, in order to promote the magnitude of the fruit. When the ſun is warm, the glaſſes ſhould be raiſed, in order to let out the ſteam of the bed, and to admit freſh air; and in the middle of the day, in very hot weather, it will be proper to ſhade the glaſſes with mats. During the ſummer ſeaſon, theſe plants muſt be frequently watered in ſmall quantities at a time; and in hot weather they muſt have free air admitted to them every day, from ten o'clock till four. In winter the heat of the ſtove is regulated by a thermometer, which ſhould never be kept to a greater warmth than five or ſix diviſions above ananas, nor ſuffered to be more than as many diviſions below it. In winter they will require watering only once a week. When the plants are placed into the tan for the winter ſeaſon, which ſhould be done about the beginning of October, the tan-bed ſhould be renewed, adding two-thirds of new tan to one-third of the old, which will maintain a proper degree of warmth till February, when it ſhould be ſtirred again, and a load or two of new tan added, ſo as to raiſe the bed as much as it ſunk ſince the autumn. In April it will be proper to ſtir up the tan again; and by adding freſh tan, to renew the warmth of the bed, and forward the fruit. At this time it will be proper to ſhift the young plants, which are deſigned to produce fruit the following year; and the tan-bed, into which theſe are plunged, muſt be renewed, in order to forward their growth, that they may have ſtrength enough by autumn to produce good fruit. Thoſe plants, which ſhew their fruit early in February, will ripen about June; but the ſeaſon in which the fruit is in greateſt perfection is from the beginning of May to the end of September. The method of judging when the fruit is ripe is by the ſmell and from obſervation; nor ſhould it remain ſo long before it is cut as to become ſoft to the touch, for it will become flat and dead; and it ſhould be cut early in the morning, laid in a cool but dry place, preſerving the ſtalk and crown upon it, and eaten the ſame day in which it is cut. That ſort with green fruit, if ſuffered to ripen well, is of an olive-colour; but the ſugar-loaf ſort is preferable, and is eaſily diſtinguiſhed from all the others by the purple ſtripes on the inſide of its leaves. The fruit, when ripe, is of a paler colour than the others, inclining to ſtraw colour. This ſort was brought from Braſil to Jamaica. The next in goodneſs to this is the Montſerrat *pine*; the leaves of which are of a dark brown, inclining to purple on their inſide; and the protuberances of the fruit are larger and flatter than thoſe of the common ſort. Miller.

One of the principal difficulties attending the culture of the *pine-apple* has been to deſtroy the inſects which infeſt it. Mr. Speechley, in a late treatiſe on this ſubject, has enumerated three ſpecies, viz. the brown turtle inſect, or *coccus heſperidum* of Linnæus; the white ſcaly inſect; and the white mealy crimſon-tinged inſect. The methods that have been formerly in uſe for extirpating them have been to ſhift the plants into freſh pots, at the ſame time cleanſing their leaves and roots, which is uſually denominated a dreſſing. Decoctions made from tobacco, wormwood, walnut leaves, henbane, and other herbs of a bitter and poiſonous quality, have alſo been generally uſed on this occaſion, to which ſome have added ſnuff, ſulphur, and pepper; but none of theſe are in their nature ſufficiently penetrating. And it is well known, that ſhifting and dreſſing the plants conſiderably retard their growth, and give them a ſickly appearance, eſpecially in their fruiting ſeaſon. He therefore recommends the following receipt: take one pound of quickſilver; put it into a glazed veſſel, with one gallon of boiling water; let it ſtand till it becomes cold, and pour off the water for uſe. Repeat this on the ſame quickſilver, till a ſufficient number of gallons is provided; then to every gallon of this mercurial water add ſix ounces of ſoft green ſoap, diſſolved in a portion of it; let the mixture be milk-warm when it is uſed; then tie the leaves of the large-ſized plants together; take them out of the pots, and diveſt them of their leaves, and dip them wholly in the mixture for three minutes, and ſet them out in the open air to dry, with their roots downwards; in a few hours repeat the operation a ſecond time, having added one table-ſpoonful of ſweet oil to every gallon of the mixture; then ſet them to dry with their tops downwards, and afterwards remove them to the hot-houſe. The moſt eligible ſeaſons are March and September.

The ſame author has alſo deſcribed a method of raiſing *pines* without the uſe of tanner's bark, or, at moſt, with only a covering of tan two inches thick, viz. by oak-leaves, collected in the fall of the year, laid in heaps ſix or ſeven feet thick to couch, well trodden, and occaſionally moiſtened, for five or ſix weeks, which, he ſays, are ſuperior to bark for this uſe. See Dr. Hunter's Edition of Evelyn's Sylva, 1776.

A ſimilar idea of uſing the decayed leaves of trees in the hot-houſe was before ſuggeſted by Mr. Clark of Chiſwick, and applied to the culture of melons. It appears that leaves under proper management, i. e. after fermentation, &c. are a moſt valuable manure; mixed with dung they make the beſt hot-beds, which preſerve their heat much longer than thoſe which are made entirely with dung. Beſides, when reduced to black vegetable mould, and mixed with compoſt of earth, they are ſuperior to every other for flowers, as well as for all plants that grow in pots.

William Baſtard, eſq. has deſcribed a method of raiſing *pine apples* in water. The plant contained in a pot of earth is placed in a pan, which is always kept full of water, and which ſtands on a ſhelf near the higheſt, and conſequently the moſt heated, part of the back wall of the hot-houſe, ſo that the *pine* plants ſtand as near as poſſible to the glaſs, without abſolutely touching it. The fruit raiſed in this manner is ſaid to be always much larger as well as better flavoured, than when it is ripened in a bark-bed. Phil. Tranſ. vol. lxvii. part ii. art. 33.

PINE-*apple*, in *Metallurgy*, a word uſed to expreſs a ſort of mould, uſed in the refining ſilver. It has this name from its ſhape, reſembling the fruit of that name.

When the refiners have taken the mixture of the ſilver and mercury together out of the cauldron, and ſtrained it through two coarſe wetted cloths, to make it the thicker, they then beat it with a ſort of battledores, to drive out yet more of the quickſilver; and ſtraining it again after this, they take out the remaining thick amalgam, and forming it into little pellets, they put theſe carefully into the moulds called *pine-apples*, preſſing them down. The amalgam, when put into this veſſel or mould, is uſually ſo rich as to be about one fifth ſilver. The manner of diveſting this of the quickſilver afterwards is by means of fire; in which the quickſilver riſes in vapour, and the ſilver is left pure behind; but the careleſſneſs of the workmen in doing this, and particularly the uſing bad veſſels, or the not luting them cloſe, cauſes a waſte of this mineral greater than could be conceived. Alonſo tells us, that in the city of Potoſi alone, at the time of his writing, when the trading in metals ran but low, above thirty thouſand pieces of eight were waſted in quickſilver that was loſt one year with another. To prevent this, they then principally ſtudied the means of keeping the ſilver as dry of quickſilver as they could, in the *pine-apple*; but it then holding four-fifths of the whole maſs in quickſilver, the great waſte was in the ſeparating it afterwards.

PINE-*ſalt*, a name given to a preparation of the bark of the *pine*-tree, uſed as a ſort of ſeaſoning to food in the manner in which we uſe ſalt.

The Laplanders are very fond of this; and the manner of their preparing it is given in Scheffer's hiſtory of that country: they peel off the bark from the lower part of the bodies of thoſe trees, and ſeparating the outer rough part, they take the inner bark, which they carefully divide into its ſeveral thin coats; when they have thus reduced them to as thin pieces as they can, they expoſe them to the ſun in their ſummer months to dry, and when thoroughly dried, they tear them into thin and narrow ſlips, and put them up in boxes made of the outer bark of other trees freſh taken off. They bury theſe boxes in deep holes dug in the ſands, and let them remain thus one day; on the other day following they bring together a number of ſtumps of trees, and other wood, and laying them over the place where the bark is buried, they ſet them on fire; the next day they take out their buried boxes, and the heat having penetrated ſo deep into the earth in a mild degree, the bark is found to have been greatly affected by it, and to have received a red colour, and a very agreeable flavour, ſomewhat ſweetiſh. This is their general ſauce; they eat it with all their food, as we do ſalt, but it has ſo little of the nature of ſalt, that the name is ill adapted to it.

There is another vegetable ſubſtance, which, though of a diſagreeable taſte to us, yet cuſtom teaches them to be fond of. This is the angelica petroſa: they cut the large ſtalks of this plant before it runs to ſeed, and roaſt them; they eat this in conſiderable quantities with their *pine-ſalt*, and eſteem it not only an agreeable, but a more than ordinary wholeſome ſort of food.

PINEA, or **PIGNE**, in *Commerce*, a term uſed in Peru and Chili, for a kind of light, porous maſſes or lumps, formed of a mixture of mercury and ſilver-duſt from the mines.

The ore, or mineral, of ſilver, being dug out of the veins of the mine, is firſt broken, then ground in mills for the purpoſe, driven by water with iron peſtles, each of two hundred pounds weight. The mineral, thus pulveriſed, is next ſifted; then worked up, with water, into a paſte; which, when half dry, is cut into pieces, called *cuerpos*, a foot long, weighing each about two thouſand five hundred pounds.

Each cuerpo is again kneaded up with ſea-ſalt, which, diſſolving, incorporates with it. They then add mercury, from ten to twenty pounds for each cuerpo, kneading the paſte afreſh until the mercury be incorporated therewith. This office being exceedingly dangerous, on account of the noxious qualities of the mercury, is always made the lot of the poor Indians.

This amalgamation is continued for eight or nine days; and ſome add lime, lead, or tin ore, &c. to forward it; and, in ſome mines, they are obliged to uſe fire. To try whether or no the mixture and amalgamation be ſufficient, they waſh a piece in water; and if the mercury be white, it is a proof that it has had its effect; if black, it muſt be further worked.

When enough, it is ſent to the lavatories, which are large baſons that empty ſucceſſively into one another. The paſte, &c. being laid in the uppermoſt of theſe, the earth is then waſhed from it into the reſt by a rivulet turned upon it; an Indian, all the while, ſtirring it with his feet, and two other Indians doing the like in the other baſons.

When the water runs quite clear, out of the baſons, they find the mercury and ſilver, at bottom, incorporated.

This matter they call *pella*, and of this they form the *pineas*, by expreſſing as much of the mercury as they can; firſt, by putting it into woollen bags, and preſſing and beating it ſtrongly; then, by ſtamping it in a kind of wooden mould, of an octagonal form, at bottom, whereof is a braſs plate pierced full of little holes.

The matter, being taken out of the mould, is laid on a trivet, under which is a large veſſel full of water; and the whole being covered with an earthen head, a fire is made around it.

The mercury ſtill remaining in the maſs is thus reduced into fumes, and at length condenſing, it is precipitated into the water, leaving behind it a maſs of ſilver grains of different figures, which only joining or touching at the extremes, render the matter very porous and light.

Thus, then, is the *pinea*, or *pigne*, which the workmen endeavour to ſell ſecretly to veſſels trading to the South Sea; and from which thoſe who have ventured to engage in ſo dangerous a commerce, have made ſuch vaſt gains. Indeed, the traders herein muſt by very careful; for the Spaniſh miners are errant knaves, and to make the *pignes* weigh the more, they make a practice of filling the middle with ſand, or iron,

PINEAL, *pinealis*, in *Anatomy*, a name which Des Cartes gives to a ſmall gland, in the third ventricle of the brain, from its reſemblance to a pine-apple.

This gland he makes the ſenſorium, or ſeat of the reaſonable ſoul. Other authors call it *conoides* and CONARION.

PINEI *nuclei Maluccani ſive pergatorii*, J. B. PINUS *Indica nucleo purgante* C. B. PINEI *nuclei Maluccani*. Park. in *Botany*, a ſpecies of the CROTON in the Linnæan ſyſtem. There grows, ſays Acoſta, in ſome gardens of Malabar, and alſo wild, in ſome woods, a tree of the bigneſs of a pear-tree, whoſe leaves are of a watery-green beneath, and of a dead green on the upper face, and are very tender and ſoft. They are of a very acrid taſte, and vellicate the tongue for a long while afterwards: the fruit is triangular, of the ſize of a filberd, and divided into many capſules, containing each a round ſort of white or dark greeniſh ſeed, equal to a pine-kernel, when taken out of its ſhell.

The Indians, as Acoſta ſays, take a couple of the kernels, peel them, and then pound them, and mix them in clyſters, againſt difficulty of urine, and the pain of the ſciatica; or exhibit them in cock-broth, for the evacuation of putrid, ſlimy, groſs, and could humours, and particulaly for the cure of an aſthma. They anoint the impetigo with theſe kernels, bruiſed in water, and ſo cure it; but they are very burning. The cathartic pine-kernels, as Monardes ſays, purge very ſtrongly bile, phlegm, and water; and though milder than filberds, excite vomiting. When roaſted, they operate with leſs violence, and fewer gripes. They are exhibited in chronic diſeaſes, and have a peculiar virtue of evacuating groſs humours.

The fruit of this tree is the *grana tiglia* of other writers. It is intenſely hot and acrimonious; and ſo violent an evacuant, that it cannot be taken with any tolerable ſafety. This, as well as the PINHONES *Indici*, and AVELLANA *purgatrix*, which is a ſpecies of the JATROPHA, in the Linnæan ſyſtem, yield upon expreſſion a conſiderable quantity of oil, impregnated more or leſs with the taſte and purgative quality of the ſeeds; but they all appear too draſtic to be ventured on in ſubſtance. The wood and leaves of the plants are likewiſe ſtrong cathartics.

PINGUEDO, in *Anatomy*, the Latin term for FAT.

Some reſtrain *pinguedo* only to that *humid ſoft kind of fat* found in animals, next under the ſkin. See ADEPS.

PINHONES *Indici*, the name by which the Portugueſe call the purging nuts, as they are called, of America; the fruit of the JATROPHA *foliis cordatis angulatis* in the Linnæan ſyſtem or the *ricinoides* and *curcas* of other writers. It is called Barbadoes nut; and has an oval, walnut-like fruit, with oblong black ſeeds. Their taſte is ſweetiſh, nauſeous, and acrid; and they are powerful evacuants. In America it is ſaid to be taken in conſiderable quantities, and to purge without much inconvenience. See PINEI *nuclei*, &c.

PINGUICULA, in *Botany*. See BUTTER-*wort*.

It is ſaid, that the unctuous and glutinous juice of the *pinguicula* is uſed in ſome places as a liniment for chaps, and as a pomatum for the hair; that new milk, poured upon the freſh leaves, on a ſtrainer, and, after quick colature, ſet by for a day or two, becomes thick, tenacious, very agreeable, and ſalubrious, and throws off no whey, unleſs it be long kept; and that a little of the milk ſo thickened, ſerves for bringing freſh milk to the ſame ſtate that a ſyrup made from the juice and decoctions of the leaves in broths, are uſed among the common people in Wales as carthartics; and that the herb is hurtful to cattle that feed upon it. Lewis.

PINGUIN, in *Ornithology*, is made a diſtinct genus of birds, of the order of web-footed, by Mr. Pennant; the characters of which are, that the bill is ſtrong, ſtraight, and bending a little towards the point; the tongue is covered with ſtrong ſharp ſpines, pointing backwards; the wings are very ſmall, pendulous, uſeleſs for flight, and covered with mere flat ſhafts; the body is covered with thick ſhort feathers, with broad ſhafts, placed as compactly as ſcales; the legs are ſhort and thick, placed quite behind; the toes are four, ſtanding forward, the interior looſe, the reſt webbed; and the tail is very ſtiff, conſiſting only of broad ſhafts. He has enumerated and deſcribed three ſpecies; viz. 1. The Patagonian *pinguin*, which inhabits an iſle near the Cape of Good Hope, on the coaſts of New Guinea, the iſle of Deſolation, ſouth of the Cape, the ſouthern parts of America, and the ſeas among the ice, as high as ſouth lat. 64° 12′, long. 38° 14′ eaſt. It lives much at ſea; the wings act as fins; it burrows on land, and is analogous to ſeals. The name *pinguin* is given to theſe birds, he ſays, *propter pinguedinem*, on account of their fatneſs; and he obſerves, that it has been corrupted to *penguin*; ſo that ſome, imagining it to be a Welch word, ſignifying *white head*, entertained ſome hopes of tracing the Britiſh colony, ſaid to have migrated into America, under Madoc Gwineth, ſon of Owen Gwineth, A. D. 1170. But he adds, as the two ſpecies of birds that frequent that coaſt have black heads, we muſt reſign every hope, founded on that hypotheſis, of retrieving the Cambrian race in the new world. 2. The leſſer *pinguin*, *diomedea demerſa* of Linnæus, or *anſer Magellanicus* of Cluſius. See *Magellanic* GOOSE. And, 3. The red-footed *pinguin*, the PHAETON *demerſus* of Linnæus, inferior to the laſt in ſize, with a thick, arched red bill; plumage like the former in texture; the head, hind part of the neck, and the back, of a duſky purpliſh hue, and breaſt and belly white; brown wings, with the tips of the larger feathers white; inſtead of a tail, a few black briſtles; and red legs. It is found on *Pinguin* iſle, near the Cape of Good Hope. Phil. Tranſ. vol. lviii. art. 14.

The PENGUIN is of a different genus from thoſe birds.

PINION, in *Mechanics*, an arbor, or ſpindle, in the body whereof are ſeveral notches, into which catch the teeth of a wheel that ſerves to turn it round.

Or a *pinion* is a leſſer wheel, which plays in the teeth of a larger. See WHEEL.

In a watch, &c. the notches of a *pinion* (which are commonly 4, 5, 6, 8, &c.) are called *leaves*, and not teeth, as in other wheels.

PINION *of report* is that *pinion*, in a watch, which is commonly fixed on the arbor of a great wheel, and which in old watches, uſed to have but four leaves; it drives the dial-wheel, and carries about the hand.

The quotient, or number of turns, to be laid upon the *pinion* of report, is found by this proportion: as the beats in one turn of the great wheel are to the beats in an hour; ſo are the hours of the face of the clock (viz. 12, or 24) to the quotient of the hour-wheel or dial-wheel divided by the *pinion* of report, that is, by the number of turns which the *pinion* of report hath in one turn of the dial-wheel; which, in numbers, is 26928 : 20196 : : 12 : 9.

Or rather thus: as the hours of the watch's going are to the numbers of the turns of the fuſee; ſo are the hours of the face, to the quotient of the *pinion* of report. If the hours be 12, then 16 : 12 : : 12 : 9. But if 24, the proportion is 16 : 12 : : 24 : 18.

This rule may ſerve to lay the *pinion* of report or any other wheel, thus: as the beats, in one turn of any wheel, are to the beats in an hour; ſo are the hours of the face, or dial-plate, of the watch, to the quotient of the dial-wheel, divided by the *pinion* of report, fixed on the ſpindle of the aforeſaid wheel. See CLOCK and MOVEMENT.

PINION, *flying*. See FLYING.

PINIROLO, in *Ornithology*, the name of a bird of the tringa kind, ſomewhat approaching to the ſand-piper, but larger; its beak is little more than a finger's breadth long, and black; it is of a mixed cheſnut colour, and brown on the back; and its belly and breaſt are perfectly white: it is common in the Italian markets, and very much reſembles the common tringa.

PINK, in *Botany*. For the characters, See DIANTHUS.

Of *pinks* there is a great variety now cultivated in the gardens; the principal of which are, the damaſk *pink*, the white ſtock, the pheaſant's eye, with double and ſingle flowers, varying greatly in their ſize and colour; the Cob's *pink*, Dobſon's *pink*, white Cob *pink*, and Bat's *pink*: the old man's head, and painted lady *pink*, rather belong to the carnation.

The common *pinks* are propagated either by ſeeds, which is the way to obtain new varieties, or by making layers of them, as is practiſed for carnations; or by planting ſlips, which, if carefully managed, will take root very well.

If they are propagated by ſeeds, there ſhould be care taken in the choice of them, and only the ſeeds of the beſt ſorts ſaved, where perſons are curious to have the fineſt flowers. Theſe ſeeds may be ſown in the ſpring, and the plants afterwards treated in the ſame manner as is directed for the CARNATIONS; with this difference only, that as the *pinks* are leſs tender, ſo they may be more hardily treated. Thoſe which are propagated by layers muſt be almoſt managed as the carnation.

The beſt time to plant the ſlips of *pinks* is about the end of July, when, if there ſhould happen rain, it will be of great ſervice to them; but if the weather be dry, they will require to be conſtantly watered every other day, until they have taken root; theſe ſhould be planted in a ſhady border, and the ground ſhould be dug well, and all the clods broken, and if no rain falls, it ſhould be well ſoaked with water a few hours before the ſlips are planted; then the ſlips ſhould be taken from the plants, and all their lower leaves ſtripped off, and planted as ſoon as poſſible after; for if they are ſuffered to lie long after they are taken from the plants, they will wither and ſpoil; theſe need not be planted at a greater diſtance than three inches ſquare, and the ground muſt be cloſed very hard about them; then they muſt be well watered, and this muſt be repeated as often as is found neceſſary, till the cuttings have taken root; after which they will require no other care but to keep them clean from weeds till autumn, when they ſhould be tranſplanted to the borders of the flower-garden, where they are to remain.

There are ſome who plant the ſlips of *pinks* later in the ſeaſon than here directed; but theſe plants are never ſo ſtrong, nor flower ſo well as thoſe which are early planted. Miller.

PINK, *Indian*, a ſpecies of *ipomoea*. See QUAMOCLIT.

PINK, *Indian*, is alſo a ſpecies of *lonicera*. See *Upright* HONEYSUCKLE.

PINK, *Montpelier*. See APHYLLANTHES.

PINK, *ſea*. See THRIFT.

PINK, *brown*, among *Painters*, is the tinging part of ſome vegetable of a yellow or orange-colour, precipitated upon the earth of alum, cuttle-fiſh bone, or ſome ſimilar calcareous ſubſtance. When good, it is a concentrated yellow, which, as a pigment, is tranſparent in oil, gives the effect of a dark colour, and ſerves for deep ſhades.

There are many methods of preparing brown *pink*. One of the beſt and moſt common methods is the following: take of the French berries, one pound; of fuſtic wood in chips, half a pound; and of pearl-aſhes, one pound. Boil them in a tin-boiler, with a gallon and a half of water, for an hour; and then ſtrain off the tincture through flannel, while the fluid is boiling hot. Having prepared in the mean time a ſolution of a pound and a half of alum, put it gradually to the tincture, as long as an ebullition ſhall appear; waſh the ſediment, as in the preparation of LAKES; and when it is brought, by filtering through paper with a linen cloth, to a proper conſiſtence, dry it on boards in ſquare pieces. Or, it may be made without the uſe of ſalts, by boiling two pounds of the berries in a gallon of water for two hours, and ſtraining off the tincture through flannel. In the mean time prepare a pound and a half of cuttle-fiſh bone, by levigating the ſoft inner part with water on a marble; add this to the tincture, and evaporate them in balneo Mariæ till the matter becomes of a ſtiff conſiſtence; when the whole has been well mixed by grinding, let it be laid on boards to dry.

The goodneſs of *brown pink* muſt be judged of by its tranſparency, and force of colour, when mixed with oil; but its qualities of ſtanding well, and not fattening in oil, in both which reſpects it is commonly defective, can only be aſcertained by trial and experience.

PINK, *Dutch*, is a pigment formed of chalk, coloured with the tinging particles of French berries, or other vegetables. It is principally uſed for coarſer purpoſes in water. It may be made by boiling one pound of French berries, and four ounces of powdered turmeric root in a gallon of water for two hours, and then ſtraining off the tincture through flannel, and boiling it again with an ounce of alum, till it be evaporated to one quart. Prepare in the mean time four pounds of chalk, by waſhing it over, and afterwards drying it; and mix the chalk with the tincture, by grinding them together, and then dry it on boards. It is ſometimes prepared in the ſame manner with ſtarch and white lead. Its goodneſs conſiſts in its being of a full gold-coloured yellow, and very bright.

PINK, *Engliſh*, is only a lighter and coarſer kind of Dutch *pink*; and may be prepared in the ſame manner, the quantity of chalk being increaſed in proportion, as it is intended to be inferior to the Dutch.

PINK, *light*, is of two kinds; the one being the ſame with the Dutch *pink*, only with much leſs colour, ſo that the proportion of the French berries and turmeric muſt be leſſened to one half: the other is the ſame with the brown *pink*, that is, tranſparent in oil, but with leſs colour. It may be prepared by boiling one pound of French berries in a gallon of water, for an hour, and adding to the ſtrained fluid two pounds of pearl-aſhes, diſſolved and purified, by filtering through paper; then precipitate with alum diſſolved in water, by adding the ſolution gradually, till the ebullition ceaſes; and proceed as with *brown* PINK.

PINK, *roſe*, is a LAKE, the earth or baſis of which is principally chalk, and the tinging ſubſtance is extracted from Braſil or Campeachy wood. This pigment, which does not ſtand, is ſeldom employed, except for the coarſe work of houſe-painters, or for paper-hangings, and ſometimes with varniſh. It may be prepared by boiling ſix pounds of Braſil wood, or three pounds of Braſil and three of Campeachy wood, in three gallons of water, in which a quarter of a pound of alum has been diſſolved, for an hour. Purify the fluid, by ſtraining through flannel, and put back the wood into the boiler with the ſame quantity of alum, and proceed as before; repeating the operation a third time; mix the three quantities of tincture together, and evaporate them till only two quarts of fluid remain. Prepare eight pounds of chalk, by waſhing it over in water, in which a pound of alum has been diſſolved, and afterwards fuſing the chalk from the ſalt, formed by the alum, and drying it to the conſiſtence of a ſtiff clay. Grind the chalk and tincture together; and lay the maſs to dry out of the ſun or cold air.

The goodneſs of roſe *pink* conſiſts chiefly in the brightneſs of the colour, and fineneſs of its ſubſtance.

PINK, *pinque*, Fr. in *Sea-Language*, is a name given to a ſhip with a very narrow ſtern; whence all veſſels, however ſmall, whoſe ſterns are faſhioned after this manner, are called *pink-ſterned*.

PINNA, or PENNA, a Latin word ſignifying a FEATHER.

It is alſo uſed figuratively, in divers arts, to expreſs things which bear ſome reſemblance, in form, to feathers; as the fins of fiſhes, &c. See FIN.

PINNA *auris*, in *Anatomy*. See EAR.

PINNA *naſi* is the ſame as *ala naſi*. See NOSE.

PINNÆ, *aculei* PINNARUM, in *Ichthyology*. Every apophyſis, or eminence on the head or body of a fiſh, which is ſo ſharp at the end as to be capable of pricking, is called an *aculeus*; but the *aculei pinnarum* in particular are thoſe prickly *radii* or bones, which ſerve to ſupport the fins; and being carried out beyond the rim of the membrane, end in ſo many points.

Theſe *aculei* are ſimple cylindric oſſicles; whereas the other oſſicles, which ſuſtain the fins, are leſs rigid, and are bent and not prickly; and theſe are not ſimple, but are compoſed each of two oſſicles cloſely cohering one to another. Many of theſe *radii* are divaricated at their extremity into two, three, or more branches; theſe, when they are carried out beyond the rim of the membrane, are harmleſs, and are ſeen to be compoſed of two oſſicles, as the body of the radius is. The *aculei* of the back and belly of all fiſhes are ſo far of the ſame nature, that they never ſtand ſingle, as ſome have ſuppoſed them to do in particular inſtances; but they are always connected one to the other at the bottom by a membrane, though that be ever ſo ſmall and low, as in ſome it is ſcarce viſible.

PINNARUM *radii*. See RADII *pinnarum*.

PINNA, in the Linnæan ſyſtem of *Zoology*, is a genus of the *teſtacea* worms. Its animal is a ſlug; it is bivalve, fragile, and furniſhed with a beard; it gapes at one end, and has a hinge without a tooth. Linnæus enumerates eight ſpecies.

The *pinna marina* is a ſhell-fiſh like the muſcle, held in its place by a number of threads, which proceed from its body, and are fixed to any adjoining ſubſtance, and is one of thoſe fiſh, which, like the muſcle, has a power of ſpinning in the manner of the ſpider and caterpillar.

The threads which theſe fiſh ſpin are infinitely finer and ſlenderer than thoſe of the muſcle, notwithſtanding that the fiſh is vaſtly larger; its ſhells being often found two feet long. Theſe threads are indeed ſcarce leſs fine than the ſingle ſilk threads of the ſilk-worm, and like it have in all times been worked into uſe. The fineſt kind of the byſſus of the ancients was wrought out of theſe threads, and at preſent they are manufactured at Palermo, and at many other places, into gloves, ſtockings, and other ſorts of wearing apparel.

It is eaſy to conceive, that threads ſo fine as theſe can be of no great ſtrength; but what is wanting in the force of each, is made up in the number of them; which are ſpun by every fiſh, for this is almoſt infinite. They differ in nothing from the threads of the muſcles beſide their fineneſs and their length; which is in theſe much greater, and therefore makes them much the more valuable. They are probably formed in the ſame manner with thoſe of the muſcles; and the *pinna* may be called, by way of diſtinction, the ſilk-worm of the ſea; and the muſcle, the caterpillar. See *Tab. of Shells*, N° 20. Mem. Acad. Par. 1711.

PINNARUM *dilator proprius*, in *Anatomy*, a name given by Santorini to one of the muſcles of the face, which he has alſo called *myrtiformis naſi*, and which Cowper has called *depreſſor labii ſuperioris, ſive conſtrictor alæ naſi*, and Albinus the DEPRESSOR *alæ naſi*.

PINNACE, a ſmall veſſel, navigated with ſails and oars, and carrying generally two maſts; chiefly uſed as a ſcout for intelligence, and for landing of men.

One of the boats belonging to a great man of war, ſerving to carry the officers to and from the ſhore, is alſo called the *pinnace*. It reſembles a barge, but never rows more than eight oars, whereas a barge properly never rows leſs than ten. *Pinnaces* are for the accommodation of lieutenants, &c. as barges are for admirals and captains of ſhips of war.

PINNACLE, from *pinna*, or *pinnaculum*, in *Architecture*, the top or roof of a houſe, terminating in a point.

This kind of roof, among the ancient, was appropriated to temples; their ordinary roofs were all flat, or made in the platform-way.

It was from the *pinnacle*, that the form of the pediment took its riſe.

PINNATED *leaf*, among *Botaniſts*. See LEAF.

PINNATIFID *leaf*, among *Botaniſts*. See LEAF.

PINNATUS, in *Heraldry*, a term uſed by the Latin writers on theſe ſubjects, to expreſs that ſort of line in arms which is called by our heralds the EMBATTLED *line*, or *crenelle*. It is alſo called by ſome *linea pinnis aſperata*, and by Sylveſter Petro Sancto *murales pinnulæ*. When this line is only embattled on one ſide, it is properly expreſſed by this word; but when it is embattled on both ſides, as in ſome arms, it is called *breteſſe*, and *contre breteſſe*.

PINNING, in *Building*, the faſtening of tiles together, with pins of heart of oak; for the covering of a houſe, &c.

PINNIRAPI, in *Antiquity*, an order of GLADIATORS, who being matched with the SAMNITES, uſed to catch at the *pinnæ* which adorned their helmets, and bear them off in triumph, as marks of victory.

PINT, *pinta*, a veſſel or meaſure uſed in eſtimating the quantity of liquids, and even ſometimes of dry things.

Budæus derives the word *pint*, from the Greek πινθα; others from the German *pint*, a little meaſure of wine; Nicod from the Greek πινειν, *to drink*.

The Engliſh *pint* is two-fold; the one for wine-meaſure, the other for beer and ale-meaſure.

The wine *pint* is ſaid to contain a full pound, avoirdupois, of common running water; two *pints* make a quart, two quarts a pottle, two pottles a gallon, &c.

The Paris *pint* is eſtimated at one ſixth of the ancient congius, and contains two pounds of common water, and is therefore nearly equal to an Engliſh wine quart; it is divided into chopines, which ſome call ſeptiers; the ſeptier into two demi-ſeptiers, the demi-ſeptier into two poiſſons, each poiſſon containing ſix cubic inches. Two *pints* make a quart, quarteau, which ſome call a pot: the *pint* of St. Denis is almoſt double that of Paris.

In the Engliſh beer-meaſure, the *pint* is the eighth part of a GALLON; conſequently contains $35\frac{1}{4}$ cubical inches.

As to the *pint* uſed in Scotland, there are different opinions concerning the number of cubical inches it contains. Dr. Gregory makes them 109; others, from ſeveral careful menſurations of the ſtandard kept at Edinburgh, make the Scotch *pint* to contain $103\frac{4}{10}$; and thoſe in common uſe are ſaid to contain betwixt 105 and 106 cubical inches. Another experiment was made with a caſk, which was found to contain $46\frac{7}{8}$ Scoch *pints*, and $18\frac{1}{10}$ Engliſh ale gallons. Suppoſing this menſuration juſt, the Scotch *pint* will be to the Engliſh ale gallon as 289 to 750; and if the Engliſh ale gallon be ſuppoſed to contain 282 cubical inches, the Scotch *pint* will contain 108.664 ſuch inches.

PINTADO, or AFRA AVIS, in *Natural Hiſtory*, a name given by the ancient Roman authors to the GUINEA-*hen*.

PINTLE, in *Artillery*, a long iron bolt, fixed upon the middle of the limber bolſter, to go through the hole made in the trail-tranſom of a field carriage, when it is to be tranſported from one place to another. The hole through which the *pintle* paſſes is wider above than below, in order to leave room for the *pintle* to play in.

PINTLE-*plate* is a flat iron, through which the *pintle* paſſes, and nailed to both ſides of the bolſter, with eight diamond-headed nails.

PINTLE-*waſher*, an iron ring, through which the *pintle* paſſes, placed cloſe to the bolſter for the trail to move upon.

PINTLE, *prieſt's*, in *Botany*. See WAKE-*robin*.

PINTLES, in a *Ship*, are hooks by which the rudder hangs to the ſtern-poſt.

PINUS. See PINE-*tree*.

PIONEER, in *War*, a labourer employed in an army, to ſmooth the roads, paſs the artillery along, and to dig lines and trenches, mines, and other works.

Menage derives the word from the Latin *peditones*, a diminutive of *pedites*. Bochart deduces it from the Pæones, a people of Aſia, whoſe principal employment was to dig the earth in mines, &c.

Moſt of the foreign regiments of artillery have half a company of *pioneers* well inſtructed in their buſineſs. Our regiments of infantry and cavalry have three or four *pioneers* each, provided with aprons, hatchets, ſaws, ſpades, and pick-axes. They have alſo a cap with a leathern crown, and a black bear-ſkin front, on which is the king's creſt in white, on a red ground, and the number of the regiment on the back part of the cap.

PIONY, *pæonia*, in *Botany*, a genus of the *polyandria digynia* claſs. Its characters are theſe; the flower has a permanent empalement, compoſed of five concave, reflexed leaves; the flower has five large, roundiſh, concave petals, which ſpread open, and a great number of ſhort hairy ſtamina, with two, three, or four, oval, erect hairy germina in the centre, having no ſtyles; the germina afterward become ſo many oval, oblong, reflexed, hairy capſules, having each one cell opening longitudinally, containing ſeveral oval, ſhining-coloured ſeeds, fixed to the furrows. Linnæus reckons two, and Miller ſix ſpecies.

The ſeveral ſorts of this plant, with double flowers, are all very hardy, and will grow in almoſt any ſoil and ſituation; they are propagated by parting the roots, which multiply very faſt. They ſhould be planted in Auguſt, or the beginning of September, and will then flower the ſucceeding ſummer. The off-ſets ſhould not be too ſmall, and ſhould all have a fair bud or eye. The ſingle kinds may alſo be propagated by ſowing their ſeeds in Auguſt in a light earth, and managing them in the method of all other ſeedling plants. There may probably be ſome good varieties of the flowers produced this way. The ſingle Portugal *piony* is of ſo ſweet a ſmell as to deſerve a place in any garden, though but a ſingle flower. Miller.

The roots, flowers, and ſeeds, of the male and female *piony*, are looked upon as lightly anodyne and corroborant; to the latter of which virtues they appear to have ſome claim. They have been principally recommended in ſpaſmodic and epileptic complaints; in which Dr. Lewis apprehends their effects are not very conſiderable.

PIP, or PEP, *pepia*, a diſeaſe among poultry, conſiſting of a white thin ſkin, or film, that grows under the tip of the tongue, and hinders their feeding.

It uſually ariſes from want of water, or from the drinking puddle-water, or eating filthy meat. It is cured by pulling off the film with the fingers, and rubbing the tongue with ſalt. Hawks are particularly liable to this diſeaſe, eſpecially from feeding on ſtinking fleſh.

PIPE, in *Building*, &c. a canal or conduit for the conveyance of water, and other liquids.

Pipes for water, water-engines, &c. are uſually of lead, iron, earth, or wood. The latter are commonly either oak or alder.

Thoſe of iron are caſt in the forges; their uſual length is about two feet and a half; ſeveral of theſe are commonly faſtened together, by means of four ſcrews at each end, with leather, or old hat, between them, to ſtop the water.

Thoſe of earth are made by the potters. Theſe are fitted into one another, one end being always made wider than the other.

To join them the cloſer, and prevent their leaking, they are covered with pitch and tow. Their length is uſually about the ſame with that of the iron *pipes*.

The wooden *pipes* are bored with large iron augres of different ſizes, ſucceeding one another from leſs to larger; the firſt pointed, the reſt formed ſpoon-wiſe, increaſing in diameter from one inch to ſix. See BORING *of water-pipes*. They are fitted into the extremities of each other, and are ſold by the foot.

Leaden *pipes* are of two kinds; the one ſoldered, the other not ſoldered: for the conſtruction of each kind whereof, ſee PLUMBERY.

For the PIPES *of organs*. See ORGAN.

Bag-PIPE. See BAG-PIPE.

PIPE is alſo a popular machine uſed in the ſmoking of tobacco, conſiſting of a long ſlender tube, made of earth or clay; having at one end, a little vaſe, or furnace, called the *bowl*, for the reception of the tobacco: the

fumes

ſumes whereof are drawn by the mouth through the other end.

Pipes are made of various faſhions, long, ſhort, plain, worked, white, varniſhed, unvarniſhed, and of various colours, &c. The Turks uſe *pipes* three or four feet long, made of ruſhes, or of wood bored; at the end whereof they fix a kind of nut, of baked earth, which ſerves as a bowl, and which they take off after ſmoaking. Thoſe they carry with them when they travel, are made in two or three joints, to put into a bag; they cover the tube ſometimes with cloth, and dip it in water to make it ſmoke cool.

The inſtrument uſed by the Perſians for ſmoking, and called nargury, is ſo conſtructed, that the ſmoke of the tobacco paſſes through water before it comes into the mouth.

Pipe-*fiſh*. See Acus and Tobacco-*pipe fiſh*.

Pipe, *horn*. See Horn-*pipe*.

Pipe-*tree*, in *Botany*. See Philadelphus and Lilac.

Pipe-*tree*, *pudding*. See Cassia.

Pipe, in *Mining*, is where the ore runs forwards endways in a hole, and doth not ſink downwards, or in a vein.

Pipe, *air*, an invention of the late ingenious Mr. Sutton, to clear ſhips of foul air. This he does by a *pipe*, the branches of which are laid in the hold, and the extremity of which is fixed in the aſh-hole of the furnace. Mr. Watſon has ſhewn how theſe *pipes* may be laid, ſo as to be no way inconvenient, and relates the ſucceſs of a trial of them, mode on a hulk. See Phil. Tranſ. N° 462, p. 12.

We have now three different contrivances publiſhed for cleaning ſhips, and other cloſe places, of foul air.

One by Dr. Deſaguliers, which will change the air in the chamber of ſick people, in a little time; either by drawing out the foul air, or driving in freſh; or doing both ſucceſſively, without opening doors or windows. See Phil. Tranſ. N° 437.

The other by Mr. Sutton before mentioned; and the third by means of Dr. Hales's ventilators, which ſeems to be the moſt expeditious and ſimple method. See Ventilator.

Pipe, *pipa*, in *Law*, is a roll in the exchequer, called alſo the *great roll*.

Pipe-*office* is an office wherein a perſon called the *clerk of the pipe*, makes out leaſes of crown lands, by warrant from the lord-treaſurer, or commiſſioners of the treaſury, or chancellor of the exchequer.

Clerk of the pipe makes up all accounts of ſheriffs, &c. and gives the accomptants their quietus eſt. To this office are brought all accounts which paſs the remembrancer's office, and remain there; that if any ſtated debt be due from any perſon, the ſame may be drawn down into the great roll of the *pipe*, from the form of which he derives his name; upon which the comptroller iſſues out a writ, called the *ſummons of the pipe*, for recovery thereof. And if there be no goods and chattels, the clerk then draws down the debts to the lord-treaſurer's remembrancer, to write eſtreats againſt their lands.

All tallies, which vouch the payment of any ſum contained in ſuch accompts, are examined, and allowed, by the chief *ſecondary of the pipe*.

Beſides the chief clerk, and his deputy, in this office are a firſt and ſecond ſecondary, ſix attorneys, or ſworn clerks, and a comptroller, deputy and clerk, board-end clerks, and bag-bearer.

PIPER, in *Botany*. See Pepper.

Piper *chiapæ*, in *Botany*, a name given by ſome authors to the clove-berry-tree, or *caſſia caryophyllata*.

Piper, in *Ichthyology*, the Engliſh name of a ſpecies of trigla, with a bifid roſtrum, and tubuloſe noſtrils. It is called by the generality of authors lyra. See Tibicen.

Piper *Jamaicæ*, the *pepper-tree* of Jamaica. See Pimento.

Piper *Nigrorum*, *Negro pepper*. The plant called at preſent by this name is the capsicum, or *Guinea* pepper, a remarkable herb, bearing large pods as red as coral, of which the Cayan butter is made in America. But this is not the plant that was anciently known by this name. Avicenna and Serapion both mention a plant, which they call *fulful alſuaden*, the Engliſh of which is, the *pepper of the black people*. But this was properly what has been ſince called the *Ethiopian pepper*; a ſort of hot ſeeds approaching to the nature of the common *pepper*, and containing ſeveral together in pods.

It is not eaſy, from the accounts we have left, to ſay what it is; but they have left deſcription enough of it for us to ſay what it is not, and to find that they have all been miſtaken, who have ſuppoſed it be either the root tarſi, or the bulbus of the Arabians, which laſt was as large as a pear.

Piper, *ſand*, in *Ornithology*. See Arenaria and Sand-*piper*.

Piper *tavaſci*, in *Botany*, the clove-berry-tree, or *caſſia caryophyllata*; a tree whoſe bark is uſed in medicine.

PIPERAPIUM, an old name of a plant found in Apuleius, and ſaid to have its name from its heat to the taſte; which was ſo offenſive to the bees, that if a piece of it were hung up in the hive, it would drive them all out.

This is a very ſtrange account: and as we meet with nothing to countenance it in any other author, there is reaſon to ſuſpect it to be an error; and there ſeems this foundation for it. The acorus root is ſaid by Dioſcorides to be the root of a plant allied to the papyrus, or paper-reed of the river Nile; and is thence called by that author *papyraceous*. Avicenna and Serapion copy this, and liken the acorus plant to the papyrus; but in all the copies of the Greek author, it is often found written πεπέρακιον. This word *peperacion* may have been formed by Apuleius into *piperapium*, by way of amendment, and all the reſt might be occaſioned by this.

PIPERITIS, in *Botany*, a name given by ſome authors to the *momordica*, or *male* balsam *apple*.

PIPERIVORA *avis*, in *Ornithology*, a name given by ſome authors to the toucan, or Braſilian magpye, from its feeding on pepper.

PIPING, in *Sea-Language*. See Call.

PIPPERIDGE-*tree*, in *Botany*. See Barberry-*tree*.

PIPRA, in *Ornithology*, a name given by Ariſtotle, and other ancient writers, to the *picus varius major*, the great ſpotted wood-pecker, or witwall.

Pipra, in the Linnæan ſyſtem of *Ornithology*, a genus of the passeres. Its characters are, that the bill is ſhorter than the head, three-cornered at the baſe, entire, and incurvated at the apex; the feet are formed for walking. Linnæus enumerates thirteen ſpecies.

PIQUE, in *Natural Hiſtory*, a name given by the Spaniards to an inſect of the ſize of a flea, called by the Indians tung. It is common in the Eaſt and Weſt Indies, and eats its way into the fleſh under the nails, &c.

PIQUET. See Picket.

PIQUETTE, among the *Floriſts*, a term uſed for a certain ſort of carnations, which have always a white ground, and are ſpotted, or, as they call it, pounced with ſcarlet, red, purple, or other colours.

PIQUITINGA, in *Ichthyology*, the name of a ſmall American river-fiſh. It ſeldom exceeds two inches in length; its mouth appears very ſmall, but it can at pleaſure open it to a great width; its eyes are very large and black, with a ſilvery iris; it has ſix fins beſides the tail, which is forked; its head is of a ſilvery white; its back olive-colour, and its belly and ſides are covered with ſilvery ſcales; the fins are all white, and the ſide-lines are broad, and very bright and ſhining. Marggrave.

PIRA-*aco*, in *Ichthyology*, a name by which Marggrave and ſome other authors have called a little horned fiſh of the Weſt Indies, called by Cluſius and others, the monoceros *piſcis*, or unicorn fiſh.

Pira-*acangata*, in *Ichthyology*, the name of a Braſilian fiſh, reſembling the perch in ſize and ſhape. It is of a ſmall ſize, ſeldom exceeding four or five inches in length; its mouth is ſmall; its tail is forked; and it has on the back only one long fin, which is ſupported by rigid and prickly ſpines; this it can depreſs at pleaſure, and ſink within a cavity made for it in the back; its ſcales are of a ſilvery white. It is a wholeſome and well-taſted fiſh. Marggrave.

Pira-*bebe*, in *Ichthyology*, a name uſed by ſome authors for the milvus, or kite-fiſh.

Pira-*coaba*, in *Ichthyology*, the name of an American fiſh of the truttaceous kind, much eſteemed for the delicacy of its flavour. It grows to about twelve inches in length; its noſe is pointed, and its mouth large, but without teeth; the upper jaw is longer than the other, and hangs over it in form of a cartiliginous prominence; its eyes are very large, and its tail forked; under each of the gill-fins it has a beard made of ſix white filaments, and is covered all over with ſilvery ſcales. Marggrave.

Pira-*jurumenbeca*, in *Ichthyology*, the name of a Braſilian fiſh, called by many the *bocca molle*. It lives in the muddy bottom of the American ſeas, and it is a long-bodied not flatted fiſh; it grows to a vaſt ſize, being ſometimes caught of nine, and ſometimes even of ten or eleven feet long, and two feet and a half thick; it has one long fin on the back, the anterior part of which is thin and pellucid; and has a cavity on the back, into which the creature can depreſs the fin at pleaſure; its tail is not forked; its ſcales are all of a ſilvery colour and brightneſs. It is a very well-taſted fiſh. Marggrave.

Pira-*pixanga*, in *Ichthyology*, the name of a Braſilian fiſh of the turdus or wraſſe kind, and called by ſome the *gatviſch*. Its uſual length is four or five inches; its mouth is conſiderably large, and furniſhed with very ſmall and ſharp teeth; its head is ſmall, but its eyes large and prominent; the pupil of a fine turquoiſe colour, and the iris yellow and red in various ſhades; the coverings of the gills end in a triangular figure, and are terminated by a ſhort ſpine or prickle; its ſcales are very ſmall, and ſo evenly arranged, and cloſely laid on the fleſh, that it is very ſmooth to the touch; its tail is not forked, but rounded at the end; its whole body, head, tail, and fins, are of a pale yellow, variegated all over with very beautiful blood-coloured ſpots; theſe are round, and of the bigneſs of hemp-ſeed on the back and ſides, and ſomething larger on the belly; the fins are alſo ſpoted in the ſame manner, and are all marked with an edge of red. It is caught among the rocks, and about the ſhores, and is a very well taſted fiſh. Marggrave.

PIRANHA, in *Ichthyology*, a name given to the American fiſh more commonly known by the name PIRAYA.

PIRAQUIBA, or IPIRAQUIBA, in *Ichthyology*, a name originally Braſilian, by which ſome authors expreſs the REMORA, or ſucking-fiſh.

PIRATE, *pyrate*, *pirata*, *rover*; a perſon, or veſſel, that robs on the high ſeas, or makes deſcents on the coaſts, &c. without the permiſſion or authority of any prince or ſtate.

The colours uſually diſplayed by *pirates* are ſaid to be a black field, with a death's head, a battle-axe, and an hour-glaſs.

By the ancient common law, *piracy*, if committed by a ſubject, was held to be a ſpecies of treaſon, and by an alien to be a felony only; but now, ſince the ſtatute of treaſons, 25 Edw. III. cap. 2. it is held to be only felony in a ſubject. Formerly it was only cognizable by the admiralty courts, which proceed by the rules of the civil law; but the ſtatute 28 Hen. VIII. cap. 15. eſtabliſhed a new juriſdiction for this purpoſe, which proceeds according to the courſe of the common law. The offence of *piracy*, by common law, conſiſts in committing thoſe acts of robbery and depredation upon the high ſeas which if committed upon land would have amounted to felony. But, by ſtatute, ſome other offences are made *piracy* alſo; as by 11 & 12 W. III. cap. 7. if any natural born ſubject committs any act of hoſtility upon the high ſeas, againſt others of his majeſty's ſubjects, under colour of a commiſſion from any foreign power, this, which would be only an act of war in an alien, ſhall be conſtrued *piracy* in a ſubject. And farther, any commander, or other ſea-faring perſon, betraying his truſt, and running away with any ſhip, boat, ordinance, ammunition, or goods, or yielding them up voluntarily to a *pirate*, or conſpiring to do theſe acts; or any perſon confining the commander of a veſſel, to hinder him from fighting in defence of his ſhip, or to cauſe a revolt on board, ſhall, for each of theſe offences, be adjudged a *pirate*, felon, and robber, and ſhall ſuffer death, whether he be a principal or acceſſory. By 8 Geo. I. cap. 24. the trading with known *pirates*, or furniſhing them with ſtores or ammunition, or fitting out any veſſel for that purpoſe, or in any wiſe conſulting, combining, confederating, or correſponding with them; or the forcibly boarding any merchant veſſel, though without ſeizing or carrying her off, and deſtroying or throwing any of the goods overboard, ſhall be deemed *piracy*; and all acceſſories to *piracy* are declared to be principal *pirates* and felons without benefit of clergy. Commanders or ſeamen wounded, and the widows of ſuch as are ſlain, in any *piratical* engagement, ſhall be entitled to a bounty, to be divided among them, not exceeding one fiftieth part of the value of the cargo on board; and ſuch wounded ſeamen ſhall be entitled to the penſion of Greenwich hoſpital. And if the commander ſhall behave cowardly, by not defending the ſhip, if ſhe carries guns or arms, or ſhall diſcharge the mariners for fighting, ſo that the ſhip falls into the hands of *pirates*, ſuch commander ſhall forfeit all his wages, and ſuffer ſix months impriſonment.

In different parts *pirates* are differently denominated; as in the Weſt Indies, *buccaneers*, *free-booters*, &c. In the Mediterranean, *corſairs*, &c.

Alexander reproaching a *pirate* with his condition, was anſwered, "If I am a *pirate*, it is becauſe I have only "a ſingle veſſel; had I a fleet, I ſhould be a mighty "conqueror."

PIRATE was alſo anciently uſed for the perſon to whoſe care the mole, or pier of a haven, which, in Latin, was called *pera*, was entruſted.

PIRATE was ſometimes too, according to Spelman, uſed for a ſea-captain, or ſoldier. Aſſer, in the life of king Alfred, tells us, *juſſit naves longas fabricari, impoſitiſque* piratis *in illis vias maris cuſtodiendas commiſit.*

PIRATIA-*pua*, in *Ichthyology*, the name of an American ſea-fiſh, which grows to a very large ſize, and, while young, is eaten and accounted a delicacy; but when full grown is too coarſe, rank, and ſtrong; it has ſix fins beſides the tail, which is made of a very large fin, of a ſomewhat ſquare figure, and is not at all forked; it is all over of a duſky orange-colour, but more obſcurely ſo on the back than elſewhere; and its ſides are variegated with grey ſpots, ſo diſpoſed as to repreſent a ſort of network. Piſo.

PIRATIAPIA, in *Ichthyology*, the name of a Braſilian fiſh, approaching to the nature of the turdus or wraſſe. Its body is oblong, not flatted, and very thick; it is a large fiſh, and ſometimes grows even to fifty pounds weight. It is a very delicate and valuable fiſh. Marggrave.

PIRAUMBU, in *Ichthyology*, the name of a Braſilian fiſh, ſomewhat approaching to the nature of the turdus, and called by the Portugueſe *chayquarona*. It is of the figure of the carp, and its uſual length is ſix or ſeven inches, and its breadth in the broadeſt part about three inches, but gradually diminiſhing to the tail. It is caught among the rocks, and near ſhores, and is a well taſted fiſh. Marggrave.

PIRAYA, in *Ichthyology*, the name of a fiſh caught in the American rivers. There are two kinds of it; the one growing to a foot long, and very broad in proportion; this loves the muddy bottoms of rivers; the other is much of the ſame ſize, but has two fins on its back, whereas the other has but one; this loves the ſandy bottoms of rivers. There is alſo a ſmaller ſpecies of this; all three are eatable fiſh.

PIRIT, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a peculiar ſpecies of ſparrow, which is very common with them. It is much ſmaller than our common ſparrow, and feeds only on the ſeeds of the canary-graſs, which is very commonly wild there.

PIROUETTE, or PYROUET, in the *Manege*, a turn or circumvolution which a horſe makes, without changing his ground; his haunches remaining firm in the centre, and his ſhoulders furniſhing and deſcribing the circle. In this action the inner hind-leg muſt not be lifted from the ground, but turned round in the ſame place, like a pivot, while the other three legs, and the body of the horſe turn and wheel round it at the ſame time.

The word is French, and literally ſignifies a whirligig.

Pirouettes are either of *one tread* or *piſte*, or of *two*. The firſt is an entire ſhort turn which the horſe makes upon one tread, and, almoſt, in one time; in ſuch manner as that his head comes to the place where his tail was, without putting out his haunches. In the *pirouette* of *two treads* or *piſtes* he takes a ſmall compaſs of ground, almoſt his length, and marks both with the fore-part and the hind.

PISCARY, *piſcaria*, in our *Ancient Statutes*, the liberty of fiſhing in another man's waters.

This differs from a free fiſhery, which is an excluſive right: in this laſt the man has a property in the fiſh before they are caught; in a common of *piſcary*, nor till afterwards.

PISCES, in *Aſtronomy*, the twelfth ſign, or conſtellation, of the zodiac.

The ſtars in *Piſces*, in Ptolemy's Catalogue, are 38; in Tycho's 36; in Hevelius's 39; in the Britannic Catalogue 113: the longitudes, latitudes, magnitudes, &c. whereof are as follow.

Names and ſituations of the ſtars.	Bayer's Gha.	Signs.	Longitud.	Latitude.		Magnitude.
			° ′ ″	° ′ ″		
		♓	11 06 22	7 22 49	B	7
			12 06 22	6 51 39	B	6
			12 04 48	6 01 09	B	6
In the mouth of the ſouth. fiſh	β		14 15 56	9 03 19	B	5
	A		14 41 18	7 01 31	B	6
5.						
South. of 2 in the hind part of the head	γ		17 03 44	7 16 43	B	4
North. in the hind part of the head	*b*		18 42 18	8 52 35	B	5.6
Preced. of two in the belly	1.*x*		18 34 33	4 26 26	B	5
A ſmall one contiguous to it	2.*x*		18 35 20	4 16 40	B	6.7
Preced. in the back	θ		20 52 27	9 01 58	B	5
10.						
			17 56 47	1 22 54	B	6
			18 16 15	2 04 20	B	6
			18 48 28	1 46 36	B	6
			19 13 58	1 24 53	B	6
			20 34 43	3 37 54	B	6
15.						
			21 05 46	4 15 34	B	6
Subſeq. in the back	ι		23 18 8	7 12 12	B	5
Subſeq. of two in the belly	λ		22 16 36	3 25 07	B	5
			23 56 55	4 32 43	B	5.6
1ſt of thoſe preceding the ſquare under the ſouth. fiſh			21 48 21	1 19 58	B	6.7

Names and ſituations of the ſtars.	Bayer's Cha.	Signs.	Longitud.			Latitude.				Magnitude.
			°	′	″	°	′	″		
		♓	23	41	07	2	01	47	B	6
			24	59	44	3	28	57	B	6
		♈	2	57	32	20	32	58	B	6
Second			22	47	44	2	11	39	A	6
			24	55	24	2	36	30	B	6
25.										
			27	22	55	6	58	13	B	6
Preced. of north. in the ſqnare			23	57	34	3	07	49	A	5
In the tail of the ſouth fiſh	ω		28	14	55	6	22	15	B	5
Sub. of north. in the ſquare			24	53	04	2	57	45	A	5
Prec. of the ſouth. in the ſquare			23	42	36	5	42	33	A	5
30										
	1.c		29	49	12	7	57	50	B	6
That which follows over the tail	2.c		29	38	45	7	31	43	B	5.6
Subſeq. the ſouth. of thoſe in the ſquare under *Piſces*			24	36	38	5	46	55	A	5.4
		♈	2	26	23	9	12	37	B	6
			2	37	16	6	36	03	B	6
35.										
			2	45	08	5	54	26	B	6
			5	04	06	11	05	36	B	6
			3	11	38	6	24	02	B	7
			6	18	45	13	12	04	B	6
			6	46	18	12	55	03	B	6
40										
In the line next the tail of *Piſces*	d		3	39	13	5	27	28	B	6
			6	09	48	10	09	08	B	6
			7	01	06	10	41	34	B	6
			2	16	10	0	44	49	A	6
			4	36	55	4	30	42	B	6
45.										
			9	57	40	15	06	45	B	6
			9	16	48	13	37	30	B	6
			8	43	31	12	16	56	B	7
			9	08	47	11	39	13	B	7
			11	05	11	15	29	04	B	6
50.										
Second from the tail in the line			5	49	21	3	11	08	B	6
			11	19	37	15	24	27	B	6
			10	08	47	10	21	41	B	7
			13	17	39	15	37	12	B	6
			13	25	26	15	44	47	B	6
55.										
			13	25	49	15	42	03	B	6
			12	26	42	9	38	42	B	6
			11	08	49	6	22	25	B	7
			14	16	36	13	19	58	B	6
			9	12	22	1	31	48	B	6
60.										
			14	57	38	14	30	43	B	7
			9	37	31	1	57	28	B	6
Precd. of the bright ſtars in the line	δ		9	49	17	2	09	44	B	4
			13	34	02	10	44	49	B	6
Preced. of three in the head of the north fiſh	ι		18	17	46	20	30	43	B	6
65.										
			15	43	29	12	17	13	B	6
Middle of thoſe in the head	k		19	23	24	19	29	39	B	6
Laſt of 3 in the head of the north. fiſh	1.h		20	33	56	20	57	08	B	6
Preced. of 2 againſt the eye of the north. fiſh	1.σ		22	53	41	23	03	47	B	5
			13	01	40	1	09	28	B	6
70.										
Middle of the bright ſtars in the ſouth line	ε		13	12	11	1	04	07	B	4
			16	23	36	7	23	22	B	6
			12	46	46	1	10	55	A	6
Preced. of 2 in fin of the back	ψ		19	06	00	13	21	00	B	5
			15	43	21	5	31	13	B	6
75.										
Subſeq. againſt the eye of the north. fiſh	2.σ		23	46	30	23	06	23	B	5
			12	41	48	1	55	30	A	6
			24	04	18	22	47	51	B	6
Middle in the fin of the back	2.ψ		19	18	25	12	28	46	B	6
	e		3	36	45	1	30	14	A	5
80.										
Laſt of 3 in the fin of the tail	3.ψ		19	17	50	11	18	09	B	6
North. of 2 againſt the mouth of north. fiſh	g		24	27	32	21	59	06	B	6
South of the ſame	τ		23	58	26	20	42	19	B	5
That following the fin of back	χ		20	11	43	12	25	29	B	5
South of 2 in the belly	φ		22	08	31	15	29	02	B	5
85.										
Laſt of 3 bright ones in ſouth. line	ζ		15	32	13	0	13	25	A	4
			18	53	15	7	39	27	B	7
			15	32	53	0	51	50	A	6.7
South of 2 in fold of ſouth. line			15	00	04	4	17	13	A	6
North in the belly	υ		24	27	10	17	26	56	B	5
90.										
Another following it	l		25	25	21	18	39	53	B	6
			21	40	54	8	20	43	B	7
Prec. of contig. in bending of the line	S	♈	22	45	12	9	22	03	B	5
Subſeq. of the ſame			22	52	27	9	23	58	B	5
			17	56	00	3	34	52	A	7
95.										
			18	57	55	1	54	52	A	6.7
			23	14	23	8	17	49	B	6.7
3d of thoſe in nor. line before the knot	μ		18	46	40	3	04	25	A	5
Middle of 3 in north line	ν		22	29	20	5	21	07	B	4.3
			22	13	38	2	28	05	B	6
100.										
			23	11	35	4	20	47	B	6
South. of thoſe in north. line	π		22	35	18	1	52	05	B	5
			24	41	39	5	41	46	B	8.7
			23	50	06	3	40	32	B	6.7
			24	42	32	5	37	12	B	6.7
105.										
Middle of 3 in the hind line before the knot.	γ		21	10	37	4	43	12	A	5
			26	27	42	9	01	34	B	7
			28	22	53	11	24	08	B	6
			27	14	27	8	36	20	B	8
That next the knot in nor. line	ο		23	24	40	1	38	58	A	5
110.										
1ſt behind the knot in ſouth. line	ξ		23	11	18	7	55	45	A	6
			24	42	05	8	35	05	A	6.7
In the knot of the two lines		♈	25	02	23	9	05	10	A	3

PISCIDIA, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are, that it has an acute ſtigma, and a winged pod. There are two ſpecies.

PISCINA, in *Antiquity*, a large baſon in an open public place or ſquare, where the Roman youth learnt to ſwim; and which was ſurrounded with a high wall, to prevent the caſting of filth into it.

The word is formed from the Latin *piſcis*, *fiſh*; becauſe men here imitated fiſhes in ſwimming, and becauſe fiſhes were actually kept in ſome of theſe places.

Piscina was alſo uſed for the ſquare baſon in the middle of a bath.

Piscina *probatica* was a pool or reſervoir of water, near the court of Solomon's temple; ſo called from the Greek *προϐατον*, *ſheep*; becauſe here they waſhed the cattle which were deſtined for ſacrifice.

By this *piſcina* it was that our Saviour wrought the miraculous cure of the paralytic. Daviler obſerves, there are ſtill remaining five arches of the portico, and part of the baſon, of this *piſcina*.

Piscina, or *lavatory*, among the Turks, is a large baſon placed in the middle of the court of a moſque, or under the porticos that encompaſs it.

Its form is uſually a long ſquare. It is built of ſtone or marble, furniſhed with a great number of cocks, wherein the muſſulmans waſh themſelves before they offer their prayers; as being perſuaded, that ablution effaces ſin.

PISCIS, in *Ichthyology*. See Fish.

Piscis *auſtralis*, in *Aſtronomy*. See Australis.

Piscis *foſſilis*, in *Ichthyology*, a name given by Johnſton to a kind of the cobitis, found buried in the ſand, and dug out by the people in many parts of Germany for food. It is called by many authors the *muſtela foſſilis*, and by ſome the *pæcilia*. It is properly a ſpecies of cobitis, and is called by Artedi the *bluiſh cobitis*, with five longitudinal black lines on each ſide of the body.

Piscis *ſancti Petri*, in *Ichthyology*, a name given by Jovius and ſome other authors to the *faber* or *John* Doree. It is properly a ſpecies of zeus.

Piscis *volans*, the *Flying Fiſh*, in *Aſtronomy*, is a ſmall conſtellation of the ſouthern hemiſphere, unknown to the ancients, and inviſible to us in theſe northern regions. It contains eight ſtars, whoſe longitudes and latitudes, &c. are as follow:

Names and ſituations of the ſtars.	Signs.	Longitud.			Latitude.			Magnitude.
		°	′	″	°	′	″	
In the head	♎	16	46	14	72	11	5	5
In the middle of the body		20	15	49	77	44	31	5
In the tail	♏	6	1	39	82	35	27	5
In the left wing upper	♎	11	19	45	75	33	22	5
Lower		15	38	28	82	27	26	5
5.								
In the right wing, upper	♏	3	31	11	76	45	0	6
Lower		11	51	38	79	21	46	5
Informis, between Chamælion and the *Flying fiſh*		24	11	45	67	52	34	5

PISCIVOROUS *animals* are ſuch as feed on fiſh. See BIRD.

PISHAMIN *plum*, in *Botany*. See *Indian Date* PLUM.

PISMIRE, in *Zoology*. See ANT.

PISONIA, in *Botany*, the name given by Plumier, in honour of Piſo, to a genus of plants, called by Vaillant *pentagonotheca*. See FINGRIGO.

PISSASPHALTUM, or PISSASPHALTUS, *ϖισσασφαλτος*, compounded of *ϖισσα*, *pitch*, and *ασφαλτος*, *bitumen*, in *Natural Hiſtory*, denotes a native, ſolid bitumen, found in the Ceraunian mountains of Apollonia; of an intermediate nature between pitch and aſphaltum. Its characters are theſe: the *piſſaſphalta* are fluid mineral bodies, of a ſomewhat thick conſiſtence, duſky, and opake; of a ſtrong ſmell, and readily inflammable, but leaving a reſiduum of greyiſh aſhes after burning.

There are three known ſpecies of this genus. 1. A thinner blackiſh kind, called *oleum terræ*. See OIL *of the earth*, and PETROL.

2. A thicker black one, called *piſſelæum Indicum*, or BARBADOES *tar*. And, 3. A black and viſcous one, called ſimply *piſſaſphaltum* in the ſhops.

Piſſaſphaltum is as tough and viſcous as bird-lime, and of the ſame conſiſtence when old. It very much reſembles the common black pitch, when ſoftened a little by heat; and has been generally thought to have ſomething of the ſmell of that ſubſtance; but this ſeems to have ariſen from its being too frequently adulterated by mixing pitch with it, and the true genuine ſubſtance has no other ſmell than the rank one of all the bitumens, which ſomewhat reſembles that of oil of amber. It is produced in ſeveral parts of the world, and there are large quantities of it in Germany, in Perſia, and in France. It yields a limpid oil by diſtillation, which very much reſembles the native petroleum, and is too often ſold with us under this name, being annually imported in large quantities from thoſe parts of Germany where it is manufactured, and having itſelf no particular name in the ſhops of our druggiſts.

Piſſaſphaltum was much recommended by the ancients for external uſe, as an emollient, maturant, and digeſtive: with this intention it was uſed in cataplaſms, for ripening all ſorts of tumors, and againſt the ſciatica and other pains of the limbs. They alſo had recourſe to it for ſtrengthening the limbs, after the reduction of diſlocations. It is little uſed at preſent, the petroleum being thought very proper to ſupply its place.

PISSAPHALTUM is alſo a name given to a factitious ſubſtance, compounded of pitch and aſphaltus, or the true bitumen Judaicum.

The coarſeneſs of this, the black colour, and the fetidneſs of the ſmell, diſtinguiſh it from the true aſphaltum.

PISSAPHALTUM is alſo uſed, by ſome writers, to denote the Jewiſh pitch, or ſimple aſphaltum.

PISSELÆUM, *ϖισσελαιον*, *oleum* PICINUM, or oil of pitch, a medicament compounded of oil and pitch.

PISSELÆUM *Indicum*, among *Modern Writers*, denotes a bituminous ſubſtance brought from the Weſt Indies, popularly called BARBADOES-*tar*.

It is a heavy, thick, and duſky-looking mineral fluid, of the colour and conſiſtence of common treacle, and of a very opake hue; it is of a diſagreeable ſmell, faintly approaching to that of oil of amber, and is very inflammable. It is found trickling down the ſides of the mountains at the back of ſeveral of our plantations in America, and is in great eſteem there for coughs and diſorders of the lungs. We meet with very little in England that is genuine, ſeveral different ſophiſtications of it being in common uſe, even upon the ſpot. See PETROL. It has a ſtrong ſmell not unlike the common tar, and is not very pleaſant to ſight or taſte. It is accounted a good balſamic, and where the ſtomach can diſpenſe with it, will do great ſervice in many diſorders of the breaſt, which has alſo been experienced of common tar.

PISSEROS, the name of an ointment greatly recommended by Hippocrates in many caſes, as in burns, freſh wounds, &c. It was made of oil of roſes, bees-wax, and pitch, proportioned ſo as to give the whole a ſoft conſiſtence. It was of the nature of our modern black baſilicon, and found a good ointment in many caſes.

PISSINUM. Pliny ſays it was cuſtomary for the aecients to hold fleeces of wool over the ſteam of boiling tar, and ſqueeze the moiſture from them, which watery ſubſtance was called *piſſinum*.

Ray will have this to be the ſame with the *piſſelæum* of the ancients; but Hardouin, in his notes on Pliny, thinks the *piſſelæum* to have been produced from the cones of cedars. What uſe they made of theſe liquors anciently, is not known; but it may be preſumed they were uſed in medicine, though at preſent it does not appear they are uſed at all.

PISSITES, a name given by the ancients to a wine impregnated with the virtues of liquid pitch or tar. To prepare it, the tar was ordered to be waſhed in ſea-water or brine, and afterwards in freſh water many times; and after a tedious preparation of this kind, two ounces of it were ordered to be put to eight gallons of muſt, which is to be ſuffered to work together, and then the clear liquor to be bottled off.

This was accounted a warm wine, very aſſiſtant to concoction, and of an abſterſive faculty, and a good pectoral: on theſe accounts it was given in diſorders of the breaſt, and in obſtructions of the liver, ſpleen, and uterus, if not attended with a fever; and was a common medicine in coughs and aſthmas of all kinds.

PISSOCEROS, a name given by the old naturaliſts to a ſubſtance found very frequently in the hives of bees, and conſiſting of a mixture of propolis and wax. The ancients were well acquainted with the uſe of this ſubſtance, which was uſed for ſtopping up the cracks and chinks in the hives: they mention, indeed, three ſorts of matter uſed by the bees for this purpoſe; the metys, the *piſſoceros*, and the propolis; but later authors call them all by the general term propolis, the *piſſoceros* and metys being only the ſame ſubſtance, mixed with wax in different proportions. This PROPOLIS is a reſinous ſubſtance, of a ſoft and viſcous conſiſtence, collected from the beds of the poplar and other trees.

PISSOSIS, a word uſed by the old writers on medicine for the depraved appetite of young women about the firſt eruption of the menſes, and of ſome women with child.

PISTACHIA *trifolia*, in *Botany*, a name improperly given by ſome authors to the trifoliate American BLADDER-*nut*.

PISTACHIA, or PISTACH-*nut*, a fruit brought from ſeveral parts of Aſia, chiefly from Aleppo and Perſia. When wrapt in all its coats, it is of the ſize of a green almond; but when ſtript of all but its ſhell, it reſembles a ſmall nut. The kernel is red without, and green within; its taſte is very agreeable.

The word is formed from the Latin *piſtacium*, of the Greek *ϖιστακιον*, whence, according to Menage, the city Pſittacium took its name.

The tree that produces it is a kind of turpentine-tree. See MASTIC-*tree*.

The nuts are to be choſen new, heavy, and full; as to thoſe that are broken, ſuch as have kept their colours beſt are to be preferred; for nothing depends upon the ſize.

Piſtachias are aperitive, and proper to give vigour; and are uſed in emulſions, &c in phthiſical and nephritical caſes. They alſo enter ſeveral ragouts, and are comfited, made into conſerves, &c. There is likewiſe a kind of falſe *piſtachia*, brought from the Caribbee iſlands, which ſome confound with the real ones, though very different, both with regard to the plants that produce them, and their quality. The ſpurious *piſtachia* plant does not riſe above a foot high; nor does the fruit grow on the branches, but is found in pods. The pod ſometimes only contains a ſingle nut, which reſembles an olive; but uſually ſeveral; and in that caſe they are irregular. The ſubſtance is white, compact, and heavy.

This fruit is rarely eat raw, becauſe of the ill effects it produces; it is uſually roaſted or comfited; it is uſed in ragouts, and to make ratifias.

PISTACHIA-*tree*, *black Virginian*, a ſpecies of the *hamamelis*. See *Witch* HAZLE.

PISTANA, in *Botany*, a name by which ſome authors have called the *ſagittaria aquatica*, or water arrowhead.

PISTATIO, among *Pharmaceutic Writers*, a word uſed to expreſs that preparation of ſimples which conſiſts in covering them with, or including them in, a paſte, and ſending them to a baker's oven till tender throughout. Squills are ſometimes prepared thus.

PISTE, in the *Manege*, the track or tread, which a horſe makes upon the ground he goes over.

The word is French, and literally ſignifies a *track*.

The *piſte* of a horſe may be either *ſingle* or *double*.

If the rider make him go but an ordinary gallop, in a circle, or rather ſquare, he will make but a *ſingle piſte*: if he either make him gallop with his haunches in, or go terra à terra, he will make two *piſtes*, one with the forepart, another with the hind. And the ſame if the rider make him paſſage, or go ſideways, either in a ſtrait line, or upon a circle.

PISTEREEN, a Spaniſh coin, worth about a ſhilling.

PISTIA, *water-houſe-leek of Egypt*, in *Botany*, the name given by Linnæus to a genus of plants of the *gynandria hexandria* claſs and order, called *kodda-pail* by Plumier, and in the Hortus Malabaricus. The characters are theſe: there is no cup; the flower conſiſts of one unequal petal, which is cucullated and turbinated, with a ſingle, oblique, and long lip, bent and folded at the ſide; there are no ſtamina, but ſix double antheræ grow to the piſtil under the ſtigma; the germen of the piſtil is of an oval oblong figure; the ſtyle is ſhorter than the flower; the ſtigma is peltated, and obtuſely divided into ſix ſegments; the fruit is a capſule of an oval figure attenuated at the baſe, and contains one cell; the ſeeds are truncated. This genus ſeems nearly allied to the birth-worts. There is one ſpecies.

PISTIL, among *Botaniſts*, the female organ of generation in flowers. It is compoſed of three parts, the germen, the ſtyle, and the ſtigma: the germen ſupplies the place of the uterus in plants; its ſhape is various, but it is always ſituated at the bottom of the *piſtil*, and contains the embryo ſeeds: the ſtyle is a part of various figures alſo, but is always placed on the germen; in ſome it is extremely ſhort, in others it ſeems entirely wanting: the ſtigma is alſo of various figures; its place, however, is certain, as it always ſtands on the top of the ſtyle, and if there is no ſtyle, on the top of the germen.

The *piſtil* is an eſſential part of a flower; and the principal female organ of generation; it being in this that the ſeeds or young plants are formed.

It ariſes from the pedicle of the flower, or the centre of the calyx; and at length becomes the young fruit, which is ſometimes hid in the calyx, and ſometimes ſtands quite out.

The figure of the *piſtil* is very different in different flowers: ſometimes it is a little ſtalk, which inlarges at the two ends like a peſtle; ſometimes it is a mere ſtamen, or thread; ſometimes it is round, ſometimes ſquare, triangular, oval, &c.

Almoſt all *piſtils* are furniſhed at top, either with fine hairs, which make a kind of velveting; or with little filaments diſpoſed in plumes; or elſe they are beſet with little veſicles full of glutinous juice.

Some flowers have ſeveral *piſtils*; or rather the *piſtils* terminate in ſeveral branches or horns, which have their riſe from as many young fruits, or as many different capſulæ, containing ſeeds.

All theſe *piſtils*, whatever form they be in, have certain apertures at their tops, or certain clefts continued the whole length, to the baſe or embryo of the fruit. This is very viſible in the lily, daffodil, and melon, either by cleaving the *piſtils* lengthwiſe, or cutting them tranſverſly. If, after cutting the *piſtil* of the lily, you immerge one extremity in water, and ſuck through the other end, the water will riſe through it as through a pipe.

By opening the *piſtils* in their different ſtates of growth, it appears evidently, that theſe form the young fruits, and contain within them the embryos of the ſeeds; whether thoſe ſeeds be diffuſed through the whole length of the *piſtil*; or whether they be all incloſed in its baſe; and that they are always open at top, and perforated either more or leſs ſenſibly, to the bottom; though this cavity is frequently effaced as the young fruit grows; and ſometimes a part of the *piſtil*, which Malpighi calls the *ſtyle*, or bodkin, dries and falls off.

The *piſtil*, we have obſerved, is the female organ of generation; its baſe does the office of the uterus, or womb, in women; and its length that of the vagina.

It is encompaſſed with the ſtamina, the apices whereof are full of a fine duſt called *farina fœcundans*; which burſting its veſiculæ, or apices, when mature, is ſhed on the upper part of the *piſtil*, and thence is conveyed by the cavity thereof to the baſe or uterus; where being fed with a fine juice, ſecreted by the petala, it grows, expands, and thus forms the embryo of a new plant, &c. For a more diſtinct account of the office of the *piſtil* in the generation of plants, ſee Plant.

PISTIS, in the *Materia Medica of the Ancients*, a name given to the gum bdellium, particularly to that kind of it which was brought from Arabia, and was of a fine yellowiſh white, and in ſmall round drops, or lumps of a roundiſh ſhape, and firm conſiſtence.

PISTOL, a little fire-arm, borne at the ſaddle-bow, at the girdle, or in the pocket.

The *piſtol* is ſaid to have taken its name from *Piſtoya*, a city in Italy; where, as Fauchet tells us, it was firſt made. Borel derives the word from *fiſtula*, *pipe*; the barrel of this piece bearing ſome reſemblance to a flute.

PISTOLE, *doublon*, in *Commerce*, a gold coin ſtruck in Spain, and ſeveral parts of Italy, Switzerland, &c.

It has its augmentations, and diminutions; which are *quadruple piſtoles*, *double piſtoles*, and *half piſtoles*.

The *piſtole* is about the ſame weight, fineneſs, and value, with the French louis d'or; viz. it is equal to about ſixteen ſhillings and ſix-pence ſterling.

In Spain the *piſtole* is accounted equal to four pieces of eight, or thirty-two rials, or a thouſand and eighty-eight maravadis, or a thouſand three hundred and ſixty maravadis, of billon; the old money current at Seville and Cadiz, in Andaluſia, &c. being 25 per cent. better than the money they now reckon by at Madrid, Bilboa, &c. which augmentation was made by Charles II. in 1668, to prevent the exportation of money out of the kingdom.

Moſt of the exchanges in Italy are made on the foot of the *piſtole*.

PISTOLOCHIA, in *Botany*, a name uſed by ſome authors for the plant of which the Virginian ſnake-root of the ſhops is the root.

PISTON, a part or member in ſeveral machines, particularly pumps, air-pumps, ſyringes, &c. called alſo the *embolus*, and popularly the *ſucker*.

The *piſton* of a pump is a ſhort cylinder of metal, fixed exactly to the cavity of the barrel, or body; and which, being worked up and down alternately therein, raiſes the water; and when raiſed, preſſes it again, ſo as to make it force up a valve wherewith it is furniſhed, and ſo eſcape through the noſe of the PUMP.

There are two ſorts of *piſtons* uſed in pumps; the one with a valve, which is called a *bucket*; and the other without a valve, which is called a FORCER.

The *piſtons* of air-pumps, ſyringes, &c. ſee deſcribed under Air-pump and Syringe.

PISUM. in *Botany*. See Pea.

PIT *and gallows*, in our *Ancient Cuſtoms*. See Furca and Fossa.

Pits, *brine*, the name given by the people of Worceſterſhire and Cheſhire, to the wells or *pits* affording the ſalt water, out of which they extract the ſalt.

Theſe waters, though they all contain ſalt, yet have other things alſo in them, and theſe not in ſmall quantity. They all contain a very large proportion of ſtony matter; this is common to the whole ſet, but particular ſubſtances beſide this are found in the particular *pits*. At Northwich, in Cheſhire, there are four *pits*, the water of all which ſtinks very ſtrongly of ſulphur, and contains ſo much vitriol, that it will turn black like ink, with a decoction of galls; yet this is boiled into a very fine and pure kind of ſalt, common at our tables under the name of baſket-ſalt, and having no ſuch properties.

There is a vaſt quantity of ſtony matter precipitated from theſe pans of *brine* in the boiling them to ſalt; this is partly ſaved in ſmall pans ſet at the ſide of the boiler, and partly precipitates to the bottom of the pan, where it forms a cruſt like that at the bottom and ſides of our tea-kettles, which the workmen find it neceſſary to remove every week; but there is no vitriol or ſulphur ſeparated. Phil. Tranſ. Nº 150.

In the country near where theſe *brine-pits* are, the inſtruments uſed in boring often bring up fine and hard ſalt; ſo that they give proofs of there being rocks of ſalt in many places.

All along the river Weever, on each ſide, the earth affords *brine* wherever it is opened: but all theſe are not fit for boiling, many of the *pits* affording a *brine* too weak to be worked to any advantage. The very ſtrongeſt *pits* ſometimes alſo become at once too weak; this is owing to the irruption of freſh ſprings into them, and ſometimes the river itſelf makes its way into them, and overflows them with ſuch a quantity of freſh water, that they are utterly ſpoiled. The *brine-pits* at Weſton near Stafford afford a *brine* that ſtinks like rotten eggs; this turns inſtantly to ink with galls, and purges and vomits violently, if taken even in a ſmall quantity. This in boiling depoſits a white flaky ſand, or ſtony matter, without ſmell or taſte, and the ſalt is pure and fine.

The *pit* at Droitwich, in Worceſterſhire, affords no ſand in the boiling, nor any the leaſt ſediment of the ſtony matter at the bottom of the pan, and the ſalt is the pureſt of all the others: and by the people of the country it is eſteemed the moſt wholeſome; becauſe of its being without the ſand.

This and the other *pits* hereabout, all have the ſmell of rotten eggs, eſpecially after a little reſt, as on the Monday morning after the Sunday's reſt. If meat be put to pickle in the brine of theſe *pits*, inſtead of being preſerved it will ſtink in twenty-four hours, ſometimes in twelve, yet they yield the beſt ſalt of any inland *pits* in the world.

The ſulphur ſpaws of Yorkſhire, which are very numerous in different parts of the county, all ſtink violently of rotten eggs; but if well drawn and worked, they would prove as inoffenſive as the reſt, and only ſo many weaker or ſtronger brine *pits*; and the ſmell is no other than that of the Cheſhire and Staffordſhire brine, when it has been left ſome time at reſt. It is remarkable, that though the ſtony matter is depoſited in ſuch vaſt plenty by the waters of all our ſalt ſprings, it is not found in any abundance in thoſe places where ſalt is made out of ſea-ſand, as in Lancaſhire and ſome other places; ſo that it is much more than the natural quantity of ſpar contained in water that is thus depoſited; and indeed it appears from trial, that the brine of our ſalt ſprings, in general, contains more than twenty times the quantity of ſpar that common water does.

This ſtony matter ſeparates itſelf from the water before the ſalt does, and thus it appears in many other waters impregnated with mineral particles. The vitriolic waters all contain ochre and ſalt, and in all theſe the ochre ſeparates itſelf firſt in the boiling, and then the vitriol; and the ſtony matter precipitated from common ſalt ſprings affords, on an analyſis, the ſalt called *nitrum calcarium*, in conſiderable abundance. Phil. Tranſ. N^{o} 156.

PIT, *coal.* See COAL.

PIT, *cock.* See COCK *pit.*

PIT, *ſaw.* See SAW.

PIT *of a theatre*, all that ſpace between the amphitheatre or galleries, and the theatre or ſtage; called by the ancients *orcheſtra*; and by the French, *parterre.*

This being the moſt commodious part, it was here the Roman ſenate was placed. It has its name *pit*, in Latin *cavea*, from its being ſunk below the level of the ſtage.

PIT-*fiſh*, or **PIT**-*viſch*, in *Ichthyology*, the Dutch name of an Eaſt Indian fiſh, approaching very much to the nature of the European turdus, but that it has no ſcales; its body is not flat but rounded, and is variegated with blue and yellow ſpots; its eyes ſtand very prominent, and the fiſh is able, at pleaſure, to thruſt them out or draw them in; its back-fin is prickly: it loves muddy and foul places, yet is a very well taſted fiſh.

PITANCIARIUS, PIETANCIARIUS, or PIETANTIARIUS, an office, in the ancient monaſteries, whoſe buſineſs it was to provide and diſtribute the pittances of herbs and meat amongſt the monks. See PITTANCE.

PITANGUAGUACU, in *Ornithology*, the name of a Braſilian bird of the ſtarling kind, called by the Portugueſe there the *bemetre*. It is of the ſize of the common ſtarling; its beak is long, thick, and of a pyramidal figure; its head broad and flatted; its neck ſhort, which as it ſits it contracts alſo, ſo as to make it appear much ſhorter; its legs and feet are of a duſky brown; it has a very loud and ſhrill voice; its head, neck, back, wings, and tail, are all of a browniſh black, with a faint admixture of green; the lower part of the throat, the breaſt, and the belly, are yellow, the upper part of the throat white; its beak is very ſharp-pointed.

PITCH, PIX, a tenacious ſort of juice, or gum, drawn from fatty woods, chiefly from pines and firs; and uſed in ſhipping, in medicine, and in various other arts.

Pitch is properly a juice of the wild PINE, or pitch-tree; and is conceived to be no other than the oil thereof inſpiſſated, and turned black, farther than in the balſam. For the method of procuring it from the wood of this tree, ſee PINE.

The beſt is that brought from Sweden and Norway. Its goodneſs conſiſts in its being of a gloſſy black colour, dry, and brittle.

This is leſs pungent and leſs bitter than the liquid TAR, and uſed only in ſome external application, as a warm, adheſive, reſinous ſubſtance. Neumann obſerves, that when melted with oils, reſins, and fats, into ointments and plaſters, the *pitch* is very apt to ſeparate and precipitate. The ancients had a peculiar kind of *pitch* called BRUTIA, which was inſpiſſated to a higher than ordinary degree for certain uſes; ſuch as the receiving a proper quantity of bees wax, to render it the zopiſſa uſed in coating the bottoms of ſhips; which the common *pitch* could not do, being of too ſoft a conſiſtence for this uſe. Pliny tells us that it was made in this manner: the wood was cleaved and formed into a pile, with proper trenches cut in the earth to receive what run from it in burning. When the pile was lighted, the firſt thing that flowed into theſe trenches was a thin fluid liquor like water.

PITCH-*tree*, in *Botany*. See PINE-*tree*.

PITCH, *Burgundy*, is brought to us from Saxony, and is ſuppoſed to be a preparation of the ſame kind with the common ROSIN of the ſhops, only leſs diveſted of the oil, made by boiling the common TURPENTINE till it acquires a due conſiſtence.

PITCH, *naval*, *pix navalis*, is that drawn from old pines, ranged and burnt like charcoal. This, with a mixture of tow, or beaten cables, ſerves for the pitching of veſſels.

PITCH, *naval*, is alſo a denomination given to that ſcraped from off the ſides of old veſſels; and which is ſuppoſed to have acquired an aſtringent virtue, by means of the ſalt water. It ſerves to make plaſters; though it is certain the apothecaries uſually ſubſtitute the common *black pitch* in its ſtead.

PITCH, *Greek*, or *Spaniſh* PITCH, is that boiled in water till it has loſt its natural ſmell; upon which it becomes dry and friable.

The ancients called it *colophony*; from Colophon, a city in Greece, whence great quantities were brought.

PITCH, *oil of*, *oleum picinum*, is an oil procured from *pitch*, by ſeparating the aqueous matter that ſwims a-top of the melted *pitch*. This, for the great virtues attributed to it, is alſo called *balſam of pitch*.

PITCH, *ointment of*, in *Medicine*, is made by melting tar with an equal weight of mutton ſuet, and ſtraining the mixture whilſt hot: this is uſed ſometimes as a digeſtive, and ſaid to be particularly ſerviceable againſt ſcorbutic and other cutaneous eruptions.

PITCH, *pills of*, are made of tar mixed with ſo much powdered liquorice, or other ſuch powdered matter as is ſufficient to render it of due conſiſtence for being formed into pills.

PITCH *of Caſtro*, in the *Materia Medica*, the name given by Boccone and ſome other writers, to a thick kind of bitumen found iſſuing out of the cracks of ſome rocks near the village of Caſtro; from whence it has its name: it is famous in the eccleſiaſtical ſtate for its medicinal virtues.

PITCH, *Jew's*. See ASPHALTUM.

PITCH, in *Muſic*. See GRAVITY *of Sound*, and KEY.

PITCH, in *Building*, denotes the angle or GABLE end.

If the length of each rafter be three fourths of the breadth of the building, the roof is ſaid to be *true pitch*. This is uſed when the covering is of plain tiles.

If the rafters be longer, it is ſaid to be a *high* or *ſharp-pitched* roof; if ſhorter, which ſeldom happens, it is ſaid to be a *low* or *flat-pitched* roof.

If the length of the principal rafters be equal to the breadth of the building, it is called *Gothic pitch*. This is uſed when the covering is of pantiles.

If to rule as a pediment, it is ſaid to be pediment *pitch*. The perpendicular height of this *pitch* is equal to $\frac{2}{9}$ of the breadth of the building. This *pitch* is uſed when the covering is lead.

PITCHED, in the *Sea Language*. They ſay the maſt is *pitched*, when it is put or let down into the ſtep; alſo the maſt is *pitched* too far aft, when placed too near the ſtern. When a ſhip falls with her head too much into the ſea, or beats againſt it ſo as to endanger her top-maſts, they ſay, ſhe will *pitch her maſts by the board*.

This motion may proceed from two cauſes; the waves which agitate the veſſel, and the wind upon the ſails, which makes her ſtoop to every blaſt thereof.

PITCHING. See PAVEMENT.

PITCHING-*pence*, a duty, commonly of one penny, paid for *pitching* or ſetting down every ſack of corn, or pack of merchandize, in a fair or market.

PITCHT, *ſhoulder*. See SHOULDER *itcht*.

PITH, in *Vegetation*, the ſoft ſpongy ſubſtance contained in the central part of plants and trees. As the ſubſtance of the trunk in trees become more woody, the *pith* is compreſſed and ſtraitened to ſuch a degree, that it wholly diſappears.

It is plain from this, that the office of the *pith* in vegetation cannot be very great, ſince it is not of perpetual duration. By its ſpongy ſtructure, it ſeems fitted to receive any ſuperfluous moiſture that might tranſude through the pores of the woody fibres. If by the exceſs of ſuch moiſture, or from any other cauſe, it happens to rot and periſh, as frequently happens in elms, the tree is found to grow full as well without it; a proof it is of no eſſential uſe in vegetation. Boerhaave, Chem. p. 139.

The *pith* of trees is continued farther into their minute parts than is generally conceived; the ſmalleſt branches and pedicles of the leaves and flowers have their ſhare of it, according to the nature of the tree they belong to; and even the middle ribs of the leaves, when examined by the microſcope, are not without it: a tranſverſe ſection of one of theſe ribs of the leaf of a *pithy* tree ſhews a very beautiful arrangement of veſſels, or little bladders, containing a quantity of clear liquor, and reſembling in all reſpects thoſe of which the *pith* in the branches is compoſed. The *pith* in theſe is not round, however, as in the others, but flat, and runs from one end of the pedicle to the other, in form of a thin white rib, gradually leſſening to a point.

The *pith* of plants, in fine, ſeems what the marrow is in animals, a congeries of an infinite number of veſicles, which ſeem deſtined to ſeparate a finer juice than is neceſſary for the nouriſhment of the coarſer parts of the tree. It is obſerved of plants which have a larger than ordinary ſhare of *pith*, that they produce larger quantities of flowers than others; inſtances of this are ſeen in the roſe, the lilach, and the common elder; and in the ferulaceous plants, the quantity of flowers is not only profuſely large, according to the great quantity of *pith* in their ſtalks, but the *pith* ſeems carried up the ſtalks all the way to the ſeeds themſelves; the long ſeeds of the ſweet myrrhis, and other the like plants, while not ripe, being only *pith*. Mem. Acad. Scienc. 1709.

Dr. Hales ſhews that the *pith* ſerves to ſupply the diluting moiſture for the tender ſhoots of plants, and that the figure of theſe may be oblong, and not round, like the fruit, there are tough diaphragms, or partitions in the *pith* at ſmall diſtances from each other, which check the lateral expanſion; as alſo horizontal fibres, which ſerve for the ſame purpoſe.

Of the ſame ſort is the *pith* in the large growing feathers of birds; being compoſed of veſicles that can be diſtended lengthways, but have ſphincters at the ends, to prevent too large a lateral dilatation. Vid. Hales's Veget. Statics, vol. i. p. 337.

PITHECALOPEX, the *ſemivulpa*, or *ape-fox*, a name given by Aldrovandus and ſome others to that ſtrange American animal which we call the OPOSSUM.

The name is compounded of that of the *fox* and the *ape*; of the natures of both which animals it is ſuppoſed by ſome to participate.

PITHIA, and PITHIAN. See PYTHIA, and PYTHIAN.

PITHIAS, or PITHITES, with ſome writers, a ſort of comet, or rather meteor, in form of a tub. Of theſe it is ſaid there are divers kinds, viz. ſome of an oval figure, others like a tun or barrel ſet perpendicular, and ſome like one inclined or cut ſhort off; others having a hairy train or buſh, &c.

PITHYUSA, in *Botany*, a name uſed by many authors for a ſmall ſpecies of SPURGE.

PITT. See PIT.

PITTACIUM, Πιττακιον, in *Surgery*, a name which ſome authors give to a piece of cloth ſpread with a ſalve, to be laid on a part affected.

PITTANCE, *pietantia*, the commons, or allowance of meat, be it fiſh, fleſh, or the like, ſtatedly eaten at meals, beſides bread.

The word is not much uſed except among religious, and thoſe who live in college, or community. Du-Cange derives it from *pictantia*, uſed in the lower Latin for a monachal portion given to two monks in the ſame diſh, conſiſting of ſomething better than pulſe.

Hence we ſometimes alſo find it denote a meal, or commons, better than ordinary; ſuch as is allowed in communities on feaſt days.

Others derive the word *a pietate*; and others, with Salmaſius, from *pittacia*, a meſs, or portion, allowed the ſoldiers, mentioned in ſeveral laws of the Theodoſian code. It is added, that the word *pittacia* properly ſignified a title, or written label, added a-top of the veſſel, to ſhew what was withinſide, or for whom it was intended.

PITUINA, in the *Materia Medica*, a name for the reſin of the pitch-tree.

PITUITA, one of the four humours found in the bodies of animals, on which their temperament is commonly ſuppoſed to depend.

The *pituita*, called alſo *phlegm*, is properly the moſt viſcid and glutinous part of the blood ſeparated in the largeſt glands, where the contortions of the arteries are greateſt, and give the greateſt retardation to the blood's velocity; as in the glands about the mouth and head.

The claſs of phlegmagogues, as manna, &c. are ſuppoſed particularly to purge *pituita*.

Phyſicians give ſeveral epithets to the *pituita*, according to its conditions, or qualities; as *ſaline*, *vitreous*, *gypſous*, *acid*, &c.

Pituita is ſuppoſed to be the prevailing humour in cold, heavy, ſlow people, inclined to ſeriouſneſs and ſtudy; as the bile is in thoſe inclined to war, &c.

The *pituita*, diſcharged at the noſtrils, is ſeparated in the membrane that lines the cavities of the noſe, cheeks, &c. Its uſe is, to keep that membrane ſoft, and defend it from injuries of extraneous bodies, eſpecially thoſe of the air, which paſſes this way, in inſpiration, when the mouth is ſhut.

PITUITARY *gland* is a gland in the brain ſomewhat difficult to be ſeen without removing it out of its place; and of a ſingular kind of ſubſtance, which ſeems to be neither medullary nor glandular. In figure it is tranſverſely oval or oblong, and in the lower part in ſome ſubjects it is divided by a ſmall notch with two lobes, like a kidney bean. See *Tab. Anat. (Angeiol.) fig.* 1. *lit.* 6.

It is of the ſize of a very large pea, and is placed in the ſella of the os ſphenoides, under the infundibulum, wherewith it communicates; and covered by the pia mater as by a bag; receiving a lympha, or juice, which the infundibulum derives from the plexus choroides, and pineal gland; and from this lympha does the gland itſelf take its name.

It alſo filtrates a juice itſelf; ſeparating from the blood a white liquor, very ſubtile, and apparently very ſpirituous.

M. Littre obſerves a ſinus, or reſervoir of blood, which touches this gland; and which is open to it in the place of contact, ſo that the gland lies partly in the blood. This, that author takes to do the office of a balneum Mariæ, in keeping the gland of the degree of warmth neceſſary for the diſcharge of its functions.

This gland is found in all quadrupeds, fiſhes, and fowls, as well as in men. M. Littre gives an inſtance of a tedious diſeaſe, and at length death, ariſing ſolely from an obſtruction and inflammation of the *pituitary* gland.

PITUITARY *membrane*, is that which lines the whole internal nares, the cellular convolutions, the conchæ, the ſides of the ſeptum narium, and, by an uninterrupted continuation, the inner ſurface of the ſinus frontales and maxillares, and of the ductus lacrymales, palatini, and ſphenoidales. It is likewiſe continued down from the nares to the pharynx, ſeptum palati, &c. It is ſo called, becauſe it ſeparates from the arterial blood a mucilaginous lympha called PITUITA.

This membrane is of different ſtructure in different parts. Near the edge of the external nares it is very thin, in other places it is thick and ſpongy; it is thickeſt on the ſeptum narium, the lower portion of the internal nares, and on the conchæ: in the ſinuſes its texture is more ſlender; and on the ſide next the perioſteum and perichondrium, it is furniſhed with many ſmall glands. Winſlow.

PITY, in *Ethics*. See COMPASSION.

PITYDES, a name uſed by ſome authors for the kernels incloſed in the cones of the fir or pitch-tree; they are recommended by the old phyſicians, in diſorders of the breaſt.

PITYLISMA, a name of one of the exerciſes deſcribed by the ancient phyſicians, as of great ſervice in chronic caſes. It conſiſted in a perſon's walking on tip-toe, and ſtretching his hands as high above his head as he could, keeping the whole body alſo as much upon the ſtretch as might be. In this condition the patient was to walk as far as he was well able, all the while moving about both hands as much as he could, in all directions.

PITYRIASIS a name given by the ancients to a ſcurfy diſorder of the head and eye-brows, and of any other part where there is hair. It makes the ſkin ſeem as if covered with bran, and is attended with a troubleſome itching.

PIVA, in the *Italian Muſic*, a HAUTBOY or CORNET.

PIVOT, or PEVOT, a foot or ſhoe of iron, or other metal, uſually conical or terminating in a point; whereby a body intended to turn round bears on another fixed at reſt, and performs its circumvolution.

The *pivot* uſually bears or turns round in a ſole or piece of iron or braſs, hollowed to receive it.

Large gates, &c. uſually turn on *pivots*. The ancients tells us, they had theatres in Rome, that held eighty thouſand people, which have yet turned on a ſingle *pivot*.

PLACAGNODIAUGIA, in *Natural Hiſtory*, the name of a genus of ſpars.

The word is derived from the Greek πλαζ, *a cruſt*, αγνος, *pure*, and διαυγης, *pellucid*.

The bodies of this genus are cryſtalline terrene-ſpars, or ſparry bodies with much of the brightneſs and tranſparence of cryſtal, but debaſed by an admixture of earthy matter, and are imperfectly pellucid, and formed into thin plates with flat ſurfaces, but covered at times either in part or entirely, with tubercles or botryoide prominences, and are compoſed of arrangements of oblong concretions, of no determinately angular figure.

Of this genus there are only two known ſpecies, viz. a hard ſemipellucid and yellowiſh brown one and a brittle pellucid and whitiſh one. Hill.

PLACAGNOSCIERIA, in *Natural Hiſtory*, the name of a genus of ſpars.

The word is derived from the Greek πλαξ, *a cruſt*, αγνος. *pure*, and σκιερος, *opake*.

The bodies of this genus are dull and opake cryſtalline terrene ſpars, formed into cruſts, and of an irregular and not ſtriated texture within.

Of this genus there are three known ſpecies, viz. a hard whitiſh brown one, a dull crumbly whitiſh one, and a dull pale brown friable one, of a very coarſe texture, which encruſts the ſides and bottoms of veſſels, in which water is frequently boiled. Hill.

PLACARD, or PLACART, PLACAERT, a foreign term, frequent in Gazettes, ſignifying a leaf, or ſheet of paper, ſtretched and applied upon a wall, or poſt. Edicts, regulations, &c. are to be made public in *placards*.

The word *placard* is alſo uſed for a libel or lampoon. At Rome, *placards* againſt the pope are frequently fixed, in the night-time, to the ſtatue of Paſquin. See PASQUINADE.

PLACARD, in *Architecture*, denotes the decoration of the door of an apartment, which is ſometimes a corniche ſuported by conſoles.

PLACARD, in *Our Cuſtoms*, denotes a licence whereby a perſon is permitted to ſhoot with a gun, or to take otherwiſe unlawful game.

PLACE, *locus*, in *Philoſophy*, that part of immoveable ſpace which any body poſſeſſes.

Ariſtotle, and his followers, divide *place* into *external* and *internal*.

PLACE, *internal*, is that ſpace, or room, which the body contains.

PLACE, *external*, is that which includes or contains the body; which is alſo called, by Ariſtotle, the firſt or concave and immoveable ſurface of the ambient body.

It is controverted, in the ſchools, whether *internal place* be a real entity, or only an imaginary being; i. e. whether it be any thing intrinſically, or only an aptitude and capacity of receiving bodies.

Some maintain it a poſitive being, incorporeal, eternal, independent, and infinite; and aſſert it even to conſtitute the immenſity of the Godhead.

The Carteſians, on the contrary, hold *internal place*, abſtractedly conſidered, to be no other than the very extenſion of the bodies contained therein; and therefore in no wiſe different from the bodies themſelves.

The ſchoolmen likewiſe diſpute, whether *external place* be moveable, or immoveable? Its immobility is argued from this conſideration; that what moves, muſt neceſſarily leave its *place*; which it cannot do, if it go along with the moveable. Others charge an abſurdity on this opinion of Ariſtotle; viz. that hence it follows, that a body really at reſt is continually ſhifting *place*: a tower, for inſtance, on a plain; or a rock in the middle of the ſea; becauſe the one and the other are continually incloſed with new air, or new water, muſt be ſaid to be in motion or to change *place*.

To ſolve this difficulty, and ward off the abſurdity which follows from Ariſtotle's laying down external place as immoveable, many expedients have been had recourſe to. The Scotiſts contend for *place*'s being only immoveable, by equivalence. Thus, when the wind blows, the air which inveſted the ſurface of the tower does indeed recede, but then other ſimilar and equivalent air takes place. The Thomiſts chuſe to deduce the immobility of *external place*, from its keeping the ſame diſtance from the centre, and the cardinal points of the world; and the Nominaliſts, for a correſpondence with certain virtual parts of the divine immenſity.

The Carteſians deny *external place* to be either a ſurrounding ſurface, or a body ſurrounded, or a mean term between the two; and conceive it to be the ſituation of a body among adjacent bodies conſidered as at reſt. Thus the tower ſhall be deemed to remain in the ſame *place*, though the ambient air be changed; ſince it retains the ſame ſituation with regard to the neighbouring hills, trees, and other parts of the earth.

Sir Iſaac Newton better, and more intelligibly, diſtinguiſhes *place* into *abſolute*, and *relative*.

PLACE, *abſolute*, and *primary*, is that part of infinite and immoveable ſpace which a body poſſeſſes.

PLACE, *relative*, or *ſecondary*, is the ſpace it poſſeſſes, conſidered with regard to other adjacent objects.

Dr. Clark adds another kind of *relative place*, which he calls *relatively common place*; and defines it, that part of any moveable or meaſurable ſpace which a body poſſeſſes; which *place* moves together with the body.

PLACE, Mr. Locke obſerves, is ſometimes likewiſe taken for that portion of infinite ſpace poſſeſſed by the material world, though this, he adds, were more properly called extenſion.

The proper idea of *place*, according to him, is the relative poſition of any thing, with regard to its diſtance from certain fixed points; whence we ſay, a thing has or has not changed *place*; when its diſtance is, or is not altered with reſpect to thoſe bodies.

For the viſion of *place*, ſee VISION, and VISIBLE.

PLACE, in *Optics*, or *Optical* PLACE, is the point to which the eye refers an object.

Thus the points D and E (*Tab.* V. *Optics. fig.* 89.) to which two ſpectators in *d* and *e* refer the object C, are called *optic places*.

Here, if a right line joining the optic *places* D and E, be parallel to a right line paſſing through the eyes of the ſpectators *d*, *e*; the diſtance of the optic *places* D, E will be to the diſtance of the ſpectators *d* and *e*, as the diſtance of one of the optic *places* from the *place* of the object E C, to the diſtance of the other ſpectator from the ſame object *d* C.

PLACE, *optic*, of a ſtar, is a point in the ſurface of the mundane ſphere as C or B (*Tab. Aſtronomy*, *fig.* 27.), wherein a ſpectator in E, or T, ſees the centre of the ſtar S.

This is divided into *true*, and *apparent*.

PLACE, *true*, or *real optic*, is that point of the ſurface of the ſphere B, wherein a ſpectator, placed in the centre of the earth, ſees the centre of the ſtar, or phenomenon. Or, it is a point among the fixed ſtars, determined by a line drawn from the centre of the earth through that of the ſtar, and terminated in B among the ſtars.

PLACE, *apparent*, or *viſible optic*, is that point of the ſurface of the ſphere, wherein a ſpectator, placed on the ſurface of the earth in E, ſees the centre of the ſtar S. Or, a point C found by a line paſſing from the ſpectator's eye through the ſtar, and terminated in the ſphere of the ſtars.

The diſtance between the two optic *places* makes what we call the PARALLAX.

The *apparent place*, in optics, is different from the *real* one; for when, by refraction through glaſſes, that parcel of rays which falls on the pupil of the eye, from each point of any near object, is made to flow as cloſe together, as that which comes from a diſtant one; or when, by the ſame means, the rays coming from diſtant objects are made to diverge as much as if they flowed from near ones; then the eye muſt neceſſarily ſee the *place* of the object changed; which change is its *apparent place*.

If an object be placed nearer to a convex glaſs than is the diſtance of its focus, its *apparent place* may be determined: but if the object be in the focus of the glaſs the *locus apparens* of the object cannot be determined; only that it will appear vaſtly remote.

Nor can the *locus apparens* be determined if the object be beyond the focus of the convex glaſs: but if the object be farther diſtant from a convex glaſs than its focus, and the eye lie beyond the diſtinct baſe, its *apparent place* will be in the diſtinct baſe. See LENS.

PLACE *of the ſun*, a *ſtar*, or *planet*, ſimply, denotes the ſign and degree of the zodiac, which the luminary is in.

Or, it is that degree of the ecliptic, reckoned from the beginning of Aries, which the planet's or ſtar's circle of longitude cuts: and therefore it coincides with the longitude of the ſun, planet, or ſtar.

As the ſine of the ſun's greateſt declination $23^\circ\ 30'$: to the ſine of any preſent declination given or obſerved v. gr. $23^\circ\ 15'$ :: ſo is radius 10: to the ſine of his longitude $80^\circ\ 52'$, which, if the inclination were north, would give $20^\circ\ 51'$ of Gemini, if ſouth, $20^\circ\ 52'$ of Capricorn, for the ſun's *place*.

PLACE, *Aſtronomical*. See ASTRONOMICAL.

PLACE, *moon's*, is that point of her orbit wherein ſhe is found at any time.

This, by reaſon of the great inequalities in the lunar motions, which render a number of equations and reductions neceſſary before the juſt point be found, is of various kinds; viz. her *fictitious place*, which is the moon's *place* once equated; her *place nearly true*, which is her *place* twice equated; and the moon's *true place*, which is her *place* thrice equated.

PLACE, *excentric, of a planet in its orbit*. See EXCENTRIC, and P. *Tab. Aſtron. fig.* 26.

PLACE, *heliocentric*, of a planet. See HELIOCENTRIC, and R, *fig.* 26.

PLACE, *geocentric*. See GEOCENTRIC, and R, *fig.* 26.

PLACE *computation of a planet's*. See PLANET.

PLACE *of radiation*, in *Optics*, is the interval, or ſpace in a medium or tranſparent body, through which any viſible object radiates.

PLACE, in *Geometry*, is a line uſed in the ſolution of problems; more uſually called by the Latin name, *locus*.

See the doctrine of geometrical *places* under LOCUS; ſee alſo PLAIN.

PLACE, in *War*, is a general name for all kinds of fortreſſes, where a party may defend themſelves.

In which ſenſe it may be defined to be a place ſo diſpoſed, as that the parts which encompaſs it defend and flank one another.

PLACE, *ſtrong*, or *fortified*, is a *place* flanked and covered with baſtions. See FORTIFIED *place*.

PLACE, *regular*, is that whoſe angles, ſides, baſtions, and other parts are equal; and this is uſually denominated from the number of its angles: as a pentagon, a hexagon, &c. Palma Nova, built by the Venetians, is a dodecagon.

PLACE, *irregular*, is that whoſe ſides and angles are unequal.

PLACE *of arms*, in *Fortification*, is a ſtrong city or town, pitched upon for the chief magazine of an army. See *Tab.* II. *Fortific. fig.* 21. *litt.* *g g*, &c. and *Tab.* VII. *fig.* 38.

PLACE *of arms*, in a *city* or *garriſon*, is a large open ſpot of ground, uſually near the centre of the place, where the grand guard is commonly kept, and the garriſon holds its rendezvous at reviews, and in caſes of alarm, to receive orders from the governor.

PLACE *of arms*, of an *attack*, in a ſiege, is a ſpacious place covered from the enemy by a parapet or epaulement, where the ſoldiers are poſted ready to ſuſtain thoſe at work in the trenches, againſt the ſoldiers of the garriſon. It is cuſtomary to make three *places of arms*, when the ground will permit; the firſt and moſt diſtant from the place is about three hundred toiſes from the glacis of the covert way; the ſecond is within one hundred and forty toiſes; and the third at the foot of the glacis. See PARALLELS.

PLACE *of arms particular*, in a *garriſon*, is a place near every baſtion, where the ſoldiers, ſent from the grand place to the quarters aſſigned them, relieve thoſe that are either upon the guard, or in fight.

PLACE *of arms without*, is a place allowed to the covert-way, for the planting of cannon; to oblige thoſe who advance in the approaches to retire.

Thoſe *places of arms* that are in the covered way, are places made at the entering and ſaliant angles, conſiderably larger than the ſtreet of the covered way, and formed by turning the head of the glacis into two faces, projecting towards the country: thoſe at the ſaliant angles are formed by the rounding of the counterſcarp; thoſe at the entering angles are conſtructed by taking the gorges at the head of the glacis of a certain length, drawing the faces at a certain angle, and parallel to thoſe faces drawing a glacis. See FORTIFICATION *according to M. Vauban, and according to M. Coehorn.*

PLACE *of arms*, in a camp, is properly the bell-tents at the head of each company, where the arms are lodged. It alſo denotes a large ſpace at the head of the camp, for the army to be ranged in and drawn up in battalia.

PLACE *of arms* of a troop or company, is the ſpot of ground on which the troop, or company, draws up.

PLACE, *face of a.* See FACE.

PLACE, *tenaille of the.* See TENAILLE.

PLACE, *view of a.* See VIEW. See FORTIFICATION, *according to M. Vauban's firſt method.*

PLACE, *fire.* See FIRE-PLACES.

PLACE, among *Logicians* and *Orators*, denotes the ſeat or ſource of an ARGUMENT; or that from which it is taken.

PLACE is uſed in the doctrine of artificial memory: and theſe *places* may be either ſuch in a proper ſenſe, as a door, a window, a corner, &c. or familiar and known perſons; or any thing at pleaſure, providing they be placed in a certain order, animals, plants, words, letters, characters, hiſtorical perſonages, &c. though ſome of theſe are more and ſome leſs fit for the purpoſe; but ſuch kinds of *places* greatly help the memory, and raiſe it far above its natural power. See MEMORY.

PLACE, *common.* See COMMON *place.*

PLACE *of units, tens*, &c. See UNIT, and NUMERATION.

PLACES, *hylegial*, in *Aſtrology.* See HYLEGIAL.

PLACE, *whiſpering.* See WHISPERING.

PLACE, *additions of.* See ADDITION.

PLACE *unity of.* See UNITY.

PLACE *bricks*, were kiln-burnt red *bricks* of a full ſize, now entirely diſuſed in the metropolis; but in lieu of them, the ſoft inſufficiently burnt bricks from the outſide of the clamps are called, by way of diſtinction from ſtock or hard burnt bricks, *place bricks.* Theſe are of a foul red colour, and will eaſily break or cruſh to pieces. The particular manner in which *place bricks* were formerly made was by dipping the mould in water before the clay was put in; which made the outer ſurfaces when burnt very coarſe and hard. See BRICK.

PLACENTA, in *Anatomy*, a ſoftiſh roundiſh maſs, found in the womb of a pregnant woman; wherein the ancients ſuppoſe the blood was purified, and prepared for the nouriſhment of the fœtus. See *Tab. Anat. (Splanch.) fig.* 16. *lit. a a.*

Hence they alſo called it *hepar uterinum*, the liver of the womb, as if it did the office of a liver in preparing the blood.

It is called by the moderns *placenta*, q. d. womb-cake, becauſe in form of a cake.

The *placenta* is ſuppoſed by ſome to be only a maſs of coagulated blood: for in the preſſing or waſhing it, it diſſolves; and its real uſe to be, to ſerve as a pillow for the umbilical veſſels to reſt on.

Its figure is not unlike that of a plate without brims; it is uſually three-quarters of a foot over, and ſometimes a foot. It is round, and generally concave and convex; the convex ſide adheres to the uterus, and is uneven, having divers protuberances and pits, by which it makes impreſſions upon, and receives others from, the uterus. Its place in the uterus, whatever ſome pretend, is not certain.

In women, unleſs in caſe of twins, &c. there is but one *placenta:* however, the number generally anſwers the number of the fœtus. In ſome brutes, eſpecially cows or ſheep, they are very numerous, ſometimes near a hundred, even for one fœtus; but ſmall, and only reſembling large conglomerate glands. From the external or concave ſide, which likewiſe has its protuberances, though covered with a ſmooth membrane, iſſue the umbilical veſſels, which are in great plenty diſtributed through the whole ſubſtance of it.

Some even imagine this part to be no more than a plexus of the veins and arteries, by whoſe extremities opening into the ſides of the hypogaſtric veſſels, the circulation is performed between the mother and the fœtus; for that ſide of the *placenta* which adheres to the womb appears to be nothing but the extremities of an infinite number of ſmall threads, which, in labour, dropping out of the pores in the ſides of the hypogaſtic blood-veſſels, into which they had inſinuated themſelves, is the occaſion of the flowing of the lochia, till the uterus collapſes, or the pores, by the natural elaſticity of the veſſels, contract by degrees.

It is a great diſpute among the anatomiſts of the Royal Academy of Paris, whether the *placenta* have any external coat, whereby it is connected to the womb? M. Mery maintains it has none, and that nothing hinders the blood of the mother from paſſing out of the womb into the *placenta*, and thence to the fœtus: in which opinion he is ſeconded by M. Rohault. Meſſ. Vieuſſens and Winſlow maintain the contrary. In a ſubſequent memoir, M. Rohault endeavours to ſhew, that the *placenta* is no particular part, but only a portion of the CHORION condenſed or thickened.

The *placenta* has generally been looked upon as an original part among the ſecundines; but according to Dr. Thomas Simpſon of St. Andrew's, it ſeems to have no place in the ovarium, nor in the uterus, till once the ovum becomes contiguous to the fundus, and then every contiguous part becomes really a *placenta.* He thinks the fundus uteri, a place peculiarly fitted for the growth of the *placenta*, as proper ſoils encourage the growth of the roots of trees and ſhrubs, many of which are propagated by the branches however placed; ſo that every part of them ſeems equally fitted to be root or branch. Hence he thinks extra-uterine conceptions can have no *placenta*; and he ſays, there are no inſtances in authors to contradict his opinion.

The *placenta* does not increaſe in the ſame proportion which the fœtus does; for the ſmaller the fœtus is, the *placenta* is proportionably larger.

The *placenta* generally adheres to, or near the fundus of the womb, and is covered on the ſide next to the womb, with a fine membranous continuation of the chorion. Vid. Monro, Medic. Eſſ. Edinb. vol. ii. p. 128, and the authorities there quoted.

The ſeparation of the *placenta* from the womb muſt produce abortions, and this may be occaſioned by different cauſes operating in various manners, and requires very different treatment to prevent the loſs of the fœtus.

PLACENTA, in *Botany*, a term improperly given by Mr. Houſton, in the Philoſophical Tranſactions, N° 421, to what is uſually called *receptacle.* See RECEPTACULUM *ſeminum.*

PLACENTA, in *Natural Hiſtory*, the name of one of the claſſes of the echini marini. The characters of theſe are, that they are of a depreſſed or flatted form, and are wrought in various ſhapes, as the paſtry people make their cakes; they all have a cinquefoil flower at their top, and their mouth is in the middle of the baſe; the aperture for their anus is uſually near the edge.

Of this claſs there are three genera: 1. The *melitta.* 2. The *laganum.* And 3. The *rotula.* Which ſee under their ſeveral heads.

PLACENTA, among the *Ancients*, a kind of cheeſe-cake, the moſt ſimple kind of which was made of flour mixed with oil and cheeſe, to which honey was added: but the more luxurious ſort of people added likewiſe a great variety of herbs and fruits, as alſo ſugar, eggs, butter, &c.

PLACITA, PLEAS, a term frequent in our laws and cuſtoms. Originally, *placita* ſignified certain public aſſemblies, of all degrees of men, wherein the king preſided, and where the great affairs of the kingdom were conſulted upon.

Theſe aſſemblies were called *placita generalia*; becauſe *generalitas univerſorum majorum tam clericorum quam laicorum ibidem conveniebat.* And hence the decrees, ordinances, ſentences, &c. of this aſſembly, were alſo called *placita.*

Sim. Dunelmenſis tells us, they were held in the open fields; for, ſays he, *nullam oportet regem in literis aſſignare curiam, quia ubi rex judicat in aperto, ibi eſt curia ſua.*

Some will have theſe *placita generalia*, and *curiæ regis*, of ancient times to be much the ſame with what we now call a *parliament.*

The lords courts came hence alſo to be called *placita generalia*, though oftener *curiæ generales*; becauſe all their tenants and vaſſals were obliged to appear in them.

We alſo meet with *placitum nominatum*, for the day appointed a criminal to appear in, and make his defence. Leg. Hen. I. And *placitum fractum*, i. e. when the day is lapſed.

Lord Coke derives the word *placitum à placendo, quia bene-placitare ſuper omnia placet:* indeed, this ſeems a very fanciful etymon; and others have more reaſon in deriving the word from the German *platz*, or the Latin *plateis*, *fields*, or *ſtreets*, where theſe aſſemblies were originally held.

PLACITARE, in the *Old Law Books*, ſignifies to plead cauſes. See PLEADING.

Mos placitandi, *ante Conquæſtum, fuit coram aldermanno, & proceribus, & eorum hundredariis,* ſc. *baronibus, majoribus, melioribus, ſenioribus, & urbanis,* Miſc. in Bibl. Cott. ſub. Tit. Vitellius.

Hence, *placitator, a pleader.* Ralph Flambard is recorded to have been *totius regni placitator*, in William the Second's time.

PLACITUM, in *Law*, a ſentence of the court; or an opinion, ordinance, or decree.

Cuſtos PLACITORUM *coronæ.* See CUSTOS.

PLAFOND, or PLATFOND, in *Architecture*, the ceiling of a room, whether it be flat or arched; lined with laths and plaſter, and ſometimes alſo enriched with paintings, &c. See CEILING.

PLAFOND is alſo more particularly uſed for the bottom of the projecture of the larmier of the corniche; called alſo the SOFFIT.

PLAGIARY, in *Philology, author-theft*; or the practice of purloining other people's works, and putting them off for a man's own.

Among the Romans, *plagiarius* was properly a perſon who bought, ſold, or retained a freeman for a ſlave; ſo called, becauſe the Flavian law condemned ſuch a perſon *ad plagas*, to be whipped.

Thomaſius has an expreſs treatiſe *de plagio literario*; wherein he lays down the laws and meaſures of the right which authors have to one another's writings. Dictionary-writers, at leaſt ſuch as meddle with arts and ſciences, ſeem in this caſe to be exempted from the common laws of *meum* and *tuum*; they do not pretend to ſet up on their own bottom, nor to treat the reader at their own coſt. Their works are ſuppoſed, in great meaſure, compoſitions of other people; and whatever they take from others, they do it avowedly. In effect, their quality gives them a title to appropriate every thing that may be for their purpoſe, wherever they find it, and, they do no otherwiſe, than as the bee does for the public ſervice.

Their occupation is not pillaging, but collecting contributions; and if you aſk them their authority, they will produce you the practice of their predeceſſors of all ages and nations.

PLAGIAULUS, Πλαγιαυλος, among the *Ancients*, a kind of FLUTE.

PLAGIOPLATEUS, in *Natural Hiſtory*, a term uſed by Artedi and others to ſignify depreſſed, in oppoſition to the term CATHETOPLATEUS, which ſignifies compreſſed.

PLAGIUM, in *Civil Law*, the offence of ſpiriting away and ſtealing men and children: whence the offenders were called plagiarii, and were puniſhable with death. See KIDNAPPING.

PLAGIURI, in *Natural Hiſtory*, the name of one of the great claſſes, or families of fiſh: the characters of which are, that the tail is placed horizontally; they reſpire by means of lungs, and have uſually a double fiſtule in the head; they are viviparous, and the males have a penis and teſtes, the females the vulva, ovaria, mammæ, &c. and they bring up their young with milk.

The term is derived from the Greek πλαγιος, *tranſverſe*, and ουρα, *a tail.*

Under this claſs of fiſh are comprehended the following genera: the phyſeter, delphinus, balæna, monodon, catodon, and thrichechus; which ſee under their reſpective articles.

PLAGUE, PESTILENCE, PESTIS, a very acute, deſtructive, malignant, and contagious diſeaſe; being a putrid fever in its worſt degree, and uſually proving mortal.

The *plague* is commonly defined by a malignant fever; but Diemerbroek thinks the two ought to be diſtinguiſhed; the fever not being the eſſence, but only a ſymptom or effect, of the *plague.*

The *plague* is reckoned by Dr. Liſter, and many others, as an exotic diſeaſe, never bred or propagated in England, but always imported from abroad, and particularly from the Levant, the coaſts of Aſia the Leſſer, Egypt, &c. where it is familiar. Sydenham obſerves, that it rarely infeſts England oftener than once in forty years; but through the mercy of God, it is now greatly beyond that period ſince we have been viſited.

The origin and cauſe of the *plague* have been a celebrated ſubject of controverſy among phyſicians. The diſorder is generally ſuppoſed to be communicated by the air; but how, and in what manner, the air becomes thus deadly, is the queſtion.

Some will have inſects the cauſe of *plagues*, as they are of blights; theſe, they ſay, being brought in ſwarms from other parts by the winds, are taken into the lungs in reſpiration, mix with the blood and juices, and attack and corrode the viſcera. Mr. Boyle, on the other hand, attributes *plagues* principally to the effluvia or exhalations breathed into the atmoſphere, from noxious minerals.

The air, in effect, is depraved in far more places than improved by being impregnated with ſubterraneous expirations. Indeed among the minerals known to us, there are many more noxious than wholeſome ones; and the power of the former to do miſchief is more efficacious than of the latter to do good, as we may gueſs by the ſmall benefit men receive in point of health, by the effluvia of any mineral or other known foſſil, in compariſon of the great and ſudden damage often done by the expirations of orpiment, ſandarac, and white arſenic.

Amongſt the various ſorts of particles wherewith the atmoſphere is replete, ſome may be ſo ſmall and ſolid, or ſo conveniently ſhaped, as to enter many of the numerous orifices of the minute glandules of the ſkin, or at other pores thereof. Thus, though neither paper nor bladder be pervious to the elaſtic parts of the air; yet may either of them be eaſily penetrated by other corpuſcles of the atmoſphere; and Mr. Boyle ſays, he has prepared a dry body, which being incloſed in either, would, without wetting or diſcolouring, or any ways ſenſibly altering them, paſs immediately through the pores thereof, in ſuch plenty, as to exert a manifeſt operation on bodies placed at ſome diſtance beyond them.

This is alſo confirmed from the ſudden check almoſt every ſummer given to the *plague* at Grand Cairo; for ſince morbific cauſes operate more effectually than curative ones, it ſeems more than probable, that exhalations aſcending from under-ground may produce peſtilential fevers, and the *plague* itſelf; ſince the corpuſcles which impregnate the Egyptian air upon the ſwelling of the Nile, put a ſpeedy ſtop not only to the contagion, but to the malignity of the *plague*, aſſiſted even by the ſummer's heat, which is there exceſſive.

It is poſſible there may be noxious minerals in a country, that are not often able to produce peſtilences; they may be in ſtrata, or beds, ſo deep, that even a ſmall earthquake ſhall not affect them, though a more violent ſhock may.

And hence we may account for the *plague's* raging in ſome parts of Africa once in thirty, or once in a hundred years; ſince there may be periodical paroxyſms or grand and vehement commotions in the ſubterranean parts, though not yet obſerved in them.

It is probable, peculiar kinds of venomous exhalations may ſometimes be emitted, eſpecially after earthquakes; and thus occaſion mortal diſeaſes in animals of one kind, and not of another; and in this or that place, and not elſewhere.

It is very eaſy to conceive, that the air we breathe, which is the general repoſitory of the various effluvia emitted, not only by minerals and metals, but by ſtagnant waters, putrifying ſubſtances of different kinds, burning bodies, breathing animals, &c. may on ſome particular occaſions, become in a peculiar degree noxious and fatal. How this effect is produced, the reader will be able to perceive by conſulting the articles AIR, DAMP, EFFLUVIA, PHLOGISTON, PUTREFACTION, &c.

Fernelius gives us an account of a *plague*, or murrain, in 1514, which invaded no creatures but cats. Dionyſius Halicarnaſſeus mentions a *plague* which attacked none but maids; and that which raged in the time of Gentilis, killed ſcarce any women, and very few but luſty men. Boterus mentions another *plague*, which aſſaulted none but the younger ſort; and we have inſtances of the ſame kind of a later ſtanding. Cardan ſpeaks of a *plague* at Baſil, with which the Switzers, and not the Italians, Germans, or French, were infected; and Joh. Utenhovius takes notice of a cruel *plague* at Copenhagen, which though it raged among the Danes, ſpared the Germans, Dutch, and Engliſh, who went with all freedom, and without the leaſt danger, to the houſes of the infected.

The *plague*, according to Sydenham, uſually begins with a chillineſs and ſhivering, like the acceſs of an intermitting fever; then comes on a nauſea, with vehement vomitings; an intenſe pain about the region of the heart, as if pinched in a preſs; and a burning fever, which continually preys on the patient, till either death, or the eruption of ſome bubo, parotis, or other tumor, in the inguina or axillæ, or behind the ears, relieve him, and diſcharge the matter of the diſeaſe. Sometimes, indeed, it attacks without any fever; purple ſpots appearing all at once, the certain ſigns of preſent death; but this rarely happens except at the beginning of ſome terrible *plague*.

It has alſo been known to make its firſt appearance in tumours, without any fever, or other violent ſymptom.

Heavineſs, pain in the ſtomach, head, and back, cardialgy, broken ſleep, anxiety, alteration in the look, difficulty of breathing, hiccough, ſyncope, delirium, convulſive twichings, diarrhœa, eyes ſunk or inflamed, tongue black and dry, vehement drought, fœtid breath, carbuncles, ſpots livid, purple, green, &c. are alſo ſymptoms uſually attending this diſeaſe.

A great deal depends on the circumſtances of the tumors, or *plague-ſores*; as they appear and increaſe, the fever abates; and as they ſink or diminiſh, it renews again. When they happen about the time of the criſis, and ſuppurate kindly, they are good prognoſtics of a happy recovery.

In acute diſeaſes, ſays Hippocrates, prognoſtics are ever fallacious. However, in the terrible *plague* at Nimeguen, Diemerbroek, who attended the ſick through the whole progreſs thereof, relates, that thoſe taken ill about new and full moon rarely eſcaped; that faintings, ſwoonings, and palpitations of the heart, were uſually deadly ſigns; and intermitting pulſe always mortal; drowſineſs, ſneezings, tremulous motions, doſing, ſore throat, &c. were ill omens: pleuriſies always mortal; coſtiveneſs a good ſign: a diarrhœa almoſt conſtantly fatal; and that bloody ſtools or urines always preſaged ill.

As to the cure, phyſicians are much divided. It is generally attempted with alexipharmics and cardiacs, with the aſſiſtance either of ſudorifics, or phlebotomy, or both. Many eminent phyſicians, both ancient and modern, highly commend blood-letting; Sydenham particularly ſays, that if uſed copiouſly, and in time, it never yet did harm; but that ſudorifics often prove pernicious. Diemerbroek, on the contrary, with other very experienced writers, proteſts againſt phlebotomy, as very dangerous, and often deadly; the chief hopes they founded on diaphoretics and ſudorifics: emetics and purgatives are by moſt abſolutely forbid; and yet Dr. Sayer uſed the former with good ſucceſs, in the beginning of the diſeaſe in the *plague* at London, Ann. 1640. See ALEXIPHARMIC, &c.

The juice of lemons is commended of ſingular efficacy in the *plague*, and peſtilential fevers: Piſo relates, that it is the principal remedy of the Indians; and proteſts he never new any thing come up to it. Dr. Harris obſerves, that the ſame remedy is what the Turks have principally recourſe to. Camphor is alſo much extolled; this, Etmuller aſſures us, was the baſis of Heinſius's antipeſtilential oil, who had a ſtatue erected to him, when dead, in the city of Verona, for the ſervice he had done thereby. It was prepared from equal quantities of camphor, citron-peel, and amber. The viperine ſalt, and rob of elder-berries, are alſo greatly commended.

For preſervatives againſt the *plague*, they are uſually ſummed up in that popular diſtich:

> *Hæ tria labificam tollunt adverbia* peſtem:
> *Mox, longe, tarde, cede, recede, redi.*

Cauteries, and eſpecially iſſues, and ſetons in the inguina, are found of great ſervice in preſerving from infection. A piece of myrrh, held in the mouth in contagious places, is alſo commended. But Diemerbroek aſſures us, that there is nothing better in this intention, than ſmoaking tobacco; but he adds, that it is only to ſuch as have not made the practice familiar to them. The other preſervatives uſed by that author were the rad, helenii, cardamoms, whitewine vinegar, and chearfulneſs; and when he found his ſpirits low as if the diſeaſe were taking poſſeſſion, a cup of generous wine ſometimes even to a degree of ebriety. See *Peſtilential* DISEASES, and EPIDEMIC.

Dr. Dover ſays he cured the *plague* among ſome ſailors, in a voyage, by one very plentiful bleeding to the quantity of a hundred ounces, and with drink ſharpened with ſpirit and oil of vitriol. Mem. Eſſ. Edinb.

Mayors, bailiffs, head offices of corporations, and juſtices of peace, have power to tax inhabitants, houſes, and lands, &c. within their precincts, for the relief of perſons infected with the *plague*; and juſtices of the county may tax perſons within five miles round, on a pariſh's inability; the tax to be levied by diſtreſs and ſale of goods, or in default thereof by impriſonment. Infected perſons going abroad, after being commanded to keep houſe for avoiding farther infection, may be reſiſted by watchmen, &c. and puniſhed as vagrants, if they have no ſores upon them; and if they have infectious ſores on them, it is felony. Juſtices of peace, &c. are to appoint ſearchers, examiners, and buriers of the dead, in places infected, and adminiſter oaths to them for the performance of their duties, &c. ſtat. 1 Jac. 1 cap. 31. See QUARANTINE.

PLAGUE-*water*, *aqua epidemica*, is one of the compound waters of the ſhops, diſtilled from mint, roſemary, angelica roots, &c.

PLAIN, *planus*, an epithet applied to various things, generally importing them to be ſmooth even, level, or ſuperficial, or ſimple, obvious, or the like.

In theſe ſenſes the words ſtand oppoſed to rough, ſolid, laboured, enriched, &c.

It is a maxim in heraldry, that the *plainer* the coat, the nearer to antiquity. *Plain* coats are ſuch as are leaſt incumbered with figures, or charges, and which have nothing in them but what is natural.

PLAIN *figure*, in *Geometry*, is an uniform ſurface, from every point of whoſe perimeter, right lines may be drawn to every other point in the ſame.

Or, it is a figure which lies evenly between its bounding lines; and as a right line is the ſhorteſt extenſion from one point to another, ſo a *plain ſurface* is the ſhorteſt extenſion from one line to another.

PLAIN *angle*, is an angle contained under two lines or ſurfaces.

It is ſo called in contradiſtinction to a *ſolid* angle.

PLAIN *triangle*, is a triangle included under three right lines, or ſurfaces; in oppoſition to a *ſpherical*, and a *mixt* triangle.

PLAIN *trigonometry* is the doctrine of plain triangles, their meaſures, proportions, &c.

PLAIN *glaſs*, or *mirror*, in *Optics*, is a glaſs or mirror whoſe ſurface is flat, or even. See the phenomena and laws of *plain* mirrors, under the article MIRROR.

PLAIN *tyle*. See TYLE.

PLAIN *ſcale* is a thin ruler, whereon are graduated the lines of chords, ſines, tangents, ſecants, leagues, rhumbs, &c. of ready uſe in moſt parts of the mathematics, chiefly in navigation.

See its deſcription and uſe under SCALE.

PLAIN *chant*, in *Muſic*. See CHANT.

PLAIN *deſcant*. See DESCANT.

PLAIN *chart*, in *Navigation*, is a ſea-chart, wherein the meridians and parallels are repreſented by parallel ſtraight lines; and where, of conſequence, the degrees of longitude are the ſame in all the parallels of latitude.

See the properties, conſtruction, &c. of this chart under CHART.

PLAIN *ſailing*, in *Navigation*, is the art of working the ſeveral caſes and varieties in a ſhip's motion on a *plain* CHART.

Plain ſailing is founded on the ſuppoſition of the earth being a plane or flat; which though notoriouſly falſe, yet, places being laid down accordingly, and a long voyage broken into many ſhort ones, the voyage may be tolerably performed by it, near the ſame meridian.

In *plain ſailing* it is ſuppoſed that by the rhumb line meridian, and parallel of latitude, there always will be formed a right angled triangle; and that ſo poſited, as that the perpendicular ſide may repreſent part of the meridian, or north and ſouth line, containing the difference of latitude; the baſe of the triangle repreſent the departure; and the hypothenuſe, the diſtance ſailed. The angle at the vertex is the courſe, and the angle at the baſe, the complement of the courſe; any two of which, with the right-angle, being given, the triangle may be protracted, and the other three parts found.

For the doctrine of *plain ſailing*, ſee SAILING.

PLAIN *table*, in *Geometry*, &c. an inſtrument uſed in the ſurveying of land; whereby the draught, or plan, is taken on the ſpot, without any future protraction, or plotting.

The *plain table*, repreſented *Tab.* II. *Surveying*, *fig.* 34. conſiſts of a parallelogram of wood about fifteen inches long and twelve broad; round this goes a boxen jointed frame, by means whereof a ſheet of paper is faſtened tight to the table, ſo that lines may be conveniently drawn upon it.

On each ſide the frame, which may be put on either ſide upwards, towards the inward edge, are ſcales of inches ſubdivided, for the ready drawing of parallel lines. Beſide which, on one ſide are projected the 306 degrees of a circle, from a braſs centre in the middle of the table (each degree halved) with two numbers to every tenth degree, the one expreſſing the degree, the other its complement to 360, to ſave ſubtraction: on the other ſide are projected the 180 degrees of a ſemicircle, from a braſs centre in the middle of the table's length, and at ¼ of its breadth; each degree halved, and every tenth noted with two numbers, viz. the degree and its ſupplement, to 180°.

To one ſide of the table is fitted a compaſs, for placing the inſtrument by; and the whole is fixed by a ſocket, upon a three-legged ſtaff for a ſtand, on which it is turned round, or faſtened by a ſcrew, as occaſion requires.

Laſtly, to the table belongs an index, which is a ruler at leaſt ſixteen inches long, and two broad; uſually graduated with ſcales, &c. and having two ſights perpendicularly placed on its extremities; and a ſloped edge called the fiducial edge.

PLAIN *table*, *uſe of the*. To take an angle by the *plain table*: or to find the diſtance of two places acceſſible from the ſame third.

Suppoſe D A, D B (*Tab. Surveying fig.* 35.) the ſides of the angle required: or A B the diſtance required. Place the inſtrument horizontally, as near the angle as poſſible; and aſſume a point in the paper on the table, v. gr. *c*. To this point apply the edge of the index, turning it about this and that way till through the ſights you ſee the point B: and, in this ſituation of the ruler, draw by its edge the line *c e* indefinitely.

After the ſame manner turn about the index on the ſame point till through the ſights you ſee the point A; and draw the right line *c d* indefinitely. Thus have you the quantity of the angle laid down.

Meaſure the lines D A, D B, with a chain; and from a ſcale ſet off the meaſures thus found, on the reſpective lines; which ſuppoſe to reach from *c* to *b*, and from *c* to *a*. Thus will *c b* and *c a* be proportional to D B and D A. Transfer the diſtance *a b* to the ſame ſcale, and find its length; the length, thus found, will be the length, or diſtance of A B required.

2. *To find the diſtance of two places, one whereof is inacceſſible, by the* plain table. Suppoſe the diſtance required A B (*fig.* 36.) and A the acceſſible point. 1. Place the *plain table* in C; look through the ſights till you ſee A and B; and draw *a c* and *c b*. Meaſure the diſtance from your ſtation to A; and ſet it off from the ſcale upon *c a*. 2. Remove the table to A, where place it ſo as that the point *a* repreſenting A, and the index laid along the line *a c*, you ſee backwards the former ſtation C. (Note, in this fixing the inſtrument, lies the uſe of the compaſs; for the needle will hang over the ſame degree of the card in the firſt and the ſecond caſe; ſo that ſome ſet the inſtrument by the needle alone; others only uſe it to ſhorten the trouble, by bringing the inſtrument nearly to its due poſition by means thereof; and then fixing for good by the back ſight). 3. The inſtrument fixed, turn the ſights to B; and draw the line *a b*. 4. On the ſcale meaſure the interval *a b*; which will be the diſtance of A B required.

3. *To find the diſtance of two inacceſſible places by the* plain table. Suppoſe the diſtance of A B (*Tab. Surveying*, *fig.* 37.) required. 1. Chooſing two ſtations in C and D; in the firſt, C, place the *plain table*; and through the ſights look to D, B, and A, drawing, by the edge of the index the lines *c d*, *c b*, *c a*. 2. Meaſure the diſtance of the ſtations C D; and ſet this off from a ſcale on *c d*. 3. Removing the table from C, fix it in D; ſo as the point *d* hanging over the place D, and the index lying along the line *c d*, through the ſights you ſee the former ſtation C. The inſtrument thus fixed, direct the ſight to A and B, and draw the right lines *d a* and *d b*; laſtly find the diſtance of *a b* on the ſcale, and this will be the diſtance of A B required. After the ſame manner may the diſtance of any number of places be found from two ſtations; and thus may a field, part of a country, &c. be ſurveyed.

4. *To take the plot of a field from one ſtation, whence all the angles may be ſeen, with the* plain table. Placing the inſtrument in the ſtation, aſſume a point in the paper, to repreſent the ſame, v. gr. O (*Tab. Surveying*, *fig.* 8.) laying the edge of the index to this point, direct it to the ſeveral angles of the field, A B C D E F, &c. and draw indefinite lines by its edge towards every angle; viz. O *a*, O *b*, O *c*, &c. meaſure the diſtance of each angle from the ſtation; viz. OA, O B, O C, O D, &c. and from a ſcale ſet theſe off from O on their correſponding lines; the extremities hereof will give points, which, being connected by lines, will repreſent the field.

5. *To take the plot of a field, wood, or the like, by going round the ſame, with the* plain table. Place the inſtrument horizontally at the firſt angle, v. gr. A: the needle being on the meridian of the card; aſſuming a point on the paper, to repreſent it; to that point lay the index, directing it till through the ſights you ſee a mark in the angle B, and draw an indefinite line along it; meaſure the diſtance of A and B, and from a ſcale ſet it off on the line thus drawn; the extremity of this diſtance will repreſent the point B. Remove the inſtrument to B, where ſet it ſo as that the needle hang over the meridian of the card; and ſo as the index lying along the line laſt drawn, you ſee the former ſtation A through the ſights: here faſten it, lay the index to the point B, and turn it till through the ſights you ſee the next angle C; in this ſituation draw a line, as before, meaſure the diſtance B C, and ſet it off from a ſcale on the line. Remove the inſtrument to C, where, fixing it by the needle, and the back ſight, as before, turn the index on the point C till you ſee the next angle D; draw the line, meaſure and ſet off the diſtance C D, as before, and remove the *plain table* to E; where fix it, as before; look to the next angle F, draw the line, meaſure and ſet off the diſtance, &c.

In this manner having compaſſed the whole field, you will have its whole perimeter plotted on the table; which may be now caſt up, and its contents found, as in the article Surveying.

Manner of ſhifting paper on the plain table. When in large parcels of grounds the plot is found to exceed the dimenſions of the *plain table*, and to run off from the paper, the ſheet muſt be taken off the table, and a freſh one put on: the way of managing which ſhifting is as follows: ſuppoſe H, K, M, Z, (*Tab.* III. *Surveying*, *fig.* 41.) the limits of the *plain table*; ſo that having laid down the field from A to B, thence to C and D; you want room, the line D E running off the paper; draw as much of the line D E as the paper will well hold; viz. D O. And by means of the diviſions on the edge of the frame, draw the line P Q through O, parallel to the edge of the table H M; and through the point of interſection O, draw O N parallel to M Z. This done, take off the frame, remove the ſheet, and put a freſh one (*fig.* 42.) in its ſtead; drawing on it a line R S near the other edge parallel thereto. Then lay the firſt ſheet on the table, ſo that the line P Q lie exactly on the line R S, to the beſt advantage, as at O. Laſtly, draw as much of the line O D, on the freſh ſheet, as the table will hold; and from O continue the remainder of the line D to E. From E proceed with the work as before to F, G, and A.

Uſe of the plain table, *as a theodolite, ſemicircle, or circumferentor*. The great inconveniency of the *plain table* is, that its paper renders its uſe impracticable in moiſt weather. Even the dew of the morning and evening is found to ſwell the paper conſiderably, and, of conſequence, to diſtort the work. To avoid this inconvenience, and render the inſtrument uſeful in all weathers; by leaving off the paper, and ſetting up a pin in the centre, it becomes a theodolite, a ſemicircle, or a circumferentor, and is applicable like them.

The *plain table*, ſtripped of its paper, becomes either a theodolite, or a ſemicircle, as that ſide of the frame, which has the projection of the degrees of a circle, or a ſemicircle, is turned upwards. If it be to ſerve for a theodolite; the index (the *plain table* turning on any point as a centre) is conſtantly to turn about the braſs centre-hole in the middle of the table.

If it be for a ſemicircle, it muſt turn on the other braſs centre-hole; in both caſes it is done by means of a pin raiſed in the holes. When the *plain table* is to ſerve as a circumferentor, ſcrew the compaſs to the index, and both of them to the head of the ſtaff, with a braſs ſcrew-pin fitted for the purpoſe; ſo that the ſtaff and table ſtanding fixed, the index, ſights, &c. may be turned about, and *vice verſa*.

To take an angle by the plain table, *conſidered as a theodolite*. Suppoſe the quantity of the angle E K G (*Tab. Surveying*, *fig.* 6.) required. Place the inſtrument at K, the theodolite ſide of the frame upwards, laying the index on the diameter. Turn the whole inſtrument about, the index remaining on the diameter till through the ſights you ſpy E. Screw the inſtrument faſt there, and turn the index on its centre till through the ſights you ſpy G. The degree here cut on the frame by the index, is the quantity of the angle ſought; which may be laid down on paper by the rules of common protraction.

Thus you may proceed to do every thing with the *plain table*, as with the common theodolite.

To take an angle with a plain table, *conſidered as a ſemicircle*. Proceed in the ſame manner with the inſtrument conſidered as a ſemicircle, as when conſidered as a theodolite; only laying the ſemicircular ſide upwards, and turning the index on the other centre-hole in the middle of the length, and at about one-fourth of the breadth of the table.

To take an angle with the plain table, *conſidered as a circumferentor*. Suppoſe the former angle E K G required. Place the inſtrument at K, the fleur-de-lis towards you. Direct the ſights to E, and obſerve the degree cut by the ſouth end of the needle, which ſuppoſe 296. Turn the inſtrument about, the fleur-de-lis ſtill towards you, and direct the ſight to G, noting the degree cut by the other end of the needle, which ſuppoſe 182. Subtract the leſs from the greater, the remainder 114° is the quantity of the angle ſought. If the remainder chance to be more than 180°, then it muſt be again ſubtracted from 360. This ſecond remainder will be the angle required; which may be protracted, &c. as under Protractor.

Thus you may proceed to do every thing with the *plain table*, as with the common circumferentor.

Plain *number*. See Number.

Plain *place*, in *Geometry*, *locus* Planus, or *locus ad* Planum, is a term which the ancient geometricians uſed for a geometrical locus, when it was a right line, or a circle, in oppoſition to a ſolid place, which was an ellipſis, parabola, or hyperbola.

Theſe *plain loci* the moderns diſtinguiſh into *loci ad rectam*, and *loci ad circulum*. See Locus.

Plain *problem*, in *Mathematics*, is ſuch a one as cannot be ſolved geometrically, but by the interſection either of a right line and a circle, or of the circumferences of two circles.

Such is the problem following. Given, the greateſt ſides, and the ſum of the other two-ſides, of a right-angled triangle; to find the triangle. Such alſo is this, to deſcribe a trapezium that ſhall make a given area of four given lines.

Such problems can only have two ſolutions, becauſe a right line can only cut a circle, or one circle cut another in two points.

Plain, in *Heraldry*, is ſometimes uſed for the point of the ſhield, when coupled ſquare, a part remaining under the ſquare, of a different colour, or metal, from the ſhield.

This has been ſometimes uſed as a mark for baſtardy, and called *champaigne:* for when the legitimate deſcendants of baſtards have taken away the bar, fillet, or traverſe, borne by their fathers, they are to cut the point of the ſhield with a different colour, called *plain.*

PLAIN, uſed ſubſtantively, in *Perſpective, Mechanics, Aſtronomy,* &c. See PLANE.

PLAINT, PLAINTE, in *Law,* the propounding or exhibiting any action, real or perſonal, in writing.

Hence, the party making this *plaint,* is called plaintiff.

PLAINTE, in the *Ancient Cuſtoms of France,* was a requeſt, or petition, preſented to the king, againſt the judges of the provinces, and afterwards againſt bailiffs and ſeneſchals for denying juſtice, or for rendering judgment contrary to the laws of the realm.

For in thoſe days there was no appeal from their deciſions; but they all pronounced in the dernier reſort; ſo that the *plainte* was not directed againſt the party, but againſt the judge; who was cited to ſee his own ſentence declared null.

This was a kind of ſupplement to the way of appeals, which was then ſhut up. The *plaintes,* in the Capitulars of Charlemagne, are called *blaſphemiæ.*

PLAINTIFF, in *Law,* he that ſues, or complains, in an aſſize, or in an action perſonal; as in an action of debt, treſpaſs, deceit, detinue, and the like.

Plaintiff ſtands oppoſed to *defendant.*

PLAISE, in *Ichthyology,* the Engliſh name for the fiſh called by authors *plateſſa* and *paſſer lævis,* by ſome *quadratulus,* and the PLEURONECTES *plateſſa* of Linnæus.

It is, according to the Artedian ſyſtem, a ſpecies of the pleuronectes, and is diſtinguiſhed by that author by the name of the *pleuronectes* with ſmooth ſides, and with a ſpine near the anus, and the eyes and ſix tubercles placed on the right ſide of the head.

It is a flat fiſh, of a duſky olive-colour, ſpotted with red on the back, and white on the belly.

The *plaiſe* are common on moſt of our coaſts; the beſt and largeſt are taken off Rye, on the coaſt of Suſſex, and alſo off the Dutch coaſts. They ſpawn in the beginning of February.

PLAISTER, in *Building.* See PLAISTER, MORTAR, &c.

PLAISTER, *caſting in.* See CASTING.

PLAISTER, in *Medicine.* See EMPLASTER, and PLASTER.

PLASTERED *walls.* See WALL.

PLAN, a repreſentation of ſomething, drawn on a plane, Such are maps, charts, and ichnographies.

PLAN, in *Architecture,* is particularly uſed for a draught of a building; ſuch as it appears, or is intended to appear on the ground; ſhewing the extent, diviſion, and diſtribution of its area into apartments, rooms, paſſages, &c.

The *plan* is the firſt device or ſketch the architect makes; it is alſo called the *groundplot, platform,* and *ichnography,* of the building.

PLAN, *geometrical,* is that wherein the ſolid and vacant parts are repreſented in their natural proportion.

PLAN, *raiſed,* is that where the elevation, or upright, is ſhewn, upon the geometrical *plan,* ſo as to hide the diſtribution. See ELEVATION.

PLAN, *perſpective,* is that conducted and exhibited by degradations, or diminutions, according to the rules of perſpective.

To render *plans* intelligible, it is uſual to diſtinguiſh the maſſives with a black waſh. The projectures on the ground are drawn in full lines, and thoſe ſuppoſed over them in dotted lines. The augmentations or alterations to be made are diſtinguiſhed by a colour different from what is already built; and the tints of each plan are made lighter as the ſtories are raiſed.

In large buildings it is uſual to have three ſeveral *plans* for the firſt three ſtories.

PLAN *of a Baſtion,* in the *Military Art,* is the ſame with the FACE of a *baſtion.*

PLANCHIER, or PLANCERE, in *Architecture,* the under part of the corona, or drip; making the ſuperior part of the corniche, between two cymatiums.

PLANE, *planum,* in *Geometry,* denotes a plain figure, or a ſurface lying evenly between its bounding lines.

Wolfius defines *plane,* a ſurface, from every point of whoſe perimeter a right line may be drawn to every other point in the ſame.

As the right line is the ſhorteſt extent from one point to another, ſo is a *plane* the ſhorteſt extenſion between one line and another.

PLANES, *oblique.* See OBLIQUE.

PLANES, *parallel.* See PARALLEL.

PLANES are frequently uſed in *Aſtronomy,* &c. for imaginary ſurfaces, ſuppoſed to cut, and paſs through, ſolid bodies, and on this foundation it is, that the whole doctrine of conic ſections, and of the ſphere, turns.

When a *plane* cuts a cone parallel to one of its ſides, it makes a parabola; when it cuts the cone parallel to its baſe, it makes a circle.

The ſphere is wholly explained by *planes,* imagined to cut the celeſtial luminaries, and to fill the areas or circumferences of the orbits; and they are differently inclined to each other; and by us the inhabitants of the earth, the *plane* of whoſe orbit is the *plane* of the ecliptic, their inclination is eſtimated with regard to this *plane.* See PLANETS.

PLANE, in *Mechanics.* A *horizontal* PLANE is a *plane* level or parallel to the horizon.

The determining how far any given *plane,* &c. deviates from a horizontal one makes the whole buſineſs of LEVELLING.

PLANE, *inclined,* in *Mechanics,* is a *plane* which makes an oblique angle with a horizontal *plane.*

A machine has been contrived for meaſuring the acceleration of a ball down an inclined *plane,* and comparing it with that found in bodies falling at liberty. See its deſcription in Mem. de l'Acad. Roy. de Scienc. 1699, p. 343.

The doctrine of the motion of bodies on *inclined planes* makes a very conſiderable article in mechanics; the general principle of it has been already illuſtrated under MECHANICAL *powers,* and the ſubſtance of it is as follows: *Laws of deſcent of bodies on inclined* planes. 1. If a body be placed on an *inclined plane,* its relative gravity will be to its abſolute gravity, as the height of the *plane,* e. gr. A B (*Tab.* VI. *Mechan. fig.* 91.) to its length A C. For, the conſtruction being as in the figure, it is evident that the abſolute gravity, tending in a direction to the horizon, is to the relative gravity in the direction of the *plane,* as D F : F G or D E, i. e. becauſe the triangles D E F and B A C are equiangular, : : C A : A B.

Hence, 1. Since the ball D only gravitates on the *inclined plane,* with its relative gravity, the weight L, applied in a direction parallel to the length of the *plane,* will retain or ſuſpend it, provided its weight be to that of the ball, as the altitude of the *plane* B A is to its length A C.

2. If the length of the *plane* C A be taken for the whole ſine or radius, A B will be the ſine of the angle of inclination A C B. The abſolute gravity of the body, therefore, is to its reſpective gravity applied to the *inclined plane*; and therefore, alſo the weight D to the weight L acting according to the direction D A, which ſuſtains it, as the whole ſine is to the ſine of the angle of inclination.

3. Hence the reſpective gravities of the ſame body on different *inclined planes,* are to each other as the ſines of the angle of inclination.

4. The greater therefore the reſpective gravity is, the greater is the angle of inclination.

5. As, therefore, in a vertical *plane,* where the inclination is greateſt, viz. perpendicular; the reſpective gravity degenerates into abſolute; ſo in a horizontail *plane,* where there is no inclination, the reſpective gravity vaniſhes: and hence it appears, that the inclination of the *plane* may be ſo ſmall, that the greateſt weight may be ſuſtained on it by the ſmalleſt power.

II. To find the ſine of the angle of inclinaton of a *plane,* on which a given power will be able to ſuſtain a given weight. Say, as the weight is to the given power, ſo is the whole ſine to the ſine of the angle of inclination of the *plane.* Thus, ſuppoſe a weight of 1000 be to be ſuſtained by a power of 50, the angle of inclination will be found 2° 52′.

III. If the weight L deſcend according to the perpendicular direction A B, and raiſe up the weight D in a direction parallel to the *inclined plane,* the height of the aſcent of D will be to that of the deſcent of L, as the ſine of the angle of inclination C to the whole ſine.

Hence, 1. The height of the deſcent C D of the weight L, is to the height of aſcent D H of the weight D, reciprocally as the weight D to the equivalent weight L.

2. Since then $CD \times L = DH \times D$, and the actions of the equiponderating bodies D and L are equal; the moments of the weights D and L are in a ratio compounded of their maſſes, and the altitudes through which they aſcend or deſcend in a *plane* either inclined or perpendicular.

3. The powers that raiſe weights through altitudes reciprocally proportional to them, are equal. This Des Cartes aſſumes as a principle whereby to demonſtrate the power of machines.

Hence we ſee why a loaded waggon is drawn with more difficulty up an inclined than on an horizontal *plane:* as being preſſed with a part of the weight which is to the whole weight in a ratio of the altitude of the plane, to its length.

IV. Weights E and F, *fig.* 92. equiponderating upon *inclined planes* A C and C B of the ſame height C D, are to each other as the lengths of the *planes* A C and C B.

S. Stevinus gives a very pretty demonſtration of this theorem, which, for its eaſineſs and ingenuity, we ſhall here add. Put a chain, whoſe parts do all exactly weigh in proportion to their length, over a triangle, G I H, (*fig.* 93.); it is evident the parts G K and K H do balance each other. If then I H did not balance G I, the preponderating part will prevail; and there would ariſe a perpetual motion of the chain about G I H: but this being abſurd, it follows that the parts of the chain I H and G I, and conſequntly all other bodies which are as the lengths of the *planes* I H and I G, will balance each other.

V. A heavy body deſcends on an *inclined plane*, with a motion uniformly accelerated.

Hence, 1. The ſpaces of deſcent are in a duplicate ratio of the times, and likewiſe of the velocities; and therefore in equal times they increaſe according to the unequal numbers, 1, 3, 5, 7, 9, &c.

2. The ſpace paſſed over by a heavy body deſcending on an *inclined plane* is ſubduple of that which it would paſs over in the ſame time, with the velocity it has acquired at the end of its fall.

3. Heavy bodies, therefore, deſcend by the ſame laws on *inclined planes* as in perpendicular *planes*. Hence it was, that Galileo, to find the laws of perpendicular deſcent, made his experiments on *inclined planes*, becauſe the motions are ſlower in the latter than the former; as in the following theorem.

VI. The velocity of a heavy body deſcending on an *inclined plane*, at the end of any given time, is to the velocity which it would acquire in falling perpendicularly in the ſame time, as the height of the *inclined plane* is to its length.

VII. The ſpace paſſed over by a heavy body on an *inclined plane*, A D (*fig.* 94.) is to the ſpace A B, it would paſs over in the ſame time in a perpendicular *plane*, as its velocity on the *inclined plane* is to its velocity in the perpendicular deſcent, at the end of any given time.

Hence, 1. The ſpace paſſed over on the *inclined plane* is to the ſpace it would deſcend in the ſame time in the perpendicular *plane*, as the altitude of the *plane* A B to its length A C; and therefore as the ſine of the angle of inclination C, to the whole ſince.

2. If then, from the right angle B, a perpendicular be let fall to A C; A C : A B : : A B : A D. So that in the ſame time wherein the body would fall perpendicularly from A to B; in an *inclined plane* it will deſcend from A to D.

3. The ſpace, therefore, of perpendicular deſcent being given in the altitude of the *plane* A B; by letting fall a perpendicular from B to A C, we have the ſpace A D to be paſſed over in the ſame time on the *inclined plane*.

4. In like manner, the ſpace A D, paſſed over on the *inclined plane*, being given, we have the ſpace A B, through which it would deſcend perpendicularly in the ſame time, by raiſing a perpendicular at D meeting the altitude of the *plane* in B.

5. Hence in the circle C D E F. *fig.* 95. the body will deſcend through all the *planes* A D, A E, A F, A C, in the ſame time; viz. in that time wherein it would fall through the diameter A B, ſuppoſing that perpendicular to the horizontal *plane* L M: becauſe all the angles D, E, F, C, in the ſemicircle, are right angles.

VIII. The ſpace A D, (*fig.* 94.) paſſed over an *inclined plane* A C being given, to determine the ſpace which would be paſſed over in any other *inclined plane* in the ſame time.

From the point D erect a perpendicular D B, meeting the altitude A B in B; then will A B be the ſpace through which the body would fall perpendicularly in that time. Wherefore if from B a perpendicular B E be let fall to the *plane* A F; A E will be the ſpace in the *inclined plane* which the body will paſs over, in the ſame time wherein it falls perpendicularly from A to B; and conſequently A D will be the ſpace in the other *inclined plane* A C, which it paſſes through in the ſame time.

Hence, ſince A B is to A D as the whole ſine to the ſine of the angle of inclination C; and A B is to A E as the whole ſine to the ſine of the angle of inclination F; the ſpaces A D and A E, which the body will paſs over in the ſame time on different *inclined planes*, are as the ſines of the angles of inclination, C and F, and reciprocally as the reſpective gravities on the ſame *planes*. And conſequently, they are alſo reciprocally as the lengths of *planes* equally high, A C and A F. Whence the problem may be reſolved various ways by calculation.

IX. The velocities acquired in the ſame time on different *inclined planes*, are as the ſpaces paſſed over in the ſame time.

For A D, A B, and A E, are the ſpaces paſſed over in the ſame time; and ſince A B : A C : : the velocity acquired in paſſing over A D to the velocity acquired in paſſing over A B; and A B : A F : : the velocity acquired in paſſing over A E to the velocity acquired in paſſing over A B; A B : A C : : A D : A B; and A B : A F : : A E : A B; the velocity acquired in paſſing over A D is to the velocity acquired in A B : : A D : A B, and the velocity acquired through A E to the velocity through A B : : A E : A B; therefore the velocities acquired in the ſame time in paſſing over A D and A E will be as the paces of A D and A E paſſed through in the ſame time.

Hence alſo, they are as the ſines of the angles of inclination C and F; reciprocally as the reſpective gravities on the ſame *planes*; and reciprocally as the lengths of equally high *planes* A C and A F.

X. A body deſcending on an *inclined plane* A C, when it arrives at the horizontal line C B, has acquired the ſame velocity which it would have acquired in a perpendicular deſcent A B, to the ſame horizontal line C B.

For A D is the ſpace paſſed over in the ſame time with A B; and, therefore, the celerity acquired in paſſing through A B is to that acquired through A D as A C to A B: but the celerity through A C is to that acquired through A D : : $\sqrt{AC} : \sqrt{AD}$; and, ſince A C : A B : : A B : A D, A C : A D : : $AC^2 : AB^2$, and $\sqrt{AC} : \sqrt{AD}$: : A C : A B: conſequently the celerity acquired through A C is to that acquired through A D as A C is to A B: therefore the celerity acquired through A C is equal to that acquired through A B.

Hence, 1. A heavy body deſcending through different *inclined planes*, A C, A G, A F, hath acquired the ſame velocity when it arrives at the ſame horizontal line B F.

Hence alſo, 2. A body, continuing its deſcent through ſeveral contiguous *inclined planes*, acquires the ſame velocity which it would acquire in deſcending perpendicularly to the ſame horizontal *plane*.

XI. The time of deſcent along an *inclined plane* A C, is to the time of perpendicular deſcent through A B, as the length of the *plane* A C, to its altitude A B: but the times of deſcent through different *inclined planes* equally high, A C and A G, are as the lengths of the *planes*.

For the time through A C is equal to the time in which A C would be deſcribed uniformly with half the celerity acquired in C; and the time through A B is equal to that in which A B would be deſcribed uniformly with half the celerity acquired in B; but theſe celerities are equal; conſequently the times are as A C and A B. In the ſame manner it might be ſhewn, that the times of deſcent through A C and A G are as A C and A G.

XII. If the diameter of a circle A B (*fig.* 95.) be perpendicular to the horizontal line L M; a body will deſcend from any point of the periphery D, E, or C, to B, along an *inclined plane* D B, E B, and C B, in the ſame time wherein it will deſcend through the diameter A B.

For, letting fall the perpendicular C G, the time in which G B is deſcribed is to the time in which B C is deſcribed as B G : B C; but the time in which B C is deſcribed is to the time in which A B is deſcribed in the ſubduplicate ratio of B G to A B; i. e. becauſe B G : B C : : B C : A B, in the ratio of B G to B C: conſequently, the time of deſcent through G B has the ſame ratio to the time of deſcent through B C and the diameter A B: therefore the time in which B C is deſcribed is equal to the time in which A B is deſcribed, &c. Hence,

XIII. The deſcents of bodies through a ſemicycloid D E F (*fig.* 96) and through any arc thereof D G, are always iſochronal, or performed in the ſame time; on which principle is founded the doctrine of pendulums vibrating in a cycloid. See CYCLOID, and PENDULUM.

PLANES, *laws of aſcent of bodies on inclined*. I. If a body aſcend in a medium void of reſiſtance, in any direction, whether perpendicular, or along an *inclined plane*; its motion will be uniformly retarded.

Hence, 1. A body aſcending either perpendicularly or obliquely, in ſuch a medium, paſſes over a ſpace which is ſubduple of that it would paſs over in the ſame time on an *horizontal plane*, with an uniform celerity equal to that it has at the beginning of its motion.

2. Such ſpaces, therefore, performed in equal times, decreaſe in a retrograde order, as the uneven numbers 7, 5, 3, 1; and therefore the aſcent is ſo much impeded; and conſequently, when the impreſſed force is exhauſted, the body will deſcend again by the force of gravity.

3. They are, therefore, inverſely as the ſpaces deſcribed in the ſame times by a body deſcending through the ſame altitude. For, ſuppoſe the time divided into four parts; in the firſt moment, the body A deſcends through the ſpace 1, and B aſcends through 7; in the ſecond, A deſcends through 3, B aſcends through 5, &c.

4. Hence a body, riſing with an impreſſed force, aſcends to that altitude, from which it muſt fall to acquire that velocity in falling wherewith it aſcended.

5. Hence, by falling, it acquires a force to riſe again to the height from whence it fell.

II. The time wherein a body aſcends to a given altitude, being given; to determine the ſpace paſſed over each moment.

Suppoſe the ſame body to deſcend from the ſame altitude, in the ſame time; and find the ſpaces paſſed over each moment.

Theſe, taken inverſely, are the ſame with the ſpaces of aſcent required.

Suppoſe, v. gr. a body projected perpendicularly, to aſcend through a ſpace of 240 feet in four ſeconds; and the ſpaces of aſcent performed in the ſeveral times required; if now the body had deſcended, the deſcent in the firſt minute had been 15 feet, in the ſecond 45, in the third 75, in the fourth 105, &c. The deſcent therefore will be in the firſt moment 105, in the ſecond 75, &c.

III. If a body deſcend either perpendicularly through A D *(fig. 96.)* or in any other ſurface F E D, and with the velocity it has there acquired, again aſcend along another ſurface D C, at points equally high, e. gr. at G, H, and Q, it will have the ſame force, and the ſame velocity.

Hence, if a body deſcend along any ſurface, F E D, and again deſcend along another ſimilar and equal ſurface D G C it is the ſame as if it paſſed over the ſeveral parts of the ſame line twice.

Whence, the times of aſcent and deſcent through equal ſpaces are equal.

On this principle are founded the conſtruction and uſe of pendulums.

Plane *of gravity*, or *gravitation*, is a plane ſuppoſed to paſs through the centre of gravity of the body, and in the direction of its tendency; that is, perpendicular to the horizon.

Plane *of reflection*, in *Catoptrics*, is a plane which paſſes through the point of reflexion; and is perpendicular to the plane of the glaſs, or reflecting body.

Plane *of refraction* is a plane drawn through the incident and refracted ray.

Plane, *perſpective*, is a plain pellucid ſurface, ordinarily perpendicular to the horizon, and placed between the ſpectator's eye and the object he views; through which the optic rays, emitted from the ſeveral points of the object, are ſuppoſed to paſs to the eye, and in their paſſage to leave marks that repreſent them on the ſaid plane.

Such is the *plane* H I *(Tab. Perſpect. fig. 3.)* Some call it the *table*, or *picture*, becauſe the draught or perſpective, of the object, is ſuppoſed to be thereon; others, the *ſection*, from its cutting the viſual rays; and others, the *glaſs*, from its ſuppoſed tranſparency. See Perspective.

Plane, *geometrical*, in *Perſpective*, is a plane parallel to the horizon, whereon the object to be delineated is ſuppoſed to be placed.

Such is the *plane* L M *(Tab. Perſpect. fig. 3.)* This *plane* is uſually at right angles with the *perſpective plane*. See Perspective.

Plane, *horizontal*, in *Perſpective*, is a plane paſſing through the ſpectator's eye, parallel to the horizon, cutting the perſpective *plane* when it is perpendicular to the geometrical one, at right angles.

Plane, *vertical*, in *Perſpective*, a *plane* paſſing through the ſpectator's eye, perpendicular to the geometrical *plane*, and uſually at right angles to the perſpective *plane*. See Perspective.

Plane, *objective*, in *Perſpective*, is any *plane* ſituate in the horizontal *plane*, whoſe repreſentation in perſpective is required.

Plane *of the horopter*, in *Optics*, is a *plane* that paſſes through the horopter A B *(Tab. II. Optics, fig. 31.)* and is perpendicular to a *plane* paſſing through the two optic axis I C and C H. See Horopter.

Plane *of the projection*, in the *Stereographic Projection of the Sphere*, is the ſame with the *perſpective plane*; which ſee.

Plane *of a dial*, or *Dial*-Plane, the ſurface whereon a dial is drawn. See Dial.

We have *horizontal*, *vertical*, *inclining*, *declining*, *reclining*, *deinclining*, *direct*, *oblique*, &c. *dial-planes*. See Dicliner, Recliner, Direct, &c.

Plane, *declination and inclination of a*. See Declination and Inclination.

For the method of finding both, ſee Declinator.

Plane *glaſs*, *mirror*, *figure*, *number*, *problem*, &c. See Plain *glaſs*, *mirror*, *number*, *figure*, *problem*, &c.

Plane, in *Joinery*, &c. denotes an edged inſtrument, uſed to pare or ſhave woods ſmooth, even, &c.

It conſiſts of a piece of wood very ſmooth at the bottom, ſerving as a ſtock, or ſhaft; in the middle whereof is an aperture, through which paſſes a ſteel edge or chiſel, obliquely placed, and very ſharp, which takes off the inequalities of the wood it is ſlid along.

The *plane* acquires various names according to its various forms, ſizes, and uſes; as the

Jack plane, which is about eighteen inches long, and is that commonly firſt uſed; the edge of its iron is not ground ſtrait, but raiſes with a convex arch in the middle, to bear being ſet the ranker; its uſe being to take off the greater irregularities of the ſtuff, and to prepare it for the

Long plane, which is about two feet in length, and ſmooths the work after the rough ſtuff is taken off by the former. This prepares the work for the *jointer*, if for the edges of a board; or for the

Smoothing-plane, which is ſhort and ſmall, being about ſix or ſeven inches in length, its iron fine; it takes off the great irregularities left by the *fore-plane*.

Jointer is the longeſt of all, being about ſix inches larger than the *long plane*; its edge very fine, not ſtanding out above a hair's breadth; it comes after the *ſmoothing-plane*, and is chiefly intended to ſhoot the edge of a board perfectly ſtraight for joining ſmooth tables, &c.

Rabbet-plane is uſed to cut the upper edge of a board, ſtraight or ſquare, down into the ſtuff, ſo as the edge of another, cut after the ſame manner, may join with it on the ſquare: it is alſo uſed to ſtrike facias in mouldings. Its iron is full as broad as its ſtock, that the angle may cut ſtraight; and it delivers its ſhavings at the ſides, not, like the others, at the top.

The *plow*, a narrow *rabbet-plane*, with the addition of two ſtaves, whereon are ſhoulders, and on the ſhoulders a fence. Its uſe is to plow a narrow ſquare groove on the edge of a board, &c.

Moulding planes, called alſo *horſe-planes*. Of theſe there are various kinds, accommodated to the various forms and profiles of the mouldings.

Such are the *round-plane*, the *hollow*, the *OG*, the *ſnipe's-bill*, &c. which are all of ſeveral ſizes, from half an inch to an inch and a half.

To uſe the *moulding-planes* on ſoft wood, as deal, pear-tree, &c. they ſet the iron to an angle of 45°, with the baſe or ſole of the *plane*. On hard wood, e. gr. ebony, box, &c. they ſet to an angle of 80°; ſometimes quite upright. To work on hard wood, the edge or baſil is ground to an angle of 18° or 20°; on ſoft wood to an angle of about 12°. For the more acute the baſil, the ſmoother the iron cuts; but the more obtuſe, the ſtronger.

A method has been uſed of forming mouldings in marble with the *plane*.

Plane, among *Fowlers*. To *plane*, is to fly or hover, as a kite or other bird does, without moving its wings.

Plane *tree*, *platanus*, in *Botany*, a genus of the *monoecia polyandria* claſs. Its characters are theſe: it hath male and female flowers growing ſeparate on the ſame tree; the male flowers are collected in a round ball; they have no petals, but have oblong coloured ſtamina, which are terminated by four-cornered ſummits; the female flowers have ſmall ſcaly empalements, and ſeveral ſmall concave petals, with ſeveral awl-ſhaped germina ſitting upon the ſtyles, crowned by recurved ſtigmas; theſe are collected in large balls; the germina afterward turn to roundiſh ſeeds ſitting upon the briſtly ſtyle, and ſurrounded with downy hairs. There are two ſpecies.

It it generally ſuppoſed, that the introduction of this tree into England is owing to the great lord-chancellor Bacon, who planted a noble parcel of them at Verulam, which were very flouriſhing ſome years ſince, but have lately been deſtroyed.

Notwithſtanding the *plane-tree* is backward in coming out in the ſpring, and the leaves decay ſoon in autumn, yet for the goodly appearance and great magnitude to which it will grow, it deſerves a place in large plantations, or ſhady receſſes near habitations, eſpecially if the plantation be deſigned on a moiſt ſoil, or near rivulets of waters; in which places this tree will arrive to a prodigious ſize.

They are all propagated very eaſy by layers; every twig of them will take root, if they are but covered with earth; theſe layers will be well rooted in one year, when they ſhould be cut off from the old trees or ſtools, and planted in a nurſery, where they may remain two or three years to get ſtrength, and then be tranſplanted where they are to ſtand; for the younger theſe trees are planted, the better they will thrive. Miller.

Plane-*tree*, *baſtard* or *falſe*. See Maple.

PLANET, *planeta*, *πλανητης*, *wanderer*, in oppoſition to a *ſtar* which remains fixed, in *Aſtronomy*, a celeſtial body revolving round the ſun as a centre, and continually changing its poſition with reſpect to the other ſtars.

The *planets* are uſually diſtinguiſhed into *primary* and *ſecondary*.

PLANETS, *primary*, called alſo ſimply, and by way of eminence, *planets*, are thoſe which move round the ſun as their proper centre. Such are Saturn, Jupiter, Mars, the Earth, Venus, and Mercury.

PLANETS, *ſecondary*, are ſuch as move round ſome *primary planet*, as their reſpective centre, in the ſame manner as the *primary planets* do round the ſun. Saturn, Jupiter, and the Earth, are each attended with *ſecondary planets*; Jupiter with four, and Saturn with five, called the SATELLITES of thoſe two *planets*.

The earth has one *ſecondary planet*, called the *moon*.

The motion of the primary *planets* is very ſimple and uniform, as being compounded only of a projectile motion, forward in a right line which is a tangent to the orbit; and a gravitation towards the ſun at the centre. See GRAVITY. Add, that being at ſuch vaſt diſtances from each other, the effects of their mutual gravitation towards one another are in a conſiderable degree, though not altogether, inſenſible; for the action of Jupiter on Saturn, e. gr. is found to be $\frac{1}{204}$ of the action of the ſun upon Saturn, by comparing the matter of Jupiter with that of the ſun, and the ſquare of the diſtance of the ſun from Saturn, with the ſquare of the diſtance of Jupiter from Saturn; ſo that the elliptic orbit of Saturn will be found to be more juſt, if we ſuppoſe its focus not to be in the centre of the ſun, but in the centre of gravity of the ſun and Jupiter, or rather, in the centre of gravity of the ſun and of all the *planets* below Saturn. In the ſame manner, the elliptic orbit of any other *planet* will be found more accurate, by ſuppoſing its focus to be in the centre of gravity of the ſun, and of all the *planets* that are below it. But the matter is far otherwiſe, in reſpect of the *ſecondary planets*; for every one of theſe, though it chiefly gravitate towards its reſpective primary one, as towards its centre, yet at equal diſtances from the ſun, it is alſo attracted towards him with an equally accelerated gravity, as the primary one is toward him; but at a greater diſtance with leſs, and at a nearer diſtance with greater: from which double tendency towards the ſun, and towards their own primary *planets*, the motion of the ſatellites, or *ſecondary planets*, comes to be very much compounded, and affected with many inequalities: as, for inſtance,

1. The ſatellite ſhall be continually accelerated in its motion, from the time of its quadrature with the ſun to the next following conjunction or oppoſition; but contrary-wiſe from the ſyzygies to the quadratures, it ſhall be retarded; and therefore it will always move ſwifter in or near the ſyzygies, and ſlower near the quadratures. From whence will follow that,

2. The orbits of theſe *ſecondary planets* will be of a figure more circular in the quadratures than in the ſyzygies, where the ſwiftneſs of the motion will make the figure of the orbit more rectilinear, and therefore the ſatellite will run farther from its primary planet at the quadratures than at the ſyzygies; ſo that the orbit will be a little elliptical, having the primary *planet* for its centre, and the longer diameter will coincide with the line of the quadratures, and the ſhorter with that of the ſyzygies. Which irregularities will ariſe, if the ſun's power of diſturbing the motion of the ſatellite be excluded, and the orbit be concentric with that of the primary *planets*: for if the orbit be eccentrical, it may happen that the ſatellite ſhall be farther off from the primary one in the ſyzygies, and ſo move ſlower than it does at the quadratures; and when this is the caſe, that the ſatellite's orbit is not a circle concentric to the primary orbit, but an ellipſis, in one of whoſe focuſes the primary *planet* is placed, then the motion of the ſatellite will be ſo diſturbed by the ſun, that, as it proceeds in its orbit, the apſides of the orbit will be moved ſometimes *in conſequentia*, and ſometimes *in antecedentia* (whereas the nodes and apſides of the primary *planets* are at reſt.)

3. When the plane of the ſatellite's orbit is inclined to the plane of the primary orbit, the line of the nodes of the *ſecondary* orbit will be moved in *antecedentia*, with an angular motion, and an unequal velocity; for it will recede moſt ſwiftly when the nodes are in quadrature to the ſun; after which, it will move ſlower; and at the time of the nodes being in the ſyzygies, it will be perfectly at reſt.

4. The inclination alſo of the plane of the *ſecondary* orbit, to the primary one, will be continually varying, and will be greateſt when the nodes are in the ſyzygies with the ſun, and leſs, *cæteris paribus*, when they are in the quadratures; and from the time of the nodes being in the ſyzygies, to the quadratures, it will be always decreaſing, and from the time of their being in the quadratures to the ſyzygies, it will be always increaſing; and all theſe irregularities, whether in any eccentric or concentric orbit, will always be ſomething greater, when the ſatellite is in conjunction with the ſun, than when he is in oppoſition to him. See MOON.

The *primary planets* are in number ſix, which are again diſtinguiſhed into the *ſuperior* and *inferior*.

PLANETS, *ſuperior*, are thoſe farther from the ſun than our earth is. Such are Mars, Jupiter, and Saturn.

PLANETS, *inferior*, are thoſe nearer the ſun than our earth, and ſituate between the earth and ſun. Such are Venus and Mercury. See the order, poſition, &c. of the *planets*, under *Copernican* SYSTEM.

The *planets* are repreſented by the ſame characters as the chemiſts uſe to repreſent their metals by, on account of ſome ſuppoſed analogy between thoſe celeſtial and ſubterraneous bodies.

Saturn is repreſented by the character ♄. This *planet*, on account of its great diſtance, appears to the eye with a feeble light. It performs its revolution round the ſun in about thirty years.

Jupiter, marked ♃, is a bright refulgent ſtar, finiſhing its courſe round the ſun in about twelve years.

Mars, characterized ♂, is a ruddy fiery-coloured *planet*, finiſhing its courſe in about two years.

Venus, ♀, is the brighteſt of all the *planets*, conſtantly attending the ſun, and never diſtant from him above 48 degrees. It finiſhes its courſe in about ſeven months. When it goes before the ſun, it is called PHOSPHORUS and *Lucifer*; and when it follows him, HESPERUS.

Mercury, ☿, a little bright *planet*, the ſun's conſtant companion, from whoſe ſide it never departs above 283, and by that means is uſually hid in his ſplendor. It performs its courſe in about three months.

To which we now add Tellus, the earth, marked ⊕, performing its courſe about the ſun, between Mars and Venus, in the ſpace of a year.

From theſe definitions, a perſon may eaſily diſtinguiſh all the *planets*. For if after ſun-ſet he ſees a *planet* nearer the eaſt than the weſt, he may conclude it is neither Mercury nor Venus; and may determine whether it is Saturn, Jupiter, or Mars, by the colour and light: by which alſo he may diſtinguiſh between Mercury and Venus.

PLANETS, *nature of the*. From the ſeveral phaſes and appearances of the *planets*, they are found to be all like the moon, which we have ſhewn to be like our earth; whence it follows, that the *planets* are alſo dark, opake, ſpherical, &c. bodies, like our earth.

This may be ſhewn almoſt to a demonſtration. 1. Venus obſerved with a teleſcope, is rarely found full, but with variable phaſes like thoſe of the moon; her illuminated part ſtill turned towards the ſun, viz. towards the eaſt when ſhe is the morning-ſtar, and towards the weſt when the evening-ſtar. And the like phaſes are obſerved in Mercury and Mars.

2. Gaſſendus firſt, and after him others have obſerved Mercury on the face of the ſun, acroſs which he appeared to paſs like a black round ſpot. Horrox in 1639, alſo obſerved Venus in the ſun, where ſhe made the ſame appearance. See PARALLAX and TRANSIT.

3. De la Aire, in 1700, with a teleſcope of ſixteen feet, diſcovered mountains in Venus, larger than thoſe of the moon.

4. Caſſini obſerved two ſpots in Venus; four in Mars, likewiſe obſerved by Campani; and ſeveral, at ſeveral times, in Jupiter; and from his obſervations of theſe ſpots, he found that they had a rotation round their axes; he even determined the velocity of that rotation, or the period wherein it was effected; v. gr. that of Jupiter, 9 hours 56′; that of Mars, 24 hours 40′; and that of Venus, 24 hours; and ſince the ſun, moon, Jupiter, Mars, Venus, and the earth, are found to revolve on their axes, i. e. to have a diurnal rotation, no doubt Mercury and Saturn have the ſame; though the great nearneſs of the former to the ſun, and the great diſtance of the latter, prevent any ſpots from being obſerved on them, whence that rotation might be demonſtrated.

5. In Jupiter are obſerved two ſwarths or belts, different from the reſt of his diſk, and moveable; they are ſometimes found in one part, ſometimes in another; and are ſometimes broader, ſometimes are narrower.

6. In 1609 were firſt obſerved the little ſtars or moons, moving about Jupiter, by Sim. Marius; and in 1610 the ſame were obſerved by Galileo: theſe are now frequently obſerved to diſappear in a clear ſky, when Jupiter happens to be diametrically interpoſed between them and the ſun. Whence it appears they are void of light, at ſuch time when the ſun's rays, intercepted by Jupiter, cannot be propagated to them in right lines; and hence alſo that, like the moon, they are opake bodies illuminated by the ſun; and hence again, ſince Jupiter does not illuminate his ſatellites when placed behind him, he himſelf, in that part turned from the ſun, may be argued to be void of light.

7. When Jupiter's moons are diametrically interpoſed between Jupiter and the ſun, there is ſeen a round ſpot on Jupiter's diſk, which is ſometimes larger than the ſa-

tellite itſelf. Whence it appears, that the ſatellites are opake bodies, illuminated by the ſun; that they project a ſhadow from the ſun; and that the round ſpots, ſeen in Jupiter, are the ſhadows of the ſatellites.

Whence, alſo, the interſection of that ſhadow being found to be a circle, the ſhadow muſt be conical; and therefore the figure of the ſatellites, at leaſt as to ſenſe, is ſpherical.

8. The earth being between Jupiter and the ſun; if, at the ſame time, any of the ſatellites happen to be between Jupiter and the ſun, it is loſt in Jupiter's light; though ſometimes appearing like a black ſpot. This phenomenon has been frequently obſelved by Caſſini and Maraldi who have likewiſe noted very conſiderable alterations in the apparent magnitudes of the ſatellites; for which no reaſon could be given from the diſtance of Jupiter, the ſun, or the earth: e. gr. that the fourth, which is uſually ſeen the ſmalleſt, is ſometimes the largeſt; and the third, which is uſually the largeſt, appears ſometimes the ſmalleſt. Hence, as the ſatellites are illuminated by the ſun, even then when immerged in Jupiter's light, yet do appear obſcure, there muſt be ſome alteration in their atmoſpheres, to prevent the ſun's rays being equally reflected from every part of their ſurface; which muſt likewiſe be the cauſe why their ſhadow is ſometimes larger than themſelves. Now, to ſum up the evidence: 1. Since in Venus, Mercury, and Mars, only that part of the diſk illuminated by the ſun, is found to ſhine; and, again, Venus, and Mercury, when between the earth and the ſun, appear like dark ſpots or maculæ, on the ſun's diſk, it is evident, that Mars, Jupiter, and Mercury, are opake bodies, illuminated with the borrowed light of the ſun. And the ſame appears of Jupiter, from its being void of light in that part to which the ſhadow of the ſatellites reaches, as well as in that part turned from the ſun; and that his ſatellites are opake, and reflect the ſun's light, is alſo abundantly ſhewn. Wherefore, ſince Saturn, with his ring and ſatellites, do only yield a faint light, fainter conſiderably than that of the fixed ſtars, though theſe be vaſtly more remote, and than that of the reſt of the *planets*, it is paſt doubt, that he too, with his attendants, are opake bodies.

2. Since the ſun's light is not tranſmitted through Mercury and Venus, when placed againſt him, it is plain they are denſe opake bodies; which is likewiſe evident of Jupiter, from his hiding the ſatellites in his ſhadow; and therefore, by analogy, the ſame may be concluded of Saturn.

3. From the variable ſpots in Venus, Mars, and Jupiter, ſome have concluded that thoſe *planets* have a changeable atmoſphere; which changeable atmoſphere may, by a like argument, be inferred of the ſatellites of Jupiter; and therefore, by ſimilitude, the ſame may be concluded of the other *planets*. But we want a ſufficient number of obſervations to eſtabliſh this fact; there is reaſon, on the contrary, to apprehend, that ſome, at leaſt, of the *planets* have no atmoſphere. See Moon.

4. In like manner, from the mountains obſerved in Venus, the ſame may be ſuppoſed in the other *planets*.

5. Since then Saturn, Jupiter, the ſatellites of both, Mars, Venus, and Mercury, are opake bodies, ſhining with the ſun's borrowed light, and are furniſhed with mountains, and encompaſſed, as ſome have ſuppoſed, with a changeable atmoſphere, they have, of conſequence, waters, ſeas, &c. as well as dry land, and they are bodies, therefore, like the earth. Q. E. D.

And hence nothing hinders but that the *planets* may alſo be concluded to be inhabited. Huygens, in his Coſmotheoros, argues very plauſibly for the exiſtence of planetary inhabitants, from the ſimilitude of the *planets* with our earth: thoſe, like this, being opake, denſe, uneven, round, heavy, illuminated, and warmed by the ſun, having night and day, ſummer and winter, &c.

Wolfius deduces ſomething relating to this purpoſe from arguments of another kind. Thus, e. gr. it is ſcarce to be doubted, that the inhabitants of Jupiter are much larger than thoſe of the earth, and, in effect, of the giant kind. For it is ſhewn in optics, that the pupil of the eye dilates in a ſtrong light, and contracts in a weak one: wherefore, ſince in Jupiter the ſun's meridian light is much feebler than on the earth, on account of Jupiter's greater diſtance from the ſun, the pupil will need to be much more dilatable in the inhabitants of Jupiter than in thoſe of the earth. But the pupil is obſerved to have a conſtant proportion to the ball of the eye, and the eye to the reſt of the body; ſo that in animals, the larger the pupil the larger the eye, and the larger the body.

To aſcertain the ſize of theſe Jovial inhabitants, it may be obſerved, that the diſtance of Jupiter from the ſun is to the earth's diſtance from the ſame, at 26 to 5; the intenſity of the ſun's light in Jupiter is to its intenſity on the earth, in a duplicate ratio of 5 to 26; but it is found by experience, that the pupil dilates in a ratio greater than that wherein the intenſity of light decreaſes; otherwiſe a body at a great diſtance might be ſeen as clearly as a nearer: the diameter, therefore, of the pupil in its greateſt dilatation, in the earth, is to its diameter in the like ſtate in Jupiter, in a ratio greater than that of the duplicate of 5 to 26. If then we put it as 10 to 26, or as 5 to 13: ſince the ordinary ſtature of the inhabitants of the earth is computed at 5 Engliſh feet 4 inches and $\frac{3}{10}$ which Wolfius tells us was his own height), the ordinary ſtature of Jupiter's inhabitants will be found 14 feet $\frac{2}{3}$, which is very nearly the ſize of the giant Og, mentioned by Moſes, whoſe iron bed was 9 cubits long, and its breadth 4. But arguments of this kind being more whimſical than ſolid, are needleſs, in order to juſtify the ſimilarity of the other *planets* to our earth, and a conjecture, that they are deſtined by the Creator for the ſame purpoſe.

Planets, *motion of the*. That the *planets* do all revolve round the ſun as their centre, and not round the earth, is evident from a thouſand phenomena. 1. The orbit wherein Venus, e. gr. moves, does certainly encompaſs the ſun; and therefore, in deſcribing that orbit, the *planet* muſt turn round the ſun.

That her orbit includes the ſun, appears hence, that ſhe is ſometimes above the ſun, ſometimes below it, ſometimes beyond it, and ſometimes on this ſide; all which are evident from the circumſtances of her phaſes.

That ſhe does not move round the earth, is no leſs apparent from her being ever obſerved in the ſame quarter with the ſun, never receding from him above 48°. She never, therefore, comes to be in oppoſition to the ſun; no, not to be in a quartile aſpect, or to have a quarter of the heavens between them; both which, like the earth, ſhe muſt frequently have, did ſhe attend and move round the earth.

2. That Mercury revolves round the ſun, appears in like manner from his phaſes, which reſembles thoſe of Venus and the moon; and from its neighbourhood to the ſun, from whom Mercury never recedes ſo far as Venus does.

3. That the orbit of Mars includes the ſun, is evident from that *planet's* being found both in conjunction and oppoſition with the ſun; and in both caſes ſhining with a full face. Indeed, from the ſame circumſtances it appears, that the orbit of Mars encompaſſes the earth; but then it follows, likewiſe, from Mars's diameter appearing ſeven times as big when in oppoſition, as when in conjunction, that he is ſeven times nearer the earth in the former than the latter poſition. The earth, therefore is far from being the centre of Mars's *motion*; but Mars is ever nearly at the ſame diſtance from the ſun. Again Mars viewed from the earth moves very irregularly; is ſometimes ſeen to proceed ſlower, ſometimes faſter; ſometimes he ſtands ſtill, and ſometimes he goes backward (the reaſon whereof, ſee under the article Optical *inequality)*; but viewed from the ſun, he will ever appear to move with the ſame conſtant uniform tenor; whence it is evident, he reſpects the ſun, not the earth, as the centre of his *motion*.

4. The ſame appearances whence Mars is ſhewn to revolve round the ſun as a centre, are likewiſe obſerved in Jupiter and Saturn; whence the ſame concluſion may be made of them.

Laſtly, that the earth revolves round the ſun, as a centre is evident from her place, which we have obſerved to be between the orbits of Mars and Venus; and from the phenomena of the ſuperior *planets* viewed from it. If the earth ſtood ſtill, we ſhould never ſee thoſe *planets* either ſtationary or retrograde; the earth therefore moves, but it is ſtill found between the orbits of Mars and Venus, which encompaſs the ſun; therefore the the earth alſo encompaſſes the ſun.

To this aſtronomical demonſtration may be added a phyſical demonſtration of the earth's motion from ſir Iſaac Newton. It appears from abundant obſervation, that either the earth turns round the ſun, or the ſun round the earth, ſo as to deſcribe equal areas in equal times; but he demonſtrates, that bodies revolving about one another according to ſuch law, do of neceſſity gravitate toward each other. Whence, if the ſun gravitate to the earth, action and re-action being ſtill equal, the earth will likewiſe gravitate towards the ſun. But he proves, farther, that two bodies gravitating towards each other, without directly approaching one another in right lines, muſt both of them turn round the common centre of gravity of both. The ſun and earth, therefore, do both revolve round one common centre; but the earth being but a point in compariſon of the ſun, the common centre of gravity of the two will be within the ſun's body, and not far from its centre. The earth, therefore, revolves round a point, within the body of the ſun, and therefore round the ſun. See the arguments for the earth's motion, under Earth

From the tranſit of Venus over the ſun on the 6th of June, 1761, Mr. Ferguſon has given the following account of the magnitudes, diſtances, revolutions, &c. of the ſun and *planets*. See PARALLAX.

The ſun's diameter is 890,000, Engliſh miles, his ſuperficial contents (or number of ſquare miles contained in his ſurface) is 2,488,461,360,000, and his ſolid content, in cubic miles, is 369,121,768,400,000,000. He revolves round his axis in 25 days 6 hours, and his axis is inclined to the plane of the ecliptic at an angle of 8°.

Mercury's diameter is 3000 miles, its ſuperficial content is 28,274,400 ſquare miles, and its ſolid content is 14,137,200,000 cubic miles. It diſtance from the ſun is 36,841,468 miles; it goes round the ſun in 87 days 23 hours, moving at the rate of $109,699\frac{16}{100}$ miles per hour. The inclination of its orbit to the plane of the ecliptic is 6° 54′; the plane of its aphelion ♐ 13° 8′ and the place of its aſcending node ♉ 14° 43′.

Venus's diameter is 9330 miles, its ſuperficial content is 273,472,824 ſquare miles, and its ſolid content is 425,250,241,693 cubic miles. Its diſtance from the ſun is 68,891,486 miles; it goes round the ſun in 224 days 17 hours, moving at the rate of $80,295\frac{24}{100}$ miles per hour; and round its own axis in 24 days 8 hours; its axis is inclined to the plane of its orbit at an angle of 75°; its orbit inclined to the ecliptic at an angle of 3° 20′; the place of its aphelion ♒ 4° 20′; and the place of its aſcending node ♊ 13° 59′.

The earth's diameter is 7970 miles; its ſurface contains 199,557,259 ſquare miles, and its ſolid content or bulk is 265,078,559,623 cubic miles. Its diſtance from the ſun is 95,173,000 miles it goes round the ſun in a year, moving at the rate of $68,243\frac{24}{100}$ miles per hour. Its axis is inclined to its orbit 23° 29′; and the place of its aphelion is ♑ 8° 1′.

Mars's diameter is 5400 miles; its ſupeficial content is 91,608,956 ſquare miles, and its ſolid content, in cubic miles, is 82,448,140,400. Its diſtance from the ſun is 145,014,148 miles; it goes round the ſun in 1 year 321 days 17 hours, moving at the rate of 55,287 miles per hour. It revolves round its axis in 24 hours 40′; its orbit is inclined to the ecliptic at an angle of 1° 52′; the place of its aphelion is ♍ 0° 32′, and of its aſcending node ♉ 17° 17′.

Jupiter's diameter is 94000 miles; its ſuperficial content 27,759,077,600 ſquare miles, and its ſolid content, in cubic miles, is 434,893,782,400,000. Its diſtance from the ſun is 494,990,976 miles; it goes round the ſun in 11 years 314 days 18 hours, moving at the rate of $29,083\frac{68}{100}$ miles per hour. It revolves round its axis in 9 hours 56′; its orbit is inclined to the ecliptic at an angle of 1° 20′; the place of its aphelion is ♎ 9° 10′, and of its aſcending node ♋ 7° 29′.

Saturn's diameter is 78000 miles; its ſuperficial content is 19,113,494,400 ſquare miles; and its ſolid content, in cubic miles, is 248,475,427,200,000. Its diſtance from the ſun is 907,956,130 miles; it goes round the ſun in 29 years 167 days 6 hours, moving at the rate of $22,101\frac{64}{100}$ miles per hour. His orbit is inclined to the ecliptic at an angle of 2° 30′; the place of its aphelion ♐ 27° 50′, and of its aſcending node ♋ 21° 13′.

The Sun is $539\frac{1}{2}$ times as big all as the *planets* put together.

The Sun is 26,109,963 times as big as Mercury, 845,019 times as big as Venus, 1,392,500 times as big as the Earth, 4,477,015 times as big as Mars, 849 times as big as Jupiter, and 1,486 times as big as Saturn.

The earth's bulk is to Mercury's bulk as 1 to $\frac{53}{1000}$, to Venus's bulk as 1 to $1\frac{604}{1000}$. to Mars's bulk as 1 to $\frac{315}{1000}$ to Jupiter's bulk as 1 to 1640, and to Saturn's bulk as 1 to 937.

Suppoſing the light and heat received by the earth to be 1, thoſe of Mercury will be $6\frac{1}{2}$, of Venus $1\frac{3}{4}$, of Mars $\frac{3}{7}$, of Jupiter $\frac{1}{28}$, of Saturn $\frac{1}{90}$.

If a body, projected from the ſun, ſhould continue to fly at the rate of 480 miles per hour (which is about the ſwiftneſs of a cannon ball), it would reach the orbit of Mercury in 8 years 276 days; of Venus in 16 years 136 days; of the earth in 22 years 226 days; of Mars in 34 years 169 days; of Jupiter in 117 years 234 days; and of Saturn in 215 years 287 days.

The Moon's diameter is 2180 miles; her bulk is in proportion to the Earth's bulk as 1 to $48\frac{6}{10}$; her diſtance from the earth's centre is 240,000 miles, and a cannon ball would go from the earth's centre to the moon in 20 days 20 hours. She goes round her orbit in 27 days 7 hours 43 minutes, moving at the rate of $2299\frac{65}{100}$ miles per hour.

The quantities of matter in the Sun, Jupiter, Saturn, and the Earth, as determined by the Newtonian theory of gravity, are to each other as the numbers 1, $\frac{1}{3067}$, $\frac{1}{3021}$, $\frac{1}{8001}$, $\frac{1}{169282}$; and their denſities as the numbers 100, $94\frac{1}{2}$, 67, and 400; and their attractive powers at their ſurfaces as the numbers 10,000, 943, 529, 435, reſpectively.

Mr. Hutton, by very elaborate calculations, founded on the ſurvey and meaſures taken at Schehallien, with a view to aſcertain the ATTRACTION *of mountains*, has deduced the mean denſity of the earth, in compariſon with water, to be as $4\frac{1}{2}$ to 1; and the relative denſities of the ſun and *planets*, in reſpect of water, admitting the denſities compared with each other to be as M. de la Lande has ſtated them in his Aſtronomy, will be as follow; viz. water 1, the ſun $1\frac{2}{15}$, Mercury $9\frac{1}{6}$, Venus $5\frac{11}{15}$, the Earth $4\frac{1}{2}$, Mars $3\frac{2}{7}$, the Moon $3\frac{1}{11}$, Jupiter $1\frac{1}{24}$, and Saturn $\frac{13}{32}$. Phil. Tranſ. vol. lxviii. part ii. art. 33.

For the diameters of the ſun and *planets*, as ſeen from the earth, and the diameters of the *planets*, as ſeen from the ſun, ſee DIAMETER.

For the relative mean diſtances of the *planets*, from the ſun, ſee DISTANCE.

For the eccentricities of the *planets*, ſee EXCENTRICITY.

The orbits of the *planets* are all ellipſes; one of whoſe foci is in the ſun. This Kepler firſt found from Tycho's obſervations; before him, all aſtronomers took the planetary orbits for eccentric circles.

The planes of theſe orbits do all interſect in the ſun; and the line wherein the plane of each orbit cuts that of the earth, is called the *line of the nodes*; and the two points wherein the orbits themſelves touch that plane, *the nodes*.

The diſtance between the centre of the ſun and the centre of each object, is called the EXCENTRICITY *of the planet*.

And the angle at which each plane cuts that of the ecliptic is called *the inclination of the plane*.

To account for the *motion of the planets* about the ſun, there needs nothing but to ſuppoſe an uniform projectile *motion*, in ſtraight lines, at firſt given them; and a power of attraction or gravitation, ſuch as we obſerve in all the great bodies in our ſyſtem. For a body A (*Tab. Aſtron. fig.* 45.) proceeding uniformly along the line AB, will, by the intervention of the attracting body C, be every moment diverted out of its rectilinear, and bent into a curvilinear path, according to the laws of central forces.

If, then, the projectile *motion*, be perpendicular to a line, CA, drawn from the attracting body C, and its velocity be ſo proportioned to the force of attraction of A, as that the centripetal and centrifugal forces are equal, i. e. that the conatus to fall to the central body C, in a right line, AC; and that to proceed in the direction of the tangent, AB, balance each other; the body will revolve in a circular orbit, A, β, γ, δ, &c.

It is not improbable, that at the beginning this was the ſtate of things; and that the velocities impreſſed on the ſeveral *planets* were ſo combined with their reſpective maſſes and diſtances from the ſun at which they were to roll, as that their momenta ſhould counterballance the ſun's attractive force, and be preciſely counterbalanced thereby; whence the primitive orbits muſt have been perfect circles, from which they do not even now deviate very far. See EXCENTRICITY.

If the *planet's* projectile *motion* be not perfectly adjuſted to the ſun's attraction, the orbit deſcribed will be an ellipſis. If it be too ſwift, the orbit will be greater than a circle, and the nearer focus coincides with the central body; if too ſlow, the orbit will be leſs than a circle, and the farther focus coincide with the central body.

Indeed the form of the planetary orbits does not only depend on the adjuſtment of the firſt projectile velocity with the ſun's attraction, but alſo on the direction wherein that motion was originally impreſſed. If that direction were according to the tangent AB, as above ſuppoſed, and the central forces exactly ballanced, the orbit would be circular; but if that direction were oblique, in any manner, whether aſcending to, or deſcending from the ſun, the orbit of the *planet*, notwithſtanding any adjuſtment of its velocity to the attraction, would be an ellipſis.

The *motions of the planets* in their elliptic orbits are not equable, becauſe the ſun is not in their centre, but their focus. Hence they move, ſometimes faſter, and ſometimes ſlower, as they are nearer or farther from the ſun; but yet theſe irregularities are all certain, and follow according to an immutable law.

Thus, ſuppoſe the ellipſis BEP, &c. *Tab. Aſtron. fig.* 47.) the orbit of a *planet*, and the focus S, the ſun's place; AP, the axis of the ellipſis, is called the *line of the apſides*; the point A, the *higher apſis* or *aphelion*; P, the *lower apſis* or *perihelion*; SC, the eccentricity; and ES, the mean diſtance of the *planet* from the ſun.

Now the *motion* of the *planet* in its perihelion, is ſwifteſt, and in its aphelion, ſloweſt; at E the *motion* as well as the diſtance is mean, i. e. it is ſuch as would deſcribe the whole orbit in the ſame time it is really deſcribed in.

The law whereby the *motion* is regulated in every point of the orbit, is, that a line, or radius, drawn from the centre of the ſun to the centre of the *planet*, and thus carried along with an angular *motion*, does always deſcribe an eliptic area proportional to the time. Suppoſe, e. gr. the *planet* in A, and thence, in a certain time, to proceed to B; the ſpace or area the radius SA deſcribes, is the triangle ASB: when at length the *planet* arrives at P, if from the centre of the ſun S there be drawn SD, in ſuch manner as that the elliptic area PSD is equal to that of ASB; the *planet* will here move through the arch PD, in the ſame time wherein it moved through the arch AB; which arcs are unequal, and nearly in a reciprocal proportion to their diſtance from the ſun. For from the equalities of the areas it follows, that the arch PD, muſt exceed AB as much as SA exceeds SP.

This law was firſt demonſtrated by Kepler, from obſervation; and is ſince accounted for by ſir I. Newton from phyſical principles; and to this all aſtronomers now ſubſcribe, as of all others that which beſt ſolves the planetary phenomena.

Computation of a PLANET'*s motion and place.* As to the periods and velocities of the *planets*, or the time wherein they perform their courſes, they are found to have a wonderful harmony with their diſtances from the ſun, and with one another. The nearer each *planet* is to the ſun, the quicker ſtill being its motion, and its period the ſhorter. The great law they here all immutably obſerve is, that the ſquares of their periodical times are as the cubes of their diſtances from the centres of their orbits.

The knowledge of this law we alſo owe to the ſagacity of Kepler, who found it to obtain in all the primary *planets*; as aſtronomers have ſince found it alſo to do in the ſecondary ones.

Kepler deduced this law merely from obſervation, and compariſon of the ſeveral diſtances of the *planets* with their periods: the glory of inveſtigating it from phyſical principles is due to ſir Iſaac Newton, who has demonſtrated, that, in the preſent ſtate of things, ſuch a law was inevitable.

A *planet's* motion, or diſtance from its apogee, is called the *mean anomaly* of the *planet*; and is meaſured by the arc or area it deſcribes in the time. When the *planet* arrives at the middle of its orbit, or the point G, the diſtance or time is called the *true anomaly*. When the *planet's* motion is reckoned from the firſt point of Aries it is called its *motion in longitude*; which is either mean, viz. ſuch as the *planet* would have, were it to move uniformly in a circle; or true, which is that wherewith the *planet* actually deſcribes its orbit, and meaſured by the arc of the ecliptic it deſcribes.

Hence may the *planet's* place in its orbit for any given time after it has left the aphelion be found. For ſuppoſe the area of the ellipſis ſo divided by the line SG, that the whole elliptic area may have the ſame proportion to the area ASG as the whole periodical time wherein the *planet* deſcribes its orbit has to the time given: in this caſe G will be the *planet's* place in its orbit.

PLANETS, *the phenomena of the inferior*, are their conjunctions, elongations, ſtations, retrogradations, phaſes, and eclipſes. See CONJUNCTION, ELONGATION, STATION, RETROGRADATION, &c.

PLANETS, *phenomena of the ſuperior*, are the ſame with thoſe of the inferior; with an additional one, viz. oppoſition.

PLANET, *the particular phenomena, circumſtances, &c. of each*, ſee under the name of the reſpective *planet*, &c. JUPITER, MARS, &c.

PLANETS, *configuration of the.* See CONFIGURATION.

PLANETS, *theories of the.* See THEORY.

PLANETARIUM, an aſtronomical machine, made to repreſent the motions of the planets, as they really are in nature, or at leaſt agreeably to the Copernican ſyſtem, and commonly called an ORRERY.

The moſt remarkable of theſe machines was that invented by Huygens, and deſcribed by him. See Deſcript. Automati Planetarii, ap. Huygen. Opuſcul. Poſthum. tom. ii. p. 157. edit. Amſt. 1728.

In this *planetarium* the five primary planets perform their revolutions about the ſun; and the moon performs her revolution about the earth, in the ſame time that theſe revolutions are really performed in the heavens. The orbits alſo of the moon and planets are repreſented with their true proportions, eccentricity, poſition, and declination, from the ecliptic or orbit of the earth; ſo that by this *planetarium* the ſituation of the planets, the conjunctions, oppoſitions, &c. may not only be known for the preſent time, but for any time paſt, or future, as in a perpetual ephemeris.

This machine is now preſerved among the curioſities of the univerſity of Leyden.

But the *planetariums* or orreries now moſt commonly uſed do not repreſent the true times of the celeſtial motions, but only their proportions; and are of uſe to beginners, to give them an idea of the planetary ſyſtem; as alſo, if conſtructed with ſufficient accuracy, to ſolve queſtions relating to the motions of the planets, and of the earth and moon, &c.

Theſe machines are made of various ſizes, ſome repreſenting more planets than others. However, theſe complex ones are far from being improvements upon the original *planetarium*, or orrery, which ſhewed only the motion of the moon round the earth, and of the earth and moon round the ſun. They give but very confuſed, and even falſe ideas of the diſtances and bigneſs of the planets; which muſt always be ſo whilſt the orbits of the moon, and other ſecondary planets are fixed to the ſame machine, which contains the primary one. In the original one, every thing was well and properly executed; as the phenomena of day and night, and their gradual increaſe and decreaſe according to the ſeaſons; the places of the earth where the ſun is ſucceſſively vertical, and ſeems to deſcribe its parallels; the real annual motion of the earth, which gives the ſun an apparent annual motion; the rotation of the ſun about its axis; the periodical and ſynodical month; the ſolar and ſydereal days; the ſucceſſive illumination of all the parts of the moon, &c.

It is therefore proper to have a machine for repreſenting the general ſolar ſyſtem by itſelf; the ſun, moon, and earth, ought alſo to be ſhewn ſeparately; and the ſyſtem of any other primary planet; as Jupiter, for inſtance, with all its ſatellites, ſhould have a ſeparate machine ſo contrived, as to repreſent in true proportion their magnitudes, diſtances, and other phenomena.

Dr. Deſaguliers deſcribes a *planetarium* of his own contrivance, the frame of which, containing the clock-work, is made of ebony; its outſide is adorned with twelve pilaſters, between which are painted, on as many vertical planes, the twelve ſigns of the zodiac. The upper ſurface is flat, and made of poliſhed braſs; on the outward circumference of which are ſcrewed ſix braſs pillars, ſupporting a large flat ſilvered ring. On this ring, which repreſents the ecliptic, are drawn ſeveral circles; the three innermoſt being divided into twelve parts for the ſigns of the zodiac, and each of theſe into thirty degrees; and among thoſe degrees are graved in their proper places the nodes, aphelia, and greateſt north and ſouth latitudes of the planets. The next three circles have the months, and days of the month, exactly correſponding to the ſun's place at noon each day throughout the year; and upon the braſs ſurface of the machine graduated are ſilver circles, which carry the planets, repreſented by ſilver balls, and raiſed upon arbors or ſtems to the height of the ecliptic.

Above the ecliptic ſtand ſome of the principle circles of the ſphere, according to their reſpective ſituation in the heavens, viz. the two colures, one half of the equinoctial circle, the tropic of Cancer, the arctic circle, &c. The whole machine is alſo ſo contrived, as to be ſet to any latitude, without injuring any of the inſide motions. Within the ecliptic ſtand the ſun and other planets; the ſun being in the centre of the whole ſyſtem, and the reſt repreſented agreeably to the above mentioned magnitudes and diſtances. When things are thus diſpoſed, by turning about the handle, or winch, of the *planetarium*, all the planets perform their revolutions round the ſun, according to their periodical times; and being furniſhed with indices of blued ſteel, theſe ſhew the longitudes of the planets, by pointing to the diviſions on the graduated ſilver circles, as they move round.

As the diſtances of the planets are in their due proportions to each other, ſo likewiſe are their magnitudes; but it cannot be expected, that the diameters of the planets ſhould be in proportion to the diameters of their orbits; for to effect this, the machine muſt either be made three thouſand times bigger than uſual, or the balls repreſenting the planets three thouſand times leſs than uſual; whereby they would all be rendered inviſible, excepting the ſun, and even it would be leſs than $\frac{1}{100}$th part of an inch diameter. For the ſame reaſon it is found impracticable to repreſent the ſun by a ball, proportionably bigger than thoſe repreſenting the other planets.

Now, as the orbit of the moon, as well as of the ſatellites of Jupiter and Saturn, bear no manner of proportion to the orbits of the primary planets, the diſproportion between theſe and their ſatellites muſt be ſtill greater. Hence appears the abſurdity of crowding them all into one machine, as is the caſe in the common orreries.

To give a right notion of the diſtances and magnitudes of the ſatellites with reſpect to the primary planets, it will be neceſſary to have a ſeparate machine for each ſyſtem; or, the ſame machine may be ſo contrived, as to repreſent one ſyſtem after another, by ſhifting and adjuſting the magnitudes and diſtances of the balls. In this manner, the general ſolar ſyſtem may be firſt exhibited; then that of the moon and earth round the ſun; afterwards that of Jupiter and its ſatellites; and, laſtly, that of Saturn and its ſatellites.

We have already taken notice of ſome of the phenomena explained by the general *planetarium*, as well as of that contrived to exhibit the revolution of the earth and moon round the ſun. By theſe is likewiſe plainly ſhewn the cauſes of eclipſes, as well as of the apparent ſtationary and retrograde motions of the planets.

By the *planetarium* adapted to the ſyſtem of Jupiter, and its ſatellites, are exhibited the immerſion or entrance of a ſatellite into the ſhadow of Jupiter; its emerſion out of the ſhadow; when theſe are viſible; when a ſattellite is hidden by the body of Jupiter before it comes into, or after it is gone out of the ſhadow; when a ſatellite may be ſeen to croſs the body of Jupiter; when a ſattellite makes a ſolar eclipſe in Jupiter; and when ſatellites eclipſe one another. See Deſaguliers Exper. Phil. vol. i. p. 430, &c.

PLANETARY, ſomething that relates to the *planets*.

In this ſenſe we ſay *planetary* worlds, *planetary* inhabitants, &c. Huygens and Fontenelle bring ſeveral probable arguments for the reality of *planetary* worlds, and animals, plants, men, &c. The former in his Κοσμοθεωρος, ſive de Terris Cœleſtibus; the latter in his Dialogues, Sur le Pluralité des Mondes.

PLANETARY *globe*: See GLOBE.

PLANETARY *ſyſtem*, is the ſyſtem or aſſemblage of the *planets*, primary and ſecondary, moving in their reſpective orbits round their common centre, the ſun.

PLANETARY *hours*, in *Chronology*. See HOUR.

PLANETARY *days*. Among the ancients, the week was ſhared among the ſeven planets, each planet having its day. This we learn from Dion Caſſius, and Plutarch, Sympoſ. lib. iv. q. 7. Herodotus adds, that they were the Egyptians who firſt diſcovered what god, that is, what planet, preſides over each day; becauſe among this people the planets were directors. And hence it is, that in moſt European languages, the days of the week are ſtill denominated from the planets; Sunday, Monday, &c.

PLANETARY *years*, the periods of time wherein the ſeveral planets make their revolutions round the ſun, or earth.

As from the proper revolution of the ſun, the ſolar year takes its original; ſo from the proper revolutions of the reſt of the planets about the earth, ſo many ſorts of years do ariſe, viz. the Saturnian year, which is defined by 29 Egyptian years, 174 hours 58 minutes, equivalent in a round number to 30 ſolar years. The Jovial year, containing 317 days 14 hours 59 minutes. The Martial year, containing 321 days 23 hours 31 minutes. For Venus and Mercury, as their years when judged of with regard to the earth, are almoſt equal to the ſolar year; they are more uſually eſtimated from the ſun, the true centre of their motions: in which caſe, the former is equal to 224 days 16 hours 40 minutes; the latter to 87 days 23 hours 14 minutes.

PLANETARY *dials*, thoſe whereon the *planetary* hours are inſcribed.

PLANETARY *ſquares*, the ſquares of the ſeven numbers from 3 to 9, diſpoſed magically.

Corn. Agrippa, in his famous book of magic, has given the conſtruction of the ſeven *planetary* ſquares: M. Poignard, canon of Bruſſels, in his Treatiſe of Sublime Squares, gives new, eaſy, and general methods for making the ſeven *planetary* ſquares, and all others to infinity, by numbers, in all ſorts of progreſſions. See MAGIC *Square*.

PLANIFOLIOUS *flowers*. See FLOWER.

PLANIMETRY, *planimetria*, that part of geometry which conſiders lines and plain figures; without any conſideration of heights or depths.

Planimetry is particularlarly reſtrained to the menſuration of planes or ſurfaces; in oppoſition to *ſtereometry*, or the menſuration of ſolids. See MEASURING and SURVEYING.

Planimetry, or the art of meaſuring the ſurfaces and planes of things, is performed with the ſquares of long meaſures, as ſquare feet, ſquare inches, ſquare yards, ſquare perches, &c. that is, by ſquares whoſe ſides are an inch, a foot, a yard, a perch, &c. ſo that the area or content of any ſurface is ſaid to be found, when we know how many ſuch ſquare inches, feet, yards, &c. it contains.

PLANISPHERE, a projection of the ſphere, and the ſeveral circles thereof, on a plane; as upon paper, or the like.

In this ſenſe, maps of the heavens and the earth, wherein are exhibited the meridians, and other circles of the ſphere, are called *planiſpheres*.

PLANISPHERE is ſometimes alſo conſidered as an aſtronomical inſtrument, uſed in obſerving the motions of the heavenly bodies; conſiſting of a projecton of the celeſtial ſphere upon a plane, repreſenting the ſtars, conſtellations, &c. in their proper ſituations, diſtances, &c. Such is the ASTROLABE, which is a common name for all ſuch projections.

In all *planiſpheres*, the eye is ſuppoſed to be a point viewing all the circles of the ſphere, and referring them to a plane whereon the ſphere is as it were flattened. This plane is called the *plane of the projection*.

A perſpective plane is only a plane of projection placed between the eye and the object, ſo as to contain all the points which the ſeveral rays drawn from the object to the eye impreſs thereon. But in *planiſpheres* or aſtrolabes, the plane of the projection is placed beyond the object; which is the ſphere. The plane of the projection is always ſome of the circles of the ſphere.

Among the infinite number of *planiſpheres* which the different planes of projection, and the different poſitions of the eye, would furniſh, there are two or three that have been preferred to the reſt. Such are that of Ptolemy, where the plane of projection is parallel to the equator; that of Gemma Friſius, where the plane of projection is the colure, or ſolſtitial meridian, and the eye the pole of the meridian: that of John de Royas, a Spaniard, whoſe plane of projection is a meridian, and the eye placed in the axis of that meridian, at an infinite diſtance. This laſt is called the ANALEMMA.

The common defect of all theſe projections is, that they diſtort and alter the figure of the conſtellations ſo as it is not eaſy to compare them with the heavens; and that the degrees in ſome places are ſo ſmall, that they afford no room for operation.

All theſe faults M. de la Hire has provided againſt in a new projection, or *planiſphere*; where it is propoſed the eye ſhall be ſo placed, as that the diviſions of the circles projected ſhall be ſenſibly equal in every part of the inſtrument. The plane of his projection is that of a meridian.

PLANISPHERE, *nautical*. See NAUTICAL.

PLANKING, in *Naval Architecture*, the art of covering and lining the ſides of a ſhip with an aſſemblage of oak planks, which completes the proceſs of ſhip-building, and is ſometimes called by artificers laying on the ſkin.

PLANKS, in a *Ship*, are the timbers which go fore and aft on each ſide of the ſhip, whereon lie the beams of the firſt orlop.

PLANK, *garboard*, in a *Ship*. See GARBOARD.

PLANO-*concave glaſs*, or *lens*. See LENS.

PLANO-*convex glaſs*, or *lens*. See LENS.

PLANT, *planta*, an organical body, conſiſting of a root, and other parts; and producing uſually leaves, a ſtem, branches, and flowers.

A *plant* may be defined in Boerhaave's manner to be an organical body compoſed of veſſels and juices; to which body belong a root, or a part whereby it adheres to ſome other body, and particularly the earth, from which it derives the matter of its life and growth.

A *plant* is diſtinguiſhed from a foſſil by its being organical, and conſiſting of veſſels and juices; and from an animal, by its adhering to another body, and deriving its nouriſhment therefrom.

That *plants* are organized bodies, and endued with life, is evident from many conſiderations: every body that has ſpontaneous motion muſt alſo have life; for proper and internal motion in every body depends on the ſpontaneous propulſion of fluids, and where this manifeſts itſelf, there is life. This kind of motion in *plants* appears in a variety of circumſtances: thus herbs in green-houſes or ſtoves incline or turn towards the light. When ſhut up, if they find a hole in the wall, ſhutters, or frames, there they endeavour to penetrate. Several *plants* in the day-time turn their flowers towards the ſun; moſt *plants* in a ſerene ſky expand their flowers; but before rain, ſhut them up, or contract them at the approach of night. The flowers of many *plants* hang down in the night, as if the *plants* were aſleep, leſt rain or the moiſt air ſhould injure the fertilizing duſt. The trefoils, &c. ſhut up, or double their leaves before ſtorms and tempeſts, but unfold them in a clear ſky. The tamarind-tree is ſaid by Alpinus and Acoſta to enfold within its leaves the flowers or fruit every night in order to guard them from cold or rain. Some of the ſenſitive *plants*, and the wood-ſorrel with pinnated leaves, upon being touched, roll up their leaves, and turn downwards or ſhrink, and after a little time expand them again, as if they had both life and ſenſation. And it farther appears, that motion is no leſs neceſſary to the vigour of *plants*, than exerciſe to the health and ſtrength of animals. Thus *plants* in ſtoves and green-houſes, though they have ſufficient heat and nouriſhment, are ſlender, weak, and loſe the colour of their leaves, and ſeem to languiſh for want of motion; and trees, ſurrounded with high walls or buildings, and confined within narrow bounds, are ſlender, and grow tall, but not ſtrong.

The organization and life of *plants* will be farther evinced in the ſequel of this article by many conſiderations, deduced from their anatomy, generation, œconomy, and vegetation.

Plant is a general name, under which are compriſed all vegetable bodies, as trees, ſhrubs, and herbs.

Trees are defined to be perennial *plants*, which riſe to a very great height, with a ſimple, woody, and durable ſtem or trunk: and by theſe characters they are accurately diſtinguiſhed from herbs, whoſe ſtems are frequently compound, herbaceous, or ſucculent, and die down to the root every year. Theſe differences ſuggeſted the very ancient diviſion of vegetables into herbs and trees; ſo that from the time of Ariſtotle and Theophraſtus, this diviſion has obtained a principal place in almoſt every ſyſtem, except that of Linnæus, which mixes herbs, ſhrubs, and trees promiſcuouſly together: and thus is preſerved the harmony of his ſyſtem, which is ſolely founded on the fructification of every individual genus and ſpecies. Among the celebrated names in botany, which have retained the ancient diſtinction, are numbered Cæſalpinus, the father of ſyſtematic botany, Moriſon, Hermannus, Chriſtopher Knaut, Boerhaave, Ray, Pontedera, and Tournefort. On the oppoſite ſide are ranged Rivinus, Chriſtian Knaut, Linnæus, Ludwig, &c. The diſtinction into trees and ſhrubs, though of equal antiquity, is neither ſo obvious, nor are its limits ſo accurately aſcertained.

The learned Dr. Alſton, in his Tyrocinium Botanicum, wiſhes to conſider the diſtinction into trees and ſhrubs, as a true natural diſtinction, and endeavours to trace its foundation in the internal ſtructure of the *plants* themſelves. All trees, ſays he, whether they bear buds or not, are covered with two barks, the outer and inner called by the botaniſts *cortex* and *liber*.

Shrubs differ from herbaceous vegetables in the duration of their ſtems; from trees, in the nature of their covering, which is not a bark but a cuticle or ſimple ſkin: but this fact is not ſufficiently aſcertained. The farther diſtinction into ſhrubs and under-ſhrubs, which is exceedingly arbitrary and indeterminate, was firſt ſuggeſted by Cluſius, in a work intitled Rariores & Exoticæ Plantæ, publiſhed in 1576; and adopted by Cæſalpinus and others. See Dr. Hunter's edition of Evelyn's Sylva, p. 2. note *.

From the obſervations of Malpighi, Dr. Grew, M. Reneaume, Bradley, and others, there appears a great ſimilitude between the mechaniſm of *plants*, and that of animals; the parts of the former bear a conſtant analogy to thoſe of the latter; and the vegetable and animal œconomy appear both formed on the ſame model. To give an idea hereof, it will be neceſſary to deſcribe the parts whereof *plants* conſiſt.

PLANTS, *anatomy of*. The general and obvious parts of a *plant* are five, viz. the root, the ſtem, the branches, the leaves, and the flower. A good microſcope diſcovers the conſtituent parts of a *plant* to be, 1. A very thin outer rind. 2. An inner rind, much thicker than the former. 3. A blea, of a ſpongy texture. 4. A vaſcular ſeries. 5. A fleſhy ſubſtance, which anſwers to the wood of a tree or ſhrub. 6. Pyramidal veſſels, contained within the fleſh. And, 7. A pith. Whatever part of the *plant* we examine, we obſerve theſe and no more. The root, its aſcending ſtalk, and deſcending fibre, are one, and not three ſubſtances. This reduces the entire vegetable to one body; and what appears in the flower to be many parts is only compoſed of the extremities of the ſeven above mentioned. The cup terminates the outer bark; the inner rind ends in the outer petals; the blea forms the inner petals; the vaſcular ſeries ends in the nectaria; the fleſh makes the filaments; the pyramidal veſſels form the receptacle; the pith furniſhes the ſeeds and their capſules.

Trees, ſhrubs, and herbs are organized in the ſame manner; but the colour and thickneſs of their component parts are different, according to their reſpective natures.

1. The outer bark, which firſt preſents itſelf to view, has the appearance of a fine film full of irregular meſhes, though in reality it conſiſts of two membranes, with a ſeries of veſſels between them. Theſe take their courſe upwards, and as they advance towards the cup of the flower, inoſculate with the ſmall veſſels of the inner bark, into which they pour part of the juices they have received from the earth and atmoſphere. The fine meſhes ſerve the purpoſes of inhalent or exhalent pores, according to the circumſtances of the weather.

2. The inner bark is much thicker than the outer. It is made up of ſeveral flakes laid evenly upon one another, each of which conſiſts of two membranes, incloſing a ſeries of veſſels. Theſe communicate freely through the whole ſubſtance of the rind, and as they inoſculate with the veſſels of the outer bark, ſo they alſo communicate with thoſe of the blea.

3. The blea lies immediately under the inner bark. It is a ſingle ſubſtance of uniform ſtructure, of conſiderable thickneſs, and made up of beds of hexagonal cells; in the angles formed by theſe cells, we obſerve the veſſels of the blea, which pour their contents into the cells, that appear to be reſervoirs for the water imbibed by the *plant*. Underneath the blea lies,

4. The vaſcular ſeries, whoſe ſtructure is extremely ſimple, being a ſingle courſe of greeniſh veſſels lodged between two membranes. At a certain ſeaſon of the year, the juices of the vaſcular ſeries are very mucilaginous. Its veſſels have a free communication with the wood and blea. The favourers of a circulation aſſert, that through theſe veſſels, which Mr. Bradley calls the venal veſſels, the returning ſap deſcends; but by the moſt accurate experiments of Dr. Hales, it appears that the vegetable juices do riſe and fall in the ſame ſeries of veſſels, and conſequently have no CIRCULATION.

5. The wood, or fleſhy part of a *plant* is that in which the life of the vegetable ſeems to be placed. It is univerſal in the *plant*, and made up of ſtrong fibres. From this all the other parts are produced; it ſhoots a pith inward, and a rind, blea, and vaſcular ſeries outward. Through every part of the wood or fleſh, there are veſſels, called by the advocates of circulation, arterial veſſels, that convey a juice highly elaborated, the greateſt part of which has undergone the concoction of the rinds, blea, and vaſcular ſeries. The woody fibres conſtitute an order of veſſels, which are named tracheæ. Theſe are filled with elaſtic air, and may be diſcovered by the eye, in the wood of all trees. The tracheæ form an arterial ſyſtem, and ſupply the place of the heart in animals. Being filled with air, they become ſubject to the alternate effects of heat and cold.

6. The pyramidal veſſels ſpread through the whole ſubſtance of the fleſh, and, as they advance upwards, their ramifications inoſculate, ſo as to prevent any poſſible obſtruction of the ſap. Their juices are very highly elaborated, having paſſed through all the orders of ſap-veſſels. Their ſides are conſtantly in contact with the tracheæ; ſo that they are at all times ſubject to the viciſſitudes of the weather. The pyramidal veſſels communicate with,

7. The pith, which is found in all trees, ſhrubs, and *plants*, occupying the center, but not always regularly continued. When examined by a microſcope, it has the appearance of a number of veſicles, and is of an uniform ſtructure. It does not appear to be abſolutely neceſſary to vegetation, becauſe elms and other trees live and thrive without it. In trees it is found in the branches, being obliterated in the trunk. The veſſels of the fleſh communicate with it, from which it receives a fluid, and it is probably the receptacle of part of the ſap; it is alſo diſcovered in tranſverſe ſections of the ribs of leaves: and when minutely traced, it is found to run up to the ovarium, where it forms the ſeeds and their capſules.

The fibres of a root are ſuppoſed to be ſimple capillary tubes; but upon a minute inſpection, we diſcover them to conſiſt of the ſeven component parts of a *plant*. At their extremities we obſerve a ſpongy kind of excreſcence pierced with innumerable ſmall holes, through which the nutritive juices of the earth are abſorbed, and which Boerhaave conſiders as analagous to the lacteals in animals. When a *plant* has been pulled up, it will be retarded in its growth, until nature has renewed that ſpongy nipple. The bark and leaves of a *plant* imbibe, at proper ſeaſons, the moiſture of the atmoſphere; at other times they perſpire the ſuperfluous nouriſhment. The leaves are broad, in order the more readily to receive the moiſture of the air. The roots are formed ſharp and pointed, to make their paſſage more eaſily through the earth. But experiments ſhew, that a young tree may have its branches placed in the earth, and its roots elevated in the air; and in that inverted ſtate it will continue to live and grow. The air contains, eſpecially during the ſummer months, all the principles of vegetation, which are greedily abſorbed by the veſſels of the leaves and bark; and conveyed to the innermoſt parts of the *plant* for its growth and fructification. When the air happens to be cold and moiſt, this abſorption takes place: when it is hot and dry, the ſame veſſels throw off the ſuperfluous moiſture by perſpiration.

PLANTS, *œconomy, or uſe of the parts of*. The analogy, that ſubſiſts between *plants* and animals, has induced ſome very eminent naturaliſts to ſuppoſe a regular circulation of the vegetable juices. M. Perrault, M. Major, M. Marriotte, Malpighi, and Grew, contended, much about the ſame time, for the CIRCULATION *of the ſap*.

According to their microſcopical obſervations, the wood of trees and the fleſh of *plants* conſiſt of fine capillary tubes, which run parallel from the root, through the trunk and branches. Theſe are looked upon as arteries. Other minute veſſels were obſerved running between the wood and inner bark, whcih they diſtinguiſhed by the name of veins. They alſo deſcribed very correctly, the tracheæ or air-veſſels, whcih take their courſe through the fibres of the wood. From theſe preliminaries they reaſoned in this manner: the root having abſorbed a quantity of juice from the earth, it is made to aſcend through the veſſels of the wood, by the alternate expanſion and contraction of the tracheæ, aſſiſted by the natural abſorption of the ſap-veſſels themſelves. They ſuppoſe the ſap to be rarefied to the degree of a fine vapour, in which ſtate it mounted upward to the extreme parts of the *plant*, where, meeting with the external air, it became condenſed into a liquor, and in that form, returned to the root by the venal ſyſtem, between the wood and bark.

Dr. Hales, in the moſt ſatisfactory manner, exploded this doctrine, and ſubſtituted another in its place, more conſonant to reaſon and experiment: and it is remarked, that, as Dr. Harvey eſtabliſhed the *circulation of the* BLOOD, in oppoſition to moſt of the anatomiſts in Europe, Dr. Hales clearly diſcovered the CIRCULATION *of the ſap*, againſt the opinion of almoſt every naturaliſt of his time.

In order to have a diſtinct view of the motion of the ſap, it is neceſſary to reflect, that the root, ſtem, branches, and leaves are conſtructed in the ſame manner. Sallows, willows, vines, and moſt ſhrubs, will grow in an inverted ſtate, with their tops downward in the earth. Dr. Bradley deſcribes the manner of inverting a young cherry-tree, the roots of which will put forth leaves, and the branches become roots. Hence it is evident, that the nutritive matter may be conveyed by the leaves as well as by the roots, their vaſcular ſtructure being the ſame.

For underſtanding the motion of the ſap, according to theſe principles, it is to be conſidered, that, during the heat of a ſummer's day, all plants perſpire freely from the pores of their leaves and bark. At that time the juices are highly rarefied. The diameters of the tracheæ, or air-veſſels, are enlarged, ſo as to preſs upon and ſtraiten the veſſels that carry the ſap; in conſequence of which, their juices, not being able to eſcape by the roots, are preſſed upward, where there is the leaſt reſiſtance, and perſpire off the excrementitious parts by the leaves and top branches, in the form of vapour. When the ſolar heat declines, the tracheæ are contracted; the ſap veſſels are enlarged, and the ſap ſinks down in the manner of the ſpirits of a thermometer. In conſequence of this change, the capillary veſſels of the leaves and top-branches become empty. Being ſurrounded with the humid vapours of the evening, they fill themſelves, from the known laws of attraction, and ſend down the new-acquired juices to be mixed with thoſe that are more elaborated. As ſoon as the ſun has altered the temperature of the air, the tracheæ become again diſtended, and the ſap-veſſels are ſtraitened. The ſame cauſe always produces the ſame effect; and this alternate aſcent and deſcent through the ſame ſyſtem of veſſels, continues as long as the *plant* ſurvives. The irregular motion of the ſtem and branches is another cauſe that contributes to the aſcent of the ſap. Whenever theſe parts are agitated by the air, they are made to aſſume a variety of angles, whereby the ſap-veſſels are ſuddenly ſtraitened. The contained juices, conſequently, receive reiterated impulſes, ſimilar to what happens to the blood of animals, from the contraction of the heart. Theſe obſervations convey a general idea of the motion of the ſap, which varies according to the temperature of the weather; which is ſeldom the ſame in any ſucceeding moment: and, therefore, the ſap muſt ſometimes move quick, and ſometimes ſlow: it may riſe and fall many times in a day, puſhed upward by ſudden heats, and falling by ſudden cold. Thus the juices are blended, and the ſecretions forwarded.

As to the manner in which the nutritive juices of the earth and atmoſphere are conveyed into the ſap-veſſels, we are to conſider, that the outer back which covers every external part of the vegetable, as well below as above the ſurface, is full of perſpiratory or abſorbent holes. The veſſels of this bark, being endowed with the power inherent in capillary tubes, draw up the moiſture that is applied to their ſurface. From them it is commited to the veſſels of the inner bark. After receiving ſome degree of melioration, the ſap is delivered to the blea; from the blea, it paſſes, by anaſtomoſing canals, to the vaſcular ſeries. From thence to the wood or fleſh, where it receives its laſt concoction. The nutritive particles, being ſeparated by the mechaniſm of theſe numerous canals, are applied towards the fructification and increaſe of the *plant*; while the watery and excrementitious parts are carried expeditiouſly to the leaves, where they are perſpired off in the form of vapour.

It is evident, however, that, as water contains but few particles that are fit for nouriſhment, it was necaſſary that *plants* ſhould have a power of imbibing a large portion of that fluid. For which reaſon the ſun-flower, conſidered bulk for bulk, takes in ſeventeen times more nouriſhment than a man, and conſequently perſpires more. Air, likewiſe, which contains the life of vegetables, as well as of animals, and which exiſts in two ſtates, both elaſtic and fixed, paſſes in both ſtates into the abſorbent veſſels of *plants*, and mixing with their juices, circulates through every part.

Dr. Hales, in his Statical Experiments upon the Vine, diſcovered it aſcending with the ſap in the bleeding ſeaſon; and we learn from him that *fixed* AIR conſtitutes near one third part of the ſolid contents of the heart of oak: and it is found to bear the ſame proportion in peas, beans, and other vegetable ſubſtances. From the combinations of the nutritive particles thus received, a number of different fluids are prepared in the ſame *plant*.

The univerſal juice of a *plant* is a limped ſub-acid liquor, which, as it moves through the innumerable ſmall veſſels, becomes more and more concocted, and is the general maſs from which all the juices are derived. It may be called the blood of the *plant*. By a certain modification it produces high-flavoured oils, gums, honey, wax, turpentine, roſin, and even the conſtituent parts of the *plant* itſelf. See *Food of* PLANTS.

PLANTS, *generation of*. All *plants* are produced from ſeeds, as all animals are produced from eggs, and the proceſs of nature is very ſimilar in both kinds of generation. The ſmalleſt vegetables have ſeeds, though often not diſcoverable by the naked eye: Valiſnerius has diſcovered the ſeeds in ducks meat, and Micheli has diſcovered them in the mucor and byſſus; Bobart in the ferns; Linnæus in the moſſes; and Reaumur in the fungi. Miſſletoe is alſo known to be produced from ſeed; and the ſeſſile and flat funguſes, which ſome conſider as morbid excreſcences, are now known to be true ſpecies of thoſe agarics, which are furniſhed with caps and ſtems, and grow on the ground, whoſe ſeeds falling on a moiſt tree, produce, as it were, half caps without ſtems. Beſides, that ſeeds are the eggs of *plants* appears from hence, that as every egg produces an offspring ſimilar to the parent, ſo do alſo the ſeeds of vegetables, and therefore, they alſo are eggs. A ſeed reſembles the egg of a hen; as this, as well as the egg, has a ſhell, external membrane or film, a membrane including the yolk, the yolk itſelf, and the ſcar or point of life. In ſeeds the white is wanting, becauſe the moiſture of the earth ſupplies its place, and nouriſhes the embryo of the *plant*. When the flower is going off, the ſeed begins to ſwell, and on the outſide there is ſeen a veſicle, which is the amnion of Malpighi, furniſhed with an umbilical chord or navel-ſtring, which is produced through the chorion to the oppoſite ſide of the egg. While with the egg, the amnion increaſeth, on its top is obſerved another ſmall body, which likewiſe increaſeth continually, till it has filled the whole chorion and egg; and the amnion and chorion are turned into the external ſhell or coat of the ſeed. Thus, as the ſame changes are brought about on the ſeed as in the egg, the ſeeds muſt be the eggs of *plants*. Farther, that *plants* ſpring from eggs, is plain from the lobes, which, when we ſpeak of cows and ſimilar quadrupeds, are nothing elſe than ſeveral ſecundines, always adhering to the fœtus, drawing their ſupply of fluids from the matrix, which fluids they prepare for the nouriſhment of the tender fœtus. That moſt *plants* have ſeminal leaves or lobes is very well known. Theſe ſeminal leaves once conſtituted the whole ſeed, except the hilum, or little heart, in which is the point of life; and theſe lobes prepare the noutiſhment for the very tender plant, until it be able to ſtrike root in the earth; in the ſame manner as the yolk in an egg, becoming the placenta, prepares the nouriſhment, and ſends it by the navel-ſtring to the chick; after which they drop off. Hence it appears, that the ſeminal leaves are the lobes; but ſince all lobes proceed from the egg or ſeed, we may fairly conclude that *plants* are produced from eggs. But as no egg can produce an animal, till it be impregnated or fecundated by the male, it will be neceſſary to inveſtigate the ſituation of the genital organs deſtined by nature for this purpoſe in *plants*.

It is plain, that the genital organs of *plants* muſt be ſituated where the ſeeds are produced, but the ſeeds are produced where the flower and fruit are; therefore the flower and fruit are the genital organs of *plants*. And as there was never a clear and evident example produced of any plant which wanted flowers and fruit, though they might not be diſtinctly known on account of their exceeding minuteneſs, we may juſtly ſay, that the eſſence of *plants* conſiſt in their fructification. Moreover, as generation precedes the birth in animals, the flower in *plants* always precedes the fruit; and, therefore, we are neceſſarily led to aſcribe fecundation to the flower, and the birth or excluſion of the ſeed to the ripe fruit. The flower, may, conſequently, be defined to be the genital organs of a *plant*, ſerving for fecundation, and the fruit to be the genital organs ſerving for the birth or maturation of the ſeed. And ſince we know that there are many *plants*, ſome of which want the calyx, others the corolla, others the filaments of the ſtamina, and others the ſtyle, but that all flowers, the moſſes only excepted, are furniſhed with the antheræ or ſtigmata, or both together; theſe parts muſt conſtitute the eſſence of the flower. If we find a flower with antheræ, but no ſtigmata, we may alſo aſſuredly find another flower either in the ſame, or a different *plant* of the ſame ſpecies, which has ſtigmata with the antheræ, or without them. The act of fecundation is performed in the flower, and, therefore, the genital organs of both ſexes muſt be preſent in the flower; not, indeed, always in one and the ſame flower, but it is ſufficient that thoſe of the male be in one flower, and thoſe of the female in the other; and theſe genital organs are the antheræ and ſtigmata. The antheræ, or male organs of generation in flowers, are nothing elſe but the bodies which prepare and contain the male ſperm; therefore theſe antheræ are the teſticles together with the ſeminal veſicles, and their duſt the genuine male ſperm of *plants*, anſwering to thoſe particles which are called animalcules in the male ſperm of animals. This propoſition may be evinced by the following arguments: the antheræ and their duſt always come before the fruit; and when they ſhed their duſt, which they do before the flower has attained its full vigour, they have performed their office, and then they drop and become uſeleſs. Beſides, the antheræ are ſo ſituated in the flower, that their duſt, which is the male ſperm, may reach the piſtil or female organs; for the ſtamina either ſurround the piſtil, as in moſt flowers, or if the piſtil incline to the upper ſide of the flower, the ſtamina do the ſame; or if the piſtil nods, the ſtamina aſcend.

Farther, the antheræ and ſtigmata are in full vigour at the ſame time, both when they are in the ſame flower and when they are in ſeparate flowers. Moreover, if we cut aſunder the antheræ before they have ſhed their duſt, their ſtructure will be found altogether as wonderful and curious as that of the ſeed-veſſels themſelves; for within they conſiſt of one, two, three, or four cells; and they open either longitudinally, or at the baſe, ſeparating into pieces or valves, or from the top, or at the two points or horns. And, if we cut off the antheræ of any plant which bears but one flower, taking care at the ſame time that no other *plant* of the ſame ſpecies is near it, the fruit proves abortive, or at leaſt produces ſeeds which will not vegetate.

Finally, the figure of the fertilizing duſt will clearly convince any one that this fine powder is not accumulated by chance, or from the dryneſs of the antheræ.

Malpighi, Grew, Moreland, and Geoffroy, who have viewed the figure of theſe particles with good microſcopes, found all of them exactly equal to one another, but in different genera as great a difference in ſhape and figure as the ſeeds themſelves ever have. The powder of the antheræ, in point of fecundation, anſwers to Leewenhoek's animalcules in the male ſperm; and the ſtigma which receives this duſt is always moiſtiſh, that the duſt may inſtantly adhere or ſtick to it. That the ſtigmata, which are the other eſſential parts of a flower, are the female organ of generation, may be proved by the following conſiderations: the parts of the piſtillum are the germen, the ſtyle, and the ſtigma; the germen, or ſeed-bud, while the *plant* is in flower, is always imperfect and immature, being only the rudiment of the future fœtus; the ſtyle is no eſſential part, for it is wanting in many ſpecies of *plants*; but the germen can never bring the fruit to maturity, except it be within the flower along with the ſtigma. Hence it follows, that the ſtigma is that part of the flower which receives the impregnating duſt. This will farther appear, if we conſider, that the ſtigma is always ſo ſituated, that the antheræ, or their impregnating duſt, can reach it; moreover, it has always a figure peculiar to itſelf, ſo that in moſt (though not all) *plants* it is double when the fruit conſiſts of two cells; triple when the ſeed-veſſel has three cells; quadruple when it has four cells, &c. Again, the ſtigmata are always in full vigour at the ſame time with the antheræ: beſides, the ſtigmata in moſt *plants*, when they have diſcharged their office, drop off in the ſame manner as the antheræ do; which proves, that the ſtigmata contribute nothing to the ripening of the fruit, but ſerve only for the purpoſe of generation. If the ſtigma be cut off before they have received the impregnating duſt of the antheræ, the *plant* is caſtrated as to the female organs, and the fruit periſhes. The ſtigma of the flower has, beſides, two other ſingular properties: viz. that it is always diveſted of the cuticle or film, nor has it any bark as the other parts have, and then it is always bedewed with a moiſture. Upon the whole it appears, that the *generation of plants* is accompliſhed by the antheræ ſhedding their duſt on the ſtigmata. It is not ſufficiently clear, in what way the generation of animals is accompliſhed; but thus far we are certain, that the male ſperm muſt come in contact with the female organ, if there be any impregnation. In the vegetable kingdom the genital duſt is carried by the air to the moiſt ſtigmata, where the particles burſt and diſcharge their exceeding fine or ſoluble contents, which impregnate the ovary. This will appear if it be conſidered, that when a *plant* is in flower, and the duſt of the antheræ flying about, part of this duſt viſibly lights upon and clings to the ſtigma; the ſtamina and piſtillum are generally of the ſame height, that the male duſt may more eaſily come at the ſtigma, and in thoſe *plants* where this is not the caſe, a ſingular proceſs of fecundation may be obſerved: thus in the African tree crane's bill, or *geranium inquinans*, where the piſtillum is ſhorter than the ſtamina, the flowers before they blow are pendulous, but upon their opening they ſtand upright, that the powder may fall upon the ſtigma; after which they again nod till the fruit is ripe, and then ſtand upright a ſecond time, that their ſeeds may be more eaſily ſcattered about. In ſome of the pinks, the piſtilla, which are longer than the ſtamina, are bent back like ram's horns towards the antheræ.

Again, the ſtamina for the moſt part ſurround the piſtillum, ſo that ſome of the duſt is always blown by the wind on the ſtigma. Moreover, the ſtamina and piſtillum come at the ſame time, not only in one and the ſame flower, but alſo where ſome are male and others female, on the ſame plant, very few excepted.

Farther, in almoſt all ſorts of flowers we ſee how they expand or open by the heat of the ſun, but in the evening and a moiſt ſtate of the air, they cloſe or contract their flowers, leſt the moiſture getting to the duſt of the antheræ ſhould coagulate the ſame, and render it incapable of being blown on the ſtigma; but when once the fecundation is over, the flowers neither contract in the evening, nor yet againſt rain.

The culture of palm-trees furniſhes a deciſive confirmation of the ſame doctrine of vegetable generation. That the cultivators of the common palm-tree or date-tree, cut off the male ſpadixes, and place them over the females, is recorded by Theophraſtus, Pliny, Proſper Alpinus, Tournefort, Kæmpfer, and others; and if they neglect to do this, the dates are harſh, bad-taſted, and many trees wholly deſtitute of nuts or fruit. The date-tree is every year thus impregnated in Arabia, Perſia, and Egypt, by the inhabitants. The wind does on many occaſions ſerve as a vehicle for bringing the farina of the males to the females. M. Geoffroy cites a ſtory from Jovius Pontanus, who relates, that in his time there were two palm-trees, the one male, cultivated at Brindiſi, the other female, in the wood of Otranto, fifteen leagues apart; that this latter was ſeveral years without bearing any fruit; till at length, riſing above the other trees of the foreſt, ſo as it might ſee (ſays the poet) the male palm-tree at Brindiſi, it then began to bear fruit in abundance. M. Geoffroy makes no doubt but that the tree then only began to bear fruit, becauſe it was in a condition to catch on its branches the farina of the male brought thither by the wind. In the male and females of the piſtachia nut tree they obſerve the ſame method as in thoſe of the date-tree. We may obſerve farther, that ſince the male duſt is generally of greater ſpecific gravity than the air, in moſt plants that have the piſtillum longer than the ſtamina, the all-wiſe Creator has made the flowers nodding, that the powder may more eaſily reach the ſtigma. With reſpect to thoſe *plants*, whoſe ſtems grow under water, the flowers, a little before they blow, emerge or riſe above the ſurface of the water; and thoſe, all whoſe parts grow under water, about the time of flowering, raiſe their flowering ſtems above the water, which ſtems ſink again as ſoon as the time of flowering is over. A ſimilar concluſion may be farther eſtabliſhed from the conſideration of all ſorts of flowers; but enough has been ſaid to prove, that the generation of *plants* is performed by the genital duſt of the antheræ falling on the moiſt ſtigma or female organ, which duſt, by the help of the moiſture, adheres and burſts, diſcharging its contents, the ſubtile particles of which are abſorbed by the ſtyle, into the ovarium, germen, or ſeed-bud. However, the duſt of the antheræ does not penetrate through the ſtyle to the germen and rudiments of the ſeed, as ſome writers have ſuppoſed: the contrary appears to be the caſe from opening a flower of the Oriental rough poppy, with a large flower, cutting its piſtillum perpendicularly downwards; and the lamellæ or folds, the placentæ and the ſmall ſeeds ſticking to them will be found of a pure white colour, though at the ſame time the ſtyle and all the ſtigma are wholly tinged with a purple hue from the duſt of the antheræ. Hence we may conclude, that not one grain or particle of the farina enters the fold of the receptacle or ſeeds themſelves.

We may cloſe this account with obſerving upon the whole, that the calyx is the marriage-bed, in which the ſtamina and piſtilla, the male and female organs, celebrate the nuptials of *plants*, and where they are cheriſhed and defended from external injuries; the corolla or petals are the curtains, cloſely ſurrounding the genital organs, in order to keep off ſtorm, rain, or cold; but when the ſun ſhines bright, they freely expand, both to give acceſs of the ſun's rays, and the fecundating duſt: the filaments are the ſpermatic veſſels by which the juice, ſecreted from the *plant*, is carried to the antheræ; the antheræ are the teſticles, and may not improperly be compared to the ſoft roe or milt of fiſhes: the duſt of the antheræ anſwers to the ſperm and ſeminal animalcules; for though it is dry, that it may be the more eaſily conveyed by the wind, yet it gets moiſture upon touching the ſtigma: the ſtigma is that external part of the female organ, which receives the male duſt, and on which the male duſt acts: the ſtyle is the vagina or tube, through which the effluvia of the male duſt paſs to the germen or ſeed-bud: the germen is the ovary, for it contains the unimpregnated or unfertilized ſeeds: the pericarpium or ſeed-veſſel anſwers to the impregnated ovary, and in fact, is the ſame with the germen or ſeed-bud, only increaſed in bulk and loaded with fertile ſeeds; the ſeeds are the eggs. Moreover, the calyx is a production of the external bark of the *plant*; the corolla of the inner bark; the ſtamina of the alburnum or white ſap; the pericarpium or ſeed-veſſel of the woody ſubſtance; and the ſeeds of the pith of the tree; for in this manner they are placed, and in this they are alſo unfolded: ſo that in the flower we find all the internal parts of a *plant* unfolded.

The ſtomach of *plants* is the earth, from which they receive their nouriſhment, and the fineſt and moſt ſubtile parts of its ſoil is their chyle; the root, which carries the chyle from the ſtomach to the body of the *plant*, is analogous to the lacteals or chyliferous veſſels of animals: the trunk, which ſupports and gives ſtrength to the whole plant, is analogous to the bones: the leaves, by which *plants* tranſpire, are inſtead of lungs, and they may be alſo compared to the muſcles of animals, for by their agitation with the wind the *plant* is put in motion; on which account herbs furniſhed with leaves cannot thrive, except they have air; but ſucculent *plants* which have no leaves, though ſhut up in green-houſes and quite deprived of the external air, thrive very well: heat is to *plants* analogous to the heart in animals, for they have no heart, nor have they occaſion for any; becauſe they live like polypes in the animal kingdom; their juices mixed with air being propelled through their veſſels, but not circulated back again by returning veſſels. *Plants* have generally their genital organs placed at their ramifications, as animals have theirs at the ramification of the iliac veſſels, with this difference, that the ramifications of *plants* aſcend, whereas thoſe of animals go downwards or backwards; whence the ancients called a *plant* an inverted animal. Pliny obſerves, that there is in *plants* a natural inſtinct to generation, and that the males by a certain blaſt, and ſubtile powder do conſummate the nuptials on the females. See Hunter's edit. of Evelyn's Sylva, p. 416, &c. notes.

For the manner wherein the farina fecundifies, M. Geoffroy advances two opinions:—1. That the farina being always found of a ſulphureous compoſition, and full of ſubtile penetrating parts (as appears from its ſprightly odour) falling on the piſtils of the flowers, there reſolves, and the ſubtileſt of its parts penetrating the ſubſtance of the piſtil and the young fruit, excite a fermentation ſufficient to open and unfold the young *plant*, incloſed in the embryo of the ſeed. In this hypotheſis the ſeed is ſuppoſed to contain the *plant* in miniature, and only to want a proper juice to unfold its parts, and make them grow. The ſecond opinion is, that the farina of the flower is the firſt germ or bud of the new *plant*, and needs nothing to unfold it, and enable it to grow, but the juice it finds prepared in the embryos of the ſeed.

Theſe two theories of vegetable generation, the reader will obſerve, bear a ſtrict analogy to thoſe two of animal generation; viz. either that the young animal is in the ſemen maſculinum, and only needs the juice of the matrix to cheriſh and bring it forth; or that the animal is contained in the female ovum, and needs only the male ſeed to excite a fermentation, &c.

M. Geoffroy rather takes the proper ſeed to be in the farina; inaſmuch as the beſt microſcopes do not diſcover the leaſt appearance of any bud in the little embryos of the grains, when examined before the apices have ſhed their duſt. In leguminous *plants*, if the leaves and ſtamina be removed, and the piſtil, or that part which becomes the pod, be viewed with the microſcope, before the flower be opened; the little green tranſparent veſiculæ, which are to become the grains, will appear in their natural order; but ſtill ſhewing nothing elſe but the mere coat or ſkin of the grain. If the obſervation be continued for ſeveral days ſucceſſively, in other flowers, as they advance, the veſiculæ will be found to ſwell, by degrees to become replete with a limpid liquor; wherein, when the farina comes to be ſhed, and the leaves of the flower to fall, we obſerve a little greeniſh ſpeck, or globule, floating about at large. At firſt there is not any appearance of organization in this little body; but in time, as it grows, we begin to diſtinguiſh two little leaves like two horns. The liquor diminiſhes inſenſibly, as the little body grows, till at length the grain becomes quite opake; when upon opening it, we find its cavity filled with a young *plant* in miniature; conſiſting of a little germ or *plumula*, a little root, and the lobes of the bean, or pea, &c.

The manner wherein this germ of the apex enters the veſicula of the ſeed, is not very difficult to determine. For, beſides that the cavity of the piſtil reaches from the top to the embryos of the grains, thoſe grains or veſiculæ have a little aperture correſponding to the extremity of the cavity of the piſtil, ſo that the ſmall duſt, or farina, may eaſily fall through the aperture into the mouth of the veſicula, which is the embryo of the grain. This cavity, or cicatricula, is much the ſame in moſt grains, and it is eaſily obſerved in peas, beans, &c. without the microſcope. The root of the little germ is juſt againſt this aperture, and through this it paſſes out when the little grain comes to germinate.

The proceſs of nature in the generation of vegetables, and the apparatus ſhe has contrived for that purpoſe, are ſo curious, and withal ſo little known among us, that we ſhall illuſtrate them farther with figures; taking the melon for our example, in regard the parts of generation are here very diſtinct.

By the way it muſt be obſerved, that though the melon contains both ſexes, yet the diſpoſitions of the organs differs, here, from that of the tulip: in effect, on the melon *plant* are two diſtinct flowers, or bloſſoms, the one doing the male office, the other the female; which we ſhall therefore call the *male* and *female flower*.

In *Tab. Nat. Hiſt. fig.* 10 is repreſented the male flower or bloſſom of the pumpion, a plant of the melon kind, the leaves being ſtripped from the circle F F. A B E repreſent the head, placed in the centre of the flower, and formed of the circumvolutions of the apices B, and ſuſtained by four columns, G G G G. The part B of the head repreſents the circumvolutions of the apices while yet ſhut; and the part E repreſents them open, and covered with the farina, which they before contained, but which is diffuſed on the outſide when the *plant* arrives at maturity. Each apex forms a kind of canal ſeparated by a partition into two. A grain of the farina is repreſented by D. H repreſents the pedicle that ſuſtain the flower, and which in the male flower produces nothing.

Fig. 11. repreſents the female flower, or bloſſom of the pumpion, or that which bears the fruit. The leaves are ſtripped off the circle F F, as before, the better to ſhew the other parts. The knot of the flower, or the embryo of the fruit, is repreſented by A. The piſtil is repreſented by B B; and is only a continuation of the embryo of the fruit A. The top of the piſtil ſpreads in B B into ſeveral oblong bodies, each ſeparable into two lobes. Theſe bodies are very rough, furniſhed with hairs and little veſicles proper to catch the duſt of the male flower, and to conduct them to the mouths of the canals, which communicate as far as the cells of the grains contained in the young fruit. Upon cutting the piſtil tranſverſely in its ſmalleſt part, we find as many canals as there are diviſions in its head; which canals correſpond to as many little cells, each including two order of grains, or ſeeds, ranged in a ſpongy placenta.

This doctrine of generation affords us a hint how to alter, improve, &c. the taſte, form, and quality, of fruits, &c. viz. by impregnating the flower of one, with the farina of another of the ſame claſs.

To this accidental coupling and intermixing it is, that the numberleſs varieties of new fruits, flowers, &c. produced every year by our gardeners, with many other phenomena in the vegetable kingdom, are to be aſcribed.

PLANTS, *diſeaſes of.* See DISEASES *of Plants.*

PLANTS, *fecundity of.* See FECUNDITY, and *propagation of* PLANTS, infra.

PLANTS *flowering of.* See FLOWERING.

PLANTS, *food, pabulum,* or *paſture of,* is the matter of their nouriſhment and increaſe. What this matter is, has been the ſubject of conſiderable diſpute. We ſhall endeavour in the ſequel of this article to collect the principal opinions that have occurred to us on this ſubject, and to ſtate what appears to be the moſt rational and the moſt conformable to the lateſt experiments and obſervations.

The ancients, in general, aſcribed to the earth the power of producing *plants* and animals; and for this reaſon they gave it the general title of parent earth, and mother of all things. They ſuppoſed that into this common parent all things returned again at laſt; and that after a time of diſſolution in its bowels, they reverted back again into the formation of more bodies of the ſame kind. Even thoſe among them, who aſſerted the doctrine of the four elements, allowed that the earth was the matter which conſtituted thoſe bodies, and that the other three, that is, fire, air, and water, ſerved only to convey and diſtribute this as occaſion required; and Thales is only miſunderſtood, when he is ſuppoſed to deviate in his opinion from this general ſyſtem of the ancients.

But though the ancients generally aſcribed to the earth the power of producing animals and other bodies, the moderns have adopted another opinion, viz. that water is the origin of all. Lord Bacon was one of the firſt who argued on this principle: he ſays, that *plants* derive their nouriſhment principally, if not altogether, from water; and that the earth only ſerves to keep the ſtalk upright, and to defend the root from an exceſs of heat or of cold. Since the time of this great author, many have been more expreſs in aſſerting, and more poſitive in defending this opinion; and they have affirmed, that water is the only principle of all natural things, ſuppoſing that, by ſome ſecret proceſs of nature, water is tranſmuted into ſtones, *plants*, and other ſubſtances. Helmont attempted to eſtabliſh this doctrine by many experiments: and Mr. Boyle, who followed him through the whole courſe of his experiments, ſeems to aſſent to his opinion, that water is tranſmuted by nature into wood and ſtone; though, in his uſual way, he delivers his thoughts with great modeſty and candour.

The two principal facts upon which their opinion is founded, are that of mint and ſome other *plants* growing in water; and that of a tree being planted in a ſmall quantity of earth, which, being baked to a dryneſs, and weighed before the tree was ſet in it, and again baked, and weighed afterwards, will be found to have loſt nothing of its own weight; though the tree has increaſed to a very great degree, merely, as they ſay, from the water with which they have, from time to time, moiſtened this earth.

To the laſt experiment it might be objected, that it is not eaſy to bake earth to the ſame degree of dryneſs twice over, ſo as to have any hopes of being exact in the weight; but allowing the greateſt poſſible degree of exactneſs, the experiment muſt be inconcluſive, unleſs it could be proved that the water which was uſed was pure and homogeneous, and not charged with any terreſtrial matter: for if it were, the plant might owe its increaſe to that alone, and the water only ſerve, according to the doctrine of the ancients, to convey and diſtribute this grand nouriſhing element, in a neceſſary and proper manner. Water always contains a ſolution of animal and vegetable ſubſtances; and theſe may conſtitute the nouriſhment of *plants*, whilſt the element, in which they are ſuſpended, acts only as a vehicle, in guiding them through the fine veſſels of the vegetable body. In conformity to the firſt experiment, it has been alledged, that the hyacinth, and other bulbous roots are known to perfect their flowers in pure water. See FLOWERING *of Plants*.

Hence ſuperficial obſervers have deduced an argument in favour of water being the food of vegetables.

But the truth is, the roots, ſtem, and flowers of ſuch *plants* are nouriſhed by the mucilaginous juices of the bulb, diluted by the ſurrounding water: this mucilage is juſt ſufficient to perfect the flower, and no more. Such a bulb neither forms ſeeds, nor ſends forth off-ſets; at the end of the ſeaſon, it appears weak, ſhrivelled, and exhauſted, and is rendered unfit to produce flowers the ſucceeding year. A root of the ſame kind, that has been fed by the oily and mucilaginous juices of the earth, eſſentially differs in every particular. It has a plump appearance, is full of mucilage, with off-ſets upon its ſides.

That water is the food of vegetables has been alſo argued, from ſetting a ſprig of balm, mint, or ſuch plant in a phial of pure water, without any mixture of earth; in which ſtate the ſprig grows, and puts forth roots, leaves, and branches. Agreeable to which is another experiment of Van Helmont; who, drying two hundred pounds of earth, and planting a willow which weighed five pounds in it, watered it only with rain or diſtilled water; and to ſecure it from any earth, covered it with a perforated tin cover; at five years end, weighing the tree with all the leaves it had borne in that time, he found it to weigh one hundred and ſixty-nine pounds three ounces; yet the earth was only diminiſhed two ounces.

Dr. Woodward has made many experiments, with a view of aſcertaining this point; from the reſult of which he draws concluſions favourable to the opinion which has very generally prevailed, till of late, that earth is the nutriment of *plants*. Moſt of his experiments were made with ſprigs of mint, and ſome other plants nicely weighed and incloſed in equal glaſs phials, well covered up with parchment; leaving room for the ſtems to aſcend through it, and filled with water; ſome with ſpring water, others with rain water, and others with Thames water. At the end of ſeventy-ſeven days, he took them all out again, and weighed them, and alſo the water left; and computed the weight of water expanded on them, and the proportion of the increaſe of the plant to the expence of the water. The next year, viz. 1692, he made freſh experiments with the ſame phials and the ſame ſorts of *plants*, weighed as before, only ſome were filled with Hyde-park conduit water alone, others with the ſame water, and a certain proportion of garden earth diſſolved in it; and others with the ſame water diſtilled. At the end of fifty-ſix days, he weighed the *plants*, waters, &c. and computed that each plant had gained, what quantity of water was expended on the *plant*, and the proportion of the increaſe of the *plant* to the decreaſe of the water.

The reſult of all theſe experiments he gives us in the following obſervations and reflections. 1. In *plants* of the ſame kind, the leſs they are in bulk the ſmaller quantity of the fluid maſs, in which they are ſet, is drawn off: the conſumption, where the maſs is of equal thickneſs, being nearly proportional to the bulk of the *plant*. In reality, the water ſeems to aſcend up the veſſels of *plants* in much the ſame manner as in a filtre; and, therefore, it is no wonder, that the larger filtre ſhould draw off more water than the ſmaller; or that a *plant*, which hath more and larger veſſels, ſhould take up a greater ſhare of the fluid in which it is ſet, than one that has fewer. 2. Much the greater part of the fluid maſs, thus drawn off and conveyed into the *plants*, does not ſettle or abide there; but paſſes through their pores and exhales up into the atmoſphere. See *Perſpiration of* PLANTS.

The leaſt proportion of the water expended was to the augment of the *plant* as 46 or 50 to 1; and in ſome as 100, 200, nay in one as 700 to 1. Nor does this humidity go off alone; but it uſually carries with it many parts of the ſame nature with thoſe, of which the *plant*, through which it paſſes, conſiſts: the groſſer, indeed, are not ſo eaſily borne up into the atmoſphere, but are uſually depoſited on the ſurface of leaves, flowers, and other parts of the *plants*; whence proceed our mannas, honeys, and other gummous exudations of vegetables; but the finer and lighter parts are with greater eaſe tranſmitted to the atmoſphere, where they are conveyed to our organs of ſmell, and by the air we draw in reſpiration; and they are pleaſant or offenſive, beneficial or injurious to us, according to the nature of the *plants* from which they ariſe. And as theſe owe their riſe to the water that aſcends out of the earth, through the bodies of *plants*, we may hence perceive the reaſon why they are more numerous in the air in wet ſummers, and a greater quantity of odours is found exhaling from vegetables in warm humid ſeaſons, than in any other. 3. A great part, ſays Dr. Woodward, of the terreſtrial matter that is mixed with water aſcends up into the *plant*, as well as the water. There was much more terreſtrial matter, at the end of the experiment, in the water of the glaſſes that had no *plants* in them, than in thoſe which had *plants*. The garden mould diſſolved in ſome of the glaſſes was conſiderably diminiſhed and carried off; nay the terreſtrial and vegetable matter was borne up in the tubes filled with ſand, cotton, &c. in ſuch quantity as to be evident to ſenſe; and the bodies in the cavities of the other tubes, that had their lower ends immerſed in water, wherein ſaffron, cochineal, &c. had been infuſed, were tinged with yellow, purple, &c. Marine *plants*, he obſerves, abſorb mineral matter with the vegetables. As for the vegetable matter, this is ſo fine and light, as to be ſurpriſingly adapted and diſpoſed to attend water in all its motions, and into each of its receſſes: for if water be percolated with all the care imaginable, and filtered ever ſo many times, yet ſome terreſtrial matter will remain. Dr. Woodward filtered water through ſeveral ſheets of thick paper, and afterwards, through very cloſe fine cloth, twelve times doubled; and this he did repeatedly: and yet a conſiderable quantity of this matter diſcovered itſelf, after all his pains, in the water. Hence he reaſons, that if it there paſſes interſtices that are ſo very ſmall and fine, along with the water, it is leſs ſtrange that it ſhould attend it in its paſſage through the ducts and veſſels of *plants*: and although in filtering and diſtilling the water, ſome of the earthy matter with which it was before impregnated is intercepted, and made to quit it, yet that which remains in the water after theſe operations is fine and light, and ſuch as, in his apprehenſion, is peculiarly fit for the nouriſhment and growth of vegetables. This, he ſays, is the caſe of rain-water; the quantity of terreſtrial matter in it is not great; but it is chiefly of the light kind, and ſo perfectly diſſolved and reduced to ſingle corpuſcles, fit to enter the tubules and veſſels of *plants*; on which account this water is ſo fertile and prolific. The reaſon why all the terreſtrial matter mixed with the water does not aſcend into the *plant* is, that the mineral matter compoſes a great part of it; and this is not only groſs and pendulous, but ſcabrous and inflexible, and not diſpoſed to enter the pores of the roots: beſides many of the ſimple vegetable particles, by degrees, unite and form ſmall clods of moleculæ, which adhere to the extremities of the roots; and others of them, entangled in a looſer manner, form the nubeculæ or green bodies ſo commonly obſerved in ſtagnant water; theſe, when thus conjoined, are too big to enter the pores or aſcend up the veſſels of *plants*, which ſingly they might have done.

We ſhall here obſerve, that this green matter is itſelf a *plant*, probably belonging to the genus of CONFERVA. The ſeeds of it float inviſibly in the air, inſinuate themſelves into the veſſels of water, through the ſmalleſt apertures, and then diffuſe themſelves through the whole maſs of it; and are capable of producing *plants*, in all ſeaſons in the year, whenever they meet with water, eſpecially if it be impregnated with a proper proportion of vegetable or animal ſubſtance, in a ſtate of putrefaction. But though the richeſt pabulum for this *plant* is the putreſcent parts of animal and vegetable ſubſtances, ſome of them are unfavourable to it, and prevent its growth.

Dr. Priſtley has made many curious experiments on this green matter, or water-moſs, as he calls it; and ſhewn how, by the influence of the light, it contributes to depurate or dephlogiſticate the air previouſly contained in water. Obſ. on Air, vol. iv. and v.

Hence it is, as Dr. Woodward proceeds, that in agriculture, let the earth be ever ſo rich, good, and fit for the production of corn, or other vegetables, little will come of it, unleſs the parts of it be ſeparated and looſened; and it is on this account, ſuch pains are beſtowed in digging, plowing, fallowing, harrowing, and otherwiſe breaking the clodded lumps of earth; and thus, Dr. Woodward ſays, ſea-ſalt, nitre, and other ſalts, promote vegetation.

Mr. Tull has founded his new ſyſtem of HUSBANDRY, in a great meaſure, on this principle, that earth is the food of *plants*. The increaſed fertility of a well pulveriſed ſoil induced him to imagine that the plough, &c. could ſo minutely divide the particles of earth, as to fit them for entering into the roots of *plants*. The mouths of the veſſels deſtined to take in the food or nouriſhment of the *plant* are well ſituated on the convex ſurface of the roots; and theſe, according to him, take their pabulum or food, which is extremely ſmall particles of earth, blended with a due proportion of water, from the ſuperficies of the pores or cavities within which the roots are included. It is certain, he ſays, that the earth is not diveſted of this pabulum by any other means than by the roots of *plants* or by actual fire; for where no vegetables are ſuffered to be, the ground will always grow the richer. Plough it or harrow it as often as you pleaſe; let it be expoſed to the ſun in horſe-paths all the ſummer, and to the froſts all the winter; let it be covered by water at the bottom of ponds and ditches, or grind it to fine powder; the longer it is expoſed or treated by any or all of theſe methods, or in any other poſſible way, except actual fire be uſed, the more fertile it will be. Thoſe particles, which are the pabulum of *plants*, are ſo extremely minute and light, as not to be ſingly attracted to the earth, if ſeparated from thoſe parts to which they adhere, or with which they are in contact. They adhere in the earth like duſt to the ſurface of a ſmooth clay, which, though you turn it up and down, ſtill remains in its place, as theſe particles do to thoſe parts of the earth, till they are removed by ſome external agent. The proper agent for this purpoſe is the root of a *plant*, but this cannot act upon them unleſs they are firſt moiſtened by water, which helps to looſen them, and goes with them into the mouths of the veſſels in the root. It is neceſſary alſo that the nitre of the air come in contact with the matter of this pabulum in order to relax and render it fit to be ſeparated and imbibed by the roots of thoſe *plants* which are in the way of it. As to the ſize of the particles of this pabulum, of *plants*, it is not unlikely that the roots may take in none groſſer than thoſe on which the colours of bodies depend; but to diſcover the magnitude of theſe corpuſcles, ſir Iſaac Newton thinks will require a microſcope that will repreſent things five or ſix hundred times bigger than they appear to the eye at a foot diſtance, and that with ſufficient diſtinctneſs. We are well aſſured, he adds, that the fine particles of the food of *plants*, after they have been received into the bodies of *plants*, do perſpire through their pores in a large quantity, and fly off into the air: which affords a proof, that they are not to be ſeparated from the parts of the earth with which they are in contact, otherwiſe than by means of *plants*; for if they could, then all our ſtirring and digging the earth would make it the poorer, by giving them occaſion to evaporate; the contrary of which is found by experience. Water alone affords, in appearance, nouriſhment to *plants*, ſince they will grow in water; but this water is allowed never to be free from earth, and that makes it ſo very nutritive to *plants*, even when juſt deſcending in rain. This is the earthy matter, which is properly the pabulum, or food of *plants*, which is continually in great abundance evaporated from *plants* and trees into the air, and in a manner fills the whole atmoſphere about them; this is met by and embodied in the watery vapours in their aſcent, and again brought down to the earth in ſhowers of rain with them. Hence it is no wonder that rain water proves ſo very nutritive to *plants*, ſince it contains the very matter of their food, ready ſeparated from the reſt of the earth and mixed in that vehicle with which, and by means of which alone, it can be received into the bodies of *plants*, through the mouths of the veſſels of their roots. The pores, cavities, and interſtices of the earth being of two ſorts, viz. natural and artificial, the one affords the natural, the other the artificial paſture for *plants*; all depending on the different nature of the *internal* SUPERFICIES of the earth. But from the ſyſtem of Mr. Tull, it ſeems to follow, that all ſoils, equally tilled, would prove equally prolific. It is certain, that an open ſoil, if not too light in its own nature, will always produce plentiful crops; becauſe it readily receives the air, rains, and dews into its boſom, and at the ſame time gives the roots of *plants* a free paſſage in queſt of food. This ſeems to be the true reaſon why land well tilled is ſo remarkably fruitful. But to return to the farther reaſoning of Dr. Woodward. Some authors imagine nitre eſſential to *plants*; but this author aſſures us, that by all the trials he has been able to make, the caſe is quite otherwiſe, and that nitre, when contiguous to the *plant*, deſtroys inſtead of nouriſhing it. But nitre, and other ſalts, looſen the earth, and thus diſpoſe its parts to be aſſumed by the water, and carried up into the ſeed or *plant*, for its formation or increaſe. In the ſame way, lime is likewiſe ſervicable to vegetation; the huſbandmen ſay, it does not fatten, but only mellows the ground; rendering it more capable of entering the ſeeds of vegetables ſet in it, in order to its nouriſhment, than otherwiſe it would have been.

4. The *plant*, according to Dr. Woodward, is more or leſs nouriſhed in proportion as the water in which it ſtands, contains more or leſs proper terreſtrial matter in it. The truth of this propoſition, he infers, from the whole proceſs of his experiments. The mint in one of his glaſſes were of much the ſame bulk and weight with that of two or three others; but the water in which the firſt was, being river-water, which was apparently more copiouſly furniſhed than the others with terreſtrial matter, this occaſioned it to arrive at almoſt double their bulk, and with a leſs expence of water: ſo likewiſe the mint in another glaſs, in whoſe water was diſſolved a ſmall quantity of good garden mould, though it had the diſadvantage of being leſs, when firſt ſet, than either of the mints in two other glaſſes, whoſe water was the ſame with the firſt, without any mixture of earth in it; yet, in a ſhort time, the plant not only overtook in growth, but much outſtripped the others. However, Dr. Woodward is of opinion, that every kind of vegetable, and even every part of the ſame vegetable, requires a peculiar and ſpecific matter for its formation and nouriſhment; ſo that if the ſoil in which any vegetable or ſeed is planted, contains all or moſt of the proper ingredients for its compoſition, and thoſe in due quantity, it will grow and thrive there; otherwiſe it will not proſper at all, or not attain its natural ſtature; and it will be defective in taſte, ſmell, colour, or ſome other reſpect. Beſides, the ſoil once proper for the production of ſome ſort of vegetable does not always continue to be ſo, but in length of time loſes its property; and this ſooner in ſome lands than in others: at laſt it becomes barren; the vegetative matter with which it firſt abounded, being reduced and borne away by ſucceſſive crops; and before it can be fit for bearing another ſucceſſion of the ſame vegetables, it muſt be ſupplied with a new fund of matter ſimilar to that which it contained at firſt, either by lying fallow and ex-

poſed to the air and rain, or by being manured. And this ſupply conſiſts chiefly of the parts of vegetables or of animals. Many facts of this kind, which Dr. Woodward alledges, point out a peculiar terreſtrial matter, and not water, for the ſubject to which *plants* owe their increaſe; for if it were water only, there would be no need of manures or tranſplanting; ſince the rain falls in all places; and, perhaps, theſe facts and even the doctor's reaſoning upon them, might lead us to preſume, that ſome other ſubſtance, which pertains to the terreſtrial matter under peculiar modifications of it, may be neceſſary for the purpoſes of vegetation; as we ſhall ſee more particularly in the ſequel of this article.

5. Vegetables, Dr. Woodward concludes, are not formed of water, but of a certain terreſtrial matter. A little diſtillation ſhews, that there is a conſiderable quantity of this matter contained in rain, ſpring, and river-water; and experiments ſhew that the much greateſt part of the fluid maſs that aſcends into *plants* does not ſettle or abide there, but paſſes through their pores and exhales into the atmoſphere; and that a great part of the terreſtrial matter, mixed with the water, paſſes up into the *plant* along with it; and that the *plant* is more or leſs augmented, in proportion as the water contains a greater or ſmaller quantity of that matter: from all which we may reaſonably infer, that earth, and not water, is the matter that conſtitutes vegetables. One of the ſprigs of mint drew up into it two thouſand five hundred and one grains of the fluid maſs, and yet had received but three and $\frac{1}{2}$ grains of increaſe from it; a ſecond, though it was at firſt leſs than the third, yet, being ſet in water with which earth was plentifully mixed, and the other in water without ſuch earth, had very much outgrown it; weighing, at leaſt, one hundred and forty-five grains more than the former: a fourth *plant*, though at firſt much leſs than the fifth, yet, being ſet in the foul thick water, that was firſt in the ſtill, after that in which the laſt was ſet was drawn off, had gained in weight, at the end, above double what that in the finer and thinner water had gained. The proportion of the augment of that *plant* which throve moſt was to the fluid maſs ſpent upon it but as one to forty-ſix; in othes, as one to ſixty, one hundred, two hundred, and in the cataputia but as one to ſeven hundred and fourteen. One of the ſprigs took up thirty-nine grains of water a day, one day with another; which was much more than the whole *plant* weighed originally, and yet it gained not $\frac{1}{4}$ of a grain a day in weight; and another took up two hundred and fifty-three grains a day, which was near twice as much as its original weight; and after all the daily increaſe of the *plant* was no more than $2\frac{15}{16}$ grains.

6. Spring and rain water contain nearly an equal charge of vegetable matter; and river-water more than either of them. Theſe proportions hold in the main, though, for various reaſons, a ſtrict and juſt compariſon is hardly to be expected. Some rivers abound with this matter more than others; of this we have a remarkable inſtance in the Nile, the Ganges, and other rivers, that yearly overflow the neighbouring plains; their banks producing the largeſt crops of any in the world.

7. Water ſerves only for a vehicle to the terreſtrial matter which forms vegetables, and does not itſelf make any addition to them. Where the proper terreſtrial matter is wanting, the *plant* is not augmented, though ever ſo much water aſcend into it; ſo that water is not the matter that compoſes vegetable bodies; this is only the agent that conveys the matter to them, and diſtributes it to their ſeveral parts for their nouriſhment: that matter is ſluggiſh and inactive, and would lie eternally confined to its beds of earth, without advancing up into *plants*, if water or ſome ſuch inſtruments did not draw it forth, and convey it to them. This fluid is fit for ſuch a neceſſary vehicle on various accounts: the figure of its parts, which are exactly ſpherical, renders it fit for motion and for moving other bodies; the intervals of ſuch parts are, with reſpect to the bulk, larger than thoſe of any other, and, therefore, the fitteſt to receive and contain other matter in them; the conſtituent corpuſcles of water are alſo, ſingly conſidered, abſolutely ſolid, and do not eaſily yield to any external force, which ſecures their figure, and, conſequently, their intervals from any alteration. Water is farther capacitated to be a vehicle for this matter, by the tenacity of the corpuſcles of which it conſiſts; ſo that they will paſs through pores and interſtices, which are impregnable to air and any other fluid. Thus they are capable of entering into the fineſt tubes and veſicles of *plants*, and of introducing the terreſtrial matter with them, conveying it to all their parts; whilſt each, by means of organs with which it is endued for this purpoſe, intercepts and aſſumes to itſelf ſuch particles, as are ſuitable to its own nature, letting the reſt paſs on through the common ducts.

8. Water is not capable of performing this office to *plants*, unleſs it is aſſiſted by a due degree of heat. This muſt concur, or vegetation will not ſucceed. The *plants* ſet in the glaſſes in October and the following colder months, had not nearly the quantity of water conveyed into them, or nearly ſuch an additional increaſe, as thoſe that were ſet in June and the hotter months. The particles of water are ſuſceptible of every impreſſion, and are eaſily put into motion by heat. Beſides, it is obſervable in autumn, that as the ſun's power is gradually leſs and leſs, ſo its effects on *plants* is remitted, and vegetation ſlackens by little and little. Its failure is firſt obſervable in trees, next in ſhrubs, and then in herbs and the lower tribes of vegetables; the heat being, at length, not ſufficient to ſupply even thoſe which are ſo near the earth and the fund of their nouriſhment. As the heat returns in the ſucceeding ſpring, they will recruit again, and are furniſhed with freſh ſupplies and verdure; the loweſt firſt, then the ſhrubs, and laſtly the trees. The greater the heat given to *plants* to a certain degree in the natural way, the ſooner they paſs through the ſeveral ſtages of fructification. In the northern regions, e. gr. in Lapland, where the greater part of the year is ſubject to intenſe and inceſſant froſts, the ſummer ſeaſon affords an exceſſive heat for two months, the ſun never ſetting in all that time. This ſeaſon comes on towards the latter end of June, and the graſs and other herbs then firſt begin to appear in their young ſhoots above the ground; but after this vegetation is carried on with ſuch ſpeed, that in a fortnight the flowers of the herbs and trees are expanded, and the leaves attain to their full ſize and maturity. Thus, as the heat of the ſeveral ſeaſons affords us a different face of things, ſo the ſeveral diſtant climates exhibit the different ſcenes of nature, and productions of the earth. The hotter countries ordinarily yield the largeſt and talleſt trees, and in greater variety than the colder: and thoſe *plants* common to both attain to a much greater bulk in the ſouthern than in the northern climes; nay, there are ſome regions ſo cold, that they raiſe no vegetables at all to any conſiderable ſize: this we learn from Greenland, Iceland, and other places of like cold ſituation: in theſe there are no trees and the ſhrubs are poor, ſmall, and low. We alſo find, that even in the warmer climates, if there happen a remiſſion or diminution of the uſual heat, their productions are always impeded in proportion. But it is not merely the ſun, or the ordinary emiſſion of the ſubterranean heat, that promotes vegetation, but likewiſe any other, according to its degree and power; as we find from our ſtoves and hot-beds.

Such are the ſyſtems of vegetation, that have been founded on the ſuppoſition, that water or earth is the principal pabulum of *plants*. See FOOD *of Plants*.

Modern experiments and diſcoveries, have led the way to another theory with reſpect to the food of *plants*, that ſeems to be leſs exceptionable than either of the former. Dr. Hales, whoſe experiments and reaſoning on the ſubject of vegetation have been deſervedly applauded, obſerves, that the ſubſtances of vegetables appear, by a chemical analyſis, to be compoſed of ſulphur, volatile ſalt, water, and earth; which principles, he ſays, are all endued with mutually attracting powers; and alſo of a large portion of air, which has a wonderful property of ſtrongly attracting, in a fixed ſtate, or of repelling in an elaſtic ſtate, with a power which is ſuperior to great compreſſive forces: and it is by the infinite combinations, action, and re-action of theſe principles, that all the operations in animal and vegetable bodies are effected. Theſe active aerial principles are very ſerviceable in carrying on the work of vegetation to its perfection and maturity; not only in helping by their elaſticity to diſtend each ductile part, but alſo by enlivening and invigorating their ſap, where, mixing with the other mutually attracting principles, they are by gentle heat and motion ſet at liberty to aſſimilate into the nouriſhment of the reſpective parts. The ſum of the attracting powers of theſe mutually acting and re-acting principles, is, while in this nutritive ſtate, ſuperior to their repelling power; whereby the work of nutrition is gradually advanced by the nearer and nearer union of theſe principles from a leſs to a greater degree of conſiſtency, till they are advanced to that viſcid ductile ſtate, whence the ſeveral parts of vegetables are formed; and are at length firmly compacted into hard ſubſtances, by the flying off of the watery ductile vehicle: but when they are again diſunited by the watery particles, their repelling power is thereby become ſuperior to their attracting power, and the union of the parts of vegetables is ſo thoroughly diſſolved that putrefaction commences. Of theſe principles of vegetables there are found greater proportions of oil in the more exalted and elaborate parts, as in the ſeeds and flowers. Hence it is argued, that nature's chief buſineſs in bringnig the parts of a vegetable, eſpecially its fruit and ſeed, to maturity, is to combine together in a due proportion the more active and noble principles of ſulphur and air, that chiefly conſtitute oil, which in itsmore refined ſtate is never found without ſome degree of earth and ſalt in it.

Dr. Hunter, the ingenious and learned editor of Evelyn's Silva, is induced by a number of experiments, accurately conducted, to believe, that all vegetables receive their principal nouriſhment from oily particles incorporated with water, by means of an alkaline ſalt or abſorbent earth. Till oil is made miſcible, it is unable to enter the radical veſſels of vegetables; and, on that account, Providence has bountifully ſupplied all natural ſoils with chalky or other abſorbent particles; and thoſe ſoils which have been aſſiſted by art are full of materials for that purpoſe; ſuch as lime, marl, ſoap-aſhes, and the volatile alkaline ſalt of putrid dunghills. Natural ſoils receive their oily particles from the air or atmoſphere, which, during the ſummer mouths, is full of putrid exhalations ariſing from the ſteam of dunghills. the perſpiration of animals and ſmoak; and every ſhower brings down theſe oleaginous particles for the nouriſhment of *plants*. All rich ſoils, in a ſtate of nature, contain oil, and in lands that have been plouged for ſome years, it is found in proportion to the quantity of putrid dung that is laid upon them, allowance being made for the crop they have ſuſtained. By attending to the effects of manures of an oily nature, Dr. Hunter apprehends that we muſt be ſatisfied, that oil, however modified, is one of the chief inſtruments of vegetation. Thus, rape-duſt, laid on land is a certain and ſpeedy manure, as it contains the food of *plants* ready prepared: ſoot is alſo an oily manure, but different from the former, becauſe it contains alkaline ſalt, in its own nature calculated as well for opening the ſoil, as for rendering the oily parts miſcible with water: the dung of pigeons, which feed chiefly upon grains and oily ſeeds, is a rich and haſty manure: the dung of horſes that are kept in ſtables, and fed upon beans, oats, and hay, which contain much oil is alſo a ſtrong manure, more eſpecially when it has undergone the putrid ferment, in order to mix and aſſimilate its oily, watery, and ſaline parts. Swine's dung is of a ſaponaceous and oily nature, and perhaps is the richeſt of the animal manures. The dung of ruminant animals, as cows and ſheep, is preferable to that of horſes at graſs, owing to the quantity of animal juices mixed with their food in chewing; and the fatter the animal, *cæteris paribus*, the richer is the dung. Human ordure, which is full of oil and a volatile alkaline ſalt, is of itſelf too ſtrong a manure for any land; the dung of carnivorous animals is plentifully ſtored with oil; animals that feed upon ſeeds and grains come next, and after them follows thoſe which ſubſiſt upon graſs only.

Beſides, the argument in favour of oil being the principal food of *plants*, is confirmed by the obſervation, that all vegetables, whoſe ſeeds are of an oily nature, are found to be remarkable impoveriſhers of the ſoil, as hemp, rape, and flax; and the beſt manures for lands worn out by theſe crops are ſuch as have a good deal of oil in their compoſition, provided that they are laid on with lime, chalk, marl, or ſoap-aſhes, ſo as to render the oily particles miſcible with water.

Farther, oily particles conſtitute the nouriſhment of *plants* in their embryo ſtate; and by a fair inference we may ſuppoſe that ſomething of the ſame nature is continued to them as they advance in growth. The oily ſeeds, as rape, hemp, line, and turnip, conſiſt of two lobes, which when ſpread upon the ſurface, form the ſeminal leaves; in theſe the whole oil of the ſeed is contained. The moiſture of the atmoſphere penetrates the cuticle of the leaves, and, mixing with the oil, conſtitutes an emulſion for the nouriſhment of the *plant*. The oleaginous liquor being conſumed, the ſeminal leaves having performed their office decay. The leguminous and farinaceous *plants* keep their placenta, or ſeminal leaves, within the earth; in which ſituation they ſupply the tender germ with oily nutriment, until its roots are grown ſufficiently ſtrong to penetrate the ſoil. See VEGETATION.

It has been a received opinion, that lime enriches the land upon which it is laid, by ſupplying it with a ſalt fit for the nouriſhment of *plants*; but by all the experiments that have been made upon lime, it is found to contain no kind of ſalt. Its operation, therefore, ſhould be conſidered in a different light; by the fermentation which it occaſions, the earth is opened and divided, and, by its abſorbent and alkaline quality, it unites the oily and watery parts of the ſoil. It ſeems alſo to have the property of collecting the acid of the air, which it readily forms into a neutral ſalt, of great uſe in vegetation. It is probable, therefore, that lime tends to rob the ſoil of its oily particles, and will, in time, render it barren, unleſs care be taken to ſupport it with rotten dung, or other manures of an oily nature. Its great excellence however, upon a ſandy ſoil, is by mechanically binding the looſe particles, and thereby preventing the liquid parts of the manure from eſcaping out of the reach of the radical fibres of the *plants*. Upon clay its effect is different, for, by the gentle fermentation it produces, the unſubdued ſoil is opened and divided; the manures laid on readily come into contact with every part of it; and the fibres of the *plants* have full liberty to ſpread themſelves. Clay, well limed, will fall in water, and ferment with acids; and in theſe circumſtances, the air, rains, and dews, are freely admitted, and the ſoil is unable to retain the nouriſhment which they reſpectively afford. In conſequence of a fermentation raiſed in the ſoil, the fixed air is ſet at liberty, which, in a ſurpriſing manner, promotes vegetation.

To the univerſal principle of oil, Dr. Hunter adds another of great efficacy, which is the nitrous acid of the air. The exiſtence of ſuch a principle is demonſtrable from the method of making ſalt petre in different parts of the world. See NITRE.

And though experiments have not yet aſcertained the efficacy of nitre, conſidered as a manure, Dr. Hunter conſiders it as a vivifying principle in the proceſs of vegetation.

In order to conceive how *plants* receive their nouriſhment, we muſt recur to the analogy that is known to ſubſiſt between *plants* and animals. Oil and water ſeem to make up the nouriſhment of both. Earth enters very little into the compoſition of either. It is known that animals take in a great many earthy particles at the mouth, but they are ſoon diſcharged by urine and ſtool. Vegetables take in the ſmalleſt portion imaginable of earth; and the reaſon is, they have no way to diſcharge it. It is highly probable, that the radical fibres of *plants* take up their nouriſhment from the earth, in the ſame manner that the lacteal veſſels abſorb the nutriment from the inteſtines; and as the oily and watery parts of our food are perfectly united into a milky liquor, by means of the ſpittle, pancreatic juice, and bile, before they enter the lacteals, we have all the reaſon imaginable to keep up the analogy, and ſuppoſe that the oleaginous and watery parts of the ſoil are alſo incorporated, previous to their being taken up by the abſorbing veſſels of the *plant*. To form a perfect judgment of this, we muſt reflect that every ſoil, in a ſtate of nature, has in itſelf a quantity of abſorbent earth, ſufficient to incorporate its inherent oil and water; but when we load it with fat manures, it becomes eſſentially neceſſary to beſtow upon it, at the ſame time, ſomething to aſſimilate the parts. Lime, ſoap-aſhes, kelp, marl, and all the alkaline ſubſtances, perform that office. In order to render this operation viſible to the ſenſes, diſſolve one dram of Ruſſia pot aſh in four ounces of water; then add one ſpoonful of oil; ſhake the mixture, and it will inſtantly become an uniform maſs of a whitiſh colour, adapted to all the purpoſes of vegetation. This eaſy and familiar experiment is a juſt repreſentation of what happens after the operation of BURN-*baking*, and, conſequently, may be conſidered as a confirmation of the hypotheſis advanced. In this proceſs, the ſward being reduced to aſhes, a fixed alkaline ſalt is produced; the moiſture of the atmoſphere ſoon reduces that ſalt into a fluid ſtate, which, mixing with the ſoil, brings about an union of the oily and watery parts, in the manner demonſtrated in the experiment. When the under ſtratum conſiſts of a rich vegetable mould, the effects of burn-baking will be laſting; but when the ſoil happens to be thin and poor, the firſt crop frequently ſuffers before it arrives at maturity. The farmer, therefore, who is at the expence of paring and burning a thin ſoil, ſhould beſtow upon it a portion of rotten dung, or ſhambles manure, before the aſhes are ſpread, in order to ſupply the deficiency of oily particles: in this way, the crop will be ſupported during its growth, and the land will be preſerved in health and vigour. But *plants* not only receive nouriſhment by their roots, but alſo by their leaves. Vegetables that have a ſucculent leaf, ſuch as vetches, peas, beans, and buck-wheat, draw a great part of their nouriſhment from the air, and on that account impoveriſh the ſoil leſs than wheat, oats, barley, or rye, the leaves of which are of a firmer texture. Rape and hemp are oil-bearing *plants*, and, conſequently, impoveriſhers of the ſoil; but the former leſs ſo than the latter, on account of the greater ſucculency of its leaf. The leaves of all kinds of grain are ſucculent for a time, during which period the *plants* take little from the earth; but as ſoon as the ear begins to be formed, they loſe their ſoftneſs and diminiſh in their attractive power. The radical fibers are then more vigorouſly employed in extracting the oily particles of the earth, for the nouriſhment of the ſeed. Dr. Hales obſerves, that the leaves of *plants* ſerve, not only as excretory ducts to ſeparate and carry off the redundant watery fluid, which by being long detained in the plants, would turn rancid and prejudicial to them; but likewiſe to imbibe the dew, and rain, which contain ſalt, ſulphur, &c. and to be of the ſame uſe to *plants*, that the lungs are to animals. However he adds, that as *plants* have not a dilating and contracting thorax, their inſpirations and expirations will not be ſo frequent as thoſe of animals, but depend wholly on the alternate changes from hot to cold for inſpiration, and *vice verſâ* for expiration. But the greater part of their nouriſhment is derived from the roots. Theſe, therefore, are found to bear a conſiderable proportion to the body of the *plant* above ground; the ſuperficies of the former being above four-tenths of that of the latter. Hence appears the neceſſity of cutting off many branches from a tranſplanted tree; becauſe in digging it up, a great part of the root is cut off. See *Oeconomy and uſe of the parts of* PLANTS, and *Perſpiration of* PLANTS.

The facts above ſtated, with regard to the influence of putrid air, ariſing from dunghills and the perſpiration of animals, on the nouriſhment and increaſe of *plants*, were publiſhed by Dr. Hunter in his Georgical Eſſays, in 1769 and 1770; but they were afterwards aſcertained, in the moſt ſatisfactory manner, by a variety of curious experiments made by Dr. Prieſtley, in the years 1771 and 1772, an account of which was preſented to the Royal Society, in 1773. Having diſcovered, that ſprigs of mint throve, in a moſt ſurpriſing manner, in air that had been freſhly and ſtrongly tainted with putrefaction, and that was immediately fatal to animal life, he was led to conclude, that *plants*, inſtead of affecting the air in the ſame manner with animal reſpiration, reverſe the effects of breathing, and tend to keep the atmoſphere ſweet and wholeſome, when it is become noxious in conſequence of animals either living and breathing, or dying and putrefying in it. See AIR, *phlogiſticated*.

In order to aſcertain this, he took a quantity of air, made thoroughly noxious, by mice breathing and dying in it, and divided it into two parts: one of which he put into a phial immerſed in water, and to the other, which was contained in a glaſs jar, ſtanding in water, he put a ſprig of mint. After eight or nine days, he found that a mouſe lived perfectly well in that part of the air, in which the ſprig of mint had grown, but died the moment it was put into the other part of the ſame original quantity of air, expoſed in the ſame mnaner, but without any *plant* growing in it. This experiment was ſeveral times repeated, with different kinds of tainted air, and generally with the ſame ſucceſs. From theſe facts he reaſons thus: ſince the *plants* that were made uſe of manifeſtly grow and thrive in putrid air; ſince putrid matter is well known to afford proper nouriſhment for the roots of *plants*; and ſince it is likewiſe certain that they receive nouriſhment by their leaves as well as by their roots, it ſeems to be exceedingly probable, that the putrid effluvium is in ſome meaſure extracted from the air, by means of the leaves of *plants*; and, therefore, that they render the remainder more fit for reſpiration.

Dr. Prieſtley repeated and varied experiments of the ſame kind, and eſtabliſhed the principle, that air, rendered noxious by reſpiration, putrefaction, the burning of inflammable ſubſtances, &c. was reſtored by vegetation. He alſo found, that common air is rendered in ſome meaſure dephlogiſticated by vegetating *plants*, ſo as to be much more diminiſhed by *nitrous* AIR than before: and alſo, that *plants* do not grow ſo well in dephlogiſticated air as in common air, which affords a preſumption, that dephlogiſticated air does not ſupply that *pabulum*, which *plants* derive even from common air: and farther, that aquatic *plants*, by means of the action of light upon them, depurate the air contained in the water, in which they grow. So that air, combined with water, is liable to be dephlogiſticated by vegetation as well as to be phlogiſticated by reſpiration, as much as air in an elaſtic ſtate, out of water.

Dr. Priſtley having aſcertained the fact, that vitiated air was reſtored by vegetation, and conſidered that common air is vitiated by being combined, in various ways, with PHLOGISTON, (ſee *Fixed* AIR,) was led to conjecture, that this reſtoration was effected by *plants* imbibing the phlogiſtic matter with which air is loaded by any of thoſe proceſſes, that tend to injure it. And hence it was natural to conclude, that phlogiſton is the principal pabulum or food of *plants*, upon which their nouriſhment and increaſe very materially depends. See on the ſubject of this article, Phil. Tranſ. N° 253. Dr. Hunter's Georgical Eſſays, vol. i. Evelyn's Silva, with Dr. Hunter's notes, quarto, 1776. Hales's Statics, vol. i. Prieſtley's Obſervations on Air, vol. i. p. 49, 87. vol. iv. p. 299, 305. vol. 5. p. 12, &c. See VEGETATION *of Plants*.

PLANTS, *fructification of*. See FRUCTIFICATION, *Oeconomy*, &c. *of* PLANTS, and *Food of* PLANTS.

PLANTS, *perpendicularity of*. See PERPENDICULARITY.

PLANTS *perſpiration of*. We have already obſerved under *Oeconomy*, &c. *of* PLANTS, and *Food of* PLANTS, that vegetables imbibe and perſpire moiſture and air very copiouſly. Theſe properties of *plants*, on which their nouriſhment and vigour depend, are very elaborately illuſtrated and evinced by Dr. Hales. In order to try what moiſture *plants* would imbibe, the doctor cut off ſeveral branches of apple-trees, pear, cherry, and apricot-trees; and having immerſed them into a known quantity of water, he found ſome of them imbibing fifteen ounces, ſome twenty ounces, and others twenty-five or thirty ounces, in twelve hours day, more or leſs, according to the quantity of leaves they had; and yet when he weighed them at night, they were lighter than in the morning, which undoubtedly was owing to their perſpiration. The quantity imbibed decreaſed very much every day, the ſap-veſſels being properly ſhrunk at the tranſverſe cut, and too much ſaturated with water, to let any more paſs, ſo that uſually in four or five days, the leaves faded and withered much. He made the ſame experiments with elm-branches, oak, oſier, willow, ſallow, aſpen, currant, gooſeberry, and filberd branches; but none of theſe imbibed ſo much as the foregoing, and ſeveral ſorts of ever-greens much leſs. From an experiment with the ſtem of an apple-tree, he concludes, that the imbibing and perſpiring powers of leaves, &c. are proportionable to their ſurfaces; and thence he infers, that the uſe of thoſe leaves, which are placed juſt where the fruit joins to the tree, is to bring nouriſhment to the fruit. From another experiment with hop-vines, he determined, that one of them with its leaves imbibed in twelve hours day, four ounces, and the other without leaves $\frac{3}{4}$ of an ounce: whence, allowing 1000 hills in an acre of hop-ground; three poles to each hill, and three vines to each pole, ſo that the number of vines is 9000, each of which imbibes four ounces, the ſum of the ounces imbibed in an acre in twelve hours day, will be 36000 ounces = 15768000 grains, = 62047 cubic inches, or 202 ale gallons, which, divided by 6272640, the number of ſquare inches in an acre, will give the quantity of liquor perſpired by all the hop-vines, equal to an area of liquor as broad as an acre, and $\frac{1}{101}$ part of an inch deep. In a kindly ſtate of the air, this moiſture is daily carried off, ſo that the hops are kept in a healthy ſtate, but in a rainy moiſt ſtate of air, the moiſture hovering about the hops hinders the kindly perſpiration of the leaves, ſo that the ſtagnating ſap corrupts and breeds mouldy fen, which ſpoils many hop-grounds. See FIRE-*blaſt*, and HONEY-*dew*.

Farther, Dr. Hales made ſeveral experiments to aſcertain the force with which *plants* imbibe moiſture. This he did by putting the ſtump of a branch into one end of a glaſs tube, cementing it faſt, and then immerſing the other end of the tube, after being firſt filled with water, into a ciſtern of mercury; on which, removing his finger that ſtopped up the lower end of the tube, the ſtump imbibed the water with ſo much vigour, that in ſix minutes time the mercury was raiſed eight inches in the tube. For the method of conducting theſe experiments, &c. ſee *Aqueo-mercurial* GAGE.

The imbibing force of a great variety of trees being tried in the ſame manner, by immerſing branches of them in aqueo-mercurial gages, it was found that the pear, quince, cherry, walnut, peach, apricot, plum, black-thorn, white-thorn, gooſeberry, water-elder, and ſycamore, raiſed the mercury from three to ſix inches high. The elm, oak, horſe-cheſnut, filberd, fig, mulberry, willow, ſallow, oſier, aſh, linden, and currant, raiſed the mercury only one or two inches. But the ever-greens, and the following trees and *plants*, viz. laurel, roſemary, lauruſtine, phyllerea, furze, rue, barberry, jeſſamine, cucumber-branch, pumkin, and Jeruſalem artichoak, did not raiſe it at all. In another experiment it was found, that the force with which peas dilate by imbibing water, is ſufficient to lift up a weight of one hundred and eighty-four pounds laid upon them; and the dilatation of the peas is always equal to the quantity of water they imbibe.

In order to diſcover with what force the ſap of the vine is puſhed forth in the bleeding ſeaſon, the following experiments were made. Dr. Hales cut off a vine on a weſtern aſpect, within ſeven inches of the ground, the remaining ſtump having no lateral branches, and being four or five years old, and $\frac{3}{4}$ of an inch in diameter. To the top of this ſtump be fixed a glaſs tube, twenty-five feet high, ſecuring the joint with ſtiff cement made of bees-wax and turpentine, beſides ſeveral folds of wet bladder faſtened over it with packthread. As the ſtem did not at firſt bleed into the tube, he filled the tube two feet high with water, which the ſame afternoon was imbibed by the ſtem within three inches of the bottom. Next day the ſtem began to bleed, ſo that the ſap of the tube continued raiſing daily, till it was above twenty-one feet high, and would very probably have riſen higher, if the joint had not ſeveral times leaked. In the chief bleeding ſeaſon, it would continue riſing night and day: but much more in the day than night; and moſt of all in the greateſt heat of the day. When the ſun ſhone hot upon the vine, there was always a continued ſeries of air bubbles aſcending from the ſtem through the ſap in the tube, in ſo great plenty, as to make a large froth on the upper part of the ſap, which ſhews the great quantity of air drawn in through the roots and ſtem.

This force of the ſap is five times greater than the force of the blood in the great crural artery of a horſe; ſeven times greater than the force of the blood in the like artery of a dog; and eight times greater than the blood's force in the ſame artery of a fallow doe.

The free communication of the ſap-veſſels of *plants* appears from hence; that though deep gaps or notches be cut in a branch, it will nevertheleſs imbibe water in the manner already mentioned. In order to try whether it would not be the ſame in branches, as they grow on trees, the doctor cut two ſuch oppoſite gaps in a duck-cherry branch, three inches diſtant from each other, notwithſtanding which, the leaves of this branch continued green, within eight or ten days as long as the leaves on the other branches of the ſame tree.

As to the quantity of moiſture perſpired by *plants* and trees, there appears to be a very conſiderable difference in different vegetables. The lemon-tree, which is an evergreen, perſpires much leſs than the ſun-flower, or than the vine, or the apple-tree, whoſe leaves fall off in winter. Thus, from equal areas, the lemon-tree was found to perſpire only $\frac{1}{248}$ of an inch in height, during twelve hours of the day in the month of July; the apple-tree $\frac{1}{102}$; a cabbage $\frac{1}{80}$; a vine $\frac{1}{191}$; and a ſun-flower $\frac{1}{165}$; in a day and night. Dr. Hales, having taken a pretty exact account of the weight, ſize, and ſurface of the ſun-flower, and of the quantities imbibed and perſpired by it, formed a curious compariſon of what is taken in and perſpired by a human body, and this plant. The weight of a well-ſized man is equal to 160 pounds; the weight of the ſun-flower was 3 pounds; ſo that their weights are to each other as 160 to 3, or as 53 : 1. The ſurface of ſuch human body is equal to 15 ſquare feet, or 2160 ſquare inches. The ſurface of the ſun-flower, is 5616 ſquare inches; and, therefore, it is to that of the human body as 26 : 10. The quantity perſpired by a man in twenty-four hours is about thirty-one ounces, according to Dr. Keill. The quantity perſpired by the *plant* in the ſame time is twenty-two ounces; ſo that the perſpiration of a man to that of the ſun flower is as 141 : 100. Abating the 6 ounces of the 31 ounces to be carried off by reſpiration from the lungs in the 24 hours, the 25 ounces, multiplied by 438, the number of grains in an ounce avoirdupoiſe, give a product of 10950 grains; which, divided by 254, the number of grains in a cubic inch of water, gives 43 cubic inches perſpired by a man; which, divided by the ſurface of his body, viz. 2160, ſquare inches, gives a quotient, which is nearly $\frac{1}{50}$ th part of a cubic inch perſpired off a ſquare inch in 24 hours. Therefore in equal ſurfaces in equal times, the man perſpires $\frac{1}{50}$, the *plant*, $\frac{1}{165}$, or as 50 : 15. Dr. Keill, by eſtimating the quantities of the ſeveral evacuations of his body, found that he eat and drank every 24 hours 4 pounds 10 ounces; the ſun-flower imbibed and perſpired in the ſame time 22 ounces; ſo the man's food to that of the *plant* is as 74 ounces to 22 ounces, or as 7 : 2. But, compared bulk for bulk, the *plant* imbibes 17 times more freſh food than the man; for deducting 5 ounces, which Dr. Keill allows for the *fæces alvi*, there will remain 4 pounds 5 ounces of freſh liquor, which enters a man's veins, and an equal quantity paſſes off every 24 hours. Then it will be found, that 17 times more new fluid enters the ſap-veſſels of the *plant*, and paſſes off in 24 hours, than there enters the veins of a man, and paſſes off in the ſame time. One reaſon of this greater plenty of freſh fluid in the vegetable than in the animal body may be, becauſe the fluid which is filtrated through the roots immediately from the earth is not near ſo full freighted with nutritive particles as the chyle which enters the lacteals of animals; not to add, that the motion of the ſap is thereby much accelerated. Since then a plentiful perſpiration is found ſo neceſſary for the health of a plant or tree, it is probable that many of their diſtempers are owing to a ſtoppage of this perſpiration by inclement air. It appears alſo, that the power of perſpiration much depend on expoſure to the air; and that the perſpiring matter is more actuated by warmth and ſo exhaled, than protruded by the force of the ſap upwards. For this purpoſe the roots of trees and *plants* are by means of the ſun's warmth, conſtantly irrigated with freſh ſupplies of moiſture from thoſe parts of the earth which are not immediately adjacent to them; which, by the ſame means, inſinuates itſelf with ſome vigour into the roots, and aſcends, by the principle of attraction, up their fine capillary veſſels, and is carried off in perſpiration by the action of warmth; without which perſpiration the ſap muſt ſtagnate. This perſpiration is greateſt in the middle of the day, but decreaſes towards evening, and probably wholly ceaſes when the dews fall.

In animals it is the heart which ſets the blood in motion, and makes it continually circulate; but in vegetables no other cauſe of the ſap's motion can be diſcovered, but the ſtrong attraction of the capillary ſap-veſſels, aſſiſted by the briſk undulations and vibrations cauſed by the ſun's warmth, whereby the ſap is carried up to the top of the talleſt trees, and there perſpired off through the leaves; but when the ſurface of the tree is greatly diminiſhed by the loſs of its leaves, then alſo the perſpiration and motion of the ſap is proportionably diminiſhed; ſo that the aſcending velocity of the ſap is principally accelerated by the plentiful perſpiration of the leaves, thereby making room for the fine capillary veſſels to exert their great attracting power, which perſpiration is effected by the briſk rarefying vibrations of warmth; a power, ſays Dr. Hales, that does not ſeem to be in any reſpect well adapted to make the ſap deſcend from the tops of vegetables by different veſſels to the root. This excellent author has urged many arguments to prove, that there is no uniform CIRCULATION *of the ſap in trees*, like that of the blood in animals; for this reaſon, beſides others, that if there were ſuch a circulation, the leaves of the ilex grafted upon the Engliſh oak would fall in winter equally with thoſe of the oak itſelf, which is not found to be the caſe. See *Anatomy*, *Oeconomy*, &c. and *Food of* PLANTS, ſupra.

PLANTS, *preſervation of*. See PRESERVATION, &c.

PLANTS, *propagation of*. Though the moſt natural, as well as moſt univerſal method of propagating *plants* is that of ſowing the ſeeds of each kind in a proper ſoil, yet ſuch is the prolific power of nature, that in ſome inſtances, like the polype animal, they may be propagated by ſets, pieces, ſlips or cuttings, taken from the parent-tree, or *plant*, and ſet in ſuch a ſoil as they are known to delight in. The whole family of willows are propagated in this manner with the greateſt eaſe. Thoſe ſorts which grow to be large trees, and are cultivated for timber, are generally planted from ſets of about ſeven or eight feet long, ſharpened at their larger ends, which are thruſt into the ground by the ſides of ditches and banks where the ground is moiſt; in which place they make a conſiderable progreſs, and are a great improvement to ſuch eſtates; becauſe their tops will be fit to lop every fourth or fifth year. The ſallows are planted of leſſer ſets, only three feet long, thruſt two feet into the ground, and one foot above it. The rows ſhould be three feet aſunder, and the ſets in each row eighteen inches; obſerving always to place the rows ſloping, in the ſame manner as the ground. The beſt ſeaſon for planting theſe cuttings is in February; and if the ſoil be good, they will produce a greatcrop of ſhoots every year, which will produce, at a moderate computation, ten pounds per acre.

Beſides the willow kind, the plane-tree, mint, &c. may be propagated in this manner; only it ought to be remarked, that in providing the ſlips, ſprigs, or cuttings, ſuch branches as have knots or joints ſhould be cut off two or three inches beneath them; and that ſmall top ſprigs, of two or three years growth, are the beſt for this operation.

Another way of propagating *plants*, is by parting or dividing their roots, each part of which will, by proper management, thrive and ſend out freſh roots, which may be ſeparated in the ſame manner.

The manner of propagating *plants*, by laying the tops of branches in the ground, is deſcribed under the head LAYER; and the common way by ſowing of the ſeeds, is ſufficiently explained under NURSERY, SOWING, SEED, &c. *Plants* are alſo propagated by their bulbs.

The number of vegetables that may be propagated from an individual, is very remarkable, eſpecially in the moſt minute *plants*.

It has been recorded, that in ſo large a *plant* as the common mallow, the annual product of one ſeed was no leſs than 200,000; but it has been ſince proved, by a ſtrict examination into the more minute parts of the vegetable world, that ſo deſpiſed a *plant* as the common wall moſs produces a much more numerous offspring. In one of the little heads of this *plant* there have been counted 13824 ſeeds. Now allotting to a root of this *plant* eight branches, and to each branch ſix heads, which appears to be a very moderate computation, the produce of one ſeed is 6 × 13824=82944; and 8 × 82944, gives 663552 ſeeds, as the annual produce of one ſeed, and that ſo ſmall that 13824 of them are contained in a capſule, whoſe length is but one ninth of an inch; its diameter but one twenty-third of an inch, and its weight but the thirteenth part of a grain. Phil Tranſ. N°478, ſect. 12. See FECUNDITY *of plants*.

PLANTS, *reſuſcitation of*, in *Chemiſtry*. See RESUSCITATION.

PLANTS, *ſleep of*, *ſomnus plantarum*, is that faculty which the leaves of many *plants* have of aſſuming in the night-time a ſituation different from what they bear in the day. The term was firſt uſed by Linnæus in his treatiſe on this ſubject, though the property denoted by it has been long known. Acoſta and Proſper Alpinus, who wrote near the concluſion of the ſixteenth century, are the firſt who recorded this nocturnal change in the leaves of *plants*. However, it is an obſervation of Pliny, Hiſt. Nat. lib. xviii. cap. 35. that the leaves of trefoil aſſume an erect ſituation at the approach of ſtorms. The ſame is obſervable of our wood-ſorrel; and Linnæus adds, of almoſt all *plants* with declinated ſtamina. The examples of ſleeping *plants* inſtanced by Alpinus are few: he ſays, that it was common to ſeveral Egyptian ſpecies, but ſpecifies only the acaciæ, abrus, abſus, ſeſban, and the tamarind-tree. Linnæus diſcovered the ſame property in many other *plants*; and there is reaſon to believe, that no *plant* or tree is wholly unaffected by it. This property was aſcribed by Ray and many others to the coldneſs of the evening air; but Linnæus found that this was not the true cauſe, ſince *plants* were alike influenced by it when placed in ſtoves, where the temperature of the air was always the ſame. Dr. Hill, in his Sleep of *Plants*, aſcribes this alternate change of poſition in the leaves of *plants* to the impulſe of light upon their leaves. This is very different from that other property of *plants*, called the VIGILIÆ *florum*.

PLANTS, *ſyſtems of*. Ray's ſyſtem is delivered below, under the article PLANTS. The ſyſtem of Linnæus is to be found under FRUCTIFICATION; and the ſyſtem of Tournefort under PETAL. See BOTANY.

PLANTS, *tracheæ of*. See TRACHEÆ and *Anatomy of* PLANTS.

PLANTS, *tranſportation of*. See TRANSPORTATION.

PLANTS may be divided, with regard to the manner of their generating, into

Male, or ſuch as bear no fruit or ſeed, and have only the male organ of generation, viz. the farina. Of this kind are the

Male palm-tree, willow, poplar, hemp, nettle, and hop-plant.

Female, or ſuch as bear fruit, and have the female organ: viz. the piſtil, or uterus, but want the farina. Such are the *female* palm, willow, poplar, &c.

Hermaphrodites, or ſuch as have both male and female parts, or both the farina or piſtil.

Theſe are again ſubdivided into. 1. Thoſe in whoſe flower both ſexes are united; as the lily, gilliflower, tulip, and much the greater part of the vegetable ſpecies, whoſe piſtil is ſurrounded by the ſtamina. And 2. Thoſe whoſe male and female parts are diſtinct, and at a diſtance from each other: ſuch as the roſe, whoſe uterus is beneath the petala; the melon, and all of the cucumber kind, which have their male and female flowers apart; and all fruit, nut, and maſt-bearing trees; as the apple, plum, gooſberry; and the walnut, hazel, filbert, oak, beech, pine, cypreſs, cedar, juniper, mulberry, plantain, &c. which have catkins.

Plants may be again diſtinguiſhed, with regard to their food, and the element they live in, into

Terreſtrial, which are thoſe that live only on land; as oak, beach, flax, &c.

Aquatic, which live only in water; either in rivers, as the water-lily, water-plantain, &c. or in the ſea, as the fucus, &c.

Amphibious, which live indifferently either in land or water; as the willow, alder, &c.

Plants are again diſtributed, with regard to their deſtined age, or period, into

Annual, which are thoſe whoſe root is formed and dies in the ſame year; ſuch are all the leguminous *plants*, wheat, rye, &c.

Biennials, or *triennials*, which only produce flowers and ſeeds the ſecond, or even the third year after their being raiſed, and then die; ſuch are fennel, mint, &c.

Perennial, which are thoſe that do not die after they have once borne ſeed. Of theſe, ſome are evergreens; as the aſarabacca, yew, &c. Others loſe their leaves one part of the year; as ragwort, coltsfoot, &c.

Plants, again, are diſtinguiſhed, with regard to their magnitude, &c. into

Trees, arbores; as the oak, pine, fir, elm, ſycamore, &c.

Shrubs, frutices; as the holly, box, ivy, juniper, &c. and

Herbs; as mint, ſage, ſorrel, thyme, &c.

With regard to certain remarkable qualities, into inert and *ſenſitive*, ſuch as give ſome tokens of ſenſe. On which account, they were called by the ancients, *æſchynomenous* plants (from αισχυνομαι, *to be baſhful*); and, by the moderns, *living*, or *mimic plants*.

But theſe diviſions are rather popular than juſt and philoſophical.

The botaniſts give us more accurate and minute arrangements, or diſtributions, of the vegetable kingdom, into claſſes, genera, ſpecies, &c. with regard to their nature, characters, &c. But it is a point they are not well agreed upon, from what conſideration the diviſion into genera is beſt taken; ſome, as Geſner, Columna, Tournefort, &c. chuſing only the flower and fruit; and others taking in the roots, leaves, ſtems, &c. See BOTANY.

The claſſification of Linnæus is now generally followed. Our ingenious Mr. Ray diſtributes plants into twenty-five genera, or claſſes, under the following denominations.

1. PLANTS, *imperfect*, which are ſuch as appear to want the flower and ſeed. Theſe were once a very large tribe of *plants*, but the more accurate obſervations of the moderns have proved, that moſt of theſe *plants* really contained ſeeds, and thoſe very numerous, though ſo ſmall as not to appear obvious to the naked eye; and probably the farther diſcoveries of the microſcope will in time leave us no one *plant* deſerving the appellation of *imperfect*. In Mr. Ray's time, many whole genera of *plants* were eſteemed imperfect; but he includes the ſeveral kinds he calls ſo under three general heads. 1. The ſubmarine. 2. The funguſes. And, 3. The moſſes. But it has been evinced by later authors, that ſome of theſe are not plants, and that many of thoſe which really are plants, have true ſeeds, and it is ſcarce to be doubted of the reſt. See CONFERVA or HAIR-*weed*, CORAL, CORALLINES, FUCUS, FUNGUS or MUSHROOM, MUSCUS or MOSS, &c.
2. PLANTS producing an imperfect flower, and whoſe ſeed is too ſmall to be diſcerned by the naked eye: ſuch are fern, polypody, &c.
3. Thoſe whoſe flowers want petala. Such are hops, hemp, nettles, and docks.
4. Thoſe with a compound flower, and which emit a milky juice when cut or broken; as lettuce, dandelion, ſuccory, &c.
5. Thoſe with a compound flower of a diſcous form, and whoſe ſeed is alated, or, as it were, winged with down; as coltsfoot, fleabane, &c.
6. *Herbæ capitatæ*, or thoſe whoſe flower is compoſed of ſeveral long fiſtulous flowers, gathered into a round head, and covered with a ſcaly coat; as the thiſtle, great burdock, bluebottle, &c.
7. PLANTS, *corymbiferous*, with a diſcous flower, but no down to the ſeeds; as the daiſy, yarrow, corn-marygold, &c.
8. PLANTS with a perfect flower, and only one ſeed in each flower; as valerian, agrimony, burnet, &c.
9. PLANTS, *umbelliferous*, with a flower of five petala, and two ſeeds to each flower. This being a large genus, is ſubdivided into ſeven orders; viz. thoſe with a flat broad ſeed, as wild garden parſnip; with a longiſh and larger ſeed, ſwelling in the middle, as cow-weed, and wild chervil; with a ſhorter ſeed, as angelica; with a tuberous root, as the earth-nut; with a ſmall ſtriated ſeed, as caraways, ſaxifrage, and burnet; with a rough hairy ſeed, as parſly, and wild carrot; and with entire leaves, as ſanicle, and thorough-wax.
10. PLANTS, *ſtellate*, whoſe leaves go round the ſtalks, at certain intervals, in form of ſtars; as clivers, madder, &c.
11. PLANTS, *rough-leaved*, which have their leaves placed alternately, or in no certain order, along the ſtalks; as hound's-tongue, mouſe-ear, &c.
12. PLANTS, *verticillate*, whoſe leaves grow, by pairs, on their ſtalks, one leaf right againſt another, the flower being monopetalous, and uſually in form of a helmet; as thyme, mint, pennyroyal, vervain, &c.
13. *Polyſpermous*, or thoſe with many naked ſeeds, at leaſt five, ſucceeding their flower; as crow's foot, marſhmallows, cinquefoil, ſtrawberries, &c.
14. PLANTS, *bacciferous*, or ſuch as bear berries; as briony, honeyſuckle, Solomon's ſeal, lily of the valley, nightſhade, aſparagus, &c.
15. PLANTS, *multiſiliquous* or *corniculate*, which after each flower, produce ſeveral long ſlender ſiliquæ, or caſes, wherein their ſeed is contained; as orpine, navelwort, bears-foot, columbines, &c.
16. PLANTS, *vaſculiferous*, *with a monopetalous flower*, and which, after each flower, have a veſſel beſide the calyx, containing the ſeed; as henbane, bindweed, rampions, ſoxglove, eyebright, &c.
17. Thoſe with *an uniform tetrapetalous flower*, bearing their ſeeds in oblong ſiliquous caſes; as ſtockgilly-flower, muſtard, raddiſh, &c.

18. PLANTS, *vaſculiferous, with a ſeeming tetrapetalous flower*, but of an anomalous or uncertain kind, and, in reality, only monopetalous, falling off altogether in one; as ſpeedwell, fluellin, plantain, yellow and wild poppy, &c.

19. PLANTS, *vaſculiferous, with a pentapetalous five leaved flower*; as maiden pinks, campions, chick-weed, St. John's wort, flax, primroſe, wood-ſorrel, &c.

20. PLANTS, *leguminous*, or ſuch as bear pulſe, with a papilionaceous flower, conſiſting of four parts joined at the edges; as peas, beans, vetches, tares, lentils, liquorice, trefoil, &c.

21. PLANTS *with a true bulbous root*; as garlic, daffodils, hyacinth, ſaffron, &c.

22. Thoſe whoſe roots approach nearly to the bulbous form; as fleur-de-lys, cuckoo-pint, &c.

23. PLANTS, *culmiferous*, with a graſſy leaf, and an imperfect flower, having a ſmooth, hollow-jointed ſtalk, with a long ſharp-pointed leaf at each joint, and the ſeeds contained in a chaffy huſk; as wheat, barley, rye, oats, reeds, and moſt kinds of graſs.

24. PLANTS with a graſſy leaf, but not culmiferous, with an imperfect or ſtamineous flower; as ruſhes, cats tail, &c.

25. PLANTS whoſe characters are uncertain; chiefly water plants: as the water-lily, milk-wort, mouſe-tail, &c. See FRUCTIFICATION.

PLANTS, *for the fancied tranſmutation of one ſpecies of, into another*, ſee TRANSMUTATION, DEGENERATION, &c.

The properties and virtues of *plants* have been obſerved by ſome naturaliſts, to bear analogy to their forms. In the Philoſophical Tranſactions we have a diſcourſe of Mr. James Pettiver, to ſhew, that *plants* of the ſame or like figure have the ſame or like virtues and uſes. Thus the umbelliferous tribe, he obſerves, have all a carminative taſte and ſmell, are powerful expellers of wind, and therefore good in all flatulent diſorders. The galeate or verticillate kind are a degree warmer, and more powerful, than the laſt; and therefore may be reputed aromatic, being proper for nervous diſorders. The tetrapetalous kind are hot like the two former, but exert their power in a different way, viz. by a diuretic volatile ſalt, which makes them of uſe in chronical diſeaſes, obſtructions, cacochymias, &c.

PLANTS, *analyſis of*. The common method of attempting the *analyſis of plants*, by common diſtillations, gave hopes that it would prove very uſeful in determining their virtues; but experiment ſhewed it to fail of this intent, ſince the wholeſome *plants* and the poiſonous ones afforded by this means much the ſame ſort of principles; and on the whole, theſe appeared in a great meaſure to be creatures of the fire rather than parts of the ſubject. This ſet M. Boulduc of the Paris academy upon trying whether there might not be ſome way invented at once more ſimple and more certain; and with this view he attempted to examine the juices and decoctions of ſeveral *plants*, to find their eſſential ſalts, which had not been procured in their natural ſtate by the chemical trials. The *plant* this gentleman choſe as the ſubject of his experiments in this view, was the common borage.

Firſt, he made a large quantity of a decoction of borage; this he divided into three equal parts: the firſt of theſe he evaporated to a pellicle, or to the conſiſtence of a ſyrup; it was then of a blackiſh colour, and was charged with a great quantity of oily particles. This being ſet by for ſome days in a warm time of the year, covered itſelf with a thick ſkin, which was again covered by a mouldineſs. When this ſkin was removed, there appeared underneath a large quantity of cryſtals, in fine ſlender filaments like needles, mixed among a large quantity of other cryſtals, which were ſmall, and of no regular figures; all theſe were ſwimming in a liquor of the thickneſs of a ſyrup. Theſe long cryſtals being taken out of the liquor, and laid upon a hot iron, took fire, and flamed in the manner of ſalt-petre when mixed with any ſulphureous ſubſtance: and, in truth, this was a ſalt-petre, yet loaded with the oily matter of the decoction.

Here, therefore, is a clear proof, not only of the nitrous acid being in this plant, but of plain nitre itſelf; for on pouring oil of tartar on a ſolution of this ſalt, there was no precipitation made of any ſubſtance whatever; which would have been the caſe, had there been in this ſtate an earthy matter for its baſis.

The ſecond portion of this decoction was diveſted of its oil by means of lime, and then evaporated to a light pellicle over a very gentle heat. This was ſet by to reſt for ſome days, and finer and more perfect cryſtals were found, ſhot in the form of needles in it: theſe were truly nitrous, and occupied the upper part of the liquor; below theſe there were a great number of other cubic ones, which were eaſily known to be cryſtals of ſea ſalt. The long cryſtals of this operation took fire on a lighted charcoal, and appeared plain nitre; and the others, when dry, crepitated in the fire exactly in the manner of ſea ſalt; and when a ſolution of them was poured upon a ſolution of ſilver, made in ſpirit of nitre, it immediately occaſioned a white curd to appear, which being ſeparated, waſhed, and put to the fire, became a true luna cornea, being tranſparent, and eaſily cut with a knife. Here, therefore, are plain proofs of nitre and ſea ſalt in this *plant*. Mem. Acad. Scienc. Par. 1734.

The third portion of the decoction was poured upon ſome freſh wood-aſhes; and being afterwards evaporated to a pellicle, and ſet by for ſome days, there was found in this more nitre than in any of the others, and that whiter and more clear; the others being uſually coloured browniſh or reddiſh by the decoction. The occaſion of this ſeems to be, that part of the nitrous acid, which in the other experiments neither joined with any earthy matter, nor with the fatty matter of the decoction, mixed with the ſalts of the lixivium, made by pouring the liquor which contained it on wood-aſhes, and thus yielded a much larger quantity of ſalt-petre than before.

The fatty ſubſtance which covered the firſt decoction being dried, was found to contain a great quantity of nitre, which it had not ſuffered to ſhoot, or form itſelf into cryſtals: this dried cruſt being laid on a burning charcoal, took fire in the ſame manner as if nitre and powder of charcoal had been thrown into a crucible made red hot.

The ſalts of the *plant* being thus obtained from its decoction, it was determined to try whether the *plant* remaining after the decoction had any more to yield. To try this, it was gently dried in a ſhade, and burned in a covered veſſel to a black coal, and afterwards, in an open fire, to aſhes.

Of theſe aſhes there was made a lixivium in the common way, in order to be evaporated for the ſalt: this lixivium being mixed with ſyrup of violets, ſcarce at all altered it from its blue colour, only juſt bringing on a faint greeniſhneſs, which ſoon went off again, and left the ſyrup of as fine a blue as before: this made it evident, either that there was very little alkali ſalt there, or elſe that it was blended with ſalts of ſome other kind, which altered its effects; and this proved to be the true ſtate of the matter on farther experiment; for evaporating the lixivium to a pellicle, there very ſoon ſhot in it regular and beautiful cryſtals of a ſalt, having all the characters of tartarum vitriolatum. A ſecond evaporation of the lixivium afforded more of the ſame ſalt, but in ſmaller cryſtals. Evaporating the liquor to about half its quantity, and ſetting it again to ſhoot, there appeared plain cubic cryſtals of ſea ſalt; which being ſtrictly examined, were found to be perfect ſea ſalt, no way altered, but having ſtood the force of the calcination.

After theſe ſalts had been ſeparated from the lixivium, it changed ſyrup of violets immediately to a beautiful green, which colour it always retained.

It is evident from theſe experiments, that this *plant* affords four different kinds of ſalts, viz. nitre, ſea ſalt, tartarum vitriolatum, and the common fixed alkali; and it is hence no trivial obſervation, that the three mineral acids are found here all in one *plant*.

The virtues of *plants* are very variable; a change of climate will alter or deſtroy them, as we ſee in many of the medicinal *plants* of other countries brought over hither, which, though they ſeem to flouriſh with us, never poſſeſs their virtues in the ſame degree as in their native climate. The bodies of different animals alſo render the effect of the ſame *plant* different: the tithymals or ſpurges are all of them very violent cathartics, when taken by us; but yet they are eaten by goats and ſeveral other animals without hurt, or without any purgative effect, and ſeem to give them a particular ſhare of vigour and ſpirits. The fiſh are, on the other hand, more ſtrongly affected by it than we are: for the juice made into paſte with flour and honey, poiſons, or at leaſt intoxicates them ſo, that they may be taken out of the water with one's hand. Bitter almonds are of no ill conſequence to us, yet they kill all ſorts of birds.

PLANTS, *aſhes of*. The aſhes of a *plant* carefully prepared, retain its exact form till diſturbed by accidents. The way of preparing them is this: take a whole *plant* which has been uſed for the diſtillation of the oil, water, &c. lay it evenly upon a flat plate of iron, and place this on a clear fire, that no ſmoke may prevent the ſucceſs of the operation; continue and raiſe the fire, till the whole ſubſtance of the *plant* appears perfectly ignited. There firſt ariſes a light ſmoke from it; this gradually becomes darker, and at length as black as pitch; the ſmell of burning increaſes as the ſmoke increaſes; at length the ſmoke breaks out into flame, and then the ſmell in a great meaſure ceaſes: the *plant* by degrees grows black, as the ſmoke ariſes, and as ſoon as perfectly black all over, it takes fire. When the flame ceaſes, the leaves appear white; but if any black ſpots remain, there are always ſeen ſparks of fire ſcattering themſelves about on them, till the blackneſs is perfectly conſumed. The aſhes being now become perfectly white, yield no ſmell, nor the leaſt appearance of fire; and they yet retain, after all this violence of fire, the perfect form of the *plant*, even to a microſcopic obſervation: for, if examined by glaſſes, there will be found every feature and lineament of the *plant*, even the hairineſs of the ſtalks or down upon the leaves; every riſing and cavity natural to the *plant* appear alſo diſtinct, and every the ſmalleſt fibre. But this only remains while they are unmoved; the moment they are diſturbed, though but by breathing upon them, the whole falls to duſt, and the form is irrecoverably loſt.

The aſhes thus carefully prepared, are perfectly inſipid and ſcentleſs; and when lixiviated in the common way for making the fixed ſalt, afford no ſalt at all, but only on the evaporation leave a ſmall quantity of a matter reſembling lime; the remaining aſhes are wholly terreſtrial, and ſerve excellently for the making copels, for the uſe of aſſaying. Boerhaave's Chem. part ii. p. 19.

From this we learn, that the *plant*, by having been previouſly boiled in water in the diſtillation, was diveſted of all its ſalts; and that in general, water, with a great degree of heat, is capable of extracting from any vegetable all its ſaline particles, whether volatile or fixed. We find, however, that water can never ſeparate the fixed oil, which here ſhews itſelf to have wholly remained in the *plant*, by the ſmoke, ſmell, and flame it yields; and by the ſparks of fire in the remaining black parts of the *plant*, which were wholly owing to the remains of this oil, no fire being able to make the ſmalleſt ſpark afterwards appear in the aſhes.

Air, as well as fire, is neceſſary to this oil's taking flame; for in a covered veſſel it will not blaze till the cover is taken off. This thick oil is extremely different from what we call the eſſential oil of a *plant*, and ſeems to be the ſame in all vegetables; and to this they owe their coheſion; while the eſſential oil and ſalt are extracted from the *plant* by boiling, it yet holds together in its native figure and ſtrength; but as ſoon as the black oil is diſſipated by burning, the whole firmneſs of the *plant* is loſt, and a breath of air blaſts it to duſt.

The aſhes of different woods, burnt to perfect whiteneſs, and freed from their alkaline ſalt, have been found to be, in part, of the ſame nature with the true MAGNESIA. Of vegetable aſhes, moderately or ſtrongly calcined, only a part was found to diſſolve in acids, and this part appeared to be perfect magneſia. It is probable that the remainder might be reduced to the ſame ſtate, by repeating the calcination. See POT-*aſhes*.

PLANTS, *juices of*. Moſt juices of vegetables coagulate when expoſed to the air, whether it be that they are drawn out of the *plant* by wounds, or that they naturally run out; though what is called naturally running out, is generally the effect of a wound in the *plant*, from a ſort of cancer, or ſome other internal cauſe. The flowers of the St. John's wort, and the leaves of the rorella, or ſun-dew, afford us purple blebs and veins, and large drops of a clear fluid; yet it does not ſeem certain that theſe are coagulated juices. The ſmall green leaves, forming the cup of the flower of the common erect tutſan St. John's wort, are ſurrounded with purple blebs, and the points or tops of the leaves alſo have each two or three ſuch blebs, all containing a purple juice; yet the ſtalk of this *plant*, being cut and ever ſo nicely examined, does not ſhew to the naked eye, nor even to the microſcope, any veſſels containing ſuch a purple fluid. Whence it may appear not improbable, that what is thus found in ſmall blebs is a matter ſeparated by coagulation only from the reſt of the juice of the flower.

In the common St. John's wort the edges of all the leaves of the flower are ſurrounded with theſe purple blebs, and the ſtalk, though round, has a double edge, one on each ſide, and the blebs or bags are to be ſeen riſing on theſe edges of the ſtalk. The cup of the flower has ſeveral purple veins, yielding a purple juice, and the leaves of the flower have alſo ſome ſuch veins, and even the apices all contain a purple matter.

In the ſquare-ſtalked St. John's wort, commonly called St. Peter's wort, the edges of all the leaves, from the top to the bottom of the ſtalk, are ſurrounded with rows of theſe purple bags, and the apices of the flower are ſo many purple bags; but the cup and the petals of the flower have but very few purple veins in this ſpecies.

In the *hypericum pulcrum tragi*, or upright elegant St. John's wort, the leaves and ſtalks have no purple blebs, but only the cup and the flower have them. Theſe juices alone are what give the red colour to the oil of St. John's wort kept in the ſhops. And it is worthy a ſtrict enquiry, what they really are, and by what means produced.

Diverſe parts of the ſame *plant* yield different juices. The ſame veins, in their courſe through the different parts of the *plant*, yield juices of a different appearance. Thus the milky juice, in the root of the cow-parſnep, is of a brimſtone colour; but in the ſtalk it is white.

Among thoſe juices of vegetables which are clammy, and readily coagulate, there are ſome which readily break with a whey. The great wild lettuce, with a ſmell of opium, yield the greateſt plenty of milky juice of any known Engliſh *plant*. When the ſtalk is wounded with a knife, the juice flows readily out like a thick cream, and is white and ropy; but if theſe wounds be made at the top of the ſtalks, the juice that flows out of them is daſhed with a purple tinge, as if cream had been ſprinkled over it, with a few drops of red wine, and has ſome veins. Some little time after the letting this out, it becomes much more purple, and thickens, and finally the thicker part of it ſeparates, and the thin whey ſwims at the top. Herein the juice of this plant exactly reſembles the blood of animals, which, though a ſimple fluid, when drawn from the veſſel, yet ſoon ſeparates into a thick cake, and a thin fluid, or ſerum.

The whey, or thin part of this ſeparated matter, is eaſily preſſed out from the curd by ſqueezing between the fingers, and the curd then will remain white, and, on waſhing in fair water, becomes like rags. The purple whey, for in this part all the colour is lodged, ſoon dries into a cake of the ſame colour, and may be crumbled between the fingers into a purple powder. The white curd being dried, and kept ſome time, becomes hard and brittle. It breaks with a ſhining ſurface like reſin, and is inflammable, taking fire at a candle, and burning all away with a ſtrong flame. The ſame thick part being held over a gentle heat, would draw out into tough long threads, melting in the manner of wax.

The purple cake, made from the whey, is wholly different from this, and when held to a candle, ſcarce flames at all, but burns to a black coal. The whole virtue of the *plant* ſeems alſo to conſiſt in this thin part of its juice, for the coagulum or curd, though looking like wax or reſin, has no taſte at all, whereas the purple cake made from the ſerum is extremely bitter, and of a taſte ſomewhat reſembling that of opium.

It is poſſible that the artifice of bees may conſiſt, in a great meaſure, in the ſeparating in this manner the thick and the thin parts of the juices of peculiar *plants*, the curd or thick part of which, being glutinous and inſipid, may ſerve them as wax, and the thin part may make their honey.

The throat-wort, ſpurge, and many other *plants*, replete with milky juices, are of this kind, and their juice, when let out, ſeparates into curd and whey. But this, though a common law of nature, is not univerſal; for there are many *plants* which yield the like milky juices which do not ſeparate and break into curds and whey, but coagulate all together into one ſimple maſs. The white juice of the *ſonchus* never ſeparates, but dries into an uniform cake; the common red wild poppy bleeds freely with a milky juice, and the heads or capſules of ſeed bleed not leſs than the reſt of the *plant*, even after the flower is fallen. This juice, on being received into a ſhell or other ſmall veſſel, ſoon changes its white to a deep yellow colour, and dries into a cake which ſeems reſinous and oily, but no whey ſeparates from it.

It ſeems by the experiments on the juice of the opium lettuce before mentioned, that theſe milky liquors are of a mixed kind, and compoſed of different fluids, of various and perhaps of contrary qualities; ſo that if the curd part be ſimple and harmleſs, the whey may be a powerful medicine, and ſo of the reſt; but in thoſe which do not ſeparate in this manner, we are forced to take the whole together, unleſs ſome way may be found of ſeparating them by art. Perhaps the ſetting them in wooden veſſels, and after a time adding freſh juice to them, may do it; and poſſibly the adding a little calf's rennet may be able to effect it.

The tragopogon, or goat's beard, when wounded, bleeds freely a milky juice; it is at firſt white, but becomes immediately yellow, and after that more and more red; at length it is wholly of a duſky red; it never ſeparates, but dries together into one cake, and is oily and reſinous, but of an inſipid taſte. The great bindweed bleeds freely alſo a white juice; the flowers, as well as the ſtalks and leaves, afford this liquor. It is of a ſharp taſte; and as many of the purging plants are of this claſs, it would be worth trying whether this liquor be not purgative.

Theſe juices, as well as the generality of others which bleed freely from *plants*, are white like milk; but there are ſome other colours. The juice of the great celandine is of a fine yellow; it flows from the *plant* in the thickneſs of cream, and ſoon dries into a hard cake, without any whey ſeparating from it. Another yellow juice is yielded by the ſeed veſſels of the yellow centaury, in the month of July, when the ſeeds are full grown. This is of a fine yellow colour, and very clammy: it ſoon hardens altogether into a cake, no whey ſeparating from it; it ſticks to the fingers like birdlime, and is of the colour of pale amber, and will never become harder than ſoft wax, if dried in the ſhade; but if laid in the ſun it immediately becomes hard like reſin. Theſe cakes burn like wax, and emit a very pleaſant ſmell. The great angelica alſo yields a yellowiſh juice on being wounded; and this will not harden at all, but if kept ſeveral years will ſtill be ſoft and clammy, drawing out into threads like wax, or half melted reſin.

Another kind of juices, very different from all theſe, are thoſe of a gummy nature; ſome of theſe remain liquid a long time, and are not to be dried ſooner without the aſſiſtance of heat; the others very quickly harden of themſelves, and are not inflammable. The gum of the juice of rhubarb-leaves ſoon hardens, and is afterwards ſoluble in common water, and ſparkles when put into the flame of a candle. Theſe two qualities ſhew that theſe gums have a watery part in them, and they melt alſo in the flame of a candle, and become ductile; and this ſhews that they have alſo the curdy part, though this does not ſeparate from the whey in drying, as in ſome other caſes. Theſe do not ſparkle in the flame ſo much as ſome others which contain more water; and their not burſting out into an actual flame, ſhews that they want oil. The cluſters of the common honeyſuckle are full of a liquid gum; they frequently throw this out, and it falls upon the leaves, and retains its own form there; the red hairs of the ſun-dew are all terminated by large bladders of a thin watery fluid. This is alſo a liquid gum: it ſticks to the fingers, and draws out into long threads, and this ſtands the force of the ſun all day. In the centre of each of theſe dew drops, there is a ſmall red bladder, which ſtands immediately on the ſummit of the red hair. This is of the nature of the blebs on the leaves and flowers of the St. John's wort, containing a purple juice which may be ſqueezed out of it. The pinguicula, or butter-wort, has alſo ſome gummy liquid matter on its leaves. It does not ſtand upon ſuch long hairs as that of the ſun-dew, but it is in much greater quantity. The hairs of the leaves of theſe two *plants* ſtand on the upper ſide of the leaves, and are very thick ſet there, while the under ſide is ſmooth. This is a ſingularity not obſervable in any other *plant*, at leaſt of our own growth. Vide Liſter, in Phil. Tranſ. Nº 244. and Lowthorp's Abridg. vol. ii. p. 696, ſeq.

Mr. Boyle tells us, that the fumigated juices of *plants* may be ſucceſsfully preſerved by adding a ſmall quantity of the white coagulum, made by the pure ſpirits of wine and urine. See OFFA *alba*.

Some *plants* yield juices which are of a manifeſtly oily nature, which, being rubbed between the fingers, are not at all clammy, but make them glib and ſlippery; and theſe juices do not harden at all on being expoſed to the air. If the ſtalk of elecampane be wounded, there flows out a plain oily juice ſwimming upon a watery one. The ſtalks of hemlock alſo afford the ſame oily liquor ſwimming upon the other; and the common white mullein, if the leaves are pulled off in the month of June, yields the ſame ſort of oil very freely along with its watery juice. The berries of ivy, the bay, juniper, dogberry tree, and the fruit of the olive, when wounded, ſhew their oil in the ſame manner floating on the watery juice.

Some of theſe oily juices, ſoon after they are let out of the *plant*, coagulate and harden into a kind of reſin. Our ivy yields ſuch a juice very abundantly, and the juice of the ſmall purple-berried juniper is of the ſame kind, being hard and fat, and not very gummy.

If the bark of the common ivy be wounded in March, there will ooze out a tough and greaſy matter of a yellowiſh colour; if this be taken up between the fingers, it feels not at all gummy or ſticking, but melts in handling into a ſort of oil, which in proceſs of time hardens and cruſts upon the wounds, and looks like brown ſugar; it burns with a laſting flame, and ſmells very ſtrong. The tops of the wild lettuce, and the leaves growing near the tops, if examined with a magnifying glaſs, ſhew a great number of ſmall bladders or drops of an oily juice of a browniſh colour, hardening into a kind of reſin; they are eaſily wiped off when of any ſize, and are truly an oily juice hardened a little It is probable alſo, that the fine blue flour or powder called the bloom, upon the ſurface of our common plums, is no other than ſuch an oily juice exſudating from their pores in ſmall particles, and hardening into a ſort of reſin. The leaves and ſtalks of the common Engliſh mercury are all over covered with ſmall tranſparent drops looking like pearls; and if the *plant* is taken into the hand, theſe feel rigid and greaſy. The leaves of the ſtinking orach abound alſo with the ſame ſort of drops, and theſe are only ſmall portions of the oily juices of the *plant*, which are continually exſudating through its pores, and harden into theſe reſiny pearls. Phil. Tranſ. Nº 224.

The ſap or juice of trees appears to be very different, according to the ſpecies or genus of the tree, as we find by experiments, or by their ſpontaneous exudations. The extravaſations of ſap in the plum and cherry-kind, being all clammy, and hardening into a gum like gum arabic; and, on the other hand, thoſe of the vine, the oak, and many other trees, being thin as water. The clammineſs of the ſap in trees ſeems one of the great things that renders them hardy, and not liable to injuries from cold, &c. In the hard froſts, thoſe trees which have watery juices periſh, and even ſplit and cleave of themſelves; while thoſe which have gummy and viſcous juices eſcape. In our gardens the vines crack and burſt with the froſt, while the plums, cherries, peaches, and other gummy trees, ſtand without any damage or danger; and in the fields no trees ſo readily ſplit in ſevere froſts as the oaks, which though the hardeſt wood of all our timber trees, yet has of all the moſt thin and watery juices. The trees which have deciduous leaves, have in general thinner and more watery juices than the evergreens; to the freezing of theſe, or their decay from want of due heat, and other accidents, is owing the decay and fall of thoſe leaves, while the others remain in their places, though not increaſing, or no new ones growing, the juices remaining unaltered, though ſtagnated in the veſſels, and ſafe from injury, though waiting the ſun's heat to put them in motion. The earlier or later germination of trees and *plants* of different kinds, is probably owing alſo to the ſame cauſe. The thinneſt juices, as they are ſooneſt injured by cold, ſo they are probably ſooneſt influenced alſo by heat; and that warmth may make them move, and prepare the *plant* for growing, which could ſcarce begin to attenuate the tough and gummy ones. Phil. Tranſ. Nº 165.

PLANTS, *ſalts of*. It has been obſerved by all who have examined the different eſſential *ſalts of plants*, that ſome of them, when thrown on the fire, have the effects of ſalt-petre, and others of common ſea-ſalt; and it has been concluded from hence, that they really contained particles of thoſe ſalts, which their roots had taken in with their nouriſhment, and conveyed up into the ſtalk and leaves with the juices; and that theſe ſalts ſtill retained their original nature, and were no otherwiſe altered than by the mixture with other ſubſtances in the *plant*. But as two *plants* of different qualities, when ſet in the ſame earth cloſely by one another, ſhall out of the ſame juices make a medicine, a ſallad, or a poiſon, it cannot be, but that the ſubſtances abſorbed by the root, be they what they will, muſt be greatly altered in the *plant*; inſomuch, that a ſalt purely nitrous, when received into the root, might become of the nature of ſea-ſalt, or of the volatile urinous kind, according to the different organs of the *plants*, and the different natural fermentations it might meet with there. To be perfectly informed of this, Mr. Homberg made the following experiment:

He took a large quantity of rich black garden mould, and waſhed it in ſeveral waters, to carry off all the ſalts it might contain: this done, he divided the earth into four boxes or caſes of wood, into each of which there was put about two hundred weight. Two of theſe caſes of earth he watered with a ſolution of ſalt-petre, ſo as to make each imbibe about two ounces of that ſalt; the other two caſes were left with the earth inſipid as the waſhing had made it, and care taken to water them with none but perfectly pure water, ſo that they might remain as ſimple as poſſible. In one of the caſes of nitrous earth, and in one of thoſe of ſimple earth, he ſowed fennel; and in the other two, garden creſſes.

The herbs in all the caſes grew very well, and when they were grown to about eight inches high, they were all gathered; and when the roots were cleanſed, and the whole product weighed, thoſe *plants* which had grown on the ſimple earth weighed twenty-five ounces, and thoſe in the nitrous earth twenty-ſix; their ſmell and taſte manifeſted no ſort of difference in either. In order to examine theſe *plants*, while yet quite freſh, by means of fire, he put a pound and a half of each, with their roots, into a retort of glaſs: he placed theſe retorts firſt in a balneum Mariæ, and then in a ſand-heat, in order to drive over all the aqueous humidity. The quantity of water from each retort was within a few grains of the ſame weight; and from the beginning to the end of the diſtillation there was not the leaſt appearance of any acid.

After this, the creſſes which had grown in the inſipid earth,

earth yielded a drachm of volatile ſalt; and that which had grown in the earth which had imbibed ſalt-petre, yielded ſeventy-five grains.

The oil of each was very nearly the ſame in quantity; that from the plants in the ſalt-petre earth weighing ſix grains more than that of the *plants* of the inſipid earth. The lixivial ſalt was two drachms from the *plants* in the nitrous earth, and one drachm and ſixty-ſeven grains from thoſe in the inſipid.

The differences between theſe two parcels of *plants* upon the analyſis, appeared on the whole ſo little, that it could not be counted any thing: ſince the more or leſs cloſe luting of the veſſels, or many other accidents in the diſtillation, might have eaſily occaſioned as much in *plants* perfectly the ſame in all reſpects. If there be any thing, however, to be collected from the experiment, it is, that the earth moiſtened with a ſolution of nitre, yielded more of the principles than the other; probably from its actually affording a quantity of ſalt to the juices of the *plant* in the growth: but as the nitrous earth afforded a *plant* which yielded more oil than that from an inſipid ſoil, it muſt be from this that the lotions of the earth not being able to carry off any of the fatty parts, they remained in the ſame quantity in both; but that the nitre, where it was, had contributed ſomewhat to the breaking of them, and the rendering them more fit to be abſorbed by the *plants*. From the different weights of the *plants* when gathered, after the time of growth, from the ſame ſeed, and with all the ſame advantages in common, it may be concluded that the nitrous ſalts in the earth are not eſſentially neceſſary to vegetation, ſince the *plants* in the inſipid earth grew very well without them; yet that they are very uſeful, ſince the *plants* produced there were of a greater bulk, and according to the whole analyſis, if the differences are to be depended on as reſulting wholly from the nature of the ſubjects, they yielded more of all the active principles; and therefore, that they were to all purpoſes better *plants*. Mem. Acad. Par. 1693.

The weights above mentioned are French, the word *gros* being tranſlated drachm, though really exceeding it by twelve grains. See WEIGHT.

PLANTS, *foſſile*, many ſpecies of tender and herbaceous *plants* are found at this day, in great abundance, buried at conſiderable depths in the earth, and converted, as it were, into the nature of the matter they lie among; foſſile wood is often found very little altered, and often impregnated with ſubſtances of almoſt all the different foſſile kinds, and lodged in all the ſeveral ſtrata, ſometimes firmly embedded in hard matter; ſometimes looſe: but this is by no means the caſe with the tenderer and more delicate ſubjects of the vegetable world. Theſe are uſually immerſed either in a blackiſh ſlaty ſubſtance found lying over the ſtrata of coal, or elſe in looſe nodules of ferruginous matter of a pebble-like form, and they are always altered into the nature of the ſubſtance they lie among: what we met with of theſe are principally of the fern kind; and what is very ſingular, though a very certain truth, is, that theſe are principally the ferns of American growth, not thoſe of our own climate.

The moſt frequent *foſſile plants* are the polypody, ſpleenwort, oſmund, trichomanes, and the ſeveral larger and ſmaller ferns; but beſide theſe there are alſo found pieces of the equiſetums, or horſe-tails, and joints of the ſtellated *plants*, as the clivers, madder, and the like; and theſe have been too often miſtaken for flowers; ſometimes there are alſo found complete graſſes, or parts of them, as alſo reeds and other watery *plants*; ſometimes the ears of corn, and not unfrequently the twigs or bark, and impreſſions of the bark, and fruit of the pine or fir kind, which have been, from their ſkaly appearance, miſtaken for the ſkins of fiſhes; and ſometimes, but that very rarely, we meet with moſſes and ſea *plants*.

Many of the ferns not unfrequently found, are of very ſingular kinds, and ſome ſpecies yet unknown to us; and the leaves of ſome appear ſet at regular diſtances, with round protuberances and cavities. The ſtones which contain theſe *plants* ſplit readily, and are often found to contain on one ſide, the impreſſion of the *plant*; and on the other the prominent *plant* itſelf: and, beſide all that have been mentioned, there have been frequently ſuppoſed to have been found with us ears of common wheat, and of the maize or Indian corn; the firſt being in reality no other than the common endmoſt branches of the firs, and the other the thicker boughs of various ſpecies of that and of the pine kind, with their leaves fallen off; ſuch branches in ſuch a ſtate cannot but afford many irregular tubercles and papillæ, and, in ſome ſpecies, ſuch as are more regularly diſpoſed.

Theſe are the kinds more obvious in England; and theſe are either immerſed in the ſlaty ſtone which conſtitutes whole ſtrata, or in flatted nodules, uſually of about three inches broad, which readily ſplit into two pieces on being ſtruck. They are moſt common in Kent, on coal-pits, near Newcaſtle, and the foreſt of Dean, in Glouceſterſhire; but are more or leſs found about almoſt all our coal-pits, and many of our iron mines. See *Tab. of Foſſils, claſs* 6.

Though theſe ſeem the only ſpecies of *plants* found with us, yet in Germany there are many others, and thoſe found in different ſubſtances. A whitiſh ſtone, a little harder than chalk, frequently contains them; they are found alſo often in a grey ſlaty ſtone, of a firmer texture, not unfrequently in a blackiſh one, and at times in many others; nor are the bodies themſelves leſs various here than the matter in which they are contained; the leaves of trees are found in great abundance, among which thoſe of the willow, poplar, whitethorn, and pear-trees, are the moſt common; ſmall branches of box, leaves of the olive-tree, and ſtalks of garden thyme, are alſo found there; and ſometimes ears of the various ſpecies of corn, and the larger as well as the ſmaller moſſes in great abundance.

Theſe ſeem the tender vegetables, or herbaceous *plants*, certainly found thus immerſed in hard ſtone, and buried at great depths in the earth; others of many kinds there are alſo named by authors, but as in bodies ſo imperfect, errors are eaſily fallen into, theſe ſeem all that can be aſcertained beyond mere conjecture. Hill's Hiſt. of Foſſils, p. 64.

PLANT, *burning thorny* See SPURGE.

PLANT, *egg*, a ſpecies of *ſolanum*, or NIGHTSHADE.

PLANT, *ice*. See ICE.

PLANTS, *marine*. See SEA-*plants*.

PLANT, *paraſitical*. See PARASITE.

PLANT-*root* a term uſed by Dr. Grew, to expreſs the radicle in ſeeds; he by this name diſtinguiſhes it from what he calls the SEMINAL *root*; which is a very different ſubſtance diſtributed throughout the parenchyma of the ſeed, but wholly different from it, and preying upon it as the *plant-root* does upon the earth.

PLANT, *ſenſitive*, is the Engliſh name of a diſtinct genus of *plants*, called by the botaniſts *mimoſa*. See SENSITIVE *plant*.

PLANT, *baſtard ſenſitive*. See ÆSCHYNOMENE.

PLANTA, in *Anatomy*, the loweſt part, or ſole of the FOOT of a man, comprehended between the tarſus and the toes.

PLANTAGENET, in *Hiſtory*, an addition, or ſurname, borne by many of our ancient kings.

The term *plantagenet* has given infinite perplexity to the critics and antiquaries, who could never ſettle its origin and etymology.

It is allowed, that it firſt belonged to the houſe of Anjou, and was brought to the throne of England by Henry II. where his male poſterity preſerved it till the time of Henry VII. a ſpace of above four hundred years.

It is diſputed, who it was that firſt bore the name. Moſt of our Engliſh authors conclude, that our Henry II. inherited it from his father Geoffrey V. earl of Anjou, ſon of Fulk V. king of Jeruſalem, who died in 1144. This Geoffrey they will have the firſt of the name; and our Henry II. the iſſue of Geoffrey, by Maud, only daughter of Henry I. the ſecond.

Yet Manege will not allow Geoffrey to have borne the name; and adds, that, in effect, the old annaliſt of Anjou, J. Bourdigne, never calls him ſo. The firſt, Manege adds, to whom he gives the appellation, is Geoffrey, third ſon of this Geoffrey V.

Yet muſt the name be much more ancient than either of theſe princes, if what Skinner ſays of its origin and etymology be true. That author tells us, that the houſe of Anjou derived the name from a prince thereof, who, having killed his brother to enjoy his principality, took to repentance, and made a voyage to the Holy Land, to expiate his crime; diſciplining himſelf every night with a rod made of the plant genêt, geniſta, broom; whence he became nicknamed *Planta-genêt*.

Now it is certain that our Geoffrey made the tour of Jeruſalem; but then he did not kill his brother, nor did he go thither out of penance, but to aſſiſt king Amauris his brother. Who then ſhould this prince of the houſe of Anjou be? Was it Fulk IV? It is true he diſpoſſeſſed his elder brother Geoffrey, and put him in priſon; but he did not kill him; nay, Bourdigne obſerves, he was even releaſed from the ſame priſon by his ſon Geoffrey V. already mentioned.

Farther; this Fulk did make a journey to Jeruſalem; and that, too, partly out of a penitential view; we are aſſured, by Bourdigne, he did it out of apprehenſion of the judgments of God, and eternal damnation, for the great effuſion of Chriſtian blood in the many mortal battles he had been in. The annaliſt alſo adds, that he made a ſecond voyage; but it was to return God thanks for his mercies, &c. to which we may add, that Fulk was never called *Plantagenet*; ſo that what Skinner advances, appears to be a fable.

There is another common opinion, which appears no better founded; and it is this: that the name *Plantagenet* was common to all the princes of the houſe of Anjou, after Geoffrey V. whereas in fact, the name was only given to a few; and that, as it ſhould ſeem, to diſtinguiſh them from the reſt. Thus Bourdigne never applies it to any but the third ſon of Geoffrey V. and diſtinguiſhes him, by this appellation, from the other princes of the ſame family. Though it is certain that it was likewiſe given to the elder brother, Henry of England, as before obſerved.

PLANTAGINELLA, in *Botany*, a name given by Dillenius to a genus of plants ſince called by Linnæus LIMOSELLA.

PLANTAGO, in *Botany*. See PLANTAIN.

PLANTAIN, *plantago*, in *Botany*, the name of a genus of plants, the characters of which are theſe; the empalement is quadrifid; the flower conſiſts of one leaf, of the *tetrandria monogynia* claſs; and is wide, expanded at the opening, and with a reflex limb, and uſually divided into four ſegments; from the bottom of this flower riſes a piſtil ſurrounded with ſtamina of conſiderable length; the fruit is a capſule, which when ripe ſeparates tranſverſely into two pieces, and is divided by an intermediate ſeptum into two cells, filled with oblong ſeeds.

The ſpecies of *plantain*, enumerated by Linnæus are twenty-one, comprehending, beſides the ſeveral ſpecies of *plantains*, uſually ſo called, the pſyllium, or fleawort, and the coronopus or buckſhorn.

The *plantains* grow naturally in paſtures in moſt parts of England, and are frequently very troubleſome weeds. The common broad-leaved *plantain*, and the narrow-leaved or ribwort, are uſed in medicine; they poſſeſs much the ſame qualities, though the firſt has been generally directed for medicinal uſe in preference to the other. The leaves and ſeeds, recommended as vulneraries, in phthiſical complaints, ſpittings of blood, alvine fluxes, &c. appear to be of the milder kind of reſtringents or corroborants. The expreſſed juice of the leaves, depurated by ſettling and colature, or clarified with white of eggs, and inſpiſſated to the conſiſtence of honey, and called the extract of *plantain*, manifeſts a conſiderable ſaline auſterity. The leaves are, in ſome places, the uſual application made by the common people to ſlight wounds.

Of the buckſhorn *plantain* there are two varieties growing in England, one of which is plentiful every where on heaths, and was formerly cultivated in gardens as a ſallad herb, and the other is the narrow-leaved Welſh ſort, which is found on many of the Welſh mountains. The ſeeds of the *pſyllium*, or FLEA-*wort*, have been uſually brought from the ſouth of France. The mucilage which they yield has been chiefly employed in emollient glyſters, in gargariſms for hoarſeneſs and aſperity of the fauces, and in external applications for chaps of the lips, and inflammations of the eyes. Proſper Alpinus relates, that among the Egyptians, the mucilage, or an infuſion of the ſeeds, is given internally in ardent fevers, and that it generally either looſens the belly or promotes ſweat. Lewis.

PLANTAIN, *water*, *aliſma*, in *Botany*, a genus of the *hexandria polygynia* claſs and order: its characters are, that the empalement is compoſed of three leaves, that the flower has three petals, and that the ſeeds are numerous. Linnæus enumerates ſeven ſpecies.

PLANTAIN *leſſer water*. See LIMOSELLA.

PLANTAIN *ſhot*. See CANNA.

PLANTAIN, *ſtar-headed water*, *damaſonium*, in the Linnæan ſyſtem of *Botany* is a ſpecies of the *aliſma*, or *water*-PLANTAIN: but Mr. Miller has made it a diſtinct genus with the following characters: it hath a flower compoſed of three leaves, which are placed orbicularly, and expand in form of a roſe; out of the flower-cup ariſes the pointal, which afterward becomes a ſtar-ſhaped fruit, with many cells, which are full of oblong ſeeds. He reckons two ſpecies.

PLANTAIN-*tree*, *muſa*, in *Botany*, a genus of the *polygamia monoecia* claſs. Its characters are theſe: it hath male and female flowers upon the ſame ſtalk, ſeveral of which are hermaphrodite: theſe are produced on a ſingle ſtalk, or ſpadix; the male flowers are ſituated on the upper part of the ſpike, and the female below; theſe are in bunches, each bunch having a ſheath or cover, which falls off; the flowers are of the lip kind; the two petals conſtitute the upper lip, which is erect, and furniſhed with five horizontal points, and the nectarium, which is concave and ſhorter; they have ſix filaments, five of which are perfect; the germen is ſituated under the flower, which is long, having three obtuſe angles, ſupporting an erect cylindrical ſtyle, crowned by a roundiſh ſtigma: the germen afterwards turns to an oblong, three-cornered, fleſhy-fruit or berry, covered with a thick rind, divided into three parts.

Here we may obſerve, that the *muſa paradiſiaca*, or *plantain-tree*, produces a ſpadix, which contains often two hundred germina, the few female flowers of which continue in blow for ſome days; when the female flowers have done blowing, the males ſucceed, and continue in flower till the fruit is ripe, in which are to be found no ſeed at all. Wherefore the authors of the Hortus Malabaricus have aſſerted that ſeeds were evidently wanting, in the *plantain-tree*, and this ſeemed a paradox to Linnæus; but when he ſaw the firſt female flowers deſtitute of males, and that the males which followed came too late to impregnate the females, he clearly perceived that no ſeeds would ever be produced in this ſpecies, unleſs ſeveral plants placed together were to flower nearly at the ſame time, and then one could impregnate the other. There is one thing farther remarkable in the *muſa*, viz. that it produces two ſorts of flowers very different in the ſame plant, ſome of which want the ſtigmata, and others the antheræ; the firſt may be called male hermaphrodites, and the latter female hermaphrodites. So that here we have a peculiar kind of polygamy, where thoſe different flowers may impregnate each other, and one female joined with barren males is impregnated by the males belonging to another female, which is itſelf barren. See *Generation of* PLANTS.

Of this genus Miller reckons two, and Linnæus four ſpecies.

The firſt ſort, or *muſa* with a nodding ſpike, and a long three-cornered fruit, is cultivated in all the iſlands in the Weſt Indies, where the fruit, which is roaſted in the embers, ſerves the negroes for bread; and ſome of the white people alſo prefer it to moſt other things, eſpecially to the yams and caſſada bread. This plant riſes with a ſoft herbaceous ſtalk fifteen or twenty feet high; the lower part is often as large as a man's thigh, diminiſhing gradually to the top, where the leaves come out on every ſide.

The fruit is eight or nine inches long, and above an inch diameter; the ſkin is tough, and within is a ſoft pulp of a luſcious ſweet flavour; the ſpikes of fruit are often ſo large as to weigh upwards of forty pounds. The leaves are uſed for napkins and table-cloths, and are food for hogs.

The ſecond ſort, with a nodding ſpike, and a cucumber ſhaped fruit, which is commonly called BANANA, differs from the former, in having its ſtalk marked with dark purple ſtripes and ſpots; the fruit is ſhorter, ſtraighter, and rounder; the pulp is ſofter, and of a more luſcious taſte, ſo is generally eaten by way of deſert, and ſeldom uſed in the ſame way with the former; therefore is not cultivated in ſuch plenty.

It grows in both the Indies, and the fruit is uſed, which is very nouriſhing, provokes urine, and ſtimulates to venery.

PLANTANOCEPHALUS, in *Botany*. See BUTTON-*tree*.

PLANTARIS, in *Anatomy*, a muſcle which has a fleſhy beginning from the back part of the external protuberance of the thigh-bone, and, deſcending a little way between the gemellus and ſoleus, becomes a long and ſlender tendon; which proceeds, by the inſide of the great tendon over the os calcis, to the bottom of the foot, and expands itſelf, under the ſole, upon the muſculus perforatus, to which it adheres cloſely, as the palmaris does to the hand. See *Tab. Anat.* (*Myol.*) *fig.* 1. *n.* 68.

Some reckon this among the extenders of the foot. See EXTENSOR.

PLANTATION, in the *Iſlands and Continent of America*, a ſpot of ground which ſome planter, or perſon arrived in a new colony, cultivates and tills for his own uſe.

Plantations, or colonies in diſtant countries, are either ſuch where the lands are claimed by right of occupancy only, by finding them deſart and uncultivated, and peopling them from the mother country; or where, when already cultivated, they have been either gained by conqueſt, or ceded to us by treaties. See COLONY.

But there is a difference between theſe two ſpecies of colonies, with reſpect to the laws by which they are bound. For it hath been held (Salk. 411, 666.) that if the uninhabited country be diſcovered and planted by Engliſh ſubjects, all the Engliſh laws then in being, which are the birth-right of every ſubject, are immediately there in force. But this muſt be underſtood with very many and very great reſtrictions. Such coloniſts carry with them only ſo much of the Engliſh law as is applicable to their own ſituation and the condition of an infant colony; ſuch, for inſtance, as the general rules of inheritance, and of protection from perſonal injuries. But in conquered or ceded countries, that have already laws of their own, the king may indeed alter and change thoſe laws; but, till he actually does change them, the ancient laws of the country remain, unleſs ſuch as are againſt the law of God, as in the caſe of an infidel country. 7 Rep. 17. Calvin's caſe. Show. Parl. cap. 31.

Our American *plantations* are principally of this latter ſort, being obtained in the laſt century either by right of conqueſt and driving out the natives, or by treaties. And, therefore, the common law of England, as ſuch, has no allowance or authority there; they being no part of the mother country, but diſtinct, though, till the late unhappy conteſt, dependent dominions. They, ſays Judge Blackſtone, are ſubject, however, to the controul of the parliament: whilſt, on the other hand, it is as ſtrenuouſly contended, that they neither are nor can be ſubject to the legiſlative authority of the parliament of Great Britain. But the litigation and deciſion of this queſtion has been unfortunately referred to the iſſue of a war, the wiſhed-for termination of which may produce alterations in the ſtate of our American *plantations*, and their connection with this country, which render it impoſſible now (1782) to ſay, how their government may be conducted for the future.

Previous to our late conteſt, our colonies, with reſpect to their interior polity, were of three ſorts: viz. Provincial eſtabliſhments, proprietary governments, and charter-governments. See CHARTER-*governments*.

PLANTATIONS and *Trade, board of*. See BOARD.

PLANTE-*ver*, in *Natural Hiſtory*, the name of a herb ſent over from China, where it is called *hiatſaotonetchom*; that is to ſay, a plant which at a certain time of the year changes into a worm. The Chineſe ſay, that this is a plant during the ſummer ſeaſon; but that in winter its ſtalk dies, and the root becomes a worm. Mr. Reaumur has well obſerved, that in the preſent improved ſtate of natural knowledge, we can give no credit to ſuch marvellous accounts; and of the roots ſent over to the Academy at Paris, it appeared, that only a certain part of each was to undergo this change: this, however, if true, was no leſs a marvel than that the whole ſhould.

Father Parenin, who ſent it to France, obſerves, in his account of it, that it was a very ſcarce plant even in China; being found only at the palace of Pekin there, where alſo it was not native, but brought from the mountains of Tibet, and ſome other places on the confines of the Chineſe dominions. This father had never ſeen the leaves or flowers of the plant, but only its roots, which were in high eſteem there, not only becauſe of their miraculous changes, but from their poſſeſſing the virtues of the famous ginſeng; but with this advantage, that the uſe of them was not ſubject to be attended with thoſe hæmorrhages which frequently affected the perſons who take large quantities of that famous root. The roots of this *plante-ver* are uſually about a quarter of an inch thick, and from an inch to three inches in length; but there are much larger in the places where they grow.

Theſe roots had nothing particular in their figure or appearance; but with theſe the father ſent ſome of thoſe which were ſuppoſed to be changed into worms, concerning which he obſerved, that nothing could more exactly expreſs a worm or caterpillar; the head, the eyes, the feet, and the mouth, being all plainly diſtinguiſhable, as well as the ſeveral folds and cuttings-in of the body. This account was found to be perfectly true; but the miſtake was the want of proper accuracy in the obſervation; for this body, which was ſuppoſed to be the root transformed, had in reality never been any part of the plant, but was found to be really and truly a caterpillar.

This was one of the under-ground kind, or at leaſt of thoſe which go into the ground to paſs their transformation: of theſe we have a great many different ſpecies in all parts of Europe, and ſome of them, when they are entering into their nymph ſtate, have a cuſtom of faſtening themſelves to the roots of plants, Of this kind was the Chineſe inſect, which, when the time of its change approached, always ſelected the roots of this plant as of a proper ſize and dimenſion for its purpoſe; and, gnawing off the end, hollowed away the ſtump, ſo as to introduce its tail into the cavity; where it remains covered with the bark of the root, which ſo nicely joins to it, that people who obſerve it in a ſlight way cannot but miſtake it to be a part of the root, or the remainder of the root a continuation of its body. The more accurate naturaliſts will, however, eaſily diſtinguiſh the vegetable fibres, which make up the root from the animal ones of the caterpillar; and to an eye accuſtomed to ſuch reſearches, the nice joining of the tail to the remainder of the root will eaſily diſcover itſelf. Mem. Acad. Par. 1720.

PLANTED *coat*, in the *Manege*. See HAIR.

PLANTING, in *Agriculture* and *Gardening*, the ſetting of a tree, or plant, taken up from its former place, in a new hole or pit, proportionable to its bulk, throwing freſh earth over its root, and filling up the hole to the level of the other ground.

As PLANTATIONS of trees are not only profitable to the owner, as well as ornamental to the country around them, but a national advantage, it may not be improper to give ſome general directions concerning them: referring to the ſeveral articles for more particular inſtructions.

Firſt, then, care muſt be taken to prepare the ground before trees are taken out of the earth; becauſe they ſhould never be ſuffered to remain long out of the ground. Care likewiſe is to be taken not to tear or bruiſe the roots of the trees, in raiſing them in order to be tranſplanted. When taken up, the next thing to be done is to prepare them for *planting*; which is done by cutting off all the ſmall fibres of the roots, and ſuch roots as are any wiſe injured in pulling up, or which croſs one another. The downright roots of fruit trees are likewiſe to be pruned off, as ſhould all their irregular branches; that, when agitated by the wind, they may not rub againſt or bruiſe each other. However, the main ſhoots ought by no means to be cut off as is but too often injudiciouſly practiſed.

Having thus prepared the trees for *planting*, they are next to be fixed in the ground; in doing which, if they have been long out of the ground, their roots ſhould be previouſly immerſed in water for eight or ten hours; and care muſt be taken to place them deeper or ſhallower, according to the nature of the ſoil; in which, if it be cold and moiſt they ſhould be planted very ſhallow: but if it be a hard rock or gravel, the beſt method of all is to raiſe a hill of earth, wherein to plant them. They ſhould be placed as erect as may be, with the roots as deep in the ground as they were growing before they were taken up, and the earth gently preſſed down about their roots; for it is a fault to make it too hard. Pales or ſtakes ſhould be fixed round thoſe that are ſtandards, in order to prevent their being diſplaced or blown down by the wind.

When the trees are thus *planted* and ſecured, a little mulch ſhould be laid upon the ſurface of the ground, to prevent its drying; and as to watering them, it ought to be done with great moderation, nothing being more hurtful to them than over watering.

The ſeaſons for *planting* are various, according to the different ſorts of trees, or the ſoil in which they are to be planted.

For ſuch trees whoſe leaves fall off in winter, the beſt time is the beginning of October, provided the ſoil be dry; but for a wet ſoil, it is better to defer it to the latter end of February, or the beginning of March; and for many kinds of ever-greens, the beginning of April is by far the beſt ſeaſon; though ſome ſorts may be ſafely removed at Midſummer, provided they are not to be carried far. They ſhould always be removed in a cloudy moiſt ſeaſon, by which means they will take root in a few days.

As the method of cultivating moſt trees, eſpecially garden ones, is explained under their reſpective articles, there is the leſs reaſon to be particular on that head in this place. However, one thing more deſerves to be well attended to, as regarding plantations in general. It is this; that plantations of fruit and other trees ſhould be raiſed always from trees tranſplanted from nurſeries, and never from hedge-rows, or trees of a large ſize, becauſe theſe laſt ſeldom come to good account, often dying after continuing alive for many years.

Another general rule in regard to plantations, is, to keep the ground clear of weeds, at leaſt for the ſpace of ſeven years; for which purpoſe it ſhould be annually dug, or plowed, where that can be done. This will encourage the roots of the trees to extend themſelves, whereby they will draw a larger proportion of nouriſhment. Miller's Gard. Dict.

PLANTING *an orchard*. See ORCHARD.

PLANTING *of foreſt trees*. See SEMINARY, NURSERY, TIMBER, and TREE. See alſo ASH, CHESTNUT, ELM, OAK, &c.

PLANTING *of wall fruit-trees*. After two years growth in the nurſery, ſtone-fruit, being firſt inoculated or grafted, are ready for removal; which is beſt done in October or November.

To prepare the ſoil for its new gueſt, a hole is dug two feet deep; or, if the ſoil be not very good, the pit is made ſhallower, and the earth raiſed above it. With the ſoil dug up, they frequently mix either a rich ſoil from elſewhere, or manure, ſo as the mixed be at leaſt as rich as the ſoil out of which the tree came. The hole being half filled up with this compoſt, it is trodden down, to afford a firm reſt to the root; all the extremities whereof are cut off, and the tree fitted to the wall, by cutting off ſuch branches as grow directly either towards or from the wall, and leaving only the ſide-branches, which are to be nailed to it.

This done, the tree is ſet in its hole, as far from the wall as is conſiſtent with the head's ſpreading thereon, that the root may have the more room backwards; and the hole is then filled up with the compoſt.

If the ſoil be poor, it is proper to manure round the tree; and, at the end of February, to cover it with fern or ſtraw. It will alſo be neceſſary to prune and nail the tree to the wall, at leaſt twice or thrice every year.

PLANTING, *inverſe*, or *reverſe*, is a method of *planting* wherein the ordinary poſition of the plant, or ſhoot, is inverted; the branches being ſet in the earth, and the roots reared into the air.

Agricola mentions this monſtrous way of *planting*, which, he aſſures us, ſucceeds very well in moſt, or all ſorts of fruit-trees, timber-trees, &c. both foreign and domeſtic. Bradley affirms to have ſeen a lime-tree, in Holland, growing with its firſt roots in the air, which had ſhot out branches in great plenty, at the ſame time that its firſt branches were turned into roots, and fed the tree.

The induſtrious Mr. Fairchild has practiſed the ſame with us, and gives us the following directions for the performance thereof.

Chuſe a young tree of one ſhoot, of alder, elm, willow, or any other tree that takes root readily by laying; bend the ſhoot gently down, till the extreme part be in the earth, and ſo let it remain till it has taken good root. This done, dig about the firſt root, and gently take it up out of the ground, and raiſe it till the ſtem be nearly upright; in which ſtate ſtake it up.

Then prune the roots, now erected in the air, from the bruiſes and wounds they received in being dug up; and anoint the pruned parts with a compoſition of four parts of bees-wax, four of tallow, two of reſin, and two of turpentine, melted together, and applied pretty warm. Then prune off all the buds or ſhoots upon the ſtem, and dreſs the wounds with the ſame compoſition, to prevent any collateral ſhootings; and leave the reſt to nature.

PLANTING, in *Architecture*, denotes the laying the firſt courſes of ſtone on the foundation, according to the meaſures, with all the exactneſs poſſible.

PLASHING, a term uſed by our farmers to expreſs an operation performed at certain times upon their quickſet-hedges, in order to aſſiſt their growth and continuance. This operation is performed ſometimes in October, but more uſually in February: and this is by much the better ſeaſon for it. Suppoſe a hedge to be of twenty or thirty years growth, and full of old ſtubs as well as young ſhoots: this is the kind of hedge that requires *plaſhing* moſt of all.

The old ſtubs muſt be cut off within two or three inches of the ground, and the beſt and longeſt of the middle-ſized ſhoots muſt be left to lay down. Some of the ſtrongeſt of theſe muſt be left to anſwer the purpoſes of ſtakes. Theſe are to be cut off to the height at which the hedge is intended to be left; and they are to ſtand at ten feet diſtance one from another; when there are not proper ſhoots for theſe at the due diſtances, their places muſt be ſupplied with common ſtakes of dead wood. The hedge is to be firſt thinned, by cutting away all but thoſe ſhoots which are intended to be uſed either as ſtakes, or the other work of the *plaſhing*: the ditch is to be cleaned out with the ſpade: the ditch muſt be now dug as at firſt, with ſloping ſides each way; and when there is any cavity on the bank on which the edge grows, or the earth has been waſhed away from the roots of the ſhrubs, it is to be made good by facing it, as they expreſs it, with the mould dug from the upper part of the ditch; all the reſt of the earth dug out of the ditch is to be laid upon the top of the bank, and the owner ſhould look carefully into it that this be done; for the workmen, to ſpare themſelves trouble, are apt to throw as much as they can upon the face of the bank; which, being by this means overloaded, is ſoon waſhed off into the ditch again, and a very great part of the work undone again, whereas what is laid on the top of the bank always remains there, and makes a good fence of an indifferent hedge.

In the *plaſhing* the quick, two extremes are to be avoided; theſe are, the laying it too low, and the laying it too thick: this makes the ſap run all into the ſhoots, and leaves the *plaſhes* without ſufficient nouriſhment into the *plaſhes*, and ſo makes the ſhoots ſmall and weak at the bottom, and, conſequently, the hedge thin. This is a common error in the north of England. The beſt hedges made any where in England are thoſe of Hertfordſhire; and they are *plaſhed* in the middle way between the two extremes, and the cattle are by that prevented both from cropping the young ſhoots, and from going through; and a new and vigorous hedge ſoon forms itſelf.

When the ſhoot is bent down that is intended to be *plaſhed*, it muſt be cut half way through with the bill: the cut muſt be given ſloping, ſomewhat downwards, and then it is to be wound about the ſtakes, and after this its ſuperfluous branches are to be cut off, as they ſtand out at the ſides of the hedge. If for the firſt year or two the field where a new hedge is made can be plowed, it will thrive the better for it; but if the ſtubs are very old, it is beſt to cut them quite down, and to ſecure them with good dead hedges on both ſides, till the ſhoots are grown up from them ſtrong enough to *plaſh*; and wherever void ſpaces are ſeen, new ſets are to be planted to fill them up. A new hedge raiſed from ſets in the common way, generally requires *plaſhing* about eight or nine years after. Mortimer's Huſbandry, p. 10.

PLASM, PLASMA, is ſometimes uſed for a MOULD, wherein any metal, or ſuch like running matter, which will afterwards harden, is caſt, to receive its figure.

PLASTER, or PLAISTER, in *Building*, a compoſition of lime, ſometimes with hair, ſometimes with ſand, &c. to parget or cover the nudities of a building.

There is alſo a *plaſter* of a coarſer ſort than the PLASTER of Paris, which is ſometimes uſed in this country for floors in gentlemen's houſes, and for corn-granaries: it is made of a bluiſh ſtone, taken out of quarries, which are generally at the ſide of a hill, much like the ſtone of which Dutch terraſs is made: the ſtone is burnt like lime, becomes white by burning, and when mixed with water, does not ferment like lime: when cold, it is beat into a fine powder; and when it is uſed, the quantity of about a buſhel is put into a tub, and water applied to it, till it becomes liquid: in this ſtate it is well ſtirred with a ſtick, and uſed immediately; for in leſs than a quarter of an hour it becomes hard and good for nothing, as it will not bear being mixed a ſecond time like lime. See GYPSUM, and PLASTERING.

PLASTER, in *Pharmacy*, an external application of a harder conſiſtence than our ointments: theſe are to be ſpread according to the different circumſtances of the wound, place, or patient, either upon linen or leather.

If the part upon which they are to be laid be naturally hairy, it muſt be ſhaved; but that they may ſtick the better, the natural ſhape of the part muſt be conſulted, and the *plaſter* ſpread and formed accordingly, either round, ſquare, triangular, elliptical, in a lunar form, or in ſhape of the letter T. Some alſo are divided at both ends, and others are perforated in the middle: theſe laſt are of frequent uſe in fractures attended with a wound; for by this contrivance the wound may be cleanſed and dreſſed without removing the *plaſter*.

Indeed there is almoſt no part of the body which a *plaſter* of one of thoſe forms may not be made to ſerve for, if it be notched about the edges with a pair of ſciſſars. See EMPLASTER.

The uſe of *plaſters* are various; they are ſerviceable in ſecuring the dreſſings, they alſo forward the maturation of the pus, agglutinate and heal wounds, unite broken bones, heal burns, aſſuage pain, and ſtrengthen weak parts. Heiſter.

The calces of lead boiled with oils unite with them into a *plaſter* of a proper conſiſtence, which makes the baſis of ſeveral other *plaſters*: in boiling theſe compoſitions, a quantity of hot water muſt be added from time to time, to prevent the *plaſter* from burning and growing black; but this ſhould be done with care, leſt it cauſe the matter to explode.

PLASTERS, *adheſive*, *anodyne*, *bliſtering*, *common*, *drawing*, *gum*, *mercurial*, *ſtomach*, and *ſtrengthening*. See EMPLASTRUM.

PLASTER, *warm*, is made by melting together, over a gentle fire, one ounce of gum *plaſter*, and two drachms of bliſtering *plaſter*. This is uſeful in the ſciatica, and other fixed pains of the rheumatic kind; it ought, however, to be worn for ſome time, and to be renewed, at leaſt, once a week.

PLASTER, *wax*, is formed by melting together one pound of yellow wax, half a pound of white reſin, and three quarters of a pound of mutton ſuet. This is generally uſed inſtead of the MELILOT *plaſter*, and is a proper application after bliſters, and in other caſes where a gentle digeſtion is neceſſary.

PLASTER *of Paris*, is a fiſſile ſtone, ſerving many purpoſes in building; and uſed likewiſe in ſculpture, to mould and make ſtatues, baſſo relievos, and other decorations in architecture.

It is dug out of quarries, in ſeveral parts of the neighbourhood of Paris; whence its name. The fineſt is that of Montmartre.

Plaſter of Paris, among our workmen, is of two kinds, viz. *crude*, or in the ſtone, and *burnt*, or beaten.

The *crude* is the native *plaſter*, as it comes out of the quarry; in which ſtate it is uſed as ſhards in the foundations of buildings.

The *burnt plaſter*, is a preparation of the former, by calcining it like lime in a kiln or furnace, and then beating it into powder, and diluting and working it. In this ſtate it is uſed as mortar, or cement, in building.

This, when well ſifted, and reduced into an impalpable powder, is uſed alſo to make figures, and other works of ſculpture; and is, beſides, of ſome uſe in taking out ſpots of greaſe, &c. in ſtuffs and ſilks.

In the *plaſter* quarries is alſo found a kind of falſe talc, or plated ſelenites, wherewith they counterfeit all kinds of marble. See Gypsum.

The method of repreſenting a face truly in *plaſter of Paris*, is this: the perſon whoſe figure is deſigned, is laid on his back, with any convenient thing to keep off the hair. Into each noſtril is conveyed a conical piece of ſtiff paper, open at both ends, to allow of reſpiration. Theſe tubes being anointed with oil, are ſupported by the hand of an aſſiſtant; then the face is lightly oiled over, and the eyes being kept ſhut, alabaſter freſh calcined, and tempered to a thinniſh conſiſtence with water, is by ſpoonfuls nimbly thrown all over the face, till it lies near the thickneſs of an inch. This matter grows ſenſibly hot, and in about a quarter of an hour hardens into a kind of ſtony concretion; which being gently taken off, repreſents, on its concave ſurface, the minuteſt part of the original face. In this a head of good clay may be moulded, and therein the eyes are to be opened, and other neceſſary amendments made. This ſecond face being anointed with oil, a ſecond mould of calcined alabaſter is made, conſiſting of two parts joined lengthways along the ridge of the noſe; and herein may be caſt, with the ſame matter, a face extremely like the original.

If finely powdered alabaſter, or *plaſter of Paris*, be put into a baſon over a fire, it will, when hot, aſſume the appearance of a fluid, by rolling in waves, yielding to the touch, ſteaming, &c. all which properties it again loſes on the departure of the heat; and being thrown upon paper, will not at all wet it, but immediately diſcover itſelf to be as motionleſs as before it was ſet over the fire; whereby it appears, that a heap of ſuch little bodies as are neither ſpherical, nor otherwiſe regularly ſhaped, nor ſmall enough to be below the diſcernment of the eye, may, without fuſion, be made fluid, barely by a ſufficiently ſtrong and various agitation of the particles which compoſe it; and, moreover, loſe its fluidity immediately upon the ceſſation thereof.

Two or three ſpoonfuls of burnt alabaſter, mixed up thin with water, in a ſhort time coagulate, at the bottom of a veſſel full of water, into a hard lump, notwithſtanding the water that ſurrounded it. Artificers obſerve, that the coagulating property of burnt alabaſter will be very much impaired or loſt, if the powder be kept too long, eſpecially if in the open air, before it is made uſe of; and when it hath been once tempered with water, and ſuffered to grow hard, they cannot, by any burning or powdering of it again, make it ſerviceable for their purpoſe as before. Boyle's Works Abr. vol. i. p. 133, 313, 341.

This matter, when wrought into veſſels, &c. is ſtill of ſo looſe and ſpongy a texture, that the air has eaſy paſſage through it. Mr. Boyle gives an account among his experiments with the air-pump, of his preparing a tube of this *plaſter*, cloſed at one end and open at the other, and on applying the open end to the cement, as is uſually done with the receivers, it was found utterly impoſſible to exhauſt all the air out of it; for freſh air from without, preſſed in as faſt as the other, or internal air was exhauſted, though the ſides of the tube were of a conſiderable thickneſs. A tube of iron was then put on the engine; ſo that being filled with water, the tube of *plaſter of Paris* was covered with it; and on uſing the pump, it was immediately ſeen, that the water paſſed through into it as eaſily as the air had done, when that was the ambient fluid. After this, trying it with Venice turpentine inſtead of water, the thing ſucceeded very well; and the tube might be perfectly exhauſted, and would remain in that ſtate ſeveral hours. After this, on pouring ſome hot oil upon the turpentine, the caſe was much altered; for the turpentine melting with this, that became a thinner fluid, and in this ſtate capable of paſſing like water into the pores of the *plaſter*. On taking away the tube after this, it was remarkable that the turpentine which had pervaded and filled its pores, rendered it tranſparent, in the manner that water gives tranſparency to that ſingular ſtone called *oculus mundi*. In this manner, the weight of air, under proper management, will be capable of making ſeveral ſorts of glues penetrate *plaſter of Paris*; and not only this, but baked earth, wood, and all other bodies porous enough to admit water on this occaſion. Phil. Tranſ. N° 122.

Plaſter of Paris, diluted with water into the conſiſtence of a ſoft or thin paſte, quickly ſets or grows firm, and at the inſtant of its ſetting, has its bulk increaſed; for Mr. Boyle has found, that a glaſs veſſel, filled with the fluid mixture, and cloſely ſtopped, burſts while the mixture ſets, and ſometimes a quantity of water iſſues through the cracks.

This expanſion of the *plaſter* in paſſing from a ſoft to a firm ſtate, is one of its valuable properties; rendering it an excellent matter for filling cavities in ſundry works, where other earthy mixtures would ſhrink and leave vacuities, or entirely ſeparate from the adjoining parts.

It is probable alſo, that this expanſion of the *plaſter* might be made to contribute not a little to the elegance of the impreſſions which it receives from medals, &c. by properly confining the ſoft matter, that its expanſion may force it into the minuteſt traces of the figure; the expanſion of the matter doing the ſame office as the preſſure by which the wax is forced into the cavities of a ſeal.

Plaſter of Paris promotes the fuſion of forged Iron.

This ſubſtance is commonly uſed for taking caſts and impreſſions from figures, buſts, medals, &c. as it is adapted to the double uſe of making both caſts and moulds for forming them. See *Impreſſions of* Medals.

PLASTERING. The modern taſte runs greatly into *plaſtering*; and it were much to be wiſhed that this art could be again brought to its ancient perfection. In our beſt buildings the *plaſtered* walls and cielings crack and fly, and in a little time grow damp, or moulder to decay. The Romans had an art of rendering their works of this kind much more firm and durable, and there is no reaſon to deſpair of reviving this art by proper trials.

The ancient *plaſtering* of theſe people preſerved to this time, where it has not met with violent blows or injuries from accidents, is ſtill found as firm and ſolid, as free from cracks or crevices, and as ſmooth and poliſhed on the ſurface, as if made of marble. The bottoms and ſides of the Roman aqueducts were made of this *plaſtering*, and endured many ages without hurt, unleſs by accidents; witneſs that whereof ſome yards are ſtill to be found on the top of the Pont de Garde, near Niſmes, for the ſupport of which that famous bridge was built to carry water to the ſaid town. The roofs of houſes, and the floors of rooms at Venice are covered with a ſort of *plaſter*, made of later date, and yet ſtrong enough to endure the ſun and weather for ſeveral ages, without cracking or ſpoiling, and without much injury from people's feet.

The ſecret of preparing this Venetian *plaſter* is not among us; but it would be worth while to try whether ſuch a ſubſtance might not be made by boiling the powder of gypſum dry over the fire, for it will boil in the manner of water; and when this boiling or recalcining was over, the mixing with it reſin, or pitch, or both together: with common ſulphur, and the powder of ſea-ſhells. If theſe were all mixed together, and the water added to it hot, and the matter all kept hot upon the fire till the inſtant of its being uſed, ſo that it might be laid on hot, it is poſſible this ſecret might be hit upon.

Wax and oil of turpentine may be alſo tried as additions: theſe being the common ingredients in ſuch cements as we have accounts of as the firmeſt. Strong ale-wort is by ſome directed to be uſed, inſtead of water, to make mortar of lime-ſtone of a more than ordinary ſtrength. It is poſſible, that the uſe of this tenacious liquor to the powdered ingredients of this propoſed *plaſter*, might greatly add to their ſolidity and firmneſs. Phil. Tranſ. N° 93.

PLASTIC, Πλαϛικος, from πλαϛης, of πλαττω, or πλασσω, *fingo*, *I faſhion*, *form*, &c. imports as much as *formative*, or a thing indued with a faculty of forming or faſhioning a maſs of matter after the likeneſs of a living being.

Some of the ancient Epicureans, and perhaps the Peripatetics too, imagine a *plaſtic* virtue to reſide in the earth, or at leaſt to have anciently reſided therein; and that it was by means hereof, and without any extraordinary intervention of a Creator, that it firſt put forth plants, &c. Nay, ſome of them, whether ſeriouſly or not we do not undertake to determine, taught that animals, and even man, were the effects of this *plaſtic* power.

Some learned modern writers have ſtrenuouſly contended for the doctrine of a *plaſtic nature*, which they have deſcribed to be an incorporeal created ſubſtance, endued with a vegetative life, but not with ſenſation or thought, penetrating the whole created univerſe, being co-extended with it, and, under God, moving matter ſo as to produce the phenomena, which cannot be ſolved by mechanical laws; active for ends unknown to itſelf, not being conſcious of its own actions, and yet having an obſcure idea of the action to be entered upon. Dr. Cudworth reaſons thus: ſince neither all things are produced fortuitouſly, or by the unguided mechaniſm of matter, nor God himſelf may reaſonably be thought to do all things immediately and miraculouſly, it may well be concluded, that there is a *plaſtic* nature under him, which, as an inferior and ſubordinate inſtrument, doth drudgingly execute that part of his providence, which conſiſts in the regular motion of matter; yet ſo as that there is alſo, beſides this, a higher providence to be acknowledged, which, preſiding over it, doth often ſupply the defects of it, and ſometimes over-rule it: for as much as this *plaſtic* nature cannot act electively, nor with diſcretion. This doctrine, he ſays, hath had the ſuffrage of the beſt philoſophers of all ages. Ariſtotle, Plato, Empedocles, Heraclitus, Hippocrates, Zeno, and the Stoics, and the latter Platoniſts and Peripatetics, as well as the chemiſts and Paracelſians, maintained this doctrine. Intell. Syſtem. vol. i. p. 147, &c. Birch's Ed. More's Imm. of the Soul, lib. iii. cap. 12.

PLASTICE, Πλαϛικη, the PLASTIC *art*, a branch of SCULPTURE; being the art of forming figures of men, birds, beaſts, fiſhes, plants, &c. in plaſter, clay, ſtucco, or the like.

The workmen concerned herein are alſo called *plaſtæ*, ϖλαϛαι.

Plaſtice differs from carving, becauſe here the figures are made by addition of ſomething that is wanting; but in carving, always by ſubtraction of what is ſuperfluous.

The *plaſtic art* is now chiefly uſed, among us, in fret-work ceilings: but the Italians apply it alſo to the mantlings of chimneys with great figures.

PLAT, a popular term, among *Mariners*, &c. for a ſea-chart.

PLAT-*veins*, in the *Manege*, called in French *ars*, are the veins in which we bleed horſes, one in the lower part of each ſhoulder, when we bleed a horſe in the ſhoulders; and in the flat part of the thighs.

PLATS, in a *Ship*, flat ropes made of rope-yarn, and twiſted into foxes; they ſerve to ſave the cable from galling in the hawſe, or to wind about the flukes of the anchors, to ſave the pennant of the fore-ſheet from galling againſt them.

PLATA, **PLATE**, in *Commerce*, a Spaniſh term, ſignifying ſilver; as vellon, which they pronounce vellion, ſignifies copper.

Theſe two terms are not only uſed to expreſs the ſpecies of thoſe metals ſtruck in Spain, but alſo to diſtinguiſh between their ſeveral monies of account. Thus they ſay, a DUCAT of *plata*, and a ducat of vellon; a rial of *plata*, and a RIAL of vellon: which denominations augment and diminiſh the value by almoſt one half; thirty-four maravedis of *plata* being equal to ſixty-three of vellon; and the PIECE *of eight* being only two hundred and ſeventy-two MARAVEDIS of *plata*, but five hundred and ten of vellon. See COIN.

PLATÆ, a word uſed by ſome anatomical writers to expreſs the ſcapulæ.

PLATALEA, in *Ornithology*. See SPOON-*bill*.

PLATAMON, a word uſed to expreſs a low and ſmooth rock, juſt appearing above water.

PLATANARIA, in *Botany*, a name by which ſome authors have called the *ſpargarium*, or burr-reed, from its round echinated fruit, which in ſhape and ſize much reſemble thoſe of the *platanus*.

PLATANUS, in *Botany*. See PLANE-*tree*.

PLAT-BAND, in *Gardening*, a border, or bed of flowers, along a wall, or the ſide of a parterre; frequently edged with box, &c.

PLAT-BAND, in *Architecture*, is any flat ſquare moulding, whoſe height much exceeds its projecture. See *Tab. Architect. fig.* 25.

Such are the faces, or faſciæ, of an architrave, and the *plat-bands* of the modillions of a cornich.

The *plat-band* is ſignified in Vitruvius, and others, by the words FASCIA, *tænia*, and *corſa*.

PLAT-BAND of door or window, is uſed for the lintel, where that is made ſquare, or not much arched.

Theſe *plat-bands* are uſually croſſed with bars of iron when they have a great bearing: but it is much better to eaſe them by arches of diſcharge built over them.

PLAT-BANDS of flutings, the liſts, or fillets, between the flutings of columns.

PLATE, in *Commerce*, denotes gold or ſilver wrought into veſſels for domeſtic uſes.

PLATE, in *Heraldry*, is a round flat piece of ſilver, without any impreſſion; but, as it were, formed ready to receive it.

The term is uſed only by the Engliſh heralds. In other nations they are known by the name of BESANTS *argent*.

PLATE, a term uſed by our ſportſmen to expreſs the reward given to the beſt horſe at our races.

The winning a *plate* is not the work of a few days to the owner of the horſe, but great care and preparation are to be made for it, if there is any great dependence on the ſucceſs. A month is the leaſt time that can be allowed to draw the horſe's body clear, and to refine his wind to that degree of perfection that is attainable by art.

It is firſt neceſſary to take an exact view of his body, whether he be low or high in fleſh; and it is alſo neceſſary to conſider whether he be dull and heavy, or briſk and lively, when abroad. If he appear dull and heavy, and there is reaſon to ſuppoſe it is owing to too hard riding; or, as the jockies expreſs it, to ſome greaſe that has been diſſolved in hunting, and has not been removed by ſcouring, then the proper remedy is half an ounce of diapente, given in a pint of good ſack; this will at once remove the cauſe, and revive the creature's ſpirits. After this, for the firſt week of the month, he is to be fed with oats, bread, and ſplit beans, giving him ſometimes the one, and ſometimes the other, as he likes beſt; and always leaving ſome in the locker, that he may feed at leiſure when he is left alone. When the groom returns at the feeding time, whatever is left of this muſt be removed, and freſh given; by this means the creature will ſoon become high ſpirited, wanton, and full of play. Every day he muſt be rode out an airing, and every other day it will be proper to give him a little more exerciſe; but not in ſuch a degree as to make him ſweat too much.

The beans and oats in this caſe are to be put into a bag, and beaten till the hulls are all off, and then winnowed clean; and the bread, inſtead of being chipped in the common way, is to have the cruſt clean cut off.

If the horſe be in good fleſh and ſpirits when taken up for its month's preparation, the diapente muſt be omitted; and the chief buſineſs will be to give him good food, and ſo much exerciſe as will keep him in wind, without over-ſweating or tiring his ſpirits. When he takes larger exerciſe afterwards, towards the end of the month, it will be proper to have ſome horſes in the place to run againſt him. This will put him upon his mettle, and the beating them will give him ſpirits.

This, however, is to be cautiouſly obſerved, that he has not a bloody heat given him for ten days or a fortnight before the *plate* is to be run for; and that the laſt heat that is given him the day before the race, muſt be in his cloaths: this will make him run with greatly more vigour, when ſtripped for the race, and feeling the cold wind on every part. In the ſecond week, the horſe ſhould have the ſame food and more exerciſe; and in the laſt fortnight he muſt have dried oats, that have been hulled by beating; after this they are to be wetted in a quantity of whites of eggs, beaten up, and then laid out in the ſun to dry; and when as dry as before, the horſe is to have them. This ſort of food is very light of digeſtion, and very good for the creature's wind. The beans in this time ſhould be given more ſparingly, and the bread ſhould be made of three parts wheat, and one part beans. If he ſhould become coſtive under this courſe, he muſt then have ſome ale and whites of eggs beaten together: this will cool him, and keep his body moiſt.

In the laſt week the maſh is to be omitted, and barley-water given him in its place; and every day, till the day before the race, he ſhould have his fill of hay; then he muſt have it given him more ſparingly, that he may have time to digeſt it; and in the morning of the race-day, he muſt have a toaſt or two of white bread, ſoaked in ſack, and the ſame juſt before he is led out of the field. This is an excellent method, becauſe the two extremes of fullneſs and faſting are at this time to be equally avoided; the one, hurting his wind, and the other, occaſioning faintneſs that may make him loſe. After he has had his food, the litter is to be ſhook up, and the ſtable kept quiet, that he may be diſturbed by nothing till he is taken out to run. See RACING.

PLATES, in *Gunnery*. The *priſe-plates*, are two *plates* of iron on the cheeks of a gun-carriage, from the cap-ſquare to the centre, through which the priſe-bolts go, and on which the hand-ſpike reſts when it poiſes up to the breech of the piece. Breaſt-*plates* are the two *plates* on the face of the carriage, one on each cheek. Train-*plates* are the two *plates* on the cheeks at the train of the carriage. Dulidge *plates* are the fixed *plates* on the wheel of a gun-carriage, where the fellows are joined together, and ſerve to ſtrengthen the dulidges.

PLATES, *copper*, in *Engraving*. See COPPER-*plates*.

PLATES, *ground*, in *Building*. See GROUND-*plates*.

PLATES, *pintle*. Sep PINTLE.

PLATE-*glaſs*. See GLASS.

PLATES, *colours of glaſs*. See COLOURS.

PLATE-*longe*, in the *Manege*, a woven ſtrap, four fathom long, three fingers broad, and as thick as one. It is uſed for raiſing a horſe's legs, and ſometimes for taking him down, in order to facilitate ſeveral operations of the farrier. Some improperly give the name of *plate-longe* to a MARTINGALE.

PLATEA, in *Ornithology*, the name of a bird of the long-necked kind, approaching to the nature of the ſtork and heron, and called in Engliſh the SPOON-*bill*.

PLATESSA, in *Ichthyology*, a name by which Auſonius and ſome other authors have called the paſſer-fiſh, or common PLAISE.

PLAT-FOND, in *Architecture*, the ſame as SOFFIT.

PLAT-FORM, in the *Military Art*, an elevation of earth, a floor of wood or ſtone, on which cannon is placed to fire on the enemy.

Such are the mounts in the middle of the curtins. On the rampart there is always a *plat-form*, where the cannon are mounted.

It is made by the heaping up of earth on the rampart, or by an arrangement of madriers, riſing inſenſibly for the cannon to roll on, either in a caſemate, or an attack in the out works.

Plat-forms are generally laid ſloping towards the parapet, nine or ten inches; this declivity carries off the rain, prevents the gun from recoiling ſo much when fired as it would do if laid level; and, when loaded, it is more eaſily brought to the embraſure.

In temporary batteries, the *plat-forms* are made of planks laid acroſs ground-timbers or ſleepers, uſually five in number, and kept ſteady by ſtakes at each end; there is uſually a *plat-form* made to each gun; it is commonly about eighteen feet long, eight feet broad next the parapet, and about fourteen feet broad at the tail, the intermediate ſpaces between the *plat-forms* ſerving for the ſhot and other neceſſaries. When a *plat-form* is to be laid on marſhy ground, firſt lay a floor or two of faſcines; cover theſe with hurdles, twelve or fifteen feet long, and ſix or ſeven broad; on theſe lay a floor of three or four inches of earth, and therein lay the ſleepers, and over them the planks. When a BATTERY is built of ſtone or brick, the *plat-form* is generally a flat ſtone-pavement ranging the whole length of the battery: this, on account of its reſiſting the injuries of the weather for a long time, is to be preferred to planks; but in caſe of bombardment ſuch a *plat-form* is to be avoided, becauſe the ſhells will not only break the pavement, but alſo, by driving about the broken ſtones, do much miſchief to the troops.

All practitioners are agreed, that no ſhot can be depended on, unleſs the piece be placed on a ſolid *plat-form*; for if the *plat-form* ſhakes with the firſt impulſe of the powder, it is impoſſible but the piece muſt likewiſe ſhake; which will alter its direction, and render its ſhot uncertain. To prevent this accident, the *plat-form* is uſually made extremely firm to a conſiderable depth backwards, ſo that the piece is not only well ſupported in the beginning of its motion, but likewiſe through a great part of its recoil. However, it is ſufficiently obvious, that when the bullet is ſeparated from the piece, it can be no longer affected by the trembling of the piece or *plat-form*; and by a very eaſy computation it will be found, that in a piece ten feet in length, carrying a bullet of twenty-four pounds, and charged with ſixteen pounds of powder, the bullet will be out of the piece before it has recoiled half an inch; whence if the *plat-form* be ſufficiently ſolid at the beginning of the recoil, the remaining part of it may be much ſlighter, ſince its unſteadineſs beyond the firſt half inch will have no influence on the direction of the ſhot: and hence a more compendious method of conſtructing *plat-forms* may be found out. New Princip. of Gunnery, p. 42.

Plat-form, in *Architecture*, is a row of beams, which ſupport the timber work of a roof and lie at the top of the wall where the entablature ought to be raiſed.

Plat-form is alſo uſed for a kind of terrace, or broad, ſmooth, open walk, at the top of a building, from whence we may take a fair proſpect of the adjacent country.

Hence an edifice is ſaid to be covered with a *plat-form*, when it is flat at top, and has no ridge.

Moſt of the oriential buildings are thus covered, as were all thoſe of the ancients. Cæſar was the firſt among the Romans who procured leave to build his houſe with a ridge or pinnacle.

Plat-form, in a *Man of War*. See ORLOP.

PLATIASMOS, of πλατιαζω, *I dilate*, formed from πλατυς, *wide*, a word uſed by many authors to expreſs a fault in pronunciation, owing to a perſon's opening his mouth too wide, and thence ſpeaking indiſtinctly.

PLATICORIA, formed of πλατυς, *wide*, and κορη, *pupil*, a word uſed by medical writers to expreſs a preternatural dilatation of the pupil of the eye, uſually owing to a paralytic diſorder.

PLATINA, in *Natural Hiſtory*, a metallic ſubſtance lately diſcovered, analogous to the perfect metals, and eſpecially to gold, many of the properties of which it poſſeſſes; and, in conſequence of modern experiments, ſuppoſed to be itſelf a perfect metal.

The name *platina* ſeems to be a diminution of *plata*, *ſilver*, and expreſſes the moſt obvious appearance of this body, which is that of ſilver-coloured metal in ſmall grains. It is alſo called *platina del Pinto*, probably becauſe Pinto is the name of ſome particular diſtrict, which affords it; *Juan blanco*, *white Jack*, *white rogue*, *white mock metal*, and *diabolous metallorum*, becauſe it was found to be refractory and unmanageable, and, though reſembling true metals in aſpect and weight, found to elude all attempts for ſmelting or running it down; and *or blanc*, or *white gold*, on account of its relation to gold.

Platina, *hiſtory of*. D'Ulloa is the firſt writer who mentions *platina* by name. In his voyage to South America, in 1735, and the following years, printed at Madrid in 1748, ſpeaking of the gold and ſilver mines of Quito, he relates, that in the territory of Choco there were gold mines which they were obliged to abandon, becauſe the mineral was mixed with *platina*; which he deſcribes as a ſtone, ſo hard that it is not eaſily broken by a blow upon an anvil; that it is not ſubdued by calcination; and that it is very difficult to extract the metal it contains even with much labour and expence.

In 1741, Mr Charles Wood found ſome *platina* in Jamaica, which was brought thither from Carthagena; and in his account of it he obſerves, that the Spaniards have a method of caſting it into different kinds of toys, which are common in the Spaniſh Weſt Indies. But Dr. Lewis has ſince found, that this caſt metal, which has been often confounded with the native or mineral *platina*, is a compoſition of the true *platina* with ſome other metallic bodies. Some have ſuppoſed that *platina* is the produce of the Eaſt as well as Weſt Indies; but this does not appear to be the caſe. It is undoubtedly obtained from the Spaniſh Weſt Indies, and in the greateſt quantities from the provinces of Quito and Peru.

Soon after the importation of this ſubſtance into England, it was found, that the Spaniards, having diſcovered that it ſuſtained all the ordinary trials of gold, poſſeſſed nearly the ſame ſpecific gravity, and rendered gold much leſs pale than ſilver, had a method of adulterating gold with it, which was ſo brittle, that it could not be refined nor applied to any uſe. And it is ſaid, that, in order to prevent frauds of this kind, the king of Spain ordered the mines that afforded it to be ſtopped up: but there is now no danger of ſuch fraud, ſince modern experiments have diſcovered eaſy means for diſtinguiſhing with certainty gold debaſed by *platina*, and for completely parting the two metals, however they may be blended together by accident or by deſign.

The firſt experiments that were made with this ſubſtance were thoſe of Mr. Wood; one of which, viz. the cupellation of the caſt metal with lead, was afterwards repeated, more circumſpectly, by Dr. Brownrigg, who preſented an account of the whole to the Royal Society by Dr. Watſon, and the account was publiſhed in the Phil. Tranſ. vol. xliv. art. 12. p. 584, &c.

But we owe the greateſt part of our knowledge concerning this ſubſtance, to the numerous and accurate experiments of Dr. Lewis, publiſhed, in ſix papers, in the forty-eighth and forty-ninth volumes of the Tranſactions; and farther purſued in his excellent work, intitled Commercium Philoſophico-Technicum.

In 1752. Mr. Scheffer, of the Swediſh Academy, publiſhed two Memoirs on the ſame ſubject; and another, containing remarks on ſome of the experiments of Dr. Lewis in 1757. A French tranſlation of the four firſt papers of Dr. Lewis, and the two firſt Memoirs of Mr. Scheffer, was publiſhed at Paris by M. Morin, in 1758, under the title of La Platine, l'Or blanc, ou le huitieme Metal, &c. In conſequence of this publication, Meſſrs. Margraaf, Macquer, and Beaumé, directed their attention to this ſubject; the experiments of the former were firſt publiſhed among the Memoirs of the Berlin Academy, for the year 1757, printed in 1759, and ſince in the firſt volume of his Chemical Writings; thoſe of the two latter gentlemen were publiſhed in the Memoirs of the Academy of Paris, for 1758, printed in 1763.

Some farther experiments on this ſingular anomalous ſubſtance have been more lately made and publiſhed by Meſſrs. de Buffon, de Liſle, and Morveau. See Buffon's Supplement, vol. ii. and Rozier's Journal for September, 1775.

Platina, *deſcription and properties of*. *Platina* in grains, as it is brought into England, is of a ſhining whitiſh colour, ſomewhat approaching to that of ſilver, but leſs white. Its colour is not tarniſhed or altered by air or moiſture, or by any vapours uſually floating in the atmoſphere, even by thoſe which diſcolour ſilver, and appears to be equally permanent with that of pure gold. As it is incapable of acquiring ruſt, it is alſo perfectly indeſtructible in the fire. The grains are of various ſizes; ſome few being as large as linſeed, but moſt of them much ſmaller. In figure ſome of them are triangular, others circular, but moſt of them flat, with a ſmooth ſurface, and the edges and angles generally rounded off. Some few of the grains are weakly attracted by a magnetic bar.

Dr. Ingenhouſz (Phil. Tranſ. vol. lxvi. part i. p. 262). obſerves, that every one of the particles of ſome fine *platina*, which he examined, obeyed the magnet, more or leſs, except ſome tranſparent ſtony particles; and that even theſe were all magnets in themſelves; or that each particle had two poles, which he could change at pleaſure by the application of magnetical bars. In thoſe grains of *platina* which Dr. Lewis examined, he found an intermixture of ſeveral heterogeneous particles: ſuch as a conſiderable quantity of blackiſh duſt, ſome particles of which were of a deep ſparkling black colour, reſembling the black ſand of Virginia, and were much attracted by a magnetic bar; and others of a browniſh hue, not attracted at all, with which ſeveral bright particles, that appeared to be fragments of the grains of the *platina*, were intermixed. The magnetic duſt juſt mentioned ſeemed to be fragments of other irregular dark-coloured particles, which reſembled pieces of emery or load-ſtone; ſome of theſe were attracted by the magnet very weakly, and others not at all. There were alſo ſome rough yellow particles, very malleable, which appeared to be gold, with ſome mixture of *platina*.

Moſt of the gold particles of *platina*, ſays Dr. Ingenhouſz, ubi ſupra, are evidently attracted by the magnet, and diſcovered upon the ſurface of the water their two diſtinct poles; and this magnetical quality he aſcribes to ſome *platina* mixed with gold.

Dr. Lewis farther obſerves, that the grains of *platina* conſiſt likewiſe of a few globules of quick-ſilver with ſome particles of the *platina* intermixed, and pretty ſtrongly adhering; which have been alſo diſcovered by M. Margraaf. They contain alſo fine colourleſs tranſparent particles which were hard to break under the hammer, and were not ſenſibly acted upon by aqua fortis, and which are probably fragments of quartz: and a few irregular particles of a jet-black colour, which eaſily broke, and laid on a red-hot iron emitted a yellowiſh ſmoke, and ſmelt like burning coal.

Dr. Lewis obſerves, that there is reaſon to ſuſpect that this mineral does not come to us in its native form; but that it has probably been ground in mills and worked with quickſilver, in order to extract the particles of gold intermixed with it: and ſome later accounts confirm this conjecture, that *platina* is found in large maſſes, and is reduced into ſmooth grains by ſtamping and grinding. M. de Buffon expreſsly ſays, that a perſon of credit had aſſured him, that *platina* is ſometimes found in large maſſes, and that he had ſeen a lump of it weighing no leſs than twenty pounds, which had not been melted, but had been taken in that ſtate out of the mine.

However this be, all the matters above mentioned are entirely adventitious to the *platina*, and their quantities are very various: the magnetic or ferruginous matter being always the moſt conſiderable, and poſſibly the only conſtant admixture.

When we conſider the heterogeneous particles with which *platina* is combined, we need not wonder at the different accounts which different writers give of its ſpecific gravity. Dr. Lewis found, by weighing hydroſtatically ſeveral different particles, that the gravity compared with that of water was very nearly as ſeventeen to one, never leſs than 16.500 nor greater than 17.200. Dr. Pemberton and Mr. Ellicott reported it to be about 17; and Dr. Davies found the gravity of a parcel which he tried to be 17.233. M. Margraaf ſtates the gravity of *platina* to that of gold as $18\frac{1}{2}$ to 19: and Dr. Lewis, having taken previous pains to cleanſe and prepare a quantity of the larger grains, in order to come as near as poſſible to the ſpecific weight of the pure *platina*, found its gravity on many trials to be upwards of eighteen; though the microſcope ſtill diſcovered a portion of blackiſh matters in the cavities of the grains. Theſe accounts are very different from thoſe which reſult from the experiments of M. de Buffon, and M. Tillet, who affirm, that *platina* is ſpecifically lighter than gold by at leaſt an eleventh or twelfth part, and that its denſity is a mean between that of gold and iron.

The great weight of *platina*, Dr. Lewis apprehends, inſtead of being a proof of its containing gold, affords rather a preſumption of its being a ponderous body diſtinct from gold.

By experiments on this ſubſtance, ſome of the purer grains of it have been found, by gentle ſtrokes of a flat hammer on a ſmooth anvil to bear extenſion into thin plates, without breaking or cracking about the edges; and therefore *platina* appears to be a malleable metal; though different grains ſeemed to poſſeſs this property in a different degree, ſome being more brittle than others, and all being more brittle when red-hot than when cold. The brittleneſs of thoſe that craked ſooneſt and were moſt eaſily reduced to powder is ſuppoſed to proceed from ſome accidental cauſe.

As fuſion is neceſſary for the application of metals to uſe, chemiſts have made their utmoſt efforts to melt *platina*. The moſt violent heat which could be raiſed in air-furnaces, or by the united action of ſeveral large bellows, has been applied repeatedly, and continued a long time without ſucceſs. In all theſe trials the grains of *platina* remained unaltered in form and weight, and were only agglutinated to each other, nearly as ſand is by expoſure to violent heat, but ſo ſlightly, that they were ſeparable by the ſmalleſt effort.

Meſſrs. Macquer and Beaumé expoſed *platina* during five days and five nights to the greateſt heat of a glaſs-houſe furnace, which trial did only confirm the unfuſibility and unalterability of *platina* by ordinary fires, as it was found to be only a little agglutinated, and its weight to be a little increaſed; which latter phenomenon has alſo been obſerved by Mr. Margraaf and Dr. Lewis. This increaſe of weight M. Macquer very juſtly ſuſpects to be owing to the CALCINATION of ſome heterogeneous ſubſtances mixed with the *platina*.

Platina has been alſo expoſed to the fire in contact with the burning fuel, and yet has come out of the crucible unmelted and unaltered in its form. However Meſſrs. Macquer and Beaumé having expoſed it to the focus of a large burning-glaſs, twenty-two inches diameter and of twenty-eight inches focus, melted a little of it in a minute. It firſt ſmoked, then emitted ſparks, and thoſe parts of it melted well which were expoſed to the centre of the focus. Theſe chemiſts carefully examined the properties of this *platina*. The melted parts, they obſerve, were diſtinguiſhed from the others by a brilliancy like that of ſilver, and by a rounded, ſhining, poliſhed ſurface. They are eaſily flattened upon an anvil, and formed into very thin plates without cracking or ſplitting; ſo that theſe grains ſeemed to be much more malleable than *platina* in its natural ſtate. Theſe metals by repeated ſtrokes of the hammer became hard and brittle, like all other metals, eſpecially gold or ſilver; and by annealing, their malleability was reſtored, as that of other metals is alſo by the ſame means. It has been alſo found, that *platina* is fuſible by the electric fire; and Dr. Ingenhouſz obſerves, that common fire diminiſhes the magnetical virtue of *platina*, but that electrical fire increaſes it. M. de Liſle has lately diſcovered a method of melting *platina*, by diſſolving the crude ſubſtance in aqua regia, precipitating it from the acid menſtruum by ſal ammoniac, and by fuſing this precipitate, without addition, in a double crucible, expoſed to the intenſe heat of a forge-fire, excited by double bellows. M. Morveau has repeated this experiment: from ſeventy-two grains of *platina* he obtained a regulus, which weighed $50\frac{1}{2}$ grains, and ſeemed to have undergone a very imperfect fuſion, for it did not adhere to the crucible nor take its form, but ſeemed to be the *platina* merely revived; its ſpecific gravity alſo was found to be to that of water no more than as 10.045 to 1; but it was found to be nearly as malleable as ſilver, and when it had been ſufficiently hammered, its ſpecific gravity was found to be to water as 20.170 to 1.

Platina reſiſts as perfectly as gold the action of the vitrolic, marine, and nitrous acids; and, indeed, of any pure acid, howſoever applied. Theſe acids, concentrated or diluted, may be boiled for any length of time upon *platina*, without diſſolving an atom of it; but aqua regia, the proper menſtruum of gold, is alſo the ſolvent of *platina*. M. Macquer having tried different proportions of the nitrous and marine acids, found that in aqua regia, compoſed of equal parts of the two acids, diſſolve moſt of this metal: but *platina* appears to require a much greater quantity of this ſolvent, in what way ſoever it is prepared, than gold, and to diſſolve with greater difficulty. The aqua regia, employed by Margraaf, conſiſted of one part of ſal ammoniac and fixteen parts of aqua fortis; and one ounce of *platina* required twenty-four ounces of this menſtruum: but ſixteen ounces of the aqua regia of Macquer diſſolved, by digeſtion, one ounce of *platina*: and Dr. Lewis, preparing an aqua regia by diluting $10\frac{1}{2}$ ounces of ſtrong ſmoking ſpirit of nitre with eight ounces of water, and abſtracting the mixture from ſix ounces of common ſalt, diſſolved one ounce of *platina* with fourteen ounces of the menſtruum; but by performing the operation in cloſe veſſels, and by diſtillation and cohobation, a much leſs quantity of the aqua regia would have been ſufficient.

Solutions of *platina* in aqua regia, when ſaturated with the metal, which requires conſiderable heat, are of a dark, almoſt opake, brown-red colour; when only ſlightly impregnated, they are yellow like thoſe of gold. They communicate a rich tinge to watery fluids, but, according to Dr. Lewis, impart no durable colour or ſtain to other bodies; in which reſpect they differ from ſolutions of gold: though Macquer obſerves, that, in certain circumſtances, they tinge the ſkin and other animal matters with a blackiſh-brown colour, and that either mixed with this ſolution, by agitation, quickly ſeparates from it, and becomes tinged with a fine yellow colour, as it does with the ſolution of gold: but this fact is contrary to the obſervation of Dr. Lewis, who affirms that *platina* is not taken up from its ſolution in aqua regia by ether. Solutions of *platina* are obſerved to cryſtallize much more eaſily than thoſe of gold: and the cryſtals are nauſeous, ſlightly acid, and corroſive.

Platina may be precipitated from its ſolvent by fixed and volatile alkalis: the precipitates by volatile alkalis being of a dark kind of red colour, are conſiderably ſparkling, but thoſe of the fixed being of a paler dull reddiſh, with little brilliancy. M. Margraaf has diſcovered, that the mineral alkali produces no precipitation at all. The ſame writer alſo obſerves, that when ſolution of *platina* is mixed and ſaturated with a lixivium of fixed alkali that has been calcinated with blood, it yields a fine blue precipitate, which in certain circumſtances proves as beautiful as the beſt *Pruſſian* BLUE: count de Milly has made a ſimilar obſervation, and inferred from it that iron is a conſtituent part of *platina:* but probably the *platina* which theſe gentlemen uſed was impure: more eſpecially as M. Morveau has ſince found, that no Pruſſian blue was formed on the addition of phlogiſticated alkali, if the experiment was made with thoſe particles of the *platina* that were inſenſible to the magnet.

It has ſufficiently appeared from many experiments, that *platina* is not only of itſelf refractory in the fire, but obſtinately reſiſts the additions and managements, by which every other known metallic body is corroded, diſſolved, or changed into a vitreous ſtate. Neither borax, nor alkali, nor nitre, which calcines all the known metallic bodies, except gold, ſilver, and mercury, nor common ſalt, nor vitriolic ſalts, nor the eſſential ſalts of urine, nor the phoſphoric acid, nor the black flux, nor ſulphur, nor earthy bodies, nor vitreous bodies, produce any material alteration in *platina*. However, Dr. Lewis diſcovered that the liver of ſulphur is capable of diſſolving *platina*, as it alſo does gold, by fuſion.

Platina, like gold, is capable of being alloyed with all metals, and in theſe alloys exhibits intereſting phenomena. We are indebted to Dr. Lewis for many important facts and obſervations to this purpoſe; the principal of which we ſhall here ſubjoin. *Platina* appears to be capable of amalgamating with mercury, though with difficulty, and after long trituration in a ſolution of common ſalt with water, and a few drops of ſpirit of ſalt; part of it being diſſolved by the mercury, and the undiſſolved parts coated with it. Equal parts of *platina* and biſmuth being dropped into a mixture of black flux and common ſalt fuſed in a crucible, and being urged with a quick fire ſtrongly excited by bellows, melted together in a few minutes; and the *platina* was ſo blended with the biſmuth, that no grain of it could be ſeen. All the compoſitions of *platina*, with different proportions of biſmuth, were extremely brittle; and on expoſure to the air changed from a dull greyiſh colour to a yellowiſh, purpliſh, or bluiſh, and at lengeth to a purpliſh black.

Platina may be melted with tin in the ſame manner, in all proportions, from equal parts of the two metals to twenty-four of tin; and it appears from ſeveral alloys of this kind, that *platina* diminiſhes the malleability of tin, renders its texture coarſer, and debaſes or darkens its colour more or leſs, as the *platina* is in greater or leſs proportion. And the malleability poſſeſſed by both metals ſeparately, is deſtroyed by their combination, when the *platina* is about one third of the tin or upwards.

Lead alſo may be alloyed in different proportions with *platina*, nearly as tin may; with this difference, that a much greater fire is neceſſary for the formation of this latter alloy, eſpecially when the quantity of *platina* is great. The metal, reſulting from it, has a leafy or fibrous texture, and a dark colour, ſomewhat approaching to a purple or blue; or it has a diſpoſition to acquire theſe colours ſpeedily in the air, and changes at length into black. When the two metals, fuſed together, are left in a crucible to cool, a conſiderable part of the *platina* ſeparates, and falls to the bottom

Platina alſo melts with arſenic, as Scheffer obſerved, and Dr. Lewis has confirmed; but leſs perfectly than with other metals; but it is next to impoſſible to fuſe it ſufficiently, in order to its being poured out into a mould. All the arſenicated pieces are very brittle, internally of a greyiſh colour, and a looſe granulated texture; and they retain the ſame appearance for many years.

Of all metallic matters zinc may be moſt eaſily alloyed with *platina*, and moſt effectually diſſolved by fuſion. Dr. Lewis obſerved, that theſe alloys did not appear very different from pure zinc; but that when the proportion of *platina* is conſiderable, their grain is cloſer, their colour is leſs clear, and more bluiſh than that of zinc. They do not tarniſh, nor change colour, by expoſure to air; and they are harder than zinc, and have not the malleability of this ſemi-metal. With regulus of antimony, *platina* formed a darker and harder compound than the pure regulus.

Silver and *platina* may be melted and alloyed together in equal parts with a very violent fire. The alloy, thus formed, is much harder and darker-coloured than ſilver, and of a large grain, although it preſerves ſome ductility. Theſe qualities are leſs ſenſible when one part of *platina* is added to ſeven parts of ſilver; but this alloy is ſtill coarſer grained and leſs white than ſilver. This coarſeneſs of grain ſhews an imperfect union; and, indeed, ſilver and *platina* do not ſeem to unite very perfectly; for Dr. Lewis obſerves, that when the alloy of theſe two metals was left, after fuſion, in the crucible, a conſiderable part of the *platina* was ſeparated, and ſunk to the bottom. The *platina* did not appear to communicate any good quality to the ſilver, excepting a greater hardneſs.

Gold and *platina* may be combined in various proportions, with conſiderable heat; and from ſeveral experiments Dr. Lewis concludes, that *platina* diminiſhes the malleability of gold much leſs than it does that of the other malleable metals; and infinitely leſs than lead, tin, iron, and the brittle metals do that of gold; that in conſiderable proportions it debaſes the colour of gold far more than the uſual alloy, communicating a peculiar and remarkable ill colour; and that it both hardens and debaſes the colour of ſtandard gold, with copper alloy, much more than fine gold; that in ſmall proportions, as one forty-ſeventh and downwards, it does not ſenſibly injure either the colour or malleability of gold, and conſequently, that large proportions of *platina* mixed with gold, are diſcoverable at ſight; but that ſmall proportions, if perfectly united with the gold, will not betray themſelves either to the eye or in the workman's hands.

Copper ſeems to be moſt improved by being alloyed with *platina*. When, indeed, a large proportion of *platina* is added to copper, as equal parts or two-thirds, the alloy is hard, brittle, and coarſe; but when a leſs quantity of *platina* is added, as from $\frac{1}{8}$ to $\frac{1}{25}$, or even leſs, a golden-coloured copper is produced, very malleable, harder, ſuſceptible of a finer poliſh, ſmoother grained, and much leſs ſubject to calcination and ruſt than pure copper. Dr. Lewis was not able to fuſe forged iron with *platina*, but he alloyed *platina* with caſt IRON, by throwing one part of *platina* to four parts or more of the iron, when it was juſt beginning to flow.

This alloy was much harder, and much leſs ſubject to ruſt, than pure iron, and ſuſceptible of a very fine poliſh. The ſame ingenious philoſopher combined *platina* at the ſame time with two metallic matters, ſuch as braſs compoſed of copper and zinc, and bronze compoſed of copper and tin. The latter alloy was hard, and capable of receiving a fine poliſh; equal parts of *platina* and braſs formed a compound very hard and very brittle, capable of receiving a very fine poliſh, and not ſubject to tarniſh. This metal might be advantageouſly employed for the ſpecula of teleſcopes.

The cupellation of *platina* was one of the moſt deſirable diſcoveries with regard to this ſubſtance; becauſe on the ſucceſs of this operation depended our obtaining compact and malleable maſſes of pure *platina*, in the ſame ſtate with a metal which has been well fuſed, and of which all ſorts of utenſils might be made, either by caſting or forging. Dr. Lewis made many unſuceſsful experiments with this view; the proceſs of cupelling with lead went on well at firſt, but as the quantity of lead diminiſhed, the matter became leſs fuſſible, and required a ſtronger fire, till at laſt it could not, with the greateſt degree of heat be made to flow at all. The regulus obtained was always dark-coloured, rough, and brittle, and weighing more than the *platina* originally employed. Meſſrs. Scheffer and Margraaf were equally unſucceſsful with Dr. Lewis; Meſſrs. Macquer and Beaumé tried what might be effected by a long duration of fire, and, therefore, they kept the matter expoſed to a violent fire for about fifty hours, and in this way they obtained *platina:* which, though tarniſhed and rough in its ſurface, was entirely white and ſhining, eaſily ſeparable from the cupel, and a little diminiſhed in weight, which afforded a certain proof that no lead remained in it. This *platina* was alſo ductile, and capable of extenſion under the hammer. Dr. Lewis purſuing the ſame kind of proceſs, and uſing vehement fires for twenty hours or more, ſucceeded in obtaining *platina* ſo much diſengaged from the lead, as to be malleable; but he obſerves that the ſucceſs of the operation very much depends upon ſpreading the metal thin upon the bottom of the cupel; the thinner the metaline plates, the ſooner and the more effectually were they freed from the lead, and rendered malleable. How far, he ſays, the diſſipation of lead or biſmuth may be practicable on maſſes of a conſiderable thickneſs, his experiments have not abſolutely determined. M. Macquer ſeems to make no doubt that *pla-*

tina may thus be rendered manageable by the workmen in large quantities, ſo as to furniſh us with burning concaves, ſpecula for teleſcopes, innumerable veſſels and utenſils for chemical and culinary uſes, and almoſt all the works of the lockſmith. He obſerves, that *platina* would for theſe purpoſes be an excellent material, as its vivid and brilliant poliſh is never tarniſhed by any kind of ruſt, and as it not only reſiſts the action of air, water, fire, acids, and the voracious metals, as well as the pureſt gold does, but joins to theſe admirable qualities a property ſtill more precious, which gold wants, viz. the force and hardneſs of iron.

The affinities of *platina*, as ſtated by Dr. Lewis, are as follow; obſerving, that the body placed uppermoſt is always underſtood to have a greater affinity to that which is immediately under it than to the third or lowermoſt.

1. Mercury.	2 Mercury.	3. *Platina.*	4. Aqua regia.	5. Aqua regia.
Platina.	Gold.	Lead.	Zinc.	Iron.
Lead.	*Platina.*	Iron.	*Platina.*	*Platina.*

6. *Platina.*	7. Aqua regia.	8. Aqua regia.	9. Aq. regia.	10. Aqua regia.
Aqua regia, and ſolution of Iron vitriol.	Copper.	Tin.	Mercury.	Nickel.
Gold.	*Platina.*	*Platina.*	*Platina.*	*Platina.*

One of the moſt important advantages hitherto obtained from the experiments made upon this metal, is that of preſerving the fineneſs and value of gold, and preventing it from being fraudently debaſed by the admixture of a body ſo much reſembling itſelf. The principal methods of diſtinguiſhing any mixture of *platina* and gold, and of ſeparating them from one another, are as follow: the firſt is by uniting a mixture of *platina* and gold with mercury, and grinding the amalgam for a conſiderable time with water, in which proceſs the *platina* will be gradually thrown out, and the gold retained by the quickſilver. Another method is by mixing a few drops of a ſolution of *platina* with above a hundered times the quantity of a ſolution of gold, and gradually adding a pure fixt alkaline ſalt as long as it occaſions any efferveſcence or precipitation. The remaining liquor in this caſe will be ſo yellow, that it has been judged the *platina* would diſcover itſelf, though its proportion had been leſs than a thouſandth part of that of *gold*. A *third* mode of ſeparating *platina* and gold is that of precipitation, by means of mineral fixed alkali; for when this alkali is mixed with a ſolution of gold containing *platina*, the gold alone is precipitated, and all the *platina* remains diſſolved. Another method is by precipitation of the *platina* with ſal ammoniac: for this purpoſe, to a ſolution of the metal in aqua regia, add a ſmall quantity of the ſolution of ſal ammoniac in water; and if the gold contained any *platina*, the liquor will inſtantly grow turbid, and a fine yellow or reddiſh precipitate will quickly fall to the bottom; if the gold were pure, no precipation or change of tranſparency would enſue. The *fifth* method of ſeparation is by means of inflammable liquors: let the compound to be examined be diſſolved in aqua regia, the ſolution mingled with twice its quantity or more of rectified ſpirit of wine, and the mixture ſuffered to ſtand for ſome days in a glaſs ſlightly covered, the gold will riſe to the ſurface, leaving the *platina* diſſolved. Otherwiſe, add to the ſolution of the metal in aqua regia about half its quantity of any colourleſs eſſential oil; ſhake them well together, and ſuffer them to reſt, the oil will riſe immediately to the ſurface, carrying the gold with it, and leave the *platina* diſſolved in the acid under it. Or the gold may be taken up ſtill more readily and more perfectly by ether, or the ethereal ſpirit of wine. But after all the moſt effectual and advantageous method of purifying GOLD from the metallic bodies commonly found mixed with it, appears to be by diſſolving it in aqua regia, and precipitating with a large proportion of a filtred ſolution of green vitriol: the ſame proceſs ſerves for purifying it from *platina*; the vitriolic ſolution precipitating the gold, and leaving the *platina* diſſolved. This property, which *platina* poſſeſſes, of being precipitated by green vitriol, was firſt diſcovered by Mr. Scheffer.

From all the preceding properties of *platina*, and other circumſtances enumerated by Dr. Lewis, Scheffer, Margraaf, Macquer, Beaumé, &c. we may infer, that *platina* is a mineral ſubſtance, whoſe metallic aſpect, great weight, malleability, and perfect miſcibility with all the common metallic bodies, are ſufficient characters of its being a true metal; which abides fixed and uncalcined in the ſtrongeſt fires, is no wiſe ſcorified by nature, or by lead or biſmuth, nor diſſolved by vitreous bodies, and which is, therefore, a perfect metal of the ſame claſs with gold and ſilver, and, perhaps more perfect or leſs alterable than they; which, with the colour of ſilver, poſſeſſes the ſpecific weight and ſeveral other of the moſt diſcriminating properties of gold; reſiſting, equally with gold, many agents, which diſcolour, corrode, diſſolve, or ſcorify ſilver, and the baſe metals, as air and ſulphureous exhaltations, the nitrous, marine, and vitrolic acids, both in their liquid ſtate, and when reſolved by fire into fume, and ſulphur and antimony in fuſion. With theſe valuable properties, it adds ſome to gold itſelf, making it both leſs ſoft and leſs fuſible, which no other alloy does; ſo that hence a due proportion of it bids fair to remove thoſe inconveniencies, which the enamellers complain of, when they work upon plates either of fine gold or of alloyed gold. But, though *platina* undoubtedly belongs to the ſame genus of bodies with gold and ſilver, of which genus no more than theſe three ſpecies have been hitherto diſcovered; and though it agrees with gold in many of its diſtinctive properties, yet there are other important characters in which it remarkably differs from gold. Its white colour; its want of fuſibility; the ſingular alterations which it produces in ſome of the other metals, and in gold itſelf; its being difficultly and ſparingly acted upon by hepar ſulphuris, by which gold is plentifully diſſolved; its ſolution in aqua regia giving no ſtain to the ſubſtances which by the ſolutions of gold are tinged red or purple; its being in part precipitated from its ſolution by ſal ammoniac, which does not in the leaſt precipitate gold; its being precipitated only partially by vegetable fixed alkalis, and by volatile alkalis, and not in the leaſt by the mineral alkali, or by ſolution of green vitriol, by all which gold is precipitated entirely; its precipitates by alkalis having nothing of the fulminating power, which precipitates of gold poſſeſs in a more eminent degree than any other known kind of matter; its ſolutions in aqua regia ſuffering no decompoſition from eſſential oils or ether, by both which gold is imbibed from the acid; nor from inflammable ſpirits, by which gold is revived and thrown out in its proper form: its being rejected, on trituration, from its ſolution in quickſilver, while gold is retained and continues diſſolved; its being ſeparable from gold; in virtue of theſe diverſities of affinity, without augmentation or diminution of either metal, as eaſily and as perfectly as any one metal is ſeparable from any other, are characters abundantly more than ſufficient for eſtabliſhing a ſpecific difference between *platina* and gold. However, there are ſome authors who ſtill maintain, that *platina* is not a true metal, or ſemimetal, of a peculiar kind: Vogel apprehends that it is a mixed mineral; the droſs of the amalgamation-works in which gold is ſeparated by quickſilver from a mixed ore. De Buffon ſuppoſes *platina* to be a compound of gold and iron, ſuch as would reſult from a combination of theſe metals in the proportion of three-fourths of the former to one of the latter, formed by the action of ſome volcano, or by the water which has ſeized upon theſe two metals in a ſtate of diſſolution, and united them in the form under which they actually appear in *platina*. The principal arguments he alledges in favour of this hypotheſis are, that *platina* has neither the ductility nor malleability that conſtitute the character of all metals; that its ſpecific gravity is leſs than others have ſuppoſed, and that the ferruginous ſand which is ſo abundant in all the ſpecimens of *platina*, is not peculiar to that ſubſtance, or to the mines from which it is taken, as he has found a matter of the ſame nature, though in very ſmall quantities, in ſeveral iron mines. Supplement, ubi ſupra. See on the ſubject of this article Dict. Chem. art. *Platina*, and particularly the complete hiſtory and analyſis of it by Dr. Lewis in his Commercium Philoſophico-Technicum, &c. p. 433—612.

PLATONIA, in *Natural Hiſtory*, a name given by the modern Greeks to the *prox* of Ariſtotle, and of other ancient writers in that language. This is the *cervus platyceros*, or broad-horned ſtag. Some have tranſlated this *dama* but they are to be underſtood in this as meaning the *dama* of their own times, not that of the ancients; that being the *iſarus*, or chamois-goat, not any animal of the ſtag kind, or by any means meriting that title.

PLATONIC, ſomething that relates to Plato, his ſchool, philoſophy, opinions, or the like.

PLATONIC *bodies* are the ſame with what we otherwiſe call REGULAR *bodies*.

PLATONIC *love* denotes a pure ſpiritual affection, ſubſiſting between the different ſexes, abſtracted from all carnal appetites, and regarding no other object but the mind, and its beauties; or it is even a ſincere diſintereſted friendſhip ſubſiſting between perſons of the ſame ſex, abſtracted from any ſelfiſh views, and regarding no other object but the perſon.

The term took its riſe from the philoſopher Plato, a ſtrenuous advocate for each kind.

The world has a long time laughed at Plato's notions of love and friendſhip. In effect, they appear arrant chimeras, contrary to the intentions of nature, and inconſiſtent with the great law of ſelf-preſervation; which love and friendſhip are both ultimately reſolvable into.

Platonic *year*, or the *great year*, is a period of time determined by the revolution of the equinoxes, or the ſpace wherein the ſtars and conſtellations return to their former places, in reſpect of the equinoxes.

The *Platonic* year, according to Tycho Brache, is 25816; according to Ricciolus, 25920; and according to Caſſini, 24800 years.

This period, which is more than five times the age of the world, once accompliſhed, it was an opinion among the ancients, that the world was to begin anew, and the ſame ſeries of things to return again.

PLATONISM, the doctrine and ſentiments of Plato, and his followers, with regard to philoſophy, &c.

The founder of this ſyſtem of philoſophy, Plato, the ſon of Ariſto, was an Athenian, related by his father to Codrus, and by his mother to Solon; born on the ſeventh of Thargelion, in the eighty-ſeventh Olympiad, about the year of the world 3625, who, after having ſpent his youth in exerciſes of the body, painting, poetry, rhetoric, and muſic, became a diſciple of Socrates. After his maſter's death, he applied himſelf to Cratylus and Hermogenes; till, being a maſter of the Greek philoſophy, he travelled into Italy, where he learnt alſo that of the Pythagoreans. Thence he proceeded into Egypt; where, in ſeveral years reſidence, he became fully acquainted with the ſecrets of the Egyptian prieſts.

At his return to Athens, he began to retail the ſtock of learning he had collected, among his countrymen; philoſophizing daily in the Academy, a delicious villa in the neighbourhood of that city. And hence his diſciples, among whom were Xenocrates, Ariſtotle, Lycurgus, Demoſthenes, and Iſocrates, were called *Academics*. In phyſics, he chiefly followed Heraclitus; in ethics and politics, Socrates; and in metaphyſics, Pythagoras.

After his death, at the age of eighty-one years, two of the principal of his diſciples, Ariſtotle and Xenocrates, continuing his office, and teaching, the one in the Academy, the other in the Lycæum, formed two ſects, under different names, though, in other reſpects, the ſame; the one retaining the denomination of Academics, the other aſſuming that of Peripatetics.

In after times, about the firſt ages of the Chriſtian church, the followers of Plato quitted the title of *Academiſts*, and took that of *Platoniſts*.

It is ſuppoſed to have been at Alexandria, in Egypt, that they firſt aſſumed their new title, after having reſtored the ancient academy, and re-eſtabliſhed Plato's ſentiments; which, in proceſs of time, had many of them been laid aſide.

Porphyry, Plotin, Iamblichus, Proclus, and Plutarch, are thoſe who acquired the greateſt reputation among the Greek Platoniſts; and among the Latins, Apuleius and Chalcidius. Among the Hebrews, Philo Judæus. The modern Platoniſts own Plotin the founder, at leaſt the reformer, of their ſect.

The *Platonic philoſophy* appears very conſiſtent with the Moſaic; and a great party of the primitive fathers follow the opinions of that philoſopher, as being favourable to Chriſtianity. Juſtin is of opinion, that Plato could not learn many things which he has ſaid in his works, from mere natural reaſon; but thinks he might have learnt them from the books of Moſes, which he might have read when in Egypt.

Hence Numenius the Pythagorean expreſly calls Plato the *Attic Moſes*, and upbraids him with plagiariſm; becauſe he ſtole his doctrine about the world and God from the books of Moſes.

Theodoret ſays expreſly that he has nothing good and commendable about the Deity, and his worſhip, but what he ſtole from the Hebrew theology; and Clemens Alexandrinus calls him the *Hebrew philoſopher*.

Gale is very particular in his proof of the point, that Plato borrowed his philoſophy from the Scriptures, either immediately, or by means of tradition; and, beſide the authority of the ancient writers, he brings ſome arguments from the thing itſelf. As, e. gr. Plato's confeſſion, that the Greeks borrowed their knowledge of the one infinite God, from an ancient people, better and nearer to God than they; by which people, our author makes no doubt, he meant the Jews, from his account of the ſtate of innocence; as, that man was born of the earth, that he was naked, that he enjoyed a truly happy ſtate, that he converſed with brutes, &c. In effect, from an examen of all the parts of Plato's philoſophy, phyſical, metaphyſical, and ethical, this author finds, in every one, evident characters of its ſacred original.

As to the manner of the creation, Plato teaches, that the world was made according to a certain exemplar, or idea, in the divine Architect's mind. And all things in the univerſe, in like manner, he ſhews, do depend on the efficacy of eternal ideas. This ideal world is thus explained by Didymus: "Plato ſuppoſes certain patterns, "or exemplars, of all ſenſible things, which he calls "ideas; and, as there may be various impreſſions taken "off from the ſame ſeal, ſo, he ſays, are there a vaſt "number of natures exiſting from each idea." This idea he ſuppoſes to be an eternal eſſence, and to occaſion the ſeveral beings in nature to be ſuch as itſelf is. And that moſt beautiful and perfect idea, which comprehends all the reſt, he maintains to be the world.

Farther, Plato teaches that the univerſe is an intelligent animal, conſiſting of a body and a ſoul, which he calls θειον γεννητον, *the generated God*, by way of diſtinction from the ȣσια, or immutable eſſence, who was the cauſe of the generated God, or the univerſe.

According to Plato, there were two ſorts of inferior and derivative gods; the mundane gods, all which had a temporary generation with the world; and the ſupramundane eternal gods, which were all of them, one excepted, produced from that one, and dependent on it as their cauſe. It is obſerved by the learned Dr. Cudworth, that though ſome of the ancient fathers impute to Plato the opinion, that matter was an unmade ſelf-exiſtent being, there ſeems to be no ſufficient ground for their ſo doing; and Porphyry, Iamblichus, Proclus, and other Platoniſts, do not only profeſſedly oppoſe the ſame as falſe, but alſo as that which was diſſonant from Plato's principles. However, he acknowledges, that Plato did aſſert a plurality of gods, meaning animated or intellectual beings, or dæmons, ſuperior to men, to whom honour and worſhip are due, and applying the appellation to the ſun, moon, and ſtars, and alſo to the earth. Nevertheleſs he aſſerts, at the ſame time, that there was one ſupreme God, the ſelf-originated being, the maker of the heaven and earth, and of all thoſe other gods. He alſo maintains, that the Pſyche, or univerſal mundane ſoul, which is a ſelf-moving principle, and the immediate cauſe of all the motion which is in the world, was neither eternal nor ſelf-exiſtent, but made or produced by God in time; and above this ſelf-moving Pſyche, but ſubordinate to the ſupreme Being, and derived by emanation from him, which he calls τὸ ἓν, and τ' αγαθον, the *good*, he ſuppoſes an immoveable Nous or intellect, which was properly the Demiurgus, or former of the world.

The firſt matter whereof this body of the univerſe was formed, he obſerves, was a rude undigeſted heap, or chaos: now, adds he, the creation was a mixed production; and the world is the reſult of a combination of neceſſity and underſtanding; i. e. of matter, which he calls neceſſity, and the divine wiſdom: yet ſo that mind doth rule over neceſſity; and to this neceſſity he aſcribes the introduction and prevalence both of moral and natural evil; maintaining, however, that the evils reſulting from the neceſſity of imperfect beings are over-ruled by Mind or God for good.

The principles, or elements which Plato lays down, are fire, air, water, and earth.

He ſuppoſes two heavens, the *empyrean*, which he takes to be of a fiery nature, and to be inhabited by angels, &c. and the *ſtarry* heaven, which he teaches is not adamantine, or ſolid, but liquid and ſpirable.

With regard to the human ſoul, Plato maintains its tranſmigration, and conſequently its future immortality and pre-exiſtence. He aſſerted, that human ſouls are here in a lapſed ſtate, and that ſouls ſinning ſhould fall down into theſe earthly bodies. Euſebius expreſly ſays, that Plato held the ſoul to be ungenerated, and to be derived by way of emanation from the firſt cauſe.

His phyſics, or doctrine *de corpore*, is chiefly laid down in his Timæus, where he argues on the properties of body in a geometrical manner; which Ariſtotle takes occaſion to reprehend in him. His doctrine *de mente* is delivered in his tenth book of Laws, and his Parmenides.

St. Auguſtine commends the *Platonic philoſophy*; and even ſays, that the *Platoniſts* were not far from Chriſtianity. He adds, that the generality of the new *Platoniſts* of his time embraced the faith; and he expreſly acknowledges, that it was by means of the Platonic ſyſtem he was able to underſtand the doctrine of the trinity.

Juſtin Martyr profeſſes, that Plato's doctrine was of the utmoſt advantage to him, in helping him to believe the myſteries of the Chriſtian faith. To which it may be added, that it was, in good meaſure, by Plato's help, that Origen confuted Celſus.

Indeed, the late author of Platoniſme Devoilé carries things to an extravagant length, when he contends, that the dogmata of our religion are only the opinions of Plato; that the fathers give us nothing of the myſteries thereof, but what they learnt from him; and that Chriſtianity is only *Platoniſm* veiled, or covered over. To which opinion, however, M. le Clerc ſeems alſo a little inclined.

It is certain, that moſt of the celebrated fathers were Platoniſts, and borrowed many of their explanations of ſcripture from the Platonic ſyſtem. In order to account for this fact, we may obſerve, that, towards the concluſion of the ſecond century, a new ſect of philoſophers, called the modern, or later Platonics, aroſe of a ſudden, ſpread with amazing rapidity through the greateſt part of the Roman empire, ſwallowed up almoſt all the other ſects, and proved extremely detrimental to Chriſtianity. The ſchool of Alexandria in Egypt, inſtituted by Ptolemy Philadelphus, renewed and reformed the Platonic philoſophy. The votaries of this ſyſtem diſtinguiſhed themſelves by the title of Platonics, becauſe they thought that the ſentiments of Plato, concerning that moſt noble part of philoſophy, which has the Deity and things inviſible for its objects, were much more rational and ſublime than thoſe of the other philoſophers. This new ſpecies of *Platoniſm* was embraced by ſuch of the Alexandrian Chriſtians as were deſirous to retain, with the profeſſion of the Goſpel, the title, the dignity, and the habit of philoſophers. Ammonius Saccas was its principal founder, who was ſucceeded by his diſciple Plotinus, as he was by Porphyry, the chief of thoſe formed in his ſchool. From the time of Ammonius until the ſixth century, this was almoſt the only ſyſtem of philoſophy that was publicly taught at Alexandria. It was brought into Greece by Plutarch, who renewed at Athens the celebrated Academy, from whence iſſued many illuſtrious philoſophers. The general principle on which this ſect was founded, however the partizans of it might differ with reſpect to particular opinions, was, that truth was to be purſued with the utmoſt liberty, and to be collected from all the different ſyſtems in which it lay diſperſed. None, however, who were ambitious to be ranked among theſe new Platoniſts, called in queſtion the main doctrines; thoſe, for example, which regarded the exiſtence of one God, the fountain of all things; the eternity of the world; the dependence of matter upon the Supreme Being; the nature of ſouls; the plurality of gods; the method of interpreting the popular ſuperſtitions, &c.

In the fourth century, under the reign of Valentinian, a dreadful ſtorm of perſecution aroſe againſt the Platoniſts; many of whom, being accuſed of magical practices, and other heinous crimes, were capitally convicted. In the fifth century Proclus gave new life to the doctrine of Plato, and reſtored it to its former credit in Greece; with whom concurred many of the Chriſtian doctors, who adopted the Platonic ſyſtem. The Platonic philoſophers were, in general, oppoſers of Chriſtianity; but in the ſixth century, Chalcidius gave the pagan ſyſtem an evangelical aſpect; and thoſe who, before it became the religion of the ſtate, ranged themſelves under the ſtandard of Plato, and repaired to that of Chriſt, without any conſiderable change of their ſyſtem. Under the emperor Juſtinian, who iſſued a particular edict, prohibiting the teaching of philoſophy at Athens, which edict ſeems to have been levelled at modern *Platoniſm*, all the celebrated philoſophers of this ſect took refuge among the Perſians, who were, at that time, the enemies of Rome; and though they returned from their voluntary exile, when the peace was concluded between the Perſians and Romans, A. D. 533, they could never recover their former credit, nor obtain the direction of the public ſchools. Thus, ſays Moſheim, expired that famous ſect, which was diſtinguiſhed by the title of the modern or later Platoniſts, and which, for a ſeries of ages, had produced ſuch diviſions and tumults in the Chriſtian church, and which had been, in other reſpects, prejudicial to the intereſts and progreſs of the Goſpel. For a farther account of this ſect, ſee ECLECTICS.

Platoniſm, however, prevailed among the Greeks, and was by them, and particularly by Gemiſtius Pletho, introduced into Italy, and eſtabliſhed, under the auſpices of Coſmo de Medicis, about the year 1439; who ordered Marſilius Ficinus to tranſlate into Latin the works of the moſt renowned Platoniſts.

PLATONISTS. See PLATONISM, and ACADEMICS.

PLATOON, or PLOTTOON, formed, by corruption, of the French *peloton*, a *bottom*, or *clue*, *of thread*, in *War*, a ſmall body of men, drawn out of a battalion of foot, and placed between the ſquadrons of horſe, to ſuſtain them; or in ambuſcades, ſtraits, and defiles, where there is not room for whole battalions, or regiments.

Platoons are alſo uſed when they form the hollow ſquare, to ſtrengthen the angles.

The grenadiers are generally poſted in *platoons*.

A battalion is generally divided into ſixteen *platoons*, excluſive of the grenadiers, which form two or four *platoons* more, as occaſion may require.

PLATOON *firing*. See FIRING.

PLATTS, on *Board a Ship*. See PLATS.

PLATYCEROS *ovis*, in *Natural Hiſtory*, the name given by Geſner and ſome others to a ſpecies of ſheep, commonly called *ovis laticauda*, or the broad-tailed SHEEP.

PLATYOPHTHALMON, a name given by ſome to antimony, from its uſe among the ladies of old time, to make their eye-brows broad and black.

PLATYRYNCHOS, in *Ichthyology*, a name given by ſome to the NASUS, or *neſe*, a freſh water fiſh, caught in the Danube, and moſt of the large rivers in Germany, and much reſembling the chub.

PLATYSMA *myodes*. See MUSCLE.

PLATYSTERNOS, a word uſed by the old phyſicians to expreſs a perſon with a very broad cheſt or ſternum.

PLAUSUS, among the Romans. See ACCLAMATION.

PLAY, *luſus*. See GAME, and GAMING.

PLAY, in the *Doctrine of Chances*, is uſed for the probability of the play's ending in a given number of games.

PLAY, in *Poetry*, &c. See DRAMA, TRAGEDY, COMEDY, &c.

PLAY-HOUSE. See THEATRE, AMPHITHEATRE, &c.

The moſt ancient Engliſh *play-houſes* were the Curtain in Shoreditch, and the Theatre. In the time of Shakſpeare, who commenced a dramatic writer about the year 1592, there were no leſs than ten theatres open, four private houſes, and ſix that were called public theatres. Moſt, if not all of Shakſpeare's *plays*, were performed either at the Globe, which was an hexagonal building, partly open to the weather, and partly covered with reeds, on the ſouthern ſide of the river Thames, called the Bankſide, and a public theatre, where they always acted by day-light; or at the theatre in Black-friars, which was a private *play-houſe*, and where plays were uſually repreſented by candle-light. Both theſe belonged to the ſame company of comedians, *viz.* his majeſty's ſervants, which title they aſſumed after a licence had been granted to them by king James, in 1603; having before this time been called the ſervants of the lord chamberlain. The exhibitions at the Globe ſeem to have been calculated chiefly for the lower claſs of people, and thoſe at Black-friars for a more ſelect and judicious audience. The former was a ſummer, and the latter a winter theatre. Many of our ancient dramatic pieces were performed in the yards of carriers' inns, in which, in the beginning of queen Elizabeth's reign, the comedians, who then firſt united themſelves in companies, erected an occaſional ſtage. The form of theſe temporary *play-houſes* ſeems to be preſerved in our modern theatre. Many circumſtances concur to render it probable, that our ancient theatres, in general, were only furniſhed with curtains, which opened in the middle, and a ſingle ſcence compoſed of tapeſtry, ſometimes ornamented with pictures. In the year 1605 Inigo Jones exhibited an entertainment at Oxford, in which moveable ſcenes were uſed; but they were not then uſed in the public theatres. When Sir William Davenant firſt opened, by virtue of his patent, the duke of York's theatre in Lincoln's Inn fields, in the ſpring of the year 1662, with one of his own plays, the Siege of Rhodes, then ſcenes made their firſt appearance upon the Engliſh ſtage; and about the ſame time actreſſes were alſo introduced, probably by him, in imitation of the foreign theatres; and Mrs. Betterton is ſaid to have been the firſt woman that appeared on the Engliſh ſtage. Before this time, female characters were repreſented by boys or young men. In the time of Shakſpeare plays began at one o'clock in the afternoon, and the exhibition was uſually finiſhed in two hours; and ſo late as 1667, they commenced at three o'clock. See Malone's Supplemental Obſervations to Steevens's edition of Shakſpeare.

If any perſons ſhall in plays, &c. jeſtingly or phrophanely uſe the name of God, they ſhall forfeit 10*l*. Stat. 1 Jac. I. cap. 21. And players ſpeaking any thing in derogation of religion, &c. are liable to forfeitures and impriſonments. 1 Eliz. Alſo acting plays or interludes on a Sunday is ſubject to penalties, by 1 Car. I. cap. 1. No perſon ſhall act any new play, or an addition to an old one, &c. unleſs a true copy thereof, ſigned by the maſter of the *play-houſe*, be ſent to the lord chamberlain fourteen days before it be acted, who may prohibit the repreſenting any ſtage play; and perſons acting contrary to ſuch prohibitions ſhall forfeit 50*l*. and their licences, &c. Stat. 10 Geo. II. cap. 28. And by this ſtatute, no licence is to be given to act plays, but in the city and liberties of Weſtminſter, or places of his majeſty's reſidence. Ibid.

PLEA, *placitum*, in *Law*, that which either party alledgeth for himſelf in court, in a cauſe then depending to be tried.

Pleas are either *of the crown*, or *common pleas*.

PLEAS *of the crown* comprehend all crimes and miſdemeanors in which the king, on behalf of the public, is the plaintiff.

tiff. Such are treaſons, felonies, miſpriſions of either, and mayhem.

PLEAS, *common*, include all civil actions depending between ſubject and ſubject. The former of theſe were the proper object of the juriſdiction of the court of king's-bench; the latter of the court of common *pleas*.

PLEAS are of two ſorts; viz. DILATORY *pleas*, and *pleas* to the action.

Dilatory *pleas* are ſuch as tend merely to delay or put off the ſuit, by queſtioning the propriety of the remedy, rather than by denying the injury. And they are, to the juriſdiction of the court, called foreign *pleas*, to the diſability of the plaintiff, and in ABATEMENT.

Pleas to the action, are ſuch as diſpute the very cauſe of ſuit.

Pleas of this kind are general to the declaration, or a ſpecial *plea*, in bar. A general *plea* traverſes, thwarts, and denies at once the whole declaration, without offering any ſpecial matter whereby to evade it. Thus, in debt on contract, it is, *He owes nothing*; in debt on bond, *It is not his deed*, or *He paid it at the day*; in action of the caſe upon a promiſe, *He hath not promiſed*; in treſpaſs upon the caſe, *Not guilty*; in covenant, *Performance of covenants*, &c. In real actions, *No wrong done*; *no diſſeiſin*; and in a writ of right, *That the tenant has more right to hold than the demandant has to demand*. Theſe *pleas* are called the general iſſue, becauſe they amount at once to an iſſue, or a fact affirmed on one ſide, and denied on the other. A ſpecial *plea* contains the matter at large, concluding to the declaration or action; and ſpecial *pleas* are many, as by *dureſs* and *per minas*, and in JUSTIFICATION, that in aſſault and battery, the plaintiff ſtruck the firſt blow, &c. In treſpaſs, that the defendant did the thing complained of in right of ſome office which warranted him to do; or, in an action of ſlander, that the plaintiff is nearly as bad a man as the defendant ſaid he was.

Special *pleas*, in anſwer to the plaintiff's declaration, are of two kinds; *pleas* in bar, and in abatement; and every *plea* muſt be pleaded either in bar, to the action brought, or in abatement of the writ; upon which the action is framed, or it is but a diſcourſe, and not a *plea*.

PLEA, in *Equity*, may be either to the juriſdiction, ſhewing that the court has no cognizance of the cauſe; or to the perſon, ſhewing ſome diſability in the plaintiff, as by outlawry, excommunication, and the like; or in bar, ſhewing ſome matter wherefore the plaintiff can demand no relief, as an act of parliament, a fine, a releaſe, or a former decree. And the truth of this *plea* the defendant is bound to prove, if put upon it by the plaintiff.

PLEAS *of the ſword*. Ranulph earl of Cheſter, 2 Hen. III. granted to his barons of Cheſhire an ample charter of liberties, *exceptis placitis ad gladium meum pertinentibus*.

The reaſon of the exception was, that William the Conqueror gave the earldom of Cheſter to his half-brother Hugh, commonly called Lupus, anceſtor of this Ranulph, *Tenere ita libere ad gladium, ſicut ipſe rex tenuit Angliam & coronam*.

Accordingly, in all indictments for felony, murder, &c. in the county palatine, the form was, *Contra pacem domini comitis, gladium & dignitatem ſuam*; or, *contra dignitatem gladii Ceſtriæ*. Such were the *pleas* for the dignity of the earl of Cheſter.

PLEAS, *court of common*, called alſo common bench. See COURT *of common pleas*.

PLEADING, *placitatio*, a diſcourſe ſpoken at the bar, in defence of the cauſe of a party.

From the time of the Conqueſt, all *pleading* was performed in French, till the time of Edward III. when it was appointed, that the *pleas* ſhould be *pleaded* in Engliſh, but that they ſhould be entered, or recorded, in Latin. But now by 4 Geo. II. cap. 26. it is enacted, that all proceedings in courts of juſtice ſhall be in Engliſh.

At Athens, and even in France and England, it was prohibited to have any formed, or prepared *pleading*, or to amuſe the court with long artificial harangues; only, in important matters, it was the ſettled cuſtom to begin the *pleadings* with a paſſage in holy Scripture.

It is but of late years that eloquence was admitted to the bar, where it has been much practiſed and encouraged.

Among the Athenians, an equal time was allowed both parties to *plead*, which was meaſured by a water hour-glaſs; and in order to ſee juſtice done in this reſpect, there was an officer appointed to diſtribute the water to each, whence he was called EPHYDOR.

PLEADINGS, in the ſtricteſt ſenſe, are all the allegations of the parties to a ſuit, made after the count, or declaration, till iſſue is joined.

In this ſenſe, the *pleadings* expreſs what is contained in the bar, replication, and rejoinder; and not what is in the declaration itſelf. Hence defaults in the matter of declaration are not compriſed within the *miſpleading*, or inſufficient *pleading*; which only extends to that committed in the bar, replication, or rejoinder.

PLEASURE, the effect of a ſenſation, or perception, agreeable to the mind, or of the gratification of ſome appetite.

Pleaſures may be diſtinguiſhed into two kinds. The firſt, thoſe which anticipate, or go before the reaſon: ſuch are all agreeable ſenſations. Theſe are popularly called *pleaſures of ſenſe*, or *of the body*.

The ſecond are thoſe which do not precede, or anticipate, either the ſenſes or reaſon. Theſe we call *pleaſures of the mind*. Such is the joy ariſing from a clear perception of ſome future good, or the confuſed ſenſation of a preſent one.

For an inſtance of each. A man frequently finds *pleaſure* in eating a fruit he was before unacquainted with; this is *anticipating pleaſure*, which he feels before he knows the fruit to be good. On the other hand, a hungry hunter expects, or perhaps actually finds victuals; where the joy he conceives is a *pleaſure* that follows from the knowledge of his preſent or future good.

Pleaſure and *pain* ſeem to be no other than engines in nature's hand, whereby we are directed to conſult our own preſervation, and avoid our ruin. To things that may contribute to the one, as food, venery, &c. ſhe has annexed *pleaſure*; and to thoſe that may conduce to the other, as hunger, diſeaſes, &c. pain. She durſt not leave it to our diſcretion, whether we would preſerve and propagate the ſpecies, or not; but, as it were, conſtrains us to both. Were there no *pleaſure* in eating, nor pain in hunger, what numbers would be ſtarved, through negligence, forgetfulneſs, or ſlothfulneſs? What is it induces people to the office of generation, but *pleaſure*? Without this, the world had ſcarce ſubſiſted to this time.

Among the multiplicity of things to be done, and to be avoided, for the preſervation of animal life, &c. how ſhould we have diſtinguiſhed between the one and the other, but for the ſenſation of *pleaſure* and pain? Theſe are not only ſpurs to urge us on, but alſo guides, to direct us whither we are to go. Wherever nature has fixed a pleaſure, we may take it for granted, ſhe there enjoins a duty; and ſomething is to be there done, either for the individual, or for the ſpecies.

Hence it is, that our *pleaſures* vary at different ſtages of life; the *pleaſures*, e. gr. of a child, a youth, a grown man, an old man, &c. all tending to thoſe particular things required by nature in that particular ſtate of life, either for the preſervation, ſimply, or, jointly, for that and propagation, &c.

Hence, from the different conſtitutions of the body, at different ages, it were very eaſy to account for all the particular taſtes and *pleaſures* thereof: not by deducing the *pleaſures* mechanically from the diſpoſition of the organs in that ſtate, but by conſidering what is neceſſary for the perfection and well-being of the individual in that ſtate, and what is to contribute to that of the ſpecies. In a child, e. gr. mere preſervation in the preſent ſtate is not enough, it muſt likewiſe grow: to bring this to paſs, nature has made the returns of hunger, &c. more frequent, as well as more acute, and the *pleaſures* of feeding more exquiſite. And that the exceſs of aliment, in proportion to the bulk of the body, may be diſpenſed with, ſhe has made one of the great *pleaſures* of the ſtate to conſiſt in a ſeries of ſportive exerciſes; by means whereof the parts of the body come to be opened and expanded, and arrive at maturity. This done, the *pleaſures* that conduced thereto diſappear; and others, ſuited to the new ſtate, ſucceed.

For the PLEASURES *of beauty, muſic*, &c. ſee BEAUTY, MUSIC, &c.

PLEASURE *boat*, among the *Ancients*. See THALAMEGUS.

PLEBANUS was anciently the title of a *rural* DEAN.

The denomination aroſe hence, that theſe deanries were then affixed to the *plebania*, or chief mother-church within ſuch a diſtrict; which, at firſt, was uſually ten pariſhes.

PLEBANUS ſeems alſo to have been uſed for a pariſh-prieſt of ſuch a large mother-church, as was exempt from the juriſdiction of the ordinary; ſo that he had the authority of a rural dean committed to him by the archbiſhop; to whom the church was immediately ſubject.

PLEBEIAN, *plebeius*, a perſon of the rank of the populace, or common people.

The term is chiefly uſed in ſpeaking of the ancient Romans; who were divided, about the time of Tarquin's expulſion, into ſenators, knights, and *plebeians*, or commons.

The *plebeians* were thoſe who could not claim their deſcent from the ancient ſenators, appointed by Romulus, and the kings who ſucceeded him.

PLEBEIAN *games*, were games celebrated by the Roman people, in remembrance, as ſome ſay, of their reconciliation with the ſenators, after their expulſion from the city, in the year of Rome 261; or, according to others, in token of their public rejoicing, when the kings were driven from Rome U. C. 245, and the people enjoyed their liberty. Theſe games were celebrated in the Circus for three days, and commenced on the ſeventh of the calends of December. Adrian inſtituted *plebeian* games in the circus U. C. 874.

PLEBISCITUM, among the Romans, a law enacted by the common people, at the requeſt of the tribune, or ſome other plebeian magiſtrate, without the intervention of the ſenate.

Plebiscitum is more particularly applied to the law which the people made, when, upon ſome miſunderſtanding with the ſenate, they retired to the Aventine mount.

PLECHAS, a word uſed by Hippocrates to expreſs that region of the body which is terminated backward by the anus, forward by the pudenda, and ſideways by the hips.

PLECTANÆ, a word uſed by ſome to expreſs the cornua uteri, and by others, for any plexus of veſſels.

PLECTRONIA, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that it has five petals inſerted in the empalement; and the fruit is a berry containing two ſeeds. There is only one ſpecies.

PLECTRONITÆ. See Conicthyodontes.

PLECTRUM, a word uſed by ſome anatomical writers to expreſs the ſtyloide proceſs of the os petroſum; by others for the uvula; and by others for the tongue.

Plectrum, among the *Ancients*, an inſtrument uſed in playing upon the lyre. We have a deſcription of it in Mem. Acad. Inſcrip. vol. v. p. 168.

PLEDGE, *plegius*, in *Common Law*, a ſurety, or gage, either real or perſonal, which the plaintiff, or demandant, is to find, for his proſecuting the ſuit.

The word is ſometimes alſo uſed for frank *pledge*.

To Pledge, in *Drinking*, denotes to warrant, or be ſurety to one, that he ſhall receive no harm while he is taking his draught.

The phraſe is referred, by our antiquaries, to the practice of the Danes, heretofore, in England; who frequently uſed to ſtab, or cut the throats of the natives while they were drinking.

PLEDGERY, or Pleggery, ſuretiſhip, or an undertaking, or anſwering for another.

The appellant ſhall require the conſtable and mareſchal to deliver his pleggs, and to diſcharge them of their *pledgery*; and the conſtable and mareſchal ſhall aſk leave of the king to acquit his pleggs, after that the appellant is come into the liſts to do his devoir. Orig. Jur. ex Vet. Cod. MS. in Bibl. Selden.

PLEDGES *of goods for money*, &c. See Pawn.

PLEDGET, in *Surgery*, a kind of flat tent, made, not to enter a wound, but to be laid upon it, to imbibe the ſuperfluous humours, and keep it clean and dry.

PLEGII *de retorno*, &c. in *Law*. See Replevy, and Returno *Habendo*.

PLEGIIS *acquietandis*, a writ that lies for a ſurety, againſt him for whom he is ſurety, in caſe he pay not the money at the day. Fitz. Nat. Brev.

PLEIADES, Πλειαδες, in *Aſtronomy*, an aſſemblage of ſeven ſtars in the neck of the conſtellation Taurus.

They are thus called from the Greek ϖλειν, *navigare, to ſail*; as being terrible to mariners, on account of the rains and ſtorms that frequently riſe with them.

The Latins call them *vergiliæ*, from *ver, ſpring*; becauſe of their riſing about the vernal equinox.

The largeſt is of the third magnitude, and is called *Lucida Pleiadum*. See their ſeveral longitudes, latitudes, magnitudes, &c. under Taurus.

There are now only ſix ſtars viſible in *Pleiades*, and this appears to have been the caſe ſo long ago as the time of Ovid:

Quæ ſeptem diei, ſex tamen eſſe ſolent.

Pleiades, in *Mythology*, were the ſeven daughters of Atlas, called Maya, Electra, Taygeſa, Aſteropa, Alcione, Celeno, and Merope. Theſe Atlantides, it is ſaid, were tranſlated to the heavens, and formed the *Pleiades*; the meaning of which fable is, that Atlas firſt obſerved theſe ſtars, and called them by the names of this daughters.

Pleiades, *poetical*, is a name which the Greeks gave to ſeven celebrated poets, flouriſhing under the reign of Ptolemy Philadelphus.

In imitation of the Greeks, Ronſard formed a *Pleiades* of French poets under the reign of Henry II. It conſiſted of Daurat, Ronſard, du Bellay, Belleau, Baif, Tyard, and Jodelle.

On the ſame model, ſome of their authors afterwards projected a new *Pleiades* of the Latin poets of the laſt century; but they were not agreed about the names of thoſe that ſhould compoſe it; much leſs on him who ſhould be the *Lucida Pleiadum*. M. Baillet named F. Rapin, F. Commire, F. de la Rue, M. de Santeuil, M. Menage. M. du Perier, and M. Petit.

PLEMMYROS, a word uſed by the old Greek writers to expreſs a redundance of humours. Its proper ſignification is the flowing in of the tide.

PLENARTY, in *Law*, a term uſed in eccleſiaſtical matters, to denote that a benefice is full, or poſſeſſed of an incumbent.

In which ſenſe it ſtands oppoſed to vacancy.

Inſtitution, by ſix months, is a good *plenarty* againſt a common perſon, but not againſt the king, without induction. See Institution, and Induction.

PLENARY, formed of the Latin *plenarius*, of *plenus, full*, ſomething complete, or full. Thus we ſay, the pope grants *plenary indulgences*, i. e. full and entire remiſſions of the penalties due to all ſins.

PLENE *adminiſtravit*, in *Law*, is a plea pleaded by an executor or adminiſtrator, where they have adminiſtered the deceaſed's eſtate faithfully and juſtly before the action brought againſt them. On *plene adminiſtravit*, pleaded by an executor, if it be proved that he hath goods in his hands which were the teſtator's, he may give in evidence, that he hath paid to the value of his own money, and need not plead it ſpecially; for when an executor before the action hath paid the money in equal degree with that demanded by the plaintiff, he may plead fully adminiſtered generally, and give the ſpecial matter in evidence. 2 Lill. Abr. 330.

PLENILUNIUM, compounded of *plenus*, and *luna*, in *Aſtronomy*, that phaſis or ſtate of the moon, properly called the *full moon*.

PLENIPOTENTIARY, compounded of *plenus, full*, and *potentia, power*, a perſon who has full power and commiſſion to do any thing.

The word is chiefly underſtood of the miniſters or ambaſſadors ſent from princes or ſtates to treat of peace, marriages, and other important matters.

The firſt thing done in conferences of peace, is, to examine the power of the *plenipotentiaries*.

PLENITUDE, *plenitudo*, the quality of a thing that is full, or that fills another.

In phyſic, it is chiefly uſed for a redundancy of blood and humours.

Phyſicians reckon two kinds of *plenitude*. The one called *ad vires*, when the abundance of the blood oppreſſes the patient's ſtrength.

The other *ad vaſa*, when it fills the veſſels too much; ſwelling them to a degree of burſting.

PLENNA, a word uſed by ſome writers to expreſs any mucous humour.

PLENUM, in *Phyſics*, a term uſed to ſignify that ſtate of things, wherein every part of ſpace, or extenſion, is ſuppoſed to be full of matter.

It is uſed in oppoſition to a *vacuum*, which is a ſpace ſuppoſed devoid of all matter.

The Cartesians adhere firmly to the doctrine of an obſolute *plenum*. This they do on this principle, that the eſſence of matter conſiſts in extenſion; from whence, indeed, the conſequence is very eaſy, that wherever there is ſpace or extenſion, there is alſo matter.

But this principle we have ſhewn to be falſe; and, therefore, the conſequence drawn from it falls to the ground. See Matter.

But that there is a real vacuum, in the nature of things, is likewiſe demonſtrated by arguments *à poſteriori*, under vacuum.

PLEONASM, *pleonaſmus*, formed from ϖλεονασμος, q. d. *ſuperabundancy*, in *Rhetoric*, a figure of ſpeech, whereby we make uſe of words, ſeemingly needleſs or ſuperfluous, in order to expreſs a thought with the greater force and energy.

Such is, *I ſaw it with my own eyes*; or, *he heard it with his own ears*, &c.

The *pleonaſm* is called by the Latins *redundantia*.

Pleonaſm, by grammarians, is uſually defined a fault in diſcourſe, wherein we ſay more than is neceſſary.

M. Vaugelas will not allow the phraſe, *I ſaw it with my own eyes*, to be a *pleonaſm*; inaſmuch as there are no ſuperfluous words in it; none but what are neceſſary to give a ſtronger aſſurance of the thing affirmed. It is ſufficient that one of the phraſes ſay ſomewhat more than the other, to avoid the imputation of a *pleonaſm*.

In effect, though we give the name *pleonaſm* to any thing that is not neceſſary, or that enters the diſcourſe independently of the ſenſe or conſtruction, yet there are frequently words which, in that view, would be pertinent, and even are uſed to good purpoſe, to give a greater force or grace to diſcourſe, and to aſcertain the truth of what is ſaid.

He ſpoke with his mouth, is a *pleonaſm* in Engliſh; it is none in Latin: Virgil ſays, *ſic ore locutus*. Some French authors deny *unir enſemble, to unite together*, to be a *pleonaſm*.

PLEROSIS, a word uſed by the old Greek to expreſs the repletion or reſtoring the body to its natural ſtate, after it has been emaciated by ſickneſs.

PLEROTICS, Πληρωτικα, formed from πληροω, *I fill*, in *Medicine*, a kind of remedies, otherwiſe called INCARNATIVES, and SARCOTICS.

PLESMONE, a word uſed by the ancients to ſignify plenitude or ſatiety.

PLESTYA, in *Ichthyology*, a name given by Bellonius to a freſh water fiſh of the leather-mouthed kind, appearing to be no way eſſentially different from the more common kind of carcaſſius, called by authors *carcaſſii tertium genus*.

PLETHORA, Πληθορα, in *Medicine*, ſuch an abundance of any good and laudable humour, as proves hurtful to the animal functions.

Plethora is chiefly underſtood of the blood, though ſometimes of the other humours.

The *plethora* is the conſequence of a good chylification, ſanguification, &c. attended with a too ſparing diſcharge by perſpiration, &c.

It is uſually deſcribed either as *ad vires*, or *ad vaſa*. See PLENITUDE.

The *plethora* is chiefly produced in a body whoſe organs of digeſtion are ſtrong, blood-veſſels lax, diet full of good juice, temperament ſanguine, mind at eaſe and indolent, of a middle age, and in a moiſt air. It renders heat and motion uneaſy; it ſtretches the great veſſels, and compreſſes the ſmaller. And hence ſtiffneſs and heavineſs, and on the leaſt occaſion ruptures in the veſſels, ſuffocations, &c.

Dr. Freind makes the catamenia, or MENSES, the mere reſult of a *plethora*.

Medical writers now uſually diſtinguiſh four kinds of a *plethora*. 1. The ſimple *plethora*, which is that ſtate of the body to which the blood is too abundant in quantity, but is as yet of no bad quality. 2. The cacochymious *plethora*, which is that where the blood is abundant in quantity, and at the ſame time is ſubject to a too great thickneſs, or ſome other dyſcracy. 3. The *plethora ad vaſa*, whereby the blood, from its over great quantity, renders the veſſels turgid, without any farther ill effect. And, 4. The *plethora ad vires*, in which there is joined to too great a plenitude of the veſſels, a laſſitude and torpor, or numbneſs of the limbs.

The ſigns of a *plethora* are, 1. A florid conſtitution of the body. 2. A tolerable uſe of the non-naturals, a good appetite to food, and a ſound ſleep: this is the caſe while the *plethora* is ſimple and unmoved, but when any commotion happens from without, the ſigns are inquietude at night, dreams of bleeding, and of wounds from ſwords or other weapons, rubicund looks in the face, and a general turgeſcence of the veſſels, a heavineſs of the limbs, an inaptitude to motion, and difficulty of breathing, a vertiginous diſorder of the head, a ſenſe of a pricking or tingling in the fleſh from the ſlighteſt heat, an eaſy heating of the body from the weather, a moiſture of the eyes, and in hyſteric women a ſenſation as if a piece of cold ice were ſuddenly laid on ſome part of the head.

PLETHORA, *perſons moſt ſubject to a*, are, 1. People of ſedentary lives, who live high. 2. The younger rather than perſons more advanced in years. 3. The female ſex rather than the men. 4. All perſons who have been accuſtomed to large evacuations, and have haſtily ſuppreſſed them. And, 5. Thoſe perſons who have ſuddenly changed a life of labour or exerciſe to a ſedentary one, without making the neceſſary changes in the non-naturals.

PLETHORA, *prognoſtics from a*. 1. *Plethoric* perſons are more ſubject to diſeaſes in general than others. 2. They are particularly ſubject to hæmorrhages, inflammations, and acute fevers. 3. The lighter diſeaſes coming upon perſons of a *plethoric* habit, are uſually more ſtubborn and dangerous than on others. 4. The *plethora* itſelf can ſcarcely be called a diſeaſe, but it is the parent of many diſeaſes. Chronic diſeaſes are with more difficulty cured in *plethoric* patients than in others, becauſe they are always averſe to exerciſe. 6. A *plethoric* habit, diſturbed by violent motion, by paſſions of the mind, or by ſtimulating medicines, is capable of producing very terrible conſequences. 7. The diſeaſes ariſing from a *plethora*, from ſtopping ſome accuſtomed evacuation, are with difficulty cured; and *plethoras* are more efficaciouſly relieved by natural hæmorrhages than by any artificial means.

PLETHORA, *method of cure in a*. A ſimple *plethora* is eaſily removed by bleeding and gentle exerciſe, and by a more ſpare diet; to theſe may be added, gentle purging once a month. The *plethora* with a cacochymy requires gentle purging, bleeding, and cupping, diaphoretics and diuretics. If a violent commotion of the blood happen with a *plethora*, temperance is to be firſt preſcribed, then the uſe of nitre and crabs eyes ſaturated with lemon juice, and other cooling and alterative remedies. Junker's Conſpect. Medic. p. 4.

PLETHRON, a Grecian meaſure, by ſome ſaid to contain 1444, by others 10,000 ſquare feet. Arbuthnot.

PLEVIN, *plevina*, in *Law*, a warrant or aſſurance; the ſame with pledge. See PLEDGE, REPLEVIN, &c.

PLEURA, Πλυρα, derived from πλευρα, which, primarily, ſignifies *ſide*, in *Anatomy*, a membrane which lines the inſide of the cavity of the breaſt, and incloſes all the parts contained therein, being of the ſame figure and extent as the thorax itſelf, and of the ſame ſubſtance with the PERITONÆUM. The Latins call it *ſuccingens*.

It is of a very fine texture, and plentifully ſtored with blood-veſſels and nerves; and made up of an inner true membranous lamina, and a cellular ſubſtance on the outſide, which is a production of the lamina. The cellular portion goes quite round the inner ſurface of the thorax, but the membranous portion is diſpoſed in a different manner. Each ſide of the thorax has its particular *pleura*, entirely diſtinct from the other, and forming, as it were, two great bladders ſituated laterally with reſpect to each other in the great cavity of the breaſt, in ſuch a manner as to form a double ſeptum or partition running between the vertebræ and the ſternum, their other ſides adhering to the ribs and diaphragm. This particular duplicature of the two *pleuræ* is termed MEDIASTINUM. The cellular portion of the *pleura* connects the membranous portion to the ſternum, ribs, and muſcle; to the diaphragm, pericardium, thymus, and veſſels, and to every part that lies near the convex ſide of the membranous portions of the *pleura*. It likewiſe inſinuates itſelf between the laminæ, of the duplicature of which the mediaſtinum is formed, and unites them together. It even penetrates the muſcles, and communicates with the cellular ſubſtance in their interſtices, all the way to the membrana adipoſa on the external convex ſide of the thorax. The inner ſurface of the *pleura* is moiſtened by a lymphatic ſeroſity, which tranſudes through the pores of the membranous portion; and this fluid is ſaid to be ſecreted by imperceptible glands, the exiſtence of which has not yet been demonſtrated. The arteries and veins of the *pleura* are chiefly ramifications of the intercoſtals, and alſo of the mammariæ internæ and diaphragmaticæ. The nerves are ramifications of the true intercoſtales, called otherwiſe coſtales and dorſales. Winſlow.

The uſe of the *pleura* is to defend the inſide of the thorax, and to render it ſmooth, that the lungs may not be hurt in their motion.

PLEURISY, *pleureſis*, *pleuritis*, πλευριτις, in *Medicine*, a violent pain in the ſide, attended with an acute fever, a cough, and a difficulty of breathing.

The *pleuriſy* ariſes from an inflammation of ſome part of the pleura, to which is frequently joined that of the exterior and ſuperficial part of the lungs.

This inflammation ſeizes any part of the integuments of the thorax, viz. either the pleura or mediaſtinum; and, therefore, the pricking pain may be felt in any part of the thorax; but the place it moſt ordinarily infeſts is the ſide; ſometimes the right, ſometimes the left; ſometimes higher, ſometimes lower.

The *pleuriſy* ſometimes ſucceeds another fever; occaſioned by a precipitation of the febrile matter upon the pleura.

When it riſes to an impoſthume, it is called an EMPYEMA.

When it happens in the mediaſtinum, or diaphragma, it is called PARAPHRENITIS.

The *pleuriſy* and peripneumony have ſome reſemblance in their general ſymptoms, and are thence ſometimes miſtaken one for the other. They are, however, extremely different in their place of origin, as well as in their ſeveral ſymptoms; the *pleuriſy* being a ſtaſis of blood in the *pleura*, and the *peripneumony* a ſtaſis of the ſame fluid in the lungs. They are both attended with an acute, continuous, and inflammatory fever, by means of which nature is labouring to break through the obſtructions made by the ſtaſis of the blood in thoſe parts.

The ſpurious *pleuriſy* is to be carefully diſtinguiſhed from theſe two diſeaſes. In the true *pleuriſy*, or *peripneumony*, a pain is felt either about or a little below the nipple; but the ſpurious *pleuriſy* generally ſhews itſelf higher, uſually about the clavicle; the pain is more external, and uſually affects the muſcles between the ribs. In the genuine diſeaſes the pains are equal and regular, anſwering to the pulſe; in the ſpurious *pleuriſy* they are vague, and wholly irregular. In the true, they are alſo continual; but in the ſpurious, they have frequent intermiſſions and remiſſions. The true have always a cough attending them, uſually attended with a ſpitting of coloured matter, at firſt thin, afterwards groſſer, and often ſtreaked with blood, though ſometimes with little or no ſpitting, which has given occaſion for diſtinguiſhing the true *pleuriſy* into the moiſt and dry; but the ſpurious often has no cough at all attending it; or if it has, it is either dry, or there is no difference ſeen in the matter voided by ſpitting. The true has always an acute continuous fever, which attacks the patient at firſt with a ſhivering; the ſpurious either has no fever at all with it, or it is at the utmoſt a ſlight and irregular one. The pulſe is quick, and there is a difficulty of lying on the affected ſide, which does not always occur in the true *pleuriſy*.

The true diſeaſes do not terminate in leſs than ſeven days; the others much ſooner. The true uſually attack young people; the ſpurious are common to young and old. The baſtard or ſpurious *pluriſy* generally goes off by keeping warm for a few days, drinking plenty of diluting liquors, and obſerving a proper regimen. In ſome caſes, indeed, it proves more obſtinate, and requires bleeding, cupping, and ſcarification of the part affected. Theſe operations, with the uſe of nitrous and other cooling medicines, ſeldom fail to effect a cure. The difference between the true and ſpurious diſeaſes is determined by the obſervations of theſe ſymptoms; but it yet remains to diſtinguiſh juſtly the true diſeaſes from one another. This is done by the following obſervations.

The *pleuriſy* is a very rare diſeaſe; and the *peripneumony* a very common one; but this is exactly contrary to the common opinion, from theſe diſeaſes being too generally confounded with, and miſtaken for, one another.

In a *peripneumony*, a ſpitting of blood uſually happens about the cloſe of the ſecond day: this is the primary ſymptom in a *peripneumony*, but is uſually erroneouſly attributed to a *pleuriſy*, though reaſon ſhews how eaſily ſuch a ſpitting may happen from an inflammation of the lungs; and it is very different to conceive how it ſhould happen ſo readily from an inflammation of a part ſo remote from having any communication with the organs of expectoration as the pleura.

In the *peripneumony*, the pain extends itſelf farther, affecting the whole breaſt, whereas in the *pleuriſy* it is rather fixed to the right ſide, and felt a little below the breaſt. Theſe are the ſymptoms by which theſe diſeaſes are diſtinguiſhed from one another, and the uſe of the diſtinction is principally this, that in the *pleuriſy* the application of external remedies often is of great ſervice, whereas it is of no effect in the other caſe, though the miſtake is of no great conſequence in this reſpect, as the applications in the *peripneumony* can do no harm; but in an unhappy termination of the ſediſeaſes by ſuppuration, the diſtinction becomes of ſome conſequence; ſince, in the *pleuriſy*, the matter may be evacuated by a paracenteſis, or the letting in a canula; which in the *peripneumony* can by no means be done, unleſs in ſuch an accidental caſe that the diſeaſe terminates in an external *vomica pulmonum*; then indeed the matter being diſcharged from the abſceſs into the cavity of the thorax, may be let out in the ſame manner as in the ſuppurated *pleuriſy*; but this is a caſe that does not occur in an age.

The uſual opinion of medical writers, in regard to this caſe, is, that the *peripneumony* is always a diſorder affecting only the external ſurface of the lungs; and they obſerve, that even its name expreſſes this, the ſignification of it being a diſtemperature ſpreading round about the lungs: this, however, is not agreeable to obſervation or experience; for in diſſections of bodies that have died of this diſeaſe, the very internal part of the lungs is always found affected; and indeed if the ſurface only were ſo, it is not eaſy to conceive how the ſpitting of blood ſhould come on ſo ſoon as the ſecond day.

Signs of theſe diſeaſes. Theſe are in general common to both; and are the following: a vertiginous diſorder of the head uſually precedes all the other ſymptoms; this is ſucceeded by a ſhivering and chillneſs all over the body; this increaſes by degrees, and uſually brings on with it cardialgias, nauſeas, and anxieties; after this there comes on a very remarkable heat, with very intenſe thirſt, and a violent pain in the head; this is accompanied with a ſtraitneſs of the breaſt, and difficulty of reſpiration; and the patient feels a violent and ſevere pricking pain in one of the ſides amongſt the ribs, which ſometimes extends towards the back-bone, ſometimes towards the fore-part of the breaſt, and at other times towards the ſhoulder blades: this pain becomes continual, is always greatly exaſperated by the cough that attends the diſeaſe, and is generally moſt violent when the patient draws in his breath. The urine in the firſt days is red, and after a few days more it becomes turbid, when it has ſtood to be cold; and finally depoſits a thick pale-red ſediment. The pulſe in the *pleuriſy* is commonly quick and hard; and if blood be let, it is covered with a tough cruſt or buffy coat. Baglivi remarks, that *pleuriſies* are frequently occult, and gives the method of diſcovering them: make the patient lie on is right or left ſide, and bid him breathe ſtrongly, and cough; if he feels any pain or heavineſs after it, he is certainly pleuritic. The ſame author adds, that a hard pulſe is a certain attendant of the *pleuriſy*.

Perſons ſubject to them. Theſe are diſeaſes not equally common to all ages, but they principally affect young and labouring people; they are moſt frequent in the beginning of the ſpring ſeaſon, and moſtly affect ſuch as are of a ſanguine plethoric habit. Perſons who have been ſubject to bleeding at the noſe, but have been for ſome time free from returns of them, often fall into theſe diſeaſes; and in general men are much more ſubject to them than women.

Cauſes of them. Theſe diſeaſes are brought on by any thing that gives a violent commotion to the blood, ſuch as immoderate exerciſe, the abuſe of ſpirituous liquors, and violent fits of anger. The ſuddenly cooling the body when very hot, by drinking cold liquors, ſleeping on damp ground, wet clothes, and expoſing the body to cold water or air in this ſtate, has alſo often occaſioned them, by ſhutting the pores and forcing the blood inwards. The neglect of habitual bleedings, the ſtoppage of uſual evacuations, and the ſtriking in of any eruption, may alſo occaſion them; and they have been ſometimes occaſioned by blows, or other external injuries on the breaſt, and by endeavouring to lift great weights.

Prognoſtics in them. All inflammatory fevers are dangerous; but the *pleuriſy* and *peripneumony*, when they attack young perſons, or ſuch as are under thirty years of age, are attended with the leaſt danger of any, provided that they are properly treated. When they affect perſons advanced in years, they uſually prove very dangerous, in ſpite of all the care and caution with which they can be treated.

When they have been treated in a judicious manner, they uſually go off on the ſeventh, or at the utmoſt the eleventh day, in copious ſweats, which come on of themſelves; after this criſis, the pulſe in a very little time returns to its natural ſtate, the violent heat goes off, and the ſtrength, appetite, and ſleep, return. When they go beyond the days of their criſis, which is often the caſe in old people, they then become very dangerous. If the urine is obſerved to be turbid before the fourth day, and afterwards depoſits a ſediment, and the reſt remain clear at the top, there is great hope that the diſeaſe will terminate happily, on the critical day, by a ſweat. When a yellowiſh matter is thrown up by coughing, and is neither very viſcid nor frothy, and particularly when in a *peripneumony* it is ſtreaked with blood, there is great reaſon to expect that the diſeaſe will go happily off; but, on the contrary, when the patient cannot ſpit at all, and the urine continues crude, there is great reaſon to fear the diſeaſe will have a fatal period.

Finally, when a diſcuſſion and reſolution of the ſtaſis cannot be affected by nature, or obtained by art, a corruption and ſuppuration follow, and often an ulcerous diſpoſition of the lungs, or true phthiſis, is the conſequence.

Method of cure. The bowels are to be kept gently lax during the whole courſe of the diſeaſe; but no irritating medicines muſt by any means be given to premote this. For this purpoſe, a clyſter of thin water-gruel, or of barley-water, in which a handful of mallows, or any other emollient vegetable has been boiled, may be daily adminiſtered. When there is a remarkable plethora with a narrowneſs of the breaſt, and a ſenſible ſtuffing up of the lungs, then bleeding is neceſſary; but a ſmall quantity only ſhould be taken away, and the ſame repeated the next day or oftener, if the ſame ſymptoms continue to require it; always after bleeding the patient muſt take ſome gently diaphoretic medicines, and drink plentifully of warm and weak liquors. In the uſual and more common caſes, bleeding, according to ſome, is not neceſſary in theſe diſeaſes, though ſo greatly recommended by others. Every day before noon it is proper to give two doſes of the mixtura ſimplex, or ſome other ſuch temperate diaphoretic, with large draughts of warm liquors; and in the afternoon the antifebrific powders of nitre, diaphoretic antimony, crabs eyes ſated with lemon juice ſhould be given; and emulſions are alſo very proper, made of ſweet almonds and barley water, or of the ſeeds of carduus Mariæ. When theſe medicines have been given for ſome days, if the pain continues ſtill violent, the tincture of caſcarilla muſt be taken; and in caſes of the *pleuriſy*, cloths four or more times doubled and wetted in camphorated ſpirit of wine, are to be applied to the part. Fomentations may be prepared by boiling a handful of the flowers of elder, chamomile, and common mallows, or any other ſoft vegetables, in a proper quantity of water. The herbs may be either put into a flannel bag, and applied warm to the ſide, or flannels dipped in the decoction may be ſucceſſively uſed in the ſame manner. The ſide may alſo be frequently rubbed with a little of the volatile liniment; leaves of various plants, and eſpecially young cabbage leaves, may be applied warm to the ſide with advantage. Plaſters may alſo be applied occaſionally, but they muſt not be ſuffered to remain on too long, leſt they ſtop reſpiration; an equal regimen and perfect quietneſs are to be obſerved during the whole time of the diſeaſe; but particularly on the critical days, on which nature muſt be by no means ruffled or diſturbed.

The diet ought to be cool, ſlender, and diluting: the drink may be ſweet whey, an infuſion of pectoral and balſamic vegetables, barley water, with a little honey or currant jelly mixed with it, or the decoction of figs, raiſins, barley, &c. Theſe liquors ſhould be drank often and in ſmall quantities. Every thing the patient takes ſhould be a little warm.

Authors differ greatly in their opinions about bleeding in this diſeaſe: ſome judge it abſolutely neceſſary in all caſes; and others wholly reject it in all. Etmuller obſerved, that bleeding in theſe diſeaſes always gave the ſtaſis a tendency to ſuppuration, and much recommends ſudorifics in the *pleuriſy*; others are of opinion, that it is to be done, or omitted according to the peculiar indications in the caſe; and ſome throw aſide all the diſſolvent and diſcutient medicines, and rely on the volatile ſalts alone for the promoting ſweats, and accompliſhing the cure by that means alone, only obſerving, that if the diſeaſe will not yield to theſe, bleeding is to be added.

Others again contend, that it is a raſh attempt to endeavour to diſcuſs the ſtaſis already formed, by hot medicines, which expand the blood, and ſeem calculated only to add to it; and that the natural ſtate of the diſeaſe does not indicate bleeding, though the urgency of certain ſymptoms, ſuch as ſtraitneſs of the breaſt and infarctions of the lungs, in perſons of plethoric habits, may render it neceſſary and beneficial.

Perſons of very plethoric habits, who have died of theſe diſtempers, on diſſection, have been found to have one ſide of the lungs ſo ſtuffed up with blood, that it would ſink in water; and unqueſtionably in ſuch caſes bleeding is neceſſary.

Sydenham's method of curing by large and often repeated bleedings, and the uſe of gentle expectorants, has been found, ſays Juncker, very dangerous in its effects, and ſeems the only reproachable thing in the works of that excellent writer. And he adds, though Riverius gives an inſtance of a perſon cured of a *pleuriſy* in a few hours, by bleeding alone, the account does not ſeem wholly to be depended upon; for ſome circumſtances in the relation ſeem to ſhew, that the diſeaſe was not properly either a *pleuriſy*, or a *peripneumony*, but an inflammation of the liver or ſtomach.

Nevertheleſs, moſt medical writers have recommended bleeding as ſoon as poſſible, and large quantities at once, in the beginning of a *pleuriſy*, in preference to ſmall repeated bleedings. An adult, ſays Dr. Buchan, may loſe twelve or fourteen ounces of blood as ſoon as it is certainly known that he is ſeized with a *pleuriſy*. If the ſtitch and other violent ſymptoms continue, eight or nine ounces more of blood may be taken away at the diſtance of twelve or eighteen hours. When the ſymptoms do not abate, and the blood manifeſts a ſtrong buffy coat, a third, and even a fourth, bleeding may be neceſſary. But the operation of bleeding is ſeldom neceſſary after the third or fourth, day of the fever, and ought not to be performed unleſs in very urgent circumſtances. Topical bleeding by leeches, or cupping, has a very good effect. If the ſtitch continues after repeated bleedings, fomentations, &c. a bliſtering plaſter muſt be laid on the parts affected, and ſuffered to remain for two days. Some people recommend the flowers of the common red poppies in theſe caſes, as a ſpecific remedy; but Etmuller allows them no ſuch quality, but ſays they act in this caſe merely as a gentle opiate and anodyne; a ſort of medicines very dangerous in theſe caſes.

The ſeeds of carduus mariæ, or the milk thiſtle, are alſo by ſome recommended as ſpecifics; it is very evident that they mitigate the pain; but the fever will always continue to its regular period on the ſeventh day.

Expectorating medicines, in general, are of no uſe in theſe caſes, only if the ſpitting of a bloody matter do not ſucceed ſufficiently by the fourth day, it may be neceſſary to give a doſe or two of ſomething of this kind; and to this purpoſe a decoction of hyſſop is preferred by many before all other medicines.

The ſpitting may be promoted by taking two table ſpoonfuls of a mixture of an ounce of the oxymel or vinegar of ſquills with ſix ounces of the *pectoral* DECOCTION: or the *oily* EMULSION may be adminiſtered; or if oily medicines are nauſeous, two table-ſpoonfuls of the ſolution of gum ammoniac in barley water may be given three or four times a day.

Nitre is to be given boldly for the four firſt days; but after this, if the diſeaſe go on regularly, it is to be given in ſmaller quantities, and not oftener than twice in a day. All oily and fatty ſubſtances are to be excluded from external uſe, but camphor in any form is found to do ſervice. When the patient does not perſpire, and has a burning heat on the ſkin, and diſcharges little water, two drams of purified nitre may be rubbed with five or ſix grains of camphor in a mortar, and the whole divided into ſix doſes, one of which may be taken every five or ſix hours in the patients common drink. Dr. Buchan mentions another medicine, which he ſays, ſome reckon almoſt a ſpecific in the *pleuriſy*; viz. the decoction of the ſeneka rattleſnake root. After bleeding and other evacuations, the patient may take two, three, or four table ſpoon-fuls of this decoction, as his ſtomach can bear it, three or four times a day. If it occaſions vomiting, the quantity may be leſſened or mixed with ſimple cinnamon-water.

Opiates in theſe caſes are dangerous; for as there is in all of them a tenacity of the blood, this ſtate of it requires concuſſion, reſolution, and excretion, but opiates effect the exact contrary of all theſe. Caſcarilla properly given, will almoſt always mitigate the pain; and when that fails of its effect, it is certain that opiates cannot procure it, but muſt inevitably do harm. Junck. Conſ. Med. p. 297. and ſeq. Buchan's Dom. Med. ch. 16.

Mr. Du Hamel found the polygala vulgaris of ſervice in promoting expectoration in *pleuriſies*. Med. de l'Acad. Sciences, 739.

PLEUROCYSTUS, in *Natural Hiſtory*, the name of one of the general arrangements of the echini marini.

The word is derived from the Greek πλευρον, *the ſide*, and κυςος, *the anus*.

The echini of this diviſion are diſtinguiſhed from the others, by having their anus neither on the ſummit, nor in any part of the baſe, but in ſome part of the ſuperficies of one of the ſides.

PLEURONECTES, in *Ichthyology*, the name of a genus of fiſhes of the malacopterygious kind, the characters of which are theſe: the branchioſtege membrane on each ſide, contains ſix bones of a cylindric figure; and in the middle between theſe, but lower down, there are two others joined together at the end, but theſe are ſcarce conſpicuous. Both the eyes are placed in one ſide of the head; in ſome they are in the right ſide, and in others in the left; the eyes are covered with a ſkin; one ſide of the fiſh is always white, the other is ſpotted or obſcure.

Of theſe fiſh there are ſome which have a very ſhort ſpine at the anus, and the eyes uſually on the right ſide. The ſpecies of this ſort, enumerated by Artedi, are ſeven. The other ſpecies of the *pleuronecta* have their eyes on the left ſide of the head, and have no ſpine, or ſcarce any at the anus. Of theſe Artedi enumerates three ſpecies.

The name is of Greek origin, and is derived from the words πλευρον, *the ſide*, and νεκτης, *a ſwimmer*; and expreſſes the peculiar and diſtinctive character of theſe fiſhes; which is, that they all ſwim on one ſide, not as other fiſhes.

In the Linnæan ſyſtem, this is a genus of the *thoracici*, comprehending ſeventeen ſpecies, as the *holibut*, *plaiſe*, *flounder*, *dab*, *ſole*, *pearl*, *turbot*, &c.

PLEUROPNEUMONY, a name given by medical writers to a diſeaſe approaching to, and partaking of the nature of both the PLEURISY and PERIPNEUMONY.

PLEURORTHNOPŒA, a term uſed by medical writers to expreſs that kind of pleuriſy in which the patient cannot breathe, unleſs in an erect poſture.

PLEXUS, in *Anatomy*, a name common to ſeveral parts in the body, conſiſting of bundles of little veſſels, interwoven in form of net-work.

The nerves, in their progreſs, form ſeveral *plexuſes*; eſpecially the par vagum, or eighth pair, the intercoſtals, and the fifth.

The par vagum, at its interſection with the intercoſtal nerve, forms the *plexus ganglioformis* ſuperior and inferior. A branch of this nerve joining near the heart, with others from the intercoſtals, forms the *plexus cardiacus ſuperior*. A little farther it ſends off ſeveral branches, which reuniting, form the *plexus pneumonicus*. In each trunk of the intercoſtal, before it arrives at the thorax, are two *plexus ganglioformis*, called *plexus cervicales*. When arrived in the thorax, it receives three or four twigs from the vertebral nerves, together with which it conſtitutes the *plexus intercoſtalis*; whence, deſcending into the abdomen, it forms that famous piece of net-work, called on the right ſide *plexus hepaticus*; and on the left, *plexus ſplenicus*. From the hepatic *plexus* ariſe a number of branches, proceeding ſome to the liver, others to the pancreas, others to the capſula of Gliſſon, and other larger ones to the right kidney. The ſplenic *plexus* ſends out branches to the left part of the ventricle and pancreas, the ſpleen, the left atrabiliary capſula, and left kidney. Laſtly, ſeveral branches both from the hepatic and ſplenic *plexus*, paſſing along the meſenteric arteries, eſpecially the upper, to which they ſerve as a kind of cover, form the meſenteric *plexus*, which bears ſome reſemblance to a ſun, from the circumference whereof proceed ſeveral little branches or threads, in manner of rays, continued thence to the inteſtine, though ſtill accompanying the arteries.

Plexus *choroides.* See Choroides.

It is ſometimes, alſo, called *plexus reticularis*, from its net-like ſtructure.

PLICA *Polonica*, in *Medicine*, a diſeaſe of the hair, almoſt peculiar to Poland, though there are inſtances of it in Hungary, Alſatia, Switzerland, &c.

Writers are not agreed as to the hiſtory of the origin of this diſeaſe. Some aſſert that it was not known before the year 1564; others, with the greateſt probability, fix its epocha to the year 1287, when the Tartars corrupted the waters of the country: whilſt others apprehend, that it has exiſted from time immemorial.

The *plica* is a ſevere, malignant, and dangerous diſeaſe, wherein the hair of the head is matted and glued together beyond all poſſibility of being extricated; and is attended with a grievous diſorder of all the limbs of the body; and, before the hair becomes complicated, a violent pain; a ſweat uſually attending it.

An unſeaſonable cutting off the hair, in this caſe, is dangerous; nor is there any proper and adequate remedy for the diſeaſe yet diſcovered.

In Poland and Lithuania, this diſorder is endemial, and well known; it conſiſts in a preternatural bulk of the hair, which being firmly conglutinated, and wrapped up in inextricable knots, affords a very monſtrous and unſeemly ſpectacle. When this is cut, blood is diſcharged from it, the head is racked with pain, the ſight impaired, and the patient's life frequently endangered. This miſfortune is principally incident to the Jews who live in thoſe countries. Though it ſeems difficult to account for this diſorder, and aſſign its true cauſes, we ſhall, nevertheleſs, make an attempt of this kind.

What therefore contributes not a little to its production, is the ſordid and naſty manner of life to which theſe people are addicted, for they rarely comb their hair, ſleep in low moiſt rooms, and drink large quantities of brandy. The waters, alſo, concur and aſſiſt in the generation of this diſorder. Hence Gehema, in Epiſt. ad Bontekoe de *Plica* Polonica, is juſtly of opinion, that the cauſes of this diſeaſe are lodged in ſome particular waters of Poland, which if either drank, or uſed for waſhing the body, produce the *plica*. This he confirms by the fate of two ſoldiers, who, when intending to waſh their bodies, had ſcarce immerſed their heads in the water of a certain pond, before their hairs were contracted into many folds. Beſide theſe cauſes, we ſuppoſe an hereditary fault conveyed from the parents, &c. which conſiſts in too great a bulk of the pores, and bulbous hairs under the ſkin of the head. Hence the thick and glutinous nutritious juice, produced by their coarſe aliments, and impure waters, is, by the heat excited by their drinking brandy, forced into the cavities of the hairs, and ſweating through their pores, produces this terrible diſorder. Hoffman. de Morb. cert. Reg. propr.

From the ſymptoms that precede and accompany the *plica*, it ſeems to be a ſpecies of malignant fever or acute ſcurvy, whoſe diſtinguiſhing ſymptom or criſis is a complication of the hair. Some authors have pretended, that the earth moſs, hence called *plicaria*, uſed externally in fomentation, and internally in decoction, is a ſpecific in this diſeaſe. Others have attributed extraordinary virtues to mercury.

PLICARIA, in *Botany*, a name uſed by ſome for the club-moſs.

PLICATED *leaf*, among *Botaniſts*. See Leaf.

PLIGHT, in our *Old Law Books*, a term which ſignifies the eſtate, with the quality of the land; though ſometimes, it extends alſo to the rent-charge, and the poſſibility of a dower. Coke's Inſt. fol. 221.

PLINIA, in *Botany*, the name of a genus of plants of the *polyandria monogynia* claſs, deſcribed by Plumier and Linnæus, the characters of which are theſe: the empalement is divided into five ſegments; the flower conſiſts of five petals; the ſtamina are numerous filaments, very ſlender, and of the length of the flower; the antheræ are ſmall; the germen of the piſtil is ſmall; the ſtyle is ſubulated, and of the length of the ſtamina; the ſtygma is ſimple; the fruit is a large globoſe berry, of a ſtriated or ſulcated ſurface, containing only one cell, in which is a very large, ſmooth, and globoſe ſeed. There is one ſpecies.

PLINTH, from πλινθος, *brick*, in *Architecture*, a flat ſquare member, in form of a brick: ſometimes, alſo called the ſlipper. See *Tab. Archit. fig.* 25. N° 3.

The *plinth* is uſed as the foot, or foundation of columns: being that flat ſquare table, under the mouldings of the baſe and pedeſtal, at the bottom of the whole order; ſeeming to have been originally intended to keep the bottom of the primitive wooden pillars from rotting.

The *plinth* is alſo called the *orle* or Orlo.

Vitruvius alſo calls the Tuſcan abacus, *plinth*, from its reſembling a ſquare brick.

Plinth *of a ſtatue*, &c. is a baſe or ſtand, either flat, round, or ſquare, ſerving to ſupport a ſtatue, &c.

Plinth *of a wall*, is a term for two or three rows of bricks advancing out from the wall; or in the general for any flat high moulding, ſerving in a front wall to mark the floors; or to ſuſtain the eaves of a wall, and the larmier of a chimney.

PLINTHITIS, a kind of alum found in ſome of the iſlands of the Archipelago, and called alſo *placitis*, from its uſually being found in thin cakes.

PLINTHIUM, a name given by the ancients to a machine invented for the making extenſion of diſlocated or fractured limbs. Oribaſius deſcribes ſeveral kinds.

PLITE *of lawn*, in our *Old Writers*, ſeems to be an ancient meaſure, as a yard or ell, at this time: it is mentioned in the ſtat. 3 Ed. IV cap. 5.

PLOCE, in *Rhetoric*, a figure whereby a word is repeated, by way of emphaſis; in ſuch manner, as not only to expreſs the ſubject, but ſome particular character or property of it.

Cruelty! yes, cruelty beyond all example. His wife's a wife indeed! So Cicero ſays, Young Cato wants experience, but yet he is Cato.

PLOK-PENIN, a term uſed in the public ſales at Amſterdam for a little ſum given by the laſt bidder.

The *plok-penin* is a kind of earneſt, whereby it is ſignified, that the commodity is adjudged to him.

The *plok-penin* differs according to the quality of the commodity, and the price of the lot. Sometimes it is arbitrary, and depends on the pleaſure of the buyer; and, ſometimes, it is regulated by the ordinances of the burgomaſters.

PLOMO, in *Metallurgy*, a name given by the Spaniards, who have the care of the ſilver mines, to the ore of that metal, when it is found adhering to the ſurface of ſtones, and incruſting their cracks and cavities in the form of ſmall and looſe grains of gunpowder. Though theſe grains be but few in number, and the reſt of the ſtone have no ſilver in it, yet they are always very happy in meeting with it, as it is a certain token that there is a very rich vein ſomewhere in the neighbourhood. And if in digging forwards they ſtill meet with theſe grains, or the *plomo* in greater quantity, it is a certain ſign that they are getting more and more near the good vein.

PLONKETS, in our *Old Writers*, a kind of coarſe woollen cloth. 1 Rich. III. cap. 8.

PLOT, or **Plott**, in *Gardening*. See Graſs-*plat*, &c.

Plot, in *Dramatic Poetry*, the fable of a tragedy or comedy; or the action repreſented therein.

Plot, is more particularly uſed for the knot or intrigue which makes the difficulty and embarraſs of a piece.

The unravelling puts an end to the *plot*.

Plot, in *Surveying*, the plan or draught, of any parcel of ground, e. gr. a field, farm, or manor, ſurveyed with an inſtrument, and laid down in the proper figure and dimenſions. See Plotting.

PLOTTING, among *Surveyors*, the art of deſcribing or laying down on paper, &c. the ſeveral angles and lines of a tract of ground ſurveyed by a theodolite, or the like inſtrument, and a chain.

In ſurveying with the plane-table, the *plotting* is needleſs; the ſeveral angles and diſtances being laid down on the ſpot as faſt as they are taken.

But, in working with the theodolite, ſemicircle, or circumferentor, the angles are taken in degrees; and the diſtances in chains and links. So that there remains a ſubſequent operation, to reduce thoſe numbers into lines; and ſo to form a draught, plan, or map. The operation is called *plotting*.

Plotting, then, is performed by means of two inſtruments, the protractor and *plotting-ſcale*. By the firſt, the ſeveral angles obſerved in the field with a theodolite, or the like, and entered down in degrees in the field-book, are protracted on paper in their juſt quantity.

By the latter, the ſeveral diſtances meaſured with the chain, and entered down, in like manner, in the field-book, are laid down in their juſt proportion.

Under the articles *protractor* and *plotting-ſcale*, is found, ſeverally, the uſe of thoſe reſpective inſtruments in the laying down of angles and diſtances; we ſhall here give their uſe conjointly, in the *plotting* of a field, ſurveyed either with the circumferentor, or theodolite.

Plotting, *method of, from the circumferentor.* Suppoſe an incloſure, e. gr. A B C D E F G H K (*Tab. Survey. fig.* 8.) to have been ſurveyed: and the ſeveral angles, as taken by a circumferentor in going round the field, and the diſtances, as meaſured by a chain, to be found entered in the field-book as in the following table.

	Deg.	Min.	Cha.	Link.		Deg.	Min.	Cha.	Link.
A	191	00	10	75	F	324	30	7	54
B	297	00	6	83	G	98	30	7	54
C	216	30	7	82	H	71	00	7	78
D	325	00	6	96	K	161	30	8	22
E	12	24	9	71					

1. On a paper of the proper dimenſions, as L M N O (*Tab.* III. *Survey. fig.* 43.) draw a number of parallel and equidiſtant lines, repreſenting meridians, expreſſed in dotted lines. Their uſe is, to direct the poſition of the protractor; the diameter whereof muſt always be laid either upon one of them, or parallel thereto; the ſemicircular limb downwards for angles greater than 180°, and upwards for thoſe leſs than 180°.

The paper being thus prepared, aſſume a point on ſome meridian, as A, whereon lay the centre of the protractor, and the diameter along the line. Conſult the field-book for the firſt angle, i. e. for the degree cut by the needle at A, which the table gives you 191°.

Now ſince 191° is more than a ſemicircle or 180°, the ſemicircle of the protractor is to be laid downwards; where, keeping it to the point with the *protracting pin*, make a mark againſt 191; through which mark, from A, draw an indefinite line A *b*.

The firſt angle thus protracted, again conſult the book, for the length of the firſt line A B. This you find 10 chains 75 links. From a convenient ſcale therefore, on the *plotting ſcale*, take the extent of 10 chains, 75 links between the compaſſes; and ſetting one point in A, mark where the other falls in the line A *b*, which ſuppoſe in B: draw therefore the full line A B, for the firſt ſide of the incloſure.

Proceed then to the ſecond angle; and laying the centre of the protractor on the point B, with the diameter as before directed, make a mark, as *c*, againſt 297°, the degrees cut at B; and draw the indefinite line B *c*. On this line, from the *plotting-ſcale*, as before, ſet off the length of your ſecond line, viz. 6 chains 83 links; which extending from B to the point C, draw the line B C, for the ſecond ſide.

Proceed now to the third angle or ſtation: lay then the centre of the protractor, as before, on the point C; make a mark, as *d*, againſt the number of degrees, cut at C, viz. 216° 30′: draw the indefinite line C *d*, and thereon ſet off the third diſtance, viz. 7 chains 82 links; which terminating, e. gr. at D, draw the full line C D, for the third ſide.

Proceed now on the fourth angle D: and, laying the centre of the protractor over the point D, againſt 325°, the degree cut by the needle, make a mark *e*; draw the occult line D *e*, and thereon ſet off the diſtance 6 chains 96 links; which terminating in E, draw D E for the fourth line: and proceed to the fifth angle, viz. E.

Here the degrees, cut by the needle, being 12° 24′ (which is leſs than a ſemicircle) the centre of the protractor muſt be laid on the point E, and the diameter on the meridian, with the ſemicircular limb turned upwards. In this ſituation make a mark as before, againſt the number of degrees, viz. 12° 24′, cut by the needle at E; draw the line E *f*, on which ſet off the fifth diſtance, viz. 9 chains 71 links; which extending from E to F, draw the full line E F, for the fifth ſide of the incloſure.

After the ſame manner proceed orderly to the angles F, G, H, and K: then placing the protractor, making marks againſt the reſpective degrees, drawing indefinite lines, and ſetting off the reſpective diſtances, as above, you will have the *plot* of the whole incloſure, A B C, &c.

Such is the general method of *plotting* from this inſtrument; but it muſt be obſerved, that in this proceſs, the ſtationary lines, i. e. the lines wherein the circumferentor is placed to take the angles, and wherein the chain is run to meaſure the diſtances, are, properly, the lines here *plotted*. When, therefore, in ſurveying, the ſtationary lines are at any diſtance from the fence or boundaries of the field, &c. off-ſets are taken, i. e. the diſtance of the fence from the ſtationary line is meaſured at each ſtation; and even at intermediate places, if there prove any conſiderable bends in the fence.

In *plotting*, therefore, the ſtationary lines being laid down, as above, the off-ſets muſt be laid down from them; i. e. perpendiculars of the proper lengths muſt be let fall at the proper places from the ſtationary lines. The extremes of which perpendiculars, being connected by lines, give the *plot* deſired.

If, inſtead of going round the field, the angles and diſtances have been all taken from one ſtation, the proceſs of *plotting* is obvius, from the example above; all here required, being to protract, after the manner already deſcribed, the ſeveral angles and diſtances, taken from the ſame ſtationary point in the field; from the ſame point or centre on the paper. The extremities of the lines thus determined, being then connected by lines, will give the *plot* required.

If the field has been ſurveyed from two ſtations, the ſtationary lines are to be firſt *plotted*, as above; then the angles and diſtances taken from each to be laid down from each reſpectively.

PLOTTING, *the method of, where the angles are taken by the theodolite*, i. e. *by back ſight and fore ſight* (as it is called) is ſomewhat different. To prepare the angles for *plotting*, the quantity of each muſt firſt be found, by ſubtracting the degrees of the fore-ſight and back-ſight from each other: the remainder is then the angle to be protracted. The uſe of parallel lines is here excluded; and inſtead of laying the protractor conſtantly on, or parallel to meridians, its direction is varied at every angle. The practice is thus:

Suppoſe the former incloſure to have been ſurveyed with the theodolite, after the manner of back-ſight and fore-ſight; and ſuppoſe the quantity of each angle to be found by ſubtraction.

An indefinite line is drawn at random, as A K, *fig.* 43; and on this the meaſured diſtance, e. gr. 8 chains, 22 links, is ſet off, as in the former example: if now the quantity of the angle A have been found 140°, the diameter of the protractor is to be laid on the line A K, with the centre over A; and againſt the number of degrees, viz. 140, a mark made, an indeterminate line drawn through it, and the diſtance of the line A B laid down from the ſcale thereupon.

Thus we gain the point B; upon which laying the centre of the protractor, the diameter along the line A B, the angle B is protracted. by making a mark againſt its number of degrees, drawing an occult line, and ſetting off the diſtance B C, as before.

Then proceed to C, laying the diameter of the protractor on B C, the centre on C protracts the angle C, and draw the line C D: thus, proceeding orderly to all the angles and ſides, you will have the *plot* of the whole incloſure A B C, &c. as before.

PLOTTING *ſcale* a mathematical inſtrument uſually of box-wood, ſometimes of braſs, ivory, or ſilver, and either a foot, or half a foot long, and about an inch and a half broad.

It is denominated from its uſe in PLOTTING of grounds, &c.

On one ſide of the inſtrument (repreſented *Tab.* II. *Survey. fig.* 44.) are ſeven ſeveral ſcales, or lines, divided into equal parts. The firſt diviſion of the firſt ſcale is ſubdivided into ten equal parts, to which is prefixed the number 10, ſignifying that ten of thoſe ſubdiviſions make an inch; or that the diviſions of that ſcale are decimals of inches.

The firſt diviſion of the ſecond ſcale is likewiſe ſubdivided into 10, to which is prefixed the number 16, denoting that ſixteen of thoſe ſubdiviſions make an inch. The firſt diviſion of the third ſcale is ſubdivided in like manner into 10, to which is prefixed the number 20. To that of the fourth ſcale is prefixed the number 24; to that of the fifth, 32; that of the ſixth, 40; and that of the ſeventh, 48; denoting the number of ſubdiviſions equal to an inch, in each, reſpectively.

The two laſt ſcales are broken off before the end, to give room for two lines of chords, marked by the letters C C.

On the back-ſide of the inſtrument is a diagonal ſcale, the firſt of whoſe diviſions, which is an inch long, if the ſcale be a foot, and half an inch, if half a foot, is ſubdivided, diagonally, into 100 equal parts; and at the other end of the ſcale is another diagonal ſubdiviſion, of half the length of the former, into the ſame number of parts, viz. 100.

Next the ſcales, is a line divided into hundredth parts of a foot, numbered 10, 20, 30, &c. and a line of inches ſubdivided into tenths, marked 1, 2, 3, &c.

PLOTTING *ſcale, uſe of the.* 1. *Any diſtance being meaſured with the chain, to lay it down on the paper.* Suppoſe the diſtance to be 6 chains, 50 links. Draw an indefinite line; ſet one foot of the compaſſes at figure 6 on the ſcale, e. gr. the ſcale of 20 in an inch, and extend the other to five of the ſubdiviſions, for the 50 links: this diſtance being transferred to the line, will exhibit the 6 chains 50 links, required.

If it be deſired to have 6 chains 50 links, take up more or leſs ſpace, take them off from a greater or leſſer ſcale, i. e. from a ſcale that has more or fewer diviſions in an inch.

To find the chains and links contained in a right line, as that juſt drawn, according to any ſcale, e. gr. that of 20 in an inch. Take the length of the line in the compaſſes, and, applying it to the given ſcale, you will find it extend from the number 6 of the great diviſions to five of the ſmall ones; hence the given line contains 6 chains 50 links.

PLOTTING-*table*, in *Surveying*, is uſed for a plain *table*, as improved by Mr. Beighton, who has obviated a good many inconveniencies attending the uſe of the common plain *table*. See Phil. Tranſ. N° 461. ſect. 1.

PLOTUS, in *Ornithology*, a genus of the *anſeres*, in the Linnæum ſyſtem: its characters are, that the beak is ſtrait, ſharp, and denticulated; the face covered, and the feet palmated, with the toes joined. Of this genus there is only one ſpecies, which is the ANHINGA of Marcgrave.

PLOVER, *golden*, or *green*, *pluvialis*, in *Ornithology*, the CHARADRIUS *pluvialis*, of Linnæus: an elegant ſpecies, which is often found on our moors and heaths, in the winter time, in ſmall flocks. Its weight is nine ounces, its length eleven inches, and breadth twenty-four; the bill is ſhort and black; the feathers on the head, back, and coverts of the wings, are black, beautifully ſpotted on each ſide with light yellowiſh green; the breaſt brown marked with greeniſh oblong ſtrokes; the bely white, the middle feathers of the tail barred with black and yellowiſh green, the reſt with black and brown, and the leggs black. Mr. Pennant has obſerved ſome variety in theſe birds, probably owing to age or ſex; ſome having black bellies, others with a mixture of black and white, others with bluiſh legs, and ſome with a ſmall claw in the place of the hind toe. This bird, which lays four eggs, pointed at the leſſer end, and of a dirty white colour, irregularly marked with black ſpots, breeds on ſeveral of our unfrequented mountains: it makes a ſhrill whiſtling noiſe, and may be enticed within ſhot by a ſkilful imitator of the note. Pennant.

PLOVER, *baſtard*. See LAPWING.

PLOVER, *leſſer*, CHARADRIUS *morinellus* of Linnæus. See DOTTEREL.

PLOVER, *long-legged*. See HIMANTOPUS.

PLOVER, *Norfolk*, or *greater*. See OEDICNEMUS, and *Stone* CURLEW.

PLOVER, *ringed*. See *Sea*-LARK, and *Tab. Birds*, N° 45.

PLOVER-*ſtone*, in *Ornithology*, a name uſed in ſome parts of England for the GODWIT, or *ægocephalus* of authors.

PLOUGH, or PLOW, in *Agriculture*, a popular machine for the breaking up of ground; conſiſting of a train or carriage with two large irons, the one pointed, the other edged; ſerving to cut and open the land, and draw furrows therein. The parts of the PLOUGH are, the *plough beam*, the *handle*, *tail*, *ſtilts*, *hales* or *ſtaves*, *neck* or *ſhare-beam*, *earth-board*, *mould-board*, *breaſt-board*, *furrow-bord*, *ſhield-board*, &c. the *ſheath*, *ſhare-iron*, *coulter*, *plough-pin*, and *collar-links*, *plough pillar*, and *bolſter*, and ſometimes *wheels*.

The advantage of digging with the ſpade, or ſuch other inſtrument, very naturally led men to the invention of the *plough*, as a much more expeditious way of doing the ſame thing; that is, cutting and breaking the earth into ſmall pieces; but in this the ſpade has the advantage of the common *plough*, as it goes deeper, and divides the earth more minutely; but the improvement of the common *plough* into the four-coultered one ſhews, that it is eaſy to make the *plough* perform this office as much better, as it uſually does it worſe than the ſpade.

The *plough* deſcribed by Virgil had no coulter; and at this time the *ploughs* in Italy and the ſouth of France, have none; and the *ploughs* in Greece, and in the eaſtern nations in general, are of the ſame kind. Neither is it indeed poſſible to uſe a coulter in ſuch a *plough*; becauſe the ſhare does not cut the bottom of the furrow horizontally, but obliquely; in going one way it turns off the furrow to the right hand, but in coming back it turns it off to the left; therefore, if it had a coulter, it muſt be on the wrong ſide every other furrow.

It is a great miſtake in thoſe who ſay that Virgil's *plough* had two earth-boards, for it had really none at all; but the ſhare itſelf always going obliquely, ſerved inſtead of an earth-board; and the two ears, which were the corners of a piece of wood lying under the ſhares, did the office of ground-wriſts.

This faſhion of the *plough* continues to this day in thoſe countries; and in Languedoc this ſort of *plough* performs tolerably well when the ground is fine, and makes a ſhift to break up light land. This is the ſort of land that is common in the Eaſt; and the arable lands about Rome being never ſuffered to be fallow ſo long as to come to turf; this *plough* ſucceeds very well in ſuch places, but it would be wholly impoſſible to turn up what in England we call ſtrong land with it.

The Engliſh *ploughs* are therefore different from theſe, as the ſoil is different. Our *ploughs*, where well made, cut off the furrow at the bottom horizontally; and therefore, it being as thick on the land ſide as on the furrow ſide, the *ploughs* cannot break it off from the whole land at ſuch a thickneſs (being ſix times greater than what the eaſtern *ploughs* have to break off), and for this purpoſe it muſt have, of neceſſity, a coulter to cut it off: this means the furrow is turned perfectly whole, and no part of the turf of it is broken; and if it lie long without new turning, the graſs from the edges will ſpread, and form a new turf on the other ſide, which was the bottom of the furrow before the turning, but is now become the ſurface of the earth, and will ſoon become greener with graſs than it was before *ploughing*.

If whole, ſtrong, turfy furrows are *ploughed* croſs-ways as is too commonly practiſed, the coulter cannot eaſily cut them; becauſe, being looſe, underneath, they do not make a proper reſiſtance or preſſure againſt its edge, but are apt to be drawn on heaps, and turned in all directions, but without cutting.

Some of our *ploughs* have heavy drags, with long iron tines in them; and though theſe broken pieces of furrows, being now looſer than before, require keener edges to cut them, theſe tines have no edges at all. Thus the clods of earth are toſſed into heaps again, and the ſurface left bare between them, and great labour and expence are uſed to very little purpoſe; all this is owing to the one coulter.

If the ſoil be ſhallow, it may be broken up with a narrow furrow, which will the ſooner be brought into tilth; but if it be a deep ſoil, the furrows muſt be proportionably enlarged, or elſe a great part of the good mould will be left unmoved, and ſo be loſt. The deeper the land is, the worſe it is broke by one coulter; that is, it is broke into larger furrows, and it requires ſuch repeated labour to conquer this, that often the beſt land will ſcarce pay the tillage.

This gives an opportunity to ſervants to cheat their maſters. They *plough* ſuch deep land with a ſmall furrow, and ſhallow, to the end that the turf and furrows may be broken the ſooner, and the ſuperficial part made fine. They pretend the *plough* will go deeper the next time; but this is never the caſe.

This ſort of land muſt not be *ploughed* the ſecond time in wet weather; for this will cauſe the weeds to multiply, and the earth will be formed into thick and heavy clods where trodden; and in dry weather the reſiſtance of the untouched earth below, and the ſlight preſſure of the *plough* above, will always be reaſons why the *plough* will enter no deeper the ſecond time than it did the firſt.

Another way to conquer a ſtrong turf, is to plough it up firſt with a breaſt-*plough*, very thin; and when the ſward is rotten, then it is to be *ploughed* to the proper depth: but this method is liable to great objections; it is very troubleſome and expenſive, and, if the turf be pared off in the winter, or early in the ſpring, it is a chance but the rains come on, and ſet it to growing faſter than before: if, on the other hand, it be pared later in the year, though the turf be thoroughly killed by the ſucceeding dry weather, yet the time is loſt, and the farmer loſes the ſowing ſeaſon for wheat, which is the proper corn for ſuch ſtrong land. Tull.

The contrivance and ſtructure of *ploughs* are various, according to the fancy of the maker, or the ſoil and uſes to which they are applied; ſo that it would be endleſs to give a particular deſcription of all: but that this work may not be thought eſſentially defective in this particular, we ſhall here ſubjoin a brief account of ſeveral kinds of *ploughs* that have fallen under our notice, and that have been recommended by the advantages attending their ſtructure.

The common *dray* or *drag* PLOUGH is well known: this is made without either wheel or foot, of an eaſy draught, and beſt in winter for miry clays, where the land is ſoft: but in ſummer, and eſpecially in hard ſoil, it is inconvenient, becauſe its point will be continually riſing out of the ground.

In the *double* PLOUGH, one *plough* is fixed to the ſide of another, ſo that by means of four horſes and two men, a double furrow is *ploughed*, one by the ſide of the other. There is another kind of *double plough* whereby two furrows are *ploughed* at once, one under another, by which the earth is ſtirred up to the depth of twelve or fourteen inches, which in many caſes is of great benefit.

This purpoſe is well anſwered by the *double* PLOUGH invented by Mr. Randal, (ſee *Tab. Agriculture*, *fig.* 7.) which by putting the ſhare point to the middle of the interval left by the horſe-hoe, throws the mould on each ſide of it, at the ſame time, towards the rows, and earths them up to what degree the ploughman pleaſes: and alſo by the *double lifting* PLOUGH, (*fig.* 8.) which paſſes into all the trenches made by the *double plough*, and by means of the irons, running up on each ſide of the *plough*, will lift up the mould, and throw it upon the old ridges; ſo that the ground, thus *ploughed*, will lie in deep trenches and high ridges.

The *double wheeled* PLOUGH has of late years become univerſally uſed in many counties, and is found much preferable to the *ploughs* they uſed before; there is an objection to it indeed, in regard to ſome ſtiff and miry lands, in which the wheels become clogged up, and cannot turn. This, however, is eaſily remedied by twiſting thumb ropes of ſtraw about the iron circle and ſpokes of the wheels; theſe ſpreading as they turn, and as the circle twiſt bears upon the ground, throw off the dirt, and never clog. The two principal parts of this *plough* are the head and the tail; the *plough*-head contains the two wheels A, B (*fig.* 9.) and their axis, or ſpindle of iron, paſſing through the box C, and turning round both in it and in the wheels. There are fixed perpendicularly in this box, two crow-ſtaves D, D, which are flat and narrow boards, each having in it two rows of holes, whereby to raiſe or ſink the beam of the *plough*, by pinning up or down the pillow E, to increaſe or diminiſh the depth of the furrow. Behind are the gallows F, through which the crow-ſtaves paſs at the top by mortiſes, into which they are pinned; and to theſe are faſtened what are called the wilds, G, with links and crooks of iron, by which the whole *plough* is drawn in the working. From the box to the centre of the beam there is carried an iron-chain, conſiſting of four, five, or more long links, and called the tow-chain, H: this faſtens the *plough*-tail to the *plough*-head. It is fixed to an iron collar, I, faſtened in the beam at one end, and the other paſſes through a hole in the middle of the box, and is pinned in by the ſtake K. From the ſame iron-collar to which the tow-chain is fixed, there is another chain faſtened, called the bridle-chain L: this runs above the beam, as the tow-chain does below it, and is compoſed of ſmaller and more numerous links. At the upper end, as the tow-chain enters the box of the *plough*, this bridle chain is fixed to the top of what is called the ſtake of the *plough*; this is a perpendicular ſtick, carried up parallel with the left crow-ſtaff, and pretty near it, and faſtened to it by a wythe or rope, M, or by the end of the bridle-chain itſelf, when that is long enough. This ſtake is alſo faſtened in its lower part, under the gallows, to the ſame crow-ſtaff, by another wythe or piece of rope.

Theſe are the parts of which the head-part of the *plough* is compoſed. The *plough*-tail conſiſts of the beam, N, carried from the head to the very extremity, and ſerving as the ſupport and baſe of all the reſt. A little below the collar, to which the tow-chain and bridle-chain are faſtened, this beam is pierced with a large hole, which lets through the coulter, O: this is a long and narrow piece, terminating in an edge, and reaching juſt to the ſhare, P; and it is fixed immoveable in its place by means of a wedge which is driven into the hole of the beam with it: the office of this coulter is to cut the earth as it is thrown up by the ſhare. Behind theſe, the ſame beam is pierced with two more holes, one very near its end: theſe give paſſages to two oblong pieces, called the fore-ſheat Q and hinder-ſheat R, by which the *plough*-ſhare is ſupported in its place. To the top of the hinder-ſheat there is faſtened a ſhort handle, S, by a wooden pin. Parallel to the hinder-ſheat there runs up a piece of wood of much the ſame form, called the drock, T; and to this is faſtened another horizontal piece, called the ground-wriſt, V: theſe are all on the right hand ſide of the *plough*, and parallel with the fore-ſheat. There runs another piece, of much the ſame form with it, on the right hand; and the bottom of this is the earth-board, whoſe fore-part, W, is ſeen before the ſheat. The long handle, X, of this whoſe fore-part appears before the ſheat, which reaches as far as that of the ſheat, is faſtened to the drock by a pin at *a*, the other end of which goes into the beam. Near the lower end of the fore-ſheat, there are two flat pieces of iron, called the double retch, *z*, which paſs from the two ſides of it up to the beam; and, being let through it, are faſtened to the upper part by ſcrews and nuts at *b* and *c*. Theſe keep the ſheat in its place.

Plough, *draining*, or *trenching*, is an inſtrument uſed to cut out the trenches, drains, and carriages in meadow and paſture-ground. It is alſo uſed for cutting the ſides of turf even, which are to be laid down again either in the ſame, or in ſome other places.

It conſiſts of a long handle, with a knob or button at the end, and at the other end it turns upward like the foot of a *plough*, to ſlide in the ground. In this part is placed a coulter, of the length proportioned to the depth to be cut, and with a ſharp edge; this has two wheels to make it run eaſy, and does a great deal of buſineſs in a very little time.

The *trenching-plough* uſed about Caxton, in Cambridgeſhire, is larger than ordinary, and has two coulters, one before the other, which, bending inwards, cut each ſide of the trench. The mould-board is longer than common, in order to caſt the turf a great way off from the trench. It cuts a trench a foot wide at bottom, a foot and a half at top, and a foot deep, and is drawn with twenty horſes.

The importance of draining wet land induced the Society of Arts, &c. to propoſe a premium of fifty guineas for the beſt *plough* or machine, of the ſimpleſt conſtruction, that ſhould, with the leaſt force, cut a new drain or trench one foot in perpendicular depth, one foot eight inches wide at top, and ten iches at the bottom, ſloping equally on each ſide, the contents of which were alſo to be thrown equally on each ſide.

This premium was adjudged to Mr. Cuthbert Clarke, who invented the *double* mould-board *drain-plough*, repreſented *Tab.* II. *Agriculture, fig.* 10. which anſwered exceeding well in meadow ground, but could not be drawn in a ſtiff clay with the force of eight horſes.

A, B, and C are the three coulters; D, E, F, the nuts and ſcrews that faſten the coulters to the beams; G, H, I, a wheel or roller, which prevents the *plough* from ſinking too deep into the earth; this roller is divided into three parts by circular pieces of iron, which project beyond it, and cut the turf into three parts; the coulters follow in the ſame track, and finiſh that part of the work. K, K, are the centres on which the roller turns; L, L, the nuts and ſcrews which faſten the iron arbor in which the pivots of the roller turn to the beams; the arbors are kept in their places by means of the two iron braces *f*, *f*: M is a large iron hook, to which the tow-chain N, by which the *plough* is drawn, is faſtened: O is the head of the *plough*, into which the beams are mortiſed; P, Q, R are the three beams: S is a ſhoe of iron, the whole part from S to A being of that mettle, and into which the hoof of the *plough* is inſerted: T is a ſhelf on which the mould riſes after it is cut by the coulter and fore-part of the ſhare, till it is thrown out of the trench by the mould-boards V, V: W, W is a band of iron, which faſtens the hinder part of the *plough* to the main or middle beam; X is the head of a tenon, which faſtens the mould-boards and hoof of the *plough* to the main-beam; Z, Z are the two handles, like thoſe of a common *plough*, kept ſecure, and in their proper poſition by the board *a*, *b*, *c*, *d*, repreſent the ſurface of the ground when the *plough* is at work; ſo that all the parts below that dotted line are under the ground when the drain is cutting: *f e g* is the angle which the coulters make with a line drawn parallel to the horizontal plane, and is nearly equal to 45°: though by being ſo large, the *plough* tends too much to get into the earth; and, therefore, when the ſoil is ſtiff and a great force is required to draw the *plough*, it cannot be properly held by the handles, even by the force of ſix men without turning over. This inconvenience might be removed by diminiſhing the angle *f e g* to about 33°.

Mr. Clarke conſtructed another improved *plough* of this kind, but the premium of the ſociety was aſſigned to Mr. Knowles, whoſe *plough* cut a trench of one foot one inch in depth, twenty inches broad at top, and ten at bottom, laying the earth and turf on each ſide of the trench in the moſt exact manner.

Mr. Clarke's *ſingle mould-board drain plough* is repreſented *fig.* 11. Its conſtruction is very ſimilar to that already deſcribed: A is the regulating wheel, which, by the radius F, may be ſo adjuſted as to adapt the *plough* for cuts of various depths. H, H are two coulters faſtened to the wings of the ſhare, and ſcrewed into the bar G; they are ſo extended as to make the deſigned breadth at top, and equally ſloping on each ſide. In whatever way the cut is made, the contents are forced up the inclined plane C, which is ſupported by the heel D, as in the other *plough*; and the mould-board B turns the furrow clear of the drain. This *plough* requires only four horſes. Clarke's Theory and Practice of Huſbandry, &c. p. 332, &c.

Plough, *drill*, is an inſtrument contrived for ſowing corn in drills or rows, according to the method of the new huſbandry.

The firſt inventions of this kind were the *drill-plough* of Mr. Worlidge, and the ſembrador of Lucatello; but neither of theſe or any other of the kind anſwered in practice, till Mr. Tull contrived his *drill-plough*; furniſhed with ſhares, hoppers, and a harrow, ſo diſpoſed, that the furrows are formed, the ſeeds dropped into them, and covered at the ſame time. This curious machine is, from its nature and extenſive uſe, ſo complicated, that it would lead us beyond our proper limits to give ſuch a minute deſcription of it as would be ſufficient to afford our readers an adequate and juſt idea of it. Such a deſcription, illuſtrated by various figures, together with the inventor's lateſt improvements, may be found in his Horſe-hoeing Huſbandry, chap. 21, 22, and Appendix. See **Drill**.

Mr. Clarke, whoſe name has been already mentioned, has invented a *drill-plough*, (ſee *fig.* 12.) I I are a pair of ſhafts; L L is a bar, which ſtrengthens the hinges of the ſhafts; E, E, E are three mortiſes to receive the three coulters; A repreſents the ſhape of the coulter, the bulb at the end of which makes the groove or furrow for the ſeeds; B B B are oval holes to receive the piece

N, which conveys the ſeeds down to the furrows made by the coulters; *a*, *a*, *a*, are three ſhes or damſels, like thoſe of a corn mill, to receive the ſeeds from the three hoppers R, R, R, which are placed about eight or nine inches above the board, containing the holes B, B, B, but parallel to it, and ſupported by the frame C, which frame is ſupported by ſeven pillars, ſuch as *q*. The hoppers and their ſhes being thus ſuſpended, and the ſhes pinned to a flat bar as repreſented by B, B, B, and held to their ſtation by an eaſy ſpring, they are jogged by the call or ſquare piece of wood fixed upon the ſpindle, paſſing through the trundle O: this trundle is turned by the cog wheel H, which is turned by the axle-tree Z Z of the two wheels G G: *g* is the bridge for ſupporting the ſpindle and trundle. When the ſeed, jogged by the call, is made to trickle out, a perſon takes hold of the handles P P, and directs the whole machine, ſo that the ſeeds will be covered in by the harles *d*, *d*, *d*; which turn upon a pin or hinge at the fore end, and are loaded at the hind end with lead or any other heavy ſubſtance, as repreſented by the balls over *d*, *d*, *d*, to make the feet ſink in the ſoil. This inſtrument may be made to ſhift its drills at pleaſure, or to drill always at one diſtance. Clarke ubi ſupra.

For the method of conſtructing *drill ploughs*, invented by M. de Chateauvieux and Du Hamel, ſee Farmer's Dict. art. DRILL *plough*.

Mr. Randall, Mr. Craik, and Mr. T. Hope, have likewiſe conſtructed *drill ploughs*.

The *four-coultered* PLOUGH of Mr. Tull, (ſee *fig.* 13.) is different in ſome reſpects from the *double-wheeled plough* already deſcribed, though in general founded upon it.

Its beam is ten feet four inches long, whereas that of the common *plough* is but eight. The beam is ſtraight in the common *plough*, but in this it is ſtraight only from *a* to *b*, and thence arched: ſo that the line let down perpendicularly from the corner at *a*, to the even ſurface on which the *plough* ſtands, would be 11½ inches; and if another line were let down from the turning of the beam at *b* to the ſame ſurface, it would be one foot eight inches and a half; and a third line let down to the ſurface from the bottom of the beam at that part which bears upon the pillow, will ſhew the beam to be two feet ten inches high in that part. At the diſtance of three feet two inches from the end of the beam *a*, at the *plough*-tail, the firſt coulter, or that next the ſhare, is let through; and at thirteen inches from this, a ſecond coulter is let through: a third at the ſame diſtance from that; and, finally, the fourth at the ſame diſtance from the third, that is, thirteen inches: and from *a* to *b* is ſeven feet.

The crookedneſs of the upper part of the beam of this *plough* is contrived to avoid the too great length of the three foremoſt coulters, which would be too much, if the beam was ſtraight all the way; and they would be apt to bend and be diſplaced, unleſs they were very heavy and clumſy. Aſh is the beſt wood to make the beam of, it being ſufficiently ſtrong, and yet light.

The ſheat in this *plough* is to be ſeven inches broad. The fixing of the ſhare in this, as well as in the common *plough*, is the niceſt part, and requires the utmoſt art of the maker; for the well-going of the *plough* wholly depends upon the placing this. Suppoſing the axis of the beam, and the left ſide of the ſhare, to be both horizontal, they muſt never be ſet parallel to each other; for if they are, the tail of the ſhare bearing againſt the trench as much as the point, would cauſe the point to incline to the right hand, and it would be carried out of the ground into the furrow. If the point of the ſhare ſhould be ſet ſo, that its ſide ſhould make an angle on the right ſide of the axis of the beam, this inconvenience would be much greater; and if its point ſhould incline much to the left, and make too large an angle on that ſide with the axis of the beam, the *plough* would run quite to the left hand; and if the holder, to prevent its running quite out of the ground, turns the upper part of his *plough* towards the left hand, the pin of the ſhare will riſe up, and cut the furrow diagonally, leaving it half *unploughed*. To avoid this and ſeveral other inconveniencies, the ſtraight ſide of the ſhare muſt make an angle upon the left ſide of the beam; but that muſt be ſo very acute a one, that the tail of the ſhare may only preſs leſs againſt the ſide of the trench than the point does.

This angle is ſhewn by the pricked lines at the bottom of *fig.* 9, where *e f* is ſuppoſed to be the axis of the beam let down to the ſurface, and *g f* parallel to the left ſide of the ſhare: and it is the ſubtenſe *e g* that determines the inclination which the point of the ſhare muſt have towards the left hand. This ſubtenſe, ſays Mr. Tull, at the fore-end of an eight feet beam, ſhould never be more than one inch and a half, and whether the beam be long or ſhort, the ſubtenſe muſt be the ſame.

The great thing to be taken care of, is the placing the four coulters; which muſt be ſo ſet, that the four imaginary planes deſcribed by their four edges, as the *plough* moves forward, may be all parallel to each other, or very nearly ſo; for if any one of them ſhould be very much inclined to, or ſhould recede much from either of the other, then they would not enter the ground together. In order to place them thus, the beam muſt be carefully pierced in a proper manner. The ſecond coulter-hole muſt be two inches and a half more on the right hand than the firſt, the third muſt be as much more to the right of the ſecond, and the fourth the ſame meaſure to the right hand of the third; and this two inches and a half muſt be carefully meaſured from the centre of one hole to the centre of the other. Each of theſe holes is a mortiſe of an inch and quarter wide, and is three inches and a half long at the top, and three inches at the bottom. The two oppoſite ſides of this hole are parallel to the top and bottom, but the back is oblique, and determines the obliquity of the ſtanding of the coulter, which is wedged tight up to the poll.

The COULTER is two feet eight inches long, before it is worn; the handle takes up ſixteen inches of this length, and is allowed thus long, that the coulter may be driven down as a point wears away.

As to the wheels, the left hand wheel is twenty inches diameter, and that on the right hand two feet three inches, and the diſtance at which they are ſet from each other two feet 5½ inches. Tull's Horſe-hoeing Huſband. p. 294, ſeq.

PLOUGH, *hoe*, an inſtrument adapted to the new HUSBANDRY, and to the operation of HOEING, for deſtroying weeds, keeping plants clean, and ſtirring the ground. See *Horſe*-HOE.

The *hoe-plough* invented by Mr. Tull, is repreſented in *fig.* 14. A is the beam and *plough*-tail; being much the ſame with that of the common *plough*, *fig.* 9. The ſhare from its tail to the fore-part of its ſocket is two feet one inch long, and from thence to the end of the point ten ½ inches. B is the plank, two feet ſeven ½ inches long, two ½ inches thick, and nine inches broad. C, D are the nuts of the two ſcrew-pins, which hold up the beam to the plank: E is the nut of the draw-pin, which pin has a crook underneath, to which one of the links of the ſhort chain of the whipper is faſtened, for drawing the *plough*; F, G are the two limbers, ſcrewed on to the plank by four ſcrews and nuts, and having their inferior ſurface parallel to the plank, and to the upper ſurface of the fore-end of the beam; theſe limbers bend outwards from each other all the way, till they come within about a foot of the chain; and the diſtance of their fore-ends is two feet eight inches: they are to be made ſtrong and ſtiff, and of ſuch a length, that there may be room for the horſe before the bar, H, which holds them at their proper diſtance: I is the whipper; K, L are its notches, to which the traces, both of the thiller and of the horſe next before him, are faſtened.

This *plough* is made to go deeper or ſhallower by the chain of the limbers. In hoeing near the young plants, the firſt or ſecond time, the earth is prevented from running over to the left ſide of the *plough*, and burying them, by nailing a very thin ſquare piece of board to the ſheat with one corner bearing at or below *a*, and its other lower corner bearing on the back of the coulter on its left ſide at *b*, its upper corner reaching to *c* or higher: its fore end is tied on to the coulter by a leathern thong paſſing through a hole very near the end of the board. The lower edge of the board muſt come no lower than the pricked line *a b*; which at *b*, is juſt even with the ſurface of the ground, before it is raiſed by the ſhare. For a farther account of the ſtructure and uſe of this *plough*, ſee Tull, ubi ſupra, chap. 23.

PLOUGH, *paring*, is an inſtrument uſed in ſeveral parts of England, for paring off the ſurface of the ground, in order to its being burnt.

Mr. Bradley has given the following deſcription of a very ſimple inſtrument of this kind: from A to A (*fig.* 15.) is the *plough*-beam, about ſeven feet long, mortiſed and pinioned into the block B, which is of clean timber, without knots. C, C are the ſheaths or ſtandards, made flat on the inſide, to cloſe equally with the paring plate, and faſtened to it with a bolt and key on each ſide, as at D. E is the paring plate of iron laid with ſteel, about four inches wide, and from twelve to eighteen inches long. This plate muſt be made to cut on the ſides, which are bolted to the ſtandards, as well as at the bottom part. F, F are two iron braces, to keep the ſtandards from giving way: theſe ſtandards muſt be mortiſed near their outſides, and through the block. G, G are the *plough* handles, which muſt be fixed ſlope-ways between the beam and the ſtandards. The pin-holes in the beam, the uſe of which is to make this *plough* cut more or leſs deep, by fixing the wheels nearer to or farther from the paring plate, ſhould not be above two inches aſunder.

PLOUGH, *Rotheram*, or *patent*, is a *plough* of very ſimple conſtruction, and eaſily worked. The left or land ſide of this *plough* is repreſented *fig.* 16. A B is the beam, C D the ſheath, E B D the main handle, F R the ſmaller handle, G H the coulter, K I the ſock or ſhare, N P the bridle, S the ſly-band, and M L a piece of wood in place of a head. The whole of this *plough* ſhould be made of aſh or elm; the irons ſhould be ſteeled and well-tempered; and that part of the *plough* which is under ground in tilling, ſhould be covered with plates of iron. The difference between this and the common *plough* ſeems to conſiſt in the bridle at the end of the beam, by which the *plough*-man can give the *plough* more or leſs land by notches at N, or make it cut deeper or ſhallower by the holes at P, in the coulter or ſhare, which are ſo made and ſet as to cut off the new furrow without tearing; and in the mould-board, which is ſo ſhaped at firſt to raiſe a little, and then gradually turn over the new cut furrow with very little reſiſtance. But the greateſt advantage attending it is its being ſo eaſy of draught, that it will do double the work of any common *plough*. Mr. Clarke has alſo conſtructed a *plough*, which he ſays, may be worked with the leaſt force poſſible. Clark, ubi ſupra, p. 347.

For an account of the improvements made in wheeled *ploughs* by Meſſrs. de Chateauvieux and Du Hamel, we muſt refer the reader to the Farmer's Dictionary, art. PLOUGH.

PLOUGH, *the ſingle-wheel*, is lighter than moſt other weeel *ploughs*, and may be uſed almoſt in any kind of ground; though in Suſſex they have a *plough* of this kind, wide in the breech, and of heavy draught.

PLOUGH, *Spaniſh*, varies much in its make from our common *ploughs*. It is a kind of ſemicircle pitched on one end, with the convex ſide turned to the ploughman; and the concave ſide (a little inclined) to the horſe. Its tail is in a right line with the ſhare. With this *plough* and one horſe the Spaniards *plough* two or three acres of their light ground in a day. See *fig* 17.

PLOUGH, among *Book binders*, is a tool wherewith they cut the leaves of books ſmooth. See BOOK-BINDING.

PLOUGH, or *plow*, in *Navigation*, an ancient mathematical inſtrument made of box or pear-tree, and uſed to take the height of the ſun, or ſtars, in order to find the latitude.

It admits of the degrees to be very large, and has been much eſteemed by many artiſts; though now generally diſuſed amongſt us.

PLOUGH-*bote* in our *Old-Writers*, a right of tenants to take wood to repair *ploughs*, carts, and harrows, and for making rakes, forks, &c.

PLOUGH, *gallows of a*. See GALLOWS.

PLOUGH-*head*, a name given by the farmers to the foremoſt half of the *plough*, or that part containing the two wheels and their ſpindle, the box, the crow-ſtaves, the pillow, the wilds, the tow-chain, and bridle-chain, and the ſtake: all which, ſee under their ſeveral heads, and under the article PLOUGH.

PLOUGH-*land*, *carucata terræ*, in our *Ancient Cuſtoms*. See CARRUCATE.

PLOUGH-ALMS, a duty anciently of a penny, paid to the church for every *plough-land*, or hide of land.

De qualibet carucata juncta inter Paſcha & Pentecoſten unum denarium, qui dicitur plou-almes. Monaſt. Ang.

PLOUGH-MONDAY, the next Monday after Twelfth-day. The ploughmen, in the north-country, on this day, draw a *plough* from door to door, and beg *plough* money for drink.

PLOUGH, *handles of a*, the name given by farmers, to the two pieces of the *plough* faſtened to the earth-board, and to the ſheat, and ſerving the ploughman to reſt his force upon in the guiding of the *plough*. When they are conſiderably long, the *plough* is always guided the better, and the land is better tilled; but the lazy ploughmen are apt to cut them off ſhorter, that by bearing their whole weight upon them, they may, in a manner, ride, inſtead of walking. If they ſhould ride, in this manner, on the long handles, they would tilt up the end of the beam, and raiſe the *plough* out of the ground.

PLOUGH-*tail*, a name given by the farmers to that part of a *plough* which contains the beam, the coulter, or coulters, the ſhare, the ſheat and under-ſheat, the earth-board and handles, as alſo the drock, the ground-wriſts, and the retches: all which ſee under their ſeveral heads, and under the article PLOUGH.

PLOUGHING, or PLOWING, one of the principal operations in agriculture, performed with the *plough*.

Ploughing is principally either that of *lays*, or of fallows.

PLOUGHING *of layes*, is the firſt cutting up of graſs-ground for corn; in which caſe the Engliſh writers on agriculture always ſuppoſe, that the land is to be ſummer fallowed; and they recommended to plough as deep at firſt as the nature of the ſoil will allow; directing alſo to turn the earth upſide down, that the ſward or turf may be ſooner rotten. On the rich lands in Scotland they purſue a method the reverſe of this: they commonly ſow after one *ploughing* of graſs-ground, and plough as ſhallow and narrow as poſſible, and ſet the turf as exactly as poſſible upon its edge. In this way it may be expected, that after froſt, the turf will be in ſpring in ſuch a condition as to be eaſily broken by the harrows, and fit for being ſown with oats, or to be ſummer fallowed, and ſown with wheat. With reſpect to their barren lands, they purſue the Engliſh method, *ploughing* deep and turning the turf over on its back. There is another method propoſed for opening up graſs-ground, and that is by trench-*ploughing*. This manner of *ploughing* is performed by one plough following another in the ſame track. The plough that goes firſt turns over the ſward or turf, and the ſecond turns up ſome inches of ſoil upon it. By this method there is ſufficient nouriſhment provided for the crop, and the ſward is rotten before the next ſeaſon.

PLOUGHING *of fallows*, called alſo *following*, is a preparing of land by *ploughing*, long before it be *ploughed* for ſeed. This is a conſiderable benefit to all lands, few of which will bear above two or three crops ſucceſſively without ſuch reſpite. Hence landlords uſe to bind their tenants to do it once in three years. When this is done twice, it is called *twifallowing*; when thrice, *trifallowing* &c.

The firſt is as ſoon as the huſbandman has done ſowing his corn; and this is to be very ſhallow, well turned, and clapped cloſe together. The ſecond is in June, when they go to the full depth. The third, about the beginning of Auguſt. If it riſe full of clods, they harrow it down; but then they ſoon ſtrick-ſize, or *plough* it up again into ridges.

In Staffordſhire, beſides the three ſummer fallowings, they uſually give their land a winter fallowing. Pliny commends the *ploughing* of lands four times; and ſo does Virgil:

> *Illa ſeges demum votis reſpondet avari*
> *Agricolæ, bis quæ ſolem, bis frigora ſenſit.*—Georg. lib. i.

This is an ancient part of huſbandry: Xenophon, Pindar, and Virgil recommended it:

> *Alternis idem tonſas, caſſare novaleis,*
> *Et ſegnem patiere ſitu dureſcere campum.*—Georg. lib. i.

The great end of *ploughing* is to break and pulveriſe the ſoil as much as poſſible, for the deſtruction of weeds, the more eaſy ſpreading of the roots of plants, and their better nouriſhment. This operation ſhould therefore be often repeated, and by ſuch ploughs as have two or four coulters; the furrow ſhould not be made too broad, and care ſhould be taken that it be made ſufficiently deep. See PLOUGH, and HUSBANDRY.

If between each *ploughing* of the land a harrow with long teeth is made uſe of to tear and break the clods, it will be of great ſervice; eſpecially if the land is ſtrong; for the more it is ſtirred by different inſtruments, the better will the parts be ſeparated and pulveriſed. The common method, as practiſed by the farmers when they fallow their land, is far from anſwering their intention, for they *plough* up the ground, leaving it in great clods for ſome months, and frequently during this time, thiſtles and all bad weeds are ſuffered to grow upon the land, and exhauſt the goodneſs of it; and perhaps juſt before the ſeeds are ſown, they give it two more *ploughings*. This is what the farmers call good huſbandry: but if inſtead of this method they would labour the ground often with the plough, a harrow, and heavy roller, to break and ſeparate the parts, and never ſuffer any weeds to grow upon the land during its lying fallow, they would find their account in it; firſt by the growth and increaſe of their crops, and afterward by a ſaving in the weeding; for if no weeds are ſuffered to grow to ſhed their ſeeds, during the time of fallowing the land, there will but few come up when the ground is ſown.

Ploughing in ridges is very proper for removing wetneſs, in which caſe every furrow becomes a drain, and alſo for enlarging the ſurface of the ſoil, expoſed to the air, and employed in vegetation. In order to abtain theſe purpoſes, the ridges ſhould be narrow; though ſoils in different ſituations will require being laid out in different kinds of ridges: they ought alſo to be ſtraight in their direction, and equal to one another in ſize, each ridge being alſo equally broad in all its parts. See RIDGES.

There are three different ways of *ploughing* ridges, viz. gathering, caſting, and cleaving.

Gathering keeps the crown and furrows of the ridge in the ſame place in which they were before. The plough begins in the crown, and ploughs out the ridge, turning the earth towards the crown: by this method of *ploughing* the earth on each ſide is turned upon the crown, and thrown up out of the furrows, ſo that the ridge is raiſed. Caſting likewiſe keeps the crowns and furrows in the ſame place; the ridges are ploughed in pairs, and they are kept of the ſame height in the crown, and one of the furrows made a little higher, and the other a little lower than before; the earth being taken out of one furrow and thrown into the other.

Cleaving is the reverſe of gathering: the plough enters the furrow on the right ſide of the ridge, turns to the furrow on the left ſide, and ploughs out the ridge, turning the earth from the crown towards the furrow. In this caſe the furrows are made higher and the crown lower.

There is another method of *ploughing* called *ribbing*, which is performed by making furrows about two feet diſtant from each other; one half of the ſurface is untouched by the plough, and the other half, which the plough turns up in making the furrows, is thrown on the top of what remains faſt. This kind of *ploughing* is ſeldom practiſed, but in the beginning of winter, and upon land to be ſown with barley, after two more clean *ploughings*. It is much condemned by the modern improvers of agriculture, though in ſome caſes it has its uſes. *Bouting* is another kind of *ploughing*, performed by throwing the earth of two furrows towards each other upon ſome faſt land; this is an improvement of ribbing, and better ſerves the ſame purpoſes.

PLOUGHMAN, in *Huſbandry*, the perſon who guides the PLOUGH, in the operation of tilling or TILLAGE.

Ploughman's *ſpikenard*, the Engliſh name of a genus of plants called by the botaniſts *conyza*; it is likewiſe called by us FLEA-*bane*.

PLUG, a large wooden peg, wherewith to ſtop the bottom of a ciſtern, caſk, pipe, or the like.

Plugs, in *Shipping*, are certain pieces of timber, formed like the fruſtum of a cone, and uſed to ſtop the hauſe-holes, and the breaches made in the body of a ſhip by cannon-balls; the former of which are called *hauſe-plugs*, and the latter *ſhot-plugs*, which are formed of various ſizes, in proportion to the holes made by the different ſize of ſhot which may penetrate the ſhip's ſides or bottom in battle: accordingly they are always ready for this purpoſe.

PLUKENETIA, in *Botany*, the name of a genus of plants deſcribed by Plumier, and called by this name in honour of Plukenet, the great Engliſh botaniſt. In the Linnæan ſyſtem it belongs to the claſs of *monoecia adelphia*.

The characters are theſe: it produces male and female flowers on the ſame plants; the male flowers have no cup, but are compoſed of four expanded petals of an oval figure, eight ſtamina, and four bearded nectaria; the female flowers have no cup, and the four petals in theſe are diſpoſed as in the male; the germen of the piſtillum is ſquare; the ſtyle is ſlender, very long, and crooked; the ſtygma is peltated and divided into four parts; the ſegments are obtuſe and flat, and each has a remarkable ſpot in the centre; the fruit is a depreſſed ſquare capſule, hollowed at all the angles; it contains four bivalve cells; the ſeeds are ſingle, roundiſh, and compreſſed, and bluntly pointed at one end.

Linnæus obſerves, that this fructification is very ſingular; and is very deſirous, that ſome perſon ſhould examine carefully the growing plant, ſince Plumier, who was not over curious about the nicer parts of the fructification of plants, may have in ſome ſort miſrepreſented this. There is only one ſpecies.

PLUM-*tree*, *prunus*, in *Botany*, a genus of the *icoſandria monogynia* claſs. Its characters are theſe: the flower hath a bell-ſhaped empalement, cut into five points; it hath five large roundiſh petals, which are inſerted in the empalement, and from twenty to thirty ſtamina, which are near as long as the petals, and are alſo inſerted in the empalement, terminated by twin ſummits; it has a roundiſh germen, ſupporting a ſlender ſtyle, crowned by an orbicular ſtigma; the germen afterwards turn to a roundiſh fruit, incloſing a nut of the ſame form. Miller reckons thirty-three, and Linnæus fourteen ſpecies.

All the ſorts of *plums* are propagated by budding or grafting them upon the ſtocks of the muſcle-*plum*, the white pear-*plum*, the St. Julian, or the bonum magnum. See Inoculation.

Budding is much more proper than grafting for theſe trees, as they are apt to throw out a great deal of gum from the wound: and the trees ſhould be no more than one year's growth from the bud, when they are tranſplanted; for if they are more they ſeldom ſucceed well, being very ſubject to canker; and if they eſcape that, they uſually produce only two or three luxuriant branches. The whole management of planting and pruning them is the ſame with that of peaches. See Peach.

If the walls againſt which they are planted are low, they ſhould be ſet thirty feet aſunder; if they are higher, then not leſs than twenty-four feet.

Plums ſhould have a middle ſoil, for they ſeldom ſucceed well either in a too moiſt or too dry a one; and, when planted againſt walls, ſhould have an eaſt or a ſouth-eaſt aſpect. If they have one at full ſouth, they are apt to ſhrivel up, and grow mealy.

Plums in general ſucceed very well with proper care on eſpaliers; they will alſo bear very well as ſtandards, but the fruit will not be ſo well taſted. *Plums* do not only produce their fruit on the laſt year's wood, but alſo on ſpurs that come out of wood many years old. It is a common error to be too free with the knife in the winter-pruning, cutting off the extremities of all the branches; the conſequence of which is, that there is too great a quantity of young ſhoots produced, and the fruit is ſmall and poor.

The ſafeſt method in the management of theſe trees is to lay in their ſhoots horizontally, as they are produced, at equal diſtances, in proportion to the length of their leaves; and where there is not a ſufficient quantity of branches to fill up the vacancies of the tree, there the ſhoots may be pinched in the beginning of May, which cauſes them to produce ſome lateral branches to ſupply thoſe places: and during the growing ſeaſon, all fore-right ſhoots ſhould be diſplaced, and ſuch as are to remain, muſt be regularly trained in to the wall or eſpalier. Miller.

All the ſpecies of *plums* have within their fruit a hard ſtone, within which there is contained a ſoft and tender kernel: this kernel contains the ſeminal plant, from which would be produced another tree of the ſame kind, if it were ſet in the ground; and it is very natural to ſuppoſe, that the only uſe of the thick ſtone or huſk of this, was to preſerve its tender ſubſtance from rotting too ſoon in the earth, and to give it a proper time for developing its parts, to preſerve its natural oilyneſs during that time, and to furniſh from its own ſubſtance a proper nouriſhment to the growing plant; for obſervation ſhews, that it finally breaks into a very fine powder.

There has not been found any ſpecies of *plum*, which had not its kernel contained in a ſtony coat of this kind, from whatever grafts they have been propagated; nor is there any art known by which the kernel of this ſort of fruit can, while growing, be deprived of its coat.

Mr. Marchand, however, in the year 1735, ſhewed, before the Academy of Sciences at Paris, certain *plums*, whoſe kernels had no ſtone or ſhell round them; and found that they grew upon a tree which never had produced any others, and which had been known to produce ſuch for twenty years. The kernel in theſe was covered with a reddiſh ſkin, which was rough to the touch; and, within that, with another which was thinner and white. The kernel had nothing particular in it, except that it carried on one ſide of its outer ſurface, and that always in the ſame place, a little ſtony prominence, more or leſs dented on its convex part: this is uſually a twelfth of an inch broad, and two thirds of an inch long, and has no other appearance but that of a diſtempered part of the kernel, only that all the kernels have it.

The thick wrinkled ſkin which ſurrounds the kernel, ſeems in this caſe to ſupply the place of the ſtone or hard ſhell; and in this alſo it reſembles it, that the pulp of the fruit parts eaſily and readily from it; and the hard oblong body, which is placed on one ſide of the kernel, is by no means proper for this purpoſe. Mem. Acad. Scienc. Par. 1735.

For the method of deſtroying inſects in the *plum* tree, ſee Peach-*tree*.

Plum, *American black cocoa*, or *maiden*, *chryſobalanus*, in *Botany*, a genus of the *icoſandria digynia* claſs. Its characters are theſe: the empalement of the flower is of one leaf, divided into five parts, almoſt to the middle; the flower has five petals and ten ſtamina, five of which are longer than the petals, the other ſhorter; in the centre is ſituated an oval germen which becomes an oval fleſhy berry, incloſing a nut with five longitudinal furrows, and five valves. Linnæus mentions one, and Miller two ſpecies, which are natives of the warm parts of Ameria.

Plum, *bay*. See Guaiava.

Plum, *Jamaica*, or *hog*, *ſpondias*, in *Botany*, a genus of the *decandra pentagynia* claſs. Its characters are theſe: the flower has five oblong ſpear-ſhaped petals; and a ſmall permanent coloured empalement, with ten ſcaly obtuſe nectariums, ſituated between the petals; and ten briſtly ſtamina ſhorter than the petals, with oblong ſummits; the oblong germen, which is immerſed in the receptacle, ſupports five ſhort parallel ſtyles, joined in a five-cornered column, crowned by a ſimple ſtigma; and afterward becomes an oblong fleſhy berry, incloſing a hard oblong nut, covered with fibres, having five cells.

The fruit of this ſort is eſteemed by ſome of the inhabitants of the iſlands in the Weſt Indies; but as the fleſh is very thin, ſo a great number of the *plums* will afford but little meat: however, the wild hogs are very fond of them, and it is their principal food during the ſeaſon of their ripening. Linnæus enumerates two ſpecies, one of which is the mombin, and the other the myrobalanus.

Plum, *Indian date, piſhamin, perſimon,* or *pitchumon, dioſpyros,* in *Botany*, a genus of the *polygamia dioecia* claſs. Its characters are theſe: it hath hermaphrodite and male flowers on ſeparate plants; the hermaphrodite flowers have a large, obtuſe, permanent empalement, divided into four parts; the flower has one pitcher-ſhaped petal, cut at the brim into four ſegments, and eight ſhort briſtly ſtamina, firmly joined to the empalement; in the centre is ſituated a roundiſh germen, ſupporting a ſingle quadrifid ſtyle, crowned by an obtuſe bifid ſtigma; the germen becomes a large globular berry, with cells, each including one oblong, compreſſed, hard ſeed; the male flowers have the ſame calyx and flower, with eight ſhort ſtamina, but have no germen. There are two ſpecies.

PLUMAGE, the feathers, or covering of birds. For the mechaniſm whereof, ſee Feather.

Plumage, in *Falconry*, is particularly underſtood of the feathers under a hawk's wing.

The falconers alſo give their hawks parcels of ſmall feathers to make them caſt: and theſe they call *plumage*.

PLUMB, or **Plum**, in matters of ſpicery. See Currants and Raisins.

Plumb-Line, a term among artificers for a perpendicular *line*.

It is thus called, becauſe uſually deſcribed by means of a plumbet.

PLUMBAGO, in *Metallurgy*, a metalline recrement, ſeparated in the purification of gold or ſilver with lead, and ſticking to the ſides of the furnace.

This is otherwiſe called *molybdæna*; and has the ſame virtue with litharge.

Plumbago ſeems alſo to have been uſed, among the *Ancients*, for *black* lead, uſed in making pencils for deſigning, &c.

Pomet adds, that *plumbago* was alſo the ſea-lead, *plumbum marinum*, of the ancients; who, he notes, took black lead for a production of the ſea, not a mineral, as it really is; but this is ſcarce credible.

Plumbago, in *Botany*. See Lead-*wort*.

Plumbago, in the *Hiſtory of the Gems*, a word uſed by the Roman authors to expreſs a blemiſh common to their worſe kinds, and greatly debaſing their value It was a ſort of bluiſh or blackiſh deadneſs in the ſtone, which mixed itſelf with the other colour, be that what it would, and rendered it dull and dead. The emerald was of all the gems the moſt ſubject to this fault; and, in this caſe, its fine green colour was always rendered cloudy and bluiſh; and in ſome lights the ſtone appeared of a duſky greyiſh blue, with no green at all in it. The Bactrian emeralds, which were in great eſteem with the ancients, were often ſubject to this imperfection; and thoſe of Cyprus, taken out of the copper-mines, though ſubject to many other imperfections, were uſually quite free from this.

Plumbago, in *Mineralogy*, a name given by many authors to a ſort of foſſil, having very much the appearance of a lead-ore, but not ſuch in reality.

It is called alſo galena, blinde, and *mock-lead*. It is uſually of a plated texture, and dark blackiſh blue colour, like the lead-ores; but on trial it yields no metal.

PLUMBATÆ, among the *Ancients*, a kind of ſcourge, the thongs of which were armed with leads.

Plumbatæ likewiſe ſignified leaden balls, uſed by ſoldiers to annoy the enemy with; whence the ſoldiers were called *martiobarbuli*.

PLUMBERY, formed of *plumbum, lead*, the art of caſting, preparing, and working lead; and of uſing it in buildings, &c.

The lead uſed in *plumbery* is furniſhed from the lead-works in large ingots, or blocks, called pigs of lead, ordinarily weighing about a hundred pounds a-piece.

As this metal melts very eaſily, it is eaſy to caſt figures hereof, of any kind, by running it into moulds of braſs, clay, plaiſter, &c. But the chief article in *plumbery*, is the ſheets, and pipes of lead. They are theſe which make the baſis of the plumber's work in building; the proceſs of theſe, therefore, we ſhall give a deſcription of.

Method of caſting large ſheets of lead. The lead deſtined for this uſe is melted in a large caldron or furnace, uſually built with free-ſtone and earth, fortified on the outſide with a maſſive of ſhards and plaiſter. At the bottom hereof is a place ſunk lower than the reſt, wherein is diſpoſed an iron pot, or pan, to receive what may remain of the metal after the ſheet is run. The furnace is ſo raiſed above the area of the floor, as that the iron pot juſt reſts thereon.

To uſe the furnace, they heat it with wood laid within it; that done, they throw in the lead at random with the burning coals, to melt.

Near the furnace is the table or mould, whereon the lead is to be caſt. This conſiſts of large pieces of wood, well jointed, and bound with bars of iron at the ends. Around it runs a frame, conſiſting of a ledge or border of wood, two or three inches thick, and one or two high from the table, called the *ſharps*. The ordinary width of the tables is from three to four feet; and their length from eighteen to twenty feet.

This table is covered with fine ſand, prepared by moiſtening it with a watering pot, then working it with a ſtick; and at laſt, to render it ſmooth and even, beating it flat with a mallet, and planing it with a ſlip of braſs, or wood.

Over the table is a ſtrike or rake of wood, which bears and plays on the edges of the frame, by means of a notch cut in either end thereof; and is ſo placed, as that between it and the ſand is a ſpace proportionable to the intended thickneſs of the ſheet. The uſe of this ſtrike is to drive the matter, while yet liquid, to the extremity of the mould.

At top of the table is a triangular iron peel or ſhovel, bearing, before, on the edge of the table itſelf, and behind, on a treſsle ſomewhat lower than the table. Its uſe is in conveying the metal into the mould; and the deſign of its oblique diſpoſition is, that it may by that means be able to retain the metal, and keep it from running off at the fore-ſide, where it has no ledge. Some of theſe peels are big enough to hold fifteen or ſixteen hundred weight of lead, and even more.

Things being thus diſpoſed, with a large iron ladle they take out the melted lead, coals and all, out of the furnace; and with this, mixed as it is, they fill the iron peel. When full, they take out the coals, and clear the lead with another iron ſpoon, pierced after the manner of a ſcummer.

This done, they hoiſt up the lower part of the peel by its handle; upon which the liquid matter running off, and ſpreading itſelf on the mould, the plumber conducts and drives it to the extremity of the table, by means of the ſtrike, which the workman paſſes along the ledges, and thus renders the ſheet of an equal thickneſs.

The ſheets thus caſt, there remains nothing but to edge them, i. e. to planiſh the edges on both ſides, in order to render them ſmooth and ſtrait.

Method of caſting thin ſheets of lead. The table or mould here uſed is of a length or breadth at diſcretion, only ledged on one ſide. Inſtead of ſand, they cover it with a piece of woollen ſtuff, nailed down at the two ends, to keep it tight; and over this they lay a very fine linen cloth. The feet of the table are uneven, ſo that it does not ſtand horizontal, but moderately inclined.

Great regard is, in this proceſs, had to the lead while melting, that it have the juſt degree of heat, ſo as it may run well, yet not burn the linen. This they judge of by a piece of paper; for if the paper take fire in the liquid lead, it is too hot; and if it be not ſhrunk and ſcorched a little, it is not hot enough.

Being then in its juſt degree, they have a ſtrike, but different from that deſcribed in the former article; as ſerving both for peel and ſtrike; both to contain and to conduct the liquid lead. It is, in effect, a wooden caſe without any bottom, only cloſed on three ſides. It is pretty high behind, but the two ſides, like two acute angles, ſtill diminiſh to the tip, from the place where they are joined to the third or middle piece, where they are of the ſame height therewith; viz. ſeven or eight inches high. The width of the middle makes that of the ſtrike, which again makes that of the ſheet to be caſt.

The ſtrike is placed at top of the table, which is before covered in that part, with a paſteboard, that ſerves as a bottom to the caſe, and prevents the linen from being burnt while the liquid is pouring in. The ſtrike is ſo diſpoſed on the table, as that the higheſt part looks to the lower end of the table, and the two ſloping ſides to the higher end.

The ſtrike is now filled with lead, according to the quantity to be uſed; which done, two men, one at each ſide the table, let the ſtrike deſcend down the table, or elſe draw it down with a velocity greater or leſs, as the ſheet is to be more or leſs thick; the thickneſs of the ſheet ſtill depending on the promptitude wherewith the ſtrike ſlides down the inclining mould.

The fine ſmooth ſheets of lead, thus made, are ſometimes uſed between the joints of large ſtones in great buildings, &c.

Method of caſting pipes, without ſoldering. To make theſe pipes, they have a kind of furnace, conſiſting of a large iron pot or caldron, ſupported on a pretty high iron ſtand. The caldron is encompaſſed with a maſſive of bricks and loam; only leaving a mouth or paſſage for the conveyance of wood underneath, and for lighting the fire; and another little aperture behind, to ſerve as a vent-hole.

In this furnace they melt the lead, after firſt heating it with a fire underneath: to forward the fuſion, they alſo put in burning faggots along with the metal. The metal is afterwards ſkimmed, and laded off with the inſtruments mentioned above. Near the furnace is a bench, furniſhed at one end with a little mill, with arms or levers to turn it with. A ſtrong girt, armed with an iron hook at one extremity, is faſtened by the other to the axis of the mill, around which it turns when in motion. On this bench the moulds of the pipes are placed horizontally, and the mill and the girt ſerve to draw out the iron core, after the pipe is caſt.

The moulds of theſe tubes are of braſs, and conſiſt of two pieces, which open and ſhut by means of hooks and hinges: their inward caliber, or diameter, is according to the ſize of the pipe to be made, and their length is uſually two feet and a half. In the middle is placed a core, or round piece of braſs or iron, ſomewhat longer than the mould, and of the thickneſs of the inner diameter of the pipe. This core is paſſed through two copper rundles, one at each end of the mould, which they ſerve to cloſe; and to theſe is joined a little copper tube about two inches long, and of the thickneſs the leaden pipe is intended to be of. By means of theſe tubes the core is retained in the middle of the cavity of the mould. The core being in the mould, with the rundles at its two ends, and the lead melted in the furnace, they take it up in a ladle, and pour it into the mould, by a little aperture at one end, made in form of a funnel.

When the mould is full, and the metal cold, they paſs the hook of the girt into a hole at the end of the core; and turning the mill with the hand, draw out the core. They then open the mould, and take out the pipe.

If they deſire to have the pipe lengthened, they put one end thereof in the lower end of the mould, and paſs the end of the core into it; then ſhut the mould again, and apply its rundle and tube as before, the pipe juſt caſt ſerving for rundle, &c. at the other end.

Things thus replaced, they pour in freſh metal into the mould, thus repeating the operation, till they have got a pipe of the length required.

Pipes made of ſheet lead ſoldered. For theſe the *plumbers* have wooden cylinders or rollers, of the length and thickneſs required; and on theſe they form their pipes, by wrapping the ſheet around them; ſoldering up the edges all along in this manner. After grating the lead well with a grater, they rub reſin over the part thus grated; they then pour on it ſome ſolder melted in a ladle, or elſe melt it with a hot ſoldering iron, ſmearing thoſe parts where they would not have the ſolder catch, with chalk, or the ſoil of the hand.

The ſolder which the *plumbers* uſe, is a mixture of two pounds of lead with one of tin. See SOLDER.

PLUMBING, among *Miners*, a term uſed to expreſs the uſing a mine dial, in order to know the exact place of the work where to ſink down an air ſhaft, or to bring an adit to the work, or to know which way the load inclines when any flexure happens in it.

It is performed in this manner: a ſkilful perſon with an aſſiſtant, and with pen, ink, and paper, and a long line and a ſun-dial, after his gueſs of the place above ground, deſcends into the adit or work, and there faſtens one end of the line to ſome fixed thing in it; then the incited needle is let to reſt, and the exact point where it reſts is marked with a pen: he then goes on farther in the line ſtill faſtened, and at the next flexure of the adit he makes a mark on the line by a knot or otherwiſe; and then letting down the dial again, he there likewiſe notes down that point at which the needle ſtands in this ſecond poſition. In this manner he proceeds from turning to turning, marking down the points, and marking the line till he comes to the intended place; this done, he aſcends, and begins to work on the ſurface of the earth what he did in the adit, bringing the firſt knot in the line to ſuch a place where the mark of the place of the needle will again anſwer its pointing, and continues this till he comes to the deſired place above ground, which is certain to be perpendicularly over the part of the mine into which the air-ſhaft is to be ſunk.

PLUMBUM. See LEAD.

PLUMBUM *corneum*, called alſo *Saturnus corneus*, in *Chemiſtry*, is a metallic ſalt, formed by the precipitation of lead from its ſolution in nitrous acid with the marine acid, and all the neutral ſalts which contain it. It is thus called from its reſemblance to the LUNA *cornea*. This ſalt may be made by other methods, and particularly by diſengaging the volatile alkali from ſal ammoniac by lead. In this way Mr. Margraaf makes the *plumbum corneum*, which he employs in the preparation of PHOSPHORUS. See LEAD.

PLUMBUM *uſtum*. See *Burnt* LEAD.

PLUME, a ſet or bunch of oſtrich feathers, pulled out of the tail and wings, and made up to ſerve for ornament in funerals, &c.

PLUME, formed of *pluma*, *feather*, in *Falconry*, is the general colour or mixture of the feathers of a hawk, which ſhews her conſtitution.

When a hawk ſeizes her prey, and diſmantles it of its feathers, ſhe is ſaid to *plume* it.

PLUME, or PLUMULE, in *Botany*, a little member of the grain or ſeed of a plant; being that which in the growth of the plant becomes the ſtem, or trunk thereof. See SEED, and STEM.

The *plume* is incloſed in a cavity formed in the lobes on purpoſe for its reception. It is almoſt of the ſame colour with the radicle, or little root, on the baſis whereof it is ſuſtained.

The *plume* is the firſt part that appears out of the earth; as, in effect, it is the part that firſt appears out of the membrane, or cover or the ſeed; there being a hole over-againſt it in the membrane, through which it makes its eſcape.

It is the appearance of the *plume* without the cavity of the grain, that makes what we call the *bud* or *germ* of a plant.

The *plume* is ſo called, becauſe conſiſting of ſeveral pieces bound together in manner of a feather. In corn, the *plume* is that, which, after the radicle is ſhot forth, ſhoots out towards the ſmaller end of the ſeed; whence ſome call it the *acroſpire*.

PLUME *allum*, *alumen plumoſum*. See ALLUM.

PLUMERIA, in *Botany*. See *Red* JASMINE.

PLUMMER's *Æthiops*. This medicine is compoſed of the ſulphur auratum antimonii and calomel, commonly in equal parts, e. gr. of each three drams; but this may be varied occaſionally, according to the phyſician's diſcretion. Theſe two powders muſt be well levigated together, by which the bright red colour of the ſulphur is changed into a duſky brown; afterwards, add two drams of the extract of liquorice; and the maſs, with a ſufficient quantity of the mucilage of gum arabic, may be made into pills. We refer to the Medical Eſſays of Edinburgh for the doſe, regimen to be obſerved, and effects of this medicine; as alſo for the manner of preparing the ſulphur of antimony according to Angelus Sala, which is ſaid to be preferable to the common method. See Med. Eſſ. Edinb. abridg. vol. i. p. 205. vol. ii. p. 455.

This medicine has been found greatly beneficial in cutaneous eruptions, and is ſaid to have completed a cure after ſalivation has failed, in venereal infections, and in gleets remaining after the cure of a gonorrhœa. It operates by carrying off the excrements of diſtempers by inſenſible perſpiration or ſweat. It has alſo been found ſucceſsful in obſtinate glandular ſwellings; two or three pills of an ordinary ſize may be taken night and morning, the patient keeping moderately warm, and drinking after each doſe a draught of the decoction of the woods, or of ſarſaparilla.

PLUMMET, PLUMB-RULE, or PLUMB-LINE, an inſtrument uſed by maſons, carpenters, &c. to draw perpendiculars; in order to judge whether walls, &c. be upright, planes horizontal, and the like.

It is thus called from a piece of lead, *plumbum*, faſtened to the end of a thread or cord, which uſually conſtitutes this inſtrument.

Sometimes the ſtring deſcends along a ruler of wood or metal raiſed perpendicularly on another; in which caſe it becomes a level.

At ſea a *plummet* is uſed by the pilot to ſound the depth of the water.

PLUMOSE *antennæ*, in *Natural Hiſtory*, a term uſed to expreſs the *antennæ*, or horns of certain moths and butterflies, which are formed in the manner of feathers, being compoſed of a ſtem and fibres iſſuing on each ſide from it: theſe are jointed and moveable any way; and even the ſmall fibres, at their ſides, are jointed at their bottom, and are moveable, but they move all together. See FEELERS.

PLUNDER, in *Sea-Language*, a name given to the effects of the officers or crew of a prize, which are pillaged by the captors.

PLUNGE, in the *Manege*. See ESTRAPADE.

PLUNGER, in *Mechanics*, a ſolid braſs cylinder uſed as a FORCER in *forcing* PUMPS.

PLURAL, *pluralis*, in *Grammar*, a particular inflexion of nouns and verbs, whereby they come to expreſs a plurality or number of things.

The Latins, Engliſh, &c. have only two numbers, *ſingular*

gular and *plural*; the Greeks and Hebrews have three, *ſingular*, *dual*, and *plural*.

In Latin, &c. both nouns and verbs have uſually diſtinct terminations to their different numbers; in Engliſh, nouns ſubſtantives uſually become *plural* by the addition of an *s* or *es* to the ſingular.

Nouns adjective are the ſame in both numbers: and in verbs, the number is diſtinguiſhed by that of the pronouns.

PLURALITY, *pluralitas*, a diſcrete quantity, conſiſting of two, or a greater number.

A *plurality of worlds* is a thing which Mr. Huygens has endeavoured to prove in his Coſmotheoros. And the ſame is likewiſe contended for in a very pretty treatiſe of M. Fontenelle under that title.

See the chief argument for a *plurality* of worlds under MOON, PLANET, and EARTH.

The greateſt abſurdity in the pagan theology, is the *plurality of gods*.

PLURALITY *of benefices*, or *livings*, is where the ſame clerk is poſſeſſed of two or more ſpiritual preferments, with cure of ſouls. See BENEFICE.

Plurality of benefices is a thing too much tolerated in the church, but never approved of.

It was the ſmallneſs of ſome benefices that firſt gave occaſion to *pluralities*; for an eccleſiaſtic, not being able to ſubſiſt on a ſingle one, was allowed to hold two; and at length the number increaſed without bounds.

The abuſe was endeavoured to be remedied at the council of Lateran, under Alexander III. and Innocent III. in the year 1215, when the holding more than one benefice was expreſly forbid by a canon, under the penalty of deprivation: but the ſame canon granting the pope a power to diſpenſe with it in favour of perſons of diſtinguiſhed merit, there were ſo many found a title to this merit, that the prohibition became uſeleſs.

Pluralities were alſo reſtrained by ſtatute 21 Hen. VIII. cap. 13. which enacts, that if any perſon, having one benefice with cure of ſouls, of the yearly value of 8*l.* or above (in the king's books), accept any other with cure of ſouls, the firſt benefice ſhall be adjudged in law to be void, &c. though the ſame ſtatute provides for diſpenſation in certain caſes. See CHAPLAIN.

In order to procure a diſpenſation, the preſentee muſt obtain of the biſhop, in whoſe dioceſe the livings are, two certificates of the values in the king's books, and the reputed values and diſtance of ſuch livings; one certificate for the archbiſhop, and the other for the lord chancellor. And if the livings lie in two dioceſes, then two certificates, of the ſame kind are to be obtained from each biſhop. He muſt alſo exhibit to the archbiſhop his preſentation to the ſecond living; and bring with him two papers of teſtimonials from the neighbouring clergy, concerning his behaviour and converſation, one for the archbiſhop, and the other for the lord chancellor; and he muſt alſo exhibit to the archbiſhop his letters of orders of deacon and prieſt, and a certificate of his having taken the degree of maſter of arts at the leaſt, in one of the univerſities of this realm, under the hand of the regiſter of ſuch univerſity. And in caſe he be no doctor or bachelor of divinity, nor doctor of law, nor bachelor of canon law, he is to procure a qualification of a CHAPLAIN, which is to be duly regiſtered in the faculty office, in order to be tendered to the archbiſhop, according to the ſtatute. And if he hath taken any of the aforeſaid degrees, which the ſtatute allows as qualifications, he is to procure a certificate thereof as already mentioned, and to exhibit the ſame to the archbiſhop; after which his diſpenſation is made out at the faculty office, where he gives ſecurity according to the direction of the canon. Afterwards he muſt repair to the lord chancellor, for confirmation under the broad ſeal: and then he is to apply to the biſhop of the dioceſe where the living lies, for his admiſſion and inſtitution. By the ſeveral ſtamp acts for every ſkin, or paper, or parchment, &c. on which any diſpenſation to hold two eccleſiaſtical dignities or benefices, or a dignity and a benefice, ſhall be engroſſed or written, there ſhall be paid a treble forty ſhillings ſtamp duty.

We have alſo a regulation in regard to *pluralities*; but it is often diſpenſed with; for, by the faculty of diſpenſation, a pluraliſt is required, in that benefice from which he ſhall happen to be moſt abſent, to preach thirteen ſermons every year, and to exerciſe hoſpitality for two months yearly.

In Germany the pope grants diſpenſations for poſſeſſing a *plurality of benefices*, on pretence that the eccleſiaſtical princes there need large revenues to bear up againſt the proteſtant princes.

PLURIES, a writ that iſſues in the third place after two former writs have been diſobeyed; for firſt goes out the original writ or *capias*, which, if it has no effect, then iſſues the *alias*; and if that alſo fails, then the *pluries*. Old Nat. Br. 33.

It is uſed in proceedings to OUTLAWRY, and in great diverſity of caſes. Tabl. Reg. Writs.

PLUS, in *Algebra*, a term commonly uſed for *majus*, or *magis*, *more*; denoted by the CHARACTER +.

Thus $4+10=14$, is read, four, *plus*, or more, 10, is equal to 14.

PLUSH, in *Commerce*, &c. a kind of ſtuff having a ſort of velvet nap or ſhag on one ſide; compoſed regularly of a woof of a ſingle woollen thread, and a double warp, the one wool, of two threads twiſted, the other goats or camel's hair; though there are alſo ſome *pluſhes* entirely worſted, and others compoſed wholly of hair.

Pluſh is manufactured, like velvet, on a loom with three treadles. Two of theſe ſeparate and depreſs the woolen-warp, and the third raiſes the hair-warp, upon which the workman throwing the ſhuttle, paſſes the woof between the woollen and hair-warp; and afterwards laying a braſs broach, or needle, under that of the hair, he cuts it thereon with a knife deſtined for that uſe, conducting the knife on the broach, which is made a little hollow, all its length; and thus gives the ſurface of the *pluſh* an appearance of velvet.

Some aſcribe the invention of *pluſh* to the Engliſh: others ſay it was firſt made in Holland, and particularly at Haerlem. Be this as it will, it is certain, the French are the people who make the moſt of it; there being ſeveral very conſiderable *pluſh* manufactures at Amiens, Abbeville, and Compeigne.

There are other kinds of *pluſh*, all of ſilk; ſome of which have a pretty long knap on one ſide, and ſome on both.

PLUSH, among *Botaniſts*, is a name given to the middle of roſes, anemonies, &c. called alſo *thrum* or *thrummy heads*; by others, *hairy heads*, *buttons*, *baſs*, *tuft*, or *wort*. This is properly the STAMINA of the flower.

PLUTEI, in the Roman *Art of War*, were engines contrived for the defence of ſoldiers, conſiſting of the ſame materials with the VINEÆ, but of a different figure; being ſhaped like an arched ſort of waggon, and having three wheels, ſo conveniently placed, that the machines would move either way with equal eaſe.

PLUTO, in *Mythology*, the ſon of Saturn and Rhea, and ſovereign of the empire of darkneſs. Statius calls him the black Jupiter; and he is repreſented by the poets as holding his ſceptre in his hand, with a veil over his head, which, as well as his complexion, ſhould be dark and terrible. He is ſometimes called by the name of Dis.

PLUTUS, in *Mythology*, the God of riches, reckoned amongſt the number of infernal deities, becauſe riches are derived from the bowels of the earth. Heſiod makes him to be a deſcendant of the Ceres and Jaſon in the Iſle of Crete, probably becauſe theſe two perſons applied themſelves to agriculture, which is the means of obtaining the moſt ſubſtantial riches. *Plutus* had a ſtatue at Athens, placed in the temple of Minerva, where the public treaſures were depoſited; at Thebes, in the temple of Fortune, this goddeſs holds *Plutus* in her arms as an infant, nouriſhed by her; and at Athens *Plutus* is in the arms of the ſtatue of Peace, as the ſymbol of riches, which give peace.

PLUVIAL, *pluviale*, anciently ſignified a hood or cloak; which eccleſiaſtics, chiefly religious, wore in the country, to ſhelter themſelves from the rain; by the Latins called *pluvialis lacerna*.

The word is now uſed, in the Romiſh church, for a large hood worn by the chanter and ſubdeacon, at maſs and veſpers, &c. It covers the whole man, and is fixed before with two claſps.

PLUVIALIS, in *Ornithology*. See PLOVER.

PLUVIALIS *major*, in *Ornithology*, a name given by ſome authors to the LIMOSA, a bird in ſome reſpects reſembling our red ſhank, but larger and longer legged.

This bird is alſo called the *glottis* and *totanos*.

PLUVIALIS *levis*, in *Ornithology*, a name given by many to the common green *wood-pecker*, the *picus viridis* of authors, called alſo in Engliſh the *rain-fowl*, from an obſervation of its always being moſt clamorous when rain is coming on.

PLUVIUS, in *Antiquity*, an attribute of JUPITER; implying him the author of rain; q. d. he that ſends rain. Among the baſſo relievos of the Antonine column, in the place where the miracle of the thundering legion is repreſented, we ſee a flying man in the air, his arms ſpread out, and with a very long beard, which ſeems to diſſolve into rain. The learned take this to be a repreſentation of Jupiter *Pluvius*.

PLYERS, in *Fortification*, denote a kind of balance uſed in raiſing or letting down a *draw*-BRIDGE. They conſiſt of two timber levers, about twice the length of the bridge they lift, joined together by other timbers framed in the form of a St. Andrew's croſs, which ſerves as a counterpoiſe. They are ſupported by two upright jambs, on which they ſwing; and the bridge is raiſed or let down by means of chains joining the ends of the *plyers* and bridge.

PLYING, in *Sea-Language*, is the art of making, or endeavouring to make a progreſs againſt the direction of the wind.

Plying is alſo uſed by ferrymen to denote their waiting for a fare.

PLYMOUTH *marble*, among our *Artificers*, a term uſed for a ſort of *marble* dug in great plenty about Plymouth, and in ſome parts of Devonſhire, where it lies in very thick ſtrata, and whence it is brought in large quantities to us; and when wrought looks little leſs beautiful than ſome of the Italian *marble*.

It is very hard and firm, and of a beautiful texture; its ground is a bluiſh white, and its variegations are principally a pale red, and in ſmaller quantities brown and yellow: theſe lie in very orderly beds, and often there is a very agreeable glow of a faint red diffuſed through the whole ſubſtance. It is remarkably even in its whole ſtructure, and is therefore capable of a more than ordinarily elegant poliſh.

PLYNTERIA, Πλυντερια, in *Antiquity*, a feſtival in honour of Aglaurus, the daughtor of king Cecrops, or rather of Minerva, who had from that lady the name of Aglaurus. For the ceremonies obſerved at this ſolemnity, ſee Potter, Archæol. Græc. lib. ii. cap. 20. tom. i. p. 425.

PNEUMA, Πνευμα, in Hippocrates, ſometimes imports ſpirit, air, or vapour, and frequently it ſignifies the breath that is, the air drawn in by inſpiration, and expelled during expiration. But *pneuma*, by the above quoted author, is often uſed to expreſs a difficult, ſhort, and laborious reſpiration

PNEUMATICS, *pneumatice*, called alſo PNEUMATOLOGY and PNEUMATOSOPHY, the doctrine and contemplation of ſpirits, and ſpiritual ſubſtances.

The word is formed of the Greek ϖνευμα, *ſpiritus*, *breath*; whence, from the different acceptations of that word either as an incorporeal ſubſtance, or as air, there ariſe two ſorts of *pneumatics*.

PNEUMATICS, in the *Schools*, is frequently uſed for the doctrine of ſpirits; as God, angels, and the human ſoul. See SPIRIT.

In this ſenſe *pneumatics* coincide with what we otherwiſe call METAPHYSICS.

PNEUMATICS, is more commonly, uſed among us, for the doctrine of the air; or that part of natural philoſophy which treats of the nature, properties, and effects of the air.

Some make *pneumatics* a branch of mechanics; becauſe it conſiders the air in motion, with the effects thereof. It is certainly a ſiſter of hydroſtatics; the one conſidering air in the ſame manner that the other does water.

Wolfius, in lieu of *pneumatics*, uſes the word *aerometry*, q. d. the art of *meaſuring the air*.

The doctrine and laws of *pneumatics* will be found under AIR, ATMOSPHERE, ELASTICITY, GRAVITY, COMPRESSION, CONDENSATION, RAREFACTION, EXPANSION, &c.

PNEUMATIC *engine*, *machina* or *antlia* PNEUMATICA, denotes the AIR-PUMP.

PNEUMATOCELE, Πνευματοκηλη, formed from ϖνυμα, *wind*, and κηλη, *tumor*, in *Medicine*, a flatulent or windy HERNIA; or a tumor of the membranes of the ſcrotum or navel, proceeding from pent up vapours, and attended with a tenſive pain.

Sometimes one of the teſtes only is thus inflated, ſometimes both, and ſometimes likewiſe the ſcrotum.

This *hernia* is of all others the lighteſt, and leaſt dangerous. Mr. Pott objects to the propriety of the appellation *pneumatocele*, or *wind-rupture*, and maintains that there is no hernia produced by mere wind. The two diſeaſes, he ſays, which in new-born children and infants are taken for and called wind-ruptures, are, a tumor produced by a ſmall quantity of fluid remaining in the lower part of the tunica vaginalis, after its communication above with the cavity of the belly is cloſed; and a true, but ſmall, *inteſtinal* HERNIA. Chirurgical Works, vol. ii. p. 422.

It is cured by diſcutients internally, and fomentations and cataplaſms externally.

PNEUMATODES, a word uſed by Hippocrates to expreſs a perſon who fetches his breath ſhort and quick: and ſometimes for one who has his belly or ilia much diſtended by flatulencies. *Pneumatias* is alſo uſed in the ſame double ſenſe.

PNEUMATOMACHI, Πνευματομαχοι, ancient heretics, ſo called, becauſe they oppoſed the divinity of the Holy Spirit, placing him in the number of creatures.

PNEUMATOMPHALOS, a word uſed by Hippocrates to expreſs a perſon who has a windy or flatulent rupture of the navel.

PNEUMATOSIS, Πνευματωσις, a term which ſome authors uſe for the generation or formation of animal ſpirits in the brain.

PNEUMONANTHE, in *Botany*, a name given by many botanical writers to a ſpecies of GENTIANA, called alſo by ſome the *calathian* violet.

PNEUMONICS, Πνευμονικα, medicines proper in diſeaſes of the lungs, in which reſpiration is affected.

The word is formed from the Greek ϖνευμον, *lungs*, or ϖνευμα, *ſpiritus*, *breath*.

Of this number are ſulphur, lung-wort, hyſſop, ground-ivy, and colt's-foot; they are uſed in phthiſes, aſthmas, peripneumonies, pleuriſies, &c.

PNIGITIS *terra*, in the *Materia Medica of the Ancients*, a name given at different periods of time to two different ſpecies of earth: the *terra pnigitis* of Diſcorides and Pliny being a grey marle, aud the *pnigitis* of Galen a black clay.

The laſt of theſe is a very valuable aſtringent, and is found in many parts of this kingdom, particularly in the neighbourhood of London, and well deſerves to be introduced in the practice of phyſic.

PNIGMOS, from ϖνιγω, *I ſuffocate*, in *Medicine*, a kind of ſuffocation, from whatever cauſe: it is very often uſed to expreſs that of hyſteric fits in women.

PNIX, a word uſed by phyſicians to expreſs the ſuffocation from hyſteric fits, or any other cauſe.

POA, in *Botany*, the name of a genus of plants of the graſs kind, belonging to the claſs and order of *triandria digynia*; the characters of which are, that the calyx is a glume compoſed of two valves, containing ſeveral flowers diſpoſed in a two rowed-oval, or oblong ſpikes; the valves oval and pointed, but without awns: the flower is compoſed of two oval and pointed valves; theſe are hollowed, compreſſed, a little longer than the valves of the cup, and without beards or awns; the ſtamina are three capillary filaments; the antheræ are ſplit at their ends; the germen of the piſtillum is roundiſh; the ſtyles are two, reflex and hairy; the ſtigmata are hairy alſo; the flower adheres cloſely to the ſeed, and does not open to let it out; the ſeed is ſingle, oblong, and pointed at both ends, and ſomewhat flatted. There are twenty-five ſpecies enumerated by Linuæus. Seee GRASS.

POAKE-*root*, in Virginia, is uſed to denote the ſolanum bacciferum. The Indians uſe it for a purge, though commonly deemed a poiſon. Phil. Tranſ. N° 454 § 1.

POCATSJETTI, H. M. in *Botany*, the name of a ſmall ſhrub which grows in Malabar. The leaves powdered, and ſprinkled upon ulcers, repreſs luxuriant and fungous fleſh; and taken internally, they excite a ſweat, and diminiſh the paroxyſm of an intermitting fever.

Of the bark and root, powdered, and mixed with oil, an unguent is made, ſaid to be good for the itch, and other cutaneous diſorders.

POCCOON, in *Botany*. See PUCCOON.

POCHARD, in *Ornithology*, the name of a ſpecies of wild-duck, called by ſome the *penelops* and *rothals*, and by many in Engliſh the red-headed *widgeon*.

It is larger than the common *widgeon*, and is ſhorter and thicker bodied.

POCK. See POX.

POCK-*wood*. See GUAIACUM.

POCKET *ſheriffs*, in *Law*, ſheriffs nominated of the ſole authority of the crown. See SHERIFF.

POCKET *of wool*, is half a ſack. See SACK *of wool*.

The *pocket* contains uſually twenty-five hundred weight of wool.

POCKET *inſtruments*, in *Surgery*, are ſuch as a ſurgeon ought always to have in readineſs, and may conveniently carry about him in a proper caſe: theſe are two lancets of different ſizes; the one proper to open abſceſſes, the other ſmaller, for bleeding; a pair of ſtraight ſciſſars, uſeful on many occaſions; a pair of crooked ſciſſars, proper to be uſed in dividing fiſtulæ, and in ſeveral other caſes; a pair of forceps with teeth at one end, to remove dreſſings, and upon occaſion to extract ſplinters or thorns; theſe are alſo ſerviceable to the ſurgeon in his anatomical exerciſes; they are commonly made of ſteel, but thoſe of ſilver are much neater; a razor; a ſtrait inciſion-knife; a crooked inciſion-knife: a ſtrait double-edged inciſion-knife; a probe with one end broad and thin, proper for diſcovering a fiſſure in the cranium, and for many other uſes; and the other end rounded, to examine the depth and ſituation of wounds and ulcers. The neateſt probes are made of ſilver, though they are frequently made alſo of ſteel, ivory, or whalebone; a grooved probe or director; to direct the edge of the knife or ſciſſars in openin ſinuſſus, or fiſtulæ, that by this means the ſubjacent veſſels, nerves, and tendons, may remain unhurt. The upper end of this inſtrument, ſometimes is ornamented, and ſerves only for a handle; ſometimes it is made in form of a ſpoon, to contain powder to ſprinkle upon wounds or ulcers; ſometimes alſo this is made forked at the end, to divide the frænum of the tongue; a ſpatula to depreſs the tongue, in order to examine the ſtate of the tonſils, uvula, and fauces, when they are affected with any diſorders; it is alſo uſed to ſuſpend the tongue when the frænum is to be divided; for which purpoſe it is to be made with a fiſſure at its extremity, and ſhould therefore rather be made of ſilver than of any other metal. Beſides theſe, there ſhould be an ordinary ſpatula for ſpreading plaſters, ointments, and cataplaſms; and ſometimes by means of their fulcated extremity they are of ſervice in raiſing up fractured bones of the cranium; ſeveral needles muſt alſo be kept here, ſome ſtraight, and others crooked, for the ſtitching up of wounds, taking up of arteries, and many other uſes. Heiſter's Surg. p. 12.

Pocket *medicines*. See Medicine.

POCO *allegro*, in the *Italian Muſic*, is not ſo faſt as *allegro*.

Poco *largo*, intimates to play or ſing a little ſlow. See Largo.

Poco *meno allegro*, is uſed to ſignify that the part it is joined to ſhould be played or ſung in a little leſs gay manner than *allegro* requires.

Poco *preſto*, ſerves to let us know that we ought to ſing or play that part to which it is annexed, not quite ſo quick as *preſto* requires it ſhould.

POCUMMA, in *Botany*, a name given by the people of Guinea to a ſpecies of plant which they uſe as an aſtringent. Their manner of taking it is very ſingular; for they put the leaves among their dough, and bake them into a maſs with the bread, and then eat the whole together in their food. Phil. Tranſ. N° 232.

POD, among *Botaniſts*, a ſpecies of *pericarpium*, conſiſting of two valves, which open from the baſe to the point, and are ſeparated by a membranaceous partition, from which the ſeeds hang by a kind of funiculus umbilicalis. It is in plain language the ſhell or huſk of any kind of pulſe. See Pericarpium, and Siliqua.

PODAGRA, ϖοδαγρα thus called from ϖȣς, *foot*, and αγρα *captura*, *ſeizure*, in *Medicine*, the gout in the feet.

Podagra *dentium*, ſometimes, though with impropriety enough, is uſed for the tooth-*ach*.

Podagra *lini*, in *Botany*, a name given by ſome of the later Greek writers to *cuſcuta*, or *dodder*, when found growing on the linum of flax. The Latins have called this *epilinum*, as they do the dodder growing on thyme *epithymum*; the earlier Greeks called this *linozoſtes*. Where this dodder takes root in a field of flax, it generally occupies many plants; and where it twines round them it cauſes protuberances and ſwelling, and has therefore been reſembled to the gout on that plant.

PODAGRARIA, in *Botany*, a name given by many authors to the leſſer wild *angelica*, called alſo *herba Gerardis*.

PODARIA, in the *Hiſtory of Inſects*, a claſſical name comprehending all ſuch inſects as have limbs, but no wings. Hill. See Aptera.

Of this claſs there are two ſubdiviſions. 1. Such *aptera podaria* as have oblong bodies with numerous legs, or more than ſix pair: theſe are the *julus*, or gally-worm; the *ſcolopendra*, or *centipes*; and the *oniſcus*, or woodlouſe. 2. The *aptera podaria* with ſhorter bodies, and leſs numerous legs, or fewer than ſix pair. This ſubdiviſion contains numerous genera, as the pulex; the podura or puceron, the pediculi of various kinds, the monoculi, the acari, the aranei, the ſcorpio, and a great many others. See Gally-*worm*, Scolopendra, &c.

PODERIS, ϖοδηρης, from ϖȣς, *pes*, and αρω, *apto*, in *Antiquity*, a robe hanging down to the feet; but it is chiefly uſed to expreſs a linen garment, a ſurplice, a ſhirt. The Jewiſh prieſts were covered with this kind of long ſurplices, during the time of their attendance in the temple; and this was the proper habit of their order.

PODESTA, or Potesta, a magiſtrate, or officer of juſtice and policy, in a free city.

The name is originally Italian, *podeſta*; and is chiefly applied to certain magiſtrates of Venice and Genoa, whoſe function is to adminiſter juſtice in thoſe republics.

The *podeſta* in Venice correſponds to the prætor in ancient Rome, though appeals lie from his deciſions to the new auditors, or the new civil quaranty. See Quarantia.

PODEX, in *Anatomy*, &c. the ſame with anus, or *fundament*.

PODICEPS, in *Ornithology*, a name given by many to the ſeveral kinds of *colymbi*, or *divers*, as they are alſo called in Engliſh *arſe-foots*: from their legs being placed very backward on their bodies, by which means they have great advantages in ſwimming and diving.

PODISMUS, ϖοδισμος, among the Greeks, a certain ſpace, or number of feet laid out by ſurveyors: it was the ſame with what the Romans called Pedatura.

PODIUM, in the *Theatre of the Ancients*, the wall that ſeparated the orchestra from the scene. Mem. de l'Acad. vol. i. p. 190.

PODOMETER, for Pedometer. See Pedometer.

PODONIPTÆ, formed from ϖȣς, ϖοδος, *foot*, and νιπτω, *I waſh*, a name given to ſome of the rigid Anabaptists, who enjoin it has an obligation upon the members of their community to waſh one another's feet, in compliance with the example of Chriſt.

PODOPHYLLUM. See Duck's *foot*.

PODURA, in *Natural Hiſtory*, a genus of the *aptera* inſects. Its characters are, that it has ſix feet formed for running; that it has two octonous eyes; a bifurcated inflexed tail, formed for leaping; and long ſetaceous antennæ. There are fourteen ſpecies. See Puceron.

PŒANOPSIA, ϖειανοψια, in *Antiquity*, a name ſometimes given to the feſtival Pyanepsia.

POEM, *poema*, ϖοιημα, a compoſition in verſe, of a due length and meaſure.

Poems, *carmina*, are of various kinds; ſome denominated from the perſons who firſt invented, or moſt uſed them; as the *Archilotian*, *Sapphic*, &c. Others from their compoſition, as the *monocolon*, conſiſting of one kind of verſe; *dicolon*, of two; and *tricolon*, of three kinds. Others from their entireneſs or deficiency; as *brachycatalectus*, which in every verſe wants two ſyllables; *catalectus*, which wants one; *acatalectus*, none; and *hypercatalectus*, which hath a ſyllable too much, which, if cut off at the beginning of the next verſe, the verſe is ſaid to be *hypermeter*. See Acatalectic, &c. Others are denominated from the ſubject matter; as the *apobaterion*, *epibaterion*, *epinicion*, *epithalamium*, *genethliac*, *propemptic*, *elegiac*, *ſatiric*, *epicedion*, *epithaph*, *threnos* or *lamentation*, *encomiaſtic*, *panegyric*, *ſoteric*, *lyric*, *paſtoral*, &c. Others from the manner of narration; as *exegetic*, which relates a thing under the author's own perſon, *dramatic*, and *epic*. See each on its proper head, Epic, Drama, &c. To theſe may be added, odes, eclogues, and idylliums.

To this head muſt alſo be referred ſeveral other poetical compoſitions of a leſs ſerious kind, which the idly-labouring vein of little poets has produced into the world, and which, though frequently admired by perſons of a low taſte, are juſtly ranked by Mr. Addiſon in the claſs of falſe wit. Such are the acroſtic, engima, anagram, cento-chronogram, proteus, echo, &c.

PŒNITENTES, in the church of Rome, a deſignation given to heretics, who being admoniſhed by the eccleſiaſtical judge, have abjured their errors, and given ſufficient ſatisfaction to the biſhop or inquiſition. Confiſcation of goods is a puniſhment common to all heretics; but if they confeſs and abjure of their own accord, without being formerly proſecuted, this part of their puniſhment is uſually remitted. See Inquisition.

POEROU, in *Natural Hiſtory*, a name given at Otaheite in the South Seas to the *hibiſcus tiliaceus* of Linnæus, of the bark of which they make matting, coarſe cloth, and ropes and lines from the thickneſs of an inch to the ſize of a ſmall packthread. Hawkeſworth's Voyages, vol. ii. p. 217.

POESY, *poeſis*. See Poetry

The word is formed from the Greek ϖοιησις, of ϖοιεω, *facio*, *fabricor*, *fingo*, *I make*, *I frame*, *I invent*.

Hence alchemy, or the art of making gold, we anciently called *poeſy*, *chryſopoeſy*, &c.

POET, *poeta*, an author who compoſes poems or diſcourſes in verſe.

Cicero relates it as a ſaying of Democritus and Plato, that there could be no good *poet ſine afflatu furoris*, *without a tincture of madneſs*; and Ariſtotle calls *poets* expreſly, *maniaci*, *maniacs*, *madmen*.

M. Spanheim tells us, that the Arab authors are more poetically given than thoſe of any other people; and adds that there are more verſes among the Arabians than among all the other nations of the world put together.

The Greek word ϖοιητης, *poet*, ſignifies *maker*, from ϖοιεω, *facio*, *I make*; whence the *poets* were anciently alſo called *fatiſts*. The name they were properly denoted by among the Romans, was *vates*, which ſignifies alſo *prophet*.

By a law of the emperor Philip, inſerted in the Code, lib. x. tom. lii. *poets* are expreſly excluded from the immunities granted the profeſſors of all other ſciences.

Homer, Virgil, Milton, and Taſſo, are the chief, almoſt the only epic *poets*. Sophocles, Euripides, Shakſpeare, Otway, Corneille, and Racine, are the beſt tragic *poets*. Ariſtophanes, Menander, Plautus, Terence, Fletcher, Johnſon, Moliere, &c. the chief comic *poets*. Horace, Cowley, Malherbe, and Rouſſeau, excelled as lyric *poets*. And Juvenal, Perſius, Regnier, Boileau, Dryden, and Oldham, as ſatiric *poets*.

POET, *laureat*. See LAUREAT.

POET, *Provençal*. See PROVENÇAL, and TROUBADOURS.

POETICAL, ποιητικος, ſomething that relates to poetry or poets. In this ſenſe we ſay, a *poetical* genius, a *poetical* phraſe, *poetical* licence, *poetical* fury, &c.

Moſt languages have their *poetical* words, which are never uſed on other occaſions. Theſe prove of great advantage to the poets, who are hereby enable to raiſe the ſtyle and diction into the *poetical* character, with the greater eaſe.

The French often lament the want of a ſet of ſuch words in their language; for want whereof, their poetry appears in two familiar a garb, not ſufficiently diſtinguiſhed from the common language. It is too reſerved, not being allowed any boldneſs or flights, but what might paſs in proſe. To this, in good meaſure, is attributed the little ſucceſs their authors have met with in the epic way.

POETICAL *juſtice* is chiefly uſed in reſpect to the drama, to denote a diſtribution of rewards and puniſhments to the ſeveral perſons, at the cataſtrophe or cloſe of the piece, anſwerable to the ſeveral characters they have appeared in. See CHARACTER.

Whatever difficulties and diſtreſſes the virtuous and innocent may labour under, and how proſperouſly ſoever it may go with the wicked, in the courſe of the piece; the poet uſually takes care to give each of them their due before he parts with them. But it is controverted whether this piece of juſtice be indiſpenſable, and whether it may not be allowed to leave virtue oppreſſed, and vice flouriſhing.

POETICAL *licence*. See LICENCE.

POETICAL *numbers*. See NUMBERS.

POETICAL *riſing and ſetting*. See RISING and SETTING.

The ancient poets, referring the riſing, &c. of the ſtars to that of the ſun, make three kinds of riſing and ſetting, viz. COSMICAL, ACRONICAL, and HELIACAL.

POETICS, *poetice*, ποιητικη, the doctrine of poetry, or the laws and rules of conducting pieces, or compoſitions of poetry. Ariſtotle's *Poetics* is a work infinitely valued; and M. Dacier's comment thereon is one of his beſt pieces we have. Horace, Vieta, Voſſius, and Scaliger, have likewiſe publiſhed *Poetics* in Latin; the duke of Buckingham in Engliſh; and Menardiere, Hédelin, and Deſpreaux, in French.

POETRY, *poeſy*, the art of compoſing poems, or pieces in verſe.

The word is formed from the Greek ποιηϛια, of ποιεω, *facio, I make*.

If a verſe be conſidered as a mere ſeries of juſt ſix feet following one after another in the ſame line, *poetry* and verſification will appear two very different things; but Boſſu, in his idea of verſe, includes cadences, peculiar conſtructions, arrangements, and expreſſions unknown in common diſcourſe; and above all, a certain noble, bold, elevated, and metaphorical turn and manner of diction. Theſe, he obſerves, are ſo eſſential to *poetry*, that without them the moſt exact arrangement of long and ſhort ſyllables make little elſe but a kind of meaſured proſe; whereas theſe, in a diſcourſe that has no poetical feet or meaſures, do yet give it the poetical character, and make it a kind of *unmeaſured poetry*.

The rules of *poetry* and veſifying are taught by art, and acquired by ſtudy; but this force and elevation of thought, which Horace calls, *ſomething divine*, and which alone makes the *poetry* of any value, muſt be derived from nature: or, according to Ariſtotle, from ſome happy tranſports, to which that author gives the name of madneſs: Ευφυεος ἡ ποιητικη εϛιν ἐ μανικȣ. But there muſt be conceived a juſt ſolid judgment, to direct and govern this fury of the poet's imagination.

Hence the critic concludes, that *the end of poetry* is to pleaſe; *its cauſe*, either the excellence of the poet's genius, or a poetical fury, and tranſport of the ſoul, manageable by the judgment; *its matter*, long and ſhort ſyllables, and feet compoſed hereof, with words furniſhed by grammar; and *its form*, the arrangement of all theſe things in juſt and agreeable verſe, expreſſing the thoughts and ſentiments of the author after the manner already mentioned.

But, after all, how narrow are theſe bounds, if we conſider *poetry* in the light wherein the works of Homer and Virgil have ſet it? What is here laid down pretends to no praiſe, which a mere tranſlator may not riſe to, and which the war of Catiline might not merit, if turned out of the proſe of Salluſt. It is with reaſon, therefore, that we diſtinguiſh the *low* and *ſimple* from the *greater poetry*: by giving the former the title of *verſification*; and that we make *poetry* and *verſification* two diſtinct arts: in effect, there is not more difference between grammar and rhetoric, than between the art of making verſes, and that of inventing poems.

The *greater poetry*, then, conſiſts principally in fiction, or the invention of fables; in the expreſſing of things by allegories and metaphors; and in the inventing of actions, under which the truths which the poet has to teach may be agreeably diſguiſed.

In this view, ſcarce any poems retain the nature and eſſence of the grand *poetry*, but the *epopœia*, *tragedy*, and comedy; the reſt, be they elegies, ſatires, ſongs, or what they will, come under the name of *verſification*.

The ancient eloquence, it is obſerved, was full of myſteries and allegories. The truth was by them uſually diſguiſed under thoſe ingenious inventions, called μυθοι, *fables*, q. d. *words*; as if there were as much difference between theſe fabulous diſcourſes of the learned, and the common language, as between the ſpeech peculiar to man and the voice of brutes.

At firſt fables were chiefly uſed in treating of the divine nature, after the manner they then conceived of it: this occaſioned the firſt poets to be called *divines*, and *poetry* the *language of the gods*. The divine attributes they ſeparated into a number of perſons; becauſe the weakneſs of the human mind could not conceive ſo much power, and ſo much action, in a ſimplicity ſo ſtrict and indiviſible as that of God.

Nor could they ſpeak of the operation of this almighty cauſe, without ſpeaking likewiſe of its effect. They therefore added phyſics to their theology, handling both after the ſame manner, without quitting their veils or allegories.

Now man being the moſt conſiderable of all the works of the Deity, and there being nothing ſo proper for poets, or of ſuch general uſe to mankind as ſuch a ſubject, they therefore added ethics to the former, and treated the doctrine of manners in the ſame way as they had done divinity and phyſiology: and hence aroſe the epopœia or epic poem.

The epic poets have done with regard to morality, juſt the contrary of what the divine poets did for their theology. As the too great diverſity of divine actions and perfections, ſo little proportioned to our underſtanding, occaſioned the latter to divide the ſingle idea of the ſimple eſſence of God into ſeveral perſons under different names, as Jupiter, Juno, Neptune, &c. ſo, on the contrary, the nature of moral philoſophy, which never gives any rules for particular things, occaſioned the epic poets to unite in one ſingle idea, in the ſame perſon, and even in a ſingle action, whatever of the like kind occurs in different perſons and different actions.

Thus, ſays Ariſtotle, *poetry* teaches moral philoſophy, not by reciting hiſtorically what Alcibiades has done or ſuffered, but propoſing what ſuch a perſon, whom the poet calls by any name he pleaſes, would neceſſarily or probably have done or ſaid on the like occaſion. It is in this manner that *poetry* repreſents either the unhappy conſequences of deſigns ill concerted, of wicked actions, &c. or the reward of good actions, and pleaſure reaped from a deſign laid in virtue, and conducted by prudence.

Thus, according to our critic, the poetical actions and perſons are all feigned, allegorical, and univerſal, not hiſtorical and ſingular. This is likewiſe the ſentiment of Horace; who adds, that poets teach morality as well as philoſophy; but the preference herein he gives to Homer.

This advantage of the poets over mere philoſophers ariſes hence, that all *poetry* is an imitation. Now imitation is a thing extremely natural; and hence this manner of propoſing things becomes better fitted to engage the auditors. Again imitation is an inſtruction given by examples; and examples are the more proper to perſuade, becauſe they prove the thing poſſible. In effect, imitation is ſo much the nature of *poetry*, that, Ariſtotle tells us, it is to this the art owes its riſe.

But the poets, by becoming philoſophers, did not ceaſe to be divines; on the contrary, the morality they taught obliged them frequently to introduce the Deity in their works; and the ſhare ſo auguſt a Being had in the action, obliged the poet to make it grand, important, and conducted by the perſons of kings and princes.

Add to this that it likewiſe obliged the poet to think and ſpeak after a manner elevated above the common pitch of men, and to uſe phraſes equal, in ſome meaſure, to the divine perſons he introduced; and to this purpoſe ſerved the poetical, figurative language, and the majeſty of heroic verſe.

To convey their truths to the beſt advantage, and adapt them to the particular purpoſes they were intended for, poets found out various forms. Hence the epopœia and drama.

Epic *poetry* is more for the habits and manners than the paſſions; theſe laſt riſe all at once, and their violence is but of a ſhort duration; but the habitudes are cooler and more gentle, and riſe and fall more ſlowly.

The epic action, therefore, could not be reſtrained to a day or two, as that of the drama; a longer and a juſter ſpace was required for this than for tragedy, which is only for the paſſions. And hence aroſe a ſtill greater difference between tragedy and the epopœia.

For the tragic violence required a ſtronger and more lively repreſentation than the epic; and accordingly it conſiſts wholly in the action, the poet never ſpeaking, as he does in the epopœia, where there are no actors.

POETRY, *the laws of epic and dramatic*, ſee under EPIC, CHARACTER, INVOCATION, DRAMATIC, THEATRE, TRAGEDY, COMEDY, ACT, SCENE, and SENTIMENT.

For the lower ſorts of POETRY, ſee ODE, SONG, EPIGRAM, ELEGY, SATIRE, &c.

For the hiſtory of Engliſh *poetry*, we refer the reader to Mr. Warton's learned, comprehenſive, and accurate work on this ſubject.

POETS's *caſſia*, or *poet's roſemary*, in *Botany*, *oſyris*, a genus of the *dioecia diandria* claſs. Its characters are theſe: it is male and female in different plants, and the empalement of the flower is of one leaf, which is divided into three acute ſegments; the flower has no petals, but thoſe on the male plants have three ſhort ſtamina; the female have a germen, which changes to a globular berry, having a ſingle ſeed. There is but one ſpecies, a native of the ſouthern parts of Europe.

The whole plant being aſtringent, it is likely to be of efficacy in fluxes of the belly, and other diſorders of that kind. Ray.

POGGE, the *cataphractus* COTTUS of Linnæus, in *Ichthyology*, the name of a ſmall ſea-fiſh very common on moſt of the Britiſh coaſts, and ſeldom more than five inches and a half in length; the head is large, bony, and very rugged; the end of the noſe is armed with four ſharp upright ſpines; on the throat are a number of ſhort white beards; the teeth are very ſmall, ſituated in the jaws; the body is octagonal, and covered with a number of ſtrong bony cruſts, divided into ſeveral compartments; the ends of which project into a ſharp point, and form ſeveral echinated lines along the back and ſides, from the head to the tail; the firſt dorſal fin conſiſts of ſix ſpiny rays; the ſecond is placed juſt behind the firſt, and conſiſts of ſeven ſoft rays; the pectoral fins are broad and rounded, and are compoſed of fifteen rays. See *Tab.* IV. *of Fiſh*, Nº 37.

There is an American *cataphractus*, much reſembling this, but having three angles on the hinder part of its head, one on each ſide, and the third in the middle; and its upper chap elliptic, and its mouth a little prominent; its head is covered with a brown and bony helmet; and its back, ſides, and tail, with ſcales of the ſame colour, engraven with ſmall parallel lines, and of a rhomboidal figure; its belly is covered with a thin limber ſkin.

POGO, a name by which the inhabitants of the Phillipine iſlands call their *quail*: it is very like our common quail, but ſmaller.

POINCIANA, in *Botany*. See BARBADOES *flower-fence*.

POINSON, in the *Manege*, is a little point or piece of ſharp pointed iron, fixed in a wooden handle, which the cavalier holds in his right hand when he means to prick a leaping horſe in the croupe, or beyond the end of the ſaddle, in order to make him yerk out behind.

POINT, derived from *punctum*, which is formed from *pungere, to prick*, is a term in various arts.

POINTS, in *Engliſh Antiquity*, were a neceſſary article in the dreſs at leaſt of men; and mention of them frequently occurs in the ancient comedies and other old books.

They were pieces of ſtring about eight inches in length, conſiſting of three ſtrands of cotton yarn, of various colours twiſted together, and tagged at both ends with bits of tin-plate: their uſe was to tie together the garments worn on different parts of the body; particularly the breeches or hoſe, as they were called: hence the phraſe, to untruſs a *point*. With the leathern doublet or jerkin, buttons were introduced, which in time rendered *points* uſeleſs. Theſe points continued to be given on Aſcenſion-day to boys that perambulated the pariſhes, together with willow wands, as a kind of honorary rewards, though diſtinguiſhed only by the name of tags, and become uſeleſs.

POINT, in *Architecture*. *Arches of the third point*, and *arches of the fourth point*. See ARCHES.

POINT, *gauge*. See GAUGE.

POINT, in *Aſtronomy*, is a term applied to certain parts or places marked in the heavens, and diſtinguiſhed by proper epithets.

The four grand *points* or diviſions of the horizon, viz. the *eaſt*, *weſt*, *north*, and *ſouth*, are called the *cardinal points*. See CARDINAL: ſee alſo EAST, WEST, &c. The zenith and nadir are the *vertical points*.

The *points*, wherein the orbits of the planets cut the plane of the ecliptic, are called the *nodes*.

The *points*, wherein the equator and ecliptic interſect, are called the *equinoctial points*. Particularly that, whence the ſun aſcends towards the north pole, is called the *vernal point*.

And that, by which he deſcends to the ſouth pole, the *autumnal point*.

The *points* of the ecliptic, where the ſun's aſcent above the equator, and deſcent below it, terminate, are called the *ſolſtitial points*. Particularly the former of them the *eſtival* or *ſummer point*, the latter, the *brumal* or *winter point*.

POINTS, in *Electricity*, are thoſe acute terminations of bodies which facilitate the paſſage of the electrical fluid *from* or *to* ſuch bodies.

Mr. Jallabert was, probably, the firſt perſon who obſerved that a body, pointed at one end and round at the other, produced different appearances upon the ſame body, according as the pointed or round end was preſented to it. But Dr. Franklin firſt obſerved and evinced the entire effect of pointed bodies, both in drawing and throwing off electricity at greater diſtances than other bodies could do it; though he candidly acknowledges, that the power of points to throw off the electric fire was communicated to him by his friend Mr. Thomas Hopkinſon. Dr. Franklin electrified an iron ſhot three or four inches in diameter, and obſerved, that it would not attract a thread, when the point of a needle, communicating with the earth, was preſented to it; but he found it impoſſible to electrify an iron ſhot, when a ſharp needle lay upon it. He alſo obſerved, that a piece of leaf gold, ſuſpended between two plates (ſee *Experiments in* ELECTRICITY, *Exp.* 7.) always removed farther from that plate to which its ſharpened point was preſented; and that if one of the *points* was very blunt and the other very ſharp, it would be ſuſpended in the air by its blunt end, though no electrified plate was held below it.

This remarkable property, poſſeſſed by pointed bodies, of gradually and ſilently receiving or throwing off the electric fluid has been evinced by a variety of familiar experiments. Thus, if one hand be applied to the outſide coating of a large jar fully charged, and the point of a needle held in the other, be directed towards the knob of the jar, and moved gradually near it, till the point of the needle touches the knob or ball, the jar will be entirely diſcharged, ſo as to give no ſhock at all, or a ſhock ſcarce ſenſible.

In this caſe the point of the needle has gradually and ſilently drawn away the ſuper-abundant electricity from the electrified jar.

Farther, if the knob of a braſs rod be held at ſuch a diſtance from the prime conductor, that ſparks may eaſily eſcape from the latter to the former whilſt the machine is in motion; and when this is the caſe, if the point of a needle be preſented, though at twice the diſtance of the rod from the conductor, no more ſparks will be ſeen paſſing to the rod: when the needle is removed, the ſparks will be ſeen, but upon preſenting it again they will diſappear, ſo that the point of the needle draws off ſilently almoſt all the fluid, which is thrown by the cylinder or globe of the machine upon the prime conductor. This experiment may be varied, by fixing the needle upon the prime conductor with the point upwards; and then, though the knob of a diſcharging rod or the knuckle of the finger be brought very near the prime conductor, and the excitation be very ſtrong, no ſpark will be perceived, or if there be any, it will be exceedingly ſmall.

The influence of *points* is alſo evinced in the amuſing experiment, commonly called the electrical horſe-race. See *Experiments in* ELECTRICITY, *Exp.* 11.

Again, if a ſmall lock of cotton be ſuſpended from the prime conductor by a thread and electrified, its filaments will repel one another, and extend themſelves towards the neareſt conductor; but if the finger or the knob of a rod be preſented to it, it will move toward the finger or knob, and endeavour to touch it: at the ſame time let a pointed needle be preſented with the other hand to the cotton a little above the end of the finger, and it will ſhrink upwards and move towards the prime conductor; but upon removing the needle, the cotton will return towards the finger; on preſenting the needle again, it will ſhrink; and hence it is inferred, that the point of the needle draws off the electric fluid from the cotton, ſo that it is capable of being attracted by the prime conductor, an effect which the finger or blunt end of the wire could not produce. See THUNDER-*houſe*.

The late Mr. Henly exhibited the efficacy of pointed bodies by ſuſpending a large bladder, well blown and covered with gold, ſilver, or braſs leaf, by means of gum water, at the end of a ſilken thread ſix or ſeven feet long, hanging from the cieling of a room, and electrifying the bladder by giving it a ſtrong ſpark with the knob of a charged bottle: he then preſented to it the knob of a wire, which cauſed the bladder to move towards the knob, and when nearly in contact to give it a ſpark, and thus to diſcharge its electricity. By giving the bladder another ſpark, and preſenting to it the point of a needle, the bladder was not attracted by the point, but rather receded from it, eſpecially if the needle was ſuddenly preſented towards it. But experiments evincing the efficacy of pointed bodies for ſilently receiving or throwing off the electric fluid, may be infinitely diverſified according to the fancy or convenience of the electrician; and in a work of this kind it is needleſs to enumerate them.

In connection with this ſubject it may be proper to remember, that, in caſe of *points* throwing off or receiving electricity, a current of air is ſenſible at an electrified point, which is always in the direction of a point, whether the electricity be poſitive or negative. This fact has been ſufficiently aſcertained by many electricians, and particularly by Dr. Prieſtley and ſig. Beccaria: the explication of it will be ſubjoined in the ſequel of this article.

Dr. Prieſtley contrived to exhibit the influence of this current on the flame of a candle, preſented to a pointed wire, electrified negatively as well as poſitively. The blaſt was ſo ſtrong (and in both caſes alike) as to lay bare the greateſt part of the wick, the flame being driven from the point; and the effect was the ſame, whether the electric fluid iſſued out of the point or entered into it. He diverſified this experiment in a variety of ways, by placing the flame between two *points*, variouſly circumſtanced in their connection with the prime conductor, electrified poſitively, and the floor; with the rubber and the floor; with the rubber and the conductor, &c. He alſo tried the force of this current upon paper vanes, ſtuck into the ſides of a cork, which by means of a needle was ſuſpended on a magnet: theſe vanes he held two or three inches from the point of a wire, communicating with the outſide coating of a jar placed upon an electrical ſtand, and he obſerved, that whenever he took a ſpark from the wire communicating with the inſide, the vanes were ſtrongly blown upon and made to turn, as if the current of air had flowed from the point; in which caſe, according to Dr. Franklin's theory, the electric fluid was entering it. If they were made to turn the contrary way, the current ſoon ſtopped them, and never failed to bring them back and make them move as before. This experiment was varied, and vanes were prepared of thin pieces of braſs, which are conductors, and the effect was ſimilar to that of the former. Dr. Prieſtley alſo found, as Mr. Wilſon had before obſerved, that the vanes would not turn in vacuo, nor in a cloſe unexhauſted receiver where the air had no free circulation. In much the ſame manner Beccaria exhibited to ſenſe the influence of the wind or current of air driven from *points*. See *Exp.* 11. under *Experiments in* ELECTRICITY.

Points, *theory of*. Dr. Franklin endeavoured to account for the efficacy of *points*, by ſuppoſing that the baſe on which the electric fluid at the point of an electrified body reſted being ſmall, the attraction by which the fluid was held to the body was ſlight; and that for the ſame reaſon, the reſiſtance to the entrance of the fluid was proportionably weaker in that place than where the ſurface was flat: but he was not ſatisfied with this hypotheſis. The facility with which pointed bodies receive or diſcharge the electric fluid may, perhaps, be more ſatisfactorily explained by conſidering, that the electric fluid ſuperinduced upon an inſulated body, is confined upon that body by the ſurrounding air, and that electricity, by being continually communicated to the air, which is never a perfect electric, is gradually diſſipated; whence it follows, that as a greater or leſs quantity of air is contiguous to a given quantity of electrified ſurface, that ſurface will loſe its electricity more ſuddenly or more ſlowly. Thus, as the point of a needle, ſuppoſed to be connected with an electrified prime conductor, is ſurrounded by the air, the electricity will be diſſipated more eaſily from that than from any other part of the prime conductor of the ſame dimenſions, but expoſed to a leſs quantity of air. Beſides, the air about the point may be more eaſily moved in conſequence of the electrical repulſion than at any other part of the ſurface of the prime conductor; and new air, i. e. unelectrified air paſſes more frequently by it, which taking always part of the electricity of that body, farther promotes its diſſipation. When the pointed body is negatively electrified, it acquires the electric fluid through the point more eaſily than through any other part of its ſurface; becauſe the point preſenting the leaſt ſurface to the greateſt quantity of air receives a proportionably greater quantity of the electric fluid.

Lord Mahon, in his Principles of Electricity, in 1779, explains the influence of *points* in a different manner: he firſt premiſes, that electric atmoſpheres are conſtituted of the particles of air ſurrounding the electrified body: if, e. gr. the body be poſitively electrified, he maintains that it will depoſit, upon all the particles of air that ſurround it, and come ſucceſſively in contact with it, a proportional part of its ſuperabundant electricity; ſo that they will become likewiſe poſitively electrified, and form a poſitively electrified atmoſphere. The ſame reaſoning is applied, *mutatis mutandis*, to negatively electrified bodies, and their negative atmoſpheres.

From this principle, and the obſervation that the denſity of an electrical atmoſphere diminiſhes, in a certain ratio, as the diſtance from the electrified body increaſes, as well as from other conſiderations, his lordſhip undertakes to aſſign the cauſe why an electrified body, to which a projecting point is fixed, parts with or receives electricity more readily than a ſmooth cylinder or globular body: becauſe the ſuperabundant electricity of the body, ſuppoſing it to be poſitively electrified, which, in all caſes, tends to quit it, will, when a point is fixed to it, meet with leſs reſiſtance to its eſcape; as the point projects beyond the denſe part of the electrical atmoſphere of the body into the rarer, and, conſequently, more unreſiſting part of that atmoſphere. But the eſcape of the electric matter from any part of a ſmooth cylindrical body, poſitively electrified, is prevented or impeded; becauſe every part of its ſurface is in contact with the denſeſt part of its own ſtrongly reſiſting electric atmoſphere. The ſurface too of the point being extremely ſmall, the leſs will be the reſiſtance oppoſed to the eſcape of the ſuperabundant electricity of the body into that rare part of its electrical atmoſphere into which the point projects. Beſides other illuſtrations of this principle he produces the inſtance of a pointed wire, placed between two round or prominent metallic bodies, with its point on a level with their ſurface. In this ſituation, when preſented to an electrified body, it acts no longer as a point, or only in a very ſmall degree; becauſe the denſe parts of the electrical atmoſphere of the two round bodies flows or is extended over it.

As for the current of air iſſuing from the *points* of bodies electrified *plus* or *minus*, Dr. Prieſtley obſerves, that it is not more difficult to be accounted for on Dr. Franklin's hypotheſis of poſitive and negative electricity, than any other caſe of electrical repulſion. The particles of the atmoſphere, near the *points* of electrified bodies, having by their means become poſſeſſed of more or leſs than their natural ſhare of the electric fluid, muſt retire to places where they can diſcharge or repleniſh themſelves as occaſion may require. If it be aſked why the particles of the atmoſphere do not, in the ſame manner, recede from all the parts of the electrified body, as well as from the *points*; it is anſwered, that as the preſſure of the atmoſphere will prevent a vacuum, and as electrical attraction and repulſion are moſt powerful at the *points* of bodies, on account of the eaſier entrance or exit of the fluid at the *points* (upon whatever principle that effect depends) the electrified atmoſphere, whether negative or poſitive, muſt fly off at the *points* preferable to any other places, and the weight of the atmoſphere will force the air of the neighbouring places upon the flatter parts of the electrified conductor, notwithſtanding the real endeavour it may have to recede from it. Hiſt. of Elect. vol. ii. p. 191. 8vo. edit. 1775.

Beccaria accounts for this phenomenon by obſerving, that *points*, annexed to electrified bodies or preſented to them, throw into the contiguous air, or draw from it the electrified fire with ſuch a force, that in both caſes they repel from themſelves the air, either loaded with part of the fire with which they ſuperabound, or deprived of its own fire, if theſe bodies were themſelves in a ſtate of negative electricity: and theſe *points*, while they drive away the air next to them, throw into or draw from the air, which laterally ſucceeds the electrical fire; and they do this in ſuch a divided manner, that little light or noiſe is produced, but with ſuch rapidity, that a great quantity of fire is really diſcharged in a ſmall ſpace of time. He accordingly diſtinguiſhes between that tickling ſenſation, which the electrical fire excites in us, when the face or hand is immerſed into the atmoſphere of an electrified body, and the current of air above mentioned. The exceſſive fire, he ſays, which actuates this atmoſphere drives the natural fire from the contiguous air to the face, &c. and this fire in paſſing into the ſkin, produces the ſenſation of tickling: but if the body near which we ſtand be negatively electrified, the fire within the ſkin flows to the external ſurface of it, and thus the ſame kind of feeling is produced, whether the fire iſſues out of the body or paſſes into it. But the electric wind is a real current of air, driven from a point either annexed or preſented to a body ſtrongly electrified, and with ſuch rapidity, that the direction of it cannot be diſcerned either with the naked eye or with the aſſiſtance of any glaſs. Artificial Electricity, 1776, p. 331, &c.

Points, *application of the doctrine of*. There is not a more important fact in the hiſtory of electricity than the uſe to which the diſcovery of the efficacy of pointed bodies was applied.

Dr. Franklin, having aſcertained the ſameneſs of electricity

city and lightning, was immediately led to propoſe a cheap and eaſy method of ſecuring buildings from the damage of lightning, by fixing a pointed metalline rod higher than any part of the building, and communicating with the ground or with the neareſt water. See *Pointed Metallic* CONDUCTORS.

This contrivance was actually executed in a variety of caſes, and has proved an excellent preſervative: ſome few inſtances, however, having occurred, in which buildings provided with ſuch conductors have been ſtruck and damaged, a controverſy has ariſen with regard to their expediency and utility. In this controverſy Mr. Wilſon has taken the lead, and with him Dr. Muſgrave and ſome few other electricians have concurred in their oppoſition to elevated and pointed conductors. They alledge, that every point, as ſuch, ſolicits the lightning, and thus contributes not only to increaſe the quantity of every actual diſcharge, but alſo frequently to occaſion a diſcharge where it might not otherwiſe have happened: whereas, they ſay, if inſtead of pointed conductors, thoſe with blunted terminations were uſed, they would as effectually anſwer the purpoſe of conveying away the lightning ſafely, without the ſame tendency to increaſe or invite it. Accordingly, Mr. Wilſon, in a letter to the Marquis of Rockingham (Phil. Tranſ. vol. liv. art. 44.) expreſſes his opinion, that, in order to prevent lightning from doing miſchief to high buildings, large magazines, &c. the ſeveral builings ſhould remain as they are at the top, that is, without having any metal above them, either pointed or not, by way of a conductor; but that on the inſide of the higheſt part of ſuch a building, and within a foot or two of the top, it may be proper to fix a rounded bar of metal, and to continue it down along the ſide of the wall to any kind of moiſture in the ground.

On the other hand it is urged by the advocates for pointed conductors, that *points*, inſtead of increaſing an actual diſcharge, prevent a diſcharge where it would otherwiſe happen, and that blunted conductors tend to invite the clouds charged with lightning. And it ſeems to be a certain fact, that though a ſharp point will draw off a charge of electricity ſilently at a much greater diſtance than a knob, yet a knob will be ſtruck with a full exploſion or ſhock, the charge being the ſame in both caſes, at a greater diſtance than a ſharp point.

The efficacy of pointed bodies for preventing a ſtroke of lightning is ingeniouſly explained by Dr. Franklin in the following manner: an eye, he ſays, ſo ſituated as to view horizontally the underſide of a thunder-cloud, will ſee it very ragged, with a number of ſeparate fragments or ſmall clouds one under another; the loweſt ſometimes not far from the earth. Theſe, as ſo many ſtepping-ſtones, aſſiſt in conducting a ſtroke between a cloud and a building. To repreſent theſe by an experiment, he directs us to take two or three locks of fine looſe cotton, and connect one of them with the prime conductor by a fine thread of two inches, another to that, and a third to the ſecond, by like threads, which may be ſpun out of the ſame cotton. He then bids us to turn the globe, and ſays we ſhall ſee theſe locks extending themſelves towards the table, as the lower ſmall clouds do towards the earth, but that, on preſenting a ſharp point, erect under the loweſt, it will ſhrink up to the ſecond, the ſecond up to the firſt, and all together to the prime conductor, where they will continue as long as the point continues under them. May not, he adds, in like manner, the ſmall electrified clouds, whoſe equilibrium with the earth is ſoon reſtored by the point, riſe up to the main body, and by that means occaſion ſo large a vacancy, as that the grand cloud cannot ſtrike in that place. Letters, p. 121, &c.

Mr. Henly, with a view of determining the queſtion, whether *points* or knobs are to be preferred for the terminations of conductors made ſeveral experiments, two or three of which it may not be improper to recite. Having placed two of Mr. Canton's ELECTROMETERS, A and B, (*Tab.* V. *Electricity*, *fig.* 35.) inſulated, upon ſtands of ſealing wax about ſeven inches aſunder, and as far from the end of a prime conductor, eighteen inches long, and $1\frac{1}{2}$ inch in diameter, with a ball at each end, $2\frac{1}{2}$ inch in diameter, the diameter of the electrical globe being nine inches; on the top of the box A, he placed a wire, projecting three inches from the end of it, and terminated by a ball $\frac{3}{4}$ of an inch in diameter: on the top of the box B, he placed a ſharp-pointed wire, projecting alſo three inches from its end. After giving the winch five or ſix turns, the balls hanging from the box A, were repelled to the diſtance of one inch from each other, but thoſe hanging from the box B, ſeparated full two inches. Then touching the prime conductor with a finger, the balls at A cloſed, while thoſe at B remained a full inch aſunder: hence he infers, that a ſharp point is much better adapted to draw off lightning than a knob of $\frac{3}{4}$ of an inch in diameter.

In another experiment he inſulated three of his largeſt jars containing together about ſixteen ſquare feet of coated ſurface; from the bottom of theſe jars projected a wire terminated in a ball $\frac{3}{4}$ of an inch in diameter; and at the diſtance of $1\frac{1}{2}$ inch from it, he placed the inſulated ball C (*fig.* 36.) on which he brought down the charge of the three jars by his diſcharging rod, which leaped from thence to the ball in contact with the jars, and diſcharged them by a loud and full exploſion: but the ſame thing did not happen when he removed the inſulated ball only one-eighth of an inch farther from the other. He then removed the fire which was terminated by the ball, and placed in its ſtead another of the ſame length and diameter, but very nicely tapered to a point: then placing the inſulated ball C one inch from the point, he brought down the charge of the three jars as before, which flew upon the point and melted it a little; the jars were diſcharged with a loud and full exploſion. But having removed the ball C to the diſtance of $1\frac{1}{8}$ inch from the point, the charge did not ſtrike it, though much of it was preſently drawn off ſilently by the point, as appeared by the falling of the index of the electrometer. Whence it ſeems probable, that a conductor terminated by a ball of three-fourths of an inch in diameter, would be in danger of a ſtroke from a highly electrified cloud at a much greater diſtance than another with a ſharp termination. He alſo varied this experiment by placing the large copper ball, C, at ſuch a diſtance from that in contact with the jar, that on bringing down the charge by his diſcharging rod, it ſeemed to remain almoſt undiminiſhed, though the rod was kept in contact with the prime conductor a full minute. Then repeating the experiment with a point inſtead of a knob, the charge was in a great meaſure preſently drawn off ſilently.

In another experiment, he ſuſpended a large bullock's bladder gilded with leaf copper by a ſilken ſtring, at one end of an arm of wood, placed horizontally, and turning freely upon the point of a needle; the bladder was balanced by a leaden weight, (*fig.* 37.) In this ſituation he gave the bladder a ſtrong ſpark from the knob of a charged bottle, when preſenting towards it a braſs rod, terminated by a ball, two inches in diameter, he obſerved that the bladder would come towards it at the diſtance of three inches; and when it had got within one inch of it, it would throw off its electricity in a full and ſtrong ſpark, nearly, if not quite as large as that which it had received. But giving it another ſtrong ſpark, and preſenting towards it a pointed wire, he could never perceive that it attended to that, and when it was brought nearly into contact with the bladder, there was no ſpark at all, ſcarce any ſenſible quantity of electricity remaining in it. This experiment was frequently repeated with the ſame reſult. Phil. Tranſ. vol. lxiv. part ii. art. 18. See THUNDER *Houſe*.

It has been univerſally allowed, that in caſes where the quantity of electricity with which thunder-clouds are charged is ſmall, or when they move ſlowly in their paſſage to and over a building, pointed conductors, which draw off the electrical fluid ſilently, within the diſtance at which rounded ends will explode, will gradually exhauſt them, and thus contribute to prevent a ſtroke and preſerve the buildings to which they are annexed.

But it has been ſaid by thoſe that are averſe to the uſe of ſuch conductors, that if clouds of great extent and highly electrified, ſhould be driven with great velocity directly over them, or if a cloud hanging directly over buildings to which they are annexed, ſuddenly receives a charge by exploſion from another cloud at a diſtance, ſo as to enable it inſtantly to ſtrike into the earth, theſe pointed conductors muſt take the exploſion; on account of their ſuperior readineſs to admit electricity at a much greater diſtance than thoſe that are blunted, and in proportion to the difference of that ſtriking diſtance, do miſchief inſtead of good: and, therefore, they add, that conductors terminated by ſharp *points* are ſometimes advantageous, and at other times prejudicial: and that, as the purpoſe for which conductors are fixed upon buildings is not to protect them from one particular ſort of clouds only, but if poſſible, from all, it cannot be adviſeable to uſe that kind of conductors, which if they diminiſh danger on the one hand, will increaſe it on the other. Beſides, it is pleaded, that if ſharp-pointed conductors are attended with any the ſlighteſt degree of danger, that danger muſt be conſiderably augmented by carrying them high up into the air, by fixing them upon every angle of a building, and making them project in every direction. Such is the reaſoning of Dr. Muſgrave, for which we muſt refer to his paper in the Phil. Tranſ. vol. lxviii. part ii. art. 36.

Mr. Wilſon, diſſenting from the report of a committee of the Royal Society, appointed to inſpect the damage done by lightning to the houſe of the board of ordnance, at Purfleet, in 1777, was led to juſtify his diſſent, and to diſparage the uſe of pointed and elevated conductors, by conſtructing a magnificent apparatus, with which he might produce effects ſimilar to thoſe that had happened in the caſe referred to the conſideration and deciſion of the committee.

With this view he prepared a model of the board-houſe at Purfleet, reſembling it as nearly as poſſible in every eſſential appendage, and furniſhed with conductors of different lengths and terminations. As no apparatus ſufficiently large for repreſenting a thunder-cloud, could conveniently be put in motion, he contrived to accompliſh the ſame end by moving the model of the building, with a velocity anſwering to that of the cloud, which he ſtates, at a moderate computation, to be about four or five miles an hour. In order to conſtruct a proper ſubſtitute for the cloud, he joined together the broad rims of one hundred and twenty drums, making the ſurfaces formed by the ſeveral junctures even with cloth paſted down, and covering them with tin-foil. Theſe drums formed a cylinder above one hundred and fifty-five feet in length, and above ſixteen inches in diameter. The whole cylinder was made in four ſeparate parts, three of which could eaſily be made to communicate or not with each other: the fourth conſiſting of eight braſs drums, was reſerved for a different purpoſe. The great cylinder, conſiſting of the three parts, and containing five hundred and ninety-two ſquare feet, was ſuſpended about five or ſix feet from the floor by ſilk lines, one end of it hanging over the middle of the long frame on which the model was propoſed to move, and the other being joined occaſionally to the end of a wire four thouſand eight hundred feet long, that was ſuſpended through the whole ſpace of the room; the remote end of this wire hooked on occaſionally at the end of the braſs drums, which made a ſeparate cylinder about ten feet in length, and which was ſuſpended by ſilk lines about ſix feet from the floor, in ſuch a manner that the fartheſt end thereof from the wire was within nine or ten feet from the great cylinder. The long wire with the great cylinder and braſs drums made the whole of the ſubſtitute for a thunder-cloud, when they were properly charged. This apparatus was charged by a machine with one glaſs cylinder, about ten or eleven feet from its neareſt end. The whole of the apparatus was diſpoſed in the great room of the Pantheon, and was applied to uſe in no leſs than fifty different experiments.

It is impoſſible within the limits of this article to do juſtice to Mr. Wilſon's experiments, or to the inferences which he deduces from them. It will be ſufficient to obſerve in general, that moſt of his experiments, in which the model of the houſe, with pointed or blunted conductors annexed to it at the ſame or different heights, and made to move ſwiftly under his large artificial cloud, were intended to ſhew, that conductors with *points* are ſtruck at a greater diſtance, and with a higher elevation than thoſe with blunt or rounded terminations: and from all his experiments made with pointed and rounded conductors (provided the circumſtances be the ſame in both) he infers that the rounded ones are much the ſafer of the two; whether the lightning proceeds from one or more clouds; that thoſe are ſtill more ſafe which (inſtead of being, as Dr. Franklin recommends, ten feet high) are very little, if at all, above the higheſt part of the building itſelf; and that this ſafety ariſes from the greater reſiſtance exerted at the larger ſurface. For a farther account of the apparatus, experiments, and reaſoning of Mr. Wilſon, the reader, deſirous of more particular information, is referred to the Phil. Tranſ. vol. lxviii. part i. art. 15.

The committee of the Royal Society, compoſed of nine of the moſt diſtinguiſhed electricians in this kingdom, to whom the conſideration of the moſt effectual method of ſecuring the powder-magazines at Purfleet, againſt the effects of lightning, was referred, expreſs their united opinion, that elevated rods, conſtructed and diſpoſed in the manner which they direct, are preferable to low conductors terminated in rounded ends, knobs, or balls of metal, and that the experiments and reaſons, made and alledged to the contrary by Mr. Wilſon, are inconcluſive.

Mr. Nairne, in order to obviate the objections of Mr. Wilſon and others, and to vindicate the preference generally given to elevated and pointed conductors, conſtructed a much more ſimple apparatus than that of Mr. Wilſon, with which he made twenty-ſeven well-deſigned and well-conducted experiments, which ſeem to prove the point as far as it is capable of being proved by our artificial electrical apparatus. Of theſe, as the ſubject is of importance, it will be proper to give ſome account. His apparatus and machine are repreſented in *fig.* 38. A is a glaſs cylinder eighteen inches in diameter, B a conductor of wood, covered with tin-foil, ſix feet long, and one foot in diameter, and intended to repreſent a cloud, and D a braſs rod on a ſtand communicating with the earth, to the end of which other rods, terminated with balls of a different ſize or a point might be ſcrewed, and deſigned to repreſent a conductor to a houſe. A braſs ball, four inches in diameter, being ſcrewed on to the end of the rod D, was ſtruck by the ball C, at the end of the charged conductor to the diſtance of ſeventeen inches and four-tenths, and ſometimes to nineteen, and even to twenty inches: a ball, one inch in diameter, received ſtrokes to the diſtance of about two inches, which were ſucceeded by a hiſſing noiſe, and a continued light on the ball, till the diſtance was about ten inches; after which the ſtrokes were renewed and continued to the diſtance of $14\frac{8}{10}$ inches, and occaſionally to $16\frac{3}{10}$ inches: a ball of $\frac{3}{10}$ of an inch diameter, in the ſame circumſtances, was ſtruck to the diſtance of half an inch, and continued luminous till it was removed beyond the ſtriking diſtance as far as thirty-three inches. Inſtead of a ball, a wire about $3\frac{1}{2}$ inches long, terminating in a point, was ſubſtituted in its ſtead, but no ſtrokes happened, though the point was almoſt in contact with the ball C; at the diſtance of half a tenth of an inch, the point received a ſtream of fire; beyond that diſtance, it was luminous, and ſo continued whilſt it was gradually removed to the diſtance of ſix feet.

In another experiment, the ball of four inches in diameter, with a hole through it, was uſed; through the hole a wire projected $\frac{1}{10}$ of an inch beyond the ſurface of the ball, and directly pointing to the ball C; but neither the ball nor point were ſtruck at any diſtance; the point was luminous at the diſtance of thirty inches: when the point of the wire was made even with the ſurface of the ball, it was ſtruck to the diſtance of $17\frac{1}{4}$ inches. Having ſcrewed a hollow braſs ball $3\frac{1}{2}$ inches in diameter, with a hole through it, to a braſs hollow ſtem, and paſſed a wire through it with its pointed end projecting one inch beyond the ſurface of the ball; this apparatus was placed on a ſtand communicating by metal with the earth, at the diſtance of five feet from the conductor or artificial cloud, and directly oppoſite to its ſides; in this caſe the ſtriking diſtance from the ball C to the ball of four inches diameter on the rod D, was $16\frac{1}{15}$ inches: when the point of the wire, paſſing through the ball and ſtem, was made to project nine inches beyond it, the ſtriking diſtance only $6\frac{8}{10}$ inches. In order to diſcover how far a point or differently ſized balls, with ſmall ſeparations in the metallic communication with the earth, would act to carry off the electric fire of the artificial cloud, Mr. Nairne fixed a ſcrew to each end of a ſtick of ſealing-wax, and, having paſted a ſlip of tin-foil over its ſurface, and made a ſeparation of the tin-foil of about $\frac{1}{50}$ of an inch, ſcrewed the pointed wire into one end, and the other end of the wax to the braſs rod, where the ball with the point projecting from it was placed in the laſt experiment. The ſtand, being placed directly oppoſite to the ſide of the artificial cloud, was removed to the diſtance at which the light between the ſeparation of the tin-foil no longer became viſible, which was above ſeven feet. When a ball of $\frac{3}{10}$ of an inch was put in the place of the point, the light was viſible at the diſtance of four feet ſix inches, but with a ball of three inches diameter, only at two feet. He took another ſtick of wax, $1\frac{3}{10}$ inch in diameter, and about ten inches long, and, having paſted on it round pieces of tin-foil half an inch in diameter, at about half an inch diſtance from each other, ſcrewed one end of it to the receiving rod, (*fig.* 39), the pointed wire being ſcrewed into the other end. All the ſeparations of the tin-foil, except two, were connected by a piece of braſs laid on the wax, and the point of the wire was placed nearly in contact with the ball: in theſe circumſtances the fire of the charged conductor ſtruck into the point, and continued to ſtrike till it was gradually removed to the diſtance of $1\frac{1}{10}$ inch; beyond which diſtance it would not ſtrike, but the point continued luminous to the diſtance of three feet. When the connecting braſs piece was removed, the point was not ſtruck till it was removed to the diſtance of $4\frac{1}{2}$ inches; it continued to be ſtruck to the diſtance of ten inches; after which it was not luminous, except when the artificial cloud diſcharged its electric fire into the air, by a diverging pencil from the ball C.

From the experiments above recited, we may infer, that the artificial cloud ſtrikes at diſtances greater, as the termination of the conductor is more blunted; that the ſtriking diſtance is leſs as the end of the conductor tends more to a point; and that when the end of a conductor is pointed, the point is not ſtruck at any diſtance, but continues luminous to a certain diſtance, carrying off ſilently the electricity of the artificial cloud. We may alſo infer the utility of a pointed rod, even if it projects but a ſmall diſtance above the higheſt part of a building; that a point within the ſurface of a ball does not prevent the ball being ſtruck; that the more elevated our pointed conductors are, the greater is the chance of preſerving buildings from the effects of lightning; that a conductor terminating in a point acts at a much greater diſtance than one terminating with a ball, in carrying off the electric fire; that the reaſon why the artificial cloud ſtrikes to the *point*, is the ſeparation or diſcontinuance of the metallic part of the conductor; that it ſtrikes farther to the *point*, as the number of ſeparations is increaſed; and that, if the metallic communication with the moiſt earth be completed, the charged cloud will not ſtrike to the *point*.

Another part of Mr. Nairn's apparatus (ſee *fig*. 40.) is a moveable artificial cloud, conſiſting of a hollow tube of wood, with a ball at each end, about ſix feet in length; from the ends are ſuſpended hollow wooden cylinders E, E, which, together with the balls and tube, are covered with tin-foil; the axis of the tube reſts on two ſemicircular hollows in a piece of braſs fixed on the glaſs pillar; round which axis it eaſily moves, and is brought to a horizontal poſition by means of two moveable pieces F, F. Having put this moveable cloud into an horizontal poſition, and the braſs on which the axis reſted into contact with the end of the artificial cloud B, under each of the hollow cylinders E, E, Mr. Nairn placed ſtands G, G, having a good metallic communication with the earth, one of which was furniſhed with a pointed wire, and the other with a braſs ball three inches in diameter. Each of theſe was placed twelve inches from the bottom of its correſponding cylinder; and when the clouds were charged, the point became luminous, and the moveable cloud remained in a horizontal poſition; but when the operation of charging the two clouds was diſcontinued, it was immediately found, that the *point* had drawn off almoſt all the electric fire. When the clouds were again charged, and the ſtand with the ball removed, the *point* was luminous, and the moveable cloud remained horizontal, not being attracted to the *point*, which carried off the electric fire. But when the clouds were charged, the ſtand with the ball reſtored, and that with the pointed wire removed, the end over the ball was attracted down till it came to its ſtriking diſtance, where it diſcharged its electricity on the ball in a ſtrong ſpark. It then receded a little, and being charged, approached the ball as before, and diſcharged its electricity at once, and thus continued ſtriking and receding as long as the two clouds were charged. When the pointed wire was replaced, it became luminous, the ſtriking ceaſed, and the moveable cloud returned to its horizontal poſition. The effect was the ſame, when the pointed wire was placed on the ſame ſide with the ball. The concluſions from theſe experiments are obvious. From their experiments, in which the moveable artificial cloud was made to repreſent a cloud in its natural ſtate receiving electric fire from a charged cloud, it was found, that the *point* deprived it of its electric fire which it received from the charged one ſo faſt, that the artificial cloud could keep conſtantly ſtriking to the other end, without repelling it from it; but that, when the ball was placed in the room of the *point*, inſtead of the artificial cloud continuing to ſtrike to the other end, without repelling that end, it now firſt attracted and charged it with electricity, then immediately repelled it; and being attracted by the ball under the other end, it moved down with an increaſing velocity, till it came within its ſtriking diſtance, when it diſcharged its electricity on the ball with a loud and ſtrong ſpark, and ſo continued alternately receiving and diſcharging its electric fire on the ball, according to the known laws of electricity. In another experiment it was found, that, though the moveable artificial cloud was in great motion, receiving and diſcharging its electric fire on the ball, on taking away the ball, and putting the *point* in its place, the artificial ſtorm immediately ceaſed. When the cloud is fixed at a certain diſtance between the artificial cloud and the *point*, the fixed cloud, at the inſtant it receives the electric ſpark, directly diſcharges it again on the *point*; but without any other alteration, beſides making the cloud moveable on its axis, the diſtances being the ſame, the end of the cloud then recedes from the *point*, and will not ſtrike to it; and this caſe is much more agreeable to nature than the other, becauſe clouds are not fixed but floating bodies.

In order to obſerve the effects of rods terminating with balls of different ſizes, or terminating with a *point*, moving ſwiftly under the artificial cloud, Mr. Nairn made uſe of the apparatus repreſented in *fig*. 41. in which H is a hollow tube of wood, covered with tin-foil, with a heavy weight faſtened to one end of the tube, ſuſpended by an axis, about three inches above the weight, between two wooden pillars: in this wooden tube there was a moveable braſs rod, by means of which a ball, or *point*, fixed on it, might be raiſed to any required height. To the under part of the artificial cloud, at K, was fixed a ball 1 of $\frac{3}{10}$ of an inch in diameter; and then the apparatus was placed under it with a *point*, the ſwinging rod being held down to the floor, as in *fig*. 42. and the *point* covered; the artificial cloud was then charged, and the ſwinging rod with the point being let go, paſſed ſwiftly and very near to the ball under the artificial cloud at K. This was repeated ſeveral times, till the greateſt ſtriking diſtance to the *point* was found, which was generally $1\frac{6}{10}$th of an inch. Inſtead of the *point*, a ball $\frac{3}{10}$ths of an inch in diameter was applied in the ſame manner, and the ſtriking diſtance was generally found to be $2\frac{1}{10}$ inches. When a ball of $1\frac{3}{10}$ths of an inch was uſed, the ſtriking diſtance was generally fifteen inches. Here we may obſerve, that the ſingular diſappearance and re-appearance of the ſparks, on gradually removing the ſmall conductor from the prime conductor, already mentioned, occurred likewiſe in the two firſt of the caſes juſt recited; but when the large ball was uſed, it was ſtruck uninterruptedly till it was removed to the diſtance of ſixteen inches. From theſe vaſt experiments it appears, that the *point* is ſtruck by means of a ſwift motion, but that the ball of $\frac{3}{10}$ths of an inch was ſtruck farther than the *point*, and the larger ball at a much greater diſtance than either, even with the ſwifteſt motion. Upon the whole, Mr. Nairne ſeems to be juſtified in preferring elevated pointed conductors; next to them thoſe that are pointed, though they project but a little diſtance above the higheſt part of a building; and after them thoſe terminating in a ball, and placed even with the higheſt part of a building For a farther account of theſe curious and uſeful experiments, and the authors remarks on thoſe of Mr. Wilſon, the reader is referred to Phil. Tranſ vol. lxviii. part ii. art 37.

POINT, in *Geometry*, according to Euclid, is a quantity which has no parts, or which is indiviſible.

Wolfius defines it, that which terminates itſelf on every ſide; or which has no terms or boundaries diſtinct from itſelf.

This is what we otherwiſe call the *mathematical point*, and is only conceived by the imagination; yet it is in this that all magnitude begins and ends, the flux or motion of the *point* generating a line, that of a line a ſurface, &c.

Hence ſome define a *point* to be the inceptive of magnitude.

Hobbes defines a *point* to be a body whoſe magnitude is not conſidered. But his falſe notions of a *point*, line, and ſurface, have led him into many errors. Monſieur de Crouzas alſo has ſuppoſed a line to be compoſed of *points*, in his geometry and comment on the Analyſe des Infiniment petits. This ſuppoſition only tends to confound learners. See Jo. Bernouilli Oper. vol. iv. p. 161, ſeq.

A line can only cut another line in a *point*. Any three *points* being given out of a right line, a circle, or part of a circle may be drawn, that ſhall paſs through them all. To *draw a parallel line*, *a perpendicular*, *a tangent*, &c. *to a given point*, are popular problems in geometry. See PERPENDICULAR, PARALLEL, TANGENT, &c.

POINT, *conjugate*, in *Geometry*, is uſed for that point into which the *conjugate* oval, belonging to ſome kind of curves, vaniſhes. Maclaur. Algebr. p. 308.

POINTS, *proportion of mathematical*. It is a current maxim, that all infinites, whether infinitely great, or infinitely ſmall, are equal; yet is the maxim falſe in both caſes. Dr. Halley ſhews ſeveral infinite quantities which are in a finite proportion to each other; and ſome infinitely greater than others. See INFINITE *quantity*.

The like the hon. Mr. Roberts ſhews of infinitely ſmall quantities, viz. *mathematical points*.

He demonſtrates, for inſtance, that the points of contact between circles and their tangents, are in a ſubduplicate proportion to the diameters of the circles; that the *point* of contact between a ſphere and a plane is infinitely greater than that between a circle and a tangent; and that the *points* of contact in ſpheres of different magnitudes are to each other as the diameters of the ſpheres.

POINT *of contrary flexure*, in the *Higher Geometry*. See *Point of* INFLECTION, and RETROGRADATION *of curves*.

POINT *of reflection*, in *Geometry*, is commonly uſed inſtead of *point* of RETROGRADATION, or retrogreſſion.

POINT, in *Grammar*, is a character uſed to mark the diviſions of diſcourſe.

The *point proper* is what we otherwiſe call a *full ſtop*, or period, and ſerves to denote the ſenſe complete, and the period ended. See PAUSE.

Two *points* uſually mark the middle of a period, and ſhew a conſtruction complete, and the ſenſe to be perfect; yet intimating ſomething to come after it: this we call a COLON.

A *point* with a comma, called a **SEMICOLON**, marks a ſenſe leſs complete than the colon: though authors ſeem to uſe them indifferently; nor are grammarians agreed about their preciſe difference.

The **COMMA**, or virgula, marks a ſubdiviſion of a member of a period. To theſe *points* Dr. Ward adds the **SEMI-PERIOD**.

Beſides theſe primary *points* which diſtinguiſh *ſentences*, there are others which Dr. Ward calls *notæ affectuum*, and which Dr. Lowth ſays, denote a different modulation of the voice in correſpondence with the ſenſe: ſuch are A *point of interrogation*, ?, which marks ſomething to be pronounced in a higher tone, as intimating a queſtion aſked. A *point of admiration*, or *exclamation* !, which marks a ſudden ſurpriſe and wondering; and a **PARENTHESIS**.

The interrogation and exclamation *points* are indeterminate as to their quantity or time, and may be equivalent in that reſpect to a ſemicolon, a colon, or a period, as the ſenſe requires. They mark an elevation of the voice.

The parentheſis, which incloſes in the body of a ſentence a member inſerted into it, which is neither neceſſary to the ſenſe, nor at all effects the conſtruction, marks a moderate depreſſion of the voice, with a pauſe greater than a comma.

Our *points* and accents were entirely unknown to the ancients. In the ancient Greek manuſcripts, the whole diſcourſe ſeems written with the ſame ſtroke of the pen; the words and letters being joined throughout.

In after-times, *points* were invented, and added at the top of the letters, to ſhew when the ſenſe was finiſhed. Hence the grammarians, coming to retouch the old manuſcripts, thought fit to add the *points* and accents. Salmaſius affirms, that he has even obſerved plainly where they have been added, by the difference of hands. See PUNCTUATION.

POINTS, or *vowel* POINTS, in the *Hebrew Learning*, are certain characters, which, in the writings of that language, ſerve to mark the vowels.

The antiquity of the *points* in the Hebrew tongue makes the ſubject of a celebrated controverſy among the learned; ſome maintaining their origin to be the ſame with that of the Hebrew language; and others aſſerting them to have been firſt introduced by Ezra, after the Babyloniſh captivity, when he compiled the canon, tranſcribed the books into the preſent Chaldee character, and reſtored the purity of the Hebrew text.

Others will have them invented by the doctors of the ſchool of Tiberias, uſually called the Maſorites, about five hundred years after Chriſt. The rabbin Elias Levita was the firſt who ſtarted this queſtion, in the beginning of the ſixteenth century; and maintained them to have been an invention of the Maſorites, for the eaſe of thoſe who were to learn the Hebrew tongue.

This ſentiment was eſpouſed by Capellus, to whom alſo adhered Luther, Calvin, Caſaubon, Scaliger, Maſclef, Erpenius, Mercer, Morinus, Druſius, Le Clerc, Walton, Hare, Bently, Newton, Sharpe, &c. who are all oppoſers of the antiquity of vowel *points*. To theſe we might add ſeveral of the Jews, particularly Aben Ezra, who lived in the twelfth century: and almoſt all the learned men of the Romiſh perſuaſion. Buxtorf attacked Capellus violently on this article, and gained a great number of divines on his ſide, who took the alarm, imagining it a grevious wound to the holy text, to allow the *vowel points* to have been added by the Maſorites, and not to have been found in the ancient text; becauſe, without theſe, it is very difficult to fix the certain reading thereof. Yet, in the Samaritan text, there is no *point* or vowel, nor in many of the moſt ancient Hebrew manuſcripts.

Thoſe who maintain that the Hebrew *points* were not invented by the Maſorites, alledge, that there is no mention in any Jewiſh writer of ſuch an alteration, as the introduction of the *points*, being made in the Hebrew Bible; that all the annotations or notes of the Maſorites upon the vowels, relate to the irregularity of them, which could not have been occaſioned by themſelves, but muſt have exiſted in the copies that were before them; that expreſs mention of the *points* or vowels occurs in books more ancient than the Talmud. viz. Babir and Zoar, the firſt ſaid to be written a little before our Saviour's time, and the ſecond about a century later. However, theſe books are juſtly rejected by others as ſpurious. Prideaux ſays, that many particulars occur in theſe books, which prove that they muſt have been written above a thouſand years after the pretended time of their compoſition; and farther it is pleaded, that the *points* were in uſe in our Saviour's time, from Mat. v. 18. whence it appears, that the tittles or *points* at that time belonged to the law. But Capel underſtands by the *κεραιαι*, not the *points*, but the corollæ or flouriſhes made about the Hebrew conſonants.

Thoſe who are of opinion that the *points* are coeval with the conſonants, argue, that it is impoſſible to pronounce the language without vowels, and alſo to teach it, unleſs the vowels were expreſſed; that if the vowels are of human and late invention, the authority of the holy Scriptures will be weakened, and the ſacred text left to an arbitrary and uncertain reading and interpretation. But to this objection it is replied, that א, ה, ו, י, and ע, originally ſerved for vowels. Nevertheleſs, this anſwer ſeems inſufficient; becauſe there are many words in which theſe letters do not occur; and it is argued, from the nature and ſtructure of the Hebrew language, and its dialects, in which the radicals or primitive words are formed by triads, compoſed by the conjunction of different conſonants or letters, that ſome other letters muſt neceſſarily belong to the language. However, it is certain, that the matres lectionis, as the above letters are called, have been ſometimes omitted: for they are more frequent in ſome of the older manuſcripts than in the later, or in the printed text.

The arguments againſt the antiquity of the Hebrew *points*, tending to prove that they were added by the Maſorites, are deduced from grammar, teſtimony, and hiſtory. The grammatical arguments are principally founded in the Keri and Chetibh. The Kerioth, it is agreed, began to be collected a little before the completion of the Talmud, probably by the Maſorites; and it is obſerved, that they are various lections merely of the conſonants, and not of the vowel *points*; and that there are certain irregularities in the punctuation, both with reſpect to whole words, and the parts of words, which ſhew that the *points* were not in the copies, from whence the Keri and Chetibh were made.

The teſtimony which furniſhes the ſecond claſs of arguments, is either expreſs or tacit. Of the firſt ſort is the teſtimony of Aben Ezra, R. David Kimchi, R. Jehuda Levita, and R. Elias Levita, who deny the antiquity of the vowel *points*. The tacit teſtimony is derived from the copies of the law, which are kept and read in the ſynagogues, or from the cabaliſtic interpretation, or from paſſages of the Talmud. Thoſe copies of the law called, Sepher-torah, read every Sabbath, and reckoned the moſt ſacred, are conſtantly written without *points*; to which we may add, that in many manuſcripts, examined by Dr. Kennicott, and thoſe ſome of the oldeſt and beſt, either there are no *points* at all, or they are evidently a late addition. The cabaliſtic interpretations relate to the conſonants, and none of them to the vowels. When the Talmud was compoſed, the *points* were not affixed to the text, becauſe there are ſeveral diſputes concerning the ſenſe of the paſſages of the law, which could not have been diſputed, if there had been *points*; beſides, the vowels are never mentioned, where the faireſt opportunity occurred for mentioning them, if they had been in being.

The arguments from hiſtory are drawn from the Chaldee paraphraſes of Jonathan and Onkelos, the Greek verſions of Aquila, Symmachus, and Theodotion, and eſpecially that of the Septuagint; whence it is argued, that the copy from which theſe were tranſlated was without *points*; as ſeveral words are tranſlated in a different ſenſe from that which the *points* would determine them to mean. Thoſe who wiſh to ſee a compendious abſtract of the arguments for and againſt the antiquity of *points*, and of the ſtate of this controverſy, may conſult Jennings's Jewiſh Antiq. vol. ii. p. 344, &c.

Dr. Prideaux has an hypotheſis peculiar to himſelf: he apprehends that the *points* were added by more ancient Maſorites than thoſe of the ſchool of Tiberias, ſoon after Ezra, when the Hebrew ceaſed to be a living language; but that they were not in common uſe, nor taught in the theological ſchools, till after the compilation of the Talmud. Conn. part i. book v. vol. i. p. 5—520. ed. 10.

POINTS, in *Heraldry*, are diviſions of the eſcutcheon into ſeveral ſquares, ſometimes to the number of 9, ſometimes to 15; ſome whereof are of one colour or metal, the others of another; called alſo *equipollent points*.

There is alſo another, and that more frequent diviſion of the eſcutcheon into *points*, which have ſeveral names and values, according to their ſeveral places.

There are nine principal *points* in an eſcutcheon, as marked in *Tab. Herald. fig.* 38, and deſcribed under ESCUTCHEON.

Columbiere makes the *points*, and their ſituations, ſymbolical. As the ſeveral bearings in an eſcutcheon are ſo many types repreſenting the commendable actions of the perſon they are given to; ſo the eſcutcheon itſelf repreſents the body of the man that performed them; and the *points* or parts ſignified by theſe letters, the principal parts of his body. Thus, A, B, C, repreſent the head, in which the three great faculties reſide; D, the neck, where ornaments are chiefly borne; E, the heart, &c.

POINT is alſo the name of an ordinary, ſomething like the pile, riſing frequently from the bottom of the eſcutcheon to the top, very narrow, and only taking up two-thirds of the *point* of the eſcutcheon.

When the *point* ariſes from the baſe, it is peculiarly called *point-in-point*.

Point *inverted* is when it deſcends from the chief downwards; poſſeſſing two thirds of the chief, but diminiſhing as it approaches the *point* of the eſcutcheon, though without touching it.

Point *in bend*, or *point in bar*, is when the *point* is placed tranſverſe in the ſituation of a bend or bar.

When it comes from the ſides of the eſcutcheon, it is alſo called a *point dexter* or *ſiniſter*, according to its ſituation.

The *point dexter* is commonly reputed an abatement due to a braggadocio. *Point champion ten* due for killing a priſoner after quarter demanded. *Point-in-point*, a diminution belonging to a coward. *Point-plane*, an abatement belonging to a lyar, &c. See Diminution.

Point is alſo uſed in heraldry for the loweſt part of the eſcutcheon, which uſually terminates in a *point*.

Point *champain*. See Champain.

In the French arms, the fleur-de-lys are two in chief, and one in *point*.

Point, in the *Manege*. A horſe is ſaid to make a *point*, when in working upon volts, he does not obſerve the round regularly, but pulling a little out of his ordinary ground, makes a ſort of angle or *point* by his circular tread. This fault is prevented by haſtening the hand. See Haste.

Point is alſo uſed to denote the toes of a bow of a ſaddle.

Point, in the *Manufactories*, is a general term uſed for all kinds of laces wrought with the needle.

Such are *point de Venice*, *point de France*, *point de Genoa*, &c. which are diſtinguiſhed by the particular œconomy and arrangement of their *points*.

Point is ſometimes alſo uſed for lace woven with bobbins, as *Engliſh point*, *point de Molines*, *point de Havre*, &c.

Point is alſo an iron or ſteel inſtrument, uſed, with ſome variety, in ſeveral arts.

Engravers, etchers, cutters in wood, ſtone-cutters, &c. uſe *points* to trace their deſigns on the copper, wood, ſtone, &c.

Statuaries, &c. have likewiſe *points* in manner of little chiſſels, uſed in the firſt forming or ſketching out their work.

Turners work or faſhion their common works between two *points* faſtened to the puppets. Lapidaries have alſo iron *points*, to the ends whereof are faſtened pieces of diamonds, ſerving to pierce the precious ſtones.

Point, in *Muſic*, is a mark or note anciently uſed to diſtinguiſh the tones.

Hence we ſtill call it ſimple *counter-point*, when a note of the baſs anſwers preciſely to that of the treble; and figurative *counter-point*, when a note is ſyncopated, and one of the parts makes ſeveral inflexions of the voice or tone, while the other only makes one.

We ſtill uſe a *point* to raiſe the value of the note, and prolong its time by one half; e. gr. a *point*, added to a ſemibreve, makes it, inſtead of two minims, equal to three.

Point, in *Navigation* and *Geography*. *Points of the horizon*, or *of the compaſs*, are certain *points*, formed by the interſections of the horizon by vertical circles.

The number of theſe *points*, therefore, is really the ſame with that of the points conceived in the horizon, i. e. infinite; though, in practice, we only diſtinguiſh thirty-two of them.

Some uſe *point* for the interſection of a vertical circle with a circle parallel to the horizon; and even ſome, for the ſegment of a vertical, intercepted between the meridian and horizon, or a circle parallel thereto.

The *points* are ſhewn by right lines drawn from a *point* aſſumed in a horizontal plane.

A *point of the compaſs* is popularly taken for a 32d part of the whole; or for an arch of 11 degrees 15 minutes; half of which, viz. $5^\circ\ 37' \frac{1}{2}$, is called a *half point*; and half of that, or $2^\circ\ 48' \frac{3}{4}$, a *quarter point*.

Theſe *points of the compaſs* are divided into cardinal and collateral.

Point, in *Optics*. The *point* of *concourſe*, or *concurrence*, is that, wherein converging rays meet, more uſually called the focus.

Point *of diſperſion*. See Dispersion.

Point *of incidence*. See Incidence.

Point *of reflexion*. See Reflexion.

Point *of refraction*. See Refraction.

Point, *radiant*. See Radiant.

Point, in *Perſpective*, is a term uſed for various parts or places, with regard to the perſpective plane. Such are the

Point *of ſight*, or *of the eye*; this is a *point* F on a plane HI (*Tab. Perſpective fig.* 12. N° 1.) marked out by a right line O F, drawn from the eye, perpendicular to the plane. This is alſo called the principal point.

This *point* is in the interſection of the horizontal and vertical planes.

Some authors call this the *principal point*; and give the name *point of ſight*, or *viſion*, to the *point* wherein the eye is actually placed, and where all the rays terminate; as O. See Perspective, and Point *of view*.

Point *of diſtance*, is a *point*, v. gr. P or Q, in the horizontal line P Q, at the ſame diſtance from the principal *point* F, as the eye O is from the ſame. See Perspective.

Point, *third*, is a *point* taken at diſcretion in the line of diſtance, wherein all the diagonals drawn from the diviſions of the geometrical plane concur.

Point, *objective*, a *point* on a geometrical plane, whoſe repreſentation is required on the perſpective plane.

Point, *accidental*. See Accidental.

Point, *viſual*. See Visual.

Point *of view*, with regard to *Building*, *Painting*, &c. is a *point* at a certain diſtance from a building, or other object, wherein the eye has the moſt advantageous view or proſpect of the ſame.

This *point* is uſually at a diſtance equal to the height of the building. For an inſtance: to conſider with judgment the whole of the famous church of the invalids at Paris, we muſt not ſtand at above three hundred and forty feet diſtance from it, which is nearly its height. To be able to judge of the ordonnance of its façade or frontiſpiece, and the regularity of its order, the eye ſhould only be as far off as the frontiſpiece is high; viz. a hundred feet.

But to examine the correctneſs of its profiles, and the ſpirit of its ornaments, the eye ſhould only be diſtant the height of the Doric order, which is about forty feet; if it be nearer, the parts, being too much ſhortened, will appear out of proportion.

A vague or indeterminate *point* has a different effect from the *point of view*; in that, in looking at a building from an indeterminate *point*, the eye can only form an idea of the magnitude of its maſs, by comparing it with other buildings adjacent to it.

Point, *punctum*, in *Phyſics*, is the ſmalleſt or leaſt ſenſible object of ſight, marked with a pen, point of a compaſs, or the like.

This is what we popularly call a *phyſical point*, which in reality, has parts, though thoſe parts are not here regarded. Of ſuch *points* does all phyſical magnitude conſiſt.

This *phyſical point* coincides with what Mr. Locke calls the *point ſenſible*, and which he defines to be the leaſt particle of matter, or ſpace, we can diſcern. He adds, that, to the ſharpeſt eye, this is ſeldom leſs than thirty ſeconds of a circle, whereof the eye is the centre.

Point, in *Poetry*, denotes a briſk lively turn or conceit, uſually found or expected at the turn of an epigram.

Point, among *Seamen*, is alſo uſed for a cape, or headland, jutting out into the ſea.

They ſay, two *points* of land are *one in another*, when they are ſo in a right line againſt each other, as that the innermoſt is hindered from being ſeen by the outermoſt.

Points are alſo uſed to denote ſhort flat pieces of braided cordage, tapering from the middle towards each end, and uſed to reef the courſes and top-ſails of a ſhip.

Point-blank, in *Gunnery*, denotes the ſhot of a gun levelled horizontally, without either mounting or ſinking the muzzle of the piece.

In ſhooting *point-blank*, the ſhot or bullet is ſuppoſed to go directly forward in a ſtraight line, to the mark; and not to move in a curve, as bombs and highly elevated random-ſhots do.

When a piece ſtands upon a level plane, and is laid level, the diſtance between the piece and the *point* where the ſhot touches the ground firſt, is called the *point-blank* range of that piece; but as the ſame piece ranges more or leſs, according to a greater or leſs charge, the *point-blank* range is taken from that of a piece loaded with ſuch a charge as is commonly uſed in action. It is, therefore, neceſſary that theſe ranges of all pieces ſhould be known, ſince the gunner judges from thence what elevation he is to give to his pieces when he is either farther from or nearer to the object to be fired at; and this he can do pretty nearly by ſight, after conſiderable practice. See *Pointing of a* Gun.

POINTED *crowns*. See Crown.

Pointed *roof*. See Roof.

A croſs Pointed, among *Heralds*, is that which has the extremities turned off into *points* by ſtraight lines. Columbiere calls it *aiguiſe*. q. d. *ſharpened*.

POINTERS, in *Ship-building*, are pillars in an oblique poſition, from the floor-rider heads on each ſide, pointing

ing or meeting each other at the middle of the gun-deck beams.

POINTING, *punctuation*, in *Grammar*. See PUNCTUATION.

POINTING, among *Seamen*, the marking on the chart in what point or place the veſſel is.

All the difficulty in *pointing* a chart ariſes from our ignorance of the longitude. The pilot eaſily finds the latitude, by taking the height of the pole; but, for the LONGITUDE, there is no coming at it but by computation, which is always uncertain.

POINTING is a ſea-term, denoting the operation of tapering the end of a rope, and weaving a ſort of mat or cloſe texture about the diminiſhed part of it ſo as to thruſt it more eaſily through any hole, and prevent it from being readily untwiſted. This operation is applied to the reef-line, and to the cable, for the purpoſe of ſplicing it, and that it may more eaſily paſs, when ſpliced, through the hauſe-holes.

POINTING, in *War*, the levelling or directing a cannon, or mortar-piece ſo as to play againſt any certain point. See *Pointing of a* GUN, and GUNNER'S QUADRANT.

POISE. See COUNTERPOISE, WATERPOISE, &c.

POISON, in *Medicine*, a malignant quality in ſome animal, vegetable, or mineral body, which renders it hurtful, and even fatal to thoſe who take it even in a ſmall quantity.

The word is derived from the Latin *potio*, *draught*; and was anciently uſed in an innocent ſenſe. See POTION.

Some define *poiſon* to be any thing taken inwardly, whoſe properties are contrary to thoſe of food, or to what they ſhould be in order to nutrition.

However this vague and uncertain ſenſe of the word introduces great confuſion into the writings of thoſe who thus uſe it.

Poiſons are of various kinds, and operate in various manners; ſome by diſſolving the blood, others by coagulating it, and others by corroding and deſtroying the ſolid parts. Some attack equally all the parts; ſome only a particular one. Thus, the lepus marinus is an enemy to the lungs, cantharides to the bladder, &c.

Some things, again, which prove *poiſon* to man, ſerve for food to other animals. Thus, mandragora and henbane feed hogs, though they kill man; and thus that deadly *poiſon* hemlock is wholeſome for goats, buſtards, and, as Galen ſays, for ſtarlings too. The caſſivi plant, ſir Hans Sloane tells us, *poiſons* unprepared; but prepared, is the common bread of the Weſt-Indies, particularly in Jamaica, and the hotter parts; and is uſed to victual ſhips. Nay, what is more, ſome *poiſons* are not only food, but even phyſic to other animals. In the Philoſ. Tranſact. we have an inſtance of a horſe troubled with a farcy, which could not be cured by the moſt famed remedies, which yet cured himſelf in a ſhort time, by feeding greedily on hemlock. Fontanus alſo tells us of a woman, who eat hemlock for ſome time, to procure ſleep, and with very good effect, though repeated doſes of opium had no operation.

Dr. Tanc. Robinſon, in a letter to Mr. Ray, gives an account of ſeveral poiſonous plants, which if truly corrected, or exactly doſed, he ſays, may prove the moſt powerful remedies known. Thus the hellebores, incorporated with a ſapo, or with alcali ſalts alone, are ſucceſsful in epilepſies, vertigoes, palſies, lethargies, and mania: doſe from ℈ j to ʒ ß. The roots of cicuta, aſarum, and napellus, in agues, and periodical pains: doſe ʒ j to ʒ ß. The hyoſcyamus in hæmorrhages, violent heats, and inflammations; doſe ℈ j to ʒ ß. The ſemen ſtramonii is a good anodyne, uſeful in vigilias, rheumatiſms, hyſteric caſes, &c. doſe ℈ j to ʒ ß. Elaterium, ſoldanella, and gratiola are alſo good in hydropic caſes. Opium, corrected, loſes its narcotic quality, and is ſafely given, in great doſes, in convulſive caſes, fluxes, catarrhs, &c.

Poiſons are diſtinguiſhed by ſome authors by ſeveral names, according to the different time and manner of their taking effect.

Some are called *venena terminata*. Theſe are ſuch *poiſons* as perform their fatal office, according to the opinion of the world, at certain ſtated or determinate periods of time: thus, according to the quantity given, or the nature of the ſpecies of *poiſon*, a man muſt be killed by it at the pleaſure of the giver, either in an hour, a day, a week, a month, many months, or years; the *poiſon* in this laſt caſe operating like a chronical diſeaſe, and carrying off the patient by a very tedious train of ſymptoms.

Others are called *venena temporanea*, *temporary poiſons*. Theſe will kill a man by degrees, every minute of his life growing worſe and worſe, from the time of taking them to the final period; but this is not at any ſtated or certain time.

Others are called *delibutoria venena*. Theſe are ſuch as kill without being taken internally, and are ſurely fatal if rubbed upon the ſkin, put into gloves, or the like.

As to the firſt of theſe kinds, it is very much to be doubted whether there be in nature any ſuch thing as a *venenum terminatum*, or a *poiſon* which ſhall kill at the fixed time at which the giver pleaſes; ſince all the known *poiſons* are only relatively ſuch, and depend for their effect on the peculiar ſtate of the body: the different conſtitutions of men muſt therefore vary the period of time at which death muſt happen from the taking of the ſame doſe. At leaſt, if it be poſſible to contrive a terminatory *poiſon*, it muſt require the ſkill of the ableſt phyſician to prepare it, ſince he muſt at once know the true ſtate of the perſon's body who is to take it, and the exact power of the *poiſon*, in its ſeveral doſes, on other bodies.

Much, therefore, is required in the phyſician who is to cure a perſon who has ſwallowed *poiſon*; ſince the nature of the medicine, and the true knowledge of the ſtate of the patient's body, are both neceſſary, in order to know what ſymptoms to expect and guard againſt.

Of the number of thoſe *poiſons* which take a long time to kill, and that different, according to their doſe and the habit of the perſon, are the venom of the toad and of the mad dog, whether the ſaliva be communicated immediately to the blood by a wound, or ſwallowed with food or with the ſpittle. The *poiſon* of the tarantula is alſo of this number, and to theſe may be added, that of the ſmall pox, meaſles, and other diſeaſes of that kind which is evidently long dormant in the body, till certain peculiar occaſions and accidents call it forth to appear in its proper form. The *poiſon* of the hectic fever is alſo by ſome referred to this, it being accounted an alkaline virus, mixed with a viſcid matter. The *poiſon* of the French pox, *lues venerea*, is alſo of this kind, and is eſteemed highly acrid and alkaline. The *poiſon* of cantharides, the acid ones of nitre, ſalt, vitriol, ſulphur; the ſolutions or cryſtals of gold, ſilver, and the other metals; and the precipitates of mercury, and the very fatal common arſenic. To theſe are added many others, and among them ſome which act merely mechanically, by their numerous ſharp points and edges; ſuch as the powder of diamonds, glaſs, and the like: and to this claſs belong many of the delibutory *poiſons*.

Of the temporaneous *poiſons* many are taken under the common denominations of food and drink, and ſeem at firſt to be of no injury; but by degrees they impair the conſtitution, and bring on diſeaſes and death. Coffee, tea, and all the ſpirituous liquors are accounted of this kind.

We may perhaps aſcribe the prodigious multiplicity of *poiſons*, and that equally numerous tribe of antidotes treated of by the ancients, to the love of the marvellous; however, it cannot be denied, that ſome things are very ſuddenly and ſtrangely deſtructive to animal life, and that in very ſmall quantities. Among the reſt, there is a *poiſon* made uſe of by the Indians, ſome of which was ſent over to the Royal Society by M. de la Condamine: Dr. Brockleſby has given us ſome accounts of its effects on cats, dogs, and birds, who were ſoon killed by it, only by ſprinkling a few drops of the ſolution of this *poiſon* on wounds made by a lancet. The doctor gave alſo two drachms of ſugar to a bird, and ſhortly afterwards poured a little of the ſolution into its mouth; but two drops had ſcarce touched its tongue, before the creature was convulſed, and could with difficulty be laid down before all motion was taken away.

Hence it appears, that ſugar is no ſpecific againſt this *poiſon*, even when only taken at the mouth. Phil. Tranſ. Nº 482. ſect. 12.

This *poiſon*, which ſeems to be of a very ſubtile and dangerous nature, is extracted by fire from divers plants, eſpecially from thoſe which the French call lianes. The Indians in various places of South America prepare this *poiſon*, and make uſe of it for the killing of wild beaſts, in this manner.

Thoſe ſavages are very dexterous at making long trunks, which are the moſt common weapon uſed by them in hunting. To theſe trunks or tubes they fit little arrows made of palm-tree, on which they put a little roll of cotton exactly fitting the bore of the tube. They ſhoot theſe with their breath, and ſeldom miſs their mark. They dip the points of theſe little arrows, as well as of thoſe of their bows, in this *poiſon*; which is ſo active, that in leſs than a minute, eſpecially when freſh, it kills certain animals from which the arrow has drawn blood.

Though a very ſmall drop of this *poiſon*, conveyed into the blood by puncture, is ſometimes ſufficient to kill a man, or at leaſt to cauſe great diſturbance in the animal œconomy, it is quite otherwiſe when taken in at the mouth; for then it does no ſort of miſchief. See Phil. Tranſ. loc. cit. See MACASSAR *Poiſon*, and GECCO.

The negroes uſe a *poiſon* of an extraordinary nature. The doſe is very ſmall, and it hath no ill taſte; ſo that, mixed with meat or drink, it is not perceivable. It cauſes divers ſymptoms, and the effects are various, according as the doſe is large or ſmall. It kills ſometimes in a very few hours, ſometimes, it is ſaid, in ſome months, and at others in ſome years. The ſymptoms are according to the quantity given; if great, it cauſes evacuations upwards and downwards; of excrements firſt, then of humours, and laſtly of blood, with fainting fits and ſweatings. Death follows in ſix or ſeven hours. The negroes turn white. Phil. Tranſ. Nº 462. p. 3.

The antidote to this *poiſon* is the root of the ſenſible weed, as it is commonly called, or *herba ſenſitiva*, in decoction.

Phyſicians diſtinguiſh three kinds of *poiſons*.

POISONS, *animal*, which are thoſe drawn from animals by the bite or ſting: as, the viper, ſcorpion, lepus marinus, &c.

The theory of the effects, operations, &c. of *animal poiſons*, is very accurately and mechanically delivered by Dr. Mead, in thoſe remarkable caſes, the bites of a viper, tarantula, and mad dog. See his doctrine under TARANTULA, VIPER, and HYDROPHOBIA. See alſo MADNESS *from the bite of enraged animals*, and *Rattle* SNAKE.

POISONS, *vegetable*, as aconite, cicuta or hemlock, hellebore, napellus, &c. which are generally of a narcotic or ſtupefying quality.

With regard to the operation of vegetable *poiſons*, it is obſerved that, beſides heat and pain, they commonly occaſion ſome degree of giddineſs, and often a kind of ſtupidity or folly. See OPIATE and OPIUM.

The perſons who have taken theſe *poiſons* muſt be treated in the ſame manner as for the mineral or corroſive. Dr. Mead, beſides vomits, in this caſe, recommends acid medicines with lixivial ſalts. He ſays, that he has often given ſalts of wormwood mixed with juice of lemon, in repeated doſes, with great ſucceſs.

It has been a general complaint, and indeed too juſt a one, that the qualities of plants are much leſs ſtudied than their external appearances; and the beſt modern authors have contented themſelves with nicely characteriſing plants according to their flowers and ſeeds, and aſcertaining the proper names to each, without at all enquiring how they might be beneficial or hurtful to mankind, or diſtinguiſhing whether they were ſafe medicines or deſtructive *poiſons*. Nor, indeed, is the inveſtigating the virtues of plants, yet untried as medicines, an eaſy taſk; ſince neither chemical analyſes nor experiments on brutes, nor even the taſte and ſmell, and other ſenſible qualities of plants, can ever certainly aſſure us what effects they will have on the human body.

Chemical analyſes alter the ſubſtance too much to give any certain knowledge; and the effects things have on one animal are no aſſurance of what they will do to another, as is familiar to us in a thouſand inſtances. Bitter almonds, and many other things, wholly harmleſs to us, kill birds; and goats will eat the tithymals, to give them an appetite when they want it, while thoſe very plants are fatal to fiſhes, and very dangerous to man. The ſenſible qualities as often deceive us, of which we might give many inſtances; and what ſome have obſerved of the botanical characters of plants, telling us their virtues, or that all of the ſame claſs poſſeſs the ſame qualities, is the moſt erroneous, and if truſted to, might prove the moſt fatal of all opinions; ſince the known *poiſons*, hemlock, phellandrium, and water-dropwort with the *poiſonous* juice, are all umbelliferous plants, and conſequently of the ſame family with fennel and angelica.

Nothing can, indeed, aſſure us with any degree of certainty of the virtues of plants, but experiments made on ourſelves; but few are to be found who wiſh ſo well to the public, as to venture their own lives for its ſervice: and perhaps the honeſt Geſner is the only man who ever carried theſe attempts to any degree, and he unhappily died a martyr to them, periſhing by the doſe he took of the ſcorpion-rooted doronicum: the very root which has of late with us been ſo fatal, by being accidentally mixed with our gentian.

What we learn of the vegetable *poiſons* muſt therefore be either by the conſequences of the raſh preſcriptions or miſtakes of ignorant pretenders to medicine, or by the misfortune of thoſe who have unwarily eaten them.

We have accounts in the Memoirs of the Academy of Sciences of Paris, of many things of this kind. An apothecary, a very honeſt man, but of no knowledge in botany, had made his extract of black hellebore from the roots of chriſtophoriana, or bane-berries, a plant always accounted a *poiſon*, and a ſingle berry of which is capable of killing ſeveral animals; yet ſo far had the fire diveſted the roots of their poiſonous qualities, that twelve grains of this given as an extract of hellebore, proved of no ill effect. Mem. Acad. Scienc. Par. 1739.

Another apothecary having learned, that hermodactyls were the roots of a ſpecies of colchicum, dried the roots of the common colchicum and ſold them in its place; yet there is no knowledege of any ill effects from them. The enquiry into things of this kind has its uſe, which is very important; ſince *poiſons* often differ only in doſe from medicines, and many of the vegetables eſteemed *poiſonous*, may perhaps be found uſeful remedies, with proper management, and in proper quantities.

The LAUREL-*leaves* are well known to afford a *poiſonous* water in diſtillation, yet it is well known that they have been long uſed in cookery, to give a taſte like that of bitter almonds to creams, &c. and that without any ill effect. The roſe-bay, or oleander, is well known to be a *poiſon* to goats, yet is taken by countrymen of ſtrong and robuſt habits as a purge, and that with very good ſucceſs. Nay, opium, one of the greateſt of all medicines, if it had firſt been diſcovered by perſons taking overdoſes of it, and dying by it, as they naturally muſt have done, might very naturally have been recorded to us as a very fatal *poiſon*.

The plumbago, or dentillaria of Rondeletius, is ſo violent a cauſtic, that a poor girl who once anointed herſelf with it, to cure her of the itch, was flead alive by it; yet this properly managed, and infuſed in oils, has proved one of the greateſt of all remedies for cancers.

The ſhrub uſed in dying, and called by the French *redoul*, by ſome authors *coriaria*, and by others the myrtle-leaved *rhus*, is generally known to the world only as a drug uſeful in the dreſſing of leather; but Pliny and ſome other old writers, have given it the character of an uſeful external medicine, and a remedy againſt *poiſon*, yet with all this inattention of the moderns, and all the praiſes of the ancients, this plant is truly a very terrible *poiſon*. The grown cattle refuſe to feed upon it, but the young lambs and kids often eat of it in thoſe parts of Europe where it is common; and if they eat the full-grown leaves they are killed by it; if the young ſhoots only, which is more uſually the caſe, they are then only affected with ſpaſms and a ſort of drunkenneſs, of which, after a few hours, they recover. Nor is this ſingular to this *poiſonous* plant, ſince it is well known, that many plants, of very improper kinds for food, are yet eaten in their young ſhoots: and Linnæus has recorded it of the Laplanders, that they even eat the young ſhoots of the *poiſonous* blue aconite, or wolf's-bane; and even in France they eat the firſt ſhoots of the clematitis, or flammula repens, the full grown leaves of which are of ſo acrid a nature, that they ſerve the beggars to eat ulcers in their arms and legs, to give them a pretended title to charity.

The *redoul* is not only a *poiſon* to animals, but its fatal effects have been ſeen on the human ſpecies. A girl in France, where it is very common, gathering its fruit among black-berries, eat of them, and died epileptic, in ſpite of all the aſſiſtance that could be given to her: and another inſtance is given from the Hotel Dieu at Paris, where an unhappy traveller, a robuſt man, was brought in epileptic, and died ſo; though the caſe was not known, except by a vomit which was given him bringing up ſome of the berries of this pernicious plant, and ſome more of them having been found in his ſtomach when diſſected. Mem. Acad. Scienc. Par. 1739.

POISONS, *mineral*, as arſenic, corroſive ſublimate, ceruſſe, orpiment, realgal, &c. which are commonly of an acrid or corroſive quality.

As to *mineral poiſons*, they all bear ſo much analogy to that made of quickſilver in the common ſublimate, that their operation will be eaſily conceived, from what is laid down under the heads MERCURY, and SUBLIMATE.

They are all more or leſs dangerous, as their ſalts receive a greater or leſs force from the metallic particles; and hence, as the moſt virulent may be mitigated, by breaking the points of the ſaline cryſtals, ſo the moſt innocent minerals may become corroſive, by combining them with ſalts, as is ſeen in the preparations of ſilver, antimony, iron, &c.

As to the effect of arſenic, to which that of every other ſpecies of corroſive *poiſon* is ſimilar, it is obſerved, that the perſon who has taken it, ſoon perceives a burning heat, and a violent pricking pain in his ſtomach and bowels, with an intolerable thirſt, and an inclination to vomit. The tongue and throat feel rough and dry, and, without proper help, the patient is ſoon ſeized with great anxiety, hiccupping, faintings, and coldneſs of the extremities. Theſe are ſucceeded by black vomits, fœtid ſtools, with a mortification of the ſtomach and inteſtines, which are the immediate fore-runners of death.

When theſe ſymptoms firſt appear, the patient ſhould drink large quantities of new milk and ſallad oil, till he vomits, or warm water with oil; or fat broths; or freſh butter melted or mixed with the milk or water: theſe are to be drank as long as the inclination to vomit continues; nor is it ſafe to leave off drinking as long as one particle of the *poiſon* remains in the ſtomach. If theſe liquids do not produce vomiting, half a dram or two ſcruples of the powder of ipecacuanha may be given, or a few ſpoonfuls of the oxymel, or vinegar of ſquills, may be mixed with the water which is drank. Or if other methods fail, half a dram of white vitriol, or five or ſix grains of emetic tartar, muſt be adminiſtered. If tormenting pains are felt in the lower belly, and there be reaſon to apprehend, that the *poiſon* has got down to the inteſtines, clyſters of milk and oil muſt be thrown up; and the patient muſt drink emollient decoctions of barley, oatmeal, marſhmallows, and ſuch like. He muſt likewiſe take an infuſion of ſenna and manna, a ſolution of Glauber's ſalts, or ſome other purgative. After the *poiſon* has been evacuated, the diet for ſome time ſhould be cooling and healing, ſuch as milk, broth, gruel, light puddings, and ſpoon-meats of eaſy digeſtion, and the drink ſhould be barley-water, linſeed-tea, or infuſions of any of the mild mucilaginous vegetables; but all fleſh, and ſtrong liquors ſhould be avoided. Buchan's Dom. Med. p. 515. ed. 5th.

It has been remarked under LIVER *of ſulphur*, that M. Navier recommends it as an antidote againſt certain metallic *poiſons*. This has been long and ſucceſsfully applied by others; and in the ſixth volume of the Edinburgh Medical Commentaries, there is a paper, in which alkaline ſalts are recommended on the ſame principle.

Dr. Houlſton obſerves, that in all caſes of *poiſon*, it is prudent immediately to give a ſolution of an alkali, followed by a vomit. If the poiſon be corroſive ſublimate, an alkali either fixed or volatile, will decompoſe it, and precipitate the metal in a form nearly inoffenſive. It will have a ſimilar effect on the ſugar of lead, emetic tartar, or any metallic ſalt. If the *poiſon* be arſenic, Neumann obſerves, that alkalis will very plentifully diſſolve it: and therefore the vomit will ſucceed the better to diſcharge it. If the *poiſon* be of the vegetable claſs, an alkali can be of no diſſervice, nor interfere with the other means of remedying by evacuation, nor by the ſubſequent uſe of acids, ſo much inſiſted upon by Tiſſot, as counteracting the effects of narcotics; becauſe acids adminiſtered with alkaline ſalts, are pronounced, by Dr. Mead and others, to be attended with great ſucceſs in this caſe. This writer, therefore, directs, when ſymptoms of *poiſon* appear, to mix a tea-ſpoonful of any of the following ingredients: ſalt of tartar, ſalt of wormwood, pearl-aſh, pot-aſh, ſpirit of hartſhorn, or ſal volatile, with half a pint of water; and of this let one half be given to the patient immediately, and the other ſoon after. It will ſometimes give relief, and the vomiting will ſoon ceaſe. The vomiting, however, is to be promoted by warm water, ipecacuanha, &c. and after each vomiting, a doſe of this ſolution of ſalt of tartar ſhould be given, and repeated every two or three hours, if the pain of the ſtomach returns. It ſhould be continued too, in ſmall doſes, for ſome time after the ſymptoms diſappear. A little wood-aſhes, mixed with boiling water, ſuffered to ſtand, and pouring off the water, or filtering it through linen, will anſwer the ſame purpoſe.

The general remedies againſt *poiſons* are known by the name of *antidotes*, *alexipharmics*, and *alexiterials*.

The following rules ſhould be ſtrictly obſerved with regard to every kind of *poiſon*: that when any poiſonous ſubſtance has been taken into the ſtomach, it ought, as ſoon as poſſible, to be diſcharged by vomits, clyſters, and purges; and when *poiſon* has been received into the body by a wound, that it be expelled by medicines which promote the different ſecretions, eſpecially thoſe of ſweat, urine, and inſenſible perſpiration; to which may be joined antiſpaſmodics, or ſuch medicines as take off tenſion and irritation, the chief of which are opium, muſk, camphor, and aſſa fœtida.

POISON-*aſh*. See POISON-*wood*.

POISON-*berry*, a ſpecies of the CESTRUM.

POISON-*buſh*, *tithymalus*, in *Botany*. Its characters are theſe: the flower has an empalement of one leaf, indented in three parts; it has one petal, which is ſhaped like a ſlipper, of a thick fleſhy conſiſtence; under the upper part of the flower are ſituated ten ſtamina, which are incloſed in the receptacle of the flower; they are ſlender and terminated by globular ſummits; in the centre is ſituated a roundiſh three-cornered germen, ſupporting three bifid ſtyles crowned by oblong ſtigmas; the germen becomes a roundiſh capſule, having three cells, each containing an oval ſeed. There are two ſpecies, natives of the Weſt Indies, abounding with an acrid milky juice, which will raiſe bliſters on the fleſh, and, it is ſaid, when mixed with the blood, becomes a deadly *poiſon*; and it is uſed for applying to the points of armour, and the edge of ſwords. Linnæus has joined this genus to the *euphorbia*, or SPURGE.

POISON, *Macaſſar*. See MACASSAR *Poiſon*.

POISON, *Indian*. See GECCO.

POISON-*tree*, or POISON-*wood*, *toxicodendron*, in *Botany*. Its characters are theſe: the male flowers are upon different plants from the female; they have a ſmall empalement, cut into five points at the brim, but have no petals; they have five ſhort ſtamina, terminated by roundiſh ſummits; the female flowers have empalements and petals like the male; they have no ſtamina, but in the centre is ſituated a roundiſh germen, ſupporting three ſmall ſtyles, crowned with globular ſtigmas; the germen afterwards turns to a berry, with one or two cells, incloſing one ſeed in each. Miller enumerates nine ſpecies. Linnæus has joined theſe plants to his genus of RHUS, for the characters of which ſee SUMACH.

The moſt common American kind of this tree, is the aſh-leaved one; it grows in marſhy places, and is called by the common people marſh-ſumach, and is the RHUS *vernix* of Linnæus; its leaves reſemble thoſe of the common ſumach, which are very well known to reſemble aſh-leaves in their pinnated ſtructure. It grows to about four inches in diameter, and to twenty feet, or upward, in height, in thoſe countries where it grows naturally. It ſpreads much at the root, and where one has been at any time cut down, there are always ſeen a great number of young ones growing from its ſtump. It is of very quick growth, but is not durable. The inſide of the wood is yellow, and contains a whitiſh yellow juice, which comes out between the bark and wood, is as glutinous as turpentine, and has a nauſeous ſmell; the wood itſelf has a very ſtrong and diſagreeable ſmell, but the juice ſtinks like carrion.

This tree poiſons two ways; by handling of it, and by the ſmell. The ſcent of it when cut down in the woods has poiſoned many people, and many more have ſuffered by it while burning in their fires. People with only handling it have been made blind for ſeveral days, and perſons who ſit near a fire when it is burning are often ſwelled and choaked up in all parts of the body in a terrible manner. It is very remarkable that the effect of this *poiſon* ſeems confined to ſome few perſons, and that one may handle it ever ſo long, and even chew it without hurt, while another is poiſoned by only touching it; and a whole company ſitting by a fire where it is burning, ſhall often all eſcape except one or two, who will be ſwelled with it. The *poiſon* of this tree is never mortal, but goes off of itſelf in a few days; and the people who ſuffer by it generally carry its effects off the ſooner, by applying ſallad oil and cream to the parts. The firſt notice the perſon has of being affected by it, is by feeling a violent itching in the ſkin; this provokes ſcratching and rubbing; and in conſequence of this the part inflames and ſwells. Sometimes a perſon's whole body is ſwelled and poiſoned in this manner, and ſometimes only a particular part, as the legs; and in this caſe, they often diſcharge a conſiderable quantity of water, and then grow well.

People who have been poiſoned by handling it, affirm that it is ſo much colder to the touch than other wood, that it may be diſtinguiſhed by this in the dark; when it is burning ſome people are ſo affected by it as to ſwoon away, others yawn and ſeem uneaſy, while the reſt feel nothing of it.

The fruit of this tree is a white roundiſh dry berry, growing in cluſters. Phil. Tranſ. Nº 367. p. 144. Prof. Kalm's Travels in North America.

For the uſe of this juice in ſtaining linen, ſee LINEN.

POISON, *counter*. See COUNTER *poiſon*.

To POISON *a piece*, among *Gunners*, is the ſame as to clog and nail it up. See NAILING.

POISONING, in *Law*, the crime of adminiſtering poiſon to a perſon, whereby he dies.

This, by 22 Hen. VIII. cap. 9. was made a ſort of treaſon; and the puniſhment doomed for it was, to be put alive into a caldron of water, and boiled to death. But this act was repealed by 1 Edw. VI. cap. 12.

At preſent, it is only murder, or felony without benefit of clergy, if the party dies of the poiſon within a year and a day.

POISONOUS *waters*. See WATER.

POKE, or PORK *phyſic*. See *American* NIGHTSHADE.

POLA, in *Ichthyology*, the name of a flat fiſh, ſomething reſembling the ſoal, but ſhorter and ſmaller; commonly called CYNOGLOSSUS and *linguatula*.

It is caught in the Mediterranean, and ſold in Rome and Venice for the table.

POLACRE, in *Naval Language*, is a ſhip with three maſts, uſually navigated in the Levant, and other parts of the Mediterranean. Theſe veſſels are generally furniſhed with ſquare ſails upon the main-maſt, and lateen ſails upon the fore-maſt, and mizen-maſt. Some of them, however, carry ſquare ſails upon all the three maſts, particularly thoſe of Provence, in France. Each of their maſts is commonly formed of one piece, ſo that they have neither top-maſt nor top-gallant-maſt; neither have they any horſes to their yards, becauſe the men ſtand upon the top-ſail-yard to looſe or furl the top-gallant-ſail, and on the lower yard to reef, looſe, or furl the top-ſail, whoſe yard is ſufficiently lowered down for that purpoſe. Falconer.

POLAEDRASTYLA, in *Natural Hiſtory*, the name of a genus of cryſtals. The word is derived from the Greek πολυς, *many*, εδρα, *ſides*, the privitive particle *a*, *not*, and ςυλος, *a column*; and expreſſes a cryſtal compoſed of many planes, and having no column.

The bodies of this genus are cryſtals compoſed of two octangular pyramids, joined baſe to baſe, and conſequently the whole body conſiſting of ſixteen planes. Of this genus there are only two known ſpecies: 1. A brown kind with ſhort pyramids, found in conſiderable plenty in Virginia, on the ſides of hills; and 2. A colourleſs one, with longer pyramids. This has yet been found only in one place, which is the great mine at Goſſalaer, in Saxony, and there uſually lies at great depths. Hill's Hiſt. of Foſſils, p. 171.

POLAR, ſomething that relates to the poles of the world. In this ſenſe we ſay, *polar* virtue, *polar* tendency, &c. See POLARITY.

POLAR, or *white bear*, in *Zoology*, a ſpecies of BEAR, with a long head and neck, ſhort round ears, end of the noſe black, large teeth, hair long, ſoft, white, and tinged in ſome parts with yellow, and limbs of great ſize and ſtrength. This animal, which grows to a great ſize, ſo that the ſkins of ſome are thirteen feet long, is confined to the coldeſt part of the globe; being unknown, except on the ſhores of Hudſon's-bay, Greenland, and Spitzbergen. In ſummer the white bears make their reſidence on iſlands of ice; they ſwim with great agility for ſix or ſeven leagues, and are excellent divers. Their winter retreats are in dens under the ſnow or the fixed ice of the frozen ſea. Their food is fiſh, ſeals, and the carcaſes of whales, and human bodies, which they will greedily diſinter; and they are ſo fond of human blood, that they will attack companies of armed men, and even board ſmall veſſels. On land they live on birds and their eggs. They bring two young at a time, and their mutual attachment is ſo ſtrong, that they would die ſooner than deſert one another. Their greateſt enemy is the morſe. The fleſh is white, and ſaid to taſte like mutton; the fat is melted for train oil, and that of the feet uſed in medicine: but the liver is very unwholeſome. Pennant's Hiſt. of Quad. vol. ii. p. 288. See *Tab. Quadrupeds*, N° 4.

POLAR *circles*. See *Polar* CIRCLES.

POLAR *dials* are thoſe whoſe planes are parallel to ſome great circle paſſing through the poles, or to ſome one of the hour-circles; ſo that the pole is neither elevated above, no depreſſed below the plane.

Such dial, therefore, can have no centre, and conſequently its ſtyle, ſub-ſtyle, and hour lines, are parallel.

This, therefore, will be an horizontal dial to thoſe who live under the equator or line.

POLAR *dial, to conſtruct a*. See DIAL.

POLAR *projection* is a repreſentation of the earth, or heavens, projected on the plane of one of the *polar* circles.

POLARITY, the quality of a thing conſidered as having poles.

By heating an iron bar, and letting it cool in a vertical poſture, it requires a *polarity*. The lower end becomes the north pole, the upper the ſouth.

Iron bars acquire a *polarity*, by being kept a long time in an erect poſture, even without heating. Thus, the bars of windows, &c. are frequently found to have poles. Nay a rod of iron acquires a *polarity*, by the mere holding it erect; the lower end, in that caſe, attracting the ſouth end of a magnetic needle, and the upper, the north end. But theſe poles are mutable, and ſhift with the ſituation of the rod. See MAGNET.

Some modern writers, particularly Dr. Higgins, in his Philoſophical Eaſſy concerning Light, have maintained the *polarity* of the parts of matter, or that their ſimple attractions are more forcible in one direction, or axis of each atom, than in any other.

POLE, POLUS, Πολος, formed from πολειν, *to turn*, in *Aſtonomy*, one of the extremities of the axis, whereon the ſphere revolves.

Theſe two points, each 90 degrees diſtant from the equator, are called, by way of eminence, the *poles of the world*.

Wholſius defines the *poles*, thoſe points on the ſurface of the ſphere, through which the axis paſſes; ſuch are the points I and K (*Tab. Aſtron. fig.* 21.) whereof that viſible to us, or raiſed above our horizon, I, is called the *arctic* or *north pole*; and its oppoſite, K, the *antarctic* or *ſouth pole*.

POLE, in *Geography*, is the extremity of the earth's axis, or one of the points on the ſurface of our globe, through which the axis paſſes. See EARTH.

Such are the points P, Q. (*Tab. Geog. fig.* 7.) whereof that elevated above our horizon is called the *arctic*, or *north pole*; and its oppoſite, Q, the *antarctic* or *ſouth pole*.

Dr. Halley ſhews, that the ſolſtitial day, under the *pole*, is as hot as under the equinoctial, when the ſun is in the zenith; in regard, all the twenty-four hours of that day under the *pole*, the ſun-beams are inclined to the horizon in an angle of 23½ degrees; whereas, under the equinoctial, though the ſun becomes vertical, yet he ſhines no more than twelve hours, and is abſent twelve hours. Beſides, that, for three hours eight minutes of the twelve hours which he is above the horizon there, he is not ſo much elevated as under the *pole*. See HEAT, *in Geography*.

The *altitude* or ELEVATION *of the pole*, is an arch of the meridian intercepted between the *pole* and the horizon. To find this elevation is a very popular problem in aſtronomy, geography, and navigation; this and the latitude of the place being always the ſame.

POLE, *to obſerve the altitude of the*. With a quadrant obſerve both the greateſt and leaſt meridian altitude of the *pole*-ſtar.

Subtract the leaſt from the greateſt, and divide the difference by two; the quotient is the ſtar's diſtance from the *pole*; which, added to the leſſer altitude found, gives the elevation of the *pole* required. See LATITUDE.

Thus M. Couplet, the younger, at Liſbon, in 1697, in the end of September, obſerved the greateſt meridian altitude 41° 5′ 40″. The ſmalleſt 36° 28′ 0″, the difference whereof is 4° 37′ 40″; one half whereof, 2° 18′ 50″, added to the leſs, gives 38° 46′ 50″, the altitude of the *pole* of Liſbon.

The altitude of the *pole*, together with the meridian line, being the baſis of all aſtronomical obſervations; to determine it with the greateſt accuracy, the meridian altitude muſt be corrected from the doctrine of refractions, hereafter to be delivered.

By means hereof, M. Couplet, ſubtracting 1′ 25″ in the propoſed example, leaves the corrected altitude 38° 45′ 25″.

Hence, 1. the altitude of the *pole* being ſubtracted from 90°, leaves the *altitude of the equator*.

2. If the greateſt meridian altitude of this ſtar exceed the altitude of the equator, the latter, ſubtracted from the former, leaves the declination of the ſtar northward; if the altitude of the ſtar be leſs than that of the equator, the former, ſubtracted from the latter, leaves the ſtar's declination ſouthward.

Dr. Hooke, and ſome others, imagined the height of the *pole*, and the poſition of the circles in the heavens, in reſpect of thoſe on the earth, to be changed from what they anciently were. But M. Caſſini thinks there is no ground for ſuch a ſurmiſe; but that all the difference we now find in the latitudes of places, &c. in reſpect of the ancient accounts, ariſes from the inaccuracies of the ancient obſervations.

Indeed, it is no wonder they ſhould err in their obſervations, conſidering what inſtruments they uſed. He adds, it is probable there may be ſome variations in the height of the *pole*; but, he thinks, this never exceeds two minutes; and that even this will vaniſh, after it is arrived to its higheſt difference.

POLE, in *Spherics*, is a point equally diſtant from every part of the circumference of a greater circle of the ſphere; as the centre is in a plain figure.

Or, *pole* is a point 90° diſtant from the plane of a circle, and, in a line paſſing perpendicularly through the centre, called the axis.

The zenith and nadir are the *poles* of the horizon. The *poles* of the equator are the ſame with thoſe of the ſphere or globe.

POLES of the ecliptic are two points on the ſurface of the ſphere, 23° 30′ diſtant from the *poles* of the world, and 90° diſtant from every part of the ECLIPTIC.

POLES, in *Magnetics*, are two points in a loadſtone, correſponding to the *poles* of the world; the one pointing to the north, the other to the ſouth.

If the ſtone be broken in ever ſo many pieces, each fragment will have its two *poles*. If a magnet be biſected by a line perpendicular to the axis; the two points, before joined, will become oppoſite *poles*, one in each ſegment.

To touch a needle, &c. that part intended for the north end is touched with the ſouth *pole* of the magnet, and that intended for the ſouth end with the north *pole*.

A piece of iron acquires a polarity, by only holding it upright; but its *poles* are not fixed, but ſhift, and are inverted as the iron is. A fixed north *pole* may be made all the ways a fixed ſouth *pole* is made; but not *vice verſa*: and whatever way we get a fixed ſouth *pole*, it is always weaker than a fixed north *pole* got the ſame way. Fire deſtroys all fixed *poles*; but it ſtrengthens the mutable ones.

The end of a rod being heated, and left to cool northward, Dr. Gilbert ſays, becomes a fixed north *pole*; if ſouthward, a fixed ſouth *pole*: yet this doth not hold in all caſes. If the end be cooled, held downward, or to the nadir, it acquires ſomewhat more magnetiſm than if cooled horizontally towards the north; but the beſt way is to cool it a little inclined to the north. Repeated ignitions do not avail to this purpoſe any more than a ſingle one.

Dr. Power ſays, that if we hold a rod northwards, and hammer the north end in that poſition, it will become a fixed north *pole*; and contrarily, if you hammer the ſouth end. What is ſaid of hammering, is to be likewiſe underſtood of filing, grinding, ſawing; nay, a gentle rubbing, provided it be continued long, will produce *poles*. The more heavy the blows are, *cæteris paribus*, the magnetiſm will be the ſtronger. A few hard blows do as much as many.

Old drills and punches have all fixed north *poles*, becauſe almoſt conſtantly uſed downwards. New drills have either mutable *poles*, or weak north *poles*. Drilling with ſuch a one ſouthward horizontally, it is a chance if you produce a fixed ſouth-*pole*, much leſs if you drill ſouth downwards; but if you drill ſouth upwards, you always make a fixed ſouth-*pole*.

A weak fixed *pole* may degenerate into a mutable one in a day, nay, in a few minutes, by holding it in a poſition contrary to its *pole*. The load-ſtone itſelf will not make a fixed *pole* in any iron. It is required the iron have a length, if it be thick.

Mr. Ballard tells us, that in ſix or ſeven drills made before his face, the bit of each became a north *pole*, merely by hardening. See MAGNET, and MAGNETISM.

POLES, *under bare*, in *Sea Language*, denotes the ſituation of a ſhip at ſea, when all her ſails are furled, particularly in a tempeſt.

POLE *of a glaſs*, in *Optics*, is the thickeſt part of a convex, or the thinneſt of a concave glaſs.

If the glaſs be truly ground, the *pole* will be exactly in the middle of its ſurface.

This is ſometimes alſo called the *vertex* of the glaſs.

POLE, in *Surveying*, is a meaſure containing ſixteen feet and a half; called alſo PERCH, and ſometimes rod.

POLE-*axe*, is a ſort of hatchet nearly reſembling a BATTLE-*axe*, having a handle about fifteen inches in length, and being furniſhed with a ſharp point, or claw, bending downwards from the back of its head; the blade of which is formed like that of any other hatchet. It is principally employed to cut away and deſtroy the rigging of an adverſary who endeavours to board. *Pole-axes* are alſo ſaid to have been ſucceſsfully uſed on ſome occaſions in boarding an enemy, whoſe ſides were above thoſe of the boarder. This is executed by detaching ſeveral gangs to enter at different parts of the ſhip's length, at which time the *pole-axes* are forcibly driven into her ſide, one above another, ſo as to form a ſort of ſcaling ladders. Falkoner.

POLE-*cat muſtela putorius* of Linnæus, in *Zoology*, the name by which authors call a creature of the weaſel kind, but larger than the common weaſel, and remarkable for its ſtinking ſmell. It is alſo called *fitchet*.

The whole circumference of the face is white; at the extremity of the angles of the mouth there begins a broad line of a yellowiſh hue, which ſurrounds the head, and is white in ſeveral parts; its long hairs are black, its ſhort ones yellowiſh; and the throat, the feet, and the tail, are blacker than any other part of the body; the upper jaw ſtands out a little beyond the lower; the ears are broad and ſhort, and are fringed, as it were, with white; its ſtink is occaſioned by an extremely fœtid matter, ſecreted by two glands, which it has in common with all the creatures of this kind, within the anus.

It feeds on fleſh, frequently ſtealing hens and other poultry, and ſometimes contenting itſelf with their eggs.

In winter it frequents houſes, and will rob the dairy of the milk. It commonly burrows in the ground, forming a retreat about two yards in length, terminating under the roots of ſome large tree; and ſometimes forms its lodgments in barns and under hay-ricks. It brings five or ſix young at a time. The ſkin of this animal is dreſſed with the hair on, and uſed as other furs for tippets, &c. and is ſent abroad to line cloaths. It inhabits moſt parts of Europe. Ray and Pennant. *See Tab.* IV. *Quadr.* Nº 48.

POLE-*cat*, *American*, or *ſtriated*, called *ſkunk*, in *Zoology*, is the *viverra putorius* of Linnæus, with rounded ears; head, neck, belly, legs, and tail, black; the back and ſides marked with five parallel white lines; one on the top of the back, the others on each ſide; the ſecond extends ſome way up the tail, whch is long and buſhy towards the end. This animal, which is about the ſize of the European *pole-cat*, inhabits North America; when attacked, it briſtles up its hair, and flings its body into a round from: its vapour is horrid. Pennant.

POLE-*maſt*. See MAST.

POLE-STAR, or POLAR-STAR, is a ſtar of the ſecond magnitude, the laſt in the tail of URSA minor, or the Little Bear.

The nearneſs of this ſtar to the *pole*, whence it happens that it never ſets, renders it of vaſt ſervice in navigation, &c. for determining the meridian line, the elevation of the *pole*, and conſequently the latitude of the place, &c.

POLE *of a wheel-carriage*. See PERCH.

POLEIN, in our *Ancient Cuſtoms*, a ſort of ſhoe, ſharp or picked at the point.

This faſhon was firſt taken up in the time of king William Rufus; the picks being made ſo long, that they were tied up to the knees, with ſilver or golden chains.

They were forbidden by ſtat. an. 4 Edw. IV. cap. 7. *Tunc fluxus crinium, tunc luxus veſtium, tunc uſus calceorum cum arcuatis aculeis inventus eſt.* Malmſb. in Will. II.

POLEMARCHUS, Πολεμαρχος, among the Athenians, a magiſtrate who had all the ſtrangers and ſojcurners in Athens under his care, over whom he had the ſame authority that the archon had over the citizens.

It was the duty of the *polemarchus* to offer a ſolemn ſacrifice to Enyalus, ſaid by ſome to be the ſame with Mars, but by others to have been only one of his attendants; and another to Diana, ſurnamed Αγροτηρα, in honour of the famous patriot Harmodius. It was alſo the buſineſs of the *polemarchus* to take care that the children of thoſe who had loſt their lives in their country's ſurvice, ſhould have a competent maintenance out of the public treaſury. Potter.

POLEMICAL. Πολημικος from πολεμος *war*, *battle*, an epithet applied to books of controverſy, eſpecially thoſe in divinity.

Scaliger's Exercitations againſt Cardan make a pure *polemical* book.

Hence alſo we ſay, *polemical divinity*, for controverſial, &c.

POLEMONIUM, in *Botany*. See *Greek* VALERIAN.

POLEMOSCOPE, in *Optics*, an oblique kind of proſpective glaſs, contrived for the ſeeing of objects that do not lie directly before the eye.

It was invented by Hevelius, in 1637, who gave it this name, from the Greek πολεμος, *battle*; becauſe it may be of uſe in war, in engagements, duels, &c. for diſcovering what the enemy is doing, whilſt the ſpectator lies hid behind any obſtacle.

Something of this kind, are thoſe now known among us under the name of ogling glaſſes, or OPERA-glaſſes, through which one ſees a perſon, in appearing to look at another.

POLEMOSCOPE, *conſtruction of the*. Any teleſcope will be a *polemoſcope*, if the tube be but crooked, like a rectangular ſiphon A B D M (*Tab.* V. *Optics*, *fig.* 90) and between the object-glaſs A B and the firſt eye-glaſs G H, (if there be ſeveral) be placed a plain mirror, in ſuch manner as that the mirror is inclined to the horizon at an angle of 45°, and its reflected image found in the focus of the eye-glaſs G H.

For, by this means, objects, ſituate over-againſt the lens A B, will appear the ſame as if the mirror K were away, and the object glaſs, with the objects, were directly oppoſite to the eye-glaſſes.

If it be deſired to look in at O, not at M, another plain mirror N muſt be added.

POLETA, in our *Ancient Law Books*, ſignifies the ball of the foot. *Tres ortilli ſcindantur de pede anteriori ſine poleta.* Matt. Par. anno 1215.

POLETÆ, Πωληται among the Athenians, ten magiſtrates, who, together with three that had the care of the money allowed for ſhews, had the power of letting out the tribute-money, and other public revenues, and ſelling confiſcated eſtates; all which bargains were ratified in the name of their preſident. Beſides this, it was their office, to convict ſuch as had not paid the tribute called Μετοικιον, and ſell them by auction. Potter.

POLEY-*graſs*, in the Linnæan ſyſtem of *Botany*, is a ſpecies of LYTHRUM.

Mountain POLEY, or POLEY *mountain*, *polium*, in *Botany*.

Its characters are theſe; the empalement of the flower is permanent and of one leaf, cut into five acute ſegments; the flower is of the lip kind; it hath one petal, with a ſhort tube; the ſtamina occupy the place of the upper lip, and the lower lip is cut into five ſegments; it hath four awl-ſhaped ſtamina, which are terminated by ſmall ſummits; and a germen divided into four parts, ſupporting a ſlender ſtyle, crowned by two narrow ſtigmas; the germen afterward becomes four naked ſeeds, encloſed in the empalement. Miller enumerates fifteen ſpecies. Linnæus has joined this genus to the TEUCRIUM.

Theſe plants may be diſpoſed in a garden, ſo as to afford pleaſure, by mixing them with marum, maſtich, and ſeveral other aromatic plants, upon the ſloping ſides of banks, which are expoſed to the ſun; or upon little hillocks raiſed in a ſheltered ſituation; where, by the diverſity of their hoary branches, being of various ſhapes, they will make a pretty appearance, and in ſuch places they will reſiſt the cold much better than when they are planted in a good ſoil. They may be propagated by ſeeds, which muſt be procured from the countries where they naturally grow, ſown on a bed of freſh light earth in the ſpring. About the middle of July the plants may be removed, and part of them planted on a warm border of dry rubbiſhy ſoil, where they are to be ſhaded from the ſun, watered till they have taken root, and kept clear of weeds. The other part may be planted in ſmall pots filled with freſh, light, undunged earth, and placed in the ſhade till they have taken root; they may then be removed into an open ſituation, and remain there till the beginning of November, when they ſhould be placed under a common frame.

They may alſo be propagated by cuttings or ſlips, which ſhould be planted the beginning of April, juſt before they ſhoot, upon a border expoſed to the eaſt; and if the ſeaſon proves dry, they muſt be watered and ſhaded until they have taken root; afterward they will require no other care but to keep them clean from weeds, and at Michaelmas the plants ſhould be removed where they are deſigned to remain; but it will be proper to put a plant of each ſort into pots, that they may be ſheltered in winter, to preſerve the kinds. Miller.

Several ſpecies and varieties of *polium*, erect and procumbent, with white, yellow, and purpliſh flowers, have been received in the ſhops. But the *poley-mountain* of Candy has been commonly underſtood as the officinal ſort, which is procured dry from the iſland Candy; and the *poley-mountain* of Montpelier is allowed to be of the ſame quality. The leaves and tops have a moderately ſtrong aromatic ſmell, and a diſagreeable bitter taſte; they are recommended as corroborants, aperients, and antiſpaſmodics; but are at preſent ſcarcely otherwiſe made uſe of than as an ingredient in mithridate and theriaca. Lewis.

POLGHA, in *Botany*, a name by which ſome authors have called the cocoa-nut tree, or *palma Indica nucifera* of other writers.

POLIA *lithargirus*, a term uſed by Dioſcorides to expreſs the white litharge, which we call litharge of ſilver.

The proper ſenſe of the word *polia*, is hoary, or grey, and it very well expreſſes the colour of this ſubſtance; but the commentators have not been ſatisfied with this obvious meaning, but have made it *pelia*, and ſome of them *ſicelia*. See Litharge.

POLIANTHES, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are, that the corolla is funnel-ſhaped, incurvated, and equal; the filaments are inſerted in the chaps of the corolla, and the germen in the baſe of it. There is only one ſpecies.

POLICY, or Polity, Πολιτεια, the laws, orders, and regulations, preſcribed for the conduct and government of ſtates and communities.

The word is of Greek original, being derived from the Greek πολις, *civitas*, *city*, or *ſtate*.

In the general, *policy* is uſed in oppoſition to barbariſm. Different ſtates have different kinds of *policy:* thus the *policy* of Athens differed from that of Sparta.

Loyſeau obſerves, that *policy* properly ſignifies the courſe and adminiſtration of juſtice in a city. The direction of the *policy* of London is in the hands of the lord mayor.

At Paris they have a *chamber of policy*, where people are verbally accuſed for contraventions of *policy*.

Some divide *policy* into two parts, *agoranomy*, that relating to affairs of merchandize; and *aſtynomy*, that concerning the civil and judiciary government of the citizens. Some add a third branch, viz. what relates to the ECCLESIASTICAL government.

Richard Hooker has a fine treatiſe of the laws of eccleſiaſtical *policy*.

In much the ſame ſenſe is uſed the modern term *police*, or *public* œconomy, to denote the due regulation and domeſtic order of the kingdom: whereby the individuals of the ſtate, like members of a well governed family, are bound to conform their general behaviour to the rules of propriety, good neighbourhood, and good manners; and to be decent, induſtrious, and inoffenſive, in their reſpective ſtations. The claſs of crimes againſt the public *police* of a Country comprehends thoſe which amount to FELONY, as clandeſtine MARRIAGES, BIGAMY, and POLYGAMY: thoſe of idle ſoldiers and MARINERS, wandering about the realm, and GYPSIES; and others, whoſe puniſhment is ſhort of death, as common NUSANCES, IDLENESS, LUXURY, GAMING, and the deſtroying of GAME.

Policy *of inſurance*, or *aſſurance of ſhips*, is a contract or convention, whereby a perſon takes upon himſelf the riſks of a ſea-voyage; obliging himſelf to make good the loſſes and damages that may befall the veſſel, its equipage, tackle, victualling, lading, &c. either from tempeſts, ſhipwrecks, pirates, fire, war, reprizals, &c. in part or in whole, in conſideration of a certain ſum of ſeven, eight, or ten per cent. more or leſs, according to the riſk run; which ſum is paid down to the aſſurer by the aſſuree, upon his ſigning the *policy*.

There are ſome aſſurances for the going, ſome for the returning, and ſome for both, or for a limited time; though ſome maintain, that the time ought never to be limited, in that the contract thereby becomes uſurary.

The *policy* is to contain the name and dwelling of the perſon aſſured; his quality, whether as proprietor, or agent; the effects; the name of the veſſel, and of the maſter; thoſe of the place where the goods are to be loaden or unloaden; the port whence, and whither; as alſo the time, the riſks, and the conditions.

If the veſſels or merchandizes aſſured be loſt, the aſſuree muſt notify the ſame by an act in form; declaring he ſurrenders the whole to the aſſurer, on his paying the ſums aſſured in the time expreſſed.

The origin of theſe aſſurances is aſcribed to the Jews, at the time they were expelled France, in 1182; who are ſaid to have uſed this as a means to facilitate the tranſporting of their effects. The term *policy* is Spaniſh, and comes from *poliça*, *ſchedule*; but the practice comes from the Italians and the Lombards; who, again, derived it originally from the Latin *pollicitatio*, *promiſe*. Some ſay the merchants of Marſeilles were the firſt who ſet on foot this kind of commerce.

Anciently *policies* were given by word of mouth, called *policies of credit*; it being ſuppoſed the aſſurer would enter them in his ledger; but of late, that honeſty is become leſs frequent among traders, they have been made conſtantly in writing. For the hiſtory and practice of inſuring ſhips, ſee Insurance.

Policy *of inſurance*, or *aſſurance of houſes*, is an inſtrument formed on the model of that for veſſels; whereby a perſon, or community of perſons, take on themſelves the riſks and damages that may befall houſes, their furniture, in whole, or in part, &c. from fire, on conſideration of a certain ſum, or ſums, to be paid by the aſſurer, according to the terms of the agreement.

The inſurance from fire is now a popular ſpecies of commerce; and we have a number of ſocieties erected into corporations for that purpoſe. See Insurance.

Policy *of inſurance of lives*, is an inſtrument whereby a ſociety of perſons, erected into a corporation, &c. oblige themſelves to pay a certain ſum of money, e. gr. a hundred pounds, upon the death of a perſon whoſe life they aſſure, in conſideration of a ſum of money, e. gr. one guinea paid quarterly to the aſſurers, during the life of the ſaid perſon aſſured.

The *policy* is under the ſeal of the office, and entitles the perſon in whoſe favour it is granted, to make good his claim, according to the tenor of the articles, or by-laws, of the ſociety. See Assurances *on lives*.

Policy, *officers of*. See Officer.

Policy, in *Letter Foundery*, is ſometimes uſed for a rule that regulates the number of letters of each kind in a complete font; i. e. to determine how many, in proportion to the whole ſet, there are to be of each particular kind.

For inſtance, in a font of an hundred thouſand characters, there are to be five thouſand for *e*, a thouſand for *a*, three thouſand for *m*, thirty only for *k*, as many, or a little more, for *x*, *y*, and *z*; and in proportion for the other letters, the great and ſmall capitals, the initial letters, points, commas, double letters, &c. See *Letter* Foundery.

POLIDE, formed of πολις, *city*, and denoting the patroneſs of a town or city, in *Mythology*, an epithet given to Minerva, under which title ſhe had two temples; one at Erythres, in Achaia, and another at Tegea, in Arcadia.

POLIEA, Πολισια, in *Antiquity*, a ſolemnity of Thebes in honour of Apollo, ſurnamed Πολιος, i. e. *grey*, becauſe he was repreſented in this city (contrary to the practice of all other places) with grey hairs. Potter.

POLIEUS, formed of πολις, *city*, and denoting the protector of a city, in *Mythology*, a name under which Jupiter had a temple in the citadel of Athens.

POLIIFOLIUM, in *Botany*, the name of a genus of plants deſcribed by Buxbaum, the characters of which are theſe; the flowers are monopetalous, of the bell-faſhioned globoſe kind; the ſeed-veſſel is divided into five parts, and contains a number of roundiſh ſeeds: the leaves are like thoſe of the poley-mountain, whence the name; the flowers reſemble thoſe of the arbutus, or ſtrawberry-tree; and the fruit that of the ciſtus.

The plant has been known among authors before, though ill-named, and confounded with other genera; Ray has called it *ſedum arbuti flore*. It properly belongs to the plants of the ſhrub-kind, with dry fruits, and ought to be placed after the chamærhododendros, in the regular arrangements of plants.

Beſide the common kind of this, there is an African one, the leaves of which are ſhorter and rounder than thoſe of this ſpecies, and which may be called the ſhort-leaved African ſhrub *poliifolium*. The *poliifolia* in the Linnæan ſyſtem are ſpecies of ANDROMEDA.

POLIOPTRUM, in *Optics*. See POLYOPTRON.

POLIOPUS, in *Ornithology*, a name given by Aldrovand, and ſome other authors, to the GRINETTA, a ſmall bird of the moor-hen kind.

POLISH *coins*, *meaſures*, &c, See COIN, MONEY, MEASURE, &c.

POLISHER, an inſtrument, called alſo a burniſher, uſed for poliſhing and burniſhing gold, ſilver, and other metals, when gilt or ſilvered; and matters of other kinds proper to take a poliſh.

The *poliſher* is different in the different arts and manufactories. The gilders uſe an iron *poliſher*, to prepare their metals before gilding; and the blood-ſtone, to give them the bright poliſh after gilding.

The *poliſher* uſed by the makers of ſpurs, bits, &c. is part iron, part ſteel, and part wood. The inſtrument conſiſts of an iron bar, with a wooden handle at one end, and a hook at the other, to faſten it to another piece of wood held in the vice, while the operator is at work. In the middle of the bow, withinſide, is what they properly call the *poliſher*; which is a triangular piece of ſteel, with a tail, whereby it is riveted to the bow. What the cutlers call their *poliſhers* are a kind of wooden wheels, for grinding, made of walnut-tree, an inch thick, and of a diameter at pleaſure. They are turned by the great wheel; and it is on theſe they poliſh and ſmooth their works with emery and putty.

The *poliſhers* uſed in the manufacture of glaſs are very different from all theſe. They conſiſt of two pieces of wood; the one flat, covered with old hat; the other long and half round, is faſtened on the former, whoſe edge it exceeds, on both ſides, by ſome inches: which ſerve the workman to take hold of, and to work it backwards and forwards by.

The *poliſhers* uſed by ſpectacle-makers are pieces of wood a foot long, ſeven or eight inches broad, and an inch and a half thick, covered with old caſtor hat, whereon they poliſh the ſhell and horn frames their ſpectacle glaſſes are to be ſet in.

POLISHING, the art of giving a gloſs or luſtre to a thing; particularly a precious ſtone, marble, glaſs, a mirror, or the like.

POLISHING *of glaſſes, lenſes*, &c. ſucceeds the grinding thereof.

The *poliſhing* of a mirror is the laſt preparation given it, with emery or putty.

For an account of the methods recommended by various authors for *poliſhing* glaſs and metals in the conſtruction of teleſcopes &c. ſee GRINDING.

For the *poliſhing* of diamonds, &c. ſee LAPIDARY.

POLISHING *copper-plates*. See COPPER *plates*.

POLISHING *of ſhells*. See SHELLS.

POLISHING, *water*. See JAPANNING.

POLITICAL, ϖολιτικος, formed from ϖολις, *city*, ſomething that relates to policy, or cicil government.

In this ſenſe we ſay *political* intereſts, *political* views, *political* diſcourſes, &c.

POLITICAL *arithmetic* is the application of arithmitical calculations to *political* uſes and ſubjects; as the public revenues, number of people, extent and value of lands, taxes, trade, commerce, manufactures, or whatever relates to the power, ſtrength, riches, &c. of any nation or commonwealth! or, as Davenant conciſely defines it, the art of reaſoning by figures, upon things relating to government.

The chief authors who have attempted calculations of this kind are, Sir William Petty, Major Graunt, Dr. Halley, Dr. Davenant, and Mr. King; and the principal points ſettled by them are as follow.

According to Sir William Petty's computations, though the land of Holland and Zealand be not above 1,000,000 acres, nor that of France leſs than 8,000,000, yet the former are near a third part as rich and ſtrong as the latter. That the rents of lands in Holland are to thoſe in France, as 7 or 8 to 1. That the people of Amſterdam are two-thirds of thoſe of Paris or London; which, according to him, do not differ above a 20th part from one another. That the value of the ſhipping of Europe is about two millions of tons, whereof the Engliſh have 500,000, the Dutch 900,000, the French 100,000; the Hamburghers, Danes, Swedes, and Dantzickers, have 250,000; and Spain, Portugal, Italy, &c. about as much. That the value of goods then exported yearly from France into all parts, was quadruple of that exported into England alone; and conſequently, in all, about 5,000,000*l.* What was then exported out of Holland into England, was worth 300,000*l.* and what was exported thence into all the world, 18,000,000*l.* That the money yearly raiſed by the French king, in time of peace, is about 6½ millions ſterling; and that the monies raiſed in Holland and Zealand are about 2,100,000*l.* and in all the provinces together about 3,000,000*l.* That the people in England are about 6,000,000; and their expences, at 7*l.* per annum a head, 42,000,000*l.* or 800,000*l.* a week. That the rent of the lands is about eight millions, and the intereſts and profits of the perſonal eſtates as much. The rent of houſes in England 4,000,000*l.* That the profits of the labour of all the people is 26,000,000*l.* yearly. That in Ireland the people amount to about 1,200,000. That the corn ſpent in England, at 5*s.* the buſhel for wheat, and 2*s.* 6*d.* for barley, amounts to ten millions per annum. That the navy of England (then) required 36,000 men to man it, and other trade and ſhipping about 48,000. That in France, to manage the whole ſhipping trade, there were at that time required but 1500 men. That the whole people of France are about thirteen millions and a half; and thoſe of England, Scotland, and Ireland, together, about nine millions and a half. That, in the three kingdoms, are about 20,000 churchmen; and in France above 270,000. That in the dominions of England are above 40,000 ſeamen, and in France not above 10,000. That in England, Scotland, and Ireland, and all other dominions depending thereon, there was then about 60,000 ton of ſhipping, which is worth about four millions and a half in money. That the ſea-line round England, Scotland, and Ireland, and the adjacent iſles, is about 3,800 miles. That in the whole world are about three hundred and fifty millions of people, whereof thoſe with whom the Engliſh and Dutch have any commerce, are not above eighty millions. That the value of commodities annually traded for in the whole, is not above 45,000,000*l.* That the manufactures exported out of England amounted to about 5,000,000*l.* per annum. Lead, tin, and coals, to 500,000*l.* per annum. That the value of the French commodities (then) brought into England, did not exceed 1,200,000*l.* per annum. That the whole caſh of England, in current money, was then about 6,000,000*l.* ſterling. See Sir W. Petty's *Political* Arithmetic, p. 74, &c.

Dr. Davenant gives ſome good reaſons why many of Sir Wm. Petty's numbers are not to be entirely depended upon; and, therefore, advances others of his own, founded on the obſervations of Mr. Greg. King.

Some of the particulars are, that the land of England is 39 millions of acres. That the number of People, according to his account, is about 5,500 000 ſouls, increaſing about 9000 every year, allowances being made for plagues, wars, ſhipping, and the plantations. The people in London he reckons at 530,000; thoſe in the other cities and market-towns in England, 870,000; and thoſe in the villages and hamlets, at 4,100,000. The yearly rent of the land he accounts to be 10,000,000*l.* That of the houſes and buildings 2,000,000*l.* per annum. The produce of all kinds of grain he reckons to be worth 9,075,000*l.* in a year moderately plentiful. The rent of the corn lands, annually, 2,200,000*l.* and their net produce above 9,000,000*l.* The rent of the paſture, meadows, woods, foreſts, commons, heaths, &c. 7,000,000*l.* The annual produce by cattle, in butter, cheeſe, and milk, he thinks is about 2,500,000*l.* The value of the wool yearly ſhorn, about 2,000,000*l.* Of horſes yearly bred, about 250,000*l.* Of the fleſh yearly ſpent as food, about 3,350,000*l.* Of the tallow and hides, about 600,000*l.* Of the hay yearly conſumed by horſes, about 1,300,000*l.* Of the hay conſumed by other cattle, 1,000,000*l.* Of the timber yearly felled for building, 500,000*l.* Of the wood yearly ſpent in firing, &c. about 500,000*l.* The land of England, to its inhabitants, is now about 7¼ acres per head. The value of the wheat, rye, and barley, neceſſary for the ſuſtenence of England, amounts to at leaſt 6,000,000*l.* ſterling per annum. The value of the woollen manufacture made here is about 8,000,000*l.* per annum; and our exports of all kinds of the woollen manufacture amount to above 2,000,000*l.* per annum. The annual income of England, on which the whole people live and ſubſiſt, and out of which taxes of all kinds are paid, is ſtated at about 43,000,000*l.* that of France, 81,000,000*l.* and that of Holland, 18, 250,000*l.* See Davenant's Eſſay upon the probable methods of making a people gainers in the balance of trade, &c. in his Works, vol. vi.

Major Graunt, in his obſervations on the bills of mortality, computes, that there are 39,000 ſquare miles of land in England. That in England and Wales there are 4,600,000 ſouls. That the people of London are about

640,000; being one fourteenth part of the people of England. That in England and Wales are about 10,000 pariſhes. That there are 25,000,000 of acres in England and Wales; viz. about four acres to every head. That but 64 out of 100 of the children born are living at 6 years old. That but 40 of 100 are alive at 16 years end. That but 25 of 100 at 26 years end. That but 16 at 36 years end. That but 10 out of 100 at 46 years end. That but 6 out of 100 at 56 years end. That but 3 out of 100 at 66 years end. And that but one out of 100 at 76 years end. And that London doubles itſelf in about 64 years.

Sir William Petty, in his diſcourſe about duplicate proportion, farther tells us, that it is found by experience, that there are more perſons living between 16 and 26, than of any other age; and, laying down that as a ſuppoſition, he infers, that the ſquare roots of every number of men's ages under 16 (whoſe root is four), ſhew the proportion of the probability of ſuch perſons reaching the age of 70 years.

Thus, it is four times more likely, that one of 16 years of age lives to be 70, than that a child of one year old does. It is thrice as probable, that one of 9 years lives to be 70, as that a new-born child does, &c. That the odds is 5 to 4, that one of 25 dies before one of 16 years. That it is 6 to 5 (ſtill as the ſquare roots of the ages) that one of 36 years old dies before one but of 25 years of age; and ſo on, according to any declining age, to 70, compared with a number between 4 and 5, which is the root of 21, the law age.

Dr. Halley has made a very exact eſtimate of the degrees of the mortality of mankind, from a curious table of the births and burials, at the city of Breſlaw, the capital of Sileſia; with an attempt to aſcertain the price of annuities upon lives. From a table which he has calculated thence, publiſhed in the Philoſophical Tranſactions, he derives the following uſes.

1. To find in any multitude, or body, of people, the proportion of men able to bear arms; which he reckons from 18 to 56 years old, and accounts about ¼ of the whole.

2. To ſhew the different degrees of mortality, or rather vitality, in all ages: by which means he finds the odds there is, that any perſon of any age doth not die in a year's time, or before he attains ſuch an age. 3. To ſhew in what number of years it is an even lay, that ſuch a perſon ſhall die; and finds, for inſtance, that it is an even lay, that a man of thirty years of age lives between twenty-ſeven and twenty-eight years. 4. To regulate the price of inſurance upon lives. 5. And the valuation of annuities upon lives. 6. How to value two or three lives after the ſame manner.

From the whole he makes two very good obſervations:

1. How juſtly we uſe to complain of the ſhortneſs of our lives; for that it appears, that one half of thoſe that are born do not live above ſeventeen years.

2. That the growth and increaſe of mankind is not ſo much ſtinted by any thing in the nature of the ſpecies, as it is from the curious difficulty moſt people make of venturing on the ſtate of marriage; and, therefore, that celibacy ought to be every way diſcouraged by all wiſe governments; and thoſe who have numerous families of children ought to be countenanced and encouraged by good laws, ſuch as the *jus trium liberorum*, &c. among the Romans.

According to Mr. Kerſeboom's computation, the inhabitants of Holland and Weſt Friezeland, in the year 1738, amounted to 980,000. He has given us a table of the particulars, exhibiting the number of people of all ages, living at the ſame time, from their birth to extreme old age. This table having the chances of mortality within the ages mentioned, he calls the table of contingency of life and death.

This table is calculated upon three principles. 1. On correct obſervations upon the tables of aſſignable annuities in Holland, which have been kept there for above 125 years: wherein the ages of the perſons dying are truly entered. 2. Upon a ſuppoſition that there are yearly born in the two provinces 28,000 living children. 3. That the whole number of inhabitants, in any country, is to the number of births as 35 to 1.

From this table it appears, 1. That more than half the number of people in the two provinces are above 27 years old. 2. That by the obſervations made in England, out of 35 children born, 18 of them are boys, and 17 girls; the inhabitants of Holland and Weſt Friezeland conſiſt of 504,000 males, and 476,000 females, the ſum of which is 980,000.

Here follows the table of contingency of life and death.

Of above 90 years old		500	
Of 90	to 86 incl.	2500	
85	81	6500	
80	76	13000	
75	71	20300	
70	66	27300	
65	61	34300	
60	56	40800	
55	51	47000	
50	46	53000	
45	41	57800	
40	36	62500	
35	31	67600	
30	27	58400	
		491500	ſum above 27 years old
Of 26	21	94300	
20	16	83400	
15	11	87200	
10	6	91800	
5	to birth	131800	
		488500	ſum under 27 years old
		491500	
		488500	
		980000	ſum of all the inhabitants

Mr. Kerſeboom obſerves, from the aſſignable annuities for lives before mentioned, that females, one with another, live about three or four years longer than the ſame number of males.

He alſo thinks there is no reaſon to differ from the proportions aſſigned by Mr. King (in Davenant's Eſſays) of the ſtate and condition of the inhabitants of England; which is, that for every 100,000 inhabitants there are,

Married men and women	34500
Widowers	1500
Widows	4500
Unmarried youth and children	45000
Servants	10500
Travellers, ſtrangers, &c.	4000
	100000

If this propoſition be admitted, then the number of each ſort in Holland and Weſt Friezeland, will be as in the following table:

In the two provinces of Hol. and Weſt Fr.		Amſter
Married men and women	338100	86156
Widowers	14700	4218
Widows	44100	13858
Unmarried youth and children	441000	93990
Servants	102900	28318
Travellers, ſtrangers, &c.	39200	14460
Total	980000	241000

The mortality of the ſeveral quarters of the year.

Spring to ſummer	307 dead.
Summer to the autumnal equinox	286
Autumn to winter	287
Winter to ſpring	286

The mortality of the different months of the year obſerved for 31 years, one with another.

Dead in	
January	102
February	88
March	95
April	77
May	112
June	100
July	92
Auguſt	95
September	99
October	93
November	95
December	99

Hence it appears, that April is the leaſt, and May the moſt fatal month in the year; their proportion of mortality being nearly as 2 to 3; and that of the four ſeaſons of the year, moſt deaths happen in the ſpring; that is, from the vernal equinox to the ſummer ſolſtice.

Mr. Kerſeboom adds, that theſe provinces may raiſe 220,000

220,000 men able to bear arms, and ſeveral other curious obſervations.

His book is entitled, Verhandeling tot een proeve, om te weeten de probable Menigte des Volks in de Proventie van Holland en Weſtfriezlandt. Hague 1738, 4to.

Dr. Brakenridge has given an eſtimate of the number of people in England, which he has formed from the number of houſes and the quantity of bread conſumed. According to the former principle, he ſtates the number of houſes throughout England and Wales at 911,310, and allows ſix perſons, at an average, to a houſe, and thence computes the number of people to be about 6,257,418, or ſix millions, all ages included. From a ſurvey of the window-lights, after the year 1750, the number of houſes charged to that tax in England and Wales appers to have been 690,000; to which adding 200,000 cottages that pay nothing, the whole number appears to be 890,000; and the number of people, allowing ſix to a houſe, 5,340,000. Upon the latter principle, he eſtimates the number of quarters of wheat conſumed at home to be 2,026,100; and allowing the quantity of a quarter for three perſons in a year, or ſeven ounces a day for each perſon, he concludes, that the number of people is 6,078,300, or about ſix millions. Of this number, according to Dr. Halley's rule, he ſuppoſes that there may be about fifteen hundred thouſand men able to carry arms. The country, he ſuppoſes, is capable of ſupporting one half more inhabitants, or nine millions; for, admitting Mr. Templeman's ſurvey, England contains 49,450 ſquare miles, that is, 31,648,000 acres, of which 25,300,000 acres are proper to be cultivated; and allowing three acres, well manured, for the maintenance of one perſon, there will be maintenance in England for 8,430,000 people; to which the produce of fiſhing being added, it will enable the country to ſupport nine millions. In Ireland, according to Mr. templeman, there are 17,536,000 acres, of which, ſays Dr. Brakenridge, 12,000,000 are capable of cultivation; and allowing four acres, at an average, to each perſon, and the number of inhabitants to be (at much too low an eſtimate) one million, Ireland could maintain two millions more people than it has now. In Scotland, containing a million and a half of people, and 17,728,000, acres of land, of which the good acres are 11,000,000, allowing five acres for each perſon, he ſuppoſes there may be proviſion for 2,200,000 people, or for 700,000 more than there are at preſent. Hence he infers, that in both the Britiſh iſles, properly cultivated, there is a proviſion for ſix millions of inhabitants beyond the number now ſupported in them. Extending his ſurvey to the whole globe he ſuppoſes the whole ſurface to be to the quantity of land as 8 to 3, i. e. as 197,819,550, to 74,182,331 ſquare miles; out of which, deducting one-third for waſte ground, there will be 49,454,887 ſquare miles, or 31,651,127,680 good acres. And ſtating the whole number of inhabitants on the globe to be 400,000,000 there will be 79 good acres to each perſon. Phil Tranſ. vol. xlix. art. 45. art. 113.

For an account of the calculations of Dr. Price, a late well known and excellent writer on this ſubject, and farther particulars relating to the number of births and burials, the proportion of males and females, &c. See Expectation *of life*, Marriage, Mortality, &c.

Political *criticiſm*. See Criticism.

Political *liberty*. See Liberty.

POLITICS, *politice*, ϖολιτικη, from ϖολις, *civitas*, *ſtate*, the firſt part of œconomy, or ethics, conſiſting of the governing and regulating of ſtates, for the maintenance of the public ſafety, order, tranquility, and good morals.

Lord Bacon divides *politics* into three parts, with regard to the three grand ends thereof, or the three offices incumbent on thoſe who have the adminiſtration; viz. the *preſervation* of the ſtate; the *happineſs* and *flouriſhing* of the ſtate; and the *enlargement* of its bounds.

The two firſt parts, he obſerves, are well handled by ſeveral authors; but about the third there is a deep ſilence. He ranks this, therefore, among the number of the *deſiderata*, and gives us a ſpecimen of an eſſay to ſupply it.

We have ſeveral ſyſtems of *politics* by Ariſtotle, Machiavel, Doria, Lipſius, &c. in which laſt there is nothing but particles and conjunctions of the author's own; the body of the book being all quotations.

Politics, *academy of*. See Academy.

POLITY, or **Policy**. See Policy.

POLIUM, *poley*, in *Botany*. See *Mountain* Poley.

POLL, a term uſed in ancient writings for the head.

The word is, doubtleſs, formed from *pole*; this part being, as it were, the pole of the microcoſm.

Hence, to *poll* is to enter down the names of perſons who give their votes, or voices, at an election.

Poll *deed*. See Deed.

POLLACK, in *Ichthyology*, a name which we give to two different fiſh of the aſellus or gadus kind, with the different epithets of *raw* and *whiting*. The *raw-pollack* is the ſame ſpecies that in ſome parts of England is called the cole-fiſh, and is the aſellus niger of authors. The others is called the *whiting-pollack*, and is the *aſellus vireſcens* of Willughby and others; and the *gadus pollachius* of Linnæus.

Both theſe fiſh are, according to the new Artedian ſyſtem, of the genus of the gadi; and as the names taken from their colours, black and green, are very little expreſſive, the colours being not perfect, permanent, or entire, Artedi has deviſed others for them, by which they may be diſtinguiſhed at ſight from one another. The *raw-pollack*, or cole-fiſh, he diſtinguiſhes by the name of the *gadus* with three fins on the back, with no beard at the mouth, with the lower jaw longer than the upper, and the lateral line ſtraight. The other, or *whiting-pollack*, he diſtinguiſhes by the name of the *gadus* with three fins on the back, with no beard, with the lower jaw longer than the upper, and the lateral line crooked. Theſe two kinds of *pollack* are by theſe names not only diſtinguiſhed from one another, but from all the other ſpecies of the ſame genus, as the cod-fiſh, &c.

The whiting *pollack* is common on many of our rocky coaſts, and numbers of them are ſeen in ſummer ſporting on the ſurface of the water, which are often taken with a gooſe's feather fixed on the hook. They do not grow to a lage ſize, and are a good fiſh for the table.

POLLARD, among *Hunters*, a ſtag, or male deer, which has caſt its horns.

Pollard, or **Pollenger**, in *Agriculture*, is applied to ſuch trees as have been frequently polled, or lopped; by which they are contradiſtinguiſhed from timber trees.

Pollard is a name given by ſome hiſtorians to a ſort of baſe money current at one time in Ireland, and called more uſually crocards.

Theſe were coins of France, and other nations, which paſſed in Ireland as pennies, though really not worth quite half ſo much. They were made of copper, with a very ſmall admixture of ſilver.

It was in the reign Edward I. appointed lord of that kingdom in the life-time of his father Henry III. that the uſe of falſe and counterfeit money of this kind was ſo extremely common in Ireland. While his father reigned in England this prince never extended his power ſo far as to ſet up any mint, or coin any money in Ireland; but at his acceſſion to the crown he found his treaſury empty, and the current coin of his kingdoms in a very bad condition; his abſence of near two years after his father's death having ſo encouraged the clippers and coiners of money, that little but clipped or counterfeit money of the kingdom was to be met with; and five or ſix different ſorts of baſe and mixed money had been imported privately, and uttered in England and Ireland as pennies, though they were not half the value of the penny ſterling.

Theſe were the *crocards* and *pollards*, called alſo *mitres*, *lionines*, *roſaries*, and by the like names, according to the things marked in the impreſſions. To remedy this evil, and reſtore the current coin of the kingdom to its ancient purity and value, this prince eſtabliſhed a certain ſtandard; and as the baſe money was an admixture of a very ſmall quantity of ſilver, with a great deal of copper, he ordered that there ſhould be in every pound of money weighing twelve ounces, eleven ounces and two pennyweight and a quarter of pure ſilver, and only ſeventeen pence halfpenny farthing alloy.

The ſaid pound to weigh twenty ſhillings and three pence in account; the ounce twenty pence, and the penny twenty-four grains and a half. According to this regulation, the money of Ireland was alſo ordered to be made, and a new kind of money was ſtruck there in the year 1279, under Stephen de Fulbourn, biſhop of Waterford, and lord deputy of Ireland. The pieces coined at this time in Ireland were groats, or four-pennies, halfpence, and farthings; and as theſe were the ſame in value, as to weight, with the Engliſh coins, they would go equally in England and Ireland; and in the twenty-ninth year of the reign of the ſame prince, that is, in 1300, the *crocards*, *pollards*, and other baſe money, were decried; and it was made death, with confiſcation of goods, to import any of them.

By this means the circulation of the baſe and mixed money was in a great meaſure ſtopped, and four new furnaces were erected in the mint of Dublin, to ſupply the great demand that there was for good money; and Almander Norman de Line was appointed maſter of the coiners. This was the beginning of good money in Ireland; and in the year 1304, there were ſent over from England twenty-four ſtamps for coining of money there, viz. three piles with ſix croſſes, for pennies; three piles with ſix croſſes, or halfpence; and two piles with four croſſes, for farthings. In the old way of coining with the hammer, before the mill and ſcrew were invented; two kinds of punchions were in uſe, the one called the croſs, whereupon was engraved the head of the prince; and this was ſo called, becauſe anciently a croſs was the figure ſtruck on this ſide of coins inſtead of the head of the prince: the other, called the pile, containedt he arms, or ſome other figure, to be ſtruck with an inſcription on the back, or reverſe of the coins. The pennies and halfpence ſtruck in this king's reign, have the king's head in a triangle full-faced. The beſt preſerved of them, found at this time, weigh twenty-two grains the penny; and the halfpence from ten grains to ten and a half. The farthings are ſo ſcarce, that it is very rare to meet with one in the collections of the moſt curious. Simon's Hiſt. of Iriſh Coins, p. 15.

Pollard, in *Ichthyology*, a local name for the young and ſmall fiſh of the cole-fiſh, or *rawling*-POLLACK kind. It is uſed in Cornwall, &c.

POLLEN, in *Botany*. See FARINA *fæcundans*.

Pollen *thuris*, in the *Materia Medica*, a term uſed by the Latin writers to expreſs the *manna thuris*, or *manna libanotis*, of the Greeks, but that very improperly; for the word *pollen thuris* properly ſignifies the frankincenſe reduced to a powder; but this was not what the ancient Greeks called *manna thuris*, but the ſmall fragments which were broken off from the large pieces, in the gathering or packing up.

The *manna* uſed in medicine by the Greeks and Arabians was not formed into large flakes, as ours is; but was compoſed of ſmall fragments or grains, and therefore they called by the ſame name the ſmall granulæ or fragments alſo of other things: it was thus that the broken frankincenſe was called *manna thuris*.

This cuſtom of the times of ſaving all the fragments of this drug, made them collect even what was in ſo ſmall pieces as to reſemble powder; but this, though mixed with the reſt, was not properly the *manna thuris*. This gave occaſion to the adulterating this commodity, and Dioſcorides tells us, that even in his time they had learned the trick of putting the powder of the reſin of the pine tree among it; and this growing worſe and worſe, they at laſt diſcarded it, and would purchaſe only the fragments without the powder. Theſe fragments they called *thus minutum*, to diſtinguiſh them from what was then called *manna thuris*, though improperly, and which was the adulterated maſs of reſin and fragments of olibanum.

POLLEX, in *Anatomy*, denotes either the thumb, or great toe, according as either manus, or pedis, is added to it.

POLLICIPES, the *toe-ſhell*, in *Natural Hiſtory*, the name of a genus of ſhells, the characters of which are theſe: they are multivalve flat ſhells, of a triangular figure, each being compoſed of ſeveral laminæ, which end in a ſharp point. They ſtand upon pedicles, and are furniſhed with a great number of hairs. We have only one known ſpecies of this genus, and this always found in large cluſters. See *Tab. of Shells*, N° 27.

POLLICIS *abductor*. See ABDUCTOR.

Pollicis *adductor*. See ADDUCTOR.

Extenſor **Pollicis** *brevis*, and *longus*. See EXTENSOR.

Flexor **Pollicis** *brevis*, and *longus*. See FLEXOR.

POLLINCTORES, among the *Ancients*, an appellation given to thoſe who waſhed and anointed the dead.

POLLINCTURA, a word uſed by ſome authors to expreſs the embalming dead bodies.

POLLING, in *Gardening*, the operation of diſperſing the worm-caſts all over the walks, with long aſh-poles: this, beſides deſtroying worm-caſts, is very beneficial to the graſs of the walks. See GRASS-*walks*.

POLLUCTUM, among the Romans, a feaſt kept in honour of Jupiter Dapalis, Hercules, &c. at which ſacrifiçes were offered to the gods.

POLL-MONEY, or capitation, a tax impoſed by authority of parliament, on the perſon, or head, either on all indifferently, or according to ſome known mark of diſtinction; as quality, calling, &c.

Thus, by the ſtatute 18 Car. II. every ſubject in the kingdom was aſſeſſed by the *head*, or *poll*, according to his degree; every duke 100*l*. marquis 80*l*. baronet 30*l*. knight 20*l*. eſquire 10*l*. &c. and every ſingle private perſon 12*d*.

This was no new tax, as appears by former acts of parliament; particularly that anno 1380, where, *quilibet tam conjugatus quam ſolutus, utriuſque ſexus, pro* capite *ſuo ſolvere cogebatur*. Walſing.

Camden, in his Remains of Coins, ſays, there was anciently a perſonal tribute called *capitatio*, or *poll-ſilver*, impoſed on the *poll*, or perſon, of every one; on women from the age of twelve years, and on men from 14.

POLLUTION, *pollutio*, the act of profaning a temple, or other holy place.

The Romaniſts hold a church to be polluted by the effuſion of blood, or of ſeed, therein; and requires its being conſecrated anew.

The Jews were held polluted by the touching of a dead body, or of the menſes of women; and were to be purified in form. See the laws hereof in Leviticus.

The Indians are ſo ſuperſtitious on the head of *pollution*, that they break all the veſſels which thoſe of another religion have drank out of, or even only touched; and drain all the water out of a pond a ſtranger has bathed in.

Pollution, or *Self*-**Pollution**, is alſo uſed for the abuſing or defiling of one's own body, by means of laſcivious frictions and titillations, raiſed by art, to produce emiſſion.

We read in Scripture, that Onan, and, as ſome critics alſo think, Er, were ſeverely puniſhed for having polluted themſelves by ſpilling their ſeed on the ground; whence the crime has been denominated, by ſome, ONANIA.

Of *pollutions*, ſome are *voluntary*, others *involuntary*, and *nocturnal*.

Pollution, *pollutio nocturna*, in *Medicine*, the name of a diſeaſe, which conſiſts in an involuntary emiſſion of the ſeed in the night, in time of ſleep. This, in different perſons, is very different in degree; ſome being affected with it only once a week, a fortnight, three weeks, or even a month, and others being ſubject to it almoſt every night.

The perſons moſt ſubject to this are young men of a ſanguineous temperament, and who feed high, and lead a ſedentary life. When this happens to a perſon but once in a fortnight or a month, it is of no great conſequence; but when it happens almoſt every night, it greatly injures the health; the patients look pale and ſickly. In ſome the eyes become weak and inflamed; ſometimes they are affected with violent defluxions, and uſually, at laſt, are circled round with a livid appearance of the ſkin.

The diſtemper is to be cured rather by a change of life than by medicines. When it has taken its riſe from high diet and a ſedentary life, a coarſer food and the uſe of exerciſe, will generally cure it; but if any medicines are to be given, nitre alone will do more than almoſt all the reſt. This may be taken in large doſes, a ſcruple at a time, with very little liquid with it, and muſt be continued for ſome time at night going to reſt. The root of the water-lily is greatly recommended by ſome in this caſe; and by others, the ſeeds of the agnus caſtus; but it is very doubtful, whether they have either of them any effect.

Perſons ſubject to this diſeaſe muſt never take any ſtimulating purges, and muſt avoid, as much as poſſible, all violent paſſions of the mind; and though exerciſe is recommended in moderation, yet if this be too violent, it will rather increaſe the diſorder than do any thing towards its cure.

The Romiſh church puts up prayers in the cloſe of the evening office, to be preſerved from nocturnal *pollutions*.

POLLUX, in *Aſtronomy*, the hind twin, or the poſterior part of the conſtellation GEMINI.

Pollux is alſo a fixed ſtar of the ſecond magnitude, in the conſtellation GEMINI, or the Twins.

Pollux is alſo uſed in *Meteorology*. See CASTOR.

Pollux, in *Mythology*, the name of a demi-god, ſuppoſed to be the ſon of Jupiter and Leda, who had a temple in the city of Teraphne, in Laconia, where was alſo a ſacred fountain, called Polydocea, or the fountain of *pollux*.

POLPHOS, a word uſed by ſome authors to expreſs a bulb or bulbous root.

POLPOCH, in *Zoology*, a ſpecies of ſerpent ſaid to be found in Jucatan, a country bordering upon New Spain. It can bite with the mouth, and ſting with the tail.

POLTROON, or **Poltron**, a coward, or daſtard, wanting courage to perform any thing great or noble.

The word we borrow from the French, who, according to Salmaſius, derive it *à pollice truncato*; becauſe, anciently, thoſe who would avoid going to the wars, cut off their thumbs.

But Menage, with more probability, derives it from the Italian *poltrone*, and that from *poltro*, a *bed*; becauſe timorous puſillanimous people uſually take pleaſure in lying a-bed. He adds, that the Italian *poltro*, is again derived from the German *polſter*, a *pillow*, or *cuſhion*.

Others chooſe to derive the word from the Italian *poltro*, *colt*; becauſe of that creature's readineſs to run away.

Poltroon, in *Falconry*, is a name given to a bird of prey when the nails and talons of his hind toes are cut off, wherein his chief force and armour lay; in order to intimidate him, and prevent his flying at great game.

POLVERINE, the calcined aſhes of a plant; a ſubſtance of the nature of our pot-aſhes, or pearl-aſhes.

It is brought from the Levant and Syria; but in the glaſs trade, though it be of the nature of the other aſhes they uſe, it is always to be preferred to any other. The barilla, or pot-aſhes of Spain, yield more pure ſalt than the *polverine* of the Levant, but the glaſs made with it has always ſome tinge of bluiſhneſs: that made with the *polverine* is ever perfectly white, and this is the ſubſtance that ought always to be uſed for the fineſt cryſtal. See Glass.

POLYACOUSTICS, compounded of πολυς, *much*, and ακεω, *I hear*, inſtruments contrived to multiply ſounds; as multiplying-glaſſes, or polyſcopes, do the images of objects. See Phonics.

POLYADELPHIA, in *Botany*, the eighteenth claſs of plants, whoſe ſtamina are formed into three or more ſeparate bodies, comprehending four orders, viz. *pentandria*, *dodecandria*, *icoſandria*, and *polyandria*, having reſpectively, five, twelve, and twenty, and many in each ſet or body. See Fructification and Order.

POLYANDRIA, in *Botany*, the thirteenth claſs of plants with hermaphrodite flowers, and a large number of ſtamina, or male-parts, in each; comprehending ſeven orders, viz. *monogynia*, *digynia*, *trigynia*, *tetragynia*, *pentagynia*, *hexagynia*, and *polygynia*, diſtinguiſhed by having one, and three ſtyles. See Fructification and Order.

POLYANTHEA, a collection of common-places in alphabetical order; of great ſervice to orators, preachers, &c. of the lower claſs.

The word is formed from the Greek πολυς, *much*, and ανθος, *flower*; and is much of the ſame ſignificancy with *anthology*, or *florilege*.

The firſt author of the *polyanthea* was Dominic Nanni de Mirabellio, whoſe labour has been improved on by Barth. Amantius, and Franc. Torſius; and ſince theſe, by Joſ. Langius, under the title of *Polyanthea nova*, 1613.

POLYANTHEMUM, in *Botany*, a name given by ſome authors to the water-crow-foot, from its great number of flowers.

POLYANTHUS, or Polyanthium, compounded of πολυς, *much*, and ανθος, *flower*, a garden flower, of the primrose kind. The word is alſo uſed, in general, to denote a plant which bears or produces ſeveral or many flowers.

POLYCARPON, in *Botany*, a genus of the *triandria trigynia* claſs: its characters are, that the calyx is five-leaved, the petals are five in number, ſmall and ovated; and the fruit is a ſingle-celled, three valved capſule. There is one ſpecies.

POLYCEPHALON, πολυκεφαλον, in *Antiquity*, a kind of poetry, for the nature and origin of which ſee Mem. de l'Acad. Roy. des. Inſcrip. vol. xiv.

POLYCOMBUS, in *Botany*, a name given by Neophytus and others to the common knot-*graſs*, more uſually called *polygonum*.

The name *polycombus* is formed of the Greek πολυς, *many*, and κομβος, *a joint*; and as it is uſually applicable to this, and all the other jointed plants, it is uſed by ſome for the name of the ſeveral ſpecies of equiſetum, or horſetail, as the word *polygonum* is.

Neophytus deſcribes one ſpecies of this, which he ſays is called *oreon*, from its growing in mountainous places. This, he ſays, looks like a young reed, and has ſeveral joints in the main ſtalk, which are received into one another as ſo many cups or boxes: he adds, that the leaves are like thoſe of the pine-tree. What he calls the leaves, are probably the tender branches; and then this deſcription will agree very well with our great marſh horſetail, which grows in wet places in mountainous countries, and about the ſprings in our hills. This is the horſetail to which the greateſt virtues are attributed by this author; but the whole account of the hippuris, polygonum, and equiſetum, is ſo confuſed, that there is little to be learnt from what the ancients ſay of them, without repeating the trials of their virtues.

POLYCHREST, πολυχρηστος, compounded of πολυς, *much*, and χρηστος, *uſeful*, in *Pharmacy*, a medicine that ſerves for many uſes, or that cures many diſeaſes.

Polychrest. *ſal*. See Sal-*Polychreſt*.

POLYENEMUM, in *Botany*, a genus of the *tryandria monogynia* claſs: its characters are, that the calyx is three-leaved; the petals are five, and caliciform; and the fruit contains a ſingle ſeed almoſt naked. There is one ſpecies.

POLYCROTA, in the *Naval Architecture of the Ancients*, a word uſed to expreſs ſuch of their gallies as had three, four, five, or more tiers of rowers, ſeated at different heights; they were diſtinguiſhed by this term from the *monocrota*, or thoſe which had only ſingle rows of oars.

The number of rows of rowers in the *polycrote* gallies has given occaſion to ſome to ſuppoſe thoſe veſſels of ſuch a height from the water as is ſcarce credible; we have, however, no warrant for this, but the commentators have given occaſion to the opinion, from their not having been able to ſtow the rowers in leſs room, and have meaſured the height of the veſſel by their own ſkill in this ſort of architecture, not by that of the people who built them. Meibomius has found a way to take off a great deal from the imaginary height of theſe gallies. He has two inventions to anſwer this purpoſe: by the firſt of them, he ſhews how the lateral rowers may be ſo placed, that he who ſits behind another may move his hands and oar under the ſeat of the rower who ſits next before him; by which means three lateral rowers, which, according to Scaliger's way of reckoning, would require thirteen feet and a half, will be placed in the height of ſeven feet and a half.

By the ſecond invention, he finds out a place in the veſſel for almoſt half the number of rowers; foraſmuch as on the ſides of the aforeſaid rowers, he places others in the middle of the ſhip, upon tranſtra or tranſverſe ſeats, which he imagines thruſt out their oars under the ſeats of the lateral rowers; by this contrivance he has gained no leſs than nine feet in the height of a quinqueremis. The different ſeries of rowers were called by different names; the *thalamitæ* were thoſe who ſat in the loweſt row; the *zygitæ* were thoſe who ſat in the tranſtra, or croſs ſeats; and the *thranitæ* thoſe who ſat uppermoſt of all in the veſſel.

The moſt ſurpriſing account of a *polycrote* veſſel among the ancients, is that ſaid to have been built by Philopater, of forty tiers of rowers. The next to this is that of Ptolemy Philadelphus, which is ſaid to have had thirty tiers; and in theſe there ſat more than three thouſand rowers. It has been diſputed by many, whether ſuch immenſe veſſels as theſe were ever built, or ever could be uſed if built. The monſtrous height they have been calculated to be of, according to the ſchemes of the generality of commentators, has rendered it incredible that there were ever any ſuch; but Meibomius has found out ſuch convenient ways of placing the rowers in them, and has taken off ſo great a part of this imaginary height neceſſary in them, that he is clearly of opinion, that there were ſuch veſſels actually built and uſed.

The triremis, according to the computation of this author, contained two hundred men; of which one hundred and eighty were rowers, and the reſt were mariners; ſo that the Athenian fleet, of which Conon was commander, conſiſting of one hundred and eighty triremes, had in it ſix and thirty thouſand men. The quinqueremis of theſe times contained four hundred and twenty men, three hundred of whom were rowers, and the reſt ſoldiers; ſo that there are three ſtupendous things to be obſerved in regard to the Roman fleet at Meſſina and the Carthaginian at Lilybæum: one is, that the former conſiſted of three hundred and thirty, and the latter of three hundred and fifty veſſels, moſt of which were quinqueremes, which, according to the moſt accurate computation, were a hundred and fifty feet long; the number of men they contained was, in the Roman, one hundred and thirty thouſand, and in the Carthaginian, one hundred and fifty thouſand. The apparatus and proviſions neceſſary for ſuch a numerous hoſt, are wonderful in theſe early days of ſhipping, and the accounts would be doubted, were they not given by one of the beſt of hiſtorians, Polybius, who wonders, as indeed he very well may, at ſuch an amazing equipage for ſea ſervice at ſuch a time.

POLYEDRON. See Polyhedron.

POLYEIDÆ *ſphragis*, the name of a ſort of troches or paſtils greatly uſed among the ancients. They conſiſted of alum, four drachms; myrrh and aloes, of each five drachms: pomegranate-peel, and bull's gall, of each ſix drachms: all of which were rubbed to fine powder, and made into troches with the bull's gall, mixed with a ſufficient quantity of the moſt auſtere wine.

POLYGALA, *milk-wort*, in *Botany*. See Milk-*wort*.

POLYGAMIA, in *Botany*, the twenty-third claſs of plants, comprehending three orders, viz. *monœcia*, or ſuch plants as have the polygamy on the ſame plant, *diœcia*, having the polygamy on two diſtinct plants, and *triœcia*, having the polygamy on three diſtinct plants. See Fructification and Order.

POLYGAMY, Πολυγαμια, formed from πολυς, *multus*, and γαμη, *uxor*, *wife*; a plurality of wives, or huſbands, held by the ſame man, or woman, at the ſame time.

Polygamy is prohibited among Chriſtians; but it was allowed among the Jews; as it is ſtill among the Mahometans; and under all the religions that have obtained in Aſia. In the kingdoms of Boutan and Thibet, *polygamy* is at this time almoſt general; one wife frequently ſerving all the males of a whole family, without being the cauſe of any uncommon diſunion or jealouſy among them. Major Graunt obſerves, that the males and females, brought into the world are nearly on a balance, only abating for a little exceſs on the ſide of the males, to make up for the extraordinary expence thereof in war, and at ſea: whence it evidently follows, that nature only intends one wife, or one huſband, for the ſame perſon; ſince, if they have more, ſome others muſt go without any at all. See MARRIAGE.

Hence he concludes, that the Chriſtian law, which prohibits *polygamy*, is more agreeable to the law of nature than the Mahometan; and we may add, than the Jewiſh law, which tolerated *polygamy*.

Dr. Percival, Phil. Tranſ. vol. lxvi. part. i. p. 163. has very juſtly obſerved, that the practice is brutal, deſtructive to friendſhip and moral ſentiment, inconſiſtent with one great end of marriage, the education of children, and ſubverſive of the natural rights of more than half of the ſpecies: beſides, it is injurious to population, and, therefore can never be countenanced or allowed in a well regulated ſtate; for, though the number of females in the world may conſiderably exceed the number of males, yet there are more men capable of propagating their ſpecies than women capable of bearing children: and it is a well known fact that Armenia, in which a plurality of wives is not allowed, abounds more with inhabitants than any other province of the Turkiſh empire.

Yet Selden has proved, in his Uxor Hebraica, that plurality of wives was allowed of, not only among the Hebrews, but alſo among all other nations, and in all ages. It is true, the ancient Romans were more ſevere in their morals, and never practiſed it, though it was not forbid among them: and Mark Antony is mentioned as the firſt who took the liberty of having two wives.

From that time it became pretty frequent in the empire, till the reigns of Theodoſius, Honorius, and Arcadius, who firſt prohibited it by expreſs law in 393. After this the emperor Valentinian, by an edict, permitted all the ſubjects of the empire, if they pleaſed, to marry ſeveral wives: nor does it appear, from the eccleſiaſtical hiſtory of thoſe times, that the biſhops made any oppoſition to this introduction of *polygamy*. In effect there are ſome even among the Chriſtian caſuiſts, who do not look on *polygamy* as in itſelf criminal. Jurieu obſerves, that the prohibition of *polygamy* is a poſitive law; but from which a man may be exempted by ſovereign neceſſity. Baillet adds, that the example of the patriarchs is a very powerful argument in favour of *polygamy*.

It has been much diſputed among the doctors of the civil law, whether *polygamy* be adultery. In the Roman law it is called STUPRUM, and puniſhed as ſuch, that is, in ſome caſes, capitally. But a ſmaller puniſhment is more conſiſtent with the Jewiſh law, wherein the prohibition of adultery is perpetual, but that of *polygamy* temporary only. See Selden, lib. i. cap. 9. de Uxore Hebraica.

In Germany, Holland, and Spain, this offence is differently puniſhed. By a conſtitution of Charles V. it was a capital crime. By the laws of ancient and modern Sweden, it is puniſhed with death. In Scotland it is puniſhed as perjury.

In England it is enacted by ſtatute 1 Jac. I. cap. 11. that, if any perſon, being married, do afterwards marry again, the former huſband or wiſe being alive, it is felony, but within the benefit of clergy. The firſt wife in this caſe ſhall not be admitted as an evidence againſt her huſband, becauſe ſhe is the true wife; but the ſecond may, for ſhe is indeed no wife at all; and ſo *vice verſâ*, of a ſecond huſband. This act makes an exception to five caſes, in which ſuch ſecond marriage, though in the three firſt it is void, is, however, no felony. 1. Where either party hath been continually abroad for ſeven years, whether the party in England had notice of the other's being living or no 2. Where either of the parties hath been abſent from the other ſeven years, within this kingdom, and the remaining party hath had no notice of the other's being alive within that time. 3. Where there is a divorce or ſeparation *a menſa et thoro* by ſentence in the eccleſiaſtical court. 4. Where the firſt marriage is declared abſolutely void by any ſuch ſentence, and the parties looſed *a vinculo*. Or, 5. Where either of the parties was under the age of conſent at the time of the firſt marriage; for in ſuch caſe the firſt marriage was voidable by the diſagreement of either party, which this ſecond marriage very clearly amounts to. But if at the age of conſent the parties had agreed to the marriage, which completes the contract, and is, indeed, the real marriage, and afterwards one of them ſhould marry again, judge Blackſtone apprehends that ſuch ſecond marriage would be within the reaſon and penalties of the act. Comment. book iv. p. 164.

Bernardus Ochinus, general of the order of Capuchins, and afterwards a proteſtant, publiſhed about the middle of the ſixteenth century, Dialogues in favour of *polygamy*, which were anſwered by Theodore Beza. And about the concluſion of the laſt century we had at London an artful treatiſe publiſhed in behalf of a plurality of wives, under the title of Polygamia Triumphatrix: the author whereof aſſumes the name of Theophilus Aletheus; but his true name was Lyſerus: he was a native of Saxony. It has been anſwered by ſeveral.

In the year 1780, the rev. Mr. Madan publiſhed a treatiſe, artfully vindicating and ſtrongly recommending *polygamy*, under the title of Thelypthora; or a Treatiſe on Female Ruin, in its Cauſes, Effects, Conſequences, Prevention, and Remedy, &c. Marriage, according to this writer, ſimply and wholly conſiſts in the act of perſonal union, or *actus coitus*. Adultery, he ſays, is never uſed in the ſacred writings but to denote the defilement of a betrothed or married woman, and to this ſenſe he reſtricts the uſe of the term, ſo that a married man, in his opinion, is no adulterer, if his commerce with the ſex be confined to ſingle women, who are under no obligations by eſpouſals or marriage to other men: but, on the other hand, the woman who ſhould dare to have even but once an intrigue with any other man beſides her huſband, (let him have as many wives as Solomon) would, *ipſo facto*, be an adultreſs, and ought, together with her gallant, to be puniſhed with immediate death. This, he boldy ſays, is the law of God: and on this foundation he limits the privilege of *polygamy* to the man; in ſupport of which he refers to the polygamous connections of the patriarchs and ſaints of the Old Teſtament, and infers the lawfulneſs of their practice from the bleſſings which attended it, and the laws which were inſtituted to regulate and ſuperintend it. He contends for the lawfulneſs of Chriſtians having, like the ancient Jews, more wives than one; and labours much to reconcile the genius of the evangelical diſpenſation to an arrangement of this ſort. With this view he aſſerts, that there is not one text in the New Teſtament that even hints at the criminality of a polygamous connection; and he would infer from St. Paul's direction, that biſhops and deacons ſhould have but one wife, that it was lawful for laymen to have more. Chriſt, he ſays, was not the giver of a new law: but the buſineſs of marriage, *polygamy*, &c. had been ſettled before his appearance in the world, by an authority which could not be revoked. Beſides, this writer not only thinks *polygamy* lawful in a religious, but advantageous in a civil light, and highly politic in a domeſtic view.

In defence of his notion of marriage, which, according to his account of it, conſiſts in the union of man and woman as one body, the effects of which in the ſight of God no outward forms or ceremonies of man's invention can add to or detract from, he grounds his principal argument on the Hebrew words made uſe of in Gen. ii. 24. to expreſs the primitive inſtitution of marriage, viz. רבקבאשתו rendered by the LXX προσκολληθησηται προς την γυναικα αυτȣ, which tranſlation is adopted by the evangeliſt (Matt. xix. 5.) with the omiſſion only of the ſuperfluous propoſition (προς) after the verb. Our tranſlation he ſays—"ſhall cleave to his wife" doth not convey the idea of the Hebrew, which is literally, as Montanus renders the words, "ſhall be joined or cemented *in* his woman, and they ſhall become (i. e. by this union) one fleſh." But on this criticiſm, it is well remarked, that both the Hebrew and Greek terms means ſimply and literally attachment or adherence; and are evidently made uſe of in the ſacred writings to expreſs the whole ſcope of conjugal fidelity and duty, though he would reſtrain them to the groſſer part of it. See Deut. iv. 4. Joſhua xxiii. 8. Acts v. 36.

With reſpect to the Moſaic law, for which Mr. Madan is a warm advocate, it was certainly a local and temporary inſtitution, adapted to the ends for which it was appointed, and admirably calculated, in its relation to marriage, to maintain and perpetuate the ſeparation of the Jewiſh people from the Gentiles. In attempting to depreciate the outward forms of marriage, this writer would make his readers believe, that becauſe none are explicitly deſcribed, therefore none exiſted: and, conſequently, that they are the ſuperfluous ordinances of human policy. But it is evident, from comparing Ruth iv. 10, 13. with Tobit vii. 13, 14. and from the caſe of Dinah, related Gen. ch. xxxiv. that ſome forms were deemed eſſential to an honourable alliance by the patriarchs and ſaints under the Old Teſtament, excluſive of the carnal knowledge of each other's perſons. It is alſo evident in the caſe of the woman of Samaria, whoſe connection with a man not her huſband, is mentioned in John iv. that ſomething beſides cohabitation is neceſſary to conſtitute marriage in the ſight of God.

Having ſtated his notion of marriage, he urges in defence of *polygamy*, that notwithſtanding the ſeventh commandment, it was allowed by God himſelf, who made laws for the regulation of it, wrought miracles in ſupport of it by making the barren woman fruitful, and declared the iſſue legitimate to all intents and purpoſes. God's allowance of *polygamy* is argued from Exod. xxi. 10, and particularly from Deut. xxi. 15, which, he ſays, amounts to a demonſtration. This paſſage, however, at the utmoſt, only preſuppoſes that the practice might have exiſtence among ſo hard-hearted and fickle a people as the Jews; and therefore wiſely provides againſt ſome of its more unjuſt and pernicious conſequences; ſuch as tended to affect the rights and privileges of heirſhip. Laws enacted to regulate it cannot be fairly urged in proof of its lawfulneſs on the author's own hypotheſis; becauſe laws were alſo made to regulate divorce, which Mr. Madan condemns as abſolutely unlawful, except in caſes of adultery. Beſides, it is more probable, that the "hated wife" had been diſmiſſed by a bill of divorcement, than that ſhe was retained by her huſband: and moreover, it is not certain that the two wives, ſo far from living with the ſame huſband at the ſame time, might not be dead; for the words may be rendered thus "if there *ſhould have been* to a man two wives, &c." The words expreſſing the original inſtitution of marriage, Gen. ii. 24. compared with Matt. xix. 4, 5, 8, afford inſuperable objections againſt Mr. Madan's doctrine of *polygamy*. See alſo Lev. xviii. 18. 1 Cor. vii. 2, &c.

If we appeal on this ſubject, from the authority of ſcripture to the writings of ſome of the earlieſt fathers in the Chriſtian church, there is not to be found the fainteſt trace of any thing reſembling a teſtimony to the lawfulneſs of *polygamy*; on the contrary, many paſſages occur, in which the practice of it is ſtrongly and explicitly condemned. See Juſtin Martyr's Dial. with Trypho the Jew, Greek edit. by Thyrlby, fol. p. 336, 423, 372. Clemens Alexandrin. Stromata, lib. iv. p. 312, 335, 336, edit. Heinſii, &c. Lug. Bat. fol. 1616.

We ſhall cloſe this article with the words of an excellent anonymous writer, to whoſe critique on Mr. Madan's work we are indebted for the above remarks: in a word, when we reflect, that the primitive inſtitution of marriage limited it to one man and one woman; that this inſtitution was adhered to by Noah and his ſons, amidſt the degeneracy of the age in which they lived, and in ſpite of the examples of *polygamy*, which the accurſed race of Cain had introduced; when we conſider how very few, (comparatively ſpeaking) the examples of this practice were among the faithful; how much it brought its own puniſhment with it; and how dubious and equivocal thoſe paſſages are in which it appears to have the ſanction of divine approbation; when to theſe reflections we add another, reſpecting the limited views and temporary nature of the more ancient diſpenſations and inſtitutions of religion—how often the imperfections, and even vices of the patriarchs, and people of God, in old time, are recorded, without any expreſs notification of their criminality—how much is ſaid to be commanded, which our reverence for the holineſs of God and his law, will only ſuffer us to ſuppoſe, were, for wiſe ends, permitted—how frequently the meſſengers of God adapted themſelves to the genius of the people to whom they were ſent, and the circumſtances of the times in which they lived; above all, when we conſider the purity, equity, and benevolence of the Chriſtian law; the explicit declarations of our Lord, and his apoſtle St. Paul, reſpecting the inſtitution of marriage, its deſign and limitation; when we reflect too, on the teſtimony of the moſt ancient fathers, who could not poſſibly be ignorant of the general and common practice of the apoſtolic church; and, finally, when to theſe conſiderations we add thoſe which are founded on juſtice to the female ſex, and all the regulations of domeſtic œconomy and national policy, we muſt wholly condemn the revival of *polygamy*; and thus bear our honeſt teſtimony againſt the leading deſign of this dangerous and ill-adviſed publication. Monthly Review, vol. lxiii. p. 338.

POLYGAMY is alſo uſed in the *Canon Law*, for a plurality of wives, though only had ſucceſſively, or one at a time; in the Romiſh church this diſqualifies a man for the epiſcopate. See BIGAMY.

POLYGLOTT, Πολυγλωττος, thus called from πολυ, and γλωττα, *tongue*, *language*, among *Divines* and *Critics*, chiefly denotes a Bible printed in ſeveral languages.

The firſt *Polyglott* Bible is that of cardinal Ximenes, printed in 1515, at Alcala de Henares; and commonly called the *Bible of Complutum*, or the *Complutenſian Bible*; and contained in ſix volumes.

It contains the Hebrew text, the Chaldee paraphraſe on the Pentateuch, the Greek verſion of the LXX. and the ancient Latin verſion.

In this *Polyglott* there is no other Latin verſion from the Hebrew, beſide this laſt; but there is added another literal one from the Greek Septuagint. The Greek text of the new Teſtament is here printed, without accents, to bring it nearer to the original of the apoſtles, or, at leaſt, to the moſt ancient copies; wherein there are no accents found.

At the end is added an apparatus of grammars, dictionaries, and indices, or tables. The chief author, Ximenes, de Cineros, cardinal, and archbiſhop of Toledo, in his dedication to Pope Leo X. obſerves, that it was neceſſary to give the holy Scriptures in their originals, there being no tranſlation, how good ſoever, that can render them perfectly.

The ſecond *Polyglott*, called the *Biblia regia*, is that of Philip II. printed by Plantin, at Antwerp, in 1571, in eight volumes, with a better paper and letter than the former, and the care of the edition impoſed on Arias Montanus.

In this, beſides every thing in the Bible of Complutum, there are added, the Chaldee paraphraſes on the reſt of the Old Teſtament, beſides the Pentateuch, with a Latin tranſlation of thoſe paraphraſes. In this *Polyglott* is likewiſe a very literal Latin verſion of the Hebrew text; for the uſe of thoſe who have a mind to learn the Hebrew language.

As to the New Teſtament, beſide the Greek and Latin of the Bible of Alcala, in this edition there is added an ancient Syriac verſion, both in Syriac and Hebrew characters, with points, to facilitate the reading thereof to thoſe accuſtomed to read Hebrew. To the Syriac is likewiſe added a Latin one, compoſed by Guy le Fevre, who had the care of the Syriac verſion of the New Teſtament.

Laſtly, in the *Polyglott* of Antwerp, is added a more copious apparatus of grammars, dictionaries, &c. than in that of Complutum; with ſeveral little treatiſes, judged neceſſary for clearing up the more difficult paſſages in the text.

The third *Polyglott* is that of M. le Jay, printed at Paris in 1645, in ten volumes, which has this advantage over that of Philip II. that it has the Syriac and Arabic verſions of the Old Teſtament, with Latin interpretations. In the Pentateuch it has likewiſe the Hebrew and Samaritan text; and the Samaritan verſion in Samaritan characters.

As to the New Teſtament, beſide every thing in the *Polyglott* of Antwerp, here is added an Arabic tranſlation, with a Latin interpretation. But here are wanting the apparatus, and the grammars and dictionaries, which are both in the former *Polyglotts*; which renders this great work very imperfect.

The fourth *Polyglott* is that of London, printed in 1657, in ſix volumes, called Walton's *Polyglott*, from the author of the edition, Dr. Bryant Walton, afterwards biſhop of Wincheſter.

This is, indeed, leſs magnificent than that of M. le Jay, with regard both to the ſize of the paper, and the beauty of the characters; but is, in all other reſpects, preferable; being both much more ample and more commodious.

In this the Vulgate is printed according to the reviſed and corrected edition of Clement VIII. which is not done in that of Paris, where the Vulgate is printed as it ſtands in that of Antwerp, before that correction.

This likewiſe contains an interlineary Latin verſion of the Hebrew text; whereas the Paris edition has no other Latin verſion from the Hebrew beſide the common Vulgate: again, the Greek Septuagint printed in the *Polyglott*, is not the ſame with that printed in the Bible of Complutum, which was retained in the editions of Antwerp and Paris, but the Greek text of the edition of Rome. To which are added the various readings of another very ancient Greek copy, called the *Alexandrian*, becauſe brought from Alexandria.

The Latin verſion of the Greek of the Septuagint, is that publiſhed by Flaminius Nobilius, by authority of pope Sixtus V. Add, that in this *Polyglott* are found ſome parts of the Bible in the Ethiopic and Perſian; nothing whereof appears in any of the reſt.

Laſtly, this edition has the advantage of preliminary diſcourſes, called *prolegomena*, on the texts, both of the originals and verſions; with a volume of various readings of all the different editions.

Dr. Edmund Caſtell, Arabic profeſſor at Cambridge, in 1669, publiſhed a Lexicon Heptaglotton, for the uſe of Walton's *Polyglott*, in two volumes, folio. See the Preface to this *Polyglott*.

To the number of the *Polyglotts* may likewiſe be added, the two Pentateuchs, printed by the Jews of Conſtantinople, in four languages; but all in Hebrew characters. In one of theſe Pentateuchs, printed in 1551 is found the Hebrew text, in large characters; on one ſide whereof is the Chaldee paraphraſe of Onkelos, in middling characters; and on the other ſide, a paraphraſe in the Perſian, compoſed by a Jew, one Jacob de Tous, ſo called from the city where he lived. Beſide theſe three columns, the Arabic paraphraſe of Saadias Gaon is printed in ſmall characters, at the top of the pages; and at bottom is added the commentary of Raſch.

The other *Polyglott* was printed at Conſtantinople in 1547, in three columns like the former. The Hebrew text of the law is in the middle, a tranſlation into the vulgar Greek on one ſide, and a Spaniſh tranſlation on the other. Theſe verſions are both in Hebrew characters, with points to determine the pronounciation. At the top of the page is added the Chaldee paraphraſe of Onkelos, and at the bottom the commentaries of Raſch.

To all theſe may be added as a ſeventh *Polyglott*, the Pſalter publiſhed by Aug. Juſtinian, a Dominican, and biſhop of Nebio, at Genoa, 1515, containing the Hebrew, Greek, Arabic, and Chaldee, with Latin interpretations and gloſſes.

There are alſo various other editions of the Bible, either in whole, or in part, which might be ranged under the article of *Polygotts*; though they are not ſo denominated. Such are the *Hexapla*, and *Octapla*, of Origen.

And the Bible of Hutter, printed at Hamburgh in Hebrew, Chaldee, Greek, Latin, German, Saxon, Italian, French, Sclavonic, Daniſh, &c.

POLYGLOTTA *avis*, in *Ornithology*, the name of a bird deſcribed by Nieremberg, and which, he ſays, he ſaw and heard, with admiration, ſinging in all tones. It is of the ſize of our ſtarling.

Its back is brown, and its breaſt and belly white; and near the neck and tail it is variegated with ſpots and ſtreaks of white; its head has a ſtreak of white, which repreſents a ſort of crown of ſilver; it is mightily eſteemed, and kept in cages by the Spaniards, as infinitely ſuperior to all other birds in melody; it feeds on almoſt any thing that is given it, and is moſt fond of the warmer climates; but endures the more temperate ones without harm. Ray.

The *polyglottos* of Linnæus is a ſpecies of the TURDUS. See MOCK-*bird*.

POLYGON, Πολυγωνος, formed from πολυς, *many*, and γωνια, *angle*, in *Geometry*, a multilateral figure, or a figure whoſe perimeter conſiſts of more than four ſides and angles.

If the ſides and angles be equal, the figure is called a *regular polygon*. For *ſimilar polygons*, ſee SIMILAR.

Polygons are diſtinguiſhed according to the number of their ſides. Thoſe of five ſides are called *pentagons*; thoſe of ſix, *hexagons*; thoſe of ſeven, *heptagons*; thoſe of eight, *octagons*, &c. The particular properties, &c. of each whereof, ſee under its proper article, PENTAGON, HEXAGON, &c.

POLYGONS, *general properties of*. Euclid demonſtrates theſe which follow: 1. That every *polygon* may be divided into as many triangles as it hath ſides.

This is done by aſſuming a point, as F (*Tab. Geom. fig.* 8.) any where within the *polygon*, and thence drawing lines to every angle, F*a*, F*b*, F*c*, F*d*, &c.

2. The angles of any *polygon*, taken together, make twice as many right ones, abating four, as the figure hath ſides. Thus, if the *polygon* hath five ſides, the double of that is 10; whence ſubtracting 4, there remains 6 right ones.

3. Every *polygon*, circumſcribed about a circle, is equal to a rectangled triangle, one of whoſe legs is the radius of the circle, and the other the perimeter, or ſum of all the ſides of the *polygon*.

Hence, every regular *polygon* is equal to a rectangled triangle, one of whoſe legs is the perimeter of the *polygon*; and the other a perpendicular drawn from the centre to one of the ſides of the *polygon*.

Hence, alſo, every *polygon*, circumſcribed about a circle, is bigger than it; and every *polygon*, inſcribed, is leſs than the circle. The ſame likewiſe appears hence, that the thing containing is ever greater than the thing contained.

Hence, again, the perimeter of every *polygon* circumſcribed about a circle, is greater than the circumference of that circle; and the perimeter of every *polygon* inſcribed, leſs: whence it follows, that a circle is equal to a right-angled triangle, whoſe baſe is the circumference of the circle, and its height the radius; ſince this triangle is leſs than any *polygon* circumſcribed, and greater than any inſcribed.

Nothing therefore is wanting to the quadrature of the circle, but to find a right line equal to the circumference of a circle.

POLYGON, *to find the area of a regular*. Multiply a ſide of the *polygon*, as AB, by half the number of the ſides, e. gr. the ſide of a pentagon by 2½. Again multiply the product by a perpendicular let fall from the centre of the circumſcribing circle to the ſide AB; the product is the area required.

Thus, ſuppoſe AB 54; and half the number of ſides 2½; the product or ſemiperimeter is 135. Suppoſing then the perpendicular FH 29; the product of theſe two, 3915, is the area of the pentagon required.

POLYGON, *to find the area of an irregular*, or *trapezium*. Reſolve it into triangles; find the ſeveral areas of the ſeveral triangles, ſee TRIANGLE. The ſum of theſe is the area of the *polygon* required.

POLYGON, *to find the ſum of all the angles in any*. Multiply the number of ſides by 180°: from the product ſubtract 360; the remainder is the ſum required.

Thus, in a pentagon, 180, being multiplied by 5, gives 900; whence ſubtracting 360, there remain 540, the ſum of the angles of a pentagon.

Hence, if the ſum found be divided by the number of ſides, the quotient will be the angle of a regular *polygon*.

Or the ſum of the angles is more ſpeedily found thus: multiply 180 by a number leſs by two than the number of ſides of the *polygon*; the product is the quantity of the angles required: thus, in a pentagon, 180 being multiplied by 3, a number leſs by two than that of its ſides, the product is 540, the quantity of angles as before.

The following table exhibits the ſums of the angles in all rectilinear figures, from a triangle to a dodecagon; and is of good uſe, both for the deſcribing of regular figures, and for proving whether or no the quantity of angles have been truly taken with an inſtrument.

Num. Sides.	*Sum.* *Ang.*	*Ang. of Reg. fig.*	*Ang. at the centre*	*Num.* *Sides.*	*Sum.* *Ang.*	*Ang. of Reg. fig*	*Ang. at the centre*
III.	180°	60°	100°	VIII.	1080°	135°	45°
IV.	360	90	90	IX.	1260	140	40
V.	540	108	72	X.	1440	144	36
VI.	720	120	60	XI.	1620	$147\ 16'\frac{4}{11}$	$32\ 43'\frac{7}{11}$
VII.	900	$128\ 43'\frac{2}{7}$	$51\ 35'\frac{5}{7}$	XII.	1800	150	30

This table is formed by dividing 360, the degrees in a circumference, by the number of the ſides in each *polygon*; and the quotients are the angles at the centres; the angle at the centre ſubtracted from 180° leaves the angle at the circumference; and the ſum of the angles is had by doubling the number of ſides, ſubtracting 4 from the product, and multiplying the remainder by 90.

POLYGON, *to inſcribe a regular, in a circle*. Divide 360 by the number of ſides in the *polygon* required, to find, the quantity of the angle EFD. Set off the angle at the centre, and apply the chord thereof, ED, to the periphery, as often as it will go. Thus will the *polygon* be inſcribed in the circle.

The reſolution of this problem, though it be mechanical, yet is not to be deſpiſed, becauſe both eaſy and univerſal. Euclid, indeed, gives us the conſtruction of the pentagon, decagon, and quindecagon; and other authors give us thoſe of the heptagon, enneagon, and hendecagon; but they are far from geometrical ſtrictneſs.

Renaldinus lays down a catholic rule for the deſcribing of all *polygons*, which many other geometricans have borrowed from him; but Wagnerus and Wolfius have both demonſtrated the falſity thereof.

POLYGON, *about a regular, to circumſcribe a circle*: or, *to circumſcribe a regular* POLYGON *about a circle*. Biſect two of the angles of the given *polygon* A and E, by the right lines AF and EF, concurring in F, and from the point of concourſe with the radius EF deſcribe a circle.

To circumſcribe a *polygon*, &c. divide 360 by the number of ſides required, to find *e*F*d*; which ſet off from the centre F, and draw the line *ed*; on this conſtruct the *polygon*, as in the following problem. See CIRCUMSCRIBING.

POLYGON, *on a given line* ED *to deſcribe any given regular*. Find an angle of the *polygon* in the table; and in E ſet off an angle equal to it, drawing EA = ED. Through the three points AED deſcribe a circle. In this apply the given right line as often as it will go. Thus will the required figure be deſcribed.

POLYGON, *to inſcribe, or circumſcribe a regular, trigonometrically*. Find the ſine of the arc produced by dividing the ſemiperiphery 180 by the number of ſides of the *polygon*: the double of this is the chord of the double arc; and therefore the ſide AE to be inſcribed in the circle: If then the radius of a circle wherein, e. gr. a pentagon is to be inſcribed, be given in any certain meaſure, e. gr. 345, the ſide of the pentagon is found in the ſame meaſure by the rule of three, thus: as radius 1000 is to 1176 ſo is 3450 to 4057, the ſide of the pentagon. With the given radius, therefore deſcribe a circle; and therein ſet off the ſide of the *polygon* as often as it will go; thus will a *polygon* be inſcribed in the circle.

To ſave the trouble of finding the ratio of the ſide of the *polygon* to radius, by the canon of ſines; we ſhall add a table expreſſing the ſides of *polygons* in ſuch parts whereof radius contains 100000000. In practice, as many figures are cut off from the right hand, as the circumſtances of the caſe render needleſs.

Numb. Sides	*Quantity Side.*	*Numb. Sides.*	*Quantity Side.*
III.	17320508	VIII.	7653668
IV.	14142135	IX.	6840402
V.	11755705	X.	6180339
VI.	10000000	XI.	5634651
VII.	8677674	XII.	5176380

POLYGON, *to deſcribe a regular, on a given right line, and to circumſcribe a circle about a given* polygon, *trigonometrically*. Taking the ratio of the ſide to the radius out of the table, find th radius in the ſame meaſure wherein the ſide is given. For the ſide and radius being had, a *polygon* may be deſcribed by the laſt problem. And if with the interval of the radius, arcs be ſtruck from the two extremes of the given line, the point of interſection will be the centre of the circumſcribing circle.

POLYGON, in *Fortification*, denotes the figure or perimeter of a fortreſs, or fortified place. See FORTIFICATION.

POLYGON, *exterior*, is a right line drawn from a vertex or point of a baſtion, to the vertex or point of the next adjacent BASTION. Such is the line CF, *Tab. Fortif. fig.* 1.

POLYGON, *interior*, is a right line drawn from the centre of one baſtion to the centre of another. Such is the line GH.

POLYGONS, *line of*, is a line on the French ſectors, containing the homologous ſides of the firſt nine regular *polygons* inſcribed in the ſame circle, i. e. from an equilateral triangle to a dodecagon. See SECTOR.

POLYGONAL *column*. See COLUMN.

POLYGONAL *number*, in *Algebra*, is the ſum of a rank of numbers in arithmetical progreſſion, beginning from unity: thus called, becauſe the units, of which it conſiſts, may be ſo diſpoſed as to repreſent a figure of ſeveral equal ſides and angles.

Polygonal numbers are divided with reſpect to the common difference in the ſeries whence they proceed, or whoſe ſums they are into *triangular*, which are thoſe whoſe difference of terms is 1; *quadrangular* or *ſquare*, where it is 2; *pentagonal*, where 3; *hexagonal*, where 4; *heptagonal*, where 5; *octagonal*, where 6, &c.

They have their names from the geometrical figures into which points correſponding to their units may be diſpoſed, e. gr. three points, correſponding to the three units of a triangular number, may be diſpoſed into a triangle; and ſo of the reſt.

The geneſis of the ſeveral kinds of *polygonal* numbers from the ſeveral arithmetical progreſſions, may be conceived from the following examples:

Arithmetical progreſſion	1,	2,	3,	4,	5,	6,	7,	8
Triangular numbers	1,	3,	6,	10,	15,	21,	28,	36
Arithmetical progreſſion	1,	3,	5,	7,	9,	11,	13,	15
Square numbers	1,	4,	9,	16,	25,	36,	49,	64
Arithmetical progreſſion	1,	4,	7,	10,	13,	16,	19,	22
Pentagonal numbers	1,	5,	12,	22,	35,	51,	70,	92
Arithmetical progreſſion	1,	5,	9,	13,	17,	21,	25,	29
Hexagonal numbers	1,	6,	15,	28,	45,	66,	91,	120

POLYGONAL *number, ſide of a*, is the number of terms of the arithmetical progreſſion that compoſe it; and the number of angles is that which ſhews how many angles that figure has, whence the *polygonal* number takes its name.

The number of angles therefore in triangular numbers, is 3, in tetragonal 4, in pentagonal 5, &c. Conſequently the number of angles exceeds the common difference of terms by two.

To find a **POLYGONAL** *number, the ſide and number of its angles being given.* The canon is this: the *polygonal* number is the ſemi difference of the factums of the ſquare of the ſide into the number of angles diminiſhed by two units; and of the ſide itſelf into the number of angles diminiſhed by four units.

The ſums of *polygonal* numbers collected in the ſame manner as the *polygonal* numbers themſelves are, out of arithmetical progreſſions, are called *pyramidal numbers*.

POLYGONATUM, in *Botany*. See LILY *of the Valley*.

POLYGONIFOLIA *of Dillenius*, in *Botany*. See CORRIGIOLA.

POLYGONOIDES, in *Botany*. See CALLIGONUM.

POLYGONUM, in *Botany*. See KNOT-*graſs*.

POLYGRAM, in *Geometry*, a figure conſiſting of many lines

POLYGRAPHY, POLYGRAPHIA, or POLYGRAPHICE, formed from πολυ, *multum*, and γραφη, *ſcriptura*, *writing*, the art of writing in various unuſual manners or cyphers; as alſo the art of decyphering the ſame.

The word is uſually confounded with STEGANOGRAPHY, and CRYPTOGRAPHY.

The ancients ſeem to have been very little acqainted with this art; nor is there any mark of their having gone beyond the Lacedæmonian SCYTALA.

Trithemius, Porta, Vigenera, and father Niceron, have written on the ſubject of *polygraphy*, or CIPHERS.

POLYHEDRON, or POLYEDRON, Πολυεδρον, formed from ϖολυ, *much*, and εδρα, *ſeat*, in *Geometry*, a body comprehended under many rectilinear ſides or planes.

If the ſides of the *polyhedron* be regular *polygons*, all ſimilar and equal, the *polyhedron* becomes a regular body, and may be inſcribed in a ſphere; that is, a ſphere may be drawn round it, ſo that its ſurface ſhall touch all the ſolid angles of the body.

POLYHEDRON, *gnomonic*, is a ſtone with ſeveral faces, whereon are projected various kinds of dials. See DIAL. Of this kind, that in the privy-garden, London, now gone to ruin, was anciently the fineſt in the world.

POLYHEDRON, or POLYSCOPE, in *Optics*, is a glaſs, or lens, conſiſting of ſeveral plain ſurfaces, diſpoſed into a convex form; popularly called a MULTIPLYING-*glaſs*.

The phenomena of the *polyhedron* are as follow: 1. If ſeveral rays, as EF, AB, CD (*Tab.* V. *Optics*, *fig.* 91.) fall parallel on the ſurface of a *polyhedron*, they will continue parallel after refraction.

If then the *polyhedron* be ſuppoſed regular, LH, HI, IM, will be as tangents, cutting the ſpherical convex lens in F, B, and D; conſequently, rays falling on the points of contact, interſect the axis. Wherefore, ſince the reſt are parallel to theſe, they will alſo mutually interſect each other in G.

Hence, if the eye be placed where parallel rays decuſſate, rays of the ſame object will be propagated to it ſtill parallel from the ſeveral ſides of the glaſs. Wherefore, ſince the cryſtalline humour, by its convexity, unites parallel rays, the rays will be united in as many different points of the retina, *a*, *b*, *c*, as the glaſs has ſides.

Conſequently the eye through a *polyhedron*, ſees the object repeated as many times as there are ſides. And hence, ſince rays coming from remote objects are parallel; a remote object is ſeen as often repeated through a *polyhedron*, as that has ſides.

2. If rays AB, AC, AD (*fig.* 92.) proceeding from a radiant point A, fall on ſeveral ſides of a regular *polyhedron*; after refraction they will decuſſate in G, and proceed on a little diverging.

Hence, if the eye be placed where the rays coming from the ſeveral planes decuſſate, the rays will be propagated to it from the ſeveral planes a little diverging: i. e. as if they proceeded from different points. But ſince the cryſtalline humour, by its convexity, collects rays from ſeveral points in the ſame point; the rays will be united in as many different points in the retina, *a*, *b*, *c*, as the glaſs has ſides; conſequently, the eye, being placed in the focus G, will ſee even a near object repeated as often through the *polyhedron* as that has ſides.

Thus may the images of objects be multiplied in a camera obſcura, by placing a *polyhedron* at its aperture, and adding a convex lens at a due diſtance from it. And it makes a very pleaſant appearance, if a priſm be applied ſo that the coloured rays of the ſun refracted therefrom be received on the *polyhedron*: for by this means they will be thrown on a paper or wall, near at hand, in little lucid ſpects, much exceeding the brightneſs of any precious ſtone; and in the focus of the *polyhedron* where the rays decuſſate (for in this experiment they are received on the convex ſide) will be a ſtar of ſurpriſing luſtre.

If images be painted in water-colours in the areolæ or little ſqares of a *polyhedron*, and the glaſs applied to the aperture of a camera obſcura; the ſun's rays, paſſing through it, will carry with them the images thereof, and project them on the oppoſite wall.

This artifice bears a reſemblance to that other, whereby an image on paper is projected on the camera; viz. by wetting the paper with oil, and ſtraining it tight in a frame; then applying it to the aperture of the camera obſcura, ſo that the rays of a candle may paſs through it upon the *polyhedron*.

To make an anamorphoſis, or deformed image, which through a **POLYHEDRON**, *or* multiplying-glaſs, *ſhall appear regular and beautiful.* At one end of a horizontal table erect another at right angles, whereon a figure may be deſigned; and on the other erect another, to ſerve as a fulcrum or ſupport, moveable on the horizontal one. To the fulcrum apply a plano-convex *polyhedron*, conſiſting, e. gr. of twenty-four plain triangles; let the *polyhedron* be fitted in a draw-tube, whereof that end towards the eye to have only a very ſmall aperture, and a little farther off than the focus. Remove the fulcrum from the other perpendicular table, till it be out of the diſtance of the focus; and that more, as the image is to be greater. Before the little aperture place a lamp; and trace the luminous areolæ projected from the ſides of the *polyhedron*, with a black-lead pencil, on the vertical plane, or a paper applied thereon.

In the ſeveral areolæ, deſign the ſeveral parts of an image, in ſuch a manner as that, when joined together, they may make one whole, looking afreſh every now and then through the tube to guide, correct, &c. the colours, and to ſee that the ſeveral parts match aptly together.

The intermediate ſpace fill up with any figures or deſigns at pleaſure, contriving it ſo, as that to the naked eye the whole may exhibit ſome appearance very different from that intended to appear through the *polyhedron*.

The eye, now looking through the little aperture of the tube, will ſee the ſeveral parts and members diſperſed among the areolæ to exhibit one continued image, all the intermediate ones diſappearing. See ANAMORPHOSIS.

POLYHEDROUS *figure*, in *Geometry*, a ſolid contained under, or conſiſting of many ſides. See POLYHEDRON.

POLYHISTOR is uſed for a perſon of great and various erudition. See POLYMATHY.

POLYHYMNIA, in *Mythology*, one of the nine MUSES, diſtinguiſhed among authors and poets by holding ſome ſtringed inſtrument of muſic in her hands, and by marking out what ſhe ſings with her hand.

POLYMATHY, POLYMATHIA, Πολυμαθια, from ϖολυ, *multum*, and μανθανω, *diſco*, *I learn*, the knowledge of many arts and ſciences; or an acquaintance with a great number of different ſubjects.

Lipſius, Scaliger, Kircher, Petavius, Grotius, Salmaſius, Leibnitz, &c. were famous for *polymathy*. Among the ancients, ſuch as were eminent this way were called *polyhiſtores*.

Polymathy is frequently little more than a confuſed heap of uſeleſs erudition, occaſionally detailed, either pertinently or impertinently, for parade. The genuine *polymathy* is an extenſive erudition, or a knowledge of a great number of things, well digeſted, and applied to the purpoſe, and never but where they are neceſſary.

POLYMNIA, in *Botany*, a genus of the *ſygeneſia polygamia neceſſaria* claſs: its characters are, that the receptacle is chaffy, and that there is no down; the exterior calyx is compoſed of five leaves, and the interior of ten, with ſmall concave leaves. There are four ſpecies.

POLYMORPHOS, variouſly ſhaped, an epithet often given to the os ſphenoides.

POLYMYTHY, POLYMYTHIA, in *Poetry*, denotes a multiplicity of fables, in an epic or dramatic poem; in lieu of an unity or a ſingle one.

Polymythia is a great fault. It conſiſts in joining a number of diſtinct actions or fables into one complex body. Such a work Boſſu compares to the Batrachomyomachia, or one of the fables of Æſop: and ſuch would be the idea of a Theſaid, an Heracleid, an Achilleid, or the like poems, which ſhould comprehend all the actions of thoſe heroes compared with the Iliad or Æneid.

POLYNEMUS, *finger-fiſh*, in *Ichthyology*, a genus of the *abdomonales*: its characters are, that the head is compreſſed and ſquamoſe; the beak is very obtuſe and prominent; the gills conſiſt of five or ſeven rays, and there are ſeveral diſtinct proceſſes or appendages placed with the pectoral fins. There are three ſpecies, one of which is the paradiſe-fiſh of Edwards.

POLYNOMIAL, or *multinomial roots*, in *Mathematics*. See MULTINOMIAL, and ROOT.

To raiſe a *polynomial* to any given power, may be done by ſir Iſaac Newton's BINOMIAL theorem. Among other methods of demonſtrating this, we have one by ſignor Caſtillioni in the Philoſophical Tranſactions, N° 464.

POLYOPTRUM, formed from ϖολυ, *much*, *many*, and οπτομαι, *I ſee*, in *Optics*, a glaſs through which objects appear multiplied, but diminiſhed.

The *polyoptrum* differs both in ſtructure and phenomena from the common multiplying-glaſs, called *polyhedra*.

POLYOPTRUM, *conſtruction of the*. In a glaſs plain on both ſides, A B (*Tab.* V. *Optics*, *fig.* 93.) and about three fingers thick, cut out ſpherical ſegments, ſcarce a fifth part of a digit in diameter.

If then the glaſs be removed from the eye, till you can take in all the cavities at one view, you will ſee the ſame object, as if through ſo many ſeveral concave glaſſes, as there are cavities, and all exceeding ſmall.

Fit this as an object-glaſs, in a tube A B C D, whoſe aperture A B is equal to the diameter of the glaſs, and the other C D is equal to that of an eye-glaſs, e. gr. about a finger's breadth. The length of the tube A C is to be accommodated to the object and eye-glaſs, by trial. In C D fit a convex eye-glaſs, or in lieu thereof a meniſcus having the diſtance of its principal focus a little larger than the length of the tube; ſo that the point from which the rays diverge after refraction in the object-glaſs, may be in the focus. If then the eye be applied near to the eye-glaſs, a ſingle object may be ſeen repeated as often as there are cavities in the object-glaſs, but ſtill diminiſhed.

POLYOSTEON, a name given by authors to that part of the foot which conſiſts of a great many bones.

POLYPE, or POLYPUS, in *Zoology*, a ſmall freſh-water inſect, belonging to the genus of HYDRA, in the claſs of *worms*, and order of *zoophytes*, in the Linnæan ſyſtem; which, when cut into a number of ſeparate pieces, becomes in a day or two ſo many diſtinct and ſeparate animals; each piece having the ſurpriſing property of producing a head and tail, and the other organs neceſſary for life and all the animal functions. See *Tab. of Microſcopical Objects*, *Claſs* 1.

The firſt diſcovery of this animal was owing to M. Leeuwenhoek, who, in the year 1703, preſented to the Royal Society of London a deſcription of it, and an account of its uncommon way of producing its young: but the diſcovery of its amazing property of reproducing the ſeveral organs of its various pieces, was not made till the year 1740, by Mr. Trembley, at the Hague. See Martyn's Abr. Phil. Tranſ. vol. ix. p. 17, &c.

The production of its young is, indeed, different from the common courſe of nature in other animals: for the young one iſſues from the ſide of its parent, in form of a ſmall pimple or protuberance, which, lengthening and enlarging every hour, becomes, in about two days, a perfect animal, and drops from off its parent, to ſhift for itſelf: but before it does this, it has often another growing from its ſide; and ſometimes a third from it, even before the firſt is ſeparated from its parent.

M. Trembley obſerves, that there is no diſtinguiſhed place in the body of the *polypus*, by which the young are brought forth. He has ſeen ſome of them that have produced young ones from all the exterior parts of their bodies.

They breed quicker in hot than in cold weather; and what is very extraordinary is, that there never has yet been diſcovered among them any diſtinction of ſex, or appearance of copulation; every individual of the whole ſpecies being prolific, and that as much if kept ſeparate, as if ſuffered to live among others.

If the method of this little animal's producing its young be very amazing, its reproduction of the ſeveral parts, when cut off, is much more ſo. The diſcovery of this was perfectly accidental; for M. Trembley, who had often met with the creature in the water, and from its fixed reſidence in one place, and ſome other obſervations, not being able to determine whether it were an animal or a vegetable, made the trial by cutting it aſunder, when, to his amazement, he found, that in a few days each of thoſe pieces was become a perfect animal, the head part having ſhot forth a tail, and the tail a head.

A thouſand other trials, by cutting the animal in different manners, firſt by M. Trembley, and afterwards, at his requeſt, by Monſ. Reaumur, and Bernard de Juſſieu, at Paris, and Mr. Folkes, Mr. Baker, and the other naturaliſts in England, were the reſult of this; and all ſucceeded in the ſame manner by thoſe who repeated them.

It is not eaſy to ſay what is the ſize of this creature; for it can contract or extend its body at pleaſure from the length of an inch or more, and the thickneſs of a hog's briſtle, to the ſhortneſs of a ſingle line, with a proportionable increaſe of thickneſs. Its body is round and tubular, at one end of which is the head, ſurrounded with ſix, eight, ten, or more arms, with which it catches its prey; and at the other, the anus and tail, by which it fixes itſelf to any thing it pleaſes.

There have been many different ſpecies of it diſcovered, the moſt elegant of which, the *polype a panache*, or plumed *polype*, of Mr. Trembley, ſeems much to reſemble the wheel-animal (ſo called from having the appearance of two wheels in its head) which Mr. Leeuwenhoek diſcovered, living in a ſheath or caſe, and affixed to the roots of duckweed.

All the ſpecies are found in clear and ſlowly running waters, adhering by the tail to ſticks, ſtones, and water-plants, and live on ſmall inſects. They are eaſily kept alive a long time in glaſſes, often changing the water, keeping the glaſſes clean, and feeding them with a ſmall red worm, common in the mud of the Thames, or with other ſmall inſects.

The creature has its name from the Greek πολυς, *many*, and πȣς, *a foot*, ſignifying an animal with many feet; but a more appoſite one might have eaſily been invented, ſince it has in reality no feet at all. What were originally taken for feet, are what have ſince been called its horns, and of late more properly its arms, their office being to catch its prey.

This animal, repreſented in the plate of *Microſcopical Objects*, &c. above referred to, is firſt of a worm-ſhaped figure, and of the ſame kind of tender ſubſtance with the horns of a common ſnail; it adheres by one end, like a ſucker, to water plants and other ſubſtances; the other end, which is the head, is ſurrounded by many arms or feeders, placed like rays round a centre; this centre is its mouth; and with theſe tender arms, which are capable of great extenſion, it ſeizes minute worms, and various kinds of water-inſects, and brings them to its mouth; and often ſwallows bodies larger than itſelf; having a ſurpriſing property of extending its mouth wider, in proportion, than any other animal. After its food is digeſted in its ſtomach, it returns the remains of the animals upon which it feeds through its mouth again, having no other obſervable emunctory. In a few days there appear ſmall knobs or *papillæ* on its ſides: as theſe increaſe in length, little fibres are ſeen riſing out of the circumference of their heads, as in the parent animal; which fibres they ſoon begin to uſe for the purpoſe of procuring nouriſhment, &c. When theſe are arrived at mature ſize, they ſend out other young ones on their ſides in the ſame manner; ſo that the animal branches out into a numerous offspring, growing out of one common parent, and united together and diſpoſed in the manner repreſented in the plate. Each of theſe provides nouriſhment not only for itſelf, but for the whole ſociety; an increaſe of the bulk of one *polype* by its feeding, tending to an increaſe in the reſt. Thus a *polype* of the freſh-water kind becomes like a plant branched out, or compoſed of many bodies, each of which has this ſingular characteriſtic, that if one of them be cut in two in the middle, the ſeparated part becomes a complete animal, and ſoon adhering to ſome fixed baſe, like the parent from which it was ſeparated, produces a circle of arms; a mouth is formed in the centre; it increaſes in bulk, emits a numerous progeny, and is, in every reſpect, as perfect an animal as that from which it was ſevered.

The ſeveral ſtrange properties recorded of this animal, though very ſurpriſing, are, however, none of them peculiar to it alone. The Surinam toad is well known to produce its young not in the ordinary way, but in cells upon its back. Mr. Sherwood has very lately diſcovered the ſmall eels in ſour paſte to be each, without exception, full of living young ones. And as to the moſt amazing of all its properties, the reproduction of its parts, we know the crab and lobſter, if a leg be broken off, always produce a new one: and M. Bonet, M. Lyonet, Monſ. de Reaumur, and Mr. Folkes, have all found on experiment, that ſeveral earth and water worms have the ſame property, ſome of them even when cut into thirty pieces. The *urtica marina*, or ſea-nettle, has been alſo found to have the ſame: and the ſea ſtar-fiſh, of which the *polype* is truly a ſpecies, though it had long eſcaped the ſearches of the naturaliſts, was always well known by the fiſhermen to have it alſo. See Reproduction.

Polype, *cluſter*, the name of a ſpecies of ſmall inſect of the *polype* kind, called by the French naturaliſts *polype en bouquet*.

There is found on ſeveral of the water-plants, and on other ſubſtances, as ſticks, boards, and the like accidentally fallen into the water, a whitiſh ſubſtance that at firſt ſight appears to be only a ſort of mouldineſs; but if the bodies on which this is found be put into a veſſel of clear water, and the matter examined with a magnifying glaſs, it is ſoon ſeen that this whitiſh ſubſtance is really a vaſt number of ſmall animals, which are almoſt continually in motion. When this is brought before the microſcope, the form and ſtructure of the creatures are very evidently diſtinguiſhed, and they are found to be minute roundiſh creatures, ſeverally affixed to the end of a ſort of ſtem or tail; and many of the ſtems are ſo interwoven and united together, that they form *cluſters*, which have occaſioned the name of a *cluſter-polype* to be given to the animal, though in itſelf it is really and properly ſingle from the beginning. There are ſeveral ſpecies of *polype* of this minute kind, that *cluſter* themſelves in this manner together; and according to theſe and other circumſtances, the *cluſters* are found larger or ſmaller, and more or leſs complex.

The ſmaller *cluſters* ſhould always be choſen for obſervation, as in the larger the bodies of the ſeveral animals that compoſe them are apt to hide and obſcure one another; but the moſt beautiful and accurate of all obſervations is to be formed when they are ſingle, as they are ſometimes found; and this is the only opportunity of ſeeing diſtinctly in what manner the *cluſters* are formed. One of theſe ſingle animals is not in length above the two hundred and fortieth part of an inch, and is of a ſhape nearly reſembling that of a bell: the anterior part of this generally appears open when it preſents itſelf properly; and the poſterior part is fixed to the ſtem or pedicle, by the other extremity of which the creature faſtens itſelf to any ſolid body that it meets with. The body is of a browniſh colour, except at the ſmaller end, which, as well as the tail, is whitiſh and tranſparent; and when the anterior part is open, there may always be perceived about its edges, a very lively motion; and when the creature preſents itſelf in a better manner, there may be ſeen on either ſide of the edges on the anterior part, ſomewhat reſembling the wheels of a mill, continually moving with great velocity.

Theſe creatures are able to contract their bodies, and often do it very ſuddenly, eſpecially if any thing diſturb the ſubſtance on which they are fixed; when they are thus contracted, the edges of their anterior parts are drawn juſt into their bodies: and when the fright is over, it is a very agreeable to ſight behold theſe edges turning out again, and putting themſelves in motion as before. If the edges of the anterior parts of the bodies of theſe animals be ſtrictly obſerved while in motion, the water about them will be found to be full of extremely minute round bodies, which are brought together by means of that motion, and ſerve the creature for its food: theſe may be often ſeen going down into the cavities of the body of the *polype*, and that very ſuddenly, as if forcibly driven down; and when ſwallowed too voraciouſly, are often thrown up again. Theſe obſervations are beſt made when a ſmall *cluſter* of the *polypes* are examined together.

If theſe *polypes* are kept ſometime in the rain-water, they, by degrees, loſe their brown colour, and become white and tranſparent throughout, except that a few ſpots of a duſky colour remain in their bodies; but if, after this, they are removed into other water of the ſame kind with the firſt, but newly taken out of the ditch, they in a little time recover their brown colour. When they become white, they plainly appear to be in a ſickly condition, and ceaſe to multiply; but when they have freſh water and recover their colour, they immediately begin to multiply again.

Theſe creatures are not abſolutely and immoveably fixed to the bodies on which they are placed, but they can at pleaſure quit them and ſwim about: in this ſwimming ſtate they are always found ſingle and not in *cluſters*; and they do not then appear in the ſame form as when they are fixed and open at the anterior ends. When they have ſwam about as long as they pleaſe, they either return to their *cluſters* from which they ſeparated themſelves, or affix each ſingly to any thing they meet with: and this is a circumſtance that merits to be carefully watched, becauſe it is by means of this that we ſee in what manner the creature multiplies itſelf and the *cluſters* are formed.

As ſoon as a ſingle animal of this kind is fixed to a ſtick, a ſtone, or any other ſubſtance, it begins to lengthen its ſtem or tail, which, though very ſhort while ſwimming, and when firſt fixed, very ſoon becomes of its priſtine length while in the *cluſter*; and after this the creature begins immediately to multiply by the moſt amazing means in the world, that is, by ſpliting itſelf to pieces lengthways. The firſt motion towards this operation is the drawing in the lips or edges; this is ſoon done, and the body then loſes its bell-like-ſhape, and becomes round; the motion which was before perceived at the edges ceaſes, and there is only a ſlight tremulation to be ſeen within the body; after which the anterior part of the body becomes flat or broad, and the whole body ſhortens in proportion; and ſoon after this the whole body gradually ſplits itſelf regularly into two, from the centre of the anterior part to the centre of the hinder end, where it joins the tail or pedicle, and there ſoon appear two round and perfect bodies joined to that pedicle which before ſupported only one. The anterior parts of the two bodies ſoon begin to open, and gradually ſhew their edges, which perform the ſame motion the ſingle one did before. The motion is at firſt very ſlow, but it grows quicker by degrees as they open; and when they are perfectly expanded, it is as quick as it was in the original ſingle body; it is at this time that the two bodies may be eſteemed quite perfect. They are at firſt indeed leſs than the original *polype*, from which they were formed, but they grow to the ſame ſize in a very little time: the whole operation of dividing itſelf, takes up the creature about an hour: but to form a true idea of the manner in which it is performed, there muſt be many obſervations made, and the creatures muſt be examined in all views and lights while about it.

The lips of theſe *polypes*, when cloſely examined, appear to be compoſed of four or five tranſparent bands, all of which have an undulatory motion. And when the newly divided *polype* is but ſlow in its motions, it is eaſy to diſcover that what afterwards appear to be like the wheels of a mill, are, in reality, only four or five oblong bodies, reſembling a ſort of figures which alternately bend down, and extend themſelves every inſtant. Theſe are faſtened to the bands of the lips on each ſide of the mouth; and when they are put into ſwift motion in the time of the full growth and vigour of the animal, they are not to be diſtinguiſhed, as to form, nor can their motion be otherwiſe diſcovered than by its ſwiftneſs, which makes it reſemble the quick turning of a wheel.

When the ſeparation of the body of a ſingle *polype* of this kind is complete, one ſees two regular and perfect bodies adhering ſide by ſide to the ſame pedicle, but ſoon after each of the new formed bodies begins to ſhew a pedicle of its own; theſe grow in a day's time to a moderate length, and unite at their bottoms to the end of what was the original ſingle pedicle of the body while but one; they grow to this in the manner of the branches growing to the trunk of a tree.

Twenty-four hours after the ſeparation of the original body into two, theſe two begin to ſeparate themſelves in the ſame manner, each into two again; and theſe, after a like time, again ſeparate: each of theſe ſeparated animals has its own tail formed in a like period of time with the firſt; and the conſequence is, that the firſt ſeparation producing two, the ſecond gives four, the third eight, and ſo the ſixth ſixty-four, the ſeventh one hundred and twenty-eight, and ſo on; by which means a ſingle animal in a very few days, forms out of itſelf, an immenſe cluſter, each animal of which is perfect in itſelf, and independent of all the reſt, and can when it pleaſes, ſwim away and form a new *cluſter*. They will multiply as faſt in glaſs jars, as in their native free ſtate in the waters, and *cluſters* of them, begun near one another, will often join in ſuch a manner as to form one complex *cluſter* of an inch diameter: from theſe ſeveral *cluſters* there detach themſelves ſingle *polypes* from time to time, which go off, and faſtening themſelves to other bodies, become the authors of new progenies.

The original branch or ſtem of the firſt *polype* remains always in the centre of the *cluſter*; but it is of no uſe, never afterwards having any body fixed to it.

There are, beſides this ſpecies here deſcribed, four other known kinds of *polypes*, which divide themſelves in the ſame manner by ſplitting into two lengthwiſe: thoſe which come neareſt to the firſt are ſlenderer, and their ſtems are more tranſparent. They are of a bluiſh colour, when many of them are ſeen together, and their ſtems or tails very aptly reſemble ſpun glaſs. When this ſpecies is perfectly formed, the motion of its lips is leſs diſtinct than in the other; but it may be diſcovered in the ſame manner while they are newly ſeparated, and are but growing toward perfection, when it gradually becomes leſs and leſs diſtinct.

Another ſpecies of theſe *polypes* is ſmaller than the laſt, but more open at the mouth and deeper hollowed; and theſe are particularly diſtinguiſhed from all the others, by having a motion in their ſtems and branches, which all the others want. The ſtems draw themſelves up, and ſhorten all at once into the appearance of a ſpiral ſcrew, and in a moment can dart themſelves ſtraight out to their full length again. All theſe multiply very ſpeedily, but they have all enemies that deſtroy them in a very terrible manner, whole *cluſters* making but ſingle mouthfuls. The *funnel-polypes* are nearly allied to theſe creatures. Phil. Tranſ. Nº 474, vol. xliii. p. 169. &c. and vol. xliv. p. 627, &c.

POLYPE, *funnel*, a name given by naturaliſts to a ſmall water-inſect, in ſome reſpects approaching to the nature of the *cluſter*-POLYPE.

The *funnel-polype* nearly reſembles a funnel, from which it has its name. It is long and hollow, and very wide at the anterior end. Theſe little animals are of three ſpecies, a green, a blue, and a white one: they are all too minute for the obſervation of the naked eye, they muſt be viewed with great caution, and in ſeveral different directions and attitudes, before their true form can be diſcovered; and their anterior end, particularly when carefully obſerved, is of a much more compound ſtructure than might at firſt be imagined; there may always be obſerved round the edges of this part a ſenſible motion, reſembling that of an indented wheel, or rather that of a ſcrew turned very nimbly about. Theſe, though they approach to the ſhape of the cluſter-*polypes*, and reſemble them in their having this motion about the mouths, yet never have any tendency to form cluſters, but are ever found looſe and ſingle. There are always a number of little round bodies, which ſeem to be animals of a very minute ſize, ſwimming about in the water in which theſe *polypes* live; and theſe are continually drawn into the mouths of the *polypes*, and ſerve them for food.

The manner of theſe creatures propagating themſelves is very amazing; they do it by dividing their own body into two; but this is not done longitudinally, as in the cluſter-*polypes*, nor tranſverſely, but diagonally from the edge of the head to the oppoſite edge of the tail; ſo that of the two thus formed out of one, the one has a head and no tail, the other a tail and no head; but theſe deficiencies are ſoon made up, and the head ſoon grows out of one, and the tail out of the other.

Mr. Trembley, in his account of this inſect, calls that of the two which has the old head, the ſuperior *polype*; that which has the old tail, the inferior. The firſt particulars obſervable in a *funnel-polype* that is going to divide, are the lips of the inferior *polype*, or thoſe tranſparent edges, that are ſo very conſpicuous in the creature when perfectly formed. Theſe new lips firſt diſcover themſelves upon the *polype* that is going to divide, from a little below the old lips to about two-thirds of the length of the *polype*, reckoning from the head; but theſe new lips are not diſpoſed in a ſtraight line, according to the length of the *polype*, but run ſloping near half way round about. Theſe lips are diſtinguiſhed by their motion; but it is to be obſerved, that this motion is at firſt very ſlow, and requires an attentive eye and good glaſſes to diſcover it.

That portion of the body of the *polype* which is bounded by theſe new lips, then gathers up itſelf, and theſe lips inſenſibly draw cloſe together, and finally, they cloſe themſelves. By this means there is found a ſwelling at the ſide of the *polype*, which is found on cloſe examination, to be the head of the new *polype*, bounded by the lips before mentioned. Before this ſwelling is become very remarkable, it is eaſy to diſcover the true *polypes* that are forming themſelves; and, after this, when the ſwelling is greatly increaſed, theſe two diſtinct animals will be found joined to one another only by a very ſmall part of their bodies. The ſuperior *polype*, in this caſe, no longer adheres to the inferior one but by its poſterior extremity, which is ſtill fixed on one ſide of the inferior one. The ſuperior one then begins to make motions, which tend to the ſeparating itſelf from its fellow; and theſe ſoon finiſh the work, and he becomes perfectly diſengaged, and ſwims away whither he pleaſes, and ſoon fixes on ſome other place. The inferior *polype* remains fixed in the place where both were before, and becomes a perfect animal; and the ſuperior one, after taking a tour in the water, ſometimes returns to the old place, and fixes himſelf by the tail to the body of the inferior one. All theſe animals are extremely minute, and are not to be ſeen diſtinctly, much leſs are their operations obſerved without the help of glaſſes; and as there is no taking them out of the water to bring them before the microſcope in the common way, without abſolutely deſtroying them, M. Trembley, who has obſerved them with more accuracy than perhaps any other perſon ever did, has contrived to view them in a glaſs veſſel, in their own water, by bringing them ſo near the ſides of the glaſſes, that the microſcope glaſſes are able to reach them properly from the outſide. The ſubſtances on which they are fixed, are to be brought cloſe to the edges of the veſſel, by means of a ſet of quills framed properly together; and the microſcope glaſſes to be ſupported on a moveable arm made for that purpoſe. Phil. Tranſ. Nº 474 vol. xliii. p. 180, &c. and vol. xliv, p. 627, &c.

POLYPE, *marine*, is different in form from the freſh water POLYPE already deſcribed, but is nouriſhed, increaſes, and may be propagated after the ſame manner: Mr. Ellis having often found, in his enquiries, that ſmall pieces cut off from the living parent, in order to view the ſeveral parts more accurately, ſoon gave indications that they contained not only the principles of life, but likewiſe the faculty of increaſing and multiplying into a numerous iſſue. It has been lately diſcovered and ſufficiently proved by Peyſſonnel, Ellis, Juſſieu, Reaumur, Donati, &c. that many of thoſe ſubſtances, which had formerly been conſidered by naturaliſts as marine vegetables or ſea-plants, are in reality animal productions; and that they are formed by *polypes* of different ſhapes and ſizes, for their habitation, defence, and propagation. To this claſs may be referred the CORALS, CORALLINES, KERATOPHYTA, ESCHARA, SPONGES, and ALCYONIUM: nor is it improbable that the more compact bodies, known by the common appellations of ſtar-ſtones, brain-ſtone, petrified fungi, and the like, brought from various parts of the Eaſt and Weſt Indies, are of the ſame origin; to this purpoſe Mr. Ellis obſerves, that the ocean, in all the warmer latitudes near the ſhore, and wherever it is poſſible to obſerve, abounds ſo much with animal life, that no inanimate body can long remain unoccupied by ſome ſpecies. In thoſe regions the ſhips' bottoms are ſoon covered with the habitations of thouſands of animals: rocks, ſtones, and every thing lifeleſs, are covered with them inſtantly: and even the branches of living vegetables that hang into the water, are immediately loaded with the ſpawn of different animals, ſhell-fiſh of various kinds. And ſhell-fiſh themſelves, when they become impotent and old, are the baſis of new colonies of animals, from whoſe attacks they can no longer defend themſelves. For a farther account of this ſyſtem, ſee CORAL, and CORALLINES.

POLYPE, *ver*. See VER-*polype*.

POLYPETALOUS, from πολυ, *multum*, and πεταλον, *petalum*, in *Botany*, a flower conſiſting of ſeveral petala, or leaves.

The corollæ of flowers conſiſt either of a ſingle continued petalon, whence they are called *monopetalous*; or of ſeveral diſtinct pieces, whence they are named *polypetalous*.

Polypetalous flowers are either *regular* or *irregular*.

Polypetalous *flowers, regular*, according to ſome botaniſts, are either thoſe conſiſting of two pieces, as the circæa flower: or of four, thence called *croſs flowers*, as the flower of the clove-tree; or of five, uſually *umbelliferous*, as fennel; or of ſix, as the white lily, thence called the *lily kind*.

Thoſe exceeding this number, in any quantity, equal or unequal, form a new claſs of *polypetalous* flowers; among which are alſo ranked all thoſe whoſe fruits differ ſo from the reſt, that the rules of genera require that they be diſtinguiſhed from them.

Such is the flower of the water-plantain, which though it has only three leaves, yet, by this relation of its ſeed with that of the ranunculus, is ranged in this laſt claſs. Such alſo is the flower of tormentil; which, by reaſon of the difference of its fruit from the ſiliquæ or ſiliculæ of the croſs flowers, cannot be ranged among them. Such alſo is the pink, which, though conſiſting of five pieces, yet is excluded the claſs of umbelliferous plants, becauſe its fruit is not divided into two parts. Such, laſtly, are the flowers of ſome ranunculuſes, houſe-leek, and anemonies; which, though they have ſix petala, yet never produce fruits divided into three lodges, as thoſe of the lily-kind; and therefore cannot belong to their claſs.

Polypetalous *flowers, irregular*, are ſo called from the odd figure and diſpoſition of their petala, what number of them ſoever they have.

Such are thoſe two pieces reſembling two chaps, as in fumitory; or thoſe of five pieces reſembling butterflies: theſe laſt are common to all leguminous plants.

POLYPHEMUS, in *Mythology*, the moſt celebrated and the moſt terrible of the Cyclopes, who were deemed to be the ſons of Neptune.

POLYPODES, a word uſed by ſome as the name for the MILLEPEDES.

POLYPODITES, a name given by the ancients to a wine impregnated with polypody, and ſometimes for the juice of millepedes, expreſſed with wine.

POLYPODY, in *Botany*. See Polypody.

Polypody, *polypodium*, in *Botany*, a genus of the *cryptogamia filicies* claſs. Its characters are theſe: it is diſtinguiſhed from the other plants of the fern tribe by the fructification being in roundiſh ſpots, diſtributed on the under ſurface of the leaf. Miller.

There are many ſpecies of this plant. Tournefort enumerates twenty-ſix; Miller two; and Linnæus ſixty-four.

The *polypodies* are not branched, but conſiſt of ſingle leaves divided almoſt to the middle rib into oblong jags or ſegments.

The word is formed from the Greek πολυς, and πȣς, *foot*, in regard the root of the plant clings to walls and trees, by a great number of little fibres like claws.

The common *polypody*, with wing-pointed leaves having oblong obtuſe lobes, which are ſomewhat ſawed, and a ſcaly root, is the kind uſed in medicine; it is uſually found about the roots of old trees, in woods, and by hollow road ſides: and is green all ſeaſons of the year. There is a vulgar opinion, that ſuch of it as grows upon the ſtump of an oak, thence called *oak polypody*, is preferable to what grows on any other tree; but there is no foundation for this.

The root is the part uſed in medicine; it is a gentle cathartic, and has been recommended in diſorders ariſing from obſtructions of the liver and ſpleen. It is by many eſteemed an excellent medicine in ſcorbutic and hypochondriac complaints. The country people take it in infuſion alone, but phyſicians uſually preſcribe it in compound decoctions and medicated ales. It has alſo been made an ingredient in many of the purging electaries in the old diſpenſatories.

However, though it has been ſuppoſed to be aperient, reſolvent, and expectorant, and formerly ranked among the purgatives, its operation is ſo weak, a decoction of an ounce or two ſcarcely moving the belly, that it has been long expunged from the latter claſs, and the preſent practice very little regards it in any intention.

POLYPOSIA, a term uſed by the ancients to expreſs a copious drinking of wine.

POLYPREMUM, *Carolina flax*, in *Botany*, a genus of the *tetrandria monogynia* claſs: its characters are, that it has a four-leaved calyx; a rotated corolla divided into four ſegments, with heart-ſhaped lobes; and that the fruit is a compreſſed emarginated capſule, with two cells. There is only one ſpecies.

POLYPTOTON, Πολυπτωτον, in *Rhetoric*, a figure wherein the ſame word is repeated in different caſes, genders, or numbers, i. e. with different terminations.

Such is that of Cicero, pro Arch. *Sed pleni ſunt omnes libri, plenæ ſapientum voces, plena exemplorum vetuſtas.* So Virg. Æn. lib. iv. v. 28.

Littora littoribus contraria, fluctibus undas
Imprecor, arma armis pugnent. —

POLYPUS, the *polype*, in *Zoology*. See Polype.

Polypus, in *Natural Hiſtory*, a name given by ſome of the earlier writers to the thin ſhelled nautilus, or nautilus papyraceus. The body and arms of this creature ſomewhat reſemble thoſe of the polype; it was ſuppoſed to be a ſpecies of polype incloſed in a ſhell, which it could quit occaſionally, and go on ſhore to feed.

Polypus, πολυπȣς, or πολυπος, in *Surgery*, a fleſhy tumor or excreſcence ariſing from the inſide of the noſtrils, prejudicial to reſpiration and ſpeech; called alſo by way of diſtinction, *polypus narium*.

This *polypus* ariſes by ſeveral roots from the os criboſum, and hangs down, ſometimes as low as the lip; growing likewiſe backwards, ſo as to ſtop the hole of the palate; whereby the air and pituita deſcend out of the noſe down into the throat; and by this means ſtrangling the patient. It has its name from the reſemblance it bears to the fiſh *polypus*, called the *pour-contrel*, or *many-feet*. Some derive the name from the reſemblance its ſubſtance bears to that of the *polypus*; and others from the reſemblance its many roots bear to the many feet of that fiſh.

If it have no roots, or only one continued root, it is called a SARCOMA, which is only a beginning *polypus*.

Polypuſes are chiefly found in ſcrophulous or cancerous conſtitutions, along with venereal caſes, ulcers, ozænas, &c. Cauſtics, emollient fomentations, extirpation, and deſiccative powders, and lotions, are the uſual remedies.

M. Le Dran cured a *polypus* of the noſe, which he could not extract wholly, in the following manner, which may be practiſed for deſtroying all ſuch excreſcences. He introduced one end of a large ſeton, put on the point of the fore-finger of the left hand, into the patient's mouth, till he brought it behind the velum pendulum; then ſliding a pair of thin crooked forceps into the affected noſtril, he catched hold of the ſeton, after covering what was to be introduced into the noſe with a ſuppurant medicine. While he drew the cord, he endeavoured to preſerve the velum pendulum from being hurt, by introducing his finger into the mouth, and ſupporting the cord upon it. He continued the ſuppurant till he was ſenſible, by the patient's breathing freely through the noſtril, that the remains of the *polypus* was deſtroyed, and then he injected deſiccatives to cauterize the ulcer. Le Dran, tom. i. obſ. 6. ap. Med. Eſſ. Edinb.

Polypus is alſo uſed for a morbid excreſcence in the heart, conſiſting of a tough concretion of grumous blood lodged therein. Malpighi gives a very accurate deſcription of this *polypus*. In the right ventricle of the heart, he obſerves, it is uſually larger, and of a paler colour, like pituita, with reddiſh or blackiſh ſtreaks; in the left ventricle it is ſmaller, blacker, and denſer. He adds, that it ſeems to have a ſort of organiſm, and appears like a congeries of pellicles ſtretched over one another, which form a kind of nervous compages.

Polypuſes are often found upon opening the bodies of perſons dying apoplectic: and are doubtleſs frequently the occaſion of ſudden death. They are ſeldom diſcovered till they have diſpatched the patient.

It is, however, a diſpute among phyſicians, whether *polypuſes* be produced any conſiderable time before, or always immediately after death? Mr. Gould has an expreſs diſcourſe in the Philoſophical Tranſactions to evince the former.

Polypus *of the lungs*. In the Philoſophical Tranſactions, Dr. Robert Clarke gives us a very odd inſtance of a patient who coughed up, at times, ſeveral hundred *polypuſes of the lungs*.

They ſeemed to have ſome organization, and were all perfectly alike. The patient ſaid, though they had no life, he had frequently preſſed a ſlimy matter out of the body of them.

Dr. Liſter obſerves, that ſuch *polypuſes* are formed in the remoter and deeper branches of the aſperia arteria, whence they are very difficult to get up. The patient above mentioned never brought them up till after a continued coughing of half a day and night.

He adds, that they are nothing but viſcous excretions of the ſmall glands, hard baked in thoſe parts whoſe form they receive. M. Buiſſiere obſerves, they are frequently miſtaken for pieces of the blood-veſſels or lungs.

Though Kerkringius, and others, have endeavoured to explode the notion of the formation of true *polypi* in the heart and blood-veſſels, yet Malpighi, Bartholine, Tulpius, Pecklin, and others, have given us inconteſtible inſtances of the exiſtence of true *polypi* in the heart, in the ſtricteſt ſenſe; and we have three unqueſtionable evidences of the like nature, in Philoſ. Tranſact. Nº 464. ſect. 6.

POLYPYRENEOUS *fruits*, in *Botany*, are ſuch as contain ſeveral kernels or ſeeds.

They are thus called from the Greek ϖολυ, *much*, and πυρην, *kernel* or *berry*.

POLYSACTINODOS, in *Natural Hiſtory*, a name given by Linkius, and ſome other authors, to thoſe ſtar-fiſh whoſe body is divided into more than five rays, that being the more uſual and general number.

POLYSCHIDES *fucus*, a ſea-plant, called in Engliſh *ſea-hanger*. It is one of the largeſt ſea-plants we know, growing often to ten feet or more in length. Its roots is not flat in the manner of moſt of the other ſea-plants, but is compoſed of ſeveral little hooks, all which lay faſt hold of the ſtone on which it grows: theſe, in ſome meaſure, reſemble the tendrils of the vine, and are ſomewhat broad and flatted at the end, where they are faſtened to the ſtone, though round elſewhere, and are about half an inch long: theſe hooks grow from a broad flattiſh part at the bottom of the ſtalk, which is often four or five inches in diameter, and is uſually hollow, being compoſed only of two membranes conſiderably tough and firm, with a cavity between them; from the centre of this riſes the ſtalk, which is often twiſted and undulated at the edges; from the top of this ſtalk grows the leaf, which is divided into eight or ten ſegments; each of which is often again divided into two. Theſe ſegments are very long, and as the plants float in the water, give it much of the appearance of a broad piece of leather cut into ſeveral thongs; theſe all terminate in ſharp points, and their colour is a browniſh green. The niceſt eye cannot diſtinguiſh the leaſt nerve or fibre, either in the ſtalk or leaf of this plant; but on great numbers of theſe plants, that curious enquirer, M. Reaumur, found flowers of the ſame kind with thoſe which he originally diſcovered on the common ferns; they are compoſed of ſlender filaments, not exceeding the twentieth part of an inch in length; and theſe were the more eaſy to be overlooked, as they are of the ſame colour with the leaves of the plant. Thoſe plants on which M. Reaumur found theſe flowers, were not, however, entirely covered with them, but they ſtood at about a twelfth of an inch diſtance from one another. It was in the month of July that M Reaumur examined this plant; and at that time there were no ſeeds diſcoverable upon it; but doubtleſs at a proper ſeaſon, and with proper care in the obſerver, they will hereafter be diſcovered as plainly in this as in many other of the ſea-plants, uſually ſuppoſed by authors to have wanted them. Mem. Acad. Par. 1712.

POLYSCOPE, a multiplying glaſs, i. e. a glaſs which repreſents one ſubject to the eye as if it were many: called alſo POLYEDRON.

POLYSPASTON, ϖολυσπαϛον, from ϖολυ, and σπαω, *traho*, *I draw*, q. d. that may be drawn many ways, in *Mechanics*, a machine ſo denominated by Vitruvius, conſiſting of an aſſemblage of ſeveral pullies, uſed for raiſing of heavy weights in a little time.

The multiplication of pullies in the *polyſpaſton* is to very good purpoſe; it being demonſtrated in mechanics, that the force required to ſuſtain a weight by means of a *polyſpaſton*, is to the weight itſelf as unity to the number of ropes, or of the pullies, thoſe ropes or pullies being ſuppoſed parallel to each other. See PULLY.

Hence the number of pullies, and the power, being given, the weight that will be ſuſtained thereby is eaſily found; viz. by multiplying the power by the weight.

E. gr. Suppoſe the power 50 pounds, and the number of pullies 5, the weight they will balance is 250 pounds.

In like manner, the number of pullies being given, together with the weight ſuſtained, the power is found by dividing the weight by the number of pullies: thus, if the weight be 900 pounds, and the number of pullies 6, the power will be 150 pounds.

Dechales obſerves, that it is found by experience, that a moderate man, ſtanding barely on the ground, will lift 150 pounds; whence the ſame man, by means of a *polyſpaſton* conſiſting of ſix pullies, will be able to ſuſtain 900 pounds.

The power of the pullies will be ſtill exceedingly increaſed by joining ſeveral *polyſpaſtons*.

To find the number of pullies a *polyſpaſton* is to conſiſt of, to raiſe a given weight by a given power. Divide the weight by the power; the quotient is the number required. Suppoſe, e. gr. the weight 600 pounds, and the power 150; the pullies will be 4; whoſe diameters are to be all equal, ſuppoſing two of them upper, and two lower, moveable on the ſame common axes.

POLYSPERMOUS, πολυσπερμος, formed from πολυ, and σπερμα, *ſeed*, in *Botany*, is applied to ſuch plants as have more than four ſeeds ſucceeding each flower, without any certain order or number.

Theſe Mr. Ray makes a diſtinct kind of herbs, calling them *herbæ ſemine nudo polyſpermæ*; where, by *ſemine nudo*, are meant ſuch ſeeds as do not put off ſpantaneouſly the integuments or covering which they either have, or appear to have, but fall off whole from the mother-plant.

Polyſpermous herbs are ſubdivided into, 1. Such as have a calyx or perianthium, conſiſting either, firſt of *three leaves*, and the flower tripetalous, as the plantago aquatica, and the ſagittaria, both water-plants: or the flower polypetalous, and the calyx falling with it; as the chelidonium minus: or remaining after the flower is dropped; as in the hepatica nobilis. Secondly, of *five leaves*, in ſome deciduous, with the flower, as in the ranunculus, in others perennial, as in the helleborus niger ferulaceus; or annual, as in the flos Adonis. Thirdly, of *eight leaves*, as the malva and alcea. Fourthly, of *ten leaves*, as the caryophylla, fagaria, pentaphyllum, tormentilla, argentina, altæa, and pentaphylloides.

2. Such as have no calyx or perianthium; as the clematitis, filipendula, ulmaria anemone, nemorum, pulſatilla, &c.

POLYSTYLE *colonnade*. See COLONNADE.

POLYSYLLABICAL *echoes*, thoſe which repeat many ſyllables or words. See ECHO.

POLYSYLLABLE, ϖολυσυνδετον, from ϖολυ, *much*, and συλλαβος, *ſyllable*, in *Grammar*, a word conſiſting of more than three ſyllables.

Shuckford refers the origin of *polyſyllables* in language to the confuſion of Babel; obſerving, that the languages which moſt probably aroſe about this time do remarkably differ from the moſt ancient Hebrew in words of a greater length than that of the original Hebrew words. The Chaldean, Syrian, Egyptian, and Arabian languages, he ſays, afford inſtances of this kind, as well as the more modern tongues. Conn. of the Sacred and Prophane Hiſt. vol. i. p. 136, &c.

POLYSYNDETON, ϖολυϛυνδετον, in *Rhetoric*, a figure conſiſting in the union of the ſeveral parts of a ſentence by proper particles.

Such is, *Me præ ceteris & colit, & obſervat, & diligit.* In oppoſition to this ſtands ASYNDETON.

This figure adds a weight and gravity to an expreſſion, and makes what is ſaid to appear with an air of ſolemnity; and by retarding the courſe of the ſentence, gives the mind an opportunity to conſider and reflect upon every part diſtinctly. We often meet with this figure in Demoſthenes, which very well ſuits the gravity of his ſtyle. Thus he encourages the Athenians to proſecute the war againſt king Philip of Macedon, from this conſideration, that now *they had ſhips, and men, and money, and ſtores, and all other things, which might contribute to the ſtrength of the city, in greater number and plenty than in former times.* Philipp. iii.

POLYTHALAMIUM, in *Natural Hiſtory*, a name by which ſome authors have called the TUBULI *marini concamerati*, a ſort of ſea-ſhell found frequently foſſile, with other ſhells, in Sweden, and brought over to us in the ſtones uſed for pavements, but not known in its recent ſtate.

It is of the ſame general ſtructure with the cornu ammonis, and thick nautilus, being compoſed of ſeveral cells or cavities, communicating whith one another by means of a ſiphunculus or pipe; but it is uſually ſtraight, though ſometimes its end is twiſted exactly in the manner of the cornu ammonis.

POLYTHALAMIUS, in *Natural Hiſtory*, a term invented by Breynius, to expreſs a claſs of ſhells, the character of which is, that they are hollow ſhelly bodies, either ſtraight or regularly twiſted into a ſpiral form, always wide at the mouth, and growing narrower to the other extremity; they are divided within into ſeveral cells or chambers, which are called *thalami*, each ſeparated from the other by a diaphragm, or partition of ſhelly matter. The upper or largeſt chamber contains the body of the animal; but all the others are perforated by a ſiphunculus, which gives them communication one with another, and which runs from the mouth to the very apex, growing ſlender all the way.

Of this claſs he diſtinguiſhes four genera, the orthoceros, lituus, ammonites, and nautilus. The two laſt of theſe, he obſerves, have been long well known to the world; the two firſt he gives as new, and of his own diſcovery.

Of the orthoceratitæ, which are ſtones caſt in the ſhells of the orthoceros, there are at preſent diſtinguiſhed nine kinds: theſe differ from one another principally in the poſition of the ſiphunculus, or in their external form; the cone which they deſcribe running quicker or more gradually to a point; or, finally, by the thalami or chambers being wider or narrower.

POLYTHEISM, from ϖολυ, *much*, and θεος, *deus*, the doctrine or belief of a plurality of gods. See GOD, IDOLATRY, and JUPITER.

POLYTHRIX, the *hair-ſtone*, a name given by ſome writers to thoſe German agates which have received into their maſs, while yet ſoft, either the branches of the conſervæ, or other capillary water-plants, or elſe have thin ſtreaks of a coarſer matter frequent in them, and running in the form of hairs. See AGATE.

POLYTRICHUM, *golden maiden-hair*, in *Botany*, the name of a genus of moſſes in the claſs of *cryptogamia*, the characters of which are theſe; the ſtalks are not much branched, and the capſules have calyptræ to cover them till mature; this calyptra is always hairy, and in many of the ſpecies is compoſed merely of long hairs, ranged length ways together, without any membrane. The others have membranaceous calyptræ, but covered with erect hairs; the leaves of thoſe kinds are rigid, and have a membranaceous appendage, by which they touch the ſtalks and ſurround them; thoſe of the others are ſofter and have not this appendage. The baſis of the pedicle which ſupports the head, is alſo in theſe ſurrounded by a ſort of tube, round which their ſtand a number of membranaceous leaves; this is more viſible in the larger than in the ſmaller ſpecies. The capſules in ſome of theſe moſſes are ſquare, in others they are roundiſh; and the ſquare ones have uſually an apophyſis, by which they are joined to the pedicle, which the round ones never have, or at leaſt very ſeldom. See *Tab.* XIV. *of Botany*, Nº 12.

The *polytrichum* of the firſt order are thoſe which have ſquare capſules, which are joined to the pedicles by a round apophyſis: of theſe there are three ſpecies.

The ſecond order of the *polytrichum* comprehends thoſe which have round capſules, and uſually want the apophyſis, by which the others are joined to the ſtalk. There are nine ſpecies of this kind. Dillen. Hiſt. Muſc. p. 430. Linnæus enumerates three ſpecies.

Old writers are very full of the praiſes of this plant for its virtues in making the hair grow thick; but this ſeems to have been an opinion taken upon no better reaſon than the likeneſs of the ſtalks of the plant to hairs. They make a decoction of it in ſome parts of Germany, and waſh the head carefully with it in the increaſe of the moon; but there is no great reaſon for ſuppoſing this liquor does any thing more than warm water would do. See ADIANTUM *aureum*.

POLYTROPHEROS, a name given by the Greeks to coarſe bread, from its conveying much more nouriſhment to the body than the finer kind; which they called, by way of diſtinction, *oligotropheros*.

POLYZONOS, in *Natural Hiſtory*, a name given by the ancients to a ſpecies of onyx, which had a dark or blackiſh ground, with a great number of zones.

POMA, in the *Writings of the Old Greek Phyſicians*, a word which has given the commentators a great deal of trouble rightly to explain.

Braſſavolus ſays, that it means all ſorts of ſhelly or cruſtaceous covering of fiſhes: but this is an abſolute error; for even the medical authors do not extend its ſenſe ſo far as that. The Greeks called all ſhells by the name *oſtraca*, and this author attributing a different virtue to the whole ſhell of the purpura, ſufficiently ſpeaks this *poma* to have been but a part of it.

The Arabian writers were ſenſible of this, and rendered it by the word *adſor althaib*, which ſignify fragments like nails. Serapio calls it *mucatha*, which ſignifies a morſel or piece of any thing cut from a ſolid body. The original ſenſe in which the Greeks uſed the word *poma*, was to expreſs the thing that cloſed the mouth of any veſſel with a long and narrow neck. The Latins, expreſſed this by the word *operculum*, and ſometimes, as in Sulpicius Severus, by the word *umbo*.

The ancients alſo uſed the word *poma* to expreſs the lid or covering of a well, or of any hole. Now the purpuræ buccina, and all thoſe other ſhells which the Greeks have called *ſtromboide*, may in ſome ſort be compared to narrow and deep veſſels, and they have all of them a ſort of *poma*; or, as the Latins have expreſſed it, an *operculum*, to ſtop the mouth of the ſhell, and prevent the ingreſs or egreſs of any thing at the creature's pleaſure. This *operculum* being what Ariſtole has called *opicalimma*, is certainly alſo what Dioſcorides means by the word *poma*; Ariſtotle has been very expreſs in his deſcription of it, and ſays that the tongue lies under it, and that all the *ſtromboide* ſhells gave it. The *onyx Indicus*, therefore, was only the *poma*, or *operculum* of an Indian *ſtromboide* ſhell, of the buccinum or purpura kind, and was of a ſweet ſmell, and thence had the term *aromaticus*, or *odoratus*. The name *onyx* is eaſily accounted for, as the *poma* of every ſhell of this kind is flat and thin, and does not unaptly reſemble the human nail.

POMADA, an exerciſe of vaulting the wooden horſe, by laying one hand over the pommel of the ſaddle.

POMATIA, in *Natural Hiſtory*, the name of a larger ſpecies of garden-ſnail, ſo called from its feeding on apples and other fruit. It is originally a native of Italy, but is become of late years as familiar with us in England, as if a native with us. It is a noble remedy in conſumptive decays; and a perſon of diſtinction in England having occaſion to take great numbers, had ſeveral large parcels brought carefully alive from Italy, and turned looſe in his garden, where they multiplied to ſuch a degree, that the neighbouring woods and hedges ſoon became full of them, and they have ſince been propagated in many other places.

The *pomatia* is much larger than our common ſnail, and of a paler colour: it is of a roundiſh figure, and has five ſpires or twiſts at the head: theſe are placed very cloſe, and its mouth is large and almoſt circular, and has no duplicature or fold ſurrounding it, but is as thin as the reſt of the ſhell.

POMATUM, or POMADO, a compoſition of apples, with lard and roſe-water; uſed by way of unguent on many occaſions, particularly for diſeaſes of the ſkin, pimples, ſcurfs, &c. and to ſoften the hands, render the ſkin ſmooth, the complexion freſh, &c.

Pomatums are occaſionally made with jeſſamins, oranges, jonquils, tuberoſes, &c. i. e. they are perfumed with the odour of thoſe flowers.

The beſt is ſaid to be that prepared of kid's greaſe, pippins, an orange ſliced, with a glaſs of roſe water, and half a glaſs of white-wine, boiled and ſtrained, and at laſt ſprinkled with oil of ſweet almonds.

Dr. Quincy obſerves, that the apple is of no ſignificance at all in the recipe; and that the common *pomatum* ſold in the ſhops is only lard beat into a cream, with roſe-water, and ſcented with lemons, thyme, or the like.

The *pomatum* of the London Diſpenſatory is formed by beating tried, or purified lard with roſe-water, in the proportion of three ounces of the water to two pounds of the lard, till they are well mixed; then melting it over a gentle fire, and after it has ſtood for a little while, that the watery part may ſettle, pouring off the lard, and inceſſantly ſtirring and beating it about till it grows cold, ſo as to reduce it into a light yielding maſs; and afterwards adding ſo much eſſence of lemons as will be ſufficient to give a grateful ſmell. Some ſcent it with oil of rhodium; aand previouſly digeſt the lard for ten days with common water, renewing the water every day, a proceſs which does not appear to be of much uſe. The ointments may be tinged of a fine red colour, for lip-ſalves, by a proper addition of alkanet root. The faculty of Paris directs, for this purpoſe, twenty-four parts of the white *pomatum*, eight of ox's marrow, and eight of white wax, cut in ſmall pieces, to be melted together by the heat of a water-bath; one part, i. e. one fortieth of the whole maſs, of powdered alkanet root to be added; the mixture ſtirred at times till it appears tinged of a deep red colour, and then ſtrained through a linen cloth. Lewis.

POME, among *Gardeners*. To *pome*, is to grow or knit into a round head, ſomewhat like an apple.

Thus, they ſay, a *cabbage begins to pome*, &c. They ſometimes uſe the term *to cabbage*, in the ſame ſenſe.

POMEGRANATE-*tree*, *punica*, in *Botany*, a genus of the *icoſandria monogynia* claſs. Its characters are theſe: the empalement of the flower is bell-ſhaped, coloured, and cut into five parts at the top; the flower has five roundiſh, erect, ſpreading petals, which are inſerted in the empalement, and a great number of ſlender ſtamina, which are alſo inſerted in the empalement, terminated by oblong ſummits: the germen is ſituated under the flower, ſupporting a ſingle ſtyle, crowned by a headed ſtigma; it afterwards becomes a large almoſt globular fruit, crowned by the empalement; the fruit is divided into ſeveral cells by membranous partitions, which are filled with roundiſh ſucculent ſeeds. There are two ſpecies, including ſeveral varieties.

Theſe plants grow naturally in Spain, Portugal, Italy, and Mauritania. There are alſo many of them in the Weſt Indies, but they are ſuppoſed to have been tranſplanted there from Europe. They are ſo much improved there, as to be much preferable to any in Europe, the fruit being larger and finer flavoured.

The balauſtia of the ſhops is the empalement of the flower of the double flowering *pomegranate*. Miller.

It is denominated from the abundance of its grains or kernels; q. d. *pomum granatum*, a *kernelled apple*; or from the country where it was anciently produced, viz. Granada.

The trees never grow high; their branches are a little prickly; their leaves are long and narrow; the flowers are of a deep red, and pentapetalous, ſet in bell-ſhaped cups of the ſame colour; and their fruit, which is compoſed of a great number of red angular grains, ſometimes ſweet, ſometimes ſour, and ſometimes vinous, according to the quality of the tree, are all incloſed in little diſtinct cells, and covered, in common, with a thick browniſh rind. Over this grows a kind of crowning, of the ſame nature with the rind, formed of a production of the calyx.

In the general, *pomegranates* are not only agreeable to the taſte, but good for the ſtomach, and of conſiderable uſe in medicine. Of the kernels are made ſyrups and conſerves; and the peel or rind, which is called *malicorium*, is moderately aſtringent, and is an ingredient in ſeveral remedies and ptiſans, for dyſenteries, diarrhœas, lienteries, hæmorrhages, and relaxations of the gums. The ancients uſed the rind as the moderns do ſumach, in the preparation of leather.

The rind ought always to be dried, after the grains are taken out; that dried without ſcooping always taſting muſty, and being more likely to increaſe diſtempers than cure them.

As to the conſerve, there is but little of the true ſold; it being very difficult to make. That which ordinarily paſſes for it is only ſugar melted down; to which they give the colour, and ſharp taſte, with cochineal, cream of tartar, and alum.

POMEIS, in *Heraldry*, are green roundles; ſo called by the Engliſh heralds, who expreſs different coloured roundles by diſtinct names.

The French, who content themſelves to denote the different colour of the roundles, call the *pomeis*, *tourteaux vert*.

POMERIUM, in *Antiquity*. See Pomoerium.

POMIFEROUS, *apple-bearing*, in *Botany*, a name given to thoſe plants which have the largeſt fruit, covered with a thick hard rind; by which they are diſtinguiſhed from the bacciferous, which have only a thin ſkin over the fruit.

The *pomiferous* kind have a naked monopetalous flower, divided into five partitions, and growing on the top of the ſucceeding fruit. They are divided into,

1. *Capreolate*, or thoſe creeping along the ground, &c. by means of tendrils; as the cucurbita, melo, cucumis, cepo, balſamina, anguria, and colocynthis.

2. Without *capreoli*, or *tendrils*, as the cucurbita clypeata, or melo cepo clypeiformis.

POMIGLION is a name given by ſeamen to the Cascabel, or hindmoſt knob of a cannon. See Gun.

POMME', or Pommette', in *Heraldry*. A *croſs pommé*, or *pommetté*, called alſo *trophe*, is a croſs with a ball or knob, like an apple, at each end.

POMMEL, or Pummel, in the *Manege*, a piece of braſs, or other matter, at top, and in the middle, of the ſaddlebow, to which are faſtened the holſters, ſtirrup-leathers, &c.

Pommel, is alſo a round ball of ſilver, ſteel, or the like, fixed at the end of the guard and graſp of a ſword; to ſerve, in ſome meaſure, as a counterpoiſe.

Balzac obſerves, that there are ſtill extant charters and privileges granted by Charlemagne, which were ſealed with the *pommel* of his ſword, which, ordinarily, he promiſes to defend with the ſame ſword.

POMMETTE'. See Pomme'.

POMOERIUM, among the Romans. Authors are not agreed as to particular circumſtances relating to the *pomoerium*; ſome will have it to be a piece of ground without the walls; others a ſpace within them; and others again think it was both within and without. But whichever of theſe is true, the *pomoerium* was a place eſteemed ſacred, and kept free from houſes and every other kind of obſtruction. Hiſt. Acad. Inſcr. vol. ii. p. 91, ſeq.

POMONA, in *Mythology*, an amiable nymph, for whoſe favour the deities of the fields were competitors. The name was originally appropriated to ſome perſon who had merited divine honours by the culture of fruit-trees, and eſpecially of apple-trees. This nymph is repreſented as ſitting on a large baſket full of fruit, holding a number of apples in her left hand, and in the right a noſegay of flowers. At Rome ſhe had a temple and altars. Her prieſt was called *flamen Pomonale*, and ſacrifices were offered to her for the preſervation of the fruits of the earth.

POMPEION, Πομπειον, in *Antiquity*, a ſtately edifice at Athens, in which were kept the ſacred utenſils made uſe of at feſtivals, and all things neceſſary for the ſolemn proceſſions prepared. It ſtood at the entrance of the old city, which looked towards Phalerum, and was adorned with many ſtatues of the Athenian heroes.

The word *pompeion* is derived from πομπευω, *cum pompa incedo*, and was likewiſe uſed for any utenſil employed on theſe occaſions.

POMPEY's *pillar*. See Pillar.

POMPHOLYX, πομφολυξ, literally denoting a *bubble ariſing on water*, in *Pharmacy*, a ſort of metalline flower; being a white, light, and friable ſubſtance, found adhering to the lid or cover of the crucibles or furnaces, wherein zinc or its ore are melted with other metals.

It is eſteemed deterſive and deſiccative, though only applied externally.

The apothecaries ſometimes call it *nil*, or *nihili album*, and ſometimes *white tutty*, in regard of its reſemblance to Tutty in virtue.

POMPILUS, in *Ichthyology*, the name of a ſea-fiſh, in the Linnæan ſyſtem a ſpecies of the Coryphæna, remarkable for following the rudders of ſhips to vaſt diſtances. It has no ſcales; it has a very broad line from the gills to the tail, under which are a number of dotted tranſverſe lines, reaching to the belly, above the line on the ſide; the back is ſpotted with different colours; the mouth is moderately large, but the teeth very ſmall; its forehead, between the eyes, is of a gold colour, and it has four fins, two at the gills, and two on the belly; and beſide theſe, one long one running all the length of the back, and another anſwering it from the anus to the tail; its tail is not forked.

Pompilus is alſo uſed by ſome authors for the nautilus, as well of the papyraceous as the camerated kind.

POMPION, in *Botany*. See Pumpkin.

POMPONA, a name given by the Spaniards in America to a ſort of *vanilla*, the pods of which are ſhorter and thicker than thoſe of the common kind, and of a ſtronger ſmell, though leſs agreeable. The pulpy matter alſo in theſe pods is more liquid than that in the common kind, and the ſeeds much larger, being as big as thoſe of muſtard. This is never brought to market alone; but the Indians who gather it, cunningly mix it among the right kind; but this ſhould be taken care of by the buyer, ſince this kind is very prejudicial, occaſioning violent head-achs in men, and in women vapours and diſorders of the womb.

It is not yet certainly known whether this be the fruit of a different ſpecies of the *vanilla* plant, or whether it be only different from the common in age, or in the place of growth of the plant.

POMUM, *apple*, a well known fruit. See Apple-*tree*.

Pomum, *apple*, in *Botany*, is a fleſhy or pulpy Pericarpium, without valves containing a capſule.

Pomum *Adami*, in *Anatomy*, a protuberance in the forepart of the throat. See Adami *pomum*.

POND, in *Geography*, a little lake which neither receives nor emits its waters into any river.

Ponds, *fiſh*. See Fish-*ponds*.

Pond *weed*, *potamogeton*, in *Botany*, a genus of plants of the *tetandria tetragynia* claſs, the characters of which are theſe; the flower has no calyx or cup, but is compoſed of four obtuſe, roundiſh, hollow, and open petals, which fall off before the ripening of the ſeeds; the ſtamina are four plane, obtuſe, and very ſhort filaments; the antheræ are double and ſhort; the piſtillum has four germina, which are all oval and pointed; theſe have no ſtyle, but obtuſe ſtigmata; there is no other fruit than four ſeeds ſucceeding each flower; theſe are of a roundiſh, but flatted figure, gibboſe, and pointed. Linnæus enumerates twelve ſpecies.

Pond *weed*, *water*. See Persicaria.

Pond *weed*, *triple-headed*. See Zannichellia.

PONDERATE, in our *Ancient Cuſtoms*, a method of curing ſick children, by weighing them at the tomb of ſome ſaint; counterpoiſing or balancing the ſcale with money, wheat-bread, or any other thing the parents were willing to offer to God, his ſaints, or the church.

But a ſum of money was always to make part of the counterbalance. By this means the cure was effected. *Ad ſepulchrum ſancti, nummo ſe ponderabat.*

PONDUS, *weight*. See Weight.

Pondus, in *Ancient Records*, denotes a duty paid to the king, according to the weight of merchandizes.

Pondus *regis*, the ſtandard weight anciently appointed by the king; being that which we now call *troy weight*. See Standard and Troy-weight.

Ad Pondus *omnium*. See Ad.

Pondus, *temperamentum ad*. See Temperamentum.

PONE, a writ, whereby a cauſe depending in the county, or other inferior court, is removed to the common pleas, or ſometimes to the king's bench.

Pone *per vadium*, is a writ commanding the ſheriff to take ſurety of one for his appearance at a day aſſigned.

PONENDUM *in ballium*, in *Law*, a writ commanding that a priſoner be *bailed*, in caſes bailable.

Ponendum *ſigillum ad exceptionem*, a writ by which juſtices are required to put their ſeals to *exceptions* exhibited by the defendant againſt the plaintiff's evidence, verdict, or other proceedings before them, according to ſtat. Weſtmin. 2.

PONENDIS *in aſſiſis*, a writ granted by the ſtatute of Weſtmin. 2. cap. 38. which ſtatute ſhews what perſons ſheriffs ought to impanel upon *aſſiſes* and juries, and what not.

PONGA, in *Botany*, H. M. *Jaca minor ſylveſtris Malabarica*. D. Commelin *tataiſbæ Braſilienſium* Piſon. *ſimilis*;

a tall evergreen tree growing in Malabar, and bearing no obſervable flowers; the fruit adheres to the branches in the ſame manner as that of the jaca; and hence the Portugueſe call the tree the wild jaca; the calyces are echinated, the firſt green, and afterward reddiſh, and contain multitudes of roundiſh, oblong, acuminated, and reddiſh ſeeds.

A cataplaſm prepared of the green fruit of the tree bruiſed, being applied to tumors, promotes their ſuppuration. Of the bark and root, boiled in water, is prepared a fomentation for œdematous tumors of the legs; an endemic diſeaſe among the Indians, and called by the Portugueſe pædo St. Thomæ, which preſerves them from an inflammation. Raii H. P.

PONGO, in *Zoology*, a name given in Purchas's Pilgrims to the ORANG-*outang*.

PONIARD, formed from the French *poignard*, and that from *poignée*, *handful*, a little pointed dagger, very ſharp-edged; borne in the hand, or at the girdle, or hid in the pocket.

The *poniard* was anciently in very great uſe; but is now in good meaſure ſet aſide, except among ASSASSINS.

Sword and *poniard* were the ancient arms of duelliſts; and are ſaid to continue ſtill ſo among the Spaniards.

The practice of ſwerd and *poniard* ſtill makes a part of the exerciſe taught by the maſters of defence.

PONS *varoli*, or *varolii*, or PONS *cerebri*, in *Anatomy*, the upper part of a duct in the third ventricle of the brain, ſituate in the cerebellum, and leading to the infundibulum. See *Tab. Anat. (Oſteol.) fig.* 5. *litt. g, g.*

It is thus called from its diſcoverer, Varolus, an Italian phyſician, who flouriſhed in the univerſity of Padua about the year 1572.

PONTAGE, *pontagium*, a contribution towards the maintenance, repairing, and rebuilding, of BRIDGES.

This was anciently one of the three general national charges, whence no perſon of any degree whatever was exempted.

The three things called *trinoda neceſſitas*, whence Ingulphus tells us, *nulli poſſunt laxaria*, were, the expedition to the wars, the building of caſtles, and the building and repairing of bridges. Mr. Selden, in his notes on Eadmerus, obſerves, that *ne quidem epiſcopi, abbates, & monachi, immunes erant.* And Matt. Paris adds, anno 1244, that in all grants of privileges to the monaſteries, thoſe three things were always excepted, for the public good, and that the people might be better able to reſiſt any enemy.

PONTAGE is alſo a due anciently belonging to the lord of the fee, for perſons or merchandizes, that paſs over rivers, bridges, &c. called in the later Latin *pontagium*, or *pontonagium*, pontage.

PONTAGIA, a term uſed by Paracelſus, and his followers, to expreſs a mixing ſaline ſubſtances with thoſe which are bitter or ſtyptic.

PONTEE, in the *Glaſs Trade*, an iron inſtrument uſed to ſtick the GLASS at the bottom, for the more convenient faſhioning the neck of it.

PONTE-*ſtake*, in *Glaſs Making*, is the iron whereon the under ſervants place the irons from the upper workmen, when they have knocked off the broken pieces of glaſs.

PONTEDERIA, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are theſe: the flowers are included in an oblong ſheath, which opens on one ſide; it hath ſix petals, which are divided; the three upper are erect, and form a kind of lip; the three under are reflexed; it hath ſix ſtamina, which are inſerted to the petals; the three which are longeſt are faſtened to the mouth of the tube; the other are inſerted in the baſe; they are terminated by proſtrate ſummits; under the petals is ſituated an oblong germen, ſupporting a ſingle ſtyle, which declines, and is crowned by a ſingle ſtigma; the germen afterward turns to a ſoft fruit, divided into ſix cells, each containing ſeveral ſmall roundiſh ſeeds. There are two ſpecies. Miller.

The characters, according to Linnæus, are, that the flower has a ſingle petal, divided into ſix parts, forming a double lip; three of the ſtamina are inſerted in the apex, and three in the tube; and the fruit is a three-celled capſule. He enumerates three ſpecies.

PONTIBUS *reparandis*, a writ, directed to the ſheriff, commanding him to charge one or more perſons to repair a bridge, to whom it belongs.

PONTICA *gemma*, a name given by the ancients to a ſtone of the AGATE kind, with a white ground and red and black ſpots, irregularly placed, and making a beautiful variegation in it. This ſeems to have been the ſame ſtone which ſome of the moderns have called the *ſmall-pox ſtone*, from its ſpots reſembling the eruptions in that diſeaſe. The ancients mention ſeveral kinds of it, as they were ſpotted with various colours.

PONTICA *vina*, a term uſed to expreſs acid, feculent, and tartarous wines.

PONTICUM *mel*, a name given to a ſort of poiſonous honey.

PONTICUS *mus*, in *Zoology*, the name of a creature deſcribed by the ancients, and ſuppoſed to be the ſame with our SQUIRREL.

PONTIFEX, *pontif*, *high-prieſt*, a perſon who has the ſuperintendance and direction of divine worſhip; as the offering of ſacrifices, and other religious ſolemnities.

The Romans had a college of *pontifs*, and over thoſe a ſovereign *pontif*, or *pontifex maximus*, inſtituted by Numa; whoſe function it was to preſcribe the ceremonies with which each god was to be worſhipped, compoſe the rituals, direct the Veſtals, regulate the calendar, and ſettle the ſeveral games, and aſſiſt at them; and for a good while to perform the buſineſs of augury; till on ſome ſuperſtitious occaſions he was prohibited intermeddling therewith.

He conſecrated the ſtatues of the gods, before they were put up in the temples; conducted the dedications of the temples; offered ſacrifices; bleſſed the figures of ſome of Jove's thunderbolts, to preſerve the people from harms; and compiled their ſtatutes.

The Jews too had their *pontif*, or high-prieſt; and among the Romaniſts, the pope is ſtill ſtyled the *ſovereign pontif*.

Authors differ about the origin of the word *pontifex*. Some derive it from *poſſe facere*, that is, from the authority the *pontifs* had to ſacrifice; others, as Varro, from *pons*, becauſe they built the Sublician bridge, that they might go and offer ſacrifice on the other ſide of the Tiber.

PONTIFICAL, *Pontificale*, a book of the rites and ceremonies belonging to pontifs, biſhops, popes, &c. See RITUAL, and CEREMONIALE.

PONTIFICAL *college*, in *Roman Antiquity*, conſiſted of thoſe who had the principal direction of the affairs of religion, who ſettled religious diſputes, regulated the worſhip and ceremonies, and explained the myſteries of religion. This college, at the time of its firſt inſtitution by Numa, was compoſed of four prieſts ſelected from the patricians, to whom were afterwards added four others from the plebeians. Sylla the dictator increaſed their number to fifteen, of whom eight were ſuperior, and ſeven ſubordinate; and the chief among them aſſumed the title of PONTIFEX *maximus*.

PONTIFICALIA, the robes and ornaments wherein a biſhop performs divine ſervice.

PONTIFICATE, *pontificatus*, the ſtate or dignity of a pontif, or high prieſt.

Cæſar reformed the CALENDAR in the time of his *pontificate*.

PONTIFICATE is more peculiarly uſed in modern writers for the reign of a pope.

The concordat was paſſed in the *pontificate* of Leo X.

There was a *pontificate* that only laſted twenty-four hours.

PONTLEVIS, in the *Manege*, a diſorderly reſiſting action of a horſe, in diſobedience to his rider; in which he rears up ſeveral times, and riſes ſo upon his hind legs, that he is in danger of coming over. It is cured by clapping ſpurs ſmartly to him, as the fore-feet are returning to the ground.

PONTOON, in *Naval Language*, denotes a low flat veſſel, reſembling a lighter or barge of burthen, and furniſhed with cranes, capſterns, tackles, and other machinery, neceſſary for careening ſhips of all ſizes. Theſe are very common in the principal ports of the Mediterranean, but rarely uſed in the northern parts of Europe. Falconer.

PONTOON, or PONTON, in *War*, denotes a kind of flat-bottomed boat, whoſe carcaſs of wood is lined within and without with tin. The French *pontoons*, and thoſe of moſt other powers, are covered on the outſide with ſtrong copper-plates, without any inſide lining; and theſe have the advantage of our's, becauſe copper is much ſtronger than tin, and is not damaged by ruſt. Our *pontoons* are twenty-one feet long, nearly five feet broad, and two feet $1\frac{1}{2}$ inch deep within.

PONTOON-*bridge* is made of *pontoons* ſlipped into the water, and placed about five or ſix feet aſunder; each faſtened with an anchor, when the river has a ſtrong current, or to a ſtrong rope, that paſſes acroſs the river, and runs through the rings of the *pontoons*. Each boat has an anchor, cable, baulks, and cheſts. The baulks are about five or ſix inches ſquare, and twenty-one feet long. The cheſts are boards joined together by wooden bars, about three feet broad, and twelve feet long. The baulks are laid acroſs the *pontoons* at ſome diſtance from one another, and the cheſts upon them joined cloſe. When ſeveral of theſe are thus connected, they form one firm, uniform bridge, by means of which a train of artillery, cavalry, infantry, &c. may paſs over a river, arm of the ſea, &c. If *pontoons*, &c. are wanting, bridges are formed of empty caſks or barrels, that ſupport baulks and planks.

Cæſar and Aulus Gellius both mention *pontoons*; but theirs were no more than a kind of ſquare flat veſſels, proper for the carrying over of horſe, &c. Ours, however, take their names from them: thoſe authors call them *pontones*, of *ponto*.

Pontoon-*carriage* is made with two wheels only, and two long ſide-pieces, whoſe fore ends are ſupported by a limber; and ſerves to carry the *pontoons*, boards, croſs-timbers, anchors, and every thing elſe neceſſary for making a bridge.

PONT-VOLANT, *flying-bridge*, a kind of bridge uſed in ſieges: made of two ſmall bridges laid over one another, and ſo contrived by means of cords and pullies placed along the ſides of the under-bridge, that the upper may be puſhed forwards, till it join the place where it is deſigned to be fixed; the whole length of both not to be above five fathom, leſt they ſhould break with the weight of the men. See Bridge.

POOD denotes a weight in Ruſſia, equal to forty of their pounds; and amounting to 35½, or 36 Engliſh pounds avoirdupoiſe.

POOL, is properly a reſervoir of water ſupplied with ſprings, and diſcharging the overplus by ſluices, defenders, weirs, and other cauſeways.

Pool, *mill*. See Mill.

Pool, *whirl*. See Whirl-*pool*.

Pool-*ſnipe*, in *Ornithology*, a name given in many parts of England to the red-ſhank.

POOP, in *Sea Language*, denotes the hind-part of a ſhip, or that wherein the helm is fixed; called alſo STERN. The French frequenly call it *queue*, *tail*, becauſe the rudder here applied ſerves the ſame purpoſes in a ſhip as the tail does to fiſhes. The *poop* is divided into three or four ſtories, which all together form the *poop* caſtle, or hind-caſtle, the outſide of which is richly adorned with balconies, galleries, trophies, the arms of the prince, &c.

To have the wind in *poop*, in *Sea-phraſe*, is to have it behind, or favourable.

Poop, *puppis*, *ſtern*, denotes more particularly the higheſt or uppermoſt part of a ſhip's hull a-ſtern. See *Tab. Ship. fig.* 2. *lit.* P. See Deck.

Poop-*royal* is a ſhort deck or plat-form, placed over the aſtmoſt part of the *poop* in the largeſt of the French and Spaniſh men of war, and ſerving as a cabin for their maſters and pilots. This is uſually called the top-gallant-*poop* by our ſhip-wrights.

POOPING, in *Sea Language*, denotes the ſhock of a high and heavy ſea upon the ſtern or quarter of a ſhip, when ſhe ſcuds before the wind in a tempeſt. This circumſtance is extremely dangerous to the veſſel, which is thereby expoſed to the riſk of having her whole ſtern beat inwards, by which ſhe would be immediately laid open to the entrance of the ſea, and, of courſe, foundered, or torn to pieces.

POOR, *pauper*. A *poor* perſon, in a legal ſenſe, is one who is a burden to and charge upon a pariſh.

Formerly, the maintenance of the *poor* was chiefly an eccleſiaſtical concern; and a fourth part of the tithes in every pariſh was ſet apart for that purpoſe. Afterwards, when the tythes of many pariſhes were appropriated to the monaſteries, theſe ſocieties were the principal reſource of the *poor*, who were farther relieved by voluntary contributions. Judge Blackſtone obſerves, that till the ſtatute 26 Hen. VIII. cap. 26. he finds no compulſory method for providing for the *poor*; but upon the total diſſolution of the monaſteries, abundance of ſtatutes were made in the reign of king Henry VIII. Edw. VI. and Elizabeth, for this purpoſe. At length, by ſtat. 43 Eliz. cap. 2. OVERSEERS of the *poor* were appointed in every pariſh.

Poor *rate*. By the 14 Eliz. cap. 5. power was given to the juſtices to lay a general aſſeſſment; and this hath continued ever ſince. For by 43 Eliz. cap. 2. the churchwardens and overſeers of the *poor* of every pariſh, or the greater part of them (with the conſent of two juſtices, one of whom is of the quorum, dwelling in or near the pariſh) are empowered to raiſe weekly, or otherwiſe, by taxation of every inhabitant, parſon, vicar, and other, and of every occupier of lands, houſes, &c. materials for employing the *poor*, and competent ſums for their relief. Notice ſhall be given in church of every ſuch rate the next Sunday after it is allowed, which may be inſpected by every inhabitant, paying 1*s*. and copies of it granted on demand, 6*d*. being paid for every twenty-four names; and a churchwarden or overſeer refuſing, ſhall forfeit 20*l*. to the party aggrieved. The rate is to be levied by diſtreſs on thoſe who refuſe to pay it; and appeals againſt it are allowed. 17 Geo. II. cap. 2. cap. 38. See Overseers.

If the juſtices find, that the inhabitans of any pariſh are not able to levy among themſelves ſufficient ſums for the purpoſes ſpecified in the act, they may aſſeſs any other pariſh within the hundred; and if the hundred be unable to grant neceſſary relief, they may rate and aſſeſs any pariſh within the county. 43 Eliz. cap. 2. Concerning the obligation of parents and children, ſee Parent and Child.

In order to compel huſbands and parents to maintain their own families, the law hath provided, that all perſons running away out of their pariſhes, and leaving their families upon the pariſh, ſhall be deemed and ſuffer as incorrigible rogues. 7 Jac. cap. 4. And if a perſon merely threatens to run away and leave his wife and children upon the pariſh, he ſhall, upon conviction, before one juſtice by confeſſion, or oath of one witneſs, be committed to the houſe of correction, for any time not exceeding one month. 17 Geo. II. cap. 5. For the farther maintenance of the *poor*, there are many fines and forfeitures payable to their uſe: as for ſwearing, drunkenneſs, deſtroying the game, &c. And alſo parts of waſtes, woods, and paſtures, may be incloſed for the growth and preſervation of timber and underwood for their relief. See Work-*houſe*.

Poor, *ſettlement and removal of the*. The firſt rudiments of pariſh ſettlements ſeem to be the ſtatutes 12 Ric. II. cap. 7. & 19 Hen. VIII. cap. 12. which direct the *poor* to abide in the cities or towns where they were born, or ſuch wherein they had dwelt for three years, a term afterwards (viz. by 39 Eliz. cap. 4.) confined, in the caſe of vagabonds, to one year only. But after the Reſtoration, by 13 and 14 Car. II. cap. 12. a legal ſettlement was declared to be gained by birth; or by inhabitancy, apprenticeſhip, or ſervice for forty days; within which period all intruders were made removeable from any pariſh by two juſtices of the peace, unleſs they ſettled in a tenement of the yearly value of 10*l*. The frauds, naturally conſequent upon this proviſion, which gave a ſettlement by ſo ſhort a reſidence, produced the ſtatute 1 Jac. II. cap. 17. which directed notice in writing to be delivered to the pariſh officers, before a ſettlement could be gained by ſuch reſidence. Subſequent proviſions allowed other circumſtances of notoriety to be equal to ſuch notice given; and thoſe circumſtances have from time to time been altered, enlarged, or reſtrained, whenever the experience of new inconveniencies, ariſing daily from new regulations, ſuggeſted the neceſſity of a remedy. And the doctrine of certificates was invented, by way of counterpoiſe, to reſtrain a man and his family from acquiring a new ſettlement by any length of reſidence whatever, unleſs in two particular excepted caſes; which makes pariſhes very cautious of giving ſuch certificates, and of courſe confines the *poor* at home, where frequently no adequate employment can be had. The law of ſettlements may be, therefore, now reduced to the following general heads; or a ſettlement in a pariſh may be acquired, 1. By *birth*; for wherever a child is firſt known to be, that is always *prima facie* the place of ſettlement, until ſome other can be ſhown. This is alſo always the place of ſettlement of a baſtard child; for a baſtard having in the eye of the law, no father, cannot be referred to his ſettlement, as other children may. However, this rule admits of ſeveral exceptions; as in the caſe of a baſtard born in a place by colluſion; after the order of removal is made out; in removing; after the removal, and before the appeal; in a ſtate of vagrancy; in a priſon; in a lying-in hoſpital; and under a certificate. But with regard to legitimate children, though the place of birth be *prima facie* the ſettlement, yet it is not excluſively ſo; for there are, 2. Settlements by *parentage*, being the ſettlement of one's father or mother: all children being really ſettled in the pariſh where their parents are ſettled, until they get a new ſettlement for themſelves. A new ſettlement may be acquired ſeveral ways; as, 3. By *marriage*: for a woman, marrying a man that is ſettled in another pariſh, changes her own; the law not permitting the ſeparation of huſband and wife. But if a man has no ſettlement, her's is ſuſpended during his life, if he remains in England, and is able to maintain her; but in his abſence, or after his death, or during (perhaps) his inability, ſhe may be removed to her old ſettlement. The other method of acquiring ſettlements in any pariſh are all reducible to this one, of *forty days reſidence* therein; but this forty days reſidence (which is conſtrued to be lodging or lying there) muſt not be by fraud, or ſtealth, or in any clandeſtine manner, but accompanied with one or other of the following concomitant circumſtances. The next method, therefore, of gaining a ſettlement is, 4. By forty days reſidence and *notice*. For if a ſtranger comes into a pariſh, and delivers notice in writing of his place of abode, and number of his family, to one of the overſeers (which muſt be read in the church and regiſtered), and reſides there unmoleſted for forty days after ſuch notice, he is legally ſettled thereby. 13 & 14 Car. II. cap. 12. 1 Jack. II. cap. 17. 3 & 4 W. & M. cap. 11. But there are alſo other circumſtances equivalent to ſuch notice: therefore, 5. *Renting* for a year a tenemant of the yearly value of 10*l.* and reſiding forty days in the pariſh, gains a ſettlement without notice. 13 & 14 Car. II. cap. 12. 6. Being charged to and paying the public *taxes* and levies of the pariſh, excepting thoſe for ſcavengers, highways, houſe, and windows. 9 Geo. I. cap. 7. 21. Geo. II. cap. 10. 18 Geo. III. cap. 26. And, 7. Executing, when legally appointed, any public parochial *office* for a whole year in the pariſh, as churchwarden, &c. are both of them equivalent to notice, and gain a ſettlement, if connected with a reſidence of forty days. 3 & 4 W. & M. cap. 11. 8. Being *hired* for a year, when unmarried and childneſs, and *ſerving* a year in the ſame ſervice; and, 9, Being bound an *apprentice* for ſeven years, give the ſervant and apprentice a ſettlement without notice, in that place wherein they ſerve the laſt forty days. 3 & 4 W. & M. cap. 11. 8 & 9 W. III. cap. 10. 31 Geo. II. cap. 11. 10. Laſtly, the having an *eſtate* of one's own, and reſiding thereon forty days, however ſmall the value may be, in caſe it be acquired by act of law, or of a third perſon, as by deſcent, gift, deviſe, &c. is a ſufficient ſettlement; but if a man acquire it by his own act, as by purchaſe (in its popular ſenſe, in conſideration of mony paid), then, unleſs the conſideration advanced *bona fide*, be 30*l.* it is no ſettlement for any longer time than the perſon ſhall inhabit thereon. 9 Geo. I. cap. 7. All perſons, not ſo ſettled, may be removed to their own pariſhes on complaint of the overſeers, by two juſtices of the peace, if they ſhall adjudge them likely to become chargeable to the pariſh into which they have intruded; unleſs they are in a way of getting a legal ſettlement, as by having hired a houſe of 10*l.* per annum, or living in an annual ſervice; for then they are not removeable. And in all other caſes, if the pariſh to which they belong will grant them a certificate, acknowledging them to be their pariſhioners, they cannot be removed, becauſe likely to become chargeable, but only when they become actually chargeable. But ſuch certificated perſons can gain no ſettlement by any of the means above mentioned, unleſs by renting a tenement of 10*l.* per annum, or by ſerving an annual office in the pariſh, being legally placed therein; neither can an apprentice or ſervant to ſuch certificated perſon gain a ſettlement by ſuch their ſervice. 8 & 9 W. III. cap. 30. 12 Ann. cap. 18. Theſe are the general heads of the laws relating to the *poor*, which, by the reſolutions of the courts of juſtice thereon, within a century paſt, are branched into a great veriety. And yet notwithſtanding the pains that have been taken about them, they ſtill remain very imperfect, and inadequate to the purpoſes for which they are deſigned. Blackeſt. Comm. book i. p. 360, &c. For a variety of caſes and arguments relating to the ſettlement, removal, &c. of the *poor*, ſee Burn's Juſtice, art. *Poor.*

POOR, or POWER, in *Ichthyology*, a name given by the people of Cornwall to a ſpecies of bearded gadus. This is the GADUS *minutus* of Linnæus, and is the only ſpecies of cod-fiſh with three dorſal fins that is found in the Mediterranean ſea. It is taken in great quantities near Marſeilles, and eſtemed good, but incapable of being ſalted or dried. Its length is little more than ſix inches.

POOR *man's pepper*, in *Botany*. See DITTANDER.

POOSPANSCUM, in *Natural Hiſtory*, the name of a peculiar ſpecies of foſſil in the Eaſt Indies. It is of the nature of the blende, or mock-lead, with us; but it is not formed into ſo large flakes, but more reſembles the ſteel-grained lead ores. It is found in the beds of rivers, and when calcined, it is uſed with the juices of certain herbs, for ulcers and other cutaneous diſorders. Before calcination it is alſo uſed by the women to make their hair of a fine gloſſy black colour, which it performs very neatly.

POPÆ, among the Romans, were ſuch perſons as attended the ſacrifices, whoſe buſineſs it was to provide victims, and to kill them after they had knocked them down. They were half naked, their ſhoulders, arms, and upper parts of their bodies being uncovered as far as their navels, and the reſt covered to the mid-leg with a linen apron, or the ſkins of the ſacrifices; and they wore crowns of laurel upon their heads. See SACRIFICE.

POPE, *papa*, i. e. *univerſal father*, the biſhop of Rome; being the head or patriarch of the Roman catholic church. Father le Cointe, in his Annals, obſerves, from St. Jerom, St. Cyprian, St. Gregory, St. Auguſtine, and Sidonius Apollinaris, that the title *pope* was anciently given to all biſhops. Accordingly we find, that in the eighth general council held at Conſtantinople, in the year 869, which was compoſed of three hundred biſhops, all the patriarchs were there called *popes*.

Biſhops were alſo addreſſed under the term *holineſs*, and *beatitude*; and their churches were called *apoſtolical ſees*. He adds, that it was only in the eleventh century, that Gregory VII. firſt appointed, in a ſynod held at Rome, that the title *pope* ſhould be reſtrained to the biſhop of Rome, as a particular diſtinction and prerogative.

It is one of the maxims of Gregory, contained in a famous piece, entitled Dictatus *papæ*, that there is no name in the world but his, i. e. as ſome underſtand it, he alone is to be ſtyled *pope*; and F. Paul obſerves, that the name of *pope*, formerly common to all biſhops, was appropriated by Gregory VII. to the Roman pontif.

In the council in the Lateran, held under Innocent III. the *pope* was declared *ordinary of ordinaries*.

The power of the *pope* has advanced by ſlow degrees to that plenitude in which it has been exerciſed in later times. It appears, that towards the end of the third century, the biſhop of Rome, in common with thoſe of Antioch and Alexandria, had a kind of pre-eminence over all others, becauſe they were conſidered as rulers of primitive and apoſtolic churches. However, this pre-eminence implied no ſuperior power and authority, infringing on the rights and liberties of other biſhops, but merely a power of convening councils, of preſiding in them, of collecting voices, and ſuch other things as were eſſential to the order of thoſe aſſemblies; a power ſimiler to that which Cyprian, biſhop of Carthage, poſſeſſed in the African churches. About the cloſe of the fourth century, the biſhop of Rome ſurpaſſed all his brethren in the magnificence and ſplendor of the church over which he preſided; in the riches of his revenue and poſſeſſions; in the number and variety of his miniſters; in his credit with the people, and in his ſumptuous and ſplendid manner of living. Nevertheleſs it is certain, that at this time the biſhops of that city had not acquired the pre-eminence of power and juriſdiction in the church, which they afterwards enjoyed. Differences in religion were ultimately decided, and eccleſiaſtical laws were enacted either by the emperor or by councils; nor does it appear, that any of the biſhops acknowledged, that they derived their authority from the permiſſion and appointment of the biſhop of Rome, or that they were created biſhops by the favour of the apoſtolic ſee. But in this century we may trace, in the imprudence of the emperors, the dexterity of the Roman prelates themſelves, and the inconſiderate zeal and precipitate judgment of certain biſhops, ſeveral of thoſe ſteps by which they afterwards aſcended to the ſummit of eccleſiaſtical power and deſpotiſm. The law of Valentinian in 372, which empowered the biſhop of Rome to examine and judge other biſhops, that religious diſputes might not be decided by profane and ſecular judges, approved and confirmed in a council in Rome at 378, proved very favourable to the ambition and advancement of the Roman pontif; and his votaries have likewiſe laid great ſtreſs on the fourth canon of the council held at Sardis, in 347, which prohibited the election of a ſucceſſor to a biſhop depoſed by neighbouring prelates, before the biſhop of Rome had examined the cauſe, and pronounced ſentence: but the authority of this council has been generally conſidered as extremely dubious, and its decrees have been regarded by many as altogether fictitious and ſpurious. In the fifth century a variety of circumſtances united in augmenting the power and authority of the biſhop of Rome; though he had not, as yet, aſſumed the dignity of ſupreme law-giver and judge of the whole Chriſtian church. The biſhops of Alexandria and Antioch, unable to make head againſt the lordly prelate of Conſtantinople, fled often to the Roman pontif for ſuccour; and the inferior order of biſhops uſed the ſame method, when their rights were invaded by thoſe prelates. The protection afforded them by the Roman pontif was the means of extending his dominion in the Eaſt, and of imperceptibly eſtabliſhing his ſupremacy. In the Weſt its increaſe was owing to other cauſes; the declining power, and the ſupine indolence of the emperors, left the authority of the biſhop who preſided in their imperial city almoſt without controul. The incurſions, moreover, and triumphs of the barbarians contributed to its advancement; for the kings, who penetrated into the empire, when they perceived the ſubjection of the multitude to the biſhops, and the dependence of the biſhops upon the Roman pontif, reſolved to reconcile this ghoſtly ruler to their intereſts, by loading him with various kinds of honours and benifits. However, the Africans could not be prevailed upon, by threats and promiſes, to ſubmit the deciſion of their controverſies, and the determination of their cauſes, to the Roman tribunal. Although the Roman pontifs artfully availed themſelves of every circumſtance that could contribute to their obtaining univerſal dominion, yet it is certain, that towards the cloſe of the ſixth century, the emperors and the nations in general were far from being diſpoſed to bear with patience the yoke of ſervitude, which the ſee of Rome was arrogantly impoſing upon the Chriſtian church. The Gothic princes ſet bounds to the power of the biſhop of Rome in Italy, permitted none to be raiſed to the pontificate without their approbation, and reſerved to themſelves the right of judging concerning the legality of every new election. They enacted ſpiritual laws, called the religious orders before their tribunals, and ſummoned councils by their regal authority.

In the beginning of the ſeventh century, or about the year 606, Boniface III. as Baronius relates, engaged the emperor Phocas to take from the biſhop of Conſtantinople the title of œcumenical or univerſal biſhop, and to confer it upon the Roman pontifs; and thus, as it is ſaid, introduced the papal ſupremacy. But the ambitious views of the biſhops of Rome were ſtill vigorouſly oppoſed, not only by ſeveral emperors and princes, but alſo by whole nations; and the civil magiſtrate retained his influence in religious matters, and the Roman pontiffs were obliged to acknowledge their ſubordination to the regal authority. No event ſeems to have been more favourable to their ambitious views than the part they took in the eighth century, in promoting the advancement of the traitor Pepin to the throne of Childeric III. in anointing and crowning him as king of France. This proved an abundant ſource of opulence and credit to the church, and to its aſpiring miniſters; for Pepin, having obtained two victories over Aiſtulphus, king of the Lombards, in 754 and 755, compelled him to deliver up to the ſee of Rome, the exarchate of Ravenna, Pentapolis, and all the cities, caſtles, and territories, which he had ſeized in the Roman dukedom. And thus the biſhop of Rome was raiſed to the rank of a temporal prince. The grant of Pepin was afterwards confirmed by his ſon Charlemagne, who alſo ceded to the Roman pontifs ſeveral cities and provinces in Italy, which were not contained in his father's grant; reſerving to himſelf the ſupreme dominion. It is ſaid that a pretended grant of Conſtantine the Great was made uſe of both by Adrian I. and Leo III. in order to perſuade Charlemagne to this donation. At this time the power of the *pope* was ſubordinate to that of the emperors, and confined within very narrow limits. The right of election was veſted in the emperor, and his approbation was neceſſary to the conſecration of the biſhops of Rome. However, their authority and affluence greatly increaſed from the time of Lewis the Meek, and more eſpecially from the acceſſion of Charles the Bald to the imperial throne. Their power was augmented in a very conſiderable degree by the diviſions and troubles that aroſe in the empire towards the cloſe of the ninth century: the emperors were diveſted of their eccleſiaſtical authority, the power of the biſhops was greatly diminiſhed, and even the authority of both provincial and general councils began to decline. The Roman pontifs availed themſelves of various circumſtances that occurred at this time to promote an opinion that the biſhop of Rome was conſtituted by Jeſus Chriſt ſupreme legiſlator and judge of the church univerſal; and that, therefore, the biſhops derived all their authority from the Roman pontif, and that the councils could not determine any thing without his permiſſion and conſent. They had alſo recourſe to forged memorials, acts of councils, and epiſtles, in order to eſtabliſh their claims to ſupremacy. The moſt notorious forgeries of this kind were the DECRETAL epiſtles, compiled by an obſcure writer, but aſcribed, in order to give them credit, to Iſidore, biſhop of Seville. In the tenth century, a novel doctrine was propagated by ſome mercenary and intereſted prelates, who publicly maintained, that the Roman pontifs were not only biſhops of Rome, but of the whole world; and that their authority, though divine in its origin, was conveyed to them by St. Peter, the prince of the apoſtles. The CRUSADES of the eleventh century very much contributed to the augmentation of the influence and authority of the Roman pontifs; ſo that towards the cloſe of this century they ſeem to have attained the zenith of their dominion. From the time of Leo IX. the *popes* employed every method, which the moſt artful ambition could ſuggeſt, to render their dominion both deſpotic and univerſal. They not only aſpired to the character of ſupreme legiſlators in the church, to an unlimited juriſdiction over all ſynods and councils, whether general or provincial, to the ſole didiſtribution of all eccleſiaſtical honours and benefices, as divinely authoriſed and appointed for that purpoſe, but they carried their inſolent pretenſions ſo far as to give themſelves out for lords of the univerſe, arbiters of the fate of kingdoms and empires, and ſupreme rulers over the kings and princes of the earth. Gregory VII. ſeems to have exceeded all his predeceſſors in the luſt of dominion, as well as in the ſucceſs which attended his endeavours to obtain it. He conſidered the Roman pontif, under the character of Chriſt's vicegerent, as the king of kings, and the whole univerſe as his rightful domain. Accordingly, with an arrogance hardly to be paralleled, he claimed tribute from France, Saxony, Spain, England, the moſt powerful of the German princes, Hungary, Demark, Poland, &c. ſoliciting them to do homage to the Roman ſee, to make a ſolemn grant of their kingdoms and territories to the prince of the apoſtles, and to hold them under the juriſdiction of his vicar at Rome, as fiefs of the apoſtolic ſee. If the ſucceſs of this pontif had been anſwerable to the extent of his inſolent views, all the kingdoms of Europe would have been this day tributary to the Roman ſee, and its princes the ſoldiers or vaſſals of St. Peter, in the perſon of his pretended vicar upon earth. Many of his attempts, however, were crowned with a favourable iſſue, and from the time of his pontificate the face of Europe underwent a conſiderable change, and the prerogatives of the emperors, and other ſovereign princes, were neceſſarily diminiſhed. In Italy his ſucceſs was the moſt remarkable; for he prevailed upon Mathilda, the daughter of Boniface, duke of Tuſcany, to ſettle all her poſſeſſions in Italy and elſewhere upon the church of Rome; and though the Roman pontiffs have not been able to preſerve the whole inheritance, thus granted to them, they ſtill remain in the poſſeſſion of a conſiderable part of it. See ECCLESIASTICAL *ſtate*.

The monſtrous power of erecting new kingdoms, which had been claimed by the pontifs from the time of Gregory VII. was not only aſſumed, but exerciſed alſo by Alexander III. in a remarkable inſtance; for in the year 1179 he conferred the title of king, with the enſigns of royalty, upon Alphonſo I. duke of Portugal, who, under the pontificate of Lucius II. had rendered his province tributary to the Roman ſee. In the thirteenth century the ſame ambitious ſpirit governed the councils and proceedings of ſucceeding pontifs; and they were induſtrious in inculcating the maxim, that the biſhop of Rome is the ſupreme lord of the univerſe, and that neither princes nor biſhops, civil governors nor eccleſiaſtical rulers, have any lawful power in church or ſtate, that is not derived from them. In conſequence of this arrogant pretenſion, they not only claimed the right of diſpoſing of eccleſiaſtical benefices, but of conferring civil dominion, and of dethroning kings and emperors, according to their good pleaſure. They alſo aſſumed to themſelves the power of diſpoſing of the various offices of the church, and of creating and depoſing biſhops, abbots, and canons, according to their fancy. Inſtances of theſe practices occur in the pontificates of innocent III. Honorious III. Gregory IX. and of ſeveral of their ſucceſſors. And Boniface VIII. maintained in the moſt expreſs and impudent terms, that the univerſal church was under the dominion of the pontiffs, and that princes and lay patrons, councils and chapters, had no more power in ſpiritual things than what they derived from Chriſt's vicar upon earth. Under Innocent III. and Nicholas IV. the poſſeſſions and revenues of the Roman ſee received very conſiderable augmentation, partly by the events of war, and partly by the munificence of kings and emperors; and arrived at that high degree of grandeur and opulence, which it yet maintains even in our times. The former of theſe pontifs followed the ſteps of Gregory VII. and not only uſurped the deſpotic government of the church, but claimed alſo the empire of the world, and thought of nothing leſs than ſubjecting the kings and princes of the earth to his lordly ſceptre. In Aſia and Europe he diſpoſed of crowns and ſceptres with the moſt wanton ambition. The Roman pontifs derived great advantages in the exerciſe of their dominion from the attachment and zeal of the ſeveral orders of MENDICANTS.

In the fourteenth century the papal authority diminiſhed by reaſon of the continued reſidence of the *popes* in France. And in the fifteenth century, by the ſchiſm which happened in the papacy, the dawnings of the reformation, and a variety of other concurring cauſes. In the councils of Conſtance, held in 1414, and of Baſil, opened in 1431, the power of the Roman pontifs was declared to be inferior and ſubordinate to that of general councils, and the papal impoſitions, called expectatives, reſervations and proviſions, were entirely annulled. The revival of learning, and the progreſs of the reformation in the ſucceeding century, contributed very much to the abridgment of the papal authority; not only by withdrawing ſeveral provinces from the yoke of papal tyranny, but by producing a change in the ſentiments of many kings and princes, and ſovereign ſtates, who adhered to to religion of Rome, with reſpect to the claims and pretenſions of its biſhop. Beſides, it is neceſſary to obſerve, that the authority of the *pope* is circumſcribed by various limits in the different countries where his ſpiritual juriſdiction is acknowledged; and that in all his deciſions relating to the goverment of the church, he previouſly conſults the cardinals, who form his privy-council; and in matters relating to religious doctrine, he is obliged to aſk the advice of eminent divines; and that matters of different degrees of moment are referred to the conduct of certain colleges, called CONGREGATIONS.

It is well known, that when the authority of the *pope* declined in Europe, he ſought to extend the limits of his ſpiritual dominion to other parts of the globe, and for this purpoſe deputed miſſionaries to gain proſelytes. And a new order was formed, that became afterwards ſo famous, under the appellation of JESUITS, in order to preſerve thoſe parts of the papal dominions that remained yet entire, and to augment them by new acceſſions. The fate of this fraternity is well known; and many circumſtances ſeem to concur in different countries, hitherto devoted to the ſee of Rome, that are likely to reduce within very narrow limits the ſpiritual juriſdiction and dominion of the *pope*.

The *pope* is choſen by the cardinals out of their own body.

In the firſt ages of the church, the people and the prieſts, and ſometimes only the prieſts, elected the *pope*, according to the plurality of voices. The emperors afterwards claimed the right of confirming the election. In the eighth century, *pope* Adrian I. in a council of biſhops aſſembled at Rome, conferred upon Charlemagne and his ſucceſſors the right of election; and they reſerved to themſelves the privilege of approving the perſon that was elected by the prieſts and people; nor was the conſecration of the elected pontif valid, unleſs performed in the preſence of the emperor's ambaſſadors. The election, however, after undergoing many revolutions as to the form of it, is now referred to the CARDINALS in CONCLAVE.

The ſee of the *pope* is at Rome, whence he iſſues out his orders, called *briefs* and *bulls*, throughout the catholic world.

Hiſtory mentions a *popeſs*, Joan. The reality hereof has been oppoſed and defended by many learned men. The tradition might poſſibly take its riſe from the weakneſs of *pope* John VIII. in reſtoring Photius to his communion, and owing him as true patriarch; for he hence got the appellation of woman; as that prince called *king Mary* did, by leaving himſelf to be governed by queen Mary his wife.

M. Spanheim, profeſſor of theology at Leyden, has lately written very amply on the ſubject; and ſhews it to be a queſtion *de facto*, ſcarce determinable at this time of day.

POPE, in *Ornithology*, a name by which the people in many parts of England call the *anas arctica cluſii*. See PUFFIN.

POPEDOM, or PAPACY, in *Eccleſiaſtical Hiſtory*, denotes the office and juriſdiction of the POPE.

POPERY, in *Eccleſiaſtical Hiſtory*, comprehends the religious doctrines and practices adopted and maintained by the church of Rome. The following ſummary, extracted cheifly from the decrees of the council of Trent, continued under Paul III. Julius III. and Pius IV. from the year 1545 to 1563, by ſucceſſive ſeſſions, and the creed of pope Pius IV. ſubjoined to it, and bearing date November 1564, may not be unacceptable to the reader.

One of the fundamental tenets, ſtrenuouſly maintained by popiſh writers, is the infallibility of the church of Rome; though they are not agreed, whether this privilege belongs to the pope, or a general council, or to both united; but they pretend that an infallible living judge is abſolutely neceſſary to determine controverſies, and to ſecure peace in the Chriſtian church. However proteſtants alledge, that the claim of infallibility in any church is not juſtified by the authority of Scripture; much leſs does it pertain to the church of Rome; and that it is inconſiſtent with the nature of religion, and the perſonal obligations of its profeſſors; and that it has proved ineffectual to the end for which it is ſuppoſed to be granted, ſince popes and councils have diſagreed in matters of importance, and they have been incapable, with the advantage of this pretended infallibility, of maintaining union and peace. See INFALLIBLE.

Another eſſential article of the popiſh creed is the ſupremacy of the pope, or his ſovereign power over the univerſal church. On this ſubject it is maintained, that every Chriſtian, under pain of damnation, is bound to be ſubject to the pope; that no appeals may be made from him; and that he alone is the ſupreme judge of all perſons, in all eccleſiaſtical cauſes, but that he himſelf can be judged by no man. To this purpoſe they aſſert, that the church of Rome is the catholic church; the mother and miſtreſs of all churches; that the pope is the vicar of Chriſt, ſucceſſor of St. Peter, and the ſupreme paſtor over all the world. And they likewiſe aſſert his dominion over temporal princes; pretending that he may over-rule what they command; excommunicate and depoſe them, if they contradict his commands; and abſolve their ſubjects from allegiance, and exempt the clergy from their juriſdiction.

This exorbitant power hath been challenged by the pope for many ſucceſſive ages, and in ſeveral inſtances actually exerciſed. Thus Gregory VII. excommunicated the emperor Henry IV. and gave away his kingdoms to Rudolphus, duke of Sweden. Gregory IX. excommunicated the emperor Frederick II. and abſolved his ſubjects from their oath of allegiance. Pope Paul III. excommunicated and depoſed Henry VIII. king of England, and commanded all his ſubjects, under a curſe, to withdraw their obedience from him. Pope Pius V. and Gregory XIII. damned and depoſed queen Elidabeth, and abſolved her ſubjects from their allegiance. And this practice has been warranted by the decree of the third Lateran council under pope Alexander III. and by the fourth Lateran council under pope Innocent III. though it is contrary to the expreſs language of Scripture, to the doctrine and conduct of the apoſtles and primitive fathers, and to the confeſſions and practice of the ancient biſhops of Rome, and altogether inconſiſtent with the rights of goverment and the welfare of ſociety.

Farther, the doctrine of the ſeven ſacraments is a peculiar and diſtinguiſhing doctrine of the church of Rome: theſe are baptiſm, confirmation, the euchariſt, penance, extreme unction, orders, and matrimony. The council of Trent (ſeſſ. 7. can. 1.) pronounces an anathema on thoſe who ſay, that the ſacraments are more or fewer than ſeven, or that any one of the above number is not truly and properly a ſacrament. And yet it does not appear that they amounted to this number before the twelfth century, when Hugo de St. Victore and Peter Lombard, about the year 1144, taught, that there were ſeven ſacraments. The council of Florence, held in 1438, was the firſt council that determined this number. Theſe ſacraments confer grace, according to the decree of the council of Trent (ſeſſ. 7. can. 8.) *ex opere operato*, or by the mere adminiſtration of them: three of them, viz. baptiſm, confirmation, and orders, are ſaid (can. 9.) to impreſs an indelible character, ſo that they cannot be repeated without ſacrilege; and the efficacy of every ſacrament depends on the intention of the prieſt by whom it is adminiſtered (can. 11.) Pope Pius expreſly enjoins, that all theſe ſacraments ſhould be adminiſtered according to the received and approved rites of the catholic church. With regard to the euchariſt in particular, we may here obſerve, that the church of Rome holds the doctrine of TRANSUBSTANTIATION; the neceſſity of paying divine worſhip to the conſecrated bread, or HOST; the propitiatory ſacrifice of the MASS, according to their ideas of which Chriſt is truly and properly put to death as a ſacrifice, as often as the prieſt ſays maſs; and *ſolitary* MASS, in which the prieſt alone, who conſecrates, communicates; and allows COMMUNION only in one kind, viz. the bread, to the laity. Seſſ. 14.

The doctrine of MERITS is another diſtinguiſhing tenet of *popery*; with regard to which the council of Trent has expreſly decreed (ſeſſ. 6. can. 32.) that the good works of juſtified perſons are truly meritorious; deſerving not only an increaſe of grace, but eternal life, and an increaſe of glory; and it has anathematized all who deny this doctrine. Of the ſame kind is the doctrine of ſatisfactions; which ſuppoſes that penitents may truly ſatisfy, by the afflictions they endure under the diſpenſations of Providence, or by voluntary penances to which they ſubmit, for the temporal penalties of ſin, to which they are ſubject, even after the remiſſion of their eternal puniſhment. Seſſ. 6. can. 30. & ſeſſ. 14. can 8. & 9.

In this connection we may mention the popiſh diſtinction of venial and mortal ſins: the greateſt evils ariſing from the former are the temporary pains of purgatory; but no man, it is ſaid, can obtain the pardon of the latter without confeſſion to a prieſt, and performing the penances which he impoſes.

The council of Trent (ſeſſ. 14. can. 1.) has expreſly decreed, that every one is accurſed, who ſhall affirm, that PENANCE is not truly and properly a ſacrament inſtituted by Chriſt in the univerſal church, for reconciling thoſe Chriſtians to the divine majeſty, who have fallen into ſin after baptiſm: and this ſacrament, it is declared, conſiſts of two parts, the matter and the form: the matter is the act of the penitent, including contrition, confeſſion, and ſatisfaction; the form of it is the act of abſolution on the part of the prieſt. Accordingly it is enjoined, that it is the duty of every man, who hath fallen after baptiſm, to confeſs his ſins, once a year at leaſt, to a prieſt; that this confeſſion is to be ſecret; for public confeſſion is neither commanded nor expedient; and that it muſt be exact and particular, including every kind and act of ſin, with all the circumſtances attending it. When the penitent has ſo done, the prieſt pronounces an abſolution, which is not conditional or declarative only, but abſolute and judicial. This ſecret, or auricular CONFESSION, was firſt decreed and eſtabliſhed in the fourth council of Lateran, under Innocent III. in 1215 (cap. 21). And the decree of this council was afterwards confirmed and enlarged in the council of Florence, and in that of Trent, which ordains, that confeſſion was inſtituted by Chriſt; that by the law of God it is neceſſary to ſalvation; and that it has been always practiſed in the Chriſtian church. As for the penances impoſed on the penitent, by way of ſatiſfaction, they have been commonly the repetition of certain forms of devotion, as PATER-NOSTERS, or AVE-MARIAS, the payment of ſtipulated ſums, pilgrimages, faſts, or various ſpecies of corporal diſcipline. But the moſt formidable penance in the eſtimation of many, who have belonged to the Romiſh communion, has been the temporary pains of PURGATORY. But under all the penalties which are inflicted or threatened in the Romiſh church, it has provided relief by its INDULGENCES, and prayers or maſſes for the dead; performed profeſſedly for relieving and reſcuing the ſouls that are detained in purgatory. Seſſ. 25.

Another article that has been long authoritatively enjoined and obſerved by the church of Rome, is the celibacy of her clergy. This was firſt enjoined at Rome by Gregory VII. about the year 1074, and eſtabliſhed in England by Anſelm, archbiſhop of Canterbury, about the year 1105; though his predeceſſor Lanfranc had impoſed it upon the prebendaries and clergy that lived in towns. And though the council of Trent was repeatedly petitioned by ſeveral princes and ſtates to aboliſh this reſtraint, the obligation of celibacy was rather eſtabliſhed than relaxed by this council; for they decreed, that marriage contracted after a vow of continence is neither lawful nor valid; and thus deprived the church of the poſſibility of ever reſtoring marriage to the clergy. For if marriage, after a vow, be in itſelf unlawful, the greateſt authority upon earth cannot diſpenſe with it, nor permit marriage to the clergy, who have already vowed continence. Seſſ. 24. can. 9. See CELEBATE.

To the doctrines and practices above recited may be farther added the worſhip of IMAGES: to juſtify which, the papiſts often leave the ſecond commandment out of their catechiſms (ſee DECALOGUE); the invocation of ſaints and angels, with reſpect to which the council of Trent decreed, that all biſhops and paſtors, who have the cure of ſouls, do diligently inſtruct their flocks, that it is good and profitable humbly to pray unto the ſaints, and to have recourſe to their prayers, help, and aid; for which practice no ſcripture command or example, nor any teſtimony within the firſt three hundred years after Chriſt, can be pleaded: the worſhip of ſacred RELICS, by which they underſtand not only the bodies and parts of the bodies of the ſaints, but any of thoſe things that appertained to them, and which they touched; and the celebration of divine ſervice in an unknown tongue, to which purpoſe the council of Trent hath denounced an anathema on any one who ſhall ſay, that maſs ought to be celebrated only in the vulgar tongue. Seſſ. 25. and ſeſſ. 22. can. 9. Though the council of Lateran under Innocent III. in 1215 (can. 9.) had expreſly decreed, that, becauſe in many parts, within the ſame city and dioceſe, there are many people of different manners and rites mixed together, but of one faith, the biſhops of ſuch cities or dioceſes ſhould provide fit men for celebrating divine offices, according to the diverſity of tongues and rites, and for adminiſtering the ſacraments.

We ſhall only add, that the church of Rome maintains, that unwritten traditions ought to be added to the holy Scriptures, in order to ſupply their defect, and regarded as of equal authority; that the books of the APOCRYPHA are canonical ſcripture; that the Vulgate edition of the Bible is to be deemed as authentic; and that the Scriptures are to be received and interpreted according to that ſenſe which the holy mother church, to whom it belongs to judge of the true ſenſe, hath held, and doth hold, and according to the unanimous conſent of the fathers. Seſſ. 4. See INDEX.

Such are the principal and diſtinguiſhing doctrines of *popery*, moſt of which have received the ſanction of the council of Trent: and that of the creed of pope Pius IV. which is received, profeſſed, and ſworn to by every one, who enters into holy orders in the church of Rome; and at the cloſe of this creed, we are told, that the faith contained in it is ſo abſolutely and indiſpenſably neceſſary, that no man can be ſaved without it. Hardouin's Concil. tom. x. p. 1—211.

Many of the doctrines of *popery* were relaxed, and very favourably interpreted by M. de Maux, biſhop of Condom, in his expoſition of the Doctrine of the Catholic Church, firſt printed in the year 1671; but this edition, which was charged with perverting, in endeavouring to palliate the doctrine of the church, was cenſured by the doctors of the Sorbonne, and actually ſuppreſſed: nor does it appear that they ever teſtified their approbation, in the uſual form, of ſubſequent and altered editions. See the examination of this work by archbiſhop Wake, in the Preſervative againſt *Popery*, vol. iii. p. 3—112.

POPERY, *declaration againſt*. See DECLARATION.

POPERY, *laws againſt*. See PAPISTS, MASS-*books*, PARENTS, and PRÆMUNIRE.

POPLAR, *populus*, in *Botany*, a genus of the *dioecia octandria* claſs. Its characters are theſe: the male and female flowers grow upon ſeparate trees; the male flowers, or catkins, have one oblong, looſe, cylindrical empalement, which is imbricated; under each ſcale, which is oblong, plain, and cut on the border, is ſituated a ſingle flower, without any petal, having a nectarium or one leaf, turbinated at the bottom, and tubulous at the top; and eight ſtamina, terminated by large four-cornered ſummits; the female flowers are in catkins like the male, but have no ſtamina; they have an oval acute-pointed germen, with ſcarce any ſtyle, crowned by a four-pointed ſtigma; the germen afterwards becomes an oval capſule, with two cells, including many oval ſeeds, having hairy down. Linnæus reckons five, and Miller ſeven ſpecies.

The *poplar*, whether black or white, may be eaſily propagated, either by layers, cuttings, or ſuckers, of which the white kind always produces a great many from the root. The beſt ſeaſon for the tranſplanting theſe ſuckers is in October, when the leaves begin to decay; and they ſhould be removed into a nurſery for two or three years, at the end of which time they will have got ſtrength enough to be tranſplanted into the places where they are to remain.

When they are to be propagated by cuttings, it is beſt to do that in February, cutting off truncheons two or three feet long; which being thruſt down a foot and a half deep in the ground, will take root very quickly, and if the ſoil be moiſt, will grow to a conſiderable ſize in a very few years.

The black *poplar* is not ſo eaſily raiſed from theſe large truncheons, but ſhould be planted in cuttings, of about a foot and a half long, planting them a foot deep in the ground. This will grow on almoſt any ſoil; but does much better on a moiſt one than on any other. They are the fitteſt of all trees for raiſing a ſhade quickly, as they will grow fourteen feet in height ſometimes in one ſeaſon, and in four or five years will be large trees. Miller. See ABELE-*tree*, and TACAMAHACCA.

POPLAR-*galls*. The black *poplar* is famous among naturaliſts for producing a ſort of *galls*, or protuberances of various ſhapes and ſizes, on its leaves and branches, which have been uſually miſtaken for the lodgments of worms hatched from the eggs of an ichneumon fly; but they are in reality produced from the operation of a viviparous inſect, called the PUCERON, for the bringing up of its offspring.

Theſe *galls* are of the bladder-kind, being uſually ſkinned over, and more or leſs hollow within, not woody, as thoſe of the oak, &c. They proceed from different parts of the plant, ſome from the pedicles of the leaves, and many from the young ſhoots; they are very various in figure, ſome being roundiſh, others oblong, others crooked and contorted in various directions, and ſome of them are in the figure of horns, like thoſe of the turpentine-tree, and of the ſame origin.

POPLES, in *Anatomy*, the inner part of the juncture whereby the thigh-bone is articulated with the tibia; popularly called the *ham*.

POPLICANI, POPULICANI, or PUBLICANI, a name given in the Weſt to the Manichees; or rather to a particular branch thereof, called in the Eaſt PAULICIANS.

POPLIFUGIA, in *Antiquity*. See FUGALIA.

POPLITÆUS, or SUB-POPLITÆUS, a muſcle which ariſes from the external and inferior protuberance of the thigh-bone, and paſſing over the joint obliquely, is inſerted into the ſuperior and internal part of the tibia. It is fixed above, by a ſtrong narrow tendon, to the outer edge of the inner condyle of the os femoris, and to the neighbouring poſterior ligament of the joint; from thence it runs obliquely downward, under the inner condyle of the os femoris; its flat and pretty thick fleſhy body increaſing gradually in breadth, till it is fixed in the backſide of the head of the tibia all the way to the oblique line obſervable on that ſide. It aſſiſts in bending of the leg, and turns it inwards. See *Tab. Anat. (Myol.) fig.* 7. *n.* 27. 27. 27. See Leg.

POPLITEA, in *Anatomy*, is a name given to the third vein of the leg.

It ariſes from the heel, where it is formed out of ſeveral branches coming both from the heel and ankle.

It lies pretty deep in the fleſh; and, aſcending up to the ham, terminates in the crural vein.

POPPY, *papaver*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the empalement of the flower is oval, indented, and compoſed of two almoſt oval, concave, obtuſe leaves, which fall off; the flower has four large roundiſh petals, which ſpread open, with a great number of hair-like ſtamina, terminated by oblong, compreſſed, erect ſummits; in the centre is placed a large, roundiſh germen, having no ſtyle, but crowned by a plain, radiated, target-ſhaped ſtigma; the germen afterward becomes a large capſule, crowned by the plain ſtigma, having one cell, opening in many places at the top under the crown, and is filled with ſmall ſeeds. There are nine ſpecies, including a great number of varieties.

We have many ſpecies of this plant cultivated in gardens for the beauty of the flowers. They are all eaſily propagated by ſowing the ſeeds in September. When the young plants come up, they are to be cleared from weeds, and thinned to a proper diſtance by pulling ſome up where they ſtand too thick; for they never thrive well if they are tranſplanted. They are to be left, according to their ſizes, at the diſtance of a foot and a half for the larger, and about half this ſpace for the leſs.

They are very ſhowy flowers, and make a ſplendid appearance in gardens; but they are of a ſhort duration, and of an offenſive ſmell, which makes them leſs valued at preſent than they have been.

Some ſow theſe plants in ſpring, but it is not ſo well; becauſe they then have not time to get ſtrength before autumn, when they are to flower; and for that reaſon thoſe ſown in ſpring uſually flower weakly. Miller.

Thoſe moſt uſed for medicinal purpoſes, are the white, *papaver hortenſe ſemine albo*; and black, *papaver hortenſe ſemine nigro*. The heads of theſe plants are of ſingular virtue to promote ſleep, aſſuage pain, &c. They ſtop diarrhœas, hæmorrhages, &c.

Of the juice of the white *poppy*, which is the largeſt, is prepared the Opium ſold in the ſhops; (for the method of cultivating which at Bahar, ſee London Med. Obſ. vol. v. p. 317, &c.) and of the juice of the leaves, Meconium.

A decoction of *poppy* heads in water, ſtrongly preſſed out, depurated by ſettling, then clarified with white of eggs, and inſpiſſated, yields an extract amounting to one-fifth or one-ſixth the weight of the heads. It is ſaid that two grains of this preparation are equivalent to one grain of opium, and that the extract is not liable to produce a nauſea or giddineſs which generally follow the uſe of pure opium. See Mr. Arnot's method of preparing it, &c. in the Edinb. Medical Eſſays, vol. v. art. 11.

The common wild red *poppy*, or *papaver erraticum*, is one of the moſt troubleſome and miſchievous weeds the farmers are plagued with among their corn, and it is the moſt difficult to thoroughly deſtroy of almoſt any other. Its ſeed will lie a long time in land unploughed, without ever ſhooting: but they will be ſure to grow with the firſt crop of corn. Mr. Tull gives an inſtance of the ſeeds of this plant being buried four and twenty years in a field of ſaint-fôin, and at the end of that time, the land being ploughed for wheat, they all grew up among the corn, though they had laid dormant ſo long before.

The only part made uſe of is the flowers, which yield on expreſſion a deep red juice, imparting the ſame colour to watery liquors, and a brighter though paler red to rectified ſpirit; and the colouring matter, on the admixture of alkaline liquors, is obſerved to change into a dark purple, and not into a green, like that of clove-gilly-flowers, red roſes, and other bright red flowers. A ſtrong infuſion of them is prepared in the ſhops, by pouring four pints and a half of boiling water upon four pounds of the freſh leaves, ſtirring them over the fire till the flowers are all immerged, and ſetting them by to ſteep for a night. This infuſion, preſſed out and depurated by ſettling, is reduced, by a proper addition of ſugar, into a deep red ſyrup.

It has been the general opinion of authors, that the narcotic quality of the *red poppy* lay in its flowers; but Mr. Boulduc, in his courſe of experiments for the finding out an European plant which ſhould yield us a juice of the nature of the opium of the Eaſt, without its bad effects, found that the virtue of this plant, which is very great, lay much more in the heads than the flowers; and from four ounces of theſe heads, while freſh and green, he obtained five drachms of a ſolid extract, of the nature of opium, two, three, or four grains of which were a full doſe, and which poſſeſſed the virtues of opium, and might be given with great ſucceſs and ſafety in obſtinate coughs and other ſuch caſes. Hiſt. Acad. Par. 1712.

Poppy, *horned*. See Celandine.

The yellow horned *poppy*, called by authors *papaver corniculatum luteum*, is one of thoſe vegetable poiſons of our own growth, which may be very miſchievous by their not being generally known or ſuſpected to be ſo. We have an account of the ſtrange effects of this plant in the Philoſophical Tranſactions, in an inſtance of a family in Cornwall, who eat of a pye made of the roots of this inſtead of thoſe of eryngo, or ſea-holly, which it is the cuſtom of the poorer people there to make into a coarſe ſort of a pye for their food. See Phil. Tranſ. N° 242.

Poppy, *prickly, argemone*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the flower hath a three-leaved empalement, and ſix roundiſh petals, which ſpread open, and are larger than the empalement; and in the centre is ſituated an oval five cornered germen, which is attended by a great number of ſtamina; it becomes an oval ſeed-veſſel, having five angles and cells, filled with ſmall rough ſeeds. Miller mentions only one ſpecies, which is an annual plant, very common in moſt parts of the Weſt Indies, called by the Spaniards *fico del inferno*, or the devil's fig. There is no great beauty or uſe in this plant among us. Linnæus enumerates three ſpecies.

Poppy, *ſpatling*, a ſpecies of the *cucubalus*, or *berry-bearing* Chick-weed. This ſtands in the catalogue of medicinal plants under the title *behen album*. See Ben.

Poppy-*ſeeds*. The *poppy-ſeed* is of a more delicious taſte than ſweet almonds; it is oily and farinaceous. Dr. Alſton ſays, he has eaten large quantities of the black as well as the white ſeed, and never found it ſomniferous or noxious. See Med. Eſſ. Edinb. vol. v. art. 12.

If emulſions of *poppy-ſeeds* have been found ſerviceable in coughs, catarrhs, heat of urine, and other like diſorders, their virtue is to be aſcribed not to an anodyne, but an emollient quality.

Theſe ſeeds are uſed in food in ſome places, as is their expreſſed oil, which is as wholeſome as olive-oil. Vide Matthiol. p. 476. Geoffr. Mat. Med. vol. ii. p. 713.

The qualities and uſes of this oil, with regard to painting, are much the ſame as thoſe of Nut-*oil*; only when it is perfectly good, it is more clear and limpid, and will dry better than the beſt oil of that kind.

Poppy, *ſyrup of*. See Meconium.

Poppy, *water*. See Water.

POPULAGO, in *Botany*. See *Marſh* Marygold.

POPULAR, *popularis*, ſomething that relates to the common people.

The Roman nobility was diſtinguiſhed into two factions; the *optimates*, who adhered ſtrenuouſly to the miniſtry, the ſenate, &c. in oppoſition to the people; and the *populares*, who favoured the rights and pretenſions of the people, in oppoſition to the nobleſſe.

Popular *action*. See Action.

Popular *diſeaſes* are ſuch as become common, and run through the body of the people; called alſo *endemic* and *epidemical* Diseases.

Hippocrates has written expreſly, De Morbis *Popularibus*.

Popular *errors*, are ſuch as people imbibe from one another, by cuſtom, education, and tradition, without having conſidered the reaſon or foundation thereof.

POPULARIA, among the Romans, were ſteps or places where the people ſat and beheld the games and horſe-races.

POPULATION, the ſtate of a country with reſpect to the number of people. See on this ſubject Expectation *of life*, Marriage, Mortality, and Political *arithmetic*.

POPULEUM, or Populneum, in *Pharmacy*, an unguent prepared of the buds of black poplar, violet leaves, navelwort, and lard, bruiſed and macerated; to which are added bramble-tops, leaves of black poppies, mandragora, henbane, nightſhade, lettuce, and burdock, boiled in roſe-water, and ſtrained. It was formerly much uſed as a cooler, in burns, ſcalds, and all ſorts of inflammations, and alſo to aſſuage arthritic pains, but it is now almoſt entirely diſregarded.

POPULICANI. See Poplicani.

POPULNEUM. See Populeum.

POPULUS, in *Botany*. See Poplar.

PORBEAGLE, in *Ichthyology*, a ſmall ſpecies of Shark, found on the coaſt of Cornwall; the noſe is long, ſlender towards the end, and ſharp-pointed; the mouth placed far beneath; the body thick and deep, but extremely ſlender juſt at the ſetting on of the tail; the firſt back-fin is placed almoſt in the middle, the other pretty near the tail; the belly is very deep; the ventral and anal fins are very ſmall; the tail is bifurcated; the upper fork being a little longer than the other. Pennant.

PORCELAIN, or **PURCELAIN**, a fine ſort of earthen-ware, chiefly manufactured in China, and thence alſo called *china*, or *china-ware*; but brought into Europe from other parts of the Eaſt, eſpecially Japan, Siam, Surat, and Perſia.

The Chineſe call it *tſe-ki*. The word *porcelain* is but little known there; except among a few workmen and merchants; and ſeems derived from the Portugueſe, *porcelana, a cup*.

Scaliger and Cardan, though generally of contrary ſentiments, are yet agreed, that what the Romans called *vaſa murrhina, murrina* and *murrea*, which were firſt ſeen at Rome in Pompey's triumph, and afterwards became ſo very precious, were the *porcelain* of our times.

This may be true; but if the opinion be only founded on Pliny's deſcription of thoſe veſſels, one would rather take them to have been made of a kind of precious ſtones, of a whitiſh colour, but variouſly veined and variegated, found in ſome parts of Parthia.

Oriens murrhina mittit, &c. Plin. Hiſt. Nat. lib. xxxvii. cap. 2. See MURRHINE.

Be this as it will, it is certain, that both Cardan and Scaliger are miſtaken when they tell us that *porcelain* is made of eggs and ſea-ſhells, beaten ſmall, and buried under-ground for eighty or one hundred years. The account we ſhall here give will put that matter out of all queſtion.

It is not known who was the inventor of *porcelain*; the Chineſe annals, which commonly contain every thing in any reſpect memorable, are perfectly ſilent about it; nor do we know much more of the time of its invention: only it is certain it muſt have been before the beginning of the fifth century, the annals of Feou-leam relating that from the ſecond year of the reign of the emperor Tam, about the year of Chriſt 442, the workers in *porcelain* of that province had alone furniſhed the emperors with it.

Porcelain is now made chiefly, ſome ſay wholly, at Kingtetching, a large town in the province of Kyangſi.

There is ſome indeed made in the province of Kanton and Fokyen; but it is of little account, being far inferior in beauty and value to the *porcelain* of Kingtetching. That of Fokyen is perfectly white, without either gloſs or painting. Attempts have been made to remove the manufacture from Kingtetching to Pekin, and other places, but in vain; the *porcelain* made in the new manufactories never coming up to that of the old; ſo that Kingtetching has the honour of ſupplying the greateſt part of the world with this commodity. F. du Halde aſſures us, that even the Japaneſe come to China for it.

There is a current opinion among the Chineſe themſelves, that the *porcelain* ware of former times was greatly ſuperior to that which they make at preſent; and that the burying china in the earth for a long time, adds to its beauty; but all this is founded on error. The truth is, that our merchants beat down the price of the ware, and thereby compel them to make a worſe kind in general; but they are able to do as fine things now as ever. What gave birth to the opinion, that burying *porcelain*-ware made it good, was, that finer pieces than ordinary are ſometimes found buried. Theſe are all precious vaſes, which the poſſeſſors buried by way of ſecurity in the times of civil war; and it is no wonder, that there are none but of the fineſt kind found buried on theſe occaſions.

PORCELAIN, *manufacture of*. *Porcelain* makes a very curious article in commerce, and not leſs ſo in natural hiſtory. Its manufacture for a long time paſſed as a myſtery in Europe; and that in ſpite of all the endeavours of the Jeſuit miſſionaries to penetrate into the ſecret. The veil, however, was at length drawn: and in a letter of F. d'Entrecolles to F. Orry, from Jauchew, dated September 1, 1712, and publiſhed in French, the whole proceſs is deſcribed in all its circumſtances; with an extract whereof we ſhall here gratify the curious reader. In the manufacture of *porcelain* there are four principal things to be conſidered, viz. the matter it is made of; the art of forming the veſſels, and other works; the colours wherewith it is painted; and, laſtly, the baking or giving it the proper degree of fire. Each of which will make the ſubject of a ſeparate article.

PORCELAIN, *materials of*. There are two kinds of earths, and as many kinds of oils, or varniſhes, uſed in the compoſition of *porcelain*. The firſt earth, called KAOLIN, is intermixed with glittering corpuſcles; the ſecond, called PETUNSE, or PETUNTSE, is a plain white, but, exceedingly fine, and ſoft to the touch. They are both found in quarries twenty or thirty leagues from Kintetching; and hither theſe earths, or rather ſtones, are brought in a number of little barks, inceſſantly paſſing up and down the river Jaotcheou, for that purpoſe. The petunſes are brought in form of bricks; having been ſo cut out of the quarries, where they are naturally pieces of a very hard rock. The white of the beſt petunſe is to border a little on green.

The firſt preparation of theſe bricks is, to break and pound them, firſt into a coarſe powder with iron mallets, then in mortars with peſtles that have ſtone heads, armed with iron, and wrought either with the hand, or with mills.

When the powder is rendered almoſt impalpable, they throw it in a large urn full of water, ſtirring it briſkly about with an iron inſtrument. After the water has reſted a little while, they ſkim off from the top a white ſubſtance formed there, of the thickneſs of four or five fingers, and diſpoſe this ſcum or cream in another veſſel of water. They then ſtir again the water of the firſt urn, and again ſkim it, and thus alternately, till there remain nothing but the gravel of the petunſes at bottom; which they lay afreſh under the mill, for a new powder.

As to the ſecond urn, wherein are put the ſkimmings of the firſt, when the water is well ſettled, and become quite clear, they pour it off; and with the ſediment, collected at bottom in form of a paſte, fill a kind of moulds: whence, when almoſt dry, they take it out, and cut it into ſquare pieces, which are what they properly call ſquare *petunſes*; reſerving them to be mixed with the kaolin in the proportion hereafter aſſigned.

Theſe ſquares are ſold by the hundred, but it is very rare to meet with them unfalſified; the workmen, who, like the reſt of the Chineſe are arrant knaves in their dealings, uſually mixing refuſe along with them; ſo that they are commonly obliged to purify them before they can be employed.

The *kaolin*, which is the other earth uſed in *porcelain*, is much ſofter than the petunſe, when dug out of the quarry; yet it is this, which by its mixture with the other, gives the ſtrength and firmneſs to the work. F. d'Entrecolles obſerves that ſome Engliſh or Dutch, having procured ſome petunſes to be bought privately; upon their attempting to make *porcelain* at their return into their own country, could not ſucceed for want of taking kaolin along with it: which the Chineſe being appriſed of, ſaid, humorouſly, "That the Europeans were wonderful people, to go about to make a body, whoſe fleſh was to ſuſtain itſelf without bones."

The mountains whence the kaolin is dug, are covered without-ſide with a reddiſh earth. The mines are deep, and the matter is found in glebes or clods. The author is of opinion, that the white earth of Malta is not much different from the kaolin, except that it wants the ſilvered particles. The preparation of kaolin is the ſame with that of the petunſes, except that the matter being leſs hard, leſs labour is required. The oil or varniſh, which makes the third ingredient in *porcelain*, is a whitiſh liquid ſubſtance: this is drawn from the hard ſtone, whereof the petunſes are formed; that which is the whiteſt, and whoſe ſtains are the greeneſt, being always choſen for this purpoſe.

The manner of preparing the oil is thus: the petunſes, being waſhed, undergo the ſame preparations as for making the ſquares; excepting that the matter of the ſecond urn is not put in moulds, but the fineſt part of it taken to compoſe the oil. To a hundred pounds of this matter they caſt a mineral ſtone, called *ſhekau*, or kekao, reſembling our alum: this ſtone is firſt heated red hot, and thus reduced in a mortar into an impalpable powder; and ſerves to give the oil a conſiſtence; which, however, is ſtill to be kept liquid.

The oil of lime makes the fourth ingredient; the preparation whereof is much more tedious and circumſtantial. They firſt diſſolve large pieces of quick lime, and reduce it to a powder, by ſprinkling water on it; on this powder they lay a couch of dry fern, and on the fern another of the ſlacked lime, and thus alternately, till they have got a moderate pile; which done, they ſet fire to the fern: the whole being conſumed, they divide the aſhes that remain on new couches of dry fern; ſetting them on fire as before. And this they repeat five or ſix times ſucceſſively, or even more; the oil being ſtill the better, as the aſhes are oftener burnt.

In the annals of Feou-leam it is ſaid, that inſtead of fern they anciently uſed the wood of a kind of medlar-tree; and that it was this gave the ancient *porcelains* that admirable hue, which the moderns cannot come up to for want of that wood. But this is become ſcarce in the country, and is no longer uſed. It is certain, however, the quality of the fern and lime contribute very much to the goodneſs of the oil.

A quantity of theſe aſhes of fern and lime is now thrown into an urn full of water: and to a hundred pounds of aſhes is added a pound of ſhekau, which diſſolves therein. The reſt being performed after the ſame manner as in preparing the earth of the petunſes, the ſediment found at the bottom of the ſecond urn, and which is to be kept liquid, is what they call the *oil of lime*; which the Chineſe eſteem as the ſoul of the former oil, and which gives the *porcelain* all its luſtre.

This oil is eaſily ſophiſticated by adding water to increaſe the quantity; adding at the ſame time proportionably of the ſame ſhekau to maintain the conſiſtence. Ten meaſures of oil of petunſe uſually go to one of lime. To have the mixture juſt, the two oils ſhould be equally thick.

Porcelain *veſſels, forming of.* The firſt thing is, to purify the petunſe and kaolin; which, for the firſt, is done after the manner already deſcribed in preparing the ſquares. For its ſecond, as its ſoftneſs makes it diſſolve eaſily, it is ſufficient, without breaking it, to plunge it in an urn full of water in an open baſket. The dregs that remain are perfectly uſeleſs, and are emptied out of the work-houſe when a quantity is got together.

The work-houſes are properly vaſt yards walled round, with ſheds and other conveniencies for the workmen to work under; as well as other buildings for them to live in. It is almoſt inconceivable what number of perſons are employed in theſe works; there being ſcarce a piece of *porcelain* but paſſes through above twenty hands, before it comes to the painter's work-houſe; and above ſixty before it be brought to perfection.

To make a juſt mixture of petunſe and kaolin, regard muſt be had to the fineneſs of the *porcelain* to be made; for the finer *porcelains*, they uſe equal quantities; four parts of kaolin to ſix of petunſe, for moderate ones; and never leſs than one of kaolin to three of petunſe, for the coarſeſt.

The hardeſt part of the work is the kneading and tewing the two earths together; which is done in a kind of large baſons, or pits, well paved, and cemented, wherein the workmen trample continually with their feet, relieving one another, till the maſs be well mixed, grow hard, and become of the conſiſtence required to be uſed by the potter.

The earth, when taken out of the baſons, is kneaded a ſecond time, but piece-meal, and with the hands, on large ſlates for the purpoſe; and on this preparation, in effect, it is, that the perfection of the work depends; the leaſt heterogeneous body remaining in the matter, or the leaſt vacuity that may be found in it, being enough to ſpoil the whole. The ſmalleſt grain of ſand, nay, ſometimes a ſingle hair, ſhall make the *porcelain* crack, ſplinter, run, or warp.

The *porcelain* is faſhioned or formed either with the wheel, like our earthen ware, or in moulds. See Pottery. Smooth pieces, as cups, urns, diſhes, &c. are made with the wheel. The reſt, i. e. ſuch as are in relievo, as figures of men, animals, &c. are formed in moulds, but finiſhed with the chiſſel.

The large pieces are made at two operations: one half of the piece is raiſed on the wheel by three or four workmen, who hold it till it have acquired its figure; which done, they apply it to the other half, which has been formed in the ſame manner; uniting the two with *porcelain earth*, made liquid by adding water to it, and poliſhing the juncture with a kind of iron ſpatula.

After the ſame manner it is that they join the ſeveral pieces of *porcelain* formed in moulds, or by the hand; and after the ſame manner they add handles, &c. to the cups, and other works formed with the wheel.

The moulds are made after the manner of thoſe of our ſculptors; viz. of divers pieces, which ſeverally give their reſpective figure to the ſeveral parts of the model to be repreſented; and which are afterwards united to form a mould for an entire figure. The earth they are made of is yellow and fat, dug out of its proper quarries, whereof there are abundance about Kingtetching. It is kneaded like potters earth, and when ſufficiently mellow, fine, and moderately dry, beating it ſtoutly, they form it into moulds, according to the works required, either by hand, or on the wheel. Theſe moulds are ſold very dear, but they laſt a long time.

All the works made in moulds are finiſhed by the hand, with ſeveral inſtruments proper to dig, ſmooth, poliſh, and to touch up the ſtrokes that eſcape the mould; ſo that it is rather a work of ſculpture than of pottery. There are ſome works whereon relievos are added, ready made, as dragons, flowers, &c. others that have impreſſions in creux; which laſt are engraven with a kind of puncheons. In the general, all *porcelain* works are to be ſheltered from the cold, their natural humidity making them liable to break when they dry unequally.

To conceive the number of hands each piece of *porcelain* paſſes through before it is perfect, we ſhall cloſe this article with what F. d'Entrecolles inſtances of a common tea-cup, before it be fit for the painter. The cup begins with the potter, who has the management of the wheel, where it acquires its form, height, and diameter. This operator has only three farthings ſterling for a plate furniſhed with twenty-ſix cups: accordingly, they go out of his hands exceedingly imperfect, eſpecially towards the feet, which are only unformed lumps of earth, to be afterwards cut with a chiſſel, when the cup is dry. When it comes from the wheel, the cup is received by a ſecond workman, who fits it to its baſe. A third takes it immediately from him, and applies it on a mould to bring it to its true form. This mould is on a kind of lathe. A fourth workman poliſhes the cup with a chiſſel, eſpecially about the edges; and brings it to the thinneſs neceſſary to make it tranſparent: in doing which, he moiſtens it from time to time, leſt its drineſs ſhould make it break. When of its proper thickneſs, another workman turns it gently on a mould, to ſmooth its inſide; taking a deal of care it be done equably, leſt any cavity be formed, or it warp. Other workmen add ſome ornaments in relievo; others, impreſſions in creux; others, only handles; as the quality of the cup requires. At laſt, they round and hollow the foot on the inſide with the chiſſel; which is the function of a particular artiſt, who does nothing elſe.

This multiplicity of workmen is ſo far from retarding the work, that it is found, by experience, to go on the faſter for it; as well as to be the better done; each workman, by a continual attention to the ſame thing, becoming very dexterous at it; beſides ſaving the time of changing inſtruments, &c.

Porcelain, *painting of.* The Chineſe painters, eſpecially thoſe that meddle with human figures, our author obſerves, are all bad workmen: he adds, that the defect is ſcarce any where ſo ſenſible as in the whapey, or *porcelain* painters, among whom, ſetting aſide flowers and landſcapes, which are ſometimes tolerable, the greateſt maſters are not to be compared to ordinary apprentices among the Europeans, for the beauty and juſtneſs of deſign. But it is otherwiſe with the colours theſe whapey uſe; which are ſo exceedingly lively and brilliant, that there are but little hopes our workmen ſhould ever come to vie with them.

The painting work is diſtributed among a great number of workmen, in the ſame laboratory: to one it belongs to form the coloured circle about the edges of the *porcelain*; another traces out flowers, which another paints: this is for waters and mountains alone; that for birds and other animals; and a third for human figures.

There are *porcelains* made of all colours: both with regard to the grounds, and to the repreſentations thereon. As to the colour of landſcapes, &c. ſome are ſimple; ſuch are all blues, which are thoſe moſt uſually ſeen in Europe; others are mixed up of ſeveral tints; and others, again are heightened with gold.

The Chineſe, for a great many ages, uſed only white *porcelain*. The firſt colour they employed was blue, and after that they came into the uſe of all the reſt. Their ancient blues were prepared by themſelves from a kind of lapis lazuli; but we now ſupply them with the ſmalt ſo much cheaper, that it is no longer worth their while to make it themſelves. They uſed to prepare this only by giving a gentle calcination to the ſtone, and then beating it to powder, and grinding it to the utmoſt fineneſs in mortars of unglazed *porcelain*-ware, with peſtles of the ſame.

The fine deep blue of the old *porcelain*-ware of China, is much valued by the curious; and it is much lamented, that the ſame colour is not uſed at this time. The art ſeems at preſent to be loſt; but perhaps it might be recovered by trials.

It is certain that the Chineſe have cobalt among them, and very probably they uſed a blue colour prepared from this, before they had any commerce with us: notwithſtanding all the conjectures about their materials for colouring, this ſeems the moſt probable ſubſtance; and there is a way of preparing a colour from this, much ſuperior to that now in uſe, which we call ſmalt.

Cobalt is a mineral containing arſenic and a blue vitrifiable earth. The common way of preparing ſmalt is, by roaſting this cobalt in a reverberatory fire. This diſpoſes it to vitrify, and drives off the arſenic it contains in fumes, which, collected at the top, form true flowers of arſenic. It is very certain, however, from experiments, that if this arſenic could be preſerved in the cobalt, the ſmalt would be of a much finer colour; for there are ſome kinds of cobalt which yield ſmalt without previous roaſting; and as the arſenic is in a great meaſure contained in theſe, the ſmalts are much finer coloured.

Arſenic added to ſmalt, while in fuſion, greatly exalts its colour alſo; and there is a way of procuring ſmalt from cobalt without fire, only by diſſolving it in an acid, and precipitating that ſolution with oil of tartar. The ſmalt thus precipitated to the bottom, is of a much finer colour than any prepared by fire; but it is much more expenſive, and prepared in leſs quantity. It is very poſſible that the Chineſe might have the art of making this kind of ſmalt before they knew us, and that to this was owing the fine blue of their *porcelain* ware: but when we trafficked with them, and they purchaſed ſmalt ſo much cheaper of us than they could make it themſelves, they naturally diſcontinued the manufacture of their own finer kind, without conſidering how greatly inferior the colour was which the other yielded. If this be the caſe, it will be eaſy to revive this art, and the adding the true old china blue to our European manufactures, in imitation of *porcelain*, may give them a value which they have not at preſent.

The red, which the Chineſe uſe, is made of our green vitriol, or common copperas, which they call *tſa-fan*. They put about a pound of this into a crucible; and lute on this another crucible inverted: this laſt has a hole cut in the top, which they keep covered or open at pleaſure. They ſet this crucible in a furnace of bricks, ſo contrived, as to throw all the flame upon the lower veſſel, in the way of our chemiſts reverberatory furnaces. They make a large fire of charcoal all round it, and obſerve the hole at the top; for ſo long as there aſcend thick black fumes through that, the matter is not ſufficiently calcined. They watch the going off of this fume, and when there appears in the place of it a fine and thin cloud, they take away the crucible, the matter being then ſufficiently burnt. They try this, however, by taking a little out, and examining the colour; if it is not ſufficiently red, they let it remain longer in the fire. When they find that it is of a good colour, they take away the fire, and leave the veſſels to cool; this done they find a cake of red matter at the bottom of the crucible, and a quantity of a finer powder about its ſides. They keep theſe ſeparate, the latter being the pureſt, the fineſt, and the brigheſt colour.

One pound of copperas affords about four ounces of this colour, and this is the red which they manage in different ſhades, and vary ſo much. See *Blown*-RED.

The Chineſe have alſo a white colour, which they uſe in their figures painted on the China: the ware itſelf is naturally white, and the varniſh, or oil of ſtone, is a great addition to its whiteneſs all over. But they have yet a way of making a much brighter and finer white than theſe, as may be ſeen in moſt of the fine China-ware where there is any white in the figures. This white is made in the following manner: they collect on the ſhores of their rivers a ſort of flint or agate, which is of a whitiſh hue, without veins, and tolerably tranſparent. It approaches very much to the nature of cryſtal, and probably cryſtal may be found to ſupply its place with us. They calcine this ſtone to a white powder, and to every ounce of this, when ground in their porcelain mortars to an impalpable fineneſs, they add two ounces of ceruſs in fine powder: this they mix with the varniſh, and lay on in the common way of other colours. This white mixture ſerves not only for the colouring white, but it is the baſis of ſeveral other of thoſe beautiful colours which we ſee on the China-ware, and which our manufacturers have been often perplexed what to make of. Their green colour is made of copper ruſted with acid; and their fine deep violet colour is made of this green, by adding to it a due proportion of this white. It is not to be ſuppoſed that this effect is produced according to the common laws of mixing colours among our painters, for then the white and green would only make a paler green. But copper being a metal that as well gives a fine blue as a fine green, according to the nature of the ſubſtances it is mixed with, the white in this caſe alters the very nature of the green, and converts it into that fine and deep violet blue, which we may draw from copper by means of any of the volatile alkalis, ſuch as ſpirit of ſal ammoniac, ſpirit of hartſhorn, ſpirit of urine, or any the like liquor. The workmen know how to bring this blue to any degree, by putting in different proportions of the two colours. There is not any admixture of them, that will not produce a blue of ſome kind; but always the more of the green colour is uſed, the deeper the blue will be, and the leſs the paler. The yellow is made of an admixture of ſeveral drachms of this white, and three drachms of copperas, or more if they deſire the colour to be deeper.

Moſt of theſe colours are mixed up with gum water, for application; with a little ſalt-petre, ſometimes ceruſs or copperas, but more uſually copperas alone, being firſt diſſolved in the water. Indeed for *porcelain*, that are to be quite red, the colour is uſually applied with oil; i. e. with the common oil of the *porcelain*, or another made of the white flints.

Theſe colours are laid on upon the veſſels when they have been once baked, but they do not appear till the ſecond baking is over in their proper ſhades or tinges, and ſometimes ſcarce at all.

The black China called *umiam*, is much eſteemed in the Eaſt, and particularly when it is ornamented with gold; this colour looking better with that ornament than any other. The black is always laid on when the *porcelain* is firſt dried, and is prepared by mixing three ounces of the fine deep blue with ſeven ounces of that fine varniſh, which they call *oil of ſtones*. This admixture gives a fine deep black; but the proportion is varied, as the colour is deſigned to be more or leſs deep. When the colour is thoroughly dry, the veſſels are baked, and when this is done the gold is laid on, and the whole is baked again in a particular furnace made for this purpoſe.

The *gold* on this ware is never laid on alone, but managed in the following manner: they grind it in water to a fine powder, and leave it to dry in the ſhade; they then mix with every ten grains of gold one grain of ceruſs, and incorporating the whole with gum-water, they lay it on in the manner of other colours. See GILDING *of China-ware*.

If they would have the black degenerate into blue, they need only add leſs of the blue, and a little of the ceruſs and agate white before deſcribed. They have two peculiar ways of applying the red, beſide the common one, both which require a nice workman, and make the ware come very dear. They call one of theſe *oils red*, and the other *blown* RED, which is very rare and of great price.

There is likewiſe a kind of marbled *porcelain*, called by the Chineſe, who are very fond of it, *tſou tchi*.

It is generally plain white, ſometimes blue, and has exactly the appearance of a piece of China which had been firſt broken, and then had all the pieces cemented in their places again, and covered with the original varniſh. The manner of preparing it is eaſy, and might be imitated with us. Inſtead of the common varniſh of the China-ware, which is made of what they call oil of ſtone and oil of fern mixed together, they cover this with a ſimple thing made only of a ſort of coarſe agates calcined to a white powder, and ſeparated from the groſſer parts by means of water, after long grinding in mortars. When the powder has been thus prepared, it is left moiſt, or in form of a ſort of cream, with the laſt water that is ſuffered to remain in it, and this is uſed as the varniſh. Our cryſtal would ſerve fully as well as theſe coarſe agates, and the method of preparation is perfectly eaſy. The occaſion of the ſingular appearance of this ſort of porcelain is, that the varniſh never ſpreads evenly, but runs into ridges and veins. Theſe often run naturally into a ſort of moſaic-work, which can ſcarce be taken for the effect of chance. If the marbled China be deſired blue, they firſt give it a general coat of this colour, by dipping the veſſel into a blue varniſh; and when this is thoroughly dry, they add another coat of this agate-oil. See PARTY-*China*.

There are ſeveral other kinds of *porcelain*; but they are ſuch as are rather for curioſity than uſe: the prettieſt are the magic *porcelains*, whoſe colours only appear when filled with water, or ſome other clear liquor. Theſe are made double; the outſide is white, and all laid out in compartiments; the inſide is a ſolid cup, of coloured *porcelain*; though the cup is ſometimes of glaſs, which has a better effect than *porcelain*.

The Chineſe called this ſort of china-ware *kiatſim*, that is to ſay, the concealed blue china.

The art is now in a great meaſure loſt; but there may be ſome gueſs made as to the manner in which it might be done at this time. The veſſels which are to be made in this manner, muſt be very thin: the colour muſt be laid on in the form of fiſh, or other animals or figures, on the inſide, after the veſſel has been once baked. After this colour has had time to dry, the inſide of the veſſel muſt have a ſecond coat of the ſame earth, or ſtone-ware, of which the veſſel is made; and over this a varniſh of the common kind. The conſequence of this will be, that the figures of the fiſh, in a very ſtrong colour, will be buried between two coats of the ware, which together form a complete veſſel. The outſide is then to be ground down almoſt to the figures, and when they begin to appear, a new coat of the varniſh muſt be laid over this. The figures will then be obſcure, and ſcarce, if at all perceivable; but on filling the veſſel with water, the tranſparence of the ſides will be taken off, and the liquor will make a ſort of foil behind, which will throw out the figures of the fiſh. This might be done in any ware tolerably clear and tranſparent. The *porcelain* of China would ſucceed better with it; but the pains and nicety required are too great, and all the attempts lately made by them have miſcarried.

The Chineſe make a great variety of figures on the ſurfaces of the vaſes of white China-ware, and there is one kind of this greatly in eſteem among them, in which there are flowers and other figures; yet the ſurface is quite ſmooth, and the ſubſtance extremely thin. The manner of making it is this; they firſt form the veſſel of the fineſt materials, as thin as they can; then, when they have poliſhed it, inſide and out, at the wheel, they put into it a ſtamp of its own ſhape, but cut with all theſe figures: they preſs this down ſo firmly on the yet moiſt veſſel, that the impreſſion is received in a very perfect manner; and if the ſhape of the veſſel be at all hurt, they take it into the wheel again to reſtore it. They then finiſh it with the knife and ſciſſars; and when they have made it as perfect as can be, they cover it with the fine white varniſh within and without. This fills up all the cavities of the impreſſion, and gives a perfectly ſmooth and even ſurface; yet the thickneſs of this varniſh in the traces of the figures gives it a different white, and the whole figures are as finely and accurately ſeen, as if painted on the outſide. This is an artifice that might eaſily be brought to bear among us, and ſeveral of our finer wares would make a pretty figure with it.

There are many things practiſed by the Chineſe in their colouring and forming the ſeveral kinds of *porcelain*, which may be well brought into uſe among us, and give a new value to our own wares, even though we ſhould never arrive at their art of making the thing itſelf. One kind of colouring eaſily introduced among us, would be what they call *hoan ton hoan*. This produces veſſels of great beauty and price, and is done in this manner. The matter of which the veſſels are made, for this purpoſe, need not be fine; they uſually take any of the common veſſels baked, without having been varniſhed, and conſequently ſimply white, and without luſtre. When theſe are intended to be of one ſimple colour, they need only be plunged into a liquid varniſh of oil, as the workmen there call it, coloured with ſuch ingredients as will ſtrike the moſt lively tinges; but if it is to be coloured in compartments, as is uſually the cuſtom with this ſort of china, it is to be done by the pencil. The uſual way is to paint theſe in pannels, one green, another blue, and ſo on, and they make a very agreeable appearance. There requires no more to this, than the laying on the colours tolerably thick with a large pencil; but if the pictures of animals and plants are to be given, they ~~are to~~ be done with the moſt permanent colours, and the veſſel being again well baked, becomes very beautiful.

The Chineſe, who are deceivers in every thing, find the way of cheating very much in regard to this ſort of china-ware. They paint the flowers of plants, and ſome parts of the birds, &c. in very bright colours, after the veſſel has been baked. Vermillion is a fine colour, which they often add on this occaſion; but they cannot uſe this before the baking, becauſe it would be deſtroyed by the fire. Theſe colours which are laid on afterwards cannot laſt, but ſoon rub off in the wiping, or uſing the things; the others laſt for ever; for they are laid on with the greateſt heat of all, the veſſels being put into the ſame furnaces to lay on theſe, as the other things are baked in for the firſt time.

Salt-petre, and powder of flints, are generally the things added to the colours thus laid on, to make them penetrate, and run properly. Thus for the fine deep violet colour, which makes the greateſt figure of all others on this ware, they mix together equal quantities of the fine azure, the powder of flints and ſalt-petre, all firſt powdered ſeparately till perfectly fine; this is tempered with water, and then laid on with the pencil, and though it looks rough at firſt, it comes out of the furnace of as beautiful a gloſſy hue as any thing can be conceived. The yellow is made by mixing together three ounces of ceruſs, and three ounces of powdered flints, and adding, three, four, or more drachms of the red copperas, till the whole is of the proper degree of colour. The white is compoſed only of powder of flints and ceruſs, with a ſmall admixture of the ſalt-petre, or it will ſucceed tolerably well without. Theſe are all the particulars neceſſary to be obſerved for the making a ſort of *porcelain* of great beauty, in which the nature of the ware itſelf is not concerned; ſo that it ſeems eaſy to imitate it with any of our own wares. Obſ. ſur les Coutumes de l'Aſie, p. 320, &c.

The ſeveral kinds of *porcelains* above mentioned, being quite painted, with their ſeveral colours, and all the colours dry, are to be poliſhed, to prepare them to receive the oil or varniſh; which is done with a pencil of very fine feathers, moiſtened with water, and paſſed lightly over, to take off even the ſmalleſt inequalities.

The oiling or varniſhing is the laſt preparation of the *porcelain*, before it be carried to the oven: this is applied more or leſs thick, and ſeldomer or oftener repeated, according to the quality of the work. For thin fine *porcelain*, they give two very thin couches: to others one; but that one equivalent to the other two. There is a deal of art in applying the varniſh, both that it be done equally, and not in too great quantity. The couches on the inſide are given by aſperſion, i. e. by caſting in as much varniſh as is neceſſary: thoſe on the outſide, by immerſion, or by plunging the pieces in a veſſel of oil. It muſt be obſerved, that the foot is not yet formed, but continues in a mere maſs, till the work has been varniſhed: it is at length finiſhed on the wheel, and when hollowed, a little circle is painted in it, and ſometimes a Chineſe character. This painting being dry, the foot is varniſhed, and the work now carried to the oven to be baked.

The varniſh they lay on is ſo thick, that it often hides the colours, till the baking afterwards brings them out again: this is the caſe with the fine deep blues; we ſee none on the beſt china; it is all hid under the coat of white, and the veſſel appears plain, till it has paſſed through the fire again; but then the colour appears deeper than when at firſt laid on. See HOACHE.

The china varniſhes have been always famous; the manner of making which is ſaid to be as follows: take crude varniſh ſixty ounces; common water, the ſame quantity: mix them well together till the water diſappears; afterwards put this into a wooden veſſel five or ſix palms long, and two or three broad; mix them together with a wooden ſpatula, for a whole day in the ſummer's ſun, for two days if in the winter, and afterwards keep it in an earthen veſſel, covered with a bladder. The warer will not ſeparate again: this is called the ſun varniſh.

The oil of wood, called by the Portugueſe *azeile de pao*, is made in the following manner: take twenty ounces of that oil, which they call oil of wood; and ten drachms of the oil of the fruit; boil theſe a little together, and the oil will look yellow; then let it cool, and add to it five drachms of quick lime powdered. To make the firſt grounds called *camiſeca*, take ſwine's blood and quicklime powdered, of each an equal quantity; ſpread this mixture upon the wood, and when it is dry, ſmooth it with pumice-ſtones.

To make the black varniſh: take the varniſh prapared in the ſun ſixty ounces; ſtone black alum (ſuppoſed to be a ſort of copperas) diſſolved in a little water, three drachms; and ſeventy drachms of lamp oil, called by the Portugueſe *azeile de Candea*. Theſe things are all to be mixed together in a wooden veſſel, putting the lamp oil in at twice, and ſtirring the whole together with a wooden ſpatula.

The pitch-coloured varniſh is made in the following manner: take oil of wood, crude, forty drachms, called *da pao*; of the lamp oil, called *da Candea* crude, forty drachms; mix them together in the ſun in a wooden veſſel, in the ſame manner as the common varniſh and water are ordered to be mixed in the firſt proceſs.

To make the red varniſh: take ten drachms of cinnabar, twenty drachms of prepared varniſh, and a little lamp-oil; mix them all together.

To make a yellow varniſh: take of the yellow colour ten drachms, prepared varniſh thirty drachms, a little lamp-oil; mix all together.

To make the varniſh of a muſk colour: take of the red varniſh ten drachms, and of the black varniſh four drachms; mix them well together. Philoſ. Tranſ. Nº 261. p. 524.

Theſe are the accounts ſent to the great-duke of Tuſcany by the Jeſuits in China: Dr. William Sherard communicated them to the Royal Society; and to render the accounts uſeful to the world, he preſented them with the ſeveral ſubſtances mentioned; theſe are depoſited in the muſæum of the ſociety, and may ſerve as inſtructions to all who are curious in this art.

The Chineſe have of late years diſcovered a new kind of varniſh for their ware: they call this *tſekinyeou*, that is to ſay, the browniſh gold varniſh; it is of the colour of the brown images, or of what we call coffee colour. The novelty of this has made it much eſteemed: it is made in the manner of all their other varniſhes, by diſſolving the finer part of an earthy ſubſtance in water. The ſubſtance which they make it of is a common yellow earth: this they diſſolve in water, and letting the coarſe parts ſettle, they pour off the yet thick liquor, and what afterwards ſubſides from this, is the pure and fine part, which they keep in form of a ſoft paſte, or thick cream. They uſe this only to the thinneſt and moſt delicate *porcelain* ware.

The manner of uſing it is this: they mix a quantity of this fine ſediment with ſo much water as renders it thin and liquid, like the common varniſh: this and the common kind are to be uſed together, ſo that care muſt be taken that they are nicely of the ſame degree of thickneſs: this the workmen try by dipping a petunſe or brick of their earth into both, and ſeeing which comes out moſt covered, that which lies on the thickeſt, is to be diluted with more water, or the other to be heightened with more of the earth, to bring them to the ſame ſtandard.

They are both judged to be ſufficiently liquid when they enter the pores of the petunſe. They then mix ſome of the *oil of* FERN aſhes and lime, along with the brown varniſh, and add as much of this mixture to the common varniſh as they find upon trial will give ſuch a colour as is required. The common proportion for the brown colour moſt eſteemed at preſent, is two pints of the brown varniſh to eight pints of the common; and to four pints of this mixture they add one pint of the varniſh, or oil of fern. It might puzzle a ſtranger to their terms, to underſtand what theſe people meant by oil; but it is a word with them in uſe for any thing liquid; and they call all their varniſhes ſo, though made of the powders of earths and ſtones mixed with water. They apply this varniſh to the veſſels by dipping them into it, and ſo completely covering them inſide and out before they put them into the oven; and the baking give ſa great brightneſs to the colour. This is the niceſt part of the whole manufacture of the *porcelain*, and other wares of that kind.

The varniſhes uſed by the Chineſe are two; the one they call *oil of ſtones*, the other *oil of fern*; which ſee. They mix theſe together, and with great caution and delicacy apply them to the veſſels all over equally, with a ſteady hand and a fine pencil.

PORCELAIN, *baking or nealing of*. There are two kinds of ovens uſed in baking *porcelain*; large ones, for works that are only uſed to come to the fire once, which is the common way; and ſmall ones, for ſuch as require a double baking.

The large ones are two Chineſe fathoms deep, and almoſt four wide. They are formed of a mixture of three earths; one whereof, yellow and common, makes the baſis; the two others are ſcarcer, and dug out of deep mines, wherein people can only work in winter. One of them, called *lautou*, is avery ſtrong ſtiff earth; the other *youtou*, oily.

The ſides and roof of the ovens are ſo thick, that one may lay the hand on them, when the fire is at its height, without danger of burning. At the top of the dome, which is in form of a tunnel, is a large aperture, to give vent to the flames and ſmoke, which mount up inceſſantly, as ſoon as fire is once ſet to the oven; beſide the principal aperture, there are four or five ſmall ones around; which, by being opened and ſhut, ſerve to augment or diminiſh the heat: like the holes in the chemiſts furnaces, called *regiſters*. The hearth, which takes up the whole breadth of the oven, is placed in front, preciſely againſt the opening of the door, and is two or three feet deep, and two broad; people paſſing over it on a plank, to go into the furnace to range the *porcelain*. As ſoon as the fire is lighted, the door is walled up, only leaving an aperture for the conveyance of wood. Laſtly, the bottom of the oven is covered with ſand, wherein part of the firſt *porcelain* caſes are buried. The oven itſelf is uſually placed at the extremity of a long, narrow veſtibule, which ſerves in lieu of bellows; the cold air and wind being thus driven directly in the face of each oven.

Each piece of *porcelain* of any note, is diſpoſed in the furnace, in its peculiar, ſeparate caſe, or coffin. Indeed, as to tea-diſhes, &c. the ſame caſe ſerves for ſeveral. The caſes are all of the ſame matter with the oven; they have no lids, but ſerve each other mutually; the bottom of a ſecond caſe fitting into the aperture of the firſt; and thus ſucceſſively to the top of each column. Each coffin, which is uſually of a cylindrical form, that the fire may communicate itſelf more eqeably to the *porcelains* incloſed, has, at bottom, a little lay of very fine ſand, covered over with duſt of kaolin, that the ſand may not ſtick to the work; and care is taken, that the *porcelain* may not touch the ſides of the caſe. In the larger caſes, which hold the ſmall pieces, they leave the middle vacant, in regard *porcelains* placed there would want the neceſſary heat. Each of theſe little pieces is mounted on a little maſſive of earth, ofthe thickneſs of two crowns, covered with powder of kaolin.

F. d'Entrecolles obſerves, that the *porcelains* are put in caſes to prevent any diminution of luſtre from the too violent effect of a naked fire; adding, that it is owing to thoſe thick veils, that the beauty, or, as he calls it, the complexions of the *porcelains*, is not tanned by the heat of the fire.

As faſt as the caſes are filled, a workman ranges them in the cavity of the furnace; forming them into piles, or columns, whereof thoſe in the middle are, at leaſt, ſeven feet high: the two caſes at the bottom of each column are left empty, becauſe being partly ſunk in the ſand, the fire has the leſs effect on them; and, for the ſame reaſon, the uppermoſt one is left empty. In this manner is the whole cavity of the oven filled with columns, excepting that part preciſely under the grand aperture. In ranging the caſes, they obſerve always to place the fineſt piles of *porcelain* in the centre, the coarſeſt at the bottom, and thoſe that are high-coloured, and conſiſt of as much petunſe as kaolin, and wherein the worſt oil is uſed, at the mouth.

Theſe piles are all placed very near one another, and are bound together at top, at bottom, and in the middle, by pieces of earth, in ſuch manner as that the flame may have a free paſſage among them, and inſinuate equally on all ſides: in which a great part of the workman's art lies, and on which the perfection of the *porcelain* much depends. Another thing to be obſerved is, that an oven muſt never be ſet altogether with new coffins; but half one, half the other: the old ones at the bottoms and tops of the pile, and the new ones in the middle. Indeed it were better to have them all burnt in an oven apart, before they come to be uſed for *porcelain*, as was anciently done. The caſes, our author obſerves, are brought, ready prepared, from a large village on the river, a league diſtant from Kingtetching. Before they are burnt, they are yellow; and afterwards of a dark red.

When the oven is filled, they wall up the door, only leaving a ſmall aperture for the throwing in of little pieces of wood, a foot long but very ſlender, to keep up the fire: it is then heated, by degrees, for the ſpace of a day and night; after which, two men, who relieve one another, continue to throw in wood, without any intermiſſion. To know when the *porcelain* is baked enough, they open one of the leſſer holes of the oven, and, with a pair of tongs, take off the lid of one of the piles. If the fire appears very briſk and clear, and the piles equally inflamed, and eſpecially if the colours of the *porcelain* that is uncovered, dart forth a noble luſtre; the coction is ſufficient, they diſcontinue the fire, and wall up what remained of the door of the furnace.

If the oven be only filled with ſmall *porcelain*, they take them out twelve or fifteen hours after the fire is extinct: if it be filled with larger, they defer opening it for two or three days. In this the modern practice differs from the ancient; wherein the door was not opened till after ten days for the large pieces, and five for the ſmall ones. One thing very ſurpriſing, and almoſt inconceivable, F. d'Entrecolles obſerves, is, that there are never found any aſhes on the hearth of the oven, what quantity of wood ſoever is conſumed. He adds another thing, which with him paſſes for equally ſtrange, that the workmen employed about the furnaces, ſlake their thirſt by continually drinking hot tea, with ſalt diſſolved in it.

The Chineſe make another kind of *porcelain*, which they paint and bake twice; and for this ſecond baking they have a kind of little ovens on purpoſe. Theſe ovens, when very ſmall, are made of iron; or otherwiſe of a kind of bricks an inch thick, a foot high, and half a foot broad, made of the ſame earth with the *porcelain caſes*. The biggeſt of theſe ovens do not exceed five feet in height, and three in diameter; and being made much in form of bee-hives, the bricks are arched a little, to form the curvity the better. The hearth is of earth half a foot high, formed of two or three ranges of bricks; and on this maſſive is the oven built. Around the oven at the diſtance of about half a foot, is raiſed a ſhell of common bricks, joined to the oven itſelf by a kind of arcboutant of earth, which ſerves to ſtrengthen it. They uſually build four or five of theſe ovens at equal diſtances from each other. At the bottom of the ſhell are holes to give air to the fire when lighted: at top is an aperture, which they cover up with a piece of the baked earth, when the *porcelains* are laid in the oven.

The *porcelains*, here, are not incloſed in coffins, as in the common ovens; the oven itſelf ſerving that purpoſe, and being ſo exactly cloſed, that they receive no other impreſſion of the fire, but that of the heat of the charcoal diſpoſed in the hearth, at the bottom of the oven, as well as at top of the vault, and in the interval between the oven and the ſhell, or brick-wall.

To prepare the *porcelains* for a ſecond baking, they muſt have had their varniſh in the common manner, and have paſſed the great oven: in this ſtate they are painted with various colours, after which, without giving them any new varniſh, they are ranged in piles in the little oven; ſetting the little ones over the larger, in form of pyramids. The Chineſe are very artful in their diſpoſition of theſe, arranging them in the moſt compact manner, and putting the little ones within the great ones; but great care is alſo neceſſary, that the veſſels do not touch one another in the parts where they are painted, for the conſequence of that would be the ſpoiling of both veſſels, as the colours would run together. The bottom of one veſſel may generally be placed on the bottom of another, though both are painted, becauſe the rims are not painted, and they keep the painted parts from touching one another. High and narrow veſſels, ſuch as chocolate-cups, and the like, are very troubleſome on this occaſion. The method the

Chineſe workmen take with them, is this: they place a range of them, ſo as to cover the whole bottom of the furnace, and they cover this with a thin bed of broken-China-ware, over which they place another row of the cups, and ſo on to the top, where they lay on no covering: they never bake any thing elſe with theſe cups, when they are of this kind of twice-baked *porcelain*.

This ſecond baking is ſometimes intended to preſerve the luſtre of the colours the better, and at the ſame time to give them a kind of relievo; but, more uſually its deſign is to hide defective places, by covering them over with colours; but the artifice is eaſily found out, by paſſing the hand over them.

When the workman judges his *porcelains* enough baked, he takes off the piece that covers the aperture; takes out the charcoal; and, when the oven is cold, the *porcelain* is ſo too.

How beautiful ſoever the modern *porcelain* may be, the taſte for antiquity, which reigns in China, as well as in Europe, gives the ancient *porcelain* a value far above that of the modern.

It muſt be owned, the ancient ſeems finer as to the matter, more perfect as to the baking, and of a more pleaſant caſt, both as to the white of the ground, and the other colours; yet, it is certain, the moſt able and diſcerning may be deceived herein; and there are workmen who make it their buſineſs to counterfeit the ancient *porcelain*, called *kutong*, in the modern.

The matter of the falſe kutong is a ſoft and yellowiſh earth, found near Kingtetching. There is nothing particular in the firſt part of the proceſs, except that they are made thicker, and that they are varniſhed with an oil drawn from the yellow-ſtone, mixed with the common oil, which gives them a kind of ſea-green hue. When taken out of the oven they throw it into a fatty broth, made of capons, &c. in which they boil it a ſecond time; they then bury it in the filthieſt ſink they can find, for a month or ſix weeks, or more, according as they would give it the greater appearance of antiquity. Beſides their thickneſs, and their colour, theſe falſe antiques reſemble the true ones in this, that they do not reſound when ſtruck, nor even give the leaſt buz, when held to the ear.

Notwithſtanding the vaſt quantity of *porcelains* made in almoſt all the provinces of the empire of China, they ſtill continue very dear, though not near ſo dear as anciently. The Chineſe annals tell us of times wherein a ſingle urn coſt ninety or a hundred crowns on the ſpot. What chiefly occaſions the extraordinary price of this commodity, eſpecially in Europe, is, beſide the great profits of the merchant in Europe, and their factors in China, that it rarely happens an oven ſucceeds throughout; that it is frequently quite ſpoiled, ſo that, upon opening it, in lieu of fine *porcelains*, is found a hard unformed maſs, into which both the *porcelains*, and their coffins, are converted, either by exceſs of heat, or ſome ill qualities in the matter.

Another reaſon of the dearneſs of *porcelain* is, that the ingredients it is made of, and the wood wherewith it is burnt, grow more and more ſcarce. One may add a third reaſon for the exceſſive price of *porcelains* to the Europeans; and it is this: that moſt of thoſe ſent to Europe are formed on new models, frequently very capricious, and difficult to ſucceed in; which yet, for the ſmalleſt defects are turned on the manufacturer's hands; and he, not being able to diſpoſe of them to the Chineſe, becauſe not to their taſte, nor to their uſe, is forced to charge the *porcelain* he delivers the higher, to pay himſelf for thoſe refuſed.

The art of making *porcelain* is one of thoſe in which Europe has been excelled by oriental nations. However, earthen wares have been made, for ſeveral years paſt, in different parts of Europe, ſo like the oriental, that they have acquired the name of *porcelain*. The firſt European *porcelains* are ſaid to have been made in Saxony and in France; and afterwards in England, Germany, and Italy; all of which differed from thoſe of Japan and China, but each poſſeſſing its peculiar character. The firſt perſon, who ſeems to have made this manufacture the object of ſcientific attention, was M. Reaumur; and he communicated his reſearches in two Memoirs to the Academy of Sciences, in 1727 and 1729. Having broken pieces of the Japaneſe, Saxon, and French *porcelains*, he examined the difference of their grains or internal ſtructure. The grain of the Japaneſe *porcelain* appeared to him to be fine, cloſe, compact, moderately ſmooth, and ſomewhat ſhining. The grain of the Saxon *porcelain* was found to be ſtill more compact, not granulous, ſmooth, and ſhining like enamel. And the *porcelain* of St. Cloud had a grain much leſs cloſe and fine than that of Japan, ſhining little or not at all, and reſembling the grain of ſugar. In order to determine their difference ſtill farther, he expoſed them to a violent heat; and found that the Japaneſe *porcelain* was unaltered by the fire, and all the European *porcelains* were melted. This eſſential difference ſuggeſted to him the moſt juſt and regular idea, that has yet been formed of the *porcelain* or China-ware, viz. that it is a half vitrified ſubſtance or manufacture, in a middle ſtate between the common baked earthen ware of our vulgar manufactures, and true glaſs. This is the eſſential and diſtinctive character of *porcelain*, and it is only by conſidering it in this light, that we are to hope to arrive at the perfect art of imitating it in Europe. The determining the due degree of heat for the baking the China-ware, and the finding out the proper time it ſhould remain in that heat, are two very eſſential points in the manufacture of this elegant ware. Perhaps our Engliſh attempts to imitate it would be brought nearer the perfection we are aiming at, by a juſt regard to theſe particulars, than by many other leſs material articles, about which we ſeem more ſolicitous.

This attempt is to be made on theſe principles in two different manners: the one by finding ſome appropriated matter on which fire acts with more than ordinary ſtrength in the time of its paſſing from the common baked ſtate of earthen ware into that of glaſs. The other is, to compoſe a paſte of two ſubſtances reduced to powder, the one of which ſhall be of force to reſiſt a very violent fire, ſo as not to become vitrified in it; and the other, a matter very eaſily vitrifiable.

In the firſt caſe, the matter is to be taken out of the fire at the time when it is imperfectly vitrified; and in the other, the compound maſs is to remain in the furnace till the one ſubſtance, which is the more eaſily vitrifiable, is truly vitrified; and being then taken out, the whole will be what *porcelain* is, a ſubſtance in part vitrified, but not wholly ſo.

The firſt method is that by which the European *porcelain* has generally been made, and though that of St. Cloud, and ſome other places, has been very beautiful, yet it is always eaſy to diſtinguiſh even the fineſt of it from the China-ware, and the nature of the two ſubſtances appears evidently different: theſe owing all their beauty to their near approach to vitrification, are made to endure a long and violent fire, and are taken from it at a time when a very little longer continuance would have made them perfect glaſs; on the contrary, the China-ware being made of a paſte, part of which is made of a ſubſtance in itſelf ſcarce poſſible to be vitrified, bears the fire in a yet much more intenſe degree than ours, and is in no danger of running wholly into glaſs from it.

The two ſubſtances uſed by the Chineſe are well known by the names of *petunſe* and *kaolin*, and on examining theſe it appears very evident, that we have in Europe the very ſame ſubſtances, or at leaſt ſubſtances of the very ſame nature, and capable of being wrought into a *porcelain* equally beautiful and fine. Mem. Acad. Scienc. Par. 1739. See Kaolin and Petunſe.

Theſe are the two different ſemi-vitrifications, on one or other of which all the European manufactures have hitherto been founded; and it is eaſy from the knowledge of theſe principles to determine, on breaking a piece of the china of any of our manufactures, by which of the two proceſſes it is made. If it is made by ſeizing the half-vitrified maſs of a ſubſtance which would ſoon after have been wholly vitrified, then the putting it in a crucible, into an equal degree of fire, will ſoon turn it wholly into glaſs. This is the caſe of moſt of our European *porcelain*; but if it be made of two ingredients, the one of which is not vitrifiable, or at leaſt not by ſuch fires, then the matter will melt, but will not vitrify: this is the caſe with the Chineſe *porcelain*, which if kept in fuſion a long time, yet when cold is China-ware ſtill; ſo that this is evidently made of two ſuch different ingredients.

Beſides theſe methods, there is yet another, of late invention, which makes a very beautiful China; and which, if it does not afford veſſels equal to thoſe of China, yet will afford them nearly approaching to thoſe, and at a conſiderably ſmaller price. This method conſiſts in reducing glaſs to China. See Glass-*porcelain*.

The author of the Chemical Dictionary obſerves, that M. Reaumur has erroneouſly confounded the Saxon *porcelain* with the other fuſible *porcelains* in Europe. For though it contains, as every *porcelain* does, particularly that of China and Japan, a fuſible ſubſtance, which has been completely fuſed in the operation of baking, and to which it owes its denſity and internal luſtre: yet it contains alſo a large quantity of a ſubſtance abſolutely unfuſible, from which it receives its admirable whiteneſs, its firmneſs and ſolidity, during the baking, ſupplying the place of the oriental kaolin, and contracting its dimenſions in a conſiderable degree, while it incorporates with the fuſible ſubſtance. He has actually found, that this *porcelain* cannot be fuſed, unleſs by a fire capable alſo of melting the beſt Japaneſe *porcelain*. And he obſerves, that it is ſuperior to the oriental in the ſmoothneſs, luſtre, and leſs granulous appearance of its internal ſurface. The manufacture of Saxony has been long eſtabliſhed: and that at Meiſſen, a few miles from Dreſden, has produced *porcelains* painted and enamelled in ſuch perfection, that they have been reckoned more beautiful and ſold at a higher price than even thoſe of China.

The invention is ſaid to have been owing to an alchemiſt called Botticher, who, being confined in the caſtle of Konigſtein by the king of Poland, on a ſuſpicion of being maſter of the philoſopher's ſtone, had leiſure ſufficient, not indeed to make gold, but to invent a ware, which by the excellence and value of it conſiderably inriches the country. He died in 1719, but it ſeems that he only invented the white ſort; the art of making brown and blue *porcelain* not having been diſcovered till the year 1722.

Porcelain is alſo made at Vienna, Frankendal, and lately in the neighbourhood of Berlin: all which are made of the ſame kind of materials with thoſe of Saxony. In Italy there are alſo manufactures of *porcelain*, at Naples, and Florence. In France they have had manufactures of this kind for many years: *porcelain* was made at St. Cloud, and in the ſuburb of St. Antoine at Paris, before M. de Reaumur's publication; but though beautiful, it was of the vitreous and fuſible kind. Since that time, conſiderable manufactures of it have been eſtabliſhed at Chantilly, Villeroi, and Orleans, the *porcelains* of which have a diſtinguiſhed merit: but thoſe produced in the king's manufactory at Sevrés, are ſaid to do greateſt honour to France, on account of their ſhining, white, beautiful glazing, and coloured grounds.

M. Guettard, who has lately publiſhed an account of his diſcoveries in the Memoirs of the Academy of Sciences for the year 1765, ſeems to have been one of the firſt, who, ſince M. Reaumur, found in France a kaolin and petunſe of the ſame nature as the Chineſe; the former is a white argillaceous earth filled with mica; the latter a hard quartoſe ſtone. The count de Lauraguais has alſo ſo far ſucceeded in his attempts in this way, that ſome pieces, preſented by him in 1766, to the Academy of Sciences, were declared to reſemble the *porcelain* of China and Japan in ſolidity, grain, and unfuſibility, more than any other that had been made in that country, though it wants the whiteneſs and luſtre obſervable in the ancient Japaneſe *porcelain*.

We have alſo had for many years, ſeveral manufactures of *porcelain* in England: that of Chelſea is ſcarce inferior to thoſe of Saxony and France; but being calculated more for ornament than uſe, it is dear and of no very general advantage. The *porcelains* that are produced in our other manufactories are ſold at a much cheaper rate than any that is imported; but, except that of Worceſter, they all wear brown, and are ſubject to crack, eſpecially in the glazing, by boiling water; the Worceſter *porcelain* has a good body hardly inferior to that of eaſtern china; it is equally tough, and its glazing never cracks or ſcales of.

With reſpect to the method of manufacturing *porcelain*, it may be obſerved, that the baſis of that which is fuſible and vitreous, and which may be called falſe *porcelain*, is a FRIT, formed of a mixture of ſand or of powdered flints, with ſalts capable of diſpoſing them to fuſion, and of giving them a great whiteneſs by means of a ſufficient heat.

This frit is mixed with as much of a white tenacious earth of an argillaceous or marly nature, as is ſufficient to make it capable of being worked upon the wheel: the whole mixture is well ground in a mill, and made into a paſte, which is formed either upon the wheel or in moulds, into the various pieces required. Each of theſe pieces, when dry, is put into a caſe made of earthen ware; which caſes, called by the Engliſh potters SEGGARS, are to be ranged in piles one upon another, in a furnace or kiln, which is to be filled with them to the roof. The furnaces are chambers or cavities of various forms and ſizes, and are ſo diſpoſed, that the fire-place is on the outſide oppoſite to one or more openings, which communicate within the furnace. The furnace is gradually heated by increaſing the fire till the *porcelain* is baked, or has acquired its proper hardneſs and tranſparency, which is known by taking out and examining pieces, placed for that purpoſe in caſes which have lateral openings. When the *porcelain* is ſufficiently baked and gradually cooled, it reſembles white marble, not having a ſhining ſurface, which it is to acquire by the operation of glazing. This muſt be adapted to the nature of the *porcelain*, i. e. to the hardneſs and denſity of the ware, the ingredients of compoſition, &c. The ſeveral glazings are prepared by previouſly fuſing together all the ſubſtances of which they conſiſt, ſo as to form vitreous maſſes, which are to be ground by a mill into fine powder, and this powder is to be mixed with a ſufficient quantity of water or other liquor, ſo that the mixture may have the conſiſtence of cream. The pieces of *porcelain* are to be covered with a thin ſtratum of this matter, and when very dry to be put into the furnace as before, and continued there till the glazing be well fuſed; which requires a leſs fire than baking the paſte. And thus the pieces of *porcelain* that are to remain white are finiſhed. The glazing uſed by the Chineſe is ſaid to be formed of the oil of petunſe and the oil of lime, deſcribed in the preceding part of this article: that uſed in a conſiderable manufactory of *porcelain* in our own country, is formed of twenty pounds of the fineſt white ſand or calcined flints, eighteen pounds of red-lead, ten pounds of pearl-aſhes, and four pounds of common ſalt decrepitated. The two firſt ingredients, being well levigated together, are mixed with the two latter, and the compound fuſed to vitrification. It is then to be reduced in a flint, agate, or porphyry mortar to an impalpable powder, which is tempered with water to the proper conſiſtence for painting.

The colours applied to *porcelain* are the ſame as thoſe uſed for ENAMEL painting, and conſiſt of metallic calces bruiſed and incorporated with a very fuſible glaſs. Crocus of iron affords a red colour; Caſſius's precipitate of GOLD makes the purple and violet; copper calcined by acids and precipitated by an alkali, gives a fine green; zaffre makes the blue; earths ſlightly ferruginous produce a yellow, and, laſtly, brown and black colours are produced by calcined iron, together with a deep blue of zaffre. Theſe colours, ground with gum water or oil of ſpike, are to be employed for the painting of the *porcelain* with deſigns of flowers and other figures.

For GILDING, a powder or calx of gold is to be applied in the ſame manner as the coloured enamels. The painted and gilded *porcelains* are to be expoſed to a fire capable of fuſing the glaſs with which the metallic colours are mixed; by which means they are made to adhere, and acquire a gloſs equal to that of the GLAZING. The ſhining appearance of the gold is produced by burniſhing with a blood-ſtone.

Dr. Lewis (Com. Phil. Techn. p. 627.) obſerves, that glaſs of lead and glaſs of antimony make a gold-coloured glazing for *porcelain* and earthen-ware. The fineſt gold glazing is ſaid to be made with an addition of ſilver. A glaſs of lead is prepared by melting minium or litharge with a third or fourth part of its weight with powdered flint. This yellow glaſs, reduced into fine powder, is either ſprinkled on the *porcelain* made red-hot, or mixed with beer, or other glutinous liquids to a due conſiſtence, and applied with a pencil: the ware is then placed in the furnace, under a muffle, till the glaſs begins to melt, which is known by its gliſtening; after which, while warm from the fire, it is moiſtened with a diluted ſolution of ſilver, and baked again. Or, the powdered glaſs of lead is moiſtened with the ſilver ſolution, then melted, and the glazing of the ware finiſhed in one proceſs, by applying on it this compound glaſs. After the baking, the glazed veſſels, while ſtill red-hot, are held over the ſmoke of burning ſtraw, &c.

The operations for the infuſible *porcelains*, and alſo for ſuch as are of the nature of ſtone-ware, are ſomewhat more ſimple. The ſand and ſtones which enter into their compoſition are to be ground in a mill: the earths or clays are to be waſhed; the materials are to be well mixed and formed into a paſte; the pieces are firſt rudely formed upon a potter's wheel; and when dry or half dry, they are turned again upon the wheel, and their form is made more perfect; they are then placed in the furnace, not to bake them, but only to apply a ſufficient heat to give them ſuch a ſolidity that they may be handled without breaking, and may receive the glazing. As the pieces of *porcelain* after this ſlight heat are very dry, they imbibe water readily. This diſpoſition aſſiſts the application of the glazing. The vitrifiable or vitrified matter of this glazing, which has been previouſly ground in a mill, is to be mixed with ſuch a quantity of water, that the liquor ſhall have the conſiſtence of milk. The pieces of *porcelain* are haſtily dipt in this liquor, the water of which they imbibe, and thus on their ſurface is left an uniform colouring of the glazing materials. This covering, which ought to be very thin, will very ſoon become ſo dry, that it cannot ſtick to the fingers when the pieces are handled.

The pieces of this *porcelain* are then put into the furnace to be perfectly baked. The heat is to be raiſed to ſuch a height, that all within the furnace ſhall be white, and the caſes ſhall be undiſtinguiſhable from the flame. When, by taking out ſmall pieces, the *porcelain* is known to be ſufficiently baked, the fire is diſcontinued, and the furnace cooled. If the baking has been well performed, the pieces of *porcelain* will be found by this ſingle operation to be rendered compact, ſonorous, cloſe-grained, moderately gloſſy, and covered externally with a fine glazing. The painting and gilding of this *porcelain* are to be executed in a manner ſimilar to that already deſcribed. Chemical Dict. art. *Porcelain*. See POTTERY, and DELF-*ware*.

PORCELAIN-*ſhell, porcellana*, or *concha venerea*, in *Natural Hiſtory*, the name of a genus of ſhell fiſh, the characters of which are theſe: they are of the univalve kind, and have for their mouth a long and narrow ſlit, dentated on each ſide, and of a conglobated, oblong, gibboſe, or umbonated form.

Theſe ſhells are claſſed in the Linnæan ſyſtem under the genus of CYPRÆA, including forty-four ſpecies, whoſe characters are, that the animal is a ſlug; the ſhell univalve, ſub-oval, and blunt at each end; and the aperture of the length of the ſhell longitudinal, linear, and toothed.

This genus of ſhells originally had the name of *porcellana* and *concha venerea* from the reſemblance of its mouth to the *pudendum muliebre*, called by ſome of the Roman writers, *porculus* and *porcellus*, and always alluded to under the word *Venus*. We have of late ſo far miſunderſtood the name as to ſuppoſe it derived of the word *porcelain*, from an imagination, that the Chineſe *porcelain*-ware was made of it. Geſner has fallen into the opinion, and Aldrovand ſeems to have been miſtaken in regard to its other name, *concha venerea*, ſuppoſing it ſo called becauſe of its beauty, and therefore ſacred to Venus. Rondeletius calls it the *remora Mutiani*; and the murex of the ſame author. Aldrovand. de Teſt. I. 3. p. 352. Geſner, Rondelet. de Teſt. I. 2. p. 102.

Theſe ſhells are current in ſeveral parts of Aſia, Africa, and America, as money; and they have been preſcribed, pulverized, in medicine. See CONCHA *Veneris*.

The name *concha venerea* may be apt to create confuſion, becauſe there is another ſhell of a very different kind, a bivalve, called CONCHA *Veneris*. This genus is therefore much better diſtinguiſhed by the name *porcellana*. There is a prodigious difference among the ſpecies of this genus; ſome are heavy, others very light; ſome have the mouth placed in a longitudinal, others in a tranſverſe direction.

The gibbous *porcelain* is a very remakable ſpecies, as is alſo the egg-*porcelain*, which has two buttons at the extremities; and the egg-*porcelain* called the *navel* is not leſs remarkable than theſe: this has, inſtead of a button, a long beak at each end.

The mouth of the *porcelain* muſt be narrow and oblong; this is the great characteriſtic, and is uſually dentated either on both ſides or on one.

The ſpecies of *porcelain* are ſo numerous, that it may be proper in the enumeration of them, to arrange them under ſome regular heads. See *Tab. of Shells*, Nº 16.

Some *porcelains* are conglobated, and thick; of theſe the cabinets of the curious afford us ſixteen ſpecies.

Some again are thick and of a pyriform figure; of theſe we have twenty-one; and others are gibbous, of which we have five ſpecies. Hiſt. Nat. Eclaric. p. 308.

PORCELLIONES, in the *Materia Medica*, a name given by ſome to the MILLEPEDES.

PORCELLO, in the *Glaſs Trade*, the inſtrument with which the workmen, after having made the opening for the bowl of a drinking glaſs or other ſuch veſſel, with his paſſage, widens and renders it more capacious at pleaſure.

PORCELLUS *Caſſovienſis*, in *Medicine*, the name of a diſeaſe to which the people of Hungary and Poland are very ſubject.

It is a hard tumor of the belly, attended with a wind and violent pains. It is truly an infarction of the SPLEEN, and is to be cured by aperitives. Philoſ. Tranſact. Nº 243.

PORCELLUS *Indicus*, in *Zoology*, a name given by authors to the animal called with us the GUINEA *pig*.

PORCH, *atrium*, a kind of veſtibule, ſupported by columns, much uſed at the entrance of the ancient temples, halls, churches, &c.

In the ancient architecture, a *porch* was a veſtibule, or a diſpoſition of inſulated columns, uſually crowned with a pediment, forming a covert place before the principal door of a temple, or court of juſtice. Such is that before the door of St. Paul's, Covent-garden, the work of Inigo Jones.

When it had four columns in front, it was called a *tetraſtyle*; when ſix, *hexaſtyle*: when eight, *octoſtyle*; when ten, *decaſtyle*, &c. Vitruvius calls it *pronas*; Pollux, προδομος, *prodomos*: when finer than ordinary, the ancients call it, alſo, *propyleum*.

PORCO, a name by which ſome authors have called the fiſh more uſually known by the name of *capriſcus*, ſuppoſed to be the *porcus* of Pliny. See GOAT-*fiſh*.

PORCUPINE, *hyſtrix*, in the Linnæan ſyſtem in *Zoology*, a diſtinct genus of animals of the order of *glires*, the characters of which are, that the creatures of it have two cutting teeth in each jaw, eight grinders, and the body covered with long, hard, and ſharp quills; to which Mr. Pennant adds, that the upper lip is divided. Linnæus enumerates four ſpecies.

The *creſted porcupine* is ſo called from a long creſt on the top of the head, reclining backwards, formed of ſtiff briſtles; between the quills, which are ſharp at the ends, and varied with black and white, there are a few hairs; the head, belly, and legs are covered with ſtrong briſtles, terminated with ſoft hair of a duſky colour; the whiſkers are long; the ears like the human; the toes are four before, and five behind; the tail ſhort, and covered with quills. This animal inhabits India, Tartary, Perſia, and all parts of Africa; it is found wild in Italy, and brought into the markets at Rome, where it is eat; but it is not originally a native of Europe. It is a harmleſs animal, lives on vegetables, ſleeps by day, and feeds by night; and when angry runs its noſe into a corner, erects its ſpines, and makes a ſnorting noiſe. Theſe animals produce a BEZOAR. Pennant. See *Tab.* IV. *Quadrupeds*, Nº 49.

PORCUPINE, the *American*, or *Braſilian*, the *hyſtrix prehenſilis* of Linnæus, called alſo *cuandu*, and by Hernandez *tlaquatzin*, has a ſhort blunt noſe, long white whiſkers, beneath the noſe a bed of ſmall ſpines, and the top of the head, back, ſide, and baſe of the tail covered with ſpines, about three inches long, white, and barred near their points with black, between which the ſkin is naked: on the breaſt, belly, and lower part of the legs, it has dark-brown briſtles; its feet are divided into four toes with very long claws; the tail is eighteen inches long, tapering towards the end, and for the laſt ten inches almoſt naked. This ſpecies inhabits Mexico and Braſil.

It climbs trees, but ſlowly and with difficulty, for want of a heel or hinder toe. It uſually twiſts its tail about a bough to keep it ſafe from falling. It makes a grunting like that of a hog. It feeds on poultry, and its fleſh is very well taſted. See *Tab.* IV. *Quadrupeds*, Nº 50. Ray and Pennant.

PORCUPINE, the *Canada*, or *hyſtrix dorſata* of Linnæus, has ſhort ears hid in the fur; the head, body, legs, and upper part of the tail are covered with ſoft, long, dark brown hair; the upper part of the head, back, body, and tail are furniſhed with many ſharp ſtrong quills, hid in the hair; the under ſide of the tail is white; the fore-feet have four toes; and the hind feet five; armed with long claws; the body in form reſembles that of the beaver, but it is not half as large; the tail is about ſix inches long. This animal inhabits North America, as high as Hudſon's-bay, neſts under the roots of large trees, and climbs the boughs; it feeds on wild fruits and barks of trees. The Indians eſteem its fleſh wholeſome and agreeable; and uſe the quills for ornaments. See *Tab.* IV. *Quadrupeds*, Nº 51.

The *long-tailed porcupine*, or *hyſtrix macroura* of Linnæus, called by Seba *porcus aculeatus*, has long whiſkers, ſhort naked ears, large bright eyes, a ſhort thick body, covered with long ſtiff hairs as ſharp as needles, of different colours, according to the incidence of the light upon them; feet divided into five toes, the tail as long as the body, with a thick tuft at the end, and the briſtles appearing as if they were jointed, tranſparent, and of a ſilvery hue. This ſpecies inhabits the iſlands of the Indian Archipelago, and lives in the foreſts. Pennant.

PORCUPINE-*fiſh, hyſtrix*, in *Ichthyology*, a ſpecies of *oſtracion*, in the Artedian ſyſtem, but of the *diodon*, belonging to the claſs of *amphibia nantes*, according to the Linnæan diſtribution. Its uſual ſize is between twelve and twenty inches in length; it is very thick, and covered, inſtead of ſcales, with a whitiſh, coriaceous ſkin, every way beſet with ſtrong ſharp thorns, the baſis of each of which has two other ſmaller ones buried under the ſkin; the opening of the mouth is very large, with rough rugged lips, and two broad bones in the place of teeth, one placed above, and the other below, both which are arched and a little prominent, as is alſo the whole mouth; the eyes are large, the eye-lids elevated, and armed with four thorns, which are from one to three inches in length; the ſides having the longeſt, and their length gradually ſhortening towards the back and belly; the belly is white, and the back brown, ſpotted with black, as are alſo the ſides. This ſpecies is found near the Cape of Good Hope. Cluſ. Exot. lib. vi. cap. 21. See *Tab.* IV. *Fiſh*, Nº 38.

PORCUS *aculeatus*, in *Zoology*. See PORCUPINE.

PORCUS *fluviatilis*, in *Ichthyology*, a name given by the old Lattin authors to the fiſh we at this time call the CERNUA and *aurata*, and in Engliſh the RUFFE.

PORCUS *Guinienſis*, in *Zoology*, the name of the Guinea HOG. This creature is of the ſame ſhape and make with our hog, and of a reddiſh tawny colour; its head, however, is ſomewhat more depreſſed than in our kind, and its ears longer, and running into narrow points; its tail is naked, but ſo long that it reaches almoſt to its heels; its hair is all ſhort and ſhining: it has no briſtles on the back, but only near the rump; and on the ſhoulders the hair is a little longer than elſewhere. It is a tame domeſtic creature. Ray.

Porcus *marinus*, or *ſea-hog*, in *Ichthyology*. See PORPESSE.

PORE, formed from πορος, *aperture*, or *duct*, a little interſtice between the particles of matter which conſtitute bodies either empty, or filled with ſome inſenſible medium.

Condenſation and rarefaction are only performed by cloſing and opening the *pores*.

The tranſparency of bodies is uſually ſuppoſed to ariſe from their *pores* being directly oppoſite to one another.

The matter of inſenſible perſpiration is conveyed through the *pores* of the cutis.

Sir Iſaac Newton ſhews, that bodies are much more rare and *porous* than is commonly believed: water, e. gr. is nineteen times lighter, and conſequently rarer, than gold; and gold itſelf is ſo rare, as very readily, and without the leaſt oppoſition, to tranſmit magnetic effluvia, and eaſily to admit quickſilver into its *pores*, and to let even water paſs through it: for a concave ſphere of gold hath, when filled with water, and ſoldered up, upon preſſing with a great force, let the water ſqueeze through it, and ſtand all over its outſide, in multitudes of ſmall drops like dew, without burſting or cracking the gold. See COMPRESSION.

Whence it may be concluded, that gold has more *pores* than ſolid parts; and, by conſequence, that water hath above forty times more *pores* than parts.

The MAGNET tranſmits its virtues, without any diminution or alteration, through all cold bodies that are not magnetic: as gold, ſilver, braſs, glaſs, water, &c.

The rays of light, let them be either bodies actually coming to us from the ſun, or only motions or impreſſions upon the medium, move in right lines, and are hardly ever, unleſs by great chance, reflected back again in the ſame line, after their impingence upon objects; and yet we ſee, that light is tranſmitted to the greateſt diſtances through pellucid bodies, and that in right lines.

Now how bodies ſhould have *pores* ſufficient for theſe effects, may be difficult to conceive, but not impoſſible: for Sir Iſaac ſhews, that the colours of all bodies ariſe from their particles being of ſuch a determinate ſize, or magnitude. Wherefore, if we conceive thoſe particles to be ſo diſpoſed, as that there is as much poroſity as there is of matter; and, in like manner, thoſe particles to be compoſed of others much leſs, and that have as much interſperſed vacuity, or ſpace, as their quantity of matter amounts to; and ſo on, till we come to ſolid particles without *pores*: then, if in any body there be (for inſtance) three of theſe ſizes of particles, and that the laſt be of the ſolid, or leaſt ſort; that body will have ſeven times as much vacuity as ſolid matter: if four ſuch degrees and the laſt be leaſt, and ſolid, that body will have fifteen times as much poroſity as ſolidity; if five ſuch degrees, it will have thirty-one times as much ſpace as ſolidity; and if ſix degrees, then it will have ſixty-three times as much vacuity as ſolid matter.

And perhaps, in the wonderful conformation and fabric of natural bodies, there may be other proportions of ſpace to matter, which are to us wholly unknown; whence it is poſſible there may be yet farther great quantities of interſperſed vacuity.

Pores, in *Anatomy*, are certain permeable ſpaces, between the parts of the ſkin; whereby we ſweat, or perſpire, &c. See *Tab. Anat. (Myol.) fig.* 8. *lit.* d d. *fig.* 9. *lit.* a a. *and* c.

The *pores* are moſt remarkable in the hands and feet. By viewing the palm of the hand with a moderate glaſs, after waſhing it well, we perceive innumerable little ridges of equal ſize and diſtance, running parallel to each other, eſpecially on the tips and joints of the fingers, &c. where they are regularly diſpoſed into ſpherical triangles, and ellipſes.

On theſe ridges ſtand the *pores*, in even rows, big enough to be ſeen by a good eye without a glaſs; but with one, every *pore* looks like a little fountain; and the ſweat may be ſeen to ſtand therein, clear as rock water; and as often as it is wiped off, it ſprings up again.

The *pores* are placed on the ridges, not in the furrows between them; that they might be leſs liable to be ſtopped by compreſſion: for the ſame reaſon, the *pores* of the hands and feet are larger than the reſt; thoſe parts being more uſed, and preſſed, than the reſt; and hence, again, there are no ridges on other parts.

Theſe *pores* ſerve as a convenient outlet for the more noxious parts of the blood, which, by the continual uſe of the hands and feet, are plentifully brought into them: whence, in hypochondriac and hyſteric people, there is a continual burning in the palms and ſoles.

In the ſtoppage or conſtriction of the *pores* of the ſkin, that diſeaſe which we popularly call a *cold*, is commonly ſuppoſed to conſiſt; though Dr. Keill maintains a quite contrary opinion in a diſſertation at the end of his Medicina Statica Britannica.

In the Philoſophical Tranſactions we have an inſtance of a ſtudent near Leyden much addicted to aſtronomy, who ſpending many nights in ſtar-gazing, had, by the nocturnal wet and cold, ſo obſtructed the *pores* of his ſkin, that little or nothing exhaled from his body: as appeared hence, that the ſhirt he had worn five or ſix weeks was then as white as if it had only been worn one day. In the mean while, a water was collected under the ſkin whereof he was afterwards cured.

Pore, *bliary*. See BILARIUS *porus*.

PORELLA, in *Botany*, the name of a genus of moſſes, the characters of which are theſe: the capſules contain a powder like thoſe of the other moſſes: and they have neither operculum, calyptra, nor pedicle; and their manner of ſhedding their powder is not by ſeparating into two parts, like thoſe of the ſelago and lycopodium, but by opening into ſeveral holes on all ſides. See *Tab.* XV. *of Botany*, N° 17.

Of this genus of moſſes there is only one known ſpecies; this is called by Dillenius, the bluntly pinnated *porella*, and grows in wet places in Virginia, Penſylvania, Maryland, and other parts of North-America.

PORFILIGON, a word uſed by ſome of the chemical writers to expreſs the ſquamæ martis, or the ſcales of iron which fly off in the ſmith's hammering of it.

PORIME, Porima, in *Geometry*, a theorem or propoſition, ſo eaſily demonſtrated, that it is almoſt ſelf-evident.

The word is formed from the Greek ποριμος, *pervious*, a thing eaſy to penetrate or conceive, and which opens the way to ſomething more difficult.

Such, e. gr. is this; that a chord is wholly within the circle.

Porime ſtands oppoſed to *aporime*, which denotes a propoſition ſo difficult, as to be almoſt impoſſible to be demonſtrated. Such as the quadrature of the circle is now, and as the ſquaring of any aſſigned portion of Hippocrates's lunes formerly was.

The *porime* coincides nearly with the LEMMA, or aſſumption.

PORISM, Porisma, in *Mathematics*, a general theorem, or canon, deduced from a geometrical locus, and ſerving for the ſolution of other general and difficult problems. Proclus derives the word from the Greek ποριζω, *I eſtabliſh*, and concludes from ſomething already done and demonſtrated: and, accordingly, defines *poriſma*, a theorem drawn occaſionally from ſome other theorem already demonſtrated. In which ſenſe it coincides with what we otherwiſe call corollary.

The *poriſms* of Euclid were contained in three books, and conſiſted of a curious collection of many things which related to the analyſis of the more difficult and general problems: nothing remains in the works of the ancient geometers concerning this ſubject beſides what Pappus has preſerved in a very imperfect and obſcure ſtate in his mathematical collections.

A *poriſm*, he ſays, is that in which ſomething was propoſed to be inveſtigated. Dr. Simſon, of Glaſgow, has made an attempt to reſtore ſome of them in a poſthumous treatiſe concerning *Poriſm*, printed in Latin. See alſo Phil. Tranſ. Abr. vol. vi. part i. p. 76.

PORISTIC *method*, in *Mathematics*, is that which determines when, by what means, and how many different ways, a problem may be ſolved.

POROCELE, a word uſed by chirurgical writers for a callous hernia.

POROMPHALON, a word uſed by Hippocrates to expreſs a callous concretion, or a ſort of a tophus formed in the region of the navel.

POROPHYLLUM, in *Botany*. See *Foreign* COLTS-FOOT.

POROTICKS, a term uſed by the ancients for ſuch medicines as would conſume calluſes.

PORPESSE, an Engliſh name given indiſcriminately to two different fiſhes, the phocæna and the DOLPHIN.

Artedi, who has been very careful in bringing together the ſynonyma of authors, tells us, that this is properly the Engliſh name only of that ſpecies of the dolphin, the characters of which, according to his ſyſtem, is, that the body is almoſt of a conic form, the back broad, and the body ſubacute. This ſpecies is the phocæna of Ariſtotle, the tirſio or turſio of Pliny and Rondeletius, and the *delphinus phocæna* of Linnæus. Schoneveldt calls it the ſmall northern or oriental *dolphin*, and the Swedes the *marſuin*.

This fiſh is ranked among the cetaceous kind, and is the ſmalleſt fiſh of that tribe; the *porpeſſe*, properly ſo called, ſeldom exceeding five feet in length, in which it differs from the dolphin, a fiſh very often confounded with it, but which is frequently ſeen of ten or twelve feet in length. The ſnout of the dolphin is alſo much larger than that of the *porpeſſe*, which is another thing that may ſerve to determine their difference.

The *porpeſſe*, or *phocæna*, is of a roundiſh, not flat body, growing gradually ſmaller toward the tail; and juſt at the root of the tail it is a little flatted; its noſe is long and pointed, and furniſhed with ſtrong muſcles by means of which it is able to turn up the mud and ſand, to ſeek after ſmall animals; its ſkin is ſmooth, and but thin; its back is of a duſky bluiſh hue, almoſt black in ſome of the fiſh, and from the middle of the ſides downwards, it is whitiſh; it has no gills, nor any aperture in the place of them; but in the middle of the upper part of its head, before the brain, it has a pipe or ſpiracle, in form of a half moon, through which this ſort of fiſhes draws in their breath, and ſpouts out the water; this pipe terminates outwardly in one hole, but it is within divided into two parts by a bony ſeptum, ſo as to repreſent two noſtrils; but at its lower end it again becomes one hole, and opens into the mouth by a common orifice furniſhed with a very ſtrong ſphincter muſcle, by means of which it may be ſhut and opened at pleaſure; above this ſphincter, the ſides of the pipes are lined with a glandulous fleſh, from which, when preſſed, a glutinous liquor is forced out of certain little holes in it into the inſide of the pipe; above the noſtrils is a ſtrong valve or membrane, which ſerves to ſtop the pipe at pleaſure, and prevent any water from getting into it, but when the fiſh requires it within; within the fiſtula are ſix blind holes, having no outlet, four tending towards the ſnout, two placed above the valve, which ſtops the noſtrils, and two beneath it; and two tending towards the brain, having a long and narrow cavity, which ſeems intended for the uſe of ſmelling, though, on opening the brain, no ſuch olfactory nerves, or proceſſus mamillares, as other animals are furniſhed with for this purpoſe, are to be found; its eyes are ſmall; its auditory paſſages extremely minute, if any; its teeth, which are forty-eight in each jaw, alſo ſmall; it has two fins on the breaſt, and one on the back, which are cartilaginous and flexible, not ſharp or prickly as the ancients have repreſented them; and its tail is ſlightly forked, thus forming the figure of a creſcent, and placed horizontally, like thoſe of the cetaceous kind, not vertically, as in other fiſhes. The great contrivance of nature in this poſition of the tail in theſe fiſhes is, that it may ſupply the place of the hinder pair of belly-fins in other fiſh, thoſe of the cetaceous kind having none ſuch. Theſe fins in other fiſh ſerve to balance the body, and keep it under water, and anſwer alſo in many reſpects to the hinder legs of a quadruped; and hence we ſee, that thoſe fiſh which have long bodies, and have not this hinder pair of fins, nor the horizontal tail, cannot ſuſpend themſelves quietly in the water, but are forced to keep grovelling at the bottom. This is the caſe of eels, and all other fiſh of that kind: the uſe of reſpiration being as neceſſary to the *porpeſſe* as to quadrupeds, and its wanting this pair of hinder fins, to poiſe or elevate itſelf with, nature has abundantly provided againſt the miſchiefs that would attend that defect, by giving it this tranſverſe tail, by a ſudden jerk of which it can in a moment throw itſelf up to the ſurface from the deep water. The whale, and all the cetaceous fiſhes requiring the uſe of reſpiration, have alſo this manner of raiſing their unwieldy bodies allotted them by nature, inſtead of the hinder pair of fins, which muſt have been inconveniently large to be capable of this office. Its lungs and heart are like thoſe of quadrupeds. The *porpeſſe* has no gall-bladder, and thence authors have concluded that it has no gall; but this is too haſty a concluſion; for there is a duct which ariſes in the liver, and has a great many branches, and which, tending downwards, joins itſelf to the pancreatic duct; and theſe two, ſo united together, form a canal, or common duct, about four or five lines long, before they diſcharge their contents into the duodenum; from whence it appears that the *porpeſſe* has always a diſcharge of bile into the duodenum, though it is thin and diluted, and ſuch as, in other animals, is uſually called *hepatic bile.* The brain is large, and reſembles that of man; and probably it has been an obſervation of this that has given occaſion to the opinion of this animal having ſo great a ſhare of will and underſtanding, that has given riſe to the ſtory of Herodotus, that Arion was carried to ſhore on the back of one; and that of Pliny the Elder, of one of theſe fiſh ſo fond of a certain boy, that he uſed to carry him daily from Baiæ to Puteoli, acroſs the ſea to ſchool, and wait to carry him back again at a certain time. Pliny the Younger gives us alſo a ſtory of this kind in his Epiſtles. The tongue is flat, pectinated at the edges, and faſtened down to the bottom of the mouth.

The blood of the *porpeſſe* is as warm to the touch as that of quadrupeds, and the blubber, or fat, which lies in great quantity under the ſkin, covering the muſcular fleſh of the back and ſides, is to keep up the natural heat, and prevent the cold of the ſea water from chilling the circulating fluid. This blubber yields a great quantity of excellent oil.

The food of the fiſh ſeems to beſpeak its living at the bottom of the water; for the common matter found in its ſtomach is the remains of fiſh that live in or on the bottom. The young *porpeſſes* are generally found to feed on the ammodytæ, or ſand-eels, and ſea-worms.

This fiſh is common in all parts of the ſea that waſh theſe iſlands; but they are moſt numerous at the time when fiſh of paſſage appear, as mackarel, herrings, and ſalmon, which they purſue up the bays with the ſame eagerneſs as a pack of dogs does a hare. Its fleſh is greaſy, and now not valued; though it was a royal diſh in the reign of Henry VIII. and continued in vogue in the reign of Elizabeth. Phil. Tranſ. Nº 74 and 76. Id. abr. vol. ii. p. 839, &c.

We have from Dr. Liſter an account of the tooth of this creature, after death, giving an envenomed wound. The accident happened to the doctor himſelf, and he relates it in Phil. Tranſ. Nº 233. Abridg. vol. ii. p. 842.

PORPHYRIANA *arbor*. See ARBOR.

PORPHYRIANS, in *Eccleſiaſtical Hiſtory*, an opprobrious name given to the Arians, by an edict of Conſtantine, at the council of Nice, in 325. Cap. 36. apud Hard. Concil. tom. i. p. 446.

That prince, publiſhing an edict againſt Arius and his writings, declares, that as Arius had imitated Porphyry in compoſing books againſt religion, he deſerves to be noted with his infamy; and that, as Porphyry is become the reproach of poſterity, and his writings ſuppreſſed, ſo he wills, that Arius and his followers be called *Porphyrians*, &c.

PORPHYRIO, in *Ornithology*, the name of a bird figured and deſcribed by all the natural hiſtorians from one another, but which, it ſeems, none of them ever ſaw; and there is ſome room to doubt whether there be in nature any ſuch bird. According to the accounts we have of it, it appears to be one of the gallinula or moor-hen kind, and is all over of a fine deep blue, only the middle of the tail is at the extremity of a greyiſh white; its legs and feet are of a fine ſhining purple. There have been ſome fabulous things related of it, as having five toes on each foot, and the like; but if there be any ſuch creature, it ſeems to be a moor-hen of theſe remarkable colours. In the Linnæan ſyſtem this is a ſpecies of *fulica*, or COOT.

PORPHYRIO *Americanus*, in *Ornithology*, a name by which ſome have called the QUACHILTO, a very beautiful ſpecies of Braſilian moor-hen.

PORPHYROGENITUS, in *Antiquity*, an appellation given to the children of the Eaſtern emperors; implying as much as *born in purple.*

Cedrenus will have the word to ſignify, *born in the purple palace*, or the *palace of porphyry*, a palace ſo called in Conſtantinople, wherein the empreſſes uſed to lie in. Others derive the appellation hence, that the imperial children, as ſoon as born, were wrapped in purple; others from this, that the chamber wherein they were born was hung with purple hangings.

This term is ſometimes found on the medals of the lower empire, ſtruck at Conſtantinople.

PORPHYRY, *porphyrites*, in *Natural Hiſtory*, &c. a precious kind of ſtone, or marble, of a browniſh-red colour, frequently interſperſed with white ſpots; anciently brought from Egypt, and exceeding all other marbles in hardneſs.

It is uſed as the name of a genus of foſſils, generally, but improperly, added to the marbles. Theſe are ſtones of a plain uniform maſs, and compact texture, like flint, ſpotted or veined, with ſeparate concretions of quartz imbedded in all directions; giving fire with ſteel, not fermenting with acids, very ſlowly and difficultly calcining in a ſtrong fire, and fuſible.

Wallerius makes the *porphyry* a ſpecies of jaſper. Pott claſſes the *porphyries* and jaſpers under diſtinct genera. It is certain that the baſis of the *porphyry* is of a compact, uniform ſubſtance, approaching nearly to that of the jaſper; but in many properties they are different. The *porphyries* are always found in ſtrata, the jaſpers only in nodules; the former have always detached quartzoſe concretions imbedded in them; the latter are uniform, and never have concretions of a different nature.

Of this genus Dr. Hill enumerates three known ſpecies.

1. The purple kind, commonly known by the name of

porphyry, among the workmen. 2. The hard red-lead-coloured kind, variegated with black, white, and green. And, 3. The very hard fleſh-coloured one, variegated with white, green, and black.

The *purple porphyry* is a ſubſtance which has been well known, and highly eſteemed, in all ages of the world. It has its name from the Greek πορφυρος, *purple*, as that remarkable colour always afforded a very obvious diſtinction for it, from the other kinds. It is of an extreme firm and compact ſtructure, remarkably heavy, and of a fine ſtrong purple, variegated more or leſs with pale red, and white, and with a ſmall number of little, and generally diſregarded, black flaky ſpecks. Its purple is of all degrees, from the deep tinge of the violet to a pure claret colour; and its variegations are uſually diſpoſed in ſmall ſpots, commonly ſmall and diſunited, but ſometimes running into one another, and making large blotches. It is very difficultly cut, becauſe of its very great hardneſs; but is capable of a very fine poliſh. It is found in great quantities in Egypt; and we find was had thence alſo in very early times. It ſerves us for ſtones for the apothecaries and colourmen, to grind or levigate their powders on, and on any other occaſion where great hardneſs is required.

The *red-coloured porphyry* is alſo an extremely beautiful and valuable ſubſtance, but is hitherto unknown among our lapidaries. It has the hardneſs, and all the other characters of the purple *porphyry*, and greatly exceeds it in the variety of its colours. It is found in great plenty in the iſland of Minorca, but has never yet been regarded as a ſtone worth importing into England.

The *fleſh-coloured porphyry*. This is another very little known, but extremely beautiful ſtone; it is of an irregular, but very compact and firm texture, and of a pale fleſh-colour, often approaching to white, and variegated with black, green, and white, in large blotches, from half an inch to an inch broad. It is found in immenſe ſtrata in Arabia Petræa, and in Upper Egypt, and in detached nodules is common to almoſt all parts of the world. Germany abounds with them; and we have of them in many parts of England and Ireland. They are found in many places on our ſhores, and in ſome parts of Devonſhire far from the ſea. Hill's Hiſt. of Foſſ. p. 494 to 498.

Mr. Da Coſta mentions two or three other ſpecies of green *porphyry* of different hues and variegations: and Ficoroni takes notice of two exquiſitely fine columns of black *porphyry* in a church at Rome; and black *porphyry* is alſo mentioned by Wallerius.

There are three famous *porphyry* pillars, or OBELISKS, in Egypt; one near Cairo, and the other two at Alexandria. The French call them *aguglias*, the Engliſh *Cleopatra's needles*.

The art of cutting *porphyry*, practiſed among the ancients, ſeems loſt. In effect, it is hard to conceive what kind of tools they muſt have uſed for the faſhioning of theſe huge columns, and other *porphyry* works found in ſome of the antique buildings in Rome.

One of the moſt conſiderable pieces, now remaining entire, is a tomb of Conſtantia, daughter of the emperor Conſtantine, in the church of St. Agnes without the walls; ordinarily called *the tomb of Bacchus*, becauſe of ſeveral boys repreſented herein, playing among the vine-leaves. Add to this Apollo's, and the buſts of twelve emperors, all in *porphyry*, in the palace of the Thuilleries.

Some of the ancient pieces appear to have been wrought with the chiſſel, others with the ſaw, others with wheels, and others ground down by degrees with emery. Yet the modern tools will ſcarce touch *porphyry*: it ſhould ſeem, therefore, and Dr. Liſter, Phil. Tranſ. Nº 203, or Lowth. Abr. vol. ii. p. 560, adopts this opinion, that the ancients had the ſecret of tempering ſteel better than we; not, as ſome incline to think, that they had the art of ſoftening the *porphyry*; though it is probable that time and air have contributed to increaſe its hardneſs.

Mr. Addiſon tells us, he ſaw a workman at Rome employed in the cutting of *porphyry*; but his advances were exceedingly ſlow, and almoſt inſenſible.

All the way the Italian ſculptors have to work the pieces of old *porphyry* columns ſtill remaining (for the *porphyry* quarries are long ſince loſt), is with a braſs ſaw without any teeth. With this, together with emery and water, they rub and wear the ſtone with infinite patience.

Yet have many excellent perſons endeavoured to retrieve the ancient art, particularly Leon Baptiſta Alberti; who, ſearching for the neceſſary materials for temper, ſays, he found goats blood the beſt of any; yet even this availed but little; for in working with chiſſels tempered herein, ſparks of fire came much more plentifully than pieces of the ſtone. By means hereof, the ſculptors were able to make a flat or oval form; but could never attain to any thing like a figure.

It is true, in 1555, Coſmo de Medicis is ſaid to have diſtilled a water from certain herbs, wherewith his ſculptor, Franceſco Tadda, gave his tools ſuch an admirable hardneſs and temper, as that he performed ſome fine works with them; particularly our Saviour's head in demi-relievo, and Coſmo's head, and his ducheſs's. Even the very hair, and beard, how difficult ſoever, are here well conducted; and there is nothing of the kind better in all the works of the ancients: but the ſecret ſeems to have died with him.

The French have lately found another method of cutting *porphyry*, viz. with an iron ſaw without teeth, and *grez*, a kind of free-ſtone pulverized, and water. The authors of this invention pretend, they could form the whole contour of a column hereby, had they matter to work on.

Others have propoſed a method of hardening tools, ſo as to make them proper to cut *porphyry*, by ſteeping them in the juice of the plant called bear's breech, or brankurſine. Birch's Hiſt. R. S. vol. i. p. 238. vol. ii. p. 73, &c.

Mr. Boyle tells us, that he cauſed *porphyry* to be cut by means of emery, ſteel ſaws, and water. He obſerves, that in his time, the workmen in England were ignorant of the manner of working upon *porphyry*, and that none of them would undertake to cut or poliſh it. See Works abr. vol. i. p. 111.

M. Da Coſta conjectures, that the method uſed by the ancients in cutting and engraving *porphyry* was very ſimple, and performed without the aid of any ſcientific means that are now loſt. He ſuppoſes that, by unwearied diligence, and with numbers of common tools at great expence, they rudely hewed or broke the ſtone into the intended figure, and by continued application reduced thoſe rude figures into more regular deſigns; and that they completed the work by poliſhing it with great labour, by the aid of particular hard ſands found in the country of Egypt. And he ſuppoſes, not without reaſon, that, in the *porphyry* quarries, there were layers of grit, or looſe diſunited particles, analogous to the *porphyry*, which they carefully ſought for, and uſed for this work. Nat. Hiſt. of Foſſils, p. 285.

PORPHYRY-*ſhell*, in *Natural Hiſtory*, a name given by authors to a ſpecies of ſea-ſhell of the PURPURA kind, with a ſhort clavicle and beak.

PORPITES, the *hair button-ſtone*, in *Natural Hiſtory*, a name given by authors to a ſmall ſpecies of foſſil coral; which is uſually of a rounded figure conſiderably flatted, and ſtriated from the centre every way to the circumference. Theſe are of different ſizes, and of different colours, as greyiſh, whitiſh, browniſh, or bluiſh, and are uſually found immerſed in ſtone. See *Tab. of Foſſils, Claſs* 7.

PORRACEOUS, formed from *porrum*, *leek*, in *Medicine*, a term applied to the bile, fæces, &c. when their colour is green, approaching that of a leek.

PORRETANI, a religious ſect, the followers of Gilbert de la Porree, biſhop of Poictiers, condemned by Eugenius III. in the council of Rheims, held in 1147, for admitting a phyſical diſtinction between God and his attributes; or, as Marſham ſays, for having written too curiouſly on the ſubject of the Trinity: as to his real ſentiments we are not well acquainted with them.

However, he gave occaſion for thoſe ſuſpicions, by maintaining that this propoſition, *Deus eſt bonitas*, is not true, unleſs reduced to this, *Deus eſt bonus*. And there are ſome paſſages noted by St. Bernard, who wrote warmly againſt him, wherein he ſeems to admit a real diſtinction between the nature of God and his attributes. The *Porretani* are ſet in oppoſition to the *Nominals*.

PORRUM, in *Botany*. See LEEK.

PORT, *haven*, or *harbour*, a commodious place ſituate on the ſea-coaſt, or at the mouth of a river, with depth of water ſufficient for ſhips of burden, and convenient bottom for anchorage; where veſſels lie by, to load or unload; ſcreened from the wind, and ſafe from any enterprize of enemies; either by the diſpoſition of the place, or by means of a mole, or dike, or the like, with a chain and light-houſe.

Ports are either *natural* or *artificial*.

PORTS, *natural*, are thoſe which Providence ſeems to have formed for the communication of commerce: or, where the natural figure of the land forming them, is ſuch as contributes to the ſafety of the ſhipping therein, by ſheltering the veſſels from the fury of the ſea; and this happens in various ways; ſuch as a ſhoal lying off the harbour's entrance, which breaks the waves, and thereby keeps the water ſtill within; or by the points of land, forming the harbour's mouth, ſtretching themſelves ſo far into the ſea, and coming ſo near to one another, that the ſurges are broke at their entrance; or by a narrow inlet that runs into the land for a conſiderable way, and where the ſhores near the entrance, receiving the ſhock of the waves, render the upper *ports* ſmooth enough to anchor in; of which kind are navigable rivers: or by a large deep bay, wherein iſlands, or other obſtructions, contribute to render a *port* ſecure for the riding of ſhips at anchor, &c.

The properties of a good harbour are, a ſufficient depth of water for large ſhips to enter at any time, whether the tide be in or out; good offing, and an eaſy acceſs out of all danger from the winds, and good anchoring ground; free entrance, without rock or ſand-bank; the entrance not too wide, to be eaſily barred and defended upon occaſion, and yet of ſufficient extent to admit the entrance or departure of large ſhips without difficulty; not ſubject to overflow, and where ſhips may lie cloſe to the quays; where the veſſels are ſheltered from all winds by the high mountains ſurrounding the harbour, and from whence there is an extended view of the ſea; that the ſhipping therein be out of all danger, either from being ſet on fire, bombarded, or cannonaded from ſea by the ſhips of an enemy; that it be furniſhed with a good light-houſe, and have variety of proper rings, ports, moorings, &c. in order to remove or ſecure the veſſels contained therein; and laſtly, that it have plenty of wood, and other materials for firing, beſides hemp, iron, mariners, &c.

Ports, *artificial*, are thoſe formed with piers, moles, or projectures into the ſea; and when the moles or piers can be brought ſo cloſe as to be ſhut up by ſluices or gates, the harbour is then called a *baſon*; but the inner part of a harbour, where the ſhips ride in ſtill water, is uſually called the *baſon*.

All artificial *ports* of this kind are eaſily fortified by building on the moles or piers either batteries, redoubts, or forts, which command the entrance into the harbour. But the method of fortifying harbours, and alſo ROADS, in general depends on a variety of circumſtances peculiar to each. See *Marine* FORTIFICATION, FORT, and BOOM.

The Engliſh coaſts are exceedingly thin of *ports*. France has the advantage of all other countries in the number and excellence of *ports*; that of Breſt is the fineſt natural *port* in the world, as that of Dunkirk was lately the ſtrongeſt artificial one.

The ſtatutes 1 Eliz. cap. 11. & 13 & 14 Car. II. cap. 11. § 14. enable the crown by commiſſion to aſcertain the limits of *ports* and havens, and to aſſign proper wharfs and quays in each *port*, for the excluſive landing and lading of merchandize.

Ports, *bar*, Ports *de barre*, are ſuch as can only be entered with the tide; as that of Goa.

Ports, *cloſe*, are thoſe within the body of a city; as thoſe of Rhodes, of Venice, Amſterdam, Rochelle, Bayonne, and St. John de Luz.

Port, *free*, in *Commerce*, a *port* open and free for merchants of all nations to load and unload their veſſels in, without paying any duties or cuſtoms.

Such are the *ports* of Genoa and Leghorn.

Port, *free*, is alſo uſed for a total exemption and franchiſe which any ſet of merchants enjoy, for goods imported into a ſtate, or thoſe of the growth of the country exported.

Such was the privilege the Engliſh enjoyed for ſeveral years after their diſcovery of the *port* of Archangel; and which was taken from them on account of the regicide in 1648.

Ports, *cinque*. See CINQUE *ports*.

Port is alſo ſometimes uſed for the BURDEN of a ſhip.

The capacity of a veſſel is eſtimated in tons; each whereof may contain about two thouſand pounds weight of ſea-water. When we ſay, a veſſel is of the *port* or burden of a thouſand tons, it is not meant, as ſome imagine, that it bears ſo many caſks full of merchandize; but that the ſea-water, which would be contained in the ſpace which the capacity of the veſſel poſſeſſes in the ſea, weighs a thouſand tons, which, at the rate of two thouſand pounds each, is as much as to ſay, it bears a burden of two millions weight.

For the method of eſtimating this, ſee BURDEN.

Port is alſo uſed for the palace of the grand ſignior, or emperor of the Turks.

Port is alſo uſed for a ſtrong wine brought from Oporto, or Port-a-Port in Portugal; whence its name. See WINE.

Port *of the voice*, in *Muſic*, the faculty and habit of making the ſhakes, paſſages, and diminutions, wherein the beauty of a ſong, or piece of muſic, conſiſts; and which the Italians comprehend under the terms *trilli*, *gruppi*, *ſtraſcini*.

Port, among *Sailors*, denotes the larboard, or left ſide of the ſhip.

To port a helm is to put the helm on the left ſide of the ſhip, that the ſhip may go to the right, or ſtarboard.

The ſhip heels to port denotes that ſhe inclines or ſtoops to the larboard ſide.

Top the yard to port is the order to make the larboard extremity of a yard higher than the other.

Ports *of a ſhip*. See PORT-HOLES.

PORTA, or *Vena* PORTÆ, in *Anatomy*, a very conſiderable vein, employed in bringing the blood from ſeveral parts, by an infinite number of branches, which it is divided into, to the liver, through the whole ſubſtance whereof it is diſſeminated. See *Tab. Anat.* (*Angeiol.*) *fig.* 4. *lit. a.* (*Splanch.*) *fig.* 5. *lit. i.*

The *vena portæ* is formed of two large veins; the meſenteric and ſplenic; which are again formed of ſeveral other minuter veins coming from the ſtomach, inteſtines, ſpleen, epiploon, &c.

The ancients gave it the name *porta*, as imagining it to bring the chyle, by its meſenteric branch, from the inteſtines to the liver; but ſome of the moderns have found another uſe for it.

It is remarkable of the *porta*, that, after the manner of the arteries, it ſhoots itſelf from a trunk into branches; and, being at laſt loſt in capillaries, it delivers the blood into the cava, by which it is immediately re-conveyed to the heart.

The *porta* is formed out of the concurrence of divers veins, which, meeting together, make one of the moſt conſiderable venous trunks of the body, as to its bulk; though, contrary to the courſe of other veins, it runs not far in a trunk, but is, as before obſerved, ſoon diſtributed again, by ramifications, into the liver.

The vein is vulgarly divided into *branches without the liver*, and *branches within*, and a *trunk intermediate*; but this diviſion is not very clear, the *branches*, as they are called, without the liver, not being ſo properly branches as roots; which have, by anatomiſts, been dignified with diſtinct names from the parts whence they come.

The veins which conſpire towards the formation of this trunk, which having been deſcribed in their proper places, or being to be deſcribed there, we ſhall not here enlarge upon, are, from the placenta uterina, in a fœtus, the vena umbilicalis; from the gall-bladder, the cyſticæ gemellæ; from the upper part of the ſtomach, the pylorica, or gaſtrica dextra, which goes to the trunk; the gaſtrica major, and minor ſiniſtra, from the ſtomach (of which the major is formed out of the coronaria ventriculi); the epiplois ſiniſtra and poſtica, from the omentum; the vas, or vaſa brevia, from the ſtomach; the ſplenica, from the ſpleen: all which join to form the *left*, or *ſplenic branch of the* porta.

The *right*, or *meſenteric branch*, conſiſts of the gaſtrica and epiploica dextra, from the ſtomach and omentum; the duodena, from the duodenum and jejunum; the hæmorrhoidalis interna, from the inteſtinum rectum and colon; the meſaraics, from the meſentery.

By means of all theſe veſſels, the *porta* receives the blood from moſt of the viſcera of the abdomen; and, after the coaleſcence of its branches, enters the liver in a trunk; immediately under the ſurface whereof, having firſt formed a kind of ſinus, it is divided into two principal branches, and thoſe again into five, which ſcatter innumerable ramifications through the whole ſubſtance of the liver.

The *vena portæ*, according to the deſcription of M. Winſlow, may be conſidered as made up of two large veins, joined almoſt end-wiſe by their trunks, from each of which branches proceed in oppoſite directions. One of theſe trunks adheres to the liver, and is ramified by that viſcus, its branches accompanying the whole diſtribution of the hepatic artery. The other trunk is without the liver, and ſends its branches to the viſcera. The firſt portion of this vein may be called *vena portæ hepatica* ſuperior or minor, the trunk of which is commonly known by the name of *ſinus venæ portarum*. From this ſinus proceed five principal branches, which are ſpread in ramifications through the whole ſubſtance of the liver; the extremities of theſe branches end in the pulpy friable corpuſcles, which ſeem to be thick villous folliculi, in which the bile is ſecreted; and it is immediately collected in the ſame number of extremities of another kind of veſſels, uniting by numerous ramifications, called pori bilarii, into one trunk, denominated ductus hepaticus.

The other portion, called *vena portæ inferior*, or *ventralis*, is ſituated under the lower or concave ſide of the liver, and joined by an anaſtomoſis to the ſinus of the *vena portæ hepatica*, between the middle and right extremity of that ſinus; from thence it runs down obliquely from right to left under the trunk of the arteria hepatica, bending behind the beginning of the duodenum, and under the head of the pancreas, its length being about five fingers breadth; at the head of the pancreas it loſes its name, and terminates in three large principal branches, viz. the vena meſaraica, or meſaraica major, the ſplenica, and the hæmorrhoidalis interna, or meſaraica minor. Winſlow's Anat. vol. ii. p. 54. 160.

The true uſe of this vein, hitherto unknown, Dr. Keill thinks he has diſcovered; he ſays it is this: the bile, ſays he, being to be mixed with the chyle, as it comes out of the ſtomach into the duodenum, could no where be ſo conveniently ſecerned from the blood, as where the liver is placed; but if all the branches of the cœliac artery carried all the blood to the liver, from which the gall was to be ſeparated, it is evident, conſidering the nearneſs of the liver to the heart, and the inteſtine motion of the blood, that ſo viſcid a ſecretion as the gall is, could never have been formed.

Nature, therefore, is forced to alter her conſtant method of ſending the blood to all parts of the body by arteries: ſhe here forms a vein, by which ſhe ſends the blood from the branches of the meſenteric and cœliac arteries to the liver.

By this means the blood is brought a great way about, before it arrives at the liver; ſo that its celerity being diminiſhed, all the corpuſcles that are to form the gall, may have time to attract one another, and unite before they come to their ſecerning veſſel. Keill's Anim. Secret. p. 36, &c. See LIVER and BILE.

PORTABLE, ſomething eaſy of carriage.

PORTABLE *barometer* See BAROMETER.

PORTAIL, in *Architecture*, the face or frontiſpiece of a church, viewed on the ſide wherein is the great door.

Portail is alſo uſed for the great door, or gate itſelf of a palace, caſtle, &c.

PORTAL, in *Architecture*, a term uſed for a little ſquare corner of a room, cut off from the reſt of the room, by the wainſcot; frequent in the ancient buildings, but now diſuſed.

The word ſeems a diminutive of the French *porte*, *door*, *gate*, it being through this that they entered into the room.

PORTAL is ſometimes alſo uſed for a little gate, *portella*; where there are two gates of a different bigneſs. See GATE.

PORTAL is ſometimes alſo uſed for a kind of arch of joiner's work before a door.

PORTAMENTS, in *Italian Muſic*, ſignifies the conduct of the voice, which is ſaid to be good, when it is neither naſal nor guttural.

PORTATE, in *Heraldry*. A *croſs* PORTATE is a croſs which does not ſtand upright, ar croſſes generally do, but lies athwart the eſcutcheon, in bend, as if it were carried on a man's ſhoulder. See CROSS.

Colombiere tells us, it is by ſome called *porté*, that is, *carried*, becauſe, when our Saviour went to ſuffer death, he was obliged to carry his croſs, which is always thus repreſented ſloping, and inclined after this manner.

PORT-CRAION, a *pencil-caſe*, an inſtrument ſerving to incloſe a PENCIL, and occaſionally alſo uſed as a handle for holding it.

It is uſually four or five inches long, and contrived ſo that the pencil may be ſlid up and down it by means of a ſpring and button. Its outſide is filed into eight ſides or faces, whereon are drawn the ſector lines; its inſide is round; ſometimes it is made round or cylindrical both withoutſide and within, and has its length divided into inches and parts of inches.

PORTCULLICE, called alſo HERSE and SARRASIN, in *Fortification*, an aſſemblage of ſeveral great pieces of wood laid or joined acroſs one another, like a harrow, and each pointed at the bottom with iron.

Theſe formerly uſed to be hung over the gateways of fortified places, to be ready to let down in caſe of a ſurprize, when the enemy ſhould come ſo quick, as not to allow time to ſhut the gates.

But, now-a-days, the ORGUES are more generally uſed, as being found to anſwer the purpoſe better.

PORT-DIEU, among the French, is a pariſh-prieſt, whoſe buſineſs is to carry the viaticum, or ſacrament, to ſick people.

PORTEGLO, in the *Glaſs Trade*, the inſtrument with which the founder, or conciator, ſcums the GLASS while melting.

PORTER, in the *Circuit of Juſtices*, is an officer who carries a verge, or white rod, before the juſtice in eyre; ſo called *à portando virgam*.

PORTER *of the door of the parliament houſe* is a neceſſary officer belonging to that court; who enjoys the privileges accordingly.

PORTER, *groom*. See GROOM *porter*.

PORTER, in the *Manege*, ſignifies to direct or puſh on a horſe at pleaſure; whether forwards, or upon turns, &c.

PORTER is alſo a kind of malt liquor, which differs from ALE and pale beer, in its being made with high dried malt.

PORTERAGE, a kind of duty paid at the cuſtom-houſe to thoſe who attend the water-ſide, and belong to the package-office. Theſe *porters* have tables ſet up, aſcertaining their dues for landing of ſtranger's goods, and for ſhipping out the ſame.

PORT-FIRE, a paper tube, about ten inches long, filled with a compoſition of meal-powder, ſulphur, and ſaltpetre, rammed moderately hard; uſed to fire guns and mortars inſtead of match.

Theſe *port-fires* are diſtinguiſhed into wet and dry: the compoſition of wet *port-fires* is four parts of ſalt-petre, one of ſulphur, and four of mealed powder; when the compoſition is well mixed and paſſed through a ſieve, it is moiſtened with a little linſeed-oil, and well rubbed with the hands till the oil is thoroughly mixed with the other ingredients.

The compoſition of dry *port-fire* is four parts of ſalt-petre, one of ſulphur, two of mealed powder, and one of antimony. Theſe compoſitions are drove into ſmall paper caſes, and ſo kept till they are uſed.

PORT-GLAIVE, *ſword bearer*, an order of knights in Poland, called by the Latins *enſiferi*.

It was confirmed by pope Innocent III. and by him ſent into Livonia to defend the preachers of the Goſpel againſt the infidels at the firſt converſion of that country. Being too weak to effect that buſineſs, they united themſelves with the Teutonic or Marian knights, by the pope's authority; and, inſtead of knights of the ſword, were called *knights of the croſs*. They ſeparated again under Univivus, their great-maſter, anno 1541; or, according to others, in 1525. The Teutonic knights being then diſpoſſeſſed of Pruſſia, the *Port-glaives*, going into Luther's opinions, ſoon dwindled away; for in the year 1557 they fell out with the biſhop of Riga, of the houſe of Brandenburg, becauſe he would not embrace their notions; and he, to ſecure his own eſtate, put Riga into the hands of the Polanders.

Afterwards, the knights, having had moſt of Livonia taken from them by the Muſcovites, put themſelves under the protection of Sigiſmund Auguſtus, king of Poland, anno 1559; but William of Furſtemburg, their great-maſter, being betrayed by his own mercenaries into the hands of the Muſcovites, Gothard Ketler, his ſucceſſor, followed the example of Albert, the great-maſter of Pruſſia, tranſacted with the aforeſaid Sigiſmund for the whole eſtate, which he ſurrendered to his own uſe in the caſtle of Riga, together with his croſs, the ſeal of the order, the charters and grants of the ſeveral popes and emperors, which concerned the ſame; as alſo the keys of the city and caſtle of Riga, the office of great-maſter, the rights of coinage, and all the powers and privileges appertaining to it; receiving back again from Radzivil, the king's commiſſioner, the dukedom of Courland to him and his heirs for ever.

PORT-GREVE, or PORTGRAVE, was anciently the principal magiſtrate in ports, and other maritime towns.

The word is formed from the Saxon *port*, a *port*, or other town, and *geref*, a *governor*. It is ſometimes alſo written *port-reve*.

Camden obſerves, that the chief magiſtrate of London was anciently called *port-greve*; inſtead of whom, Richard I ordered two bailiffs; and ſoon afterwards king John granted them a MAYOR for their yearly magiſtrate.

The charter of William the Conqueror to the city of London runs thus: "William king, grete William biſhop, and Godfrey *port-greve*, and all the burgeſs "within London, French and Engliſh. I grant you, "that I will that ye be all your law-worth that ye were "in Edward's day the king. And I will that each child "be his fader's eyer, and I will not ſuffer that ony man "you any wrongs breed, and God you keepe."

PORT-HOLES, or PORTS, in a *Ship*, are the embraſures, or holes, in the ſides of a ſhip of war, in which the artillery is ranged in battery upon the decks above and below.

The *ports* are formed of a ſufficient extent to point and fire the cannon, without injuring the ſhip's ſide by the recoil; and accordingly the ſhipwrights cut them in proportion to the ſize of the cannon. The lower and upper edges of the *ports* are always parallel to the deck, ſo that the guns, when levelled in their carriages, are all equally high above the lower extremity of the *ports*, which is called the *port-cells*.

Large ſhips have three rows of *port-holes*, or batteries; each uſually conſiſting of fifteen *port-holes*.

In ſtorms, they uſe to ſhut up the *port-holes*, to prevent the water's driving through them.

In Engliſh, Dutch, and French ſhips, their valves or caſements, called *port-lids*, are faſtened by hinges at top of the apertures; in Spaniſh veſſels aſide of them.

PORTICO, in *Architecture*, a kind of gallery on the ground; or a piazza encompaſſed with arches ſupported by columns, where people walk under covert. See *Tab. Architecture, fig.* 40.

The roof is uſually vaulted, ſometimes flat. The ancients called it *lacunar*.

Though the word *portico* be derived from *porta, gate, door*, yet it is applied to any diſpoſition of columns which form a gallery, without any immediate relation to doors or gates.

The moſt celebrated *porticos* of antiquity were thoſe of Solomon's temple, which formed the atrium or court, and encompaſſed the ſanctuary; that of Athens, built for the people to divert themſelves in, and wherein the philoſophers held their diſputes and converſations; which occaſioned the diſciples of Zeno to be called *ſtoics*, from the Greek *ϛοα*, *porticus*; and that of Pompey at Rome, raiſed merely for magnificence, conſiſting of ſeveral rows of columns ſupporting a platform of vaſt extent; a draught whereof Serlio gives us in his antique buildings.

Among the modern *porticos*, the moſt celebrated is the piazza of St. Peter of the Vatican. That of Covent Garden, London, the work of Inigo Jones, is alſo much admired.

PORTIO, *portion*, a part or diviſion of any thing.

PORTION, in the *Canon Law*, is that allowance, or proportion, which a vicar ordinarily has out of a rectory, or impropriation; be it certain or uncertain.

PORTIO *dura*, and *mollis*, in *Anatomy*, a partition of the fifth pair of nerves of the brain; which, before its egreſs out of the dura mater, is apparently divided into two branches; the one pretty tough and firm, called *portio dura*; the other ſoft and lax, called *portio mollis*. See *Seventh pair of* NERVES.

PORTIONER, *portionarius*. Where a parſonage is ſerved ſometimes by two, ſometimes by three miniſters, alternately; as Bromyard, Burſord, &c. in Shropſhire; the vicars or incumbents are called *portioners*; becauſe they have but their portion or proportion of tythes, or profits of the living.

PORTISCULUS, among the Romans, an officer who had the direction of the rowers in a galley. He was otherwiſe called PAUSARIUS and HORTATOR *remigum*.

PORTIUS *piſcis*, in *Ichthyology*, a name given by ſome to a fiſh called by others the *mugil ater*, or black MULLET. It is a very ſcarce fiſh, much reſembling the common mullet in ſhape, but all over of a fine black, and having ſeveral lines of a deeper black than the reſt, running longitudinally from the gills to the tail; it has a very wide mouth, and has ſeven or eight prickles on the back, ſeparate from one another, and joined into a fin by a membrane in the uſual way; theſe are placed immediately before the back-fin.

PORTLAND *ſtone, ſaxum arenarium Portlandicum* of Da Coſta, and *pſadurium hebes, albidum, laxius*, of Hill, is an alkaline ſand-ſtone, of a dull whitiſh colour, heavy, moderately hard, of a ſomewhat flat texture, and is compoſed of a large roundiſh grit, cemented together by an earthy ſpar, and intermixed with numerous glittering ſpangles of pure ſpar; the grit ſplits in the cutting of the ſtone, ſo that it is capable of being brought to a ſurface very ſmooth and equal; it will not ſtrike fire with a ſteel, and burns to a ſlight aſhen hue. There are vaſt quarries of it in the iſland of *Portland* in Dorſetſhire, whence its name. It is brought from thence in large quantities to London, and much uſed in building. This and all ſimilar ſorts of ſtone, that are compoſed of granules, and are not of a laminated texture, will cut and rive in any direction, as well in a perpendicular, or in a diagonal, as horizontally and parallel to the ſite of the ſtrata. For this reaſon they have obtained the name of FREE-*ſtone*. Da Coſta's Foſſils, p. 125.

This ſtone is very ſoft when it comes out of the quarry, works very eaſily, and becomes in time very hard. The piers and arches at Weſtminſter bridge are built with it.

Duke of PORTLAND'*s powder for the gout and rheumatiſm*. See GOUT.

PORTLANDIA, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the corolla is funnel-ſhaped, the antheræ longitudinal, and the capſule pentagonous, blunted, bilocular, polyſpermous, and crowned with a five-leaved calyx. There are two ſpecies.

PORT-LAST, in a *Ship*, denotes the GUN-*wale*. See *Tab. Ship. fig.* 2. *n.* 19.

When a yard is down on the deck, they ſay, the *yard is down a port-laſt*.

PORTMANNIMOTE, in *Old Records*, the PORT-MEN'S court, held in any city or town.

PORT-MANTEAU, a piece of joiners work, faſtened to the wall, in a wardrobe, armory, &c. proper for the hanging on of cloaks, hats, &c.

PORT-MANTEAU is alſo uſed for a cloak-bag, of cloth, leather, or the like, wherein the cloak and other habiliments of travellers are diſpoſed, and laid on the horſe's crupper.

PORT-MANTEAU is alſo an officer under the king of France, whereof there are twelve: their buſineſs is to keep the king's hat, gloves, cane, ſword, &c. to take them from him, and to bring them to him again when wanted.

The dauphin has alſo his *port-manteau*. Anſwerable to theſe are the cardinals caudataries, or tail-bearers.

The Romiſh biſhops have alſo their *port-croix, port-mitres*, &c. i. e. crozier-bearers, mitre-bearers, &c.

PORT-MEN, the twelve burgeſſes of Ipſwich; thus called in the ſtat. 13 Eliz.

Camden adds, that the name was common to the inhabitants of all the CINQUE-*ports*.

PORTMOTE, formed from the Saxon *port, port*, and *gemot, conventus, meeting*, q. d. *portgemot*, ſignifies a court kept in port or haven towns; as ſwanimote in the foreſt. It is ſometimes alſo called the *portmote court*.

Portmotes are alſo held in ſome inland towns, as at Knolſt in Cheſhire.

PORT-NAILS, in a *Ship*, ſuch as are uſed to faſten the hinges to the ports.

PORTOISE, aboard a *Ship*, is the ſame with *port-laſt*, or the *gun-wale*; and as they ſay, *the yard is down a port-laſt*, when it lies down on the deck; ſo for a ſhip *to ride a portoiſe*, is to ride with her *yard a port-laſt*, or ſtruck down to the deck.

PORTORARIUM, in *Anatomy*, a name given by ſome authors to the DUODENUM.

PORTRAIT, POURTRAIT, or POURTRAITURE, in *Painting*, the repreſentation of a perſon, and eſpecially of a face, done from the life.

In this ſenſe we ſay, *portrait-painting*, in oppoſition to hiſtory-painting, where all reſemblance of perſon is diſregarded.

Portraits are uſually painted in oil-colours, ſometimes in water; ſometimes in miniature, with crayons, pens, paſtels, &c.

It was ſaid of a great painter, who never ſucceeded in the likeneſs (ſir Peter Lely, if we miſtake not) that he made a great many fine pictures, but all poor *portraits*.

PORT-RAFT, See RAFT.

PORT-ROPES, in a *Ship*, thoſe which ſerve to haul up the ports of the ordnance.

PORT-ROYAL, a term that makes a conſiderable figure in the republic of learning. Its origin is this:

Philip Auguſtus, wandering from his company in hunting, near Chevreuſe, weſtward of Paris, found a little chapel, where he put up, expecting that ſome of his attendants might meet him. This happening accordingly, he gave the place the name of the *King's port, Port du roi*, or *Port-royal*; and, to give thanks for his deliverance, he reſolved to erect a monaſtery there.

Odo, biſhop of Paris, appriſed of his intention, prevented him; and, with the concurrence of Mathilda, wife of Matth. Montmorenci, firſt lord of Marly, built a nunnery in 1204, filling it with Ciſtericans, who continued under the juriſdiction of the general of that order till the year 1627, when they were removed to a houſe given them in the Fauxbourg St. Jaques, at Paris.

In 1647, they quitted the habit of Ciſtercians, and embraced the inſtitution of the perpetual adoration of the ſacrament. The ſame year the archbiſhop of Paris allowed them to remand ſome of their religious to their former abbey, and to re-eſtabliſh the ſame.

Some time after, the formulary of Alexander VII. being appointed to be ſubſcribed throughout the kingdom, the religious of *Port-royal* in the city ſigned it: thoſe remitted to the former abbey ſcrupled it extremely, and, at laſt, only ſigned it with great reſtrictions.

Still perſiſting in the ſame ſentiments, the king finding no way to reduce them but by diſperſing them, that was executed in 1709, and the revenues given to the other monaſtery.

Upon this evacuation, ſeveral eccleſiaſtics, and others, who had the like ſentiments with regard to the ſubſcription as the religious, retired to *Port-royal*, and had apartments there; and there publiſhed ſeveral books, both on the ſubject of this diſpute, and other topics; whence all that adhered to that party took the name of *Port-royaliſts*; and their books, *books of Port-royal*.

Hence we ſay, the *writers of Port-royal*, Meſſieurs *de Port-royal*, the tranſlations *of Port-royal*, the Greek and Latin methods of *Port-royal*, which are grammars of thoſe languages.

PORT-SALE, a public ſale of goods to the higheſt bidder.

Port-ſale, in the ſtat. an. 35 Henry VIII. cap. 7. denotes the ſale of fiſh preſently upon its arrival in the port or haven.

PORT-SOKEN, or PORT-SOKA, the ſuburb of a city; or a place within the liberties and juriſdiction thereof.

The word is formed from the Saxon *port, city*, and *ſoka, juriſ-*

juriſdiction. Conceſſi, quod nullus de civitate, vel portſoka *ſua captus*, &c. Somn. Gavelkind.

PORTUGALICA *terra, earth of Portugal*, in the *Materia Medica*, the name of a fine aſtringent bole, dug in great plenty in the northern parts of Portugal, and eſteemed a remedy againſt poiſons and venomous bites, and good in malignant fevers. Whatever may be its virtues of this kind, it is manifeſtly an aſtringent of the very firſt claſs, and is uſed with great ſucceſs in fluxes of all kinds. It is well known in ſome parts of the world, beſides the kingdom where it is produced; but is not known in the Engliſh ſhops; the cheapneſs of our ſophiſticated bole armenic having excluded this whole valuable claſs of medicines from our practice.

The characters by which the *Portugueſe earth* is known from the other red boles, are theſe; it is of a cloſe, compact, and regular texture, conſiderably heavy, and of a fine florid red, of a ſmooth and ſhining ſurface, eaſily breaking between the fingers, and a little ſtaining the hands. It adheres firmly to the tongue, melts freely and readily in the mouth, and has a ſtrongly aſtringent taſte, but leaves a little grittineſs between the teeth. It does not ferment with acids, and ſuffers ſcarce any change of colour in the fire.

The Portugueſe and Spaniards make an earthen ware of this BOLE, which they call *bucaros*; it is of a fine red colour, very ſmooth and poliſhed, though it is never glazed, being only dried. They uſe it to filtre, cleanſe, and cool the water. It is alſo ſometimes made into a cake, and ſtamped with a roſe.

PORTUGUESE *man of war*, in *Natural Hiſtory*, a name which the ſeamen give to the *holothuria phyſalis* of Linnæus. It conſiſts of a ſmall bladder, about ſeven inches long, very much reſembling the air-bladder of fiſhes, from the bottom of which deſcend a number of ſtrings, of a bright blue and red, ſome of them three or four feet in length, which, upon being touched, ſting like a nettle, but with much more force. On the top of the bladder is a membrane, which is uſed as a ſail, and turned ſo as to receive the wind which way ſoever it blows. This membrane is marked in fine pink-coloured veins, and the animal is in every reſpect an object exquiſitely curious and beautiful.

PORTUGUESE *coins*. See COINS.

PORTUGUESE *meaſure*. See MEASURE.

PORTUS, *quinque*. See QUINQUE *portus*, and CINQUE *ports*.

PORT-VENT, in an organ, is a wooden pipe, well cloſed, which ſerves to convey the wind from the bellows to the ſound-board of the ORGAN.

PORTULACA, in *Botany*. See PURSLANE.

PORTUMNALIA, among the Romans, a feſtival in honour of Portumnus, who was ſuppoſed to preſide over ports and havens, celebrated on the ſeventeenth of Auguſt.

PORUS *bilarius*. See BILARIUS *porus*, and DUCTUS *communis*.

PORUS, in *Natural Hiſtory*, a name given by authors to a peculiar kind of foſſil coral, of which there are many different ſpecies; theſe are all of a beautifully laminated ſtructure, and ſeem allied to the mycetitæ or fungitæ; they are ſeldom found looſe, but uſually bedded in hard marble, and with their pores filled up with ſparry or mineral matter. See *Tab. of Foſſ. Claſs* 7.

PORUS is alſo the name of the TOPHUS.

PORUS *cervinus*, in *Natural Hiſtory*, a name given by authors to a ſpecies of marine ſubſtance, found among the rocks in the coral fiſheries, and in other places. It grows at different depths, and ſeems to adhere to the rocks by a ſimple baſe, having no root, nor any thing in the place of one. It is branched in ſuch a manner, that with the help of a little imagination it has been forced into the reſemblance of a ſtag's horn; its height is about an inch and a half, often leſs when newly taken out of the ſea; it is of a fine ſnow-white colour, but when it has lain ſome time to dry, it becomes of a duſky yellow; it is very thin, perfectly tranſparent, and ſeems compoſed of ſeveral fine membranes. When examined by the microſcope, an admirable ſtructure is diſcovered in it; the whole being compoſed of a membranous matter, in which are an infinite number of holes, and all theſe arranged into regular lines.

Count Marſigli has diſtinguiſhed this, which is the common kind of *porus cervinus*, or buck's-horn *porus*, by the name of *minor*, in order to prevent its being confounded with another leſs common kind, which Ferrante Imperato has deſcribed under the name of *porus cervinus*.

This larger kind is alſo found growing on the rocks in the coral fiſheries; but it always is found at great depths, never near the ſurface, as the other often is. It grows to the rock by a ſmall baſe, and from thence riſes to a ſhort trunk, which ſpreads itſelf out into ſeveral flat branches, divided every where into two, as thoſe of moſt of the ſea-fucuſes are; and theſe are ſo expanded as to form, what people imagine, a reſemblance of a ſtag's horn. This grows to a little more than two inches in height, and is of a beautiful pale yellow, or ſtraw colour, even while growing, and looks gloſſy and ſhining, as if covered with a thin coat of varniſh. It is as thin as the fineſt paper; and when viewed by the microſcope, is found to be of a particular texture. It is ſometimes found growing to the ſhells of ſea-fiſhes; but of thoſe only which live in great depths of water. Count Marſigli has given elegant figures both of this and the ſmaller kind, not only in their natural ſtate, but as they appear to the microſcope.

POSCA, the name of a mixture of vinegar and water, which was the common drink of the Roman ſoldiers.

POSCENIUM, or POSTCENIUM, among the Romans, the back part of the theatre, where the actors retired to undreſs themſelves. Danet. in voc.

POSCENIUM was ſometimes uſed to ſignify a lady's dreſſing-room, where the paint and waſhes were kept and uſed, and where men were not allowed admittance. See PARASCENIUM.

POSE', in *Heraldry*, denotes a lion, horſe, or other beaſt, ſtanding ſtill, with all four feet on the ground; to denote thereby that it is not a moving poſture.

POSIDIA, Ποσιδια, in *Antiquity*, a feſtival in honour of Neptune, called Ποσειδῶν.

POSIDIUM, Ποσειδεων, in *Chronology*, the ſeventh month of the Athenian year. It conſiſted of thirty days, and anſwered to the latter part of our December, and the beginning of January.

It had this name from the feſtival Poſidonia celebrated in it.

POSIDONIA, Ποσιδονια, in *Antiquity*, the ſame with POSIDIA.

POSIQUIT, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a ſmall bird very common among them, and approaching to the nature of the Canary bird, but ſmaller, and wanting its harmonious voice.

POSITI, among the Romans, an appellation given to the dead when placed at the door with their feet outwards, till the time of their interment.

POSITION, in *Phyſics*, *ſite*, or *ſituation*; an affection of place, which expreſſes the manner of any body's being therein.

POSITION, in *Architecture*, denotes the ſituation of a building, with regard to the points of the horizon.

Vitruvius directs the *poſition* of a building to be ſuch as that the four corners point directly to the four winds.

POSITION, in *Aſtronomy*. The *poſition* of the ſphere is either right, parallel, or oblique; whence ariſe the inequality of our days, difference of ſeaſons, &c.

POSITION, *circles of*. See CIRCLES.

POSITION, in *Dancing*, the manner of diſpoſing the feet, with regard to each other.

There are four regular *poſitions*: the firſt is, when the feet are joined in a line parallel to the ſhoulders: the ſecond, when the heels are perpendicularly under the ſhoulders; and of conſequence the width of the ſhoulders apart: the third, when one foot is before the other, in ſuch a manner, as that the heel is in the cavity formed by the rotula and carpus of the foot: the fourth, when one foot is the width of the ſhoulders apart from the other, the heel ſtill anſwering to the cavity above mentioned, which is the only regular manner of walking.

POSITION, in *Arithmetic*, a rule, ſo called, for *ſuppoſition*.

The rule of *falſe poſition*, or of *falſhood*, conſiſts in calculating on ſeveral falſe numbers, taken at random, as if they were the true ones; and, from the differences found therein, determining the number ſought.

Poſition is either *ſingle* or *double*.

POSITION, *ſingle*, is, when there happens in the propoſition ſome partition of numbers into parts proportional; in which caſe, the queſtion may be reſolved, at one operation, by this rule: imagine a number at pleaſure, and work therewith according to the tenor of the queſtion, as if it were the true number: and what proportion there is between the falſe concluſion and the falſe *poſition*, ſuch proportion the given number has to the number ſought.

Thetefore the number found by argumentation ſhall be the firſt term of the rule of three; the number ſuppoſed the ſecond term; and the given number, the third.

E. gr. A ſchool-maſter being aſked how many ſcholars he had, replied, if he had as many more, half as many, and one-fourth as many, he would have but one leſs than 100; how many had he? Suppoſe the number 20: then $20+20+10+5=55$ inſtead of 99; therefore $55 : 20 :: 99 : \frac{99 \times 20}{55} = 36$, the number required.

lumns, where people walk under covert. See *Tab. Architecture, fig.* 40.

The roof is uſually vaulted, ſometimes flat. The ancients called it *lacunar*.

Though the word *portico* be derived from *porta, gate, door*, yet it is applied to any diſpoſition of columns which form a gallery, without any immediate relation to doors or gates.

The moſt celebrated *porticos* of antiquity were thoſe of Solomon's temple, which formed the atrium or court, and encompaſſed the ſanctuary; that of Athens, built for the people to divert themſelves in, and wherein the philoſophers held their diſputes and converſations; which occaſioned the diſciples of Zeno to be called *ſtoics*, from the Greek *ϛοα, porticus*; and that of Pompey at Rome, raiſed merely for magnificence, conſiſting of ſeveral rows of columns ſupporting a platform of vaſt extent; a draught whereof Serlio gives us in his antique buildings.

Among the modern *porticos*, the moſt celebrated is the piazza of St. Peter of the Vatican. That of Covent Garden, London, the work of Inigo Jones, is alſo much admired.

PORTIO, *portion*, a part or diviſion of any thing.

Portion, in the *Canon Law*, is that allowance, or proportion, which a vicar ordinarily has out of a rectory, or impropriation; be it certain or uncertain.

Portio *dura*, and *mollis*, in *Anatomy*, a partition of the fifth pair of nerves of the brain; which, before its egreſs out of the dura mater, is apparently divided into two branches; the one pretty tough and firm, called *portio dura*; the other ſoft and lax, called *portio mollis*. See *Seventh pair of* Nerves.

PORTIONER, *portionarius*. Where a parſonage is ſerved ſometimes by two, ſometimes by three miniſters, alternately; as Bromyard, Burſord, &c. in Shropſhire; the vicars or incumbents are called *portioners*; becauſe they have but their portion or proportion of tythes, or profits of the living.

PORTISCULUS, among the Romans, an officer who had the direction of the rowers in a galley. He was otherwiſe called pausarius and hortator *remigum*.

PORTIUS *piſcis*, in *Ichthyology*, a name given by ſome to a fiſh called by others the *mugil ater*, or black mullet.

It is a very ſcarce fiſh, much reſembling the common mullet in ſhape, but all over of a fine black, and having ſeveral lines of a deeper black than the reſt, running longitudinally from the gills to the tail; it has a very wide mouth, and has ſeven or eight prickles on the back, ſeparate from one another, and joined into a fin by a membrane in the uſual way; theſe are placed immediately before the back-fin.

PORTLAND *ſtone, ſaxum arenarium Portlandicum* of Da Coſta, and *pſadurium hebes, albidum, laxius*, of Hill, is an alkaline ſand-ſtone, of a dull whitiſh colour, heavy, moderately hard, of a ſomewhat flat texture, and is compoſed of a large roundiſh grit, cemented together by an earthy ſpar, and intermixed with numerous glittering ſpangles of pure ſpar; the grit ſplits in the cutting of the ſtone, ſo that it is capable of being brought to a ſurface very ſmooth and equal; it will not ſtrike fire with a ſteel, and burns to a ſlight aſhen hue. There are vaſt quarries of it in the iſland of *Portland* in Dorſetſhire, whence its name. It is brought from thence in large quantities to London, and much uſed in building. This and all ſimilar ſorts of ſtone, that are compoſed of granules, and are not of a laminated texture, will cut and rive in any direction, as well in a perpendicular, or in a diagonal, as horizontally and parallel to the ſite of the ſtrata. For this reaſon they have obtained the name of free-*ſtone*. Da Coſta's Foſſils, p. 125.

This ſtone is very ſoft when it comes out of the quarry, works very eaſily, and becomes in time very hard. The piers and arches at Weſtminiſter bridge are built with it.

Duke of Portland's *powder for the gout and rheumatiſm*. See Gout.

PORTLANDIA, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are, that the corolla is funnel-ſhaped, the antheræ longitudinal, and the capſule pentagonous, blunted, bilocular, polyſpermous, and crowned with a five-leaved calyx. There are two ſpecies.

PORT-LAST, in a *Ship*, denotes the gun-*wale*. See *Tab. Ship. fig.* 2. *n.* 19.

When a yard is down on the deck, they ſay, the *yard is down a port-laſt*.

PORTMANNIMOTE, in *Old Records*, the port-men's court, held in any city or town.

PORT-MANTEAU, a piece of joiners work, faſtened to the wall, in a wardrobe, armory, &c. proper for the hanging on of cloaks, hats, &c.

Port-manteau is alſo uſed for a cloak-bag, of cloth, leather, or the like, wherein the cloak and other habiliments of travellers are diſpoſed, and laid on the horſe's crupper.

Port-manteau is alſo an officer under the king of France, whereof there are twelve: their buſineſs is to keep the king's hat, gloves, cane, ſword, &c. to take them from him, and to bring them to him again when wanted.

The dauphin has alſo his *port-manteau*. Anſwerable to theſe are the cardinals caudataries, or tail-bearers.

The Romiſh biſhops have alſo their *port-croix, port-mitres*, &c. i. e. crozier-bearers, mitre-bearers, &c.

PORT-MEN, the twelve burgeſſes of Ipſwich; thus called in the ſtat. 13 Eliz.

Camden adds, that the name was common to the inhabitants of all the cinque-*ports*.

PORTMOTE, formed from the Saxon *port*, *port*, and *gemot*, *conventus*, *meeting*, q. d. *portgemot*, ſignifies a court kept in port or haven towns; as ſwanimote in the foreſt. It is ſometimes alſo called the *portmote court*.

Portmotes are alſo held in ſome inland towns, as at Knolſt in Cheſhire.

PORT-NAILS, in a *Ship*, ſuch as are uſed to faſten the hinges to the ports.

PORTOISE, aboard a *Ship*, is the ſame with *port-laſt*, or the *gun-wale*; and as they ſay, *the yard is down a port-laſt*, when it lies down on the deck; ſo for a ſhip *to ride a portoiſe*, is to ride with her *yard a port-laſt*, or ſtruck down to the deck.

PORTORARIUM, in *Anatomy*, a name given by ſome authors to the duodenum.

PORTRAIT, Pourtrait, or Pourtraiture, in *Painting*, the repreſentation of a perſon, and eſpecially of a face, done from the life.

In this ſenſe we ſay, *portrait-painting*, in oppoſition to hiſtory-painting, where all reſemblance of perſon is diſregarded.

Portraits are uſually painted in oil-colours, ſometimes in water; ſometimes in miniature, with crayons, pens, paſtels, &c.

It was ſaid of a great painter, who never ſucceeded in the likeneſs (ſir Peter Lely, if we miſtake not) that he made a great many fine pictures, but all poor *portraits*.

PORT-RAFT, See Raft.

PORT-ROPES, in a *Ship*, thoſe which ſerve to haul up the ports of the ordnance.

PORT-ROYAL, a term that makes a conſiderable figure in the republic of learning. Its origin is this:

Philip Auguſtus, wandering from his company in hunting, near Chevreuſe, weſtward of Paris, found a little chapel, where he put up, expecting that ſome of his attendants might meet him. This happening accordingly, he gave the place the name of the *King's port, Port du roi*, or *Port-royal*; and, to give thanks for his deliverance, he reſolved to erect a monaſtery there.

Odo, biſhop of Paris, appriſed of his intention, prevented him; and, with the concurrence of Mathilda, wiſe of Matth. Montmorenci, firſt lord of Marly, built a nunnery in 1204, filling it with Ciſtericans, who continued under the juriſdiction of the general of that order till the year 1627, when they were removed to a houſe given them in the Fauxbourg St. Jaques, at Paris.

In 1647, they quitted the habit of Ciſtercians, and embraced the inſtitution of the perpetual adoration of the ſacrament. The ſame year the archbiſhop of Paris allowed them to remand ſome of their religious to their former abbey, and to re-eſtabliſh the ſame.

Some time after, the formulary of Alexander VII. being appointed to be ſubſcribed throughout the kingdom, the religious of *Port-royal* in the city ſigned it: thoſe remitted to the former abbey ſcrupled it extremely, and, at laſt, only ſigned it with great reſtrictions.

Still perſiſting in the ſame ſentiments, the king finding no way to reduce them but by diſperſing them, that was executed in 1709, and the revenues given to the other monaſtery.

Upon this evacuation, ſeveral eccleſiaſtics, and others, who had the like ſentiments with regard to the ſubſcription as the religious, retired to *Port-royal*, and had apartments there; and there publiſhed ſeveral books, both on the ſubject of this diſpute, and other topics; whence all that adhered to that party took the name of *Port-royaliſts*; and their books, *books of Port-royal*.

Hence we ſay, the *writers of Port-royal*, Meſſieurs *de Port-royal*, the tranſlations *of Port-royal*, the Greek and Latin methods of *Port-royal*, which are grammars of thoſe languages.

PORT-SALE, a public ſale of goods to the higheſt bidder.

Port-ſale, in the ſtat. an. 35 Henry VIII. cap. 7. denotes the ſale of fiſh preſently upon its arrival in the port or haven.

PORT-SOKEN, or Port-soka, the ſuburb of a city; or a place within the liberties and juriſdiction thereof.

The word is formed from the Saxon *port*, *city*, and *ſoka*, *juriſ-*

juriſdiction. Conceſſi, quod nullus de civitate, vel portſoka *ſua captus*, &c. Somn. Gavelkind.

PORTUGALICA *terra, earth of Portugal*, in the *Materia Medica*, the name of a fine aſtringent bole, dug in great plenty in the northern parts of Portugal, and eſteemed a remedy againſt poiſons and venomous bites, and good in malignant fevers. Whatever may be its virtues of this kind, it is manifeſtly an aſtringent of the very firſt claſs, and is uſed with great ſucceſs in fluxes of all kinds. It is well known in ſome parts of the world, beſides the kingdom where it is produced; but is not known in the Engliſh ſhops; the cheapneſs of our ſophiſticated bole armenic having excluded this whole valuable claſs of medicines from our practice.

The characters by which the *Portugueſe earth* is known from the other red boles, are theſe; it is of a cloſe, compact, and regular texture, conſiderably heavy, and of a fine florid red, of a ſmooth and ſhining ſurface, eaſily breaking between the fingers, and a little ſtaining the hands. It adheres firmly to the tongue, melts freely and readily in the mouth, and has a ſtrongly aſtringent taſte, but leaves a little grittineſs between the teeth. It does not ferment with acids, and ſuffers ſcarce any change of colour in the fire.

The Portugueſe and Spaniards make an earthen ware of this BOLE, which they call *bucaros*; it is of a fine red colour, very ſmooth and poliſhed, though it is never glazed, being only dried. They uſe it to filtre, cleanſe, and cool the water. It is alſo ſometimes made into a cake, and ſtamped with a roſe.

PORTUGUESE *man of war*, in *Natural Hiſtory*, a name which the ſeamen give to the *holothuria phyſalis* of Linnæus. It conſiſts of a ſmall bladder, about ſeven inches long, very much reſembling the air-bladder of fiſhes, from the bottom of which deſcend a number of ſtrings, of a bright blue and red, ſome of them three or four feet in length, which, upon being touched, ſting like a nettle, but with much more force. On the top of the bladder is a membrane, which is uſed as a ſail, and turned ſo as to receive the wind which way ſoever it blows. This membrane is marked in fine pink-coloured veins, and the animal is in every reſpect an object exquiſitely curious and beautiful.

Portuguese *coins*. See Coins.

Portuguese *meaſure*. See Measure.

PORTUS, *quinque*. See Quinque *portus*, and Cinque *ports*.

PORT-VENT, in an organ, is a wooden pipe, well cloſed, which ſerves to convey the wind from the bellows to the ſound-board of the ORGAN.

PORTULACA, in *Botany*. See Purslane.

PORTUMNALIA, among the Romans, a feſtival in honour of Portumnus, who was ſuppoſed to preſide over ports and havens, celebrated on the ſeventeenth of Auguſt.

PORUS *bilarius*. See Bilarius *porus*, and Ductus *communis*.

Porus, in *Natural Hiſtory*, a name given by authors to a peculiar kind of foſſil coral, of which there are many different ſpecies; theſe are all of a beautifully laminated ſtructure, and ſeem allied to the mycetitæ or fungitæ; they are ſeldom found looſe, but uſually bedded in hard marble, and with their pores filled up with ſparry or mineral matter. See *Tab. of Foſſ. Claſs* 7.

Porus is alſo the name of the TOPHUS.

Porus *cervinus*, in *Natural Hiſtory*, a name given by authors to a ſpecies of marine ſubſtance, found among the rocks in the coral fiſheries, and in other places. It grows at different depths, and ſeems to adhere to the rocks by a ſimple baſe, having no root, nor any thing in the place of one. It is branched in ſuch a manner, that with the help of a little imagination it has been forced into the reſemblance of a ſtag's horn; its height is about an inch and a half, often leſs when newly taken out of the ſea; it is of a fine ſnow-white colour, but when it has lain ſome time to dry, it becomes of a duſky yellow; it is very thin, perfectly tranſparent, and ſeems compoſed of ſeveral fine membranes. When examined by the microſcope, an admirable ſtructure is diſcovered in it; the whole being compoſed of a membranous matter, in which are an infinite number of holes, and all theſe arranged into regular lines.

Count Marſigli has diſtinguiſhed this, which is the common kind of *porus cervinus*, or buck's-horn *porus*, by the name of *minor*, in order to prevent its being confounded with another leſs common kind, which Ferrante Imperato has deſcribed under the name of *porus cervinus*.

This larger kind is alſo found growing on the rocks in the coral fiſheries; but it always is found at great depths, never near the ſurface, as the other often is. It grows to the rock by a ſmall baſe, and from thence riſes to a ſhort trunk, which ſpreads itſelf out into ſeveral flat branches, divided every where into two, as thoſe of moſt of the ſea-fucuſes are; and theſe are ſo expanded as to form, what people imagine, a reſemblance of a ſtag's horn. This grows to a little more than two inches in height, and is of a beautiful pale yellow, or ſtraw colour, even while growing, and looks gloſſy and ſhining, as if covered with a thin coat of varniſh. It is as thin as the fineſt paper; and when viewed by the microſcope, is found to be of a particular texture. It is ſometimes found growing to the ſhells of ſea-fiſhes; but of thoſe only which live in great depths of water. Count Marſigli has given elegant figures both of this and the ſmaller kind, not only in their natural ſtate, but as they appear to the microſcope.

POSCA, the name of a mixture of vinegar and water, which was the common drink of the Roman ſoldiers.

POSCENIUM, or Postcenium, among the Romans, the back part of the theatre, where the actors retired to undreſs themſelves. Danet. in voc.

Poscenium was ſometimes uſed to ſignify a lady's dreſſing-room, where the paint and waſhes were kept and uſed, and where men were not allowed admittance. See Parascenium.

POSE', in *Heraldry*, denotes a lion, horſe, or other beaſt, ſtanding ſtill, with all four feet on the ground; to denote thereby that it is not a moving poſture.

POSIDIA, Ποσιδια, in *Antiquity*, a feſtival in honour of Neptune, called Ποσειδὼν.

POSIDIUM, Ποσειδεων, in *Chronology*, the ſeventh month of the Athenian year. It conſiſted of thirty days, and anſwered to the latter part of our December, and the beginning of January.

It had this name from the feſtival Poſidonia celebrated in it.

POSIDONIA, Ποσιδονια, in *Antiquity*, the ſame with POSIDIA.

POSIQUIT, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a ſmall bird very common among them, and approaching to the nature of the Canary bird, but ſmaller, and wanting its harmonious voice.

POSITI, among the Romans, an appellation given to the dead when placed at the door with their feet outwards, till the time of their interment.

POSITION, in *Phyſics*, *ſite*, or *ſituation*; an affection of place, which expreſſes the manner of any body's being therein.

Position, in *Architecture*, denotes the ſituation of a building, with regard to the points of the horizon.

Vitruvius directs the *poſition* of a building to be ſuch as that the four corners point directly to the four winds.

Position, in *Aſtronomy*. The *poſition* of the ſphere is either right, parallel, or oblique; whence ariſe the inequality of our days, difference of ſeaſons, &c.

Position, *circles of*. See Circles.

Position, in *Dancing*, the manner of diſpoſing the feet, with regard to each other.

There are four regular *poſitions*: the firſt is, when the feet are joined in a line parallel to the ſhoulders: the ſecond, when the heels are perpendicularly under the ſhoulders; and of conſequence the width of the ſhoulders apart: the third, when one foot is before the other, in ſuch a manner, as that the heel is in the cavity formed by the rotula and carpus of the foot: the fourth, when one foot is the width of the ſhoulders apart from the other, the heel ſtill anſwering to the cavity above mentioned, which is the only regular manner of walking.

Position, in *Arithmetic*, a rule, ſo called, for *ſuppoſition*.

The rule of *falſe poſition*, or of *falſhood*, conſiſts in calculating on ſeveral falſe numbers, taken at random, as if they were the true ones; and, from the differences found therein, determining the number ſought.

Poſition is either *ſingle* or *double*.

Position, *ſingle*, is, when there happens in the propoſition ſome partition of numbers into parts proportional; in which caſe, the queſtion may be reſolved, at one operation, by this rule: imagine a number at pleaſure, and work therewith according to the tenor of the queſtion, as if it were the true number: and what proportion there is between the falſe concluſion and the falſe *poſition*, ſuch proportion the given number has to the number ſought.

Therefore the number found by argumentation ſhall be the firſt term of the rule of three; the number ſuppoſed the ſecond term; and the given number, the third.

E. gr. A ſchool-maſter being aſked how many ſcholars he had, replied, if he had as many more, half as many, and one-fourth as many, he would have but one leſs than 100; how many had he? Suppoſe the number 20: then $20+20+10+5=55$ inſtead of 99; therefore $55 : 20 :: 99 : \frac{99 \times 20}{55} = 36$, the number required.

Position, *double*, is when there can be no partition in the numbers to make a proportion.

In this caſe, therefore, you muſt make a ſuppoſition twice; proceeding therein according to the tenor of the queſtion.

If neither of the ſuppoſed numbers ſolve the propoſition, obſerve the errors, and whether they be greater or leſs than the reſolution requires, and mark the errors accordingly, with the ſigns + and —.

Multiply, contrariwiſe, the one *poſition* by the other error; and, if the errors be both too great, or both too little, ſubtract the one product from the other, and divide the difference of the products by the difference of the errors. If the errors be unlike, as the one +, and the other —, add the products, and divide the ſum thereof by the ſum of the errors added together. For the proportion of the errors is the ſame with the proportion of the exceſſes or defects of the numbers ſuppoſed, to the numbers ſought.

E. gr. 1. If 100*l.* be divided between A, B, and C, in ſuch a manner, that B had three times as much as A, and C as much as A and B together, and their reſpective ſums be required. Suppoſe firſt, A's $= 12$. B's will be $= 36$, and C's $= 48$, the ſum of which will be 96 inſtead of 100, and leave an error in defect, or -4.

Suppoſe 2dly. A's $= 14$, then B's $= 42$, and C's $= 56$, and the ſum $= 112$ inſtead of 100; hence we ſhall have an error in exceſs, or $+12$. And $4 \times 14 = 56$, and $12 \times 12 = 144$, and $144 + 56 = 200$: and $\frac{200}{16} = 12\frac{1}{2}$ for A's real ſhare.

E. gr. 2. A party of ſoldiers marching, came up with a ſhepherd, and drove off half his flock and half a ſheep; another party carried off half the remainder and half a ſheep; and a third plundered him of half the remainder and half a ſheep, and after all he had 20 ſheep left: what was the number of the whole flock?

1ſt. Suppoſe it 21: of which the firſt party took $\frac{21}{2} + \frac{1}{2} = 11$, the ſecond took $\frac{10}{2} + \frac{1}{2} = 5\frac{1}{2}$, the third took $\frac{4\frac{1}{2}}{2} + \frac{1}{2} = 2\frac{1}{4}$; ſo that the remainder was $1\frac{1}{4}$ inſtead of 20, which gives an error in defect, or $-18\frac{1}{4}$.

2dly. Suppoſe the number 23: then $\frac{23}{2} + \frac{1}{2} = 12$; $\frac{11}{2} + \frac{1}{2} = 6$; $\frac{5}{2} + \frac{1}{2} = 3$; and the remainder will be 2 inſtead of 20, and leave an error in defect or -18. Then $18 \times 21 = 378$, and $18\frac{1}{4} \times 23 = 419\frac{3}{4}$; and $419\frac{3}{4} - 378 = 41\frac{3}{4}$, which divided by $\frac{1}{4}$, gives a quotient 167 for the true number.

Position, in *Geometry*, is a term ſometimes uſed in contradiſtinction to *magnitude*. Thus a line is ſaid to be *given in poſition*, *poſitione data*, when its ſituation, bearing, or direction, with regard to ſome other line is given: on the contrary, a line is given in magnitude, when its length is given, but not its ſituation.

Sir Iſaac Newton ſhews how to find a point, from which three lines, perpendicularly let fall to three other lines *given in poſition*, have any given ratio, &c.

Position, in *Grammar*. See Quantity.

Position, is alſo uſed for a THESIS or propoſition maintained in the ſchools.

Position, *traiterous*. See Traytorous.

Position, *poſitio*, in *Muſic*, is uſed for the putting down the hand in beating time. See Thesis.

POSITIONAL *libel*. See Articulated *libel*.

POSITIVE, a term of relation ſometimes oppoſed to *negative*.

Thus we ſay, the commandments are ſome of them *poſitive*, others *negative*.

Positive *quantity*, in *Algebra*. See Quantities.

Positive is alſo uſed in oppoſition to *relative* or *arbitrary*.

Thus we ſay, beauty is no *poſitive* thing, but depends on the different taſtes of the people.

Positive is alſo uſed in oppoſition to *natural*.

Thus we ſay, a thing is of *poſitive* right, meaning, it is founded on a law which depends abſolutely on the authority of him who made it.

The prohibition of eating certain beaſts, under the old law, was of *poſitive* right; the command to honour father and mother, of natural right.

Positive *degree*, in *Grammar*, is the adjective in its ſimple ſignification, without any compariſon.

Or, *poſitive degree*, is that termination of an adjective, which expreſſes its ſubject ſimply and abſolutely, without comparing it with any other.

Thus, good, *bonus*, fair, *pulcher*, &c. are in the *poſitive degree*; better, fairer, &c. in the comparative.

Positive *theology*. See Theology.

Positive, in *Muſic*, denotes the little organ uſually behind, or at the foot of the organiſt, played with the ſame wind, and the ſame bellows, and conſiſting of the ſame number of pipes with the large one, though thoſe much ſmaller, and in a certain proportion. See Organ.

In the organs of the Jeſuits, the *poſitive* is in the grand body.

Positive *levity*. See Levity.

Positive *proof*, in *Law*. See Evidence.

POSSE *comitatus*, Power *of the county*, a phraſe in law, ſignifying the aid and attendance of all knights, gentlemen, yeomen, labourers, ſervants, apprentices, villains, and other perſons, above the age of fifteen years, within the county; becauſe all above that age are bound to have harneſs, by the ſtatute of Wincheſter: only women, eccleſiaſtical perſons, and ſuch as are decrepid and infirm, are excuſed.

All perſons under the degree of a peer are bound to attend upon warning of the ſheriff or juſtices, under pain of fine and impriſonment, to defend the county againſt the king's enemies when they come into the land, as well as for keeping the peace and purſuing felons.

It is alſo uſed where a riot is committed, a poſſeſſion kept upon a forcible entry, or any force of reſcue uſed, contrary to the command of the king's writ, or in oppoſition to the execution of juſtice. Stat. 2 Hen. V.

POSSESSIO *fratris*, in *Law*, is where a man hath a ſon and a daughter by one woman or *venter*, and a ſon by another *venter*, and dies; if the firſt ſon enters and dies without iſſue, the daughter ſhall have the land as heir to her brother, although the ſecond ſon by the ſecond *venter* is heir to the father: but if the eldeſt ſon dies without iſſue, not having made an actual entry and ſeiſin, the younger brother by the ſecond wife, as heir to the father, ſhall enjoy the eſtate, and not the ſiſter. 1 Inſt. 11, 15.

POSSESSIONEM, *habere facias*, in *Law*. See Habere.

POSSESSION, Possessio, in *Law*, *quaſi pedis poſitio*; an action whereby we hold or occupy any thing, either *de jure* or *de facto*.

Possession *de facto*, is when there is an actual and effectual enjoyment of the thing. See De *Facto*.

Possession *de jure*, or in *Law*, is the TITLE a man has to to enjoy a thing, though it be ſometimes uſurped, and in the actual *poſſeſſion* of another.

This right of *poſſeſſion* is of two ſorts; an apparent right of *poſſeſſion*, which may be defeated by proving a better; and an actual right of *poſſeſſion*, which will ſtand the teſt againſt all opponents. Thus if the diſſeiſor, or other wrong doer, who having obtained the *poſſeſſion* by either fraud or force, hath only a bare or naked *poſſeſſion*, without any ſhadow of right, dies poſſeſſed of the land whereof he ſo became ſeized by his own unlawful act, and the ſame deſcends to his heir; by the common law the heir hath obtained an apparent right, though the actual right of *poſſeſſion* reſides in the perſon diſſeized; and it ſhall not be lawful for the perſon diſſeiſed to diveſt this apparent right by mere entry or other act of his own, but only by an action at law. For until the contrary be proved by legal demonſtration, the law will preſume the right to reſide in the heir whoſe anceſtor died ſeiſed, rather than in one who has no ſuch preſumptive evidence to urge in his own behalf. But if he who has the actual right of *poſſeſſion*, puts in his claim, and brings his action within a reaſonable time, and can prove by what unlawful means the anceſtor became ſeiſed, he will then by ſentence of law recover that *poſſeſſion*, to which he hath ſuch actual right. Yet, if he omits to bring this his poſſeſſory action within a competent time, his adverſary may imperceptibly gain an actual right of *poſſeſſion*, in conſequence of the other's negligence. And by this and certain other means, the party kept out of *poſſeſſion* may have nothing left in him but the mere *right of* PROPERTY, without either *poſſeſſion*, or even the right of *poſſeſſion*. Thus, if a diſſeiſor turns me out of *poſſeſſion* of my lands, he thereby gains a mere naked *poſſeſſion*, and I ſtill retain the right of *poſſeſſion* and right of property. If the diſſeiſor dies, and the lands deſcend to his ſon, the ſon gains an apparent right of *poſſeſſion*; but I ſtill retain the actual right both of *poſſeſſion* and property. If I acquieſce for thirty years without bringing any action to recover *poſſeſſion* of the lands, the ſon gains the actual right of *poſſeſſion*, and I retain nothing but the mere right of *poſſeſſion*. And even this right of property will fail, or at leaſt it will be without a remedy, unleſs I purſue it within the ſpace of ſixty years. Blackſt. Com. book xi. p. 196, &c.

Possession, *property in*. See Property.

Possession, *unity of*, makes what the civilians call CONSOLIDATION. See Unity.

By the French laws, a *poſſeſſion* of three years, in matters perſonal, begets a right; and in real eſtates, a *poſſeſſion* of ten years, among perſons living near the premiſes, and twenty years among thoſe that live elſewhere.

Possession, *annual*, is the usucaptio, which gives a right to moveables; a triennial and peaceable *poſſeſſion* of a benefice is ſufficient to maintain it, provided it be founded on a plauſible title.

Possession is ſometimes alſo uſed for the act of taking *poſſeſſion*, which is performed with certain formalities, whereby a perſon is juſtified to be in the enjoyment of any thing.

Anciently, upon buying an eſtate, *poſſeſſion* was taken with much ceremony: in ſome places, by a ſtick, a branch, or a ſtraw, put into the hands of the buyer by the ſeller. See Investiture.

Possession *of a benefice*, in ſome cuſtoms, is taken by entering the church, kneeling down, kiſſing the altar, and ringing the bell. See Induction.

In ſome caſes, *poſſeſſion* is taken by the ſight of the ſteeple.

Possession is alſo uſed for the ſtate of a perſon ſaid to be *poſſeſſed* by the devil. See Dæmoniac, and Dæmoniacal *Poſſeſſion*.

Possession, in *Mining*, is the right to a meer of ground, which the miners enjoy, by having ſtones upon that ground; and it is taken generally for the ſtones themſelves, for the ſtones give *poſſeſſion*.

POSSESSIVE *pronouns*, in *Grammar*. See Pronoun.

POSSESSORY *actions*, in *Law*, are thoſe which ſerve only to regain that poſſeſſion, whereof the demandant, (that is, he who ſues for the land) or his anceſtors have been unjuſtly deprived by the tenant or poſſeſſor of the freehold, or thoſe under whom he claimed. Theſe are the writs of Entry and Assize.

POSSET, *beer*. See Zythogala.

POSSIBILITAS, Possibility, in our *Old Law Books*, is ſometimes uſed for a thing done wilfully or wittingly.

In which ſenſe it ſtands oppoſed to *impoſſibilitas*, a thing done againſt the will. *Si autem oculos aſnaſſet, reddat veram ejus*, & impoſſibilitatis *accuſetur in eo facto*. Leg. Alfred. Again, *Si quis agat* impoſſibiliter, *non eſt omnino ſimile ac ſi voluntarie faciat*. Leg. Canut. cap. 6.

POSSIBILITY, in *Law*, is uſed in the ſame ſenſe with contingency, or for that which may or may not happen: with reſpect to *poſſibilities* it is obſerved, that though they may be releaſed, or deviſed by will, or may paſs to the heir or executor, yet they cannot be aſſigned to a ſtranger, unleſs coupled with ſome preſent intereſt.

Possibility, Possibilitas, denotes a non-repugnance to exiſting in a thing that does not any way exiſt. See Possible.

This non-repugnance to exiſting is no other than the producibility of any thing; which conſiſts in this, that there are ſufficient cauſes actually exiſting, or at leaſt poſſible, whereby the thing may be produced, or be brought to exiſt; principally as there is a God, or an almighty cauſe.

So that *poſſibility* does not imply any thing in the thing poſſible, but it is a mere extrinſic denomination taken from the power of the cauſe, and principally of God.

In effect, if a creatable thing had any intrinſic *poſſibility*, it would follow, that ſuch a thing muſt exiſt even without the cauſe.

And yet we may allow an intrinſic *poſſibility* of a thing, if by *poſſibility* we do not underſtand its producibility, or its non-repugnance to exiſt; but only the non-repugnance of the attributes contained in its idea. But ſuch *poſſibility* is merely logical.

POSSIBLE, Possibile, is ſometimes oppoſed to real exiſtence, and underſtood, in the ſchools, of a thing, which, though it does not actually exiſt, yet may exiſt; as, a new ſtar, another world, &c. which are particularly ſaid to be *phyſically poſſible*.

It is alſo oppoſed to *impoſſible*. In which ſenſe it is applicable to any thing that does not contradict itſelf, or involves contradictory predicates; whether it actually exiſt or not; as a man, fire, &c. Theſe are alſo ſaid to be *logically poſſible*.

It is a great point of controverſy among the ſchool-philoſophers, whether and how far things may be ſaid to have entity, while only in a ſtate of *poſſibility*.

Poſſibles are ordinarily conceived to be threefold; *future, potential*, and *merely poſſible*.

Possible, *future*, is that whoſe production is decreed and aſcertained; v. gr. the futurition of all thoſe events fixed by the immutable decree, or the immutable will, of the Almighty.

Possible, *potential*, is that which is contained, or lies hid in its cauſes: as the tree in the ſeed, the fruit in the tree, &c.

Possible, *mere*, is that which might exiſt, though it never ſhall.

Others diſtinguiſh *poſſibles*, into *metaphyſical, phyſical*, and *ethical*.

Possible, *metaphyſical*, is that which may, at leaſt, be brought to being by ſome ſupernatural and divine power; as the reſurrection of the dead.

In which ſenſe the word is oppoſed to an *impoſſible*, even as it reſpects God himſelf; as a crooked ſtraightneſs, a ſquare circle, an infinitely perfect creature, a mortal God.

Possible, *phyſical*, is that which may be affected by a natural power; in oppoſition to ſuch things as cannot be produced by any finite power; as to reſtore the dead, &c.

Possible, *ethical*, is that which may be done by prudent perſons, uſing all the proper means they have for the ſame. Again, it is uſed for any thing done according to right reaſon, and conſiſtently with the laws.

POSSIBILITY *of iſſue extinct*. See Tail.

POSSUM, in *Zoology* See Opossum.

POST, in the *Military Art*, is any ſpot of ground capable of lodging ſoldiers.

The word is formed from the Latin *poſitus, placed*; ſome derive it from *poteſtas, power*.

A *poſt* denotes any ground or place, fortified or not, where a body of men may make a ſtand, and fortify themſelves, or remain in condition to fight an enemy.

A ſpot of ground ſeized by a party, to ſecure the front of an army, and to cover the *poſts* that are behind, is called an *advanced poſt*.

The advance-guard, or the right, of the two lines of an army, &c. is called the *poſt of honour*, and is always given to the eldeſt regiments.

A centinel placed before the colours, and at the door of the commanding officer, is ſaid to be in a *poſt* of honour.

Posts, in *Building*, large pieces of timber, placed upright in houſes, &c.

The corner *poſts* are called the *principal* or *fencing poſts*; the *poſts* framed between principal *poſts* for ſtrengthening the roof of a houſe, are called the *queen poſts*.

An excellent method to preſerve *poſts* from rotting, is to burn the outſide of the ends that are to be ſet in the ground, to a coal.

Post, *crown*. See Crown Post.

Post, alſo denotes the diſpatch a courier or letter-carrier makes by changing horſes from time to time.

The name is borrowed hence, that the horſes are *poſiti*, placed, poſted, or diſpoſed, from diſtance to diſtance.

The word is alſo applied to the perſon himſelf; the houſes where he takes up, and lays down his charge; and the ſtages, or diſtances between houſe and houſe. Hence the phraſes, *poſt-boy, poſt-horſe, poſt-houſe*, &c.

We find mention made of *poſt-horſes* in the Theodoſian Code, *de curſu publico*; but theſe were very different from the preſent eſtabliſhment, and were only public horſes firſt appointed by Trajan; till whoſe time, the meſſengers ſeized any horſes that came in their way.

Lewis Hornigk has an expreſs treatiſe on *poſts*, whereof he makes four kinds; viz. on *horſeback*, in *chariots*, in *boats*, and on *foot*: which laſt kind is in uſe in Italy, Turkey, and Peru: but in 1740, the Turks began to eſtabliſh regular *poſts* like thoſe of Chriſtian countries.

Herodotus aſcribes the origin of *poſts* to Cyrus, or Xerxes; but the *poſts* inſtituted by thoſe princes were no more than couriers.

In effect, *poſts* on the preſent footing are but a modern invention; though ſome go back as high as Charlemagne.

It is certain it was the policy, or rather the diffidence of Louis XI. of France that they owed their riſe to; that uneaſy prince firſt ſettled them by an ordonnance of the 19th of June 1464, to be the ſooner, and the more ſurely advertiſed of what paſſed in his own kingdom, and in the neighbouring ſtates.

But theſe *poſts* were only for the particular uſe of the court; for the author of the Life of the Duke d'Eſpernon ſays, that the packet or letter-office was not ſet up in France anno 1619.

From France the inſtitution propagated itſelf, by degrees, through the ſeveral other parts of Europe. In Germany, Hornigk obſerves, *poſts* were firſt ſettled by the count de Taxis at his own expence; in acknowledgment whereof, the emperor Matthias, in 1616, gave him, in fief, the charge of *poſt-maſter* under him and his ſucceſſors.

In England, *poſts* were firſt eſtabliſhed by act of parliament 12 Car. II. anno 1660, which enabled the king to ſettle a *poſt-office*, and appoint a governor: though there had been *poſts* in England from the time of Charles I. and probably ſomewhat earlier. For by 2 and 3 Edw. VI. cap. 3. A. D. 1548, the rate of *poſt-horſes*, is fixed at one penny per mile. And in the twenty-ſixth year of queen Elizabeth, anno 1581, we find mention of the office of chief *poſt*-maſter of England; and in 1631, of the office of *poſt*-maſter for foreign parts, which office we alſo learn from the Fœdera, tom. xix. fol. 385. had been firſt created by king James.

However, till king Charles I's eſtabliſhment by proclamation of the *poſts*, anno 1635, there ſeem to have been but few regular *poſt*-carriages in England. In 1656, the protector and his parliament erected a new general *poſt*-office, under regulations ſimilar to thoſe which were adopted after the Reſtoration. The privilege of franking letters, claimed by members of parliament, was coeval with the eſtabliſhment of the *poſt*-office in 1660. See FRANK *Letters*.

At this time it appears, that the revenue of poſtage brought in 21,500*l.* whereas in 1653, the poſtage of England, Scotland, and Ireland, was farmed at 10,000*l.* yearly. By 15 Car. II. cap. 14. the revenue of the general *poſt*-office was ſettled on the duke of York and his heirs male: and by 1 Jac. II. cap. 12. it was enacted by parliament, that this revenue, amounting at that time to 65,000*l.* per annum, ſhould belong to the king and his ſucceſſors; whence it was made a part of the king's private eſtate for ever, and not to be accounted for to parliament, as other public revenues are. In 1699, the net revenue of the *poſt-office* is ſaid to have been 90,504*l.* 10*s.* 6*d.* By the tenth act of the ninth year of queen Anne, the former laws for eſtabliſhing the *poſt*-offices in both kingdoms of England and Scotland were repealed; and one general *poſt*-office, and alſo one general *poſt*-maſter, was appointed for the united kingdoms: and by this act the poſtage of letters was increaſed by one-third: it appears alſo from this act, that the groſs amount of the revenue for one year, ending at Michaelmas, 1710, was 111,461*l.* 17*s.* 10*d.* and on a medium of three years, viz. 1708, 1709, 1710, the net income, according to Dr. D'Avenant, was 56,664*l.* 19*s.* 10½*d.* but according to the report of the commiſſioners of the equivalent (anno 1718), to the houſe of commons, the medium then amounted to 62,000*l.* for England, and 2000*l.* for Scotland. On a medium of four years, viz. 1711, 1712, 1713, 1714, the net revenue was 90,223*l.* The net annual produce of the *poſt*-office at Michaelmas 1722, was 98,010*l.* 8*s.* at which time the groſs amount is ſtated to have been 201,804*l.* 1*s.* 8*d.* the deduction for frank covers, 33,397*l.* 12*s.* 3*d.* and the expence of management 70,396*l.* 1*s.* 5*d.* In 1744, the groſs amount of the inland and foreign offices was 235,492*l.* and in 1764, it was 432,048*l.* The act of the ninth of Anne, eſtabliſhing the rates of poſtage, was ſo far repealed by 5 Geo. III. cap. 25. and other regulations occur in 6 Geo. cap. 21. 26 Geo. II. cap. 13. 5 Geo. III. cap. 25. and 7 Geo. III. cap. 50.

The Engliſh *poſt*-office is now managed by two *poſt*-maſters general, with an annual ſalary of 2000*l.* a year each, who have under them many other officers of their own appointing. Theſe are all ſworn, and give ſecurity for their faithful diſcharge, &c. as the ſecretary, whoſe ſalary is 200*l.* a year, clerk to the *poſt*-maſter general, ſeven clerks to the ſecretary, receiver-general with a ſalary of 300*l.* a year, his two clerks, accomptant-general whoſe ſalary is 300*l.* a year, his deputy and three clerks, the two inſpectors of the miſs-ſent and dead letters, ſolicitor to the *poſt*-office at 200*l.* a year, reſident ſurveyor at 300*l.* a year, comptroller of the inland office at 200*l.* a year and his deputy, comptroller of the bye-nights, and clerk of the ſame, court-*poſt* at 2*l.* a day, ſix clerks of the roads and their ſix aſſiſtants, thirty ſorters at 50*l.* a-year each, two junior ſorters, two facers, two window-men, inſpector of franks and aſſiſtant, inſpector of franks on the bye-days, inſpector of the letter-carriers, ſeventy-nine letter-carriers at 11*s.* a week, and ſixteen ſupernumeraries, deliverer of the letters to the houſe of commons at 6*s.* 8*d.* a day, mail-maker with an annual ſalary of 150*l.* and eight meſſengers.

The officers of the bye-letter office are the comptroller and reſident ſurveyor at 500*l.* a-year, his two clerks, collector at 200*l.* a year, his clerk, accomptant at 200*l.* a year, his clerk, inſpector of the miſs-ſent and dead-letters, two ſurveyors at 300*l.* a year each, and one at 220*l.* a year, and an office-keeper, with an appointment of 50*l.* a year.

For the foreign office there are a comptrollar with an annual ſalary of 150*l.* his deputy, and ſix clerks, ſecretary, meſſenger, ten letter-carriers at 11*s.* a week, manager of the packet-boats at the Brill, at 120*l.* a year, agents at Dover and Harwich, at 150*l.* a year each, agent at Falmouth, at 120*l.* a year, another at Liſbon, and two deputy *poſt*-maſters general and ſecretary at New-York.

On this grand office depend one hundred and eighty-two *poſt*-maſters in England and Scotland, who keep regular offices in their ſeveral ſtages, and ſub-*poſt*-maſters in their branches.

A daily poſt is eſtabliſhed (Sunday excepted) to and from this office, and moſt of the principal towns in England, and places in their reſpective diſtricts. A mail is diſpatched from London to Edinburgh, and from Edinburgh to London, every day, Wedneſday and Sunday excepted letters to all parts of Europe are diſpatched from London every Tueſday and Friday, except thoſe to Portugal which are forwarded by the Liſbon mails on Tueſday only. For this purpoſe, there are ſix packet-boats at Dover, which ſail every Wedneſday and Saturday for Oſtend and Calais; and four between Harwich and Helvoetſluys, which ſail from Harwich every Wedneſday and Saturday, and from Helvoetſluys on the ſame days: and five between Falmouth and Liſbon, which ſail from Falmouth on Saturday, but the time of their ſailing from Liſbon is uncertain. There are alſo ſix packet-boats between Falmouth, and the iſland of Madeira, and the Weſt Indies, for which a mail is made up at London the firſt Wedneſday in every month, and the packet ſails from Falmouth on the Saturday following. There are likewiſe five packet boats which ſail daily, between Holy-head and Dublin.

The rates of poſtage are as follow: for every ſingle letletter, not exceeding one whole *poſt*-ſtage from the office where the letter may be put in 1*d.* double letter 2*d.* treble 3*d.* an ounce 4*d.* and ſo in proportion for every packet. Above one *poſt*-ſtage, and not exceeding two, a ſingle letter 2*d.* and others in proportion. Above two *poſt*-ſtages, and not exceeding eighty miles from the general *poſt*-office, a ſingle letter 3*d.* &c. in the ſame proportion. Above eighty miles, a ſingle letter 4*d.* double 8*d.* and an ounce 1*s.* 4*d.* &c.

In like manner, there are different rates appointed to and from foreign parts, according to the diſtance and difficulty of conveyance. And all maſters of ſhips bringing letters from abroad, ſhall deliver the ſame (except in the caſe of quarantine) at the *poſt*-office, before they break bulk; for which the *poſt*-maſter ſhall receive 1*d.* extraordinary for each letter. 9 Ann. cap. 10. 5 Geo. III. cap. 25.

Letters from London to any part of Holland, France, or Flanders, (or to the town of Geneva in Switzerland, through France,) pay no foreign poſtage. The poſtage of a ſingle letter from any part of Holland, France, or Flanders to London is 10*d.* between London and any part of Spain or Portugal, through France, or by Liſbon, 18*d.* between London and any part of Italy, Sicily, Turkey, Switzerland, and Minorca, through France, except to Geneva, 15*d.* and between London and any part of Italy, Sicily, Turkey, Germany, Switzerland, Denmark, Sweden, Ruſſia, and all parts of the North, through Holland or Flanders, 12*d.*

Bills of exchange, and writs, or other proceedings at law, written on the ſame piece of paper with a letter, ſhall pay as ſo many diſtinct letters. 6 Geo. cap. 21. 26 Geo. II. cap. 13. But merchants accounts not exceeding one ſheet, bills of exchange, invoices, bills of lading, (ſent or brought over ſea, 6 Geo. cap. 21), ſhall be allowed without rate in the price of letters. 9 Ann. cap. 10. But patterns or ſamples of goods, or pieces of any thing, though not paper, incloſed in a letter, or affixed to it, if under an ounce weight, ſhall pay as a double letter. 26 Geo. II. cap. 13. None but the *poſt*-maſter ſhall convey letters on pain of 5*l.* for every offence, and 100*l.* a week beſides; except letters carried gratis by carriers or ſhip-maſters with goods, inſtruments out of any court, and letters ſent by friends, or a ſpecial meſſenger; and to or from the two univerſities. 9 Ann. cap. 10. No letters or packets ſhall be exempted from poſtage, except ſuch as ſhall be ſent from or to the king; and ſuch not exceeding the weight of two ounces, as ſhall be ſent during the ſitting of parliament, or within forty days before or after any ſummons or prorogation, which ſhall be ſigned, on the outſide thereof, by any member, and whereof the whole ſuperſcription ſhall be written by him; or directed to any member of either houſe of parliament at any of the places of his uſual reſidence, or at the place where he ſhall be at the time of the delivery thereof, or at the houſe of parliament, or the lobby of either houſe: or to the officers of the treaſury, admiralty, war-office, general *poſt*-office, ſecretaries of ſtate, pay-maſter-general of the forces, clerk of the parliaments, clerk of the houſe of commons; or upon his majeſty's ſervice, indorſed by the proper officer. This reſtriction ſhall not extend to printed votes or proceedings in parliament, or printed news-papers, ſent without cover, or in cover open at the ſides, ſigned on the outſide by any member of parliament, or directed to a member at any place whereof he ſhall have given notice to the *poſt*-maſter-general.

Clerks in the offices of the ſecretaries of ſtate, and *poſt*-office, licenſed by the ſaid ſecretaries or *poſt*-maſter-general, are allowed to frank votes and news-papers, ſent without covers, or in covers open at the ſides. But if any paper or other thing be incloſed in ſuch printed paper, or any writing be thereon, except the ſuperſcription, the whole ſhall be charged with poſtage.

Forging of franks, embezzling money for letters *poſt*-paid, or deſtroying the letters, ſtealing bills or other ſecurities for money out of letters, and robbing the mail, are, ſeverally felony. Any *poſt*-boy quitting the mail between one ſtage and another, or ſuffering any perſon to ride on the horſe or carriage, or loitering on the road, ſo as not to convey the mail after the rate of ſix miles an hour at leaſt, ſhall, on conviction, be ſent to the houſe of correction, and kept to hard labour not more than a month, nor leſs than fourteen days. And if he ſhall, by himſelf, or in concurrence with others, unlawfully collect any letters, convey them, or cauſe them to be conveyed, on conviction he ſhall forfeit for every letter or packet 10*s.* to the informer; or be committed to hard labour, not exceeding two months nor leſs than one. 4 Geo. III. cap. 24. 5 Geo. III. cap. 25.

The *poſt*-maſters are allowed to charge 3*d.* a mile for each horſe riding *poſt*, and 4*d.* a mile for the perſon riding as guide. No *poſt*-maſter is allowed to intermeddle in elections for members of parliament on pain of 100*l.* 9 Ann. cap. 10.

The Great Mogul performs part of his poſtage by pigeons, kept in ſeveral places, for the conveyance of letters on extraordinary occaſions. They will carry them from one end of that vaſt empire to another. The ſame vehicles have been uſed by the Dutch in ſieges. And at this day Tavernier obſerves, the conſul of Alexandretta ſends news daily to Aleppo, in five hours time, by means of pigeons; though thoſe two places are three days journey on horſeback apart.

Post, *penny*, a *poſt* eſtabliſhed for the benefit of London, and the parts adjacent; whereby any letter or parcel, not exceeding four ounces weight, unleſs it be paſſing to or from the general *poſt*-office, is ſpeedily and ſafely conveyed to all parts within the bills of mortality, to moſt towns and villages within ten miles of London, for one penny each packet, letter, &c. upon putting in the ſame, and alſo a penny upon the delivery of ſuch as are directed to any place beyond the cities of London and Weſtminſter, the borough of Southwark or ſuburbs, and within the diſtrict of the penny-*poſt* delivery. 9 Ann cap. 10. 4 Geo. II. cap. 33.

The uſeful conveyance of letters and parcels by the *penny-poſt* was firſt ſet up in London and its ſuburbs, in or about the year 1683, by a private undertaker, to whoſe aſſigns government allowed a yearly penſion of 200*l.* a year for life, in lieu of the revenue ariſing from it. But the firſt mention of the *penny poſt* in the ſtatute-book, occurs in the ninth of queen Anne.

By 5 Geo. III. cap. 25. the *poſt*-maſter-general and his deputies may appoint a *penny-poſt* office in any city or town, or places adjacent, where they ſhall judge convenient, and charge therein the ſame rates as within the limits of the *poſt* office in London.

This office is managed by a comptroller, whoſe ſalary is 300*l.* a year, his clerk, a collector, and deputy, an accomptant, five ſorters at 15*s.* per week, eight ſub-ſorters at 10*s.* per week, and near ſeventy meſſengers at 8*s.* per week. There are five principal offices from which letters are forwarded at certain hours.

Post, *writ of entry in*, in *Law*. See **Entry**.

Posts, in *Sculpture*, &c. denote ornaments formed after the manner of rolls, or wreathings; thus called, becauſe they ſeem to run after one another.

Some are ſimple; others enriched, or flouriſhed.

Post, *after*, is alſo a Latin prepoſition, uſed in compoſition with ſeveral Engliſh words, and generally implying a relation of *poſteriority*.

Post-*bills*, *bank*, in *Commerce*. See **Note**.

Post-Book. See **Book**.

Post-communion, a prayer which the prieſt recites after the **communion**.

Post-date. See **Date**.

Post-diem, a fee by way of penalty, on a ſheriff, for his neglect in returning a writ after the day aſſigned.

For this the cuſtos brevium has four pence; whereas he has nothing if it be returned at the day.

Post-disseisin, a writ given by the ſtatute of Weſtminſter, for him who having recovered lands or tenements, by præcipe quod reddat, upon default of reddition, is again diſſeiſed by the former diſſeiſor: upon which he ſhall recover damages, and the party ſuffer impriſonment.

POSTEA, in *Law*, a return or certificate of the proceedings by niſi prius in the court of common pleas, after a **verdict**; and there afterwards recorded.

POSTERIOR, a term of relation, implying ſomething behind, or that comes after another. In which ſenſe it is uſed in oppoſition to *prior* and *anterior*.

Posterior *penis*, in *Anatomy*, a name given by many authors to a muſcle more generally known at this time by the name of the **erector**.

Posterior, *ramus*. See **Ramus**.

POSTERIORITY, in *Law*, a term of compariſon, and relation in tenure, oppoſite to *priority*.

A man holding lands or tenements of two lords, holds of his ancienter lord by *priority*, and of his later lord by *poſteriority*.

POSTERN, or **sally-port**, in *Fortification*, a ſmall gate, uſually made in the angle of the flank of a baſtion, or in that of the curtin, or near the orillon, deſcending into the ditch; whereby the garriſon can march in and out, unperceived by the enemy either to relieve the works, or to make private ſallies, &c. See **Sally**-*port*, and *Tab.* VII. *Fortification*, *fig.* 41. z z.

The word is alſo uſed in the general for any private or back-door. *Poteſtas habere* poſternam *in omni curia penitus inhibeatur*, *ſed unicus ſit ingreſſus*, &c. Fleta.

Post-facto, *ex.* See Ex *poſt facto*.

Post-fine, a duty belonging to the king for a fine formerly acknowledged before him in his court; paid by the cognizee after the fine is fully paſſed, and all things touching the ſame are accompliſhed.

The rate is ſo much, and half ſo much, as was paid to the king for the *præ fine*; or 10*s.* for every five marks of land, i. e. three twentieths of the ſupoſed annual value; and is collected by the ſheriff of the county where the land lies, and to be anſwered by him into the exchequer.

Post-*horſes*. By 20 Geo. III. cap. 51, repealing 19 Geo. III. cap. 51. ſeveral duties are charged upon horſes and carriages travelling *poſt*, under the management of the commiſſioners of the ſtamp-duties. Every *poſt*-maſter, innkeeper, or other perſon, who lets horſes for travelling *poſt*, by the mile, or from ſtage to ſtage, or who, being a perſon uſually letting horſes to hire, lets to hire for a day, or any leſs period of time, any horſe for drawing a carriage uſed in travelling *poſt*, ſhall pay 5*s.* for an annual licence, which ſhall be only for one horſe, marked with the words, *Licenſed to let poſt-horſes*; under a penalty of 5*l.* Moreover, for every horſe hired by the mile or ſtage, to be uſed in travelling *poſt*, there ſhall be charged a duty of one penny for every mile; and for every horſe hired for a day or leſs time, one penny a mile, if the diſtance be aſcertained; or if the diſtance be not aſcertained, the ſum of 1*s.* 6*d* for each horſe; and ſuch duty to be paid by the hirer of the horſe to the perſon who is licenſed to let; delivering a ſtamp-office ticket ſpecifying the day of the month and the number of miles for which the horſe or horſes are hired, or the manner in which they are hired, under the penalty of 10*l.* and the charge of the duty.

This ticket ſhall be delivered to the keeper of the firſt turnpike-gate through which the traveller paſſes, for which an exchange ticket ſhall be returned, which ſhall be ſhewn at every other turnpike; and every gate-keeper ſhall bring the tickets received by him to the collectors of thoſe duties, on pain of 5*s.* for each ticket.

Licenſed perſons ſhall, at the time of receiving their firſt licence, give bond to the king of 50*l.* that they will redeliver when required, their ſtamp-office tickets, with a correſponding faithful account, under the penalty of being refuſed a licence for the future. Thoſe who reſide in London or Weſtminſter, ſhall deliver their account on the firſt Tueſday or Wedneſday in every month, and thoſe within five miles, or within the bills, ſhall ſurrender their account on the firſt Thurſday or Friday in every month, or at ſuch times as the commiſſioners appoint; and within eight days pay the ſum due thereon, under penalty of 10*l.* and double the amount of the money due. Thoſe not reſiding within the bills ſhall deliver their account for the week, ending on the Saturday preceding, under the ſame penalty, at the times and places mentioned in the licence firſt granted, and in the receipt given by the collector, to perſons authoriſed by three commiſſioners, and pay the money due: and all licenſed perſons ſhall be allowed 3*d.* in the pound, out of the monies paid by them; and any fraud ſhall incur a forfeiture of 20*l.* Forging a ticket incurs a forfeiture of 50*l.*

Perſons keeping diligences and coaches for conveying paſſengers, not exceeding four, ſhall pay anually 5*s.* for a licence, indemnifying only one carriage; or forfeit 5*l.* for each time ſuch carriage is uſed without a licence. They ſhall alſo give 20*l.* bond faithfully to account and pay; and mark on the outſide pannel of each door, their chriſtian and ſurnames, mentioning the place from which they ſet out, and to which they are going. And every ſuch diligence ſhall be charged with the duty of a half penny for every mile the ſame ſhall travel, to be paid by the owner on the firſt Mondy in every month, under a penalty of 5*l.*

POSTHUMUS, or **Posthumous**, compoſed of *poſt*, and *humus*, *ground*, a child born after the death of his father, or taken out of the body of a dead mother.

By 10 and 11 Will. III. cap. 16. it is enacted, that *poſthumous* children ſhall be capable of taking in **remainder**.

in the ſame manner as if they had been born in their father's life time; that is, the remainder is allowed to veſt in them while yet in their mother's womb.

Among the Romans, *poſthumus* was alſo uſed for a child born after the making of a teſtament, which occaſioned the teſtator to alter it.

Posthumous is alſo applied figuratively to the works of an author that were not publiſhed till after his death, or interment.

POSTICUM, in *Architecture*, the poſtern gate or back-door of any fabric.

POSTICUS *peronæus*, *ſerratus* Posticus, *tibialis* Posticus. See Peronæus, Serratus, Tibialis.

POSTIL, Postilla, a name anciently given to a note, or remark, written in the margin of the Bible; afterwards alſo to a note written in any other book poſterior to the text.

Trivet in his Chronicle, ſpeaking of Step. Langton, archbiſhop of Canterbury, ſays, *Super Bibliam* poſtillas *fecit, &c. eam per capitula, quibus nunc utuntur moderni, diſtinxit:* that Alexander, biſhop of Cheſter, *ſuper pſalterium* poſtillas *ſcripſit*. Knighton, another of our hiſtorians, ſpeaking of one Hugo, a Dominican and cardinal, ſays, *Totam Bibliam* poſtillavit.

POSTING, among *Merchants*, the putting an account forward from one book to another; particularly, from the journal or waſte book into the ledger.

POSTIQUE, formed from the Italian *poſticcio*, *added*, &c. in *Architecture*, &c. an ornament of ſculpture is ſaid to be *poſtique*, when it is ſuperadded after the work itſelf is done.

A table of marble, or other matter, is alſo ſaid to be *poſtique* when it is incruſtated in a decoration of architecture, &c.

POSTLIMINIUM, Postliminy, among the Romans, the return of one who had gone to ſojourn elſewhere, or had been baniſhed, or been taken by the enemy, to his own country and ſtate.

It was thus called, according to Aul. Gellius, from *poſt*, *after*, and *limen*, *threſhold*; q. d. a return to the ſame bounds, or threſhold. Though others after Amm. Marcellinus, will have it ſo denominated, becauſe perſons were reſtored into the houſe through a hole in the wall, *poſt limen*, not by going over the threſhhold, which was eſteemed ominous.

Postliminium was alſo a law, or action, whereby one recovered an inheritance, or other matter, that had been loſt, from a ſtranger or enemy.

POSTMAN, in the *Court of Exchequer*. See Precedence.

POST NATI, in *Our Statutes*, is particularly uſed for ſuch perſons as were born in Scotland, after the acceſſion of king James I. to the crown of England.

7 Jac. I. it was by all the judges ſolemnly adjudged, that ſuch perſons were no aliens in England; as, on the contrary, the *ante-nati*, or thoſe born in Scotland before that acceſſion, were aliens here in reſpect to the time of their birth.

Post-natus is alſo uſed by Bracton, Fleta, Glanville, &c. for the ſecond ſon, as diſtinguiſhed from the eldeſt. Thus in Brompton, lib. ii. *Eſt conſuetudo in quibuſdam partibus, quod* poſt-natus *præfertur primogenito*.

Post-*office*. See Post, *ſupra*.

POSTOMIS, among the *Ancients*, a barnacle or iron inſtrument fixed on the noſe, or put into the mouth of a horſe to make him quiet.

POSTPONING, the putting any thing after, or behind another, with regard either to the order of time or place. Sometimes it is taken in an ill part; as when we ſay, the bookbinder has *poſtponed* a ſheet, &c. out of a book.

POSTSCENIUM, in the *Ancient Theatre*. See Parascenium.

POSTSCRIPT, an after-thought, or article added to a letter, or memoir; containing ſomething learnt or recollected after the ſubſcription or concluſion of the piece.

It is uſually marked thus, P.S. The Spectator obſerves, that a woman's mind is ever better learnt from her P. S. than her letter.

POST-PREDICAMENTS, in *Logic*, are certain general affections, or properties ariſing from a compariſon of predicaments with each other; or modes following the predicaments, and often belonging to many.

Such, according to Ariſtotle, are *oppoſitum*, *prius*, *ſimul*, *motus*, and *habere:* the three firſt of which are in all *predicaments*.

POST-TERM, or Post-terminum, a fee, or penalty, taken by the cuſtos brevium of the court of common pleas, for the return of a writ, not only after the day, but after the term or time in which ſuch writs are returnable: for which the cuſtos brevium has twenty pence.

POSTULATE, Postulatum, in *Mathematics*, a clear, evident propoſition; wherein it is affirmed, or denied, that ſomething may, or may not be done. See Proposition.

A thing immediately deduced from the conſideration of one ſingle definition, if it expreſs ſomething to agree or diſagree to another is called an *axiom*. If it affirm, that ſomething may or may not be done, it is called a *poſtulate*.

Thus, e. gr. from the geneſis of a circle, it is evident, that all right lines drawn from the centre to the circumference, are equal; ſince they only repreſent one, and the ſame line in a different ſituation: this propoſition, therefore, is eſteemed an axiom. See Axiom.

But, ſince it is evident from the ſame definition, that a circle may be deſcribed with any interval, and from any point, this is accounted a *poſtulate*.

Axioms and *poſtulates*, therefore according to ſome, ſeem to have nearly the ſame relation to each other that theorems and problems have. Axioms being conſidered as indemonſtrable theoretical truths, and *poſtulata* as indemonſtrable practical truths.

But others will have it, that axioms, or common notions are primitive, and common to all things partaking of the nature of quantity, and which therefore may become the objects of mathematical ſcience, ſuch as number, time, extenſion, weight, motion, &c. and that *poſtulata* relate particularly to magnitudes ſtrictly ſo called, or to things having local extenſion, ſuch as lines, ſurfaces, and ſolids; ſo that in this ſenſe of the word *poſtulatum*, Euclid, beſides axioms, or thoſe principles which are common to all kinds of quantity, has aſſumed certain *poſtulata* to be granted him, peculiar to extenſive magnitude. Hence ſeveral of the principles aſſumed in his elements, and ranked among the axioms by the moderns are by Proclus ranked among the *poſtulata*; which has induced Dr. Wallis to judge, that the laſt of the two ſenſes given to the term *poſtulatum* is moſt agreeable to the meaning of the ancient geometers. And thoſe who contend for this ſenſe of the word, add, that Euclid, in *poſtulating* to draw a right line from one point to another, does not mean that any man can actually do this, but only that it may be conceived as poſſible. So that *poſtulata* are axioms no leſs than the other principles aſſumed in the elements of geometry, but axioms relating to a particular ſubject, and not common to all. Wallis's Oper. vol. i. p. 667. 668. See Principle.

POSTULATION, Postulatio, in the *Common Law*, the nomination of a perſon to a dignity in the church, to which, by the canons, he cannot be elected; as, for want of age, of birth, becauſe already poſſeſſed of a benefice incompatible therewith, or for the like impediment.

Thus the formal election of ſuch a perſon being faulty, they are obliged to proceed by way of *poſtulation*; that is, the chapter beſeeches the perſon to whom the confirmation of the election belongs, to approve of it, though it be not canonical. See Election.

The perſon to whom the ſupplication is made by the proteſtants in Germany, is the emperor; by the papiſts, the pope.

Wicquefort obſerves, that when a part of the chapter elects, and another *poſtulates*, the number of *poſtulants* muſt be twice as great as that of the electors, to bring the matter to a *poſtulation*.

POSTURES *of the body*. The continued unnatural *poſtures* of the body, are the occaſions of many very unhappy effects in the human frame; crookedneſs in ſhape is very frequently the conſequence of them.

And it is no uncommon thing to ſee ſchool-boys, who are forced to be continually bending to write upon their knee, or upon a low form, very terribly afflicted by means of the compreſſion which that unnatural and continued *poſture* has given the lower part of the breaſt and the viſcera contained in the epigaſtrium; and particularly thoſe unhappy youths, who, from being ſhort-ſighted, are expoſed to a greater degree of ſtooping than the reſt, have been found terribly afflicted with diſorders of the breaſt and of the lower belly.

On applying for relief in theſe complaints, the phyſician uſually forgets to enquire into the cauſe, and hearing nothing of the continued bending *poſture* of the body, which is the occaſion of all the diſorders, the medicines he gives proves ineffectual with ſome, and with others greatly heighten the diſorder.

But when the preſcriber will be at the pains of informing himſelf of the cauſe in theſe caſes, and forbid the continuance of the *poſture*, which has been the ſole occaſion of them; nature alone will often make the cure, or if not alone, yet very often with this caution the methods will prove ſucceſsful, which were ineffectual, or even hurtful without it.

Posture, in *Painting* and *Sculpture*, the ſituation of a figure with regard to the eye, and of the ſeveral principal members thereof with regard to one another, whereby its action is expreſſed.

A good part of the painter's art conſiſts in adjuſting the *poſtures*; in giving the moſt agreeable *poſtures* to his figures; in accommodating them to the characters of the reſpective figures, and the part each has in the action; and in conducting and purſuing them throughout.

Poſtures are either *natural*, or *artificial*.

POSTURES, *natural*, are ſuch as nature ſeems to have had a view to in the mechaniſm of the body; or rather, ſuch as the ordinary actions and occaſions of life lead us to exhibit while young, and the joints, muſcles, ligaments, &c. are flexible.

POSTURES, *artificial*, are thoſe which ſome extraordinary views or occaſions lead us to exhibit. Such, e. gr. are thoſe of our *balance* and *poſture-maſters*.

A painter would be ſtrangely puzzled with the figure of Clark (a famous *poſture-maſter* of Pall-mall), in a hiſtory-piece. This man, we are told in the Philoſ. Tranſ. had ſuch an abſolute command of his muſcles, &c. that he could diſjoint almoſt his whole body; ſo that he impoſed on that great ſurgeon Mullens, who looked on him to be in ſuch a miſerable condition, he would not undertake his cure. Though a well-made man, he would appear with all the deformities imaginable; hunch-backed, pot-bellied, ſharp-breaſted, &c. He diſjointed his arms, ſhoulders, legs, and thighs; and rendered himſelf ſuch an object of pity, that he has frequently extorted money, in quality of a cripple, from the ſame company he had the minute before been in, in quality of a companion. He would make his hips ſtand a conſiderable way out from his loins; and ſo high as to invade the place of his back. Yet his face was the moſt changeable part about him, and ſhewed more *poſtures* than all the reſt.

POT, in our *Old Writers*, a head-piece of war. It is mentioned ſtat. 13 Car. II. cap. 6.

POTS, *fire*. See FIRE-*pots*.

POTS, *glaſs*. See GLASS-*pots*.

POT, *hotch*. See HOTCH *pot*.

POT, *white*. See WHITE.

POTABLE, *potabilis*, ſomewhat that may be taken, or ſwallowed by way of drink.

The chemiſts talk much of *potable* gold, *aurum potabile*. See AURUM, and GOLD.

POT-ASHES are properly the lixivious aſhes of certain vegetables, uſed in the making of glaſs and ſoap.

Such are the aſhes of the herb kali, called alſo ſalt-wort, glaſs-weed, &c. from its great uſe in glaſs-making.

Pot-aſhes are alſo called *cineres clavellati*, and make the baſis of ſalt of tartar, and moſt of the lixivial ſalts, as our chemiſts ſometimes manage them for cheapneſs.

The Engliſh and Dutch make a conſiderable commerce of *pot-aſhes*, which they bring from about the Black Sea; uſing great quantities thereof in the preparation of their cloths, &c. thoſe aſhes being found excellent for ſcouring.

POT-ASHES is alſo a denomination popularly applied to all kinds of wood aſhes bought in all parts of the country, and mixed together, for the making of green-glaſs: or more generally it denotes an alkaline ſalt, of that kind called the vegetable alkali, obtained from moſt vegetables by burning or incineration.

The art of reducing vegetables to this ſtate is a very valuable one; the ſoap-maker, fuller, ſcourer, dyer, and glaſs-man, as well as the chemiſt and apothecary, depending greatly on it in many particulars.

The authors who are farther to be conſulted in this caſe, are Glauber, in his Proſperity of Germany; but the chemical foundation of the whole appears in Boerhaave's chemiſtry, and the papers of Stahl on this ſubject.

The moſt common method of making *pot-aſh* is by burning large piles of wood, lixiviating the aſhes by boiling in copper-veſſels, decanting the lixivium when clear, and boiling it in other copper-veſſels or *pots*, till the liquor be evaporated, and a reddiſh ſolid ſalt obtained, called black *pot-aſh*, which by calcination in ovens with a heat not intenſe enough to fuſe it, is dephlogiſticated and rendered white. If any of it has been fuſed, it will have a greeniſh blue colour.

Another method of preparing *pot-aſh*, and which may be conveniently uſed in a large manufactory of it, is deſcribed by Kunckel. The aſhes of wood are put into a large tub, near the bottom of which is inſerted a cock; and to prevent the aſhes from filling up the cock, the bottom is covered with ſtraw and pieces of ſmall wood. Water is to be poured on the aſhes, and the next day is to be let off through the cock into another veſſel. The aſhes may again be elixated with more water till all the ſalt be diſſolved. The weaker leys are to be poured on freſh parcels of aſhes till they can receive no more ſalt. The ley is then to be evaporated in an iron pan, and the brown ſalt is to be dephlogiſticated by calcination in a furnace or oven with a heat not intenſe enough to fuſe it. Some perſons ſoak ſtraw in the ley obtained by lixiviating wood-aſhes with water, and by drying and burning this ſtraw they obtain a ſalt without the trouble of boiling the ley. But as *pot-aſh* is made in various ways, of different materials, there appear to be different kinds of it poſſeſſing different qualities.

This ſalt has been made in New England in conſiderable quantities from rotten wood. What gave the occaſion of knowing it, was, that a white oak in that province decayed, and a third part of its ſubſtance became rotten. This rotten part was tried to burn, and was found to turn almoſt wholly into a fine alkali ſalt, or *pot-aſh*, much ſtronger than that which is made in the uſual way. What was moſt obſervable in the making of this ſalt was, that while the wood was burning, it would melt of itſelf, and run down into hard lumps of ſalt; and this, none of the wood of the ſame tree, which was ſound, would do, but only the rotten part: and what was moſt rotten of all, yielded the greateſt quantity of ſalt; and that the moſt readily: whereas all the common alkali ſalts of wood, made by incineration, are blackiſh at firſt; and a lixivium made of them, although often filtered, will ſtill be of a brown colour, occaſioned by ſome of the charcoal of the wood ſo cloſely united to the ſalt as not to be eaſily ſeparated from it. This alkali made from rotten wood was very white, even before ſolution; and the lixivium made with it was not at all tinged with brown, but clear, like pure water, only a very ſmall quantity of aſhes ſubſided to the bottom. The lixivium was eaſily decanted from this, without the trouble of filtration; and, when evaporated to a dryneſs, left the ſalt perfectly fine and pure. In the making this ſalt, as the fire grows more intenſe, the wood is ſeen to run together in great lumps, and bubble with a hiſſing noiſe.

The weight of the *pot-aſh*, prepared in the common way, is very inconſiderable, in proportion to the wood uſed; but in this, the ſalt nearly equals the whole weight of the wood.

In the common way of making the *pot-aſh*, the ſalt is never diſtinguiſhed by the eye among the aſhes, nor even cauſes them to run into lumps; but in this caſe the ſalt always runs into large lumps, and is as eaſily diſtinguiſhed from the reſt of the aſhes, though white as ſalt of tartar of the pureſt kind would be.

It is very certain, that rotten wood in many places has been found, on trial, to yield much leſs ſalt than ſound wood; but the ſound wood of this tree being tried, was found to yield no more ſalt than other wood, and conſequently much leſs than the rotten part of it. On examining this tree on the ſpot, it was thought by good judges, that it had been at ſome diſtance of time ſtruck with lightning, it being evidently torn from the top to the bottom: on that ſide where the decayed part ſeparated from the ſound, there had been a channel of about five inches wide all the way down; but this was cloſed over by ſucceeding bark, and ſhewed no trace of the accident, till on examining underneath, where the tree was found black for ſuch a ſpace, and the bark not of a piece with the reſt.

From this it may be conjectured, that the wood, having been for ſome long time, as till the growth of this bark, expoſed to the wind and weather, naturally became rotten from the wet it received; and that the lightning having penetrated the wood, had ſo altered and diſpoſed the parts and pores of it, that they attracted and retained the nitrous ſalts of the air in great abundance, even as ſalt of tartar, and other the like ſalts do; which, as Glauber obſerves, will be reduced, in continuance of time, to an abſolute nitrous ſalt, and the quantity alſo conſiderably increaſed.

The parts of this rotten wood were of a very different ſtructure from thoſe of ordinary wood in this condition; and though the lightning had not calcined it into a ſalt, yet it had, as appears, ſufficiently altered it to give that tendency to imbibe, and a power to retain the nitrous particles from the air, as well as the alkalies of vegetables perfectly calcined will do.

If it ſhould be objected, that nitre alone will not calcine into an alkali, it is eaſily anſwered, that nitre with charcoal will; and the remaining wood might very well ſerve as charcoal in this proceſs. Phil. Tranſ. Nº 366, p. 121.

Some ſort of *pot-aſhes* have been found to contain a large quantity of ſea-ſalt, which is probably mixed with them by the makers; not only as it is much cheaper, but as it makes them whiter, and more eaſily run into large maſſes. Med. Eſſ. Edinb. Abr. vol. i. p. 165. Not.

The French have two kinds of *pot-aſh*, the produce of their own manufactures; the method of making which M. du Fay, of the academy at Paris, deſcribes in the following manner.

The firſt, which is the common or coarſer kind, is made of the beech or elm; the firſt of which trees they always find to yield the largeſt quantity.

They cut down the largeſt and full-grown trees, and ſevering them into pieces of ten or twelve feet long, they lay them together in form of a pile, and burn them to aſhes in the open air. They gather up the aſhes, and make a very ſtrong lixivium of them in water; into this liquor they throw pieces of old rotten and ſpongy wood, which is, from its texture, capable of imbibing a great quantity of humidity: they uſe ſo many of theſe pieces as are ſufficient to ſoak up the whole quantity of their lixivium. When this is done, they dig a ſquare pit in the earth; over which they lay ſome iron bars to ſuſtain a quantity of dry wood, to ſerve as fuel. When they have laid together a ſufficient quantity of this, they pile upon it the rotten billets which have imbibed the lixivium; and when the dry wood underneath is ſet on fire, and heats the top of the pile, the lixivium loſes its water by the heat, and the ſalt contained in it is ſeen running down through the fire, in form of a ſhower: this is received in the pit made on purpoſe for it. When all is melted out of the billets at firſt laid on, they bring others which the fire acts upon in the ſame manner; and ſo on, till the whole pit is filled with *pot-aſh*.

When this is done, they remove the fire as quickly as they can; and with rakes clear the ſurface of the *pot-aſh* as well as they can from pieces of charcoal and aſhes which have fallen into it: but, with all their care, they are not able to prevent a great deal, both of coals and aſhes, remaining in it; as is eaſy to conceive from the manner of the proceſs. The ſalt after this forms one ſolid cake or maſs, and this they dig up out of the pit while it is yet hot; and barrel it up for fear of its receiving damage from the humidity of the air, which it is very ready to imbibe. This is the French *pot-aſh* of the common or coarſe kind.

The finer or purer kind is made of the ſame wood with the other, and the proceſs is conducted in the ſame manner, ſo far as to the making of the lixivium; but when this is prepared, inſtead of ſoaking it up with rotten wood, they pour it off into an iron caldron of a large ſize, and evaporate it, ſtill adding more lixivium as the former boils away, till they have employed all they have made; they then continue the fire till the whole humidity is evaporated: they then take the dry maſs of ſalt out of the bottom of the veſſel, and put it into a furnace made with a cloſe arched top; by means of which the flame is reverberated from all parts upon the ſalt. They here give it ſo much fire as ſerves to calcine it to a whiteneſs, and then the whole operation is finiſhed.

It is ſeldom, however, quite white: but uſually retains ſomewhat of the colour it had before its calcination. This the workmen ſay is owing to the nature of the wood the aſhes were made from. They ſay that thoſe trees which grow on the tops of high hills, yield a *pot-aſh* of a pale blue colour; and thoſe which grow in wet marſhy places, yield a reddiſh ſalt. Trees which have ſtood in other ſoils and ſituations, they ſay, yield a white *pot-aſh*; but they obſerve, that none yield it in ſo large a quantity as thoſe which grow on the tops of mountains. Mem. Acad. Par. 1727.

In France, and other countries where they make wine, they prepare a kind of *pot-aſh* in an eaſy manner from the lees of their wine.

In ſome parts of Germany, *pot-aſh* is prepared from the ſame wood of which charcoal is made. A number of tubes, made of plate iron, or of copper or braſs, are ſo diſpoſed in the pile of wood intended to be burnt into charcoal, that the water, acid, and oil, which are obtained in the ordinary method of diſtilling wood, ſhall, when ſeparated from the wood by fire, paſs through theſe tubes into buckets placed to receive theſe liquors. The oil is then to be ſeparated from the acid liquor, which is afterwards to be boiled in copper or iron veſſels, and the reſiduum dried and calcined. By this calcination, the acid ſalt is alkalized.

Some years ago Mr. Stephens, encouraged by the Society of Arts, &c. and by a parliamentary grant of 3000*l.* eſtabliſhed a manufacture of *pot-aſh* in North-America, which produced ſuch as was ſo perfectly good as to anſwer in bleaching, and other uſes, the purpoſes of PEARL-*aſh*, and which, at the ſame time, afforded a very large produce.

But the very great degree of heat, which his proceſs required, occaſioned the deſtruction of a very expenſive apparatus; and other circumſtances concurred to diſappoint the hopes and check the ſpirit of the proprietors. The manufacture was, however, afterwards undertaken and proſecuted by others.

Mr. Stephens's proceſs was as follows: pieces of timber about eight feet long, were laid lengthways in heaps containing from three to ten of them, upon dry ground, and the vacancies between them filled with ſmaller wood. The ſooner the timber is burnt after felling, he ſays, the better. In order to ſet fire to the heaps, he directs to lay embers on the bottom logs at each end; and for burning the bruſh and loppings with other ſmaller woods, to lay them lengthways on the ground, top to top, and as cloſe as a faggot, with the larger woods upon them, till the heap is full four feet high: the length of the bruſh ſet againſt each other making the breadth of the heap.

As to the choice of the timber, old hollow trees, if not dead, are beſt; pine, cypreſs, and cedar, are to be totally rejected. As ſoon as the pile is burnt down, he directs to rake ſuch aſhes as lie round the outſide towards the middle, without adding any freſh fuel or throwing on any brands. In this ſtate the aſhes are to lie without ſtirring, till you can juſt bear your hand in them: then carry them to a houſe, or under a ſhed, on a plank floor raiſed a little from the earth, and well jointed; there wet them, till they are brought nearly to the conſiſtence of mortar in the firſt mixture of lime and ſand, and ram them in a heap, in which they muſt lie full twenty days, or even ſome months if it be thought proper; obſerving to be more ſparing of water in winter, and ramming them cloſer, and ſometimes wetting the top that it may never become quite dry.

Wood may alſo be burnt in a kiln, and then it muſt be cut into ſuch lengths, as beſt ſuit the kiln and the mode of carriage. The mouth of the aſh-hole muſt be cloſe ſtopped, by daubing the joints of the lid with loam, or throwing a bank of ſand or earth againſt it: keep the bed of the kiln filled with wood up to the ſurface, and let it burn inceſſantly, till the aſhes riſe within ſix or eight inches of the grate. Draw them out whilſt red hot, and in that ſtate ſprinkle them with ley, from four to ſix caracts weight till they are made damp; then ram them as before in a heap by themſelves.

N. B. The caract weight is obtained by weighing a ſmall phial which holds about four ounces, filling it with water, and then weighing it; and dividing the weight of water into equal parts; and a caract is $\frac{1}{128}$ of the whole.

The aſhes thus prepared are to be put in vats or ſteepers with a falſe latticed bottom; firſt putting coarſe wheat or rye ſtraw about a foot thick on the lattice or grating; on which put aſhes to within four or five inches of the top, ramming them all the way up, eſpecially at the ſides, with a ſmall light rammer as tight as poſſible, without burſting the vat. Form on the top of the ſteeper, a hollow baſon in the aſhes four or five inches deep, leaving the aſhes four or five inches thick on the ſides; keep this baſon conſtantly filled with ſoft water in one ſteeper, till the aſhes will imbibe no more, which will be in twenty-four hours or more, according as it is rammed; then turn the cock and let off what ſhall be ſoaked through into the receiver or lower chamber of the ſteeper, and no more. Follow that ſteeper with freſh water on the ſame aſhes, for ſeveral other runnings, which will come off in a few days, till the liquor has neither ſmell nor taſte; then heave out the aſhes, and charge the ſteeper afreſh. Upon drawing off the firſt running from one ſteeper, fill another with aſhes as before, and put into its hollow at the top the ley ſo firſt run off, and the ſmaller or half leys alſo, till full, and draw off as before. If this weighs eighteen caracts or more, pump it into a ciſtern, as fit for uſe: if it be ſhort of that, paſs it on as half ley to a third ſteeper, and through freſh aſhes till it becomes ſtrong enough. The ley muſt be conveyed from the ciſtern into a veſſel, in which with every gallon of proof-ley mix three ounces of fine light wood aſhes; and to the ley that is $\frac{1}{4}$ over proof, put ſix ounces of aſhes; and if $\frac{2}{3}$ over proof, twelve ounces; increaſing or leſſening according to the ſtrength of the ley.

For evaporating the ley, and melting the ſalt, heat a furnace conſtructed of mortar, made of loam, with an arch eighteen inches thick, and a floor laid with tiles on a layer of ſand an inch thick, with neat joints, till you bring it very near a white heat, of which the ſide doors being red hot is a mark. This will take forty-eight hours, or more, if the furnace be quite cold. Then through the cock of the veſſel, containing the ley, paſs the mixture by a funnel into the furnace; ſo as not to reach much beyond the middle of the floor, before it changes from dark to bright red, letting the heat prevail towards front or back as you ſee neceſſary. When the maſs begins to gather about the flues or in heaps, run in no more till the furnace is cleared by driving the fire backward. In an hour or leſs there will iſſue out a red hot ſtream of melted ſalt, which is *pot-aſh*; to be broken to pieces as ſoon as cold, and packed in tight, cloſe caſks; being in no reſpects inferior to the beſt foreign aſh whatever. See Mr. Stephens's Method and plain Proceſs for making *Pot aſh* equal, if not ſuperior to the beſt Foreign *Pot-aſh*. 4to.

The method of making the beſt Ruſſia *pot-aſhes*, as it is deſcribed by ſir Peter Warren, is as follows: the beſt woods for this purpoſe are oak, aſh, poplar, hiccory, elm, hazle, and beech; which muſt be cut from November to February, ſplit and ſtacked to dry. After twelve months in warm open weather, it muſt be burnt on a brick hearth by a ſlow fire in a kiln or cloſe place: the aſhes muſt be ſifted through two ſieves, one finer than the other, and then put up in brick troughs or wooden backs, covered with rain or river water, and remain well maſhed and incorporated five months. Brick furnaces, ſhaped like baker's ovens, muſt be heated with a ſtrong fire of oak or aſh, burning night and day; the prepared aſhes muſt be gradually thrown on the fire, when they will run into metal like lead; nor muſt the fire go out till the furnace is almoſt filled with *pot-aſhes*. The aſhes muſt then be broken to be taken out, but the larger the pieces the better: they muſt be preſerved from the air in tight caſks, the large pieces by themſelves, and the duſt by itſelf.

In Sweden they purſue the following proceſs: the wood they uſe is beech or elder, of which they take the old and decayed trees, cutting them in pieces, and piling theſe in a heap, in order to burn them to aſhes, upon the ground, by a ſlow fire. They carefully ſeparate theſe aſhes from the dirt or coals in them, which they call raking them; after which they collect them in baſkets of bark, to carry them to a hut built in the woods for this purpoſe. Having made a part of theſe aſhes in the ſame manner as mortar is commonly made, they lay a row of green pine or fir-logs on the ground, which they plaſter over with this paſte of aſhes; over this they lay another layer of the ſame ſtraight logs of wood, acroſs the others, which they plaſter over with aſhes in the ſame manner: thus they continue to erect a pile of theſe logs of wood by layer upon layer, and plaſtering each with their paſte of aſhes, till they are all expended; when their pile is often as high as a houſe. This pile they ſet on fire with dry wood, and burn it as vehemently as they can; increaſing the fire from time to time, till the aſhes begin to be red hot, and run in the fire. Then they overſet their pile with poles as quick as they can; and while the aſhes are ſtill hot and melting, they beat and clap them with large round flexible ſticks made on purpoſe, ſo as to incruſt the logs of wood with the aſhes, by which the aſhes concrete into a ſolid maſs as hard as ſtone, provided that the operation has been rightly performed. This operation they call *walla*, i. e. *dreſſing*. At laſt they ſcrape off the ſalt thus prepared, with iron inſtruments, and ſell it for *pot-aſh*, which is of a bluiſh dark colour, not unlike the ſcoriæ of iron, with a pure greeniſh white ſalt appearing here and there in it.

Such is the account of this manufacture, contained in an academical diſſertation upon this ſubject at Aboe, in Sweden, and communicated by Dr. Linnæus to Dr. Mitchell; who obſerves, that all the *pot-aſh* we have from Ruſſia, Sweden, and Dantzick, is exactly like what is here deſcribed, and ſeems to be made in this manner. Of theſe the Ruſſia is the beſt, on account of the greater quantity of ſalt contained in it; which he ſuppoſes to be partly owing to the ſuperior quality of their wood, and to their making the paſte of aſhes with ley, inſtead of water. Phil. Tranſ. vol. xlv. art. 11. p. 541.

The Ruſſia *pot-aſh* is dark coloured, hard, not eaſily deliqueſcible, and contains (as Dr. Lewis ſays) more than half its weight of an earth unſoluble in water.

Scheffer, in the Swediſh Memoirs for 1759, ſays, that from 100 lb. of Ruſſia *pot-aſh* he obtained 92½ lb. of alkaline ſalt, and 7½ lb. of neutral ſalts. Dr. Home found that Ruſſia *pot-aſh* contained a conſiderable quantity of quick lime.

From experiments made by Brandt (Mem. Swed. 1749), and from the preference given to it by ſoap-boilers, it appears to be more cauſtic, and more powerfully to diſſolve oils, than purer *pot-aſh* rendered cauſtic by quick lime. The neutral ſalts found in this *pot-aſh* are chiefly vitriolated tartar, and ſea-ſalt, with which latter ſalt it is frequently adulterated to increaſe its weight.

Although very conſiderable quantities of *pot-aſh* (to the amount, it is ſaid, of no leſs than one hundred and fifty thouſand pound worth), are anually imported into this kingdom from Ruſſia, Spain, &c. we have ſome manufactures of it in our own country; and if the art of making it were properly purſued, we might have many more. The method commonly practiſed by the Engliſh manufacturers is ſaid to be as follows: with the aſhes of fern, or wood of any kind, they make a ley; for this purpoſe they have ſeveral vats, containing from four to eight ſcore buſhels of wood aſhes, with under-becks; into theſe they tread down the aſhes, and lay on a ſufficient quantity of water to run through the aſhes into the under-back. The liquor running from the firſt is laid on a ſecond vat, which is one third ſtronger than the firſt; and the liquor of the ſecond is laid on the third vat, which is alſo one-third ſtronger than the ſecond. When it has thus run through the third vat, the ley, as the liquor is then called, is ſuppoſed to be ſtrong enough for burning; but the ſtrength is proved by weighing it in ſmall quantities. It is then reduced into what is called *pot-aſh* by burning it with ſtraw. To do this, they place a tub full of this ley near a clean hearth of a chimney, in which they dip a handful of looſe ſtraw, ſo as to take up a quantity of ley with it. The ſtraw thus impregnated with ley they carry as quick as they can, to hold it over a blazing fire in the hearth, which conſumes their ſtraw to aſhes, and at the ſame time evaporates the water from the ſalt of the ley. Over the blaze of the firſt parcel of ſtraw they burn another dipt in ley in the ſame manner. This they continue to do till their ley is wholly expended. By this means the coals and aſhes of the ſtraw and ſalts of the ley, are left on the hearth, and concrete together into a hard ſoiled cake of a greyiſh black colour, which they ſcrape off, and ſell for *pot-aſh*.

To make that kind of *pot-aſh*, which is called ſolid or hard, the ley muſt be made as before deſcribed; and then burnt, it is ſaid, with peas or bean ſtraw only. But to make what is called light or comby aſhes, the ley ſhould be ſtronger, and barley, wheat, and clover ſtraw mixed with a little peas ſtraw are preferred. The ſalt thus made is full of the coal of the ſtraw, is not ſo ſtrong, or ſo ſharp and corroſive as that of the foreign *pot-aſh*, that is calcined in an open fire; on theſe and other accounts, it is unfit for ſome purpoſes, and not above half the value of the foreign. However, after the ley, in the above proceſs, has run through the vats a third time, they are emptied, and the aſhes, which are called *pot-aſh* muck, make excellent manure for ſome kinds of ſoil, particularly cold and the looſe wood-cock ſoil: and with this view the manufacture of *pot-aſh* is principally undertaken in ſome parts of the kingdom.

In the North of England they have a different method of reducing their KELP to *pot-aſh* which they uſe for making alum. For this purpoſe they collect the ſea-weeds, dry them in the ſun, and burn them in a kiln, conſtructed of the ſtones found on the ſea-ſhore in a cylindrical form, and about two feet or leſs in diameter. In this they firſt burn a ſmall parcel of the kelp, and before it is reduced to aſhes they throw on more, till the kiln is full, or their materials are expended. This is ſaid to reduce the aſhes to a hard and ſolid cake, by the heat of the kiln and quantity of ſalt in the ſubſtance employed, which makes what is commonly called kelp-aſhes.

From the nature and qualities of *pot-aſh*, as well as from the different proceſſes uſed in the manufacture of it, it is inferred, that the difficulty in making it properly is, firſt to reduce the materials or cinders and aſhes, and at the ſame time to preſerve their volatile, ſulphureous, and exhalable acid parts, that are totally deſtroyed in ſuch a degree of heat; and, ſecondly, to calcine theſe aſhes ſtill farther, ſo as to flux their ſalts, and vitrify their terreſtrial parts, and at the ſame time to keep them ſeparate from each other, or prevent their running into an indiſſoluble glaſs. To give *pot-aſh* ſome of theſe properties ſeems plainly to require a degree of heat that will totally deprive it of others. The moſt likely way by which it may acquire all theſe properties is that of Sweden already deſcribed.

There is a kind of *pot-aſh*, commonly called *barilha*, or BARILLIA, imported from Spain, where it is manufactured from a plant of the ſame name, called by ſome botaniſts *ficoides Neapolitana, flore candido*, by Bauhine *kali vulgare*, but by M. Juſſieu, *kali Hiſpanicum, ſupinum, annuum, ſedi foliis brevibus*, or *Alicant glaſs-wort*. This, he ſays, makes the beſt ſoap, the fineſt glaſs, and is the beſt of any for bleaching. With us it is chiefly or only uſed for making hard ſoap; and the manufacturers ſay it ſpoils their ſoft ſoap by making it curdle; which is a known effect of ſea-ſalt, ſo that the barilha is probably adulterated with ſea-weeds, which contain ſuch a ſalt. A ſcheme has been lately in agitation for eſtabliſhing a manufacture of this ſubſtance from ſalt.

There is another kind of *pot-aſh*, called ROCHETTA, which is ſaid to be preferable to the barilha, eſpecially for making of glaſs. This is produced from the firſt and ſecond kinds of *kali* deſcribed by Proſper Alpinus, in his accounts of the plants of Egypt; the firſt of which is the above mentioned ficoide that grows in Italy and all over the Levant, and the other is peculiar to Egypt. See on this ſubject Phil. Tranſ. vol. xlv. art. 11. p. 541. 563.

As to the origin of that fixed vegetable alkali, called *pot-aſh*, it is diſputed whether it exiſts ready formed in vegetables previouſly to their combuſtion, by which it is obtained, but which only diſengages ſubſtances which envelope and diſguiſe it; or whether vegetables contain only the materials proper for its formation, which conſequently takes place in the act of burning, and whether it be, properly ſpeaking, produced by fire.

The author of the Chemical Dictionary, art. **Alkali**, *fixed vegetable*, ſays, that the reaſons for and againſt theſe two opinions are ſo ſtrong on both ſides, that there are grounds to believe both of them to be true; or, that the fixed alkali, obtained after burning a vegetable, did partly exiſt ready formed in that vegetable before it was burnt, and that the other part was produced by the very act of combuſtion. The alkali prepared by the incineration of vegetable ſubſtances, and by lixiviating and evaporating to dryneſs is far from poſſeſſing that degree of purity, which is always requiſite in exact chemical experiments. It is almoſt always altered, 1. by ſome remaining inflammable principle, from which it may be purified either by calcination or applying to it a body on which it cannot act, and which has a ſtronger affinity than itſelf with this inflammable matter; 2. by a portion of ſuper-abundant earth, which may be eaſily ſeparated from it by drying it once or twice, by ſolutions and filtrations; 3. by the mixture of different ſaline matters, which can be ſeparated by no chemical proceſs but cryſtallization; 4. by mixture with iron, for purifying it from which no practical method is known. See Chem. Dict. ubi ſupra.

We cannot cloſe this article without recommending to the notice of the public a curious diſcovery, and a diſcovery capable of being applied to very conſiderable and extenſive advantage, of a new and cheap method of procuring *pot aſh*: the diſcovery was made by Joſiah Birch, eſq. and is now communicated with obſervations, in the Phil. Tran. vol. lxx. part 2. art. 22. by Dr. Percival, well known for his attention to every improvement in uſeful ſcience. The agriculture ſociety at Mancheſter, has long recommended the making of reſervoirs for the water which flows from dunghills in farm-yards, and applying this water as a manure; of which notice has been already taken under the article of Manuring *of land*.

Mr. Birch, who carries on an extenſive manufactory near Mancheſter, and bleaches his own yarn, was induced to try whether the dunghill water might not be converted into *pot-aſhes*. He accordingly evaporated a large quantity of it, and burnt the reſiduum in an oven; the event ſo far anſwered his expectations, that he has ever ſince continued to prepare theſe aſhes, and to employ them in the operation of bucking: and with a liberality which betokens true greatneſs of mind, he has now made this lucrative diſcovery public.

The proceſs is extremely ſimple, and may be eaſily underſtood by viewing *Tab.* II. *Miſcellany*, *fig.* 31. in which N° 1 repreſents the dunghill; 2, a ſough or drain round it; 3, a reſervoir for the dunghill water; 4, a well communicating with the reſervoir, in which a pump is fixed, to convey it to N°. 7, which is a pan, in which the water is boiled to the conſiſtence of treacle, and afterwards burnt in an oven. The pan is made of iron plates, turned up a little at the edges. To theſe are ſcrewed planks of wood, in order to make it about twenty inches deep. From a quantity of muck water equal to twenty-four wine pipes full, the quantity of aſhes made was 9 cwt. 1 qr. 12 lb. valued at two guineas per hundred; in the manufacture of which, allowing for every expence attending it, there is a clear profit of 15*l*. 4*s*. deducting a trifle for the wear of the pan and oven. Dr. Percival ſuggeſts, that this profit, conſiderable as it is, may admit of increaſe by future improvements: for in ſpring and ſummer ſeaſons, the evaporation might be carried on without the aid of fire, by conveying the dunghill-water from the reſervoir through proper ſluices into ſhallow troughs or ponds, of ſuch extent as to afford a ſufficient ſurface for the action of the ſun and wind. Theſe might be covered in rainy weather with awnings of canvas, painted on the outſide black, and white on the inſide; the former with a view to abſorb, the latter to reflect, the rays of light.

From the experiments of Dr. Percival, it appears, that this *pot-aſh* is of a greyiſh white appearance, deliqueſces a little in moiſt air; but if kept in a dry room, near the fire, acquires a powdery ſurface. It is hard, and of a ſpungy texture when broken, with many ſmall cryſtals in it ſubſtance. The colour of its internal part is duſky and variegated. To the taſte it is acrid, ſaline, and ſulphureous. It emits no ſmell of volatile alkali, either in a ſolid form, diſſolved, or when added to lime-water; neither does it communicate the ſapphire colour to a ſolution of blue vitriol. Silver is quickly tinged black by it, a proof that it contains much phlogiſton. Ten grains of this *pot-aſh* required eleven drops of the weak ſpirit of vitriol to ſaturate them. The like quantity of ſalt of tartar required, of the ſame acid, twenty-four drops: a ſtrong efferveſcence occurred in both mixtures; from the former a ſulphureous vapour was exhaled. A tea ſpoonful of the ſyrup of violets, diluted with an ounce of water, was changed into a bright green colour by five grains of the ſalt of tartar; but ten grains of this *pot-aſh* were neceſſary to produce the ſame hue, in a ſimilar mixture. Half an ounce of the *pot aſh* diſſolved entirely in half a pint of hot water; but when the liquor was cold, a large purple ſediment ſubſided to the bottom: and it was found that this ſediment amounted to about two-thirds of the whole quantity of aſhes uſed.

The ſame ingenious writer concludes with obſerving, that this *pot-aſh* is a true fixed vegetable alkali, produced by putrefaction; that the quantity of alkali contained in it may be eſtimated at one-third of its weight, whereas the white Muſcovy aſhes are ſaid to yield only one-eighth part; that no quick-lime appears to be contained in this *pot-aſh*, for a ſolution of it, poured from its ſediment, remained clear, though long expoſed to the air: that it would be worth trying, whether the large purple ſediment, which ſubſides when this *pot aſh* is lixiviated, might not be applied to the manufacture of *Pruſſian* blue, or uſed in the manner recommended by Macquer for Dying wool and ſilks; and that this manufacture will furniſh the farmer for top-dreſſing for his garden and land, of great fertilizing powers.

Dr. Watſon (the preſent biſhop of Landaff) ſuggeſts, that the inveſtigation of a method of extracting its alkaline part from rock ſalt, would be a moſt ſerviceable diſcovery. We have inexhauſtible mines of rock ſalt in this country, which, (he obſerves) the proprietors can afford at ten ſhillings a ton. A ton of rock ſalt contains about half a ton of mineral alkali, which is for moſt purpoſes far preferable to *pot-aſh*. To thoſe who have leiſure to attempt ſuch a diſcovery, he gives the following hint: whether the alkaline part of rock ſalt may not be obtained by calcining it in conjunction with charcoal in open fires? His reaſon for this conjecture is founded upon the following experiment: upon burning ſea-wrack to a black coal, and ſtopping the proceſs at that point, he has obtained great plenty of common ſalt, but no mineral alkali from the black aſhes; though we are certain, that when the black aſhes are thoroughly calcined, or reduced to white aſhes, mineral alkali may be obtained from them. This makes it probable, that the common ſalt contained in the black aſhes of ſea-wrack, is decompoſed, and changed into a mineral alkali, during the burning of the black aſhes. There are reaſons to ſuppoſe, that the cinder of pit-coal would anſwer the purpoſe better than charcoal. Chem. Eſſ. vol. i. p. 136, &c.

POTAMOGETON, in *Botany*. See Pond-*weed*.

POTAMOPITYS, in *Botany*, a name given by Buxbaum to a new genus of plants, ſomewhat reſembling the limnopeuce in its general external appearance; but greatly differing from that plant in its flower and fruit.

The ſtalk is about four inches high, and is made up of ſeveral joints, fixed in the manner of ſo many cups one into another; the leaves ſtand in form of a ſtar, eight, or thereabout, at every joint: theſe are narrow at the lower part of the plant; but toward the top, they are broader, and ſtand fewer at a joint, ſometimes only two; the flowers grow out of the alæ of the leaves, and are white and compoſed of four petals, diſpoſed in form of a croſs: they ſtand in a four-leaved cup, and have no pedicle; the piſtil occupies the centre of the flower, and is ſurrounded by four ſtamina; the ſeed-veſſels is round, divided into four cells, and filled with ſlender and lunated ſeeds. It flowers in May, and is common in the marſhy grounds in Thrace, near the Boſphorus. Act. Petrop. vol. i. p. 243.

POTATOES, the Engliſh name of the tuberoſe rooted, eſculent lycopersicon or *ſolanum* of botanical writers.

The Engliſh name ſeems evidently formed from *batatas*, the Indian name of the ſame plant.

This plant is ſaid to have been firſt introduced into our country from America, about the year 1623; and the cultivation and uſe of it have been very general for forty or fifty years paſt. Of this there are two varieties, one with a red, and the other a white root: that whoſe roots are red has purpliſh flowers, but the white root has white flowers: theſe are ſuppoſed to be only accidental variations, and not diſtinct ſpecies.

The moſt advantageous way of propagating *potatoes* is the planting them at large diſtances, and digging or horſehoeing the ground ſeveral times between them.

Mr. Tull gives an example of this, in which the hoeing ſucceeded much better than dung, and without the expence of it.

A piece of ground was planted with *potatoes*, the greater part of it in the common way; but in one part, worſe than the reſt, they had been ſet at a yard diſtance every way. The reſt of the ground was dunged; this poor part had no dung, but was ploughed deep at ſeveral times four different ways, ſo that the ground was ſtirred and broken thoroughly every where about the *potatoes*. The conſequence was, that though no dung was uſed here, and though the plants appeared much weaker than in the dung part, yet the crop was greatly better than that of the other part of the field. The roots here were all large, and in the other parts of the field, where the dung had been uſed without ploughing, they were ſo ſmall, that the crop was ſcarce worth taking up.

This is one of many inſtances of the no great uſe of dunging land, without properly ſtirring it up; and ſerves to prove, what the crops of corn and every thing elſe confirm upon trial, that the ſtirring the earth ſufficiently, without any farther trouble, will anſwer better without any other manure, than all the manure in the world without it.

The common way of planting *potatoes* is, either to plant the ſmall roots or offsets entire, or to cut the larger roots into pieces, preſerving a bud or eye to each: but Mr. Miller recommends to make choice of the faireſt roots for this purpoſe, and to allow them a larger ſpace of ground both between the rows, and alſo between one plant and another in the rows.

The ſoil in which *potatoes* are found to thrive beſt, is a light ſandy loam, not too dry, nor too moiſt; which ſhould be well ploughed two or three times, and the deeper it is ploughed, the better will the roots thrive. In the ſpring, juſt before the laſt ploughing, a good quantity of rotten dung ſhould be ſpread on the ground, which ſhould be ploughed in the beginning of March, if the ſeaſon be mild, or towards the latter end of the month, if there be probability of froſt. In the laſt ploughing the ground ſhould be laid even, and then the furrows ſhould be drawn at three feet diſtance from each other, and, about ſeven or eight inches deep. In the bottom of this furrow the roots ſhould be laid at about a foot and a half aſunder; then the furrow ſhould be covered in with the earth. About the time when the ſhoots are expected to appear above the ground, it ſhould be well harrowed over both ways in order to break the clods, render the ſurface ſmooth, and deſtroy the young weeds. The hoe-plough may be likewiſe introduced among the rows; and this operation ſhould be repeated twice, early in the ſeaſon before the ſtems of the plants begin to trail upon the ground: and a hoe may be made uſe of to ſtir the ground and deſtroy the weeds between the plants in the rows. The haulm of *potatoes* is generally killed by the firſt froſt in autumn, when the roots ſhould be taken up, and laid by in a good quantity of ſand or dry earth, under ſhelter, where they may be kept both from wet and froſt.

Here we muſt not omit to mention a new kind of *potatoe*, firſt brought from America, which John Howard, eſq. (a gentleman well known not only in our own country, but in moſt countries in Europe, for his zeal in viſiting the priſons of different nations, and promoting the great intereſts of humanity), cultivated in 1765, at Cardington, near Bedford: he firſt ſet theſe *potatoes* in hillocks about ſix feet aſunder; and the produce from each cutting was about 26 to 27½ lb. many of the ſingle *potatoes* weighing four or five pounds each. In the following year he planted them in drills three feet aſunder, and three feet from each other, when their produce was from 22 to 30lb. from each cutting, and the *potatoes* were more ſizeable for common uſe: and allowing the cuttings to weigh one ounce, the increaſe was full four hundred fold. Having thus ſucceeded in his own attempts, he promoted the propagation of this ſpecies of *potatoe* not only in his own neighbourhood, but in adjacent counties.

The increaſe of this *potatoe* exceeds that of the common ſort, at the moſt moderate and loweſt eſtimation on all ſoils, full three times, and in ſome caſes at leaſt ſix times. This ſuggeſts an obvious advantage attending the culture of this *potatoe*, viz. that farmers, who have not land naturally rich, or who cannot ſpare much manure, may yet be able to cultivate this kind, and even with greater profit than thoſe who raiſe the common kind on rich land. Beſides, as theſe *potatoes* grow cloſer together, and nearer the ſurface of the earth than thoſe of the common kind, the land may be more eaſily and effectually cleared from them, in order to make it fit for a ſucceeding crop of another kind. Hogs and cattle are likewiſe found to prefer them to the common ſort; and they are more nutritive than the others; being more ſolid and ſweet, and containing more farina or flour. They ſeem fitted, therefore, to anſwer the purpoſes of rearing, feeding, or fattening cattle and hogs. As an eſculent plant, they are alſo worthy of cultivation. When boiled thoroughly, they are equally well taſted and white with the common *potatoes*, though when under boiled, they have ſomewhat of the ſweetneſs of the Jeruſalem artichoke, and retain their reddiſh colour. When roaſted all allow them to be preferable to the common kinds.

We ſhall only obſerve, that this kind of *potatoe* has been brought over at different times, and cultivated, though in a very ſmall degree and more for curioſity than uſe, in different counties; particularly in Dorſetſhire and Northumberland.

Potatoes, *Spaniſh*, a name given to ſeveral ſpecies of the CONVOLVULUS or bind-weed.

POTENT, or Potence, in *Heraldry*, a term for a kind of a croſs, whoſe ends all terminate like the head of a crutch.

This is otherwiſe called the *Jeruſalem croſs*; and is repreſented in *Tab.* II. *Heraldry, fig.* 47.

He beareth ſable, a croſs *potent*, or, by the name of *Aleyn*.

Potent, *counter-potent*. See Counter-*potent*.

POTENTIA, Power, that whereby a thing is capable either of acting or being acted upon. See Power.

Potentia, *to exiſt in*, is uſed among ſchool-writers to denote that exiſtence which a thing has in a cauſe capable of producing it, but which has not as yet actually produced it. In which it ſtands oppoſed to exiſtence *in actu*.

POTENTIAL, *potentialis*, in the *Schools*, is uſed to denote and diſtinguiſh a kind of qualities, which are ſuppoſed to exiſt in the body *in potentia* only; by which they are capable, in ſome manner, of effecting and impreſſing on us the ideas of ſuch qualities, though not actually inherent in themſelves.

In this ſenſe we ſay, *potential heat*, *potential cold*, &c. Brandy and pepper, though cold to the touch, are *potentially* hot.

Potential *cold* is a relative term, by which we mean, that ſuch a thing is not actually cold to the touch, but in its effects and operations, if taken inwardly.

This quality is ſuppoſed to ariſe from the ſize, ſhape, &c. of the component particles of a body, which give ſome check or retardation to the blood's motion, whereby it is leſs agitated, and upon which the ſenſible parts of the body are not ſo briſkly ſtruck by it; the perception of which diminution or change of motion in the organs of feeling, is called *cold*.

Hence every thing that leſſens the blood's motion, with relation to the ſenſation before made, is cold; and every thing which increaſes it, may be called *potentially hot*.

Potential, in *Medicine*, &c. Cauteries are either actual, viz. a button of red-hot iron; or *potential*, as lime, and other cauſtic drugs.

Potential *calcination*. See Calcination.

Potential is alſo uſed by ſchoolmen, for ſomething that has the quality of a genus.

A *potential* whole is that which has its parts under it, as a genus has its ſpecies; to diſtinguiſh it from an *actual* whole, which has its parts in itſelf; as a body compoſed of matter and form.

Grotius, with a view to this diſtinction, uſes the phraſe, *potential parts of a ſtate*, in oppoſition to the *ſubjective parts*.

By *potential*, he means thoſe parts poſſeſſed of the ſovereign power; by ſubjective, thoſe ſubject thereto; which are that with regard to the ſovereign power, that ſeveral ſpecies are with regard to the genus whereof they are the ſubjective parts.

Grotius maintains, that though the ſovereign power be one and indiviſible, yet it may have ſeveral *potential* parts: for, as in the Roman empire there have been two *potential* heads, the one ruling in the Eaſt, the other in the Weſt; yet the imperial authority, all the while, ſingle and indiviſible; ſo is it poſſible, the ſubjective parts combining to give away their ſovereignty, may not give it entire, but reſerve a part of it for certain emergencies. In which caſe the ſubjective part becomes *potential*: and thus there are two *potential* parts, and yet the ſovereignty ſingle.

Potential, in *Grammar*, gives the denomination to one of the moods of verbs.

The *potential* mood is the ſame, in form, with the ſubjunctive; but differs from it in this, that it hath always implied in it, either *poſſum*, *volo*, or *debeo*; as *roget*, that is, *rogare poteſt*, *the man may aſk*.

It is ſometimes called the *permiſſive* mood, becauſe it often implies a permiſſion or conceſſion to do a thing; as *habeat*, *valeat*, *vivat*, *cum illa*. Terent.

POTENTILLA, in *Botany*, a name given by many authors, to the argentina, or ſilver weed; and by ſome, with the addition of the epithet major, or the greater *potentilla*, to the ulmeria, or meadow-ſweet. See Cinquefoil.

POTERII *antihecticum*. See Antihecticum.

POTERIUM, *burnet*, in *Botany*, a genus of the *monoecia* *polyandria* claſs. Its characters are, that it hath male and female flowers in the ſame ſpike; the male flowers have a four-leaved empalement, and one petal, which is cut into four parts: theſe are oval, concave, and permanent, and have a great number of long hair-like ſtamina, terminated by roundiſh twin ſummits; the female flowers have alſo a four-leaved empalement, and one wheel-ſhaped petal, with a ſhort tube, cut into four parts at the brim; theſe have no ſtamina, but two oblong oval germina, with two hairy ſtyles of the length of the petal, crowned by coloured pencil-ſhaped ſtigmas; the germina afterwards become two hard ſeeds incloſed in the petal of the flower. There are three ſpecies.

The firſt ſort is the common ſmall hairy burnet, that grows naturally upon chalky lands in many parts of England; of which there are two or three varieties. It is a perennial plant, the ſtalks of which riſe a foot and a half high, branching out and terminated by long ſlender footſtalks, ſuſtaining, each, an oblong ſpike of flowers, which are of a purpliſh red colour, and appear in June. The ſeeds ripen in autumn.

This plant is propagated in gardens; the young tender leaves are put into ſallads, and the leaves are uſed for cool tankards in hot weather. It is uſed in medicine, and reckoned to be cordial and alexipharmic. The powder of the root is recommended againſt ſpitting of blood. Miller.

For other ſpecies of burnet, ſee SANGUISORBA.

POTERIUM is alſo uſed by many for the prickly pimpernell. See *Burnet*, SAXIFRAGE.

POTHOS, in *Botany*, a name uſed by Theophraſtus, and ſome other of the old writers, for the aquilegia, or columbine. In the Linnæan ſyſtem it is a genus of the *gynandria polyandria* claſs. Its characters are, that it has no proper calyx, but a ſpatha, the ſpadix of which is ſimple and covered; it has four petals, and four ſtamina; and the fruit conſiſt of diſpermous berries. There are ſeven ſpecies.

POTINCOBA, in *Botany*, a name by which ſome authors call water-pepper, or the ſharp arſmart.

POTION, *potio*, a liquid medicine, in the quantity of a draught, or ſo much as is to be taken at one time.

A *potion* only differs from a JULEP, or a MIXTURE, in the quantity, as being confined to one doſe.

There are purging *potions*, emetic *potions*, diaphoretic, pectoral, cephalic, cardiac, ſtomachic, hyſteric, vulnerary, carminative, &c. *potions*.

POTIRONE, in *Botany*, a name given by the people of Burgundy to a ſtinking kind of fungus, found about the roots of trees. They have alſo extended the name much farther, and uſe it for a ſort of touchwood, or rotten wood of the oak, and other trees common in the foreſts of thoſe countries, which ſhines in the night, and has the ſame ſmell with that fungus.

POTITII, in *Antiquity*. See PINARII.

POT-METAL is formed of lead mixed with copper, in the proportion of one part of lead to four of copper. This metal is harder than copper, or even braſs.

POTRIMPOS, the name of an ancient Pruſſian idol, worſhipped under oaks, and to which human ſacrifices of enemies were offered. Mem. de l'Acad. de Berlin, tom. ii. p. 358.

Percunos and Picolos were idols of the ſame kind.

POTTERY, the art of making earthen pots and veſſels; or the manufacture of earthen ware.

All kinds of *pottery* in general are made of clays or argillaceous earths; becauſe theſe earths are capable of being kneaded, of eaſily receiving any forms, and of acquiring much ſolidity and hardneſs by expoſure to the fire.

In the Mem. de l'Acad. des Scienc. de Pruſſe, 1749, there are ſome experiments tending to prove that the tenacity of clay is owing to ſome inflammable matter which is mixed with it, and which is eaſily conſumed in the fire. But there are conſiderable differences in clays: ſome, which are of the pureſt kind, reſiſt the moſt violent fire, without receiving any other change than a conſiderable hardneſs; others by expoſure to violent heat, acquire hardneſs equal to that of flints, and a compact gloſſy texture, but are unfuſible by the moſt intenſe fire; which qualities they owe to ſome fuſible materials mixed with them, as ſand, chalk, gypſum, or ferruginous earth, which occaſion a partial but not a complete fuſion. Another kind of clays is firſt hardened by fire, and afterwards completely fuſed. From theſe three different clays, three different kinds of *pottery* may be produced. Of the firſt kind are formed the large pots or crucibles, uſed in glaſs-houſes, &c. See CRUCIBLE.

With clays of the ſecond kind may be made crucibles and other *potteries*, commonly called ſtone-ware; which when ſufficiently baked, are very ſonorous, ſo hard as to ſtrike fire with ſteel, capable of containing all liquids, which the former ſort, on account of their poroſity, will not admit of, and reſiſt the action of nitre, glaſs of lead, and other fluxes, provided that the earth of which they are formed is of good quality; but their hardneſs and denſity which prevent their ſudden expanſion and contraction, by the haſty application of heat and cold, render them liable to break in all operations where they are ſuddenly expoſed to heat or to cold. With the fuſible clays may be made many kinds of veſſels which are cheap, as they require little fire to bake them; for this kind of *pottery* is ſlightly baked, and conſequently its texture is coarſe and porous. Theſe are generally covered with a glazing, without which water, or other liquids, would paſs through their pores. Some of this *pottery*, which is carefully finiſhed, and covered with a white enamel, is called DELF-*ware*. Other coarſer *potteries* of this kind are glazed with GLASS *of lead*, mixed with metallic calces, or fuſible coloured earths, from which they receive various colours. See GLAZING.

There is alſo a kind of *pottery* made of white clays, or of ſuch as whiten in the fire, the ſurface of which is vitrified by throwing into the furnace, when the ware is ſufficiently baked, ſome common ſalt and ſalt-petre.

The French ſtone-ware is formed of a whitiſh clay, in which a good deal of fine white ſandy particles is intermixed. The Engliſh ſtone-ware is compoſed of tobacco-pipe clay, and ground flints. The uſe of the flints is to give ſtrength to the ware, ſo that it ſhall preſerve its form during the baking; whereas veſſels made of clay alone, although unfuſible by fire, and capable of acquiring, by having been expoſed to an intenſe heat, the hardneſs of the beſt porcelain, while they are hot, are ſoft, ſink by their weight ſo as to loſe the form given to them. This ſtone-ware is glazed by means of common ſalt only, without any mixture of nitre; and the glazing has not the beauty or ſmoothneſs of good vitreous glazings.

The flint, or white ſtone-ware, is made in Staffordſhire, and other places in the following manner. Tobacco-pipe clay, which they have from Dorſetſhire, is beat much in water; by this proceſs the finer parts of the clay remain ſuſpended in the water, whilſt the coarſer ſand, and other impurities, fall to the bottom. The thick liquid, conſiſting of water, and the finer parts of the clay, is farther purified, by being paſſed through hair and lawn ſieves of different degrees of fineneſs; the clay is then ſufficiently prepared to be mixed with powdered flint. They uſe annually in Staffordſhire about five thouſand tons of flint, which they have from Hull. They were formerly accuſtomed to grind theſe flints with moorſtone or granite, but of late years a large bed of CHERT (a ſpecies of flint) has been diſcovered near Bakewell in Derbyſhire, and the Staffordſhire and Yorkſhire potters prefer it to moor-ſtone for grinding theſe flints; it is very hard, and, being itſelf of the nature of flint, the parts of it which are worn off and mixed with the flints in grinding, do not vitiate the quality of the flint-powder.

When the flints have been properly calcined and ground, they are ſifted in water, till the water is, as near as may be, of the ſame thickneſs as that in which the clay is ſuſpended; then the liquid clay and flints are mixed together in various proportions, for various wares, and left to ſet; the mixture is then dried in a kiln, and being afterwards beaten to a proper temper, it becomes fit for being formed at the wheel into diſhes, plates, bowls, &c.

When this ware is to be put into the furnace to be baked, the ſeveral pieces of it are placed in caſes, made of clay, called SEGGARS, which are piled upon one another in the dome of the furnace; a fire is then lighted, and when the ware is brought to a proper temper, which happens in about forty-eight hours, it is glazed by common ſalt. The ſalt is thrown into the furnace (through holes in the upper part of it), by the heat of which it is inſtantly converted into a thick vapour, which, circulating through the furnace, enters every ſeggar, through holes made in the ſide (the top being covered, to prevent the ſalt from falling upon the ware), and attaching itſelf to the ſurface of the ware, it forms that vitreous coat upon the ſurface, which is called its glaze. This very curious method of glazing earthen ware, by the vapour of common ſalt, was introduced into England from Holland: at leaſt it was introduced from thence into Staffordſhire, about eighty years ago, by two Dutchmen.

Another kind of ſtone-ware, called the *yellow*, or *queen's ware*, is made in England, and lately much uſed. It is compoſed of the ſame materials as the former, but with a leſs proportion of flints, as it is to be expoſed to a leſs violent heat than the former ware; the vitreous glazing with which it is covered not being capable of ſuſtaining ſuch heat. Its colour is leſs white than that of the former,

mer, having a yellowiſh tinge, but the ware is preferred on account of the ſmoothneſs of its glazing, and neatneſs of its forms.

The ſtone-ware is generally made of four meaſures of liquid flint, and eighteen of liquid clay; the yellow ware has a greater proportion of clay in it; in ſome manufactories they mix twenty, and in others twenty-four meaſures of clay with four of flint. Theſe proportions, if eſtimated by the weight of the materials, would probably give for the former ware about three hundred weight of clay to one hundred weight of flint, and for the latter ſomewhat more clay; but the proportion for both ſorts of ware depends very much on the nature of the clay, which is very variable. The yellow glaze is made by mixing together in water, till it becomes as thick as cream, a hundred and twelve pounds of white lead, twenty-four pounds of ground flint, and ſix pounds of ground flint-glaſs. Some manufacturers leave out the glaſs, and mix only eighty pound of white lead with twenty pounds of ground flint. The ware, before it is glazed, is baked in the fire, by which means it acquires a property of ſtrongly imbibing moiſture; it is, therefore, dipped in the liquid glaze, and ſuddenly taken out, the glaze is imbibed into its pores, and the ware preſently becomes dry; it is then expoſed a ſecond time to the fire, by which means the glaze, which it had imbibed, is melted, and a thin glaſſy coat is formed upon its ſurface; the colour of the coat being more or leſs yellow, according as a greater or leſs proportion of lead has been uſed. The yellow colour, which lead gives, when vitrified with flints, may be wholly changed by very ſmall additions of other mineral ſubſtances; e. g. the beautiful black glaze, which is fixed on one ſort of the ware made at Nottingham, is compoſed of twenty-one parts by weight of white lead, of five of powdered flints, and of three of marcaſite. See GLAZING.

This kind of *pottery*, as well as the extenſion and application of the manufacture to a variety of curious compoſitions, ſubſervient not only to the ordinary uſes of life, but to the arts, antiquity, hiſtory, &c. have been lately proſecuted with ſingular ſkill and ſucceſs by Meſſrs. Wedgwood and Bentley; whoſe various manufactures, intended both for ornament and uſe, are well known. See PORCELAIN.

The wheel and lathe are the chief, almoſt the only, inſtruments uſed in *pottery*; the firſt for large works, the ſecond for ſmall; though in reality, they are much the ſame as to the manner of uſing them.

The potter's *wheel* conſiſts principally in its nut, which is a beam or axis, whoſe foot or pivot plays perpendicularly on a free-ſtone ſole or bottom; from the four corners atop of this beam, which does not exceed two feet in height, ariſe four iron bars, called the *ſpokes* of the wheel; which, forming diagonal lines with the beam, deſcend, and are faſtened at bottom to the edges of a ſtrong wooden circle, four feet in diameter, perfectly like the fellies of a coach-wheel; except that it has neither axis nor radii, and is only joined to the beam, which ſerves it as an axis, by the iron bars. The top of the nut is flat, of a circular figure, and a foot in diameter: on this is laid a piece of the clay, or earth, to be turned and faſhioned.

The wheel, thus diſpoſed, is encompaſſed with four ſides of four different pieces of wood, ſuſtained on a wooden frame; the hind-piece, which is that whereon the workman ſits, is made a little inclining towards the wheel; on the fore-piece are placed the pieces of prepared earth: laſtly, the ſide-pieces ſerve the workman to reſt his foot againſt; and are made inclining, to give him more or leſs room according to the ſize of the veſſel to be turned. By his ſide is a trough of water, wherewith from time to time he wets his hands, to prevent the earth's ſticking to them.

To uſe the wheel. The potter having prepared his clay or earth, and laid a piece of it, ſuitable to the work he intends, on the top of the beam, ſits down; his thighs and legs much expanded, and his feet reſted on the ſide-pieces, as is moſt convenient.

In this ſituation he turns the wheel round, till it has got the proper velocity; when, wetting his hands in the water, he bores the cavity of the veſſel, continuing to widen it from the middle; and thus turns it into form, turning the wheel afreſh and wetting his hands from time to time.

When the veſſel is too thick, they uſe a flat piece of iron with a hole in the middle, and ſomewhat ſharp on one edge, to pare off what is redundant. Laſtly, when the veſſel is finiſhed, they take it off from the circular head by a wire paſſed underneath the veſſel.

The potter's *lathe* is alſo a kind of wheel, but much ſimpler and ſlighter than the former. Its three chief members are an iron beam or axis, three feet and a half high; and two inches in diameter; a little wooden wheel all of a piece, an inch thick, and ſeven or eight in diameter, placed horizontally atop of the beam, and ſerving to form the veſſel on; and another larger wooden wheel, all of a piece, three inches thick, and two or three feet broad, faſtened to the ſame beam at bottom, parallel to the horizon. The beam or axis turns by a pivot at bottom, in an iron ſtand.

The workman gives the motion to the lathe with his feet, by puſhing the great wheel alternately with each foot; ſtill giving it a greater or leſſer degree of motion, as his work requires.

They work with the lathe, with the ſame inſtruments, and after the ſame manner, as with the wheel.

But neither the one, nor the other, ſerve for any more than forming the body of the veſſel, &c. the feet, handles, and ornament, if there be any, beſide the mouldings, being to be made and ſet on by the hand: if there be any ſculpture in the work, it is uſually done in earthen or wooden moulds, prepared by a ſculptor, unleſs the potter have ſkill enough to do it himſelf, which is very rare. The ſeveral productions of the potter are then baked and glazed, or varniſhed.

POTTERY, *for the Chineſe.* See PORCELAIN.

POTTLE, an Engliſh meaſure, containing two quarts.

Two of theſe *pottles*, in the liquids, make a gallon; but in dry meaſure three go to a gallon.

POUCH, in the *Military Art*, is a ſquare caſe or bag of leather, with a flap over it, hanging to a buff ſhoulder-belt of about three inches broad over the left ſhoulder of the infantry, uſed for holding cartridges. The CARTRIDGE-*boxes* within the *pouches* ſhould be made as light as poſſible, with thirty-ſix holes in each, in order to prevent the addition of boxes to buckle round the waiſt, which, by blowing up, have occaſioned miſchief and confuſion.

POUCH, *ſhepherd's*, in *Botany*. See MAD-*wort*.

POUDER. See POWDER.

Pie POUDER *court*. See *Pie powder* COURT.

POUDRE *des Chartreux*. See KERMES *mineral*.

POULTICE, or POULTIS, a form of medicine, called alſo CATAPLASM.

POULTRY. See FOWL.

POUNCE, among *Artificers*, a little heap of charcoal duſt, incloſed in ſome open ſtuff, to be paſſed over holes pricked in a work, in order to mark the lines or deſigns thereof on a paper placed underneath; which are to be afterwards finiſhed with a pencil, a needle, or the like.

The word is formed from the French *ponce, pumice-ſtone*; becauſe they anciently uſed pumice-ſtone powdered for this purpoſe.

Pounce is much uſed, by embroiderers, to transfer their patterns upon their ſtuffs; by lace-makers, and ſometimes alſo by engravers; and a kind made of gum SANDARACH, by writing-maſters, which being rubbed on the paper, makes it leſs apt to imbibe the ink; it is therefore uſed in this manner by thoſe who are curious in the art of the pen, by which means the writing appears more preciſe, ſharp, and determinate.

The varniſh-makers alſo uſe to diſſolve it in oil of turpentine, or in linſeed oil, or in ſpirit of wine; from which mixture is produced a kind of liquid varniſh.

POUNCES, in *Falconry*, the talons or claws of a bird of prey.

POUND, *libra*, a weight of a certain proportion, much uſed as a ſtandard for determining the gravities and quantities of bodies.

The word is derived from the Saxon *pund*, or *pond, pondus, weight*.

We have two different *pounds* in England; the *pound troy*, and the *pound avoirdupois*. See WEIGHT.

For the ſeveral POUNDS *of the ſeveral cities and countries, their proportion, reduction, diviſion*, &c. ſee WEIGHT.

POUND, *Roman*. See LIBRA.

POUND alſo denotes an imaginary money uſed in accounting; containing more or leſs, according to the ſeveral names added to it, and the ſeveral countries it is uſed in.

Thus in England, we ſay, a *pound ſterling*; in France, a *pound*, or *livre Tournois* and *Pariſis*; in Holland and Flanders, a *pound*, or *livre de gros*, &c.

The term took its riſe hence; that the ancient *pound* ſterling, though it only contained 240 pence, as ours does; yet each penny being equal to five of ours, the *pound* of ſilver weighed a *pound* troy.

The *pound* ſterling, or Engliſh *pound*, contains twenty ſhillings, the ſhilling twelve pence, and the penny four farthings. Anciently there were three ways of paying a *pound* of money into the exchequer. 1. The payment of a *pound de numero*, which was juſt twenty ſhillings in tale. 2. *Ad ſcalam*; which was 6*d* over and above the

20s. 3. *Ad penſam*; which was giving the full weight of twelve ounces.

Pound, *French*. See Livre and Coin.

The **Pound**, or *livre de gros*, of Holland, is divided into 20 ſhillings gros, and the ſhilling into 12 pence gros. It is equal to ſix florins, the florin valued at 24 ſols Tournois; ſuppoſing the exchange on the footing of 100 pence gros for a French crown of 3 livres Tournois; ſo that the *pound* gros amounts to 10 ſhillings and 11 pence farthing ſterling. The *pound* gros of Flanders and Brabant is divided like that of Holland; and like that, too, is equal to ſix florins; but the florin is equal to 25 ſols Tournois; ſo that the Flanders *pound* is equal to 7 livres, 10 ſols Tournois, or 11*s.* 3*d.* ſterling. See Coin.

Merchants, factors, bankers, &c. uſe characters, or initial letters, to expreſs the ſeveral kinds of *pounds* of account: as *L.* or *L. St. pounds* ſterling; *L. G. pounds* gros; and *L.* or ℔. ton *pounds* Tournois.

Pound *nails*. See Nails.

Pound, *parcus*, is alſo an incloſure, or ſtrong place, where cattle diſtrained, or caught in any treſpaſs, are put, till they are replevied, or redeemed.

The *pound* is either *overt*, or *covert* and *cloſe*.

Pound *overt* is an open *pound*, built upon the lord's waſte; and thence alſo called the *lord's pound*, becauſe he provides it for the uſe of himſelf, and his tenants.

Pound overt alſo includes back-ſides, court-yards, paſture-grounds, or any place whatever, to which the owner of beaſts impounded may come to give them meat and drink, without offence or treſpaſs.

By ſtat. 1 & 2 P. & M. cap. 12. no distress of cattle can be driven out of the hundred where it is taken, unleſs to a *pound overt* within the ſame ſhire, and within three miles of the place where it was taken. This is for the benefit of the tenants, that they may know where to find and replevy the diſtreſs. And by ſtat. Geo. II. cap. 19. which was made for the benefit of land-lords, any perſon diſtraining for rent may turn any part of the premiſes, upon which a diſtreſs is taken, into a *pound pro hac vice*, for ſecuring of ſuch diſtreſs. If a live diſtreſs of animals be impounded in a common *pound overt*, the owner muſt take notice of it at his peril; but if in any ſpecial *pound overt*, ſo conſtituted for this particular purpoſe, the diſtrainer muſt give notice to the owner; and in both theſe caſes the owner, and not the diſtrainer, is bound to provide the beaſts with food and neceſſaries.

Pound *covert*, or *cloſe*, on the contrary, is ſuch a one as the owner cannot come to, for the ſaid purpoſe, without treſpaſs or offence; as ſome cloſe houſe, caſtle, fortreſs, &c.

If a diſtreſs of animals be impounded in a *pound covert*, as in a ſtable, or the like, the land-lord or diſtrainer muſt feed and ſuſtain them. A diſtreſs of houſhold goods, or other dead chattels, which are liable to be ſtolen or damaged by weather, ought to be impounded in a *pound covert*, elſe the diſtrainer muſt anſwer for the conſequences.

Pound *breach*, in *Law*. If a diſtreſs be taken, and impounded, though without juſt cauſe, the owner cannot *break* the *pound*, and take away the diſtreſs; if he doth, the party diſtraining may have his action, and retake the diſtreſs wherever he finds it; and for *pound breaches*, &c. a writ *de* parco *fracto* may be obtained, or an action on the caſe lies, whereon treble damages may be recovered, if the diſtreſs was taken for rent. 1 Inſt. 161. 2 W. & M. cap. 5.

Alſo it is ſaid, that all *pound breaches* may be enquired of in the ſheriff's turn, as they are common grievances, in contempt of the authority of the law. 2 Hawk. P. C. 67.

Pound *land*, of old extent. See Librata *terræ*.

POUNDAGE, a ſubſidy granted to the king upon all manner of merchandize imported or exported, by all merchants, natives, denizens, and aliens. This, together with that of tonnage, was at firſt granted, as the old ſtatutes (and particularly 1 Eliz. cap. 19.) expreſs it, for the defence of the realm, and the keeping and ſafe guard of the ſeas, and for the intercourſe of merchandize ſafely to come into and paſs out of the ſame. It was at firſt granted, as well as that of tonnage, only for a ſtated term of years, as for two years in 5 Ric. II.; but in Henry the Fifth's time, they were granted him for life by a ſtatute, in the third year of his reign; and again to Edward IV. for the term of his life alſo; ſince which time they were regularly granted to all his ſucceſſors for life, till the reign of Charles the Firſt; in his time they were unconſtitutionally levied and taken for fifteen years without conſent of parliament; but by 16 Car. I. cap. 8. the king renounced all power in the crown for levying the duty of tonnage and *poundage*, without the expreſs conſent of parliament. Upon the Reſtoration this duty was granted to Charles II. for life. See Custom.

It is called *poundage*, becauſe fixed at the rate of ſo much per pound; viz. one ſhilling in every pound, or twenty ſhillings; and for Engliſh commodities exported by aliens, one ſhilling more.

POUNDER, in *Artillery*, is uſed to ſpecify a certain caliber: thus, a twenty-four-*pounder*, a twelve, or a ſix-*pounder*, are thoſe pieces whoſe balls weigh twenty-four, twelve, or ſix pounds. See Guns.

POUP. See Poop.

POUR *fair proclaimer, que null inject fines ou ordures en foſſes ou river pres cities*, &c. in *Law*, an ancient writ, directed to the mayor or bailiff of a city or town, requiring them to make proclamation, that none caſt filth into the ditches or places near ſuch city or town, to the nuſance thereof; and if any be caſt there already, to remove the ſame. It is founded on the ſtatute 12 Rich. II. cap. 13. F N. B. 176.

Pour *ſeiſer terres la femme que tient en dower*, in *Law*, an ancient writ, whereby the king ſeized the land which the wife of his tenant *in capite* had for her dowry, after his deceaſe, if ſhe married without the king's leave; by virtue of the ſtatute of the king's prerogative. Cap. 3. F. N. B. 174.

POURALLEE. See Purlue.

POURANAM. See Viedam.

POUR-PARTIE, or **Pour-Party**, in *Law*, a term uſed in oppoſition to *pro indiviſo*; denoting the ſhare or part of an eſtate held in common by parceners; which is by partition allotted to any of them.

To make *pour partie*, is to divide and ſever the lands that fall to parceners; which, before partition, they held jointly, and *pro indiviſo*.

POURPRE. See Purpure.

POURPRESTURE, or **Purpresture**, *pourpreſtura*, in *Law*, is defined by Glanville to be, when any thing is unjuſtly occupied, that properly belonged to the king; as is the caſe in the encroaching on his grounds, obſtructing the highways, diverting public rivers from their proper courſe, or building any thing over the high ſtreets of a city; and, in the general, where any thing is done to the prejudice of the king's tenements, highways, or cities.

Crompton in his Juriſd. ſays, *pourpreſture* is properly when a man takes to himſelf, or encroaches any thing which he ought not; whether it be in juriſdiction, in land, or in franchiſe; and generally, where any thing is done to the nuſance of the king's tenants.

Some authors divide *pourpreſture* into three kinds: the firſt againſt the king, the ſecond againſt the lord, the third againſt a neighbour.

Pourpreſture againſt the king, Lib. Nig. in Scacc. fol. 38. is that happening through the negligence of the ſheriff, or the long continuance of wars, &c. when thoſe that have lands near the crown-lands, incloſe part of them, or lay them to their own.

Pourpreſture againſt the lord is when the tenant neglects to perform what he is bound to do for the chief lord, or deprives him of his right.

Pourpreſture againſt a neighbour is a nuſance againſt a neighbour, &c. mentioned in the Monaſt. tom. i.

POURSUIVANT, or **Pursuivant**, from the French *pourſuivre, to purſue*, a meſſenger, anciently attending the king, in his wars, or at council table, or in the exchequer, to be diſpatched upon any occaſion, or meſſage: as, for the apprehenſion of a perſon ſuſpected, or accuſed, &c.

Many of the nobility too had their *pourſuivants*; a knight banneret was allowed a *pourſuivant*, with the conſent of a herald.

Upton, De Re Militari, calls the *pourſuivants*, *milites linguares*; becauſe, ſays he, their chief honour was in *cuſtodia linguæ*.

He divides them into foot and horſe *pourſuivants*, *curſores equitantes & proſecutores*.

There were alſo *pourſuivants* particularly employed in martial cauſes, called

Poursuivants *at arms*, a term anciently applied to gentlemen who attended the heralds, and aſpired to their office; to which they could not riſe, till after ſeven years apprenticeſhip paſſed in this quality. See Herald.

They were entirely dependent on the heralds, and aſſiſted at their chapter; officiating for them in preparing and aſſigning tournaments, and all other parts of their miniſtry.

They were baptized, at ſolemn feaſts, with ſome gallant name; as Jolicœur, Verluiſant, Sanſmentir, &c.

Their coats of arms were different from thoſe of the heralds, and they bore plain ſtaves, without ornament.

Of the great number of *pourſuivants* anciently on foot, there are now only four remaining; viz. *blue-mantle*, *rouge-croix*, *rouge-dragon*, and *portcullice*; who are the loweſt order of officers belonging to the college of arms. Their buſineſs is, to attend with the heralds in marſhalling

ling and ordering public ſolemnities, funerals, interviews, cavalcades, &c.

Stow, ſpeaking of Richard the Third's end, has theſe words: “His body was naked to the ſkin; not ſo much as one clout about him; and was truſſed behind a *peurſuivant* at arms, like a hog, or a calf.”

POURTRAIT, or **Pourtraiture**. See Portrait.

POURVEYANCE, or **Purveyance**, the providing of corn, victuals, fuel, and other neceſſaries, for the king's houſe. By a ſtat. 12 Car. II. cap. 24. no perſon, under colour of *pourveyance*, ſhall take any timber, cattle, corn, or other matter, from any ſubject without his free conſent.

POURVEYOR, or **Purveyor**, an officer of the houſhold, who provides and buys in corn, and other victuals, &c. for the king's houſe; mentioned in Magna Charta, and ſeveral ſtatutes.

Pourveyor became a term ſo odious in times paſt, that by ſtat. 35 Ed. III. the heinous name *pourveyor* was changed into that of *achator*, or *buyer*. The office itſelf was much reſtrained by the ſtat. 12 Car. II. cap. 24.

POUSSE *pied*, in *Natural Hiſtory*, the French name for a genus of ſhell-fiſh, called by writers of other nations the POLLICIPES.

POUST, an Indian name for a very poor and coarſe kind of opium, made by boiling the ſtalks and leaves of the opium poppy in water, and then evaporating the clear liquor to the conſiſtence of a ſolid extract.

POUTING, or *whiting*-Pout, in *Ichthyology*, a name given to a ſpecies of *bearded* GADUS, which ſeldom exceeds a foot in length. It is diſtinguiſhed from all others by its great depth, which is near four inches in thoſe of the largeſt ſize; the back is much arched and carinated; the ſcales larger than thoſe of the cod-fiſh; the mouth ſmall; the beard ſhort; and on each ſide of the jaw are ſeven or eight punctures; the firſt dorſal fin is triangular, terminating in a long fibre; the colour of the fins and tail black; and at the bottom of the pectoral fins is a black ſpot; the lateral line is white, broad, and crooked; the tail even at the end, and of a duſky colour; the colour of the body is white, but more obſcure on the back than the belly, and tinged with yellow. It is a delicate fiſh. Pennant.

POWCHES, in a *Ship*. The ſeamen call by this name the ſmall bulk-heads made in the hold, to ſtow corn, goods, or the like, that it may not ſhoot from one ſide to the other.

POWDER, or **Pouder**, in *Pharmacy*, a dry medicine pulveriſed, or prepared by being broken and reduced into almoſt imperceptible atoms, either in a mortar, or by chemical operations, &c.

The lighter *powders* may be mixed in any agreeable liquor, as tea, or water gruel. The more ponderous will require a more conſiſtent vehicle, as ſyrup, jelly, or honey. No *powders*, eſpecially thoſe of the aromatic kind, ſhould be too much expoſed to the air, and kept too long. There are *powders* of various ſorts, the principal of which are mentioned in the following articles and references.

Powder *of algaroth*. See Algarot, and Cornachine *powder*.

Powder, *amber*, or Pulvis *e ſuccino*, is a form of medicine preſcribed in the late London Pharmacopœia, in the room of the troches of amber, or *trochiſci de carabe* of former diſpenſatories. The compoſition of the *powder* is this: take prepared amber and gum arabic, of each ten drams; juice of hypociſtus, balauſtines, and Japan earth, of each five drams; olibanum, half an ounce; ſtrained opium, a dram; mix all theſe together into a fine powder, Pemberton's Lond. Diſp.

Powder, *aſtringent*, is formed by pounding together alum and Japan earth, of each two drams. If the whole be divided into ten or twelve doſes, one of them may be taken every hour in an immoderate flow of the menſes, and other hæmorrhages, or every half hour, if the hæmorrhage be violent.

Powder *of bole* is formed by pulverizing the following ingredients, viz. bole armenic, or French bole, two ounces; cinnamon, one ounce; tormentil root, and gum arabic, of each ſix drams; and long pepper, one dram. This warm, glutinous, aſtringent *powder*, is given in fluxes, and other diſorders where medicines of that claſs are neceſſary, in the doſe of a ſcruple, or half a dram. A *powder* of this kind is preſcribed in the late London Pharmacopœia, inſtead of the confectio Fracaſtorii, or DIASCORDIUM. If a dram of opium be added, it will make the *powder* of bole with opium, which may be taken in the ſame quantity as the former, but not above twice or thrice a day. Buchan.

Powder, *bezoardic*, the name given in the late London Diſpenſatory to the *powder*, commonly called Gascoign's *powder*. This is now ordered to be made only of crab's claws, one pound; prepared pearls and red coral, of each three ounces; and oriental bezoar, an ounce. The amber and hartſhorn are left out of the compoſition, as improper inefficacious ingredients; and the whole ordered to be kept alſo without the bezoar, and called by the name of *pulvis e chelis cancrorum compoſitus*, the name by which Gaſcoingn's *powder* uſed to be known.

Powder, *carminative*, is made by reducing half an ounce of coriander ſeed, one dram of ginger, half a dram of nutmegs, and a dram and a half of fine ſugar into a *powder*; which quantity will be ſufficient for twelve doſes. It is employed for expelling flatulencies ariſing from indigeſtion, particularly thoſe to which hyſteric and hypochondriac perſons are ſo liable. It may be likewiſe given in ſmall quantities to children in their food, when troubled with gripes.

Powder, *ceruſſe*, *pulvis e ceruſſa*, a medicine preſcribed in the late London Pharmacopœia, in the place of the white TROCHES of Rhaſes or Razi. The late compoſitions of that medicine had been much more complex than the original receipt of that author, and the college have, therefore, retrenched the number of ingredients in them; and as the medicine is always to be powdered for uſe, it is now ordered to be kept in the form of *powder*. It is thus ordered to be made: take ceruſſe, five ounces; ſarcocolla, an ounce, gum tragacanth, half an ounce; and make the whole into a fine *powder*. Pemberton.

Powder, *compound contrayerva*. See Contrayerva.

Powder, *cornachine*. See Cornachine *powder*, and Algarot.

Powder, *diuretic*, is made by pounding together four ounces of gum arabic, and one ounce of purified nitre. If the whole be divided into twenty-four doſes, one may be taken three times a day, with conſiderable benefit, during the firſt ſtage of the venereal diſeaſe. Buchan.

Powder, *emetic*. See Emetic and Ipecacuanha.

Powder, *Gaſcoign's*. See Gascoign's *powder*, and *Bezoardic* Powder.

Powders, *gout*, by Dr. Dover, and lord Portland. See Gout

Powder, or *pulvis guttetæ*. See Guttetæ *pulvis*.

Powder, *Jeſuit's*. See Cortex *Peruvianus*.

Powder *of myrrh*, a form of medicince preſcribed in the late London Diſpenſatory, to ſupply the place of the troches of myrrh. It is ordered to be made thus: take of dried leaves of rue, of dittany of Crete, of myrrh, each an ounce and a half; of aſſa fœtida, ſagapenum, Ruſſia caſtor, and opopanax, each an ounce; and beat altogether to a fine *powder*. Pemberton.

Powder, *aromatic purging*, is formed by pounding and well mixing the beſt Turky rhubarb, cinnamon, and fine ſugar of each two drams. Where flatulency is accompanied with coſtiveneſs, a tea-ſpoonful of this *powder* may be taken once or twice a day, according to circumſtances. Buchan.

Powder, *ſaline laxative*, is prepared of ſoluble tartar and cream of tartar, of each one dram, and of purified nitre, half a dram. In fevers, and other inflammatory diſorders, where it is neceſſary to keep the body gently open, one of theſe cooling laxative *powders* may be taken in a little gruel, and repeated occaſionally. Buchan.

Powder, *ſcammony*, a name given in the late London Diſpenſatory to the purging *powder*, commonly called the earl of Warwick's *powder*. It is, however, wholly altered here; the cryſtals of tartar and diaphoretic antimony being left out, and the medicine ordered to be made only of four ounces of ſcammony, and three ounces of burnt hartſhorn, reduced together to a fine *powder*. Pemberton.

Powder, *ſteel*, is made by pounding together filings of ſteel and loaf ſugar, of each two ounces, and half an ounce of ginger. In obſtructions of the menſes, and other caſes where ſteel is proper, a tea-ſpoonful of this *powder* may be taken twice a day. Buchan.

Powder, *Styptic*. See Styptic.

Powder, *ſudorific*, or *Dover's powder*. See Gout.

Powder, *Suffolk*. See Suffolk *powder*.

Powder, *Sympathetic*. See Sympathetic.

Powder *of tragacanth*. See Tragacanth.

Powders, *worm*, are formed by well mixing of tin, reduced into a fine powder, an ounce, and of Æthiops mineral, two drams. Let the whole be divided into ſix doſes; and one of them may be taken in a little ſyrup, honey, or treacle, twice a day. After they have been all uſed, the following anthelmintic purge will be proper.

Powder, *purging worm*, is prepared of powdered rhubarb, a ſcruple; and of ſcammony and calomel, of each five grains. Rub theſe together in a mortar for a doſe. For children the above doſes muſt be leſſened, according to their age. If the *powder* of tin be given alone, its doſe may be conſiderably increaſed. Dr. Alſton gave it to the amount of two ounces in three days, and ſays, when thus adminiſtered, that it proved an excellent anthelmintic. He uſed to purge his patients both before they took the *powder*, and afterwards.

Powder *for the hair* is flour of wheat, or beans, well ſifted and prepared to give it an agreeable odour.

That wherein ſtarch-grounds are mixed, is much uſed. See STARCH.

POWDER, *fulminating*. See *Pulvis* FULMINANS.

POWDER, *gun*. See GUN-*powder*.

POWDER-*cart*, in *Artillery*, a two-wheel carriage, covered with an angular roof of boards; and to prevent the *powder* from being damp, a tarred canvaſs is put over the roof. On each ſide are lockers to hold ſhot, in proportion to the quantity of *powder*, which is generally four barrels.

POWDER-CHESTS, in the *Sea-language*, are ſmall boxes filled with gunpowder, pebbles, old nails, or ſplinters of iron, faſtened occaſionally on the decks and ſides of a ſhip, which they ſet fire to, when the ſhip is boarded by an enemy, and ſoon make all clear before them. Theſe caſes are uſually from twelve to eighteen inches in length, and about eight or ten in breadth, having their outer or upper part terminating in an edge. They are nailed to ſeveral places of the quarter, the quarter-deck, and bulkhead of the waiſt, having a train of powder, which communicates with the inner apartment of the ſhip, ſo as to be fixed at pleaſure to annoy the enemy. Falconer.

POWDER-*flaſks*, in *Artillery*, are moſt commonly made of horn, of any convenient ſize and figure, to carry *powder* for priming of cannon: this is their chief uſe in armies.

Sometimes they are ſo made as to have a meaſure for the charge of the piece at top, but this is of more uſe to gentlemen in fowling, &c. than to ſoldiers, who have the charges of their piece put into cartridges, which they bite off, and firſt prime, and then load.

POWDERS, *flux*. See FLUXES.

POWDER *magazine*. See MAGAZINE.

POWDER-*mill*. See MILL.

POWDER-*room*, in a *Ship*, that part of the hold wherein the *powder* is ſtowed. See MAGAZINE.

POWDER *of projection*. See PROJECTION.

POWDER-*triers*, in *Artillery*. See GUN-*powder*.

Mr. Thompſon has lately recommended a new and accurate method of proving *gun-powder*. For this purpoſe, when a quantity of powder has been provided, which, from any previous trial, is known to be of a proper degree of ſtrength to ſerve as a ſtandard for the proof of other *powder*, a given charge of it is to be fired, with a fit bullet, in a barrel ſuſpended by two pendulous rods, and the recoil is to be meaſured carefully upon a ribbon annexed to the apparatus. When this experiment has been often repeated, the mean and the extreme of the chords, if there is any difference in the recoil, may be marked upon the ribbon by black lines, and the word *proof* may be written upon the middle line; or if the recoil be uniform, the proof mark is to be made in that part of the ribbon to which it was conſtantly drawn out by the recoil in the different trials. Having thus aſcertained and marked upon the ribbon the recoil, with a known charge of ſtandard *powder*, let an equal quantity of any other *powder*, which is to be proved, be fixed in the ſame barrel, with a bullet of the ſame weight, and every other circumſtance alike; and if the ribbon is drawn out as far, or farther than the proof mark, the *powder* is as good, or better than the ſtandard; but if it falls ſhort of that diſtance, it is worſe than the ſtandard, and ought to be rejected. See many curious remarks and experiments on *gun-powder*, &c. by this author, in Phil. Tranſ. vol. lxxi. part ii. art. 15.

POWDERINGS, in *Building*, a term ſometimes uſed for devices ſerving to fill up vacant ſpaces, in carved works; as alſo in eſcutcheons, writings, &c.

POWDERINGS, in *Heraldry*. See FURR.

POWER, *potentia*, in *Phyſics*, a natural faculty of doing or ſuffering any thing.

Mr. Locke explains the origin of our idea of *power* to the following effect: the mind being daily informed, by the ſenſes, of the alterations of the ſimple ideas of things without, and reflecting on what paſſes within itſelf, and obſerving a conſtant change of its ideas, ſometimes by the impreſſions of outward objects upon the ſenſes, and ſometimes by the determinations of its own choice; and concluding, from what it has ſo conſtantly obſerved to have been, that the like changes will for the future be made in the ſame things, by the ſame agents, and by the like ways; conſiders, in one thing, the poſſibility of having any of its ſimple ideas changed; and in another, the poſſibility of making that change; and ſo comes by that idea which we call *power*.

Thus we ſay, fire has a *power* to melt gold, and make it fluid; and gold has a *power* to be melted.

Power, thus conſidered, is twofold; viz. as able to *make*, or able to *receive*, any change; the one may be called *active*, the other *paſſive power*.

Of *paſſive power*, all ſenſible things abundantly furniſh us with ideas; nor have we of *active power* fewer inſtances; ſince whatever change is obſerved, the min muſt ſuppoſe a *power* ſomewhere able to make that change.

Yet, if we attentively conſider it, bodies, by our ſenſes, do not afford us ſo clear and diſtinct an idea of active *power*, as we have from reflection on the operations of our minds; for all *power* relating to action, and there being but two ſorts of action, viz. thinking and motion, it may be conſidered whence we have the cleareſt ideas of the *powers* which produce thoſe actions.

Of thinking, body affords us no ideas at all; it is only from reflection that we have that: neither have we from body any idea of the beginning of motion. A body, at reſt, affords us no idea of any active *power* to move; and when it is ſet in motion itſelf, that motion is rather a paſſion than an action in it. The idea of the beginning of motion, we have only by reflection of what paſſes in ourſelves; where we find by experience, that, barely by willing it, we can move the parts of our bodies, which before were at reſt.

We find in ourſelves a *power* to begin or forbear, continue or end, ſeveral actions of our minds and motions of our bodies, barely by a thought or preference of the mind. This *power* which the mind has, thus to order the conſideration of any idea, or the forbearing to conſider it, or to prefer the motion of any part of the body to its reſt, and *vice verſa*, in any particular inſtance, is what we call the *will*. And the actual exerciſe of that *power*, is that which we call *volition*, or *willing*.

The forbearance or performance of that action, conſequent to ſuch an order or command of the mind, is called *voluntary*; and whatſoever action is performed without ſuch a thought of the mind, is called *involuntary*.

The *power* of perception, is what we call the *underſtanding*.

Perception, which we make the act of underſtanding, is of three ſorts: the perception of ideas in our minds; the perception of the ſignification of ſigns; and the perception of the agreement or diſagreement of any diſtinct ideas.

Theſe *powers of the mind*, viz. thoſe of perceiving, and preferring, are uſually called by another name; and the ordinary way of ſpeaking is, that the *underſtanding* and *will* are two faculties or *powers* of the mind. A word proper enough, if uſed ſo as not to breed any confuſion in men's thoughts, by being ſuppoſed, as there is room to ſuſpect it has been, to expreſs ſome real beings in the ſoul, that perform thoſe actions of underſtanding and volition.

From the conſideration of the extent of the *power* of the mind over the actions of the man, which every one finds in himſelf, ariſe the ideas of LIBERTY and NECESSITY.

POWER, in *Mechanics*, denotes a force, which, being applied to a machine, tends to produce motion; whether it does actually produce it or not.

In the former caſe it is called a *moving power*; in the latter, a *ſuſtaining power*.

If the *power* be a man, or a brute, it is called an *animate power*; if the air, water, fire, gravity, or elaſticity, an *inanimate power*.

POWER, *attractive*. See ATTRACTIVE.

POWER, *conſpiring*. See CONSPIRING.

POWER, *repelling*. See REPELLING.

POWER is alſo uſed, in *Mechanics*, for any of the ſix ſimple machines, viz. the *lever*, *balance*, *ſcrew*, *axis in peritrochio*, *wedge*, and *pulley*; which are particularly called the MECHANIC *powers*.

See alſo each *power* under its proper article, LEVER, BALANCE, &c.

POWERS, in *Pharmacy*, the reſult of a combination or union of the eſſential oils with the ſpirit of a plant; wherein, it is ſuppoſed, are contained all the principal virtues thereof; whence the name.

The *powers* of ſcabius and mullein are prepared by beating, and incorporating, the expreſſed juices of theſe plants when green, with lard, and afterwards expoſing them ſeveral days to the ſun; ſuch beating and inſolation being ſeveral times repeated at due diſtances.

POWER, in the *Feodal Juriſprudence*, a right which the lord has to reunite to his fief a dependent fee held of him, when the vaſſal has alienated it, upon reimburſing the money given for it, with the legal coſts.

The lord is to exerciſe his *power* over the fee within a year after he has notice of the fall; otherwiſe he loſes it. The word is alſo uſed for the right a lord has to ſeize a dependent fee, to compel the payment of all dues, ſervices, &c.

POWERS, *potentiæ*, is alſo uſed among the fathers, &c. for the ſixth order in the hierarchy of angels, reckoning from ſeraphim.

Theſe they ſuppoſe to be the ſpirits who bridle and reſtrain

ſtrain the *power* of the devils; preſide over inferior cauſes; and prevent contrary qualities from diſturbing the œconomy of the world. See ANGEL and HIERARCHY.

POWER, in *Optics*. The *power of a glaſs* is uſed by ſome for the diſtance of the convexity from its ſolar FOCUS.

POWER, in *Arithmetic*, the produce of a number, or other quantity multiplied into itſelf.

Thus the produce of the number 3, multiplied by itſelf, viz. 9, is the ſecond *power* of 3; the factum of 9, multiplied by 3, viz. 27, is the third *power*; and the product of 27, again multiplied by 3, viz. 81, is the fourth *power*; and ſo on to infinity. In reſpect hereof, the firſt number, 3, is called the *root*, or firſt *power*.

The ſecond *power* is called the *ſquare*; with reſpect to which, 3 is the ſquare root.

The third *power*, 27, is called the *cube*; with reſpect to which, 3 is the cube root.

The fourth *power*, 81, is called the *biquadrate*, or *quadrato-quadratum*; with reſpect to which, 3 is the biquadratic root.

The number which ſhews how often the root is multiplied into itſelf, to form the *power*, or how oft the *power* is to be divided by its root, to come at the root, is called the *exponent of the power*.

The moderns, after Des Cartes, are contented to diſtinguiſh moſt of their *powers* by the exponents; as *firſt*, *ſecond*, *third*, &c.

The particular names of the ſeveral *powers* were introduced by the Arabs, viz. *ſquare*, *cube*, *quadrato-quadratum* or *biquadrate*, *ſurdeſolid*, *ſquare of the cube*, *ſecond ſurdeſolid*, *quadrato-quadrato-quadratum*, *cube of the cube*, *ſquare of the ſurdeſolid*, *third ſurdeſolid*, &c.

The names given by Diophantus, followed by Vieta and Oughtred, are, the *ſide* or *root*, *ſquare*, *cube*, *quadrato-quadratum*, *quadrato-cubus*, *cubo-cubus*, *quadrato-quadrato-cubus*, *quadrato-cubo-cubus*, *cubo-cubo-cubus*, &c.

The characters wherewith the ſeveral powers are denoted both in the Arabic and Carteſian notation, are as follow:

	2	4	8	16	32	64	128	256	512	1024
Arab.	R	*q*	*c*	*bq*	*s*	*qc*	*Bſ*	*tq*	*bc*	*ſq*
Carteſ.	a	a^2	a^3	a^4	a^5	a^6	a^7	a^8	a^9	a^{10}

Hence to raiſe a quantity to a given *power* or dignity, is the ſame as to find the factum ariſing upon its being multiplied a given number of times into itſelf; e. gr. to raiſe 2 to the 3d *power*, is the ſame as to find the factum 8; whoſe factors are 2, 2, 2. This operation is called INVOLUTION.

Powers, of the ſame degree, are to one another, in the ratio of the roots, as mainfold as their exponent contains units: thus, ſquares are in a duplicate ratio; cubes in a triplicate ratio; quadrato-quadrata, or fourth *powers*, in a quadruplicate ratio. See RATIO.

The *powers* of proportional quantities are alſo proportional to one another.

POWER, *Arithmetical*, is uſed by Mr. Machin for compoſite numbers or quanties, whoſe factors are in arithmetical progreſſion. See Dr. Martyn's Abridg. Phil. Tranſ. vol. viii. p. 78

Mr. Machin uſes a particular notation for quantities of this kind. The quantity expreſſed by this notation has a double index; that at the head of the root at the right hand, but ſeparated by a hook to diſtinguiſh it from the common index, denotes the number of factors; and that above, within the hook on the left hand, denotes the common difference of the factors proceeding in a decreaſing or increaſing arithmetical progreſſion.

Thus the quantity $\overset{\underset{\smile}{a}(m}{\overline{n+a}}$ denotes by its index ^{m} on the right hand, that it is a compoſite quantity, conſiſting of ſo many factors as there are units in the number ^{m}, and the index a above on the left, denotes the common difference of the factors decreaſing in an arithmetical progreſſion, if it be poſitive; or increaſing, if it be negative; and ſo ſignifies, in the common notation, the common number or quantity, $\overline{n+a}, \overline{n+a-a}, \overline{n+a-2a}$, &c.

For example, $\overset{\underset{\smile}{2}(6}{\overline{n+5}}$ is $= \overline{n+5}, \overline{n+3}, \overline{n+1}, \overline{n-1}, \overline{n-3}, \overline{n-5}$, conſiſting of ſix factors, whoſe common difference is 2. After the ſame manner, $\overline{n+4}^{2}, (^{5} = \overline{n+4}, \overline{n+2}\ \overline{n}, \overline{n-2}, \overline{n-4}$, conſiſting of five factors. According to which method, it will eaſily appear, that if a be an integer, then $\overset{\underset{\smile}{2}(2a+2,\ \&c.}{\overline{n+2a+1}}$ will be $= \overline{nn-1}, \overline{nn-9}, \overline{nn-25}$, continued to ſuch a number of double factors as are expreſſed by $a+1$, or half the index, which in this caſe is an even number. Thus alſo $\overset{\underset{\smile}{2}(2a+1}{\overline{n+2a}}$ will be equal to n, $\overline{nn-4}, \overline{nn-16}, \overline{nn-36}$, and ſo on, where there to be ſo many double factors, as with one ſingle one n, will make up the index $2a+1$, which is an odd number.

if the common difference a be an unit, it is omitted: thus $\underset{\smile}{}(^{6} = {}^{n}, \overline{n-1}, \overline{n-2}, \overline{n-3}, \overline{n-4}, \overline{n-5}$, containing ſix factors. So $6\underset{\smile}{}(^{6} = 6, 5, 4, 3, 2, 1$, and the like for others.

If the common difference a be nothing, the hook is omitted, and it becomes the ſame with the geometrical *power*. Thus $\overset{\underset{\smile}{0}(m}{\overline{n+a}} = \overline{n+a}^{m}$, according to the common notation.

The learned author above quoted applies this doctrine of arithmetical *powers* to the inveſtigation of the principal rule in the method of fluxions, and its inverſe, which is that if the ordinate $y = m z^{m-1}$, then will the area, or rather the form of the quantity for the area, be $= z^m$; or *vice verſa*, that if the area be z^m, the ordinate will be $m z^{m-1}$; on which occaſion he obſerves, that the ſymbol z, conſidered as a component part of the rectangle z, may bear a plain interpretation, viz. that it is the meaſure according to which the quantity z is meaſured. See FLUXION.

From a given POWER *to extract the root*, or *ſide*, is the ſame as to find a number e. gr. 2, which multiplied any number of times, e. gr. twice, produces the given *power*, e. gr. the 3d *power*, or 8. This operation is called EVOLUTION, and EXTRACTION *of roots*.

To multiply or divide any POWER *by another of the ſame root.*

1. For multiplication, add the exponents of the factors; the ſum is the exponent of the factum. Thus:

$$\begin{array}{lccccc} \text{Factors}\left\{\begin{array}{l} \\ \\ \end{array}\right. & x^4 & y^m & y^m & a^m & x^n \\ & x^3 & y^m & y^n & a^r & x^s \\ \hline \text{Prod.} & x^7 & y^{2m} & y^{m+n} & a^{m+r} & x^{n+s} \end{array}$$

2. For diviſion ſubtract the exponent of the *power* of the diviſor, from the exponent of the dividend; the remainder is the exponent of the quotient. Thus;

$$\begin{array}{l|l|l|l} \text{Divid.}\ \ \dfrac{x^7}{x^4}\Big(\,z^3 & \dfrac{y^{m+n}}{y^n}\Big(\,y^m & \dfrac{a^m}{a^r}\Big(\,a^{m-r} & \dfrac{x^n}{x^s}\Big(\,x^{n-s} \\ \text{Diviſ.} & & & \end{array}$$

M. de la Hire gives us a very odd property common to all *powers*: M. Carre had obſerved with regard to the number 6, that all the natural cubic numbers, 8, 27, 64, 125, whoſe root is leſs than 6, being divided by 6, the remainder of the diviſion is the root itſelf; and if we go farther, 216, the cube of 6, being divided by 6, leaves no remainder: but the diviſor 6 is itſelf the root. Again, 343, the cube of 7, being divided by 6, leaves 1; which, added to the diviſor 6, makes 7 the root, &c. M. de la Hire, on conſidering this, has found that all numbers, raiſed to any *power* whatever, have diviſors, which have the ſame effect with regard thereto, that 6 has with regard to cubic numbers.

For the finding of theſe diviſors, he diſcovered the following general rule:

If the exponent of the *power* of a number be even, i. e. if the number be raiſed to the 2d, 4th, 6th *power*, &c. it muſt be divided by 2; the remainder of the diviſion, in caſe there be any, added to 2, or to a multiple of 2, gives the root of this number, correſponding to its *power*, i. e. the 2d, 6th, &c. root.

If the exponent of the *power* be an uneven number, i. e. if the number be raiſed to the 3d, 5th, 7th, &c. *power*; the double of the exponent will be the diviſor, which has the property mentioned.

Thus is it found in 6, double of 3, the exponent of the *power* of all the cubes: thus, alſo, 10 is the diviſor of all numbers raiſed to the 5th *power*, &c.

If any *power* of a quantity be divided by a greater *power* of the ſame quantity, the quotient muſt be negative. For the rule for dividing any *power* of a quantity by another *power* of the ſame, is to ſubtract the exponent of the diviſor from the exponent of the dividend, and make the difference the exponent of the quotient.

For inſtance, $\frac{a^6}{a^4} = a^{6-4} = a^2$; and $\frac{a^m}{a^p} = a^{m-p}$.

Hence if p be greater than m, the exponent $m-p$ muſt be negative.

Thus if $p = m+n$, then $\frac{a^m}{a^p} = \frac{a^m}{a^{m+n}} = a^{-n}$.

It is obvious that $\frac{a}{a} = a^{1-1} = a^0$. But $\frac{a}{a} = 1$; and therefore $a^0 = 1$. In like manner $\frac{1}{a} = \frac{a^0}{a^1} = a^{-1}$; $\frac{1}{aa} = \frac{a^0}{a^2} = a^{0-2} = a^{-2}$; $\frac{1}{aaa} = a^{0-3} = a^{-3}$, ſo that the quantities a, 1, $\frac{1}{a}$, $\frac{1}{a^2}$, $\frac{1}{a^3}$, $\frac{1}{a^4}$, &c. may be expreſſed thus, a^1, a^0, a^{-1}, a^{-2}, a^{-3}, a^{-4}, &c.

This change of expreſſion is often of great uſe in the computation of fluxions and infinite ſeries.

When the quantity to be raiſed to any *power* is poſitive, all its *powers* muſt be poſitive. And when the radical quantity is negative, yet all its powers, whoſe exponents are even numbers, muſt be poſitive. For $-\times-$ gives $+$. The *power* then can only be negative, when the exponent is an odd number. Thus the *powers* of $-a$ are $-a$, $+a^2$, $-a^3$, $+a^4$, $-a^5$, &c. Thoſe whoſe exponents are 2, 4, 6, &c. are poſitive, but thoſe whoſe exponents are 1, 3, 5, 7, &c. are negative. Maclaur. Algebr. p. 37, 38.

Hence if a *power* have a negative ſign, no root of it denominated by an even number, can be aſſigned; ſince no quantity multiplied into itſelf an even number of times can give a negative product. Thus the ſquare root of $-aa$ or $\sqrt{-aa}$ cannot be aſſigned, and is what mathematicians call an *impoſſible*, or an *imaginary* quantity or *root*. See Root.

Obſerve, that every *power* has as many roots, real and imaginary, as there are units in the exponent of the *power*. This holds true of UNITY itſelf. Maclaur. Algebr. p. 128.

Power, *imperfect*, in *Algebra*, is uſed for a *power* that has a fractional exponent; thus $a^{\frac{1}{2}}$, $a^{\frac{2}{3}}$, $a^{\frac{3}{5}}$, $a^{\frac{7}{8}}$, &c. are imperfect *powers*. Maclaur. Algebr. p. 44.

Theſe are otherwiſe expreſſed by placing the given *power* within the radical ſign $\surd$, and placing above the radical ſign the number that denominates what kind of root is required. Thus $a^{\frac{3}{2}} = \sqrt[2]{a^3}$; $a^{\frac{5}{3}} = \sqrt[3]{a^5}$; $a^{\frac{m}{n}} = \sqrt[n]{a^m}$.

Theſe imperfect *powers* are alſo called SURDS.

Power, *commenſurable in*. See COMMENSURABLE.

Power *of an hyperbola*, in *Conics*, in the ſquare of the right line CI, or AI, (*Tab. Conics*, *fig.* 20.)

The *power* of the hyperbola is the fourth part of the ſquare of the conjugate ſemiaxis; or the ſixteenth part of the ſquare of the conjugate axis. See HYPERBOLA.

Power *of the county*. See Posse *commitatus*.

POWTER. or *Engliſh* Powter, the name of a peculiar ſpecies of pigeon, called by Moore the *columba gutturoſa Anglica*.

It was firſt bred in England, and is of a mixed breed, between what is called the horſeman and the cropper. It is a very beautiful ſpecies, and is valued for its length of legs and body, neatneſs of crop, and ſlenderneſs in girth, added to the beauty of its feathers. This ſpecies is often eighteen, ſometimes twenty inches long from the end of the bill to the extremity of the tail; its legs, from the upper joint of the thigh to the toe-nail, are ſometimes ſeven inches; the crop is large and round, eſpecially toward the beak, filling alſo behind, and making almoſt a perfectly orbicular figure. They are either blue-pied, black-pied, red-pied, or yellow-pied; the laſt colour is moſt valued.

Powter, *Pariſian*, a ſpecies of pigeon called by Moore *columba gutturoſa Pariſiorum*.

It was firſt bred at Paris, and thence ſent to Bruſſels, whence it was afterwards brought into England. It reſembles the Engliſh *powter*, but is ſhort-bodied, ſhort-legged, thick in the girth, and long-cropped. It is admired for the beauty of its feathers, which is peculiar to itſelf; it reſembling in this a fine piece of that ſort of needle-work which the ladies call the Iriſh ſtitch, being chequered with various colours in every feather, except the flight, which is white. It has generally a good deal of red intermixed with the other colours, and the more it has of this, the more it is eſteemed.

POWTING *horſeman*, a name given to a mixed breed of pigeons, produced between thoſe two kinds, known by the names of the *cropper* and the *horſeman*, according to the number of times that the young are bred over from the *cropper*. They are diſtinguiſhed by the name of the firſt, ſecond, or thir dbreed.

Theſe are a very agile and nimble pigeon; and by their continually flying up and down about the dove-houſe, are apt to bring in other ſtray pigeons; which cannot find their houſes. They are obſerved to breed often, and take great care of their young ones.

POX, in *Medicine*, a diſeaſe, under which name there are ſeveral kinds; as *ſmall-pox*, *French-pox*, *chicken-pox*, *ſwine-pox*, &c.

Pox, *ſmall*, *variolæ*, is a contagious diſeaſe appearing on the ſurface of the ſkin, which it covers with puſtules, or ulcerous eruptions, that leave eſchars behind them. Or, it is a general eruption of particular puſtules tending to ſuppuration, and attended with a fever.

Dr. Hahn endeavours to prove, that the *ſmall-pox*, was deſcribed by the old Greek phyſicians under the name of carbuncle.

Dr. Hahn's treatiſe on the antiquity of the *ſmall-pox* has been criticized by Dr. Werlhoff, who endeavours to ſhew, that Dr. Hahn's quotation from the old Greek writers concerning the carbuncle, cannot be underſtood of the *ſmall-pox*, which is a diſeaſe we have no account of till the Saracens diſperſed it.

The origin of this diſeaſe is uncertain· we find no mention of it before the Arab phyſicians. The firſt account we have of this diſorder was wrote by Rhazes; about the end of the ninth or the beginning of the tenth century, and his deſcription of it was ſo complete, that little or nothing was added to it for five hundred years after; and he uſed the cool method in the management of it. Rhazes ſays, that Aaron, an Alexandrian phyſician, was the firſt who deſcribed it; and that he writ A. D. 622.

It bears a great reſemblance to the meaſles: ſo that, for the two or three firſt days, it is difficult to diſtinguiſh them: they both ariſe from an impure blood, and corrupt humours; with this difference, that, in the *ſmall-pox* the peccant matter is more thick and viſcid; in the MEASLES, more ſubtle, hot, and bilious; and neither of them are known to return after they have been had once.

Dolæus ſays, that the cauſe of the *ſmall-pox* is brought into the world with us, and lies hid till it find an opportunity of burſting forth: he adds, that there is ſcarce one, in many thouſands, that eſcapes it all his life.

Dr. Drake obſerves, that the *ſmall-pox*, not being founded in any permanent habitual diſpoſition, has its period within a limited time neceſſary for the extruſion of the peccant matter out of the pores of the ſkin. For the ſalt ſerum of the blood, being in this diſeaſe, by an accidental ſever, thrown out in great quantities on the glands of the ſkin, acts much after the manner as in the lepra Arabum; but, when the blood is diſpumated, the ſcales dry, and fall off, So that he thinks it would be no great impropriety to call the *ſmall-pox*, a temporary, critical, *lepra*.

The occaſional cauſes of the Small-pox may be, 1. Some alteration in the air, ſince they happen moſt frequently about the ſpring ſeaſon, and are very frequent in ſummer, leſs ſo in autumn, and leaſt of all in winter; and, both in Europe and elſewhere, are more epidemical and mortal at particular times. 2. From fear which appears more evident than eaſy to explain. 3. From ſurfeits, as by eating any thing two chilling to the blood; as cucumbers, oranges, &c. in hot ſeaſons; or, when the body is heated by motion, the drinking of cold liquors. 4. From too plentifully feeding. 5. From any over-heating the blood, or too ſuddenly cooling it after it is heated, whereb ya ſudden check is given to perſpiration; and this more eſpecially if the air favours ſuch an eruption.

Children are moſt liable to this diſeaſe; and thoſe whoſe food is unwholeſome, who want proper exerciſe, and abound with groſs humours, run the greateſt hazard from it.

The *ſmall-pox* are of two kinds: the *diſtinct*, where the puſtules ſtand apart; and the *confluent*, where they run into one continued cake.

Dr. Mead divides them into the ſimple and malignant: the ſimple is, when the ſymptoms are mild, the ſuppuration kindly, and at laſt, the puſtules fall off in dry ſcabs: the malignant is, when the fever is great, the puſtules advance but ſlowly, and do not ſuppurate well, and the other ſymptoms are violent.

The diſtinct, or *regular Small* Pox, Sydenham obſerves, begins with a ſhuddering and chillineſs, which is ſucceeded by an intenſe heat, violent pain of the head and back, vomiting, drowſineſs, eſpecially in children, and ſometimes convulſive fits, which ſhew the *pox* to be ready to burſt forth, and that they will be mild.

The eruptions are uſually on the fourth day: upon which the feveriſh ſymptoms vaniſh, except that adults are prone to ſweat.

The puſtules firſt appear like flea-bites, in the face, then the neck, breaſt, &c. They are at firſt reddiſh; by degrees they ſwell, inflaming the ſkin and fleſh of the neighbouring parts, and then grow whiter and rough, indicating an incipient ſuppuration; and they likewiſe gradually diſcharge a yellow matter; the inflammation of the hands and face arriving the mean time at its height, cauſes the ſpaces between the eruptions to appear of a florid colour, like a damaſk roſe: and the more mild the *ſmall-pox* is, ſo much more will the eruptions and the intermediate ſpaces approach to this colour: on the eleventh day the ſwelling and inflammation of the face abate, and the puſtules begin to ſcale off; and uſually quite diſappear on the fourteenth or fifteenth day, but the eruptions an the hands, being more obſtinate, remain a day or two longer. The puſtules on the face are ſucceeded by a ſcurf, or ſcales, and theſe ſometimes by pits or marks; for when the puſtules firſt fall of, the ſkin is ſmooth, but thoſe ſcales coming on and falling off alternately, do at length make theſe pits; although the diſtinct ſort often leaves no marks behind. If this kind proves fatal, it is commonly on the fourteenth or fifteenth day.

The ſymptoms of the *diſtinct ſmall-pox*, as enumerated by Dr. Shaw are, 1. A pain in the head, back, and ſcrobiculum cordis. 2 A fever, which decreaſes as the eruptions increaſe, with redneſs of the eyes. 3. Nauſea and retchings. 4. Little reddiſh ſpots, or beginning puſtules, appearing on the neck, face, breaſt, &c. about the third or fourth day incluſive, from the beginning of the illneſs. 5. Reſtleſſneſs. 6. About the ſeventh or eighth day, other little red ſpots uſually appear between the growing puſtules. 7. The puſtules, about the ninth day, are at their ſtate; being then generally, as big as a large pea, the matter in them well concocted, of a whitiſh colour, inclined to yellow; at which time, 8. The patient is uſually light-headed and feveriſh. 9. About the tenth day the puſtules begin to dry on the face. 10. And about the fifteenth they appear ſhrunk, and begin to ſcale off; and now the danger is eſteemed to be over.

The *diſtinct* kind is here conſidered unattended with a looſeneſs, and other ſymptoms, which ſometimes happen in it, as well as in the other.

The confluent, or *flux ſmall*-Pox have the ſame ſymptoms with the *diſtinct*, only in a more violent degree, and afflict the patient for ſeveral days after the puſtules appear; they uſually come out on the third day, not ſeparate, as in the *diſtinct* kind, but ſpread into one another, eſpecially thoſe on the face; and at length appear all at firſt like a red bladder, and at length like one whitiſh pellicle, over the whole ſkin. After the eighth day, the pellicle becomes gradually rougher, and inclines to a brown, and not to a yellow colour, as in the diſtinct kind. The roughneſs and colour of the ſkin daily increaſe, till at length the pellicle falls off in large ſcales: but when the diſeaſe has been ſevere, it uſually adheres to ſome parts of the face till after the twentieth day. The ſcales which immediately precede the pellicle, are of a very corroſive nature, and not only make larger pits than thoſe of the diſtinct ſort, but alſo much disfigure the face with ſcales; and the eruptions on the hands and feet are larger than thoſe of the other parts, and diminiſh gradually as they approach the body.

In adults this kind is attended with a ſalivation; in children with a diarrhœa. The ſalivation frequently ſucceeds immediately after eruption; the diarrhœa later. The confluent kind uſually kills on the eleventh day.

In both the diſtinct and confluent ſort, the fever rages moſt from the beginning to the time of the eruption, after which it abates, and continues much more moderate, till the ſuppuration begins, which being finiſhed, it goes off entirely. When the diſeaſe proves violent, the patient has a kind of fit towards the evening; at which time, eſpecially, the moſt dangerous ſymptoms ariſe, and rage moſt ſeverely.

The ſymptoms of the confluent kind, according to Dr. Shaw, are, 1 Violent pain in the head, back, and ſcrobiculum cordis. 2. Nauſea and retching, with a fever, which rather increaſes than decreaſes after the eruption. 3. In children a diarrhœa, which uſually precedes the eruption, and attends the diſtemper throughout. 4. A ptyaliſmus in adults, and but ſeldom a diarrhœa. 5. Deliria, convulſions, hoarſeneſs, difficulty of breathing, fixedneſs of the eyes, and reſtleſſneſs; which may alſo, in a leſſer degree, attend the diſtinct ſort. 6. The ſpots are here more red, thick, and cloſe, than in the diſtinct; and the ſpaces between them more inflamed and ſwelled; purple or livid ſpots alſo often appear in theſe ſpaces; whence the *ſmall-pox with purples*. At other times in theſe ſpaces, or on the heads of the eruptions, appear bladders full of clear water, vulgarly called the *white hives*. Laſtly, theſe eruptions are frequently depreſſed in the middle, and there turn black; whence the *black ſmall-pox*.

The eruptions often riſe and ſink again in the progreſs of the diſtemper. They uſually firſt appear about the fourth or fifth day, and come to their ſtate about the fifteenth.

Morton divides the diſeaſe into four ſtages: the *apparatus* or preparation, from the time of the firſt infection to the eruption of the puſtules. The *eruption*, which comprehends three ſtates: *eruption*, *maturation*, and *declenſion*, in which laſt the puſtules are firſt incruſtated with a ſcab, then wither, and dry off.

When the eruptions are very round, diſtinct, encompaſſed with a red margin, &c. they are ſaid to be *benign*, otherwiſe *malignant*.

There are four degrees of malignancy, viz. when the puſtules are univerſally confluent; particularly confluent; diſtinct, but very ſmall and coherent; and diſtinct, with petechiæ, and miliary eruptions.

As to the prognoſtic ſigns of the ſmall-Pox: 1 The ſooner they appear in the ſpring, and the more the air is diſpoſed to favour the diſtemper, the more fatal they uſually prove. 2. The confluent ſpecies, both in children and adults, is dangerous; and the more ſo, if attended with a ſuppreſſion of urine, nauſea, retching, delirium, purple ſpots, cryſtallines, bloody urine or ſtools, with a ſwelled belly, &c. after the eruption; but the blackneſs of them is not dangerous before the criſis. 3. Diarrhœas in the confluent kind are not ſo bad in children as in adults. 4. A ptyaliſmus is a regular attendant of the confluent kind in adults, from the ſixth or ſeventh day, till after the criſis; and is ſo neceſſary, that if it ſtop ſuddenly, and return not for twenty-four hours, the patient is ſuppoſed to be in great danger. 5. A quinzy here is highly dangerous. 6. The eruptions ſwelling, and ſinking ſuddenly, are bad ſigns. 7. The danger is not over till about the twentieth day, in the confluent ſpecies. But if the puſtules be diſtinct, with a florid red baſe, few, round, plump, riſe full of a thick purulent matter, firſt of a whitiſh and afterwards of a yellow colour, and grow up ſharp at the top; if the ſickneſs, vomiting, &c. go off, or remit, upon the appearance of the eruptions, and the patient be under no dreadful apprehenſions; the danger is uſually over about the tenth day, in the diſtinct kind. Convulſions attending the firſt ſymptoms of the *ſmall-pox* in children, are ſaid to foreſhew the appearance of eruptions within twelve hours, which then generally prove diſtinct, and the patient does well. The *ſmall-pox* ſucceeding a debauch in liquors, or happening upon an irregular courſe of life, is uſually mortal.

A livid brown colour of the puſtules, in an unfavourable ſymptom; and alſo when they are ſmall and flat, with black ſpecks in the middle. Puſtules which contain a thin watery ichor are very bad. A great number of *pox* on the face is always attended with danger. Pale urine and a violent throbbing of the arteries of the neck are ſigns of an approaching delirium. If the face begins to fall about the eleventh or twelfth day, and at the ſame time the hands and feet begin to ſwell, the patient generally does well; but when theſe do not ſucceed each other, there is reaſon to apprehend danger. When the tongue is covered with a brown cruſt, it is an unfavourable ſymptom. Cold ſhivering fits coming on at the height of the diſeaſe are likewiſe unfavourable. Grinding of the teeth, when it proceeds from an affection of the nervous ſyſtem, is a bad ſign; but ſometimes it is occaſioned by worms or a diſordered ſtomach.

Dr. Friend, Dr Cade, &c. recommend purging and phlebotomy after an imperfect criſis of the *ſmall-pox*, i. e. where the fever remains after the puſtules decline; many oppoſe it: indeed reaſon ſeems on its ſide; but preſcription is againſt it. Alſaharavius, in the firſt ſtage of the *ſmall-pox*, preſcribes phlebotomy, even to a ſwooning, and great quantities of cold water to be drank. In the malignant *ſmall-pox*, Dr. Liſter found the blood, when cold, exceſſively tender and friable, ſo that the ſofteſt feather would eaſily divide its globules. Etmuller ſays, there is nothing to be more regarded than the breath and voice; where theſe are good, it is an excellent ſign. He adds, that horſe-dung is an admirable medicine, in that it promotes ſweat, ſaves the throat, &c.

Dr. Hilſcher recommends cutting off the hair in the *ſmall-pox*, by which perſpiration may be increaſed. This method was practiſed on the king of Spain's ſon Don Carlos, and on a Saxon prince with ſucceſs.

Dr. Martin, of Lauſanne, recommends bathing the face and body with cloths dipped in tepid water every four hours during the eruption of the *ſmall pox*; aſſuring that it has excellent good effects.

Dr. Haller tells us, that camphor aſſiſts greatly to fill the puſtules of the *ſmall-pox* of the confluent kind with petechiæ.

Dr. Lobb diſapproves entirely of blood-letting in the *ſmall-pox*, and thinks the diſeaſe may be prevented, or cured, without any eruption, and that a ſpecific may be found: he propoſes the Æthiops mineral as ſuch, and relates ſome examples of the diſeaſe being, in his judgment prevented by the timely uſe of it. The biſhop of Cloyne, ſeems to aſcribes the ſame virtues to TAR-*water*.

Dr. Wintringham ſays, he never obſerved antiphlogiſtic medicines, which open the belly, diluting clyſters, or, ſuch like, to have any bad effects in this diſtemper; but, on the contrary, has always ſeen them ſerviceable to young, vigorous, plethoric patients: while too bound a belly frequently at laſt produces a dangerous diarrhœa. He propoſes in urgent caſes of the confluent *ſmall-pox*, where, from the reſorption of the variolous matter, there is great danger of increaſing the ſecondary fever, that the puſtules ſhould be all opened, and treated as ſo many ulcers.

Bloody urine is looked upon as a forerunner of death in the *ſmall-pox*; but we have inſtances of perſons recovering under ſuch ſymptoms.

To theſe general obſervations it may not be improper to add ſome farther particulars with regard to the courſe of regimen and medicine to be purſued in this diſeaſe.

During the eruptive fever, nothing more is neceſſary, in general, than to keep the patient cool and eaſy, allowing him to drink freely of diluting liquors, as balm-tea, barley-water, clear whey, &c. to eat light food, as panada, bread boiled with equal quantities of milk and water, good apples roaſted or boiled with milk, &c. and to remain undiſturbed, not confining him to bed, and frequently bathing his feet and legs in lukewarm water. Warm cordials, ſudorific medicines, and every thing that tends to inflame the blood, increaſe the fever, and drive out the puſtules prematurely, are noxious, and ſhould be carefully avoided. Great regard ſhould alſo be paid to cleanlineſs and freſh air in this diſtemper.

The preſent practice has very juſtly exploded a hot regimen in the treatment of the *ſmall-pox*. When the *pox* are full, butter-milk, which is of an opening and cleanſing nature, is recommended as a very proper drink.

With regard to medicine, the diſeaſe may be conſidered in four different periods of it; viz. the fever which precedes the eruption, the eruption itſelf, the ſuppuration or maturation of the puſtules, and the ſecondary fever. Adults of a ſtrong conſtitution and plethoric habit ſometimes require bleeding, provided that a full pulſe, dry ſkin, and other urgent ſymptoms of inflammation, indicate the neceſſity of this operation: emollient clyſters may be applied, when the belly is bound; and if there be a great nauſea, the ſtomach may be cleanſed with weak chamomile tea, or lukewarm water. In this ſtate, every method ſhould be uſed, by a cool regimen, &c. to prevent too great an eruption; but after the puſtules have appeared, the ſuppuration ſhould be promoted by diluting drink, light food, and if nature flags, by generous cordials, as good wine made into negus, with an equal quantity of water, and ſharpened with the juice of orange, the jelly of currants, or the like. When the riſing of the *ſmall-pox* is prevented by the violence of the fever, a cool regimen is ſtrictly to be obſerved: and when the patient is very reſtleſs at this time, gentle opiates, ſuch as a tea-ſpoonful of the ſyrup of poppies given every five or ſix hours to infants, and a table ſpoonful to adults, are neceſſary.

Suppreſſion of urine ſhould be relieved by the patient's walking acroſs the room with his feet bare, and by frequent endeavours to paſs urine, or by occaſionally mixing with his drink a tea ſpoonful of the ſweet ſpirits of nitre. A foul mouth and throat, attended with a dry and chapped tongue, ſhould be frequently waſhed with water and honey, ſharpened with a little vinegar and currant jelly. Emollient clyſters ſhould be thrown in every ſecond or third day, during the riſing of the *ſmall-pox*, and through the whole courſe of the diſeaſe. When purple ſpots appear among the *ſmall-pox*, the Peruvian bark muſt be immediately adminiſtered. For this purpoſe two drachms of the powdered bark may be mixed in three ounces of common water, one ounce of ſimple cinnamon water, and two ounces of the ſyrup of orange or lemon; a table ſpoonful of this mixture, ſharpened with the ſpirits of vitriol, may be given to a child every hour; and three or four ſpoonfuls to an adult. The patient's drink in this caſe, ſhould be wine, or ſtrong negus acidulated with ſpirits of vitriol, vinegar, the juice of lemons, or currant jelly, and his food conſiſt of apples roaſted or boiled, preſerved cherries, plums, and other fruits of an acid nature. The bark and acids are alſo neceſſary in the lymphatic or cryſtalline *ſmall-pox*, where the matter is thin, and not duly prepared. When the eruption ſubſides ſuddenly, before the puſtules arrive at maturity, bliſtering plaſters muſt be immediately applied to the wriſts and ankles, and the patient's ſpirits ſupported with cordials. Bleeding has ſometimes a good effect for raiſing the puſtules; and ſharp cataplaſms may be applied to the feet and hands, in order to draw the humour towards the extremities.

The moſt dangerous period of the *ſmall-pox* is the ſecondary fever; when the puſtules begin to blacken and turn on the face. The efforts of nature to relieve the patient by looſe ſtools are to be promoted; and when ſymptoms of inflammation of the breaſt appear at the acceſs of this fever, bleeding is neceſſary: but if the patient be faintiſh, the puſtules become ſuddenly pale, and there be great coldneſs of the extremities, bliſtering plaſters muſt be applied, and he ſhould be ſupported with generous cordials.

The ſecondary fever, which is chiefly, if not wholly occaſioned by the abſorption of the purulent matter might be always leſſened, and often altogether prevented, by opening the puſtules when they begin to change of a yellow colour; and the operation may be repeated as long as there is any conſiderable appearance of matter in them. This operation, beſides other good effects, has a tendency to prevent the pitting.

After the *ſmall pox* are gone off, purging ſhould by no means be neglected. For very young children, an infuſion of ſenna and prunes, with a little rhubarb, may be ſweetened with coarſe ſugar, and given in ſmall quantities till it operates. A child of five or ſix years of age may take eight or ten grains of fine rhubarb in powder, at night, and the ſame quantity of jalap in powder next morning: which may be worked off with freſh broth or water gruel, and repeated three or four times: at the interval of five or ſix days between each doſe. For children more advanced, and adults, the doſe muſt be increaſed in proportion to the age and conſtitution.

When impoſthumes happen after the *ſmall-pox*, they muſt be brought to ſuppuration by ripening poultices; and after they have broken, the patient muſt be purged: the Peruvian bark, and a milk diet will alſo be uſeful in this caſe.

When a cough or ſymptoms of conſumption ſucceed the *ſmall-pox*, change of air, a courſe of aſſes milk, and gentle exerciſe will be beneficial. Buchan.

The method of inoculating the *ſmall-pox*, introduced into Europe about half a century ago, has lately prevailed in a very conſiderable degree, eſpecially under the direction of Mr. Sutton and baron Dimſdale; and thoſe who are concerned for the preſervation of their ſpecies, cannot but wiſh that it were univerſal. For an account of the hiſtory and advantages of this practice, and anſwers to the objections urged againſt it, ſee INOCULATION. Here it may be proper to give ſome account of the proceſs itſelf. The ſpring and autumn have been uſually reckoned the moſt proper ſeaſons of the year for inoculation, becauſe they are the moſt temperate; but if any caution is neceſſary, that ſeaſon ſhould be preferred in which no inflammatory or putrid diſeaſes prevail; perſons of every age are fit ſubjects of this operation; but the moſt deſirable age is from three to five. Conſtitutional diſeaſes furniſh no ſufficient objection againſt inoculation, the habit of body having been often meliorated by it; however, acute or critical diſorders ſhould be removed before the operation is performed. The beſt previous preparation is to produce a healthy ſtate of body; it is ſeldom neceſſary to make any alteration in the diet of children, unleſs they are of a groſs habit; in which caſe, their diet ſhould be ſpare, and of a light cooling nature; and their drink whey, butter-milk, and ſuch like. Two or three mild purges may alſo be adminiſtered. But the ſucceſs of inoculators does not depend on the preparation of their patients, but on their management of them while under the diſeaſe.

There ſeems to be no difference in the effect, whether the matter for inoculation be taken from patients, who have received the diſorder in the natural or artificial way; or whether it be taken from a mild kind, or from the more virulent ſort. The method commonly uſed of communicating the infection is to make two or three ſlanting inciſions in the arm, ſo ſuperficial as not to pierce quite through the ſkin, with a lancet wet with freſh matter taken from a ripe puſtule; though the lancet dipped in the variolous matter will ſerve ſeveral days after for communicating the infection; the wounds are then cloſed up, and left without any dreſſing. If freſh matter be applied long enough to the ſkin, there is no occaſion for any wound at all. Let a bit of thread, about half an inch long, wet with the matter, be immediately applied to the arm, between the ſhoulder and the elbow, and covered with a piece of the common ſticking plaſter, and kept on for eight or ten days; and it will ſeldom fail to communicate the diſeaſe. In the evening after inoculation, ſome preſcribe as much calomel mixed with a ſixteenth part of the emetic tartar as will gently move the belly, and in the morning its operation may be promoted with as much Glauber ſalts or other purging medicine as will promote three or four evacuations: they adviſe alſo the repetition of theſe every ſecond night and morning, until the ſymptoms of eruption appear. Mercury, it is ſaid, ſeems to be a ſpecific in the *ſmall-pox*, and may be given ſo freely as to affect the gums and to excite a gentle ptyaliſm. When the inflammation at the puncture is too little, the doſe of calomel ſhould be increaſed, in order both to promote the inflammation there, and to accelerate the general eruption.

The progreſs of the infection is obſerved as follows: about the punctured part, a juſt prognoſtic is uſually formed of the future ſtate of the diſtemper. Sometimes the effect of the infection is obſerved in a few hours after inoculation, by acute pains darting up the ſhoulder, when the puncture is made in the arm, a ſhivering through the body, a red tumor on the arm, or a ſmall riſing where the matter was applied: but, more uſually, nothing is obſerved on the day of operation. On the ſecond day, if the puncture is viewed with a lens, an orange-coloured ſtain may be ſeen about its edges, which ſeem to contract; ſometimes, the puncture inflames, on the firſt or ſecond day, and then vaniſhes without any farther effect; in which caſe, after a few days, the operation may be repeated. On the fourth or fifth day a hardneſs may be perceived where the puncture was made, an itching is felt there, and generally a ſlight inflammation is alſo obſerved. On the ſixth day, there is generally a pain and ſtiffneſs felt in the axilla, which continues till the tenth or eleventh day. This is reckoned a favourable ſymptom. Pain in the head and limbs, with ſtiffneſs under the arms, are certain proofs that the infection hath taken place. On the ſeventh or eighth day the eruptive ſymptoms appear, ſuch as ſlight remitting pains in the head and back, ſtiffneſs in the arm-pits, tranſient ſhiverings, alternate heats, &c. which continue more or leſs till the eruption is completed: the inflammation in the arm ſpreads, and little puſtules are begun there, which increaſe in ſize as the diſeaſe advances. On the tenth or eleventh day an effloreſcence ſurrounds the puncture, and ſometimes extends half way round the arm: the larger this effloreſcence is, the fewer, uſually, are the puſtules: when it accompanies the eruption, the fever and other uneaſy ſymptoms ſubſide, and the difficulty and danger are at an end. As ſoon as the eruptive ſymptoms are perceptible, it is adviſed to give a doſe of calomel with the emetic tartar, and a few hours after it a doſe of the Glauber ſalts.

Among the favourable ſymptoms are, an orange-coloured ſtain about the edges of the puncture on the ſecond day; an itching there in two or three days; a kind of veſication, without much inflammation, on the third or fourth day; a pain and ſtiffneſs in the axilla, the ſooner the better, but if on the ſixth day, it is not unfavourable; the large efflореſcence about the puncture on the tenth or eleventh day, or ſooner; a hardneſs which ſpreads from the puncture as from a centre, and to the touch forms ſtar-like points, and when the part inflamed on the arm riſes, as it were, to an apex, with a little dry ſcab upon it.

The leſs favourable ſymptoms are, a purpliſh, inſtead of a red-coloured inflammation about the puncture, a narrow deep red circle ſurrounding the puncture, and when the incruſtation about it becomes depreſſed and concave in the middle.

The conſtant care of inoculators is to keep their patients cool, and their bodies gently open, by which means the fever is kept low, and the eruption greatly leſſened. The danger is ſeldom great when the puſtules are few; and their number is generally in proportion to the fever which ſucceeds and attends the eruption. Hence the chief ſecret of inoculation conſiſts in regulating the eruptive fever, which generally may be kept ſufficiently low by the methods already recommended.

The regimen during the diſeaſe is in all reſpects the ſame as under the natural *ſmall-pox*. The patient muſt be kept cool, his diet ſhould be light, and his drink weak and diluting. If any bad ſymptoms appear, which is ſeldom the caſe, they muſt be treated as in the natural *ſmall-pox*: nor is purging leſs neceſſary after the *ſmall-pox* by inoculation than in the natural way, and ought by no means to be neglected. Buchan's Dom. Med. chap. 23. and Motherby's Med. Dict. art. *Variolæ*.

*Why the Small-*Pox *ſcarce ever viſits a perſon above once*, is a famous problem; long canvaſſed, and with little ſucceſs. Dr. Drake accounts for it very plauſibly from the alteration made in the ſkin by that diſeaſe. For the diſtenſion the glands and pores of the ſkin ſuffer therein, is ſo great, that they ſcarce ever recover their tone again, ſo as to be able any more to arreſt the matter in its courſe outwards long enough, or in quantity enough, to create thoſe ulcerous puſtules which are the diagnoſtics of the diſeaſe. For though the ſame feveriſh diſpoſition ſhould ariſe again in the blood, yet, the paſſages through the ſkin being more open, the matter will never be ſtopped, ſo as to exhibit the appearance of the *ſmall-pox*.

Accordingly we find, that, in perſons ſeverely afflicted with this diſeaſe, the face, (which is uſually the fulleſt, from the extraordinary obſtruction the matter meets with by the great conſtipation of the pores) ſeldom returns to its former dimenſions; which enlargement he accounts for from the dilatation of the areolæ of the glands and pores of the ſkin, not from any augmentation of the ſubſtance itſelf.

What confirms this hypotheſis is, that nurſes, &c. who attend perſons ſick of the *ſmall-pox*, are frequently a little affected with it, and have, now and then, two or three eruptions: that they have no more, ſeems to follow from the free courſe of the matter through the ſkin. With this, too, agrees that conſtant obſervation, that people of coarſe ſkins, in whom the pores are largeſt, are always more favourably treated by this diſtemper than others; and that it conſtantly leaves fine ſkins coarſer than it found them.

This ſolution would ſeem more probable, were it not that ſome have ſo very few of theſe eruptions, perhaps not above twenty or thirty; which cannot fairly be allowed ſo far to enlarge the pores of the whole ſkin, as to prevent any return.

Others hold, that in a genuine eruption, the cauſe of the diſtemper is ſo far evacuated, as ſcarce to leave a poſſibility of a return of it; and that, if part of the original cauſe did remain behind, it might when the air favours it, or when, by other accidents, it is ſecreted from the blood, appear in the form of eruptions, and ſo prove to be the meaſles, *chicken-pox*, &c.

It may, indeed, be objected that the laſt mentioned often happen before the *ſmall-pox*: but, whatever be the cauſe of the *ſmall-pox*; the ſeparating power muſt be in ſuch a determined proportion, or it will fail to cauſe a regular *ſmall-pox*; and ſo, acting proportionably, may produce any of the other diſtempers juſt mentioned.

To this head we may refer a queſtion which has been agitated among phyſicians, viz. whether any danger would attend inoculation, ſuppoſing the patient to have had the diſeaſe before? This queſtion has generally been anſwered in the negative; but Dr. Buchan inclines to think it merits farther conſideration. Several caſes have occurred, he ſays, in his practice, where the conſtitution ſeemed to ſuffer by the variolous matter having been introduced into the blood without producing what could properly be called the *ſmall-pox*. This, he adds, ought at leaſt to make practitioners careful not to communicate the poiſon unleſs where there is a proſpect of exciting the diſeaſe. Neither ought they to be too ſolicitous in ſuppreſſing the eruption, as that ſeems to be the only ſafe way in which the virus can be diſcharged after it has got into the blood.

Pox, *chicken*, a cutaneous diſeaſe, frequent in children, wherein the ſkin is covered with puſtules, like thoſe of the *ſmall-pox*, as to figure and magnitude; and only diſtinguiſhable therefrom, in that thoſe of the *ſmall-pox* appear with a redneſs and inflammation, and thoſe of the *chicken-pox* whiter, reſembling veſiculæ full of a ſerous humour; which, in three days time, burſt, and dry away, without any danger, and uſually without any fever.

The *chicken-pox*, and *ſwine-pox*, ſeem to be the *ſmall pox* in a leſs degree; though they ſometimes precede, and ſometimes ſucceed, the *ſmall-pox*. The puſtules appear to be of the ſame kind; only in the *ſwine-pox* they are much larger; and in the *chicken-pox*, ſomewhat leſs than in the *ſmall-pox*. There commonly appear five or ſix, ſometimes twenty or thirty on the face, and but very few on the body.

The patient is very little indiſpoſed, either before, at or after their appearance; though the ſudden ſinking of them often cauſes ſome diſorder; but it is preſently relieved by a little ſack and ſaffron, or a doſe of treacle-water.

Grown perſons ſeldom keep within doors for either; and upon that account, the eruptions may continue the longer, becauſe the cold air is ſuppoſed to hinder their ripening; ſo that it is ſometimes three weeks, or a month, before they totally diſappear.

Pox, *French*, a contagious diſeaſe, contracted by a poiſonous humour, uſually in coition: and manifeſting itſelf in ulcers and pains. See VENEREAL *Diſeaſe*.

The French call it *mal de Naples*, the Neapolitan diſeaſe, becauſe firſt obſerved among the ſoldiery at the ſiege of Naples, under Charles VIII. The Italians call it it *mal Franceſe*; and we the *French diſeaſe*, becauſe firſt caught by the French. The Spaniards call it *las bubas*, or *ſarva des Indias*, becauſe firſt brought from the Weſt Indies.

POYNINGS' *law*, a ſet of ſtatutes enacted in the 10 Hen. VII. one of which (cap. 4.) in order to reſtrain the power as well of the deputy as the Iriſh parliament, provides, 1. That before any parliament be ſummoned or holden, the chief governor and council of Ireland ſhall certify to the king, under the great ſeal of Ireland, the conſiderations and cauſes thereof, and the articles of the acts propoſed to be paſſed therein. 2. That after the king in his council of England, ſhall have conſidered, approved, or altered the ſaid acts or any of them, and certified them back under the great ſeal of England, and ſhall have given licence to ſummon and hold a parliament, then the ſame ſhall be ſummoned and held: and therein the ſaid acts ſo certified, and no other, ſhall be propoſed, received, or rejected. But it was afterwards provided by 3 and 4

Ph. & M. cap. 4. that any new propoſitions might be certified to England in the uſual forms, even after the ſummons, and during the ſeſſion of parliament. By this means, however, there was nothing left to the parliament in Ireland, but a bear negative or power of rejecting, not of propoſing or altering any law. But the uſage now is, that bills are often framed in either houſe under the denomination of "heads for a bill or bills," and in that ſhape they are offered to the conſideration of the lord lieutenant and privy council; who, upon ſuch parliamentary intimation, or otherwiſe upon the application of private perſons, receive and tranſmit ſuch heads, or reject them, without any tranſmiſſion to England. And with regard to *Poynings' law* in particular, it cannot be repealed or ſuſpended, unleſs the bill for that purpoſe, before it be certified to England, be approved by both the houſes. Iriſh ſtat. 11 Eliz. ſtat. 3. cap. 38.

It was alſo enacted by another of *Poyings' laws* (cap. 22.) That all acts of parliament, before made in England, ſhould be of force within the realm of Ireland. But by the ſame rule that no laws made in England, between king John's time and *Poynings' law*, were then binding in Ireland, it follows that no acts of the Engliſh parliament, made ſince the 10 Hen. VII. do now bind the people of Ireland, unleſs ſpecially named or included under general words.

Theſe laws took their name from ſir Edward *Poynings*, who was lord deputy at the time when they were enacted; before which time, theoriginal method of paſſing ſtatutes in Ireland, was nearly the ſame as in England, the chief governor holding parliaments at his pleaſure, which enacted ſuch laws as they thought proper.

With reſpect to the dependent ſtate of Ireland, it was declared by 6 Geo. I. cap. 5. that the kingdom of Ireland ought to be ſubordinate to and dependent upon the imperial crown of Great Britain, as being inſeparably united to it; and that the king's majeſty, with the conſent of the lords and commons of Great Britain in parliament, hath power to make laws to bind the people of Ireland. But this act was repealed in 1782; and, therefore, what kind of dependence Ireland will be expected, or will be content, to acknowledge for the future, is now (1783) a queſtion *ſub judice.*

POZZOLANA, a greyiſh kind of earth, uſed in Italy for buiding under water.

The beſt is found about Pozzuoli, Baiæ, and Cumæ, in the kingdom of Naples; from the firſt of which places it takes its name.

The ſubſtance itſelf is a pale greyiſh powder, compoſed of particles ſo extremely minute, as to eſcape the diſtinction even of the beſt glaſſes, and appear, when viewed by the microſcope, only a looſe, very fine, irregular powder. It has among it a few ſmall ſpangles of talc, and being ſhook up in a phial of water, leaves a whitiſh muddineſs in it, which is very long in ſubſiding. If wetted with ſalt-water, it immediately dries into a firm ſolid maſs, like a ſtone. It does the ſame alſo in common water; but the maſs is leſs firm.

The ancients were well acquainted with this ſubſtance and its properties. It is ſaid, indeed, that on running down into the water, it becomes a hard ſtone, while it remains under it; but this is probably a miſtake, ariſing from this, that the powder was continually running down the hills into the ſea, and lodging on their ſides in large quantities in many places; when theſe maſſes became wet with their waves, in ſtorms or high tides, and afterwards deſerted by them, they naturally hardened into ſo many maſſes of a ſort of ſtone: and theſe were probably what authors have ſeen and deſcribed, for they never, probably, ſearched for theſe maſſes under water. The principal uſe of this powder among the ancients was in mixing with their cements for buildings ſunk into the ſea. It is as preſent well known in France and Italy, as an ingredient in that ſort of plaſter they call *pozzolane.*

The remarkable quality of its coaleſcing on its being mixed with water, is probably owing to its having in its compoſition a quantity of a certain earth known in almoſt all ages and countries for coaleſcing into a kind of plaſter without previous burning. The ancients knew this earth by the name of *gypſum tymphaicum*; and we, by that of *calx nativa.* It is very common on the ſides of hills in many parts of Italy.

Pozzolana, mixed with lime, makes the beſt mortar in the world. It hardens and petrifies in water: builders aſſures us, that it penetrates black flints, and whitens them. It is of particular ſervice in making moles, and other buildings, in maritime places. Agricola takes it to be of an aluminous and ſulphureous nature. See Vitruvius, Pliny, de Lorme, &c. who ſet a great value on it.

PRACTICAL *arithmetic, geometry, mathematics, muſic, philoſophy.* See the ſubſtantives.

PRACTICE, in *Arithmetic*, Practica *Italica*, or *Italian uſages*, certain compendious ways of working the rule of proportion, or golden-rule; eſpecially where the firſt term is 1, or unity.

They were thus called from their expediting of *practice*, and buſineſs: and becauſe firſt introduced by the merchants and negotiants of Italy.

The moſt uſeful of theſe *practices* are as follow: 1. Since the uſe of the rule of three is to find a fourth proportional to three given numbers, divide the firſt and ſecond, or the firſt and third, by ſome common number (if that can be done exactly), and work with the quotients in their ſtead: as in the following example:

Price of 3℔ is 9 ſhil. What is the price of 7℔?

3) 1 3 3

facit 21 ſhil.

Price of 14℔. is 26 ſhil. What is the price of 7℔?

7) 2 2) — 1

facit 13 ſhil.

2. If the firſt term be 1, and the ſecond an aliquot part of a pound, ſhilling, or penny, divide the third by the aliquot part: the quotient is the anſwer.

Note, To find the aliqot part, thoſe who cannot do it otherwiſe, may ſee the table of aliquot parts of a pound, under the article Aliquot.

E. gr. If one ell coſt 10 ſhil. What coſt 957 ells?

facit l. 478 : 10*s.*

3. If the firſt or third number be 1, the other not exceeding large, and the middle term a compound, i. e. conſiſting of ſeveral denominations, it may be wrought without reduction, thus.

Price of 1℔. is 3*s.* 8*d.* 3*q.* What is the price of 5℔?

5

facit 18*s* 7*d.* 3*q.*

For 4 farthings making a penny, 5 times 3 farthings make 3*d.* 3*q.* and 12 pence making 1 ſhilling, five times eight pence make 3*s* 4*d.* which, with 3*d.* from the place of farthings, makes 3*s.* 7*d.* Laſtly, five times 3 ſhillings make 15 ſhillings; and with the 3 ſhillings from the place of pence, 18*s.* The price required, therefore, is 18*s.* 7*d.* $\frac{3}{4}$.

4. If the middle term be not an aliquot, but an aliquant part, reſolve the aliquant part into its aliquot parts, divide the middle term by the ſeveral aliquots; the ſum of the quotients is the anſwer. To find the aliquot parts contained in an aliquant, ſee the table of aliquant parts of a pound, under the article Aliquant.

For an inſtance of this rule?

If 1 ell coſt 15 ſhil. What coſt 124 ells?

$\frac{1}{2}$ $\frac{1}{2}$)62

$\frac{1}{4}$ 31

facit. 93*l.*

5. If the firſt or ſecond term be 1, and in the former caſe, the ſecond or third, in the latter the firſt, be reſolvable into factors, the whole operation may be performed in the mind, without writing down any figures; as in the following example;

Price of 1℔. is 24 ſhil. What is the price of 20℔?

4 4

6

80

6

facit 480*s.*—24*l.*

6 Where one of the given numbers is 1, we have ſeveral compendious uſages, to ſave multiplication and diviſion.

E. gr. If 9 ℔. coſt 20 ſhil. What does 1 ℔. coſt?

It is obvious the ſum required is had by adding to the tenth part of 20*s.* viz. 2*s.* the ninth part of the tenth; viz. 2*d* $\frac{1}{2}$, and $\frac{2}{3}$ of a penny; the anſwer, therefore, is 2*s.* 2$\frac{1}{2}$*d.* and $\frac{2}{3}$.

Again, If 5℔. coſt 64 ſhil. What coſts 1 ℔?

Since 5 is half of 10, the double of the tenth part of the given price; viz. 12*s.* 9$\frac{1}{2}$*d.* and $\frac{2}{5}$*q.* is the ſum required.

Again, If 1 ℔. coſt 18*d.* What will 19 ℔. coſt?

Since 19=20—1, from the given price doubled, and increaſed by a cipher, viz. 360; ſubtract the ſimple 18; the remainder is 342*d.*=28*s.* 6*d.* the ſum required.

7. If two terms of the ſame denomination differ by an unit, we have a peculiar kind of compend; which will be clear from the following examples: e. gr. If 5℔. coſt 30*s.* What will 4 ℔. coſt? Since the price of 4 ℔. is one fifth part ſhort of that of 5 lb. divide the given price 30, by 5; the quotient 6 being ſubtracted from the dividend, the remainder, viz. 24*s.* is the ſum required.

Again, If 8 lb. coſt 24*s.* What coſt 9 lb?

Since the price of 9 lb. exceeds that of eight by one-eighth part, divide the given price 24, by 8, and add the quotient 3 to the dividend: the ſum 27 is the anſwer.

8. Sometimes one may uſe ſeveral of theſe compends, or *practices*, in the ſame queſtion. E. gr. If 100lb. coſt *practice*. What coſts 50lb.

30*s*. 4*d* —

30*s*. 4*d*. *facit* 15*s*. 2*d*.

2

Again, 60 lb. coſt 4*s*. What coſt 2520?

6	42
—	—
24	6
7	7
168*l*.	

PRACTORES, Πράκτορες, among the Athenians, officers appointed to receive the money due to the city from fines laid upon criminals.

PRÆ, a Latin prepoſition, literally ſignifying *before*; it is uſed in compoſition with ſeveral words in our language, to denote the relation of priority.

Of late, our writers, in Latin words angliciſed, for *præ*, uſually write *pre*; reſtraining the Latin orthography to words that are ſtill Latin, or uſed as ſuch. Hence, for ſuch words beginning with *præ*, as are not found here, ſee Pre.

PRÆBIUM, a name uſed by medical authors to expreſs a doſe of any thing, or the quantity of a medicine to be exhibited at one time.

PRÆCIÆ, among the Romans, the ſame with *præclamitatores*, which ſee.

PRÆCIPE, in *Law*. See Precipe.

Præcipe *in capite*, a writ iſſuing out of the chancery, for a tenant holding of the king *in capite*; viz. in chief, as of his crown.

PRÆCLAMITATORES, among the Romans, officers that went along the ſtreets of Rome before the *flamen dialis*, to oblige all people to give over their work on public holidays; for if the *flamen* ſaw any one at work, the ſervice of the gods could not be performed.

PRÆCLAVIUM, among the Romans, was uſed to ſignify the PRETEXTA.

PRÆCO, among the Romans, the public crier, an officer whoſe buſineſs it was in the aſſemblies of the people to call the claſſes and centuries according to their order, and to order ſilence to be kept in the temples during the time of ſacrificing.

The aſſiſtance of the *præco* or public crier, was uſed on many other occaſions, as at public ſales or auctions, funerals, games, in courts of juſtice, or public things loſt, &c. See Ceryx.

PRÆCOCIA *mala*, in *Botany*. See Apricot.

PRÆCONISSUS, in *Natural Hiſtory*, the name given by Ludovicus Dulcis, and other writers of his time, to a gem famous for its imaginary virtues: it is deſcribed to have been of the nature of the ſapphire, but ſomewhat approaching to the colour of the chalcedony: this ſeems to make it the leucoſapphirus of other authors.

PRÆFECTURÆ, among the Romans. See Prefectures.

PRÆFERICULUM, among the Romans, a vaſe with a large prominent mouth uſed in the ſacrifices of Ops.

PRÆFICÆ, among the Romans, were mourning women hired to attend funeral ſolemnities; where they praiſed the deceaſed, made a lamentation, beat their breaſts, and diſtorted their faces, to excite others to mourn.

PRÆFINE, or *primer fine*, in *Law*, that fine which upon ſuing out the writ of covenant on levying *fines of lands*, is paid before the time is paſt. This is a noble for every five marks of land ſued for, i. e. one tenth of the annual value. See Post-*fine*.

PRÆFERNIUM, a word uſed by chemical writers to expreſs the anterior part of a furnace, by which the coals, or fuel are put in, and the aſhes taken out.

PRÆMORSUM *folium*, among *Botaniſts*. See Leaf.

PRÆNOTION is uſed by Lord Bacon for breaking of an endleſs ſearch, which he obſerves to be one of the principal parts of the art of memory. For when one endeavours to call any thing to mind, without ſome *previous notion* or perception of what is ſought for, the mind exerts itſelf and ſtrives in an endleſs manner: but if it hath any ſhort notion before hand, the infinity of the ſearch is preſently cut off, and the mind hunts nearer home, as in an incloſure. Thus verſe is eaſier remembered than proſe; becauſe if we ſtick at any word in a verſe, we have a *previous notion* that it is ſuch a word as muſt ſtand in a verſe. Hence alſo, order is a manifeſt help to memory; for here is a *previous notion* that the thing ſought for muſt be agreeable to order. Bacon's Works Abr. vol i. p. 136. and vol. ii. p. 473. See Prenotion, and *Common* Notions.

PRÆPOSITUS *ſacri cubiculi*, among the Romans, an officer who was to take care of the emperor's bed chamber. His office was the ſame with that of our lord chamberlain, and he had the privilege of marching next to the captain of the horſe-guards.

PRÆSALTER, among the Romans, an appellation given to the chief director of the SALII.

PRÆSEPIA, a word uſed by authors to expreſs the ſockets of the teeth.

PRÆSICIA, in *Antiquity*, thoſe parts of the intrails of ſacrifices which were cut off, and offered to the gods.

PRÆSUL, among the Romans, the name of a chief of the *ſalii* or prieſts of Mars. He was ſo called *a præſiliendo*; i. e. dancing at the head of the SALII.

PRAGMATIC *ſanction*, in the *Civil Law*, is defined, by Hottoman, a reſcript, or anſwer of the ſovereign; delivered, by advice of his council, to ſome college, order, or body of people, upon their conſulting him in ſome caſe of their community.

The word is formed from the Greek *ϖραγμα*, *negotium*, *buſineſs*. It is ſometimes alſo called abſolutely, *pragmatic*, *το ϖραγματικον*.

The like anſwer given to any particular perſon, is called ſimply *reſcript*, *reſcriptum*.

The term *pragmatic ſanction* is chiefly uſed, among the modern writers, for that famous ordonnance of Charles VII. of France, drawn up at Bourges, with the conſent of the moſt eminent prelates and grandees of the nation aſſembled at that place, and publiſhed in 1438, containing a regulation of eccleſiaſtical diſcipline, conformable to the canons of the council by Baſil; and ſince uſed by the Gallican church, as a barrier againſt the enterprizes and encroachments of the court of Rome.

The ſcope of the *pragmatic ſanction*, which conſiſted of twenty-three articles, was to regulate the form of elections made by the clergy, to reſtore to every church its privilege of chuſing its biſhop, and to every monaſtery that of electing its abbot or crier; to declare the collations to belong to ordinaries, the prevention alone reſerved to eſtabliſh prebends; to aſſign a third of the benefices to graduates; and to aboliſh reſervations, annates, and other like grievances.

The *pragmatic* of St. Lewis in 1268, conſiſting of ſix articles, was ſimilar to this in its chief deſign. The edict of Bourges, in 1438, was drawn up in a concert with the fathers of the council of Baſil, and the articles it contains were taken from the decrees of that council; though they were admitted by the Gallican church with certain modifications, which the nature of the times and the manners of the nation rendered expedient. See this edict publiſhed at large in Hard. Concil. tom. viii. p. 1949.

Pope Pius II. obtained an abrogation of this ſanction from Louis XI. on which occaſion the court of Rome, tranſported with joy, dragged the *pragmatic* through the ſtreets, whipping it all the way, as Xerxes anciently did the Helleſpont: and the king obtained for himſelf and his ſucceſſors the title of *Moſt Chriſtian*.

But the parliament oppoſed this abrogation with a great deal of vigour, and refuſed its conſent to the laſt. Lewis alſo perceiving that he had been deluded into this meaſure by the treacherous inſinuations of Geoffroy, biſhop of Arras, whom the pope had bribed with a cardinal's cap, and large promiſes of a more lucrative kind, took no ſort of pains to have it executed, but publiſhed, on the contrary, new edicts againſt the pecuniary pretenſions and extortions of the court of Rome. So that, in ſpite of all the efforts of Rome, the *ſanction* ſtill held in force, till the CONCORDAT held between pope Leo. X. and Francis I. in 1517, when the *pragmatic ſanction* was aboliſhed, and the king was inveſted with the privilege of nominating to biſhopricks and vacant benefices.

The parliament of Paris again oppoſed the innovation, and refuſed to confirm the concordat; and was not brought to give its conſent at laſt, till after repeated orders of the king; together with a ſecret reſolution taken always to judge conformably to the tenor of the *pragmatic ſanction*.

PRAGMATICAL, Pragmaticus, a term ſometimes uſed in the ſame ſenſe as *practical*, *mechanical*, or *problematical*.

Stevinus, in his Hydroſtatical Elements, calls certain of his mechanical or practical experiments, which he undertakes to inſtruct his reader how to make, by the name of *pragmatical* examples: and, in the like ſenſe, is the word ſometimes uſed by other naturaliſts.

PRAM, or Prame, a ſort of lighter uſed in Holland and the ports of the Baltic ſea, to carry the cargo of a merchant ſhip along ſide, in order to lade her, or to bring it aſhore.

PRAMNION, in *Natural Hiſtory*, the name of one of the ſemipellucid gems, ſo diſtinct from all the others as to make properly a peculiar genus of foſſils. It is called by many of the ancients *morio* or *morion*, and by our lapidaries the *black agate*.

It is a ſtone of a very great concealed beauty. Our lapidaries, who know it by the name of the *black agate*, are very indeterminate in the application of that name, calling not only this, but every black ſtone capable of a good poliſh by the ſame name, and never looking for its great character, its hidden colour. It is found in the ſhape of our common flints and pebbles, but ſeldom larger than an egg; it appears, on a ſlight inſpection to be of a fine deep black, but held up againſt the ſun, or the light of a candle, it diſcovers itſelf to be of a fine ſtrong red, without the leaſt admixture of any other colour. It is moſt frequently of a purpliſh tinge, like the amethyſt, but is at times found of all the degrees of red, from the pale flower colour of the hyacinth to the deep red of the carbuncle. It is of great hardneſs, and capable of an elegant poliſh.

It is produced only in the Eaſt Indies; and we ſometimes have it thence among other ſtones, but it is not much regarded with us. The Romans were fond of it for engraving on, as we find by Pliny, and by a much more undeniable proof, many of the valuable antiques being cut on it.

PRAMNOS, a name given by the ancients to a ſort of auſtere wine, which looked of a black colour till held up againſt the light, and then appeared of a deep purple: it is recommended by Hippocrates in hæmorrhages.

PRASINUM *viride*, a word uſed by the ancients for verdigriſe.

PRASION. The ancient Greek writers have expreſſed three very different plants by this name.

The moſt common ſignification of the word is the common *marrubium* or horehound. It is in many places uſed alſo to ſignify the leek, and often for that ſort of marjoram which we call *origanum onitis*, or pot-marjoram. Pliny deſcribes this plant, and ſays that it was called *onitis* and *praſius*, and had the appearance of hyſſop.

Heſychius tells us, that the ſea-weeds of the fucus and alga kinds, the ſea-oaks, and ſea-wracks, are called by ſome of the Greek writers *praſia*; and Theophraſtus in one part of his works ſeems to have given this name to thoſe ſubſtances.

The ancients having uſed the word *praſion* in this ſenſe, explains a paſſage in Galen which cannot otherwiſe be well underſtood, that is, where he calls the *empetrum marinum, praſioides*, like the *praſion*.

Dioſcorides had called it *fucoides*, like the ſea-fucus, and he was very well underſtood; but Galen coming after him, and expreſſing his ſenſe by the word *praſioides*, which was ſuppoſed to ſignify reſembling leeks, or horehound, or origanum, his readers were perplexed to find out what alliance the epithet he had choſen to uſe could have, either to the plant, or to the epithet of Dioſcorides; but when it is found that *praſion* ſignifies the ſame as *fucus*, the whole is very intelligible.

PRASIS, a word uſed by ſome authors to expreſs what they call green chalk, an earth uſed by the painters, and known among us by the name of *terre verte*.

PRASIUM, in *Botany*. See *Shrubby Hedge* NETTLE.

PRASIUS, in *Natural Hiſtory*, the name of a gem much approaching to the nature of the emerald, but of a coarſer green, and wanting its hardneſs, and having in its green a caſt of yellow.

It is the ſtone which the ancients called *praſites*; and when of a greater than ordinary admixture of yellow, the *chryſopraſus* and of which the gem diſtinguiſhed by later authors under the name of *ſmaragdopraſus*, is only one of the varieties.

The *praſius*, even in its moſt perfect ſtate, is much leſs beautiful than moſt of the other gems: it is found of various ſizes, and not unfrequently conſiderably large: it is ſeldom met with ſmaller than a pea; from that to the ſize of a horſe-bean is its more uſual ſtandard, from this to the ſize of a nutmeg it is more rarely found; and the larger ſpecimens are coarſer and leſs frequent than theſe. It is of various figures, but is never found in a columnar or cryſtal-like form; this is declaring againſt the ſenſe of our dealers in gems, indeed, who frequently buy and ſell columns of the ſhape of ſprig cryſtal, under the name of the *ſmaragdopraſus*; but theſe are all truly no other than cryſtals tinged to a coarſe and dead green, and without any mixture of yellow; ſo that they are more properly *pſeudoſmaragdi*, or baſtard emeralds, than any thing of the *praſius* kind.

PRATIQUE, or PRATIC, in *Commerce*, a negociation, or communication of commerce, which a merchant-veſſel obtains in the ports it arrives in, and the countries it diſcovers.

The word is French, and ſignifies, literally, *practice*.

Hence, to obtain *pratique*, is to obtain a liberty to frequent a port, to go aſhore, to buy and ſell, &c.

In the European ports of the Mediterranean ſea, it implies a free commercial intercourſe with the inhabitants of the country, after a limited quarantine has been performed, in conſequence of a voyage to Barbary or Turkey.

PRATIQUE is particularly uſed for a licence to traffick, granted to the maſter of a ſhip in the ports of Italy, upon a bill of health; that is, a certificate that the place whence he came is not annoyed with any infectious diſeaſe.

PRAWN. See SQUILLA.

PRAXEANS, a ſect of heretics, ſo called from their author Praxeas.

This hereſiarch was of Aſia, and lived in the ſecond century. He was at firſt a diſciple of Montanus, but quitted him, and ſoon after ſet up a ſect of his own; teaching, that there was no plurality of perſons in the Godhead; and that it was the Father himſelf that ſuffered on the croſs. Which ſentiment was afterwards adopted by the MONARCHICI, SABELLIANS, and PATRIPASSIANS.

PRAYER, in *Theology*, a petition put up to God, either for the obtaining ſome future favour, or the returning of thanks for a paſt one.

Divines diſtinguiſh three kinds of *prayer:*

Vocal, which is clothed in words and ſounds to be uttered with the mouth.

Mental, which is only formed or conceived, in the mind, and not delivered in words.

Ejaculatory, which is a ſhort, ſudden flight, without ſtudy, order, or method.

Myſtic divines, again, diſtinguiſh *prayer*, into *active* and PASSIVE.

Among us, *prayer* is moſt frequently conſidered under the diviſions of preconceived and extemporary.

Under the firſt come all ſet forms, whether public or private, by which the mind is directed in the order, manner, expreſſion, &c. of its petitions.

The ſecond is that where the mind is left to itſelf, its own conduct, both as to matter, manner, words, &c.

The Romaniſts alſo prefer *prayers* to ſaints; the Virgin, the angel Gabriel, &c. See SAINT, OFFICE, AVE *Mary*, &c.

PRAYER, *common*. See COMMON *Prayer*.

PRAYERS *of forty hours*. See HOURS.

PREACHING, in *Theology*, the declaration, or promulgation, of the word of God, in public, by a perſon authorized, and in a place appointed for the purpoſe.

The word is derived from the Hebrew *paraſch*, *expoſuit*, *he expounded*.

Anciently, none but biſhops were allowed to *preach*; now, not only prieſts, but deacons, are qualified.

Biſhop Wilkins has delivered the art of *preaching*, in a treatiſe called Eccleſiaſtes, or the Preacher.

The religious of the order of St. Dominic aſſume the quality of *preaching-brothers*, friars-predicant, or *predicants*.

PREADAMITE, *præadamita*, a denomination given to the inhabitants of the earth; conceived, by ſome people, to have lived before Adam.

Iſaac de la Pereyra, in 1655, publiſhed a book to evince the reality of *Preadamites*; by which he gained a conſiderable number of proſelytes to the opinion: but the anſwer of Demarets, profeſſor of theology at Groningen, publiſhed the year following, put a ſtop to its progreſs; though Pereyra made a reply.

His ſyſtem was this: the Jews he calls *Adamites*, and ſuppoſes them to have iſſued from Adam; and gives the title *Preadamites* to the Gentiles, whom he ſuppoſes to have been a long time before Adam.

But this being expreſly contrary to the firſt words of Geneſis, Pereyra had recourſe to the fabulous antiquities of the Egyptians and Chaldeans, and to ſome of the idle rabbins; who imagined there had been another world before that deſcribed by Moſes.

He was apprehended by the inquiſitors in Flanders, and very roughly uſed, though in the ſervice of the Dauphin. But he appealed from their ſentence to Rome, whither he went in the time of Alexander VII. and where he printed a retractation of his book of *Preadamites*.

PREAMBLE, in *Law*, the beginning of an act of parliament, &c. ſerving, as it were, for a key to open the intent of the makers of the act, and the miſchiefs intended to be prevented or remedied thereby.

PREAUDIENCE, in *Law*. See PRECEDENCE.

PREBEND, *præbenda*, the portion which a prebendary receives for his maintenance out of the eſtate of a cathedral, or collegiate church.

The term *prebend* is uſually confounded with *canonicate*, or *canonica*; yet there is a real difference. A *prebend* is properly a right which an eccleſiaſtic has in a cathedral, or collegiate church, where he officiates, to receive certain eccleſiaſtical revenues, and to enjoy certain dues, either in money or in kind (ſo called *a præbendo*, q. d. *afforded* or *allowed* him; not *a præbendo auxilium* or *conſilium epiſcopo*); whereas *canonica* is a mere title, or ſpiritual quality, which a perſon enjoys independent of any præſtation, or any temporal revenue; ſo that the *prebend* may ſubſiſt without the canonicate; but the canonicate is inſeparable from the *prebend*.

For it is not to the *prebend* that the right of ſuffrage, and other ſpiritual rights are annexed, but to the canonicate; and when the *prebend* is joined to the canonicate, it becomes ſpiritual by virtue of the canonicate to which it is attached.

Anciently the pope created canons with the right of having place in the choir, a deliberative voice in the chapter, and an expectation of the firſt *prebend* that ſhould become vacant; but this was prohibited by the council of Trent: yet the pope ſtill confers the canonicate without any *prebend*, when he would confer a dignity in a church, for the obtaining whereof it is required the candidate be a canon.

This they call a canonicate *ad effectum*, and ſometimes a *jus ventoſum*, which is no more than an empty title, conferred purely to qualify a man for a dignity reſtrained to the capacity of canon.

In ſome churches there are *double prebends*, and in others, *ſemi-prebends*.

Originally the *prebend* was only a livery, or portion of things neceſſary to life, given daily; at preſent the rents and profits of the church are divided into fixed portions, called *prebends*, which are enjoyed independently. Of common right the biſhop is patron of all the *prebends*, becauſe the poſſeſſions were derived from him. Some *prebends* are donative. At Weſtminſter, the king collates by patent, and by virtue thereof the prebendary takes poſſeſſion without inſtitution or induction; and the king, at this day, is patron of moſt of the great *prebends*.

In France it is one of the honorary rights of the king, on his joyful acceſſion to the crown, to nominate to the firſt *prebends* vacant by death in the cathedral and collegiate churches.

Prebends are either *ſimple*, or with *dignity*. The latter are ſuch as, beſide their *prebends*, have ſome juriſdiction annexed to them.

No perſon may hold more than one *prebend* in the ſame church; and if a prebendary accepteth of a deanry, his *prebend* is void by ceſſion, the acceptance of a deanry being underſtood to be in the ſame church. So if he is made a biſhop, tht king preſents to his *prebend*.

Neither prebendaries nor canons appear to have any cure of ſouls; and therefore a *prebend* and a parochial benefice are not incompatible; nor is he who takes a title to a *prebend* thereby obliged, by 13 Eliz. cap. 12. to ſubſcribe to read the thirty-nine articles.

PREBEND, *theological*, or *divinity*, is a *prebend* appropriated to a doctor in divinity, in each cathedral and collegiate church throughout France, for preaching on Sundays, and making a public lecture thrice a week.

PREBEND, *preceptorial*, is that *prebend* whoſe revenues are deſtined for the ſupport of a preceptor or maſter, who is obliged to inſtruct the youth of the place *gratis*.

The canonicate is not here neceſſary to the *prebend*.

Panorm obſerves, that in the cathedral church of Chartres there are *prebends* appropriated to laymen, and for the ſubſiſtence of ſome perſons of birth and diſtinction.

PREBENDARY, *præbendarius*, an eccleſiaſtic who enjoys a PREBEND.

Prebendaries and canons of cathedral and collegiate churches have this in common, that they have each a portion of the revenues of the church for their ſubſiſtence; the one under the title of *præbenda*, *prebend*; the other under the title of *canonica*, or *canonicate*; and have each places and voices in the chapter; but they differ in this, that the former receives his portion or prebend in conſideration of his officiating and ſerving in the church; but the latter without any ſuch conſideration, merely by his being received into the cathedral or college, *per aſſignatum ſtalium in choro, & locum in capitulo.*

Prebendaries and canons are bound to preach in their turns, or provide proper ſubſtitutes. By 28 Hen. VIII. cap. 11. the profits of a *prebend*, during the vacation. ſhall go to the ſucceſſor, towards the payment of his firſt-fruits.

Golden PREBENDARY *of Hereford*, called alſo *præbendarius epiſcopi*, is one of the twenty-eight minor *prebendaries*, who has, *ex officio*, the firſt canon's place that falls.

He was anciently confeſſor of the biſhop and cathedral, and had the altarages; on which account he was called the *golden prebendary*.

PRECARIÆ, or PRECES, in our *Ancient Law-Books*, days-works, which the tenants of certain manors are bound to give their lords in harveſt-time.

Theſe in ſome places are corruptly called *bind-days*, for *biden-days*, from the Saxon, *biddan*, *to pray*.

Magna PRECARIA was a great or general reaping-day.

The lord of the manor of Harrow, in Middleſex, had, 21 Ric. II. a cuſtom, that by ſummons of his bailiff on a general reap-day, then called *magna precaria*, the tenants ſhould do one hundred ninety-nine days work for him; every tenant that had a chimney ſending a man.

PRECARIOUS, in *Commerce*, an appellation given to a kind of trade carried on between two nations at war, by the intervention of a third at peace with them both.

Thus the Engliſh hold a *precarious* commerce with the Spaniards by means of the Portugueſe; when the two former nations being at war, the third lends its veſſels, its colours, and name, to continue their trade.

PRECARIOUS, *Juriſprudence*, is applied to a fund or ſtock, of which a perſon has not the full propriety, whereof he cannot diſpoſe abſolutely, and which is moſt of it borrowed.

PRECATORES, in *Church Hiſtory*, a ſect of heretics, who, under the pretence of praying always, refuſed to work.

PRECE *partium*, in *Law*, the continuance of a ſuit by conſent of both parties.

PRECEDENCE, PRECEDENCY, or PRÆCEDENCY, a place of honour which a perſon is entitled to in companies; either ſitting, or walking.

With regard to the order of *precedency*, it may be obſerved in general, that perſons of every degree of honour or dignity take place according to the ſeniority of their creation, and not of years, unleſs they are deſcended of the blood-royal; in which caſe they have place of all others of the ſame degree.

Precedency is either of *courteſy*, or *de jure*, of right.

The former is that which is due to age, or eſtate, &c. which is regulated by cuſtom and civility.

The latter is ſettled by authority, and where broken in upon, gives an action at law.

Here we may obſerve, that the younger ſons of the preceding rank take place from the eldeſt ſon of the next mediate; viz. the younger ſons of dukes from the eldeſt ſons of earls; the youngeſt ſons of earls from the eldeſt ſons of barons. The whole chain of *precedency* is founded upon this gradation, and thus ſettled by act of parliament. 31 Hen. VIII. cap 11. A. D. 1539. By ſubſequent alterations, all the ſons of viſcounts and barons are allowed to precede baronets; and the eldeſt ſons and daughters of baronets have place given them before the eldeſt ſons and daughters of any knights, of what degree or order ſoever, though ſuperior to that of a baronet; theſe being but temporary dignities, whereas that of baronets is hereditary; and the younger ſons of baronets are to have place next after the eldeſt ſons of knights. There are alſo ſome great officers of ſtate, who take place, although they are not noblemen, above the nobility of higher degree; and there are ſome perſons, who, on account of their dignities in the church, degrees in the univerſities, and inns of court, officers in the ſtate or army, although they are niether knights nor gentlemen born, that nevertheleſs take place among them. Thus, all colonels and field-officers, who are honourable. As alſo the maſter of the ordnance, quarter-maſter general, doctors of divinity, law, phyſic, and muſic, deans, chancellors, prebendaries, heads of colleges in univerſities, and ſerjeants at law, are, by courteſy, allowed place before ordinary eſquires. And all bachelors of divinity, law, phyſic, and muſic; maſters of arts; barriſters in the inns of courts; lieutenant-colonels, majors, captains, and other commiſſioned military officers; and various patent officers in the king's houſhould, may equal, if not precede, any gentleman that has none of theſe qualifications. In towns corporate, the inhabitants of cities are preferred to thoſe of boroughs, and thoſe who have borne magiſtracy to all others. It has been alſo determined in the earl marſhal's court of honour, that all who have been lord mayors of London, ſhall every where take place of all knights bachelors, becauſe they have been the king's lieutenants.

The point of *precedency* is thus ordered by the heralds: after the king and prince of Wales, the princes of the blood, viz. the ſons, grandſons, brothers, uncles, and nephews of the king, take place; then the great officers of the church and crown, viz. the archbiſhop of Canterbury; then the lord chancellor, or lord keeper of the great ſeal; next, the archbiſhop of York; the lord high treaſurer; the lord preſident of the privy-council; the lord privy-ſeal; next, dukes; then marquiſes, dukes eldeſt ſons, earls, marquiſes eldeſt ſons, dukes younger ſons, viſcounts, earls eldeſt ſons, marquiſes younger ſons, biſhops, barons, ſpeaker of the houſe of commons, viſcounts eldeſt ſons, earls younger ſons, barons eldeſt ſons knights of the Garter, privy-counſellors, chancellor and under-treaſurer of the exchequer, chancellor of the duchy of Lancaſter, lord chief juſtice of the king's bench, maſter of the rolls, lord chief juſtice of the common pleas, lord chief baron of the exchequer, juſtices, and barons in the courts of law, viſcounts younger ſons, barons younger ſons, knights bannerets, baronets, knights of the Bath, field and flag officers, knights-bachelors, maſters in chancery, doctors, deans, &c. ſerjeans at law, baronets eldeſt ſons, knights of the Garter's eldeſt ſons, knights of the Bath's eldeſt ſons, knight-bachelor's eldeſt ſons, baronets younger ſons, eſquires by creation, eſquires by office, gentlemen, citizens, burgeſſes, &c.

Note, that great officers of court, of what degree ſoever they are, take place above all other perſons who are of the ſame degree or order of nobility; viz. the maſter of the horſe, lord great chamberlain of England, lord high conſtable of England, lord marſhal of England, lord admiral of England, lord ſteward and lord chamberlain of his majeſty's houſhold. So the ſecretaries of ſtate, if peers, take place of all that degree, except the great officers aforeſaid.

The ladies take place, or *precedency*, according to the degree of quality of their huſbands.

With regard to the *precedency* among women, we may obſerve, that women, before marriage, have *precedency* by their father; with this difference between them and the male children, that the ſame *precedency* is due to all the daughters that belong to the eldeſt. By marriage, a woman partakes of her huſband's dignities; but none of the wife's dignities can come, by marriage, to her huſband, but are to deſcend to her next heir. If a woman has *precedency* by creation or birth, ſhe retains the ſame, though ſhe marry an inferior; but if a woman nobly born marry any nobleman, as a baron, ſhe ſhall take place according to the degree of her huſband only, though ſhe be a duke's daughter. A woman, privileged by marriage with one of noble degree, ſhall retain the privilege due to her by her huſband, though he ſhould be degraded by forfeiture, &c. The wife of the eldeſt ſon of any degree takes place of the daughters of the ſame degree, who always have place immediately after the wives of ſuch eldeſt ſons, and both of them take place of the younger ſons of the preceding degree. And this rule holds, not only in comparing degrees, but alſo families of the ſame degree among themſelves. The *precedency* among women is as follows.

The queen and princeſs of Wales; princeſſes and ducheſſes of the blood; ducheſſes; wives of the eldeſt ſons and daughters of dukes of the blood; marchioneſſes; wives of the eldeſt ſons and daughters of dukes; counteſſes; wives of the eldeſt ſons and daughters of marquiſſes; wives of the youngeſt ſons of dukes; viſcounteſſes; wives of the eldeſt ſons, and daughters of earls; wives of the younger ſons of marquiſſes; baroneſſes; wives of the eldeſt ſans, and daughters of viſcounts: wives of the younger ſons of earls; wives of the eldeſt ſons and daughters of barons; wives of the younger ſons of viſcounts; wives of the younger ſons of barons; wives of baronets; wives of the knights of the Garter; of the Bath; and of knight-bachelors; wives of the eldeſt ſons and daughters of baronets; wives of the eldeſt ſons and daughters of knights of the Garter; wives of the eldeſt ſons and daughters of knights of the Bath; wives of the eldeſt ſons and daughters of knights-bachelors; wives of the younger ſons of baronets; wives of eſquires by creation; of eſquires by office; of gentlemen; daughters of eſquires; of gentlemen; wives of citizens; of burgeſſes, &c. The wives of privy-counſellors, judges, &c. are to take the ſame place as their huſbands do.

A cuſtom has of late years prevailed of granting letters patent of *precedence* to ſuch barriſters as the crown thinks proper to honour with that mark of diſtinction; whereby they are entitled to ſuch rank and pre-audience as are aſſigned in their reſpective patents; ſometimes next after the king's attorney-general, but uſually next after his majeſty's counſel then being. Theſe, as well as the queen's attorney and ſolicitor-general, rank promiſcuouſly with the king's counſel, and together with them ſit within the bar of the reſpective courts, but receive no ſalaries, and are not ſworn; and, therefore, are at liberty to be retained in cauſes againſt the crown. The *precedence*, with regard to pre-audience in the courts, which uſually obtains among the practiſers, is as follows: the king's premier ſerjeant, ſo conſtituted by ſpecial patent; the king's ancient ſerjeant, or the eldeſt among the king's ſerjeants; the king's advocate-general; the king's attorney-general; the king's ſolicitor-general; the king's ſerjeant; the king's counſel, with the queen's attorney and ſolicitor; ſerjeants at law; the recorder of London; advocates of the civil law, and barriſters. In the court of exchequer, two of the moſt experienced barriſters, called the poſtman, and the tub-man, from the places in which they ſit, have alſo *precedence* in motions. Blackſt. Comm. book iii. p. 28.

PRECEDENT, in *Law*, frequently denotes an original, authentic inſtrument, or writing; ſerving as a form to draw others by.

Hence *precedent books*, &c. full of draughts of deeds, conveyances, &c. for attornies.

PRECEDENT *condition*, in *Law*. See CONDITION.

PRECENTOR, *præcentor*, a dignitary in cathedral churches, popularly called the CHANTOR, or *maſter of the choir*.

The *præcentor* is ſo called, from the Latin *præ*, and *cano*; becauſe he is ſuppoſed to lead the choir, and *ſing before* the reſt.

PRECEPT, *præceptum*, in *Law*, a command in writing, ſent by a chief-juſtice, juſtice of peace, or other like officer, for the bringing of a perſon, record, or other matter, before him.

PRECEPT is alſo uſed for the command, or incitement, whereby one man ſtirs up another to commit felony, theft, &c. Bracton ſpeaks of three diverſities of offending in murder; viz. *præceptio*, *fortia*, *conſilium*.

Præceptio, is the inſtigation uſed beforehand; *fortia*, the aſſiſtance in the fact; *conſilium*, the advice given either before or after.

PRECEPT *of election to parliament*. See PARLIAMENT.

PRECEPTORIAL *prebend*. See PREBEND.

PRECEPTORY, *præceptoria*, *commandry*; a kind of benefice held by the more eminent among the ancient Knights Templars, who were created by the grand maſter, with the title of *præceptores Templi*, i. e. *maſters of the Temple*.

Stephens, De juriſd. lib. iv. ſays, the *preceptories* were only a kind of cells, all ſubordinate to their principal manſion, the Temple in London.

Of theſe *preceptories*, Dugdale ſays, he finds ſixteen recorded, as anciently belonging to the Templars in England, viz. Creſſing Temple, Balſhal, Shengay, Newland, Yevely, Witham, Temple Bruere, Willington, Rotheley, Ovenington, Temple-Comb, Trebigh, Ribſtane, Mount St. John, Temple-Newſum, and Temple-Hurſt. But there were more. See COMMANDRY.

PRECES. See PRECARIÆ.

PRECES *primariæ*, or PRIMÆ, is the denomination of an imperial prerogative, whereby the emperor exerciſes, and hath immemorially exerciſed, a right of naming to the firſt prebend that becomes vacant after his acceſſion, in every church of the empire. This right was alſo exerciſed by the crown of England in the reign of Edward I. and probably gave riſe to the royal CORODIES. See OPTION.

PRECESSION, *preceſſio*, in *Aſtronomy*, a term applied to the equinoxes, which by a very ſlow inſenſible motion, change their place, going backward or weſtward, i. e. *in antecedentia*, as aſtronomers calls it, or contrary to the order of the ſigns.

It is ſhewn, in the new aſtronomy, that the pole, the ſolſtices, the equinoxes, and all the other points of the ecliptic, have a retrograde motion; and are continually moving from eaſt to weſt, or from Aries towards Piſces, &c. by means whereof the equinoctial points are carried farther and farther back, among the preceding ſigns of ſtars at the rate of about fifty ſeconds each year, which retrograde motion is called the *proceſſion*, *receſſion*, or *retroceſſion of the equinoxes*.

Hence, as the fixed ſtars remain immoveable, and the equinoxes go backward, the ſtars will ſeem to move more and more eaſtward with reſpect to them; whence the longitudes of the ſtars, which are reckoned from the firſt point of Aries, or the vernal equinox, are continually increaſing.

Hence it is that the conſtellations have all changed the places aſſigned them by the ancient aſtronomers: in the time of Hipparchus, and the oldeſt aſtronomers, the equinoctial points were fixed to the firſt ſtars of Aries and Libra; but the ſigns are now no longer in the ſame points; and the ſtars which were then in conjunction with the ſun when he was in the equinox, are now a whole ſign, or thirty degrees, to the eaſt thereof: thus the firſt ſtar of Aries is now in the proportion of the ecliptic, called Taurus; and the firſt ſtar of Taurus now reſides in Gemini; and Gemini is advanced into Cancer, &c. The equinoxes will have made their revolution weſtward, and will be returned to Aries again, or the conſtellations will have made theirs eaſtward, and will again fall into their former places with regard to the equinoxes, in 25816 years, according to Tycho; in 25920, according to Ricciolus; and in 24800, according to Caſſini.

Theſe phenomena may be clearly underſtood by a view of *Tab. Aſtronomy*, *fig.* 48. Let NZSVL, be the earth, SONA its axis produced to the ſtarry heavens, and terminating in A, the preſent north pole of the heavens, which is vertical to N, the north pole of the earth. Let EOQ be the equator, T ♋ Z the tropic of Cancer, and V T ♑ the tropic of Capricorn; VOZ the ecliptic, and BO its axis, both which are immoveable among the ſtars. But, as the equinoctial points recede in the ecliptic, the earth's axis SON is in motion upon the earth's centre O, in ſuch a manner as to deſcribe the double cone NO*n* and SO*s*, round the axis of the ecliptic BO, in the time that the equinoctial points move quite round the ecliptic, which is 25,920 years; and in that length of time, the north pole of the earth's axis produced, deſcribes the circle A B C D A in the ſtarry heavens, round the pole of the ecliptic, which keeps immoveable in the centre of that circle. The earth's axis being 23½ degrees inclined to the axis of the ecliptic, the circle A B C D A deſcribed by the north pole of the earth's axis produced to A, is 47 degrees in diameter, or double the inclination of the earth's axis. In conſequence of this, the point A, which at preſent is the north pole of the heavens, and near to a ſtar of the ſecond magnitude in the tail of the conſtellation called the Little Bear, muſt be deſerted by the earth's axis; which moving backwards a degree every 72 years, will be directed towards the ſtar or point B in 6480 years hence; and in double of that time, or 12,960 years, it will be directed towards the ſtar or point C; which will then be the north pole of the heavens, although it is at preſent 8½ degrees ſouth of the zenith of London L. The preſent poſition of the equator E O Q will then be changed into *e* O *q*, the tropic of Cancer T ♋ Z into V ♋ *t*, and the tropic of Capricorn V ♑ T into *t* ♑ Z; as is evident by the figure. And the ſun, in the ſame part of the heavens where he is now over the earthly tropic of Capricorn, and makes the ſhorteſt days and longeſt nights in the northern hemiſphere, will then be over the earthly tropic of Cancer, and make the days longeſt and nights ſhorteſt. So that it will require 12,960 years yet more, or 25,920 from the then preſent time, to bring the north pole N quite round, ſo as to be directed towards that point of the heavens which is vertical to it at preſent. And then, and not till then, the ſame ſtars which at preſent deſcribe the equator, tropics, and polar circles, &c. by the earth's diurnal motion, will deſcribe them over again.

The ancients, and even ſome among the moderns, have taken the equinoxes to be immoveable; and aſcribed that change of diſtance of the ſtars from it, to a real motion of the orb of the fixed ſtars, which they ſuppoſed to have a ſlow revolution about the poles of the ecliptic; ſo as that all the ſtars perform their circuits in the ecliptic, or its parallels, in the ſpace of 25,920 years; after which they ſhould all return again to their former places.

This period the ancients called the *Platonic* or *great* YEAR; and imagined, that at its completion every thing would begin as at firſt; and all things come round in the ſame order as they have already done.

The phyſical cauſe of the *preceſſion* of the equinoxes, ſir Iſaac Newton demonſtrates, doth ariſe from the broad ſpheroidal figure of the earth; which itſelf ariſes from the earth's rotation around its axis: for as more matter is accumulated all round the equatorial parts than any where elſe on the earth, the ſun and moon, by attracting this redundance of matter, bring the equator ſooner under them in every return towards it, than if there was no ſuch accumulation.

Allowing this to be the caſe, and ſince the plane of the moon's orbit is at one time above ten degrees more inclined to the plane of the equator than at another, it is reaſonable to conclude, that the part of the whole annual *preceſſion*, which ariſes from her action, muſt in different years be varied in its quantity; whereas the plane of the ecliptic, in which the ſun appears, keeping always nearly the ſame inclination to the equator, that part of the *preceſſion*, which is owing to the ſun's action, may be the ſame every year; and hence it follows, that, although the mean annual *preceſſion*, proceeding from the joint actions of the ſun and moon, were 50″, yet the apparent annual *preceſſion* might ſometimes exceed, and ſometimes fall ſhort, of that mean quantity, according to the various ſituations of the nodes of the moon's orbit; and Dr. Bradley, from a variety of obſervations, found this to be the caſe: or, that the *preceſſion* of the equinoctial points varies; nor are aſtronomers entirely agreed as to the quantity of the variation, ſo as to eſtabliſh what the mean *preceſſion* is. Dr. Bradley aſſumes the mean *preceſſion* to be one degree in ſeventy-one years and a half. According to this eſtimate, the Platonic or great year would be equal to 25,740 ſolar years.

Sir Iſaac Newton, in determining the quantity of the annual *preceſſion* from the theory of gravity, upon ſuppoſition that the equatorial is to the polar diameter of the earth, as 230 is to 229, finds the ſun's action ſufficient to produce a *preceſſion* of $9'' \frac{1}{8}$ only; and collecting from the tides the proportion between the ſun's force and the moon's to be as 1 to 4½, he ſettles the mean *preceſſion* reſulting from their joint actions, at 50″. But ſince the difference between the polar and equatorial diameter is found, by the late obſervations of the gentlemen of the Royal Academy of Sciences at Paris, to be greater than what ſir Iſaac had computed it to be; the *preceſſion* ariſing from the ſun's action muſt likewiſe be greater than what he has ſtated it at, nearly in the ſame proportion. From whence it will follow, that the moon's force muſt bear a leſs proportion to the ſun's than 4½ to 1. Phil. Tranſ. vol. xlv. art. 1.

To determine the quantity of the *preceſſion*, ariſing from the action of the ſun, has been a problem much agitated among modern mathematicians; and although there is no doubt of Newton's miſtake in the ſolution of it, other authors have generally diſagreed. M. D'Alembert, in 1749, printed a treatiſe on this ſubject, and claims the honour of having been the firſt who rightly determined the method of ſolving problems of this nature. The ſubject has been alſo conſidered by Euler, De la Grange, Friſius, Silvabelle, Walmeſley, Simpſon, Emerſon, Landen, and Milner.

M. de Silvabelle, ſtating the ratio of the earth's axes to be as 178 to 177, makes the annual *preceſſion* cauſed by the ſun $13'' \; 52''' \; 11''''$; the mean annual *preceſſion* cauſed by the moon, the ratio of the lunar force to the ſolar being ſuppoſed $= \frac{5}{2}$, $34'' \; 16''' \; 51''''$; and the NUTATION of the earth's axis cauſed by the moon, during the time of a ſemi-revolution of the pole of the moon's orbit, i. e. in $9\frac{1}{3}$ years, $17'' \; 51''' \; 14''''$. Mr. Walmeſley makes the annual *preceſſion*, owing to the ſun's force on the ſuppoſition that the proportion of the earth's diameters is as 230 to 229, and the obliquity of the ecliptic to the equator 23° 28′ 30″, equal to 10″,583; but ſuppoſing the proportion of the diameters to be as 178 to 177, the annual *preceſſion* depending on the action of the ſun will be 13″,675. And ſuppoſing with Dr. Bradley, that the whole mean annual *preceſſion* is 50″,3, the mean *preceſſion*, owing to the force of the moon, will be 39″,717, and the force of the moon to that of the ſun as 3,753 to 1, the diameters being as 230 to 229; but this proportion being $\frac{178}{177}$, the annual *preceſſion* ariſing from the action of the moon will be 36″,625, and the force of the moon to that of the ſun as 2,678 to 1. Mr. Simpſon, by a different method of calculation, determines the whole annual *preceſſion* of the equinoxes cauſed by the ſun, to be $21'' \; 6'''$; and he has pointed out the errors of the computations propoſed by Mr. Silvabelle and Mr. Walmeſley. Mr. Milner's deduction agrees with that of Mr. Simpſon. For the principles and reaſoning of theſe mathematicians, we muſt refer to the Phil. Tranſ. vol. xlviii. art. 58. vol. xlix. art. 109. vol. l. art. 53. vol. lxvii. part i. art. 15. vol. lxix. part ii. art. 32. M. de la Lande eſtimates the quantity of the *preceſſion* at 50¼″ yearly. Mem. Acad. de Paris, 1781. See ECLIPTIC and NODE.

PRECIOUS, or PRETIOUS-*ſtone*. See GEM.

PRECIPE, or PRÆCIPE, in *Law*, a ſpecies of original WRIT, called optional, which commands the defendant to do the thing required, or ſhew the reaſon wherefore he hath not done it. The uſe of this writ is where ſomething certain is demanded by the plaintiff, which is in the power of the defendant himſelf to perform; as, to reſtore the poſſeſſion of land, to pay a certain liquidated debt, to perform a ſpecific covenant, to render an account, and the like; in all which caſes, the writ is drawn up in form of a *præcipe* or command, to do thus, or ſhew cauſe to the contrary; giving the defendant his choice, to redreſs the injury, or ſtand the ſuit. This writ is diſtinguiſhed from the peremptory writ, called SI *te fecerit ſecurum*.

PRECIPE, or PRÆCIPE, is alſo a name given to a writ of covenant; the foundation of which is a ſuppoſed agreement or covenant, that one party ſhall convey lands to the other; on the breach of which agreement, action of covenant is brought by the party to whom the land is to be conveyed or aſſured, who thus commences an action or ſuit at law againſt the other.

PRECIPE, or PRÆCIPE *quod reddat*, a writ of great diverſity both as to form and uſe; extending as well to writs of right, as to other writs of entry and poſſeſſion.

It is ſometimes called a *writ of right cloſe*, as when it iſſues out of the court of chancery cloſe; ſometimes a *writ of right patent*, as when it iſſues out of Chancery patent, or open, to any lord's court, for any of his tenants deforced, againſt his deforcer.

PRECIPE *in capite*. See PRÆCIPE.

PRECIPITANT, *præcipitans*, in *Chemiſtry*, a term applied to any liquor, which, being poured on a diſſolution, ſeparates what is there diſſolved, and makes it *precipitate*, i. e. fall to the bottom of the veſſel.

Thus oil of tartar, and the volatile ſpirit of ſal ammoniac, are *precipitants* with regard to the diſſolution of gold in aqua regalis; and common water is a *precipitant* with regard to the diſſolution of jalap in ſpirit of wine.

PRECIPITANT is alſo uſed, in *Medicine*, for a remedy which ſeparates and precipitates any heterogeneous matter contained in the maſs of blood; and by this means abates any irregular fermentations, effervеſcences, or the like diſorders, which the matter had excited.

Among the number of *precipitants* are ranked hartſhorn, crabs eyes, ivory, bezoard, barks of oak and guaiacum, iron, quinquina, chalk, &c.

PRECIPITATE, *præcipitatus*, in *Chemiſtry*, a ſubſtance, which, having been diſſolved in a proper menſtruum, is again ſeparated from its diſſolvent, and thrown down to the bottom of the veſſel, by the pouring in of ſome other liquor.

When a body is decompoſed by means of an intermediate ſubſtance, and a *precipitate* is formed by this decompoſition, this precipitation can be effected only by the intermediate ſubſtance uniting with one of the component matters of that body; and conſequently a new compound is always formed in theſe operations. Sometimes the ſeparated matter, being no longer ſoluble, becomes ſenſible, and falls as a *precipitate*, while the new compound remains diſſolved. In other inſtances, the ſeparated ſubſtance remains diſſolved, while the new combination, not being ſoluble, is precipitated. This depends on the nature of the ſubſtances which act one upon another in theſe operations; but we may eaſily perceive, that the *precipitates* of the former kind are *ſimple*, and thoſe of the latter are *compound*. Earth and metals, when ſeparated from acids by means of alkalis, or other metals, are ſimple *precipitates*, and when ſeparated from acids by other acids, they are compound.

The chemiſts make various *precipitates* of mercury, which are of various colours, as the precipitations vary; viz. *white*, *red*, *yellow*, *green*, &c. See MERCURY, and TURBITH *mineral*.

Lemery, who mentions many *precipitates* of mercury of different colours, ſays, that if a ſolution of mercury in ſpirit of nitre be precipitated by urine inſtead of a ſolution of common ſalt, a *roſe-coloured precipitate* of mercury will be formed; and that if afterwards ſome fixed or volatile alkali be added to the liquor from which the roſe-coloured *precipitate* has been formed, another *precipitate*, which is black, will be obtained. There are other preparations deſcribed by this author, which have been uſed as remedies, but which are improperly called *precipitates*: ſuch is *green precipitate*, which is a mixture of four parts of mercury, and one part of copper, diſſolved ſeparately in the nitrous acid, and treated as in the proceſs for making red *precipitate*; afterwards, partly diſſolved a ſecond time, by being digeſted with vinegar: and, laſtly, reduced by evaporation to a dry conſiſtence; ſuch alſo is the preparation called by Lemery violet mercury, or black mercurial panacea, or *black precipitate*, which is an artificial cinnabar over-charged with ſulphur, mixed with ſal ammoniac, and prepared by a very long and laborious proceſs.

PRECIPITATE *of gold* by *tin*, &c. See GOLD, &c.

PRECIPITATION, *præcipitatio*, a proceſs in chemiſtry, which, in its moſt extenſive ſenſe, is applicable to all chemical decompoſitions made by an intermediate ſubſtance; or, to all operations in which two bodies are diſunited by employing a third body, which has the property of uniting with one of theſe, and thereby of ſeparating the other; ſo that every *precipitation* is effected by means of the AFFINITY of a precipitant, much ſtronger than that of the precipitate, with the ſubſtance from which it is ſeparated. In a more confined ſenſe, *precipitation* is a kind of ſeparation, whereby a body, diſſolved and ſuſpended in any menſtruous liquor, is detached therefrom, and falls down to the bottom of the veſſel.

Precipitation is either *ſpontaneous*, or *artificial*.

PRECIPITATION, *ſpontaneous*, is when the particles of the diſſolved body ſeparate of themſelves from their diſſolvent.

PRECIPITATION, *artificial*, is when ſome other body, called a *precipitant*, is added to procure this ſeparation. There is alſo a *total precipitation*, wherein the diſſolved parts are all ſeparated, and ſunk to the bottom; and a *partial precipitation*, wherein ſome of the parts diſſolved are ſtill ſuſpended in the fluid, and do not fall down.

Precipitation is never occaſioned but in fluid matters; and as bodies may be rendered fluid either by fire or by water, two kinds of *precipitation* may be diſtinguiſhed, one by the humid way, and the other by the dry way. In the firſt claſs may be ranged all decompoſitions of ſalts, with earthy or metallic baſes, which ſalts muſt be diſſolved in water when their baſes are to be ſeparated from their acids by proper intermediate ſubſtances. The ſecond claſs includes the ſeparations of metals, and of other ſolid and fuſible matters from each other, which are effected by fuſion and mixture with the ſeparating ſubſtances. Theſe two kinds of *precipitation* do not eſſentially differ, but many real differences diſtinguiſh the ſeparated ſubſtances, or all thoſe to which the general name of PRECIPITATE is given.

Boerhaave makes the following obſervations on the different manner in which *precipitation* is performed by ſeveral different agents.

Thus, 1. By water poured on oils diſſolved in alcohol, where the liquor turns milky.

2. By water poured on ſolid reſins diſſolved in alcohol, where alſo the liquor turns milky.

3. By water in the diſtillation of oily ſpirits, if any water run after the ſpirit is drawn off.

4. By acids on acids; thus ſilver and mercury are *precipitated* out of ſpirit of nitre, in which they had been diſſolved by adding ſpirit of ſalt.

5. By metals with metals, and other bodies. Thus, for example, dilute an ounce of ſilver diſſolved in ſpirit of nitre with twelve times the quantity of rain-water; put poliſhed plates of copper into this liquor, and the ſilver will be *precipitated*, and the copper diſſolved: then put this ſolution of copper into another glaſs, and add to it poliſhed plates of iron; the copper will be *precipitated* and caſe over the iron; finally, the copper falls to the bottom, and the iron diſſolves. Pour this ſolution of iron into a freſh glaſs, and drop upon it oil of tartar per deliquium; the diſſolved iron immediately falls to the bottom, and the alkali unites with the acid, and regenerates true nitre, after ſo many changes.

Thus does this ſalt travel from one body to another almoſt unaltered, though it is more attracted by one than another, till at length it reſts in that which in this reſpect is the ſtrongeſt, and is only thence expelled when oil of vitriol is poured upon the nitre thus regenerated. On theſe two principles *precipitation* depends, and is the true and often abſtruſe cauſe of numberleſs wonderful operations both in art and nature. Take a grain of white or red *precipitate*, rub it upon a poliſhed or heated copper-plate, and wherever the matter has paſſed, the copper will immediately look like ſilver; for the copper attracts the acid of the nitre from the calx of the mercury, and thus preſently makes an amalgam upon the ſurface of the copper, and then acquires a ſilver colour.

6. Alkalis often *precipitate* things diſſolved by acids. This happens frequently, but not always, nor in perfection: alkali *precipitates* copper diſſolved by an acid, but the copper is afterwards diſſolved by a ſalt made of the two.

7. Acids generally *precipitate* things diſſolved by alkalis; but in this caſe alſo there are ſome proceſſes which ſhew us exceptions.

8. Sharp ſalts, without being changed, and lying perfectly concealed, have ſtrange and unexpected effects by means of *precipitation*. If an ounce of luna cornea, which is perfectly ſcentleſs, inſipid, and inactive, and affords no ſign of acrimony in the fire, be ground, and united in a ſtrong heat in a glaſs retort with half an ounce of inodorous and perfectly inſipid regulus of antimony, there inſtantly ariſes an extremely ſtrong poiſon, or an exceedingly corroſive butter of antimony, the exhalation of which proves mortal. We ſee in this one inſtance how dangerous the art of mixing is, and with what care we ought to go about the compounding of bodies. Boerh. Chem. part ii. p. 338.

PRECIPITATION, *to account for the operation of*, it may be obſerved, that a fluid menſtruum may be made to ſuſtain a body ſpecifically heavier than itſelf, either by making the reſiſtance, ariſing from the coheſion of the parts of the fluid, equally to the exceſs of ſpecific gravity of thoſe bodies above that of the menſtruum: or, by the heavy body's being joined to ſome lighter one, ſo that the two together only make one whole, equal in weight to the fluid.

In the firſt caſe, the reſiſtance, we know, is ſtill proportional to the ſurface of the corpuſcles; ſo that the ſurface being diminiſhed, the reſiſtance is weakened: the proportion therefore of the tenacity of the menſtruum, to the gravity of the corpuſcles, being thus deſtroyed, a *precipitation* muſt enſue.

Precipitation, then, may be effected two ways, on this foundation; viz. either by the dropping in a liquor ſpecifically lighter, or ſpecifically heavier. In the former caſe, the gravity of the menſtruum, which is always proportional to the compound gravities of both, will by this mixture become lighter: thus the menſtruum being diluted, the force of coheſion is alſo weakened, ſo as to become unable any longer to ſuſtain the bodies; ſo hydrometers which are eaſily ſuſtained in water, upon pouring in a good deal of any burning ſpirits, ſink to the bottom of the glaſs.

And this agrees not only with the laws of mechanics, but with experiments: thus ſpirit of ſal ammoniac does very plentifully precipitate the filings of metals, diſſolved in acid menſtruums; though it be abundantly lighter than any of them.

The ſame thing is done quicker in ſpirit of wine, whoſe gravity is known to be almoſt the leaſt of that any of liquor.

By this ſpirit alſo, all ſalts, which are ſuſpended in water, are precipitated, and ſo unite into cryſtals. So, if you drop diſtilled vinegar into the ſcoria of antimony diffuſed in water, it falls to the bottom, and affords the golden ſulphur.

After the ſame manner, water, vinegar, &c. make a *precipitation* from acids, though more ſparingly: nay, acids themſelves, being poured upon others, which are heavier, will precipitate whatever is ſwimming in them. Thus ſpirit of ſalt precipitates either lead, copper, or tin, diſſolved in oil of vitriol; ſo little need is there of alkalis in this buſineſs, though the chemiſts have unanimouſly contended for them as abſolutely neceſſary.

In the ſecond caſe, *precipitation* will ſucceed by the addition of a heavier liquor to the menſtruum. For the particles of this liquor, partly with their weight, and partly with the impetus they acquire in their deſcent, carry down and ſink all the ſolid corpuſcles they meet with in their way; ſo that the corpuſcles being thus forced down, and kept there by this adventitious liquor, cannot mount up into their former ſituation.

To try the truth of this reaſoning by experiments, not only acid ſpirits, but even mere water, will be found to precipitate tinctures of vegetables extracted by ſpirit of wine; and the very ſame tinctures, extracted with water or wine, are precipitated very copiouſly by acid ſpirits, which are heavier.

Metals, when diſſolved in ſpirit of ſal ammoniac, are precipitated with oil of vitriol, or ſpirit of nitre. When ſuſpended in aqua fortis, they are precipitated with oil of vitriol, or bezoardic ſpirit of nitre.

As to bodies ſuſpended by means of their union with other lighter ones: this is properly the caſe of diſſolved metals; and to this may the laſt caſe of *precipitation* be reduced. Here the particles of a metal being ſeparated by a diſſolvent, and rendered imperceptible by their extreme littleneſs, only float, becauſe united to very light particles of the acid ſpirit, which keeps them ſuſpended; though the great ſurface they have, both on account of their ſmallneſs, and of their union with the acids, frequently contributes to the effect.

Now, as they are in a forced equilibrium with the fluid wherein they ſwim, and as the cauſes that ſuſtain them are only accidental, they muſt of courſe be precipitated to the bottom, when the acid or menſtruum abandons them, from whatever cauſe it be: it is even ſometimes ſufficient, that the quantity of the fluid, wherein they are ſuſtained, be diminiſhed. For then ſeveral of the metallic particles, though ſtill joined to their acid, coming to meet and unite, aſſume a ſmaller ſurface, with regard to their maſs; and thus, being no longer held up by the largeneſs of their ſurfaces, they ſubſide to the bottom.

When the menſtruum abandons a diſſolved body, if that body be lighter than the menſtruum, the contrary to *precipitation* will enſue; i. e. the body will riſe to the ſurface: thus camphor being mixed in oil of olives, and the whole diſtilled, the camphor riſes firſt, &c.

If it happen, that the particles, when abandoned by the diſſolvent, are equally heavy with the ſuſtaining fluid, they will neither riſe nor fall; only ſeveral of them, now reuniting, form little maſſes, ſufficient to ſpoil the limpidneſs and tranſparency of the fluid, as is the caſe in reſin diſſolved in ſpirit of wine, and water poured over them; where the water united cloſely with the ſpirit of wine, makes it let go the greateſt part of the reſinous particles. Thus is effected what we call an *imperfect precipitation*, which, in reality, is no more than a diſpoſition to precipitate.

If, in this caſe, the aqueous particles of the fluid be hid, and, as it were, abſorbed among the groſs moleculæ of the diſſolved matter, it forms what they call a *coagulum*. See COAGULATION.

Sometimes, when the liquors are poured on one another, the ſalts with which they abound, being put into motion, by their attractive force, they run mutually to embrace one another; and becauſe they do not recoil far back after the congreſs, they are at length ſo united, as to become like a ſolid, there being very little phlegm remaining, as is very obſervable in tartarum vitriolatum.

In theſe experiments there happens ſuch a conflict and effervеſcence, as evaporates almoſt all the moiſture with which the ſalts are diluted. And upon this depends the rationale of chemical coagulation, a thing of very great conſequence in the buſineſs of *precipitation*. Nor can we account for oil of tartar's precipitating bodies diſſolved in acids any otherwiſe than from its making a kind of coagulum with their corpuſcles, and thereby becoming too heavy for, and exceeding the tenacity of the MENSTRUUM.

Such are the general principles of *precipitation*, propoſed by ſome mechanical writers (ſee ATTRACTION); but the chemiſts admit of no other theory of *precipitation* beſides that which refers this phenomenon to the laws of AFFINITY.

A ſatisfactory explication of this chemical proceſs, according to theſe laws, is yet among the deſiderata in ſcience. The reader may find an hypotheſis relating to it in the Chemical Dictionary, Eng. Edit. art. *Gravity*. Where the author obſerves, that the force which unites the principles of a compound body to each other, ought to become ineffectual when, on one ſide, the tendency of the parts of theſe principles is entirely exhauſted by their union; and when, on the other ſide, to this compound is applied another body, with the parts of which thoſe of one of the principles of the compound may contract an union, infinitely ſuperior to that which they had with the part of the other principles of the compound. In this caſe, the principles of the compound muſt evidently be diſunited; one of theſe principles muſt form a new compound with the new ſubſtance applied to it; and the molecules of the other principles, being now diſengaged, muſt exerciſe their tendency upon each other, and form ſmall aggregates; which, when they are arrived at a certain maſs, muſt yield to the gravity by which they tend to the centre of the earth. Thus, he ſays, we may conceive how *precipitations* are effected.

PRECIPITATION, in *Aſſaying*, is the ſeparation of any part of a compound body, while melting in the fire, or when cooling from fuſion, from the reſt of the maſs, in ſuch manner that it ſinks to the bottom, while the remainder continues at top and makes the ſurface. The heavy part thus *precipitated* from the reſt, is called the *regulus* of that body.

Thus is an operation which almoſt always requires the addition of ſuch ingredients, as ſerve to take away the mutual connection and coherence of the parts of the body to be ſeparated; that is, ſuch as have a menſtrual virtue, and keep others in a ſtate of diſſolution. For inſtance, the reguline part of antimony, and mineral ſulphur, diſſolve each other mutually, and conſtitute crude antimony; nor can they be ſeparated from each other by fire alone, without deſtroying the regulus; but if you add iron, copper, ſilver, &c. which are more thoroughly penetrated by ſulphur, and are thus reduced to the ſtate of ore, then the regulus of antimony is freed of its ſulphur, and ſinks to the bottom, as it is heavier than the additional bodies, when joined to the ſulphur.

Such a *precipitation by fuſion* happens in vitrifications, ſcorifications, and coppelings, while one part of the body turns into droſs, or *ſcoriæ*, and the other metallic part, if there be any, keeping ſtill its metallic form, is collected at the bottom of the ſpherical veſſel. Therefore ſilver and gold, which are hardly ſubject to a perfect vitrification, conſtantly remain and ſhew themſelves in their own form; and on this account, though they were in ever ſo ſmall a quantity in a *coppel*, they always ſhew themſelves very clearly to the eye when the *ſcoriæ* are abſorbed; whereas ſo ſmall a regulus of the other metals would have been as it were buried and hidden under ſo great a quantity of *ſcoriæ*.

Nor is *precipitation by fuſion* leſs neceſſary to obtain almoſt all the other metals, which, on this account, are called leſs perfect, unleſs perhaps you except a very ſmall quantity of native metal, which nevertheleſs can ſcarce be properly called pure. Beſide, they are all to be had either in form of earth, or that of a ſolid ore. In the firſt caſe you may make a glaſs by a bare fuſion; in the ſecond, if the ſulphur and arſenic, which, together with the metallic part, conſtitute an ore, are diſſipated in roaſting, the ore, deſtitute of the oily phlogiſton, becomes glaſs in a pure fire, which glaſs may be mixed with unmetallic ſtones and earths; but by adding a phlogiſton or inflammable principle to it, this metallic glaſs is again reduced to its metalline form; and ſo long as it keeps under this form it cannot be united with the glaſs of the other ſpecies, but ſinks to the bottom of it, except only a very ſmall quantity of it, which is detained by the clammineſs of the glaſs. The *precipitating* body in this caſe, therefore is truly the phlogiſton, or inflammable principle: any body that takes away the connection, by the removal of which a *precipitation* is made, is properly called the *precipitating* body.

Precipitation of ſolid bodies from fluid menſtrua is performed either by extracting, or evaporating over a gentle fire the diſſolving menſtruum out of the diſſolved fixed body, or by adding ſuch a body, as is greedily diſſolved by that menſtruum: as if one metal diſſolved by an acid is *precipitated* by another metal, or by an alkaline ſalt; for inſtance, ſilver diſſolved in aqua fortis is *precipitated* by copper, copper by iron, iron by zinc, and all metals and ſemi-metals, either partly or entirely, by pot-aſhes, volatile and urinous ſalts.

A *precipitation* is alſo made by pouring on a ſolution ſuch things as either cannot diſſolve the body in hand, whether alone, or joined to a menſtruum that contains the ſaid body; or diſſolve it in another manner; or in a leſſer quantity than if the menſtruum had been uſed pure. In the firſt caſe a total *precipitation* is performed, as may be ſeen in the *precipitation* of ſilver out of aqua fortis, by means of ſpirit of ſalt. In the ſecond, a great deturbation and *precipitation* is made. But a ſecond ſolution ſoon follows, as it happens when iron being diſſolved in aqua fortis, you add to it, in a proper manner, a liquor perfectly free from alkaline fixed ſalt; but then there remains uſually a certain part which is not perfectly diſſolved a ſecond time. In the third caſe there is but a partial *precipitation* made. You have an inſtance of this, if mercury diſſolved in aqua fortis, and the menſtruum thoroughly ſaturated with it, is *precipitated* either by common ſalt, or ſal ammoniac, or by their acid ſpirit. A *precipitation* is alſo ſometimes made only by adding a large quantity of fair water to dilute; ſuch is that made on the regulus of antimony diſſolved in ſpirit of common ſalt, or in aqua regia, when a large quantity of cold water is poured on this ſolution; for theſe menſtrua do not diſſolve this ſemi-metal, unleſs concentrated.

All theſe *precipitations* are promoted greatly by a gentle heat, by means of which the *precipitating* body enters more eaſily into the menſtruum, and a conſiderable quantity of water is next neceſſary to dilute with, except in the *precipitations* of the firſt kind; for moſt commonly the more concentrated diſſolutions aſſume the conſiſtence of a paſte ſo ſoon as the *precipitatiug* body is added to them, which hinders this from mixing equally with the ſolution. Cramer.

PRECIPUT, q. d. *precipuate*, formed from *præcipuus*, *principal*, in the *French Juriſprudence*, an advantage belonging to any one, in a thing to be divided, or a portion taken off, and ſet by, in his favour, before the diviſion made.

In noble partition, the eldeſt has always the principal fief, or manor, for his *preciput*. In which view, the *preciput* coincides with the right of primogeniture.

PRECISION, *præciſio*, in the *Schools*, the ſame with ABSTRACTION.

PRECISION, in *Writing*, denotes ſuch a brevity as conſiſts in ſaying nothing ſuperfluous, and omitting nothing that is neceſſary. In this ſenſe it is oppoſed to a tedions prolixity on the one hand, and an obſcure conciſeneſs on the other. See STYLE,

PRECONISATION, a propoſition, or declaration, which the cardinal patron makes in the conſiſtory at Rome, of a perſon nominated by ſome prince to a prelature, by virtue of letters whereof he is the bearer; which the pope complying with, gives his collation.

The date of the bulls is diſpatched on the ſame day with the *preconiſation*.

PRECONTRACT, *præcontractus*, a contract made before, or prior to another; chiefly uſed in relation to MARRIAGES.

PRECORDIA, or PRÆCORDIA, &c. the parts about the heart, e. gr. the pericardium, the diaphragm, the hypochondria, and even the heart itſelf, with the lungs, ſpleen, &c.

The word is alſo ordinarily uſed for the fore-part of the region of the THORAX.

Pliny, and ſome other authors, uſe it for all the viſcera, or entrails: *Præcordia vocamus uno nomine exta in homine.*

One of the principal differences between men and brutes conſiſts in this, that there is a greater correſpondence and communication between the head and heart of the former than of the latter; which correſpondence is effected by means of a greater number of nerves, ſent from the brain to the heart and *præcordia*; brutes only receiving nerves to the *præcordia* by the branches of the par vagum; but man, likewiſe, by the intercoſtal pair.

The reaſon, Dr. Willis well obſerves, is, that brutes, being void of diſcretion, and but little ſubject to paſſions, need not, like man, a double paſſage for the ſpirits, the one for the ſervice of the vital functions, the other for the reciprocal impreſſions of the affections.

PRECURSOR, *præcurſor*, *forerunner*, in *Theology*, a perſon who goes before any one to notify his coming.

The term is peculiarly applied to St. John Baptiſt, who is ſtyled the *precurſor* of Jeſus Chriſt, from what is ſaid of him by St. Luke, *Thou, child, ſhalt* go before *the face of the Lord to prepare his way.*

PREDECESSOR, a perſon who has preceded another in the ſame office or employ. See ANCESTOR.

PREDESTINARIAN, a perſon who adheres to the doctrine of abſolute predeſtination.

St. Auguſtin is looked on as the founder of the ſect of *Prideſtinarians*, he being the firſt of the fathers that ſeems to have aſſerted the doctrine in ſuch expreſs terms; though the JANSENISTS and Jeſuits are ſtill greatly divided about the real doctrine of St. Auguſtin, in this article, each interpreting him conſiſtently with their own ſcheme.

Father Sirmond contends for an ancient ſect of *Predeſtinarians*, or *Predeſtinatians*, *Prædeſtinatiani*, contemporary with St. Auguſtin himſelf, and who had their riſe in Africa, in the monaſtery of Adrumetum, from a miſunderſtanding of St. Auguſtin's doctrine. Hence they were led into a notion, that God not only predeſtinated the wicked to eternal puniſhment, but alſo to the guilt and tranſgreſſion for which they are puniſhed: and that thus both the good and bad actions of all men were determined from eternity by a divine decree, and fixed by an inevitable neceſſity.

It is added, that the opinion ſpread thence throughout the Gauls, where one of them, a prieſt named Lucidus, was condemned by Fauſtus, biſhop of Rheggio, and his ſentence was confirmed by two councils.

However the exiſtence of this *Predeſtinarian* ſect has been denied by many learned men, particularly the preſident Mauguin, and conſidered as an invention of the SEMI-PELAGIANS, deſigned to decry the followers of Auguſtin, by attributing to him unjuſtly this dangerous and pernicious error. Nor does it appear, though there might have been perſons who embraced the *Predeſtinarian* opinions, that the abettors of them ever formed themſelves into a ſect.

The doctrine was again broached in the ninth century, by Godeſchalcus, a Benedictine; who, as Hincmar, in a letter to pope Nicolas, ſays, maintained with the ancient *Predeſtinarians*, who had been already anathematized, that God *predeſtinated* ſome to eternal life, and others to eternal death; that God did not will all people to be ſaved; that Jeſus Chriſt did not die for all, but only the elect, or thoſe that are ſaved, &c.

This doctrine was again condemned in a ſynod held at Mentz, A. D. 848, and by a council at Quiercy, A. D. 849, in conſequence of which Godeſchalcus was treated with the utmoſt barbarity, and compelled to burn with his own hands the juſtification of his opinion, which he had preſented to the council at Mentz. He was then caſt into priſon, where he died in the year 868 or 869, maintaining with his laſt breath the doctrine for which he had ſuffered.

The decrees of the former council were confirmed in a new council which met at Quiercy, A. D. 853, but they were declared null by a council aſſembled at Valence, A. D. 855, and the decrees of this council were confirmed by the council of Langres, in the year 859, and in 860 by the council of Touſi.

This controverſy was revived in the ſixteenth century by Calvin, who maintained that the everlaſting condition of mankind in a future world, was determined from all eternity; and that God, in predeſtinating from all eternity one part of mankind to everlaſting happineſs, and another to endleſs miſery, was led to make this diſtinction by no other motive than his own good pleaſure and free will. This opinion was, in a very ſhort time, propagated through all the reformed churches, by the writings of Calvin, and by the miniſtry of his diſciples, and, in ſome places, was inſerted in the national creeds and confeſſions: and thus made a public article of faith.

The unhappy controverſy, which took its riſe from this doctrine, was opened at Straſburg, in the year 1560, by Jerome Zanchius, an Italian eccleſiaſtic, who was particularly attached to the ſentiments of Calvin, and carried on in a manner that contributed very much to exaſperate the paſſions and foment the diſcord of the contending parties.

The *Predeſtinarian* opinions have been maintained by conſiderable numbers, both in popiſh and proteſtant countries: and in our own country in particular, they have had many zealous advocates.

We ſhall here obſerve, that they have undergone a kind of relaxation by thoſe who have been denominated *Baxterians*, from the famous nonconformiſt miniſter, Mr. Richard Baxter, of the laſt century. The Baxterians have endeavoured to ſtrike into a middle path between Calviniſm and Arminianiſm, and to unite both theſe ſchemes. They profeſs to believe in the doctrines of election, effectual calling, and other tenets of Calviniſm; and, conſequently ſuppoſe, that a certain number, determined upon in the divine counſels, will infallibly be ſaved. This they think neceſſary to ſecure the ends of Chriſt's interpoſition. But then, on the other hand, they reject the doctrine of reprobation, and admit, that our bleſſed Lord, in a certain ſenſe, died for all; and that ſuch a portion of grace is allotted to every man, as renders it his own fault if he doth not attain to eternal happineſs. If he improves the common grace given to all mankind, this will be followed by that ſpecial grace which will end in his final acceptance and ſalvation. Whether the Baxterians are of opinion, that any, beſides the elect, will actually make ſuch a right uſe of common grace, as to obtain the other, and, at length, come to heaven, we cannot aſſuredly ſay. There may poſſibly be a difference of ſentiment upon the ſubject, according as they approach nearer to Calviniſm or Arminianiſm. Kippis's Ed. of the Biog. Brit. art. *Baxter*.

PREDESTINATION, *predeſtinatio*, in *Theology*, a judgment, or decree of God, whereby he has reſolved, from all eternity, to ſave a certain number of perſons, hence named elect.

Others define *predeſtination*, a decree to give faith in Jeſus Chriſt to a certain number of men, and to leave the reſt to their own malice and hardneſs of heart.

According to the Calviniſtical ſcheme, the reaſon of God's predeſtinating ſome to everlaſting life is not founded in a foreſight of their faith and obedience, conſidered as independent upon any communication of grace from him, but is to be referred to his ſovereign mercy and free grace; nevertheleſs, it is alſo maintained on this ſcheme, that the means are decreed as well as the end, and that God purpoſes to ſave none but ſuch as by his grace he ſhall prepare for ſalvation by ſanctification.

The Remonſtrants define *predeſtination* more laxly and generally, the decree of ſaving believers, and damning unbelievers.

Some repreſent the election and *predeſtination* ſpoken of in Scripture, as relative only to nations, and not to particular perſons.

The greateſt difficulties wherewith the modern theology is clogged, turn on the article of *predeſtination*: both the Romiſh and reformed churches are divided about it: the Lutherans ſpeak of it with horror; the Calviniſts contend for it with the greateſt zeal; the Moliniſts and Jeſuits preach it down as a moſt dangerous doctrine; the Janſeniſts aſſert it as an article of faith; the Arminians, Remonſtrants, and Pelagians, are all avowed enemies of *predeſtination*.

Thoſe ſtrenuous patrons of Janſeniſm, the Portroyaliſts, teach, that God *predeſtinates* thoſe who he foreſees will co-operate with his grace to the end. Du Pin adds, that men do not fall into ſin becauſe not *predeſtinated*; but they are not *predeſtinated*, becauſe God foreſaw their ſins. See ELECTION, and REPROBATION.

PREDESTINATION is alſo uſed for a concatenation of ſecond cauſes appointed by Providence: in virtue wherof, things are brought to paſs by a fatal neceſſity, contrary to all appearances, and in ſpite of all oppoſition. See FATE, NECESSITY, and LEIBNITZIAN, *Philoſophy*.

The Turks are great *Predeſtinarians*; they eſteem the ſlighteſt accident predetermined, and on this account, are much more daring in battle, and run greater riſks of their lives than they would otherwiſe do.

PREDETERMINATION, *predeterminatio*, in *Philoſophy* and *Theology*. The ſchoolmen call that concurrence of God, which makes men act, and determines them in all their actions both good and evil, *phyſical predetermination*, or *premotion*.

Divines hold, that God hath no part in ſin, inaſmuch as he only affords his concurrence to the phyſical part of human actions, not to the *moral* part.

Phyſical predetermination, or *premotion*, if there be any ſuch thing, is that action of God whereby he excites a ſecond cauſe to act: or by which, antecedently to all operations of the creature, or before it could operate in conſequence either of the order of nature or reaſon, he really and effectually moves, and occaſions it to produce all its actions: that is, whatever the creature does or acts, is really done and acted by the agency of God on the creature, who is all the time paſſive. So that, without ſuch *predetermination* of God, all creatures muſt remain in an eternal ſtate of inactivity; and with ſuch *predetermination* it is impoſſible but they ſhould do what they are thus put upon doing.

It is ſtrongly controverted, whether or no ſuch a *phyſical predetermination* be neceſſary to the action of natural cauſes: the Scotiſts maintain the negative; urging, that all natural cauſes are of their own nature determined to a certain action; whence it ſhould ſeem needleſs to call in a new *predetermination* of God, e. gr. to fire, to make it warm the hand. For if an object be, by the courſe of divine Providence, applied to fire; what need a ſecond application of the fire to make it warm the object applied thereto? ſince beings are not to be multiplied unneceſſarily.

And ſuch *predetermination* ſome philoſophers hold ſtill leſs requiſite to produce the acts of the will: at leaſt, ſay they, the human mind muſt be allowed the common power and privilege of a ſecond cauſe, and therefore be intitled to produce its own acts, as well as other ſtrictly natural agents.

The Thomiſts, on the other hand, ſtand up ſtrenuouſly for the *phyſical predetermination*: one of their principal arguments is drawn from the ſubordination of ſecond cauſes to the firſt. Where there are ſeveral ſubordinate agents, ſay they, the lower agents do not act, unleſs firſt moved and determined thereto by the firſt; this being the very eſſence of ſubordination.

Again, the like they argue from the dominion of God over all his creatures: it is of the eſſence of dominion, ſay they, to apply and direct things ſubject thereto, to its own operations; and this, if the dominion be only moral, morally; but if it be alſo phyſical, phyſically. And that this is the caſe in reſpect of God and his creatures, is confeſſed. See LIBERTY and NECESSITY.

PREDIAL *tithes*, *decimæ* PRÆDIALES, are tithes paid of things which grow from the ground only, as corn, graſs, hops, and wood. See TITHE.

PREDIATORY *debt*. See DEBT.

PREDICABLE, PREDICABILE, in *Logic*, a general quality, or epithet, which may be predicated of, or applied to, ſeveral ſubjects

Thus animal is *predicable* both of man and beaſt: man is *predicable* of Peter and James; triangle is *predicable* of a hundred different kinds of figures, as right-angled ſcalenes, iſoceles, &c.

The ſchoolmen reduce the *predicables* to five claſſes; viz. *genus*, *ſpecies*, *proprium*, *differentia*, and *accidens*; under one or other of which all that can be *predicated* of any ſubject, is included.

A *predicable* is alſo called *univerſale logicum*, as having reſpect to other particular, and inferior or ſubject things: thus animal is an univerſal, with regard to man and beaſt. It is called a *logical univerſal*, to diſtinguiſh it from a metaphyſical one, which is a common being conſidered in itſelf, and therefore denominated univerſal in eſſendo: whereas the logical one is only univerſal as to our conception and application.

Among the ſchoolmen, *predicable* is uſually defined *unum*, *aptum* prædicari *de multis univoce*, *&* *diviſim*: or, ſomewhat more clearly, a *predicable* is a nature which may be predicated univocally of all things to which it is common, and which, as it is dividually multiplied in all its ſubordinates, may be aptly predicated of them all.

Thus, when the appellation of *virtue* is attributed to juſtice, prudence, temperance, fortitude, charity, &c. the ſame reaſon may be given why each is diſtinguiſhed by ſuch name, as being all founded in a mediocrity, and being agreeable to right reaſon, which is the character of virtue.

Hence, if there be ſeveral things called by ſome common name, but the reaſon of ſuch name is not the ſame in all, but different; thoſe do not come under the name of *predicables*. As in the inſtance, *canis*, *dog*, which is both applied to a domeſtic animal, diſtinguiſhed by its barking; to a conſtellation of the heavens; and to a ſea-fiſh.

The way by which the mind comes to form ſuch *predicables*, or univerſals, is this: among thoſe things which fall under our obſervation, we find ſome characters and properties common to ſeveral, and others peculiar to each; what we find common, we conſider apart, and thus we form an UNIVERSAL equally applicable to all.

PREDICABLY, *predicabiliter*, is uſed in the ſchools in oppoſition to *predicamentally*. Thus, matter is ſaid to be united to form *predicably*, or *per accidens*, to exclude the notion of a predicamental accident.

PREDICAMENT, *prædicamentum*, in *Logic*, a claſs or order of beings, or ſubſtances, ranged according to their natures, called alſo CATEGORY, and ſometimes *categorema*.

The word *prædicamentum* was firſt introduced by Boethius, in lieu of the Greek κατηγορια; and is uſed among the ſchool-writers with a good deal of latitude and variety: for it either ſignifies the act of *predicating*, or the common *predicate* itſelf; or, the genus or baſis of any category; or the collection of ſeveral common predicates diſpoſed in a certain order: which laſt is its more uſual acceptation.

Hence ſome define *predicament*, a ſeries of predicates traced from the genus, or higheſt term, through all the inferior genera and ſpecies. Thus, a ſeries of *ſubſtance* drawn from *ſubſtance* through *body*, *living*, *animal*, *man*, to *Peter*, is called the *predicament* of ſubſtance.

The uſual definition among logicians is, that *predicament* is a natural order or ſcheme, of ſome moſt general or univerſal thing, and of all that is contained under the ſame, that is all the ſubordinate genera, ſpecies, and individuals.

The properties of a *predicament*, *ex parte vocis*, i. e. of the term or word whereby the *predicament* or *predicamental* ſeries is denoted, the logicians hold, are, that it be *one*, *ſimple*, *preciſe*, and *concinnous*.

Vox una, & ſimplex, rebus concinna locandis.

The conditions requiſite *ex parte rei*, or of the thing to be ranged in a *predicament*, are contained in the following verſe:

Entia per ſeſe, finita, realia, tota;

i. e. it muſt be a *poſitive being*, in excluſion of non entities, negations, privations, impoſſibilities, &c. and a being *per ſe*, to exclude accidental things, factitious things, &c. and *finite*, that is, of a limited nature and extent, to exclude God, and other tranſcendentals: *real*, ſince its intention is for the better and more commodious diſpoſing of things in their places, to be the more diſtinctly known and conceived; and *whole*, or complete, as not being in the relation of a competent part, or as only acceſſary to ſome other.

Predicament, *poſt*. See Post *Predicament*.

PREDICAMENTAL *accident*. See Accident.

PREDICATE, *prædicatum*, in *Logic*, that part of a propoſition which affirms or denies ſomething of the ſubject. Thus, in *God made the world*; *made the world* is the *predicate* and *God* is the ſubject.

A *predicate*, ſay the ſchoolmen, is properly a name *predicated* or ſpoken of another, as its ſubject: as *man*, in the propoſition, *Peter is a man*.

It is a celebrated rule or law of *predicates*, that nothing is eſteemed to be abſolutely ſpoken or affirmed of another, unleſs it be affirmed thereof in ſuch manner, or by ſuch an affirmation, as wants nothing either in the ſubject, *predicate*, or copula, to make it true.

This alſo is noted properly of a *predicate*, that it contains, in ſome meaſure, its own ſubject: thus metal contains gold, copper, iron, &c. of which it is *predicated*.

The word *predicate* is ſometimes uſed indifferently with *attribute*; but the more accurate writers make a diſtinction. Every *predicate* is indeed an attribute, ſince whatever is *predicated* of a thing, is attributed to it: ſo, if animated be *predicated* of man, it is alſo attributed to him: but every attribute is not a *predicate*: thus ſoul, learning, &c. are attributed to man, but not *predicated* of him.

PREDICATING, in *Logic*, is properly the act of affirming or denying ſomewhat of ſomething. As, *Man is not a ſtone: body is a ſubſtance*. The thing thus predicated, is called *predicate*.

In the doctrine of univerſals, or predicables, to *predicate* is to ſpeak or declare a thing truly, directly, and affirmatively. Thus man is *predicated* of ſeveral, i. e. it is truly and directly affirmed that theſe ſeveral are men; as when I ſay, *Socrates is man*, *Plato is man*, *Ariſtotle is man*, &c.

The things *predicated* of others are reducible to three claſſes: *genera*, as animal, of man, &c. *forms*, as whiteneſs, of a ſwan, &c. and *equals*, of things of equal extent, as ſpecies, difference, proprium, &c.

The ſchoolmen diſtinguiſh ſeveral ways of *predicating* as, 1. *In quod tantum*, which is to *predicate* eſſentially, both as to the thing and the manner, as, *juſtice is a virtue*. 2. *In quale tantum*, which is to *predicate* accidentally, both as to the thing and the manner, as *Peter is learned* And 3. *In quale quid*, or *in quale poſt quid*, which is to *predicate* both eſſentially and accidentally, as, *man is rational*.

PREDICTION, *prædictio*, divination, prophecy, or foretelling what is to come, either by divine revelation, by art and human invention, or by conjecture. See Divination, and Prophecy.

PREDOMINANT, *prædominans*, that which prevails, appears moſt, or has ſome ſuperiority or aſcendency over another thing.

PREDY, a ſea word, ſignifying the ſame as *ready*. Thus, *predy the ſhip*, or *predy the ordnance*, is as much as to make things ready for a fight. *Predy the hold*, is to lay or ſtow every thing there in its due order and proper place.

PRE-EMPTION, *præemptio*, a privilege anciently allowed the king's purveyor, of having the choice and *firſt buying* of corn, and other proviſions, for the king's houſe, but taken away by the ſtat. 12 Car. II. cap. 24.

PREENING, in *Natural Hiſtory*, the action of birds cleaning, compoſing, and dreſſing their feathers, to enable them to glide more eaſily through the air.

For their uſe herein, nature has given them an admirable piece of furniture; viz. two peculiar glands, which ſecrete an unctuous matter into an oil-*bag*, perforated; out of which the bird, on occaſion, draws it with his bill.

PRE-ESTABLISHED *harmony*. See Harmony.

PRE-EXISTENCE, *præexiſtentia*, the ſtate of a thing actually in being before another.

The ancient Pythagoreans and Platonists all aſſerted the *pre-exiſtence* of human ſouls, i.e. that they were in being before they were joined to our bodies.

Origen alſo held the eternal *pre-exiſtence* of ſouls.

The orthodox believe, that God created the world out of nothing; and not of a *pre-exiſtent* matter.

Some perſons have held mankind *pre-exiſtent* to Adam. See Pre-adamite.

PREFACE, *præfatio*, formed from *præ* and *fari*; q. d. *to ſpeak before*, an advertiſement in the beginning of a book, to inform the reader of the deſign, order, method, &c. obſerved therein: of what is neceſſary to receive its full effect, and facilitate the underſtanding thereof.

There is no part of writing that requires more art and addreſs, or that fewer authors ſucceed in, than *prefaces*. Prefacing is, in effect, a particular ſpecies of writing, and has its peculiar character and taſte to diſtinguiſh it from all others. It is neither argumentation, diſcourſe, narration, nor apology.

Preface *of the maſs*. The Romaniſts call that part of their maſs, which precedes the conſecration, and which is to be rehearſed in a peculiar tone, *preface*.

The uſe of *prefaces* in the church, they contend, is very ancient; and conjecture, from ſome paſſages of St. Cyprian, &c. that it was in uſe in the time of the apoſtles. The *preface* to the maſs anciently had, and ſtill has, very different names in different churches. In the Gothic, or Gallican rite, it is called *immolation*; in the Mozarabic rite, *illation*; anciently among the French, it was called *conteſtation*; in the Roman church alone it is called *præfatio*, *preface*.

PREFECT, *præfectus*, in ancient Rome, was one of their chief magiſtrates, who governed in the abſence of the kings, conſuls, and emperors.

His power was ſomewhat different at different times; but was always greateſt under the emperors. His principal care was the government and adminiſtration of the city of Rome.

He took cognizance of all crimes committed in the city, and within a hundred miles thereof. He judged capitally and finally, no appeal lying from him; and even by the ſixty-ſecond Novel, he preſided in the ſenate, taking place before all the patricii and conſulares, &c.

He had the ſuperintendance of the proviſions, policy, buildings, and navigation.

There is ſtill a *prefect* in modern Rome, who is a kind of governor, differing little from the ancient *prefectus*, except that his authority only extends to forty miles round the city, whereas that of the *prefect* of ancient Rome reached one hundred miles round.

Prefect *of the prætorium*, *prefectus prætorii*, or *prefectus prætorio*, was the chief or leader of the pretorian bands, or cohorts deſtined for the emperors guard.

The pretorian legion, according to Dion, conſiſted of ten thouſand men. Suetonius refers the inſtitution of *præfectus prætorii* to Auguſtus. It is added, that he was uſually taken from among the Roman knights.

By the favour of the emperors, his authority grew very conſiderable; inſomuch, that he became the arbiter and ſupreme judge of all affairs.

To reduce this extravagant authority, Conſtantine divided the *prefecture* of the pretorium into four *prefectures*; and each of theſe he again ſubdivided into civil and military departments; though the name was only reſerved to him who was inveſted with the civil authority; and that of *comes belli* given him who had the command of the cohorts. See Count.

Thus the office of *prefect* of the pretorium which in its origin, and till the time of Conſtantine, was military, and ſucceeded to that of *magiſter equitum*, now commenced a purely civil magiſtrature; and at length became the prime dignity of the empire.

The ſucceeding emperors, following Conſtantine's diviſion, divided the empire into four *prefectures prætorii*, as into four dioceſes; viz. the Gauls, Illyria, Italy, and the Eaſt. See Diocese.

The provinces whereof theſe dioceſes conſiſted, had their particular governors; at the head of whom was the *prefect*, who, though he had not the command of the army, yet had the power of the ſword, decided ultimately of all cauſes, and had all the marks and honours of ſovereignty.

Juſtinian created a fifth *prefect* of the pretorium for the government of Egypt, which had been torn off from the dioceſe of the Eaſt by the invaſion of the Vandals during the empire of that prince.

Under Auguſtus, the officer ſent to govern Egypt with a proconſular authority, was called *prefectus Auguſtalis*.

There were alſo ſeveral other officers diſtinguiſhed by this appellation: ſuch as *præfectus ærarii*, ordained by Auguſtus to ſuperviſe and regulate the public fund, which he raiſed for the maintenance of the army; the *prefectus alæ* appointed by the Roman conſul to govern each principal diviſion of the allies; the *præfectus claſſis* or admiral; the *prefectus fabrum*, who had the care of the arms, and of every thing that related to military expeditions; the *præfectus frumenti*, appointed by Auguſtus to inſpect and regulate the diſtribution of corn among the common people; the *præfectus militum*, to which claſs belonged three different officers, viz. the *prefect* of a cohort, of a camp, and of a legion; the *præfectus vigilum*, appointed by Auguſtus to command the ſoldiers who watched the city, and whoſe buſineſs was to take cognizance of thieves, incendiaries, idle vagrants, &c. and to puniſh all petty miſdemeanours that were thought too trivial to fall under the notice of the *perfect* of the city, &c.

PREFECTURES, or *præfecturæ*, were certain towns of Italy, whoſe inhabitants had the title of Roman citizens; but were allowed to enjoy neither their own laws nor magiſtrates, being governed by annual prefects ſent from Rome. Theſe were generally ſuch places as were either ſuſpected, or had ſome way or other incurred the diſpleaſure of the Roman ſtate; this being accounted the hardeſt condition that was impoſed on any people of Italy.

PREFIX, in *Grammar*, denotes letters or ſyllables prefixed to words: theſe are common in the Hebrew, and oppoſed to AFFIXES.

PREGADI, in *Hiſtory*, a denomination given to the ſenate of Venice, in which reſides the whole authority of the republic.

At its firſt inſtitution it was compoſed of ſixty ſenators, to whom ſixty more have been added.

PREGNANCY, the ſtate of a woman when ſhe has conceived, or is with child.

The ſame ſtate with a view to the bearing of the child in the womb, is called *geſtation*.

This is a time in which women ſuffer many diſorders, which though no way to be cured abſolutely but by childbirth, yet may be greatly mitigated by medicines. Before any one venture to do any thing, however, in theſe or the like caſes, it is very neceſſary to be perfectly aſſured, whether the patient is with child or not; and this is known by the following ſymptoms, in caſes where there is no occaſion for diſſimulation, or no other diſtemperature joined with this; but when the woman choſes to conceal it, and there is a complication of diſorders, the utmoſt proofs amount but to preſumptive ones.

The ſtoppage of the menſtrual diſcharges is the firſt ſign of it, provided that there be no other apparent cauſe. But this, though the moſt plane and obvious ſymptom, is by no means a certain one; for a ſuppreſſion of this kind may happen from latent cauſes. A ſecond ſymptom is, a particular nauſea at the ſight of meat, or even the ſmell of it, while the perſon is otherwiſe well in health and can eat heartily of other foods. A third ſymptom is, a ſwelling of the belly; which appears regularly round or globoſe, not irregularly protuberant, as is the caſe in diſorders of the liver, and other viſcera. This ſwelling, alſo, increaſes placidly, and without the legs ſwelling, or any other ſymptom, if the perſon is otherwiſe in health. After this, the twentieth week of *pregnancy* gives the moſt certain of all the ſigns, the motion of the fœtus; but this is not to be diſtinguiſhed without particular attention and care, from motions of the bowels in flatulencies, which often ſo much reſemble it as to deceive the unwary.

If the mother has a mind to hide the ſymptoms, the thing may, however, uſually be found out at this period; for if a cold hand be laid upon the belly when warm, or a warm hand when it is cold, the fœtus uſually ſoon ſtirs, and the very figure and appearance of the belly will give very probable aſſurances to a perſon accuſtomed to ſuch inſpections.

In caſes of a certain conception, a living fœtus is only to be diſtinguiſhed from a mole or falſe conception by its moving; therefore when a perſon grows toward the full time, without ever perceiving the child to ſtir, it is every much to be ſuſpected that it is a mole; which alſo is the more probable, if the menſtrual diſcharges have come on at times and irregularly, during the time, and the ſwelling of the belly be irregular, the woman ſubject to violent flatulencies, and eſpecially if ſhe go beyond the natural period of nine months.

Theſe ſymptoms are not all, however, to be expected in every *pregnant* woman; for many of the laborious part of the lower claſs of life, go through their whole time in the midſt of fatigue and trouble, and that without any of theſe ſymptoms; ſo that they are in a great meaſure to be attributed to the courſe of life, not the courſe of nature, in the *pregnant* women of better fortunes. Thoſe women are moſt ſubject to them who are of a tender and delicate frame, and thoſe who are of a plethoric habit, an idle life, or given to intemperance, or ſubject to paſſions of various kinds, fear, anger, grief, or the like.

Theſe are the more natural and leſs troubleſome ſymptoms of gravidation, but this time is frequently attended with others more troubleſome or hurtful, which art is able in ſome degree to mitigate. Some are ſubject to violent hæmorrhages at the noſe, which are to be treated in the common way, and are uſually as eaſily cured as any other complaints of that kind. In others the hæmorrhoidal diſcharges are very large during the time. Theſe are to be aſſuaged by giving powder of nitre, cinnabar, and crab's eyes, once or twice a-day. Some are alſo ſubject to an hæmorrhage of the uterus itſelf, but this very rarely happens; when it does, it may be owing to two cauſes, and therefore appear in two manners. In the firſt it flows as in the common way of the menſtrual diſcharges, during the firſt months of *pregnancy*, and by that means greatly diſturbs the regular calculation of the time. In the other caſe it ſtops during the firſt months, but comes on again about the middle of the time, or later than that, and in this caſe it uſually continues regularly to the time of delivery; both theſe caſes bring on great danger of miſcarriages. In theſe caſes, nitrous, cinnabarine, and abſorbent medicines are to be given; to theſe are to be added corroborating ones, and bleeding in the arm muſt never be omitted.

Head-achs often alſo attend women during their *pregnancy*: theſe are principally owing to occaſional cauſes; ſuch as violent emotions either of the body or mind, an improper cooling of the lower parts of the body, or the drinking ſpirituous liquors. The method of taking off this troubleſome ſymptom is, by giving the attemperating and nitrous medicines, with laxatives of the moſt gentle kind, and externally the head ſhould be rubbed with ſpirit of wine and camphor, if the perſon can bear the ſmell of it, which often in this caſe they cannot.

A wearineſs and laſſitude of the limbs is another very common and very troubleſome accident attending *pregnancy*, and is to be remedied by proper bleedings and gentle exerciſe; and if theſe fail, the nitrous powder before given may be added to quiet the emotions of the blood, and this uſually takes effect.

A dry cough and difficulty of breathing are alſo not unfrequently attendant on this ſtate: theſe require the ſame methods; but when the difficulty of breathing comes on after meals, the ſaline and digeſtive powders may be given in ſmall doſes; ſuch as the vitriolated tartar, with the nitrous and abſorbent powders; and when it comes on only in the latter months, and ariſes merely from the preſſure of the diſtended uterus, there is no cure but patience till the time of delivery; when the ſymptom always goes off of itſelf on the ſubſiding of the womb. Junck. Conſp. Med. p. 701.

Abortion may happen at any period of *pregnancy*, but it is moſt common in the ſecond and third month, ſometimes, however, it happens in the fourth or fifth; and thoſe which happen in the ſixth or in later months, are moſt dangerous. If abortion happens within the firſt month, it is uſually called a falſe conception; if after the ſeven month, the child may often be kept alive by proper care.

The miſcarriage of *pregnant* women is principally owing to a plethora, and is moſt frequent with young plethoric women, in the firſt months of their *pregnancy*. There are, however, ſeveral other cauſes which concur to it; ſuch are, any violent paſſions of the mind, as ſudden anger, fear, or the like: an habitual great diſcharge at the time of the menſes, a high-ſeaſoned diet, with much wine or other ſtrong liquors; the taking of ſtrong purges, or violent emetics; diarrhœas, eſpecially when of long continuance and of the aromatic kind, as they drain off the nouriſhment from the fœtus; a teneſmus, or violent motion to ſtool, and hence the uſe of ſtimulating glyſters may alſo bring on an abortion; as alſo any commotions of the body, ſuch as running, leaping, the carrying heavy burthens, falls, or blows on the abdomen: a too frequent uſe of venery may alſo occaſion it, as may alſo the effect of ſtrong emmenagogues, copious bleeding in the foot the ſmell of burning oil or any other ſtinikng ſubſtance, nephritic complaints, cachexies, a fluor albus, or other diſorders of the womb; the taking opiates, and the death, or great debility of the fœtus while in the womb. A miſcarriage may alſo be occaſioned either by too great a ſtricture or an extreme relaxation of the uterus. The ſigns of approaching abortion are pain in the loins; or about the bottom of the belly; a dull heavy pain in the inſide of the thighs; a ſlight degree of coldneſs or ſhivering; ſickneſs; palpitation of the heart; the breaſts become flat and ſoft; the belly falls; and there is a diſcharge of blood and watery humours from the womb.

The beſt methods of preventing abortion, are the uſe of the attemperating and particularly the nitrous medicines after every commotion of the blood; bleeding at proper times, corroborating medicines, and the milder carminatives; and to theſe are to be added a temperance in diet, placid motion of the body, and chearfulneſs of mind. Egg-ſhells are by ſome greatly recommended, nd by others the ſtones of raiſins, which are indeed, manifeſtly aſtringent.

Women of a weak relaxed habit, ſhould avoid exceſs in the uſe of tea or other weak and watery liquors, uſe ſolid food, riſe early, and go to bed ſoon, ſhun damp houſes, take frequent exerciſe in the open air, and ſhun, as much as poſible, damp foggy weather. Women of a full habit

bit ſhould uſe a ſpare diet, avoid ſtrong liquors, and every thing that may heat the body or increaſe the quantity of blood. Their diet ſhould be of an opening nature, conſiſting chiefly of vegetable ſubſtances. When ſigns of abortion appear, the woman ought to be laid in bed or a mattraſs, with her head low: ſhe ſhould be kept quiet, and her mind ſhould be ſoothed and comforted. Her food ſhould conſiſt of broths, rice, and milk, jellies, gruels, &c. taken cold; nor ſhould ſhe be kept too hot. If ſhe be able to bear it, ſhe ſhould loſe, at leaſt, half a pound of blood from the arm. Her drink ought to be barley-water ſharpened with juice of lemon; or ſhe may take half a drachm of powdered nitre in a cup of water-gruel every five or ſix hours. If the woman be ſeized with a violent looſeneſs, ſhe ought to drink the decoction of calcined hartſhorn prepared. If ſhe be affected with vomiting, let her take frequently two table-ſpoonfuls of the ſaline mixture. Opiates are generally of ſervice; but they ſhould be always adminiſtered with caution. Sanguine robuſt women, who are liable to miſcarry at a certain time of *pregnancy*, ought always to be bled a few days before that period arrives. Buchan.

Coſtiveneſs in the time of *pregnancy* is very common, and is uſually owing to the want of drinking and exerciſe; ſometimes, indeed, it is owing to the immediate preſſure of the womb upon the rectum; but this caſe is known from the others, as it is always attended with a teneſmus. This complaint is to be relieved by a lubricating diet, the drinking more liquids than before, and the uſing placid motion of the body, or gentle exerciſe. Gum ammoniacum is alſo found a very uſeful medicine in this caſe, and ſometimes gentle infuſions of ſena are neceſſary; but theſe can only be given in very ſmall doſes. Some uſe ſuppoſitories that are not acrid or pungent, and others glyſters of water-gruel.

Flatulencies are another very frequent complaint with *pregnant* women: theſe are removed by the milder carminatives, ſuch as orange-peel, pimpernel-root, and the ſeeds of aniſe, ſweet fennel, &c. taken in powders or in decoctions.

Diarrhœas, in *pregnant* women, are uſually from the ſame cauſes with thoſe in other perſons; but they require in this caſe a very peculiar regard, as they, when long continued and accompanied with a teneſmus, uſually bring on abortion.

They are to be gently reſtrained, and finally ſtopped, in the following manner: ſtrengthening, carminative, and ſtomachic medicines are to be given, ſuch as candied orange-peel, preſerved ginger, calamus aromaticus, galengals, and zedoary, and the marmalade of quinces; and while theſe are taken internally, balſams and ſtomachic plaſters applied to the ſtomach have alſo a very great effect.

The fluor albus. This is a complaint that very rarely affects women with child, eſpecially if their huſbands be honeſt; but when it does, it is very difficult of cure, becauſe the purging medicines neceſſary to be given in it are by no means to be allowed of in the time of *pregnancy*. In this caſe it can only be reſtrained by the uſe of correctives, depuratives, and carminatives: of this kind are infuſions of the bitter herbs, with pimpernel-root, balm, ſouthernwood, and white dead-nettle flowers; or theſe ingredients may be made into powders, and taken in red wine.

Beſides all theſe complaints, women in their *pregnancy* are ſubject to ſeveral others, which depend upon the mere weight and preſſure of the uterus. Of this kind are:

Pains in the loins and back. Theſe are principally felt in the laſt months, when the belly is greatly ſwelled and drawn forwards; in others, at the ſame period, the belly itſelf is pained, and looks red in many places, as if it threatened to burſt.

Theſe complaints are made worſe by all motion, and they admit of no cure but child-birth, which immediately takes off the whole pain.

Varicous tumors of the legs. Theſe are alſo very common and very troubleſome, and in phlegmatic habits have alſo very frequently œdematous tumors joined with them; and in other perſons livid marks appear upon them, ſuch as are ſeen in others after bruiſes. Theſe diſtemperatures of the legs attend *pregnant* women at all times from the ſecond month to the time of delivery, and are owing to the preſſure of the uterus upon the iliac or crural veſſels. Theſe always go off on delivery, but in many perſons return again at every *pregnancy*: in ſome caſes they are ſo ſlight as not to be worth regard, in others they are very violent and painful; theſe are to be treated in the following manner: the common antiſpaſmodic powders are to be given internally once or twice every day, and externally, a moderate bandage, with camphorated medicines and friction: and if theſe fail, a liniment made of lime-water, oil of elder, and ſugar of lead, will be found of great ſervice; and when the perſon is delivered, gentle ligatures are to be uſed all up the leg, from the ankle to the knee. In order to prevent theſe tumors for the future, early in the time of *pregnancy* the perſon ſhould be blooded, the bowels are to be kept from coſtiveneſs; and it is a thing of the greateſt conſequence, that the perſon uſe herſelf to ſit upon a high ſeat, the low chairs in which *pregnant* women uſually love to ſit making the belly preſs greatly more on the crural veſſels than it would otherwiſe. Too much exerciſe alſo is to be avoided, and particular care taken that the womb is well cleanſed before the month of a former lying-in is over.

Frequent deſire of voiding the urine often attends, and is very troubleſome to *pregnant* women; but eſpecially in the latter part of their time, particularly in the laſt weeks; if it happen ſooner, as it ſometimes does, it is owing to the womb's hanging too much downward, from a laxity of the ligaments. This is a complaint of no ill conſequence, and therefore, though troubleſome, is to be borne with patience, delivery being its proper cure.

A ſtrangury and temporary ſuppreſſions of urine happen alſo frequently to *pregnant* women. In theſe caſes powders of nitre and cinnabar are to be given internally, and externally emollient cataplaſms are to be applied warm till the diſorder ceaſes.

Hæmorrhoids. Theſe in *pregnant* women often ſwell into a ſort of bladders, and are attended with a violent burning pain, and ſometimes with an ulcerous eroſion, and are uſually a very troubleſome complaint to perſons of plethoric habits. They are to be cured by giving internally nitrous and other attemperating medicines, and applying externally the unguentum linariæ, made of the herb toad-flax, cut and boiled in lard. A decoction or extract of yarrow is alſo a good medicine.

Swellings of the feet are another of the troubleſome complaints that attend *pregnant* women. Theſe, when they are confined to the feet, or do not extend above the knees, are of no great harm; but they ſometimes reach up to the abdomen, and there leave the ſymptoms of an aſcites: but, even in this caſe, it is beſt to let the tumor alone during the time of *pregnancy*, or at the utmoſt only to attempt mitigating and allaying its ſymptoms; for the cure requires ſuch medicines as cannot be ſafely given at that time. The patient muſt avoid ſtanding as much as poſſible, and after delivery the cure is to be attempted in the common way. When women in their *pregnancy* loſe their fleſh, and become extenuated and thin, the child is uſually found to be the luſtier and more robuſt for it: the woman in this caſe ſhould feed on jellies, and other the moſt nouriſhing foods, and ſhould uſe very little exerciſe, avoiding all fatigue of body and mind. Others, on the other hand, are ſubject to grow remarkably fat during their *pregnancy*: theſe generally bring forth ſmall and lean children.

Women to whom their fat grows troubleſome in this time, ſhould bleed, uſe moderate exerciſe, a thin diet, and now and then take a very gentle doſe of ſome laxative medicine.

Many are very weak and ſubject to frequent faintings during *pregnancy*: theſe ſhould take at times a gentle doſe of ſome laxative medicine, and in the intermediate days, the ſtrengthening and ſtomachic medicines with the milder carminatives.

A voiding of the waters too ſoon always threatens abortion, or an untimely delivery, which are to be guarded againſt by ſtrengthening medicines of all kinds. Many women during *pregnancy* are troubled with large brown ſpots, or lichenes, in the neck and face: theſe principally happen to perſons of bilious habits, and are in ſome attended with a continual paleneſs, in others with frequent fluſhings of heat and redneſs: the good women apply many remedies to theſe, but they are much better wholly let alone; for they always go off of themſelves after delivery.

The too great motion of the fœtus is a complaint not uncommon with *pregnant* women; but this is principally owing to themſelves, and is brought on by the violent paſſions of the mother, eſpecially thoſe of anger: the keeping the abdomen too hot will alſo occaſion this; and ſometimes it is owing to ſome indiſpoſition of the fœtus itſelf. If any medicines are to be given in this caſe, they muſt be the attemperating ones, and ſuch as can correct the acrimony of the bilious juices; nervous epithems may alſo be externally applied, and the perſon is to be kept in as tranquil a ſtate as poſſible, both as to bodily motion, and the paſſions of the mind.

The child's kicking in the uterus, a complaint very frequent in the laſt months of *pregnancy*; and in perſons of tender habits it often occaſions tears, and ſometimes faintings. Some ſuppoſe that this threatens abortion: but this is wholly erroneous, for the fœtus has no power of contributing to its own birth. This is a ſymptom for which there is no remedy but patience, but it goes off before the time of delivery.

Weakneſs of the fœtus is known by its feeble motion in the womb, and uſually depends on the bad conſtitution of the mother, or elſe on her having been ſubjected to violent frights, or to great ſorrow. Internal medicines of the ſtrengthening kind are proper in this caſe, and, externally, balſamic and aromatic plaiſters may be applied.

The ſecundines ſometimes concrete or grow to the uterus, out of their proper order and place: this is a diſorder we have but very ſlender opportunities of gueſſing at, and is principally cauſed by too much ſitting ſtill during the latter part of *pregnancy*. When this is ſuſpected to be the caſe, internal medicines are of no uſe; and the externals are only the fat of tender animals, or ſpirit of wine impregnated with oils of aniſe or carraway, frequently rubbed in on the belly.

The winding of the navel-ſtring about the neck of the child is often a very unhappy accident, and proves fatal to it: the good women ſuppoſe this to be owing to the mother's reaching upwards, and ſtraining her arms above her head near the time of her delivery; but this is an idle opinion, and the caſe is owing to no ſudden accident, but is probably an unlucky turn of the ſtring from the beginning. Junker's Conſp. Med. p. 708. See DELIVERY, LABOUR, and LYING-*in*.

From the original uſe of the word *pregnant*, is derived the act of impregnating, in its more general application. See GENERATION, FLOWER, and SEED.

PREGNANCY, *plea and trial of*, in *Law*. See *Jury of* MATRONS, and REPRIEVE.

PREGNANT. *Negative* PREGNANT, in *Law*. See NEGATIVE.

PREJUDICE, *præjudicium*, a falſe notion or opinion of any thing, conceived without a due previous examination thereof.

Prejudice, q. d. pre-judgment, does not import a judgment merely as prior to another in reſpect of time, but as being prior thereto in reſpect of knowledge, or of ſufficient attention to the thing; the prepoſition *præ* expreſſing an anticipation, not ſo much of time, as of knowledge and due attention.

Hence *prejudice* is alſo called among the ſchoolmen *anticipatio*, & *præventa cognitio*, a preconceived opinion, &c.

PREJUDICIAL *action*. See ACTION.

PRELATE, from *prælatus*, of *præ*, *before*, and *fero*, *I bear*, *carry*, an eccleſiaſtical ſuperior, raiſed to ſome eminent and ſuperior dignity of the church.

Patriarchs, primates, archbiſhops, biſhops, generals of religious orders, certain croſiered and mitred abbots, and even deans and archdeacons, are ranked among the number of *prelates*.

PRELATE *of the Garter*, is the firſt officer of that noble order, and is as ancient as the inſtitution itſelf.

William de Edynton, then biſhop of Wincheſter, was the firſt *prelate* at the erection of the order; and it has been continued in that ſee ever ſince.

It is an office of great honour, but has neither ſalary nor fees; only a convenient lodging allowed in Windſor-caſtle; and as oft as the *prelate* comes thither (by the ſovereign's command), he is to have court-livery allowed for himſelf and ſervants. See GARTER.

PRELIMINARY, or PRÆLIMINARY, formed from *præ*, *before*, and *limen*, *threſhold*, ſomething to be examined, diſpatched or determined, before an affair can be treated of thoroughly, and to purpoſe.

Preliminaries of peace generally take up the greateſt part of treaties. They conſiſt in examining of powers, qualities of princes, ranks of ambaſſadors, &c.

PRELUDE, *præludium*, in *Muſic*, a ſymphony uſed by way of introduction or preparation to what follows.

A *prelude* is uſually a flouriſh, or an irregular air, which the muſician plays off hand, to ſee if his inſtrument be in tune: and to lead him into the piece to be played.

PREMIER *ſerjeant*, in *Law*. See PRECEDENCE.

PREMISES, PREMISES, *præmiſſæ*, in *Logic*, the two firſt propoſitions of a ſyllogiſm.

When a ſyllogiſm is in form, the two *premiſes* being granted, the concluſion cannot be denied.

The *premiſes*, ſays Chauvin, are properly the parts of the antecedent of an argument, when complex; and are called *præmiſſæ*, becauſe premiſed to the concluſion.

Thus in the argument, *Every man is an animal, Peter is a man, therefore Peter is an animal:* the propoſitions, *every man*, &c. and *Peter*, &c. are the *premiſes*.

Premiſes are the principles of our reaſonings; as being clear, evident, and demonſtrative propoſitions, from the relations whereof to one another we draw or infer new truths, propoſitions, &c.

The *premiſes* are either equal, where neither ſuffices alone for drawing a concluſion, as in the inſtance above; or *unequal*, the one *major*, *greater*, from which alone the concluſion is drawn; the other *minor*, or *leſs*, which only ſerves in applying the antecedent to the conſequent.

In the common practice of the ſchools, however, every ſyllogiſm, or formal argument, of what kind ſoever, is ſaid to have a MAJOR and a MINOR, how equal ſoever the *premiſes* may be.

PREMISES, in *Law*, the lands, &c. mentioned in the preamble or beginning of a deed, leaſe, conveyance, or the like.

PREMIUM, or PRÆMIUM, literally denotes a reward or recompence.

Among merchants it is taken for that ſum of money; viz. 8 or 10 per cent. &c. which is given to an inſurer, for inſuring the ſafe return of any ſhip or merchandize.

PREMIUM is alſo uſed in the money and paper-trade, for what is given for a thing above *par*.

Thus, lottery-tickets, &c. are ſaid to bear ſo much, e. gr. 10 or 20*s.* *premium*, when they are ſold for ſo much beyond the prime coſt, at which the government iſſued them.

PREMONSTRANTES, or PRÆMONSTRATENSES, a religious order of regular canons inſtituted in 1120, by S. Norbert; and thence alſo called *Norbertines*.

The firſt monaſtery of this order was built by Norbert, in the Iſle of France, three leagues to the weſt of Laon; and by him called *Præmonſtre*, *Præmonſtratum*, whence the order itſelf was denominated; though, as to the occaſion of that name, the writers of that order are divided. At firſt, the religious of this order were ſo poor, that they had only a ſingle aſs, which ſerved to carry the wood they cut down every morning, and ſent to Laon, in order to purchaſe bread. But in a ſhort time they received ſo many donations, and built ſo many monaſteries, that, thirty years after the foundation of this order, they had above a hundred abbies in France and Germany: and in proceſs of time the order ſo increaſed, that it had monaſteries in all parts of Chriſtendom, amounting to one thouſand abbies, three hundred provoſtſhips, a vaſt number of priories, and five hundred nunneries. But their number is now greatly diminiſhed. The rule they followed was that of St. Auguſtin, with ſome ſlight alterations, and an addition of certain ſevere laws, whoſe authority did not long ſurvive their auſtere founder.

The order was approved by Honorius II. in 1126, and again by ſeveral ſucceeding popes. At firſt the abſtinence from fleſh was rigidly obſerved. In 1245, Innocent IV. complained of its being neglected, to a general chapter. In 1288, their general, William, procured leave of pope Nicholas IV. for thoſe of the order to eat fleſh on journies. In 1460, Pius II. granted them a general permiſſion to eat meat, excepting from Septuageſima to Eaſter.

The religious of this order are clothed in white, with a ſcapulary before the caſſock. Out of doors they wear a white cloak and white hat; within, a little camail; and at church, a ſurplice, &c.

In the firſt monaſteries built by Norbert, there was one for men, and another for women, only ſeparated by a wall. In 1137, by a decree of a general chapter, this practice was prohibited, and the women removed out of thoſe already built, to a greater diſtance from thoſe of the men.

The *Præmoſtratenſes*, or monks of *Premontrè*, vulgarly called white canons, came firſt into England A. D. 1146. Their firſt monaſtery, called New-houſe, was erected in Lincolnſhire, by Peter de Saulia, and dedicated to St. Martial. In the reign of Edward I. this order had twenty-ſeven monaſteries in England.

PREMOTION, *præmotio*, in the *Schools*, the action of God co-operating with the creature, and determining him to act. See PREDETERMINATION.

Phyſical premotion, according to Alvarez, Lemos, &c. is a complement of the active power, whereby it paſſes from the firſt act to the ſecond, i. e. from a complete, and next power to action. It is an influence or participation of the virtue of the firſt cauſe, which makes the ſecond cauſe actually active.

PREMUNIENTES, in *Law*, writs diſpatched to each biſhop to call them to parliament, warning them to bring with them the deans and archdeacons, one proctor for each chapter, and two for the clergy of his dioceſe.

PREMUNIRE, *premunire*, in *Law*, a term uſed for an offence, for a writ granted thereupon, and for the puniſhment thereof.

The word is a corruption of the Latin *præmonere*, q. d. to forewarn, or bid the offender take care; of which a reaſon may be drawn from the words of the ſtatute 27 Edw. III. cap. 1. and the form of the writ, *Præmunire facias præfatum prepoſitum, & J. R. procuratorem, &c. quod tunc ſint coram nobis.*

In order to underſtand properly the occaſion and origin of *præmunire*, it will be neceſſary to trace out briefly the riſe and progreſs of the papal uſurpations in England. The converſion of the Saxons in this country to the profeſſion of Chriſtianity, was effected by Auguſtin the monk, and other miſſionaries from the court of Rome: and this naturally introduced ſome few of the papal corruptions in point of faith and doctrine: but we read of no civil authority claimed by the pope in theſe kingdoms, till the æra of the Norman Conqueſt, when the reigning pontiff, having favoured duke William in his projected invaſion, by bleſſing his hoſt and conſecrating his banners, he took that opportunity alſo of eſtabliſhing his ſpiritual encroachments, which the policy of the conqueror allowed in order more effectually to humble the Saxon clergy and aggrandize his Norman prelates. Hence his legates *a latere* were introduced into England to hear and determine eccleſiaſtical cauſes; and, in the reign of Henry I. he aſſumed the diſpoſal of moſt of the biſhopricks, abbeys, and other eccleſiaſtical benefices, by mandates or bulls, called *expectative graces*, and *proviſions*, before they became void; in the reign of king Stephen, appeals to the court of Rome were eſtabliſhed; under Henry II. the pope claimed exemption of clerks from the ſecular power; and in the time of king John, pope Innocent III. obtained a reſignation of his crown to the POPE, and compelled him to accept his kingdom from the pope's donation, holding it as a vaſſal of the holy ſee, at the annual rent of a thouſand marks. Many circumſtances concurred, and many contrivances were made uſe of to extend and eſtabliſh the papal power in this kingdom.

King Edward I. a wiſe and magnanimous prince, ſet himſelf in earneſt to ſhake off this ſervile yoke; and in the thirty-fifth year of his reign was made the firſt ſtatute againſt papal proviſions, which, according to ſir Edward Coke, is the foundation of all the ſubſequent ſtatutes of *præmunire*.

In the weak reign of Edward II. the pope again endeavoured to incroach, but the parliament reſolutely withſtood him: and in the reign of Edw. III. ſeveral penal laws were enacted againſt proviſors; 25 Edw. III. ſtat. 6. 27 Edw. III. ſtat. 1. cap. 1. 38 Edw. III. ſtat. 1. cap. 4. and ſtat. 2. cap. 1, 2, 3, 4. which ordained, that the court of Rome ſhould preſent or collate to no biſhoprick or living in England; and that whoever diſturbed any patron in the preſentation to a living by virtue of a papal proviſion, ſuch proviſor ſhould pay fine and ranſom to the king at his will, and be impriſoned till he renounced ſuch proviſion; and the ſame puniſhment was inflicted on ſuch as cited the king, or any of his ſubjects, to anſwer in the court of Rome. And when the holy ſee reſented theſe proceedings, and pope Urban V. attempted to revive the vaſſalage and annual rent to which king John had ſubjected his kingdom, it was unanimouſly agreed by all the eſtates of the realm in parliament aſſembled, 40 Edw. III. that king John's donation was null and void, being without the concurrence of parliament, and contrary to his coronation oath; and all the temporal nobility and commons engaged, that if the pope ſhould endeavour by proceſs or otherwiſe to maintain theſe uſurpations, they would reſiſt him with all their power.

In the reign of Richard II. it was found neceſſary to ſtrengthen theſe laws, and, therefore, it was enacted by ſtat. 3 Ric. II. cap. 3. and 7 Ric. II. cap. 12. firſt, that no alien ſhould be capable of letting his benefice to farm; and, afterwards, that no alien ſhould be capable of being preſented to any eccleſiaſtical preferment, under the penalty of the ſtatutes of proviſors. By the ſtatute 12 Ric. II. cap. 15. all liegemen of the king, accepting of a living by any foreign proviſion, are put out of the king's protection, and the benefice made void. To which the ſtatute 13 Ric. II. ſtat. 2. cap. 2. adds baniſhment and forfeiture of lands and goods; and by cap. 3. of the ſame ſtatute, any perſon bringing over any citation or excommunication from beyond ſea, on account of the execution of the foregoing ſtatutes of proviſors, ſhall be impriſoned, forfeit his goods and lands, and moreover ſuffer pain of life and member.

In the writ for the execution of all theſe ſtatutes, the words *præmunire facias*, being uſed to command a citation of the party, have denominated, in common ſpeech, not only the writ, but the offence itſelf of maintaining the papal power, by the name of *præmunire*. And, accordingly, the next ſtatute, 16 Ric. II. cap. 5. uſually called the ſtatute of *præmunire*, and generally referred to by all ſubſequent ſtatutes, enacts, that whoever procures at Rome, or elſewhere, any tranſlations, proceſſes, excommunications, bulls, inſtruments, or other things which touch the king, againſt him, his crown and realm, and all perſons aiding therein, ſhall be put out of the king's protection, their lands and goods forfeited to the king's uſe, and they ſhall be attached by their bodies to anſwer to the king and his council; or proceſs of *præmunire facias* ſhall be made out againſt them, as in other caſes of proviſors. By the ſtatute 2 Hen. IV. cap. 3. all perſons who accept any proviſion from the pope, to be exempt from canonical obedience to their proper ordinary, are alſo ſubjected to the penalties of *præmunire*; and this is the laſt of our ancient ſtatutes touching this offence.

Such is the original meaning of the offence, which we call *præmunire*; viz. introducing a foreign power into this land, and creating *imperium in imperio*, by paying that obedience to papal proceſs, which conſtitutionally belonged to the king alone, long before the reformation in the reign of Henry the Eighth; at which time the penalties of *præmunire* were indeed extended to more papal abuſes than before; as the kingdom then entirely renounced the authority of the ſee of Rome, though not all the corrupted doctrines of the Roman church. And, therefore, by the ſeveral ſtatutes of 24 Hen. VIII. cap. 12. and 25 Hen. VIII. cap. 19 and 21. to appeal to Rome from any of the king's courts; to ſue to Rome for any licence or diſpenſation; or to obey any proceſs from thence, are made liable to the pains of *præmunire*. And, in order to reſtore to the king in effect the nomination of vacant biſhopricks, and yet keep up the eſtabliſhed forms, it is enacted by ſtatute 25 Hen. VIII. cap. 20. that if the dean and chapter refuſe to elect the perſon named by the king, or any archbiſhop or biſhop to confirm or conſecrate him, they ſhall fall wit hin the penalties of the ſtatutes of *præmunire*. Alſo by ſtat. 5 Eliz. cap 1. to refuſe the oath of ſupremacy will incur the pains of *præmunire*; and to defend the pope's juriſdiction in this realm is a *præmunire* for the firſt offence, and high treaſon for the ſecond. So too, by ſtatute 13 Eliz. cap. 2. to import any AGNUS *Dei*, croſſes, beads, or other ſuperſtitious things pretended to be hallowed by the biſhop of Rome, and tender the ſame to be uſed; or to receive the ſame with ſuch intent, and not diſcover the offender; or if a juſtice of the peace, knowing thereof, ſhall not within fourteen days declare it to a privy counſellor; they all incur a *præmunire*.

Farther, to contribute to the maintenance of a Jeſuit's college, or any popiſh ſeminary whatever, beyond ſea; or any perſon in the ſame; or to contribute to the maintenance of any Jeſuit or popiſh prieſt in England; is by ſtatute 27 Eliz. cap. 2. made liable to the penalties of *præmunire*.

The ſame penalties, thus far kept within the bounds of their original inſtitution, viz. the depreſſing the power of the pope have been applied to other heinous offences. Thus, 1. By the ſtatute 1 and 2 Phil. & Mary, cap. 8. to moleſt the poſſeſſors of abbey lands granted by parliament to Henry the Eighth, and Edward the Sixth, is a *præmunire*. 2. So likewiſe is the offence of acting as a broker or agent in any uſurious contract, where above ten per cent. intereſt is taken, by ſtatute 13 Eliz. cap. 10. 3. To obtain any ſtay of proceedings, other than by arreſt of judgment or writ of error, in any ſuit for a monopoly, is likewiſe a *præmunire*, by ſtatute 21 Jac. I. cap. 3. 4. To obtain an excluſive patent for the ſole making or importation of gunpowder or arms, or to hinder others from importing them, is alſo a *præmunire* by two ſtatutes; the one 16 Car. I. cap. 21. the other 1 Jac. II. cap. 8. 5. On the abolition, by ſtatute 12 Car. II. cap. 24. of purveyance, and the prerogative of pre-emption, or taking any victual, beaſts, or goods for the king's uſe, at a ſtated price, without conſent of the proprietor, the exertion of any ſuch power for the future was declared to incur the penalties of *præmunire*. 6. To aſſert, maliciouſly and adviſedly, by ſpeaking or writing, that both or either houſe of parliament have a legiſlative authority without the king, is declared a *præmunire* by ſtatute 13 Car. II. cap. 1. 7. By the habeas corpus act alſo, 31 Car. II. cap. 2. it is a *præmunire*, and incapable of the king's pardon, beſides other heavy penalties, to ſend any ſubject of this realm a priſoner into parts beyond the ſeas. 8. By the ſtatute 1 W. & M. ſtat. 1. cap. 8. perſons of eighteen years of age refuſing to take the new oaths of allegiance, as well as ſupremacy, upon tender by the proper magiſtrate, are ſubject to the penalties of a *præmunire*; and by ſtat. 7 and 8 W. III. cap. 24. ſerjeants, counſellors, proctors, attorneys, and all officers of courts, practiſing without having taken the oaths of allegiance and ſupremacy, and ſubſcribing the declaration againſt popery, are guilty of a *præmunire*, whether the oaths be tendered or no. 9. By the ſtatute 6 Ann. cap. 7. to aſſert maliciouſly and directly, by preaching, teaching, or adviſed ſpeaking, that the then pretended prince of Wales, or any perſon other than according to the acts of ſettlement and union, hath any right to the throne of theſe kingdoms; or that the king and parliament cannot make laws to limit the deſcent of the crown; ſuch preaching, teaching, or adviſed ſpeaking is a *præmunire*; as writing, printing, or publiſhing the ſame doctrines amount to high treaſon. 10. By ſtatute 6 Ann. cap. 23. if the aſſembly of peers of Scotland, convened to elect their ſixteen repreſentatives in the Britiſh parliament, ſhall preſume to treat of any other matter ſave only the election, they incur the penalties of a *præmunire*. 11. The laſt offence that has been made a *præmunire*, was by ſtatute 6 Geo. I. cap. 18. the year after the infamous South Sea project had beggared half the nation. This therefore makes all unwarrantable undertakings by unlawful ſubſcriptions, then commonly known by the name of bubbles, ſubject to the penalties of a *præmunire*.

The puniſhment of *præmunire* is thus ſummed up by ſir Edward Coke, that from the conviction, the defendant ſhall be out of the king's protection, and his lands and tenements, goods and chattels, forfeited to the king; and that his body ſhall remain in priſon at the king's pleaſure, or (as other authors have it) during life. And ſo odious, adds the ſame author, was this offence of *præmunire*, that a man who was attainted of the ſame might have been ſlain by any other man without danger of law; becauſe it was provided by law (ſtat. 25 Edw. III. ſtat. 5. cap. 22.) that any man might do to him, as to the king's enemy; and any man may lawfully kill an enemy. But to obviate ſuch mikaken and ſavage notions, the ſtatute 5 Eliz. cap. 1. provides, that it ſhall not be lawful to kill any perſon attainted in a *præmunire*, any law, ſtatute, opinion, or expoſition of law to the contrary notwithſtanding. However ſuch delinquent, though protected as a part of the public from public wrongs, can bring no action for private injury, how atrocious ſoever; being ſo far out of the protection of the law, that it will not guard his civil rights, nor remedy any grievance which he, as an individual, may ſuffer. And no man, knowing him to be guilty, can with ſafety give him comfort, aid, or relief. Blackſt. Com. book iv. cap. 8.

PREMUNIRE is now chiefly uſed for the puniſhment appointed by the ſtatutes above mentioned. Thus, when it is ſaid a man for an offence *ſhall incur a premunire*, it is meant, he ſhall incur the penalty appointed by the ſtatute 16 Rich II. commonly called the *ſtatute of premunire*.

PRENANTHES, in *Botany*. See *Wild* LETTUCE.

PRENDER, formed from the French *prendre, to take*, in *Law*, a power or right of taking a thing before it is offered.

Such a thing *lies in* render, *but not in* prender. Coke's Rep. p. 1. Sir John Peter's caſe. See RENDER.

PRENDER *de baron* is an exception to diſable a woman from purſuing an appeal of murder againſt the killer of her former huſband, taken from her having married a ſecond. See APPEAL.

RRENESTINÆ *ſortes*. See SORTES.

PRENOMEN, PRÆNOMEN, among the Romans, a proper name, or name prefixed to the general name of the family; as, Caius, Lucius, Marcus, &c.

The *prenomen* anſwers to our Chriſtian name, Peter, Paul, &c. It was not introduced among the Romans till long time after the *nomen*.

The name of the family was given by the Romans to their children ſoon after their birth; but the *prenomen* was not given them till they took the virile habit, or about the age of ſeventeen years. See NAME.

Varro reckons up thirty *prænomina* among the Romans. The uſual ones may be reduced to eighteen.

The Greeks had no *prænomina*; they had but one name.

PRENOTION, PRÆNOTIO, or PRÆCOGNITIO, a notice, or piece of knowledge preceding ſome other, in reſpect of time.

Such is the knowledge of the antecedent; which muſt precede that of the concluſion. See *Common* NOTIONS, and PRÆNOTION.

PREPARANTIA, or PRÆPARANTIA *vaſa*, in *Anatomy*, the ſpermatic veſſels; being two arteries, and as many veins of the teſticles; thus called by the ancients, from an opinion that the ſeed began to be prepared herein. See SPERMATIC *veſſels*, and GENERATION.

PREPARATION, PRÆPARATIO, *apparatus*, in *Mathematics*, makes one of the parts or branches of a demonſtration.

If it be a propoſition in geometry that is to be demonſtrated, the *preparation* conſiſts in certain lines to be drawn in the figure: if a propoſition in arithmetic, in ſome computation to be made to come the more eaſily at the demonſtration.

PREPARATION, in *Chemiſtry* and *Pharmacy*, is applied to the ſeveral manners of managing the materia medica, and of diſpoſing it to ſerve the ſeveral purpoſes.

There are various *preparations* of mercury, antimony, and other drugs, to purify them, ſublime, calcine, edulcorate them, &c.

PREPARATION, in *Anatomy*, is uſed for the art of preſerving the parts of animal bodies for anatomical uſes.

It is alſo uſed to ſignify the parts themſelves ſo prepared. Mr. Monro has given us an eſſay on the method of *preparing*, and preſerving the parts of animal bodies for anatomical uſes.

The principal *preparation* which bones require is to make them white: and the beſt method of whitening the bones of young creatures is to macerate them for a conſiderable time in cold water, frequently changed; the bones being laid out each time to dry a little in the ſun. Cartilages are made pellucid in the ſame manner, after which they ſhould be brought to their natural ſhape and ſituation by ſtrings, weights, &c. Muſcles that have no large cavity are to be laid and ſecured in their deſigned poſture, and preſſed with the fingers into a natural ſhape, while they are drying. The ſeveral veſſels are prepared by INJECTION.

Ruyſch deſcribes the method of ſeparating the cuticula and corpus reticulare from the ſkin, by ſtretching theſe common teguments, well freed from the fat, on a board, with the cuticula outmoſt; and then dipping all into boiling water, which looſens them ſo from the ſkin, that they are eaſily ſeparated with a blunt knife, or the thin ivory handle of a ſcalpel; then with the ſame inſtrument he ſeparates the corpus reticulare from the cuticle, leaving them connected to each other, and to the ſkin in ſome part. After this they may be either dried or put into the embalming liquor. The cellular membrane under the ſkin cannot be preſerved diſtended with air, except where there is little or no fat contained in it: one of the beſt parts for making a *preparation* of this kind is the ſcrotum, where that which is commonly called muſculus dartos may, by blowing into it, be changed entirely into fine membranous cellules. In order to preſerve the dura mater with all its proceſſes in a natural ſituation, it is neceſſary to ſaw the cranium from near the root of the noſe to the middle of the os occipitis, by a perpendicular ſection at half an inch diſtance from the ſagittal ſuture, and then by a horizontal ſection, terminating at the extremities of the former ſection, to take off a conſiderable part of the ſides of the cranium; after which the dura mater, being cut by an inciſion in form of a T, the brain and cerebellum are taken out, and the head is preſerved in a liquor; or the bones are cleaned and dried; the cut parts of the dura mater being ſtretched out with pins, hooks, or threads. The proceſſes of the pia mater may be eaſily ſeparated entire with this membrane, when it is preternaturally thickened by diſeaſe, as is often the caſe; or, in a ſound ſtate, large pieces of it may be obtained with its proceſſes after macerating the brain in water. When the water is paſſed from it, it ought to be immerſed in the embalming liquor, and properly extended. In order to prepare the eye for preſervation, it is neceſſary to coagulate the cryſtalline and vitreous humours, by immerſing it for ſome time in a proper liquor: after this they will bear maceration in water, for ſeparation of the choroid and Ruyſch's coat. By macerating the ear in water, the membrane, which is continued from the epidermis of the ear to line the meatus auditorius externus, and to form the outer lamella of the membrana tympani, may be brought off entire in adults, and is eaſily ſeparated in fœtuſes and very young children. The cuticle covering the papillæ of the lips is to be taken off by macerating in water; the villous ſubſtance of the tongue is eaſily made red, by injection of the arteries, and a membrane analagous to the cuticula ſeparates by ſoaking in water. The muſcles of the organs of deglutition, that are fixed to any of the ſurrounding parts, muſt be clean diſſected, and cut off from theſe parts; after which the tongue, os hyoides, fauces, velum pendulum palati, with the uvula, the larynx, pharynx, aſpera arteria, and œſophagus, are taken out with the diſſected muſcles hanging at them, to be ſecured in their natural ſituation with ſmall pieces of thin boards, and threads faſtened to hooks. A cork is then put into the lower part of the trachea; round which and the œſophagus a ſtrong thread is tied firmly, and quickſilver is poured by the fauces, or by the paſſage which led to the noſtrils till the œſophagus, trachea, larynx, and pharynx are filled; in which condition it is left to hang till the parts are pretty firm, but not quite dry; when the quickſilver is poured out, and the parts, overſtretched by the weight of it, or too much ſhrivelled, preſſed with the fingers, into their natural ſituation. The hollow viſcera of the thorax and abdomen are prepared, for preſerving their form and exhibiting their internal ſtructure, with air, quickſilver, or melted wax. The blood and other liquors contained in the bowels to be filled, are preſſed out, and all their paſſages tied, except that by which the diſtending liquor is introduced. The lungs and ſpleen, whoſe membranes retain quickſilver or air with great difficulty, require particular care; theſe muſt be diſtended, expoſed to a warm ſun or fire in order to dry ſoon; and then immerſed in ſtrong turpentine varniſh, ſo that their whole ſurface may be covered;

and thus they will be rendered more capable of retaining the air, that is blown into them.

The manner of preſerving anatomical *preparations*, is either by drying them thoroughly in the air, or putting them into a proper liquor.

In drying parts which are thick, when the weather is warm, care muſt be taken to prevent putrefaction, fly-blows, inſects, &c. This is eaſily done by the uſe of a ſolution of corroſive ſublimate in ſpirit of wine, in the proportion of two drachms of ſublimate to a pound of ſpirit: the part ſhould be moiſtened with this liquor as it dries, and by this method the body of a child may be kept ſafe even in ſummer. Dried *preparations* are apt to crack and moulder away in keeping; to prevent this, their ſurface ſhould be covered with a thick varniſh, repeated as often as occaſion requires.

Though ſeveral parts *prepared* dry are uſeful, yet others muſt be ſo managed as to be always flexible, and nearer a natural ſtate. The difficulty has been to find a proper liquor for this purpoſe. Mr. Monro ſays, the beſt he knows is a well rectified colourleſs ſpirit of wine, to which is added a ſmall quantity of the ſpirit of vitriol or nitre. When theſe are properly mixed, they neither change their colour nor the conſiſtence of the parts, except where there are ſerous or mucous liquors contained in them. The brain even of a young child, in this mixture, grows ſo firm as to admit of gentle handling, as do alſo the vitreous and cryſtalline humours of the eye. The liquor of the ſebaceous glands and the ſemen are coagulated by this ſpirituous mixture; and it heightens the red colour of the injection of the blood veſſels, ſo that after the part has been in it a little time, ſeveral veſſels appear which were before inviſible. If you will compare theſe effects with what Ruyſch has ſaid of his balſam, which is rectified ſpirit of malt with a third part of water diſtilled in a tin alembic, with the addition of a handful of black pepper, you will find the liquor above mentioned to come very near to it.

The proportion of the two ſpirits muſt be changed according to the part prepared: for the brain and humours of the eye, you muſt put two drachms of ſpirit of nitre to one pound of ſpirit of wine. In preſerving other parts which are harder, thirty or forty drops of the acid will be ſufficient; a larger quantity will make bones flexible, and even diſſolve them. The part thus preſerved ſhould be always kept covered with the liquor, therefore great care ſhould be taken to ſtop the mouth of the glaſs with a waxed cork, and a bladder tied over it, to prevent the evaporation of the ſpirit; ſome of which, notwithſtanding all this care, will fly off; therefore freſh muſt be added as there is occaſion. When the ſpirits change to a dark tincture, which will ſometimes happen, they ſhould be poured off, and freſh put in their room; but with ſomewhat leſs acid than at firſt.

The glaſſes which contain the *preparations* ſhould be of the fineſt ſort, and pretty thick; for through ſuch the parts may be ſeen very diſtinctly, and of a true colour, and the object will be ſo magnified as to ſhew veſſels in the glaſs which out of it were not to be ſeen.

As the glaſs, when filled with the liquor, has a certain focus, it is neceſſary to keep the *preparation* at a proper diſtance from the ſides of it, which is eaſily done by little ſticks ſuitably placed; or by ſuſpending it by a thread in a proper ſituation.

The operator ſhould be cautious of putting his fingers in this liquor oftener than is abſolutely neceſſary; becauſe it brings on a numbneſs on the ſkin, which makes the fingers unfit for any nice operation. The beſt remedy for this is to waſh them in water mixed with a few drops of oil of tartar per deliquium. Med. Eſſ. Edinb. vol. iii. art. 10.

Dr. Chriſt. Jac. Trew prefers the rectified ſpirit of grain for preſerving anatomical *preparations* to ſpirit of wine, or compoſitions of alcohol, amber, camphor, &c. becauſe theſe ſoon change into a brown colour; whereas the ſpirit from malt preſerves its limpid appearance. When any part is to be preſerved wet, waſh it with water, till it is no more tinctured. The water is next to be waſhed away with ſpirits, and then the *preparation* is to be put among ſpirits in a glaſs, the mouth of which is to be cloſely covered with a glaſs head, over which a wet bladder and leaf-tin are to be tied. Com. Lit. Norimb. 1731. Semeſt. 1. Specim. 9.

Preparation *of inſects*, in *Anatomy*. See Insects.

PREPARATORY *torture*. Sea Torture.

PREPARED *antimony*. See Antimony.

Prepared *opium*. See Opium.

PREPENSED, Præpensus, in *Law*, denotes *fore-thought*.

In which ſenſe we ſay *prepenſed* MALICE, &c.

If, when a man is ſlain upon a ſudden quarrel, there were malice *prepenſed* formerly between them, it makes it murder; and as it is called in ſome ſtatutes, *prepenſed* MURTHER.

PREPOSITION, Præpositio, in *Grammar*, one of the parts of ſpeech or diſcourſe.

The *prepoſition* is an indeclinable particle, which yet ſerves to govern the nouns that follow it. Such are, *per*, *pro*, *propter*, *in*, *with*, *through*, *from*, *by*, &c.

They are called *prepoſitions*, becauſe *præpoſitæ*, placed before the nouns they govern.

F. Buffier does not allow the *prepoſition* to be a part of ſpeech, but merely a modificative of a part of ſpeech; viz. of the noun; ſerving only to modify or circumſtantiate it. See Modificative.

The ingenious Mr. Harris ranges the *prepoſition* under the claſs of Connectives, and defines it a part of ſpeech devoid itſelf of ſignification, but ſo formed as to unite two words that are ſignificant, and that refuſe to unite or coaleſce of themſelves. Thoſe connectives which join ſentences are called CONJUNCTIONS. Hermes, book ii. chap. 3.

One great uſe (ſays biſhop Lowth, Int. to Eng. Gram. p. 114), of *prepoſitions* in Engliſh, is to expreſs thoſe relations, which in ſome languages are chiefly marked by caſes, or the different endings of the noun.

Prepoſitions are alſo prefixed to words in ſuch manner as to coaleſce with them, and to become a part of them. There are alſo certain particles, which are thus employed in compoſition of words, yet cannot ſtand by themſelves in conſtruction; which are called inſeparable *prepoſitions*; as *a*, *be*, *con*, &c.

PREPOSITUS *villæ* is ſometimes uſed for the chief officer of the king, in a town, manor, or village.

In ancient records, the *præpoſitus villæ* was no more than the bailiff of the lord of the manor.

Præpoſitus villæ is ſometimes alſo uſed, in later writers, for the conſtable of a town, or petty CONSTABLE.

Prepositus *eccleſiæ*. See Church-*reve*.

Quatuor homines Prepositi, in Crompton, &c. denote four men of each town, who are to appear before the juſtices of the foreſt in their circuit.

PREPUCE, Præputium, in *Anatomy*, the *foreſkin*; a prolongation of the cutis of the penis, covering the glans, or extremity of the yard. See *Tab. Anat. (Splanch) fig.* 10. *lit. c c.*

Dr. Drake obſerves, that nature does not ſeem more various in any part of her works than in the *prepuce*; for the figure and proportion whereof there does not ſeem any ſtandard.

Hence, probably, aroſe the neceſſity of circumciſion, ſo generally practiſed throughout the oriental parts of the world: not out of a view to religion, but to cleanlineſs, and to prevent diſeaſes, which a detention of the mucus of the *ſubpreputial* glans might breed in thoſe hot countries. For even here, the ſame author adds, he has known ſome, who having large *prepuces*, called *filbert-prepuces*, have been frightened at the appearance of a mucus ouſing out upon a mere plenitude from between the *prepuce* and glans; which, it is probable, the great legiſlator of the Jews might have a view to in the firſt inſtitution of CIRCUMCISION.

The ſkin of the *prepuce* is double; at the connection of the internal ſkin, to the other part, are ſeveral oval and roundiſh glandules placed irregularly about the joining of the glands to the corpora cavernoſa, and on the glans itſelf.

Their uſe is to ſeparate a liquor to render the agitation of the prepuce on the glans eaſy. When this liquor becomes rancid, as upon old age, or venereal contacts, it excoriates the glans and *prepuce*; and even ſometimes contracts the latter, and renders it neceſſary to be divided, to afford a paſſage to the glans. See Phimosis, and Paraphimosis.

PREROGATIVE, *prærogativa*, a privilege, or pre-eminence, which one perſon has over another.

The word is borrowed from the appellation of a century in ancient Rome, which gave the firſt vote, or ſuffrage, in the *comitia*, or aſſemblies for the election of magiſtrates; *quaſi* prærogati; becauſe firſt aſked, or their ſuffrage firſt required.

Their vote was called *omen prærogativum*, becauſe the reſt uſually gave their votes the ſame way.

Prerogative *of the king*, *prerogativa regis*, is that power, pre-eminence, and privilege, which the king hath over and above all other perſons, and out of the ordinary courſe of the common law, in right of his regal dignity. The king's *prerogatives* are either direct or incidental: the direct are ſuch poſitive ſubſtantial parts of the royal character and authority, as are rooted in and ſpring from the king's political perſon, conſidered merely by itſelf, without reference to any other extrinſic circumſtance; as the right of ſending ambaſſadors, of creating peers, and of making war or peace. But ſuch *prerogatives* as are incidental bear always a relation to ſomething elſe diſtinct from the king's perſon, and are indeed only exceptions, in favour of the crown, to thoſe general rules that are eſtabliſhed for the reſt of the community; ſuch as, that no coſts ſhall be recovered againſt the king, that the king can never be a joint-tenant, and that his debt ſhall be preferred before a debt to any of his ſubjects. The ſubſtantial, direct *prerogatives*, are of three kinds; being ſuch as regard, firſt, the king's royal character; ſecondly, his royal authority; and, laſtly, his royal income. See KING and REVENUE.

It is one of the principal bulwarks of civil liberty, or of the Britiſh conſtitution, that the king's *prerogative* is limited by bounds ſo certain and notorious, that it is impoſſible he ſhould ever exceed them, without the conſent of the people, on the one hand; or without, on the other, a violation of that original contract, which in all ſtates implicitly, and in our's moſt expreſly, ſubſiſts between the prince and the ſubject. And it is one of the moſt manifeſt proofs of that genuine freedom, which is the boaſt of this age and country, that the limits of the king's *prerogative* may be examined and diſcuſſed with decency and reſpect, without offence and danger. This was formerly reckoned among the arcani imperii; and queen Elizabeth directed her parliaments to abſtain from diſcourſing of matters of ſtate; and maintained, both in perſon and by her miniſters, that this auguſt aſſembly ought not to deal, to judge, or to meddle, with her majeſty's *prerogative* royal. And king James I. more than once, laid it down in his ſpeeches, that as it is atheiſm and blaſphemy in a creature to diſpute what the Deity may do, ſo it is preſumption and ſedition in a ſubject to diſpute what a king may do in the height of his power. Good Chriſtians, he adds, will be content with God's will revealed in his word; and good ſubjects will reſt in the king's will, revealed in his law. King James's Works, 557. 531.

PREROGATIVE, *contempts againſt the king's*, are ſuch as refuſing to aſſiſt him for the good of the public, either in his councils, by advice, when called upon; or in his wars, by perſonal ſervice, againſt a rebellion or invaſion, neglecting to join the *poſſe comitatus*; preferring the intereſt of a foreign potentate to thoſe of our own, or doing or receiving any thing that may create an undue influence in favour of ſuch extrinſic power, as by taking a penſion from any foreign prince without the conſent of the king, and diſobeying the king's lawful commands, whether by writs iſſuing out of his courts of juſtice, or by a ſummons to attend his privy-council, or by letters from the king, commanding a ſubject to return from beyond the ſeas, or by his writ of *ne exeat regnum*, or proclamation commanding the ſubject to ſtay at home. Diſobedience to any of theſe commands is a high MISPRISION, or contempt.

PREROGATIVE *copy-rights*, are acts of parliament, proclamations, and orders of council, liturgies, and books of divine ſervice, and grammars, and other compoſitions, compiled or tranſlated at the expence of the crown, tranſlation of the Bible, &c.

PREROGATIVE *court*. See COURT *of prerogative*.

PREROGATIVE, *felonies and miſdemeanors againſt the king's*, are thoſe that relate to the COIN, not amounting to treaſon, againſt the king's council (ſee PRIVY-*council*), and thoſe incurred by FOREIGN *ſervice*, by imbezzling the king's armour or warlike ſtores (ſee IMBEZZLE), and by deſertion from the king's army or navy, which, by the ſtanding laws of the land, and particularly by 18 Hen. VI. cap. 19, & 5 Eliz. cap. 5. is made felony, but not without benefit of clergy. But by 2 & 3 Edw. VI. cap. 2. clergy is taken away from ſuch deſerters, and the offence is made triable by the juſtices of every ſhire. The ſame ſtatutes puniſh other inferior military offences with fines, impriſonment, and other penalties. See DESERTER, and MUTINY.

PREROGATIVE, *property by*. See PROPERTY.

PRESA, in the *Italian Muſic*, is in general a character which ſhews when and where a performer in concert is to begin to ſing or play; but, in particular, in fugues or canons it is thus marked +̈ over the note at which the ſecond part, which is to follow or imitate the firſt, muſt begin. If the mark be repeated a ſecond time it is to ſhew the place where the third part muſt begin, to imitate the ſecond; and ſo on through all the parts.

PRESAGE, *præſagium*, an augury, or ſign of ſomething to come.

The Romans judged of future events by certain ſigns, which their ſuperſtition, or the artifice of their prieſts, had invented. Their moſt celebrated *preſages* were founded on the flight of birds, or the entrails of victims. All night-birds paſſed for birds of ill *preſage*.

PRESBYS, in *Ornithology*, a name uſed by many of the ancient naturaliſts for the *regulus criſtatus*, or golden crowned WREN.

PRESBYTA, Πρεσβυτης, in *Optics*, a term applied to perſons in whom the configuration of the cryſtalline of the eye is too flat; ſo that they ſee diſtant things clearly; but thoſe near at hand confuſedly.

The reaſon is, that, in near objects, the viſual rays paſſing the retina before they unite, there can be no diſtinctneſs, ſince the diſtinct baſe falls too far off beyond the retina.

This defect is helped only with convex glaſſes, or ſpectacles; which will make the rays converge ſooner, and, if they are well fitted, fall exactly on the retina.

The word is formed from the Greek ϖρεσβυς, *ſenex*, becauſe old people are naturally ſubject to this defect: time, and the friction of the eye-lids, &c. gradually wearing the ball flat.

Preſbytæ are oppoſed to *myopes*, in whom the cryſtalline is too round.

If the diſtance between the retina and the cryſtalline be too ſmall, the perſon will likewiſe be a *preſbyta*. See EYE, and VISION.

PRESBYTER, a *prieſt*, or perſon in prieſt's orders.

He is thus called from the Greek ϖρεσβυτερος, *elder*, of ϖρεσβυς, *old*, becauſe, anciently, none were ordained but ſuch as were advanced in years.

The great diſpute between the retainers to the Geneva and the Roman diſcipline is, about the ſameneſs or difference of *preſbyters* and biſhops, in the times of the apoſtles.

Thoſe who conſult Acts xx. 17. 28. Phil. i. 1. Tit. i. 5. 7. and 1 Tim. iii. 1. may perhaps be led to conclude, that theſe titles were applied to the ſame perſons.

The learned biſhop Uſher expreſly ſays, "I have ever "declared my opinion to be, that *epiſcopus & preſbyter* "*gradu tantum differunt, non ordine*; and conſequently, "that in places where biſhops cannot be had, the ordi-"nation by *preſbyters* ſtands valid." And being aſked by his majeſty at the Iſle of Wight, "Whether he found in "antiquity, that *preſbyters* alone ordained any?" he replied, "Yes; and that he could ſhew his majeſty more; "even where *preſbyters* alone ſucceſſively ordained bi-"ſhops;" and inſtanced in Jerom's words (Epiſt. ad Evagrium) of the *preſbyters* of Alexandria chuſing and making their own biſhops from the days of Mark, till Heraclius and Dionyſius. Baxter's Life, p. 206.

This was the conſtant ſenſe of our firſt reformers, Cranmer, Pilkington, Jewel, Grindal, Whitgift, Bancroft, &c. Biſhop Burnet expreſly ſays: "As for the notion "of diſtinct offices of biſhop and *preſbyter*, I confeſs, it "is not ſo clear to me; and therefore, ſince I look upon "the ſacramental actions as the higheſt of ſacred per-"formances, I cannot but acknowledge thoſe who are "empowered for them muſt be of the higheſt office in "the church." Vind. of the Church of Scotland, p. 336. See BISHOP.

PRESBYTERIANS, a denomination comprehending a very conſiderable number of perſons in Great Britain; but very differently applied in England and Scotland. The Engliſh *preſbyterians* do not materially differ from the independents with regard to church-government and diſcipline, and mode of worſhip; but they generally allow a greater latitude of religious ſentiments and communion in their churches. The appellation, in this reſtricted uſe of it, implies no attachment to the authority of ſynods, preſbyteries, or eccleſiaſtical aſſemblies compoſed of deputies from different churches, any more than to epiſcopacy and the eccleſiaſtical hierachy; and, therefore, according to its original uſe, it is improperly applied to many who are now diſtinguiſhed by it, and who form a very reſpectable claſs of NONCONFORMISTS, or proteſtant DISSENTERS in this kingdom. See INDEPENDENTS.

But the *preſbyterians*, properly ſo called, and with whom the former agree in ſome particulars, admit, in general, and allowing for that latitude of ſentiment, which will ever be the reſult of unreſtrained and liberal enquiry, the doctrinal articles of the church of England: their chief difference lies in the point of diſcipline, viz. who ſhall appoint the governors of the church, and what ſubordination there ſhall, or ſhall not, be between them.

The *preſbyterians* allow of no hierachy, no ſubordination in the perſons of their miniſters; biſhops and prieſts they maintain, in the times of the apoſtles, were the ſame; and therefore, though they allow epiſcopacy, as now ſettled in the church of England, to be very ancient, yet they deny it to be *jure divino*.

In lieu of a ſeries of miniſters one over another, in quality of prieſts, biſhops, and archbiſhops, their polity conſiſts in a ſeries of aſſemblies or ſynods. Thus every miniſter

niſter is to be obedient to the claſſis under which he lives; and that claſs to a ſynod, provincial, claſſical, or œcumenical.

The power of ordination, with them, reſides in a claſſis; and none are admitted to adminiſter the ſacrament, but thoſe ordained by the impoſition of hands of other miniſters.

They make uſe of deacons to take care of their poor; and, in the government of the church they call in lay-elders; whence their name: from the Greek ϖρεσϐυτερος, ſignifying *ſenior*, *elder*. See Presbytery.

This is now the eſtabliſhed diſcipline of the church of Scotland, where it was introduced as ſoon as it began to aſſume a regular form, about the year 1560. Calvin, whoſe deciſions were received among the proteſtants of that age with incredible ſubmiſſion, was the patron and reſtorer of this ſcheme of eccleſiaſtical policy. The church of Geneva, formed under his eye, and by his direction, was eſteemed the moſt perfect model of government; and Knox, who, during his reſidence in that city, had ſtudied and admired it, warmly recommended it to the imitation of his countrymen. But on the firſt introduction of this ſyſtem, he did not think it expedient to depart altogether from the ancient form; inſtead of biſhops he propoſed to eſtabliſh ten or twelve ſuperintendants in different parts of the kingdom, who were empowered to inſpect the life and doctrine of the other clergy, to preſide in the inferior judicatories of the church, and to perform ſeveral other parts of the epiſcopal function; their juriſdiction, however, extended to ſacred things only; they claimed no ſeat in parliament, and pretended no right to the dignity or revenues of the former biſhops. The number of the inferior clergy was, at this time, very ſmall; and in a few places only were formed into regular claſſes or ſocieties. In order to give greater ſtrength and conſiſtence to the *preſbyterian* plan, Knox, with the aſſiſtance of his brethren, compoſed, in 1561, the firſt book of diſcipline, which contains the model or platform of the intended policy. However, though the general aſſembly in the year 1566 had approved of the Geneva diſcipline, the parliament did not confirm the votes of the aſſembly, nor formally deprive the biſhops of their power; but all church affairs from that time were managed by preſbyteries, and general aſſemblies. In the year 1574 they voted the biſhops to be only paſtors of one pariſh; in 1577 they ordained that all biſhops ſhould be called by their own names; and in the next year they voted the name of a biſhop to be a grievance. In 1580 the general aſſembly, with one voice, declared dioceſan epiſcopacy to be unſcriptural and unlawful. In the ſame year king James, with his family, and the whole nation, ſubſcribed a confeſſion of faith, with a ſolemn league and covenant annexed, obliging themſelves to maintain and defend the proteſtant doctrine and *preſbyterian* government. In the year 1584 the biſhops were reſtored by parliament to ſome parts of their ancient dignity. In 1587 the king conſented to an act to take away biſhops lands, and annex them to the crown; and in 1590 it was ordained, that all who bore office in the kirk, or ſhould hereafter do ſo, ſhould ſubſcribe to the book of diſcipline. In 1592, all acts of parliament in favour of popery and epiſcopacy were annulled; and an act paſſed for eſtabliſhing the *preſbyterian* government, its general aſſemblies, provincial ſynods, preſbyteries, and kirk ſeſſions, with all the different branches of their diſcipline and juriſdiction, in the moſt ample manner. This act was again confirmed in 1593 and 1594. King James, during the latter years of his adminiſtration in Scotland, revived the name and office of biſhops; but they poſſeſſed no eccleſiaſtical juriſdiction or pre-eminence; their revenues were inconſiderable, and they were ſcarce diſtinguiſhed by any thing but by their ſeat in parliament, and by being the object of the clergy's jealouſy, and the people's hatred. The king, delighted with the ſplendour and authority which the Engliſh biſhops enjoyed, and eager to effect an union in eccleſiaſtical policy, reſolved to bring both churches to an exact conformity with each other. Three Scotſmen were conſecrated biſhops at London, from whom their brethren were commanded to receive orders. Ceremonies unknown in Scotland were impoſed; and though the clergy, leſs obſequious than the nobles, boldly oppoſed theſe innovations, James, long practiſed and well ſkilled in the arts of managing them, obtained at length their compliance. But Charles I. a ſuperſtitious prince, unacquainted with the genius of the Scots, imprudent and precipitate in all the meaſures he purſued in that kingdom, preſſing too eagerly the reception of the Engliſh liturgy, and indiſcreetly attempting a reſumption of church-lands, kindled the flames of civil war; and the people being left at liberty to indulge their own wiſhes, the epiſcopal church was overturned, and the *preſbyterian* government and diſcipline were re-eſtabliſhed with new vigour. Together with monarchy, epiſcopacy was reſtored in Scotland. The averſion of the nation, however, was inſurmountable, and it ſubſiſted with difficulty. At the Revolution, the inclinations of the people were thought worthy the attention of the legiſlature, the *preſbyterian* government was again eſtabliſhed (ſee Convention), and being ratified by the union, is ſtill maintained in that kingdom.

The abuſe of church power in the beginning of the reign of James I. obliged many learned miniſters and their followers to leave the kingdom, and retire to Amſterdam, Rotterdam, the Hague, Leyden, Utrecht, and other places of the Low Countries, where Engliſh churches were erected after the *preſbyterian* model, and maintained by the ſtates according to treaty with queen Elizabeth, as the French and Dutch churches were in England.

The firſt *preſbyterian* church in England was eſtabliſhed at Wandſworth, near London, in 1572; and others were afterwards erected in neighbouring counties. After the commencement of the troubles in the reign of Charles I. propoſitions for eſtabliſhing *preſbyterian* government in England were made in the treaty of Uxbridge, A. D. 1645; and ſo zealous were the advocates for it, that many of them maintained the divine right of it. This opinion of its origin was carried in the aſſembly of divines, but negatived in the houſe of commons. This form of church government was eſtabliſhed, by way of probation, in 1646; though not without conſiderable oppoſition and clamour. In the year 1648, an ordinance for more effectually ſettling the *preſbyterian* government, without limitation of time, received the ſanction of both houſes, under the title of a form of church government, to be uſed in the churches of England and Ireland. Under the commonwealth, in 1649, the *preſbyterian* government was declared by the houſe to be the eſtabliſhed government: it continued, though at a low ebb, under the protectorate of Oliver Cromwell, who was more favourably inclined to the independents, and to the Reſtoration of Charles II. an event in which the *preſbyterians* and army, under the direction of general Monk, concurred. At this period epiſcopacy was re-eſtabliſhed; the imprudent zeal of the *preſbyterians* was forgotten, and they ſuffered in common with others who diſapproved the hierachy, and who ſcrupled conformity to the eſtabliſhed articles of doctrine and diſcipline, till they were in ſome meaſure relieved by the act of toleration.

PRESBYTERY, *preſbyterium*, ϖρεσϐυτεριον, an aſſembly of the order of preſbyters, or prieſts, with lay-elders, for the exerciſe of church-diſcipline

The kirk, or church, of Scotland, is divided into ſixty-nine *preſbyteries*, each conſiſting of a number of pariſhes, not exceeding twenty-four, nor leſs than twelve.

The miniſters of theſe pariſhes, with one ruling elder, choſen half-yearly, out of every kirk-*ſeſſion*, conſtitute a *preſbytery*; who, meeting in their chief town, whence the *preſbytery* is denominated, chooſe a moderator, or, more properly a prolocutor, who muſt be a miniſter, half-yearly.

They determine all appeals from kirk-ſeſſions, i. e. from the ſeveral parochial aſſemblies; but can try nothing at the firſt inſtance cognizable before a kirk-ſeſſion.

They compoſe all differences between miniſters and people; for which end, they hold *preſbyterial* viſitations in each pariſh, where they examine the regiſters of the kirk-ſeſſions, &c.

They enquire into repairs of churches; ſee that the glebe, &c. ſuffer no dilapidations; appoint ſchools in the pariſhes; and ſee that the funds be not miſapplied.

They alone can exclude from the communion; licenſe probationers; ſuſpend, depoſe, and, in effect, determine all eccleſiaſtical matters within their diſtrict. From the *preſbytery* there lies an appeal, in all caſes, to *provincial* synods.

Presbytery, *preſbyterium*, is ſometimes alſo uſed for the choir of a church, becauſe anciently appropriated to the preſbyters. In oppoſition to the nave or body of the church, which was for the people.

PRESCIENCE, in *Theology*, *previſion*, or *foreknowledge*; that knowledge which God has of things to come.

The doctrine of predeſtination is founded on the *preſcience* of God, and on the ſuppoſition of all futurity's being preſent to him.

Human reaſon can ſcarce reconcile the *preſcience* of God with the free-agency of man: hence ſome have been led to deny the divine *preſcience*, and others to maintain the doctrine of necessity.

PRESCRIPTION, *præſcriptio*, in *Law*, a right or title acquired by uſe and time.

Preſcription is a ſort of title introduced for aſſuring the property of effects in favour of perſons who have poſſeſſed them a certain time; and to keep off any who would diſquiet them, or recover the thing poſſeſſed, after the term fixed by the laws.

Tourreil calls *preſcription* a penalty impoſed, by the laws, upon negligence; and adds, that poſſeſſors, who have no other title to plead but *preſcription*, are only legal uſurpers.

In effect, however, the law of *preſcription* does not puniſh the indolence of proprietors, but only interprets their ſilence for their conſent; preſuming, that a man who neglects to aſſert his right for a long ſeries of years, gives it up.

There are ſome of the lawyers who doubt, whether time and unjuſt *preſcription* be any legitimate means of acquiring. Others, more favourable, call it the *patroneſs of mankind*; as being a general preſumption, under which the law will have men live in peace.

In the common law, *preſcription* is uſually underſtood of a poſſeſſion from time immemorial, or beyond the memory of man: as, when my anceſtors, or his from whom I have an eſtate, have enjoyed and uſed it all the time whereof any memory remains.

But in the civil law, and even in our common law, there are *preſcriptions* of a much ſhorter date; *preſcription* of forty years excludes all actions whatever. Reform. Leg. Eccleſ.

The diſtinction between CUSTOM and *preſcription* is this: that cuſtom is properly a local uſage, and not annexed to any perſon; ſuch as, a cuſtom in the manor of Dale that lands ſhall deſcend to the youngeſt ſon: *preſcription* is merely a perſonal uſage; as that Sempronius and his anceſtors, or thoſe whoſe eſtate he hath, have uſed time out of mind to have ſuch an advantage or privilege. All *preſcription* muſt be either in a man and his anceſtors, or in a man, and thoſe whoſe eſtate he hath, which laſt is called preſcribing in a QUE *eſtate*. And formerly a man might, by the common law, have preſcribed for a right which had been enjoyed by his anceſtors or predeceſſors at any diſtance of time, though his or their enjoyment of it had been ſuſpended for an indefinite ſeries of years. But by the ſtatute of limitations, 32 Hen. VIII. cap. 2. it is enacted, that no perſon ſhall make any *preſcription* by the ſeiſin or poſſeſſion of his anceſtor or predeceſſor, unleſs ſuch ſeiſin or poſſeſſion hath been within threeſcore years next before ſuch *preſcription* be made. This title of *preſcription* was well known in the Roman law by the name of USUCAPIO; ſo called, becauſe a man, that gains a title by *preſcription*, may be ſaid *uſu rem capere*.

As to the ſeveral ſpecies of things which may, or may not, be preſcribed for, it may be obſerved, 1. That nothing but incorporeal hereditaments can be claimed by *preſcription*; as a right of way, a common, &c. but that no *preſcription* can give a title to lands, and other corporeal ſubſtances, of which more certain evidence may be had. 2. A *preſcription* muſt always be laid in him that is tenant of the fee. A tenant for life, for years, at will, or a copy-holder, cannot preſcribe, by reaſon of the imbecility of their eſtates. For, as *preſcription* is uſage beyond time of memory, it is abſurd that they ſhould pretend to preſcribe, whoſe eſtates commenced within the remembrance of man. 3. A *preſcription* cannot be for a thing which cannot be raiſed by grant. 4. What is to ariſe by matter of record cannot be preſcribed for, but muſt be claimed by grant, entered on record; ſuch as the royal franchiſes of deodands, felony, goods, &c. But the franchiſes of treaſure-trove, waifs, eſtrays, and the like, may be claimed by *preſcription*; for they ariſe from private contingencies, and not from any matter of record. 5. Among things incorporeal, which may be claimed by *preſcription*, a diſtinction muſt be made with regard to the manner of preſcribing; that is, whether a man ſhall preſcribe in a *que eſtate*, or in himſelf and his anceſtors. For if a man preſcribes in a *que eſtate* (that is, in himſelf, and thoſe whoſe eſtate he holds) nothing is claimable by this *preſcription*, but ſuch things as are incident, appendant, or appurtenant to lands; but if he preſcribes in himſelf and his anceſtors, he may preſcribe for any thing whatever that lies in grant; not only things that are appurtenant, but alſo ſuch as may be in groſs. 6. Eſtates gained by *preſcription* are not of courſe, deſcendible to the heirs general, like other purchaſed eſtates, but are an exception to the rule. Blackſt. Comm. book ii. ch. 17.

The cuſtom of Paris allows of a *preſcription* of ten years, if the parties be preſent; and of twenty, if abſent; in favour of peaceable poſſeſſors of an inheritance, if they have any title, however controverted; and of thirty years, in favour of thoſe who poſſeſs without any title at all.

In Normandy, a *preſcription* of forty years peaceable poſſeſſion is equivalent to a title to immoveables; and for moveables, and perſonal actions, a *preſcription* of thirty years ſuffices.

In Romiſh countries, *preſcription* does not avail againſt the church, if ſhort of a hundred years. In France, *preſcription* of twenty years is admitted againſt all crimes, except duelling, which was excluded by a declaration of the year 1679. In matters of adultery, five years ſuffice; i. e. provided there have been a diſcontinuance of proſecution all that time.

By our ſtatutes, a judge or clerk convicted of falſe entering pleas, &c. may be fined within two years; but, thoſe elapſed, he *preſcribes* againſt the puniſhment of the ſtatute.

The crime of maintenance or embracery, whereby perjury is committed by a jury, muſt be proſecuted within ſix days; or otherwiſe the parties *preſcribe*.

There is no *preſcribing* againſt a man's lord; no *preſcription* avails to take off any ſervitude or tenure; a title is always required there.

The author of the Hiſtory of the Inquiſition obſerves, that no time of *preſcription* avails in matters of hereſy; even death itſelf does not ſecure the ſuſpected from the reſearches of that tremendous court.

PRESCRIPTION, *corporations by*, are thoſe which have exiſted as CORPORATIONS, time whereof the memory of man runneth not to the contrary; with regard to which the king's conſent is preſumed. For though the members thereof can ſhew no legal charter of incorporation, yet in caſes of ſuch high antiquity, the law preſumes there once was one; and that by the variety of accidents, which a length of time may produce, the charter is loſt or deſtroyed.

PRESCRIPTION, *modus by*. See MODUS *decimandi*.

PRESCRIPTION, in *Medicine*, the act or art of aſſigning a proper and adequate remedy to a diſeaſe, from an examination of the ſymptoms thereof, and an acquaintance with the virtues and effects of the materia medica.

The methodus præſcribendi is the laſt finiſhing piece of furniture of a phyſician, and is the reſult of all the reſt, joined with a ready, preſent thought.

To *preſcribe* with judgment, elegance, &c. a moderate acquaintance with pharmacy, i. e. with the forms and preparations of medicine, is required.

The merits of a bill, or *preſcription*, conſiſts in its being conciſe, pertinent, efficacious, and agreeable: in the beſt and ſuitableſt materials being pitched on; thoſe aſſembled in the moſt judicious proportions, made up in the beſt and moſt convenient form, and applied in the juſteſt doſe; a due regard being ſtill had to the non-naturals, regimen, intervals of application, &c. Sydenham particularly excelled in *preſcription*.

Preſcription is either *officinal*, or *extemporaneous*: the former conſiſts in ordering the medicines which the apothecaries keep by them ready prepared, according to their diſpenſatory.

Extemporaneous is that which the phyſician frames of himſelf, *pro re nata*, according to the circumſtances of the patient, to be made up by the apothecary according to the phyſician's bill.

PRESCRIPTION, in *Theology*, was a kind of argument pleaded by Tertullian, in the third century, againſt erroneous doctors; and which has been urged by papiſts (ſee METHODISTS), and others, in more modern times. With regard to this mode of arguing, we may obſerve, that there is ſcarcely any caſe, in which the plea of *preſcription* can be admitted as a ſatisfactory argument in favour of religious tenets, or articles of faith; unleſs by *preſcription* be meant, a doctrine's being eſtabliſhed in the time and by the authority of the apoſtles. In all other caſes, *preſcription* is no argument at all; it cannot recommend error, and truth hath no need of its ſupport.

PRESENCE, *præſentia*, a term of relation, uſed in oppoſition to *abſence*, and ſignifying the exiſtence of a perſon in a certain place; or the ſtate of a perſon conſidered as co-exiſting with another.

In this ſenſe, an obligation is ſaid to be paſſed in *preſence* of a notary and witneſſes; at the breaking open a ſeal of a minor, or an abſent perſon, the *preſence* of a ſubſtitute is neceſſary.

The ſchoolmen hold, that *preſence*, in ſpeaking of bodies, denotes not only a co-exiſtence, but a ſort of contact.

They diſtinguiſh two kinds of *preſence*: the one *virtual*, in which ſenſe a ſpirit, or mind, is ſaid to be *preſent* to a body when it acts thereon; the other *corporeal*, which conſiſts in a phyſical contact.

The treaſurers, &c. of France have what they call a *right of preſence*; a certain ſum due on their actual attendance in their offices, to oblige them to be the more aſſiduous in their function.

A perſon abſent in the ſervice of the king, or a community, is repreſented as *preſent*.

The Roman catholics believe the real *preſence* of Jeſus Chriſt in the euchariſt, both in body and ſoul. See TRANSUBSTANTIATION.

PRESENT, *præſens*, in *Grammar*, the firſt tenſe, or inflexion of verbs; expreſſing the time preſent, or that which now is.

It is a particular piece of addreſs in eloquence, to make uſe of the *preſent* for a paſt tenſe, in order to expreſs a paſt action with the more force and warmth. Thus, the fleet *is* no ſooner in full ſea, than the heavens *begin* to lower, the winds *riſe*, the waves *daſh* againſt each other, thunder *rolls*, and lightning *glares* on all ſides; the ſhips *loſe* their maſts and rudders, and *are* driven impetuouſly againſt the rocks.

PRESENTATION, *præſentatio*, in the *Canon Law*, the act of a patron, nominating and offering his clerk to the biſhop or collator, to be inſtituted in a benefice of his gift, which is void.

The word is formed from the ancient phraſe, *præſentare ad eccleſiam*; which originally ſignified the patron's ſending or placing a perſon in a church; and which itſelf is formed from *repræſentare*, which Selden obſerves, is uſed in the council of Lateran, and elſewhere, for *præſentare*.

For the difference between *preſentation* and collation, ſee COLLATION.

By common law, a DEACON, of any age, might be inſtituted and inducted to a parſonage or vicarage; but it was ordained by 13 Eliz. cap. 12. that no perſons under twenty-three years of age, and in deacon's orders, ſhould be preſented to any benefice with cure; and if he were not ordained PRIEST within one year after his induction, he ſhould be *ipſo facto* deprived. And now, by 13 & 14 Car. II. cap. 4. no perſon is capable of being admitted to any benefice, unleſs he hath been firſt ordained a prieſt; and then he is, in the language of the law, a clerk in orders. Any clerk may be preſented to a parſonage or vicarage; that is, the patron, to whom the ADVOWSON of the church belongs, may offer his clerk to the biſhop of the dioceſe to be inſtituted. A layman may alſo be preſented, but he muſt take prieſt's orders before his admiſſion. As to the right of *preſentation*, this belongs even to an infant, who is heir of a manor, to which an advowſon is appendant; and in caſe of a patron's bankruptcy, the commiſſioners may ſell the advowſon. If the right of *preſentation* is in coparceners, who agree in the ſame perſon, they are to join in the act of *preſentation*; otherwiſe, the elder ſhall have the preference, and afterwards the reſt in their turns; but where the right is in joint-tenants, or tenants in common, if there hath been no compoſition in writing to preſent by turns, they muſt join in the *preſentation*. If one be ſeiſed of an advowſon in fee, and the church becomes void, the void turn is a chattel; and if the patron dies before he preſents, the avoidance doth not go to his heir, but to his executor. But if the incumbent of a church be alſo ſeiſed in fee of the advowſon of the ſame church, and dieth, his heir, and not his executors, ſhall forfeit. In the caſe of a biſhop, who holdeth an advowſon in the right of his biſhoprick, the void turn of a church doth not go to his executor, but the king ſhall preſent. If a vicarage becomes void during the vacancy of the parſonage, the patron of the parſonage, and not the executor of the deceaſed parſon, ſhall preſent. If a feme covert hath a title to preſent, the *preſentation* muſt be by huſband and wife in both their names. And though the right of patronage in the wife deſcends to her heir, yet the right of preſenting during life belongs to the huſband, who is tenant by curteſy. If a man that is ſeiſed of an advowſon takes a wife, and dieth, the heir ſhall have two preſentments, and the wife the third. In caſe of a mortgage in fee of a manor, to which an advowſon is appendant, although the legal right of *preſentation* is veſted in the mortgagee, yet a court of equity will compel the ordinary to inſtitute the clerk of the mortgager any time before foreclofure. But if the advowſon itſelf only is mortgaged, the mortgagee preſents. The king, as patron paramount of all the benefices in England, hath a right to preſent to all churches, not regularly filled by other patrons, whether it happens by lapſe, or through incapacity to preſent, as if the patron be attainted, outlawed, or an alien, or have been guilty of ſimony, &c. On this ground, the king hath a right to preſent to all dignities and benefices of the advowſon of archbiſhopricks and biſhopricks, during the vacation of the reſpective ſees. And it is ſaid, that this privilege which the king hath of preſenting, by reaſon of the temporalities of a biſhoprick being in his hands, ſhall be extended unto ſuch preferments to which the biſhop of common right might preſent, though by his compoſition he hath transferred his power unto others. Upon promotion of any perſon to a biſhoprick, the king hath a right to preſent to ſuch benefices or dignities as the perſon was poſſeſſed of before ſuch promotion, though the advowſon belongeth to a common perſon. But by law in Ireland, no perſon can accept a biſhoprick there, until he hath reſigned all the preferments which he hath in England; which preferments being void before the acceptance of the biſhoprick, the king in ſuch caſe ſhall loſe the *preſentation*. The lord chancellor, or lord keeper of the great ſeal for the time being, hath right to preſent to the benefices appertaining to the king, of the yearly value of 20*l.* or under, in the king's books. It is a rule of the canon law, that no perſon may preſent himſelf: in this caſe, the legal and regular way is to make over the right to ſome other before the avoidance.

The *preſentation* muſt be tendered to the biſhop within a hundred eighty-two days after the living is vacant, elſe it lapſes to the biſhop; and if the biſhop do not collate in half a year more, it lapſes to the archbiſhop; and from him, in a like time, to the king; who may ſtay as long as he pleaſes; for *nullum tempus occurrit regi*. See LAPSE.

By ſome cuſtoms, a lay-patron has only four months time to make his *preſentation* in; and if he have preſented a perſon incapable, he may vary it, and make a new *preſentation* within the four months.

It is ſaid that *preſentation* may be made either by word, or by writing. If it be by word, the patron muſt declare in the preſence of the ordinary; if by writing, it is no deed, but in the nature of a letter miſſive to the biſhop. Where a corporation aggregate of many doth preſent, it muſt be under their common ſeal; and ſince the ſtatute of frauds and perjuries, 29 Car. II. cap. 3. it is neceſſary that all *preſentations* ſhall be in writing. Thus alſo by the ſeveral ſtamp-acts, which enact a double 40*s.* ſtamp-duty, provided that the benefice, &c. preſented to, be of the yearly value of 10*l.* or upwards, in the king's books.

Preſentation may be revoked or varied before admiſſion and inſtitution. But when a clerk is preſented the biſhop may refuſe him on various accounts: as, 1. If the patron is excommunicated, and remains in contempt forty days. Or, 2. If the clerk be unfit; which unfitneſs is of ſeveral kinds. Firſt, with regard to his perſon; as if he be a baſtard, an outlaw; an excommunicate, perjured, guilty of forgery or ſimony, under age, or the like. Secondly, with regard to his faith or morals; as for any particular hereſy, or vice that is *malum in ſe*; but if the biſhop only alleges in general terms, as that he is *ſchiſmaticus inveteratus*, or objects a fault that is *malum prohibitum* merely, as haunting taverns, playing at unlawful games, or the like, it is not good cauſe of refuſal. Or, laſtly, the clerk may be unfit to diſcharge the paſtoral office for want of learning; in any of which caſes the biſhop may refuſe the clerk. In caſe the refuſal is for hereſy, ſchiſm, inability of learning, or other matter of eccleſiaſtical cognizance, there the biſhop muſt give notice to the patron of ſuch his cauſe of refuſal, who, being uſually a layman, is not ſuppoſed to have knowledge of it; elſe he cannot preſent by lapſe; but if the cauſe be temporal, there he is not bound to give notice. If an action at law be brought by the patron againſt the biſhop for refuſing his clerk, the biſhop muſt aſſign the cauſe. If the cauſe be of a temporal nature, and the fact be admitted (as, for inſtance, outlawry), the judges of the king's courts muſt determine its validity, or whether it be ſufficient cauſe of refuſal; but if the fact be denied, it muſt be determined by a jury. If the cauſe be of a ſpiritual nature (as hereſy, particularly alleged) the fact, if denied, ſhall alſo be determined by a jury; and if the fact be admitted or found, the court upon conſultation, or advice of learned divines, ſhall decide its ſufficiency. If the cauſe be want of learning, the biſhop need not ſpecify in what points the clerk is deficient, but only alledge that he is deficient; for the ſtatute 9 Edw. II. ſtat. 1. cap. 13. is expreſs, that the examination of the fitneſs of a perſon preſented to a benefice belongs to the eccleſiaſtical judge. If the biſhop returns the clerk to be *minus ſufficiens in literatura*, the court ſhall write to the metropolitan, to re-examine him, and certify his qualifications; which certificate of the archbiſhop is final. Burn's Eccl. Law, vol. i. art. *Benefice*. Blackſt. Com. book i. cap. 11. See INSTITUTION and INDUCTION.

PRESENTATION *of the Virgin*, is a feaſt of the Romiſh church, held on the twenty-firſt of November, in memory of the holy Virgin's being preſented by her parents in the temple, to be there educated.

Emanuel Comnenus, who began to reign in 1143, makes mention of this feaſt in his Conſtitution. Some even imagine it to have been eſtabliſhed in the eleventh century, among the Greeks; and think, they ſee evident proofs of it in ſome homilies of George of Nicomedia, who lived in the time of Photius. Its inſtitution in the Weſt is aſcribed to Gregory XI. in 1372.

Some take it to have been inſtituted in memory of the ceremony practiſed among the Jews for their new-born females;

males; correſponding to the circumciſion on the eighth day for males.

PRESENTATION *of our Lady* alſo gives the title to three orders of nuns.

The firſt, projected in 1618, by a maid named Joan of Cambray. The habit of the nuns, according to the viſion ſhe pretended to have, was to be a grey gown of natural wood, &c. but this project was never accompliſhed.

The ſecond was eſtabliſhed in France, about the year 1627, by Nic Sanguin, biſhop of Senlis. It was approved by Urban VIII. This order never made any great progreſs.

The third was eſtabliſhed in 1664, when Fred. Borromeo, being apoſtolical viſitor in the Valteline, was intreated, by ſome devout maids at Morbegno, to allow them to live in community in a retired place; which he granted, and erected them into a congregation, under the title of *congregation of our Lady*. They live under the rule of St. Auguſtine.

PRESENTATIVE *advowſons*. See ADVOWSON.

PRESENTEE, in the *Canon Law*, a clerk preſented by a patron to a collater. See PRESENTATION.

PRESENTMENT, in *Law*, a denunciation or information of the jurors themſelves, which the grand jury find and preſent to the court, without any indictment delivered to them, which is afterwards reduced into the form of an indictment; or of ſome other officer, as a juſtice, conſtable, church-warden, ſurveyor, &c. of an offence, inquirable into the court whereto it is preſented.

Preſentments are made in courts leet and courts baren, before ſtewards; and in the latter of ſurrenders, grants, &c.

PRESENTMENT, *aſſiſe of darrein*. See ASSISE.

PRESENTS, *præſentia, free gifts*, or *gratuities*, eſpecially thoſe given by the clergy, or the ſtates of a realm, to a king.

They are ſo called, becauſe given into the hands of a perſon preſent; by which they are diſtinguiſhed from *munera, gifts*, which are ſent to the party, or delivered by the intervention of a third perſon.

Thus the eighteenth law, *De verb. ſignif. Abſentibus res donari dicuntur, munera autem mitti, &* præſentia *offerri*.

There is no accoſting the eaſtern princes without making them fine *preſents*. Kings uſually make rich *preſents* to ambaſſadors ſent to their courts.

PRESEPE, or PRÆSEPE, in *Aſtronomy*, a name given to three nebulous ſtars in the breaſt of the ſign Cancer, or the Crab. Two of them are of the ſeventh, the third of the ſixth magnitude. Their longitudes, latitudes, &c. ſee among thoſe of the other ſtars in CANCER.

PRESERVATION *of vegetables*. This is to be done ſeveral ways in the ſeveral kinds, and many more might certainly be invented, for we are not yet arrived at the perfect method of *preſerving vegetables* with their colours, odours, and all their ſenſible qualities, as well as their natural form, for a number of years. Fruits may be long preſerved, in ſpirits of wine, firſt well ſaturated with the ſkins and tinged parts of thoſe fruits; and many may be tolerably preſerved in perfectly fermented liquors, which generate no more air. The more ſolid vegetable ſubſtances may be preſerved by gentle drying in the ſun ſhade, or other ſlack heat. Thus peas or beans may be dried young in a ſlack oven in their proper ſeaſon, and may afterwards be boiled in the winter, and will eat young and tender, as if juſt gathered. The ways of preſerving fruit both dry and moiſt, with ſugar, are now univerſally known; and there are in the ſeveral ways many ſecrets in the hands of particular artiſts, which it would be well to have generally known. See *Preſervation of* FLOWERS.

PRESERVATIVE, or PRÆSERVATIVE, in *Medicine*, a remedy taken by way of precaution, or to ſecure a man from a diſeaſe that threatens him.

The principal *preſervatives*, according to Boerhaave, are abſtinence, quiet, drinking of warm water; and, after this, a gentle and continued motion till the firſt appearance of ſweet; then a profuſe ſleeping, the body well covered.

By ſuch means, craſs humours are diluted, the veſſels are relaxed, and noxious matter excreted. He adds, that the beſt defence againſt the force of external cold is to leſſen the winter's clothing late in the ſpring, and to increaſe the ſummer's clothing ſoon in autumn.

In time of plague, *preſervatives* are very neceſſary againſt the contagion of the air, &c. See PLAGUE, and CONTAGION.

Generous wines, cardiacs, and ſudorifics, are *preſervatives*.

Dr. Alprunus tells us, he made inciſions with a lancet in inguine dextro & ſiniſtro, and put in ſetons, to give paſſage to the venom; which proved an excellent *preſervative* againſt the plague that raged at Prague in 1680.

Dr. Wenceſlaus Dobr. Zenſky de Negro Ponte gives us an univerſal *preſervative* againſt infection in all diſeaſes. "Whoever, ſays he, in converſing with patients of any kind, would preſerve himſelf from infection, muſt, while he is within the ſphere of their effluvia, never ſwallow his ſpittle, but ſpit it out." For this author conceives it to be the ſpittle that firſt imbibes the infection.

PRESERVING *of timber*. See TIMBER.

PRESIDENT, *præſes*, an officer created, or elected, to *preſide* over a company, or aſſembly; ſo called in contradiſtinction to the other members, who are termed *reſidents*.

Lord PRESIDENT *of the council* is a great officer of the crown, who has precedence next after the lord chancellor and lord treaſurer; as ancient as the time of king John, when he was ſtyled *conſiliarius capitalis*.

His office is, to attend on the king, to propoſe buſineſs at the council-table, and to report to the king the ſeveral tranſactions there. See PRIVY-*council*.

PRESIDIAL, a tribunal, or bench of judges, eſtabliſhed in the ſeveral conſiderable cities of France, to judge ultimately, or in the laſt reſort, of the ſeveral cauſes brought before them by way of appeal from the ſubaltern judges.

The *preſidials* make one company with the officers of the bailliages and ſeneſchauſſees, where they are eſtabliſhed.

The edict of 1551 eſtabliſhes *preſidials* under theſe two conditions: firſt, that they may judge definitely, and without appeal, to the ſum of 250 livres, or 10 livres per annum; and, 2. To the ſum of 500 livres, or 20 livres per annum, by proviſion.

When they judge in the former caſe, they are obliged to pronounce it with theſe words, *par jugement dernier*; in the ſecond, *par jugement préſidial*.

When they judge finally of appeals from inferior judges, they may not pronounce the ſentence or appeal, *au neant*, void; that form only belonging to the ſovereign courts; but are to pronounce ſimply, that *it has been well or ill-judged*. To judge *preſidially* and finally, they muſt be at leaſt ſeven in number.

PRESS, *prelum*, in the *Mechanic Arts*, a machine made of iron or wood, ſerving to ſqueeze or compreſs any body very cloſe.

The ordinary *preſſes* conſiſt of ſix members or pieces; viz. two flat, ſmooth planks; between which the things to be preſſed are laid; two ſcrews or worms, faſtened to the lower plank, and paſſing through two holes in the upper; and two nuts, in form of an S, ſerving to drive the uper plank, which is moveable, againſt the lower, which is ſtable, and without motion.

PRESSES *uſed for expreſſing of liquors*, are of various kinds; ſome, in moſt reſpects, the ſame with the common *preſſes*, excepting that the under plank is perforated with a great number of holes, to let the juice expreſſed run through into a tub, or receiver, underneath.

Others have only one ſcrew, or arbor, which paſſes through the middle of the moveable plank, which is made to deſcend into a kind of ſquare box, full of holes on all ſides; through which the juices flow, in proportion as the arbor is turned; by means of a little lever applied thereto.

PRESS *uſed by joiners* to keep cloſe the pieces they have glued, eſpecially pannels, &c. of wainſcot, is very ſimple, conſiſting of four members; viz. two ſcrews, and two pieces of wood, four or five inches ſquare, and two or three feet long; whereof the holes at the two ends ſerve for nuts to the two ſcrews.

PRESS *uſed by inlayers* reſembles the joiner's *preſs*, except that the pieces of wood are thicker, and that only one of them is moveable; the other, which is in form of a treſſel, being ſuſtained by two legs, or pillars, jointed into it at each end.

This *preſs* ſerves them for ſawing and cleaving the pieces of wood required in marquetry, or inlaid work.

PRESS, *founders*, is a ſtrong, ſquare frame, conſiſting of four pieces of wood, firmly joined together with tenons, &c.

This *preſs* is of various ſizes, according to the ſizes of the moulds; two of them are required to each mould, at the two extremities whereof they are placed; ſo as that, by driving wooden wedges between the mould and the ſides of the *preſſes*, the two parts of the mould, wherein the metal is to be run, may be preſſed cloſe together.

PRESS, *printing*. See PRINTING *preſs*.

PRESS, *meſſenger of the*. See MESSENGER.

PRESS, *rolling*, is a machine uſed for the taking off prints from copper-plates.

It is much leſs complex than that of the letter-printers. See its deſcription and uſe under the article *Rolling-preſs* PRINTING.

PRESS, in *Coining*, is one of the machines uſed in ſtriking of money; differing from the balance, in that it has only one iron bar to give it motion, and preſs the moulds, or coins; is not charged with lead at its extreme, nor drawn by cordage. See COINAGE.

PRESS, *binders cutting*, is a machine uſed equally by bookbinders, ſtationers, and paſteboard-makers; conſiſting of two large pieces of wood, in form of cheeks, connected by two ſtrong wooden ſcrews; which being turned by an iron bar, draw together, or ſet aſunder, the cheeks, as much as is neceſſary, for the putting in the books, or paper, to be cut.

The cheeks are placed lengthways on a wooden ſtand, in form of a cheſt, into which the cuttings fall. Aſide of the cheeks are two pieces of wood, of the ſame length with the ſcrews, ſerving to direct the cheeks, and prevent their opening unequally.

Upon the cheeks the plough moves, to which the cutting-knife is faſtened by a ſcrew; which has its key, to diſmount it, on occaſion, to be ſharpened.

The plough conſiſts of ſeveral parts; among the reſt, a wooden ſcrew, or worm, which catching within the nuts of the two feet, that ſuſtain it on the cheeks, brings the knife to the book, or paper, which is faſtened in the *preſs* between two boards. This ſcrew, which is pretty long, has two directories, which reſemble thoſe of the ſcrews of the *preſs*. To make the plough ſlide ſquare and even on the cheeks, ſo that the knife may make an equal paring, that foot of the plough where the knife is not fixed, ſlides in a kind of groove, faſtened along one of the cheeks. Laſtly, the knife is a piece of ſteel, ſix or ſeven inches long, flat, thin, and ſharp, terminating at one end in a point, like that of a ſword, and, at the other, in a ſquare form, which ſerves to faſten it to the plough. See BOOK-*binding*.

As the long knives uſed by us in the cutting of books or papers are apt to jump in the cutting thick books, the Dutch are ſaid to uſe circular knives with an edge all round; which not only cut more ſteadily, but laſt longer without grinding.

PRESS, in the *Wollen Manufactory*, is a large wooden machine, ſerving to preſs cloths, ſerges, rateens, &c. thereby to render them ſmooth and even, and to give them a gloſs.

This machine conſiſts of ſeveral members; the principal whereof are the *cheeks*, the *nut*, and the *worm*, or *ſcrew*, accompanied with its *bar*; which ſerves to turn it round, and make it deſcend perpendicularly on the middle of a thick, wooden plank, under which the ſtuffs to be preſſed are placed. The CALENDER is alſo a kind of *preſs*, ſerving to preſs, or calender, linens, ſilks, &c.

PRESS, *liberty of the*, in *Law*, conſiſts, ſays judge Blackſtone, in laying no previous reſtraints upon publications, and not in freedom from cenſure for criminal matter, when publiſhed; and this is eſſential to the nature of a free ſtate. Every free man has an undoubted right to lay what ſentiments he pleaſes before the public; to forbid this is to deſtroy the freedom of the *preſs*; but if he publiſhes what is improper, miſchievous, or illegal, he muſt take the conſequence of his own temerity. To ſubject the *preſs* to the reſtrictive power of a licenſer, as was formerly done, both before and ſince the Revolution, is to ſubject all freedom of ſentiment to the prejudices of one man, and make him the arbitrary and infallible judge of all controverted points in learning, religion, and government. But to puniſh, (as the law does at preſent) any dangerous or offenſive writings, which, when publiſhed, ſhall on a fair and impartial trial be adjudged of a pernicious tendency, is neceſſary for the preſervation of peace and good order, of government and religion, the only ſolid foundations of civil liberty.

The art of printing (ſays the ſame excellent writer), ſoon after its introduction, was looked upon (as well in England as in other countries) as merely a matter of ſtate, and ſubject to the coercion of the crown. It was, therefore, regulated with us by the king's proclamations, prohibitions, charters of privilege and of licence, and, finally, by the decrees of the court of ſtar-chamber, which limited the number of printers, and of *preſſes*, which each ſhould employ, and prohibit new publications, unleſs previouſly approved by proper licenſers. On the demolition of this odious juriſdiction in 1641, the long parliament of Charles I. after their rupture with that prince, aſſumed the ſame power as the ſtar-chamber exerciſed with reſpect to the licenſing of books; and in 1643, 1647, 1649, and 1652, iſſued their ordinances for that purpoſe, founded principally on the ſtar-chamber decree of 1637. In 1662 was paſſed the ſtatute 13 and 14 Car. II. cap. 33. which (with ſomefew alterations) was copied from the parliamentary ordinances. This act expired in 1679, but was revived by ſtat. 1. Jac. II. cap. 17. and continued till 1692. It was then continued for two years longer by ſtatute 4 W. & M. cap. 24.; but though frequent attemps were made by the government to revive it in the ſubſequent part of that reign, yet the parliament reſiſted it ſo ſtrongly, that it finally expired, and the *preſs* became properly free in 1694, and has ſo continued ever ſince. Comm. book iv. p. 152.

PRESS, in the *Manage*. A horſe is ſaid to reſiſt, or *preſs* upon the hand, when either through the ſtiffneſs of his neck, or from an ardour to run too much a-head, he ſtretches his head againſt the horſeman's hand, refuſes the aid of the hand, and withſtands the effects of the bridle.

If your horſe is too fiery, and *preſſes* upon the hand, endeavour to pacify him by making him go more ſoftly, and pulling him backwards; and if it proceeds from a ſtiffneſs of the ſhoulders and neck, you muſt ſupply him with a caveſſon, made after the duke of Newcaſtle's way. See HEAVY.

PRESS is alſo uſed for puſhing a horſe forwards by aſſiſting him with the calves of your legs, or even ſpurring him, in order to make him go on.

PRESS or **PRESSING**, in the *Sea-Language*. See MANNING *the fleet*.

PRESSING, in the *Manufactures*, the action of violently ſqueezing a cloth, ſtuff, linen, &c. in a preſs, to render it even, ſmooth, poliſhed, and gloſſy.

This, in the ſilken and linen manufactures, they properly call *calendering*.

There are two manners of *preſſing*; the one *hot*, the other *cold*.

PRESSING *cold*, *method of*. After the ſtuff has had all its preparations, i. e. has been ſcoured, fulled, and ſhorn, (ſee FULLING, and SHEERING) it is folded ſquare, in equal plaits; and a ſkin of vellom, or fine ſmooth paſteboard, is put between each plait. Over the whole is laid a ſquare wooden plank; and in this condition, it is put in the preſs, which is driven tight down by means of the ſcrew turned full upon it, by the hands, aſſiſted with levers.

After it has lain a ſufficient time under the preſs, they take it out, remove the paſteboards or velloms, and lay it up to keep. It may be obſerved, that ſome do not uſe a preſs with a ſcrew in *preſſing cold*, but content themſelves with laying the ſtuff on a firm table, after plaiting and paſteboarding it as before; covering the whole with a wooden plank, and loading this with a weight, greater or leſs, as is judged neceſſary.

PRESSING *hot*, *method of*. The ſtuff having received all its preparations, as before, it is ſprinkled a little with water, ſometimes with gum-water, ſpurted over it with the mouth; then plaited equally, and, between each two plaits, are put leaves of paſteboard; and between every ſixth and ſeventh plait, as well as over the whole, an iron or braſs plate, well heated, in a kind of furnace prepared for the purpoſe.

This done, it is laid upon the preſs; and a ſcrew is brought forcibly down upon it, by means of a long iron bar.

Under this preſs are laid five or ſix pieces, one over another, at the ſame time, all furniſhed with their paſteboard and iron plates. When the plates are well cold, they take the ſtuffs from under the preſs, remove the paſteboards and plates, and ſtitch it a little together, to keep it in the plaits.

This manner of *preſſing* woollen ſtuffs is very pernicious, and was only invented by the manufacturers to cover the defects of the ſtuffs, and excuſe their not giving them all the ſhearings, dyes, and preparations, that are neceſſary to render them perfect: accordingly they have been frequently prohibited.

PRESSING *to death*. See PAIN *fort & dure*.

PRESSION, or **PRESSURE**, in the *Carteſian Philoſophy*, an impulſive kind of motion, or rather an endeavour to move, impreſſed on a fluid medium, and propagated through it.

In ſuch a *preſſion* the Carteſians ſuppoſe the action of LIGHT to conſiſt. And, in the various modifications of this *preſſion*, by the ſurfaces of bodies, whereon that medium is thus preſſed, they ſuppoſe the various colours to conſiſt, &c. But Sir Iſaac Newton has taught us better; for if light, e. gr. conſiſted only in a *preſſion*, propagated without actual motion, it could not agitate and warm ſuch bodies as reflect and refract it, as we actually find it does; and if it conſiſted in an inſtantaneous motion, or one propagated to all diſtances in an inſtant, as ſuch *preſſion* ſuppoſes, there would be required an infinite force to produce that motion every moment, in every lucid particle.

And if light conſiſted either in *preſſion*, or in motion propagated in a fluid medium, whether inſtantaneouſly, or in time, it muſt follow, that it would inflect itſelf *ad umbram*; for *preſſion*, or motion, in a fluid medium, cannot be propagated in right lines, beyond any obſtacle which ſhall hinder any part of the motion; but will inflect and diffuſe itſelf, every way, into thoſe parts of the quieſcent medium which lie beyond the ſaid obſtacle.

Thus the force of gravity tends downward; but the *preſſure* which ariſes from that force of gravity, tends every way with an equable force; and, with equal eaſe and force, is propagated in crooked lines as in ſtraight. Waves on the ſurface of water, while they ſlide by the ſides of any large obſticle, do inflect, dilate, and diffuſe themſelves, by degrees, into the quieſcent water lying beyond the obſtacle. The waves, pulſes, or vibrations of our air, in which ſounds conſiſt, do manifeſtly inflect themſelves, though not ſo much as the waves of water; for the ſound of a bell, or of a cannon can be heard over a hill, which intercepts the ſonorous object from our ſight; and ſounds will be propagated as eaſily though crooked tubes, as through ſtraight.

But light is never obſerved to go in curve lines, nor to inflect itſelf *ad umbram*; for the fixed ſtars do immediately diſappear on the interpoſition of any of the planets; as well as ſome parts of the ſun's body, by the interpoſition of the moon, Venus, or Mercury.

PRESSURE *of the air*. See Air.

Moſt of the effects anciently aſcribed to the fuga vacui, are now accounted for from the weight and *preſſure* of the air.

The *preſſure* of the air on the ſurface of the earth is balanced by a column of water of the ſame baſe, and about thirty-five feet high; or of one of mercury, of about twenty-nine inches.

The *preſſure* of the air on every ſquare inch on the ſurface of the earth, is computed to be about fifteen pounds avoirdupois. See Atmosphere.

Pressure, *centre of*, in *Hydroſtatics*, is that point of any plane to which, if the total *preſſure* were applied, its effect upon the plane would be the ſame as when it was diſtributed unequally over the whole; or, it is that point in which the whole *preſſure* may be conceived to be united; or, it is that point to which, if a force were applied equal to the total *preſſure*, but with a contrary direction, it would exactly balance or reſtrain the effect of the *preſſure*. Thus if *a b c d* (*Tab.* V. *Hydraulics*, &c. *fig.* 53.) be a veſſel of water, and the ſide *a c* be preſſed upon with a force equivalent to twenty pounds of water, this force is unequally diſtributed over *a c*; for the parts near *a* are leſs preſſed than thoſe near *c*, which are at a greater depth; and, therefore, the efforts of all the particular *preſſures* are united in ſome point *z*, which is nearer to *c* than to *a*; and that point *z* may be called the centre of *preſſure*: if to that point a force equivalent to twenty pounds weight be applied, it will affect the plane *a c* in the ſame manner as by the *preſſure* of the water diſtributed unequally over the whole; and if to the ſame point we apply the ſame force with a contrary direction to that of the *preſſure* of the water, the force and *preſſure* will ballance each other, and by contrary endeavours deſtroy each other's effects. Suppoſe at *z* a cord *z p w* were fixed, which paſſing over the pully *p*, has a weight of twenty pounds annexed to it, and that the part of the cord *z p* were perpendicular to *a c*, the effort of the weight *w* is equal, and its direction contrary to that of the *preſſure* of the water. Now if *z* be the centre of *preſſure*, theſe two powers will be in equilibrio, and mutually defeat each other's endeavours. Mr. Cotes has inveſtigated a general rule for finding this centre in the following manner. If any plane, which happens to be propoſed, be produced till it interſects the upper ſurface of the water produced, if need be, and the line which is the common ſection of the two planes be made an axis of ſuſpenſion; the Center *of oſcillation*, or *percuſſion* of the plane, as it is ſuppoſed to revolve about that axis, will be the centre of *preſſure* required. Then if *a c* (*fig.* 54) repreſents the plane propoſed, let it be produced till it cuts the plane *g h* in *d*; now if *d* be made the axis of ſuſpenſion of the plane *a c*, the centre of percuſſion of the plane *a c* revolving about *d*, will be the centre of *preſſure* upon the ſame plane. For if the percuſſive forces of every point of *a c* be as the *preſſures* exerciſed upon thoſe points, then the centre of percuſſion muſt be the ſame with the centre of *preſſure*; and that the force of percuſſion is every where as the *preſſure* of the water, may be thus proved. The percuſſive force of any point, as *b*, is as the velocity of that point, and the velocity is as the diſtance *b d* of the point from the axis of motion; ſo the percuſſive force of *a* is as *a d*, of *c* as *c d*; ſince then the percuſſive forces of *a*, *b*, *c*, are as the lines *d a*, *d b*, *d c*, and theſe lines are as the lines *e a*, *f b*, *g c*, perpendicular to the ſurface of the water, and theſe laſt lines are as the *preſſures* upon *a*, *b*, and *c*, it follows, that, the percuſſive forces, taking the interſection *d* for the axis of ſuſpenſion or motion, are reſpectively as the *preſſures* upon the ſame points; therefore the centre of percuſſion or oſcillation is the ſame with the centre of *preſſure*. Cotes's Hyd. and Pneum. Lect. p. 40, &c.

Pressure *of fluids*. See Fluid.

PREST, a duty in mony, paid by the ſheriff upon his accounts in the exchequer, for mony left, or remaining, in his hands.

The word is French, *preſt*; where it ſignifies *ready*.

Prest-money is a ſum of money which binds thoſe who receive, to be ready at command, at all times appointed; chiefly underſtood in the liſting of ſoldiers.

Prest-sail, in the *Sea-Language*, is when a ſhip carries all the ſail ſhe can poſſibly croud.

This is ſometimes done in giving chace, &c. but it is a dangerous experiment, leaſt the ſhip overſet, or bring her maſts by the board; in which latter caſe ſhe becomes an eaſy prey.

Press, *auditors of the*. See Auditor.

PRESTATION-MONEY, a ſum of money paid yearly, by archdeacons, and other dignitaries, to their biſhop, *pro exteriori juriſdictione*.

Prestation, *præſtatio*, was alſo anciently uſed for other payments; *Et quieti ſint de* præſtatione *muragii*. Chart. Hen. VII. Sometimes alſo for pourveyance.

PRESTER, a meteor, conſiſting of an exhalation thrown from the clouds downwards with ſuch violence, as that by the colliſion it is ſet on fire.

The word is Greek, πρηςτηρ, the name of a kind of ſerpent; called alſo *dipſas*, to which this meteor is ſuppoſed to bear a reſemblance.

The *preſter* differs from the thunderbolt in the manner of its inflammation; and in its burning and breaking every thing it touches with greater violence. See *Water*-Spout.

Prester, a word uſed by ſome to expreſs the external part of the neck, which is uſually inflated in anger.

Prester, *John*, or *Jean*, an appellation given to the emperor of the Abyſſinians; becauſe, anciently, the princes of this country were really prieſts; and the word *jean*, in their language, ſignifies *king*.

He was firſt made known in Europe under this title by the French. His empire was, anciently, of vaſt extent; at preſent it is confined to ſix kingdoms, each about the bigneſs of Portugal.

The name *Preſter John* is altogether unknown in Ethiopia; and took its riſe hence, that the people of a province where this prince uſually reſides, when they requeſt any thing, ſay *Jean-coi*, i. e. *my king*. His proper title is, the *Grand Negus*.

There is alſo a *Preſter John* of Aſia, mentioned by M. Polo the Venetian. His juriſdicton is in the country of Cangingu, between China, Siſan, and Thibet; a kingdom mightily valued by the Chineſe, for its policy, and the number of its fortified cities; though they have uſually the utmoſt contempt for foreign countries.

Some ſay this latter is ſo called from a Neſtorian prieſt, or preſbyter, mentioned by Albericus, towards the year 1145, to have mounted the throne; who having been a preſbyter before his elevation to the royal dignity, was called *Preſbiter John*, or *Preſter John*, even when he was ſeated on the throne; but his kingly name was *Ungchan*. This preſbyter availing himſelf of the death of Coiremchan, otherwiſe called Kenchan, the monarch of Aſiatic Tartary, which borders upon Cathay, invaded the kingdom with ſuch vigour and ſucceſs, that he was acknowledged as its monarch. Others ſay, that he takes the name from a croſs which he bears in his hand as a ſymbol of his religion.

The hiſtory of *Preſter John* has been involved in conſiderable obſcurity and confuſion. Some have apprehended that there were two perſons in the Eaſt under this adpellation, agreeably to the preceding account; whilſt others conſider the Abyſſinian *Preſter John* as a fictitious character. The fact, as Mr. Moſheim has ſtated it, ſeems to be briefly this. In the fifteenth century, John II. king of Portugal, employed Pedro Couvilliano in a laborious enquiry into the real ſituation of the kingdom of *Preſter John*. The curious voyager undertook this taſk; and, for information in the matter, travelled with a few companions into Abyſſinia; and, obſerving, in the emperor of the Abyſſinians or Ethiopians many circumſtances that reſembled the accounts which at that time prevailed in Europe concerning *Preſter John*, he perſuaded himſelf that he had fulfilled his commiſſion, and found out the reſidence of that extraordinary monarch, who was the object of his reſearches. His opinion eaſily gained credit in Europe, which had not yet emerged out of its ignorance and barbariſm. But a new light was caſt upon this matter in the ſeventeenth century, by the publication of ſeveral pieces, which the induſtry of the curious drew forth from their obſcurity, and by which a great number of learned men were engaged to abandon the Portugeſe opinion, and were convinced that *Preſter John* reigned in Aſia, though they ſtill continued to diſpute about the ſituation of his kingdom, and other particular circumſtances. There are, however, ſome men of the moſt eminent learning in our times, who maintain, that *John* was emperor of the Abyſſinians, and thus prefer the Portugeſe opinion, though (ſays Moſheim) deſtitute of authentic proofs and teſtimonies, to the other, though ſupported by the ſtrongeſt evidence, and the moſt unqueſtionable authorities. Moſh. Eccl. Hiſt. vol. ii. p. 361. 8vo. Eng. edit.

We ſhall only add, that the death of *Preſter John*, and the total defeat of his ſucceſſor by Genghizkan, emqeror of the Tarters, gave an unhappy turn to the affairs of the Chriſtians in the northern parts of Aſia, towards the cloſe of the twelth century. From this period the Chriſtian cauſe loſt much of its authority and credit in the provinces that had been ruled by *Preſter John* and his ſucceſſor David, and continued to decline, till, at length, it ſunk entirely under the weight of oppreſſion; and was ſucceeded in ſome places by the errors of Mahomet, and in others by the ſuperſtitions of paganiſm. In this general account, however, we may except the kingdom of Tangut, the chief reſidence of *Preſter John*, in which his poſterity, who perſevered in the profeſſion of Chriſtanity, maintained, for a long time, a certain ſort of tributary dominion, which exhibited, indeed, but a faint ſhadow of their former grandeur.

PRESTESSE, in the *Manage*, is uſed to denote the readineſs and diligence of a horſe in working a manege.

PRESTIMONY, *præſtimonia*, in the *Canon Law*, a term about which authors are much divided. It is derived *a præſtatione quotidiana*; and is, by ſome, defined a kind of benefice, ſerved by a ſingle prieſt: in which ſenſe, *preſtimony* is the ſame with a preſbyterian chapel.

Others will have *preſtimony* to be the incumbency of a chapel, without any title, or collation; ſuch as are moſt of thoſe in caſtles, where prayers or maſs are ſaid; and which are mere oratories unendowed. Whence, alſo, the term is applied, in the Romiſh church, to certain perpetual offices, beſtowed on canons, religious, or others, for the ſaying of maſſes, by way of augmentation of their livings.

Others, again, will have *preſtimony* to be a leaſe, or conceſſion of any eccleſiaſtical fund, or revenue, belonging to a monaſtery, to be enjoyed during life.

Du Moulin makes *preſtimony* a profane benefice, which however, has a perpetual title, and an eccleſiaſtical office, with certain revenues attached to it; which the incumbent is allowed to ſell, and which may be poſſeſſed without tonſure: ſuch as the lay-churchwardens of Notre-dame. He adds, that, in propriety, the canonries of chapels are benefices of this nature.

Upon the whole the moſt probable opinion ſeems to be this, that *preſtimony* is a fund, or revenue appropriated by the founder for the ſubſiſtence of a prieſt, without being erected into any title or benefice, chapel, prebend, or priory; and which is not ſubject, either to the pope, or to the ordinary; but whereof the patron, and thoſe who have a right from him, are the collators, and nominate, and confer, *pleno jure*.

PRESTISSIMO, in the *Italian Muſic*, intimates to perform extremely quick, haſtily, and with fury.

PRESTO, in the *Italian Muſic*, is uſed to ſignify that the part it is joined to ſhould be performed gayly, faſt, and quick, yet not with rapidity.

Non tropo **PRESTO** or *men* **PRESTO**, in the *Italian Muſic*, ſignifies not too quick, or leſs than *preſto*.

Piu **PRESTO**, in the *Italian Muſic*, is uſed to intimate that we ſhould ſing, or play the part to which it is annexed, a little briſker and quicker than the *preſto* alone requires. When *piu* is added to other words, as *adagio*, *grave*, *vivace*, &c. it adds in like manner to the ſlowneſs, or quickneſs, of the movements, reſpectively.

PRESTO, PRESTO, in the *Italian Muſic*, the ſame with PRESTISSIMO.

PRESUMPTION, *præſumptio*, in *Law*, a ſuſpicion, or conjecture, founded on a veriſimilitude.

Preſumption is of three ſorts. 1. *Violent*, which many times is allowed a full proof: as if one be killed in a houſe, and a man is ſeen to come out of the houſe with a bloody ſword, and no other perſon was at that time in the houſe; this, though but a *preſumption*, is a proof. 2. *Probable*, ariſing from ſuch circumſtances as uſually attend the fact, which has its due weight. 3. *Light*, or *temerarious*, which is of no prevalency at all.

In caſes of a charter, or feoffment, if all the witneſſes to the deed be dead, the violent *preſumption*, that ſtands for a proof, gives continual and quiet poſſeſſion. *Stabit* præſumptio, *donec probetur in contrarium*. Coke on Litt. See CIRCUMSTANTIAL *evidence*, and EVIDENCE.

PRESUMPTION was alſo anciently uſed for INTRUSION.

PRESUMPTION, *præſumptio*, in *Rhetoric*, the ſame with PROLEPSIS.

PRESUMPTIVE *heir*. See HEIR.

PRESUMPTIVE *evidence of felony*. See EVIDENCE.

PRETENCE, in *Heraldry*. See INESCUTCHEON, and ESCUTCHEON *of pretence*.

PRETENSED, or **PRETENDED** *right*, in *Law*, is where one is in poſſeſſion of lands and tenements, which another, who is out, claims and ſues for. Here the *pretenſed right* is in him who ſo claims, or ſues.

PRETER, or **PRETERIT**, *præteritus*, paſt, in *Grammar*, an inflexion of verbs, expreſſing the tenſe, or time paſſed.

Preter, or preterit, is a general name, that comprehends all the inflexions correſponding to the ſeveral tenſes, or ſeveral circumſtances and relations of the time paſt; all which, the Latins, &c. diſtinguiſh by particular inflexions, or terminations, of the verb; which make the proper notion of tenſes. See TENSE.

The modern languages, particularly the Engliſh, in lieu of different terminations of the verbs themſelves, have uſually recourſe to thoſe of their auxiliaries, and participles.

The *preter*, or paſt time, is ſubdivided, by grammarians, into *preterimperfect*; as e. gr. *I had*, *I thought*; in the Latin, *Habebam*, *cogitabam*; in the French, *J'avois*, *je penſois*: the *preterperfect*, as, *I have had*, *I have thought*; *habui*, *cogitavi*; *j'ai eu*, *j'ai penſé*; and *preterpluperfect*, as, *I had thought*, *I had had*; *habueram*, *cogitaveram*; *j'eus eu*, *j'eus penſe*. The Engliſh have properly but two caſes, or kinds, of the *preter* tenſe; viz. the *preter* time of the imperfect action; as, *I was at ſupper then*, but had not yet done it; and the *preter* time of the perfect action; as, *I had then ſupped*, and it was then done. The *preter* tenſe is ofteneſt formed of the preſent tenſe, by adding *ed*; as *I burned*.

The French have a particular caſe of the *preterperfect*; which F. Buffier calls the *preterite ſimple*, in oppoſition to the former, called the *preterit-compoſite*; others call it the *preterit-indefinite*, becauſe expreſſing a thing done indeterminately; as *j'ecrivis hier*. This anſwers to the AORISTUS of the Greeks; and, in the diſtinction of this from the common *preterit*, does one of the greateſt niceties in the practice of the French language conſiſt.

In the paſſive voice, the Latins, French, &c. have recourſe to participles and auxiliaries, like the Engliſh, to form their *preter* tenſes; as, *I was loved*, *amatus eram*, *j'etois aimé*, &c.

PRETERIT, *præteritus*, in the *Roman Juriſprudence*. *Infans præteritus*, is a child of whom the father has forgot to make mention in his teſtament; which renders it entirely null.

Exheredation of his ſon is allowed in a father, but never *preterition*.

PRETERITION, or **PRETERMISSION**, in *Rhetoric*, a figure whereby, in pretending to paſs over a thing untouched, we make a ſummary mention thereof.

I will not ſay he is valiant, he is learned, he is juſt, &c.

The moſt artful praiſes are thoſe given by way of *preterition*. See RETICENCY.

PRETERNATURAL *rains*. See RAIN.

PRETEXT, or **PRETENCE**, a colour, motive, or cauſe, either real, or apparent.

PRETEXTA, or **PRÆTEXTA**, among the Romans, was a long white gown, or toga, having a band, or border, of purple, at the bottom.

It was worn by children of quality till the age of puberty, i. e. by boys, till ſeventeen, at which time they laid it aſide, and reſumed the virile gown. Girls wore it till marriage.

It took its name *prætexta*, according to Godwyn, *quod ei purpura* prætexta *erat*, becauſe guarded about with purple ſilk.

The *pretexta*, at firſt, was a robe of ſtate, or ceremony, worn only by the chief magiſtrates, and the prieſts, nor was it lawful for ſuch who wore this gown to be arraigned, or ſentence to paſs againſt them, till it was pulled off.

In continuance of time, it was permitted to noblemen's children; and at length, even to all Roman children in general. See TOGA.

PRETIUM *ſepulchri*, in old *Law-Books*, &c. thoſe goods accruing to the church wherein a corpſe is buried.

In the Iriſh Canons, lib. xix. cap. 6. it is ordered, that along with every body that is buried, there go his cow, horſe, apparel, and the furniture of his bed; none of which may be diſpoſed of otherwiſe than for the payment of debts, &c. as being familiars and domeſtics of the deceaſed.

PRETOR, **PRÆTOR**, an eminent magiſtrate, or miniſter of juſtice, in ancient Rome: accordingly we often find a balance on the medals of the *pretors*.

The title of *pretor* is derived *a præeundo*, or, *præeſſe*, denoting the ſuperiority of his juriſdiction.

In the firſt ages of the commonwealth, all the great magiſtrates were ſtyled *pretors*; afterwards, the title was beſtowed on all the principal officers of the army: at laſt, *pretor* became reſtrained to a particular magiſtrate.

About the year of Rome 386, the people ſoliciting to have one of the conſuls always choſen from among themſelves, the ſenators granted it, on condition, that a new magiſtracy ſhould be erected, to be filled wholly from among the patricians: ſuch was the origin of the *preture*, *prætura*; which, Livy obſerves, was firſt diſcharged by Spurius Furius Camillus, in the year of Rome 387; and whoſe office was to look to the adminiſtration of juſtice and equity between man and man; much in quality of a lord chief juſtice, or lord chancellor, or rather both in one.

But buſineſs increaſing, in proportion as the empire was inlarged, a ſecond *pretor* was created, A. U. C. 510. to take cognizance of the affairs of foreigners reſiding at Rome: upon which the former was diſtinguiſhed by the title of *prætor urbanus*, or *major*; and the latter, by that of *pretor preregrinus*, or *minor*.

In the year 526 of Rome, when Sicily and Sardinia were reduced into Roman provinces, two more *pretors* were created to aſiſt the conſuls in the government of the provinces; and as many more upon the entire conqueſt of Spain, A. U. C. 556. Sylla, in the year of the city 672, increaſed the number to eight; Julius Cæſar, in the year 707, augmented them firſt to ten, and then to ſixteen; under the reign of Auguſtus there were firſt ten *pretors*, and afterwards ſixteen; two whereof were called *prætores cereales*, as being charged with the providing of corn and grain; to which number Claudius added two others, viz. *prætores fidei commiſſarii*. In the Code, lib. i. tit. 39. we find a law of the emperors Valentinian and Marcian, which reduces the *pretors* to three.

In the time of Juſtinian, the office of *pretor* was entirely aboliſhed.

The office of the *pretor*, or *prætor urbanus*, was to render juſtice in the city: he had a power to interpret the laws, to ſupply and reform them; and even to make new ones, when the public good required. See Civil *law*.

In the Inſtitutes, the edicts of the *pretors* are called *jus honorarium*; whence it ſhould ſeem, they had only the force of laws out of reſpect to that eminent magiſtrate; the buſineſs of the *pretor* being rather to look to the obſervation of the old laws than to make new ones. See Edict.

Some are of opinion, he had not the *jus gladii*, the power of the ſword; the cognizanceof criminal matters being the ſpecial province of the Prefect of Rome.

But others are of another ſentiment. In the general, it is very difficult to fix preciſely how far his power extend.

When he walked, he was preceeded by ſix lictors: and was clothed with the robe called *pretexta*: he ſat in a curule *chair*; his tribunal was elevated in form of a ſemicircle; and he bore a ſpear and ſword.

His authority, like that of the other magiſtrates, was very much weakened and reduced under the emperors. In the Digeſt and Code is a title *de officio prætoris*.

Pretor was alſo a title among the Romans, given the governor of a province, who had ſerved the office of *prætor*. Whence provinces governed by *pretors*, or reſtrained to thoſe who had diſcharged that office, were called *pretorian provinces*.

PRETORIAN *guards*, prætoriæ *cohortes*, were the ſoldiers of the emperor's guard; ſo called, as ſome imagine, from their place or ſtation in the palace or court called *prætorium*.

Their inſtitution is owing to Scipio Africanus, who firſt eſtabliſhed a company of the braveſt men in his army, ſelected for the purpoſe, to be his guard, and never to ſtir from his ſide in battle.

Their number was at length increaſed, as Dion tells us, to ten thouſand. They were commanded by an officer created by Auguſtus, called *præfectus prætorii*. See Prefect.

PRETORIUM, *prætorium*, among the Romans, the place, hall, or court, wherein the pretor of a province lived, and wherein that magiſtrate ſat to adminiſter juſtice to the people.

There were of theſe *pretoriums* in all the cities of the Roman empire. The Scripture mentions that of Jeruſalem under the name of *judgment-hall*; and there are ſtill ſome remains of one at Niſmes, in Languedoc.

Pretorium was alſo the tent or pavilion of the general of the Roman army: wherein councils of war, &c. were held.

From the time of Auguſtus, the emperor's tent in the camp was diſtinguiſhed by the title of *prætorium Auguſtale*.

Pretorium was alſo a place in Rome where the pretorian guards were lodged.

Some will have the *pretorium* to be properly the tribunal of the *præfectus prætorii*, or an auditory deſtined for the rendering of juſtice in the emperor's palace. See Prefect.

This they argue from St. Paul's Epiſtle to the Philippians; and from this place called *prætorium*, they will have the guards to have been denominated *prætoriani*, becauſe aſſembled here for the emperor's ſafety.

Others will not allow the *prætorium* to be any tribunal, or ſeat of juſtice, but merely the imperial guard-houſe.

Perizonius has an expreſs diſſertation to prove, that the *pretorium* was no court of juſtice in St. Paul's time; but the camp or place where the *pretorian* guards were quartered.

He adds, that the name *pretorium* was not given to places where juſtice was adminiſtered till a long time after; when the office of the *præſectu prætorii* was converted into a civil function.

PREVARICATION, Prævaricatio, in the *Civil Law*, is when the informer colludes with the defendant, and ſo makes only a feigned proſecution.

Sylvius, in his comments on Cicero, *pro Cluentio*, gives us the difference between the three terms, *Calumniari*, *prævaricari*, and *tergiverſari*. He, who in his accuſation forges faults which were never committed, is ſaid *calumniari*: he who undertakes one's ſuit, and either will not add reaſons in behalf of his client, or not anſwer the objection of his adverſary when he is able, is ſaid *prævaricari*: and he, who deſiſts from his accuſation, and lets the ſuit drop, *tergiverſari*.

Prevarication, in our *Law* is when a man, falſly and deceitfully, ſeems to undertake a thing, with intention that he may deſtroy it; e. gr. where a lawyer pleads booty, or acts by colluſion, &c.

Prevarication is alſo uſed for a ſecret abuſe committed in the exerciſe of a public office, or of a commiſſion given by a private perſon.

PREVARICATOR, Prævaricator, in the *Univerſity of Cambridge*, is a maſter of arts, choſen at a commencement, to make an ingenious ſatirical ſpeech, reflecting on the miſdemeanors of the principal members. See Terræ *filius*.

PREVENTER, on *Board a Ship of War*, denotes an additional rope, employed at times to ſupport any other, when the latter ſuffers an unuſual ſtrain, particularly in a ſtrong gale of wind: as the *preventer*-brace, which is a temporary brace, fixed occaſionally to ſuccour the main or fore-yard of a ſhip, when it is charged with a greater effort than uſual. *Preventer*-ſhrouds and *preventer*-ſtays are applied in the ſame manner to ſerve the ſame purpoſes.

PREVENTION, Præventio, in the *Canon*, &c. *Law*, the right which a ſuperior perſon or officer has to lay hold of, claim, or tranſact, an affair, prior to an inferior one, to whom otherwiſe it more immediately belongs.

The word is chiefly uſed in ſpeaking of the pope's *preventing* the ordinary collators; and of the royal judges *preventing* ſubaltern ones.

The Roman canoniſts maintain, that the pope, who is the ſource of all juriſdiction, has not tranſmitted it privatively to the ordinary collators; but that he may ſtill not only collate concurrently with them, but he alſo may *prevent* them by uſing his original power as head of the church.

Theſe *preventions* are grown odious in ſeveral countries, where they do not now obtain without many modifications and reſtrictions; and the civil power in France always judges in favour of the ordinary collators.

The pope has no *prevention* to the prejudice of lay-patrons; but by the concordat he has reſerved to himſelf the right of conferring elective benefices by *prevention*, and even cathedral and collegiate dignities.

If the proviſions of the pope, and collations of the ordinary, bear date on the ſame day, the ultramontane canoniſts give the preference to the pope; the French to the ordinary.

The cardinals have a particular indulgence not to be *prevented* by the pope within ſix months. See Expectative *graces*, and Proviſions *by prevention*.

PRIAPE *de mer*, in *Natural Hiſtory*, a name given by the French to a peculiar ſpecies of canalis, or tubulus marinus, called alſo, by ſome authors of that nation, the *arroſoir*.

It is an oblong and thick ſhell of this kind, with a large head, which is pierced through with a great number of holes, ſo as at once to reſemble, in ſome ſort, the glans of the penis, and the head of a common gardener's watering pot. This ſpecies is found at Amboyna.

PRIAPEIA, in *Poetry*, a name given to certain obſcene epigrams, and other pieces, compoſed on the god Priapus; whereof we have many inſtances in the Greek Catalecta. See Priapus.

Priapeia, in *Botany*, a name given by John Bauhine and ſome other authors, to the ſmall ſpecies of tobacco called by Mr. Tournefort and others, *Nicotiana minor.*

PRIAPISM, Πριαπισμος, in *Medicine*, a continual and painful erection or tenſion of the virile member.

The term is derived from Priapus, a heathen god, whom the poets and painters repreſent in a ſtate of erection.

As ſatyrs are uſually painted after the ſame manner, the diſeaſe is alſo called *ſatyriaſis*, or *ſatyriaſmus*,

Some, however, diſtinguiſh between the *ſatyriaſis* and *priapiſmus*, in that the latter is without any effuſion, or deſire of coition; but the former attended with both.

The immediate cauſe of a *priapiſm* is the heat, pungency, or acrimony of the ſemen, accompanied with a convulſion of the muſcles of the part, which, compreſſing the veins and cavernous bodies, prevent the return of the blood.

The more remote cauſes are too hot, ſharp, ſtimulating foods; cantharides are alſo found to produce the ſame effect, but with much more violence. There are inſtances of people, eſpecially old men, who, making uſe of cantharides to enable them to ſatisfy their paſſions the better, have been ſeized with a *priapiſm*, which has been followed with univerſal convulſions, and even death.

With regard to the *priapiſm*, chordee, and other diſtortions of the penis, in the venereal diſeaſe, their treatment is the ſame with that of the GONORRHOEA. When they prove very troubleſome, the patient may take a few drops of laudanum at night, eſpecially after the operation of a purgative through the day.

PRIAPOLITHUS, a name given by ſome authors to a ſtone found about Caſtro in Italy, which very aptly reſembles the figure of the human penis.

PRIAPUS, Πριαπος, a term ſometimes applied to the genital parts of men; viz. the penis, and teſtes.

The name took its riſe from *Priapus*, a fabulous deity, particularly adored at Lampſacus, the place of his birth; who, for the extraordinary ſize of his parts, was exceedingly revered by the women; inſomuch that the Scripture ſeems to tell us, king Aſa dethroned his mother Maachah, becauſe ſhe had conſecrated a grove to *Priapus*, and preſided at his ſacrifices.

The Roman poets in general ſeem to have looked on *Priapus* as a ridiculous god, and are all ready enough, either to deſpiſe or abuſe him. Hor. lib. i. ſat. 8. v. 3.

PRICE, *pretium*, the value of a thing. See VALUE.

PRICE, *current*, in *Commerce*, a weekly account of the current value of moſt commodities.

PRICK *madam*, in *Botany*, the name of a ſpecies of HOUSE-LEEK.

PRICK or *queen poſt*, in *Building*. See POST.

PRICK, or PINCH, in the *Manege*, is to give a horſe a gentle touch of the ſpur, without clapping them hard to him.

To *prick* or *pinch*, is an aid; but to *appuyer*, or bear hard with a ſpur, is correction. See PINCHING.

PRICK *timber*, or *wood*, in *Botany*. See SPINDLE *tree*.

PRICKET, among *Sportſmen*. See SPITTER.

PRICKING *of a horſe's foot*, in the *Manege*, is the hurt received by a nail driven too far in the foot, ſo as to reach the quick, or preſs the vein in the horſe's foot, when he is ſhod.

PRICKING *the chart*, is the art of tracing a ſhip's courſe upon a marine chart, by the help of a ſcale and compaſſes, ſo as to diſcover its preſent ſituation.

PRICKING the *ſails*, is the art of ſtitching two cloths of a ſail together, along the ſpace comprehended between the two edges, or ſelvages, that overlay each other. Or, it is the ſowing a middle-ſeam between the two ſeams which are employed to unite every cloth of a ſail to the next adjoining.

PRICKLE *back*, in *Ichthyology*, a ſmall fiſh, ſo called from the *prickles* on its ſides and back. Vaſt numbers of theſe little fiſh are to be found in almoſt all freſh waters, wherever it is poſſible for fiſh to live, as Mr. Arderon informs us, Phil. Tranſ. N° 428. ſect. 15. who gives us ſome account of theſe creatures. They are very deſtructive to the ſpawn of all ſorts of fiſh; and they themſelves are tormented to death by a kind of louſe of an oval figure, with eight legs and a very tranſparent body. This louſe has little fins always in motion, whether it be ſwimming about or fixed on the fiſh. See STICKLE-*back*.

PRIDE *of the Iſis*, a name given by Dr. Plot to the common LAMPERN, from its being found very plentifully and very delicate in that river.

PRIDE *gavel*, a cuſtom in the manor of Rodely in the county of Gouceſter: by which to this day a rent is paid to the lord, by certain tenants, in duty and acknowledgment to him for their liberty and privilege of fiſhing for lampreys or lamprids in the river Severn.

PRIER *age*. See AGE.

PRIER *aid*. See AID.

PRIEST, *Sacerdos*, a perſon ſet apart for the performance of ſacrifice, and other offices and ceremonies of religion.

Thus the falſe gods and goddeſſes of the heathens had their *prieſts*; *prieſts* of Mars, of Bacchus, of Hercules, of Iſis; and ſome of them their prieſteſſes. See PONTIFEX, &c.

The Jews had three orders, viz. *prieſts*, LEVITES, and NETHINIMS, who ſerved in the temple; over whom the high-*prieſt* was chief.

The title כהנים, *cobanim*, or *prieſts*, is applied in Scripture to the officers of ſtate as well as to the miniſters of the ſanctuary; though more commonly to the latter, who offered ſacrifices, and other ways officiated in the public worſhip. The true reaſon of the different application of the word ſeems to be, that in the primary ſenſe it imports thoſe that miniſter to a king; and, therefore, as God had taken upon himſelf the character of the king of Iſrael, he had his *cobanim* as well as earthly monarchs, or ſuch as attended on his ſpecial preſence in the ſanctuary, and miniſtered in the ſacred ſervice.

When the Jewiſh conſtitution was ſettled, the public ſacerdotal office was allotted to Aaron and his ſons, and entailed on their poſterity: and it was made a capital crime for any beſides them to officiate, as *prieſts*, in the more ſolemn acts of offering ſacrifices, burning incenſe, and bleſſing the people. The Jewiſh *prieſts* were conſecrated to their office by waſhing, unction, enrobing them with the ſacerdotal veſtments, and offering certain ſacrifices preſcribed in the book of Exodus, chap. xxix.

The inferior *prieſts* were divided, in the time of David, into twenty-four companies, who were to ſerve in rotation, each company by itſelf, for a week. The order in which the ſeveral courſes were to ſerve was determined by lot; and each courſe was in all ſucceeding ages called by the name of its chief at the time of its firſt diviſion.

The Mahometans have their *prieſts* called *ſcheik* and *mufti*; and the Indians and Chineſe their *bramins* and *bonzas*. See MUFTI, and BRACHMAN.

PRIEST, PRESBYTER, in the *Chriſtian Church*, is a perſon inveſted with holy orders; in virtue whereof he has a power to preach, pray, adminiſter the ſacraments, &c. and, in the Romiſh church alſo, to bleſs, abſolve, &c.

By the canons, can. 34. a man muſt be twenty-four years of age before he be admitted to the prieſthood; anciently thirty years were required.

And by 13 Eliz. cap. 12. none ſhall be made miniſter, i. e. *prieſt*, being under the age of four and twenty years; and in this caſe, there is no diſpenſation, as there is in that of a DEACON: and unleſs he firſt bring to the biſhop of the dioceſe a teſtimonial both of his honeſt life, and of his profeſſing the doctrine expreſſed in the thirty-nine articles: nor unleſs he be able to anſwer, and render to the ordinary an account of his faith in Latin, according to the ſaid articles, or have ſpecial gift or ability to be a preacher. And by the canon juſt cited, it is required, that he ſhall have taken ſome degree of ſchool in either of the two univerſities, or, at leaſt, be able to give an account of his faith in Latin, according to the thirty-nine articles; and alſo that he exhibit letters teſtimonial of his good life and converſation, under the ſeal of ſome college of Cambridge or Oxford, where before he remained, or of three or four grave miniſters, together with the ſubſcription and teſtimony of other credible perſons, who have known his life and behaviour for the ſpace of three years next before. Nor ſhall any biſhop admit any perſon into ſacred orders, which is not of his own dioceſe, except he be either of one of the univerſities of this realm, or except he ſhall bring letters diſmiſſory from the biſhop of whoſe dioceſe he is.

For other requiſites, ſee DEACON. For the form of ordination, ſee ORDINATION.

The holy Scripture makes no diſtinction between the title of *prieſt*, *preſbyter*, and that of *biſhop*, *epiſcopus*; and does not give any ſuperiority to the one over the other. Blondel, therefore, and Salmaſius maintain with good reaſon, that, in the primitive church the *prieſts* governed with perfect equality, and without any other pre-eminence beſide that of age.

Yet ſome of the primitive writers ſpeak of nothing but epiſcopacy; and frequently in ſuch terms, as if they eſteemed it of apoſtolical inſtitution. See BISHOP, ORDINATION, and PRESBYTER.

As, in the ancient church, the deacons had the management and adminiſtration of the revenues of the church, their authority grew apace; and, in a little time, they were got above the *prieſts*. St. Jerom uſed his utmoſt endeavours to prove, that deacons were originally inferior to *prieſts*; and the council of Nice decided the queſtion in favour of the latter. See DEACON.

Indeed, an order of deacons having been inſtituted without any other function than to aſſiſt the *prieſt* at the altar; theſe have made no difficulty of owning the ſuperiority of the *prieſts*.

Add to this, that the order of a deacon being now become neceſſary to arrive at that of a *prieſt*, there is no room to diſpute the precedency; but the deacons, who had retained their function, had the diſpoſal of the revenues, and paid the *prieſts* their penſions, ſtill maintained the ſuperiority. Upon which the ſixth counſel in Trullo pronounced once more on the diſpute, and gave the preeminence to the *prieſts*.

In the general acceptation of the word, *prieſts* are any miniſters of a church; but in our law this word is particularly uſed for miniſters of the church of Rome. For the laws againſt popiſh *prieſts*. ſee PAPISTS.

PRIEST, *arch*. See ARCH-*prieſt*.

PRIEST, *cardinal*. See CARDINAL.

PRIESTS, *college of*. See PONTIFICAL *College*.

PRIEST, *high*. See PONTIFEX.

PRIST, *regular*. See REGULAR.

PRIEST *of the Oratory*. See ORATORY.

PRIEST'S *cap*, in *Fortification*. See BONNET *à pretre*.

PRIEST'S *pintle*, in *Botany*. See WAKE *Robin*.

PRIMA *naturalia*, in *Phyſics*, atoms, or the firſt particles whereof natural bodies are primarily compoſed; called alſo *minima naturalia*, which ſee; ſee alſo PARTICLE, and ATOM.

PRIMA *tria*, in *Chemiſtry*. See TRIA.

PRIMÆ, or *primariæ preces*, in *Law*. See PRECES.

PRIMÆ *viæ*, in *Medicine*, the firſt paſſages of the chyle; including the œſophagus, ſtomach, inteſtines, and their appendices. See CHYLE and VIÆ.

PRIMAGE, a duty at the water-ſide, appointed by a ſtatute of Henry VIII. to be paid to the maſter and mariners of the ſhip, by the merchants whoſe goods are loaded or unloaded.

It is paid to the maſter for the uſe of his cables and ropes, in moving the goods; and to the mariners for their ſervice and aſſiſtance.

This is different in different places; in ſome 12*d*. per ton; in others, a penny per pound; in others ſix pence per bale or pack. See DUTY, and CUSTOM.

PRIMARY *planet*, a planet which revolves round the ſun as a centre.

Such are Saturn, Jupiter, Mars, the Earth, Venus, and Mercury; thus called in oppoſition to ſecondary planets, or ſatellites. See PLANET.

PRIMARY *affections*, *collateral points*, *dials*, *motion*, *place*, and *qualities*. See the ſubſtantives.

PRIMATE, PRIMAS, an archbiſhop, inveſted with a juriſdiction over ſeveral archbiſhops, or biſhops.

Father Sirmond derives the origin of *primates* hence: that the large provinces have been divided and ſubdivided by the emperors; the firſt diviſions were called firſts; others ſeconds; others, thirds, &c. and the title *primate* given to the metropolitan, i. e. to the biſhop of the city which was the capital of the province, before the diviſion was made.

This metropolitan *primate* had ſome juriſdiction over the biſhops of the inferior provinces; and was alſo called *patriarch*.

The term *primate* is Latin, and ſignifies the firſt, or preſident of a ſociety: the Greek word correſponding to it, is εξαρχος, *exarch*.

Thoſe who are advocates for a ſtrict eccleſiaſtic hierarchy, maintain a *primate* to be a dignitary who has ſeveral metropolitans under him; as a patriarch has ſeveral *primates*. Yet it is pretty evident from hiſtory, that *primates* were, at firſt, confounded with patriachs: thus Socrates, enumerating ten patriarchs, does not make any diſtinction thereof from *primates*.

In Africa, after the diſtinction was made, the *primates* were not at all ſubject to the patriarch: thus the biſhop of Carthage, who was *primate*, paid no obedience to the biſhop of Alexandria, who was patriarch.

Nor, to be a *primate*, was it neceſſary to have metropolitans for ſuffragans: each province of Africa, except thoſe which compoſed the dioceſe of Alexandria, had its *primate*; this quality being given to age.

In France the ſubdiviſion of provinces gave occaſion to the erection of *primates*: thus Aquitaine, e. gr. being divided into two provinces, the archbiſhop of Bourges became *primate* of the Aquitaines, becauſe Bourges was the capital of the firſt.

Thus alſo, the diviſion of England into two provinces, Canterbury and York, in 1152, gave occaſion to the introduction of *primacies* among us; Canterbury, which was the metropolis before, thence giving the title of *primate of all England* to its prelate, though the archbiſhop of York ſtill claims that of *primate of England*. And, accordingly, the firſt has ſome juriſdiction over all England, relating to adminiſtrations, &c. which the latter has only within his own province.

PRIMATES, in the Linnæn ſyſtem of *Zoology*, the firſt order of animals belonging to the claſs of *mammalia*: the characters of which are that they are furniſhed with fore-teeth, or cutting-teeth, four above and parallel; and that they have two pectoral teats. To this order pertain four genera, viz. *homo* or man, *ſimia* or ape, *lemur* or maucuaco, and *veſpertilio* or bat.

PRIME, *primus*, the firſt in order, degree, or dignity, among ſeveral things of the ſame or like kind.

Thus we ſay, *prime miniſter*, *prime mover*, *prime coſt*, &c. See MINISTER, MOBILE, &c.

PRIME, or PRIME *minute*, in *Geometry*, denotes the ſixtieth part of a DEGREE.

PRIME is ſometimes alſo uſed for a tenth part of an unit. See DECIMAL.

In weights, it is uſed for the twenty-fourth part of a GRAIN.

PRIME *number*, in *Arithmetic*, a number which can only be meaſured by unity; or whereof one is the only aliquot part; ſuch are 5, 7, 11, 13, &c.

Prime numbers inter ſe, among themſelves, are thoſe which have no common meaſure beſides unity; thus 12 and 19 are *prime numbers inter ſe*.

PRIME *figure*, in *Geometry*, is that which cannot be divided into any other figures other more ſimple than itſelf.

Such is a triange among planes; and the pyramids in ſolids. For all planes are made of the firſt, and all bodies of ſolids are compounded of the ſecond.

PRIME *vertical*. See VERTICAL.

PRIME *verticals*, in *Dialing*, or PRIME *vertical dials*, are thoſe projected on the plane of the *prime* vertical circle, or on planes parallel to it.

Theſe are what we likewiſe call direct, erect, north, or ſouth dials. But ſince every plane hath that pole raiſed or depreſſed thereon, which lies open to it, therefore this plane (if a direct ſouth) hath the ſouth pole elevated; and, conſequently, the ſtyle, whoſe height muſt be the complement of the latitude of the place, will point downwards. Wherefore to find the hour's diſtance from the meridian upon this plane, the proportion is as the radius is to the ſine of the ſtyle's height, or co-latitude, ſo is the tangent of the hour, or angle at the pole, to the tangent of the ſeveral hours diſtant from the meridian.

By this canon, the hours requiſite for the plane, as alſo the half-hours, quarters, &c. being calculated and ſet in a table; the dial is deſcribed after the ſame manner, as the horizontal dial. North direct erect dials are but the backſide of the ſouth, becauſe lying in the ſame azimuth with it; therefore it is no more but turning the ſouth dial upſide down, and leaving out the ſuperfluous hours between 5 and 7, and 4 and 8, and the north dial is made. Only note, that the ſtyle muſt point upwards to the north pole. See DIAL.

PRIME *of the moon* is the new moon at her firſt appearance, for about three days after her change. See *Golden* NUMBER.

PRIME is alſo uſed in the Romiſh church, for the firſt of the canonical HOURS, ſucceeding to LAUDS.

PRIME, in *Fencing*, is the firſt and chief of the guards; which is that the body is in, immediately after drawing the ſword; being fitteſt to menace and terrify the enemy, by reaſon the point of the ſword is held higher up to the eye than in any the other guards.

PRIME, or PRIMING *of a gun*. See PRIMING.

PRIMER *fine*, in *Law*. See PRÆFINE.

PRIMER *ſeiſin*, in *Law*, PRIMA *ſeiſina*, or the *firſt ſeiſin*: a branch of the king's prerogative, whereby he had the firſt poſſeſſion of all lands and tenements held of him in chief, whereof his tenant died ſeiſed in fee; and conſequently the rents and profits thereof, till livery was ſued, which ſuit being commonly within a year and day next after the death of the tenant, therefore the king uſed to take at an average the firſt fruits, that is to ſay, one year's profit of the land. And this afterwards gave a handle to the popes, who claimed to be feudal lords of the church, to claim in like manner from every clergyman in England the firſt year's profits of his benefice, by way of PRIMITIÆ, or firſt fruits.

Theſe payments were only due, if the heir was of full age; but if he was under the age of twenty-one, being a male, or fourteen, being a female, the lord was intitled to the wardſhip of the heir, and was called the GUARDIAN *in chivalry*.

But all charges ariſing by *primer ſeiſin*, are annulled by ſtat. 12 Car. II.

PRIMICERIUS, in *Antiquity*, the firſt or chief perſon in any office or dignity.

In this ſenſe the word occurs frequently in the code, and even in our old Engliſh Laws: though it is there alſo occaſionally uſed for a nobleman; as *primicerius totius Angliæ*.

The Romans had great variety of *primicerii*, both in the church and the emperor's court; a *primicerius of the empreſs*, *primicerius Auguſtalis*, *primicerius of the bardariotæ*, *primicerii of the legions*, *of the court*, *of the chamber*, *of the palace*, &c.

The *eccleſiaſtical primicerius*, Du-Cange obſerves, was the ſame with the *chantor* among us.

In the church of Metz, the *primicerius* is the firſt dignitary of the dioceſe, and preſides at aſſemblies of the clergy, in prejudice of the biſhop.

At Venice the dean of the church of St. Mark is called *primocirio*, or *primicerius*: he is independent of the patriarch of Venice, and enjoys epiſcopal privileges.

PRIMING, or PRIME *of a gun*, is the gun-powder put into the pan of ſmall arms, and into the vent of cannon, near the opening of the touch-hole, in order to fire the piece. The *priming* is the laſt thing done in charging. See CHARGE.

For pieces of ordnance, they have a pointed iron-rod to pierce the cartridge through the touch-hole, called the *primer*, or *priming-iron*: and it ſerves to diſcover whether the powder contained therein is thoroughly dry, and fit for immediate ſervice.

PRIMING, among *Painters*, ſignifies the laying on of the firſt colour.

PRIMING, in *Japan Work*. See JAPANNING.

PRIMIPILARII, or PRIMOPILARII, or PRIMIPILARES, in *Antiquity*, were properly ſuch as had formerly borne the office of *primipilus*, or firſt centurion of a legion, to whom was entruſted the care of the banner.

Some will alſo have *primipilarii* to have been a denomination given to the ſoldiers of the firſt cohort of a legion.

The *primipilarii* had conſiderable advantages; one of the chief was, that moſt of the ſoldiers who died in the campaign, left them their heirs.

PRIMIPILUS, or PRIMOPILUS, or PRIMIPILI *centurio*, in *Antiquity*, the CENTURION of the firſt cohort of a legion, who had charge of the Roman eagle.

PRIMITIÆ, the *firſt fruits* gathered of the earth; whereof the ancients made preſents to the gods.

In Leviticus, the *primitiæ* of all fruits are enjoined to be offered to God.

In our law, the *primitiæ* are one year's profits, after avoidance, of every ſpiritual living, as rated in the king's books. See PRIMER *ſeiſin*, and FIRST *fruits*.

PRIMITIVE, in *Grammar*, a *root*; or a word in a language, which is neither derived from any other language, nor compounded from any other words of the ſame. See ROOT, WORD, &c.

Thus *God* is a *primitive*; *Godly*, a derivative; *God-like*, a compound.

PRIMITIVE, in *Arithmetic*. See PRIME and NUMBER.

PRIMO, in the *Italian Muſic*, is often abridged thus, P°. or I°. and added to other words, as, *primo canto*, the firſt treble; *alto primo*, the firſt counter tenor; *tenore primo*, the firſt tenor; *baſſo primo*, the firſt baſs; *fagotto primo*, the firſt baſſoon; *choro primo*, the firſt chorus, &c.

PRIMO *beneficio eccleſiaſtico habendo*, in *Law*, a writ directed from the king to the lord chancellor, appointing him to beſtow the benefice that ſhall firſt fall in the king's gift, above or under ſuch a value, upon this or that clerk. See BENEFICE.

Propoſitio de PRIMO *adjacente*. See PROPOSITION.

PRIMOGENITURE, *primogenitura*, the right of firſt-born, or eldeſt ſon or child.

The *right of primogeniture* ſeems to be an unjuſt prerogative, and contrary to natural right: for ſince it is birth alone that gives children a title to the paternal ſucceſſion, the chance of *primogeniture* ſhould not throw an inequality among them.

Accordingly, the right of *primogeniture*, which calls the elder born to the crown, preferably to the others, was not introduced into France till very late; it was unknown to the firſt race of kings: and even to the ſecond.

The four ſons of Clovis ſhared the kingdom equally among themſelves; and Leouis le Debonnaire did the ſame: it was not till the race of Hugh Capet, that the prerogative of ſucceſſion to the crown was appropriated to the firſt-born.

By the ancient cuſtom of GAVEL-KIND, ſtill preſerved in ſome parts of our iſland, *primogeniture* is of no account; the paternal eſtate being equally ſhared by all the ſons.

PRIMOPILUS. See PRIMIPILUS.

PRIMORES, in *Ornithology*, denote the quil-feathers which ſpring from the firſt bones of the wings, and are ten in number.

PRIMROSE, *primula*, in *Botany*, a genus of the *pentandria monogynia* claſs. Its characters are theſe: the flower hath a tubulous empalement of one leaf, ending in five acute points; it hath one petal, with a cylindrical tube, which ſpreads open above, where it is cut into five heart-ſhaped ſegments; it has five ſhort ſtamina, ſituated in the neck of the petal, terminated by erect acute-pointed ſummits, and a globular germen, ſupporting a ſlender ſtyle, crowned by a globular ſtigma; the germen afterwards turns to an oblong capſule, with one cell, opening at the top, filled with ſmall angular ſeeds. Miller enumerates four and Linnæus ſix ſpecies.

The common *primroſe* grows wild in the woods, and other ſhady places in moſt parts of England, from whence their roots may be eaſily tranſplanted into the garden; where, if they are placed under hedges and in ſhady walks, they make a beautiful appearance early in the ſpring, when few other plants are in flower.

This plant is ſo well known as to need no deſcription; the flowers and roots are uſed in medicine; the flowers are weaker, and much leſs agreeable in ſmell than thoſe of the cowſlip; the leaves and roots partake in ſome degree of the nature of thoſe of the *aſarum*, acting as ſtrong errhines or ſternutatories, when ſnuffed up the noſe, and as emetics (at leaſt the roots), when taken internally.

There are ſeveral varieties of this, which have been accidentally obtained, as the common *primroſe* with double flowers; the red *primroſe* with ſingle and double flowers; theſe have but one flower upon a foot-ſtalk; and the paper-white *primroſe* with ſingle and double flowers.

The ſecond ſort is the cowſlip, or paigle, or paralyſis of the ſhops. This grows naturally in meadows and moiſt paſtures in many parts of England. The flowers of this ſort grow in bunches on the top of the foot-ſtalk, and ſo are eaſily diſtinguiſhed from the former; the flowers which have a moderately ſtrong pleaſant ſmell, and a ſomewhat roughiſh bitteriſh taſte, both which they impart, together with a yellow tincture, to watery and ſpirituous menſtrua, are much uſed in medicine, and ſometimes the leaves. Vinous liquors impregnated with the flavour of the flower by maceration, or fermentation, and ſtrong infuſions of them drank as tea, are ſuppoſed to be mildly corroborant, antiſpaſmodic, and anodyne. An infuſion of three pounds of the freſh flowers in five pints of boiling water is made in the ſhops into a ſyrup, of a fine yellow colour, and agreeably impregnated with the flavour of the cowſlips.

As theſe grow wild, their roots may be taken up, and tranſplanted into gardens.

The beſt time to tranſplant them is at Michaelmas, that their roots may have ſtrength to produce their flowers early in the ſpring. Theſe delight in a ſtrong rich ſoil, but will grow in almoſt any ſort of earth, provided they have a ſhady ſituation.

There is a great variety of this at preſent in the gardens, as the hoſe in hoſe, the double cowſlip, and all the ſorts of polyanthus, which have been ſo much improved within the laſt fifty years, as almoſt to equal the auriculas in variety. in ſome parts of England they are ſo much admired as to ſell for a guinea a root.

The ſeveral varieties of polyanthuſes are produced from ſeed, which ſhould be ſaved from ſuch flowers as have large upright ſtems, producing many flowers upon a ſtalk, which are large, beautifully ſtriped, open, flat, and are not pin-eyed. From the ſeed of ſuch flowers, there is reaſon to hope for a great variety of good ſorts; but then no ordinary flowers ſhould ſtand near them, leſt by the mixture of their farina, their ſeed ſhould degenerate.

Theſe ſeeds ſhould be ſown in boxes filled with light rich earth in December and ſlightly covered: the boxes ſhould have the benefit of the morning ſun, but ſhould not be expoſed to the heat of the day: in a dry ſpring, they ſhould be often refreſhed with water, and with the increaſing heat, they ſhould be removed more into the ſhade. In the middle of May, the plants will be fit for removal to ſome ſhady border made rich with neat's dung, and may be ſet at four inches diſtance every way, and watered till they have taken root. Being kept clear of weeds, they will be fit to be tranſplanted in the latter end of Auguſt to borders, formed of good light rich earth, that are expoſed to the eaſt; in which they ſhould be placed ſix inches aſunder in rows, and watered till they have taken root. In the ſucceeding ſpring they will flower; and thoſe that are intended for preſervation ſhould be removed when they have done flowering into a freſh border of the ſame rich earth, and in the following ſpring they will produce ſtrong flowers.

The roots ſhould be conſtantly removed and parted every year, and the earth of the border changed, otherwiſe they will degenerate, and loſe the principal ſhare of their beauty; and as the plants which grow from ſeeds, generally flower much better than off-ſets, thoſe who would have theſe flowers in perfection, ſhould annually ſow the ſeeds. Miller.

PRIMROSE, *night*, or *tree*, *œnothera*, or *onagra*, in *Botany*, a genus of the *octandria monogynia* claſs. Its characters are theſe: the empalement of the flower is of one leaf, cut into four acute ſegments at the brim, which turn backward; the flower has four heart-ſhaped petals, which are lengthways inſerted in the diviſions of the empalement; it hath eight awl-ſhaped incurved ſtamina which are inſerted in the tube of the empalement; a cylindrical germen is ſituated under the tube of the empalement, ſupporting a ſlender ſtyle crowned by a thick, quadrifid, obtuſe, reflexed ſtigma; the germen becomes a four-cornered cylindrical capſule, having four cells filled with ſmall angular ſeeds. Miller reckons five, and Linnæus ſeven ſpecies.

PRIMUM *ens*. See Ens.

Primum *mobile*. See Mobile.

Primus *brachii moventium*, in *Anatomy*, a name given by Veſalius, and ſome others who have copied from him, to a muſcle generally known under the name of the PECTORALIS.

Primus *communium laryngis*, in *Anatomy*, a name given by Caſſerius and ſome others to the muſcle more generally known by the name of STERNOTHYROIDÆUS, or *ſternothyroides*.

Primus *hyoidis oſſis muſculus*, in *Anatomy*, a name given by Fallopius and ſome others to the muſcle of the *os hyoides*, called by Albinus STERNOHYOIDÆUS.

Primus *oculum movens*, in *Anatomy*, a name given by Veſalius to one of the four *muſculi recti* of the eye, called by Albinus and others the ADDUCTOR. It is called by Fabricius the *rectus interior*, and by ſome the *bibitorius*.

Primus *propriorum auriculæ muſculus*, in *Anatomy*, a name given by Caſſerius to one of the muſcles of the head, called by Albinus the *auriculam attollens*, and by Cowper and Winſlow SUPERIOR *auriculæ*.

PRIMUS *peronæus*. See Peronæus.

Primus *ſcalenus*. See Scalenus.

PRINCE, *princeps*, in *Politics*, a perſon inveſted with the ſupreme command of a ſtate or country, independent of any ſuperior.

Prince is alſo uſed for a perſon who is ſovereign in his own territory; yet holds of ſome other, as his ſuperior or lord, and pays homage or tribute to him.

Thus all the *princes* of Germany are feudatories of the emperor: they are as abſolute in their reſpective principalities as the emperor himſelf; yet are all bound in certain ſervices to him.

Prince, in *Ancient Records*, frequently ſignifies no more than *lord*. Du-Cange gives a great number of inſtances of this uſage.

In effect, the word *princeps* in Latin, whence *prince* in Engliſh, originally ſignifies only the *chief*, or *firſt*: it is compounded of the Latin *primus*, and *caput*; and is properly a word of dignity and office, not of property and ſovereignty.

Thus in the charter of king Offa, after the biſhops had ſubſcribed their names, we read *Brordanus patritius, Binnanus princeps*; and afterwards the dukes ſubſcribed their names.

And in the charter of king Edgar, in Mon. Angl. tom. iii. p. 301. *Ego Edgarus rex rogatus ab epiſcopo meo Deorwolfe, &* principe *meo Aldredo*, &c. And in Mat. Paris, p. 155. *Ego Halden* princeps *regis pro vieribus aſſenſum præbeo, & ego Turketillus dux concedo.*

Prince *of the ſenate*. There was one member of the Roman ſenate diſtinguiſhed always from the reſt by the title of *prince of the ſenate*. This title was given of courſe to that perſon whoſe name was called over the firſt in the roll of the ſenate, whenever it was renewed by the cenſors. He was always one of conſular and cenſorian dignity.

After the inſtitution of the cenſors, it became a cuſtom to confer this title of *prince of the ſenate* on the oldeſt ſenator then living of cenſorian dignity. Yet there were no peculiar rights annexed to this title, nor any other advantage, except an acceſſion of authority, from a notion which it would naturally imprint of a ſuperior merit in thoſe who bore it. See Senate.

Prince *of the youth*. Among the ancient Romans, it was the cuſtom for the emperor in his life-time to nominate him whom he would have to ſucceed in the empire, under the title of *princeps juventutis, & Cæſar*.

In the *ludus Trojanus*, the youth who was choſen captain, was alſo called *princeps juventutis*.

Prince is alſo a title given to the iſſue of *princes*, or thoſe of the royal family.

In which ſenſe they are called, particularly in France, *princes of the blood*; as partaking of the blood to which the ſovereignty is appropriated: and not by any hereditary right, but as a patrimony ſubſtituted to all the royal race.

In England, the king's children are called *ſons and daughters of England*: the eldeſt ſon is created *prince of Wales*. The cadets, or younger, are created dukes or earls, with what title the king pleaſes. They have no appendages, as in France; but only what the good pleaſure of the king beſtows on them.

The ſons are all by birth counſellors of ſtate: and the daughters are all ſtyled *princeſſes*; to violate the eldeſt of which, unmarried, is at this day high treaſon.

To all the king's children belongs the title of *royal highneſs*: all ſubjects are to kneel, when admitted to kiſs their hand; and at table, out of the king's preſence, they are ſerved on the knee. The youngeſt ſons and daughters of the king who are not in the line of ſucceſſion, have PRECEDENCE before all peers and public officers, as well eccleſiaſtical as temporal. 31 Hen. VIII. cap. 10.

The firſt *prince* of the blood in France is called abſolutely *monſieur le prince*. The quality of *prince* of the blood gives a rank and precedency, but it does not include any juriſdiction; they are *princes* by order, not by office.

Wicquefort obſerves, that it was not more than fifty years from his time that the *princes* of the blood of France gave place to all ambaſſadors, even thoſe of republics; and it was at the king's requeſt, that they were ſince allowed the precedency.

The moment a pope is elected, all his relations become *princes*.

Prince *of Wales*, the eldeſt ſon of England.

He is born duke of Cornwall; and immediately intitled to all the rights, revenues, &c. belonging thereto; as being deemed in law, at full age on his birth-day.

He is afterwards created *prince of Wales*, and earl of Cheſter; the inveſtiture whereof is performed by impoſition of a cap of ſtate, and a coronet, a verge of gold, and a ring. He holds the principality by patent granted him and his heirs, by the kings of England.

The title and principality were firſt given by king Edw. I. to his eldeſt ſon: till that time the eldeſt ſon of England was called *lord prince*. While Normandy remained to the king of England, the eldeſt ſon was always ſtyled duke of Normandy: ſince the union, his title is *Magnæ Britanniæ princeps*.

He is reputed, in law, the ſame perſon with the king: to imagine his death, or to violate his wife, is high-treaſon by ſtat. 25 Edw. III. His revenues, as duke of Cornwall, are computed at 14000*l.* per annum. The revenues of the principality were eſtimated, three hundred and fifty years ago, at 4680*l.* per annum.

Prince *of pleaſantry, prince de plaiſance*, in the *Cuſtoms of Flanders*. See Sports.

Prince *of the horſe-comb*, in the *Cuſtoms of Flanders*. See Sports.

Princes *feather*, in *Botany*, a name given to the AMARANTH.

PRINCIPAL, *principalis* the chief, moſt conſiderable, or neceſſary part of a thing.

Thus we ſay, the mayor is the *principal* magiſtrate of a city or town: a council of war conſiſts of the *principal* officers. In a peroration, the *principal* points inſiſted on, are to be briefly ſummed up. The *principal* of a college or hall is the maſter thereof.

Principal, in *Commerce*, is the capital of a ſum due or lent; in which ſenſe the word is uſed in oppoſition to INTEREST.

Principal is alſo uſed for the firſt fund or ſum put by partners into common ſtock; by which it is diſtinguiſhed from the calls or acceſſions ſometimes required, when the former proves inſufficient.

Principal *point*, in *Perſpective*, is a point in the perſpective plane, upon which a line drawn from the eye, perpendicular to the plane falls.

This point is in the interſection of the horizontal and vertical plane; and is alſo called the POINT *of ſight*, and *point of the eye*. See Perspective.

Principal *ray*, in *Perſpective*, is that which paſſes perpendicularly from the ſpectator's eye to the perſpective plane, or picture.

Whence the point where this ray falls on the plane, is by ſome alſo called *the principal point*, which other writers call *the centre of the picture*, and *the point of concurrence*.

Principal, *principalium*, in *Old Law-Writers*, is ſometimes uſed for an HEIR-*loom*.

In Urchenfield com. Hereford, certain *principals*, as the beſt beaſt, beſt bed, beſt table, &c. paſs to the eldeſt child, and are not ſubject to partition.

Principal is ſometimes alſo uſed for a MORTUARY, or *corſe preſent*. *Item lego equum meum vocatum* le bay gelding, *ut offeratur ante corpus meum in die ſepulturæ meæ, nomini* principalii. Teſt. Joh. de Macclesfield, 9 Hen. V.

Principal, in *Law*, is either the actor or abſolute perpetrator of the crime, who is called a *principal*, in the firſt degree; or he who is preſent, aiding and abetting the fact to be done, who is denominated a *principal* in the ſecond degree. The preſence of a *principal* need not always be an actual immediate ſtanding by, within ſight or hearing of the fact; but there may be alſo a conſtructive preſence, as when one commits a robbery or murder, and another keeps watch or guard at ſome convenient diſtance. And this rule has alſo other exceptions; for, in caſe of murder by poiſoning, a man may be a *principal* felon by repairing and laying the poiſon, or giving it to another, (who is ignorant of its poiſonous quality), for that purpoſe; and yet not adminiſter it himſelf, nor be preſent when the very deed of poiſoning is committed. And the ſame reaſoning will hold, with regard to other murders committed in the abſence of the murderer, by means which he had prepared before-hand, and which probably could not fail of their miſchievous effect. As by laying a trap or pit-fall for another, whereby he is killed; letting out a wild beaſt, with an intent to do miſchief; or exciting a madman to commit murder, ſo that death thereupon enſues: in every one of theſe caſes the party offending is guilty of murder as a *principal*, in the firſt degree. For he cannot be called an ACCESSORY, that neceſſarily pre-ſuppoſing a *principal*; and the poiſon, the pit-fall, the beaſt, or the madman cannot be held *principals*, being only the inſtruments of death. As therefore he muſt be certainly guilty, either as *principal* or acceſſory, and cannot be ſo as acceſſory, it follows that he muſt be guilty as *principal*; and if *principal*, then in the firſt degree; for there is no other criminal, much leſs a ſuperior in the guilt, whom he could aid, abet, or aſſiſt. Blackſt. Com. book iv. cap. 3.

PRINCIPALS and ACCESSORIES, in *Grammar*. See WORDS.

PRINCIPAL *cauſe*. See CAUSE.

PRINCIPAL *challenge*. See CHALLENGE.

PRINCIPAL *officers of the navy*. See NAVY.

PRINCIPII *petitio*. See PETITIO.

PRINCIPALIS, in *ſome ancient Latin writers of Muſic*, is uſed for the chord or note called *υπατη* by the Greeks. See HYPATE, TETRACHORD, and DIAGRAM.

PRINCIPIUM *recti abdominis*, in *Anatomy*, a name given by Veſalius to a muſcle generally known at this time under the name of the PYRAMIDALIS.

PRINCIPLE, *principium*, a term frequently uſed for the cauſe, ſource, or origin of any thing.

In which ſenſe we ſay, the *principles of thinking*, *of willing*, &c.

In phyſics, we muſt ever have recourſe to a firſt *principle*, which is God.

The Manichees admit of two *principles*, the one of good, the other of evil; which they eſtabliſh in the quality of two contrary deities, conſtantly oppoſing each other. See MANICHEE.

According to the doctrine of Pelagius, our own wills are the *principles* of our good actions, and we ourſelves the *principles* of our good wills.

PRINCIPLE is defined, among the *School Philoſophers*, to be that from which any thing is, is done, or known; *unde aliquid eſt, fit, aut cognoſcitur*; which is a very extenſive ſignification, and agrees to all kinds of *principles*.

Thus, the premiſes are *principles*, in reſpect of the concluſion; and thus fire and every other agent are the *principles* of things which they produce.

The Thomiſts define *principle* to the like effect: *id a quo aliquod procedit aliquo modo*.

Philoſophers uſually diſtinguiſh *principles* into thoſe of *being*, *principia eſſendi*; and thoſe of *knowing*, *principia cognoſcendi*; or *principia rei*, and *cognitionis*.

Of the firſt they make two kinds; viz. *principles of origination*, which are thoſe from which ſomething proceeds really the ſame with the *principle*. And *principles* of *dependency*; in which ſenſe, any cauſe may be a *principle*, in reſpect of the thing cauſed; or a ſubject, in reſpect of the accidents inherent in it.

The ſecond is that from which we borrow or derive our knowledge of ſome other thing; or it is that which makes the thing be known. Such are *axioms*, *definitions*, *hypotheſes*; ſuch alſo are *examples*, *explanations*, &c.

Philoſophers and mathematicians are generally agreed in admitting that there are AXIOMS, that is, certain indemonſtrable truths, which muſt be reckoned among the *principles* of human knowlege in the ſtricteſt ſenſe. Hobbes ſeems to advance the contrary, when he ſays, in his logic, or firſt part of his book de Corpore, that definitions, or their parts, are the only primary propoſitions, *(propoſitiones primæ)* that is, *principles* in an abſolute and ſtrict ſenſe. But this doctrine of Hobbes, cannot be admitted. For, however true it may be in itſelf, and with reſpect to the divine mind, it ſeems certain, that the human mind has never yet attained, and perhaps never will attain to a perfect analyſis of its own notions in all caſes. And wherever this analyſis ceaſes, definitions ceaſe with it; and where definitions ceaſe, we are forced, if we would demonſtrate any thing of the undefined ſubject, to have recourſe to axioms, or to indemonſtrable truths admitted by all men, though never yet demonſtrated by any one. This will appear evident to thoſe who attentively conſider Euclid's Elements. This great geometer, it is known, does not, ſtrictly ſpeaking, define a right line; becauſe he could not probably analyſe the notion of rectitude; for that which is commonly called his definition of a right line, in the beginning of his elements, is no definition, nor is it ever applied afterwards, as the definitions of an equilateral triangle, a ſquare, and a circle are. But to ſupply the place of a definition, he has aſſumed the axioms, that two right lines cannot comprehend a ſpace; and that they cannot have a common ſegment; and theſe axioms become of uſe more than once afterwards. No one has as yet been able to ſupply with ſucceſs what Euclid omitted to do; for though ſome, both ancients and moderns, have demonſtrated ſeveral very plain axioms, as that the whole is greater than its part, yet none have demonſtrated all the principles of extenſive magnitude aſſumed by Euclid, which Proclus and others choſe to diſtinguiſh by the name of *poſtulata*. See POSTULATE.

Hobbes brings this very inſtance of the demonſtration, that a whole is greater than its part, to prove, that the propoſitions commonly called axioms, are not, ſtrictly ſpeaking, primary, but only ſecondary propoſitions, and really deducible from definitions. Had he attempted the demonſtration of all Euclid's axioms and poſtulata, he would ſoon have found that he had made a raſh induction; and what he gives for a demonſtration of the properties of parallels, evidently ſhews, how little able he was to ſupply what Euclid had omitted.

What is here ſaid of Hobbes, may be applied to others who have attempted to refine upon Euclid, and who have been fond of carrying the analyſes of their demonſtrations beyond him. They have all ſhewn their inability of demonſtrating, without taking ſome axioms or poſtulata for granted; and indeed moſt of them expreſly admit this, only contending that the *principles* they aſſume are more evident than thoſe of Euclid. But whether they be ſo, or not, is of no importance to the preſent queſtion, which is, whether we are not often obliged to have recourſe to axioms, that is, to ſelf-evident, or indemonſtrable truths, in the ſtricteſt ſenſe; and whether theſe can be ſupplied by deductions, or ſyllogiſtic reaſoning, from definitions only. We ſhould not have taken any notice of this queſtion, had not Hobbes and other metaphyſicians and logicians of repute run counter to the common opinion.

But though we are forced to aſſume axioms and poſtulata in geometry, it may be a queſtion, whether any thing of this kind be neceſſary in arithmetic, or the ſcience of numbers; and whether the analyſes of our notions may not here be carried up to the notions of unity, and of the act of addition, *tanquam poſſibilia prima*; and whether it was not ſome conſideration of this kind that led Ariſtotle to ſay, that arithmetic was more accurate (ακριβεστερον) than geometry. It is certain at leaſt, that the analyſis may be, though it ſeldom is, carried farther in the former than in the latter of theſe ſciences. Becauſe the axioms commonly aſſumed, and peculiar to arithmetic, ſuch as the addition and multiplication tables, are no more than the aggregates of the ſimple ſigns, or ſimple notations of numbers; and may eaſily be demonſtrated from the definitions of the ſimple ſigns made uſe of; ſuch as that $1+1=2$; $2+1=3$; $3+1=4$, &c.

Biſhop Berkeley obſerves very juſtly, that the *principles* of ſcience are neither objects of ſenſe nor imagination, but notions of relation, that is, acts of the mind. Thus, ſpace, time, number, are not objects of ſenſe or imagination, although the things coextended with ſpace or time, or things numbered, be objects of ſenſe. This is moſt evident in number, which is plainly different from the perception of the things numbered. Nor can the act by which we number be taught or exemplified. For inſtance, that act of the mind by which we conceive $1+1=2$, cannot be explained or analyſed into others; and ſuppoſing it could, we muſt ſtill ſtop ſomewhere, and wherever that be, there is ſomething a diſciple muſt have *a ſe, non a præceptore*, as Ariſtotle ſays. So that, ſtrictly ſpeaking, *principles* are not taught. And thoſe who maintain them innate, are perhaps not ſo abſurd as Locke pretends. Reflect. on Tar Water, art. 264. Ibid, art. 288.

Leibnitz maintained, that the *principles* of contradiction, and of a ſufficient reaſon, were the foundations of all ſcience; that the firſt was ſufficient for the demonſtration of all neceſſary, and the other of all contingent truths. But though it be true, that the *principle* of contradiction, that is, the *reductio ad abſurdum*, often occurs expreſly, and is oftener implied in geometry, yet by what has been ſaid it appears, that this *principle* alone is not ſufficient to demonſtrate all the other univerſally received *principles* of that ſcience. Far leſs is it true, that we are enabled by the *principle* of a ſufficient reaſon, which amounts to the excluſion of pure chance out of the univerſe, to demonſtrate all phyſics and morals; but additional *principles*, derived from experience, muſt be aſſumed.

PRINCIPLES, *innate*. See INNATE.

PRINCIPLE, in *Phyſics*, or PRINCIPLE *of a natural body*, is ſomething that contributes to the eſſence of a body; or, whereof a natural body is primarily conſtituted.

Ariſtotle defines *principles* to be thoſe things which are not made and conſtituted of themſelves, nor of other things, but all things of them: *quæ non fiunt ex ce invicem, nec ex aliis, ſed ex iis omnia.*

To give an idea of natural *principles*, conſider a body in ſeveral ſtates; a coal, e. gr. that was juſt now a piece of wood: it is evident there is ſomething in the coal, which before exiſted in the wood; this, whatever it is, is a *principle*, and is what we call MATTER.

Again, there muſt be ſomething joined with this matter, to make it wood rather than fire, or fire rather than wood: this is another *principle*, and is what we denominate FORM.

Matter and form, then, are univerſal *principles* of natural bodies. The Peripatetics add a third *principle*; viz. *privation*; for though, ſay they, a thing is not made from nothing, yet it muſt be made from its not being that thing before. This Ariſtotle calls *privation*, and admits it as a third *principle*. But the moderns reject it: for if *privation* be a *principle*, it is at leaſt ſo in a very different ſenſe from matter and form.

Some late philoſophers admit no *principles* but *acid* and *alkali*. Ariſtotle diſtinguiſhes two ſorts of natural *principles*, as they concur in the generation, or in the compoſition of bodies.

PRINCIPLES *of generation*, or of a body *in fieri*, are thoſe without which a natural generation can neither be, nor be conceived. Such are the three *principles* above mentioned, *matter*, *form*, and *privation*.

PRINCIPLES *of compoſition*, or of a body *in facto eſſe*, already made, or thoſe whereof natural bodies really conſiſt. Such, according to him, are *matter* and *form*; to which ſome add a third, viz. union to connect the two others together. But this is only neceſſary upon ſuppoſition of ſubſtantial forms.

Principles are uſually confounded with *elements*; yet is there a real difference: elements are properly the firſt and ſimpleſt beings, ariſing from the firſt determination or aſſemblage of *principles*. They are the ſimpleſt things in which matter and form are combined. Elements and *principles*, therefore, differ in this, that a *principle*, as matter, is only a begun, not a complete nature; but an element is perfect and complete.

Some ancient philoſophers diſtinguiſhed between *principles*, αρχαι, and elements, ϛοιχεια.

Principles, according to them, were neither compoſed nor produced; but the elements were complex or compounded beings. Plutarch, ap. Eller. in Mem. de l'Acad. Berlin. 1746.

It would be endleſs to enumerate all the opinions of philoſophers concerning the elements of bodies. A late author has given us a ſummary of many of theſe opinions; and, laſtly, adds his own, that fire and water are the only things which properly deſerve the name of elements, or *principles* of natural bodies; fire being the active, and water the paſſive *principle*. According to him, water is convertible into air, and into earth, by means of fire. Hence the four, vulgarly called elements, may be reduced to two. He endeavours to eſtabliſh his doctrine on the experiments of Boyle, Hales, and Muſchenbroek. See ELEMENTS.

To this head may likewiſe be referred what we call *mechanical principles of bodies*, which ſerve to account for the mechaniſm or artificial ſtructure of things, and all the varieties and differences of bodies from motion, figure, and other common affections.

Theſe *principles* are differently maintained by three or four different ſects of philoſophers; viz. the ancient Epicureans, or Corpuſcularians, to whom may be added the modern Gaſſendiſts, the Carteſians, and the Newtonians.

PRINCIPLES, in *Chemiſtry*, are the firſt and ſimpleſt parts whereof natural bodies are compounded, and into which they are again reſolvable by fire, &c.

Theſe are more properly, as well as more commonly, called ELEMENTS.

In each ſchool of philoſophy among the ancients, very different opinions prevailed concerning theſe *principles*; ſome of them admitting only one, and others more. Some contending for earth, and others for fire. Nor were the notions of the chemiſts of the middle ages, or about the time of Paracelſus, more clear and ſatisfactory. They admitted five *principles* of bodies, which they call mercury or ſpirit, phlegm or water, ſulphur or oil, ſalt, and earth. But it has been found by later experiments, that ſome of theſe *principles* are more ſimple than others; and, therefore, Beccher attempted to reduce their number, and eſtabliſhed only two general *principles* of all bodies, viz. water and earth; extending the term earth to that which is vitrifiable, and which he conceived to be the *principle* of the fixity, ſolidity, and hardneſs of bodies; to that which is inflammable, and to which he aſcribed the inflammability of all inflammable bodies; and to that which he called *mercurial* EARTH.

This theory has been farther illuſtrated and extended by Stahl, who ſhewed, that water and vitrifiable earth enter as elements into the compoſition of many bodies; but the other two *principles* of Beccher, viz. the mercurial earth and the inflammable earth, have not yet been expoſed to our ſenſes ſingle and pure: however the exiſtence of the latter is ſufficiently aſcertained (ſee PHLOGISTON), but that of the latter is not ſatisfactorily demonſtrated.

That earth, water, and fire enter into the compoſition of bodies as *principles*, may be conſidered now as demonſtrated by Beccher and Stahl: and the experiments of Boyle, Hales, Prieſtley, &c. ſufficiently prove that air enters into the compoſition of many bodies as a *principle*. So that the chemiſts generally admit the four *principles* of Ariſtotle, viz. fire, air, water, and earth. In whatever manner bodies are decompoſed, we always obtain theſe ſubſtances; and they are the utmoſt limits of chemical analyſis. Theſe are, therefore, called *primary principles* or ELEMENTS.

Secondary principles are thoſe which reſult immediately from the union of primary *principles*.

Principles of the third order are thoſe which are compoſed of ſecondary *principles*, &c. Thus, NITRE is a compound of the acid called nitrous, and of the fixed vegetable alkali, combined and ſaturated together: by a firſt analyſis of nitre, we obtain this acid and this alkali, which are, therefore, the proximate *principles* of nitre. But neither of theſe are ſimple ſubſtances. By a farther analyſis of each of theſe, they may be decompoſed into water, earth, and fire, or the inflammable *principle*: and theſe may be conſidered as primary *principles*; but the acid and alkali are ſecondary *principles*. The water, earth, and fire are the remote *principles* of the nitre. Dict. Chem. Eng. edit. art. *Principles*. See alſo Geoffroy's Tracts, p. 5, &c.

PRINCIPLE, *inflammable*. See PHLOGISTON.

PRINCIPLE, *original*, *principium originale*, a name given by Tachenius and ſome other authors, to ſalt, without conſidering it as acid, alkali, or of any other particular kind, or any mode of exiſtence. But many others allow this name only to water, or at leaſt that water is, in almoſt all natural bodies, the moſt copious, the moſt active, and the moſt influencing part; yet even this is found to agree much better with ſome bodies than with others. See *Generation and Food of* PLANTS.

PRINCIPLES, among *Hermetic Philoſophers*. According to theſe gentlemen, the two *univerſal principles* of ſenſible nature, are ſubtile and ſolid; which, being joined in a greater or leſs degree, generate all that beautiful variety of beings in the univerſe.

The three *natural principles* are ſalt, ſulphur, and mercury. Theſe *principles* generate the four elements; and are, as it were, ſecondary elements, inaſmuch as they are contained in all mixed bodies. Sulphur is the firſt, and ſtands in the place of male; mercury the ſecond, ſtanding in the place of female; and ſalt the third, which copulates the others together. Dict. Hermet.

PRINCIPLE is alſo applied to the foundations of arts and ſciences. In this ſenſe we ſay, *principles* are not to be proved; they muſt be common notions.

There is no diſputing againſt a man that denies *principles*: the worſt reaſoning is that which includes a *petitio principii*; i. e. which ſuppoſes a *principle* that ought to be proved.

PRINCIPLE is alſo applied by extenſion to the firſt rules or maxims of an art.

In this ſenſe we ſay, a man is ignorant of the *principles* of geometry; meaning, he has not learnt Euclid's Elements. The *principles* of moſt arts and ſciences are found in this Dictionary, under their reſpective heads.

PRINOS, in *Botany*. See WINTER *Berry*.

PRINTS, *property of*. See LITERARY *Property*, and ENGRAVER.

PRINTER, *typographus*, a perſon who compoſes, and takes impreſſions, from moveable characters, ranged in order, or from plates engraven, by means of ink and a preſs.

Laurentius called Coſter, Geinsfleich, Fauſt, Guttenberg, Schoeffer, Mentel, and Eggelſtein, were the *firſt printers*. The firſt that practiſed it in England was Fred. Corſellis, brought over from Haerlem, under king Henry VI. in France, Uldric Gering, Martin Crantz, and Michael Friburgher; at Augſburg, John Bemler; at Rome, Conrad Sweynheim, and Arnold Pannartz, Germans; at Venice, the two brothers John and Vindelin of Spire, Nicholas Jenſon, and John de Cologn; at Florence, Bernard Cennini; at Naples, Sixtus Ruſinger.

The *great printers* were Aldus of Venice, and his ſon, Paulus Manutius; the two Badii; William and Frederic Morel; Oporin; Frobenius; Rob. Hen. and Charles Stephens; Gryphius, Turnebus, Torres, Commelin, Plantin, Raphelengius, Vaſcoſan, Bleau, Criſpin, and the two Elzevirs.

The *learned printers* were the Manutii, Amerbach, and Froben, of Baſil, the Stephens's, the Badii, Turnebus, Wechel, Morel, Juntæ, &c.

Plantin had the title of *arch-printer*, *architypographus*, given him by the king of Spain, in conſideration of his printing the Polyglot of Antwerp.

The names, characters, and elogies of all the famous *printers* are found in part II. of the firſt tome of the Jugemens de Scavans.

The *printers*, ſince the eſtabliſhment of that art, are eſteemed a part of the company of ſtationers and bookſellers; before that eſtabliſhment, the company conſiſted only of bookſellers, binders, writers, illuminers, and parchment-makers. The *parchment-makers* prepared the ſkins, and made the parchment or vellom; which were then almoſt the only matters books were written on. The *writers*, or *copyiſts*, wrote and tranſcribed books after copies given them by the bookſellers. The *binders* were charged with the binding of thoſe days, which was very coarſe, only conſiſting of two ſlight boards covered with ſome paltry leather. The *illuminers* painted in miniature, and gilt initial letters, head-pieces, tail-pieces, and other compartiments. Laſtly, the *ſtationers* or *bookſellers* ſet the *writers* to work, and ſold their copies in ſhops, and other places, on the days allowed them by the ſtatutes to expoſe the ſame.

PRINTING, *typographia*, the art of taking impreſſions with ink, from characters and figures moveable or immoveable, upon paper, vellom, or the like matter.

There are two kinds of *printing*; the one for books, the other from copper-plates, for pictures. The firſt called *common preſs printing*, the ſecond *rolling preſs printing*.

The prime difference between the two conſiſts in this, that the characters of the former are caſt in RELIEVO, and thoſe of the latter are engraven in CREUX.

The art of *printing* is a modern invention: it is, indeed, of a very ancient ſtanding among the Chineſe; but then their *printing* is very different from our's. It muſt be owned, the European *printing*, in its original, was much the ſame with the Chineſe; yet, as there was at that time no commerce or correſpondence between Europe and China, the paſſage into the Eaſt by the cape of Good Hope being as yet undiſcovered by the Portugueſe, there is no room to charge the Europeans with borrowing their art from the Chineſe: but each muſt be owned to have fallen on the ſame thing, though at very different times. Father Couplet aſſures us, that *printing* has been in uſe in China from the year 930. Father le Compte ſpeaks more largely; ſaying, that it has been there from almoſt all ages: he adds, that there is this difference between their's and ours, that whereas we have but a very ſmall number of letters in our alphabets, and by the various arrangement of theſe, are able to form infinite volumes; we have the advantage, by making our characters moveable, to print the largeſt works with an inconſiderable quantity of letter; thoſe that ſerved for the firſt ſheets, ſerving over again for the ſucceeding ones: the Chineſe, on the contrary, by reaſon of the prodigious number of their letters, are precluded this reſource; and find it more eaſy, and leſs expenſive to cut all their letters on wooden blocks; and thus to make as many blocks as there are pages in a book; and theſe of no farther uſe but for that ſingle work. *Their method of* printing *ſee hereafter*.

PRINTING, *origin of*. Who the firſt inventors of the *European printing* were, in what city, and what year, it was at firſt ſet on foot, is a famous problem long diſputed among the learned. In effect, as the Grecian cities contended for the birth of Homer, ſo do the German cities for that of *printing*,

Mentz, Haerlem, and Straſburgh, are the warmeſt on this point of honour: Italy alſo would have entered the liſts; but the ſuffrages being at firſt divided between the firſt three pretenders, they are left in poſſeſſion of the queſtion, which, in reality, is not yet juſtly decided; though it muſt be owned, Mentz has always had the majority of voices.

We ſhall not here enter into a nice diſquiſition of the merits of the cauſe, but only propoſe the pretenſions of each. John Mentel of Straſburgh, John Guttenberg and John Fauſt of Mentz, and L. John Coſter of Haerlem, are the perſons to whom this honour is ſeverally aſcribed by their reſpective countrymen; and they have all their advocates among the learned. Mentel, a phyſician of Paris, enters the liſts in behalf of his nameſake of Straſburg; and contends that it was he who firſt invented *printing* in the year 1440, and that, in conſideration hereof, the emperor Frederic III. gave him a coat of arms correſponding thereto, in the year 1466. He adds, that Guttenberg, whom he had taken in as a partner, or aſſociate, carried it to Mentz, where he took in Fauſt a partner. John Gensfleiſch, a native of Mentz, who was his ſervant, communicated the art to J. Guttenberg, whom Mentel had employed in making ſome of his tools; and becoming thus poſſeſſed of the art, they removed and ſettled at Mentz, where it was perfected by the aſſiſtance of John Fauſt. But this account depends on a Straſburgh chronicle of very doubtful authority, and is contradicted by the chronicle of Cologne, Trithemius, and Wimpeling. The laſt mentioned writer expreſsly ſays, that the art of *printing* was invented, incompletely, at Straſburgh, by Guttenberg, and perfected at Mentz. Here Mentel acquired it from Guttenberg and Fauſt, and returning to Straſburgh about the year 1455, practiſed it in connection with Eggelſtein.

The Haerlemers, with Boxhornius, Scriverius, &c. refer the firſt invention to Laurens Janzs Coſter, or Laurence John Coſter, (called Coſter on account of the public office diſtinguiſhed by this appellation, which he ſuſtained at Haerlem, and which was hereditary in his family), of Haerlem, in the year 1430, adding, that his aſſociate Guttenberg ſtole away his tools while he was at church, and carried them to Mentz, where he ſet up for the firſt inventor; though others attribute this theft, &c. to his partner Fauſt. And others, again, with greater probability, aſcribe it to John Gensfleiſch ſenior, one of his ſervants, in the year 1441: and with theſe types, &c. of Laurence, two ſmall works were printed at Mentz in 1442. The principal evidence in favour of Haerlem, is Cornelius, who had been a ſervant of Laurence, and afterwards a book-binder in that city, on whoſe authority Adrian Junius, M. D. founds his account; which appears to have been drawn up between the years 1562 and 1575, and publiſhed at Leyden in 1588. The learned Meerman, in his Origines Typographicæ, 1765, has amply vindicated and confirmed the account which Junius gives of the fact; though he diſputes and ſufficiently invalidates what this writer ſays, as to the types which were uſed by Coſter, at Haerlem. Theſe he ſhews, were neither cut nor fuſible metal types, but ſeparate wooden types.

Munſter, Polydore Virgil, Paſquier, &c. will have Guttenburg, or Guttemburgh, to have really been the inventor of *printing*: and add, that he took in Fauſt and Schoeffer for aſſociates.

Naude, in his Maſcurat, eſpouſes the cauſe of Fuſt, or Fauſt, or Fauſtus; and will have him to be the firſt *printer* in Europe, and that he took in Guttenberg for a partner. His reaſon for putting Fauſt in poſſeſſion of this privilege, is, that the firſt books that were printed, appear to have been all of his impreſſion. To this purpoſe it is alledged that it is more than probable, if Guttenberg or Coſter had had a greater or an equal ſhare in the invention, they would not have allowed him to attribute the whole to himſelf and his ſon-in-law Schoeffer, as he has done, without ever offering to do the like, or in the leaſt contradicting him, and aſſerting their own right.

The true ſtate of the caſe ſeems to be this, that metal types were firſt invented at Mentz; of theſe there were two ſorts, viz. thoſe that were cut, and thoſe that were caſt in matrices. The invention of the former has been aſcribed by ſome writers to Fauſt, but without ſufficient authority; the real inventor being John Gensfleiſch, ſenior, who had brought the art of *printing* with wooden types from Haerlem to Mentz, with whom John Gensfleiſch junior, called Guttenberg, might probably have concurred. The æra of this invention muſt be about the year 1442 or 1443; for John Gensfleiſch ſenior, came to Mentz in 1441, and the Latin Bible with metal types, was printed in 1450, which could not require leſs than ſeven or eight years.

The latter were invented by Peter Schoeffer, the ſervant and ſon in law of Fauſt, who ſettled at Mentz, in the year 1449 or 1450, and having acquired under the two Gensfleiſchs the art of cutting types, remedied the inconvenience of this method by contriving to caſt them, which muſt have been practiſed before the year 1459. The partnerſhip that ſubſiſted between Gensfleiſch and Fauſt, and the relation between Schoeffer and Fauſt, have probably given occaſion for aſcribing to him the merit of the invention of *printing* with metal types, in which from connections of this kind he probably might have had ſome concern.

The editions above referred to in Naude's account are 1. The Codex Pſalmorium, printed in 1457, which is the moſt ancient book known to be printed with a date or inſcription, and is lodged in the emperor's library at Vienna. 2. The Rationale Divinorum Officiorum, of William Durand, printed at Mentz, in 1459, in folio. This *Rationale* is in the earl of Pembroke's library. Malinkrot has erroneouſly ſuppoſed this to be the firſt printed book. 3. The Catholicon Januenſis, dated in 1460, and now in the king's library. Fauſt's name, indeed, is not to this; but it is perfectly like the following ones where it is. It is ſaid that the firſt printers did not ſubjoin their names and inſcriptions at the end of their books till the year 1457: and this they continued to do till Fauſt either died or left off buſineſs. 4. The Latin Bible of 1462, being the ſecond edition of it, now in the French king's library. 5. Tully's Offices, in quarto, (the reſt being all folio's) in the year 1465, and 1466, for there are copies in the Bodleian, and the library of Corpus Chriſti college, Oxon, of both theſe dates. Some eminent writers have aſſerted that this is the firſt printed book. 6. Other Bibles of 1471. 7. St. Auguſtine Civitate Dei, 1473. 8. Mercurius Triſmegiſtus de Poteſtate & Sapientia Dei, in 1503. 9. Titus Livius, in 1518, &c.

Add to this, that at the end of Livy is a privilege granted by the emperor Maximilian to Schoeffer, grandſon of Fauſt, for the ſole power of *printing* that author for ten years; and for ſix years, to all the other books he ſhould print thereafter; in conſideration of Fauſt's having invented the art of *printing*. This privilege is dated 1518, and ſigned Jac. Spiegel.

Eraſmus, however, in the epiſtle after that privilege, does not poſitively aver the fact; he only obſerves, that the firſt, or the chief inventor of that art, is held to be J. Fauſt. In the advertiſement to the ſaid book, Nic. Carbachius ſpeaks to the ſame effect as to the privilege, and Eraſmus.

As to Guttenberg, Mentel, and Caſtor, Naude obſerves, the perſon is not yet born that can ſay he has ever ſeen books printed by any of them, before or as early as, thoſe of Fauſt. All that is urged on their behalf, is only founded on reports, conjectures, probabilities, forged authorities, and the jealouſies of cities againſt one another.

Yet Salmuth, in his additions to Pancirollus, cites a public act, whereby it appears that Fauſt, after having invented *printing*, and ſuſtained it a long time on his own footing; at length took in Guttenberg as partner, to contribute to the expence; which was very great, by reaſon the firſt books was moſt of them printed on vellom, or at leaſt on parchment, and after the Chineſe way.

But the cauſe is not thus decided: the advocates for Coſter urge divers things, which ſeem to put him in the place here aſſigned to Fauſt. Mr. Ellis, in the Philoſophical Tranſactions, fathers books on him prior to any of thoſe above referred to Fauſt; and even ſome as early as 1430 and 1432. It is certain, the Haerlemers ſhew printed books of that date, which agreeing ſo well with the account given by Theod. Scriverius, and others, leaves Mr. Ellis little room to doubt, whether the honour of the invention be his or the other's due. All that belongs to Fauſt, according to this writer, is the honour of eſtabliſhing the art in greater luſtre and perfection at another place many years after.

But the difficulty lies, either in ſhewing why the practice ſhould be at a ſtand from 1432, to the reviving of it at Mentz by Fauſt and Schoeffer, in 1465, or elſe in giving ſome account of the condition and progreſs of this invention during that interval.

Now, Boxhornius, Scriverius, and other authors, expreſly affirm, that ſo large a work as the De Spiegel, Speculum Salutus, of Coſter, ſhewn at Haerliem for the firſt printed book, could never be his firſt eſſay: he muſt have had the art in its rougher rudiments before, and have made many trials on leſs works: no doubt his firſt attempts were on looſe ſheets, which we may ſuppoſe were eaſily loſt. In effect, it muſt be allowed no inconſiderable argument in Coſter's behalf that the rudeſt and moſt artleſs performances ſeems to be his. Mr. Ellis mentions ſome things of this kind without date, which he had ſeen in the king's library at St. James's, in that of Bennet college and the Bodleian at Oxford, with all the marks of the utmoſt ſimplicity, and which might fairly bid for firſt eſſays. There is ſomething ſo aukward and coarſe in them, that any body almoſt might have done them; mere nature being ſufficient, without any art or experience at all. The ink was only common writing ink, unartfully ſpread upon wooden blocks, very clumſily cut, &c.

By this time we have traced up the art to ſuch a ſtate, that it may, perhaps, ſcarce ſeem worth the conteſting who it was invented it; and no doubt, *printing*, as it now ſtands, owes more to the genius and addreſs of ſome of the later improvers than it did to its firſt author.

The ſame conſideration may make us more eaſy under our preſent ignorance of the inventors of moſt other arts; many of which had ſuch ſimple unmeaning originals, that it might perhaps be no mighty credit to be eſteemed the authors of inventions nothing leſs artful and ingenious.

We ſhall conclude this account of the origin of *printing* with an abridgment of the hiſtory of it, given by the late Mr. Bowyer. This writer obſerves, that the honour of having given riſe to this art has been claimed by the cities of Haerlem, Mentz, and Straſburgh. To each of theſe cities it may be aſcribed in a qualified ſenſe, as they made improvements upon one another. But the real inventor of *printing* was Laurentius, of Haerlem; who proceeded, however, no farther than to ſeparate wooden types. His firſt eſſay was about the year 1430; and he died about 1440, after having printed the Horarium, the Speculum Belgicum, and two different editions of Donatus. Some of Laurentius's types were ſtolen from him by one of his ſervants, John Gensfleiſch, ſenior, who became the firſt printer in Mentz, and publiſhed in 1442, Alexandri Gali Doctrinale, and Petri-Hiſpani Tractatus. Theſe works were executed with wooden types, cut after the model of thoſe which he had ſtolen. In 1443, Gensfleiſch ſenior entered into partnerſhip with Fauſt (who ſupplied money), Meidenbachius, and others; and in 1444, they were joined by John Gensfleiſch junior, who was diſtinguiſhed by the name of Guttenberg. Guttenberg, by the aſſiſtance of his brother, Gensfleiſch the elder, firſt invented cut metal types, with which was printed the earlieſt edition of the Bible. This edition appeared in 1450, and the completing of it took up ſeven or eight years. Guttenberg uſed none but either wooden or cut metal types. The carrying of the art to perfection was owing to Peter Schoeffer, the ſervant and ſon-in-law of Fauſt, who invented the mode of caſting the types in matrices; and who was probably the firſt engraver on copper-plates. The firſt book printed with the improved types was Durandi Rationale, in 1459. More copies of the earlieſt books were printed on vellom than on paper. This method, however, was ſoon changed; and paper was introduced for the greateſt part of the impreſſions, a few only being printed on vellom, for curioſities, and for the purpoſe of being illuminated.

With regard to the claim of Straſburgh, it appears, that Guttenberg had endeavoured to introduce *printing* into that city before he joined his brother at Mentz; but without ſucceſs. The firſt actual printers at Straſburgh were Mentelius and Egleſtenius; and there is no certain proof of a ſingle book having been printed there, till after 1462. The diſperſion of the Mentz printers, in that year, occaſioned the art to ſpread rapidly through Europe; and in 1490 it reached even to Conſtantinople. Thoſe who wiſh to ſee this ſubject farther diſcuſſed, and to find the authorities on which this abſtract of the riſe of *printing* is founded may conſult Meerman's Origines Typographicæ, quarto, 1765, and Bowyer's Origin of *Printing*, edit. 2.

PRINTING, *progreſs of.* The firſt printers, then, whoever they were, made their firſt eſſays on wooden blocks, or forms, after the Chineſe manner.

It is not improbable, ſays Mr. Bagford, they might take the hint from ancient medals and ſeals. To this purpoſe, it is obſerved, that the arts and ſciences, eſpecially ſtatuary and ſculpture, were arrived at ſo great perfection among the Romans, at the time when that empire was in its greateſt glory, that it is much to be wondered at that the art of *printing* was not found out among them; an art ſo nearly allied to that of the cutting of ſeals and the dies of medals.

The making of theſe dies, and the ſtamping of their coins with them, was, in reality, no other than *printing* on metal; and their impreſſing their ſeals, cut in cornelians, agates, &c. on wax, was another ſpecies of *printing* on this ſubſtance. And finally, a third ſort of *printing* among them, was the impreſſing the name of the workmen on their pieces of fine earthen-ware.

Montfaucon, in his Antiquities, gives the figures and deſcriptions of ſeveral very large ſigilla of the Romans, in which the names were all cut in hollow, in capital letters; and he imagines, that the uſe of theſe was to mark large earthen veſſels with, while the clay was ſoft, and particularly thoſe large veſſels in which the Romans kept their wines. It does not ſeem that this diligent enquirer into antiquity ever met with any of theſe ſigilla with the letters or characters in relief, or ſtanding out in the manner of our modern types for *printing*, ſince he mentions none ſuch; yet the remains of the Roman antiquities in terra cotta, or earthen-ware, ſhew that they had ſome ſuch, though they were leſs common than the others; theſe veſſels ſometimes being marked with letters going in, though in general they have them all ſtanding out, as muſt be the caſe when the impreſſion was given from a ſigillum cut in creux.

There is now, in the collection of the duke of Richmond, a ſigillum of the other more rare kind, which brings the diſcovery very near to that of *printing*: on this all the letters are raiſed, as is alſo the verge or rim of the ſeal in the manner of our types uſed this day in *printing*. The ſtamp is made of true ancient braſs, and has on it the common green coat of ærugo, which diſtinguiſhes the true antique medals. The plate is near two inches long, and near an inch in breadth, and has on the back part a ring for the convenience of holding it for making the impreſſion. The letters ſtand in two rows; they are the common Roman capitals, very well made, and their faces all ſtand exactly on the level with one another, and with the ſurface of the verge of the ſeal. This ſeal was exactly of the nature of our method of *printing* ſo many letters at once. It contains the name of one Caius Julius Cæcilius Hermias, ſome private man, as we have no account of any perſon of this name upon record. It ſerved him probably to ſet his name to any thing, to ſave him the trouble of writing; and the name being that of ſome private man ſeems alſo to prove, that theſe ſigilla were very common among that people. It was evidently made to be uſed on parchment, or ſome other ſuch thin ſubſtance; and the manner of uſing it muſt have been by firſt dipping into ink, or ſome other coloured matter, not plunging it ſo far as to touch the ground, ſo that the letters only became marked, and gave their figures on the paper. The ground of this ſeal is very rough and uneven, and thence alſo it is plain, that the uſe of it was not to preſs down any ſoft ſubſtance, ſuch as clay, or the like; becauſe the imperfection of the ground would, in that caſe, have been ſeen; whereas in the uſe it was really intended for, the ground never gave any impreſſion, and therefore there was no reaſon for beſtowing any pains on the working it even.

The firſt uſe of *printing* among the later ages, was by wooden blocks in this very manner; and it was not till long after this invention; that we learned the way of uſing ſeparate types for the letters; and theſe were then called *typi mobiles*, in opoſition to the blocks, where the whole page was contained together, which was called *typi fixi*. This ſignet of the duke of Richmond's, which was found near Rome, is truly and properly one of thoſe *typi fixi*, and prints off its impreſſion on paper with our modern printer's ink, as well as any ſet of letters cut in this manner can be expected to perform. This ſeems, therefore, the moſt ancient ſample of *printing* that we know of: for, by the appearance of the metal, it ſeems to be of the Higher Empire.

It is plain, by this ſtamp, that the very eſſence of *printing* was known to the Romans; for they had nothing to do, but to have made a ſtamp, with lines three or four times as long, and containing twenty lines inſtead of two, to have formed a frame of types that would have *printed* a whole page as Coſter's wooden blocks, uſed in *printing* the book called Speculum Salutis, which as ſome ſay, is the firſt book *printed*, in the year 1440, and conſiſting of pictures of ſtories out of the Bible, with ſome of the verſes underneath each page; being *printed* from a block of wood, like a wooden cut. This was the firſt eſſay of fixed types, from which the moveable, or common ſeparate types were ſoon deduced; and it ſeems ſtrange that the Romans, who were as ſagacious a people as any in the world, ſhould not as eaſily have fallen upon the uſe of ſeparate types, in which the whole art of modern *printing* conſiſts, from ſuch ſignets as theſe, as the later ages from Coſter's wooden blocks, which were plainly no other than larger works of the ſame kind.

Cicero, in his book de Natura Deorum, has a paſſage from which Toland ſuppoſes that the moderns took the hint of *printing*. That author orders the types to be made of metal, and calls them *formæ literarum*, the very words uſed by the firſt printers to expreſs them. It is plain from Virgil, that brands, with letters of the owner's name, were in uſe in his time for the marking of cattle. And we have an account of the ſame artifice that is now uſed for the painting of cards being uſed by the emperor Juſtin, who could not write. There was a ſmooth board, with holes cut through it, in form of the letters of his name; and when he had occaſion to ſign any thing, this was laid on the paper, and he marked the letters with a pen or ſtylus dipped in red ink and directed through the holes. Philoſ. Tranſ. N° 479, p. 393.

But others rather imagine the art of *printing* to have come from the method of making playing cards, which, it is certain, bear a nearer reſemblance to the primitive proceſs of *printing* than ſeals; as appears from the firſt ſpecimens of that art above mentioned.

The book at Haerlem, the vocabulary called Catholicon, and the pieces in the Bodleian and Bennet collage, are all performed in this way; and the impreſſion appears to have been given on one ſide the leaves; after which the two blank ſides were paſted together.

But they ſoon found the inconveniencies of this method, and therefore bethought themſelves of an improvement; which was by making ſingle movable letters, diſtinct from one another.

Theſe being firſt done in wood, gave room for a ſecond improvement; which was the making of them, at length of metal; and in order to that, cutting moulds, matrices, &c. for caſting them.

From this ingenious contrivance we ought to date the origin of the preſent art of *printing*, as practiſed throughout Europe; contradiſtinguiſhed from the methods of the Chineſe abroard, and the card-makers at home, which were the ſame art, only practiſed in a different place, or with a different view.

And of this, Schoeffer, or Scheffer, firſt ſervant, and afterwards partner, and ſon-in-law of Fauſt, at Mentz, above mentioned, is pretty generally allowed the inventor; ſo that he was properly the firſt printer with fuſile types.

But the art being yet in its infancy, there were ſome imperfections in the books they printed; among the reſt was the want of capital letters: hence they left the places of the initial letters blank, and gave them to the illuminers to paint in gold, or azure, though others ſay, this was done deſignedly, to enable them to paſs off their books for manuſcripts.

Some authors tells us, that Fauſt carrying a parcel of his Bibles to Paris, and offering them to ſale as MSS. the French, upon conſidering the number of books, and their exact conformity with one another, even to a point, and that the beſt book-writers could not be near ſo exact, concluded there was witchcraft in the caſe; and, by either actually indicting him as a conjuror, or threatening to do ſo, extorted the ſecret. And thence the origin of the popular ſtory of Dr. Fauſtus.

From Mentz, about the year 1462, when it was taken, plundered, and deprived of all its former rights and franchiſes, the art of *printing* ſoon ſpread itſelf throughout a good part of Europe; Haerlem and Straſburgh had it very early; which, as authors repreſent it, occaſioned their pretending to the honour of the invention.

From Haerlem it paſſed to Rome in 1466, where the Roman type was introduced in 1467, which was ſoon after brought to great perfection; and into England in the reign of Henry VI. by means of Thomas Bourchier, archbiſhop of Canterbury, who ſent R. Tournour, maſter of the robes, and W. Caxton, merchant, to Haerlem, to learn the art. Theſe privately prevailing with Corſellis, an under-workman, to come over, a preſs was ſet up at Oxford.

This account depends on the authority of an old manuſcript chronicle, ſaid to be preſerved in the archbiſhop's palace, and cited by Atkins, in his Original and Growth of *Printing* in England, publiſhed at London, in 1664. This chronicle informs us, that the execution of the buſineſs intruſted with Tournour and Caxton, coſt fifteen hundred marks; and that *printing* was ſet up at Oxford before there was any *printing*-preſs or printer in France, Spain, Italy, or Germany, except the city of Mentz, which claims ſeniority as to *printing* even of Haerlem itſelf, calling herſelf *Urbem Moguntinam artis typographicæ inventricem primam*; though it is known to be otherwiſe, that city (as the chronicle adds) gaining that art by the brother of one of the workmen at Haerlem, who had learned it at home of his brother, and afterwards ſet up for himſelf at Mentz. This preſs at Oxford was at leaſt ten years before there was any *printing* in Europe (except at Haerlem and Mentz), where alſo it was but new-born. This preſs at Oxford was afterwards found inconvenient to be the ſole *printing* place in England, as being too far from London and the ſea; whereupon the king ſet up a preſs at St. Alban's, and another at the abby of Weſtminſter. But the authority of this chronicle has been warmly diſputed by Mr. Palmer in his Hiſtory of *printing*, 1733, book iii. Dr. Ducarel, in his letter to Meerman, Dr. Middleton, Ames, and others, who maintain that there was no *printing* in this kingdom till the introduction of it by Caxton, who had acquired it in his travels abroad, about the year 1474, or as ſome ſay, 1470 or 1471.

But Mr. Bowyer, in his notes to the Abridgement of Dr. Middleton's Diſſertation on the Origin of *Printing* in England, hath offered ſeveral reaſons to ſhew, that the account given in Atkins's record is not ſo incredible or improbable as ſome perſons have imagined.

Mr. Meerman, in his learned work already cited, is a ſtrenuous advocate for the authenticity of this record: and he apprehends that the period, to which this hiſtory relates, muſt have been between the years 1454 and 1459; becauſe Bourchier was made archbiſhop of Canterbury in 1454, and Edward IV. ſucceeded Henry VI. in 1460. This accurate writer has produced a variety of evidence in ſupport of the claims of Corſellis, for which we muſt refer to his elaborate work, and particularly to his latter in reply to Ducarel, tom. ii. p. 19 &c. and to Mr. Bowyer, ubi ſupra; which evidence derives much confirmation from a book with a date of its impreſſion from Oxford, anno 1468, copies of which are in ſeveral public libraries, particularly at Cambridge, Oxford, lord Pembroke's library, &c. This is a ſmall volume of forty-one leaves in quarto, with this title; "Expoſitio Sancti Jeronimi in Symbolum Apoſtolorum ad Papam Laurentium," and at the end are the following words, "Explicit Expoſitio, &c. impreſſa Oxoniæ & finita, Anno Domini MCCCCLXVIII. XVII die Decembris."

If the authority of this book be admitted, it is a clear proof and monument of the exerciſe of *printing* in Oxford ſeveral years before Caxton began to deal in it. Dr. Middleton, indeed, endeavours to ſhew, that the date is a falſe one; and, not to mention the reſt of his arguments, confirms his opinion from this circumſtance, that we have no other fruit or production from the preſs at Oxford for eleven years next following. But this objection is invalidated by two conſiderations; firſt, that Corſellis's books may have been loſt, a thing by no means uncommon in thoſe days of ignorance; and, ſecondly, that the civil wars broke out in 1469, which might probably oblige our Oxford printer to ſhut up his preſs.

Mr. Bowyer produces a paſſage from the ſecond part of Shakſpeare's Henry the Sixth, as a farther evidence of a more early introduction of *printing* into England than hath generally been ſuppoſed. See alſo Meerman ubi ſupra, monitum noviſſimum, prefixed to tom. ii.

The reſult of the whole is, that this fact doth not at all derogate from the honour of Caxton, who was the firſt perſon in England that practiſed the art of *printing* with fuſile types, and conſequently the firſt who brought it to perfection: whereas Corſeillis printed with ſeparate cut types in wood, being the only method which he had learnt at Haerlem.

In 1467, *printing* was ſet up in the city of Tours; at Reuthlingen and Venice in 1469; and probably in the ſame or next year at Paris, where Gering, Crantz, and Friburger, all Germans, invited thither by two doctors of the Sorbonne, ſet up a preſs in that learned houſe.

Hitherto there had been nothing printed but in Latin, and the vulgar tongues; and this firſt in Roman characters, then in the Gothic, and at laſt in Italic. But in 1480, or, as ſome ſay, in 1476, the Italians caſt a ſet of Greek types; and it was at Venice, or, as ſome ſay, at Milan or Florence, that the firſt editions in that language appeared.

Here we may obſerve, that the firſt Greek *printing* was a few ſentences of Tully's Offices at Mentz, in 1465, which were very incorrect. In the ſame year, ſome Greek quotations in an edition of Lactantius's inſtitutes, were neatly printed, in a monaſtery, in the kingdom of Naples. The firſt whole Greek book was the Grammar of Conſtantine Laſcaris, at Milan, in 1476. See Bowyer, ubi ſupra, Appendix, N° 1; or the excellent edition of the Biographia Brittannica, by Dr. Kippis, art. *Atkins*, note (A).

The Italians too have the honour of the firſt Hebrew editions, which were printed about the ſame time with the Greek, at Soncino, a little city in the duchy of Milan; under the direction of two Jewiſh rabbins, Joſhua and Moſes, whoſe works are dated in the year of the world 5244, anſwering to the year 1484 of the Chriſtian æra.

Towards the end of the ſixteenth century, there appeared various editions of books in Syriac, Arabic, Perſian, Armenian, Coptic or Egyptian characters; ſome to gratify the curioſity of the learned, and others for the liturgic uſes of the Chriſtians in the Levant: theſe were printed chiefly at Paris; whither puncheons and matrices were ſent from Conſtantinople by M. Savary, then ambaſſador at the Porte.

Out of Europe, the art of *printing* has been carried into the three other quarters of the world: for Aſia, we ſee impreſſions of books at Goa, and in the Philippines; at Lima, Boſton, Mexico, &c. for America; and at Morocco for Africa.

The Turks, indeed, are ſaid rigorouſly to prohibit *printing* throughout their empire, as imagining that the too free communication with books might occaſion ſome change in religion or government, but this is to be underſtood with ſome limitation: and it is certain that the Jews have ſeveral editions of their books printed at Conſtantinople, Theſſalonica, &c.

PRINTING, *method of*. For the *printing* letters ſee the annexed Specimen.

For the method of forming and caſting them, ſee *Letter* FOUNDERY.

And for the art of engraving the puncheons, matrices, &c. in order thereto, under the articles ENGRAVING, PUNCHEON, MATRICE, &c.

The workmen employed in the art of *printing* are of two kinds; *compoſitors*, who range and diſpoſe the letters into words, lines, paſſages, &c. according to the copy delivered them by the author, and *preſſmen*, who apply ink upon the ſame, and take off the impreſſion. See COMPOSITION, &c.

Office of the compoſitor. The types, being caſt, &c. are diſtributed, each kind by itſelf among the diviſions of two long wooden frames, an upper and under one, called *caſes*; each of which is divided into little cells, or boxes, of different ſizes.

The boxes of the upper caſes are in number ninety-eight; and in theſe are diſpoſed the capitals, ſmall capitals, accented letters, &c. In the cells of the lower caſe, which are fifty-four, are diſpoſed the common running letters, with the points, commas, ſpaces, quadrats, &c.

Each CASE is placed a little aſlope, like a reading-deſk, that the operator may reach the upper boxes the better, and be in leſs danger of mixing the letters by ſtretching his arm over them.

The compoſitor's poſt is againſt the middle of the caſe, and he works ſtanding, holding an inſtrument, uſually made of iron, called the *compoſing-ſtick*, in one hand; with the other he takes the types as he needs them, out of the boxes; ranges them on a ſlip of braſs, called a *rule*, in his compoſing-ſtick; and, putting a ſpace, to make a blank between each two words, forms one line after another, till the ſtick being full, he empties it out upon another inſtrument called the GALLEY; ſeveral of which ranged and wedged tight in a frame, called a *chaſe*, are ready for the preſs.

This ſhort view of compoſing may need to be farther illuſtrated and inlarged upon. The *compoſing-ſtick*, then (repreſented *Tab*. I. MISCELLANY, *fig*. 5.) conſiſts of a plate, or ſlip of iron, braſs, wood, &c. more or leſs broad, and contrived ſo as to be made more or leſs long, according to the width of the page, and the number of lines to be compoſed in it.

From the right ſide of this plate ariſes a ledge *a a*, about half an inch high, running the whole length of the plate, and ſerving to ſuſtain the letters, the ſides of which are to reſt againſt it; from the ſame plate likewiſe ariſe three other leſſer pieces, *b* and *c c*, two of which, *c c*, are contrived to ſlide along it, that, ſo the two pieces may be either approached or withdrawn at pleaſure, to adjuſt the length of the line to the meaſure intended. Add, that where marginal notes, references, &c. are required in a work, the two ſliding pieces *c c* are opened in the compoſing-ſtick to a proper diſtance from each other.

Before the workman proceeds to compoſe, a rule, or thin ſlip of braſs plate, cut to the length of the line, and of the ſame height as the latter, is placed in the compoſing-ſtick againſt the ledge thereof, for the letter to bear immediately againſt.

Things thus prepared, the compoſitor having the copy lying before him, and the ſtick in his left hand, with the right he picks up the letters, ſpaces, &c. and places them againſt the rule; while with the thumb of the left he preſſes them cloſe to the upper ſcrew, or cheek: and thus keeps them tight and ſteady; while the other hand is conſtantly employed in ſetting in more letters; the whole being performed with a degree of expedition and addreſs not eaſy to be imagined.

A line being thus compoſed, if it end with a word or ſyllable, and fill the meaſure, there needs no farther care; otherwiſe more ſpaces are to be put between the ſeveral words to juſtify the lines, i. e. to make the meaſure quite full, ſo that every line may end even; and thus he proceeds to another line.

The ſpaces here uſed are a ſort of blanks, of the like dimenſions as the letters, but leſs high; and whoſe faces, therefore, when ſet, do not appear, nor give any impreſſion. They are of ſeveral kinds, according to the dimenſions of the whites or intervals to be made by them, viz. quadrats, to fill up a break at the end of a paragraph, or the like; m quadrats, which are ſquare, and of the thickneſs of an m, ſerving to make the diſtance after a period, or between ſentence and ſentence; n quadrats, of the thickneſs of an n, to be placed after colons, ſemicolons, and commas; and thick or thin ſpaces, to be uſed between the words in juſtifying, as above.

For marginal notes, in the ſpaces reſerved for them, between the two ſliding-pieces of the compoſing-ſtick, are put little quadrated pieces of metal, called *quotations*; which are juſtified by other ſmaller pieces; a ſlip of ſcaleboard being placed from the top of the page to the bottom, to keep the note and text at due diſtance.

The firſt line being thus completely juſtified, the compoſitor advances to the next; in order to which, he moves the braſs rule from behind the former, and places it before it, and thus compoſes another line againſt it, after the ſame manner as the former: and thus he goes on till his ſtick be full, which he empties into the galley, after the manner following:

Taking the rule from behind the laſt line, he places it before it; and with his two middle fingers ſqueezes the lines in the ſtick cloſe; his two fore-fingers at the ſame time being applied on the outſide of the rule: thus he lifts them out of the ſtick, and clapping his two thumbs behind the firſt line, lifts them into the galley; taking care to diſengage his two thumbs without breaking the lines.

The compoſitor having thus ſet the proper number of lines in the ſtick, viz. four, five, ſix or more, and emptied them out into the galley, he again fills, and empties, as before, till a complete page be formed; remembering at the bottom of every page to ſet a line of quadrats, and at the end thereof the firſt word of the page enſuing, for a catch-word; and, if it be the firſt page of the ſheet, one of the letters for a ſignature.

The GALLEY is a flat wooden inſtrument, in form of a long ſquare; of a length and breadth proportionable to that of the page; it conſiſts of two parts, the upper, called the *ſlice*, whereby the pages of large volumes, when compoſed, are ſlidden upon the ſtone; the other, called the *coffin*, which is the body of the galley, is ledged on three ſides, to contain the ſlice; the inner ledge not to exceed half an inch in height, that the compoſed page riſing above it by one half the height of the letter, may be tied up, or bound down, and removed without danger.

This galley is placed at the top of the caſe, and prevented by a wooden pin from ſliding down the boxes.

The page, then, being compoſed, and ranged in the galley, he ties it up therein with a cord or packthread, and ſets it by, and proceeds to the next, till the number of pages of the ſheet be completed; which done, he carries them to the impoſing or correcting ſtone, there to range them in order, in a chaſe; which they call *impoſing*.

The chaſe is a rectangular iron frame of different dimenſions, according to the ſize of the paper to be printed on, having two croſs pieces of the ſame metal, called a *long* and *ſhort croſs*, mortiſed at each end, into the frame, ſo as to be taken out occaſionally.

By the different ſituations of theſe croſſes, the chaſe is fitted for different volumes, for quartos and octavos; one traverſes the middle lengthwiſe, the other broadwiſe, ſo as to interſect in the centre, which is the moſt cuſtomary ſituation; for twelves and twenty-fours, the ſhort croſs is ſhifted nearer to one end of the chaſe. For folios, the long croſs is left entirely out, and the ſhort one placed in the middle; and for broad-ſides, or ſheets printed on one ſide only, both croſſes are ſet aſide.

To dreſs the chaſe, or range and fix the pages therein, they make uſe of a ſet of furniture, conſiſting of reglets, or ſlips of wood of different dimenſions, and about half an inch high, that they may be lower than the letters; ſome of theſe are placed at the top of the pages, called *head-ſticks*; others between them to form the inner margin, called *gutter-ſticks*; others at the ſides, called *ſide-ſticks*; and others at the bottom, called *foot-ſticks*.

The pages, then, being placed in order on the ſtone, the chaſe is put over them, and the reglets applied between the letter and the chaſe, in the poſition above-mentioned; the whole is locked up by means of ſmall pieces of wood, cut in the wedge-form, called *quoins*, which are driven with a mallet and ſhooting-ſtick to a ſufficient tightneſs.

Before the form be quite locked up, they preſs down the ſame, by paſſing a ſmooth piece of wood, called the *plainer*, over the letters, to make their ſurfaces ſtand flat and even; and, when locked up, they ſhake it, to ſee that nothing ſtir.

In this condition, the work is called a FORM, containing more or fewer pages, according to the volume.

As there are two forms required to every ſheet, when both ſides are to be printed, it is neceſſary they be exactly of the ſame length and breadth; i. e. the correſponding reglets, head ſticks, &c. are to be equal in both forms, that the pages may fall exactly on the back one of another; which is called *regiſter*.

Here, then, properly ends the compoſitor's office; the form, thus finiſhed, being to be committed to the preſſman.

Indeed, as it is impoſſible but there muſt be miſtakes in the work, either through the overſight of the compoſitor, or by the caſual tranſpoſition of the letters in the caſes.

After drawing off a proof, it is delivered to the corrector; who reading it over, and rectifying it by the copy, it is remanded to the former operator, to be corrected accordingly. For the characters uſed in correcting a ſheet for the compoſitor, ſee CORRECTION.

The compoſitor, then, unlocking the form upon the correcting-ſtone, by knocking out or looſening the quoins, and ſpreading his corrected proof ſo as that the lines thereof range with the reſpectives ones of the metal, by running his eye along both, he eaſily ſpies where corrections are to be made; according to which, he proceeds to pick out the faulty letters, points, &c. with a ſharp-pointed ſteel bodkin, and puts others in their places.

Where the alterations are conſiderable, and particularly where inſertions or omiſſions are to be made, there uſually ariſes a neceſſity of over-running; in order to which, they muſt decompoſe, or return the lines back from the chaſe into the galley, and from the galley again into the compoſing-ſtick, to be new-modelled and rectified accordingly.

If, e. gr. one or more words, to be inſerted in a line, cannot be gotten in by changing the ſpaces of the line for leſſer ones, part of the line muſt be put back into the cloſe of the preceding one, or forward into the beginning of the ſubſequent one, or both, till room is obtained. If the inſertion be large, ſeveral lines will need to be over-run, either backward or forward, till a break is arrived at; when, if it be not gotten in, a line is to be driven out; and, to get in that line, the next pages, either backward or forward, muſt ſometimes be over-run before it can come in.

When an omiſſion is to be made, the contrary courſe muſt be taken. If it be but little, the compoſitor takes it out, and drives out the remaining matter, either by enlarging his ſpaces, or beſtowing the beginning of the following, or the cloſe of the preceding line therein. If it be conſiderable, he may be obliged to over-run ſeveral pages before it can be driven out.

Preſſman's office, or PRINTING *properly ſo called.* To work off the form thus prepared and corrected by the compoſitor, there are three things required, paper, ink, and a preſs.

To fit the paper for uſe, it is to be firſt wetted or moiſtened, by dipping ſeveral ſheets together in water: theſe are afterwards laid in a heap over each other; and, to make them take the water equally, they are all preſſed cloſe down with a weight at top. As to the degree of wetting, it muſt be according to the quality of the paper, and the ſize of the letter; ſmall letters, and ſtiff paper, requiring moſt wetting.

A PRINTING-HOUSE is a place deſtined for *printing*, and fitted up for that purpoſe with preſſes, caſes, and other furniture.

The moſt conſiderable *printing-houſes* in the world are thoſe of the Louvre and Vatican. The firſt, begun under Francis I. was carried to its utmoſt perfection under Louis XIII. by the care of cardinal Richlieu; and removed into the galleries of the Louvre by Louis XIV.

The Vatican *printing-houſe*, called alſo the *apoſtolical-printing-houſe*; becauſe the pope's bulls, decrees, &c. are printed therein, was begun by Pius IV. and furniſhed with great magnificence by Sixtus V. See VATICAN.

Out of both theſe *printing-houſes* have come forth very beautiful and ſplendid editions of the ancient authors. The Vatican was the firſt that printed books in the Arabic language.

The PRINTING *ink* is of two kinds, black, and red; the laſt occaſionally uſed in title-pages, calenders, &c. the firſt for the body of books. The compoſition of each, though now reckoned no part of the printer's buſineſs, but uſually furniſhed them by other hands, is as follows:

For black ink. A hundred pounds of nut or linſeed oil, being reduced, by boiling, to the conſiſtence of a ſyrup, is cleanſed and purified by throwing into it two pounds of coarſe bread, and about a dozen onions. Nut-oil is ſuppoſed to be the beſt, and is accordingly preferred for the black ink, though the darker colour which it acquires from the fire makes it leſs fit for the red. This oil is boiled in an iron pot, capable of holding at leaſt half as much more, becauſe it very much ſwells; when it boils, it is kept ſtirring with an iron ladle; and if it does not itſelf take flame, it is kindled with a piece of lighted paper, or burning wood, in order to increaſe its conſiſtence and tenacity, and to diminiſh its greaſineſs. The oil is ſuffered to burn for half an hour or more; and the flame being then extinguiſhed by covering the veſſel cloſe, the boiling is afterwards continued, with a gentle heat, till the oil appears of a proper conſiſtence; in which ſtate it is called varniſh; of which there ſhould be two kinds, one more and another leſs boiled; or a thicker and thinner, to be uſed for different purpoſes, and in different weathers. The oil is ſaid to loſe in being boiled into thick varniſh from a tenth to an eighth part of its weight; but different oils, and perhaps the ſame oil in different ſtates, differ in this reſpect. The deſign of adding the bread and onions is more effectually to deſtroy the greaſineſs; but Dr. Lewis doubts, whether additions of this kind are of much uſe. They then boil thirty or thirty-five pounds of turpentine apart, till ſuch time as they find, upon its cooling on paper, that it breaks clean, like glaſs, without pulverizing; for if it pulverize eaſily, it is a ſign it is burnt. The oil and turpentine being thus prepared, the firſt is gently poured, half cold, into the latter; and the two ſtirred together with a ſtick till they be well mixed: after which, the boiling is repeated, and the compoſition is ſet by, to be uſed occaſionally. The turpentine is uſed in order to give a greater body to the varniſh, and to increaſe its drying quality; and with ſome artiſts, litharge has in this intention been a ſecret. M. le Breton, in the Encyclopedia, obſerves, that when very old oil is uſed, neither turpentine nor litharge are needful; but that when the oil is new, ſome turpentine ought to be employed, becauſe without it, the ſmearing of the paper, by the ſpreading or coming off of the ink, cannot be avoided; and he adds, that it is much more eligible to uſe old oil than to have recourſe to this correction of the new: both turpentine and litharge, particularly the laſt, making the mixture adhere ſo firmly to the types, that it is ſcarce to be got entirely off by the ley, whence the eye of the letter is ſoon clogged up.

Now, to proceed to make ink, they take a quantity of this mixture, and add to it a certain quantity of lamp-black, working it up with a kind of wooden mallet, or brayer, till the whole be incorporated, and reduced into a kind of pulp; which is the ink for uſe.

Where, note, that its thickneſs or ſtrength is always to be proportioned to that of the paper, and the warmth of the weather; ſtrong paper, and hot weather, requiring ſtrong ink; and that the ſtrength or weakneſs of the ink depends on the greater or the leſs degree of coction of the varniſh. According to M. le Breton, two ounces and a half of the lamp-black are ſufficient for ſixteen ounces of the varniſh. Lewis's Commerce of Arts, p. 371.

For red ink. They uſe the ſame materials as for black, excepting only, that inſtead of lamp-black, they add a proper quantity of vermillion. Some hold, that by mixing and incorporating the bigneſs of a nut of fiſh-glue, or brandy, or the white of an egg, with the ink, the vermillion acquires a greater luſtre.

The ink is applied upon the forms by balls, which are a kind of wooden cups with handles, the cavities whereof are filled with wool, or hair covered with ſheep's ſkin nailed to the wood. One of theſe the preſſman takes in each hand, and applying them on the ink-block, to charge them with ink, he works them one againſt the other, to mix and diſtribute the ink equally; and, at laſt, ſmears over the form, by beating or daubing them ſeveral times over the whole face thereof: this leaves the form in a condition to be paſſed under the preſs, with the moiſtened paper laid thereon.

The PRINTING-*preſs* (repreſented *Tab.* III. *Miſcel. fig.* 32.) is a very complex machine: its two principal parts, each whereof conſiſts of ſeveral others, are the *body* of the preſs, which ſerves to give the pinch or ſtroke for the impreſſion; and the *carriage*, on which the form is laid to undergo the ſame.

The body conſiſts of two ſtrong cheeks *b b*, placed perpendicularly, and joined together by four croſs pieces or planks. See CHEEK.

The firſt plank *c c*, called the *cap* of the preſs, is fixed, and ſerves to keep the two cheeks together at the due diſtance at top; the ſecond *d d*, called the *head*, is moveable, being ſuſtained by two iron pins, or *long bolts*, that paſs the cap; in this plank is fixed a female ſcrew or *worm*, with a *braſs nut*, ſuſtained by two *ſhort bolts*, which keep it up; the third plank *e e*, called the *ſhelves*, ſerves to keep ſteady a part called the *hoſe*, in which the *ſpindle* (to be ſpoken of hereafter) is incloſed; the fourth plank *f f*, called the *winter*, is moveable; it bears the carriage, and ſuſtains the effort of the preſs beneath, as the head does above; each giving way a little, the one upwards, the other downwards, to make the pull the eaſier.

The ſpindle *g g* is an upright piece of iron, pointed with ſteel, of different dimenſions; having a male ſcrew, which goes into the female of the head about four inches. Through the eye *h* of this ſpindle is rivetted the *bar*, by which the preſſman works the preſs.

The lower part of the ſpindle paſſes through the ſhelves, being incloſed in a ſquare wooden frame *i*, called the *hoſe*; and its point works into the plug, fixed in a braſs pan, ſupplied with oil; which pan is fixed to an iron plate let into the top of the platten. The preſſman, then, by pulling or turning the bar, fixed in the eye by an iron key, preſſes upon a ſquare, ſmooth piece of wood, called the *platten*, and enables it to compreſs the form covered with the paper, tympan, and its blankets, which in order hereto are brought under the platten.

At each corner of the hoſe, there is an iron hook faſtened to thoſe at each corner of the platten, with cords or packthread, very exactly.

The carriage *l l l l*, which makes the ſecond principal member of the preſs, is placed a foot below the platten, having its fore part ſupported by a wooden prop *m*, called the *fore-ſtay*, while the other reſts on the winter. On this carriage, which ſuſtains the plank, are nailed two long iron bars, or *ribs*, *o o*; and on the plank are nailed ſhort pieces of iron or ſteel *p p*, called *cramp-irons*, equally tempered with the ribs, and which ſlide upon them when the preſs is turned in or out.

Under the carriage is fixed a ſmall piece of iron, called the *ſpit*, with a double wheel in the middle, round which leather *girts* are faſtened, nailed to each end of the plank. To the outſide of the ſpit is fixed a handle, or *rounce*, by which the preſſman turns the plank in or out at pleaſure.

Upon the plank is a ſquare wooden frame or *coffin q q*, wherein is incloſed a marble, or poliſhed ſtone, for the form to be laid on. To this coffin are faſtened leather ſtay-girts one to each ſide; which, being again faſtened to the cheeks of the preſs, prevent the plank from running too far out, when drawn from under the platten.

On the fore part of the plank is a gallows *r r*, which ſerves to ſuſtain the tympans, when taken from off the form.

On the front of the coffin are three frames much alike, though ſerving for different purpoſes; viz. the two tympans and friſket; the tympans *s s* are ſquare, made of three ſlips of very thin wood, and at the top a ſlip of iron, ſtill thinner, called a *head-band*; that called the *outward tympan* is faſtened with iron joints to the coffin. They are both covered with parchment; and between the two are placed blankets, which ſerve to make the impreſſion of the platten upon the ſurface of the letters more equable, as alſo to prevent the letters from being broken by the force of the preſs. The friſket *t t* is all of iron, very thin, faſtened at top to the great or outward tympan, and ſuſtained by a ſlip of wood hanging from the cieling, when opened to take out the printed ſheets, and put in others. It is alſo covered with parchment or paper, cut in the neceſſary places, that the ſheet, which is between the great tympan and friſket, may receive the ink, and that nothing may hurt the margins. On the parchment of the great or outward tympan it is, that the blank ſheet is laid to be printed.

To regulate the margins, and make the lines and pages anſwer each other when printed on the other ſide, in the middle of the wood, in the ſides of this tympan, are two iron points, which make two holes in the ſheet, to be placed in the ſame pins, when the ſheet is returned for an impreſſion on the other ſide, which is called the *reiteration*.

Every thing now about the tympans being prepared for *printing*, and the preſſman having inked or beat his form, now placed on the ſtone, he brings the tympans and friſket down from the gallows upon the form; and advancing the plank under the platten, by means of the ſpit-handle, or rounce, gives two ſtrokes or pulls with the bar; and with the ſame handle turned the contrary way, brings back the plank, to take out the printed ſheet, and put in a freſh one; and this he repeats, till he has taken off the full number of ſheets the edition is to conſiſt of.

One ſide of the ſheet being thus printed, it is remanded to the preſs for the other; and is ſo diſpoſed as that the iron points paſs through the holes already made in the ſheet.

Sometimes it is required to cut the friſket afreſh, where the ſecond ſide is to be more or leſs full of *printing* than the firſt, as is frequently the caſe at the beginning and ending of books, &c.

The number of ſheets of the edition being complete, and the form to be ſeparated, to reſtore the letters into the caſes, they firſt waſh it in a ſtrong ley, to take out the remains of the ink, ſcouring it with a bruſh, and then with fair water. This done, it is carried to a wooden frame to be unlocked, and the furniture, i. e. the ſticks, &c. taken off, to diſengage it from the chaſe. Then the compoſitor, taking out ſeveral lines at once upon a little wooden ruler, replaces each letter in its proper box, to be again uſed in the remainder of the impreſſion; which laſt operation they call *diſtribution*.

Beſides the ſeveral kinds of letters and characters above mentioned, uſed in *printing*, they have likewiſe rules for black lines, borders, and head and tail-pieces, accommodated to the ſeveral kinds of letters.

The *rules* for black lines are of braſs, and are made exactly of the height of the letter; otherwiſe they will hinder the neighbouring letters from *printing*, or will themſelves be hindered by them. Theſe the compoſitor occaſionally cuts into proper lengths, as his work requires.

The *borders*, or *flowers*, are a kind of ornaments, in form of long bars, ſerving for the diviſion of books, chapters, &c. Their depth is proportioned to the letter; and their length adjuſted to the page; for being compoſed of ſeveral moveable pieces, it is eaſy to lengthen or ſhorten them.

The *head* and *tail-pieces*, cut either in wood, pewter, braſs, copper, or ſilver, are compartments uſed at the beginnings and endings of books.

The initial letters are ſometimes cut in wood, and figured; ſometimes caſt like the other characters.

For the conveniency of the binding, the *printers* had early recourſe to ſignatures, i. e. letters of the alphabet placed at the bottom of the firſt page of each ſheet, which ſhew the order they are to be bound in, as well as whether the quires are complete; which method is ſtill continued.

The *catch-words* ſerve nearly the ſame purpoſe: theſe are the firſt words of each page, which are inſerted at the bottom of the preceding pages. The number of the pages are equally ſerviceable to the reader and the binder, to guide to references, and to warrant the book duly bound and collated: ſome *printers* formerly put them at the bottoms of the pages; but cuſtom has now carried it for the tops.

In the infancy of *printing*, they had likewiſe a regiſtrum chartarum for the convenience of the binders: to draw this, at the end of each volume, they collected the ſignatures, and the firſt words of the firſt four ſheets of each alphabet. To abridge it, they afterwards contented themſelves to expreſs the ſignatures, and how often each letter was repeated; but the regiſtrum has been now long diſuſed.

As to the faults which eſcape the corrector and compoſitor, they are uſually noted in what we call the *errata*. The ancient editions had no errata; but in lieu thereof, they corrected the faults in each printed copy with a pen, which was eaſy enough in thoſe days, though impracticable now. In effect, we have anciently had *printers*, who did not need an errata of above five articles in a volume of five hundred ſheets; and the diſtinguiſhing excellence of *printing* is correctneſs; and in this reſpect many of our modern *printers* deſerve much commendation.

Printing, *Chineſe*. There are three opinions as to the antiquity of the Chineſe *printing*; one fixing it three hundred years before Chriſt; another nine hundred years after him; and a third carrying it ſtill farther back, and making it coeval with that mighty empire; though, it muſt be allowed, the laſt is much the leaſt probable of the three.

The manner of *printing* we have already hinted to be very different from that which now obtains among the Europeans: it is true, it has ſome advantage over our's in correctneſs, and the beauty of the character; but, in other reſpects, it comes far ſhort, the ſingle advantage of moveable characters making more than amends for all that is urged againſt us by ſome zealous advocates for this oriental *printing*.

Books are printed in China from wooden planks, or blocks, cut like thoſe uſed in *printing* of callico, paper, cards, &c. among us.

Theſe blocks are made of a ſmooth, firm, cloſe wood, and of the ſize of the leaf required. On the face-ſide they glue a paper, upon which ſome able penman draws out the ſeveral letters and characters with a Chineſe pen, which is a kind of pencil. This is the principal part of the work, and that whereon the ſucceſs of the reſt depends.

When finiſhed the block is put into the hands of a ſculptor, or cutter in wood; who, following the ſeveral ſtrokes of the writer with his gravers, and other ſharp little inſtruments, makes them all appear in relievo on the wood. When the carving or cutting is finiſhed, they moiſten what remains of the paper, and rub it gently off.

The ink they uſe in *printing* is the ſame with the common Chineſe ink, wherewith they alſo write, and is made of lamp-black, mixed up with other ingredients.

Their preſs reſembles our rolling-preſs much more than the letter-preſs.

As to their paper it is inferior to ours; it is made of the inner bark or rind of a kind of ruſhes, beat up with water into a pulp or paſte, and formed in moulds, much like our's.

The advantages of the Chineſe *printing* conſiſt in this, that they are not obliged to take off the whole edition at once, but print their books as they need them; that the blocks are eaſily retouched, and made to ſerve afreſh, and that there needs no corrector of the preſs.

Its diſadvantages are, that a large room will ſcarce hold all the blocks of a moderate volume; that the colour of the ink eaſily fades; and that the paper is apt to tear, and is ſubject to worms: whence it is, that ſo few ancient books are ſeen in China.

Printing, *rolling-preſs*, is employed in taking off prints or impreſſions from copper-plates engraven or etched.

It differs, as we have before obſerved, from *letter-printing*, in that the marks and characters, whoſe impreſſions are to be taken, in the former caſe, are indented, or cut inwards; and in the latter are in relievo, or ſtand out.

This art is ſaid to be as ancient as the year 1460, and to owe its origin to Finiguerra, a Florentine goldſmith; who, caſting a piece of engraven plate in melted brimſtone, found the exact print of the engraving left in the cold brimſtone, marked with black licked out of the ſtrokes by the liquid ſulphur.

Upon this, he attempted to do the ſame on ſilver-plates with wet paper, by rolling it ſmoothly with a roller; and this ſucceeded.

This novelty tempted Baccio Baldini, a goldſmith of the ſame city, to attempt the ſame; which he did with ſucceſs, engraving ſeveral plates of Sandro Boticello's deſign, and *printing* them off in this new way; in which he was followed by Andrew Mantegna, then at Rome. This knowledge getting into Flanders, Martin of Antwerp, a famous painter, graved abundance of plates of his own invention, and ſent ſeveral prints into Italy, marked thus, M. C. After him, Albert Durer appeared, and gave the world a vaſt number of prints both in wood and copper. About this time, one Hugo de Carpi, an Italian painter, found out a way by means of ſeveral pieces of wood, to make prints reſemble deſigns of chiaro ſcuro (ſee Cutting *in wood*); a method revived in our country ſome years ago with much ſucceſs by Kirkall, and ſince at Venice by Jackſon, though very imperfectly; and ſome years after, the invention of etching was diſcovered, which was ſoon after made uſe of by Parmegiano.

Mr. Walpole obſerves, that it was not till Raphael had formed Marc Antonio, that engraving placed itſelf with dignity by the ſide of painting. See Engraving and Etching.

When the art reached England does not certainly appear. Mr. Chambers, on the authority of Mr. Bagford, (ſee Phil Tranſ. N° 310, p. 2397, or Abr. vol. v. part ii. p. 20.) erroneouſly ſaid, that it was firſt brought from Antwerp by Speed, in the reign of James I. whereas we had it in ſome degree almoſt as ſoon as printing; the printers themſelves uſing ſmall plates for their devices and rebuſes. Caxton's Golden Legend, printed in 1413, has in the beginning a group of ſaints, and many other cuts diſpoſed through the body of the work. The ſecond edition of his Game of Cheſs, and Le Morte de Arthur, had alſo cuts. Wynkyn de Worde, Caxton's ſucceſſor, prefixed to his title of the Statutes, in the ſeventh year of Henry VII. or 1491, a plate with the king's arms, creſts, &c. a copy of which is given in the Life of Wynkyn, by Mr. Ames, in his Typographical Antiquities, p. 79. The ſame printer exhibited ſeveral books adorned with cuts, ſome of which are particularly deſcribed by his biographer, p. 87, 88, 89, &c.

The ſubſequent printers continued to ornament their books with wooden cuts. One conſiderable work, publiſhed by John Raſtell, called the Paſtyme of the People, and Raſtell's Chronicle, was diſtinguiſhed by prints of ſuch uncommon merit for that age, as to have been aſcribed to Holbein. Grafton's Chronicle, printed in 1569, contained many heads, as of William the Conqueror, Henry VIII. queen Elizabeth, &c. and many more are recorded by Ames. But though portraits were uſed in books, Mr. Walpole obſerves, that he can find no trace of ſingle prints being wrought off in that age. Thoſe which compoſed part of the collection of Henry VIII. were probably the productions of foreign artiſts. The firſt book that appeared with cuts from copper plates, or at leaſt the firſt that Mr. Ames had obſerved, was the Birth of Mankind, otherwiſe called the Woman's Book, dedicated to queen Catharine, and publiſhed by Thomas Raynalde in 1540, with many ſmall copper cuts, without any name. See Ames, ubi ſupra, p. 35, 46, 60, and 219. Walpole's Catalogue of Engravers, &c. 4to.

The fabric of the rolling-preſs, and the compoſition of the ink uſed therein, with the manner of applying both in the taking off prints, are as follow:

Structure of the rolling preſs. This machine, like the common preſs, may be divided into two parts; the *body* and *carriage*, analogous to thoſe in the other.

The body conſiſts of two cheeks of different dimenſions, ordinarily about four feet and a half high, a foot thick, and two and a half apart, joined at top and bottom by croſs pieces. The cheeks are placed perpendicularly on a wooden ſtand or foot, horizontally placed, and ſuſtaining the whole preſs.

From the foot likewiſe riſe four other perpendicular pieces, joined by other croſs or horizontal ones; which may be conſidered as the carriage of the preſs, as ſerving to ſuſtain a ſmooth, even plank, which is about four feet and a half long, two feet and a half broad, and an inch and a half thick; upon which the engraven plate is to be placed.

Into the cheeks go two wooden cylinders or rollers about ſix inches in diameter, borne up at each end by the cheeks, whoſe ends, which are leſſened to about two inches diameter, and called *trunnions*, turn in the cheeks between two pieces of wood, in form of half-moons, lined with poliſhed iron, to facilitate the motion.

The ſpace in the half moons, left vacant by the trunnion, is filled with paper, paſteboard, &c. that they may be raiſed and lowered at diſcretion; ſo as only to leave the ſpace between them neceſſary for the carriage of the plank charged with the plate, paper, and blankets.

Laſtly, to one of the trunnions of the upper roller is faſtened a croſs, conſiſting of two levers, or pieces of wood, traverſing each other. The arms of this croſs ſerve in lieu of the handle of the common preſs; giving a motion to the upper roller, and that to the under one; by which means the plank is protruded, or paſſed between them.

Preparation of the ink. The ink, uſed in rolling preſs *printing*, is a compoſition of black and oil mixed and boiled together in a due proportion.

The black is a factitious matter, made, as ſome ſuppoſe, of the oil of vine twigs, or, according to others, of the kernels of fruits, ſuch as peaches and apricots, well burnt, with wine lees.

This black is uſually brought hither ready prepared from Frankfort on the Maine; whence our printers call it *Frankfort* BLACK.

This is ſofter and more free from grittineſs than the ivory or other charcoal blacks, as they are uſually prepared among us.

The oil werewith they dilute this black is nut-oil; which is ſet on fire, boiled up differently, according to the different works it is to be uſed in; but never ſo far as to communicate to the oil the adheſive gluey quality of the printer's varniſh.

They uſually make three kinds, *thin*, *thick*, and *ſtrong*; only differing in the degree of coction: the ſtrong is that uſed in the fineſt works, &c.

To make the ink, they pulverize the black very carefully, and paſs it through a fine ſieve; then mix it up on a marble with the proper oil, by means of a mullet, after the ſame manner as the painters do their colours.

Method of PRINTING *from copper-plates.* The ink being prepared, they take a little quantity of it on a rubber, made of linnen-rags, ſtrongly bound about each other; and therewith ſmear the whole face of the plate, as it lies on a grate, over a charcoal-fire.

The plate ſufficiently inked, they firſt wipe it coarſely over with a foul rag, then with the palm of the left hand, then with that of the right; and, to dry the hand, and forward the wiping, rub it from time to time on whiting. In wiping the plate perfectly clean, yet without taking the ink out of the engraving, conſiſts a great part of the addreſs of the workman. The French printers uſe no whiting, as being detrimental to the colour of the ink; nor do they lay the plate on the grate to warm, till after inking and wiping it.

The plate, thus prepared, is laid on a thick paper, fitted upon the plank of the preſs; over the plate is laid the paper, firſt moiſtened, to receive the impreſſion; and over the paper two or three folds of blanketting, or other ſtuff.

Thus diſpoſed, the arms of the croſs are pulled, and, by this means, the plate, with its furniture, paſſed through between the rollers; which, pinching very ſtrongly, yet equably, preſſes the moiſtened paper into the ſtrokes of the engraving, whence it licks out the ink.

Some works require being paſſed twice through the preſs, others only once, according as the graving is more or leſs deep, or the greater or leſs degree of blackneſs the print is deſired to have.

It muſt be obſerved, that the ſtronger and thicker the ink is, the ſtronger muſt the rollers pinch the plate: this tempts many of the workmen to uſe a thinner oil, in order to ſave labour; which prove very prejudicial to the impreſſion.

The wetting of the paper ought to be done two or three days before *printing* it, to render it more ſupple and mellow: as the prints are drawn off, they are hung up to dry on lines, &c.

Laſtly, after the number of prints deſired have been wrought off from the plate, they rub it over with oil of olives, to prevent its ruſting, and ſet it by againſt a new impreſſion. If the ſtrokes of the graving be perceived full of ink hardened therein in the courſe of the *printing*, they boil it well in a ley before the oil be applied.

PRINTING *with wooden prints.* See CUTTING *in wood.*

PRINTING *in chiaro obſcuro*, is a method of producing a ſtrong effect of relief attended with a juſt and natural gradation of the lights and ſhades, grounded with brown, with white and black, by *printing* on paper. We have already obſerved, that the art of doing this in wood was diſcovered in Italy by Hugo de Carpi. M. le Boſſe directs it to be performed in the following manner. Having provided two copper-plates of equal ſize, and exactly fitted to each other, on one of them let the propoſed deſign be engraved, and let the prints be taken off from it with *printing* ink on ſheets of grey paper. The other plate muſt then be varniſhed, and the varniſhed ſide being laid upon the ſheet printed by the firſt plate, they muſt be paſſed under the roller; when the print will have made a counter-proof on the varniſh of the plate; after which the lights muſt be graved on the plate, and corroded very deeply by aqua fortis. The ſame thing may otherwiſe be done with the graver, and with greater eaſe by thoſe who can uſe it well. In order to properly prepare the oil, the beſt method is to uſe very white nut-oil drawn without fire, and to put it into two leaden veſſels, and ſet in the ſun till it becomes thick in the proportion of the weak oil. Flake white muſt then be taken, which muſt be ground, and waſhed over, till it be extremely fine; and then being dry, it muſt be ground with the weak oil, and the thick oil added to it. Then having taken an impreſſion with black *printing* ink, or any other colour, from the firſt plate, that is entirely engraved, on coarſe grey paper, it muſt be left to dry for ten or twelve days; when theſe prints having been wet, another impreſſion muſt be made upon them by the plate, on which the lights are engraved, charged with the white flake and oil in the uſual manner of *printing*; taking care that the correſpondent parts of the plate, and the impreſſion already made, may be adapted exactly. By this means the *printing* in chiaro obſcuro is perfectly performed. See CLAIR *obſcure*.

PRINTING *with a variety of colours to imitate painting*. See MEZZOTINTO.

PRIOR, *before*, ſomething that is nearer the beginning, than another with which it is compared.

PRIOR is particularly uſed for a ſuperior of a convent of monks, or the ſecond perſon after the abbot.

Priors are either *clauſtral* or *conventual*.

PRIORS, *conventual*, are the ſame as abbots, all the difference between them being in name; both having the ſame rights, and both alike being governors of monaſteries.

Conventual priors are of two kinds; viz. *regular conventual priors*, who govern religious living in the community; and *ſecular* or *commendatory conventual priors*.

Conventual *priors* are obliged to take up the prieſthood within a year, or at moſt two, from the dates of their proviſion: in default whereof, their benefices are declared vacant.

Priors muſt be twenty-five years old before they can govern the convent; and twenty, if the convent be governed by another. See CONVENTUAL.

PRIOR, *clauſtral*, is he who governs the religious of an abbey, or *priory*, in *commendam*; ſo called, becauſe he has ſuperiority in the cloiſter or monaſtery.

His juriſdiction is wholly from the abbot, and ends with the abbot's death, unleſs he has been elected by the whole convent.

PRIOR, *grand*, is the ſuperior of a large abbey, where ſeveral ſuperiors are required; as in the abbeys of Cluney and Feſchamp.

In the monaſtery of St. Denys, there were anciently five *priors*; the firſt whereof was called the *grand-prior*. In moſt monaſteries, there is alſo a *ſub-prior*. There are alſo *grand-priors* in the military orders; as in that of Malta, or St. John of Jeruſalem, &c.

PRIORS *aliens* were certain religious, born in France and Normandy, ſuperiors of religious houſes erected for their country-folks here in England.

Theſe Henry V. deeming no good members for this land, ſuppreſſed; and their livings were afterwards given by Henry VI. to other monaſteries and houſes of learning; but chiefly, as Stow obſerves, to the erecting of thoſe two famous colleges, called the *King's colleges of Cambridge* and *Eton*.

PRIOR, *arch*. See ARCH-*prior*.

PRIORITES, in *Botany*, a name given by the ancient Greeks to a plant which they recommended in medicine; but they do not clearly explain what it was. It is the ſame with the ceſtrum and pſuchrotrophon of the ſame writers; and they ſay is was called *betonica*, *ſerratula*, or *roſmarinus*, by the Romans.

It is evident, from a ſtrict equiry into their accounts, that the ſurratula was the plant they meant; for Pliny ſays, that the betonica was only a Gauliſh name for this plant, and the place of growth, which is deſcribed to be wet ſhady places, evidently excludes what we call *roſemary* from any title to the name.

Apuleius has greatly perplexed the cauſe by ſaying, that the *priorites*, or betony, has leaves like the docks; but he does not diſtinguiſh between the betonica and britannica, which laſt plant is the hydrolapathum, or great water-dock, and has leaves like the other docks; and it is plain, that both Apuleius and Pliny borrow the account of the dock-like leaves from this paſſage, and attribute them to a plant the original author never meant them for.

PRIORITY, *prioritas*, the relation of ſomething, conſidered as it is *before*, or *prior* to, another; i. e. as it is nearer to the beginning, or the firſt.

The principal modes of *priority* are five; viz. in reſpect of *time*; as when we ſay, that the Grecian empire was *prior* to the Roman; *nature*, as when we ſay, one is *prior* to two; *order*, *dignity*, and *cauſality*; which are all ſummed up in the technical diſtich:

Tempore, natura, prius ordine, dic & honore;
Effecto cauſam dicimus eſſe prius.

Priority, in *Law*, denotes an antiquity of tenure, in compariſon of another leſs ancient.

Priority, *to hold by*, is to hold of one lord more anciently than of another; in reſpect whereof the tenant is ſaid to *hold in poſterity*. The lord of the *priority* ſhall have the cuſtody of the body.

Priority *of debts*, in *Law*. See DEBT.

PRIORY denotes a ſociety of religious, the ſuperior of which was denominated a PRIOR, or prioreſs; and of theſe there were two ſorts; as where the prior was chief governor, as fully as any abbot in his abbey, and was choſen by the convent; ſuch were the *cathedral* PRIORS, and moſt of the Auſtin order, and where the *priory* was a cell, ſubordinate to ſome great abbey; and the prior was placed and diſplaced at the will of the abbot. There were alſo *priories* ALIEN.

PRISAGE, *priſagium*, that ſhare which belongs to the king, or admiral, out of ſuch merchandizes as are taken at ſea as lawful prize. See PRISE.

Prisage *of wines*, a cuſtom in certain ports, whereby the king challenges out of every veſſel laden with wine, containing twenty tons, or upwards, two tons of wine; the one before, the other behind the maſt, at his own price; which is twenty ſhillings per ton.

The cuſtom varies a little in various places: at Boſton, e. gr. every bark, laden with ten tons of wine, pays *priſage*.

The term is now grown into diſuſe; and in lieu of *priſage*, the cuſtom, ſays Cowel, is popularly called BUTLERAGE; becauſe it is the king's chief butler that receives it.

PRISCILLIANISTS, *Priſcillianiſtæ*, ancient heretics, who aroſe in Spain, or rather were derived thither from Egypt, towards the end of the fourth century.

The origin of this hereſy is not well known; but it appears to have been brought into Spain by one Marcus of Memphis, who had for his diſciple the rhetor Helpidius, under whom *Priſcillian* was educated.

What their particular tenets were, is not eaſy to diſcover; but they are charged by their adverſaries with indulging all kinds of ſecret filthineſs, and nocturnal mixtures, under a religious notion. Among their dogmata, this is ſaid to have been one: *Jura, perjura, ſecretum prodere noli.*

It appears, however, from authentic records, that the difference between their doctrine, and that of the MANICHEANS, was not very conſiderable; for they denied the reality of Chriſt's birth and incarnation; maintained, that the viſible univerſe was not the production of the Supreme Deity, but of ſome demon or malignant principle; adopted the doctrine of æons, or emanations from the divine nature; conſidered human bodies as priſons formed by the author of all evil, to enſlave celeſtial minds; condemned marriage, and diſbelieved the reſurrection of the body. Their rule of life and manners was rigid and ſevere; and the accounts which many have given of their laſciviouſneſs and intemperance deſerve not the leaſt credit, as they are totally deſtitute of evidence and authority. That the *Priſcillianiſts* were guilty of diſſimulation upon ſome occaſions, and deceived their adverſaries by cunning ſtratagems, is true; but that they held it as a maxim, that lying and perjury were lawful, is a moſt notorious falſhood, without even the leaſt ſhadow of probability, however commonly this odious doctrine has been laid to their charge.

Priſcillian, their leader, was a man of great birth, fortune, parts, and learning: he was condemned, with ſome biſhops his adherents, in a council at Saragoſſa, in the year 380, and in another at Bourdeaux, in 384; but he appealed to the emperor Maximus, and had a hearing at Treves; where being convicted of broaching novelties, he was condemned to death, with ſeveral of his followers. His doctrine, however, ſurvived him, and was propagated through the greateſt part of Spain and Gaul. Moſheim's Eccl. Hiſt. vol. i. p. 384, &c. 8vo edit.

PRISE, or **Prize**, in *Navigation*, a veſſel taken at ſea from the enemies of the ſtate, or from pirates, by a man of war, or a merchant-veſſel having commiſſion from the admiral.

Veſſels are looked on as a lawful *prize*, if they fight under any other ſtandard than that of the ſtate from which they have their commiſſion: if they have no charter-party, invoice, or bill of lading, aboard them; if they be loaden with effects belonging to the king's enemies, or with contrabands goods.

Thoſe of the king's ſubjects, recovered from the enemy, after having remained twenty-four hours in their hands, are alſo deemed lawful *prize*.

Veſſels, that refuſe to ſtrike their ſails, after having been ſummoned thereto by the king's ſhips, may be conſtrained to do it; and, if they make reſiſtance, and fight, they are lawful *prize*.

The officers and ſeamen of the king's ſhips, and of other Britiſh ſhips having letters of marque, are intitled to the ſole intereſt, and property of all ſhips and goods by them taken, and adjudged lawful *prizes* by the court of admiralty.

The *prize* is to be divided among the officers and ſeamen of the king's ſhips, as he ſhall appoint by proclamation. Among privateers, the diviſion is according to the agreement between the owners.

The court of admiralty is to finiſh the examination of the perſons to be examined to prove the lawfulneſs of the *prize*, in five days after requeſt for that purpoſe made. The monition is to be executed in three days. And in caſe no claim of the capture be duly entered, giving twenty days notice after the execution of the monition; or if there be a claim, and the claimant does not give ſufficient ſecurity to pay double coſts to the captors, if the *prize* be adjudged lawful, then the court is to proceed to ſentence in ten days.

In caſe of doubt, or of witneſſes being remote, the court may releaſe the *prize*, on the claimant's giving good ſecurity to the captors for the payment of the full appraiſed value, in caſe the *prize* be adjudged lawful.

Judges and officers, on failure of their duty, in reſpect to the condemnation of *prizes*, forfeit 500*l.* with full coſts of ſuit; one moiety to the king, and the other to the informer.

The judges and officers of the court of admiralty in the king's plantations or dominions abroad, ſhall not receive above 10*l.* in caſe the *prize* be under a hundred tons burthen; nor above 15*l.* if it be of greater burthen.

Commiſſioners of appeals in cauſes of *prizes* are to be appointed under the great ſeal; and appeals may be made to them within fourteen days after ſentence.

Agents for *prizes* are to be choſen by the captors.

The treaſurer of the navy is to pay to the officers and ſeamen on board ſhips of war, or privateers, in any action where any ſhip of war, or privateer, ſhall have been taken from the enemy or deſtroyed, 5*l.* for every man on board ſuch *prize* or ſhip deſtroyed, at the beginning of the engagement.

The captures of flota ſhips, or galleons, or regiſter ſhips bound from Buenos Ayres, or Honduras, can be tried only in the high court of admiralty.

The ſtatute enacts ſeveral penalties and forfeitures for taking *prizes* by colluſion. Privateers forfeit the *prize*, half to the king, and half to the informer; and the commander of a man of war forfeits 1000*l.* to be divided between the king and the informer.

Alſo, if any ſhips belonging to the Engliſh be taken by the enemy, and afterwards retaken by any of our men of war, or privateers, they are to be reſtored to the owners, on paying an eighth part of the value, in lieu of ſalvage, after having been in the enemy's poſſeſſion twenty-four hours; and if above that time, paying a farther moiety, &c. 13 Geo. II. cap. 4. 30 Geo. II. cap 18.

The regulations with regard to *prizes* in the royal navy, are as follow: 1. When any ſhip or veſſel is taken from the enemy, the hatches are to be immediately ſpiked up, and her lading and furniture ſecured from embezzlement, till ſentence is paſſed upon her in ſome court of admiralty, empowered to take cognizance of cauſes of that nature. 2. The captain is to cauſe the officers of the *prize* to be examined; three or more of the company, who can give beſt evidence, to be brought to the ſaid court of admiralty, together with the charter-parties, bills of landing, and other ſhip's papers, found on board. The 3d and 4th articles relate to finding any of the king's ſubjects in the *prizes*. 5. When a privateer is taken, great care is to be had to ſecure all the ſhip's papers, eſpecially the commiſſion; but if there be no legal commiſſion found on board, then all the priſoners are to be carried before ſome magiſtrate, in order to their being examined and condemned as pirates. See articles 7, 8, and 9, for the government of the NAVY.

Prise, in our *Satutes*, is uſed for things taken of the ſubjects by the king's purveyrors.

Spelman deſcribes *priſes* to be corn and other proviſions taken from the country-people, at lower rates than ordinary, for the maintenance of the king's houſhold, garriſons, &c.

Roger de Monte Alto, who married the ſiſter of Hugo de Albeney, claimed the following privileges; viz. his caſtle of Reſigne *cum* priſis 40 *dierum*, with *priſes* of forty days: which phraſe the ſame author underſtands of the liberty of taking proviſions for the ſupport of the garriſon of his caſtle, upon paying for them within forty days. See ſtat. 12. Car II. cap. 34.

PRISM, Prisma, thus called from πρισμα, ſomething *ſawn*, or *cut off*, in *Geometry*, an oblong or ſolid body, contained under more than four planes, and whoſe baſes are equal, parallel, and alike ſituated.

The *priſm* is generated by the motion of a rectilinear figure, as A C B (*Tab.* IV. *Geometry. fig.* 72.) deſcending always parallel to itſelf, along the right line A E.

If the deſcribent be a triangle, the body is ſaid to be a *triangular priſm*; if ſquare a *quadrangular* one, &c.

From the geneſis of the *priſm*, it is evident it has two equal and oppoſite baſes; that it is terminated by as many parallelograms as the baſe conſiſts of ſides; and that all the ſections of a *priſm* parallel to its baſe are equal.

Every triangular *priſm* may be divided into three equal pyramids.

Prism, *to meaſure the ſurface and ſolidity of a.* Find the area of the baſe, e. gr. A B C (ſee Triangle), and multiply it by 2; find the areas of the planes or parallelograms, that include or circumſcribe it; and add their ſum to the former product. The ſum is the whole ſurface of the *priſm*.

Multiply then the baſe B A C by the altitude C D; the product is the ſolidity of the cube A B C D E F. See Centrobaryc.

All *priſms* are in a ratio compounded of their baſes and altitudes; if, then, their baſes be equal, they are to each other as their heights; and *vice verſa*. Similar *priſms*, &c. are in a triplicate ratio of their homologous ſides, as alſo of their altitudes.

Prism, in *Dioptrics*, is a glaſs in form of a triangular *priſm*, much uſed in experiments about the nature of light and colours.

The phenomena and uſe of the *priſm* ariſe from its ſeparating the rays of light in their paſſage through it.

The more general of theſe phenomena are enumerated and illuſtrated under the article Colour: for, to enumerate all would be endleſs; and even theſe are ſufficient to demonſtrate, that colours do not either conſiſt in the contortion of the globules of light, as Deſcartes imagined; nor in the obliquity of the pulſes of the etherial matter, as Hook fancied; nor in the conſtipation of light, and its greater or leſs concitation, as Dr. Barrow conjectured; but that they are original and unchangeable properties of light itſelf.

PRISMATIC *antennæ*, in *Natural Hiſtory*, a term uſed to expreſs the horns or *antennæ* of a peculiar genus of butterflies. See Feelers.

PRISMOID, *priſmoides*, in *Geometry*, a ſolid figure bounded by ſeveral planes, whoſe baſes are right-angled parallelograms, parallel, and alike ſituated.

PRISON. See Gaol.

Prison *breaking*, by the offender himſelf, when committed for any cauſe, was felony at the common law; or even conſpiring to break it. But this ſeverity is mitigated by the ſtatute *de frangentibus priſonam*, 1 Edw. II. which enacts that no perſon ſhall have judgment of life or member, for breaking *priſon*, unleſs committted for ſome capital offence. So that to break *priſon*, when lawfully committed for any treaſon or felony, remains ſtill felony as at the common law; and to break *priſon*, when lawfully confined upon any other inferior charge, is ſtill puniſhable as a high miſdemeanor by fine and impriſonment. For the ſtatute which ordains that ſuch offence ſhall be no longer capital, never meant to exempt it entirely from every degree of puniſhment. Blackſt. Com. vol. iv. p. 130. See Escape.

Breaking of priſon, by the law of Scotland, is a puniſhable offence; but there are no particular laws againſt it in that country, ſo they are guided by the Roman law in ſuch caſes. But though this law ſeems to make the puniſhment of this crime capital, yet this is thought too great ſeverity in Scotland, where an arbitrary puniſhment, greater or leſs, according to the circumſtances of the eſcape, and the violence with which it was accompliſhed, is thought ſufficient and adequate.

PRISONER, in *Law*, one that is reſtrained of his liberty upon any action civil or criminal, or upon commandment.

A man, again, may be *priſoner*, either upon matter of fact, or of record.

Prisoner, *upon matter of record*, is he, who being preſent in court, is, by the court, committed to priſon.

Prisoner, *upon matter of fact*, is he, who is committed upon an arreſt, be it by the ſheriff, conſtable, or other.

Prisoners *of war*. See Capitulation.

PRIST—*Unques* Prist. See Uncore.

PRISTIS, in *Ichthyology*. See Saw-*fiſh*.

PRIVATE *average*, *charters*, *nuſance*, and *ſpirit*. See the ſubſtantives.

PRIVATEERS, are veſſels of war, armed and equipped by particular merchants, &c. and furniſhed with a military commander by the admiralty, or the officers who ſuperintend the marine department of a country, to cruiſe againſt the enemy, and take, ſink, or burn their ſhipping, or otherwiſe annoy them as opportunity offers.

Theſe veſſels are generally governed on the ſame plan with his majeſty's ſhips, though often guilty of ſhameful depredations.

Perſons concerned in *privateers* adminiſter at their own coſts a part of a war, by providing ſhips of force, and all other military ſtores, and they have, inſtead of pay, leave to keep what they can take from the enemy, allowing the admiral his ſhare, &c.

Privateers may not attempt any thing againſt the laws of nations; as to aſſault an enemy in a port or haven under the protection of any prince or republic, whether he be friend, ally, or neuter, for the peace of ſuch places muſt be inviolably kept; and therefore, by a treaty made by king William and the ſtates of Holland, before a commiſſion ſhall be granted to any *privateer*, the commander is to give ſecurity if the ſhip be not above one hundred and fifty tons, in 1500*l.* and if the ſhip exceeds that burthen in 3000*l.* that they will make ſatisfaction for all damages which they ſhall commit in their courſes at ſea, contrary to the treaties with that ſtate; upon pain of forfeiting their commiſſions, and the ſhip is made liable. Lex Mercat. or Merch. Compan. 177.

By ſtatute, ſhips taken by private men of war, were to be divided into five parts, four parts whereof to go to the perſons intereſted in the *privateer*, and the fifth to his majeſty, and as a farther encouragement, *privateers*, &c. deſtroying any French man of war, or *privateer*, ſhall receive for every piece of ordnance in a ſhip ſo taken 10*l.* reward, &c 4 and 5 Will. and M.

But by a later ſtatute, the commiſſioners of the admiralty may grant commiſſions to commanders of *privateers*, for taking ſhips, &c. which being adjudged *prize*, and the tenth part paid to the admiral, &c. wholly belong to the owners and captors. See Prise.

PRIVATION, *privatio*, the abſence, want, or defect of ſomething needed or neceſſary.

In logic, *privation*, as applied to modes of being, and oppoſed to negation, denotes the abſence of what naturally belongs to the thing we are ſpeaking of, or which ought to be preſent with it. It was called in the ſchools *abſentia habitus debiti*.

In the canon-law, *privation* is uſed for an interdiction, or ſuſpenſion.

Myſtic divines uſe the phraſe, *privation of God*, for thoſe drineſſes, which the ſoul experiences, to whom God does not make himſelf felt.

The church of Rome teaches that children, dying without baptiſm, go into a limbus, where they undergo a *privation* of the ſight of God.

Privation, in *Phyſics*, is a negative principle, which, with matter and form, the Peripatetics ſuppoſe conſpires to conſtitute natural bodies.

PRIVATIVE, in *Grammar*, a particle, which, prefixed to a word, changes it into a contrary ſenſe.

Thus, among the Greeks, the α is uſed as a *privative*: as in αθεος *atheiſts*, *acephalus*, &c. The Latins have their *privative in*: as *incorrigibilis*, *indeclinabilis*, &c. The Engliſh, French, &c. on occaſion, borrow both the Latin and Greek *privatives*.

Privative *modes*. See Mode.

Privative *quantity*, in *Algebra*, denotes a quantity leſs than nothing; called alſo a *negative* quantity; in oppoſition to affirmative or poſitive quantities.

Privative quantities are denoted by the character of ſubtraction—prefixed to them.

PRIVET, *liguſtrum*, in *Botany*, a genus of the *diandria monogynia* claſs. Its characters are theſe: the flower hath a ſmall tubular empalement, cut at the top into four obtuſe ſegments; it hath one funnel-ſhaped petal, cut into four oval ſegments at the top which ſpread open; it hath two ſtamina which ſtand oppoſite, and a roundiſh germen, terminated by erect ſummits, ſupporting a ſhort ſtyle, crowned by an obtuſe bifid ſtigma; the germen afterwards turns to a ſmooth round berry with one cell, incloſing two oblong ſeeds, flat on one ſide, but convex on the other. Miller reckons two and Linnæus one ſpecies, making the ever-green *privet*, a ſpecies of *rhamnus*.

Theſe plants are eaſily propagated by laying down their tender ſhoots in autumn, which in one year's time will be rooted enough to tranſplant; then they may be removed to the places where they are deſigned to remain, or planted in a nurſery for two years, where they may be trained for the purpoſes deſigned.

They may alſo be propagated by cuttings, which if planted in the autumn on a ſhady border and in a loamy ſoil, will take root very freely, and may be afterwards treated in the ſame way as the layers. But the ſtrongeſt and beſt plants are thoſe which are raiſed from ſeeds; indeed, this is a much more tedious method than the other, ſo is ſeldom practiſed, for the ſeeds generally lie a year in the ground before they vegetate; therefore, whoever would propagate the plants in this method, ſhould gather the berries and put them in a pot, with ſand between them, and bury the pots in the ground, as is practiſed for holly berries and haws; and after they have lain a year in the ground, take them up and ſow them in a border expoſed to the eaſt, where the plants will come up the following ſpring. Theſe will make great progreſs after they have gotten ſome ſtrength, and will grow upright, without ſending out ſuckers like the others.

Formerly theſe plants were greatly in uſe for hedges, but ſince ſo many other plants of greater beauty have been introduced, they have been almoſt rejected. Miller.

The leaves and flowers of *privet* are cooling, drying, and aſtringent, and conſequently good in ulcers and inflammations of the throat and mouth, bleeding of the gums, and relaxation of the uvula.

Privet, *mock*, *phillyrea*, in *Botany*, a genus of the *diandria monogynia* claſs. Its characters are theſe: the flower has a ſmall permanent empalement cut into five parts at the brim; it hath one petal with a very ſhort tube, cut into five parts which turn backward, and two ſhort ſtamina, ſtanding oppoſite, terminated by ſingle ſummits; it has a roundiſh germen, ſupporting a ſlender ſtyle, crowned by a thick ſtigma; the germen afterwards turns to a globular berry with one cell, incloſing a roundiſh ſeed. Linnæus enumerates three, and Miller ſeven ſpecies, which grow naturally in the ſouth of France, Spain, and Italy, but are hardy enough to thrive in the open air in England, and are never injured except the winters are very ſevere, which ſometimes cauſes their leaves to fall, and kills a few of the weaker branches. Theſe, however, are repaired by new ſhoots the following ſummer; ſo that there are but few of the ever-green trees which are hardier than theſe, or that deſerve more to be cultivated for pleaſure.

Theſe plants are propagated either from ſeeds or layers; but the latter being the moſt expeditious method in England, is chiefly preferred. The leaves are drying and aſtringent, and much commended for ulcers in the mouth.

Privet-*fly*, in *Natural Hiſtory*, the name of a ſpecies of fly very common on the ſhrub from whence it has its name. It is called the *erinopterus*, and is remarkable for having its wings deeply divided into ſegments, ſo that they ſeem compoſed of feathers like bird's wings. The creature, as it ſits, looks like a ſmall feather.

PRIVIES *of a camp*. See **Camp**.

PRIVILEGE, *privilegium*, formed from the Latin *privata lex*, in the general, any kind of right, prerogative, or advantage, attached to a certain perſon, condition, or employment, excluſive of others.

Privelege, in *Law*, is a particular right granted to a ſingle perſon, place, community or the like, whereby they are exempted from the rigour of the common laws.

Privilege is either *perſonal* or *real*.

Privilege, *perſonal*, is that which is granted to any perſon either againſt or beyond the courſe of the common law.

Such, e. gr. is that of a member of parliament; who may not be arreſted, nor any of his ſervants, during the ſitting of parliament, nor for a certain time before and after.

Privilege, *real*, is a franchiſe granted to a place.

Such is that granted to our univerſities, by which none who are members thereof may be called to Weſtminſter-hall upon any contract made within their own precincts. So alſo a perſon belonging to the court of chancery cannot be ſued in any other court, certain caſes excepted; and if he be, he may remove it by *writ of privilege*.

It is an ancient *privilege* for men to be exempted from arreſts within the verge of the court, i. e. in or near the palace where the king is reſident: becauſe, in ſuch caſes, quarrels frequently happen; and the peace ought to be ſtrictly kept there.

In the laws of Henry I. it is expreſſed, that peace ought to be maintained religiouſly and reverently within four miles of the king's doors towards the four quarters; and forty-nine acres, nine feet, nine palms, and nine barley-corns, around.

Privilege, *attachment of*. See **Attachment**.

Privilege, in *Commerce*, is a permiſſion from a prince or magiſtrate, to make and ſell a certain merchandize, or to engage in a certain commerce, either excluſively of others, or currently with them.

The firſt is called an *excluſive privilege*; the latter, ſimply, a *privilege*.

Excluſive privileges are to be granted rarely, by reaſon of the hindrance they are of to trade; yet they are ſometimes very juſt and reaſonable, by way of reward for the invention of uſeful machines, manufactures, &c.

Excluſive privileges for foreign commerce are uſually granted on the following conditions: that the commodities be brought from remote parts, where there is no going without running great riſques; that the *privilege* be only for a limited time; that the perſons *privileged* be not allowed to monopolize, i. e. to raiſe and lower their commodities at pleaſure; but that the ſale and price be always proportionable to the expence, intereſts, &c. and that the *privileged* aſſiſt the ſtate, on occaſion, with part of their gains.

Privilege *for the impreſſion of books* is properly excluſive; being a permiſſion which an author, or bookſeller, obtains under a prince's ſeal, to have alone the impreſſion of a book, with a prohibition of all others to print, ſell, or diſtribute the ſame, within a certain term of years, uſually fourteen, under the clauſes and penalties expreſſed therein.

Theſe *privileges* were unknown till the beginning of the ſixteenth century, when they were introduced in France. The oldeſt is ſaid to bear date in the year 1507, and to have been occaſioned by ſome printers counterfeiting the works of others as ſoon as they appeared.

But people were yet at liberty to take or let them alone at pleaſure, till the intereſts of religion, and the ſtate, occaſioned the reſtraining of this liberty.

In 1563, Charles IX. publiſhed a celebrated ordonnance, forbidding any perſon, on pain of confiſcation of body and goods, to print any letter, ſpeech, &c. without permiſſion.

The like has been ſince done in England; though, at preſent, *privileges* are not only not required, but by the late act, for ſecuring the properties of books, ſeem needleſs.

Privileges *of the clergy*. See **Clergy**.

Privilege *of the tabouret*. See **Tabouret**.

Privileged *debt*. See **Debt**.

PRIVITY, an intimate freedom, or private familiarity between two perſons.

The lawyers ſay, if there be lord and tenant, and the tenant hold of the lord by certain ſervices; there is a *privity* between them in reſpect of the tenure.

PRIUS. *Niſi* **Prius**, in *Law*. See **Nisi**.

PRIVY, in *Law*, a perſon who is partaker, or has an intereſt in any action or thing.

In this ſenſe they ſay, *privies in blood*: every heir in tail is *privy* to recover the land intailed.

In old law-books, *merchants privy* are oppoſed to merchants ſtrangers.

Coke mentions four kinds of *privies*. *Privies in blood*, as the heir to his father; *privies in repreſentation*, as executors and adminiſtrators to the deceaſed; *privies in eſtate*, as he in reverſion, and he in remainder; donor and donee; leſſor and leſſee; laſtly, *privy in tenure*, as the lord by eſcheat; i. e. when land eſcheats to the lord for want of heirs.

Privy *council*, called by way of eminence, *the* COUNCIL, a council of ſtate, held by the king with his counſellors, to concert matters for the public ſervice, and for the honour and ſafety of the realm.

The king's will is the ſole conſtituent of a *privy*-counſellor; and this alſo regulates their number, which in ancient time was about twelve. Afterwards it increaſed to ſo large a number, that it was found inconvenient for ſecrecy and diſpatch: and therefore, king Charles II. in 1679, limited it to thirty; whereof fifteen were to be the principal officers of ſtate, and thoſe to be counſellors, *virtute officii*; and the other fifteen were compoſed of ten lords and five commoners of the king's chooſing. But ſince that time the number has been much augmented, and now continues indefinite. At the ſame time alſo, the ancient office of *lord* PRESIDENT of the council was revived, in the perſon of Anthony, earl of Shafteſbury.

Privy-counſellors are made by the king's nomination, without either patent or grant; and, on taking the neceſſary oaths, they become immediately *privy*-counſellors during the life of the king that chooſes them, but ſubject to removal at his diſcretion.

As to the qualifications of members to ſit at this board, any natural born ſubject of England is capable of being a member of the *privy-council*; taking the proper oaths for ſecurity of the government, and the teſt for ſecurity of the church. By the act of ſettlement, 12 and 13 W. III. cap. 2. it is enacted, that no perſon born out of the dominions of the crown of England, unleſs born of Engliſh parents, even though naturalized by parliament, ſhall be capable of being of the *privy-council*.

The duty of a *privy*-counſellor appears from the oath of office, which conſiſts of ſeven articles. 1. To adviſe the king according to the beſt of his cunning and diſcretion. 2. To adviſe for the king's honour and good of the public, without partiality, through affection, love, need, doubt or dread. 3. To keep the king's counſel ſecret. 4. To avoid corruption. 5. To help and ſtrengthen the execution of what ſhall be there reſolved. 6. To withſtand all perſons who would attempt the contrary. And, laſtly, in general, 7. To obſerve, keep, and do all that a good and true counſellor ought to do to his ſovereign lord.

The *privy-council* is, or ought to be, the primum mobile of the ſtate, and that which gives the motion and direction to all the inferior parts. It is likewiſe a court of juſtice of great antiquity; the primitive and ordinary way of government in England being by the king and *privy-council*.

It has been frequently uſed by all our kings for determining controverſies of great importance: the ordinary judges have ſometimes declined giving judgement till they had conſulted the king and *privy-council*; and the parliament have frequently referred matters of high moment to the ſame, as being by long experience better able to judge of, and, by their ſecrecy and expedition, to tranſact ſome ſtate affairs, than the lords and commons.

At preſent, the *privy-council* takes cognizance of few or no matters except ſuch as may not be well determined by the known laws, and ordinary courts; ſuch as matters of complaint and ſudden emergencies: their conſtant buſineſs being to conſult for the public good in affairs of ſtate.

This power of the *privy-council* is to enquire into all offences againſt the government, and to commit the offenders to ſafe cuſtody, in order to take their trial in ſome of the courts of law. But their juriſdiction herein is only to enquire, and not to puniſh; and the perſons committed by them are entitled to their *habeas corpus* by ſtatute 16. Car. I. cap. 10. as much as if committed by an ordinary juſtice of the peace.

In plantation or admiralty cauſes, which ariſe out of the juriſdiction of this kingdom, and in matters of lunacy and idiocy, the *privy-council* has cognizance, even in queſtions, of extenſive property, being the court of appeal in ſuch cauſes; or, rather, the appeal lies to the king's majeſty himſelf in council.

From all the dominions of the crown, excepting Great Britain and Ireland, an appellate juriſdiction (in the laſt reſort) is veſted in this tribunal; which uſually exerciſes its judicial authority in a committee of the whole *privy-council*, who hear the allegations and proofs, and make their report to his majeſty in council, by whom the judgment is finally given.

Anciently, to ſtrike in the houſe of a *privy*-counſellor, or elſewhere in his preſence, was grievouſly puniſhed: by 3 Hen. VII. cap. 14. if any of the king's ſervants of his houſhould, conſpire or imagine to take away the life of a *privy*-councellor, it is felony, though nothing ſhall be done upon it; and by 9 Ann. cap. 16. it is enacted, that any perſons who ſhall unlawfully attempt to kill, or ſhall unlawfully aſſault, and ſtrike or wound any *privy*-counſellor in the execution of his office, ſhall be felons, and ſuffer death as ſuch.

With advice of this council, the king iſſues proclamations that bind the ſubject, provided they be not contrary to law.

In debates, the loweſt delivers his opinion firſt, the king laſt, and thereby determines the matter.

A council is never held without the preſence of a ſecretary of ſtate.

The diſſolution of the *privy-council* depends upon the king's pleaſure; and he may, whenever he thinks proper, diſcharge any particular member, or the whole of it, and appoint another. By the common law alſo it was diſſolved *ipſo facto* by the king's demiſe, as deriving all its authority from him. But now, to prevent the inconveniencies of having no council in being at the acceſſion of a new prince, it is enacted, by 6 Ann. cap. 7. that the *privy-council* ſhall continue for ſix months after the demiſe of the crown, unleſs ſooner determined by the ſucceſſor. Blackeſt. Com. book. i. p.229, &c.

The officers of the *privy-council* are four clerks of the council in ordinary, three clerks extraordinary, a keeper of the records, and two keepers of the council-chamber.

Lord preſident of the Privy *council.* See President.

Privy *ſeal*, a ſeal which the king uſes, previouſly to ſuch grants, &c. as are afterwards to paſs the great ſeal.

Yet the *privy* ſeal is ſometimes uſed in matters of leſs conſequence, which do not require the great seal.

Lord Privy *ſeal.* See **Keeper** *of the Privy Seal*, and Lord *Privy Seal.*

Clerks of the Privy *ſeal.* See **Clerk.**

Privy *chamber.* See **Chamber.**

PRIZE. See Priſe.

PRIZING, in *Sea-Language*, denotes the application of a lever to move any weighty body, as a caſk, anchor, cannon, &c.

PRO, a prepoſition, ſignifying *for*, or in reſpect of a thing, *as pro conſilio*, &c. And in law, *pro* in the grant of an annuity, *pro concilio*, ſhewing the cauſe of the grant, amounts to a condition. But in a feoffment, or leaſe for life, &c. it is the conſideration, and doth not amount to a condition; and the reaſon of the difference is, becauſe the ſtate of the land by the feoffment is executed, and the grant of the annuity is executory.

Pro *confeſſo.* See Pro-confsso.

Pro *indiviſo.* See Pro-indiviso.

PROA, *flying*, in *Navigation*, a name given to a veſſel uſed in the South Seas, on account of the ſwiftneſs with which it ſails, being with a briſk trade-wind, near twenty miles an hour. As to the conſtruction of the *proa*, her head and ſtern are exactly alike, but her two ſides are very different: the ſide intended to be always the lee-ſide, being flat; and the windward-ſide made rounding, in the manner of other veſſels, and, to prevent her overſetting, which from her ſmall breadth, and the ſtraight run of her leeward-ſide, would, without this precaution, infallibly happen, there is a frame laid out to her from windward, to the end of which is faſtened a log, faſhioned into the ſhape of a ſmall boat, and made hollow. The weight of the frame is intended to balance the *proa*, and the ſmall boat, is by its buoyancy (as it was always in the water), to prevent her overſetting to windward; and this frame is uſually called an out-rigger. The body of the *proa* is made of two pieces joined endways, and ſowed together with bark, for there is no iron uſed about her; ſhe is about two inches thick at the bottom, which, at the gun-wale, is reduced to leſs than one. The ſail is made of matting, and the maſt, yard, boom, and out riggers are all made of bamboo. See the deſcription and drawing of a *proa* in Anſon's voyage, quarto, p. 341.

The *proa* generally carries ſix or ſeven Indians; two of whom are placed in the head and ſtern, who ſteer the veſſel alternately with a paddle, according to the tack ſhe goes on; the perſon in the ſtern being the ſteerſman: the other Indians are employed either in bailing out the water, which ſhe accidentally ſhips, or in ſetting and trimming the ſail.

PROBABILISTS, a ſect, or diviſion, among the Romaniſts, who adhere to the doctrine of probable *opinions*; holding, that a man is not always obliged to take the more probable ſide, but may take the leſs probable, if it be but barely probable.

The Jeſuits and Moliniſts are ſtrenuous *Probabiliſts.* See Jesuit, &c.

Thoſe who oppoſe this doctrine, and aſſert, that we are obliged, on pain of ſinning, always to take the more probable ſide, are called *Probabilioriſts.*

The Janſeniſts, and particularly the Portroyaliſts, are *Probabilioriſts.*

PROBABILITY *of an event*, in the *Doctrine of Chances*, is greater or leſs according to the number of chances by which it may happen compared with the whole number of chances by which it may either happen or fail. Wherefore, if we conſtitute a fraction, whereof the numerator be the number of chances whereby an event may happen, and the denominator the number of all the chances whereby it may either happen or fail, that fraction will be a proper deſignation of the *probability* of happening. Thus if an event has three chances to happen, and two to fail, the fraction $\frac{3}{5}$ will fitly repreſent the *probability* of its happening, and may be taken to be the meaſure of it. The ſame thing may be ſaid of the *probability* of failing, which will likewiſe be meaſured by a fraction, whoſe numerator is the number of chances, whereby it may fail, and the denominater the whole number of chances both for its happening and failing; thus the *probability* of the failing of that event which has two chances to fail and three to happen, will be meaſured by the fraction $\frac{2}{5}$. If the fractions which repreſent the *probabilities* of happening and failing be added together, their ſum will always be equal to unity, ſince the ſum of their numerators will be equal to their common demoninator: and ſince it is a certainty that an event will either happen or fail, it follows, that certainty, which may be conceived under the notion of an infinitely great degree of *probability*, is fitly repreſented by unity. De Moivre's Doct. of Chances, p. 1, &c. See **Expectation**, and **Gaming.**

Probability *of life.* See **Expectation** *of life*, and **Life**-*annuities*.

Probability, in *Reaſoning*, *veriſimilitude*; or an appearance of truth.

To define it philoſophically, *probability* is the appearance of the agreement or diſagreement of two things by the intervention of proofs, whoſe connexion is not conſtant and immutable, or is not perceived to be ſo; but is, or appears, for the moſt part, to be ſo; ſo as to ſuffice to induce the mind to judge the propoſition to be true or falſe, rather than the contrary.

That propoſition, then, is *probable*, for which there are arguments and proofs to make it paſs, or be received for true.

The entertainment the mind gives to this ſort of propoſitions, is called *belief*, *aſſent*, or *opinion*.

Probability, then, being to ſupply the defect of our knowledge is always converſant about propoſitions whereof we have no certainty, but only ſome inducements to receive them for true: and this *probability* relates either to matter of fact, which falling under obſervation, and capable of human teſtimony, or to things which, being beyond the diſcovery of our ſenſes, are not capable of any ſuch teſtimony; called matters of ſpeculation.

According to Ariſtotle, a propoſition is *probable*, if it ſeem true to all or moſt people, and thoſe the wiſer and more reputable ſort: but by *ſeem* he means, what, after a cloſe inquiry, ſhall ſeem to be true.

Of *probability* there are various degrees, from the confines of certainty and demonſtration, down through improbability and unlikeneſs, to the confines of impoſſibility; and alſo degrees of aſſent from certain knowledge, and what is next to it, full aſſurance and confidence, quite down to conjecture, doubt, diſtruſt, and diſbelief.

The grounds of *probability* are, in ſhort, theſe two following: viz. the conformity of any thing with our own particular knowledge, experience, or obſervation, called *internal probability*; and the teſtimony of others, vouching their obſervation, or experience, called *external probability*.

In the doctrine of *probability*, one important obſervation may be made, viz. that if one premiſs only of an argument be probable, the concluſion is neceſſarily probable; but if two or more premiſes be probable the concluſion will not be neceſſarily probable. Thus for inſtance, ſuppoſing the *probability* of each premiſs expreſſed by $\frac{7}{10}$, the *probability* of the concluſion will be but $\frac{49}{100}$ which ſhews it to be improbable. For we may call any thing *improbable*, if the meaſure of the chance for its happening is leſs than $\frac{1}{2}$. If there had been three premiſes, and the *probability* of each equal to $\frac{7}{10}$, the *probability* of the concluſion would be $\frac{343}{1000}$, which is conſiderably improbable. Again ſuppoſing the *probability* of the truth of each premiſs to be 2 to 1 or expreſſed by $\frac{2}{3}$, the *probability* of the concluſion in the caſe of the two premiſes would be $\frac{4}{9}$. Where three premiſes are aſſumed to infer a concluſion, this would be $\frac{8}{27}$; and in caſe of four premiſes, the *probability* of the concluſion would be but $\frac{16}{81}$, which is leſs than $\frac{1}{5}$, ſo that one might with advantage lay 4 to 1 againſt the truth of a concluſion founded on four probable premiſes, for the truth of which ſeparately taken 2 to 1 might be laid. It is to be obſerved in all theſe caſes, that the premiſes are ſuppoſed independent, that is, not neceſſarily connected with each other. Hence it is eaſy to account how it happens, that the moſt plauſible political and phyſical reaſonings lead ſo often to concluſions falſe in fact.

Mr. de Moivre has ſolved two problems, tending to eſtabliſh the degree of aſſent that ought to be given to experience. He determines from his ſolutions, that if after taking a great number of experiments, it ſhould have been obſerved, that the happenings or failings of an event have been very near in a ratio of equality, it may ſafely be concluded, that the *probabilities* of its happening or failing at any one time aſſigned, are very near equal.

And if after taking a great number of experiments, it ſhould be perceived, that the happenings and failings have been nearly in a certain proportion, ſuch as 2 to 1, it may ſafely be concluded, that the *probabilities* of happening or failing, at any one time aſſigned, will be very near in that proportion; and that the greater the number of experiments has been, ſo much the nearer the truth will the conjectures be, that are derived from them.

Chance very little diſturbs the events which, in the natural inſtitution, were deſigned to happen or fail according to ſome determined law. For if in order to help our conception, we imagine a round piece of metal, with two poliſhed oppoſite faces, differing in nothing but their colour, whereof one may be ſuppoſed to be white, and the other black, it is plain that this piece may with equal facility exhibit a white or black face; and we may even ſuppoſe that it was framed with that particular view of ſhewing ſometimes the one face, ſometimes the other; and that conſequently, if it be toſſed up, chance will decide the appearance. But although chance may produce an inequality of appearance, and that a greater inequality, according to the length of time in which it may exert itſelf, ſtill the appearance, either one way or the other, will perpetually tend to a proportion of equality. This is, in like manner, applicable to a ratio of inequality; and thus in all caſes it will be found, that although chance produces irregularities, ſtill the odds will be infinitely great, that in proceſs of time thoſe irregularities will bear no proportion to the recurrency of that order which naturally reſults from original deſign. See De Moivre's Doctrine of Chance, p. 231, 243. See *Moral* CERTITUDE.

PROBABILITY, in *Poetry*, denotes the appearance of truth in the fable or action of a poem.

There are four kinds of actions: for a thing may be either only true or only probable; or true and probable at the ſame time; or neither the one, nor the other.

Theſe four kinds of actions are ſhared between four arts: hiſtory takes the firſt, ſtill keeping to truth, without regard to *probability*.

Epic and dramatic poetry have the ſecond, and ſtill prefer *probability*, though falſe, to an *improbability*, though true. Thus the death of Dido, who killed herſelf on her being deſerted by Æneas, though falſe in itſelf, is a fitter ſubject for a poem, than the action of Sampſon, or the Maid of Orleans.

Moral philoſophy takes the third; and the fabuliſts, as Æſop, &c. the fourth.

Boſſu adds, that the epopœia, in its nature and eſſence, uſes truth and *probability* like morality; yet, in its certainty and expreſſions, takes a liberty like that of Æſop; inſtances of which we have in the Æneid.

Poetical *probability* may be ſo either in reſpect of the rules of theology, of morality, nature, reaſon, experience, or opinion.

As to theology, there is ſcarce any thing but is probable, in reſpect hereof; becauſe nothing is impoſſible to God. This is an expedient the poets have frequent recourſe to, in order to bring things feigned contrary to the order of nature, within the bounds of *probability*. See this conſidered under the article MACHINE.

As to *morality*, we have obſerved, it requires both truth and veriſimilitude: an ancient poet was condemned on the theatre for a ſlip herein: viz. for making a perſon, whom he repreſented as an honeſt man, ſay, that *though his tongue ſwore, his mind did not*.

Seneca accuſes Virgil of an offence againſt *natural probability* in ſaying, that the winds were pent up in caves; for, ſays that philoſopher, wind being only air in motion, to ſuppoſe it at reſt, is to deſtroy its nature. To which Voſſius anſwers, that the poet only ſpeaks of the natural origin of winds; which are produced in mountains by vapours, &c. pent there; juſt as we ſhould ſay, the winds are incloſed in an *æolipile*.

Virgil, likewiſe, committed an offence againſt *natural probability*, by making Æneas find deer in Africa; becauſe that country produces none.

Indeed theſe faults are excuſable, becauſe, as Ariſtotle finely obſerves, they are not faults in the poet's art, but they ariſe from his ignorance of ſomething taught in the other arts.

However, care muſt be taken they be not too groſs: there being ſome *probabilities*, of this kind, which Æſop himſelf could not diſpenſe withal; he would never be forgiven, were he to repreſent a lion fearful, a hare daring, a fox ſtupid, &c.

Probability, in reſpect of *reaſon*, is frequently broken in upon by thoſe who affect nothing but the *merveilleux*. Here Statius is a notorious offender: Tydeus, being ſurpriſed in an ambuſcade by fifty bravoes, who had vowed his death, kills forty-nine of them, and pardons the laſt.

But the principal and moſt important kind of *probability* is that in reſpect of *common opinion*. A thing is probable, when it looks like truth: but ſometimes it ſhall appear true to the people, and falſe to the learned; and *vice verſa*. When, then, the learned and the people are divided, to which ſide muſt the poet adhere? Suppoſe, for inſtance, the adventure of Penelope, the hiſtory of Medea, Helena, or the like: what Virgil and Homer have written of them ſhall appear probable to the populace, yet the learned read the contrary in hiſtory; ſome authors having written, that Dido was chaſte, and Medea innocent; that Penelope was divorced and baniſhed, by Ulyſſes, for abuſing his abſence; and that Helena never ſaw Troy.

This point is ſoon decided: Homer and Virgil make no ſcruple of deviating from hiſtory to improve their fables; and Horace does not ſend the poets to the truths of hiſtory; but either to fables already invented, or to common fame. All which is confirmed by Ariſtotle.

To theſe kinds of *probability* may be added another, which we call *accidental probability*: it conſiſts not in the uſing of ſeveral incidents, each propable apart; but in diſpoſing them ſo as to hang probably together.

A man, e. gr. may probably die of an apoplexy; but that this ſhould happen juſt in the moment, when the poet wanted it for an unravelling, is highly *improbable*.

It is an offence againſt this kind of *probability*, to produce an incident all at once, and without any preparation which yet needed one. Virgil is wonderfully exact in this point: Juno prepares the tempeſt raiſed in the firſt book; Venus in the ſame book prepares the amours of the fourth. The death of Dido, in the end of the fourth, is prepared on the firſt day of marriage; Helenus, in the third, diſpoſes the whole matter of the ſixth; and in the ſixth, the Sibyl predicts all the wars that follow.

PROBABLE *opinion*, a term a long time controverted among the Romiſh caſuiſts; uſually defined, an opinion founded on a grave motive, or an apparently good foundation, and which has authority enough on its ſide to perſuade a wiſe diſentereſted perſon to aſſent to it.

Others define a *probable opinion* to be that, which, being compared with the contrary opinion, becomes problematical, by a perfect equality of the reaſons on each ſide; ſo that there is nothing in reaſon or nature to determine on this ſide, rather than that.

But the JESUITS go ſtill farther, and maintain, that to render an *opinion probable*, it ſuffices that it be either built on a reaſon of ſome conſequence, or on the authority of ſome one grave doctor. With theſe qualifications it is allowable to follow it, even though it be leſs *probable* and leſs certain, than the contrary opinion; thus it is ſaid, that an opinion or precept may be followed with a good conſcience, when it is inculcated by four, three, or two, nay even by one doctor of any conſiderable reputation, even though it be contrary to the judgment of him that follows it, and even of him that recommends it. Here it is that the venom of *probability* lies; as this doctrine rendered the Jeſuits capable of accommodating themſelves to all the different paſſions of men, and to perſons of all tempers and characters, from the moſt auſtere to the moſt licentious.

This doctrine is attacked, with infinite addreſs, by M. Paſcal in the Provincial Letters; on which account they were burnt publicly at Paris. The doctrine of the Jeſuits was alſo attacked by Perrault in his La Morale des Jeſuits, &c. publiſhed at Mons, in 3 vols. 8vo. in 1702; which ſhared the ſame fate with the Provincials of Paſcal. The attack is farther purſued in Arnauld's La Morale Pratique des Jeſuites, 8 vols. 8vo. of which a ſecond edition was publiſhed at Amſterdam in 1742.

One of the twenty-four patriarchs of the Jeſuits, Caſtro Palaio, aſſerts, that a judge, in a queſtion of right, may give ſentence according to a *probable opinion*, againſt a more *probable* one; and this, contrary to the judgment and perſuaſion of his own mind; *imo contra propriam opinionem*. Eſcobar, tr. 6. ex. 6. n. 45.

So Vaſquez maintains, that it is lawful to follow the leſs *probable* and leſs ſecure opinion, diſcarding the more *probable* and more ſecure one.

Leſſius and Eſcobar, treating of the queſtion, Whether a man may kill another for giving him a box on the ear? decide it to be a *probable opinion*, and ſpeculatively true; though there may be ſome inconveniences in the practice, for which it would be as well to let it alone. *In praxi tutam* & probabilem *judicarunt*—*ſed non facile admittendam*. Let. Provinciales, p. 307, 308.

PROBANDA *proprietate*. See PROPRIETATE.

PROBATE *of a will* or *teſtament*, in *Law*, is the exhibiting and proving a will and teſtament, before the eccleſiaſtical judges delegated by the biſhop, who is ordinary of the place where the party dies.

When the will is proved, the original muſt be depoſited in the regiſtry of the ordinary; and a copy thereof in parchment is made out under the ſeal of the ordinary, and delivered to the executor or adminiſtrator, together with a certificate of its having been proved before him; all which together is uſually ſtyled the *probate*. The perſon before whom the teſtament is to be proved is, generally, the biſhop of the dioceſe where the teſtator dwelled, or his officer.

If all the goods of the deceaſed be in the ſame dioceſe, then the biſhop of the dioceſe, or the archdeacon, according as their compoſition leads, has the *probate* of the teſtament. If the goods lie diſperſed in ſeveral dioceſes, ſo that there be any ſum or note, BONA *notabilia*, as five pounds, in two diſtinct dioceſes or juriſdictions, then the will muſt be proved, or ADMINISTRATION taken out, before the metropolitan of the province, by way of ſpecial *prerogative*; whence the court where the validity of ſuch wills is tried, and the office where they are regiſtered, are called the *prerogative* COURT, and the prerogative office, of the provinces of Canterbury and York. The power of granting *probates* and adminiſtrations of the goods of perſons dying, for wages or work done in the king's docks and yards, ſhall be in the ordinary of the dioceſe where the perſon dieth, or in him to whom power is given by ſuch ordinary, excluſive of the prerogative court, &c. 4 Ann. cap. 16.

This *probate* may be made two ways; either in *common form*, or *per teſtis*. The proof in *common form* is only by the oath of the executor, or party exhibiting the will, who ſwears upon his belief, before the ordinary or his ſurrogate, that the will exhibited by him, is the laſt will and teſtament of the deceaſed.

This is the practice, it is ſaid, through the province of Canterbury; but within the province of York, it hath been uſual alſo to ſwear one witneſs to the will.

The proof *per teſtes*, *by witneſſes*, is when over and beſides his own oath, he alſo produces witneſſes, or makes other proof to confirm, that it is the laſt will of the deceaſed; and this in the preſence of ſuch as may pretend ſome intereſt in the goods of the deceaſed; or at leaſt in their abſence, after they have been lawfully ſummoned to ſee ſuch a will proved, if they think fit.

The latter courſe is commonly taken when there is fear of ſome ſtrife, or diſpute about the deceaſed's goods: for ſome hold, that a will proved in common form only, may be called in queſtion any time within thirty years after.

Where a will diſpoſes of lands and tenements of freehold, it is now frequently proved by witneſſes in chancery.

The deviſe of a perſonal eſtate is not conſidered of any effect until *probate* is made of the will by the executor; neither can an executor or other perſon give a will in evidence concerning a perſonal chattel without producing the *probate*: and a *probate* obtained in the eccleſiaſtical court cannot be ſet aſide in any other court either of law or equity. But the *probate* of a will, or a copy of the will out of the regiſter of the ſpiritual court are not to be allowed as evidence in the caſe of lands.

By 21 Hen. VIII. cap. 5. it is enacted, that on *probate* of wills, &c. 6*d.* and no more ſhall be taken by the regiſter, where the goods of the deceaſed do not exceed five pounds value; and when the goods are above the value of 5*l.* and under 40*l.* the fee to the biſhop or ordinary ſhall be 2*s.* 6*d.* and to the regiſter 1*s.* And if the goods exceed 40*l.* in value, to the biſhop or ordinary 2*s.* 6*d.* and to the regiſter 2*s.* 6*d.* which, however, he may refuſe, and take a penny for every ten lines of the will, &c. And if the officer takes more than his due fees, he ſhall forfeit 10*l.* to be divided between the king and the party grieved. See alſo 31 Geo. II. cap. 10.

By the ſeveral ſtamp acts, for every ſkin or piece of vellum or parchment, or ſheet or piece of paper on which ſhall be written any *probate* of a will, for any eſtate above the value of 20*l.* ſhall be paid a ſtamp duty of 10*s.* except of common ſeamen or common ſoldiers, ſlain or dead in the ſervice. See EXECUTOR, and WILL.

PROBATICA *piſcina*. See PISCINA.

PROBATION, in a *Monaſtic Senſe*, a time of trial; or the year of noviciate, which a religious muſt paſs in a convent to prove his virtue and vocation, and whether he can bear the ſeverities of the rule.

The year of *probation* commences from the day of novices taking the habit.

PROBATION, in the *Univerſities*, denotes the examination and trial of a ſtudent who is about to take his degrees. See DEGREE.

PROBATIONER, in the *Preſbyterian Diſcipline*, a perſon licenſed by a preſbytery to preach; which is uſually done a year before he be ordained.

A ſtudent in divinity is not admitted *probationer* till after ſeveral trials; the firſt, private, before a preſbytery; the ſecond, public, before a congregation, the preſbytery being preſent.

The private trials are a homily and exegeſis, i. e. a theological ſubject is given in to the preſbytery in theſes, and the candidate anſwers any objections ſtarted againſt it.

The public trials are a popular ſermon, and an exerciſe and addition, i. e. a text is handled, half an hour logically and critically, and half an hour more practically. If he acquit himſelf to the ſatisfaction of the preſbytery, he ſigns the confeſſion of faith, and owns the preſbyterian government, &c. Upon which he receives a licence to preach.

PROBATOR, in *Law*, an accuſer, or approver; one who undertakes to prove a crime charged upon another: properly, an accomplice in the crime, who impeaches others.

PROBATUM *eſt*, q. d. *it is proved*; a term frequently ſubjoined to a receipt for the cure of ſome diſeaſe.

PROBE, a ſurgeon's inſtrument, wherewith to ſound and examine the circumſtances of wounds, ulcers, and other cavities. See *Tab. Surgery, fig.* 9.

Anel's PROBE. See *Tab.* II. *Surgery, fig.* 20. and FISTULA *lachrymalis*.

PROBLEM, Προβλημα, in *Logic*, a doubtful queſtion; or a propoſition that neither appears abſolutely true, nor falſe; but which is probable on both ſides, and may be aſſerted either in the negative or affirmative, with equal evidence.

Thus, that the moon and planets are inhabited by animals in ſome reſpect like us, is a *problem*: that the fixed ſtars are all ſuns, and each the centre of a ſeveral ſyſtem of planets and comets, is a *problem*.

Problem is alſo a propoſition expreſſing ſome natural effect, propoſed in order to a diſcovery of its apparent cauſe. Such are the *problems* of Ariſtotle.

A logical or dialectical *problem*, ſay the ſchoolmen, conſiſts of two parts; a SUBJECT, or ſubject-matter, about which the doubt is raiſed: and a PREDICATE or attribute, which is the thing doubted whether it be true of the ſubject or not.

There are four topical predicates; viz. *genus*, *definitio*, *proprium*, and *accidens*: whence ariſe four different kinds of dialectical *problems*.

The firſt, when the thing attributed to the ſubject is in the relation of a genus; as, whether fire be an element or not?

The ſecond, when the thing attributed as the effect of a definition; as, when it is aſked, whether or no rhetoric be the art of ſpeaking?

The third, when the attribute imports a propriety; as, whether it belong to juſtice to give every one their due?

The laſt is when the thing attributed is adventitious: as, whether juſtice is to be deſired?

Problems, again, may be divided into thoſe relating to things to be done, or avoided, called *ethical*; thoſe relating to the knowledge of nature, called *phyſical*; thoſe relating to ſpirits, called *metaphyſical problems*, &c.

Problem, in *Geometry*, denotes a propoſition wherein ſome operation, or conſtruction, is required; as to divide a line, to make an angle, to draw a circle through three points not in a right line, &c.

Meſſieurs of the Port Royal define a *geometrical problem*, a propoſition given to be demonſtrated, wherein ſomething is required to be done; and what is done, to be proved to be the thing required.

A *problem*, according to Wolfius, conſiſts of three parts. The propoſition, which expreſſes what is to be done. The reſolution, or ſolution, wherein the ſeveral ſteps, whereby the thing required is to be effected, are orderly rehearſed. The demonſtration, wherein is ſhewn, that by doing the ſeveral things preſcribed in the reſolution, the thing required is obtained.

Accordingly the general tenor of all *problems* is this; the things preſcribed in the reſolution being done, the thing required is done. See GEOMETRICAL *ſolution of a problem*.

Problem, in *Algebra*, is a queſtion or propoſition which requires ſome unknown truth to be inveſtigated or diſcovered; and the truth of the diſcovery demonſtrated.

In this ſenſe it is a *problem*, to find a THEOREM. Algebra is defined to be the art of reſolving all *problems* that are reſolvable.

Problem, *Kepler's*, in *Aſtronomy*, is the determining of a planet's place from the time; thus called from the aſtronomer Kepler, who firſt propoſed it.

The *problem*, ſtated in form, ſtands thus: to find the poſition of a right line, which, paſſing through one of the foci of an ellipſis, ſhall cut off an area deſcribed by its motion, which ſhall be in any given proportion to the whole area of the ellipſis.

The propoſer knew no way of ſolving the *problem* directly and geometrically; and therefore had recourſe to an indirect method; for which he was taxed with an αγεωμετρησια, or want of geometry; and his aſtronomy charged with not being geometrical. But the *problem* has ſince been ſolved directly and geometrically ſeveral ways, by ſeveral authors; particularly Sir Iſaac Newton, Dr. Keil, &c.

As to the ſolution of this *problem*, the late excellent mathematician Mr. Machin obſerves, that many attempts have been made, at different times, but never yet with tolerable ſucceſs, towards the ſolution of the *problem* propoſed by Kepler: to divide the area of a ſemicircle into given parts, by a line from a given point of the diameter, in order to find an univerſal rule for the motion of a body in an elliptic orbit. For among the ſeveral methods offered, ſome are only true in ſpeculation, but are really of no ſervice. Others are not different from his own, which he judged improper. And as to the reſt, they are all ſome way or other ſo limited and confined to particular conditions and circumſtances, as ſtill to leave the *problem* in general untouched. To be more particular, it is evident, that all conſtructions by mechanical curves are ſeeming ſolutions only, but in reality unapplicable; that the roots of infinite ſerieſes are, upon account of their known limitations in all reſpects, ſo far from affording an appearance of being ſufficient rules, that they cannot well be ſuppoſed as offered for any thing more than exerciſes of a method in calculation. And then, as to the univerſal method, which proceeds by a continued correction of the errors of a falſe poſition, it is, when duly conſidered, no method of ſolution at all in itſelf; becauſe unleſs there be ſome antecedent rule or hypotheſis to begin the operation (as ſuppoſe that of a uniform motion about the upper focus, for the orbit of a planet; or that of a motion in a parabola for the perihelion part of the orbit of a comet; or ſome other ſuch) it would be impoſſible to proceed one ſtep in it. But as no general rule has ever yet been laid down to aſſiſt this method, ſo as to make it always operate, it is the ſame in effect as if there were no method at all. And accordingly in experience it is found, that there is no rule now ſubſiſting but what is abſolutely uſeleſs in the elliptic orbits of comets; for in ſuch caſes there is no other way to proceed but that which was uſed by Kepler: to compute a table for ſome part of the orbit, and therein examine if the time to which the place is required, will fall out any where in that part. So that, upon the whole, it appears evident, that this *problem*, contrary to the received opinion, has never yet been advanced one ſtep towards its true ſolution. Vide Machin, in Phil. Tranſ. Martyn's Abridg. vol. viii. p. 73.

Mr. Machin afterwards proceeds to give his own ſolution of this *problem*, which is particularly neceſſary in orbits of a great excentricity; and he illuſtrates his method by examples, for the orbits of mercury, of Venus, of the comet of the year 1682, and of the great comet of the year 1680, all which ſhew the univerſality of that method. See EQUATION *of the Centre*.

Problem, *determinate*, *diophantine*, *indeterminate*, *limited*, *linear*, *local*, *plain*, *ſolid*, *ſurſolid*, and *unlimited*. See the adjectives.

Problem, *Deliacal*, in *Geometry*, is the doubling of a cube. This *problem* coincides with that for finding two mean proportionals between two given lines; whence that alſo is called the *deliac problem*. See DUPLICATION.

PROBLEMATICAL *reſolution*, in *Algebra*, a method of ſolving difficult queſtions by certain rules, called *canons*.

PROBOLIUM, among the Romans, a kind of ſpear, which hunters uſed in hunting boars.

PROBOSCIPLECTANUS, in *Natural Hiſtory*, a name given by ſome authors to a peculiar and very elegant ſpecies of penicillus marinus, which has ſomewhat of a funnel-like ſhape, and has its mouth ſurrounded by a number of thin hair-like filaments. See PENICILLI *marini*.

The firſt who has deſcribed this particular ſpecies is the accurate Fabius Columna, from whom Klein has engraven a figure of it.

PROBOSCIS, ϖροϐοσκις, in *Natural Hiſtory*, the *trunk* or ſnout of an ELEPHANT, and of ſome other animals.

The *proboſcis* is a member iſſuing out of the middle of the forehead, ſerving inſtead of a hand; and having a little appendix faſtened to the hand thereof, in form of a finger. By the *proboſcis* the ſhe elephant, it is ſaid, ſucks herſelf; and by the ſame conveys the milk to her young. All quadrupeds have the length of their neck equal to that of their feet, the elephant alone excepted; in which the ſhortneſs of the neck is compenſated by the length of the *proboſcis*.

The cameleon has alſo a kind of trunk or *proboſcis*, which is its tongue; and which it darts nimbly out of its throat as if it ſpat it; and draws it in again inſtantaneouſly. It ſerves, like the elephant's trunk, to lay hold on, and take in its food. See CAMELEON.

The microſcope ſhews us a little trunk or *proboſcis* in flies and gnats, by means whereof they ſuck the blood of animals, or liquors, for their food,

Proboscis *of flies*. See TRUNK, FLY, and INSECT.

PROBULEUMA, Προβȣλευμα, among the Athenians, a decree or vote of the areopagus, or ſenate of Athens.

It was ſo called becauſe agreed upon by the ſenate, with a deſign to have it afterwards propounded to an aſſembly of the people, that it might receive from them a farther ratification, without which it could not be paſſed into a law, nor have any force or obligatory power after the end of that year, when the ſenators and other magiſtrates laid down their commiſſions. Potter, Archæol. Græc. lib. i. cap. 18. tom. i. p. 100.

PROCATARCTIC *cauſe*, the original, primitive, or preexiſtent cauſe, or occaſion, of an effect.

The word is ϖροκαταρκτικος, formed from the verb ϖροκαταρχω, *I pre-exiſt, I go before.*

Such, e. gr. is a diſeaſe which co-operates with ſome other diſeaſe, ſubſequent thereto. Thus, anger, or heat of a climate, bring on ſuch a diſpoſition of the juices, as occaſions a fever; where the ill diſpoſition is the mediate cauſe, and the heat or anger, the *procatarctic* cauſe. See CAUSE.

PROCEDENDO, in *Law*, a writ whereby a plea or cauſe, formerly called from an inferior court to the chancery, king's bench, or common pleas, by writ of privilege, habeas corpus, or certiorari, is releaſed, and returned to the other court to be *proceeded* in; upon its appearing that the defendant has no cauſe of privilege, or that the matter compriſed in the party's allegation is not well proved.

Non Procedendo *ad aſſiſam rege inconſulto.* See Non.

PROCEDURE, Proceedings, in *Law*, the courſe of the ſeveral acts, expeditions, and inſtructions of a proceſs or law-ſuit.

Procedure is either civil or criminal. *Civil procedure* is that where the eſtate alone is concerned: *criminal* or *extraordinary procedure*, is that where the perſon is proſecuted.

Proceedings are alſo *ſummary* and *regular*.

PROCEED, among *Merchants*, that which ariſes from a thing. In which ſenſe they ſay, the *net proceed*.

PROCELEUSMATICUS, προκελευσματικος, in the *Ancient Poetry*, a foot conſiſting of four ſhort ſyllables: as *arietat*.

PROCELLARIA, *petrel*, in *Ornithology*, a genus of the *anſeres*, in the Linnæan ſyſtem: its characters are, that the bill is ſub-compreſſed, and formed of equal mandibles, the upper of which is hooked at the end, and the lower canaliculate; the noſtrils are ſuperincumbent and cylindric; the feet are webbed, without a back toe, but furniſhed with a ſharp ſpur pointing downwards. Linnæus enumerates ſix ſpecies. See Fulmar, Shear-*water*, and Storm-*fink*.

PROCERS, in *Glaſs Making*, iron inſtruments hooked at the extremity, uſed to ſettle the pots in their places, whether ſet too near or too far off.

PROCESS, *proceſſus*, in *Law*, is uſed for all the proceedings in any cauſe or action, real or perſonal, civil or criminal, from the original writ to the end. See Procedure.

In France they carry on a formal *proceſs* againſt the memory of people killed in duels; or that have murdered themſelves.

Process denotes, in a more reſtrained ſenſe, the means that are made uſe of, after ſuing out the original, for compelling the defendant to appear in court: this being the beginning, or principal part, and that by which the reſt of the buſineſs is directed.

This is ſometimes called *original proceſs*, being founded upon the original writ; and alſo to diſtinguiſh it from *meſne* or intermediate *proceſs*, which iſſues, pending the ſuit, upon ſome collateral interlocutory matter; as to ſummon juries, witneſſes, and the like. *Meſne proceſs* is alſo ſometimes put in contradiſtinction to *final proceſs*, or *proceſs of execution*; and then it ſignifies all ſuch *proceſs* as intervenes between the beginning and end of a ſuit. As to civil *proceſs*, ſee Blackſt. Com. vol. iii. p. 279, &c. and with regard to *criminal proceſs*, ſee ib. vol. iv. p. 313, &c. The difference between *proceſs* and *precept*, or *warrant* of the juſtices, is this; that the precept or warrant is only to attach or convene the party, before any indictment or conviction, and may be made either in the name of the king or the juſtice: but *proceſs* is always in the king's name, and, uſually, after an indictment.

Obſtructing the execution of lawful *proceſs* is a high offence; particularly when it is an obſtruction of an arreſt upon criminal proceſs. And it hath been held, that the party oppoſing ſuch arreſt, becomes thereby *particeps criminis*, i. e. an acceſſary in felony, and a principal in treaſon. Blackſt. Com. vol. iv. p. 129.

Process, *by attainder*, ſee Attainder.

Process, in *Chemiſtry*, the whole courſe of an operation, or experiment.

Process, Processus, in *Anatomy*, is a term of equal import with *apophyſis*, *epiphyſis*, *prominence*, *protuberance*, or *production*. See Apophysis, &c.

Proceſs is particularly applied to certain eminences of the bones, and other parts; diſtinguiſhed by peculiar names, expreſſing their place, form, or the like.

Such are the *proceſſus peritonæi*, *proceſſus vermiformes*, *proceſſus papillares*, *ciliares*, &c.

Processus *aliformis*, *cornicularis*, *pyrenoides*. See the ſeveral articles.

PROCESSION, Processio, in *Theology*, a term uſed for the manner wherein the Holy Spirit is conceived to iſſue from the Father and the Son, in the myſtery of the Trinity.

The Greeks and Latins are not agreed about the *proceſſion* of the Holy Spirit.

Procession alſo denotes a ceremony in the Romiſh church, conſiſting in a formal march of the clergy in their robes, and the people after them, putting up prayers, ſinging hymns, &c. and in this manner making a viſit to ſome church or other holy place.

There are general *proceſſions* of all the people in jubilees, and the ſame often in public calamities. The *proceſſions* of the holy ſacrament are very ſolemn. They have alſo *proceſſions*, frequently around the church, at the ſalutations, &c. in the maſs. Anciently, among us, there were, in each pariſh, cuſtomary *proceſſions* of the pariſh-prieſt, the patron of the church, with the chief flag, or holy banner, attended by the other pariſhioners, each Aſcenſion week; to take a circuit round the limits of the pariſh, and pray for a bleſſing on the fruits of the earth. Of which cuſtom there ſtill remains a ſhadow in that annual Perambulation, ſtill called *proceſſioning*; though the order and devotion of the ancient *proceſſions* be almoſt loſt.

PROCESSUM *continuando*, a writ for the continuance of a *proceſs*, after the death of the chief juſtice, or other juſtices in the commiſſion of oyer and terminer. Reg. Orig. 128.

Recordo & Processu *mittendis*. See Recordo.

PROCESSUS *majoris muſculus*, in *Anatomy*, a name given, by ſome of the writers on the ear, to one of the muſcles of that part, called by Cowper and others the *internus auris*, and by Albinus, more properly, the *tenſor tympani*.

Processus *minimi muſculus*, in *Anatomy*, a name given by ſeveral authors to one of the muſcles of the ear, called by Cowper and others *obliquus externus*, and by Albinus, transversus *auriculæ*.

PROCESTRIA, among the Romans, buildings adjoining to camps, eſpecially winter quarters or ſtanding camps, where ſuttlers, ſtrangers, traders, and others that followed the army reſided; for they were not permitted to mix with the ſoldiers, unleſs when the enemy was near.

PROCHARISTERIA, Προχαριςηρια, in *Antiquity*, a ſolemn ſacrifice which the Athenian magiſtrates yearly offered to Minerva, when the ſpring firſt began to appear.

PROCHEILA, formed of προ and χειλος, *lip*, a word uſed by ſome authors to expreſs the extremities of the lips.

PROCHEIN *amy*, Proximus *amicus*, in *Law*, the *neareſt friend*, or perſon next a-kin, to a child in nonage; and who, in that reſpect, is allowed in law to deal and negotiate for him, to manage his affairs, to ſee him redreſſed of any wrong, and to be his guardian, if he hold land in ſocage.

By *prochein amy* is commonly underſtood the Guardian in ſocage: though in propriety, it is he who appears in court for an infant who ſues any action, and aids the infant in purſuit thereof. For, to ſue, an infant is not allowed to make an attorney; but the court will admit his *prochein amy*, next friend, as plaintiff; or his guardian as defendant.

PROCHYMA, a word uſed by the ancients to expreſs that kind of muſt which flows ſpontaneouſly from the grapes without their being preſſed.

PROCICADA, in *Natural Hiſtory*, a name given by ſome to the inſect which the French call procigale. It reſembles the cicada in moſt reſpects, but it has not the power of making the noiſe that inſect does.

PROCIDENTIA, or Prolapsus *ani*, in *Surgery*, is when upon a diſcharge by ſtool, the inteſtinum rectum is protruded ſo far, as that it cannot be drawn back again into the body; or, when drawn back, falls out again.

This is ſometimes a chronical diſeaſe, eſpecially when it ariſes from a palſy: its cauſes are a relaxation of the fibres of the rectum, or of the ſphincter muſcle; either from the adſtriction of the alvus, or from a diarrhœa, dyſentery, or teneſmus.

It is very difficultly cured when attended with hæmorrhoids: the principal cure is by aſtringents. External aſſiſtance is alſo required to reduce the fallen gut; which, if it be not ſoon done, is apt to tumefy and mortify, by the contact of the air.

It is ſubject to relapſe after reduction in children, eſpecially upon violent crying: and is difficult to keep up, in caſe of a diarrhœa.

For this purpoſe, Heiſter directs the application of two thick compreſſes; one oblong, applied betwixt the thighs and nates; the other ſquare, traverſing the former upon the anus, both which are to be retained with the T bandage. The compreſſes ſhould be moiſtened in ſome proper decoction, which may be made ex rad. biſtortæ, tormentillæ cort. granator. quercus, gallis, foliis quercus, &c. prepared by boiling them in red wine. The uſe of this decoction ſhould be repeated, when the diſorder returns upon the patient's walking, ſtraining, or the like. When the diſorder is ſtill more obſtinate, relief may be ſometimes had from the application of a ſtrengthening diapaſma ex maſtic. colophon. terr. Japon. ſand. dracon. &c. aſſiſted with a compreſs and bandage. For the ſame purpoſe alſo may be uſed ſtrengthening glyſters made of a decoction of aromatic and aſtringent herbs in red wine, by the repeated application of which the diſorder may be generally cured. If all theſe means prove inſufficient, a ſuffitus may be uſed, e maſtic. thur. ſuccin. piper nigr. &c. The fumes being conducted through a funnel in the bottom of a chair, forbidding the patient aſtringent and drying meats, and directing him to avoid ſneezing, vomiting, and all violent exerciſe, till the cure is confirmed. Heiſter's Surg. part ii. p. 303. See Teneſmus.

Procidentia, or Prolapsus *vaginæ*, is a deſcent of the vagina, ſo as to appear wholly or in part without the labia pudendi: when the whole vagina is prolapſed, it appears like a ſwelled, bloody ring of fleſh, in which caſe, if the prolapſed part be much inflamed, a circumſtance that ſometimes proceeds from difficult labour, there is danger of a mortification: but if none of theſe ſymptoms appear there is no danger.

A partial *prolapſus* of the *vagina* is often miſtaken for an excreſcence, ficus, or ſarcoma; and danger attends the treatment of it, either by ligatures or the knife.

In order to diſtinguiſh a prolapſus uteri from that of the vagina, and both from an excreſcence, it is to be obſerved, that the firſt never happens with an inverſion except immediately after labour; whereas the vagina may ſubſide and appear externally at any time, either within or without the time of geſtation: but it moſt frequently attends a difficult labour. In this diſorder, if the prolapſed parts be uninflamed, they ſhould be immediately replaced, and the patient reſt in bed for ſome days, uſing an injection of warm vinegar and water, or red wine and water: but if theſe fail, the T bandage muſt be applied. If the prolapſed parts are inflamed, diſcutient fomentations and cataplaſms ſhould be applied externally, and recourſe ſhould be had to internal medicines and bleeding; and after reducing the inflammation, the parts may be ſafely returned without danger of mortification. Heiſter.

Procidentia *veſicæ urianariæ*, or the diſplacing of the bladder, accompanies the inverſion of the uterus; in which caſe, the bulb of the bladder being forced down, is no longer ſubject to the preſſure of the abdominal muſcles, and the patient can never diſcharge water without ſqueezing the bladder. See Procidentia *uteri*.

Procidentia *uteri*, the deſcent, or falling down of the womb, cauſed by a relaxation of the ligaments which ſhould hold it in its place.

If the uterus fall to the middle of the vagina, or even with the meatus urinarius, it is called a *bearing down* of the womb. If it fall quite down, ſo as to hang pendulous without the labia, but ſo as that no more of the inſide than the orifice is ſeen, it is called a *prolapſus*, or *procidentia*. Some diſtinguiſh between the *procidentia* and prolapſus, confining the former term to the deſcent of the uterus to the labia pudendi, and applying the latter to its deſcent through the labia. If falling thus low, it be turned inſide out, and hang like a fleſhy bag, with a rugged unequal ſurface, it is called a *perverſio* or *inverſio uteri*.

There is alſo another caſe of this diſorder, called the Retroversio *uteri*.

Theſe diſorders may proceed from violent motions, vehement coughing, ſneezing, and the fluor albus. They appear moſt frequent in women with child, from the weight preſſing and bearing hard upon the uterus; but eſpecially if the fœtus be dead, lie in a wrong poſture, or be violently extracted.

After replacing the part, reſtringents both inwardly and by injections are here uſed; ſuch as obtain in diarrhœas, hæmorrhoids, the gonorrhœa ſimplex, &c.

The firſt ſtep towards a cure of the *procidentia uteri*, or falling down of the womb, is to reduce it to its natural ſituation, and to keep it there by means of peſſaries. But as ſome diſadvantages attend the uſe of common peſſaries, Dr. Thomas Simſon has contrived one, and given us the deſcription and figure of it in the Medical Eſſays of Edinburgh, vol. iii. art. 18.

Procidentia, or Prolapsus *uvulæ*, the deſcent or relaxation of the uvula. See Prolapsus.

PROCIGALE, in *Natural Hiſtory*, a name given by Reaumur, and from him by all the French naturaliſts, to a ſpecies of four-winged fly, greatly reſembling the cigale, or cicada, but wanting its power of making a noiſe.

This creature has a trunk of the ſame form with that of the cicada, very long, and laid cloſely upon the belly, and contained in a caſe or ſheath of the ſame ſtructure with that of this inſect. The female has alſo the ſame inſtrument at its tail, prepared for boring holes in wood, and called in that creature the *piercer*, and it uſes it to the ſame purpoſe, depoſiting its eggs by means of it in the branches of trees.

There is alſo another very ſmall inſect mentioned by Reaumur, as reducible to this claſs, if properly of the fly-kind; but its ſmallneſs makes the ſtructure of its wings ſcarce diſtinguiſhable with any degree of accuracy; and it is hard to determine whether it has four wings, or two wings and two caſes of wings: this little fly is extremely common on roſe-trees; its wings are yellowiſh, and its body white; and it can hop as well as fly. It is hardly poſſible to find a roſe-tree in the ſummer-months that is not loaded with theſe inſects, and they are principally found about the extremities of the young branches. Reaumur's Hiſt. Inſ. vol. ix. p. 241.

PROCINDYNEUONTES, Προκινδυνευοντες, among the Romans, a deſignation given to the Velites, becauſe they were moſt expoſed to danger. The term anſwers to what we call the forlorn-*hope*.

PROCKIA, in *Botany*, a genus of the *polyandria monogynia* claſs: its characters are, that it has a three-leaved calyx beſides two foliola at the baſe; it has no corolla; and the fruit is a five-angled polyſpermous berry. There is only one ſpecies.

PROCLAMATION, Proclamatio, an inſtrument diſpatched by the king, with the advice of his privy-council, whereby the people are advertiſed of ſomething which his majeſty thinks fit for them to know; and whereby they are ſometimes required to do, or not to do, certain things.

The word is of Latin origin, formed from *proclamare palam & valde clamare*.

Proclamations have the force of laws; but then they are ſuppoſed to be conſiſtent with the laws already in being; otherwiſe they are ſuperſeded.

Thus, the eſtabliſhed law is, that the king may prohibit any of his ſubjects from leaving the realm; a *proclamation*, therefore, forbidding this in general for three weeks, by laying an embargo upon all ſhipping in time of war, will be equally binding as an act of parliament, becauſe founded upon a prior law. But a *proclamation* to lay an embargo in time of peace upon all veſſels laden with wheat (though in time of a public ſcarcity), being contrary to law, and particularly to ſtatute 22 Car. II. cap. 13. the adviſers of ſuch a *proclamation*, and all perſons acting under it, found it neceſſary to be indemnified by a ſpecial act of parliament, 7 Geo. III. cap. 7.

By the ſtatute 31 Hen. VIII. cap. 8. it was enacted, that the king's *proclamations* ſhould have the force of acts of parliament, a ſtatute, ſays judge Blackſtone, which was calculated to introduce the moſt deſpotic tyranny, and which muſt have proved fatal to the liberties of this kingdom, had it not been happily repealed in the minority of his ſucceſſor. Stat. 1. Edw. VI. cap. 12. Comm. book i. p. 271.

Proclamation is alſo uſed for a ſolemn denunciation, or declaration of war or peace.

Proclamation alſo denotes the act of notifying to the people the acceſſion of a prince to the crown.

The *proclamation* does not inveſt the prince with the regal authority; it ſuppoſes him already inveſted therewith, and only gives notice thereof to the people.

Proclamation *of exigents*. See Exigent.

Proclamation *on attachment*. See Attachment, and Commission *of Rebellion*.

Proclamation *of a fine*, is a notice openly and ſolemnly given thereof in the court of common-pleas, where it paſſed, and at all the aſſizes in the country, held within one year after the ingroſſing it. See Fine.

Theſe *proclamations*, at the aſſizes, are made on tranſcripts of the fine, ſent by juſtices of the common-pleas to the juſtices of the aſſize, and of the peace.

Proclamation, *in caſe of riot*. See Riot.

Proclamation, in a *Monaſtic Senſe*, is the accuſation of a frier or brother, by another brother, in open chapter, and in preſence of the ſuperior and community, for ſome external crime he has ſeen him commit.

PROCONDYLUS, ϖροκονδυλος, an appellation given to the firſt point of each finger.

PROCONNESIUM *marmor*, a name given by the ancients to a ſpecies of marble called alſo neuris and elaphonesus, and by ſome Cyzicum, from the works of a famous ſtatuary of that name, many of which were made of it. It was of a bluiſh white, lightly variegated with black; this colour uſually running in ſmall veins, and not unaptly reſembling in many inſtances the courſe of the veins of a human body in the naked ſtatues. It was alſo uſed in the ſumptuous buildings of the Romans.

PRO-CONFESSO, in *Law*. When, upon a bill exhibited in chancery, the defendant appears, and is in contempt for not anſwering, and in cuſtody; upon an habeas corpus (which is granted by order) to bring him to the bar, the court aſſigns him a day to anſwer; which being expired, and no anſwer put in, a ſecond habeas corpus is granted, and a farther day aſſigned; by which day, if he anſwer not, the bill upon the plaintiff's motion, ſhall be taken *pro-confeſſo*, or as allowed, unleſs cauſe be ſhewn by a day, which the court uſually gives. For want of ſuch cauſe ſhewed, upon motion, the ſubſtance of the plaintiff's bill ſhould be decreed, *as if it had been confeſſed* by the defendant's anſwer: or, after a fourth inſufficient anſwer made to the bill, the matter of fact not ſufficiently anſwered unto, ſhall be taken *pro-confeſſo*.

By ſtat. 5 Geo. II. cap. 25. it is enacted, that in order to prevent a defendant's eluding juſtice, by abſconding to avoid a ſubpœna, where the defendant cannot be found to be ſerved with proceſs of ſubpœna, and abſconds (as is believed) to avoid being ſerved therewith, a day ſhall be appointed him to appear to the bill of the plaintiff; which is to be inſerted in the London Gazette, read in the pariſh church where the defendant laſt lived, and fixed up at the Royal Exchange: and if the defendant does not appear upon that day, the bill ſhall be taken *pro confeſſo*.

PROCONSUL, a Roman magiſtrate, ſent to govern a province, with a conſular authority.

The *proconſuls* were appointed out of the body of the ſenate; and ordinarily, as the year of any one's conſulate expired, he was ſent *proconſul* into ſome province.

The *proconſuls* had the ſame honours, &c. with the conſuls themſelves; except that they had only ſix lictors and faſces before them.

The *proconſuls* did not ordinarily hear and determine proceſſes in perſon, but had that office performed by their aſſeſſors, or other judges, conſtituted or delegated by them.

As the *proconſuls* had the direction of juſtice, of war, and of the revenues; they had their ſeveral lieutenants in each capacity: theſe were called *legati*, and were ordinarily nominated by the ſenate.

The *proconſular* function only held a year. The charges of their journey, backwards and forwards, were borne by the public, and were called *viaticum*.

After the partition of the provinces between Auguſtus and the people, thoſe who preſided over the provinces of the people were called eſpecially *proconſuls*.

Livy, lib. viii. and lib. xxvi. mentions two other ſorts of *proconſuls*; viz. ſuch as being conſuls had their office prolonged beyond the time ſettled by law; and ſuch as were inveſted with this honour, either for the government of the provinces, or the command in war, who before were only in a private ſtation. We alſo read of ſuch as the ſenate created *proconſuls* without a province, merely for the command of the army, and the care of the military diſcipline; and ſuch as entered on their *proconſular* office before they were admitted to the conſulſhip, though deſigned for this honour.

Proconsul, in our *Antient Law Books*, is ſometimes, uſed for a JUSTICE *in eyre*, or *juſtice errant*.

PROCREATION, **Procreatio**, the action of begetting and bringing forth children.

PROCTOR, **Procurator**, a perſon commiſſioned to acts as proxy, or delegate, in behalf of another. See **Procurator**.

Proctor, *procurator*, in the *Civil Law*, is an officer appointed to appear in court, and manage the cauſes of parties who will make uſe of his procuration.

Anciently every body was obliged to appear in perſon; and when the affair happened to be drawn out to a great length, they were allowed to create a *proctor*, or proxy, in their cauſe.

But this was a favour only granted for a certain time, till towards the middle of the ſixteenth century, when it was decreed, that all procuration ſhould hold till revoked.

Proctors *in the Commons*, are perſons ſkilled in the civil and eccleſiaſtical laws, who exhibit their proxies, and make themſelves parties for their clients, to draw up acts and pleadings, produce witneſſes, prepare cauſes for ſentences, and attend the advocates with the proceedings. They are about fifty in number; are admitted by the archbiſhop's fiat: and wear black robes, and hoods lined with white furs.

By 3 Jac. cap. 5. no recuſant convict ſhall practiſe in the civil law as *proctor*; and by 5 Geo. II. cap. 18. no *proctor* in any court ſhall be a juſtice of the peace, during ſuch time as he ſhall continue in the buſineſs and practice of a *proctor*. Moreover, by the ſeveral ſtamp acts, every admiſſion of any perſon to the office of *proctor* in any of the courts ſhall be upon a treble 40*s*. ſtamp.

Proctors *of the clergy*, are deputies, or repreſentatives, choſen by the clergy of each dioceſe, two for each; and by the cathedral and collegiate churches, one for each, to ſit in the lower houſe of CONVOCATION.

Proctors, *in the univerſity*, are two officers choſen from among the ſtudents, to ſee good orders and exerciſes daily performed there.

PROCUBITORES, among the Romans, an appellation given to the VELITES, becauſe when the enemy was near, they always formed the outguard.

PROCUMBENT *leaves*, in *Botany*, ſuch leaves of plants as lie flat, or trailing on the ground.

PROCURATION, or **Procuracy**, an act or inſtrument whereby a perſon is impowered to treat, tranſact, receive, &c. in another's name, as if he himſelf were actually preſent.

When a man treats in behalf of another, the firſt thing is to examine his *procuration* or *procuracy*.

Procuration is now little uſed in this ſenſe, except in the caſe of a perſon who collects the fruits of a benefice for another.

Procuration, in the *Canon Law*, is uſed for the repaſt, or entertainment, anciently given to church-officers, or ordinaries, who came to viſit in churches or monaſteries, whether they were biſhops, archdeacons, or viſitors.

Procuration was due to the pope's legate, and even to popes themſelves, when they came into France; and the charge was compriſed in the bulls then granted.

Complaints were frequently made to the pope of the exceſſive charges of the *procurations* of biſhops and archdeacons; upon which they were prohibited by ſeveral councils and bulls.

That of Clement IV. mentioned in the Monaſticon, is very expreſs; wherein that pope tells us, complaint had been made, that the archdeacon of Richmond, viſiting the dioceſe, travelled with one hundred and three horſes, twenty-one dogs, and three hawks; and did ſo grievouſly oppreſs a religious houſe with that vaſt equipage, that he cauſed the monks to ſpend in an hour as much as would have maintained them a long time.

Procuration is now uſed for a ſum of money paid yearly by pariſh-prieſts to the biſhop or archdeacon, in lieu of this entertainment, towards defraying the charge of their VISITATION.

PROCURATOR, **Proctor**, or **Proxy**, a perſon who has a charge, or office committed to him, to act in behalf of another.

Thus the *proxies* of the lords in parliament, in our law-books are called *procurators*.

The word is alſo uſed for a vicar, or lieutenant. Thus, in Petrus Bleſenſis, we read of a *procurator regni*.

Thoſe who manage cauſes in Doctors Commons, are alſo called *procurators* or *proctors*.

The biſhops are ſometimes called *procuratores eccleſiarum*, and the repreſentatives ſent by the clergy to convocation, *procuratores cleri*.

In our ſtatutes, a perſon who gathers the fruits of a benefice for another, is particularly called a *procurator*, and the inſtrument impowering him to receive the ſame, is termed a *procuracy*.

Procurator is alſo a kind of magiſtrate, in ſeveral cities of Italy, who takes care of the public intereſts: there are *procurators* of St. Mark at Venice, at Genoa, &c.

Originally there was but one *procurator* of St. Mark at Venice: in 1442, the number was augmented to nine, when the ſenate made a decree, appointing, that, for the future, none ſhould be admitted to the dignity, but after the death of ſome of the nine. But, in the neceſſities of the republic, the number was afterwards inlarged to forty; though of theſe there are only nine that bear the title of *procurators*, and whoſe place is regularly filled. They are adminiſtrators of the church of St. Mark, and of the revenues attached thereto, the patrons of orphans, and the executors of teſtaments.

This office receives more luſtre from the merit of thoſe who diſcharge it, than from its authority. They are clothed in black, or violet, with ducal ſleeves.

Procurator *monaſterii*, anciently, was the ADVOCATE of a religious houſe, who was to ſolicit the intereſt, and plead the cauſes, of the ſociety. See **Advowee**.

Procuratores *eccleſiæ parochialis*, are the churchwardens, whoſe office is to act as *proxies*, and repreſentatives of the church.

Procuratores, in the *Roman Law*, were ſuch lawyers as aſſiſted the plaintiff in proving, or the defendant in clearing himſelf from the matter of fact. Theſe, as well as the *patroni* (ſee PATRON and ADVOCATE,) were ſelected out of the ableſt lawyers, and had their names entered in the matriculation book of the forum.

This was one condition requiſite to give them the liberty of pleading; the other was the being retained by one party, or the receiving a fee, which they termed *mandatum*.

Procuratores *Cæſaris*, among the Romans, were officers, often mentioned by Tacitus and Suetonius, who were ſent by the emperors into every province, to receive and regulate the public revenue, and to diſpoſe of it at the emperor's command. The procurator of Judæa was inveſted with all the authority proper to the PROCONSUL, and, as the learned biſhop Pearſon obſerves on the Creed, art. 4. even with the power of life and death.

PROCYON, in *Aſtronomy*, a fixed ſtar of the ſecond magnitude, in **Canis** *minor*.

PRODES *hommes*, q. d. wiſe or diſcreet men, in our *Ancient Cuſtoms*, a title given to the barons, and other military tenants, who were called to the king's council, and were to give advice according to the beſt of their prudence and knowledge.

PRODICTATOR, among the Romans, a magiſtrate who had the power, and did the office of a dictator.

The Romans ſometimes created a *prodictator*, in caſes where they could not have a dictator. Fabius Maximus was *prodictator*.

PRODIGALITY is a term, the meaning and application of which are well known. We ſhall, therefore, under this head, only take occaſion to obſerve, that, by the Roman law, if a man by notorious *prodigality* was in danger of waſting his eſtate, he was looked upon as *non compos*, and committed to the care of curators, or tutors, by the prætor. And by the laws of Solon, ſuch prodigals were branded with perpetual infamy.

PRODROMUS, προδρομος, literally denotes a fore-runner, an harbinger. Hence,

Prodromus *morbus*, among *Phyſicians*, is uſed for a leſſer diſeaſe, which precedes, or foreruns, a greater.

Thus a ſtraightneſs of the breaſt is a *prodromus* of a conſumption, &c. A vertigo is ſometimes a *prodromus* of an apoplexy.

PRODUCE, *net*. See Net *produce*.

PRODUCING, in *Geometry*, denotes the continuing a right line, or drawing it out farther, till it have any aſſigned length.

PRODUCT, in *Arithmetic* and *Geometry*, the factum of two numbers, or the quantity ariſing from, or produced by, the multiplication of two or more numbers, lines, &c, into one another.

Thus, if 6 be multiplied by 8, the *product* is 48.

In lines it is always (and ſometimes in numbers) called the RECTANGLE, between the two lines multiplied by one another.

PRODUCTION. See Generation, and Propagation.

Production, in *Anatomy*, a continuation, or PROCESS.

PROEDRI, Προεδροι, among the Athenians, magiſtrates whoſe buſineſs it was to propoſe to the people the things they were to deliberate upon and determine at every aſſembly, after which their offices expired.

They were ſo called from the privilege they enjoyed, of always having the firſt ſeats at aſſemblies. See Epistates.

PROEM, *proemium*, a term anciently uſed for PREFACE.

PROEMPTOSIS, in *Aſtronomy*, that which makes the new moons appear a day later, by means of the lunar equation, than they would do without that equation. See Metemptosis.

PROFANATION, in *Religion*, the doing of ſomething which is diſreſpectful to holy or ſacred things.

Profanation *of the Lord's day*. See Sunday.

PROFANE, a term uſed in oppoſition to *holy*, *ſacred*.

Except churches, and church-yards, all places are eſteemed *profane*. By the canon-law, a ſacred chalice, or cup, becomes *profane*, by giving it a blow with a hammer.

Profane is alſo applied, in general, to all perſons who have not the ſacred character; and all things which do not belong to the ſervice of religion.

In this ſenſe, Xenophon, Seneca, &c. are *profane* authors. The heathen prieſts, pontiffs, &c. alſo paſs with us for *profane*.

PROFANENESS denotes a diſreſpect paid to the name of God, and to things and perſons conſecrated to him. By the laſt ſtatute againſt profane and common ſwearing and curſing, 19 Geo. II. cap. 21. which repeals all former ones, every labourer, ſailor, or ſoldier, ſhall forfeit 1*s.* for every profane oath or curſe; every other perſon under the degree of a gentleman 2*s.* and every gentleman, or perſon of ſuperior rank, 5*s.* to the poor of the pariſh; and on a ſecond conviction, double; and for every ſubſequent conviction, treble the ſum firſt forfeited, with all charges of conviction; and in default of payment ſhall be ſent to the houſe of correction for ten days. Any juſtice of the peace may convict upon his own hearing, or the teſtimony of one witneſs; and any conſtable or peace officer, upon his own hearing, may ſecure any offender, and carry him before a juſtice, and there convict him. If the juſtice omits his duty, he forfeits 5*l.* and the conſtable 40*s.* And the act is to be read in all pariſh churches and public chapels, the Sunday after every quarter day, on pain of 5*l.* to be levied by warrant from any juſtice. Beſides this puniſhment for taking God's name in vain in common diſcourſe, it is enacted by ſtat. 3 Jac. I. cap. 21. that if in any ſtage-play, interlude, or ſhew, the name of the Holy Trinity, or any of the perſons therein, be jeſtingly or profanely uſed, the offender ſhall forfeit 10*l.* one moiety to the king, and the other to the informer. See Blasphemy.

PROFECTITIOUS. See Adventitious, and Goods.

PROFER, formed of the French *proferer*, *to produce*, in *Law*, the time appointed for the accounts of ſheriffs, and other officers, to be given into the exchequer; which, by ſtat. 51 Hen. III. is to be twice in the year.

Profer is alſo uſed for an offer, or endeavour, to procede in an action, by a perſon concerned ſo to do.

Trinity-term ſhall begin the Monday next after Tnirity-Sunday, whenever it ſhall happen to fall, for the keeping of the eſſoigns, *profers*, returns, and other ceremonies, heretofore in uſe. Stat. an. 32 Hen. VIII.

Profer *the half mark*. See Half-*mark*.

PROFERT *in curia*, in *Law*, is where the plaintiff in an action declares upon a deed, or the defendant pleads a deed, he muſt do it with a *profert in curia*, to the end that the other party may at his own charges have a copy of it, and until that time he is not obliged to anſwer it.

PROFESSED *monk*, or *nun*, one who, having made the vow, is admitted of a religious order.

In this ſenſe the word is uſed in oppoſition to NOVICE.

PROFESSIO *viduitatis*. See Viduitatis.

PROFESSION, *profeſſio*, in a monaſtic ſenſe, the entering into a religious order; or an action whereby a perſon offers himſelf to God, by a vow of obſerving three things; viz. obedience, chaſtity, and poverty; which he promiſes inviolably to maintain.

This is called *ſanctæ religionis profeſſio*, and the perſon, a *religious profeſſed*.

Perſons are not admitted to make *profeſſion* till after a year of probation.

PROFESSOR, in the *Univerſities*, a perſon who teaches or lectures, publicly, ſome art or ſcience, in a chair eſtabliſhed for that purpoſe.

The *profeſſors*, in foreign univerſities teach the arts, and have their claſſes of pupils; thoſe in our univerſities only read public lectures in term-time.

Of *profeſſors* we have a great number, ſome denominated from the arts they profeſs, as *caſuiſtical profeſſor*, *Hebrew profeſſor*, *phyſic profeſſor*, *divinity profeſſor*, &c.

Others, from thoſe who founded the *profeſſorſhip*, or aſſigned a revenue for the ſupport of the *profeſſor*, as the *Savilian profeſſors* of aſtronomy and geometry, the *Lucaſian profeſſor* of mathematics, *Margaret profeſſor* of divinity, &c.

Professors, *regius*. See Regius.

PROFICISCENDUM, *Capias Conductos ad* proficiſcendum See Capias.

PROFILE, in *Architecture*, the figure or draught, of a building, fortification, or the like; wherein are expreſſed the ſeveral heights, widths, and thickneſſes, ſuch as they would appear, were the building cut down perpendicularly from the roof to the foundation.

Whence the *profile* is alſo called the *ſection*, ſometimes the *orthographical ſection*: and, by Vitruvius, alſo the *ſciagraphy*.

Profile, in this ſenſe, amounts to the ſame with *elevation*; and ſtands oppoſed to a plan, or *ichnography*.

Profile is alſo uſed for the contour, or outline of a figure, building, member of architecture, or the like; as a baſe, a corniche, &c.

Hence *profiling* is ſometimes uſed for deſigning, or deſcribing the member with rule, compaſs, &c.

Profile *of a fortification*. See Fortification.

Profile, in *Sculpture and Painting*. A head, a portrait, &c. are ſaid to be in *profile*, when they are repreſented ſideways, or in a ſide-view.

As, when in portrait, there is but one ſide of the face, one eye, one cheek, &c. ſhewn, and nothing of the other. On almoſt all medals the faces are repreſented in *profile*.

PROFITS, *pernor of*. See Pernor.

PROFLUVIUM, in *Medicine*, any kind of flux, or liquid evacuation. Whence.

Profluvium *ventris*, flux of the belly, denotes a DIARRHOEA.

PROFUNDUS, in *Anatomy*, a name given by Albinus, Hunaud, and others, to a muſcle of the wriſt, generally known by the name of the perforans. Theſe authors called, in the ſame manner, the *perforatus* of others the *ſublimis*.

PROGAL-INSECT, an animal nearly approaching to the GALL-*inſect* claſs, but differing from it in ſome reſpects, and called by this name from its reſemblance to thoſe creatures; as the creatures ſomewhat approaching to the ſcarab or beetle claſs, but not regularly of it, are called *proſcarabs*.

This claſs of animals paſs a great part of their lives in the ſame manner with the gall-inſects, faſtened to the bark of a tree, and there remain motionleſs: ſome of them alſo in the manner of the gall-inſects cover their young brood with their bodies; but they are eaſily diſtinguiſhable as animals, in all the ſtages of their lives, and in that they differ from the others. The annular depreſſions of their bodies may in all their ſtates be diſtinguiſhed, eſpecially with the help of a magnifying glaſs; whereas thoſe of the gall-inſects all diſappear as they grow towards their utmoſt bulk.

If the gall-inſects are worthy of obſervation on account of the great value of one ſpecies of them, the kermes; the *progal-inſects* are at leaſt equally ſo on the ſame account, ſince the cochineal belongs to this claſs.

The moſt common and obſervable ſpecies of the *progal-inſect* claſs, is that of the elm.

PROGNOSTIC, *prognoſis*, in *Medicine*, a judgment of the event either of a ſtate of health, or of a diſeaſe; as, whether it ſhall end in life or death; be long or ſhort; mild or malignant, &c. taken from certain ſymptoms thereof.

The word comes from ϖρογνωσις, *foreknowledge*, whence alſo ϖρογνωστικον, a *prognoſtic ſign*.

In all continued fevers, Morton tells us, a ſtrong, equable pulſe, is a good *prognoſtic*, and always preſages well, whatever other threatening ſymptoms attend it; on the contrary, a quick, feeble, intermitting pulſe, is a *prognoſtic* of death, how much ſoever the other ſymptoms may flatter.

Hippocrates obſerves, that all predictions and *prognoſtics* of acute diſeaſes, are very fallacious: Diemerbroek, however, adds, that, in the plague of Nimeguen, ſix-day criſes were conſtantly found fatal *prognoſtics*; alſo to be infected about the new or full moon; faintings in the beginning of the diſeaſe, and palpitations of the heart, were found deadly *prognoſties*: on the contrary, a pleuriſy, and ſuppreſſion of ſtool, were good *prognoſtics*.

The *prognoſis* is a part of *ſemeiology*.

PROGNOSTICS *of the weather*. See WEATHER.

PROGRAMMA, anciently denoted a letter ſealed with the king's ſeal.

PROGRAMMA is alſo a college term, ſignifying a billet, or advertiſement, poſted up, or given into the hand, by way of invitation to an oration, or other college ceremony: containing the argument, or ſo much as is neceſſary for the underſtanding thereof. *Programmas* are ſent to invite people to aſſiſt at declamations, dramatic performances, &c.

PROGRESSION, *progreſſio*, an orderly advancing, or going forward, in the ſame manner, courſe, tenor, &c.

PNOGRESSION, in *Mathematics*, is either *arithmetical*, or *geometrical*.

PROGRESSION, *arithmetical*, is a SERIES of quantities equidiſtant from each other; i. e. either increaſing or decreaſing, by the ſame common interval, or difference.

Thus, 3, 6, 9, 12, 15, 18, &c. make an *arithmetical progreſſion*; becauſe increaſing, or differing equally by 3: thus alſo 25, 20, 15, 10, and 5, are in *arithmetical progreſſion*, decreaſing by a common difference, 5.

In every *arithmetical progreſſion*, whether increaſing or decreaſing, the ſum of the firſt and laſt term is equal to the ſum of any two intermediate terms equidiſtant from the extremes; as alſo, if the number of terms be uneven, to the double of the middle term. For inſtance:

$$\begin{array}{ccccccc} 3, & 6, & 9, & 12, & 15, & 18, & 21 \\ & & & 12, & 9, & 6, & 3 \\ \hline & & & 24, & 24, & 24, & 24 \end{array}$$

Hence, 1. We find the ſum of any *arithmetical progreſſion* by multiplying the ſum of the firſt and laſt term by half the number of terms. Thus let a repreſent the firſt term, x the laſt, and n the number of terms; and we ſhall have $\overline{a+x} \times \frac{n}{2} = s$, or the ſum of all the terms.

2. Having, therefore, the firſt term, the difference, and the number of terms given, the ſum of the *progreſſion* is had by multiplying the firſt term by the number of terms; and to the product adding the product ariſing from the difference multiplied into the ſemidifference of the number of terms from the ſquare of that ſame number.

Let b be the common difference; and ſince $x = a + \overline{n-1} \times b$, and $\overline{a+x} \times \frac{n}{2} = s$, we ſhall have, merely by ſubſtitution, $\overline{2a+nb-b} \times \frac{n}{2} = s$, i. e. $an + \frac{\overline{n^2-n}}{2} \times b = s$.

Thus ſuppoſe the firſt term 3, the number of terms 7, and the difference 3; the product of 3 and 7 = 21, being added to the product 63, of the difference 3 multiplied into the ſemi-difference of the number of terms 7, from the ſquare thereof 49=21, gives 84, the ſum of the *progreſſion*.

3. The number of terms leſſened by one, being multiplied by the common difference, and the firſt term added to the product, the ſum is the laſt term, i. e. $\overline{n-1} \times b + a = x$. Thus, in the *progreſſion* of 52 places, where the difference is 3, and the firſt term 5, 51 being multiplied by 3, produces 153; to which adding 5, the ſum 158 is the laſt term required.

4. If the *progreſſion* begin with 0, the ſum of all the terms is equal to half the product of the laſt term multiplied by the number of terms, i. e. $\overline{a+x} \times \frac{n}{2}$ becomes in this caſe $\frac{nx}{2}$.

Whence it follows, that the ſum of a *progreſſion* beginning from 0, is ſubduple the ſum of ſo many terms, all equal to the greateſt.

PROGRESSION, *geometrical*, is a SERIES of quantities increaſing or decreaſing, in the ſame ratio, or proportion; or it is a ſeries of quantities that are continually proportional: or which increaſe by one common multiplicator, or decreaſe by one common diviſor: which common multiplier or diviſor is called the common ratio. Thus, a, ar, ar^2, ar^3, ar^4, &c. or $a, \frac{a}{r}, \frac{a}{r^2}, \frac{a}{r^3}, \frac{a}{r^4}$, &c. and in numbers, 1, 2, 4, 8, 16, 32, 64, &c. or 729, 243, 81, 27, 9, 3, 1, make a *geometrical progreſſion*.

1. In every *geometrical progreſſion*, the product of the two extreme terms is equal to the product of the two intermediate terms equidiſtant from the extremes; as alſo, if the number of terms be uneven, to the ſquare of the middle term. For example: let a, ar, ar^2, ar^3, &c. continued to y, the laſt term, be ſuch a ſeries; then $y, \frac{y}{r}, \frac{y}{r^2}, \frac{y}{r^3}$, will be the four laſt terms; and $a \times y = ar \times \frac{y}{r} = ar^2 \times \frac{y}{r^2} = ar^3 \times \frac{y}{r^3}$, &c. And, in numbers,

$$\begin{array}{cccccc} 3, & 6, & 12, & 24, & 48, & 96 \\ & & & 12, & 6, & 3 \\ \hline & & & 288, & 288, & 288 \end{array}$$

2. If the difference of the firſt and laſt term of a *geometrical progreſſion* be divided by a number leſs by unit than the denominator of the ratio, the quotient will be the ſum of all the terms except the greateſt: hence, by adding the greateſt, we have the ſum of the whole *progreſſion*.

In the preceding ſeries, $\frac{y-a}{r-1} + y = \frac{y-a+yr-y}{r-1} = \frac{yr-a}{r-1} = s$. For the ſum of a ſeries of geometrical proportionals, wanting the firſt term, or the ſum of all the conſequents, is equal to the ſum of all but the laſt term, or the ſum of all the antecedents, multiplied by the common ratio. Thus, $ar + ar^2 + ar^3, \&c. + \frac{y}{r^2} + \frac{y}{r^3} + \frac{y}{r^4} + y = r \times \overline{a + ar + ar^2, \&c. + \frac{y}{r^4} + \frac{y}{r^3} + \frac{y}{r^2} + \frac{y}{r^1}}$

Therefore $s - a = \overline{s-y} \times r = sr - yr$; or, $sr - s = yr - a$; and $s = \frac{yr-a}{r-1}$. If it be a decreaſing ſeries, whoſe ſum is to be found, as of $y + \frac{y}{r} + \frac{y}{r^2} + \frac{y}{r^3}$, &c. $+ ar^3 + ar^2 + ar + a$; and the number of terms be ſuppoſed infinite, then a the laſt term, will be equal to nothing; conſequently the ſum of ſuch a ſeries $s = \frac{yr}{r-1}$; which is a finite ſum, though the number of terms be infinite. Thus $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$, &c. $= \frac{1 \times 2}{2-1} = 2$.

In a *progreſſion* of five terms, beginning with 3, and the denominator being likewiſe 3, the greateſt term will be 243. If, then, the difference of the firſt and laſt term 240 be divided by 2, a number leſs by 1 than the denominator, the quotient 120, added to 243, gives 363, the ſum of the *progreſſion*.

Hence, 3. The firſt or leaſt term of a *progreſſion* is to the ſum of the *progreſſion*, as the denominator leſſened by 1, to its power likewiſe leſſened by 1; the exponent of which power is equal to the number of terms. For, if the number of terms be n, the exponent of r in the laſt term will be $n-1$. Therefore $y = ar^{n-1}$; and $yr = ar^{n-1+1} = ar^n$ and $s = \left(\frac{yr-a}{r-1} = \right) \frac{ar^n - a}{r-1}$; conſequently $s \times \overline{r-1} = a \times \overline{r^n-1}$, and $a : s :: r-1 : r^n-1$.

Thus, ſuppoſing the firſt term 1, the denominator 2, and the number of terms 8, the ſum will be 255.

4. Hence, alſo, the difference between the laſt term and the ſum, is to the difference between the firſt term and the ſum, as unity to the denominator. Wherefore, if the difference between the firſt term and the ſum be divided by the difference between the ſum and the laſt term, the quotient is the denominator.

From art. 2. it appears, that $s - a = \overline{s-y} \times r$; therefore $s-y : s-a :: 1 : r$, or $r = \frac{s-a}{s-y}$.

As a right line, or figure, may increaſe continually, and never amount to a given line or area; ſo there are *progreſſions* of fractions which may be continued at pleaſure, and yet the ſum of the terms be always leſs than a given number. If the difference between their ſum and this number decreaſe in ſuch a manner, that by continuing the *progreſſion* it may become leſs than any fraction how ſmall ſoever, that can be aſſigned, this number is the limit of the ſum of the *progreſſion*, and is what is underſtood by the value of the *progreſſion*, when it is ſuppoſed to be continued infinitely. Theſe limits are analogous to the limits of figures, and they mutually aſſiſt each other. The areas of figures can, in many caſes, be no otherwiſe expreſſed than by ſuch *progreſſions*; and when the limits of figures are known, they may ſometimes be advantageouſly applied for approximating to the ſums of certain *progreſſions*.

Thus, for inſtance, let the terms of any *progreſſion* be repreſented by the perpendiculars AF, BE, CK, HL, &c. ſtanding at a given diſtance on the baſe AD (*Tab.* III. *Analyſis, fig.* 70.); and let PN be any ordinate of the curve FN*e* paſſing over the extremities of thoſe perpendiculars. Suppoſe AP to be produced; then according as the area, APMF, has a limit to which it may approach continually, but never exceed, or may be produced till it exceed any given ſpace; there will alſo be a limit of the ſum of the *progreſſion*, or it may be continued till it exceed any given number. For ſuppoſing the rectangles FB, EC, KH, LI, &c. completed, the area APNF will always be leſs than the ſum of thoſe rectangles, but greater than their ſum after the firſt; therefore the area APNF, and the ſum of thoſe rectangles, either both have limits or both have none. The ſame is to be ſaid of the ſum of the ordinates, AF, BE, CK, HL, &c. and of the ſum of the terms of *progreſſion* repreſented by them. If the curve FNE, for example, be the common hyperbola, *b* its centre, *b*P the aſymptote; and AB being equal to *b*A, if AF repreſent unity, the ſeries of ordinates will repreſent the *progreſſion* 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, &c. which may therefore be continued till it exceed any given number, as the hyperbolic area may be produced till it exceed any given ſpace. But if FN*e* be an hyperbola of any higher order, ſo that the ordinate PN be reciprocally as any power of the baſe *b*P, whoſe exponent is greater than unity, the area APNF, and the ſum of the *progreſſion* repreſented by the ſeries of ordinates, will have limits. Hence there is always a limit of the ſum of the fractions that have unity for their common numerator; and the ſquares, cubes, or any other powers of the numbers 1, 2, 3, 4, &c. whoſe exponents exceeded unity for their ſucceſſive denominators.

When the area APNF has a limit, we may not only conclude, that the ſum of the *progreſſion*, repreſented by the ordinates, has a limit; but when the former limit is known, we may by it approximate to the value of the latter; and *vice verſa*, when the limit of the *progreſſion* is given, the limit of the area may be found.

Progreſſions of fractions may be found at pleaſure, that ſhall have aſſignable numbers equal to the limit of the ſum of the terms. Thus a ſeries or *progreſſion* of any number of quantities continually decreaſing being given, their ſucceſſive differences form a new ſeries of terms, the ſum of which from the beginning is always equal to the exceſs of the firſt term of the firſt ſeries above its laſt term. For inſtance, if A, B, C, D, E, &c. be the terms of the firſt ſeries, it is manifeſt, that the ſum of the difference of A, and B, B and C, C and D, D and E, is the exceſs of A above E. If the terms of the firſt ſeries decreaſe in ſuch a manner, that by continuing the *progreſſion* they may become leſs than any quantity that can be aſſigned, then the firſt term of the firſt ſeries is the limit of the ſum of the ſecond ſeries. In like manner, the difference of the alternate terms of the firſt ſeries, as of A and C, B and D, C and E, &c. form a new *progreſſion* of terms, the ſum of any number of which is equal to the exceſs of the ſum of A and B, the firſt and ſecond term of the ſeries, above the ſum of the laſt and penultimate terms; and the ſum of A and B is the limit of the ſum of the new ſeries. In general, if a *progreſſion* is formed by taking the difference of the firſt term A and the term whoſe place in the ſeries is expreſſed by any number *n*; of the ſecond term B, and that whoſe place is $n+1$; of the third term C, and that whoſe place is $n+2$, and ſo on; then will the limit of the ſum of this new *progreſſion* be equal to the ſum of the terms A, B, C, D, &c. which precede that term whoſe place is expreſſed by *n*. In this manner *progreſſions* may be found at pleaſure, which may be continued without end, and have given numbers for the limits of their ſums.

For example, let the firſt ſeries be 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, &c. the ſucceſſive differences of the terms of which are $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{12}$, $\frac{1}{20}$, &c, and the limit of the ſum of this *progreſſion* will therefore be 1. If we multiply eaach term of this laſt ſeries by 2, that the firſt term may be unit, we ſhall have 1, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{10}$, &c. the denominators of which are the triangular numbers, unity being the common numerator, and the limit of the ſum of this *progreſſion* is 2. The ſucceſſive difference of the terms of this latter ſeries being each multiplied by $\frac{1}{2}$, that the term of the new ſeries may be unity, give 1, $\frac{1}{4}$, $\frac{1}{10}$, $\frac{1}{20}$, &c. which have the pyramidal numbers for their ſucceſſive denominators; and the limit of the ſum of this *progreſſion* is $\frac{3}{2}$. In the ſame manner, the limit of the ſum of the fractions having unity for their common numerator, and the figurate numbers of any order denominated by *m* for their ſucceſſive denominators, is found to be $\frac{m-1}{m-2}$.

The ſame ſeries 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, &c. being again aſſumed, the difference of the alternate terms are $\frac{2}{3}$, $\frac{2}{8}$, $\frac{2}{15}$, $\frac{2}{24}$, &c. the limit of the ſum of which *progreſſion* is $1\frac{1}{2}$. Dividing each term by 2, the limit of the ſum of $\frac{1}{3}$, $\frac{1}{8}$, $\frac{1}{15}$, $\frac{1}{24}$, &c. is $\frac{3}{4}$. If we take the differences of the firſt term, and that whoſe place is *m*, the ſecond term, and that whoſe place is $m+1$, &c. the common numerator of thoſe differences will be $m-1$; and their ſucceſſive denominators, the product of $1\times m$, $\overline{2\times m+1}$, $\overline{3\times m+2}$, and the limit of the ſum of this *progreſſion* is the ſum of as many terms $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}$, &c. as there are units in $m-1$. Now if each term of the new *progreſſion* be divided by $m-1$, that unity may be the common numerator, the terms $\frac{1}{m}$, $\frac{1}{2\times\overline{m+2}}$, $\frac{1}{3\times\overline{m+2}}$, &c. will ariſe, the limit of which is equal to the ſum of the fractions 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, &c. (continued till their number be $m-1$) divided by $m-1$. In like manner, by aſſuming other alternate, or any equivalent terms of the ſeries 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, &c. we may form new *progreſſions*, the value of which may be found. Thus, if we take the terms 1, $\frac{1}{5}$, $\frac{1}{9}$, $\frac{1}{13}$, &c. paſſing over three terms, and divide the ſucceſſive differences of theſe terms by 96, we ſhall have the ſeries $\frac{1}{5.24}$, $\frac{1}{5.9.24}$, $\frac{1}{9.13.24}$, $\frac{1}{13.17.24}$, &c. which is equivalent to the ſeries C, given by Monſ. de Monmort, in the Philoſophical Tranſactions, N° 353. p. 651, viz. $C = \frac{1}{1.2.3.4.5} + \frac{14}{5.6.7.8.9} + \frac{55}{9.10.11.12.13} + \frac{140}{13.14.15.16.17} +$ &c. the ſum of which will therefore be $\frac{1}{96}$. And if we take the alternate terms of the ſeries $\frac{1}{2}$, $\frac{1}{12}$, $\frac{1}{30}$, $\frac{1}{56}$, &c. above mentioned, and divide the ſucceſſive differences of the terms by 2, we ſhall have the ſeries $\frac{5}{2.12}$, $\frac{9}{12.30}$, $\frac{13}{30.56}$, &c. which is equivalent to the ſeries $\frac{5}{1.2.3.4}$, $\frac{9}{3.4.5.6}$, $\frac{13}{5.6.7.8}$, $\frac{17}{7.8.9.10}$, &c. mentioned in the ſaid Philoſophical Tranſactions, and marked A, the ſum or limit of which, by the foregoing rule, will be $\frac{1}{4}$. So the limit of Mr. Monmort's ſeries $B = \frac{1}{1.2.3.4.5} + \frac{4}{4.5.6.7.8}$, &c. will be $= \frac{1}{108}$. See Maclaurin's Fluxions, art. 356, where there is an error of the preſs, in p. 296, l. 11. and 15. for the ſeries which in line 11 is ſaid to be Mr. Monmort's ſeries B, is the ſeries A, p. 651. of the Philoſophical Tranſactions, N° 353. aforeſaid; ſo in line 15, for A, read B.

This may ſuffice to ſhew how the ſums of *progreſſions* ſo derived may be found. We refer, for the farther application of theſe principles, to the aforeſaid Treatiſe of Fluxions, art. 357, &c. Mr. Stirling's Treatiſe of the Summation of Series, ought alſo to be conſulted, as he has improved the method of approximating to the value of *progreſſions*, which often ariſe in the ſolution of problems. See alſo Mr. de Moivre's Miſcellanea Analytica, and particularly the ſupplement to that work. Methodus Differentialis, ſive Tractatus de Summatione et Interpolatione Serierum infinitarum. Lond. 1730. 4to.

Progression, *arch of a*. See **Arch**.

PROGYMNASMATA, *προγυμνασματα*, in *Antiquity*, certain preparatory exerciſes performed by all thoſe who offered themſelves to contend in the Olympian games.

PROHIBITED *goods*, in *Commerce*, ſuch commodities as are not allowed to be either imported or exported. See **Contraband**.

PROHIBITIO *de vaſto directa parti*, is a writ judicial, directed to the tenant, *prohibiting* him from making waſte upon the land in controverſy, during the ſuit. It is ſometimes alſo directed to the ſheriff.

PROHIBITION, *prohibitio*, the act of forbidding, or inhibiting any thing.

It is the *prohibition* of the law that makes the ſin; a teſtator frequently bequeaths things with a *prohibition* to alienate.

Prohibition, in *Common Law*, denotes a writ iſſued out of the chancery, the king's bench, common pleas, or exchequer, to forbid ſome other court, either ſpiritual or ſecular, to proceed in a cauſe there depending; upon ſuggeſtion, that the cognizance thereof belongeth not to that court.

It is now uſually taken for that writ which lieth for one who is impleaded in the court Chriſtian, for a cauſe belonging to the temporal juriſdiction, or the cognizance of the king's courts; whereby, as well the party and his counſel, as the judge himſelf, and the regiſter, are forbid to proceed any farther in that cauſe.

PROHIBITO, in the *Italian Muſic*, is a term applied to ſuch parts of a piece as are not proper, or according to juſt rule. Thus *intervallo prohibito* is every interval in melody that does not paſs the ear eaſily or naturally, to to give it ſome pleaſure; ſuch are the tritone, the ſixth major, the ſeventh, ninth, &c. though under certain circumſtances, even theſe have pleaſing effects, in that by their harſhneſs they render the ſubſequent concords more agreeable.

PROJECTILE, or **Project**, in *Mechanics*, a heavy body, which, being put into a violent motion by an external force impreſſed thereon, is diſmiſſed from the agent, and left to purſue its courſe.

Such e. gr. is a ſtone thrown out of the hand or a fling, an arrow from a bow, a bullet from a gun, &c.

Projectiles, *the cauſe of the continuation of the motion of*, or what it is determines them to perſiſt in motion, after the firſt cauſe ceaſes to act, has puzzled the philoſophers. See Motion and Communication.

The Peripatetics account for it from the air, which, being violently agitated by the motion of the *projecting* cauſe, e. gr. the hand and ſling, and forced to follow the *projectile*, while accelerated therein, does, upon the diſmiſſion of the *projectile*, preſs after it, and protrude it forward, to prevent a vacuum.

The moderns account for the motion of *projectiles* on a much more rational and eaſy principle; it being, in effect, a natural conſequence from one of the great laws of nature; viz. that all bodies, being indifferent as to motion or reſt, will neceſſarily continue the ſtate they are put into, except ſo far as they are hindered, and forced to change it by ſome new cauſe.

Thus a *projectile*, put in motion, muſt continue to move eternally on in the ſame right line, and with the ſame velocity, were it to meet with no reſiſtance from the medium, nor had any force of gravity to encounter.

The doctrine of the motion of *projectiles* is the foundation of all gunnery.

Projectiles, *laws of the motion of*. I. If a heavy body be *projected* perpendicularly, it will continue to aſcend or deſcend perpendicularly; becauſe both the *projecting* and the gravitating forces are found in the ſame line of direction.

II. If a heavy body be *projected* horizontally, it will, in its motion, deſcribe a parabola; the medium being ſuppoſed void of reſiſtance.

For the body is equally impelled by the impreſſed force, according to the right line AR (*Tab.* VI. *Mechanics*, *fig.* 97.) and by the force of gravity, according to the right line, AC, perpendicular thereto. While then the body, by the action of the impreſſed force, is arrived in Q; by the force of gravity it will be arrived through QM; and therefore will be found in M. But the motion, in the direction AR, will ſtill be uniform (ſee Motion); and, therefore, the ſpaces QA and *q*A are as the times; and the ſpaces QM, and *qm*, are likewiſe as the ſquares of the times (ſee Acceleration); therefore, $AQ^2 : Aq^2 :: QM : qm$. That is, $PM^2 : pm^2 :: AP : ap$.

The courſe or path therefore, AM*m*, of a heavy body *projected* horizontally, is a parabola.

Two hundred years ago the philoſophers took the line deſcribed by a body *projected* horizotally, e. gr. a bullet out of a cannon, while the force of the powder exceeded the weight of the bullet conſiderably, to be a right line; after which it became a curve.

N. Tartaglia was the firſt who perceived the miſtake, and maintained the path of the bullet to be a crooked line, throughout its whole extent; but it was Galileo who firſt determined the preciſe curve which the bullet deſcribed; and ſhewed the path of the bullet, *projected* horizontally from an eminence, to be a parabola; the vertex whereof is the point where the bullet quits the cannon. See Gunnery.

III. If a heavy body be *projected* obliquely, either upwards or downwards, in a medium void of reſiſtance, it will likewiſe deſcribe a parabola.

Suppoſe a body projected in the direction AR (*Tab.* IV. *Mechanics*, *fig.* 47.) with the velocity it would have acquired by falling from D to A, the body by that force alone acting upon it, would uniformly deſcribe the right line AR; and any part of the line of direction, as AR, repreſents the time in which it would be deſcribed. In the ſame time let the force of gravity, acting alone, carry the body from A to S, and completing the parallellogram ASBR, at the end of the time repreſented by AR, the body will actually be found in B. Since, then, the time in which the body falls from D to A is the ſame in which it would deſcribe 2AD by an uniform motion, with a velocity equal to that acquired at A, that time will be repreſented by 2AD. But the time in which the body would fall from A to S being repreſented by AR, it follows, that $AS : AD :: AR^2 : 4AD^2$; and $4AD \times AS = AR^2 = SB^2$; whence it appears, that the point B is a point in the parabola, whoſe diameter is AS, and vertex A, having the parameter of that diameter equal to 4AD.

Hence, 1. The parameter of the diameter of the parabola, AS, i. e. 4AD, is a third proportional to the ſpace through which the body deſcends in any given time, and the celerity, which is defined by the ſpace paſſed over in the ſame time; i. e. to AP and AQ, or AS and AR.

2. Since the ſpace deſcribed by a body falling perpendicularly, is $15\frac{1}{12}$ Paris feet, or 16 feet 1 inch London meaſure, in a ſecond; the parameter of the diameter of the parabola to be deſcribed is found, if the ſquare of the ſpace paſſed over by the *projectile* with the impreſſed force in a ſecond, be divided by $15\frac{1}{12}$ Paris, or 16 feet 1 inch London meaſure.

3. Since 4AD is the parameter of the diameter AS, it follows, that the parameters belonging to the vertex A of the diameter AS, are always in the duplicate ratio of the velocities of the projection, the ſpace AD being always as the ſquare of the velocity acquired by falling from D to A; and if then the velocity of the *projectiles* be the ſame, the ſpaces deſcribed in the ſame time by the force impreſſed, are equal; conſequently the parameter of the parabolas paſſed over by the compound motion is the ſame, whatever the direction AR of the *projectile* be.

4. If from the parameter of the diameter be ſubtracted quadruple the altitude of the parabola, the remainder is the parameter of the axis; the fourth part whereof is the diſtance of the vertex of the axis from the focus of the parabola. Hence the celerity of the *projectile* being given, the parabola deſcribed by the *projectile* may be laid down on paper.

5. If from A (*Tab.* VI. *Mechanics*, *fig.* 98.) as a centre, you deſcribe the ſemicircle BQL, its circumference will be the locus of all the foci of the parabolas that can be deſcribed by a *projectile* thrown from A, with the velocity it could acquire in falling from B to A; for, by a well known property of the parabola, the diſtance of the focus from A is always equal to ½ of the parameter of the diameter that paſſes through A, i. e. to ¼ of 4AB, or AB itſelf. All the foci muſt, therefore, be found in the ſemicircle BQL.

6. Hence it is eaſy to determine the parabola deſcribed, when the direction of the *projectile* is given; for, drawing AF ſo as to make the angle FAD equal to the given one DAB, which the direction AD makes with the perpendicular AB, the point F, where AF cuts the ſemicircle BQL, will be the focus required; and if through F be drawn the line FN parallel to AB, cutting the directrix BE in N, this line will be the axis, I, the middle point between F and N, will be the vertex of the parabola, and 4FI the parameter of the axis.

7. If a line be drawn through the vertex I parallel to the directrix, meeting AB in C, it muſt be biſected by the line of direction in D; and if a line be drawn from the focus F to D, it will be perpendicular to the tangent, and will paſs through B, if produced; and, therefore, a ſemicircle deſcribed upon AB as a diameter, will always paſs through the point D, where the line of direction cuts CI, the tangent to the vertex of the parabola. The line of direction of the *projectile* AH is a tangent to the parabola in A; becauſe it is parallel to the ordinate PM. And it appears, that the *projectile* continually aſcends, till its direction becomes parallel to the horizon, and then it begins to deſcend; and, therefore, the higheſt point of a curve is where its tangent is parallel to the horizon. Huygens, ſuppoſing that the reſiſtance was proportional to the velocity of the moving body, concluded that the line deſcribed by it would be a kind of logarithmic curve. But ſir Iſaac Newton having clearly proved, that the reſiſtance of the line is not proportional to the velocity itſelf, but to its ſquare, ſhews, in his Principia, that the line a *projectile* deſcribes, approaches nearer to an hyperbola than parabola. The late Mr. John Bernouilli conſtructed this curve by means of the quadratures of ſome

tranſcendental curves, at the requeſt of Dr. Keil, who propoſed this problem to him in 1718. It was alſo ſolved by Taylor, and we have a ſolution of it in Hermann's Phoronomia.

The learned commentators upon ſir Iſaac Newton's Principia, expreſsly ſay, that the deſcription of the curve, in which a *projectile* moves, is ſo very perplexed, that it can be ſcarcely expected any deduction ſhould be thence made, which may be adapted either to philoſophical or mechanical purpoſes, vol. ii. p. 118.

Profeſſor Euler has farther inveſtigated the nature of this curve, and directed the calculation and uſe of a number of tables for the ſolution of all caſes that occur in gunnery, which may be accompliſhed with nearly as much expedition as by the vulgar hypotheſis of Galileo.

By the common theory, the *projectile* will return to the horizontal plane with the ſame velocity as that with which it iſſues out of the piece, and the angle which the track makes with the horizontal plane is the ſame at the exit from the piece as at the fall; but they both differ greatly, unleſs the *initial* VELOCITY be very ſmall. True Principles of Gunnery inveſtigated, p. 322, &c.

IV. The impetus at any point of the curve is the perpendicular height to which a *projectile* could aſcend by the force it has at that point: or the perpendicular height from which a body muſt fall to acquire the velocity it has at that point; and this impetus at any point of the curve, as A, is equal to that part of the diameter which is contained between the directrix and that point. Hence, 1. The velocity of a *projectile* in any point of the curve is that which it would acquire by falling perpendicularly from the directrix to that point: and, 2. If two bodies are projected with the ſame velocity, the one perpendicularly upwards, and the other in a direction inclining to the horizon, their velocities will always be equal at points of the ſame height above the point of projection. 3. The velocity of a *projectile* is always leaſt at I, and at equal diſtances from that point it is equal: and the velocity at I is to the velocity at A as radius is to the ſecant of the angle of direction.

V. A *projectile* in equal times, deſcribes portions of its parabolic path, as A M, M *m*, (*Tab.* IV. *Mechanics, fig.* 47.) which are ſubtended by equal ſpaces of the horizon A T, T *t*; i. e. in equal times it paſſes over equal horizontal ſpaces.

For A Q, Q *q*, being ſpaces deſcribed by an uniform motion, are as the times; and A Q : Q *q* : : A T : T *t*, therefore, the times being equal, A T muſt be equal to T *t*.

VI. The quantity or amplitude of the path A B, i. e. the range of the *projectile*, is to the parameter of the diameter A S, as the ſine of the angle of elevation R A B to its ſecant.

Let the ſine of the angle of elevation be $= a$, the co-ſine $= b$, the radius $= t$, the amplitude $= c$, and the parameter $= x$. Then if A R be radius, B R will be the ſine and A B the co-ſine of the angle of elevation; and, therefore, $\frac{b}{a} = \frac{AB}{BR}$; but $b : a :: c : \frac{ac}{b}$; conſequently $BR = AS = \frac{ac}{b}$. Moreover $\frac{b}{t} = \frac{AB}{AR}$; therefore $b : t :: c : \frac{tc}{b}$; conſequently $AR = SB = \frac{tc}{b}$. But $x \times AS = SB^2$ from the property of the parabola; therefore $\frac{acx}{b} = \frac{t^2c^2}{b^2}$, and $ax = \frac{ct^2}{b}$; whence we ſhall have $a : \frac{t^2}{b} :: c : x$; but from a theorem in trigonometry, the ſecant is a third proportional to the co-ſine and radius, therefore the ſecant of the angle of elevation is equal to $\frac{t^2}{b}$. Hence it appears, that c the amplitude is to x the parameter as a the ſine of the angle of elevation is to $\frac{t^2}{b}$ its ſecant.

Hence, 1. The ſemiparameter is to the amplitude of the path A B, as the whole ſine to the ſine of double the angle of elevation. 2. If then the celerity of two *projectiles* be the ſame, the parameter is the ſame. Wherefore, ſince the ſemiparameter of the path, in the one caſe, is to the amplitude, as the whole ſine to the ſine of double the angle of elevation; and the ſemiparameter of the path in the other caſe is to the amplitude as the whole ſine to the ſine of double the angle of elevation; we may ſay farther, as the amplitude is to the ſine of the angle of double the elevation in the one caſe, ſo is the amplitude to the ſine of the angle at double the elevation in the other caſe. The amplitude, therefore, or magnitudes of the paths are as the ſines of double the angles of elevation, the velocity of the *projectile* remaining the ſame.

This may be eaſily proved by conſidering, that in *Tab.* VI. *Mechanics, fig.* 98. $AK = 2AO = 2CI = 4CD$; and that A K is the amplitude of the parabola, and C D the ſine of the angle D G B which is the double of B A D, if G B ($= \frac{1}{2}$ A B) be made radius. And, conſequently, as the amplitude is equal to four times the ſine of double the angle of elevation, the amplitudes will be to one another as the ſines of double the angles of elevation reſpectively; when the velocity of the projection is given. Hence, 1. If the angle B A D does not exceed 45°, the more acute it is, the leſs will be the amplitude A K; ſince the ſine of double that angle muſt become leſs, and the amplitude is equal to four times that ſine. When the angle B A D vaniſhes, the parabola A I K coincides with the right line A B; and the *projectile*, inſtead of deſcribing a curve, will only riſe to B and fall again to A. But the more the angle B A D approaches to 45°, the line C D, which is the ſine of double that angle, becomes the greater; and, therefore, the amplitude A K muſt alſo become the greater. 2. At the direction of 15° or 75°, the amplitude (ſuppoſing no reſiſtance of the air) is equal to the impetus; for, half the impetus being radius, a fourth part of the amplitude is the ſine of twice the angle of elevation; but the ſine of twice 15°, that is, the ſine of 30°, is always equal to half the radius; or in this caſe, a fourth part of the impetus is equal to a fourth part of the amplitude. 3. The fourth part of the amplitude is a mean proportional between the impetus at the principal vertex of the curve and its altitude. 4. When the impetus is greater than half the amplitude, we ſhall have two directions for that amplitude; when equal to it, only one; and when leſs, none at all; and converſely; for in the firſt caſe the line D *d* cuts the circle in two points; in the ſecond caſe it only touches it, and in the laſt it does not meet it at all. 5. When there is but one direction for the amplitude A K, the angle of elevation is 45°: and in ſuch a direction the altitude is equal to the impetus at the principal vertex; and each of them is equal to half the impetus at the point of projection.

VII. The celerity of the *projectile* being the ſame, the amplitude A K is greateſt, i. e. the range of the *projectile* is greateſt at an angle of elevation of 45°; and the amplitudes or ranges, at angles of elevation equally diſtant from 45°, are equal.

This is found by experiment; and is likewiſe demonſtrable thus: ſince the ratio of the ſine of double the angle of elevation to the amplitude is always the ſame, while the celerity of the *projectile* remains the ſame; as the ſine of double the angle of elevation increaſes, the amplitude will increaſe.

When the angle B A D becomes 45°, the points F and O will fall on the point Q, where the ſemicircle B Q L cuts the horizontal line A K; the ſine C D of double B A D becomes now the ſine of 90°; and, therefore, is equal to the radius G A. But ſince the radius is the greateſt ſine, the amplitude A K will now be the greateſt that can be deſcribed by any *projectile* thrown from A with a velocity which it would have acquired by falling from B to A; and this greateſt amplitude is always double of B A; for A K in this caſe is equal to $4AG = 2AB$: in other words, ſince as the whole ſine is to the ſine of double the angle of elevation, ſo is the ſemiparameter to the amplitude; and the whole ſine is equal to double the ſine of the angle of elevation, if that be 45°; under the angle of elevation of 45°, the amplitude is equal to the ſemiparameter, or twice the impetus. Hence it appears, that if a body be thrown in a direction that makes an angle of 45° with the horizon, it will be carried farther on the horizontal line than if it were thrown with the ſame force in any other direction. On account of the air's reſiſtance, the fartheſt horizontal range is not made from an elevation of 45°, but from a direction ſomewhat lower.

Moreover, when the angle B A D is greater than 45°, the amplitudes A K decreaſe as this angle increaſes; for $AK = 4CD$, and C D muſt, in this caſe, decreaſe as B A D increaſes.

Again, ſince the ſines of angles equi-diſtant from right angles, e. gr. 80° and 100°, are the ſame; and the double angles muſt be equi-diſtant from a right angle, if the ſimple ones be ſo; the amplitudes or ranges, at elevations equi-diſtant from 45°, muſt be equal: but, admitting the reſiſtance of the air, all the ranges under 45° are greater than thoſe at elevations equally diſtant above 45°. Farther, when the angle B A D becomes a right angle, then A B becomes the axis, and A the vertex of the parabola, C D vaniſhes, and A K becomes $= 0$. When the angle B A D becomes greater than a right angle, then the curve deſcribed ſhall be only a portion of the parabola, lying on the other ſide of A.

VIII. The greateſt range or amplitude being given, to determine the amplitude or range A K under any other given angle of elevation, whoſe complement is B A D; and alſo the altitude of the parabola deſcribed by this projection; the celerity remaining the ſame. Since the amplitude of 45° is 2 A B (which is the line that always expreſſes the velocity, becauſe by falling through it the velocity is acquired. Say thus: as the whole ſine is to the ſine of double the angle of elevation B A D, ſo is the greateſt amplitude or range 2 A B to A K the amplitude required.

Thus, ſuppoſe the greateſt range of a mortar at 45°, to be 6000 paces, and the length of the range at 30°, required; it will be found 5196 paces.

The amplitude being found, the altitude may be obtained by ſaying, as radius is to the tangent of the angle of elevation, ſo is C D ($=\frac{1}{4}$ A K) to A C, the altitude ſought.

IX. The velocity of a *projectile* being given, to find its greateſt range or amplitude. Since the celerity of the *projectile* is given in the ſpace it will paſs over by the impreſſed forced; e. gr. in one ſecond; there is nothing required but to find the parameter of the path (by corol. 2. of the third law); for half of this is the amplitude or range required.

Suppoſe, e. gr. the celerity of the projectile ſuch as that in one ſecond it will run over 1000 Paris feet, or 12000 inches: if then 144000000 be divided by 181, the quotient will give the parameter of the path 795580 inches, or 66298 feet. The range or amplitude required, therefore, is 33149. Any object, therefore, found within this extent, may be ſtruck by the *projectile*.

X. The greateſt range or amplitude being given; to find the velocity of the *projectile*, or the horizontal ſpace it will paſs over in a ſecond. Since double the greateſt amplitude is the parameter of the path; between double the greateſt amplitude, and the ſpace paſſed over in a ſecond by a body falling perpendicularly, viz. 181 Paris inches, find a mean proportional, for this will be the ſpace deſcribed by the *projectile* in the given ſecond.

Thus, if the greateſt amplitude be 500 feet, and its double 1000 feet, or 12000 inches, the ſpace required will be $=\sqrt{}(12000 \times 181) = 120$ feet and 9 inches.

Mr. Gray gives the following rule for finding the velocity of a *projectile* at any point of the curve, having the perpendicular height of that point, and the impetus at the point of projection given; multiply the impetus by four times 16 feet 1 inch, or $64\frac{1}{3}$ feet, and the ſquare root of the product is the velocity. Thus, ſuppoſe the impetus at the point of projection to be 3000, and the perpendicular height of the other point 100, the impetus at that point will be 2900. Then $2900 \times 64\frac{1}{3} = 186566$ feet, the ſquare root of which is 432 feet nearly, the ſpace which a body would run through in one ſecond, if it moved uniformly. And to determine the impetus or height from which a body muſt deſcend, ſo as at the end of the deſcent it may acquire a given velocity, he lays down this rule: divide the ſquare of the given velocity (expreſſed in feet run through in a ſecond) by $64\frac{1}{3}$ feet, and the quotient will be the impetus.

XI. If the amplitude A K, and the angle of elevation D A K are given, the impetus, neceſſary to deſcribe a parabola that ſhall have that amplitude, may be found by this proportion: as the ſine of double the angle of elevation is to the radius, ſo is one half of the given amplitude to A B, the ſpace through which a body muſt fall to acquire the neceſſary impetus.

XII. If the impetus and amplitude be given, the direction may be found thus: firſt find A B, by falling through which the given impetus may be acquired; then ſay, as the double of this line to the given amplitude, ſo is the radius to the ſine of double the angle of elevation; and this angle or its complement will be the direction required.

XIII. To determine the greateſt altitude to which a body obliquely projected will riſe. The rule is, biſect the amplitude A B, (*Tab.* IV. *Mechanics*, *fig.* 47.) in t, and from the point t erect a perpendicular tm; this tm will be the greateſt altitude to which the body projected, according to the direction A R, will ariſe: and this line tm is equal to $qm = \frac{1}{4}\mathrm{BR}$; for $\mathrm{AB} : \mathrm{A}t :: \mathrm{AR} : \mathrm{A}q$; and $\mathrm{A}t = \frac{\mathrm{AB}}{2}$, therefore $\mathrm{A}q = \frac{\mathrm{AR}}{2}$. But $\mathrm{AR}^2 : \mathrm{A}q^2 :: \mathrm{BR} : qm$; and ſince $\mathrm{A}q^2 = \frac{\mathrm{AR}^2}{4}$, qm will be $= \frac{\mathrm{BR}}{4}$. But $\mathrm{AB} : \mathrm{A}t :: \mathrm{BR} : tq$; and $\mathrm{A}t = \frac{\mathrm{AB}}{2}$, therefore $tq = \frac{\mathrm{BR}}{2}$, and $\frac{tq}{2} = \frac{\mathrm{BR}}{4} = qm$. And $qm = \frac{tq}{2} = tm$.

XIV. The range or amplitude A B, and the angle of elevation B A R, being given, to determine the greateſt altitude of the *projectile*. If A R be taken for the whole ſine, B R will be the ſine, and A B the co-ſine of the angle of elevation B A R: wherefore ſay, as the co-ſine of the angle of elevation is to the ſine of the ſame; ſo is the amplitude A B to a fourth number, which will be B R; the fourth part whereof is the greateſt altitude required. Hence, ſince from the given velocity of a *projectile*, its greateſt range or amplitude, and thence its range under any other angle, is found; the velocity being given, the greateſt altitude of the *projectile* is likewiſe found.

XV. The altitude of the range tm is to the eighth part of the parameter, as the verſed ſine of double the angle of elevation to the whole ſine.

Hence, 1. Since as the whole ſine is to the verſed ſine of double the angle of elevation in one caſe; ſo is the eighth part of the parameter to the altitude of the range; and as the whole ſine is to the verſed ſine of double the angle of elevation, in any other caſe, ſo is the eighth part of the parameter to the altitude: but the velocity remaining the ſame, the parameter in different angles of elevation will likewiſe be the ſame: the altitudes of the ranges under different angles of elevation are as the verſed ſines of double their angles. 2. Hence alſo, the velocities remaining the ſame, the altitudes of the ranges are in a duplicate ratio of the ſines of the angles of elevation.

XVI. The horizontal diſtance of any mark or object, together with its height above, or depth beneath the horizon, being given; to find the angle of elevation required to hit the ſaid object.

Wolfius gives us the following theorem, the reſult of a regular inveſtigation; ſuppoſe the parameter of the diameter A S $= a$; I $n = b$; n being ſuppoſed the object, AI $= c$, the whole ſine $= t$. Then, as c is to $\frac{1}{2}a + \sqrt{\frac{1}{4}a^2 - ab - c^2}$; ſo is the whole ſine t, to the tangent of the angle of elevation required, R A B.

Dr. Halley gives us the following eaſy and compendious geometrical conſtruction of the problem; which he likewiſe deduces from analytical inveſtigation.

Having the right angle L D A (*Tab.* VI. *Mechanics*, *fig.* 99.) make DA, D F, the greateſt range, D G the horizontal diſtance, and D B, D C, the perpendicular height of the object, draw G B, and make D E equal to it. Then, with the radius A C, and centre E, ſweep an arch, which, if the thing be poſſible, will interſect the line A D in H, and the line D H, being laid both ways from F, will give the points K and L; to which draw the lines G L, G K.

Here the angles L G D, K G D, are the elevations required for hitting the object B. But note, that if B be below the horizon, its deſcent DC $=$ DB, muſt be laid from A, ſo as to have AC $=$ AD $+$ DC. Note likewiſe, that if in deſcents D H be greater than F D, and ſo K fall below D; the angle K G D ſhall be the depreſſion below the horizon.

It may be here obſerved, that the elevation ſought conſtantly biſects the angle between the perpendicular and the object.

This the author was not aware of when he gave the firſt ſolution of the problem; but, upon diſcovering it, he obſerves, that nothing can be more compendious, or bid fairer for the perfection of the art of gunnery; ſince it is here as eaſy to ſhoot with a mortar at any object, in any ſituation, as if it were on the level; nothing more being required but to lay the piece ſo as to paſs in the middle line between the zenith and the object, and giving it the due charge.

XVII. When the perpendicular height is given, and the horizontal diſtance is required, Mr. Gray directs to obſerve with an inſtrument the angle which the object aimed at makes with the horizon, and to uſe this proportion; as the tangent of that angle is to the perpendicular height given, ſo is the radius to the horizontal diſtance required. But when the horizontal diſtance is given and the perpendicular height is wanted, ſay, as radius is to the horizontal diſtance given, ſo is the tangent of the angle found by obſervation to the perpendicular height of the object required.

XVIII, The times of the *projections*, or caſts, under different angles of elevation, the velocity remaining the ſame, are as the ſines of the angles of elevation.

XIX. The velocity of a *projectile*, together with the angle of elevation R A B being given (*Tab.* IV. *Mechanics*, *fig.* 47.) to find the range or amplitude A B, and the altitude of the range tm, and deſcribe the path AmB. To the horizontal line A B, erect a perpendicular A D, which is to be the altitude whence the *projectile* falling might acquire the given velocity: on A D deſcribe a ſemicircle A Q D, cutting the line of direction A R in Q: through Q draw C m parallel to A B, and make CQ $=$ Qm. From the point m let fall a perpendicular mt, to A B. Laſtly, through the vertex M deſcribe the parabola AmB.

Here AmB is the path ſought; 4 C Q its amplitude, or range; tm the altitude of the range; and 4 C D the parameter.

Hence, 1. The velocity of a *projectile* being given, the amplitudes and altitudes of all the poſſible ranges are given at the ſame time; for, drawing E A, we have under the angle of elevation E A B, the altitude A I, and the amplitude 4 I E: under the angle of elevation F A B, the altitude A H, the amplitude 4 H F. 2. Since A B is perpendicular to A D, it is a tangent to the circle in A; hence the angle A D Q is equal to the angle of elevation

RAB; conſequently AIQ is double the angle of elevation; and, therefore, CQ, the fourth part of the amplitude, is the right ſine; AC the altitude of the range, the verſed ſine of double the angle of elevation.

XX. The altitude tm of a caſt, or its amplitude AB, together with the angle of elevation RAB, being given, to find the velocity wherewith the *projectile* firſt moved, that is the altitude AD, in falling from whence it would acquire the like velocity. Since $AC = tm$ is the verſed ſine, $CQ = \frac{1}{4}AB$, the right ſine of double the angle of elevation AIQ; to the verſed ſine of double the angle of elevation, find the whole ſine, and the height of the caſt. Or, to the right ſine of double the angle of elevation, the whole ſine, and the fourth part of the amplitude, find a fourth proportional. This will be the radius IQ or IA, the double whereof, AD, is the altitude required. See Wolfii Elem. Math. tom. ii. cap. 11. Gray's Treat. of Gunnery, 1731, and Maclaurin's View, &c. 4to. p. 202, &c.

The theory of *projectiles*, as delivered by almoſt all writers on gunnery ſince Galileo, proceeds on the ſuppoſition, that the flight of ſhot and ſhells is nearly in the curve of a parabola. Galileo, indeed, has ſhewn that, independently of the reſiſtance of the air, all *projectiles* would in their flight deſcribe a parabola; and did propoſe ſome means of examining what inequalities would ariſe from that reſiſtance. So that it might have been expected, that thoſe who came after him would have tried how far the real motions of *projectiles* deviated from a parabolic tract, in order to have decided how far the reſiſtance of the air was to be attended to, in the determinations of gunnery. But, inſtead of proceeding thus cautiouſly, ſubſequent writers have boldly aſſerted, that no conſiderable variation could ariſe from the reſiſtance of the air, in the flight of ſhells and cannon ſhot; whence it became an axiom, almoſt generally acquieſced in, that the flight of theſe bodies is nearly in the curve of a parabola.

However it was proved by D. Bernouilli, that the reſiſtance of the air has a very great effect on ſwift motions, ſuch as thoſe of cannon-ſhot. He concludes from experiment, that a ball which aſcended only 7819 feet in the air, would have aſcended 58,750 feet in vacuo. See Comment. Acad. Petrop. tom. ii. See RESISTANCE.

Practical gunners alſo unanimouſly agree that every ſhot flies in a ſtraight line to a certain diſtance from the piece, which imaginary diſtance they call the extent of the point-blank-ſhot.

This flight in a ſtraight line, indeed, ſuppoſing it fact, would be not only a refutation of the parabolic hypotheſis, but a moſt unaccountable difficulty in itſelf, as implying a ſuſpenſion of the action of gravity. But the great velocity of cannon-ſhot, aſſigned by Mr. Robins, ſeems readily to clear up this affair. We need only ſuppoſe, that within the diſtance thus determined by practical gunners the deviation of the path of the ſhot is not very perceptible in their way of pointing. Now as a ſhot of 24 lb. fired with two thirds of its weight in powder, will, at the diſtance of five hundred yards from the piece, be ſeparated from the line of its original direction, by an angle of little more than half a degree; thoſe who are acquainted with the inaccurate methods often uſed in the directing of cannon, will eaſily allow, that ſo ſmall an aberration as this may, by the generality of practitioners, be unattended to, and the path of the ſhot may conſequently be deemed a ſtraight line, eſpecially as other cauſes of error will often intervene, much greater than what ariſes from the incurvation of this line by gravity. See New Princip. of Gunnery, p. 140.

How raſh and erroneous the opinion of the inconſiderable reſiſtance of the air is, will eaſily appear from what is eſtabliſhed by that ingenious author, who has ſhewn that this reſiſtance to a cannon ball amounts to more than twenty times the weight of the ball. What errors may not be expected from an hypotheſis which neglects this force, as inconſiderable? In effect, it will not be difficult to ſhew, that the tract deſcribed by the flight of ſhot or ſhells, is neither a parabola nor nearly a parabola. For by that author's experiments it appears, that a muſket-ball of three-fourths of an inch diameter, fired with half its weight of powder from a piece forty-five inches long, moves with a velocity of near 1700 feet in a ſecond. Now, by the common parabolic theory, if this ball flew in the curve of a parabola, its horizontal range at 45° would be found to be about ſeventeen miles. But from practical writers, as Diego Uſano, and Merſennus, it appears, that this range is ſhort of half a mile; ſo that a muſket-ſhot at 45° elevation, with a reaſonable charge of powder, flies not the $\frac{1}{34}$ part of the diſtance it ought to do, if it moved in a parabola.

Nor is this great diminution of the horizontal range to be wondered at, when it is conſidered that the reſiſtance of the air to this bullet when it firſt iſſues from the piece, amounts to one hundred and twenty times its gravity.

Again, if the flight of the heavieſt ſhot, in common uſe for land-ſervice, as of iron bullets of 24 lb. weight, be examined, it will appear, that ſuch a ſhot made with a full charge of powder has a velocity of 1650 feet in 1″. And the horizontal range at 45° of this ſhot, would, according to the parabolic hypotheſis, be about ſixteen miles; but by the experiments of St. Remy it appears, that the range is really ſhort of three miles; which is not one fifth of the diſtance it ought to fly, if it deſcribed the curve of a parabola.

And this deviation from the parabola happens not only in theſe great velocities, but in ſuch as are much leſs; thus in velocities of about 400 feet in 1″, by ſeveral experiments it appears, that the range of a leaden bullet of three fourths of an inch in diameter, fired at different elevations with this velocity, did not at all anſwer the common theory. So that it ſufficiently appears that this theory, or the ſuppoſition of the inconſiderableneſs of the air's reſiſtance to *projectiles*, is falſe.

Indeed the falſeneſs of this hypotheſis almoſt appears at ſight, even in *projectiles* ſlow enough to have their motion traced by the eye; few there are who do not deſcend through a curve manifeſtly ſhorter and more inclined to the horizon than that in which they aſcended, and the higheſt point of their flight, or the vertex of the curve, is much nearer to the place where they fall on the ground than to that from whence they were at firſt diſcharged. Theſe things cannot be a moment doubted of by any one, who in a proper ſituation views the flight of ſtones, arrows, or ſhells, thrown to any conſiderable diſtance. See New Princip. of Gunnery, part ii. prop. 6.

What is here advanced may be confirmed from the conſtant obſervation of all who are converſant in the practice of throwing bombs, viz. that the ranges at elevations below 45°, conſtantly exceed the ranges at elevations above 45°, which are reſpectively at an equal diſtance from 45°. But it is known that in the parabolic hypotheſis theſe ought to be equal; which hypotheſis is therefore falſe.

Mr. Robins has not only detected the errors of the parabolic theory of gunnery, which takes no account of the reſiſtance of the air, but ſhews how to compute the real range of reſiſted bodies: for the method which he propoſes, and the tables he has computed for this purpoſe, we muſt refer to his Tracts of Gunnery, p. 183, &c. vol. i. of Math. Tracts; and alſo to Euler's True Principles of Gunnery, tranſlated, with explanations and remarks, by Mr. H. Brown, in 1777. See *Pointing of a* GUN.

There is an odd phenomenon in the motion of bodies projected with conſiderable force, which ſhews the great complication and difficulty of this ſubject. The phenomenon is, that bullets in their flights are not only depreſſed beneath their original direction by the action of gravity, but are alſo frequently driven to the right or left of that direction by the action of ſome other force.

If it was true, that bullets varied their direction by the action of gravity only, then it ought to happen that the errors in their flight to the right or left of the mark they were aimed at, ſhould increaſe in the proportion of the diſtance of the mark from the piece only. But this is contrary to all experience; the ſame piece which will carry its bullet within an inch of the intended mark, at ten yards diſtance, cannot be relied on to ten inches in one hundred yards, much leſs to thirty inches in three hundred yards.

Now this inequality can only ariſe from the track of the bullet being incurvated ſideways, as well as downwards; for, by this means, the diſtance between the incurvated line, and the line of direction, will increaſe in a much greater ratio than that of the diſtance; theſe lines being co-incident at the mouth of the piece, and afterwards ſeparating in the manner of a curve from its tangent, if the mouth of the piece be conſidered as the point of contact.

This is put beyond diſpute from the experiments made by Mr. Robins; who informs us, that having taken a barrel carrying a ball of three-fourths of an inch diameter, and fixing it on a heavy carriage, he ſatisfied himſelf of the ſteadineſs and truth of its direction, by firing at a board one foot ½ ſquare, at the diſtance of one hundred and eighty feet, and miſſed it but once in ſixteen ſucceſſive ſhot. Now the ſame barrel being fixed on the ſame carriage, and fired with a ſmaller quantity of powder, ſo that the ſhock on the diſcharge would be much leſs, and conſequently the direction leſs changed, he found that at ſeven hundred and ſixty yards diſtance the ball flew ſometimes one hundred yards to the right of the line it was pointed on, and at other times one hundred yards to the left. He found too, that its direction in the perpendicular line was not leſs uncertain, it falling one time above two hundred yards ſhort of what it did at another; although, by the niceſt examination of the piece after the diſcharge, it appeared not to have the leaſt ſtarted from the poſition it was placed in.

If it be aſked what can be the cauſe of a motion ſo different from what has been hitherto ſuppoſed? It may be anſwered, that the deflexion in queſtion muſt be owing to ſome power acting obliquely to the progreſſive motion of the body, which power can be no other than the reſiſtance of the air. And this reſiſtance may perhaps act obliquely to the progreſſive motion of the body, from inequalities in the reſiſted ſurface; but its general cauſe is doubtleſs a whirling motion acquired by the bullet about its axis; for by this motion of rotation, combined with the progreſſive motion, each part of the bullet's ſurface will ſtrike the air in a direction very different from what it would do if there was no ſuch whirl; and the obliquity of the action of the air ariſing from this cauſe will be greater, according as the rotatory motion of the bullet is greater in proportion to its progreſſive motion. Principles of Gunnery in Tracts, vol. i. p. 149, &c. Profeſſor Euler, on the contrary, attributes this deflection of a bullet to its figure, and ſcarce at all to its rotation: for, if the bullet was perfectly round, though its centre of gravity did not coincide with its centre of magnitude, the deflection from the axis of the cylinder, or line of direction ſideways, would be very inconſiderable. If ſuch a ball goes to the right or left of an object, it is a ſure ſign that the object does not lie in the ſame vertical plane with the axis of the piece. But if it be not round, it will generally go to the right or left of its direction, and ſo much the more, as it goes farther from the piece. He infers from his reaſoning on this ſubject, that cannon-ſhot, which are made of iron, and rounder and leſs ſuſceptible of a change of figure in paſſing along the cylinder than thoſe of lead, are more certain than muſket-ſhot. True Principles of Gunnery inveſtigated, &c. 1777, p. 304, &c. See RIFLE-*guns*.

PROJECTING *table*. See TABLE.

PROJECTION, in *Mechanics*, the action of giving a PROJECTILE its motion.

If the direction of the force whereby the projectile is put in motion, be perpendicular to the horizon, the *projection* is ſaid to be *perpendicular*; if parallel to the apparent horizon, it is ſaid to be an *horizontal projection*; if it make an oblique angle with the horizon, the *projection* is oblique. The angle A R B (*Tab.* IV. *Mechan. fig.* 47.) which the line of direction A R makes with the horizontal line A B, is called the *angle of elevation of the projectile*.

PROJECTION, in *Perſpective*, denotes the appearance, or repreſentation of an object on the perſpective PLANE.

The *projection*, e. gr. of a point, as A (*Tab. Perſpect. fig.* 3.) is a point *a*, through which the optic ray O A paſſes from the objective point through the plane to the eye; or it is the point wherein the plane cuts the optic ray.

And hence is eaſily conceived what is meant by the *projection* of a line, a plane, or a ſolid.

PROJECTION *of the ſphere in plano*, is a repreſentation of the ſeveral points or places of the ſurface of the ſphere, and of the circles deſcribed thereon, or of any aſſigned parts thereof, ſuch as they appear to the eye ſituate at a given diſtance, upon a tranſparent plane placed between the eye and the ſphere.

For the laws of this *projection*, ſee PERSPECTIVE; the *projection of the ſphere* being only a particular caſe of perſpective.

The principal uſe of the *projection* of the ſphere is in the conſtruction of planiſpheres, and, particularly, maps and charts; which are ſaid to be of this or that *projection*, according to the ſeveral ſituations of the eye, and the perſpective plane, with regard to the meridians, parallels, and other points and places to be repreſented.

The moſt uſual *projection* of maps of the world is that on the *plane of the meridian*, which exhibits a right ſphere; the firſt meridian being the horizon: the next is that on the *plane of the equator*, wherein the pole is in the centre, and the meridians the radii of a circle, &c. This repreſents a parallel ſphere.

See the application of the doctrine of the *projection of the ſphere*, in the conſtruction of the various kinds of maps, under MAP.

The *projection of the ſphere* is uſually divided into *orthographic* and *ſtereographic*; to which may be added *gnomonic*.

PROJECTION *orthographic*, is that wherein the ſuperficies of the ſphere is drawn on a plane, cutting it in the middle; the eye being placed at an infinite diſtance vertically to one of the hemiſpheres.

PROJECTION, *laws of the orthographic*. 1. The rays, by which the eye, at an infinite diſtance, perceives any object, are parallel.

2. A right line, perpendicular to the plane of the *projection*, is projected into a point, where that right line cuts the plane of the *projection*.

3. A right line, as A B, or C D, (*Tab.* IV. *Perſpec. fig.* 57.) not perpendicular, but either parallel or oblique to the plane of the *projection*, is projected into a right line, as E F, or G H: and is always comprehended between the extreme perpendiculars A F, and B E; or C G and D H.

4. The *projection* of the right line A B is the greateſt, when A B is parallel to the plane of the *projection*.

5. Hence it is evident, that a line parallel to the plane of the *projection* is projected into a right line equal to itſelf; but if it be oblique to the plane of the *projection*, it is projected into one which is leſs.

6. A plane ſurface, as A B C D, (*fig.* 58.) at right angles to the plane of the *projection*, is projected into that right line, e. gr. A B, in which it cuts the plane of the *projection*.

Hence it is evident, that the circle B C A D, ſtanding at right angles to the plane of the *projection*, which paſſes through its centre, is projected into that diameter A B, in which it cuts the plane of the *projection*.

It is likewiſe evident, that any arch as C*c* is projected into O*o*, equal to C*a*, which is the right ſine of that arch; and the complemental arch *c*A is projected into *o*A, the verſed ſine of the ſame arch C*c*.

7. A circle parallel to the plane of the *projection* is projected into a circle equal to itſelf, whoſe centre is the centre of the *projection*, and radius equal to the coſine of its diſtance from the plane; and a circle oblique to the plane of the *projection* is projected into an ellipſis, whoſe greateſt diameter is the *projection* of that diameter of the given oblique circle, which is parallel to the plane of *projection*, and the leaſt diameter is equal to double the coſine of the obliquity of the circle, half the greater diameter being radius.

PROJECTION, *ſtereographic*, is that wherein the ſurface and circles of the ſphere are drawn upon a plane of a great circle, the eye being in the pole of that circle.

PROJECTION, *properties of the ſtereographic*. 1. In this *projection*, a right circle is projected into a line of half-tangents.

2. The repreſentation of a right circle, perpendicularly oppoſed to the eye, will be a circle in the plane of the *projection*.

3. The repreſentation of a circle, placed oblique to the eye, will be a circle in the plane of the *projection*.

4. If a great circle be to be projected upon the plane of another great circle, its centre will lie in the line of meaſures, diſtant from the centre of the primitive by the tangent of its elevation above the plane of the primitive.

5. If a leſſer circle, whoſe poles lie in the plane of the *projection*, were to be projected; the centre of its repreſentation would be in the line of meaſures, diſtant from the centre of the primitive by the ſecant of the leſſer circle's diſtance from its pole, and its ſemidiameter, or radius, be equal to the tangent of that diſtance.

6. If a leſſer circle were to be projected, whoſe poles lie not in the plane of the *projection*, its diameter in the *projection*, if it falls on each ſide of the pole of the primitive, will be equal to the ſum of the half-tangents of its greateſt and neareſt diſtance from the pole of the primitive, ſet each way from the centre of the primitive in the line of meaſures.

7. If the leſſer circle to be projected fall entirely on one ſide of the pole of the *projection*, and do not encompaſs it, then will its diameter be equal to the difference of the half-tangents of its greateſt and neareſt diſtance from the pole of the primitive, ſet off from the centre of the primitive one; and the ſame way in the line of meaſures.

8. In the *ſtereographic projection*, the angles made by the circles of the ſurface of the ſphere, are equal to the angles made by their repreſentatives in the plane of their *projection*. See STEREOGRAPHIC *Projection*.

PROJECTION, *gnomonic, of the ſphere*. See GNOMONIC *Projection*, and DIALLING.

PROJECTION, *Mercator's*. See MERCATOR, and CHART.

PROJECTION *of globes*, &c. See GLOBE, &c.

PROJECTION, *polar*. See POLAR.

PROJECTION *of Shadows*. See SHADOW.

PROJECTION, in *Alchemy*, the caſting of a certain imaginary powder, called *powder of projection*, into a crucible, or other veſſel, full of ſome prepared metal, or other matter; which is to be hereby preſently tranſmuted into gold.

PROJECTION, *powder of*, or of the philoſophers ſtone, is a powder ſuppoſed to have the virtue of changing any quantity of an imperfect metal, as copper or lead, into a more perfect one, as ſilver or gold, by the admixture of a little quantity thereof.

The mark to which alchemiſts direct all their endeavours, is to find the *powder of projection*; which every one of them has been within an ace of, a hundred times.

For the characters, properties, virtues, &c. of this powder, &c. ſee PHILOSOPHERS *ſtone*.

PROJECTION, in *Building*. See PROJECTURE.

PROJECTIVE *dialling*, a manner of drawing, by a method of projection, the true hour-lines, furniture of dials, &c. on any kind of ſurface whatſoever, without any regard to the ſituation of thoſe ſurfaces, either as to declination, reclination, or inclination. See DIALLING.

PROJECTURE, in *Architecture*, the out-jetting, or prominency, which the mouldings and members have, beyond the plane or NAKED of the wall, COLUMN, &c.

Theſe the Greeks call *ecphoræ*, the Italians *ſporti*, the French *ſaillies*, our workmen frequently *ſailings over*, and the Latins *projecta*, from *projicio*, *I caſt forward*; whence the Engliſh *projecture*.

Vitruvius gives it as a general rule, that all the *projecting* members in buildings have their *projectures* equal to their heights: but this is not be underſtood of the particular members or mouldings, as dentils, coronas, the faſciæ of architraves, the abacus of the Tuſcan and Doric capital, &c. but only of the *projectures* of entire cornices. &c. The great point of building, according to ſome modern architects, conſiſts in knowing how to vary the proportions of *projectures*, &c. agreeably to the circumſtances of the building.

Thus, ſay they, the nearneſs and remoteneſs, making a difference in the view, require different *projectures*; but it is evident the ancients had no ſuch intention.

The *projecture* of the baſe and cornice of pedeſtals, M. Perrault obſerves, is greater in the antique than the modern buildings by one-third; which ſeems to follow, in good meaſure, from the ancients proportioning this *projecture* to the height of the pedeſtals; whereas the moderns make the *projecture* the very ſame in all the orders, though the height of the pedeſtal be very different.

The reaſon of this change, which the moderns have made of the antique, the ſame author refers to a view of the appearance of ſolidity.

PRO INDIVISO, in *Law*, a poſſeſſion or occupation of lands or tenements, belonging to two or more perſons, whereof none can ſay which is his ſeveral portion, each having the whole, &c. as co-parceners before partition.

PROLABIA, *fore-lips*, a term in *Anatomy* for that part of the labia or lips which jets out.

PROLAPSUS *oculi*, in *Surgery*, a diſtemperature of the eye, in which it is ſo violently inflamed and ſwelled, that it cannot be retained in its orbit or ſocket, but protrudes itſelf out of its natural ſeat. This diſorder is not only attended with great deformity, but alſo intenſe pains, blindneſs, and too often an obſtinate cancer are the effects of it. This is ſometimes ſo violent in degree, that the eye burſts out of its coats.

This diſorder ſometimes ariſes from inflammations, or redundancy of humours; and ſometimes from external violence, or from a cancer. Sometimes, when the diſorder is recent, and but in a moderate degree, it may be carried off by bleeding, bliſtering, and purging, with external applications, as fomentations, and the like. When it will give way to none of theſe, the tumor muſt be opened, and the humours diſcharged, and this repeated as often as neceſſary; after every dreſſing, binding on a plate of lead, hollowed in a proper degree.

When the natural figure of the eye, and its office of viſion, are wholly deſtroyed by this diſeaſe, and the pains become more intenſe, there is no way left but to make a large inciſion, and let out the humours of the eye, and afterwards cut away ſo much of it, that the remainder may be covered with the eye-lid. Heiſter's Surg. p. 427.

PROLAPSUS *uvulæ*. The *uvula* is ſometimes ſo much enlarged and elongated, as to reach the larynx and pharynx, and obſtruct the actions both of reſpiration and deglutition, as well as of ſpeech. If it proceeds from a recent inflammation, the patient may be relieved by bleeding and cooling gargles, with ſal ammoniac and alum; ſcarifications are alſo very uſeful in this caſe, to prevent its ſpreading and inflammation.

When, on the other hand, this part is too much enlarged and elongated by phlegmatic humours, it appears white, and free from pain and inflammation, and is moſt relieved by a gargle of ſpirit of wine and water warm, or a decoction of red roſes, or the like aſtringent ſubſtances with ſpirit of wine, or ſpirit of ſal ammoniac, added in ſmall quantities to them.

A powder of ginger, pepper, and pomegranate peel, may alſo be applied; but when all theſe methods prove ineffectual, the only remaining one is, to take off as much of the *uvula* as is neceſſary, either by ligature or by the ſciſſars. This latter is much the eaſier and better way; and the great caution neceſſary in it is, neither to take off too much nor too little of the *uvula*. For, if too much be taken off, the patient's voice will be the worſe for it afterwards; and if too little, he will be very little the better for the operation.

This is a very common diſorder among the peaſants in Norway, and they have invented a machine with a hole in it, to let through a proper portion of the *uvula* when the whole is thruſt into the mouth, and a ſpring-knife, which cuts off juſt as much as is let through. The ſurgeons have copied and improved on this invention. Heiſter's Surg. p. 470.

PROLAPSUS *ani*, *uteri*, &c. See PROCIDENTIA.

PROLATE, in *Geometry*, an epithet applied to a ſpheroid produced by the revolution of a ſemi-ellipſis about its longer diameter.

If the ſolid be formed by the revolution of a ſemi-ellipſis about its ſhorter diameter, it is called an *oblate ſpheroid*; of which figure is the earth we inhabit, and, perhaps, all the planets too; having their equatorial diameter longer than the polar. See SPHEROID.

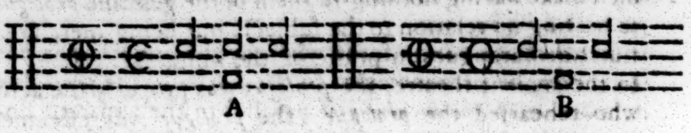
PROLATION, in *Muſic*, generally ſignifies ſinging as oppoſed to pauſing or reſting. More particularly it denotes ſinging by the notes that moſt frequently occur, viz. minims: or it is that admeaſurement in which the ſemibreves are broken into minims.

Graſſineau is, therefore, miſtaken, when he calls *prolation* the art of ſhaking or making ſeveral inflections of the voice on the ſame note or ſyllable; for this was a practice unknown to the ancients, and not introduced till the middle of the laſt century. Hawkins's Hiſt. of Muſic, vol. ii. p. 156.

The ſigns by which the modern ancients uſed to ſignify a *prolation* to be made on any note, was a point in a circle or ſemi-circle, thus, ⊙, ⋲. This point was the length of a ſemibreve and minim.

Prolation was either *perfect* or *imperfect*. *Perfect prolation* was marked after the cleff, as above, and then the ſemi-breve contained three minims, for which reaſon they placed the figure 3, or $\frac{3}{2}$, or $\frac{3}{1}$, after the circle to ſignify that three ſuch notes were required to a bar. See example A.

Imperfect prolation was marked with the ſame characters, but without points, and then the ſemi-breve contained but two minums. See example B.



Theſe characters are almoſt entirely diſuſed in the modern practice; but as they are often met with in ancient muſic, it is therefore neceſſary that a muſician ſhould have ſome knowledge of them. Though even now the Italians have two ſorts of *prolation* in muſic, which are ſignified by characters reſembling thoſe above deſcribed in the example A. The firſt they call *prolatione maggiore perfetta*, and it is marked thus, ⊙ and $\frac{3}{2}$. The ſecond they call *prolatione minore perfetta*, the characters of which are, ⋲, or $\frac{3}{1}$, or $\frac{3}{2}$, but oftener C and $\frac{3}{2}$; but in both caſes the ſemi-breve contains a whole bar, and its pauſe the ſame; the minim one-third of the bar, and its pauſe the ſame; and ſo of the reſt in proportion.

Prolation is alſo uſed for a ſeries of ſeveral ſounds or notes on the ſame ſyllable or vowel.

PROLECTATIO, a word uſed in chemiſtry to expreſs an extraction of the finer ſubſtances of a mixed body by the attenuation of the ſubtler particles; ſo that theſe, being rarefied, ſeparate ſpontaneouſly from the reſt, and leave the groſſer and leſs valuable part in form of a reſiduum behind.

PROLEGOMENA, formed of προλεγω, *I preface*, or *ſpeak before*, in *Philology*, certain preparatory obſervations, or diſcourſes prefixed to a book, &c. containing ſomething neceſſary for the reader to be appriſed of, to enable him the better to underſtand the book, to enter deeper into a ſcience, &c.

The generality of arts and ſciences require ſome previous inſtructions, ſome *prolegomena*.

PROLEPSIS, προληψις, or ANTICIPATION, a figure in *Rhetoric*, by which we anticipate, or prevent what might be objected by the adverſary.

It ſerves likewiſe to conciliate the audience, while the ſpeaker appears deſirous to repreſent matters fairly, and not to conceal any objection which may be made againſt him.

Thus, *It may perhaps be objected.* &c. *You will aſk*, &c. *But ſome man will ſay. How are the dead raiſed, or with what body do they come? Thou fool, that which thou ſoweſt*, &c. Where the objection is turned into an argument againſt the adverſary, as in the laſt inſtance, it is called *antiſtrophe*, or *inverſio*. Where it is rejected as unſufferably abſurd, it is called *apodioxis*.

PROLEPTIC, προληπτικος, denotes a periodical diſeaſe, which anticipates, or whoſe paroxiſm returns ſooner and ſooner every time; as is frequently the caſe in agues, &c.

PROLES, (Lat.) in Engliſh progeny, are ſuch iſſue as proceed from a lawful marriage; though if the word be uſed at large, it may denote others.

PROLIFIC, in *Medicine*, ſomething that has the qualities neceſſary for generating. See Fecundity.

Some phyſicians pretend to diſtinguiſh whether or no the ſeed be *prolific*.

PROLIXITY, in *Diſcourſe*, the fault of entering into too minute a detail; of being too long, preciſe, and circumſtantial; to a degree of tedioufneſs.

Prolixity is the vice oppoſite to conciſeneſs and laconiſm.

Prolixity is a fault commonly charged on Guicciardini, Gaſſendus, &c. See Method.

PROLOCUTOR *of the convocation*, the ſpeaker or chairman of that aſſembly.

The archbiſhop of Canterbury is, by his office, preſident or chairman of the upper houſe of convocation. The *prolocutor* of the lower is an officer choſen by the members the firſt day of their meeting, and is to be approved of by the higher.

It is by the *prolocutor* their affairs, debates, &c. are to be directed; and their reſolutions, meſſages, &c. delivered to the higher houſe: by him all things propounded to the houſe are read, ſuffrages are collected, &c. See Convocation.

PROLOGIA, Προλογια, in *Antiquity*, a feſtival celebrated by the inhabitants of Laconia, before they gathered their fruits.

The Romans alſo celebrated a feaſt of the ſame kind.

PROLOGUE, Prologus, in *Dramatic Poetry*, a diſcourſe addreſſed to the audience before the drama or play begins.

The word is formed from προλογος, *præloquium*, *fore-ſpeech*, formed of προ, and λογος, *ſermo*.

The original intention of the *prologue* was to advertiſe the audience of the ſubject of the piece, and to prepare them to enter more eaſily into the action; and ſometimes to make an apology for the poet.

The *prologue* is of a much more ancient ſtanding than the epilogue. The French have left off the uſe of *prologues*, except in their operas; thoſe few they now and then make having nothing in them of the genuine *prologue*, as bearing no relation to the ſubject, but being mere flouriſhes or harangues in praiſe of the king, &c.

In the ancient theatre, the *prologus* was properly the actor who rehearſed the *prologue*: the *prologue* was eſteemed one of the dramatis perſonæ, and never appeared in the piece in any other character; ſo that the learned are ſurpriſed to find Mercury, in Plautus's Amphitryo, ſpeaking the *prologue*, and yet acting a conſiderable part in the play afterwards.

The *prologue*, therefore, among them, was a part of the piece; indeed, not an eſſential, but an acceſſary part. With us the *prologue* is no part at all; but ſomething entirely diſtinct and ſeparate: with them the drama was opened with the appearance of the *prologue*; with us it is not opened till after the *prologue* is retired: with us therefore the curtain is kept cloſe till after the *prologue*; with them it muſt have been withdrawn before.

Hence proceeds a ſtill more conſiderable difference in the practice of the *prologue*; for with us the *prologue* ſpeaks in his real or perſonal character: with them, the *prologue* ſpoke in his dramatic character.

With us, he always directs his ſpeech to the audience, conſidered as in a play-houſe; to pit, box, and gallery: with them, he ought, in propriety, to have ſpoken as to a chorus of by-ſtanders, or perſons to be preſent at the real action: but this being in good meaſure inconſiſtent with the deſign of the *prologue*, their perſons ſpoke in the the dramatic capacity to the audience in its principal capacity; which was an irregularity that either the good fortune, or the good ſenſe of the moderns, have freed them from.

They had three kinds of *prologues*; the firſt ὑποθετικος, wherein the poet delivered the argument of the piece; the ſecond συστατικος, wherein the poet recommended himſelf, or his piece, to the people; the third αναφορικος, wherein objections were obviated, &c.

PROLONGED *face*. See Face.

PROLUSION, Prolusio, in *Literature*, a term applied to certain pieces, or compoſitions, made previouſly to others, by way of prelude or exerciſe.

Diomedes calls the Culex of Virgil, and his other opuſcula, *proluſions*; becauſe written before the great ones. The *proluſions* of Strada are very ingenious pieces. The famous Mr. Huet, biſhop of Avranches, had all Strada's *proluſions* by heart.

PROMACHIA, Προμαχια, in *Antiquity*, a feſtival in which the Lacedæmonians crowned themſelves with reeds.

PROMALACTERION, the name of the firſt apartment in the hot baths of the ancients; this was a hot and cloſe room, in which the perſon was kept a while before he plunged at once into the warm water.

PROMETHEIA, Προμηθεια, in *Antiquity*, an Athenian ſolemnity celebrated in honour of Prometheus, with torch-races, in remembrance that he was the firſt that taught men the uſe of fire.

PROMETHEUS, in the *Ancient Aſtronomy*, was the name of a conſtellation of the northern hemiſphere, now called *Hercules*, or *Engonaſis*.

Prometheus, in *Mythology*, the ſon of Japetus, one of the Titans, and Clymene according to Heſiod, or of Themiſa according to Eſchylus, whom the poets feign to have formed men of clay, and animated them by fire ſtole from heaven; at which Jupiter being angry ſent Mercury to chain him to Mount Caucaſus, and to ſet a vulture to his liver, which grew again as faſt as it was devoured.

PROMISE, in *Law*, is when, upon a valuable conſideration, a man binds himſelf, by his word, to do or perform ſuch an act as is agreed on with another: it is in the nature of a verbal covenant, and wants nothing but the ſolemnity of writing and ſealing to make it abſolutely the ſame. If, therefore, it be to do any explicit act, it is an expreſs contract as much as any covenant, and the breach of it is an equal injury. The remedy, indeed, is not exactly the ſame; ſince inſtead of an action of covenant there lies only an action upon the caſe, for what is called the assumpsit or undertaking of the defendant; the failure of performing which is the injury done to the plaintiff, the damages whereof a jury are to eſtimate and ſettle.

By 29 Car. II. cap. 3. it is enacted, that in the five following caſes no verbal *promiſe* ſhall be ſufficient to ground an action upon, but at the leaſt ſome note or memorandum of it ſhall be made in writing, and ſigned by the party to be charged therewith: 1. When an executor or adminiſtrator promiſes to anſwer damages out of his own eſtate. 2. Where a man undertakes to anſwer for the debt, default, or miſcarriages of another. 3. Where any agreement is made, upon conſideration of marriage. 4. Where any contract or ſale is made of lands, tenements, or hereditaments, or any intereſt therein. 5. Where there is any agreement that is not to be performed within a year from the making of it. In all theſe caſes a mere verbal *aſſumpſit* is void Black. Com. book iii. p. 157, &c.

PROMISSORY *note*. See Note.

By 17 Geo. III. cap. 30. it is enacted, that all *promiſſory* or other notes, bills of exchange, or draughts, or undertakings in writing, being negociable or transferrable, for the payment of 20*s*. or above that ſum and leſs than 5*l*. or on which 20*s*. or above, and leſs than 5*l*. ſhall remain undiſcharged, ſhall ſpecify the names and places of abode of the perſons reſpectively to whom, or to whoſe order, the ſame ſhall be made payable, and ſhall bear date before or at the time of drawing or iſſuing thereof, but not in any day ſubſequent thereto, and ſhall be made payable within twenty-one days next after the day of the date thereof, and ſhall not be transferrable or negociable after the time thereby limited for payment; and every indorſement thereon ſhall be made before the expiration of that time, and ſhall bear date at or not before the time of making thereof, and ſhall ſpecify the name and place of abode of the perſon to whom or to whoſe order the money is to be paid; otherwiſe ſuch note, bill, or draught, or undertaking ſhall be void.

The publiſhing, uttering, or negociating notes, bills of exchange, draughts, or undertakings, contrary to this act, is prohibited and reſtrained under the penalty of forfeiting not exceeding 20*l*. nor leſs than 5*l*. as by 15 Geo. III. cap. 51.

By 22 Geo. III. cap. 33. a ſtamp duty is charged upon inland bills of exchange, *promiſſory* notes, or other notes payable otherwiſe than upon demand; viz. of 3*d*. upon ſuch as are under the value of 50*l*. and on thoſe of 50*l*. and upwards, 6*d*.

PROMONTORY, in *Geography*, a high point of land, or rock, projecting out into the ſea. The extremity of which to the ſea-ward is uſually called a *cape*, or *head-land*.

PROMOTERS, Promotores, in *Law*, thoſe perſons who, in popular and penal actions, do proſecute offenders in their name and the king's; and are intitled to part of the fines and penalties for their pains.

Theſe, among the Romans, were called *quadruplatores*, or *delatores*; in Engliſh alſo, *informers*.

Sir Thomas Smith obſerves, that *promoters* belong chiefly to the exchequer, and king's bench. My lord Coke calls them *turbidum hominum genus*. 3 Inſt.

Promoter *fiſcal*. See Inquisition.

PROMPT *payment*, ready money. See Payment.

In many caſes there is a diſcount for *prompt payment*.

PROMPTER, in the *Drama*, an officer poſted behind the ſcenes, whoſe buſineſs is to watch attentively the actors ſpeaking on the ſtage, in order to ſuggeſt and put them forward when at a ſtand, to correct them when amiſs, &c. in their parts.

PROMULGATED, Promulged, Promulgatus, ſomething publiſhed, or proclaimed.

In this ſenſe we ſay the Jewiſh law was *promulgated* by Moſes: the *promulgation* of the new law was chiefly effected by the apoſtles and diſciples.

PROMUTHION, in *Rhetoric*. See Fable.

PRONAOS, ϖροναος, in the *Ancient Architecture*, a porch to a church, palace, or other ſpacious building.

PRONATION, among *Anatomiſts*. The radius of the arm has two kinds of motions; the one called *pronation*, the other ſupination.

Pronation is that whereby the palm of the hand is turned downwards: the oppoſite motion hereto, is called *ſupination*, whereby the back of the hand is downwards.

The word is formed from the Latin *pronus*, *prone*; that which lies on the foreſide, or with the face downwards.

Mr. Winſlow has advanced, that the *pronation* and ſupination of the hand are not effected ſolely by the motion of the radius; but that the cubitus, in moſt caſes, contributes equally thereto; and that both theſe bones uſually move at the ſame time. Vide Mem. Acad. R. Scienc. an. 1729, p. 36.

There are peculiar muſcles, whereby the *pronation* is effected, called *pronators*. The radius has alſo two other muſcles, called supinators, which have no oppoſite effect. See *Tab. Anat.* (*Myol.*) *fig.* 1. *n.* 27. *fig.* 2. *n.* 15.

PRONATOR, *radii quadratus*, *brevis*, *ſive tranſverſus*, in *Anatomy*, a ſmall fleſhy muſcle nearly as broad as it is long, lying tranſverſely on the inſide of the lower extremity of the fore-arm.

It is fixed by one ſide or edge in the long eminence, at the lower part of the internal angle of the ulna, and by the other in the broad concave ſide of the lower extremity of the radius. It is wholly fleſhy, without any mixture of tendinous fibres. It is ſituated tranverſely, but that extremity which lies on the radius is nearer the carpus than that on the ulna. It is of a moderate thickneſs; the fibres neareſt the ſurface are longeſt, the reſt decreaſing in proportion as they lie nearer the interval between the two bones, and the interoſſeous ligament. It has a ligamentary or tendinous frænum belonging to it, one end of which is fixed in the interoſſeous ligament, the other in the inner edge of the baſis of the radius. Winſlow.

Pronator *teres ſive obliquus*, a ſmall muſcle broader than it is thick, ſituated on the upper part of the ulna, oppoſite to the ſupinator brevis, with which it forms an angle like the letter V.

It is fixed to the internal condyle of the os humeri, partly by fleſhy fibres, and partly by a tendon common to it with the ulnaris internus; from thence it paſſes obliquely before the extremity of the tendon of the brachiæus, and reaches to the middle part of the convex ſide of the radius; where it becomes flat, and is inſerted below the ſupinator brevis, by an extremity almoſt wholly fleſhy.

It is called *teres*, to diſtinguiſh it from the quadratus; but the name of *pronator ſuperior* is much more proper; but that of *pronator obliquus* is certainly moſt proper of all. Winſlow.

PRONG-*hoe*, in *Huſbandry*, a term uſed to expreſs an inſtrument uſed to *hoe* or break the ground near and among the roots of plants.

The ordinary contrivance of the *hoe* in England is very bad, it being only made for ſcraping on the ſurface; but the great uſe of *hoeing* being to break and open the ground, beſide the killing of the weeds, which the ancients, and many among us, have thought the only uſe of the *hoe*, this dull and blunt inſtrument is by no means calculated for the purpoſe it is to ſerve.

The *prong-hoe* conſiſts of two hooked points of ſix or ſeven inches long, and when ſtruck into the ground will ſtir and remove it the ſame depth as the plough does, and thus anſwer both the ends of cutting up the weeds and opening the land.

The ancient Romans had an inſtrument of this kind, which they called the *bidens*; but they were afraid of its uſe in their fields and gardens, and only uſed it in their vineyards. The *prong-hoe* comes into excellent uſe even in the horſe-hoeing huſbandry; in this the *hoe*-plough can only come within three or four inches of the rows of the corn, turneps, and the like; but this inſtrument may be uſed afterwards, and with it the land may be raiſed and ſtirred even to the very ſtalk of the plant. Tull's Huſban. See Hoe, Hoeing, and Husbandry.

PRONOMÆA, a word uſed by ſome naturaliſts to expreſs what is uſually called the trunk, or proboſcis in inſects; an inſtrument ſomewhat reſembling the trunk of an elephant, which moſt of thoſe ſmall animals are provided with, for the extracting the juices of plants, &c. deſtined for their food.

PRONOUN, Pronomen, in *Grammar*, a part of ſpeech uſed inſtead of a noun, or name, as its ſubſtitute or repreſentative.

Whence the denomination; from *pro*, and *nomen*; q. d. *for noun*, or *name*.

As it would have been diſagreeable to have been always repeating the ſame name, there are words invented in all languages, called *pronouns*, to ſave the neceſſity thereof, and to ſtand in the place of names: as *I*, *thou*, *he*, &c.

As nouns are the marks or ſigns of things, *pronouns* are the ſigns of nouns. Father Buffier, however, ſhews, that *pronouns* are real nouns or names; and that all the difference between what the grammarians call nouns and *pronouns*, is, that the former are more particular, and the latter more general.

They are called *pronouns* becauſe uſed in the place of particular nouns; indeed, ſometimes they do not fill the place of nouns entirely, but need other words to aſſiſt them, to expreſs the object ſpoken of: ſuch, e. gr. are, *who*, *whoever*, &c. which do not expreſs any determinate object whereof a thing may be affirmed, unleſs accompanied with another word, eſpecially a verb: as, *whoever labours*, *deſerves a reward*.

Theſe father Buffier calls *incomplete pronouns*, to diſtinguiſh them from thoſe which expreſs an object completely: as, *I*, *thou*, *he*, &c.

Pronouns have three caſes; the nominative, the genitive, or poſſeſſive, like nouns; and moreover a caſe, which follows the verb active, or the prepoſition, expreſſing the object of an action, or of a relation, which, ſays biſhop Lowth, may be properly enough called the objective caſe.

Pronouns are diſtinguiſhed into three ſeveral ſorts, viz. *pronouns* of the firſt, the ſecond, and the third perſon, according as the ſubject of the converſation is the ſpeaker himſelf, the party addreſſed, or ſome third object different from both.

The grammarians ordinarily diſtinguiſh *pronouns* into four claſſes, with regard to their different ſignification, formation, &c. viz. *pronouns perſonal*, *relative poſſeſſive*, and *demonſtrative*; to which may be added *indeterminate pronouns*.

Pronouns, *perſonal*, are thoſe uſed in lieu of names of particular perſons; ſuch are, *I*, *thou*, *he*, *we*, *ye*, *they*.

Pronouons *relative*, which Buffier calls *modificative*, or *determinative*, are thoſe placed after nouns, or other *pronouns*, with which they have ſuch affinity, that without them they ſignify nothing: ſuch are *qui*, *who*, *that*, &c. Frequently the noun or *pronoun* with which the relative is joined, is underſtood.

Pronouns *poſſeſſive* are thoſe which denote the enjoyment or poſſeſſion of any thing, either in particular or in common: as, *mine*, *thine*, *his*, &c.

Theſe are pure adjectives, and only differ from the reſt by the relation they bear to *pronouns*, whence they are derived, and by ſome particular inflections which they have in ſome languages.

Pronouns *demonſtrative*, thoſe which ſerve to indicate or point out the ſubject ſpoken of: as, *this*, *thoſe*, &c.

Pronouns *indefinite*, are thoſe which expreſs their ſubject indeterminately; as, *whoever*, *any*, &c. Theſe coincide with what father Buffier calls *incomplete pronouns*.

Pronouns are likewiſe divided into *ſubſtantive* and *adjective*. To the firſt belong, *I*, *thou*, *he*; to the ſecond, *my*, *mine*, *who*, *what*, &c.

Pronouns may alſo be conſidered in two ſtates: the firſt, or foregoing ſtate, as, *I*, *we*; the ſecond, or following one, as *me*, *us*.

Mr. Harris diſtinguiſhes *pronouns*, which, he ſays, are words invented to ſupply pointing or indication by the finger or hand, called δειξις, into *prepoſitive* and *ſubjunctive*.

Prepoſitive pronouns are thoſe which are capable of introducing or leading a ſentence, without having reference to any thing previous, and are divided into three orders called the firſt, the ſecond, and the third perſon.

Subjunctive pronouns are thoſe which ſerve to ſubjoin one ſentence to ſome other which is previous as, *who*, *which*, *that*, &c. and may be diſtinguiſhed from other *pronouns*, as they are not only ſubſtitutes, but alſo connectives. They include the powers of the three orders into which the prepoſitive are diſtinguiſhed, having ſuperadded the peculiar force of connective. Hermes, chap. 5.

PRONOUNCING, Pronunciation, in *Painting*, the marking and expreſſing the parts of all kinds of bodies with that degree of force neceſſary to make them more or leſs diſtinct and conſpicuous.

Thus the painters, in ſpeaking of a piece, ſay, theſe or theſe parts are well *pronounced*; which is a metaphorical way of ſpeaking: as when we ſay, that a man who talks well, has a fine *Pronunciation*.

PRONUNCIATION, *pronunciatio*, in *Grammar*, the manner of articulating, or ſounding, the words of a language, repreſented to the eye by writing, and orthography.

From the definition it would ſeem, that the *pronunciation* were only the image of the orthography: but as we pronounce before we write, and only write to expreſs what we pronounce, it is more juſt to lay down the *pronunciation* as the rule and model of orthography.

Pronunciation makes much the moſt difficult article of a written grammar: in effect, a book only expreſſing itſelf to the eyes in a matter that wholly concerns the ears, the caſe ſeems next akin to that of teaching the blind to diſtinguiſh colours.

Hence it is, that there is no part ſo defective in the grammars as that of the *pronunciation*: for the writer has frequently no term whereby to give the reader an idea of the ſound he would expreſs: for want of a proper term, therefore, he frequently ſubſtitutes a vicious or precarious one. Thus the French grammarians frequently tell us that the vowels *a*, *e*, *i*, &c. are pronounced, in French, the ſame as in Latin; never conſidering, that there is not any known and determinate *pronunciation* of the Latin; but each nation, now, pronounces the Roman characters in the Latin, the ſame as it pronounces thoſe ſame characters in its own language. Thus the Latin *cæcus* is pronounced by the Engliſh, *ſekus*, and by the Italians, *tchekous*, &c.

Hence it appears, that the relation between ſounds and characters, as well as between things and words, is purely arbitrary and national.

Indeed, Plato ſeems of a contrary opinion, and will have a natural relation between words and the things they expreſs, as there is a natural relation between the ſigns made by mutes, and the things they would imitate: ſo that, according to Plato, to every ſeveral word there muſt be a ſeveral motion of the mouth relative to the action expreſſed by the word.

Whether or no there might be ſuch a thing in the primitive language, we dare not undertake to ſay; but it is certain, ſuch a relation would require a facility of contorſions in the mouth, to which we are ſtrangers.

To give a juſt and preciſe idea of the *pronunciation* of a language, it ſeems neceſſary to fix, as nearly as poſſible, all the ſeveral ſounds employed in the *pronunciation* of that language: this Mr. Lodwick has done, in his attempt towards an univerſal alphabet, where he enumerates forty-three ſeveral ſimple ſounds (ſome of them, indeed, ſtrangers to the Engliſh language); and F. Buffier, who gives thirty-three ſeveral ſounds in the French tongue, twenty-nine in the Italian, thirty in the German, twenty-two in the Spaniſh, and twenty-four in the Engliſh.

The French language is clogged with a difficulty in *pronunciation*, from which moſt others are free; and it conſiſts in this, that moſt of their words have two different *pronunciations*; the one in common proſe, the other in verſe. In proſe, e. gr. they omit the *pronunciation* of the final *s* in the plural of nouns, and of the *t* in the third perſon of the plural of verbs, and of ſeveral other final conſonants; but in verſe they pronounce all.

Thus, in *à qui bon reveiller mes muſes endormies?* the final *s* of *muſes* is pronounced; and in *mille & mille douceurs y ſemblent attaches*, the *t* of *ſemblent* is to be pronounced.

Add to this, that in proſe they ſoften the ſound of a great many words; pronouncing *craire* for *croire*: but in poetry the genuine *pronunciation* is retained.

Pronunciation is alſo uſed for the fourth and laſt part of rhetoric, which conſiſts in regulating and varying the voice and geſture agreeable to the matter and words; ſo as more effectually to perſuade and touch the hearers.

The *pronunciation* is of ſuch importance, that Demoſthenes called it the firſt, the ſecond, and the third part of eloquence. By which he ſeemed to intimate, that he thought the whole art of oratory did in a manner conſiſt in it. And indeed, if he had not judged this highly neceſſary for an orator, he would ſcarce have taken ſo much pains himſelf in correcting thoſe natural defects under which he laboured at firſt, in order to acquire it. For he had both a weak voice, and likewiſe an impediment in his ſpeech, ſo that he could not pronounce diſtinctly ſome particular letters. The former of which defects he conquered, partly by ſpeaking as loud as he could upon the ſhore, when the ſea roared and was boiſterous; and partly by pronouncing long periods, as he walked up hill; both which methods contributed to ſtrengthen his voice. And he found means to render his pronunciation more clear and articulate, by the help of ſome little ſtones put under his tongue. Nor was he leſs careful in endeavouring to gain the habit of a becoming and decent geſture, for which purpoſe he uſed to pronounce his diſcourſes alone before a large glaſs. And becauſe he had got an ill cuſtom of drawing up his ſhoulders when he ſpoke; to amend that, he uſed to place them under a ſword, which hung over him with the point downward.

Quintilian defines the *pronunciation*, *vocis, & vultus, & corporis moderatio cum venuſtate*; a deſcent agreeable manner of managing the voice, geſture, and action of the whole body.

Cicero ſomewhere calls it *quædam corporis eloquentia*, a certain eloquence of the body; and in another place, *ſermo corporis*, the language or ſpeech of the body.

Pronunciation is the ſame whith what we otherwiſe call action. Though if we attend to the proper ſignification of each of theſe words, the former reſpects the voice, and the latter the geſtures and motions of the body. Some writers, particularly Mr. Henly, confound it with *elocution*, which is a very different thing. That author, when he ſtyles himſelf *reſtorer of the ancient elocution*, means of the ancient *pronunciation*.

There are three things which come under the *pronunciation*; the memory, voice, and geſture. See each under its poper article.

Auguſtus, to avoid being balked by his memory, and at the ſame time ſave the trouble of getting off by heart, uſed to harangue from a writing; as we are told by Dio and Suetonius.

Pronunciation, in *Painting*. See Pronouncing.

PRONTIA *lapis*, a name given by the writers of the middle ages to a foſſil of which they relate ſeveral extraordinary things; but their reſembling it to the head of a tortoiſe, and giving it the virtue of preſerving people from injuries by lightning, ſeem to make it plain that the word is only a corrupt ſpelling of the *brontia* of the ancients, of which Pliny has related the ſame things.

This was a ſpecies of echinites, ſuppoſed to fall from the clouds in thunder-ſtorms. See Brontiæ.

PROOF, Probatio, in *Arithmetic*, an operation whereby the truth and juſtneſs of a calculation is examined and aſcertained.

The proper proof is always by the contrary rule: thus ſubtraction is the *proof* of addition, and multiplication of diviſion: and *vice verſa*. The *proof* of multiplication by 9 or by 7 is precarious.

There would need no *proofs* in arithmetic were it not that a man is liable to make miſtakes; for all the rules and operations being built on demonſtration, it is thence we are aſſured of their truth and certitude.

The *proof*, then, does not confirm the rule, but only ſhews us whether or no we have applied it right.

Proof, in *Law*, *Logic*, &c. denotes the mediums or arguments uſed to evince the truth of any thing. See Evidence.

By the French law, a *literal proof*, or *proof in writing*, called alſo *dead proof*, *probatio mortua*, is preferable to a teſtimonial, or *proof* viva voce, by witneſſes. The ordonnance de Moulins excludes all *proof* by witneſſes for loans of above 1000 livres.

The *proof* of crimes was anciently effected among our anceſtors divers ways; viz. by duel or combat, fire, water, &c.

The *proof* by red hot iron was very frequent; the accuſed, to purge himſelf, was here obliged to make an oath, as he touched the iron. The formula, ceremonies, prayers, &c. made on this occaſion, are ſtill extant in the notes at the end of the Capitularies of Charlemagne. See Ordeal.

This cuſtom was abrogated by the emperor Frederick; but it ſtill obtains in Mingrelia; as we are told by Lamberti, in his relation inſerted in Thevenot's voyages.

If they cannot have *proof* of a crime, a croſs is laid at the bottom of a caldron full of boiling water, out of which the accuſed is obliged to fetch it with his naked hand and arm: this done, the arm is put up in a bag tied, and ſealed, and three days after opened; when, if there be no marks of the burn or ſcald, the accuſed is declared innocent.

In the kingdom of Siam, to have *proof* of a crime, the party is obliged to waſh his hands in boiling oil, or to walk on burning coals; from either of which he muſt come out untouched to be reputed innocent.

Sometimes they oblige the two contending parties to plunge under water; and he who ſtays there longeſt, gains the cauſe; and ſometimes to ſwallow a grain of rice, prepared and charmed by their doctors: he who is able to ſwallow it, is declared innocent, and carried home in triumph; and the accuſer puniſhed. This looks like an imitation of what was done among the Jews to have *proof* of adultery.

The *proof* by combat is likewiſe ſaid to ſubſiſt among the Mingrelians.

Proof, in *Artillery*. See Proving *Guns*, Gun-*powder*, and Powder-*triers*.

Proof, in the *Sugar Trade*, a term uſed by the refiners in ſugar for the proper ſtate of the diſſolved ſugar when it ſhould be ſet to harden.

The proceſs in the bringing of ſugar to this ſtate may be underſtood by performing the whole work in little in this manner: take ſix pounds of coarſe, or unrefined ſugar, diſſolve it over the fire in ſix pints of lime-water; add to this the whites of four eggs beat up to a froth, ſtir the whole together; than boil the liquor to a higher conſiſtence than a ſyrup, or till, when expoſed to the cold, it will concrete into grains. This is what the ſugar-bakers call *proof*. Pour this ſyrup into an earthen mould, with a hole at its bottom; ſtop the hole, and ſet the veſſel in a moderately warm place.

The ſugar in a few days will ſet and harden; then open the hole at the bottom, and lay over the top of the ſugar ſome tobacco-pipe clay, made into a ſoft pap with water. The clay muſt be afterwards wetted at times, and the water from among it will gradually be ſoaked up by the ſugar, and running through it will waſh away the treacle without diſſolving the grained part. And thus all the treacle will by degrees be drained out of the maſs, and a loaf of white ſugar procured. See Sugar.

Proof *ſpirits*, among *Diſtillers*. See Spirits.

Proof, *bead*. See Bead.

PROPAGATION, *propagatio*, the act of multiplying the kind, or of producing the like in the way of natural generation.

Propagation *of plants*. See *Propagation of* Plants.

PROPEMPTICON, Προπεμπτικον, in *Poetry*, a poem wherein are expreſſed ardent wiſhes and ſolemn vows for the ſafety of a perſon going upon a journey or voyage. Such is that of Horace, lib. i. od. 3. addreſſed to Virgil on his ſetting out for Athens. It was otherwiſe called *apopempticon*. See Apopemptic.

The word is derived from προπεμπω, *I ſend forward*, or *accompany on the way*.

PROPER, *proprium*, ſomething naturally and eſſentially belonging to any being.

The ſchool philoſophers, after Porphyry, diſtinguiſh four kinds of *propers*, or modes of *propriety*, which are expreſſed in the following verſe.

Eſt medicus, bipes, caneſcens, riſibiliſque.

The firſt, called Proprium *primo modo*, what agrees to a ſingle ſpecies, but not to all the individuals; this they call *ſoli, ſed non omni*. As, to be a geometrician, a phyſician, a divine, &c. which are things *proper* to man; but not to all men.

The ſecond, Proprium *ſecundo modo*, is what agrees to the whole ſpecies, but agrees likewiſe to another; which they call *omni, ſed non ſoli*. Thus, to have two feet is *proper* to a man, but is likewiſe *proper* to a bird.

The third, Proprium *tertio modo*, is that which agrees to a ſingle ſpecies, but not at all times; *omni & ſoli, ſed non ſemper*. As to grow grey, according to Porphyry, is *proper* to a man, but it is to an old man.

The laſt, and higheſt, Proprium *quarto modo*, is that which alone agrees to one kind, to all the individuals thereof, and at all times; *omni, ſoli, & ſemper*. Thus, the faculty of laughing is *proper* to man, of neighing to horſes &c. And it is this that Porphyry calls the *true proper*.

The firſt three ſpecies are only accidents of the fifth vulgar predicable, to which they directly belong,

The fourth is an univerſal agreeing to every individual, or ſubject of predication of any ſpecies, in ſuch manner as to be always found abſolutely in the ſpecies alone, but not at every determinate time; thus man alone is naturally riſible; not that he is always laughing, but that he has the faculty of laughing at all times.

Proper, in reſpect of *words*, denotes their immediate and peculiar ſignification, or that directly and peculiarly attached to them.

In which ſenſe the word ſtands oppoſed to *figurative*, and *metaphorical*.

Proper is alſo uſed in a *Moral Senſe*, to denote ſomething that is uſually found in things; as their particular, or ſpecific virtues, &c.

In which ſenſe we ſay, magnanimity is the *proper* virtue of heroes.

Proper is alſo uſed for the natural qualities neceſſary to ſucceed in a thing.

In which ſenſe we ſay, people of a hot vigorous temperament are *proper* for the army; the cold and phlegmatic are proper for ſtudy. The Romans became leſs *proper* for war, in proportion as they grew more learned and polite.

Proper, in *Grammar*, is alſo applied to nouns or names, which are diſtinguiſhed into *proper* and *appellative*.

Man is the appellative, Peter the *proper* name.

The *proper* name among Chriſtians is that impoſed at baptism.

Proper *feud*. See Feud.

Proper *fraction*. See Fraction.

Proper, in the *Civil Juriſprudence*, is uſed in oppoſition to *acquired*, for an inheritence derived by derect or collateral ſucceſſion.

By the French laws, a teſtator can only diſpoſe of one fifth of his *proper* effects; the paternal relations inherit the paternal *propria*, and the maternal the maternal ones: ſo that *propria* always turn to the line whence they proceed.

The origin of the law which fixes the difference between *proper* goods and acqueſts, is not known; neither the Greeks nor Romans having ever made any ſuch diſtinction. Indeed it ſeems founded on this principle of natural equity, that men are uſually deſirous to preſerve and attach to their family the goods which they have received from their fore-fathers, and to tranſmit them to thoſe deſcending from the ſame ſtock.

Proper ſometimes alſo ſtands as a reduplicative, ſerving to mark or deſign a thing more expreſly and formally.

In this ſenſe we ſay, Jeſus Chriſt came to redeem the world in his *proper* perſon. The king did ſuch and ſuch a thing of his own *proper* motion.

Proper *motion*. See Motion.

Proper *objects*. See Object.

PROPERTY, or **Propriety**, **Proprietas**, that which conſtitutes or denominates a thing proper; or it is a particular virtue or quality, which nature has beſtowed on ſomething, excluſive of all others.

This colour is a *property* of light; extenſion, figure, diviſibility, and impenetrability, are *properties* of body.

Property, or **Propriety**, in *Law*, denotes dominion or the higheſt right a man can have to a thing; and ſuch as no ways depends on any other man's courteſy.

In this ſenſe, none in our kingdom have the *property* of any lands or tenements, except the king, in right of his crown; all other lands being of the nature of fee, and held of the king either mediately or immediately. See Fee.

Property, or *propriety*, however, is uſed for that right in lands, tenements, &c. which common perſons have; importing as much as *utile dominium*, though not *directum*; and conſiſting in the free uſe, enjoyment, and diſpoſal of all their acquiſitions, without any controul or diminution, ſave only by the laws of the land.

The original of private *property* is probably founded in nature: the earth and all things therein became the general *property* of all mankind, excluſive of other beings, from the immediate gift of the Creator; and while the earth was thinly inhabited, it is reaſonable to ſuppoſe, that all was in common among them, and that every one took from the public ſtock to is own uſe, ſuch things as his immediate neceſſities required. However, this communion of goods ſeems to have been applicable, even in the earlieſt ages, only to the ſubſtance of the thing, and not extended to the uſe of it; for, by the law of nature and reaſon, he who firſt began to uſe it, acquired therein a kind of tranſient *property*, that laſted ſo long as he was uſing it, and no longer: or, the right of poſſeſſion continued for the ſame time only that the act of poſſeſſion laſted. In proceſs of time it became neceſſary to form notions of more permanent dominion; and to appropriate to individuals not the immediate uſe only, but the very ſubſtance of the thing to be uſed. The labour of cultivation and art of agriculture by degrees introduced and eſtabliſhed the idea of a more permanent property in the ſoil than had been before received and adopted. And as occupancy gave the right to the temporary uſe of the ſoil, ſo occupancy gave likewiſe the original right to the permanent *property* in the ſubſtance of the earth itſelf; which excludes every one elſe but the owners from the uſe of it. On this head, Grotius and Puffendorf inſiſt, that this right of occupancy is founded upon a tacit and implied aſſent of all mankind, that the firſt occupant ſhould become the owner: and Barbeyrac, Titius, Mr. Locke, and others, maintain, that there is no ſuch implied aſſent, neither is it neceſſary that it ſhould be: for that the very act of occupancy alone, being a degree of bodily labour, is, from a principle of natural juſtice, without any conſent or compact, ſufficient of itſelf to gain a title. However, it is agreed on both ſides, that occupancy is the thing by which the title was in fact originally gained; every man ſeiſing to his own continued uſe ſuch ſpots of ground as he found moſt agreeable to his own convenience, provided he found them unoccupied by any elſe.

Property, both in lands and moveables thus acquired by the firſt taker, remained in him, by the principles of univerſal law, till ſuch time as he does ſome other act which ſhews an intention to abandon it; for then it becomes naturally ſpeaking, *publici juris* once more, and is liable to be again appropriated by the next occupant. But this method of one man's abandoning his *property* and another's ſeiſing the vacant poſſeſſion, could not long ſubſiſt in fact. Mutual convenience introduced commercial traffic, and the reciprocal transfer of *property* by ſale, grant, or conveyance. The moſt univerſal and effectual way of abandoing *property* is by the death of the occupant; in which caſe all *property* muſt ceaſe, conſidering men as abſolute individuals, and unconnected with civil ſociety. But as ſuch a conſtitution would be productive of endleſs diſturbances, the univerſal law of almoſt every nation (which is a kind of ſecondary law of nature) has either given the dying perſon a power of continuing his *property* by diſpoſing of his poſſeſſions by will, or the municipal law declares who ſhall be the heir of the deceaſed, or the doctrine of escheats is adopted. Thus we ſee, that though the origin of *property* is founded in nature, the modifications under which it now exiſts, the method of preſerving it to the preſent owner, and of tranſlating it from man to man, are entirely derived from ſociety; and are ſome of thoſe civil advantages, in exchange for which every individual has reſigned a part of his natural liberty.

The laws of England are, therefore, in point of honour and juſtice, extremely watchful in aſcertaining and protecting the right of *property*. Upon this principle the great charter has declared, that no freeman ſhall be diſſeiſed or diveſted of his freehold, or his liberties, or free cuſtoms, but by the judgment of his peers, or by the law of the land. And by a variety of ancient ſtatutes, viz. 5 Edw. III. cap. 9. 25 Edw. III. ſtat. 5. cap. 4. 28 Edw. III. cap. 3. it is enacted, that no man's lands or goods ſhall be ſeiſed into the king's hands againſt the great charter, and the law of the land; and that no man ſhall be diſinherited nor put out of his franchiſes or freehold, unleſs he be duly brought to anſwer, and be forejudged by courſe of law; and if any thing be done to the contrary, it ſhall be redreſſed, and holden for none. So great is the regard of the law for private *property*, that it will not authorize the leaſt violation of it; no, not even for the general good of the whole community.

The objects of dominion or *property* are things, as contradiſtinguiſhed from perſons; and things are by the law of England diſtributed into two kinds, viz. things real, and things perſonal. Things real are ſuch as are permanent, fixed and immoveable, which cannot be carried out of their place, as lands, tenements, and hereditaments of all kinds; things perſonal are goods, money, and all other moveables, which may attend the owner's perſon wherever he thinks proper to go. Hence *property* is divided into *perſonal* and *real*.

Moreover, the rights of perſonal *property* may be conſidered, as in poſſeſſion or in action. Thoſe in poſſeſſion are liable to two ſpecies of injuries, viz. the deprivation of that poſſeſſion by unjuſt and unlawful taking them away, or by unjuſt detaining them, though the original taking might be lawful; and the abuſe or damage of the chattels, while the poſſeſſion continues in the legal owner. Rights of *property* in action, are ſuch as are founded on and ariſe from contracts, which are either expreſs or implied: the former ſort includes debts, covenants, and promiſes; and the latter are either ſuch as are neceſſarily implied by the fundamental conſtitution of government, to which every man is a contracting party, or ſuch as do not ariſe from the expreſs determination of any court, or the poſitive direction of any ſtatute; but from natural reaſon and the juſt conſtruction of law.

Real *property* is liable to various kinds of injury, the principal of which are the following, viz. ouſter, treſpaſs, nuſance, waſte, ſubtraction, and diſturbance. Blackſt. Com. book i. p. 138, &c. book ii. p. 2, &c. book iii. p. 144, 167, &c.

There are three manners of right or *property*; viz. *property* abſolute, *property* qualified, and *property* poſſeſſory. See TITLE.

PROPERTY, *literary*. See LITERARY.

For offences or crimes againſt private PROPERTY; ſee LARCENY, *Malicious* MISCHIEF, and FORGERY.

PROPERTY *by prerogative*, is that *property* in perſonal chattels, a right to which may accrue either to the crown itſelf, or to ſuch as claim under the title of the crown, as by grant or by preſcription; ſuch are all tributes, taxes, and cuſtoms; all forfeitures, fines, and amercements due to the king, which accrue by virtue of his ancient prerogative, or by particular modern ſtatutes; wreck, treaſure-trove, waifs, eſtrays, royal fiſh, ſwans, &c. and thoſe animals known by the denomination of GAME

PROPERTY, *right of*, *jus proprietatis*, is that which is veſted in a man without either poſſeſſion, or even the right of poſſeſſion. This is often ſpoken of under the name of the mere right, *jus merum*; and the eſtate of the owner is in ſuch caſes ſaid to be totally diveſted, and *put to a right*. A perſon thus circumſtanced, may have the true ultimate *property* of the lands in himſelf; but by his own negligence, the ſolemn act of his anceſtor, or the determination of a court of juſtice, the preſumptive evidence of that right is ſtrongly in favour of his antagoniſt, who has thereby obtained the abſolute right of POSSESSION.

Incumbents have not the *propriety* of benefices, they have only the enjoyment thereof. The monks have a long time diſputed whether they had the *propriety* of the bread they eat, or only the uſe?

One may give the *propriety* of an eſtate, yet reſerve the uſufruit; in which caſe, by the death of the uſufructuary, the uſufruit is conſolidated to the *propriety*.

In the law of England, ſtrictly ſpeaking, that which is called an *eſtate* in lands and tenements, is termed a *property* in perſonal chattels; the law conſidering the firſt as permanent, the other as temporary and precarious.

PROPHECY, Προφητεια, a prediction, made by divine inſpiration.

One of the ſtrongeſt evidences for the truth of revealed religion is that ſeries of *prophecies* which is preſerved in the Old and New Teſtament; and a greater ſervice, ſays an excellent writer, could not be done to Chriſtianity than to lay together the ſeveral predictions of ſcripture with their completions, to ſhew how particular things have been foretold, and how exactly fulfilled. A work of this kind was deſired by the lord Bacon (vide de Augmentis Scientiarum, lib. ii. cap. 11.) and he entitles it the Hiſtory of *Prophecy*; in which he propoſes, that every *prophecy* of the ſcripture be ſorted with the event fulfilling the ſame throughout the ages of the world, both for the better confirmation of faith, and for the better illumination of the church, touching thoſe parts of *prophecies* which are yet unfulfilled; allowing, nevertheleſs, that latitude which is agreeable and familiar unto divine *prophecies*, being of the nature of the author with whom a thouſand years are but as one day, and therefore they are not fulfilled punctually at once, but have ſpringing and germinant accompliſhment throughout many ages, though the height or fulneſs of them may refer to ſome one age. A work of this kind has been actually executed by the learned biſhop Newton in his Diſſertation on the *Prophecies*.

With regard to the credibility of *prophecy*, it may be obſerved in general, that it is not at all incredible that God ſhould upon ſpecial occaſions foretel future events; and, if he affords an extraordinary revelation of his will to mankind, that he ſhould atteſt its divine original by this kind of evidence; an evidence, which, if the *prophecies* point to the events, and the events correſpond with the *prophecies*, is in the higheſt degree concluſive and convincing. No previous conjecture nor accidental coincidence are ſufficient to counteract and invalidate this kind of evidence.

As to moſt of the ſcripture *prophecies*, they comprehend ſuch a variety of particulars; they ſo minutely deſcribe diſtant events, to be accompliſhed in circumſtances which no human ſagacity could foreſee or conceive likely to occur; and they accord ſo exactly with the facts to which they refer, that there is no way of evading the concluſion, but by either denying the premiſes that ſuch *prophecies* were ever delivered and recorded, againſt which fact and hiſtory militate, or by pretending that what we call predictions are only hiſtories written after the events had happened, in a prophetic ſtyle and manner. But it is alledged in anſwer to this abſurd plea, that there are all the proofs and authorities, which can be had in caſes of this nature, that the prophets propheſied in one age and that the events happened in another and ſubſequent age: and we have as much reaſon to believe theſe, as we have to believe any ancient matters of fact whatever; and by the ſame rule which leads us to deny theſe, we may as well controvert and contradict the credibility of all ancient hiſtory: but, beſides, Chriſtian writers undertake to prove the truth of *prophecy*, and conſequently the truth of revelation, not by an induction of particulars long ago foretold and long ago fulfilled, the predictions of which may be ſuppoſed to have been written after the hiſtories, but by inſtances of things which have confeſſedly many ages ago been foretold, and have in theſe later ages been fulfilled, or are fulfilling at this very time; ſo that there is no pretence for aſſerting ſuch *prophecies* to have been written after the events; but it muſt be acknowledged that the events many ages after correſpond exactly with the predictions many ages before. The evidence, therefore, which *prophecy* furniſhes in favour of the truth of religion is a growing evidence; and the more *prophecies* are fulfilled, the more teſtimonies there are and confirmations of the truth and certainty of divine revelation.

One of the greateſt difficulties in Chriſtianity turns upon the manner of completion of the Scripture *prophecies*. In the prophets of the Old Teſtament are frequent predictions of the Meſſiah; which the writers of the New frequently urge to the Jews and heathens as fulfilled in Jeſus Chriſt; and on this principle evince the truth of his miſſion: but theſe texts, thus urged from the Old, in the New Teſtament, are ſometimes not to be now found in the Old; and at other times are not urged in the New in the literal and obvious ſenſe which they ſeem to bear in the Old: whence moſt of the Chriſtian commentators, divines, and critics, ancient and modern, judge them to be applied in a ſecondary, typical, allegorical, or myſtical ſenſe. Thus, e. gr. St. Matthew, after an account of the conception of the Virgin, and the birth of Jeſus, ſays, "All this was done that it might be fulfilled which was " ſpoken by the prophet, ſaying, Behold a Virgin ſhall " be with child, and ſhall bring forth a ſon, and they " ſhall call his name Emmanuel." But the words, as they ſtand in Iſaiah, whence they are ſuppoſed to be taken, do, in their obvious and literal ſenſe, relate to a young woman who was to bring forth a child in the days of Ahaz; as appears from the context, and as is owned by Grotius, Huetius, Caſtalio, Curcellæus, Epiſcopius, Hammond, Simon, Le Clerc, Lamy, &c.

This *prophecy*, then, not being fulfilled in Jeſus, in the primary, literal, or obvious ſenſe of the words, is ſuppoſed, like the other *prophecies* cited by the apoſtles, to be fulfilled in a ſecondary, typical, or allegorical ſenſe;

i. e. this *prophecy*, which was firſt literally fulfilled by the birth of the prophet's ſon in the time of Ahaz, was again fulfilled by the birth of Jeſus, as being an event of the ſame kind, and intended to be ſignified either by the prophet, or by God, who directed the prophet's ſpeech. Grotius obſerves this to be the caſe in moſt, if not all the *prophecies* and citations quoted from the Old in the New Teſtament; and Dodwell, with ſir John Marſham, refer even the famous *prophecy* in Daniel, about the ſeventy weeks, to the time of Antiochus Epiphanes; ſhewing, that the expreſſions taken thence by Chriſt, and urged by him as predicting the deſtruction of Jeruſalem by the Romans, have only in a ſecondary ſenſe a reſpect to that deſtruction.

And even that famous *prophecy* in the Pentateuch, "A "prophet will the Lord God raiſe up unto thee, like "unto me; to him ſhall ye hearken;" which St. Luke refers to as ſpoken of Jeſus Chriſt, is by Simon, Grotius, Stillingfleet, &c. underſtood to ſignify, in its immediate ſenſe, a promiſe of a ſucceſſion of prophets.

It is allowed, then, the apoſtles applied the *prophecies* which they quote from the Old Teſtament, in a typical ſenſe; but, unhappily, the rules whereby they quoted them are loſt. Dr. Stanhope laments the loſs of the Jewiſh traditions or rules for interpreting Scripture received among the rabbins, and followed by the apoſtles. But this loſs, Surenhuſius, Hebrew profeſſor at Amſterdam, thinks he has retrieved from the Jewiſh Talmud, and the ancient Jewiſh commentaries; and has accordingly publiſhed to the world the rules whereby the apoſtles quoted the Old Teſtament.

But the truth is, theſe rules are too precarious, ſtrained, and unnatural, to gain much credit.

Mr. Whiſton condemns all allegorical explanation of the *prophecies* of the Old Teſtament cited in the New, as weak, enthuſiaſtic, &c. and adds, that if a double ſenſe of the *prophecies* be allowed, and there be no other method of ſhewing their completion than by applying them ſecondarily and typically to our Lord, after having been in the firſt and primary intention long ago fulfilled in the times of the Old Teſtament, we loſe all the real advantages of the ancient *prophecies*, as to the proofs of Chriſtianity.

He therefore ſets up a new ſcheme in oppoſition thereto: he owns, that taking the preſent text in the Old Teſtament for genuine, it is impoſſible to expound the apoſtles citations of the *prophecies* of the Old Teſtament on any other than the allegorical foundation; and therefore, to ſolve the difficulty, he is forced to have recourſe to a ſuppoſition contrary to the ſenſe of all Chriſtian writers before him, viz. that the text of the Old Teſtament has been greatly corrupted ſince the apoſtolic age by the Jews. His hypotheſis is, that the apoſtles made their quotations out of the Old Teſtament rightly and truly from the Septuagint verſion, which in their time was in vulgar uſe, and exactly agreed with the Hebrew original; and that as they made exact quotations ſo they argued juſtly and logically from the obvious and literal ſenſe of the ſaid quotations, as they then ſtood in the Old Teſtament; but that, ſince their times, both the Hebrew and Septuagint copies of the Old Teſtament have been ſo greatly corrupted, and ſo many apparent diſorders and diſlocations introduced therein, as to occaſion many remarkable differences and inconſiſtencies between the Old and New Teſtament in reſpect to the words and ſenſe of thoſe quotations.

As to the manner wherein theſe corruptions were introduced, he ſays, the Jews, in the ſecond century, greatly corrupted and altered both the Hebrew and Septuagint, eſpecially in the *prophecies* cited by the apoſtles, to make their reaſoning appear inconcluſive; that, in the third century, they put into Origen's hand one of theſe corrupted copies of the Septuagint; which Origen miſtaking for genuine, inſerted in his Hexapla, and thus brought into the church a corrupted copy of the Septuagint; and that, in the end of the fourth century, the Jews put into the hands of the Chriſtians, who, till then, had been almoſt univerſally ignorant of the Hebrew, a corrupted copy of the Hebrew Old Teſtament.

The diſagreement, then, between the Old and New Teſtament, in reſpect to the ſaid quotations, he contends, has no place between the genuine text of the Old Teſtament (now no where exiſting), but only between the preſent corrupted text of the Old and New Teſtament; and therefore, to juſtify the reaſonings of the apoſtles, he propoſes to reſtore the text of the Old Teſtament, as it ſtood before the days of Origen, and as it ſtood in the days of the apoſtles; from which text, thus reſtored, he doubts not, it will evidently appear, that the apoſtles cited exactly, and argued juſtly and logically from the Old Teſtament. But this ſcheme of accompliſhing *prophecies* labours under difficulties at leaſt as great as the allegorical ſcheme. Its foundation is incredible, and its ſuperſtructure, from firſt to laſt, precarious. In effect, it is inconceivable, that the Old Teſtament ſhould be ſo corrupted; and it may be even made appear, that the Hebrew and Septuagint diſagreed in the times of the apoſtles: add to this, that the means whereby he propoſes to reſtore the true text, will never anſwer that end; nor has he himſelf, from all the means he is yet poſſeſſed of, been able to reſtore one prophetical citation, ſo as to make that ſeem literally, which before only ſeemed allegorically applied.

Upon this head it may be obſerved, that the double ſenſe of *prophecies*, for which ſome have zealouſly contended, and others have as ſtrenuouſly oppoſed, ought not to be underſtood, as if a *prophecy* equally and indifferently referred to many perſons or events; or as if, literally referring to a lower perſon, it was only figuratively and allegorically to be interpreted of the Meſſiah (for a paſſage only capable of being accommodated to him is not by any means a prediction of him); but it is to be ſo explained, as that it may appear the Meſſiah was principally intended, and the *prophecy* literally referred to him, though it might in part be applied to ſome other perſon; and might have been underſtood as referring to that inferior perſon alone, if farther light had not been thrown upon it, by comparing other *prophecies*, or by the teſtimony of thoſe whom on other accounts we have reaſon to regard as authentic interpreters. Nevertheleſs, it muſt be acknowledged, that though the tracing of the Meſſiah in ſuch *prophecies* as they may ſerve to illuſtrate the unity of deſign which is of a conſiderable additional proof of the truth of a revelation, yet the main ſtreſs is to be laid upon ſuch *prophecies* as evidently and ſolely relate to the Meſſiah and his kingdom, rather than on thoſe which are capable of reference to other perſons or events.

Prophecies, *falſe*, are thoſe delivered by perſons pretending extraordinary commiſſions from God, to raiſe jealouſies in the people, or terrify them with impending judgments, &c. Such perſons are puniſhable at common law as impoſtors. This was a capital offence by ſtat. 1 Edw. IV. cap. 12. which was repealed in the reign of queen Mary. By ſtatute 5 Eliz. cap. 15. none ſhall publiſh or ſet forth any falſe *prophecy*, with an intent to raiſe ſedition, on pain of 10*l*. for the firſt offence, and a year's impriſonment; and for the ſecond offence to forfeit all his goods and chattels, and ſuffer impriſonment during life; the proſecution to be within ſix months. 3. Inſt. 128, 129. To *propheſy* when the king ſhall die, hath been anciently held to be treaſon. Roll. Rep. 88.

PROPHET, *propheta*, ϖροφετης, a perſon inſpired by God with the knowledge of future events; and commiſſioned to declare his will, &c. to the world.

The word is derived from the Greek ϖρο, and φατος, *ſaid*; of φημι, *I ſay*; whence alſo the Latins derive their *fatus*, *ſpoken*.

Among the canonical books are thoſe of ſixteen *prophets*; four of which are denominated the *greater prophets*, viz. Iſaiah, Jeremiah, Ezekiel, and Daniel; ſo called from the length or extent of their writings, which exceed thoſe of the others; viz. Hoſea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Haggai, Zechariah, and Malachi; who are called the *leſſer prophets*, from the ſhortneſs of their writings.

The writings of the *prophets* form one of the three diviſions of the CANON of the Old Teſtament; and to thoſe already enumerated, called the books of the latter prophets, are added thoſe of the former prophets; viz. Joſhua, Judges, Samuel, and Kings.

The Jews only reckon three *greater prophets*: Daniel they exclude as no more to be ranked among the *prophets* than David: not but that both the one and the other foretold many important things, but becauſe their manner of life differed from that of the other *prophets*; David being a king, and Daniel a peer.

In the Greek church, the leſſer *prophets* are placed in order before the great ones; apparently becauſe many of the leſſer *prophets* are more ancient than the greater.

Among the Greeks, too, Daniel is ranked among the leſſer *prophets*. In the forty eighth chapter of Eccleſiaſticus, Iſaiah is particularly called the *great prophet*; both on account of the great things he foretold, and the magnificent manner wherein he did it.

Spinoza ſays, the ſeveral *prophets* propheſied according to their reſpective humours: Jeremiah, e. g. melancholy and dejected with the miſeries of life, propheſied nothing but misfortunes.

Dacier obſerves that among the ancients, the name *poet* is ſometimes given to *prophets*; as that of *prophet* is, at other times, given to *poets*.

Prophets, *ſons of the*, in *Scripture Hiſtory*, an appellation given to young men who were educated in the ſchools or colleges under a proper maſter, who was commonly, if not always, an inſpired *prophet*, in the knowledge of religion and in ſacred muſic, and thus were qualified to be public preachers, which ſeems to have been part of the buſineſs of the *prophets* on the Sabbath-days and feſtivals. It is probable, that God generally choſe the *prophets*, whom he inſpired, out of theſe ſchools.

PROPHETICAL *types*. See Type.

PROPHYLACTICE, ϖροφυλακτικη, that part of the art of medicine which directs the preventing or preſerving from diſeaſes.

PROPITIATION, in *Religion*, a ſacrifice offered to God to aſſuage his wrath, and render him propitious.

Among the Jews there were both ordinary and public ſacrifices; as holocauſts, &c. offered by way of thankſgiving; and extraordinary ones offered by particular perſons guilty of any crime, by way of *propitiation*.

If it were a crime of ignorance, they offered a lamb, or a kid; if done wittingly, they offered a ſheep: for the poor, a pair of turtles was enjoined as a *propitiation*.

The Romiſh church believe the maſs to be a ſacrifice of *propitiation*, for the living and the dead. The reformed churches allow of no *propitiation*, but that one offered by Jeſus Chriſt on the croſs.

Propitiation alſo gives the name to a ſolemn feaſt among the Jews, celebrated on the tenth of the month Tiſri, which is their ſeventh month, and anſwers to our September.

It was inſtituted to preſerve the memory of the pardon proclaimed to their forefathers by Moſes on the part of God; who thereby remitted the puniſhment due for their worſhip of the golden calf.

PROPITIATORY, among the *Jews*, was the cover or lid of the ark of the covenant; which was lined both within and withoutſide with plates of gold; inſomuch that there was no wood to be ſeen.

Some even take it to have been one piece of maſſive gold.

The cherubims ſpread their wings over the *propitiatory*.

This *propitiatory* was a type or figure of Chriſt, whom St. Paul calls the *propitiatory* ordained from all ages. See Ark *of the covenant*.

PROPLASM, *proplaſma*, ϖροπλασμα, is ſometimes uſed for a mould wherein any metal or ſoft matter, which will afterwards grow hard, is caſt.

PROPLASTICE, προπλαςικη, the art of making moulds, for caſting things in.

PROPOLIS, ϖροπολις, a thick yellow odorous ſubſtance, ſmelling like ſtorax, nearly akin to wax, but more tenacious; wherewith the bees ſtop up the holes and crannies of their hives, to keep out the cold air, &c.

Theſe wary animals not only ſtop up in this manner all the cracks they can find, but even examine all the weak places of the hive, and will eat away a rotten or too weak part, and make up the deficiency with this *propolis*. This was elegantly ſeen in the caſe of ſome of Mr. Reaumur's glaſs hives, which were framed of wood, and had ſquares of glaſs in the proper places: theſe ſquares of glaſs were faſtened in with ſlips of paſted paper. The bees finding this a much weaker part of the hive than any other, and capable of being eaten through by their enemies, ſoon gnawed to pieces all the paper and paſte, and covered thoſe parts with the *propolis* in the place of that matter.

It might ſeem that the bees might uſe wax on this occaſion; but this would be no defence againſt thoſe of their enemies, which devour and feed on wax; and nature has guarded them againſt theſe, by ſupplying them with a matter which ſpreads more eaſily, is of a greater tenacity, and fixes itſelf much more ſtrongly in the ſmall crevices than wax could do. It has been known from the earlieſt times, that the bees made uſe of this ſubſtance. Pliny mentions it, and tells us, that the authors of his time diſtinguiſhed three kinds of it; the firſt they called *metys*, the ſecond *piſſoceron*, and the third *propolis*. The laſt of theſe names is only retained among the later writers, and ſeems to have ſtood with the ancients for the pure ſubſtance, the other kinds differing from it only as they were more or leſs mixed with wax.

The *propolis* itſelf is a ſubſtance perfectly different from wax; it is found to be ſoluble in ſpirit of wine, or in oil of turpentine; and is ſoft when laid on by the bees, but grows hard afterwards; it may, however, even in its hardeſt ſtate, be ſoftened by heat. By all theſe obſervations it appears very plainly, that *propolis* is a true genuine vegetable reſin, of the nature of many others which we have in common uſe. The authors who have treated of this ſubſtance, have deſcribed it very differently; George Pictorius, who has written of bees, ſays, that it is of a yellow colour, and an agreeable ſmell, like that of ſtorax, and that it would ſpread when warmed properly. Pliny and the old authors deſcribe it as being of a rank and ſtrong ſmell, and being uſed as a ſuccedaneum for galbanum, and at preſent we uſually find it of an aromatic and agreeable ſmell, inſomuch that ſome rank it among the perfumes. The apothecaries, in ſome places, keep it as a medicine in their ſhops; but it is to be obſerved, that it is very various in its nature; for, according to the deſcription of authors, it is ſometimes ſweet and ſometimes ſtinking. The truth is, that the bees, who collect it as a thing to be uſed for a cement, not for food, are not over-curious what plants they gather it from; and hence in different hives it is found of very different colours and conſiſtencies. In general, the *propolis* is of a browniſh red colour on the ſurface; the red ſometimes predominating, ſometimes the brown; but when broken it is yellowiſh, or approaching to the colour of wax. It very readily diſſolves in ſpirit of wine or oil of turpentine; and this ſolution is of a fine gold colour, and will ſerve extremely well as a varniſh to colour ſilvered picture-frames, or other the like work, into the appearance of gold. It gives a fine gold-like apperance, indeed, to any white metal of a poliſhed ſurface; all that it wants is a little more brilliancy, which is eaſily given it by mixing a ſmall quantity of maſtich, or of ſandarach, in the ſolution.

It is the general opinion of thoſe who have ſtudied bees, that the willow and the poplar are the trees which principally furniſh them with this reſin, which, when it has paſſed through their management, we call *propolis*. It is very certain, however, that theſe are not the only trees which afford it, ſince the bees are not found to want this neceſſary material for their work, in places where there are no trees of that kind in the neighbourhood of the hives.

Mr. Thorley declares, as he tells us likewiſe upon the fulleſt evidence, that the combs both in their foundation and ſuperſtructure, are framed of nothing but pure wax. Beſides the uſes of the *propolis* already mentioned, there is another very ſingular one, which muſt by no means be paſſed over in ſilence; this is the embalming and preſerving, by means of it, certain bodies which they know not how to diſpoſe of otherwiſe. Notwithſtanding the care that the bees take to guard the entrance of their hives, enemies of one kind or other will often get in: theſe uſually fare very ill; for the bee's ſting is a weapon very capable of puniſhing ſuch an intruſion, and the ſwarm is ſo numerous, that it is not eaſy for the intruder to eſcape repeated wounds. When a creature of ſmall ſize has thus entered, and thus been killed for it, the bees with great care and pains carry him out; for they will bear no ſort of foulneſs in the hive. It ſometimes happens, however, that an unlucky ſnail, particularly of the large naked kind, crawls into the hive; in this caſe he never ceaſes crawling over the combs ſo long as he lives. It is no wonder that ſo cleanly creatures as the bees are highly enraged at this naſty viſitor; they ſoon ſurround and kill him with their ſtings; but then as he is a load too heavy to allow a poſſibility of their carrying him out, they prevent the miſchief attending the ſtinking of the carcaſe, by covering it over with a thick coat of this *propolis*, which perfectly well preſerves it from putrefaction.

The common garden ſnail, with the ſhell, ſometimes alſo viſits theſe induſtrious and cleanly animals; and this creature they ſecure in a different manner, and that at the expence only of a very ſmall quantity of the *propolis*: but Reaumur had an opportunity of obſerving the method of deſtroying this enemy in a very accurate and eaſy manner, in one of his glaſs hives. The ſnail had entered the hive early in the morning, and after crawling about for ſome time, had fixed itſelf to one of the glaſs ſquares by the ſame glutinous matter, by means of which it is frequently found fixed to old walls and trees; when the bees found their enemy thus fixed, they ſurrounded him, and in a few minutes formed a border of *propolis* round the verge of the mouth of the ſhell: this they continually added more and more to, till they had formed ſo thick a coat round it, that the ſnail could never move from the place again.

The ſnail is eaſily able to looſen the faſtening which it gives itſelf to any place, becauſe this is done by means of a gum, which water will diſſolve; therefore the firſt ſhower of rain, or the moiſture which the animal is able to ſecrete from its own body, releaſes it in this caſe; but the faſtening which the bees uſe to fix the ſhell to the glaſs being a reſin, this remains untouched by water, and muſt keep the animal fixed in its place till death, and even long afterwards. Reaumur's Hiſt. Inſ. vol. x. p. 77, &c.

Mr. Thorley obſerves, that he has frequently ſeen ſnails, within the boxes and at the back-window, moving about, changing their ſituation, and continuing at times for ſeveral days together, but not ſo much as a ſingle bee aſſaulting the offenſive animal, or offering the leaſt reſiſtance, but, on the contrary, ſhunning or flying from him. He adds, that he has often obſerved ſnails coming out of the colonies, in no reſpect hurt or wounded, but in full health and vigour. Thorley's Enquiry, &c. p. 136.

It ſeems probable, that the bees are not over-curious in the choice of the matter of the *propolis*; but that many vegetable reſins indifferently ſerve for this purpoſe: it has been tried, however, whether they would uſe common turpentine, and ſome other of the reſins in uſe among us, by laying them before their hives; but without ſucceſs. This is an experiment, however, that requires frequent repetition; ſince there are many ſeaſons at which the bee has no occaſion for this matter.

The *propolis* is by ſome eſteemed ſovereign in diſeaſes of the nerves. It is alſo uſed to make holes in abſceſſes; and being heated on the fire, its vapour is received for inveterate coughs.

PROPOMA, a name given by the ancients to a potion prepared of honey and wine boiled together: the proportions were four parts of wine to one of honey.

PROPORTION, *proportio*, in *Arithmetic*, the identity or ſimilitude of two ratios.

Hence quantities that have the ſame ratio between them, are ſaid to be *proportional*; e. gr. if A be to B, as C to D; or 8 be to 4, as 30 to 15; A, B, C, D, and 8, 4, 30, and 15, are ſaid to be in *proportion*, or are ſimply called *proportionals*.

Proportion is frequently confounded with *ratio*; yet have the two, in reality, very different ideas, which ought by all means to be diſtinguiſhed.

Ratio is, properly, that relation or habitude of two things, which determines the quantity of one from the quantity of another, without the intervention of any third; thus we ſay, the ratio of 5 and 10 is 2; the ratio of 12 and 24 is 2.

Proportion is the ſameneſs or likeneſs of two ſuch relations; thus the relations between 5 and 10, and 12 and 24, being the ſame, or equal, the four terms are ſaid to be in *proportion*. Hence ratio exiſts between two numbers; but *proportion* requires at leaſt three.

Proportion, in fine, is the habitude or relation of two ratios, when compared together; as RATIO is of two quantities.

Proportion again is frequently confounded with *progreſſion*. In effect, the two often coincide: the difference between them only conſiſting in this, that progreſſion is a particular ſpecies of *proportion*; wherein the ſecond of the three terms is a mean *proportional* between the other two, or has the ſame ratio to the third, which the firſt has to the ſecond.

Add to this, that *proportion* is confined to three terms, but progreſſion goes on to infinity (ſo that progreſſion is a ſeries or continuation of *proportions*); and that in four terms, 3, 6, 12, 24, *proportion* is only between the two couples 3, and 6, and 12 and 24; but PROGRESSION is between all the four terms.

Proportion is ſaid to be *continual*, when the conſequent of the firſt ratio is the ſame with the antecedent of the ſecond; as, if 3 be to 6, as 6 to 12.

The *proportion* is ſaid to be *diſcrete*, or interrupted, when the conſequent of the firſt ratio differs from the antecedent of the ſecond; as, if 3 be to 6, as 4 to 8.

Proportion, again, is either ſaid to be *arithmetical*, or *geometrical*; as the ratios are.

PROPORTION, *arithmetical*, is the equality of two or more arithmetical ratios, or the equality of difference between three or more ſeveral quantities.

Thus, 1, 2, 3, and 2, 5, 8, 11, 14, are in *arithmetical proportion*; becauſe there is the ſame difference betwixt the numbers compared, which are 1 to 2, and 2 to 3; or 2 to 5, and 5 to 8, &c.

If every term have the ſame ratio to the next, as the firſt has to the ſecond; the terms are ſaid to be in *continual arithmetical proportion*; as 5, 7, 9, 11, 13, 15.

If the ratio between any two terms differs from that of any others, the terms are ſaid to be in *arithmetical proportion diſcrete*, or *interrupted*; as where 2 : 5 : : 6 : 9, the ratios of 5 and 6 being different from that of 2 and 5.

A ſeries of more than four terms in *arithmetical proportion*, form an arithmetical PROGRESSION.

1. If three numbers be in *arithmetical proportion*, the ſum of the extremes is equal to double the middle term: thus, in 3, 7, 11; the ſum of 3 and 11 is equal to twice 7; viz. 14.

Hence we have a rule for finding a mean *arithmetical proportional* between two given numbers; half the ſum of the two being the mean required: thus, half the ſum of 11 and 3, viz 14, is 7.

2. If four numbers be in *arithmetical proportion*, the ſum of the extremes is equal to the ſum of the middle terms: thus, in 2 : 3 : : 4 : 5; the ſum of 5 and 2 is equal to the ſum of 3 and 4, viz. 7.

Hence, four terms in *arithmetical proportion* are ſtill proportional, if taken inverſly, 5 : 4 : : 3 : 2; or alternately, thus, 2 : 4 : : 3 : 5; or inverſly and alternately, thus 5 : 3 : : 4 : 2.

3. If two numbers in *arithmetical proportion* be added to other two, the leſs to the leſs, &c. their difference is in a duplicate ratio, i. e. double that of the reſpective parts added: thus, if to 3 : 5 be added 7 : 9, the ſums are 10 : 14; whoſe difference 4, is double the difference of 3 : 5, or 7 : 9. And if to this ſum you add other two, the difference of the laſt ſum will be triple the ſum of the firſt two, and ſo on.

If two *arithmetical proportionals* be ſubtracted from two others in the ſame ratio, the leſs from the leſs, &c. the arithmetical ratio of the remainder is 0. Thus, from 9 : 7 taking 5 : 3, the remainders are 4, 4.

Hence, if *arithmetical proportionals* be multiplied by the ſame number, the difference of their products will contain the firſt difference as oft as the multiplier contains unity: thus, 3 : 5, multiplied by 4, produce 12, 20, whoſe difference 8 is equal to 4 times 2, the difference of 3 and 5.

4. If two numbers in *arithmetical proportion* be added to, or multiplied by other two in another ratio of the ſame kind, leſs by leſs, &c. the ſums are in a ratio which is the ſum of the ratios added or multiplied: thus 2 : 4 and 3 : 9 being added, the ſums are 5 : 13, whoſe difference is 8, the ſum of 2 and 6, the difference of the numbers given.

PROPORTION, *geometrical*, is the equality of two geometrical ratios, or compariſons of two couples of quantities.

Thus 4 : 8 : : 12 : 24, are in *geometrical proportion*; the ratio of 4 and 8 being equal to that of 12 and 24; i. e. 4 is contained as often in 8, as 12 is in 24. Again, 9, 3, 1, are in *geometrical proportion*, 9 being triple of 3, as 3 is of 1.

If, in a ſeries of terms, there be the ſame ratio between every two terms, that there is between the firſt and ſecond, they are ſaid to be *continual geometrical proportionals*; as 1 : 2 : : 4 : 8.

If any two terms have a different ratio from that of the firſt and ſecond, they are ſaid to be in a *disjunct*, or *interrupted geometrical proportion*; as are 2 : 4 : : 3 : 6; where 2 is to 4, as 3 to 6; but not ſo as 4 to 3.

A ſeries or progreſſion of more than four *geometrical proportionals* is called a *geometrical* PROGRESSION.

1. If three quantities be in continual *geometrical proportion*, the product of the two extremes is equal to the ſquare of the middle term: thus, in 6 : 12 : : 12 : 24, the product of 6 and 24 is equal to the ſquare of 12, viz. 144. Hence we have a rule,

2. To find a mean *geometrical proportional* between two numbers, e. gr. 8 and 72.

Multiply one of the numbers by the other, and from the product 576, extract the ſquare root 24; this will be the mean required.

3. To find a fourth proportional to three given numbers, e. gr. 3, 12, 5; or a third proportional to two given numbers.

Multiply the ſecond 12 into the third 5, in the firſt caſe; and in the latter, multiply the ſecond into itſelf; divide the product by the firſt 3, the quotient 20 is the fourth *proportional* ſought in the one, or the third in the other. The ſolution of this problem is what we popularly call the *rule of proportion*, or the *golden rule*, or RULE *of three*.

4. If four numbers be in *geometrical proportion*, the product of the extremes is equal to the product of the two middle terms: thus, in 2 : 5 : : 4 : 10, the product of 10 and 2 is equal to that of 5 and 4; viz. 20. Hence,

5. If four numbers repreſented by $a : b :: c : d$, be either in *arithmetical*, or *geometrical proportion*; they will alſo be in the ſame, if taken inverſly, viz. $d : c :: b : a$; or alternately, as $a : c :: b : d$; or alternately and inverſly, as $d : b :: c : a$.

6. If the two terms of a geometrical ratio be added to, or ſubtracted from other two in the ſame ratio, the leſs to or from the leſs, &c. the ſums or differences are in the ſame ratio: thus in 6 : 3 : : 10 : 5, where the common ratio is 2, 6, added to 10, makes 16, as 3 to 5 makes 8; and 16 : 8 is in the ſame ratio as 6 : 3, or 10 : 5. Again, 16 be to 8 as 6 to 3, their differences 10 and 5 are in the ſame ratio.

The reverſe of which propoſition is likewiſe true; viz. if to or from any two numbers be added or ſubtracted other two, if their ſums or differences be in the ſame geometrical ratio as the firſt two, the numbers added or ſubtracted are in the ſame ratio. Hence,

7. If the antecedents, or the conſequents, of two equal geometrical ratios, 3 : 6. and 12 : 24, be divided by the ſame 3; in the former caſe, the quotients 1 and 4 will have the ſame ratios to the conſequent, viz. 1 : 6 : : 4 : 24; and in the latter, the antecedents will have the ſame ratio to the quotients, viz. 3 : 1 : : 12 : 4

8. If the antecedents or conſequents of ſimilar ratios, 2 : 6, and 3 : 9, be multiplied by the ſame quantity 6; in the former caſe the facta 12 and 18 have the ſame ratio to the conſequents, viz. 12 : 6 :: 18 : 9; and in the latter the antecedents have the ſame ratio to the products, viz. 2 : 36 :: 3 : 54.

9. If in a *geometrical proportion* 3 : 6 :: 12 : 24, the antecedents be multiplied or divided by the ſame number 2, and the conſequents be multiplied or divided by the ſame number 3; in the former caſe, the facta, in the latter, the quotients, will be the ſame *proportion*, viz. 6 : 18 :: 24 : 72, and 1 : 3 :: 4 : 12.

10. If in a *proportion* 4 : 2 :: 10 : 5, the antecedent of the firſt ratio to be its conſequent, as the antecedent of the ſecond to its conſequent; then by compoſition, as the ſum of the antecedent and conſequent of the firſt ratio is to the antecedent or conſequent of the firſt, ſo is the ſum of the antecedent and conſequent of the ſecond to the antecedent or conſequent of the ſecond; viz. 6 : 2 :: 15 : 5, or 6 : 4 :: 15 : 10.

11. If in a *proportion* 6 : 4 :: 15 : 10, as the antecedent of the firſt ratio is to its conſequent; ſo is the antecedent of the other to its conſequent; then, by diviſion, as the difference of the terms of the firſt ratio is to its antecedent or conſequent, ſo is the difference of the terms of the ſecond ratio to its antecedent or conſequent, viz. 2 : 4 :: 5 : 10; or 2 : 6 :: 5 : 15.

12. If in a *proportion* 4 : 2 :: 6 : 3, as the antecedent of the firſt ratio is to its conſequent, ſo the antecedent of the ſecond is to its conſequent; and as the conſequent of the firſt is to another number 8, ſo is the conſequent of the ſecond to another number 12; viz. 2 : 8 :: 3 : 12; then will the antecedent of the firſt be to 8, as the antecedent of the ſecond to 12, viz. 4 : 8 :: 6 : 12.

13. If in a *proportion* 8 : 4 :: 12 : 6, as the antecedent of the firſt ratio is to its conſequent, ſo is the antecedent of the ſecond to its conſequent; and as the conſequent of the firſt is to another number 16, ſo is another number 3 to the antecedent of the ſecond, viz. 4 : 16 :: 3 : 12; then will the antecedent of the firſt be to 16, as 3 to the conſequent of the ſecond, viz. 8 : 16 :: 3 : 6.

14. Suppoſe any four proportional quantities; viz. 3 : 6 :: 12 : 24; and any other four proportional quantities, 1 : 3 :: 9 : 27; if you multiply the ſeveral terms of the latter into thoſe of the former, the products will likewiſe be *proportional*, viz. 3 : 18 :: 108 : 648.

15. If there be ſeveral quantities continually proportional, A, B, C, D, &c. the firſt A is to the third C, in a duplicate ratio; to the fourth D, in a triplicate ratio, &c. of the firſt A to the ſecond B.

16. If there be three numbers in continual *proportion*, the difference of the firſt and ſecond will be a mean proportional between the difference of the firſt and ſecond term, and the difference of the ſecond and third, and the firſt term.

PROPORTION, *harmonical* or *muſical*, is a third kind of *proportion* formed out of the other two, thus; of three numbers, if the firſt be to the third as the difference of the firſt and ſecond to the difference of the ſecond and third; the three numbers are in *harmonical proportion*.

Thus 2, 3, 6 are harmonical, becauſe 2 : 6 :: 1 : 3. So alſo four numbers are harmonical, when the firſt is to the fourth as the difference of the firſt and ſecond to the difference of the third and fourth.

Thus 24, 16, 12, 9, are harmonical, becauſe 24 : 9 :: 8 : 3. By continuing the proportional terms in the firſt caſe, there ariſes an harmonical progreſſion, or ſeries.

1. If three or four numbers in *harmonical proportion* be multiplied or divided by the ſame number; the products or quotients, will alſo be in *harmonical proportion*: thus, if 6, 8, 12, which are harmonical, be divided by 2, the quotient 3, 4, 6, are alſo harmonical; and reciprocally their products by 2, viz. 6, 8, 12.

2. To find an harmonical mean between two numbers given: divide double the product of the two numbers by their ſum, the quotient is the mean required; thus ſuppoſe 3 and 6 the extremes, the product of theſe is 18, which doubled, gives 36; this divided by 9 (the ſum of 3 and 6) gives the quotient 4. Whence 3, 4, 6 are harmonical.

3. To find a third *harmonical proportional* to two numbers given.

Call one of them the firſt term, and the other the ſecond; multiply them together, and divide the product by the number remaining after the ſecond is ſubtracted from double the firſt: the quotient is a third *harmonical proportional*: thus, ſuppoſe the given terms 3, 4, their product 12 divided by 2 (the remainder after 4 is taken from 6, the double of the firſt), the quotient is 6, the harmonical third ſought.

4. To find a fourth *harmonical proportional* to three terms given: multiply the firſt into the third, and divide the product by the number remaining after the middle or ſecond is ſubtracted from double the firſt; the quotient is a third *harmonical proportional*: thus ſuppoſing the numbers 9, 12, 16, a fourth will be found by the rule to be 24.

5. If there be four numbers diſpoſed in order, whereof one extreme and the two middle terms are in arithmecal *proportion*: and the ſame middle terms with the other extreme, are in *harmonical proportion*, the four are in geometrical *proportion*: as here, 2 : 3 :: 4 : 6, which are geometrical; whereof 2, 3, 4, are arithmetical, and 3, 4, 6 harmonical.

6. If betwixt any two numbers you put an arithmetical mean, and alſo an harmonical one, the fourth will be in geometrical *proportion*: thus, betwixt 2 and 6, an arithmetical mean is 4, and an harmonical one 3; and the four 2 : 3 :: 4 : 6, are geometrical.

We have this notable difference between the three kinds of *proportion*; that from any given number we can raiſe a continued arithmetical ſeries increaſing *in infinitum*, but not decreaſing; the *harmonical* is decreaſable *in infinitum* but not increaſable; the geometrical is both.

PROPORTION, *contra-harmonical*. See CONTRA-HARMONICAL.

PROPORTION, *extreme and mean*. See EXTREME.

PROPORTION, *inordinate*. See INORDINATE.

PROPORTION, *reciprocal*. See RECIPROCAL.

PROPORTION *of equality*. See EQUALITY.

PROPORTION, *compoſition of*. See COMPOSITION.

PROPORTION, *rule of*. See RULE.

PROPORTION, *terms of*. See TERM.

PROPORTION is alſo uſed for the relation between unequal things of the ſame kind, whereby their ſeveral parts correſpond to each other with an equal augmentation, or diminution.

Thus, in reducing a figure into little, or enlarging it, care is taken to obſerve an equal diminution, or enlargement, through all its parts; ſo that if one line, e. gr. be contracted by one third of its length, all the reſt ſhall be contracted in the ſame *proportion*.

The making of reductions of this kind is the great uſe of the proportional compaſſes.

PROPORTION, in *Law*. See PRORATA, and ONERANDA.

PROPORTION, in *Architecture*, denotes the juſt magnitude of the members of each part of a building, and the relation of the ſeveral parts to the whole; e. gr. of the dimenſions of a column, &c. with regard to the ordonnance of the whole building.

One of the greateſt differences among architects, M. Perrault obſerves, is in the *proportions* of the heights of entablatures with reſpect to the thickneſs of the columns, to which they are always to be accommodated. See ENTABLATURE.

In effect there is ſcarce any work, either of the ancients or moderns, wherein this *proportion* is not different; ſome entablatures are even nearly twice as high as others; yet it is certain, this *proportion* ought of all others to be moſt regulated: none being of greater importance, as there is none wherein a defect is ſooner ſpied, nor any wherein it is more ſhocking.

PROPORTION is likewiſe underſtood of the magnitudes of the members of architecture, ſtatues, or the like, with regard to the diſtance whence they are to be viewed.

The moſt celebrated architects are much divided in their opinions on this ſubject; ſome will have it, that the parts ought to be enlarged in *proportion* to their elevation; and others that they ought to remain in their natural dimenſions. See STATUE.

PROPORTION, in *Painting*, is the juſt magnitude of the ſeveral members of a figure, a groupe, &c. with regard to one another, to the whole figure, the groupe, and the entire piece.

Proportion makes one of the moſt important articles in the art of painting, the principal ſubject it is employed in being the human body: for which reaſon, the curious in that art will not be diſpleaſed with the following ſcheme of the rules and laws thereof.

By the way let it be obſerved, 1. That to meaſure and ſet off *proportions*, they either divide the module into twelve parts, and ſubdivide each of theſe into four; or elſe they divide the face into three lengths of the noſe, ſubdividing each length into twelve: or laſtly, divide the whole face into three, and ſubdivide each of thoſe into four; which laſt method is what we ſhall here follow.

2. That the multiplicity of little meaſures is to be ſtudiouſly avoided, becauſe they confound, and becauſe they require great ſkill in oſteology to hit juſtly.

3. That in meaſuring there be a regard had to the relievo or juttings out of figures.

PROPORTION, *rules of, in painting*. In the *proportions* of a human figure, regard is had to the *age*, *ſex*, and *quality*. See FACE.

As to *age*; we conſider the ſtages thereof, infancy, youth, and manhood. For the firſt, at three years of age, we count five lengths of the face from top to toe, viz. from the tip of the head to the bottom of the belly, three; thence to the foot, two; breadth about the ſhoulders, one face, one eighth; and in the place of the hips, one face.

At four years, the height is ſix faces $\frac{1}{3}$; viz. from the top of the head to the bottom of the belly, three faces $\frac{1}{3}$; thence to the ſole of the foot, three faces; the breadth about the ſhoulders, one face $\frac{2}{3}$; about the haunches, one face $\frac{1}{3}$.

At five years, the height of ſix faces $\frac{1}{2}$, $\frac{1}{3}$ abated, the lower being ſhorter.

In youth, at twelve years, we have two *proportions*; the one from nature, which gives nine faces for the height; for the breadth about the ſhoulders, two faces; about the haunches, one face $\frac{1}{3}$; the other from the antique ſtatues as that of Laocoon, &c. which gives the height, ten faces $\frac{1}{2}$; the breadth from one ſhoulder to another, one face $\frac{2}{3}$; at the haunches $1\frac{2}{3}$; at the place of the muſcle called *vaſtus externus*, 2; at the thigh 1; the knee, $\frac{2}{3}$ and $\frac{1}{2}$, a ſubdiviſion; and at the ancles $\frac{1}{3}$.

In the ſtate of manhood, when the proportions are arrived at perfection, we reckon the height ten faces; the firſt, from the top of the head to the noſtril; the ſecond, to the hole in the neck between the clavicles; the third, to the pit of the ſtomach, called *cartilago enſiformis*; the fourth, to the navel; the fifth, to the pyramidal muſcles; thence to the knee, $2\frac{2}{3}$; and as much to the ſole of the foot. The extent of the arms is the ſame with the height; viz. from the tip of the long finger to the joint of the wriſt, one face; thence to the elbow, $1\frac{1}{3}$; thence to the juncture of the ſhoulders, $1\frac{1}{3}$; thence to the hole in the neck, $1\frac{1}{3}$; in all, five heads: which, with the five of the other arm, gives ten; the thickneſs of the arms to be adjuſted by the quality or character.

As to the breadth of the figure ſeen frontwiſe, the width of the ſhoulders acroſs the deltoides is 2 faces $\frac{2}{3}$; breadth of the pectoral muſcle, to the juncture of the arm, 2. About the haunches, where the obliqui externi are, $1\frac{2}{3}$, and the ſubdiviſions. The thighs, at the biggeſt place, 1. The knee, $\frac{1}{3}$, three ſubdiviſions $\frac{1}{2}$. The leg, at the thickeſt, $\frac{2}{3}$, and one ſubdiviſion. The extreme of the ankle, $\frac{1}{3}$, one ſubdiviſion $\frac{1}{2}$. The feet, $\frac{1}{3}$, and one half a ſubdiviſion. Their length, 1 face $\frac{1}{3}$, one ſubdiviſion.

Others, meaſuring by the length of the whole head, make only eight heads in height and breadth, thus; the head, one; thence to the bottom of the breaſts, one: thence to the navel, one; thence to the yard, one; thence to the middle of the thigh, one; thence to the lower part of the knee, one; thence to the ſmall of the leg, one; thence to the bottom of the foot, one.

The breadth thus: from the end of the long finger to the wriſt, one; thence to the bend of the arm, one; thence to the bottom of the ſhoulder, one; thence over to the other ſhoulder, two; thence to the end of the other long finger, three.

To theſe general *proportions* may be added others, which uſually obtain; as, that the hand is to be of the length of the face, the thumb the length of the noſe; and the great toe the ſame; the two nipples, and the hole in the neck, make a juſt equilateral triangle; the ſpace between the eye is the breadth of an eye; the breadth of the thigh, at the thickeſt, is double that of the thickeſt part of the leg, and treble that of the ſmalleſt: from the top of the head to the noſe, the ſame as from the top of the noſe to the chin. The diſtance from the chin to the throat-pit, is the breadth of the throat; the diſtance of the centre of the eye to the eyebrow, the ſame as the prominence of the noſtrils, and the ſpace between them and the upper lip; the length of the fore-finger the ſame as the ſpace thence to the wriſt; the ſpace from the tip of the forefinger to the wriſt, the length of the face.

For the *ſex*; the *proportions* of man and woman differ in height, in that the woman has a longer neck; the parts at the breaſts, and the lower parts of the belly, bigger by half a part; which makes the ſpace from the breaſt to the navel leſs by one part; and the thigh ſhorter by a third part.

As to breadth, a woman hath her breaſts and ſhoulders narrower, and her haunches larger; and thighs, at the place of their articulation, larger; arms and legs thicker, feet ſtraighter; and becauſe women are more fat and fleſhy, their muſcles are leſs ſeen, and therefore the contours are more ſmooth and even.

Young maids have little heads, long necks, low or down ſhoulders, ſlender bodies, haunches big, legs and thighs long, feet little.

Young men have the neck thicker than women, the ſhoulders and breaſts larger, the belly and haunches narrower, legs and thighs ſlenderer, and feet larger.

As to the *quality* of ſubjects, we are either to follow ſimple nature, or fine and agreeable nature, or to chuſe nature, or exceed it. In following *ſimple* nature, in common and country ſubjects, men of dull wit, and a moiſt temperament, are to be of a heavier and rougher *proportion*, the muſcles appearing but little diſtinguiſhed, the head big, neck ſhort, ſhoulders high, ſtomach little, knees and thighs thick, and feet large.

In nature, as *fine* and *agreeable*, for ſerious hiſtories, &c. the figures of the heroes to be well ſhaped, the haunches high and upright, the joints well knit, little, and compact, and free from fleſh and fat.

Military men are to have their head little, neck thick and nervous, ſhoulders large and high, body and paps elevated, haunches and belly little, thighs muſcular, principal muſcles raiſed up and knit together at the heads; the legs ſmooth, feet ſlender, ſoles hollow.

Nature is ſometimes to be *ſelected*, i. e. made up of parts from various good originals, to form extraordinary and perfect figures for great and heroic ſubjects; as in Roman hiſtories; giving, thus, a character of force ſufficient to execute actions agreeable to the deſcription the poets, &c. make.

Laſtly, ſometimes nature is to be *exceeded*, as in repreſentations of fabulous deities, of heroes and giants: in theſe the great pieces, which ſerve to form the body, are to be ſet out in meaſures agreeable to the height; only diverſifying them by the bigneſs.

In the rule of *proportions*, it is to be obſerved, that there is a difference in the contours of ſome parts, when put in different poſtures: thus, when the arm is bent, it is larger than when ſtraight; and the ſame is true of the foot and knee, as is ſhewn by Leonardo da Vinci.

PROPORTION, *rule of*, in *Arithmetic*, a rule whereby we find a fourth proportional to three numbers given.

This is popularly called the *golden rule*, and ſometimes the RULE *of three*.

PROPORTION, *compaſs of*, a name by which the French, and after them ſome Engliſh authors, call the *ſector*. See its conſtruction and uſe under the article SECTOR.

PROPORTIONAL, relating to proportion. Thus we ſay *proportional compaſſes, parts, ſcales, ſpirals*, &c. See COMPASSES, &c.

PROPORTIONALS, in *Geometry*, are quantities, either linear or numeral, which bear the ſame ratio, or relation to each other.

Thus, if 3, 6, 12, be *proportionals*, then will 3 : 6 : : 6 : 12.

To find a fourth PROPORTIONAL *to three given lines*, A B, A C, *and* B D (*Tab.* IV. *Geom. fig.* 73.) draw an angle F A G at pleaſure; from A ſet off the firſt of the lines to B; from A, the ſecond, to C; and from B, to D, the third; draw B C; and in D make an angle equal to A B C; then is C E the fourth *proportional* ſought; and A B : A C : : B D : C E.

If a third *proportional* be required to two given lines, A B and A C; make B D equal to A C; i. e. let A C be repeated twice: then A B : A C : : A C : C E.

To find a mean proportional *between two given lines*, A B and B E, (*fig.* 74.) join the two given lines into one continued right line, and biſect in C. From C, with the interval of A C, deſcribe a ſemicircle A D E; and from B erect a perpendicular B D; this is the mean *proportional* ſought; and A B : B D : : B D : B E.

The geometricians have been theſe two thouſand years in ſearch of a method for finding *two mean proportionals*.

The ancients performed it mechanically, by the meſolabe deſcribed by Eutochius; and many of them attempted to give the demonſtration; ſome by the ſolid loci, as Menechmus; others by the plain loci, as Nicomedes, Diocles, and, in our times, Vieta; and others by implicit motions, as Plato, Archytas, Pappus, and Sporus; others tentatively, by the deſcription of circles, as Hero and Apollonius, &c. but all in vain. See DUPLICATION *of a Cube*.

To find a mean proportional *between two numbers*: half the ſum of the two given numbers is an arithmetical mean *proportional*, and the ſquare root of the product a geometrical mean *proportional*. See PROPORTION *arithmetical* and *geometrical*.

To find a mean harmonical proportional. See PROPORTION *harmonical*.

PROPORTIONALS, in *Grammar*. See NUMERALS.

PROPORTIONAL *compaſſes*, an inſtrument for the ready drawing of lines and figures in any given ratio to other lines or figures. See their conſtruction and uſe under the article COMPASSES.

PROPORTIONAL *part*. See PART.

PROPORTIONAL *ſcales*, called alſo *logarithmical ſcales*, are the artificial numbers or logarithms, placed on lines, for the eaſe and advantage of multiplying, dividing, &c. by means of compaſſes, or of ſliding rules.

They are, in effect, only ſo many lines of numbers, as they are called by Gunter, but made ſingle, double, triple, or quadruple; beyond which they ſeldom go. See GUNTER's *ſcale*, SCALE, &c.

PROPORTIONAL *ſpirals*. See SPIRAL.

PROPORTIONALITY, a term uſed by Gregory de St. Vincent, for the proportion that is between the exponents of four ratios.

PROPORTUM, or PURPORT, in our *Law Books*, the intention or meaning of any thing. *Secundum* proportum *dicti chirographi inter eos confecti*.

PROPOSITION, PROPOSITIO, in *Logic*, part of an argument, wherein ſome quality, either negative or poſitive, is attributed to a ſubject.

Chauvin defines *propoſition*, a complete, conſiſtent ſentence, indicating or expreſſing ſomething either true or falſe, without ambiguity: as, *Xantippe is a bad wife. If an aſs fly, he muſt have wings.*

Others, more philoſophically, define *propoſition*, a ſpeech, uttered or produced, to ſignify ſome judgment of the mind. Or again, a *propoſition* may be defined, a ſentence wherein two or more ideas or terms are joined and diſjoined by one affirmation or negation.

A *propoſition* conſiſts of two terms; the one, that whereof we affirm or deny, called the *ſubject*; the other, the thing affirmed or denied, called the *attribute* or *predicate*. Theſe two are either joined, or ſeparated, by the intervention of ſome copula or disjunctive.

Thus in the *propoſition*, *God is juſt*; the ſubject, *God*, is joined with the attribute, *juſt*, by the verb ſubſtantive, *is*. The ſchoolmen call the two terms the *matter*, and the copula the *form*, of the *propoſition*.

Now, as terms may be either ſingular, or common and univerſal, if the ſubject of a *propoſition* be a common term, taken in all its extent, the *propoſition* is called *univerſal*: as, *every atheiſt is blind.*

This is called a diviſion according to the *ſubject*, or a diviſion ariſing from the *quantity*.

If the common term be only taken in an indeterminate part of its extent, the *propoſition* is called *particular*: as, *ſome atheiſts are wicked.*

If the ſubject of the *propoſition* be ſingular, the *propoſition* is called *ſingular*: as *George is king of England.*

If no note, either of univerſality or particularity be prefixed to a ſubject, in its own nature general, the *propoſition* is *indefinite*: as, *angels are noble creatures.*

Theſe *propoſitions* which have only one ſubject, and one predicate, are called *ſingle*. And theſe are again either *ſimple* or *complex*: a *purely ſimple propoſition* is that whoſe ſubject and predicate are made up of ſingle terms, but if either or both be made up of complex terms, the *propoſitions* are called COMPLEX. Thoſe that have ſeveral ſubjects or predicates, are called *compound*: each *propoſition* of this kind contains in it two or more *propoſitions*, which are either plainly expreſſed, or concealed and implied. The former ſort are diſtinguiſhed into ſix kinds, viz. COPULATIVE, DISJUNCTIVE, CONDITIONAL, *cauſal*, where two *propoſitions* are joined by cauſal particles, RELATIVE, and DISCRETIVE. The latter ſort comprehend EXCLUSIVES, EXCEPTIVES, *comparatives*, as, *pain is the greateſt affliction*, *inceptives*, and *deſitives*, which relate to the beginning or ending of any thing, and *continuatives*, as *Rome remains to this day.*

Some writers add under this claſs of *propoſitions*, another diviſion of them into *direct* and *indirect*.

PROPOSITION, *direct*, is that wherein a higher or more general thing is predicated of a lower and more particular: as, *man is an animal.*

Others will have it, that wherein the ſubject ſtands as a matter receiving, and the predicate as a form received: as, *Peter is learned.*

PROPOSITION, *indirect*, according to ſome, is that wherein an inferior is predicated of an higher: as *an animal is man.* According to others, it is that wherein the ſubject ſtands as the form, and the predicate as the matter: as, *every rational is man.*

Propoſitions conſidered with regard to their *form* or *copula*, or according to their *quality*, are divided into *affirmative* and *negative*.

An *affirmative* PROPOSITION is when the idea of the predicate is ſuppoſed to agree to the idea of the ſubject, and is joined to it by the word *is* or *are*, as, *God is a ſpirit.*

A *negative* PROPOSITION is when the predicate is not ſuppoſed to agree with the ſubject, and is disjoined from it by the particles *is not*, *are not*, &c. as *Man is not innocent.*

There is another diviſion of *propoſitions* among ſcholaſtic writers into *pure* and *modal*; which may be called a diviſion according to the *predicate*.

PROPOSITIONS are ſaid to be *pure*, when they imply or involve nothing beſides their matter and form, or when they merely expreſs that the predicate is connected with the ſubject: as, *man is rational.*

PROPOSITION, *modal*, is that which, beſide the pure matter and form, involves ſome mode, or manner of connection between the predicate and the ſubject: as, *it is neceſſary man be rational.*

Hence ſuch a *propoſition* is ſaid to conſiſt of a mode and a diction; the mode denotes ſome circumſtance which affects the *propoſition*; as, *it is neceſſary*: the diction is the reſt of the *propoſition*, *that man be rational.*

There are four of theſe modes very famous; viz. *neceſſary*, *poſſible*, *impoſſible*, and *contingent*. Others produce other modes; as *true*, *falſe*, *certain*, *uncertain*, *probable*, &c.

To modal *propoſitions*, ſome philoſophers refer *excluſive*, *exceptive*, and *reſtrictive propoſitions*; all which are denoted by a common name, *exponible propoſitions*, becauſe requiring ſome explanation to make them clearly underſtood.

Propoſitions, according to their *ſenſe* or *ſignification*, are diſtributed into *true* and *falſe*.

A *true* PROPOSITION repreſents things as they are in themſelves, or joins thoſe ideas and terms together whoſe objects are joined and agree; or disjoins thoſe ideas and terms, whoſe objects diſagree or are disjoined; as, *every bird has wings, a brute is not immortal.*

A *falſe* PROPOSITION is that which repreſents things otherwiſe than they are in themſelves, or joins thoſe ideas or terms whoſe objects diſagree, or disjoins thoſe whoſe objects agree; as, *birds have no wings, brutes are immortal.*

Propoſitions according to their *different degrees of evidence* are diſtinguiſhed into *certain* and *dubious*.

A *certain* PROPOSITION is that where the EVIDENCE of the agreement or diſagreement of the ideas is ſo ſtrong and plain, that we cannot withhold nor delay our aſſent; which aſſent is diſtinguiſhed by the name of KNOWLEDGE. See CERTITUDE.

A *dubious* or *uncertain* PROPOSITION is where there is any obſcurity upon the agreement or diſagreement of the ideas, ſo that the mind does not clearly perceive it, and is not compelled to aſſent or diſſent; ſuch uncertain *propoſitions* are called OPINIONS. See on this ſubject Watt's excellent Introduction to Logic, part ii. chap. 1. and 2.

A ſyllogiſm conſiſts of three *propoſitions*, major, minor, and concluſion. An enthymeme, of two.

The ſchoolmen make ſeveral other ſpecies and diviſions of *propoſitions*, as, a

PROPOSITION *de primo adjacente*, where the ſubject and predicate are both included under the verb: ſuch are, *veni, vidi, vici.*

PROPOSITION *de ſecundo adjacente* is, where either the ſubject or predicate is included in the verb; as, *I love*, or, *I write.*

PROPOSITION *de tertio adjacente* is, where both the ſubject and predicate are expreſs, and ſtand diſtinct from the verb: as, *the king is juſt.*

This *propoſition* is the rule or ſtandard of all the other; ſo that whatever *propoſition* can be reduced therein, is legitimate; and what cannot, is not.

PROPOSITIONS, *contradictory*, *contrary*, *reduplicative*. See the adjectives.

PROPOSITIONS, *converſion*, *oppoſition*, and *reduction of*. See CONVERSION, &c.

PROPOSITION, in *Mathematics*, is either ſome truth advanced and ſhewn to be ſuch by demonſtration; or ſome operation propoſed, and its ſolution ſhewn.

If the *propoſition* be deduced from ſeveral theoretical definitions compared together, as this: a parallelogram is double of a triangle, ſtanding on the ſame baſe, and of the ſame altitude; it is called a *theorem*.

If it be deduced from a praxis or ſeries of operations, it is called a *problem*; as to find a third proportional to two given quantities.

Indeed, in ſtrictneſs, the *propoſition* is only part of a theorem; viz. that which ſhews what agrees to ſuch a thing under ſuch conditions, and what not: in which ſenſe it is diſtinguiſhed from the *demonſtration*, which ſhews the reaſon why the underſtanding conceives that to agree to it.

Again, ſtrictly ſpeaking, the *propoſition* is only a member of a problem, viz. that which ſhews what is required to be done; in which ſenſe it is diſtinguiſhed from the *ſolution*, which rehearſes the ſeveral things to be done in order to effect what is required; and from the *demonſtration*, which proves, that by doing the things injoined in the ſolution, the thing required in the *propoſition* is truly done.

PROPOSITION, in *Poetry*, denotes the firſt part of an epic poem, wherein the author propoſes, or lays down, briefly and in general, what he has to ſay in the courſe of his work.

The *propoſition*, F. Boſſu obſerves, is to contain the bare matter of the poem, i. e. the action, and the perſons that are to execute it, both human and divine.

This is what we have both in the Iliad, the Odyſſey, and the Æneid. The action propoſed in the Iliad, is the wrath of Achilles; that of the Odyſſey, the return of Ulyſſes; and that of the Æneid, the tranſlation of the Trojan empire into Italy.

The ſame author obſerves, that the divine perſons are named in all three *propoſitions*. Homer, e. gr. declares, that what happens in the Iliad, is by the will of Jupiter; and that Apollo was the cauſe of the quarrel between Agamemnon and Achilles: the ſame poet ſays, it was Apollo prevented the return of Ulyſſes's companions; and Virgil mentions the Deſtinies, the will of the gods, and the anger of Juno. But they all three dwell chiefly on the perſon of the hero, as if he were the matter of the poem.

Yet there is ſome difference, in this reſpect, in the three poems; in that Achilles is named in the Iliad; but Ulyſſes and Æneas are not: they are only pointed at, and that in ſuch general terms, as if it were ſuppoſed they were known before.

This practice ſeems to fall in with the firſt intention of the poet; who is to feign an action without names, and who, as Ariſtotle ſays, does not relate the action of Achilles, nor Ulyſſes, nor Æneas, nor any particular perſon, but of an univerſal, general, and allegorical perſon.

Add to this, that the character which the poet is to give his hero, and his whole work, is expreſſed in the *propoſition*, both by Homer and Virgil.

The whole Iliad is anger and violence: it is Achilles's character, and it is what the poem commences with: Μηνιν αειδε. The Odyſſey preſents us in the firſt verſe with the prudence, diſſimulation, and addreſs, which make the character of Ulyſſes, and the buſineſs of the poem: Ανδρα πολυτροπον. And we ſee the piety and mildneſs of Æneas in the beginning of the Latin poem: *Inſignem pietate virum.*

As to the manner of the *propoſition*, Horace contents himſelf to preſcribe modeſty and ſimplicity; not to promiſe much, nor raiſe great expectations in the reader. *Do not begin*, ſays he, *like that wretched poet, who ſet out with*, Fortunam Priami cantabo, & nobile bellum. *How much better is that of Homer*, Dic mihi, muſa, virum! &c. *He does not ſpend all his fire at once, and leave nothing but ſmoke: from this feeble beginning, you ſhall ſoon ſee him riſe to the wonders of Antiphates, Scylla, Charybdis, and Polypheme.*

The ſame modeſty we find in the *propoſition* of the Æneid: if that of the Iliad be a little more furious, it is, perhaps, in conformity to the character of the poem, which is a ſeries of violences and extravagances.

Add, that if the poet be to ſpeak with modeſty of his hero, much more is he to do ſo of himſelf: thus Virgil only ſays, *I ſing the action of Æneas.* Homer begs his Muſe to *ſay*, or to *ſing*. How far does Claudian ſwerve from theſe examples?

———— Audaci promere cantu
Mens congeſta jubet; greſſus removete, profani:
Jam furor humanos noſtro de pectore ſenſus
Expulit, & totum ſpirant præcordia Phœbum.

A ſhort poem, e. g. an ode, &c. wherein the violent ſtrain could be purſued to the end, might admit of ſuch a pompous beginning. Thus we find Horace begin an ode much after the manner of Claudian:

Odi profanum vulgus, & arceo ——
—— Carmina non prius
Audita Muſarum ſacerdos
Virginibus pueriſque canto.

But the length of an epic poem quite excludes all pompous *propoſitions*.

There is ſcarce any fault we have yet obſerved a *propoſition* liable to, but there is an inſtance of it in the *propoſition* of Statius's Achilleid: he bids his *Muſe rehearſe the deeds of the magnanimous ſon of Æachus, who was formidable even to the Thunderer.* He adds, *That he has worthily diſcharged a former undertaking*; *and that Thebes eſteems him a ſecond Amphion.*

Magnanimum Æacidem, formidatamque Tonanti
Progeniem, & patrio vetitam ſuccedere cœlo,
Diva, refer.————
Tu modo, ſi veteres digno deplevimus hauſtu,
Da fontes mihi, Phœbe, novos, &c.

PROPOSITION, in *Rhetoric*, is that part of a juſt and regular diſcourſe, in which the ſpeaker lays down or *propoſes* the ſubject upon which he deſigns to treat, in a diſtinct and expreſs manner. This firſt employs his thoughts, though it uſually follows both the INTRODUCTION and NARRATION in the order of the diſcourſe.

As the *propoſition* is the baſis of his whole deſign, it is neceſſary, in the firſt place, that this be duly weighed, and repreſented to his mind in all the different views, in which he can place it; that he well conſiders the nature of it, the ſeveral parts of which it conſiſts, and the paticular force of each part. By this means he will be the better enabled to offer ſuch arguments, as may be proper, in its defence, and to refute any objections, which may be brought againſt it.

Orators uſe ſeveral methods of laying down the ſubject of their diſcourſes. Sometimes they do it in one general *propoſition*. We have an inſtance of this in Cicero's ſpeech to the ſenate, the day after Cæſar was killed, as it is given us by Dion Caſſius, lib. xliv. p. 250. ed. Leunclav. in which his deſign was to perſuade them to peace and unanimity. *This*, ſays he, *being the ſtate of our affairs, I think it neceſſary that we lay aſide all the diſcord and enmity, which have been among us, and return again to our former peace and agreement.* And then he proceeds to offer his reaſons for this advice.

At other times, in order to give a clearer and more diſtinct view of their diſcourſe, they ſubjoin to the *propoſition*, the general heads of argument, by which they endeavour to ſupport it. This method Cicero uſes in his ſeventh Philippic, cap. 3. where he ſays: *I, who have always commended and adviſed to peace, am againſt a peace with Mark Antony. But why am I averſe to peace? Becauſe it is baſe, becauſe it is dangerous, and becauſe it is impracticable; and I beſeech you to hear me with your uſual candour, while I make out theſe things.* See PARTITION.

But ſome orations, eſpecially of the demonſtrative kind, do not require any particular *propoſition*, being little more than a continued narrative or illuſtration of the ſubject: of this ſort is that of Cicero, in which he returns thanks to Cæſar, in the name of the ſenate, for pardoning Marcellus; and his invective againſt Piſo: as likewiſe Pliny's panegyric in praiſe of the emperor Trajan. Not but that ſuch diſcourſes are diſpoſed in a regular order, and under proper heads, though they are not laid down at firſt in diſtinct *propoſitions*.

Quintilian, Inſt. Orat. lib. iv. cap. 5. obſerves, that orators ſometimes avoid laying down any direct *propoſition*, when the chief thing they have in view may be diſagreeable to thoſe whom they addreſs; for which reaſon they take them off from attending to it, till they have firſt prepared them for it, by offering ſomething elſe, which, when proved, the other may with leſs difficulty be admitted. Cicero makes uſe of this art in his defence of Ligarius. Ward's Or. vol. i. lect. 14.

PROPREFECT, *propræfectus*, among the Romans, the prefect's lieutenant; or an officer whom the prefect of the pretorium commiſſioned to do any part of his duty in his place.

In Gruter, p. CCCLXX. the third inſcription mentions *proprefects* of the pretorium under Gratian, in the city of Rome, and the neighbouring parts.

PROPRETOR, or **PROPRÆTOR**, a Roman magiſtrate, who, having diſcharged the office of pretor at home, was ſent into a province to command there with his former pretorial authority.

PROPRETOR was alſo an appellation given to thoſe, who, without having been pretors at Rome, were ſent extraordinarily into the provinces, to adminiſter juſtice with the authority of pretors.

PROPRETOR is alſo a denomination given by ſome to thoſe ſent by the emperors into the provinces, which, upon partition in Auguſtus's time, fell to their lot: as the name *proconſul* was given to thoſe ſent into the provinces that fell to the people's ſhare.

PROPRIETARY *governments in America*. See the account of CHARTER *Governments*.

PROPRIETARY *monks*, were ſuch as had reſerved goods and effects to themſelves, notwithſtanding their formal renunciation of all at the time of their profeſſion.

They are frequently mentioned in the Monaſt. Anglic. &c. and were to be very ſeverely dealt with; to be excommunicated, deprived of burial, &c. Monachi proprietarii *excommunicentur ab abbatibus: &, ſi in morte* proprietarius *inventus fuerit, eccleſiaſtica careat ſepultura*, &c. Addit. ad Matt. Par.

PROPRIETATE *probanda* is a writ to the ſheriff to inquire of the property of goods diſtrained, when a defendant claims a property upon a replevin ſued.

Where a property is proved by the defendant, a replegiari properly lies not.

PROPRIETATIS *elixir*. See ELIXIR.

PROPRIETOR, or **PROPRIETARY**, he who has the property or propriety of any thing.

PROPRIETOR, in *Law*, is ſtrictly ſuch a one as has, or poſſeſſes, any thing as his own in the utmoſt degree: *Quæ nullius arbitrio eſt obnoxia.*

The term was formerly applied, in a particular manner, to him who had the fruits of a benefice to himſelf, and his ſucceſſor; as in ancient time, abbots and priors had.

PROPRIETY, in *Grammer*, is where the direct and immediate ſignification of a word agrees to the thing it is applied to.

In which ſenſe *propriety* is uſed in oppoſition to a figurative or remote ſignification. See STYLE.

PROPTOSIS, in *Surgery*, a name by which ſome authors have called that diſtemperature of the eye commonly called PROLAPSUS *oculi*.

PROPYLÆUM, Προπυλαιον, the porch of a temple, or great hall.

Hence *propylæum* is alſo uſed figuratively, in matters of learning, for an introduction, apparatus, or prodromus, to ſome greater work. In this ſenſe, we ſay, the *propylæum* of the Jeſuits at Antwerp, &c.

PROQUESTOR, PROQUÆSTOR, the queſtor's lieutenant, or a perſon who diſcharged the office of queſtor in his ſtead, without the deputation of the ſenate.

The word is chiefly applied to an officer appointed by the governor of a province to diſcharge the queſture after the deceaſe of the queſtor, or when he went to Rome without being ſucceeded by another queſtor, till the ſenate and people ſhould ſend a new one.

PRORÆ *os*, in *Anatomy*, a bone of the cranium, called alſo os *occipitis*.

PRO RATA, in *Commerce*, a term ſometimes uſed among merchants, for *in proportion*.

Thus, when ſpeaking of any undertaking, they ſay, each perſon muſt reap the profit, or ſuſtain the loſs, *pro rata* to his intereſt; it is meant, each ſhall gain or loſe, in proportion to the ſum he put in ſtock.

PRO RATA *portionis*, in *Law*. See ONERANDO *pro rata portionis*.

PROROGANDA *aſſiſa*. See ASSISA.

PROROGATION, *prorogatio*, the act of prolonging, adjourning, or putting off, to another time.

PROROGATION *of parliament*. See PARLIAMENT.

The proroguing of the lower houſe of CONVOCATION is a power veſted in the archbiſhop with the conſent of the ſuffragans.

PROSAIC *numbers*. See NUMBERS

PROSCARABÆUS, in *Zoology*, the name by which ſome call the *meloe*, a genus of four-winged flies. See *Oil* BEETLE.

PROSCENIUM, in the *Ancient Theatre*, was an eminence whereon the actors performed their parts.

The *proſcenium* anſwered to our ſtage. It conſiſted of two parts among the Greeks; one particularly ſo called, where the actors performed; the other was the *logeion*, where the ſingers and the mimics acted their parts. Among the Romans, the *proſcenium* and *pulpitum* were the ſame thing.

PROSCHÆRETERIA, Προσχαιρητηρια, in *Antiquity*, a day of rejoicing, kept when a new-married wife went to cohabit with her huſband.

PROSCLYSMA, a word uſed to expreſs an irroration, or ſprinkling of any part wih a fluid, as the throwing water in the face in caſes of fainting, &c.

PROSCRIPTION, *proſcriptio*, a publication made in the name of the chief or leader of a party, whereby he promiſes a reward to any one who ſhall bring him the head of one of his enemies.

Sylla and Marius, by turns, *proſcribed* each other's adherents. Under the triumvirate, a great part of the beſt and braveſt of the Romans fell by *proſcription*.

The term took its riſe from the practice of writing down a liſt of the perſon's names, and poſting it in public; from *pro*, and *ſcribo*, *I write*.

PROSE, *proſa*, the natural language of mankind, looſe, and unconfined by poetical meaſures, rhymes, &c. In which ſenſe it ſtands oppoſed to *verſe*.

The word comes from the Latin *proſa*, which ſome will have derived from the Hebrew *poras*, which ſignifies *expendit*: others deduce it from the Latin *prorſa*, or *prorſus*, *going forwards*; by way of oppoſition to *verſa*, or turning backwards; as is neceſſary in writing verſe.

Though *proſe* hath its connexions, which ſuſtain it, and a ſtructure which renders it numerous, it ought ſtill to appear free: its character conſiſts in running eaſy, and unreſtrained.

Poets very rarely have the talent of *proſe*: the habit of wearing chains ſits faſt upon them, even when the chains are off.

St. Evremond compares *proſe* writers to foot-travellers, who walk with leſs noiſe, but more ſecurity, than the cavaliers.

PROSECUTION. To make men liable to criminal *proſecutions* by the law of England, it is required that they have the uſe of reaſon, and that they be *ſui juris*. On the firſt account the law indulges infants under the age of diſcretion, ideots, and lunatics, whatever the nature of the fact may be; and even againſt the perſon of the king, as it has been held of late: neither will it ſuffer one who becomes *non compos* after he has committed a capital offence, to be either arraigned or executed. See LUNATIC and INFANT.

As to an offender's being *ſui juris*, it is to be obſerved, that neither a ſon, nor a ſervant, nor any other perſon, except a feme covert, is excuſed on the account of acting by command or coercion of another. See FEME *covert*.

PROSECUTION *of felons*. See LARCENY and REWARDS.

PROSECUTOR, in *Law*, is he that purſues a cauſe in another's name.

PROSELYTE, *proſelytus*, a new CONVERT to the faith.

The word is Greek, προσηλυτος, which in Latin, ſignifies *advena*; in Engliſh, *ſtranger*, or one arrived out of another country.

The term was much uſed in the primitive church. The Jews too had their *proſelytes*, who, from being Gentiles, embraced Judaiſm.

Among the Hebrews there were two ſorts of *proſelytes*; one called *proſelytes of righteouſneſs*, who became complete Jews, by ſubmitting to the rite of circumciſion, and were in all reſpects united to the Jewiſh church and nation; the latter called *proſelytes of the gate*, who did not embrace the Jewiſh religion, and yet were ſuffered to live among the Jews under certain reſtrictions; as that they ſhould not practice idolatry, nor worſhip any other God beſide the God of Iſrael; that they ſhould not blaſpheme the God of Iſrael; and that they ſhould keep the Jewiſh ſabbath, ſo far at leaſt as to refrain from working on that day. Theſe ſtrangers were permitted to worſhip the God of Iſrael in the outer court of the temple, which, for that reaſon, was called the court of the Gentiles.

PROSERPINA, in *Botany*, a name given by ſome authors to chamomile.

PROSERPINACA, in *Botany*, a genus of the *triandria trigynia* claſs; its characters are, that the calyx is tripartite, that it has no corolla, and a ſingle three-celled ſeed. There is only one ſpecies.

PROSERPINE, in *Mythology*, the daughter of Jupiter and Ceres, wife of Pluto, ſtolen by him out of Sicily, and carried to his ſubterranean dominion, where ſhe was the partner of his empire. The poets aud painters repreſent her with a dark complexion and a melancholy air in her face. Statius Theb. 8. v. 11. aſſigns her the employment of keeping a regiſter of the dead, and marking down all that ſhould be added to that number. He alſo ſays, lib. 5. Sylv. 1. v. 257. that when any woman dies who has been a remarkable good wife in this world, *Proſerpine* prepares the ſpirits of the beſt women in the other to make a proceſſion to welcome her into Elyſium with joy, and to ſtrew all the way with flowers, where ſhe is to paſs. See COREIA.

PROSEUCHÆ, derived from προσευχη, *prayer*, or *oratories*, in *Antiquity*, were the places of prayer among the Jews, and nearly the ſame as their ſynagogues. But the ſynagogues were originally in the cities, and were covered places; whereas, for the moſt part, the *proſeuchæ* were out of the cities, and upon the banks of rivers, having no covering, except, perhaps, the ſhade of ſome trees, or ſome covered galleries.

Dr. Prideaux mentions another diſtinction in reſpect to the ſervice performed in them: in ſynagogues, he ſays, the prayers were offered up in public forms in common for the whole congregation; but in the *proſeuchæ* they prayed as in the temple, every one apart for himſelf. Conn. part. 1. book 6. vol. ii. p. 556. &c. edit 10.

After all, it remains a queſtion with ſome whether the ſynagogues and the *proſeuchæ* were any thing more than two different names for the ſame place; the one taken from the people's aſſembling in them, the other from the ſervice to which they were more immediately appropriated, viz prayer.

PROSLAMBANOMENOS, in the *Ancient Greek Muſic*, was the firſt note of their ſcale, whether aſcending or deſcending. Phil. Tranſ. 481, p. 269.

It was uſual among the Greeks to conſider a deſcending as well as an aſcending ſcale; the former proceeding from acute to grave preciſely by the ſame intervals as the latter did from grave to acute. The not diſtinguiſhing theſe two ſcales has led ſeveral learned moderns to ſuppoſe, that the Greeks, in ſome centuries, took the *proſlambanomenos* to be the loweſt note in their ſyſtem; and in other centuries to be the higheſt. But the truth of the matter is, that the *proſlambanomenos* was the loweſt or higheſt note, according as they conſidered the aſcending or deſcending ſcale. The learned author of this remark, thinks this diſtinction of the aſcending or deſcending ſcales conducive to the variety and perfection of melody: but he ſays, he never met with above one piece of muſic, where the compoſer appeared to have any intelligence of that kind; and this piece was above one hundred and fifty years old.

The *proſlambanomenos* was one of thoſe ſounds which the ancients called *ſtabiles*, from their remaining fixed throughout all the genera and ſpecies.

PROSODIA, Πϱοσοδια, in *Antiquity*, a ſacred ſong, or hymn ſung in honour of the gods. It differed from the *proſodia* with an omega, ϖροσωδια, which was a ſong ſung in concert with ſome muſical inſtrument.

PROSODY, *proſodia*, that part of grammar which teaches and directs the pronunciation and manner of rehearſal; marks the accents; and diſtinguiſhes the long and ſhort ſyllables.

The word is formed from ϖϱοσωδια, compounded of ϖρος and ωδη, *cantus*, *ſinging*.

Proſody is properly that branch of grammar which relates to ſyllables; treating of their true pronunciation in reſpect of accents, and time or quantity.

The Engliſh *proſody* turns chiefly on two things; NUMBERS, that is, a certain number of feet or ſyllables; and RHYME, or a ſimilitude of ſound between the laſt ſyllables of words.

The Greek and Roman *proſodies* were unacquainted with rhyme; but, in lieu thereof, had ſomething to make their verſe harmonious without, viz. *quantity*.

PROSONOMASIS, Πϱοςονομαςια, a figure in *Rhetoric*, whereby alluſion is made to the likeneſs of a ſound in ſeveral names or words; much the ſame with PARONOMASIS, or *agnominatio*.

PROSOPIS, in *Botany*, a genus of the *decandria monogynia* claſs: its characters are, that the calyx is hemiſpherical and quadridentated: the ſtigma is ſimple, and the fruit is an inflated, polyſpermous pod. There is only one ſpecies.

PROSOLEPSIA, πρωσοποληϖσια, in *Ethics*, is uſed by ſome writers for that bodily impreſſion, which inclines to the love or hatred, eſteem or contempt of perſons or things, on account of ſome ſlight or trivial circumſtances attending them.

PROSOPOPOEIA, Πϱοςωϖοϖοια, formed from πϱοςωπον, *perſon*, and ϖοιεω, *I make*, or *feign*, in *Rhetoric*, a figure, whereby we make perſons that are abſent, or dead; or even things which are inanimate, as cities, &c. to ſpeak.

The poets, in their fictions, make frequent uſe of the *proſopopœia*; as alſo do the orators, in their painting of violent paſſions, which ſeem to tranſport, and make them forget themſelves.

This figure is of very extenſive uſe to the orator: when he thinks his own character not of ſufficient weight to affect his audience, in the manner he deſires, he ſubſtitutes a perſon of greater authority than himſelf to engage their attention. When he has ſevere things to ſay, and which may give offence, as coming from himſelf, he avoids this by putting them in the mouth of ſome other perſon, from whom they will be better taken; or makes inanimate nature bring a charge, or expreſs a reſentment, to render it the more affecting. And by the ſame method he chooſes ſometimes to ſecure himſelf from a ſuſpicion of flattery, in carrying a compliment too high. In the management of this figure, care ſhould be taken, that what is ſaid be always conſiſtent with the character introduced, in which both the force and beauty of it conſiſt.

There are two kinds of *proſopopœias*; the one *direct*, the other *indirect*. For an inſtance of the latter: *Juſt gods, protectors of the innocent, permit the order of nature to be interrupted for one moment, and let this carcaſe reſume the uſe of ſpeech.*

Inſtances of the former are found every where among the orators and poets: that which follows is a very beautiful one; found, by way of epitaph, on a tomb-ſtone: the dead wife addreſſes her ſurviving huſband thus:

Immatura peri: ſed tu felicior, annos
Vive tuos, conjux optime, vive meos.

PROSPECTIVE. See PERSPECTIVE.

PROSPECTIVE *glaſs*. See OPERA *glaſs*.

PROSPHYSIS. See ADHESION.

PROSTATE, Πϱοςαται, in *Anatomy*, two white ſpongy, glandulous bodies, ſituate at the root of the penis, or juſt below the neck of the bladder, and about the ſize of walnuts. See *Tab. Anat.* (*Splanch.*) *fig* .8. *litt.* pp. *fig.* 15. *litt.* cc.

The body of the *proſtate* lies on the inteſtinum rectum, and the apex is under the internal labium of the cartilaginous arch of the oſſa pubis.

Authors aſcribe two kinds of ſubſtance to the *proſtatæ*, the one of which is glandulous, the other ſpongious, or porous; this laſt ſeems nothing but a congeries of minute veſſels and cells, through the middle of which paſs the veſiculæ ſeminales, without any communication therewith.

The *proſtatæ* have excretory ducts of their own, pretty numerous: De Graaf does not remember to have known them fewer than ten in the *proſtatæ* of a man: in dogs they are ſometimes a hundred, each of which diſcharges itſelf into the the urethra, ſome above, ſome below, the caput gallinaceum; each having its proper caruncle.

Out of theſe there iſſues a whitiſh, ſlimy humour, ſecreted in the glandular part of the *proſtatæ*, and conveyed into the cavity of the urethra.

The uſe of this humour is to line and lubricate the cavity of the urethra, and prevent it from being annoyed with the acrimony of the urine in its paſſage through it; and to ſerve as a vehicle to the ſeed, in the time of ejaculation.

Some take it for a third kind of ſeed, but without much reaſon. Boerhaave thinks it may ſerve to nouriſh the animalculæ during the firſt moments after coition. This humour, he adds, remains after caſtration, but is not prolific.

The ſame author, from the Memoirs of the French Academy, makes the *proſtatæ* to conſiſt of an aggregate of twelve glands; each of which terminates by its excretory duct in a little bag, into which it diſcharges its humour.

Theſe twelve bags open by as many excretory ducts into the cavity of the urethra, ſo as to encompaſs the exit of the veſiculæ; whence the ſeed, and the humour of the *proſtatæ*, are the more accurately mixed.

There are alſo two glandular bodies ſituated on the two convex ſides of the ſpongy ſubſtance of the urethra near the bulb. Each of them is about the ſize of a cherry-ſtone, but they are oblong and flat, and covered entirely by the muſcles called acceleratores. Theſe are commonly called *proſtatæ inferioris*, but if their ſituation be carefully examined, they will be found to be higher than the true *proſtatæ*.

PROSTATES, Πϱοςαʈες, among the Athenians, was uſed to ſignify any patron to whoſe protection ſojourners in that city committed themſelves.

He was allowed to demand ſeveral ſervices of them, in which, if they failed, or neglected to chooſe a patron, an action was commenced againſt them before the polemarchus, and their goods were confiſcated. See SOJOURNERS.

PROSTHAPHÆRESIS, formed from ϖϱοςθε, *ante*, *ſuper*, and αφαιϱεςις, *ademptio*, in *Aſtronomy*, the difference between the true and mean motion, or true and mean place, of a planet; called alſo EQUATION *of the orbit*, or *of the centre*, and ſimply *the equation*.

Proſtaphæreſis amounts to the difference between the mean and equated anomaly.

Thus, ſuppoſe the circle ALMPNR (*Tab. Aſtron. fig.* 51.) the orbit of the earth, ſurrounded by the ecliptic ♈, ♋, ♎, &c. and ſuppoſe S the ſun, and the earth in R, the mean anomaly will be the arc APR, or caſting away the ſemicircle, the arc PR, or the angle PCR: and the true anomaly, rejecting the ſemicircle, will be PSR, which is equal to PCR, and CRS: if then to the mean anomaly we add the angle CRS, we ſhall have the true anomaly PSR, and the earth's place, in the ecliptic.

And here the angle CLS, or CRS, is called the *proſthaphæreſis*, or EQUATION, by reaſon it is ſometimes to be added, and ſometimes to be ſubtracted from the mean motion, that we may have the true motion or place of the earth.

PROSTHESIS, Πϱοςθεσις, in *Grammar*, a ſpecies of METAPLASM; being the prefixing of ſome letter or ſyllable at the beginning of a word: as in *gnavus*, pro *navus*.

This is alſo called *appoſition*.

PROSTHESIS, among *Surgeons*, is the filling up of what was before wanting, by the appoſition of new matter. Such, e. gr. is the filling up fiſtulous ulcers with new fleſh.

PROSTHETA, Πϱοσθετα, from ϖϱοςιθημι, *to apply*, ſignify in Hippocrates, ſubdititious medicines, whether ſuppoſitories or peſſaries.

PROSTYLE, Πϱοςυλος, formed from ϖϱο, *before*, and ςυλος, *column*, in the *Ancient Greek Architecture*, a range of columns in the front of a temple.

PROSTYPA, Πϱοστυπα, in the *Sculpture of the Ancients*, images carved in ſuch a manner as to be only half raiſed above the ground, or plain, on which they are formed. They ſeem to adhere to it, and have only one ſide expoſed to view. To *proſtypæ* is oppoſed ECTYPA.

PROSYLLOGISM, *proſyllogiſmus*, is uſed, by ſome ſchool-writers, for a reaſon or argument produced to ſtrengthen or confirm one of the premiſes of a ſyllogiſm.

Others define *proſyllogiſm*, an argument compoſed of two ſyllogiſms, ſo diſpoſed, as that the concluſion of the former is the major or minor of the latter: e. gr. Every rational is riſible: but every man is rational, therefore, every man is riſible: but no aſs is riſible, therefore no aſs is a man.

The major, or the ſecond ſyllogyſm, may be omitted or underſtood; and ſome even contend, that it ought to be ſo: ſo that, on their principle, a *proſyllogiſm*, or redundant ſyllogiſm, is when two ſyllogiſms are ſo contained in five propoſitions, as that the concluſion of the former is the major or minor of the latter.

PROTASIS, ϖροτασις, formod from ϖροτεινω, *porrigo, I hold forth*, in the *Ancient Drama*, the firſt part of a comic or tragic piece; wherein the ſeveral perſons of the play are ſhewn; their characters and manners intimated; and the action, which is to make the ſubject of the piece, propoſed and entered upon.

The ancient *protaſis* might go about as far as our two firſt acts. See ACT.

Where the *protaſis* ended, the epitaſis commenced.

PROTATICUS, ϖροτατικος, in the *Ancient Drama*, a perſon who never appeared but in the *protaſis*, or firſt part of the play: as Soſia, in Terence's Andria, &c.

PROTEA, in *Botany*. See SILVER-*tree*.

PROTECTION, *protectio*, the ſhelter, defence, authority, and aid, employed by any one in behalf of the helpleſs or unhappy.

Active protection ſuppoſes power, intereſt, favour, &c. in the perſon that protects. *Paſſive protection*, on the contrary, implies neceſſity, weakneſs, and dependence, in the perſon protected.

PROTECTION is alſo uſed for a privilege belonging to ambaſſadors, members of parliament, &c. whereby they, and their domeſtics are ſecured from arreſts, &c.

PROTECTION is ſometimes alſo underſtood of the perſon of the protector. Such a cardinal has the protection of France. The *protection* of Spain is become vacant by the death of ſuch a cardinal.

PROTECTION, in *Law*, in its general ſenſe, denotes that benefit and ſafety which every ſubject, denizen, or alien, ſpecially ſecured, hath by the laws.

PROTECTION, in a more ſpecial ſenſe, is uſed for an exemption or immunity given by the king to a perſon, to ſecure him againſt ſuits in law, or other vexations, upon reaſonable cauſes moving him thereunto, and for a certain time.

Of this, Fitzherbert makes two kinds: the *firſt* he calls a *protection, cum clauſulâ volumus*; whereof he mentions four caſes: 1. A *protection, quia profecturus*, for him that is to paſs over-ſea, in the king's ſervice. 2. A *protection quia moraturus*, for him who is already abroad in the king's ſervice; as an ambaſſador, &c. 3. A *protection* for the king's debtor, that he be not ſued or attached, till the king be paid his debt; but by the ſtatute 25 Edw. III. ſtat. 5. cap. 19. notwithſtanding ſuch *protection*, another creditor may proceed to judgment againſt him, with a ſtay of execution till the king's debt be paid; unleſs ſuch creditor will undertake for the king's debt, and then he ſhall have execution for both. 4. A *protection* for a perſon in the king's ſervice beyond ſea, or in the marches of Scotland.

The *ſecond* form of *protection* is *cum clauſula nolumus*, which is moſt commonly granted to a ſpiritual company, for their immunity from having their cattle taken by the king's miniſters. But this may be alſo granted to a ſingle perſon, either ſpiritual or temporal.

Protection extends not to pleas of dower, quare impedit, aſſize of novel diſſeiſin, darrein preſentment, attaints, nor pleas before juſtices in eyre.

PROTECTOR, a perſon who undertakes to ſhelter and defend the weak, helpleſs, or diſtreſſed.

God, and the magiſtrate, are the *protectors* of the widow and orphan. Among the heathens, Minerva was eſteemed the *protectreſs* of arts.

Every catholic nation, and every religious order, has a *protector* reſiding at the court of Rome, who is cardinal, and is called the *cardinal protector*.

PROTECTOR is ſometimes alſo uſed for a REGENT of a kingdom, made choice of to govern it during the minority of a prince.

Cromwell aſſumed the title and quality of *lord protector of the commonwealth of England*.

PROTELARII, among the Romans, were the poorer ſort of citizens, whoſe eſtate did not exceed fifteen hundred pieces of ſilver. They were diſtinguiſhed from thoſe who were worth little or nothing; theſe laſt being called CAPITE *cenſi*.

PROTEST, in *Law*, is uſed for a caution, or call of witneſs, or an open affirmation, that a perſon does, either not at all, or but conditionally, yield his conſent to any act; or to the proceeding of any judge in a court, wherein his juriſdiction is doubtful: or to anſwer upon his oath farther than by law he his bound.

Any of the lords in parliament have a right to *proteſt* their diſſent to any bill paſſed by a majority; which *proteſt* is entered in form. This privilege is ſaid not to be very ancient: the commons have no right to *proteſt*.

PROTEST, in *Commerce*, is a ſummons made by a notary public to a merchant, banker, or the like, to accept or diſcharge a bill of exchange drawn on him; after his having refuſed either to accept or pay the ſame.

It is called a *proteſt*, becauſe it contains a proteſtation, that the party will return the bill, and even take up money at intereſt; and charge all coſts, damages, carriage, and recarriage, on the refuſer.

There are two kinds of *proteſts*, the one for want of acceptance, and the other for want of payment.

The firſt is to be made by the bearer of the bill, at the time of preſenting it, in caſe the perſon on whom it is drawn refuſes to accept it for the time, or the ſum there expreſſed.

The latter is made as the bill falls due, whether it has been accepted or not.

The bearers of bills of exchange that have been accepted, or which become payable at a certain day, are obliged to have them either paid or *proteſted* within three days after due, on the penalty of anſwering for the omiſſion. And it muſt be obſerved, that if the third day happen to be a holiday, the *proteſt* is to be made on the eve thereof. See NOTE.

At Paris the *proteſt* is to be made within ten days; at Hamburgh within twelve days; at Venice, where all bills are paid in banco, the *proteſt* for want of payment is to be made within ſix days; but then the bank is ſuppoſed open, otherwiſe no proteſt to be made: at Rome, *proteſts* for want of payment are to be made within fifteen days: at Leghorn, Milan, and Bologna, there is no time fixed: at Amſterdam, they are to be made within ſix days.

The negociators of ſome places, as thoſe of Rome, M. Savary obſerves, do not look on themſelves as obliged to *proteſt* in default of payment: but this opinion is contrary to univerſal cuſtom, and natural reaſon; ſince, till after *proteſtation*, they have no remedy or reſource againſt the drawer, or indorſer, nor any title to be reimburſed.

M. Ricard adds, that bills of exchange drawn from Amſterdam, or Antwerp, or Spain, are to be *proteſted*, in default of payment, within fourteen days after they fall due; after which time the bearer ſtands the riſque and chance of the *non-proteſted* bill (not the drawer, or indorſer), in caſe the party happens to fail after the ſaid fourteenth day. See BILL *of Exchange*.

PROTEST, in *Sea Language*, is an inſtrument drawn up in writing, atteſted before a juſtice of the peace, by the maſter and a part of the ſhip's crew, after the expiration of a voyage, deſcribing the ſeverity of the ſaid voyage, occaſioned by tempeſtuous weather, heavy ſeas, an inſufficient crew, or any other circumſtances by which the ſhip has ſuffered, or may ſuffer, either in her hull, maſts, rigging, or cargo. It is chiefly intended to ſhew, that ſuch damages or misfortunes did not happen through any neglect or ill conduct of the maſter or his officers. Falconer.

PROTESTANDO, in *Law*, is a word made uſe of to avoid double pleading in actions; it prevents the party that makes it from being concluded by the plea he is about to make, that iſſue cannot be joined upon it; and it is alſo a form of pleading, where one will not directly affirm or deny any thing alledged by another or himſelf. In the firſt caſe, it is where a man pleadeth a thing which he dares not affirm, or that he cannot plead for fear of making his plea double; as in title to lands by two deſcents, the defendant muſt plead one of them, and put the word *proteſtando* inſtead of dicit; as to the other, that ſuch a one died ſeized, &c. and in the laſt caſe, when one is to anſwer to two matters, and by the law he ought but to plead to one; then in the beginning of the plea he may ſay *proteſtando*, that ſuch matter is not true, and add to his plea *pro placito dicit*; and ſo he may take iſſue upon the other part of the matter. Plowd. 276. Finch 359.

PROTESTANT, a name firſt given in Germany to thoſe who adhered to the doctrine of Luther; becauſe, in 1529, they *proteſted* againſt a decree of the emperor Charles V. and the diet of Spires; and declared, that they appealed to a general council.

In a former diet held at Spires in 1526, it was unanimouſly agreed to preſent a ſolemn addreſs to the emperor, beſeeching him to aſſemble, without delay, a free and a general council; and it was alſo agreed, that in the mean time, the princes and ſtates of the empire, ſhould, in their reſpective dominions, be at liberty to manage eccleſiaſtical matters in the manner they ſhould think the moſt expedient, yet ſo as to be able to give to God and to the emperor an account of their adminiſtration, when it ſhould be demanded of them. This decree was conſidered by the adverſaries of the Reformation as almoſt equivalent to a toleration of Luther's opinions, and therefore, as ſoon as the emperor had concluded a treaty of peace with Clement VII. who now ſat in the papal chair, he aſſembled the new diet at Spires in 1529; where the power which had been granted by the former diet to every prince, of managing eccleſiaſtical matters as they thought proper, until the meeting of a general council, was revoked by a majority of votes; and every change was declared unlawful, that ſhould be introduced into the

the doctrine, diſcipline, or worſhip of the eſtabliſhed religion, before the determination of the approaching council was known. Againſt this decree, the elector of Saxony, the marquis of Brandenburgh, the landgrave of Heſſe, the dukes of Lunenburg, the prince of Anhalt, together with the deputies of fourteen imperial or free cities, entered a ſolemn proteſt.

The name has been ſince alſo given to thoſe who adhere to the ſentiments of Calvin; and is now become a common denomination applied indiſcriminately to all the ſects, of whatever denomination, which have revolted from the Roman ſee.

PROTESTANTS, *French.* See HUGUENOTS.

PROTESTANT *diſſenters.* See DISSENTERS, and NONCONFORMISTS.

PROTESTATION, a ſolemn declaration made by ſome judiciary act, or proceeding againſt any oppreſſion, violence, or injuſtice; or againſt the legality of a ſentence, judgment, decree, or other procedure; Importing, that the party is determined to oppoſe it at the proper time, &c. See PROTEST.

Proteſtation is defined by juſtice Walſh, a defence, or ſafeguard, to the party that makes it, from being concluded by the act he is about to do; ſo that iſſue cannot be joined upon it.

Proteſtation is defined by Plowden, a form of pleading, when one does not either directly affirm or deny any thing alledged by another, or which he himſelf alledges. Plowd. fol. 276. See PROTESTANDO.

PROTEUS, in *Mythology*, the ſon of Neptune and Phœnice, or Oceanus and Tethys, who was reputed one of the gods of the ſea, and ſuppoſed capable of foretelling future events, and of transforming himſelf into any ſhape at pleaſure.

According to Diodorus Siculus, he was king of Egypt, and, after the manner of their kings, he ſometimes uſed a lion, and ſometimes a bull for his creſt. He is ſaid to have reigned two hundred and forty years after Moſes, and by his diſtinguiſhed knowledge of aſtronomy to be able to predict the revolutions of the planets.

PROTHESIS, ϖϱοθεσις, derived from ϖϱοτιθημι, *I expoſe to view*, among the Greeks, the ceremony of laying the dead near the door till the time of their interment, with their feet outwards; on which account the Romans called them POSITI.

PROTHESIS, a little altar in the Greek churches, whereon a ceremony is performed, called by the name ϖϱοθεσις.

On this altar the prieſt, with the other miniſters, prepare every thing neceſſary to the celebration of maſs, viz. the bread, wine, &c. After which they go in proceſſion from this to the great altar to begin maſs; carrying with them the ſpecies thus prepared.

PROTHONOTARY, PROTHONOTARIUS, PROTONOTARY, a term properly ſignifying *firſt notary*; and which was anciently the title of the principal notaries of the emperors of Conſtantinople.

With us *prothonotary*, called alſo *preignotary*, is uſed for an officer in the courts of king's bench and common pleas; the latter whereof has three, the former one. See COURT, &c.

PROTHONOTARY *of the king's bench* records all actions civil, ſued in that court; as the clerk of the crown-office doth in all criminal cauſes.

PROTHONOTARIES of *the common pleas* enter and inroll all declarations, pleadings, aſſizes, judgments, and actions: they alſo make out all judicial writs, as the venire facias, after iſſue joined; except habeas corpus, and diſtringas jurator, for which there is a ſeparate office; writs of execution and ſeiſin, of ſuperſedeas, of privilege, &c. they inroll all recognizances acknowledged in that court, all common recoveries make exemplifications of records, &c.

PROTHONOTARY, or PROTONOTARY, is alſo an officer in the court of Rome, who has a degree of pre-eminence over the other notaries.

There is a college of twelve *prothonotaries*, called *participantes*; becauſe partaking in the fees of the expeditions in chancery.

They are ranked among the number of prelates, and wear the violet rochet, the hat, &c. They aſſiſt at all grand ceremonies, and have a place in the pope's chapel.

Their office is to diſpatch the acts in grand cauſes, which the ſimple apoſtolical notaries diſpatch in leſſer cauſes: they may create apoſtolical notaries and doctors, to officiate out of the city.

Thoſe out of the college have none of the privileges of the others, except the habit.

The *prothonotaries* were firſt eſtabliſhed at Rome by pope Clement I. with deſign to write the lives of the martyrs.

PROTHYRIS, in the *Ancient Architecture*, is ſometimes uſed for a quoin, or corner of a wall; otherwiſe called *anco*. See CONSOLE.

Sometimes, alſo, for a croſs-beam, or over-thwart rafter.

PROTHYRIS is alſo uſed, by Vignola, for a particular ſort of key of an arch: an inſtance of which we have in his Ionic order, conſiſting of a roll of water-leaves, between two reglets and two fillets, crowned with a Doric cymatium; its figure being much like that of a modillion.

PROTHYRUM, πϱοθυϱον, a porch at the outer door of a houſe or portal.

PROTIPULA, in *Natural Hiſtory*, a name given to a ſpecies of fly reſembling the TIPULA, or long-legs, in many reſpects; but differing in regard to the eſſential character, which, in the tipula, is the having two beards growing on the anterior part of the head, and occaſionally falling over the mouth, and cloſing its aperture; theſe the *protipula* wants.

PROTO, formed from ϖϱωτος, *firſt*, a word uſed in compoſition with divers terms in our language, to expreſs a relation in priority; as in *proto-martyr*, *proto-type*, &c.

PROTO-*canonical.* See DEUTERO-*canonical.*

PROTOCOLLUM, πϱοτοκολλον, a term uſed in the ancient juriſprudence for the firſt leaf of a book, wherein was the mark of the paper, or parchment.

It was even ſometimes uſed for the mark itſelf; which was uſually in the margin, but ſometimes at the top of the page.

The forty-fourth Novel of Juſtinian forbids cutting the *protocollum* of charters, which ſhew the year wherein the paper or parchment was made, and the officer commiſſioned for the delivery of them; by means whereof frauds were frequently detected.

PROTOCOLLUM was alſo uſed for the firſt minute, draught, or ſummary, of an act to be paſſed, which the notary drew up, in ſhort, in little table-books, to be afterwards enlarged at leiſure.

PROTO FORESTARIUS was he whom our ancient kings made chief of Windſor foreſt, to take cognizance of all cauſes of death or mayhem there; after the manner of a lord chief juſtice in eyre.

PROTOGALA, the term uſed by the ancients for what we call *beeſtings*, the firſt milk of a cow or other animal after her having brought forth young.

PROTO-MARTYR, compounded of ϖϱωτος *firſt*, and μαϱτυς, *witneſs*, the *firſt martyr*, or witneſs, who ſuffered death in teſtimony of the truth; as Abel, improperly reckoned ſo by ſome, in the Old Teſtament, and St. Stephen in the New.

PROTONOTARY. See PROTHONOTARY.

PROTOPASCHITÆ, ϖϱωτοπασχιται, in *Church Hiſtory*, heretics, who, after the manner of the Jews, celebrated the feaſt of Eaſter with unleavened bread. They were likewiſe called SABBATIANI.

PROTOPLAST, *protoplaſtus*, a title ſometimes given to our firſt father Adam, from the Greek ϖϱωτοπλαστος, q. d. *firſt formed.*

PROTOTYPE, ϖϱωτοτυπος, the original, or model, whereby a thing is formed.

It is chiefly uſed for the patterns of things to be engraven, moulded, or caſt.

PROTOTYPON, ϖϱωτοτυπον, in *Grammar*, is ſometimes uſed for a PRIMITIVE, or original word.

PROTRACTING, or PROTRACTION, in *Surveying*, the act of plotting, or laying down, the dimenſions taken in the field, by means of a *protractor*, &c.

Protracting makes one part of SURVEYING.

PROTRACTING-*pin*, a mathematical inſtrument, or rather an appendage of an inſtrument called a *protractor*.

The *protracting-pin* is a fine needle, fitted into a handle, uſed to prick off degrees and minutes from the limb of the PROTRACTOR.

PROTRACTOR, a name of an inſtrument uſed in *Surgery*, to draw out any foreign or diſagreeable bodies from a wound or ulcer, in like manner as the forceps.

PROTRACTOR, is alſo an inſtrument uſed in *Surveying*, whereby the angles taken in the field with a theodolite, circumferentor, or the like, are plotted, or laid down, on paper.

This *protractor* conſiſts of a ſemicircular limb, A D B (*Tab.* III. *Surveying*, *fig.* 45.) of braſs, ſilver, horn, or the like divided into 180°, and ſubtended by a diameter B A; in the middle whereof is a little notch, or lip, C, called the *centre of the protractor*.

For the convenience of reckoning both ways, the degrees are numbered from the left hand towards the right, and from the right hand towards the left.

But this inſtrument is made much more commodious by transferring the diviſions on the ſame circumference to the edge of a ruler, whoſe ſide E F is parallel to A B, which is eaſily done by laying a ruler on the centre C, and the ſeveral diviſions on the ſemicircumference ADB, and marking the interſections of that ruler on the line E F: ſo that a ruler with theſe diviſions marked on three of its ſides and numbered both ways, as in the *protractor*, (the fourth or blank ſide repreſenting the diameter of the circle), is of the ſame uſe as a *protractor*; and much better adapted to a caſe.

On the limb of the *protractor* are ſometimes alſo placed numbers, denoting the angles at the centres of regular polygons: thus againſt the number 5, denoting the ſides of a pentagon, is found 72, the angle at the centre of a pentagon.

Protractor, *uſe of the*. 1. *To lay down an angle of any given quantity, or number of degrees, e. gr. of fifty degrees, at any point, and with any given line, e. gr.* Lay the centre of the *protractor* on the given point, and the diameter of the *protractor* on the given line: make a mark againſt the given degree 50, on the limb of the *protractor*; through which, from the given point, draw a line: this gives the angle required.

2. *To find the quantity of a given angle.* Lay the centre of the *protractor* on the point of the angle, and the diameter on one of the lines forming it. The degree of the limb cut by the other line; viz. 50; is the number of degrees of the angle required.

3. *To inſcribe any given regular polygon, e. gr. a pentagon, in a circle.* Lay the centre and diameter of the *protractor* on the centre and diameter of the circle, and make a dot againſt the number of degrees of the angle at the centre; viz. 72. Through this dot and the centre of the circle, draw a line, cutting the circumference of the circle. To the point of interſection, from the point where the diameter cuts the circumference draw a right line; this line will be a ſide of the pentagon, which, being taken in the compaſſes, and ſet off as often as it will go in the circumference, will give points, which, being connected by lines, will form the pentagon required. See **Polygon**.

4. *To deſcribe any regular polygon. e. gr. an octagon on a given line.* Subtract the angle at the centre, which the *protractor* gives, e. g. 45° from 180, the remainder 135 degrees is the angle included between two ſides of the octagon; one half whereof is $67\frac{1}{2}$. Applying then the diameter of the *protractor* over the given line, with the centre over one extreme; make a dot againſt $67\frac{1}{2}$, to which from the centre draw a line: apply the *protractor* to the other end of the line, ſo as the centre be over the extreme, and there ſet off another angle of $67\frac{1}{2}°$.

From the point where the two lines thus drawn interſect, as a centre, deſcribe a circle with the interval of the given line.

The given line will be one ſide of the octagon; which, being ſet off as often as it will go in the circumference thus drawn, will give points, which, being connected, will form the octagon required.

Protractor *improved*, is an inſtrument much like the former, only furniſhed with a little more apparatus, whereby we are enabled to ſet off an angle to a minute; which is impracticable in the other.

The chief addition is an index fitted on the centre, and moveable thereon, ſo as to play freely and ſteadily over the limb. Beyond the limb the index is divided, on both edges, into ſixty equal parts of the portions of circles, intercepted by two other right lines drawn from the centre, ſo that each makes an angle of one degree with lines drawn to the aſſumed points from the centre.

To ſet off an angle of any number of degrees and minutes with this *protractor*, move the index, ſo that one of the lines drawn on the limb, from one of the forementioned points, may fall upon the number of degrees given; and prick off as many of the equal parts on the proper edge of the index as there are minutes given: thus, drawing a line from the centre to that point ſo pricked off, you have an angle with the diameter of the *protractor*, of the propoſed number of degrees and minutes.

Indeed it may be of good uſe to lay down an angle to a minute, when we are able to take it to a minute: but, till we have better needles, and juſter theodolites, than are yet made, the old *protractor* may ſerve very well.

PROTRUSORIS *ordo exterior*, in *Anatomy*, a name given by Santorini to certain faſciculi of the great ZYGOMATIC muſcle, running under the fleſhy part of the lower lip. See **Lips**.

Protrusoris *interior ordo*, in *Anatomy*, a name given by Santorini to a muſcle of the face, called by Albinus *orbicularis oris*; and by Cowper and Douglas CONSTRICTOR *labiorum* and *ſphincter labiorum*. See **Lips**.

PROTRYGIA, Προτρυγεια, in *Antiquity*, a feſtival in honour of Neptune, and of Bacchus, ſurnamed προτρυγης, or προτρυγας, απο της τρυγος, i. e. *from new wine*.

PROTUBERANCE, *protuberantia*, in *Anatomy*, denotes an eminence, whether natural, or preternatural, that projects or advances out beyond the reſt.

The *orbicular protuberances* of the third ventricle of the brain, are called *nates*; and the apophyſes of the *orbicular protuberances*, are called *teſtes*.

The *annular protuberance* is the proceſs of MEDULLA *oblongata*, in form of a ring; whence its name, firſt given it by Willis.

PROVEDITOR, **Proveditour**, or **Proveditore**, an an officer in ſeveral parts of Italy, particularly at Venice. There are various kinds of *proveditors* in Venice; as *proveditor of the commons*, who is nearly the ſame with *ædile* among the Romans, conſul in Languedoc, and eſchevin in other cities. Of theſe *proveditors* there are three.

The *proveditores alle ragioni vecchie, alla biave, alla giuſtitia*, &c. have the direction of matters relating to policy, throughout the ſigniory.

Providetor *general of the ſea*, is an officer whoſe authority extends over the whole fleet when the captain-general is abſent. He has, particularly the diſpoſal of the caſh; and pays the ſeamen, and the ſoldiers.

The captain-general and *providetor* are mutually ſpies over one another: though the *proveditor* be inferior to the general, yet is the power ſo divided, that one has authority without ſtrength, the other ſtrength without authority.

PROVENCAL *poets*, in the *Hiſtory of Literature*, a name given to certain profeſſions of men who ſprang up in Provence about the end of the tenth century, comprehending thoſe that were called TROUBADOURS, or Trouverres, Jongleurs, Cantadours, Violars, and Muſars, in whom the faculties both of muſic and poetry ſeemed to be united. The firſt of theſe were ſo denominated from the art which they profeſſed of inventing or finding out, as well ſubjects and ſentiments as rhymes, conſtituting what at that time was deemed poetry. The jongleurs are ſuppoſed to have taken their name from ſome muſical inſtrument, on which they played, probably of a name reſembling in its ſound that by which their profeſſion was diſtinguiſhed: whence ſpring the jugglers, *quaſi joculatores*, as Menage conjectures, who went about ſinging their verſes in courts and the houſes of noblemen, with a viol or harp, or other inſtrument, and were dreſſed in a peculiar habit, for the ſake of entertaining in a burleſque manner their protectors and patrons. M. de Ravaliere derives jongleur from *ongle*, a nail, whence *ongleur*, a trimmer of inſtruments with the nails. This etymology, ſays Dr. Burney (Hiſt. Muſ. vol. ii. p. 267.), is probable; as the lyre, cithara, harp, lute, and guitar, the moſt ancient ſtringed inſtruments, have at all times been played with the nails and ends of the fingers. The cantadours, called alſo chanteres, were ſingers of ſongs and ballads, as were alſo the muſari; and the violars were players on the viol.

All theſe arts were comprehended, in the French language, under the general denomination of meneſtruadie, meneſtraudiſe, and jonglerie.

The *Provençal* poets were not only the inventors and compoſers of metrical romances, ſongs, ballad, and rhymes, to ſo great a number, and of ſuch a kind, as to raiſe an emulation in moſt countries of Europe to imitate them; but, if we may credit the Italian writers, the beſt poets of Italy, namely Petrarch and Dante, owed much of their excellence to their imitation of the *Provençals*: and it is alſo ſaid that the greater part of the novels of Boccace are taken from *Provençal* or ancient French romances. The learned Dr. Percy, in his Eſſay on the ancient Engliſh Minſtrels, has given a very curious and ſatisfactory account of theſe fathers of modern poetry and muſic; and although he agrees that the ſeveral profeſſions above enumerated were included under the general name of MINSTREL, he has, in the notes that to Eſſay, p. 42. with great accuracy aſſigned to each his diſtinct and peculiar office. Of the ancient writers of Romance a hiſtory is extant in the lives of the *Provençal* poets, written in French by J. Noſtradamus, compiled and publiſhed at Lyons in 1575; but a much more ſatisfactory account of them is contained in the tranſlation of this work into Italian, with many additions, by Gio. Mario de Creſcimbeni, and publiſhed, in 1710, under the title of Commentari Intorno all' Iſtoria della Volgare Poeſia. See Hawkins's Hiſt. of Muſic, vol. ii. p. 44, &c.

PROVEND, or **Provender**, is properly a ſort of veſſel containing the meaſure of grains daily given to a horſe, or other beaſt of labour, for his ſubſiſtence.

Some derive the word from the Latin *præbenda*, or *prebend*.

Hence *provender* is alſo become a general name for all food of cattle. In monaſteries, when the religious go to meals, they are ſaid to go to *provend*.

PROVER, in *Law*, *probator*, an approver, or perſon who confeſſing felony, appeals, or accuſes another of the ſame. He is thus called becauſe he muſt prove what he alledges in his appeal; which proof is either by battle, or by the country, at his election who is appealed.

39 Edw. III. coram rege, rot. 97. Suff. a man became an *approver*, and appealed five, who all joined battle with him, and he overcame them all: four of them were ac-

cordingly hanged, and the fifth pleaded he was a clerk. The *prover* was pardoned.

PROVERB, among *Jewellers*, an inſtrument by which they examine the ſize and depth of diamonds. It is a ſpring in ſhape not unlike a pair of caliber compaſſes, kept at the proper diſtance by the means of a ſpring.

PROVERB, *proverbium*, is defined, by Camden, a conciſe, witty, and wiſe ſpeech, grounded upon long experience; and containing for the moſt part, ſome uſeful caveat.

Such are, *A cloſe mouth catches no flies. A high building, a low foundation. A carrion kite will never be a good hawk. A ſhort horſe is ſoon carried. A man may love his houſe well, though he ride not on the ridge. A falſe knave needs no broker. Better to ſpare at brim, than at bottom*, &c.

PROVERBS, in *Scripture Hiſtory*, is the name of one of the canonical books of the Old Teſtament, containing a collection of moral ſentences and maxims, adapted to the regulation of the conduct in every period and condition of life, and aſcribed to Solomon; though ſome writers, among whom is Grotius, have expreſſed their doubts, whether Solomon was the author of this book.

PROVIDENCE, *providentia*, the conduct and direction of the ſeveral parts of the univerſe, by a ſuperior intelligent Being.

The notion of a *providence* is very ancient, even in the heathen theology; we find Thales mentions it. It is founded on this ſuppoſition, that the Creator has not ſo fixed and aſcertained the laws of nature, nor ſo connected the chain of ſecond cauſes, as to leave the world to itſelf; but that he ſtill preſerves the reins in his own hands, and occaſionally intervenes, alters, reſtrains, enforces, ſuſpends, &c. thoſe laws, by a particular *providence*.

Some uſe the word *providence* in a more general ſenſe, ſignifying by it that power or action whereby the ſeveral parts of the creation are ordinarily directed.

Thus Damaſcenus defines *providence* to be that divine will whereby all things are ordered and directed to the proper end. Which notion of *providence* ſuppoſes no laws at all fixed by the Author of nature at the creation; but that he reſerved it at large, to be governed by himſelf occaſionally.

The ancients called *providence* by the names of *fate, fortune, nature, deſtiny, neceſſity*, &c.

The ancient Egyptians ſeem to have been the firſt who had the notion of a divine *providence*. Arnobius obſerves they reaſoned thus. "*Providence* is ſo eſſential "to a prince, that without it he cannot be, nor even be "called, a prince; and the more auguſt a prince is, the "more perfect ought his *providence* to be. Since, then, "God is the greateſt and moſt auguſt of all princes, to "him muſt belong the moſt perfect *providence*."

The Epicureans deny any divine *providence*, as thinking it inconſiſtent with the eaſe and repoſe of the divine nature, to meddle at all with human affairs.

Others deny the exiſtence of a *providence*, from the ſeemingly unjuſt diſtribution of good and evil; which appear to fall indiſcriminately on the juſt and unjuſt.

Simplicius argues thus for a *providence*: if God do not look to the affairs of the world, it is either becauſe he cannot, or will not; but the firſt is abſurd, ſince, to govern cannot be difficult where to create was eaſy; and the latter is both abſurd and blaſphemous. See GOD.

PROVIDENTIÆ, in old *Law Books*, were proviſions of meat and drink.

Providentia *vini ante adventum ſuum in cellaria erat centum doliorum*. Knighton, anno 1354.

PROVINCE, *provincia*, among the Romans, was a country conquered by them, without the bounds of Italy; governed by a deputy, or lieutenant, and having peculiar laws and privileges. See LEGATORY.

Nicod derives the word *à procul vivendo*. *living a far off*; but it is better deduced from *pro* and *vinco*, *I overcome*. Of theſe countries that part of France next the Alps was one; and it ſtill retains the name *Province*.

PROVINCE is now chiefly uſed for a canton, or diviſion, of a kingdom or commonwealth, comprehending ſeveral cities, towns, &c. all under the ſame government; and uſually diſtinguiſhed by the extent either of the civil or eccleſiaſtical juriſdiction.

The *provinces* were anciently duchies, counties, &c. which have been ſince all reunited under the ſame chief.

The church diſtinguiſhes its provinces by archbiſhopricks, each containing a certain number of biſhopricks.

In this ſenſe England is divided into two *provinces*, Canterbury and York.

The monks make particular diviſions of *provinces*, according to the antiquity and number of convents in each.

The United *Provinces* are the ſeven northern *provinces* of of the Low Countries; which, revolting from the Spaniſh dominion, made a firm and perpetual alliance, offenſive and defenſive, at Utretcht, in the year 1579.

PROVINCIAL, *provincialis*, ſomething relating to a *province*.

Thus we ſay a *provincial council* or *ſynod*, &c. See SYNOD, and COUNCIL.

PROVINCIAL *conſtitutions*. See CONSTITUTIONS.

PROVINCIAL *eſtabliſhments in America*. See the account of CHARTER *governments*.

PROVINCIAL, in the monaſtic ſenſe, denotes a perſon who has the direction and ſuperintendency of ſeveral convents of a *province*, according to the diviſion eſtabliſhed in that order.

The general of the order has ſeveral *provinces* under him; the provincial ſeveral priors, abbots, &c.

PROVINE, *provin*, a branch of a vine laid in the ground to take root.

PROVING *of guns* is an operation performed, in order to determine whether they will bear the quantity of powder allotted for this purpoſe, or whether they are ſufficiently ſtrong for ſervice. The rule of the board of ordnance is, that all guns under twenty-four pounders be loaded with a charge of powder, which weighs as much as the ſhot; i. e. a braſs twenty-four pounder with 21 lb.; a braſs thirty two pounder with 26 lb. 21 oz.; and a forty-two pounder, with 31 lb. 8 oz.; the iron twenty-four pounder with 18 lb. the thirty-two pounder with 21 lb. 8 oz. and the forty-two pounder with 25 lb. The braſs light field-pieces are proved with a quantity of powder that weighs half as much as their ſhot; except the twenty-four pounder, which is loaded only with ten pounds. See GUN.

In the proof of all ſorts of ſmall arms, the quantity of powder uſed is the weight of the ball exactly. For the number of bullets uſed in *proving* muſkets, carabines, and piſtols, ſee BULLET.

When guns of a new metal, or of a lighter conſtruction, are proved, then, beſides the common proof they are fired two or three hundred times, as quick as poſſible, loaded with the common charge allowed for actual ſervice. In *proving* cannon, with a view of aſcertaining their being well caſt, without any cavities in the metal, and their being fit to reſiſt the effort of their charge of powder, the piece is laid upon the ground, ſupported only by a log of wood in the middle, of about five or ſix inches thick, to raiſe the muzzle a little; and then the piece is fired againſt a ſolid butt of earth. The inſtruments uſed in the proof of canon are the SEARCHER and RELIEVER. Lieutenant-general Deſaguliers has lately invented a curious inſtrument for finding the principal defects in pieces of artillery, which is no ſooner introduced into the hollow cylinder of the gun than it diſcovers its defects, and particularly its not being truly bored, to which moſt of the injuries incident to pieces of artillery are owing. In the proof of MORTARS and HOWITZERS, they are placed upon the ground, with ſome part of their trunnions or breech ſunk below the ſurface, and reſting on wooden billets at an elevation of about ſeventy degrees. The mirror is generally the only inſtrument for diſcovering the defects in theſe pieces. In order to uſe it the ſun muſt ſhine; the breech muſt be placed towards the ſun, and the glaſs over-againſt the mouth of the piece, and thus the flaws in the bore and chamber are obſerved. The Pruſſians prove their battering train and garriſon artillery with a quantity of powder equal to half the weight of the ſhot, and by firing ſeventy-five rounds as quick as in real ſervice, i. e. two or three rounds in a minute. Their light field-train from a twelve pounder upwards, are proved with a quantity of powder equal to one third of the weight of the ſhot, and fired a hundred and fifty rounds, at three or four rounds in a minute. From a twelve-pounder downwards, they are proved with a quantity of powder equal to one fifth of the ſhot's weight, and fired three hundred rounds, at five or ſix rounds each minute, properly ſponged and loaded. Their mortars are proved with the chambers full of powder, and the ſhells loaded. Three rounds are fired as quick as poſſible. The Dutch prove all their artillery by firing each piece five times; the firſt two rounds with a quantity of powder equal to two-thirds of the weight of the ſhot, and the three laſt rounds with a quantity of powder equal to one half the weight of the ſhot. The French method of proof is the ſame with that of the Dutch. The Portugueſe prove their artillery in the following manner.

42 32 24	pounders, 6 pounds	1ſt ſhot —— ——	30lb. 26lb. 18lb.	then diminiſhing 2lb. each round.
12 6 8	pounders, 6 rounds	1ſt ſhot —— ——	10lb 5lb, 2½lb.	diminiſhing 1lb. each round. —— ½lb each round. —— ¾lb. each round.

They are fired only once every minute. Their mortars are proved by filling the chambers full of powder, a loaded ſhell, and the mortar rammed full of earth. Muller's Treatiſe of Artillery, p. 180. Milit. Dict. art. *Proof*.

Proving *of gun-powder*. See Gun-*powder*, and Powder-*triers*.

Proving *of wills*, in *Law*. See Probate, Executor, and Will.

PROVISION, *proviſio*, any thing got or procured, as neceſſary for the ſubſiſtence of life.

Salting of unwholeſome *proviſions* is prohibited by 51 Hen. III. ſtat. 6. cap. 7. under pain of amercement for the firſt offence, pillory for the ſecond, fine and impriſonment for the third, and abjuration of the town for the fourth.

Provision, in *Traffic*, is ſometimes uſed for the wages due to a factor. See Factorage.

Provisions, *commiſſary of*. See Commissary.

Provisions, *park of*. See Park.

Provision, in the *Canon Law*, the title or inſtrument, by virtue whereof an incumbent holds, or is provided of, a benefice, biſhoprick, or the like.

Ordinary collators give *proviſion* in caſe of vacancy by death, pure and ſimple demiſſion, and permutation. See Collation.

The court of Rome grants *proviſions* by reſignation, devolution, and prevention.

Provisions *by prevention*, are alſo called *grattæ expectativæ* and *mandata de providendo*; of the great abuſe whereof throughout England frequent complaint was made in our ancient ſtatutes, and a remedy was provided for the ſame by the ſtatutes of premunire. See Expectative *graces*.

Proviſions of ſmall benefices, in the court of Rome, are only ſimple ſignatures, which are, as it were, minutes of the bull; becauſe the bulls themſelves, diſpatched on parchment, would be too expenſive. The ſignature is no more than the petition of the impetrant anſwered by the pope in theſe words: *Conceſſum uti petitur in præſentia D. N. papæ*, wrote in the hand of the prelate who preſides over the ſignature.

Extraordinary *proviſions* are ſigned by the pope himſelf in theſe words, *Fiat ut petiter*; with the firſt letter of his name.

PROVISO, in *Law*, a condition inſerted in a deed, upon the obſervance whereof the valadity of the deed depends.

Proviso, in *Judicial Matters*, is where the plaintiff deſiſts from proſecuting an action, by bringing it to trial in a due time; in which caſe, the defendant may take out a venire facias to the ſheriff, having it in theſe words: *Proviſo quod*, &c. to the end that, if the plaintiff take out any writ to that purpoſe, the ſheriff ſhall ſummon but one jury upon them both. In which caſe it is called *going to trial by proviſo*. See Jury.

Proviso, *caſu*. See Casu.

Proviso is alſo a ſea term. A ſhip is ſaid to moor a *proviſo*, when ſhe has an anchor out, and alſo a hawſer aſhore; and ſo is moored with her head to the ſhore with two cables at leaſt.

PROVISOR is generally taken for him who hath the care of providing things neceſſary; in which ſenſe it coincides with purveyor.

Provisor *monaſterii* is uſed for the ſteward or treaſurer of a religious houſe.

Provisor, in our *Statutes*, alſo denotes a perſon who ſued to the court of Rome for a provision, or expectative *grave*. See Premunire.

Proviſores *dicuntur, qui vel epiſcopatum, vel eccleſiaſticam aliam dignitatem in Romana curia ſibi ambiebant de futuro, quod ex gratia expectativa nuncupârunt, quia, uſque dum vacaret, expectandum eſſet*. Spelm.

PROVOCATIVE, in *Phyſic*, a medicine which ſtrengthens nature, and ſtimulates or incites to venery.

Such are cantharides, ſatyrian, &c.

PROVOCATORES, in *Antiquity*, a claſs of *gladiators*, ſuppoſed by Lipſius to be generally matched with the Samnites.

PROVOST, *præpoſitus*, an officer, whereof there are divers kinds; civil, military, &c.

Provost *of the city*, or *of the merchants*, is the chief municipal magiſtrate in ſeveral conſiderable trading cities; particularly Edinburgh, Paris, and Lyons; much the ſame with the *mayor* in other places.

The *provoſt* preſides at the city-courts, and, together with the ſheriffs, or bailiffs, decides all differences relating to trade and merchandize: he takes cognizance of the affairs of officers of policy of the city, with regard to their functions; of the delinquencies of merchants, commiſſioners, and factors; inſpects the ports, rivers, duties, impoſts, &c.

Authors attribute the inſtitution of *provoſt* of the *merchants* of Paris to Philip Auguſte. Du Haillan refers its epocha to the year 1190.

The *provoſt* of Edinburgh has the title of *lord*; the bailiffs are his deputies. He calls conventions of the boroughs by his own miſſives.

Provost, or Prevot *royal*, alſo denotes a ſort of inferior judge eſtabliſhed throughout France, for the taking cognizance of all civil, perſonal, real, and mixt cauſes, among the people; but without any juriſdiction in the cauſes of nobles.

Theſe, in the Bourbonnois, Auvergne, &c. are called *chatelains*; in Normandy, *vicomptes*; in Languedoc and Provence, *viguiers*.

Grand Provost *of France*, or *of the houſhold*, has juriſdiction in the king's houſe, and over the officers therein; he looks to the policy and regulation thereof, the rates of proviſions following the court, &c. He was anciently called *roi des ribauds*.

Grand Provost *of the conſtable*, a judge of the ſword, who manages proceſſes againſt the ſoldiers in the army, who have committed any crime.

He has four lieutenants, diſtributed throughout the armies, called *provoſts of the army*; and particularly *provoſts* in the ſeveral regiments.

Provost *guard*. See Guard.

Provost *marſhal of an army*, is an officer appointed to ſeize and ſecure deſerters, and all other criminals.

The *provoſt marſhal* is to go often abroad round the army to hinder the ſoldiers from pillaging. It is his office to indict offenders, and to ſee the ſentence paſſed upon them executed.

He likewiſe regulates the weights and meaſures, and the price of all proviſions, &c. in the army, when in the field. For the diſcharge of his office, he has a lieutenant, a clerk, and a troop of *provoſts* of marſhals men on horſeback; as alſo an executioner.

There is alſo a *provoſt marſhal* in the navy, who hath charge of the priſoners taken at ſea.

The French have a *provoſt general of the marines*, who is to proſecute the marines when guilty of any crime, and to make report thereof to the council of war; beſides a *marine provoſt* in every veſſel, who is a kind of gaoler, and takes the priſoners into his care, and keeps the veſſel clean.

Provosts *of the marſhals* are a kind of lieutenants of the marſhals of France, eſtabliſhed for the ſecurity of the country againſt rogues, vagabonds, and deſerters.

They take cognizance of royal cauſes; which, for this reaſon, are called *prevotal cauſes*. Such are all crimes committed by ſtrollers, or people without any fixed abode; robberies on the highway, infraction of ſafeguard, burnings, &c. They pronounce *en dernier reſſort*, or without appeal.

There are a hundred and eighty ſeats of theſe *provoſts* in France; their chief juriſdiction regards highwaymen, footpads, houſebreakers, &c. They correſpond to the officers eſtabliſhed by Auguſtus and Tiberius, called, as Cujas tells us, *latrunculatores*, to ſhew that their office was to purſue thieves.

Provost *of the mint* is a particular judge inſtituted for the apprehending and proſecuting falſe coiners.

PROW, *prora*, in *Navigation*, denotes the head or forepart of a ſhip; being that which is oppoſite to the *poop* or ſtern.

In front hereof is the beak that cuts the water to make way for the veſſel.

The *prow* is lower then the poop, and contains fewer ſtories or decks. On the beak is uſually ſome figure or hieroglyphic, which often gives name to the veſſel.

Prow, in ſtrictneſs, is only that part of the forecaſtle which is aloof, and not in the hold; particularly that part between the chaſe and the loof.

The ancients repreſented beaks of birds in the *prows* of their ſhips, whence they were called *roſtra*.

Prow is alſo a name given by ſeamen to the beak or pointed cut-water of a polacre, xebeck, or galley. The upper part of the *prow* in thoſe veſſels is uſually furniſhed with a grating platform for the convenience of the ſeamen, who walk out to perform whatever is neceſſary about the ſails or rigging, or the bowſprit.

PROX, in *Natural Hiſtory*, a name giving by Ariſtotle to the *cerves platyceros*, or broad horned ſtag.

PROXENETA, or Proxenetes, a kind of broker or agent, who tranſacts betwen two perſons. See Broker, and Agent.

The word is Greek, ϖροξενητης, q. d. *conciliator* or *pararius, reconciler* or *mediator*. The Latins give them a more honourable appellation, calling them *interpreters*.

The term *proxeneta* is chiefly appled to thoſe who negociate offices, marriages, &c.

The Roman law grants the *proxenetæ* an action for recovery of their hire or wages.

Theſe made a kind of office or college in Rome: to them the fathers addreſſed themſelves, to ſound and examine the inclinations of the young men they intended for their daughters. A commentator on the Digeſt accounts it a great defect in the modern policy, that there are not now any of theſe *proxenetæ*, or match-makers, eſtabliſhed by public authority.

PROXIMITY, *proximitas*, denotes the relation or nearneſs either in reſpect of place, blood, or alliance.

PROXY, *procurator*, a deputy, or perſon who officiates in the room of another.

Princes are uſually married by *proxies*, or repreſentatives. Peers are allowed to give their votes by *proxies*.

PROXY, *procuracy*, among *Civilians*, alſo denotes a commiſſion given to a PROCTOR, by a client, to manage a cauſe in his behalf.

PRUDENCE, in *Ethics*, may be defined an ability of judging what is beſt, in the choice both of ends and means According to the definition of the Roman moraliſt, De Officiis, lib. I. cap. 43. *prudence* is the knowledge of what is to be deſired or avoided. Accordingly, he makes *prudentia* (De Legibus, lib. i.) to be a contraction of *providentia*, or foreſight. Plato (De Legibus, lib. iii.) calls this the leading virtue; and Juvenal, Sat. x. obſerves,

> *Nullum numen abeſt ſi ſit* prudentia.

The idea of *prudence* includes ευβουλια, or due conſultation, that is, concerning ſuch things as demand conſultation, in a right manner, and for a competent time, that the reſolution taken up may be neither too precipitate nor too ſlow; and συνεσις, or a faculty of diſcerning proper means when they occur; and to the perfection of *prudence*, theſe three things are farther required, viz. δεινοτης, or natural ſagacity; αγχινοα, preſence of mind, or a ready turn of thought; and αμπειρια, or experience. The extremes of *prudence* are craft or cunning on the one hand, which is the purſuit of an ill end by direct and proper though not honeſt means; and folly on the other, which is either a miſtake, both as to the end and means, or proſecuting a good end by foreign and improper means. Grove's Moral Philoſophy, vol. ii. chap. 2.

PRUINA, in *Phyſiology*. See *Hoar* FROST.

PRUNE-*tree*, in *Botany*. See PLUM-*tree*.

PRUNE, *wild*. See SLOE.

PRUNELLA, a name given by ſome phyſicians to a drineſs of the tongue and throat, happening in continued fevers, eſpecially acute ones, accompanied with a heat and redneſs of the throat, and a ſcurf covering the tongue; ſometimes whitiſh, and ſometimes blackiſh.

Some alſo give the name *prunella* to the quinzy, and others to the aphthæ. *Prunella* is alſo the name of a plant, called in Engliſh SELF-*heal*.

PRUNELLÆ, *ſal*, in *Pharmacy*, is a preparation of purified ſalt-petre; called alſo *lapis prunellæ*, and CRYSTAL *mineral*.

It is prepared by ſeparating and abſorbing ſome of the more volatile parts of the ſalt-petre, which is done by burning upon it, when melted in a crucible over the fire, about a twenty-fourth part of its weight of flowers of brimſtone. When the deflagration is over, the melted ſalt is poured into clean, dry, warm, braſs moulds, ſo as to form it into little cakes.

It is given to cool, and provoke urine, in fevers and quinzies; though ſome think that ſalt-petre, purified three or four times, would be a better medicine.

The *ſal prunella* is ſaid to be frequently adulterated with alum; and that the deceit is known by its whiteneſs and glittering.

PRUNES, *pruna*, are plums dried or baked in an oven, or in the ſun.

Three ſorts of this fruit are ranked among the articles of the materia medica: they are all met with in our gardens; but the ſhops are ſupplied with them, moderately dried, from abroad. Theſe are the Brignole plum, or prunelleo, brought from Brignole in Provence, of a reddiſh yellow colour, and a very grateful, ſweet, ſubacid taſte; the common, or French *prunes*, called by our gardeners the little black damaſk plum; and damſons, the larger damaſk violet plum of Tours, which is ſeldom kept in the ſhops, but has been generally ſupplied by the common *prunes*. All theſe fruits poſſeſs the ſame general qualities with the other ſummer fruits. The prunelloes, in which the ſweetneſs has a greater mixture of acidity than in the other ſorts, are uſed as mild refrigerants in fevers and other hot indiſpoſitions, and are ſometimes kept in the mouth for alleviating thirſt in hydropic caſes. The French *prunes* and damſons are the moſt emollient, lubricative, and laxative; they are taken by themſelves for gently looſening the belly in coſtive habits, and where there is a tendency to inflammation; decoctions of them afford an uſeful baſis for laxative or purging mixtures, and the pulp in ſubſtance for electaries. Lewis.

PRUNIFEROUS *trees*, or *ſhrubs*, *the plum bearing kind*, are thoſe whoſe fruit are pretty large and ſoft, with a ſtone in the middle.

In this kind the flower adheres to the bottom of the baſe of the fruit.

PRUNING, in *Gardening*, and *Agriculture*, the operation of lopping or cutting off the ſuperfluous branches of trees; either to diſpoſe them to bear better, to grow higher, or to appear more regular.

Pruning is one of the moſt important branches of the gardener's province, and that whereon the thriving or barrenneſs of his fruit-trees, as well as the form and regularity of his garden, in a great meaſure depend.

It is ſometimes practiſed purely for the trimming or adjuſting of trees to the eye, by taking away irregular branches; as in box, holly, yew, &c.

Sometimes, to make the ſtem grow fairer, and riſe higher, by taking off all the large branches ariſing out of it, and thus ſending the ſap, which would otherwiſe be expended by them, to the top of the tree, to nouriſh and prolong the ſame.

But its more ordinary *uſe* is, to render the tree more fertile, and to mend its fruit, by retrenching ſuch uſeleſs branches as might impoveriſh the trunk, and conſume the juice neceſſary to nouriſh the branches that bear.

Pruning is an annual operation: the amputation is uſually made ſloping, ſometimes ſtump-wiſe. Its beſt ſeaſon is about the end of February, though it may be begun as ſoon as the leaves are off, viz. in November; and continued to the time when freſh leaves come on, viz. in April or May, which is the proper ſeaſon.

As the gardener has uſually three kinds of trees to manage, viz. ſome too weak, others too ſtrong, and others in a juſt plight, he will find *pruning work* through all that ſpace; it being proper to *prune* ſome ſooner, and ſome later. The weaker and more languiſhing a tree is, the ſooner it ought to be *pruned*, to eaſe it of its offenſive branches; and the more vigorous the tree is, the longer may the *pruning* be referred.

For **PRUNING** *a tree of the firſt year*, i. e. a tree planted the year before: if it have only ſhot one fine branch from the middle of the ſtem, it muſt be cut to that branch, and the branch ſhortened to four or five eyes or buds; the effect of which is, that the next year there will be, at leaſt, two fine branches oppoſite to each other.

If the tree produce two fine branches well placed, with weak ones among them, all required is to ſhorten them equally, to the compaſs of five or ſix inches in length; care, however, being taken, that the two laſt eyes or buds of the extremes of the branches, thus ſhortened, look on the right and left to the two bare ſides, that each may bring forth at leaſt two new ones; and the four be ſo well placed, that they may be all preſerved. If one of the two branches be much lower than the other, or both on one ſide, or the like, only one is to be preſerved, and that the fitteſt to begin a fine figure; the other is to be cut off ſo cloſe, as that it may never be able to produce thick ones in the ſame place. If a tree have put forth three or four branches, all in the extremity, or a little beneath, they muſt be all *pruned* by the ſame laws as the two above mentioned: if they be equally thick, they are to be uſed alike; if ſome of them be ſmaller than the reſt they muſt only be *pruned* with a proſpect of getting a ſingle branch each, taking care to have it on that ſide which ſhall be found empty; in order to which, they ſhould be ſhortened to an eye or bud that looks on that ſide; and the ſame care is to be taken in the larger, in order to begin to fill up the better; if theſe fine branches ſhoot a little below the extremity, it is but ſhortening the ſtem to them; on the contrary, if the branches be moſt of them ill ones, two at leaſt if poſſible, are to be preſerved, and *pruned* in the ſame manner as the two fine ones above. Good weak branches are to be carefully preſerved for fruit; only cutting them a little at the extremity, when they appear too weak for their length; not failing to take away all the ſapleſs branches. If the tree have produced five, ſix, or ſeven branches, it is ſufficient to preſerve three or four of the beſt; the reſt are to be quite cut off, at leaſt if they be thick; for if they be weak, i. e. fit for fruit branches, they ſhould be kept till they have performed what they are capable of doing; and if among the great ones there happen to be many ſmall ones, two or three of the beſt are only to be preſerved, pinching off the ends of the longeſt.

PRUNING *of a tree of the ſecond year*. If, having put out two fine wood branches, and one or two ſmall ones, for fruit the firſt year, the ſap have altered its courſe in the ſecond year, from the thick branches to the ſmall ones, ſo that the ſmall become wood, and the large fruit-branches, the productions of the former muſt be quite cut off to the mother branch, and thoſe of the latter uſed as fruit branches. If a tree from the firſt year's *pruning*, have produced four or five branches, or more, it muſt needs be very vigorous; for which reaſon it may be ſometimes adviſeable to preſerve thoſe branches, even though they be not neceſſary to the figure of the tree, but only to conſume part of the ſap, which might otherwiſe be prejudicial to the fruit-branches. Theſe ſuperfluous branches may be left long, without much ill conſequence; but thoſe eſſential to the beauty of the tree, muſt be all *pruned* a little longer than thoſe of the preceding year, i. e. about two, or at moſt three eyes, or a good foot. This is making an advantage of the figure of the tree, which, without this, would not yield fruit in a long time, the redundant ſap covering all the eyes into wood-branches, which, with a more ſpare diet, would have been fruit-branches. In theſe vigorous trees, ſome branches cut ſtump-wiſe, are to be left on, and even ſome thick ones, though of falſe wood, eſpecially where there are any neceſſary to the form of the tree, to employ the exceſs of ſap, and prevent its doing miſchief. Still more to aſſuage its violence, it may be neceſſary to preſerve many long, good, weak branches, when placed ſo as to occaſion no confuſion; and even on the thick branches, a good number of outlets for the ſap to range in. Be it a general rule, rather to ſpare the lower branches, and cut off the higher, than the contrary: by this means the tree ſpreads more eaſily to the bottom of the wall.

PRUNING *of a tree of the third year*. In a tree that has been planted three years, and *pruned* twice, if it be vigorous, as many old branches as poſſible are to be preſerved, eſpecially for fruit; if it be weak, it muſt be eaſed of the burden of old branches, as well thoſe for fruit, as wood: it muſt likewiſe be cut ſhort, to enable it to ſhoot out new ones; which if it cannot do with vigour, let it be pulled up, and a new one, with freſh earth, planted in its place.

In all *pruning*, proviſion is to be made for branches to proceed from thoſe now under the *pruning-knife*, to prepare ſuch as may be proper for the form: with this aſſurance, that when the high branch is taken down from over the lower, this latter being reinforced with the ſap that would have gone to the former, will certainly produce more branches than it would have done without ſuch reinforcement.

PRUNING *fruit-trees, general rules of*. The *pruning* of fruit-trees requires a ſtrict obſervation of the different manners of the ſeveral ſorts, becauſe ſome produce their fruit on the ſame year's wood, as vines; others produce their fruit, for the moſt part, upon the former year's wood, as peaches, nectarines, &c. and others upon curſors or ſpurs, which are produced upon wood of three, four, or five, to fifteen or twenty years old, as pears, plums, cherries, &c. therefore, in order to the right management of fruit-trees, there ſhould be always proviſion made to have a ſufficient quantity of bearing wood, in every part of the trees, and at the ſame time there ſhould not be a ſuperfluity of uſeleſs branches, which would exhauſt the ſtrength of the trees, and cauſe them to decay in a few years.

1. The more the branches ſhoot horizontally, the apter and better diſpoſed the tree is to bear fruit; conſequently, the more upright the branches, the more inclined is the tree to increaſe in wood, and the leſs to bear fruit.

Hence, ever take care to keep the middle of a tree from wood or thick branches; and as thoſe increaſe and grow upon you, cut them out entirely; for there is no danger but the place will be ſoon filled with better and more fruitful wood.

In dwarfs you are to *prune* all open, and clear of wood, leaving none but horizontal branches; and in wall-trees, if you do but furniſh your walls with horizontal branches, nature will provide for the middle. Chuſe, therefore, ſuch ſhoots as are not vigorous, to furniſh bearing branches.

2. Take care the tree be not left over full of wood, not even of bearing branches; as is frequently ſeen in the management of peaches, nectarines, and cherries.

Nature cannot ſupply them all with juice enough; whence none will be ſupplied well: the conſequence of which is, that either the bloſſoms will fall off, or the fruit will dwindle. It is certain, a multitude of branches, crouding on one another, produce neither ſo good, nor ſo much fruit as where there is a convenient ſpace, beſide the diſagreeable effect of croſſing one another.

3. All ſtrong and vigorous branches are to be left longer on the ſame tree than weak and feeble ones; conſequently, the branches of a ſickly tree muſt be *pruned* ſhorter, and left fewer in number, than thoſe of a ſtrong healthful tree.

4. All branches ſhooting directly forward from trees that grow againſt a wall, are to be *pruned* cloſe to the branch whence they ſpring, &c.

5. When a branch well placed either againſt a wall, or in a dwarf, has ſhot ſome falſe wood, neither fit for the figure nor the fruit, *prune* it off within the thickneſs of a crown-piece, or ſlopingly; though this is beſt *pinched* off in the beginning of ſummer.

6. Cut off all branches ariſing from hard knobs, whereon pear-ſtalks grew; or from ſhort ſtraight branches, like ſpurs.

7. If a tree, in its firſt years, have produced branches of moderate vigour, and afterwards put forth ſtrong ones, well placed, though of falſe wood; the latter may be uſed as the foundation of the figure, and the other kept a time for bearing fruit.

8. When an old tree ſhoots ſtronger branches towards the bottom than the top, and the top is in ill caſe; cut it off, and form a new figure from the lower ones. If the top be vigorous, cut off the lower ones, unleſs well placed.

9. The order of nature, in the production of ſhoots and branches, is, that a branch is always leſs than that out of which it ſhoots; if this order be inverted, uſe them as falſe wood.

10. Regard is to be always had to the effects of former *pruning*, in order to correct its defects, or continue its beauties.

11. In vigorous trees, the weaker branches are the fruit-bearers; in weak trees, the ſtronger, chiefly; therefore, in the latter, *prune* off the feeble and ſmall.

12. In vigorous trees, three good branches may put forth at one eye or bud: in which caſe, the two ſide-branches are generally to be preſerved, and the middlemoſt cut off in May or June.

13. It is difficult to ſtrengthen a weak branch without cutting off others above it; ſometimes it can ſcarce be done without cutting off the end of the branch it ſhoots out of.

14. The *pruning* of vigorous peach-teees is to be deferred till they are ready to bloſſom, the better to know which branches are likely to bear fruit.

15. Fruit-buds next the ends of branches are commonly thicker and better fed than others. In weak trees, therefore, it may be beſt to *prune* them early, that the ſap may not waſte itſelf in ſuch parts as are to be retrenched.

16. The farther a weak branch is from the trunk, the leſs nouriſhment it receives; and therefore the more it is to be ſhortened: but thick branches, the more diſtant they are from the heart, the more they receive; and they are therefore to be removed, that the vigour may extend itſelf to the middle or lower part.

17. A branch for wood muſt never be *pruned* without ſpecial occaſion; as where it annoys others.

18. If an old well-looking tree be diſordered with falſe wood, through ill *pruning*, or want of *pruning*; take it lower, by cutting off a branch or two yearly, till it be ſufficiently reduced. Some trees put forth ſo vigorouſly that they cannot be reduced to compaſs in one year; but muſt be allowed to extend themſelves, otherwiſe they will produce falſe wood.

19. All trees have a predominant branch or two, if not more: yet the more equally the vigour is divided, the better; where it runs much on one ſide, it is faulty.

20. The buds of all ſtone-fruit frequently form themſelves the ſame year in which the branch they grow on is formed; the ſame holds of pears and apples; though it is, generally, at leaſt two or three years before the latter come to perfection

21. All ſhoots that are put forth in autumn, are to be *pruned* off, as naught: the ſame may be ſaid of all ſapleſs branches.

22. When a tree puts forth much ſtonger ſhoots on one ſide than on the other, a great part of the ſtrong ones muſt be cut off cloſe to the body, or ſome of them ſtump-wiſe.

23. In all trees leſs length is to be allowed the weak than the ſtrong branches.

24. Upper branches are to be cut off cloſe to others, that they may heal over: lower branches are to be cut ſloping, or at a little diſtance, that new ones may grow out of them.

25. If a young crooked tree produce a fine branch beneath the crook, cut the head off cloſe to the branch.

26. Though five, ſix, or ſeven inches, be the ordinary lengths wood-branches are left at; yet muſt this be varied on occaſion of vigour or weakneſs of the tree, thickneſs or ſmallneſs of the branch, the fullneſs or vacuity of the place, &c.

27. Be careful not to prune many thick branches ſtanding over weak ones; leſt the ſap, which fed the larger, flow ſo plentifully into the leſs, as to occaſion them to put forth much ill wood and ſuckers.

28. Branches ſhot from the ends of others are uſually good wood; ſometimes it happens otherwiſe, and then they muſt be *pruned*.

As to the grand *yearly prunings*: fruit branches being of ſhort continuance, and periſhing the firſt year wherein they produce fruit, are to be cut off, unleſs they put forth ſhoots for bloſſoms the ſucceeding year. In the ſecond *pruning*, about the middle of May, where the fruit is ſo cloſe as to be like to obſtruct each other, ſome of them and their branches are to be taken off, as muſt alſo the multitude of young ſhoots that cauſe confuſion. Branches more luxurious than others are to be cut clear off. To preſerve old trees, they muſt be diſburdened by leaving few branches for wood on them, and thoſe to be ſhortened to five or ſix inches; and very few weak ones, and none dry, and nigh waſted.

PRUNING *of foreſt or timber trees.* See FOREST *Trees*, and LOPPING.

PRUNING *of vines.* See VINE.

PRUNUS, in *Botany.* See PLUM-*tree*, APRICOT, and SLOE.

PRURITUS, a painful, and yet pleaſurable kind of ſenſation of the ſkin, popularly called *itching*; which is ſuppoſed to ariſe hence, that the extremities of the capillary veins being obſtructed, cannot take up the redundant blood of the limbs, to carry it back again to the heart; whence, as there is a freſh ſtock of blood continually ſent into the part by the inceſſant pulſation of the heart, the fibres become preternaturally ſtretched or diſtended, and hence the uſually titillating ſenſe of itching.

PRUSSIAN *blue.* See BLUE.

PRUSSIAN *green.* See GREEN.

PRYK, a kind of ſervice or tenure, and, according to Blount, ſignifies an old faſhioned ſpur with one point only, which the tenant holding land by this tenure, was to find for the king. *Per ſervitium inveniendi unum equum, unum ſaccum, & unum* pryk *in Guerra Walliæ.* 1 Ric. II. and in the time of king Hen. VIII. light horſemen in war were called *prickers*, becauſe they uſed ſuch ſpurs or *pryks*, to make their horſes go with ſpeed.

PRYTANEUM, πρυτανειον, in *Antiquity*, a conſiderable building in Athens, where the council of *prytanes* aſſembled, and where thoſe who had rendered any ſignal ſervices to the commonwealth, were maintained at the public expence.

PRYTANIS, or PRYTANES, in *Antiquity*, the firſt magiſtrate in moſt of the cities of Greece.

At Athens there were fifty *prytanes*, at Corinth there was but one, who was the ſame with what the *archon* was at Athens.

The *prytanes* of Athens were the ſenators who compoſed the grand council that governed the ſtate; and correſpond to what we now call *the ſtates general of the United Provinces.*

Fifty of theſe were choſe each year out of each tribe; and to theſe were nominated fifty more, to ſupply the places of the former, in caſes of death, or mal-adminiſtration.

The tribes took the government by turns, each after other, for the ſpace of thirty-five days. This was an eſtabliſhment of Solon. Scaliger is miſtaken, when he ſays the tribes took their turns every day.

All the fifty *prytanes* of the tribe did not govern together during thoſe five weeks; but in companies, ten at a time, choſen by lot; ſeven days each company: after which another tribe came into office, and had its five weeks after the ſame manner.

PRYTANITIDES, in *Antiquity*, a name given to thoſe widows who at Athens, and throughout all Greece, had the ſacred fire of Veſta committed to their care. The cuſtom of the Greeks, in this reſpect, differed very much from that of the Romans; who allowed none but virgins to tend this ſacred fire, whence they were called VESTALS.

They had the appellation *Prytanitides* from πρυτανειον, a name common to all places ſacred to Veſta.

PSADURIA, a genus of rough ſtones of a plain uniform ſtructure, not laminated, but ſplitting equally in all directions.

PSAGDA. See SAGDA.

PSALM, ψαλμος, formed from ψαλλω, *I ſing*, a divine ſong or hymn.

The denomination *pſalm* is now appropriated to the one hundred and fifty *pſalms* of David; and the name *canticle*, or *ſong*, is given to other pieces of the ſame kind, compoſed by other prophets and patriarchs.

The ancients, as is obſerved by St. Auguſtine, made this difference between a *canticle*, or *ſong*, and a *pſalm*, that the former was ſung by the voice alone, but the latter accompanied with a muſical inſtrument.

The *pſalms*, in the ancient editions, are divided into five books; nor is David's name found at the head of more than ſeventy-three of them; though ſome, and among the reſt St. Auguſtine and St. Chryſoſtom, attribute all the hundred and fifty to him without exception.

The Jews, however, were always of another opinion; and it is certain there are ſome few, at leaſt, that are not his. St. Jerom obſerves, among the number, ſeveral that were compoſed a long time after David. Du Pin adds, that it is difficult to aſcertain the authors; all we know of the book is, that it is a collection of ſongs compiled by Ezra.

Gradual pſalms were thoſe anciently ſung on the ſteps of the temple. The *penitential pſalms* were not formerly the ſame with thoſe now called by that name.

PSALMIST, in the *Church of Rome*, one of the leſſer eccleſiaſtical orders, the ſame with what among us is called *clerk*, *precentor*, or *ſinger*.

PSALMODY, ψαλμωδια, the art of ſinging pſalms.

PSALTER, ψαλτηριον, the book or collection of pſalms, aſcribed to David.

There are a multitude of editions of the *Pſalter*. Auguſtine Juſtinian, a Dominican, and biſhop of Nebo, publiſhed a Polyglot *Pſalter* at Genoa, 1516. And Contarinus publiſhed the *Pſalter* in Hebrew, Greek, Chaldee, and Arabic, with Latin notes and gloſſes.

PSALTER is alſo uſed among religious for a large chaplet or ROSARY, conſiſting of one hundred and fifty beads; the number of the pſalms in the *Pſalter*.

St. Dominic is ſaid to have been the inventor of this *Pſalter*.

PSALTERY, PSALTERION, alſo denotes a muſical inſtrument much in uſe among the ancient Hebrews, who called it *nebel*.

We know but little of the preciſe form of the ancient *pſaltery*. Kircher has taken pains to prove that it was of a ſquare form; and from an old book in the Vatican library he has exhibited a figure of it. See *Tab. Muſic, fig* 8. and the NEBEL or *nevel*, from his account was a different inſtrument; ſee *fig*. 7.

That now in uſe is a flat inſtrument; in form of a trapezium, or a triangle truncated at top.

It is ſtrung with thirteen wire-chords, ſet to uniſon or octave, and mounted on two bridges on the two ſides. It is ſtruck with a *plectrum*, or little iron rod, or ſometimes with a crooked ſtick, whence it is uſually ranked among the inſtruments of percuſſion.

Its cheſt, or body, is like that of a ſpinet. It has its name *à pſallendo*; ſome call it *nablum*, or *nablium*.

Papius alſo gives the name *pſaltery* to a kind of flute, uſed in churches to accompany the ſinging; called in *Latin*, *ſambucus*.

PSAMMISMUS, ψαμμισμος, formed from ψαμμος, *ſand*, in *Medicine*, a term ſometimes uſed for a bath of dry and warm ſand, to ſet the feet of dropſical perſons upon.

PSATYRIANS, PSATYRIANI, a ſect of ARIANS, who, in the council of Antioch, held in the year 360, maintained, that the Son was not like the Father, as to will; that he was taken from nothing, or made of nothing; and that in God, generation was not to be diſtinguiſhed from creation.

PSEGMA, a name given by ſome of the ancients to the flos æris, or flowers of braſs.

PSELAPHIA, a word uſed by the ancient medical writers to expreſs friction with the hands, in caſes where the diſtempered parts require it. This was always eſteemed a part of the buſineſs of a phyſician, and was done with his own hand.

PSEN, Ψην, the name given by naturaliſts to the fig-gnat, a ſmall ſpecies of gnat bred in figs while growing on the tree, and always remaining on the leaves of the ſame tree, and feeding on its juices. See CAPRIFICATION.

PSEPHISMA, Ψηφισμα, among the Athenians, a decree of the ſenate; the ſame with PROBULEUMA.

PSEPHOMANTIA, Ψηφομαντια, in *Antiquity*, a ſpecies of divination, the ſame with CLEROMANCY.

PSEPHOPHORIA, in *Antiquity*, the art of uſing the *pſephi*, ψηφοι, or *counters*. This was the firſt arithmetic taught children of every condition. Capitolinus, in his life of Pertinax, ſays, *Puer literis, elementariis & calculo imbutus.*

PSEPHOS, Ψεφος, in *Antiquity*, a name given to ſeveral things, as ſmall ſtones, ſhells, and beans, uſed among the Greeks in giving their ſuffrages, and in their computations. Their origin is, by Mr. Mahudel, aſcribed to the ſons of Noah, who uſed this kind of calculation to aſſiſt their memory in numbering their flocks. Joſephus aſſures us, that the Egyptians borrowed this method of counting from Abraham; and Herodotus relates, that theſe ſmall ſtones were uſed both by the Egyptians and Greeks, only with this difference, that the latter placed them and cyphers from left to right, and the former from the right to the left. The art of uſing them in calculations was called PSEPHOPHORIA.

Pſephi were in uſe too among the Romans, who called them *calculi*. Whatever materials they conſiſted of, they were all of the ſame colour when uſed in calculations; whereas, thoſe uſed in giving ſuffrages were partly black and partly white. Lucky days were denoted by white, and unlucky by black ones. See CALCULUS.

PSETA, in *Ichthyology*, a name given by Athenæus to the fiſh we call the PLAISE, the *paſſer lævis* and *plateſſa* of authors.

PSETITES, in *Natural Hiſtory*, a name given by authors to a ſtone, having in it the figure of a turbot. There are ſtones found in ſome parts of Germany having the impreſſions of ſeveral kinds of fiſh as perfect as if drawn by a pencil, and it is not to be doubted, but that they in reality owe them to the fiſh themſelves; which were received into beds of the matter of ſtone, yet unhardened, which taking its conſiſtence while they were in it, muſt cruſh them, and retain the marks of their bodies. They are uſually found in a whitiſh ſlaty ſtone.

PSEUDO, a term or particle, uſed in the compoſition of divers Latin and Engliſh words; in the ſenſe of *falſe* or *ſpurious*.

The word is formed from ψευδος, *lie*, *falſhood*, of ψευδω, *I deceive*.

We ſay a *pſeudo-martyr*, q. d. *a falſe witneſs*, *pſeudo-prophet*, *pſeudo-apoſtle*, *pſeudo-chriſt*, &c.

PSEUDO-*acacia*, in *Botany*. See ACACIA.

PSEUDO-APIOS, in *Botany*, a name given by ſome authors to the roots of the *bulbocaſtanum*, or EARTH-*nut*.

The peaſants in Burgundy, and other parts of France, turn up theſe in great quantities with the plough, and eat them. They call them *arnottas*, and ſome of the writers of the adjacent places not diſtinguiſhing what they truly were, have avoided the common name, by giving them this of *pſeudo-apios*, formed of the name of a root to which they have no alliance, and taking away a name by which they would have been much better known; *arnotta* being only a corruption of the Dutch name *ertnote*, or earth-nut, a name by which they are called almoſt every where. See PIG-*nut*.

PSEUDO-ARGYRON, in *Mineralogy*, a word uſed by the ancients in two very different ſenſes; ſome make it the name of what Virgil calls *orichalcum album*, *white braſs*; and others of a mineral with which the common braſs was made.

It is very evident, from the joint teſtimony of the old Greeks and Romans both, that they had in uſe a kind of white metal made of copper, and they eſteemed it greatly above the yellow, or braſs.

Ariſtotle tells us of this white metal, and gives it great encomiums; he ſays it was very white and very bright; and that it was made by melting copper together with a certain earth; but this he does not deſcribe, ſo that we are left in the dark as to what it was.

This ſhining white metal might very naturally be called *pſeudo-argyron*, or baſtard-ſilver.

PSEUDO-CARPASUM, in *Botany*, a name given by ſome authors to the plant called by the generality of writers *libanotis*.

This is a plant of a very ſtrong ſmell; and the *carpaſum*, or *carpaſium* of the ancients, being a poiſonous gum, and the ſmell of the libanotis approaching to the ſame odour, occaſion its being called the *baſtard-carpaſium*.

PSEUDO-*dictamnus*. See HOREHOUND.

PSEUDO-*fumaria*, in *Botany*, a name uſed by ſome for a ſpecies of FUMITORY.

PSEUDO-*lotus*, in *Botany*, a name by which ſome call the *guaiacana* of Tournefort. See *Indian Date* PLUM.

PSEUDO-*viburnum*, in *Botany*, the name given by Rivinus to a ſpecies of LANTANA.

PSEUDO-*diptere*, ψευδοδιπτερος, in the *Ancient Architecture*, a temple with eight columns in front, and a ſingle row of columns all around.

The word ſignifies *falſe* or *imperfect diptere*; and is uſed to diſtinguiſh this from the *diptere* which had two rows of columns all around.

PSEUDOGELSEMINUM, in *Botany*, a name given by Rivinus to a genus of plants, the ſame with the BIGNONIA of authors. See TRUMPET-*flower*.

PSEUDO-*ipecacuanha*, in *Botany*, the name by which ſome authors have called a poiſonous kind of American apocynum, the root of which ſomething reſembles the true IPECACUANHA, and has ſometimes been unfortunately collected and uſed in its place.

PSEUDONYMUS, ψευδωνυμος, formed from ψευδος, *lie*, and ονομα, *name*, a name given by the critics to thoſe authors who publiſh books under falſe or feigned names. As the name *cryptonomus* is given to thoſe who publiſh under ſecret and diſguiſed names; and *anonymous*, to thoſe who publiſh without any names at all.

The Apoſtolical Conſtitutions, the greater epiſtles of St. Ignatius, &c. are uſually ſuppoſed to be *pſeudonymous*.

PSEUDO-*pulex arboreus*, in *Natural Hiſtory*, the name of a genus of inſects deſcribed by M. Reaumur, and ſomewhat approaching in their form to the *pulex arboreus*; but having their wings covered with a ſquammoſe caſe, which thoſe creatures have not, and having broader and flatter bodies.

Theſe principally live upon the fig-tree and the box; they paſs through a ſort of metamorphoſis into a hopping fly, ſuppoſed by ſome of the nature of a graſs-hopper; but erroneouſly, for that animal has a caſe for its wings, and the other not.

PSEUDO-STELLA, in *Aſtronomy*, any kind of meteor or phenomenon, appearing in the heavens, and reſembling a ſtar.

PSEUDO-*theca*, in *Natural Hiſtory*, the name of a ſpecies of two-winged fly, approaching to the nature of a common waſp, but having no ſting.

This is, according to the later diſtinctions in the hiſtory of inſects, properly called a *waſp-fly*. There are bee-flies, as much reſembling the bees as this does the waſp.

PSEUDO-*tinea*, in *Natural Hiſtory*, the name of a very remarkable ſpecies of inſect deſcribed by M. Reaumur, approaching to the nature of the *tinea*, or cloth-moth, while in the worm-ſtate; but not making themſelves coats of the ſubſtance of leaves, cloth, &c. though they form a ſort of caſes for their defence againſt a very terrible enemy.

Theſe creatures are truly of the caterpillar kind, and have in the manner of many of theſe inſects, ſixteen legs. They feed on wax, and for food enter the bee-hives; where they boldly engage the bees, and are not to be prevented by them from feeding, though at the expence of their habitations and the cells of their reſervoirs of honey; ſo that it is no uncommon thing for a ſwarm of bees to be forced to change their place of habitation, and make new combs elſewhere; leaving the old ones to this contemptible victor, whom they know not how to drive out or diſpoſſeſs.

Virgil and Ariſtotle, and all the authors who have written on bees, have complained of this deſtructive animal. It never eats the honey, but feeds only on the wax; attacking principally thoſe waxy cells where the female bee depoſits her eggs for the future progeny.

The bees, who are a match for moſt other creatures, by means of their ſtings, would eaſily deſtroy thoſe weak creatures were it not for the impervious armour they are covered with. They form themſelves a coat of armour of a double matter; the firſt, which immediately covers the body, is of a kind of ſilk of their own ſpinning; and the outer covering over this is of the bees wax; this is laid conſiderably thick, and the creature juſt thruſting out its head to feed, goes on devouring the cells undiſturbed, while a whole army of the inhabitants are in vain buzzing about him, and attempting to pierce him with their ſtings.

Then the time of the change of this creature approaches, it contracts its body within its double covering, and there changes into the nymph ſtate; whence after a proper time, it comes forth in form of a moth, with granulated horns and crooked proboſcis.

The bees have cunning enough to know their deſtructive enemy in this new form, and as this is a weak and defenceleſs ſtate, they attack and deſtroy all the moths of this ſpecies they can meet with. They ſeldom are ſo fortunate, however, as to kill the whole race as ſoon as produced; and if only one eſcapes, it is able to lay a foundation of revenge for the death of its brethren.

The moth produced by this caterpillar flies but little, yet is very nimble in avoiding danger by running, which it does with great ſwiftneſs.

There are ſpecies of theſe *pſeudo-tineæ*, or wax-eating caterpillars, which infeſt the ſubterranean hives of waſps, and other creatures which make wax: the manner of living, feeding, and defending themſelves from their enemies, is the ſame in all the ſpecies.

The accurate author of theſe obſervations deſcribes alſo a kind of *pſeudo-tineæ*, which feed on wool, and another that eats leather; both making themſelves houſes alſo on the materials they feed on. All theſe creatures, whatever be their food or habitation, finally become *phalænæ*, or moths; and may be diſtinguiſhed, even in this ſtate, from the other ſpecies, by having granulated horns of a remarkable ſtructure, and all of them a proboſcis, or trunk, more or leſs incurvated.

PSIDIUM, in *Botany*, the name by which Linnæus calls a genus of plants, named GUAJAVA by Tournefort and others.

PSILOCITHARISTA, among the *ancients*, one who plays on the cithara, without ſinging in concert to it.

PSILOTHRON, ψιλωθρον, formed from ψιλοω, *deglabro*, *I make bald*, or *bare*, and θριξ, *hair*, in *Medicine*, DEPILATORY; an external form of medicine proper to take off the hair.

Such are the ſtrong lixiviums, quick-lime, ants eggs, ſandarac, orpiment, and arſenic.

PSITTACUS, in *Ornithology*. See PARROT.

ſhort continuance, and periſhing the firſt year wherein they produce fruit, are to be cut off, unleſs they put forth ſhoots for bloſſoms the ſucceeding year. In the ſecond *pruning*, about the middle of May, where the fruit is ſo cloſe as to be like to obſtruct each other, ſome of them and their branches are to be taken off, as muſt alſo the multitude of young ſhoots that cauſe confuſion. Branches more luxurious than others are to be cut clear off. To preſerve old trees, they muſt be diſburdened by leaving few branches for wood on them, and thoſe to be ſhortened to five or ſix inches; and very few weak ones, and none dry, and nigh waſted.

Pruning *of foreſt or timber trees.* See Forest *Trees*, and Lopping.

Pruning *of vines.* See Vine.

PRUNUS, in *Botany.* See Plum-*tree*, Apricot, and Sloe.

PRURITUS, a painful, and yet pleaſurable kind of ſenſation of the ſkin, popularly called *itching*; which is ſuppoſed to ariſe hence, that the extremities of the capillary veins being obſtructed, cannot take up the redundant blood of the limbs, to carry it back again to the heart; whence, as there is a freſh ſtock of blood continually ſent into the part by the inceſſant pulſation of the heart, the fibres become preternaturally ſtretched or diſtended, and hence the uſually titillating ſenſe of itching.

PRUSSIAN *blue.* See Blue.

Prussian *green.* See Green.

PRYK, a kind of ſervice or tenure, and, according to Blount, ſignifies an old faſhioned ſpur with one point only, which the tenant holding land by this tenure, was to find for the king. *Per ſervitium inveniendi unum equum, unum ſaccum, & unum* pryk *in Guerra Walliæ.* 1 Ric. II. and in the time of king Hen. VIII. light horſemen in war were called *prickers*, becauſe they uſed ſuch ſpurs or *pryks*, to make their horſes go with ſpeed.

PRYTANEUM, πρυτανειον, in *Antiquity*, a conſiderable building in Athens, where the council of *prytanes* aſſembled, and where thoſe who had rendered any ſignal ſervices to the commonwealth, were maintained at the public expence.

PRYTANIS, or Prytanes, in *Antiquity*, the firſt magiſtrate in moſt of the cities of Greece.

At Athens there were fifty *prytanes*, at Corinth there was but one, who was the ſame with what the *archon* was at Athens.

The *prytanes* of Athens were the ſenators who compoſed the grand council that governed the ſtate; and correſpond to what we now call *the ſtates general of the United Provinces.*

Fifty of theſe were choſe each year out of each tribe; and to theſe were nominated fifty more, to ſupply the places of the former, in caſes of death, or mal-adminiſtration.

The tribes took the government by turns, each after other, for the ſpace of thirty-five days. This was an eſtabliſhment of Solon. Scaliger is miſtaken, when he ſays the tribes took their turns every day.

All the fifty *prytanes* of the tribe did not govern together during thoſe five weeks; but in companies, ten at a time, choſen by lot; ſeven days each company: after which another tribe came into office, and had its five weeks after the ſame manner.

PRYTANITIDES, in *Antiquity*, a name given to thoſe widows who at Athens, and throughout all Greece, had the ſacred fire of Veſta committed to their care. The cuſtom of the Greeks, in this reſpect, differed very much from that of the Romans; who allowed none but virgins to tend this ſacred fire, whence they were called Vestals.

They had the appellation *Prytanitides* from πρυτανειον, a name common to all places ſacred to Veſta.

PSADURIA, a genus of rough ſtones of a plain uniform ſtructure, not laminated, but ſplitting equally in all directions.

PSAGDA. See Sagda.

PSALM, ψαλμος, formed from ψαλλω, *I ſing*, a divine ſong or hymn.

The denomination *pſalm* is now appropriated to the one hundred and fifty *pſalms* of David; and the name *canticle*, or *ſong*, is given to other pieces of the ſame kind, compoſed by other prophets and patriarchs.

The ancients, as is obſerved by St. Auguſtine, made this difference between a *canticle*, or *ſong*, and a *pſalm*, that the former was ſung by the voice alone, but the latter accompanied with a muſical inſtrument.

The *pſalms*, in the ancient editions, are divided into five books; nor is David's name found at the head of more than ſeventy-three of them; though ſome, and among the reſt St. Auguſtine and St. Chryſoſtom, attribute all the hundred and fifty to him without exception.

The Jews, however, were always of another opinion; and it is certain there are ſome few, at leaſt, that are not his. St. Jerom obſerves, among the number, ſeveral that were compoſed a long time after David. Du Pin adds, that it is difficult to aſcertain the authors; all we know of the book is, that it is a collection of ſongs compiled by Ezra.

Gradual pſalms were thoſe anciently ſung on the ſteps of the temple. The *penitential pſalms* were not formerly the ſame with thoſe now called by that name.

PSALMIST, in the *Church of Rome*, one of the leſſer eccleſiaſtical orders, the ſame with what among us is called *clerk*, *precentor*, or *ſinger*.

PSALMODY, ψαλμωδια, the art of ſinging pſalms.

PSALTER, ψαλτηριον, the book or collection of pſalms, aſcribed to David.

There are a multitude of editions of the *Pſalter*. Auguſtine Juſtinian, a Dominican, and biſhop of Nebo, publiſhed a Polyglot *Pſalter* at Genoa, 1516. And Contarinus publiſhed the *Pſalter* in Hebrew, Greek, Chaldee, and Arabic, with Latin notes and gloſſes.

Psalter is alſo uſed among religious for a large chaplet or rosary, conſiſting of one hundred and fifty beads; the number of the pſalms in the *Pſalter*.

St. Dominic is ſaid to have been the inventor of this *Pſalter*.

PSALTERY, Psalterion, alſo denotes a muſical inſtrument much in uſe among the ancient Hebrews, who called it *nebel*.

We know but little of the preciſe form of the ancient *pſaltery*. Kircher has taken pains to prove that it was of a ſquare form; and from an old book in the Vatican library he has exhibited a figure of it. See *Tab. Muſic, fig* 8. and the nebel or *nevel*, from his account was a different inſtrument; ſee *fig.* 7.

That now in uſe is a flat inſtrument; in form of a trapezium, or a triangle truncated at top.

It is ſtrung with thirteen wire-chords, ſet to uniſon or octave, and mounted on two bridges on the two ſides. It is ſtruck with a *plectrum*, or little iron rod, or ſometimes with a crooked ſtick, whence it is uſually ranked among the inſtruments of percuſſion.

Its cheſt, or body, is like that of a ſpinet. It has its name *à pſallendo*; ſome call it *nablum*, or *nablium*.

Papius alſo gives the name *pſaltery* to a kind of flute, uſed in churches to accompany the ſinging; called in *Latin*, *ſambucus*.

PSAMMISMUS, ψαμμισμος, formed from ψαμμος, *ſand*, in *Medicine*, a term ſometimes uſed for a bath of dry and warm ſand, to ſet the feet of dropſical perſons upon.

PSATYRIANS, Psatyriani, a ſect of Arians, who, in the council of Antioch, held in the year 360, maintained, that the Son was not like the Father, as to will; that he was taken from nothing, or made of nothing; and that in God, generation was not to be diſtinguiſhed from creation.

PSEGMA, a name given by ſome of the ancients to the flos æris, or flowers of braſs.

PSELAPHIA, a word uſed by the ancient medical writers to expreſs friction with the hands, in caſes where the diſtempered parts require it. This was always eſteemed a part of the buſineſs of a phyſician, and was done with his own hand.

PSEN, Ψην, the name given by naturaliſts to the fig-gnat, a ſmall ſpecies of gnat bred in figs while growing on the tree, and always remaining on the leaves of the ſame tree, and feeding on its juices. See Caprification.

PSEPHISMA, Ψηφισμα, among the Athenians, a decree of the ſenate; the ſame with probuleuma.

PSEPHOMANTIA, Ψηφομαντια, in *Antiquity*, a ſpecies of divination, the ſame with cleromancy.

PSEPHOPHORIA, in *Antiquity*, the art of uſing the *pſephi*, ψηφοι, or *counters*. This was the firſt arithmetic taught children of every condition. Capitolinus, in his life of Pertinax, ſays, *Puer literis, elementariis & calculo imbutus.*

PSEPHOS, Ψεφος, in *Antiquity*, a name given to ſeveral things, as ſmall ſtones, ſhells, and beans, uſed among the Greeks in giving their ſuffrages, and in their computations. Their origin is, by Mr. Mahudel, aſcribed to the ſons of Noah, who uſed this kind of calculation to aſſiſt their memory in numbering their flocks. Joſephus aſſures us, that the Egyptians borrowed this method of counting from Abraham; and Herodotus relates, that theſe ſmall ſtones were uſed both by the Egyptians and Greeks, only with this difference, that the latter placed them and cyphers from left to right, and the former from the right to the left. The art of uſing them in calculations was called psephophoria.

Pſephi were in uſe too among the Romans, who called them *calculi*. Whatever materials they conſiſted of, they were all of the ſame colour when uſed in calculations; whereas, thoſe uſed in giving ſuffrages were partly black and partly white. Lucky days were denoted by white, and unlucky by black ones. See CALCULUS.

PSETA, in *Ichthyology*, a name given by Athenæus to the fiſh we call the PLAISE, the *paſſer lævis* and *plateſſa* of authors.

PSETITES, in *Natural Hiſtory*, a name given by authors to a ſtone, having in it the figure of a turbot. There are ſtones found in ſome parts of Germany having the impreſſions of ſeveral kinds of fiſh as perfect as if drawn by a pencil, and it is not to be doubted, but that they in reality owe them to the fiſh themſelves; which were received into beds of the matter of ſtone, yet unhardened, which taking its conſiſtence while they were in it, muſt cruſh them, and retain the marks of their bodies. They are uſually found in a whitiſh ſlaty ſtone.

PSEUDO, a term or particle, uſed in the compoſition of divers Latin and Engliſh words; in the ſenſe of *falſe* or *ſpurious*.

The word is formed from ψευδος, *lie, falſhood*, of ψευδω, *I deceive*.

We ſay a *pſeudo-martyr*, q. d. *a falſe witneſs*, *pſeudo-prophet*, *pſeudo-apoſtle*, *pſeudo-chriſt*, &c.

PSEUDO-*acacia*, in *Botany*. See ACACIA.

PSEUDO-APIOS, in *Botany*, a name given by ſome authors to the roots of the *bulbocaſtanum*, or EARTH-*nut*.

The peaſants in Burgundy, and other parts of France, turn up theſe in great quantities with the plough, and eat them. They call them *arnottas*, and ſome of the writers of the adjacent places not diſtinguiſhing what they truly were, have avoided the common name, by giving them this of *pſeudo-apios*, formed of the name of a root to which they have no alliance, and taking away a name by which they would have been much better known; *arnotta* being only a corruption of the Dutch name *ertnote*, or earth-nut, a name by which they are called almoſt every where. See PIG-*nut*.

PSEUDO-ARGYRON, in *Mineralogy*, a word uſed by the ancients in two very different ſenſes; ſome make it the name of what Virgil calls *orichalcum album, white braſs*; and others of a mineral with which the common braſs was made.

It is very evident, from the joint teſtimony of the old Greeks and Romans both, that they had in uſe a kind of white metal made of copper, and they eſteemed it greatly above the yellow, or braſs.

Ariſtotle tells us of this white metal, and gives it great encomiums; he ſays it was very white and very bright; and that it was made by melting copper together with a certain earth; but this he does not deſcribe, ſo that we are left in the dark as to what it was.

This ſhining white metal might very naturally be called *pſeudo-argyron*, or baſtard-ſilver.

PSEUDO-CARPASUM, in *Botany*, a name given by ſome authors to the plant called by the generality of writers *libanotis*.

This is a plant of a very ſtrong ſmell; and the *carpaſum*, or *carpaſium* of the ancients, being a poiſonous gum, and the ſmell of the libanotis approaching to the ſame odour, occaſion its being called the *baſtard-carpaſium*.

PSEUDO-*dictamnus*. See HOREHOUND.

PSEUDO-*fumaria*, in *Botany*, a name uſed by ſome for a ſpecies of FUMITORY.

PSEUDO-*lotus*, in *Botany*, a name by which ſome call the *guaiacana* of Tournefort. See *Indian Date* PLUM.

PSEUDO-*viburnum*, in *Botany*, the name given by Rivinus to a ſpecies of LANTANA.

PSEUDO-*diptere*, ψευδοδιπτερος, in the *Ancient Architecture*, a temple with eight columns in front, and a ſingle row of columns all around.

The word ſignifies *falſe* or *imperfect diptere*; and is uſed to diſtinguiſh this from the *diptere* which had two rows of columns all around.

PSEUDOGELSEMINUM, in *Botany*, a name given by Rivinus to a genus of plants, the ſame with the BIGNONIA of authors. See TRUMPET-*flower*.

PSEUDO-*ipecacuanha*, in *Botany*, the name by which ſome authors have called a poiſonous kind of American apocynum, the root of which ſomething reſembles the true IPECACUANHA, and has ſometimes been unfortunately collected and uſed in its place.

PSEUDONYMUS, ψευδωνυμος, formed from ψευδος, *lie*, and ονομα, *name*, a name given by the critics to thoſe authors who publiſh books under falſe or feigned names.

As the name *cryptonomus* is given to thoſe who publiſh under ſecret and diſguiſed names; and *anonymous*, to thoſe who publiſh without any names at all.

The Apoſtolical Conſtitutions, the greater epiſtles of St. Ignatius, &c. are uſually ſuppoſed to be *pſeudonymous*.

PSEUDO-*pulex arboreus*, in *Natural Hiſtory*, the name of a genus of inſects deſcribed by M. Reaumur, and ſomewhat approaching in their form to the *pulex arboreus*; but having their wings covered with a ſquammoſe caſe, which thoſe creatures have not, and having broader and flatter bodies.

Theſe principally live upon the fig-tree and the box; they paſs through a ſort of metamorphoſis into a hopping fly, ſuppoſed by ſome of the nature of a graſs-hopper; but erroneouſly, for that animal has a caſe for its wings, and the other not.

PSEUDO-STELLA, in *Aſtronomy*, any kind of meteor or phenomenon, appearing in the heavens, and reſembling a ſtar.

PSEUDO-*theca*, in *Natural Hiſtory*, the name of a ſpecies of two-winged fly, approaching to the nature of a common waſp, but having no ſting.

This is, according to the later diſtinctions in the hiſtory of inſects, properly called a *waſp-fly*. There are bee-flies, as much reſembling the bees as this does the waſp.

PSEUDO-*tinea*, in *Natural Hiſtory*, the name of a very remarkable ſpecies of inſect deſcribed by M. Reaumur, approaching to the nature of the *tinea*, or cloth-moth, while in the worm-ſtate; but not making themſelves coats of the ſubſtance of leaves, cloth, &c. though they form a ſort of caſes for their defence againſt a very terrible enemy.

Theſe creatures are truly of the caterpillar kind, and have in the manner of many of theſe inſects, ſixteen legs. They feed on wax, and for food enter the bee-hives; where they boldly engage the bees, and are not to be prevented by them from feeding, though at the expence of their habitations and the cells of their reſervoirs of honey; ſo that it is no uncommon thing for a ſwarm of bees to be forced to change their place of habitation, and make new combs elſewhere; leaving the old ones to this contemptible victor, whom they know not how to drive out or diſpoſſeſs.

Virgil and Ariſtotle, and all the authors who have written on bees, have complained of this deſtructive animal. It never eats the honey, but feeds only on the wax; attacking principally thoſe waxy cells where the female bee depoſits her eggs for the future progeny.

The bees, who are a match for moſt other creatures, by means of their ſtings, would eaſily deſtroy thoſe weak creatures were it not for the impervious armour they are covered with. They form themſelves a coat of armour of a double matter; the firſt, which immediately covers the body, is of a kind of ſilk of their own ſpinning; and the outer covering over this is of the bees wax; this is laid conſiderably thick, and the creature juſt thruſting out its head to feed, goes on devouring the cells undiſturbed, while a whole army of the inhabitants are in vain buzzing about him, and attempting to pierce him with their ſtings.

Then the time of the change of this creature approaches, it contracts its body within its double covering, and there changes into the nymph ſtate; whence after a proper time, it comes forth in form of a moth, with granulated horns and crooked proboſcis.

The bees have cunning enough to know their deſtructive enemy in this new form, and as this is a weak and defenceleſs ſtate, they attack and deſtroy all the moths of this ſpecies they can meet with. They ſeldom are ſo fortunate, however, as to kill the whole race as ſoon as produced; and if only one eſcapes, it is able to lay a foundation of revenge for the death of its brethren.

The moth produced by this caterpillar flies but little, yet is very nimble in avoiding danger by running, which it does with great ſwiftneſs.

There are ſpecies of theſe *pſeudo-tineæ*, or wax-eating caterpillars, which infeſt the ſubterranean hives of waſps, and other creatures which make wax: the manner of living, feeding, and defending themſelves from their enemies, is the ſame in all the ſpecies.

The accurate author of theſe obſervations deſcribes alſo a kind of *pſeudo-tineæ*, which feed on wool, and another that eats leather; both making themſelves houſes alſo on the materials they feed on. All theſe creatures, whatever be their food or habitation, finally become *phalænæ*, or moths; and may be diſtinguiſhed, even in this ſtate, from the other ſpecies, by having granulated horns of a remarkable ſtructure, and all of them a proboſcis, or trunk, more or leſs incurvated.

PSIDIUM, in *Botany*, the name by which Linnæus calls a genus of plants, named GUAJAVA by Tournefort and others.

PSILOCITHARISTA, among the *ancients*, one who plays on the cithara, without ſinging in concert to it.

PSILOTHRON, ψιλωθρον, formed from ψιλοω, *deglabro, I make bald*, or *bare*, and θριξ, *hair*, in *Medicine*, DEPILATORY; an external form of medicine proper to take off the hair.

Such are the ſtrong lixiviums, quick-lime, ants eggs, ſandarac, orpiment, and arſenic.

PSITTACUS, in *Ornithology*. See PARROT.

PSOAS *magnus*, or *lumbaris*, in *Anatomy*, a round, hard, fleſhy muſcle, which ariſes from the internal ſide of the tranſverſe proceſſes of the vertebræ of the loins, within the abdomen and deſcending upon part of the internal ſide of the ilium, is inſerted in the lower part of the little trochanter. It is the firſt of the flexors of the thigh.

It is fixed above to the laſt vertebra of the back, and to all thoſe of the loins; that is, to the lateral parts of the bodies of theſe vertebræ, and to the roots of their tranſverſe apophyſis. The inſertions in the bodies of the vertebræ are by a kind of digitations, and are very little tendinous: from thence the muſcle runs down laterally over the os ilium, on one ſide of the iliac muſcle; and paſſes over the ligamentum Fallopii, between the anterior inferior ſpine of the os ilium, and that eminence, which, from its ſituation, may be called *iliopectinea*. Before it goes out of the abdomen it unites with the iliacus, and afterwards covers the foreſide of the head of the os femoris. It is ſometimes accompanied by a ſmall muſcle, called *pſoas parvus*. Winſlow.

Psoas *parvus*, ariſes fleſhy from the inſide of the upper vertebræ of the loins, and hath a thin and broad tendon which embraces the *pſoas magnus*; and which is inſerted into the os innominatum, where the os pubis and ilium join together. This, though ordinarily reckoned among the muſcles of the thigh, properly belongs to the lower venter.

It is ſometimes wanting: but though ſome have imagined it wanting in one ſex more than the other, the conjecture ſeems without foundation. It is fixed above by a ſhort tendon, ſometimes to the laſt tranſverſe apophyſis of the back, or higher; ſometimes to the firſt of the loins, and ſometimes to both: from thence it runs down wholly fleſhy, and more or leſs complex on the great *pſoas*, in a direction a little oblique; and having reached the middle of the regio lumbaris, it forms a ſlender flat tendon, which gradually increaſing in breadth like a thin aponeuroſis, runs over the *pſoas major*, and *iliacus internus* at their union; and from thence down to the ſymphyſis of the os pubis and os ilium, and is inſerted chiefly in the criſta of the os pubis, above the inſertion of the pectinæus. Winſlow.

Beſides this *pſoas parvus*, there is another, ſtill ſmaller, between it and the vertebræ.

PSOPHIA, in *Ornithology*, a genus of the *grallæ*; its characters are, that the beak is cylindrico-conic, convex, ſharp, with the upper mandible longer than the other; the noſtils are ovated and wide, and the feet have four toes and cloven. There is only one ſpecies. See Macucaqua.

PSORA, ψωρα, in *Medicine*, a cutaneous diſeaſe, called by the Latins *ſcabies*, and by the Engliſh itch.

Psora, in *Botany*, a name by which Aetius and ſeveral others of the late Greek writers have called the *pſorice* of the ancient Greeks, that is, the *ſcabioſa* of the Latins, and our common ſcabious. It has been ſuppoſed by ſome, that the ancient Geeks were not acquainted with our ſcabious; but that is an erroneous opinion, both the deſcription and virtues of the pſcorice being the ſame with thoſe with the ſcabious.

PSORALEA, in *Botany*, a genus of the *diadelphia decandria* claſs. Its characters are theſe: the empalement of the flower is of one leaf, cut into five parts, the lower ſegments being twice the length of the other; the flower is of the butterfly kind; it hath five petals; the ſtandard is roundiſh, and indented at the top; the wings are ſmall, obtuſe, and moon-ſhaped, the keel is moon-ſhaped, and compoſed of two petals; it hath nine ſtamina joined together, and one briſtly ſtamen ſtanding ſeparate, terminated by roundiſh ſummits: with a linear germen, ſupporting an awl-ſhaped riſing ſtyle, crowned by an obtuſe ſtigma; the germen afterwards turns to a ſlender compreſſed pod, incloſing one kidney-ſhaped ſeed. Miller reckons ten, and Linnæus thirteen ſpecies.

PSORAS, in *Ichthyology*, a name by which ſome authors have called a fiſh of the turdus kind, remarkable for the variety and beauty of its ſpots, and more uſually known by the name lepras.

PSORIASIS, a peculiar ſpecies of itch affecting the ſcrotum.

PSORICA, ψωρικα, medicines good againſt the itch, ſcabs, and other cutaneous eruptions, eſpecially thoſe of the eye-lids.

PSORICE, or Psorice-*poa*, a name given by the botanical writers among the ancient Greeks to the plant we call *ſcabioſa*, or *ſcabious*

PSOROPHTHALMIA, Ψωδοφθαλμια, formed from ψωρα, *itch*, and οφθαλμος, *eye*, a ſcurfy eruption of the eye-brows, attended with a pruritus, or itching of the part, or an inflammation and ulceration of the edges of the eye-lids.

Mr. Ware, in his Remarks on the Ophthalmy, *Pſorophthalmy*, and *Purulent* Eye, 1780, propoſes for the cure of this diſorder the unguentum citrinum of the Edinburgh diſpenſatory, applied to the parts, either with the finger or a ſmall bruſh of camel's hair. He has exemplified the utility of this application by the relation of ſeveral caſes.

PSUCHAGOGICA, formed of ψυχη, *anima*, and αγω, *duco*, a word uſed by the ancients to expreſs ſuch medicines, as were uſed in apoplexies and faintings, to recall life.

PSUCHROTROPHON, in the *Materia Medica of the Ancients*, a name given to a plant often recommended, but not perfectly underſtood as to what ſpecies it means. It is the ſame plant called *ceſtrum* by the Greeks, and has this firſt name only becauſe of its growing in moiſt places; the word being formed of the Greek ψυχρος, *moiſt*, and τρεφειν, *to nouriſh*, or *cauſe to grow*.

PSYCHOLOGY, Ψυχολογια, formed from ψυχη, *ſoul*, and λογος, *diſcourſe*, the doctrine of the soul.

Anthropology, or the ſcience which conſiders man, conſiſts of two parts: the firſt treating of the body, and the parts belonging thereto, called *anatomy*; and the ſecond of the ſoul, called *pſychology*.

PSYCHOMANCY, formed of ψυχη, *ſoul*, and μαντεια, *divination*, a kind of magic or divination, performed by raiſing the ſouls of perſons deceaſed.

PSYCHOTRIA, in *Botany*, a genus of the *pentandria monogynia* claſs: its characters are, that the calyx is quindentated and coronate; the corolla tubular; the fruit a globular berry, containing two hemiſpherical ſeeds. There are two ſpecies.

PSYCHROLUSIA, formed of ψυχρος, *cold*, and λουω, *I waſh*, a word uſed by medical writers to expreſs cold bathing.

PSYCHROMETER, formed from ψυχρος, *cold*, and μετρον, *meaſure*, an inſtrument for meaſuring the degree of coldneſs of the air; more uſually called a thermometer.

PSYCTICA, formed of ψυχω, *I cool*, a term uſed by medical writers to expreſs cooling remedies.

PSYDRACIA, derived from ψυδρακες, *puſtules*, a term uſed by medical writers to expreſs ſmall tubercles on the head, which reſemble puſtules, and after a little time corrode and eat through the ſkin.

PSYGMATA, derived from ψυχω, *I cool*, a name given by phyſicians to all refrigerating medicines, external and internal.

PSYLON, in *Ichthyology*, a name given by Ariſtotle, and many other of the old Greek writers, to the tench, or cyprinus niger.

PSYLLIUM, in *Botany*. See Flea-*wort*, and Plantain.

PTARMICA, Πτρμικα, formed of πταρμος, *ſneezing*, medicines proper to promote ſneezing; more uſually called *errhines* and *ſternutatories*. *Ptarmica* is alſo uſed as the name of a genus of plants. See Sneezewort.

PTARMIGAN, the *lagopus* of Pliny, and the tetrao *lagopus* of Linnæus, in *Ornithology*, is alſo called the *white game*, and erroneouſly the white partridge. This bird is of a pale brown or aſh-colour, elegantly croſſed or mottled with ſmall duſky ſpots, and bars, the head and neck with broad bars of black, ruſt-colour, and white; the wings are white, but the ſhafts of the greater quill-feathers black; and the belly white. In the male, the grey colour predominates, except on the head and neck, where there is a great mixture of red, with bars of white. The females and young birds have a great deal of ruſt-colour. Both agree in their winter-dreſs, being entirely white: except that in the male a black line occurs between the bill and the eyes: the ſhaft of the ſeven firſt quill-feathers is black; the tail conſiſts of ſixteen feathers; the black feathers being covered by two upper ones, which in ſummer are brown, and in winter white.

Theſe birds are called by Pliny *lagopi*, becauſe their feet are clothed with feathers to the claws, as the hare's are with fur, which ſerves to guard them from the rigour of the winter: the nails are long, broad, and hollow, ſcooped off at the end exactly like a writing pen, without the ſlit, which enables them to form a lodgment under the ſnow, where they lie in heaps to protect themſelves from the cold. Their length is near fifteen inches, the extent twenty-three; and the weight nineteen ounces. They are found in theſe kingdoms only on the ſummits of the higheſt hills of the Highlands of Scotland and of the Hebrides; and ſome few are found on the lofty hills near Keſwick, in Cumberland. They reſemble the grous in taſte, and like them keep in ſmall packs, but never like thoſe birds takes ſhelter in the heath, but beneath looſe ſtones.

In Hudſon's Bay, this bird is called the willow partridge: they gather together in large flocks in the beginning of October, harbouring among the willows, the tops of which are their principal food. They then change to their winter dreſs; change again in March, and have their complete ſummer dreſs by the latter end of June. They make their neſt in the ground in dry ridges, and are ſo plentiful, that ten thouſand have been killed in the three ſorts in one winter. Pennant's Brit. Zool. vol. i. p. 272, &c. Phil. Tranſ. vol. lxiii. part ii. art. 28. See Gorcock.

PTELEA, in *Botany*. See *Shrub* TREFOIL.

PTERARIA, in *Natural Hiſtory*, a claſs of INSECTS, according to the diſtribution of Dr. Hill.

PTERIDION, in *Botany*, a name uſed by ſome authors for a ſmall kind of fern common in damp places. Ger. Emac. Ind. 2.

PTERIS, *breaks*, or *female fearn*, in *Botany*, the name of a genus of ferns, the characters of which, according to Linnæus, are theſe: the fructifications are diſpoſed into a line, which ſurrounds the whole margin of the under part of the leaf. In this diſpoſition the *pteris* evidently differs from all the other capillary plants. There are twenty ſpecies.

PTEROCARPUS, in *Botany*, a genus of the *diadelphia decandria* claſs: its characters are, that the calyx is quinquedentated; the fruit is a falcated, foliaceous, varicoſe capſule, and the ſeeds ſingle. There is only one ſpecies.

PTERONIA, in *Botany*, a genus of the *ſyngeneſia polygamia æqualis* claſs: its characters are, that the receptacle conſiſts of multipartite briſtles; the down is plumoſe, and the calyx imbricated. There are two ſpecies.

PTEROPHŒNICUS *Indiarum*, in *Ornithology*, a name under which Nieremberg has deſcribed a bird, which he ſays is called by the Spaniards there *commendadoza*, remarkable for the redneſs of the upper part of its wings. It is of the ſhape and ſize of the ſtarling, and not unlike it in colour, but for the ſingularity of the upper part of their wings, which in one part of their lives are of a yellowiſh or orange colour, and in the reſt red. They are kept in cages and learn to imitate the human voice: they feed on vegetables, principally Indian corn, and are common as well in the colder as in the hotter climates; flying in large flocks, and often doing great damage to the people. They build in trees and are eaten there; but are no very valuable bird.

PTEROSPERMADENDRON, in *Botany*, the name of a genus of plants, eſtabliſhed by Dr. Amman.

The name is derived from the Greek πτερον, *a wing*, σπερμα, *ſeed*, and δενδρον, *a tree*, to expreſs a tree with alated ſeeds.

The characters of the genus are theſe: the flower is of the roſaceous kind, conſiſting of ſeveral petals arranged in a circular order; from the cup of the flower there ariſes a piſtil, with an embryo fruit, which finally becomes a woody ſeed-veſſel of the ſhape of a pod, which when ripe opens at the end, and is ſeen to be divided into five cells, containing alated ſeeds.

Of this genus the author deſcribes two ſpecies. The firſt has leaves like the cork-tree, angulated and hoary underneath, and white flowers; the other has auriculated leaves, and a large flower and fruit. The firſt of theſe is mentioned in Petiver's Muſeum, Nº 349, under the name of a tree from Champana, with a woody fruit containing alated ſeeds: and the other ſeems to be the tree called *ſolda*, in the Hortus Malabaricus, vol. vi. tom. 58.

Beſides theſe two ſpecies, the author ſuſpects there are four others, which have not yet been ſufficiently examined in the various ſtates, to determine whether they are properly of this genus or not.

PTERYGIUM, πτερυγιον, formed by diminution from πτερυξ, *ala*, *a wing*, q. d. *a little wing*, in *Medicine*, a diſeaſe of the eye, much of the ſame nature with what the Latins call UNGUIS, *nail*, and ſometimes, though improperly, PANNUS, *web*.

It is a preternatural membrane, formed externally upon the coats of the eye, extending itſelf over the cornea and pupil, and obſtructing the ſight. Sometimes this pellicle or membrane appears red, and is then called *pannus*.

It uſually ariſes in the angles of the eyes from the temples toward the noſe, and ſometimes from above or below, extending itſelf by degrees over the pupil. Sometimes it only adheres to the cornea by a few ſlender fibres, and ſometimes it is extended over the whole eye, and is every where firmly and intimately attached to it; and in this caſe the cure is rendered very difficult.

If the patient's conſtitution, or a beginning inflammation require it, bleeding and bliſtering are proper in this caſe: and when the membrane is but thin, gentle eſcharotics may perform a cure, ſuch as burnt alum, vitriol, &c. mixed into a powder with ſugar, or a ſolution of half a ſcruple of white vitriol in two ounces of celandine or other water.

If theſe methods prove ineffectual, the aſſiſtance of a ſurgeon muſt be called in; who ſeating the patient before him, with his head bent backwards upon his lap, while an aſſiſtant holds open the eyelids, takes hold of the thickeſt or looſeſt part of the pellicle with a hook, and elevating it a little, paſſes a threaded needle through it; and taking hold of both ends of the thread, makes a gentle elevation of it; then ſeparates its upper and lower margin with a lancet, that he may afterwards cut off the reſt immediately in a ſtraight line near the lachrymal caruncle, with a ſtraight and fine pair of ſciſſars: then he draws back the thread and membrane towards the cornea, and if it adheres any were to the eye, frees it by degrees with the ſcalpel, or ſciſſars, not wounding the cornea, nor leaving any of the membrane behind to give riſe to a new production of it. Heiſter.

PTERYGIUM is alſo the name given to a WHITLOE, when ſeated at the root of the nail.

PTERYGOIDES, πτερυγοειδης, derived from πτερυξ, πτερυγος, *wing*, and ειδος, *form*, in *Anatomy*, two apophyſes of the os ſphenoides; ſo called from their reſembling the wings of a bat. See SPHENOIDES.

PTERYGOIDÆUS *major*, or *internus*, is a muſcle that lies on the inſide of the lower jaw, almoſt in the ſame manner that the maſſeter does on the outſide, and is of the ſame figure with that muſcle, only ſmaller and narrower.

It is fixed above chiefly to the inſide of the external ala of the apophyſis *pterygoides*. This inſertion is wholly fleſhy, and from hence it runs down obliquely toward the angle of the lower jaw, and is inſerted a little tendinous in the inequalities on the inſide thereof, oppoſite to the inſertion of the maſſeter. Winſlow.

When it acts, it draws the jaw to one ſide.

PTERYGOIDÆUS *minor*, or *externus*, an oblong ſmall fleſhy muſcle, ſituated almoſt horizontally between the outſide of the apophyſis *pterygoides*, and the condyloide apophyſis of the lower jaw, the ſubject being conſidered in an erect poſture.

It is fixed by one extremity to the outſide and edge of the outer ala of the *pterygoide* apophyſis, filling the foſſula which is at the baſis of this apophyſis, near the baſis of the temporal apophyſis of the ſphenoidal bone; from thence it runs backward and a little outward into the void ſpace between the two apophyſes of the lower jaw, and is inſerted anteriorly in the condyloide apophyſis, at a ſmall foſſula immediately under the angle of the inner condyle. It is alſo fixed to the capſular ligament of the joint. Winſlow.

This pulls the lower jaw forwards, and makes it ſhoot beyond the upper.

PTEROPHORI, Πτεροφοροι, in *Antiquity*, a name given to ſuch of the Roman couriers as brought tidings of any declaration of war, a battle loſt, or any miſhap befallen the Roman armies.

They were ſo called, becauſe they bore wings on the points of their pikcs: from the Greek πτερον, *wing*, and φερω, *I bear*.

PTERYGOPHARYNGÆI a pair of muſcles ariſing from the proceſſus *pterygiodes*, where the tendon of the *pterygoſtaphylinus* is reflected. Some fleſhy fibres of them do likewiſe ariſe from the upper jaw-bone, behind the fartheſt grinder, and ſome from the ſides of the tongue, and os hyoides.

From all theſe places the fleſhy fibres paſs ſemicircularly, and meet with thoſe of the oppoſite ſide in the middle line on the backſide of the pharynx externally.

In the inner ſurface of the fauces is another order of fleſhy fibres, decuſſating each other at acute angles. They ariſe both from the ſides of the uvula and from the root of the cartilage; and deſcend obliquely to their inſertions in the glandulous membrane of the pharynx.

This muſcle ſerves both to conſtringe the pharynx, and to compreſs the tonſils, and force out the mucus; whence its uſe in hawking.

The various orginations of the ſeveral parts of this muſcle have cauſed it to be generally divided into ſeveral muſcles. Thus Valſalva calls that part ſpringing from the tongue, the *golſſopharyngæus*; that immediately below it, the *hyopharyngæus*. Hence, in like manner, come the *cephalopharyngæus*, *ſphenopharyngæus*, &c.

PTERYGOSTAPHYLINUS, formed from πτερον, *wing*, and σταφυλη, *uvula*, in *Anatomy*, the internal muſcle of the uvula; called by Valſalva, *novus tubæ muſculus*; as being unknown to the ancients.

It ariſes fleſhy near the ſphenoſtaphylinus, from the os petroſum, where the tube from the palate enters that near an acute proceſs of the ſphenoides; and aſcending to the proceſſus *pterygoides*, becomes a broad flat tendon, which expands itſelf on the fore-part of the uvula.

Some of the tendinous fibres aſcend to the lower edge of the os palati, others deſcend down the ſides of the fauces; the middle ſeries either unites with thoſe of the other ſide, or is loſt in two fleſhy bodies that compoſe the uvula. This muſcle, with its partner, draws the uvula upwards and forwards, and alſo raiſes the amygdalæ.

PTINUS, in the Linnæan ſyſtem of *Natural Hiſtory*, a genus of inſects of the *coleoptera* order; with filiform antennæ and roundiſh thorax, comprehending ſix ſpecies.

PTILOSIS, πτιλωσις, from πτιλος, in *Medicine*, a perſon who has loſt his eye-laſhes; a baldneſs of the eye-lids. Paulus Ægineta lib. iii. cap. 22. ſays, the *ptiloſis* and madaroſis are diſorders of the internal margin of the eye-lids. The madaroſis is the falling off of the hair, produced by a defluxion of acrid humours; whereas in a *ptiloſis*, the margins of the eye-lids become thick and callous: ſo that it is a diſorder complicated of a madaroſis, and a hard lippitude; for which reaſon the remedies proper for the one are alſo conducive to the removal of the other.

PTISAN, PTISANA, πτισανη, in *Medicine*, a cooling potion uſually made of barley boiled in water, and ſweetened with liquorice, &c.

To theſe are ſometimes added the roots of quick-graſs, and ſometimes ſena, to render it laxative. Moſt of the decoctions of phyſicians are called *ptiſans*. Feveriſh patients are prohibited wine, &c. and reduced to *ptiſans*.

PTOLEMAIC *ſyſtem*, or *hypotheſis*. See SYSTEM.

PTOLEMAIC *ſphere*. See SPHERE.

PTOLEMAITES, a branch of the ancient Gnoſtics, ſo called from their leader Ptolemy, a man of conſiderable learning, who improved greatly on the ſyſtem of the Gnoſtics his predeceſſors, and enlarged it with the number of notions and viſions of his own.

The *Ptolemaites* were properly a branch of the ſect of the VALENTINIANS, which ſprung up towards the cloſe of the ſecond century, under Ptolemy, who differed in opinion from his maſter Valentine, with reſpect both to the number and nature of the æons.

St. Epiphanius is very full on the ſubject of the *Ptolemaites*, and produces a letter of Ptolemy to Flora, wherein that heretic lays down his doctrine. He maintained, that in the law of Moſes there were three things to be conſidered, inaſmuch as it did not all come from the ſame hand; but part of it, ſaid he, from God, part of it from Moſes, and part of it from neither of them, but from the pure traditions of the ancient doctors: on which laſt part it was that he founded his dreams.

PTOSIS, a diſtemperature of the eyelids, occaſioned by a relaxation or tumor of thoſe parts, the ſame as the PHALANGOSIS. Heiſter.

PTYALAGOGA, formed of πτυαλον, *ſpittle*, and ἀγω, *I draw*, a word uſed by phyſicians to expreſs ſuch medicines as promote a copious diſcharge of the ſaliva, ſuch as pellitory-root, and the like.

PTYALISM, PTYALISIMUS, Πτυαλισμος, formed from πτυω, *ſpuo*, *exſpuo*, *I ſpit*, in *Medicine*, a *ſpitting*, or a diſcharge of ſaliva by the glands of the mouth; whether it amount to an abſolute ſalivation, or not.

PTYSMA, a word uſed to expreſs whatever is brought up from the lungs by ſpitting.

PTYSMAGOGA, medicines which promote a copious diſcharge by ſpitting.

PUBERTY, PUBERTAS, in the *Civial Law*, a natural MAJORITY, or the age wherein a perſon is allowed to contract marriage.

Boys arrive at *puberty* at fourteen years of AGE, maids at twelve. *Full puberty* is accounted at eighteen.

Dr. Kramer obſerves, that all boys at the time of *puberty*, between twelve and fourteen year, of age, complain of uneaſineſs at their breaſts, which are ſwelled and itchy, the nipples and areolæ round them inflaming with pain, and ſometimes excoriation and exulceration of ſome of the lactiferous ducts. The beſt remedy for which, he ſays, is to preſs out the white ſerum then contained in them, after which they cure with a bit of plaſter.

By the law of Scotland, perſons under *puberty*, or under the years of diſcretion, are capable of committing the higher crimes, which being contrary to the law of nature, are obvious. But they are not chargeable with ſmaller offences ariſing from poſitive law or ſtatute.

PUBES, a term uſed for the external parts of the *pudenda*, or parts of generation in both ſexes.

This, from the age of *puberty*, is ſuppoſed to be covered, more or leſs, with hair; whence the name.

PUBIS *os*, or *Os* PECTINIS, in *Anatomy*, a bone of the hip, ſituate in the fore and middle part of the trunk, and making the lower and inner part of the os innominatum. See *Tab. Anat. (Splanch.) fig.* 1. *lit. y. (Oſteol.) fig.* 3. *n.* 18. *fig.* 7. *n.* 19. *fig.* 12. *lit. d.*

It is joined to the other part by a cartilage, thicker, but looſer in women than men; in the former whereof the *os pubis* recedes, or gives a little in time of travail, to make way for the fœtus.

It has a large foramen, which makes room for the paſſage of two muſcles of the thigh, beſides a ſinus, whereby the crural veins and arteries paſs to the thighs. See *Tab. Anat. (Oſteol.) fig.* 3. *lit. S. S.*

The *os pubis* is the leaſt of the three portions of the oſſa innominata; the two together form the fore part of the pelvis, and anatomiſts diſtinguiſh in each, the body, the angle, and the branch.

The body of the *os pubis* is its upper part, ſituated tranſverſely before the inferior part of the os ilium. Its poſterior extremity is very thick, and by its union with the oſſa ilium forms the oblique eminence which diſtinguiſhes theſe two portions of the oſſa innominata. It likewiſe contributes to the formation of the cotyloide cavity. Its anterior extremity ends in a ſmall eminence, or tuberoſity, called the *ſpine* of the *os pubis*, which is ſometimes double. The upper edge has on its inner part an oblique ridge, which may be called the *criſta* of the *os pubis*, and is continuous with that ridge which diſtinguiſhes the margin and the bottom of this pelvis. Before this criſta is a broad, oblong, and oblique ſlope. The lower edge is obliquely notched, and forms the upper part of the foramen ovale.

The angle of the *os pubis* is its anterior portion, and makes part of that connection called the *ſymphyſis* of the *oſſa pubis*. This portion is flat, and not very thick; and in ſome ſubjects toward the upper part of the fore-ſide, near the angular curvature, it has an eminence, which increaſes the ſize and extent of the ſpine already mentioned. The two *oſſa pubis* connected together by this portion, form, on the foreſide, an unequal convexity; but on the backſide a pretty even concavity.

The branch of the *os pubis* is a flat thin apophyſis, which running downwards, unites with the branch of the os iſchium by a cartilaginous ſymphyſis; of which however, there remain only ſome light marks in adults. It completes the formation of the foramen ovale. The branches of the two *oſſa pubis* form, on the foreſide, a pointed arch; which, however, in a natural ſtate, is much more round than in a dried ſkeleton. Winſlow.

PUBLIC *accounts*. Commiſſioners are to enquire of the accounts of ſheriffs, cuſtomers, and other the king's officers, after having been paſſed in the exchequer, and if detected of any fraud they ſhall pay treble damages, by ſtat. 6 Hen. IV. cap. 3. And all the lands, tenements, and hereditaments, which any accountant hath, ſhall for the payment of debts to the crown, be liable and put in execution in like manner as if he had ſtood bound by writing obligatory, having the effect of a ſtatute ſtaple, &c. ſtat. 13 Eliz. cap. 4. and there have been ſeveral ſtatutes for taking the *public accounts* of the kingdom, and examining and determining the debts due to the army and navy; alſo corruptions in the management of the king's treaſure, &c. impowering commiſſioners for that purpoſe, who were to give an account of their proceedings to the king and parliament. ſtat. 2 W. & M. 1 Ann. 2 Geo. I. &c.

PUBLIC *acts*. See ACTS, anu STATUTE.

PUBLIC *buildings*. See BUILDING.

PUBLIC *notary*. See NOTARY *public*.

PUBLIC *road*. See ROAD.

PUBLIC *verdict*. See VERDICT.

PUBLICAN, *publicanus*, among the Romans, a perſon who farmed the impoſts, taxes, and public revenues.

Theſe *publicans* are diſtinguiſhed by Sigonius into three ſorts or degrees, the farmers of the revenues, their partners, and their ſecurities; in which he follows Polybius. Theſe are called the Mancipes, Socii, and Prædes, who were all under the Quæſtores Ærarii, that preſided over the finances at Rome. But there were properly only two ſorts of *publicans*, the Mancipes and the Socii. The former called by the Greeks αρχιτελωναι, were much ſuperior to the common *publicans* in dignity, being moſtly of the equeſtrian order; ſo they were generally in their moral character. Cicero mentions them with great reſpect and honour; *flos*, ſays he, *equitum Romanorum, ornamentum civitatis, firmamentum reipublicæ, publicanorum ordine continetur*. Orat. pro Plancio, apud Opera, vol. v. ſect. 9. p. 544. Olivet edit. He likewiſe calls them *ordinem mihi commendatiſſimum*. Epiſt. Fam. lib. xiii. epiſt. 10 Oper. vol. vii. p. 442. epiſt. 9. and epiſt. ad Attic. lib. i. ep. 17. vol. viii. p. 80.

But as for the common *publicans*, the collectors or receivers, as many of the Socii were, they are ſpoken of with great contempt, by Heathens as well as Jews; and particularly by Theocritus, who ſaid, that among the beaſts of the wilderneſs, bears and lions are the moſt cruel; among the beaſts of the city, the *publican* and paraſite.

The reaſon of this general hatred was, without doubt, their rapine and extortion. For having a ſhare in the farm of the tribute, at a certain rate, they were apt to oppreſs the people with illegal exactions, to raiſe as large a fortune as they could for themſelves. Beſides, *publicans* were particularly odious to the Jews, who looked upon them to be the inſtruments of their ſubjection to the Roman emperors; to which they generally held it ſinful for them to ſubmit. So that paying tribute to the Roman emperor they looked upon to be a virtual acknowledgement of his ſovereignty. This was, therefore, a peculiar grievance, and created an averſion to the collectors, as the inſtruments of illegal oppreſſion, apart from all conſideration of their rapacious practices. Moreover, the Jews, who accepted the office of *publicans*, were on that account hated of their own nation equally with heathens; and according to the rabbies it was a maxim; a religious man, who becomes a *publican*, is to be driven out of the ſociety of religion.

Publicans was alſo a name given to the **Arnoldists** and **Albigenses**.

PUBLICANDIS, *regula de*. See **Rule**.

PUBLICATION, *publicatio*, the act of *promulgating*, or making a thing known to the world.

By the canons, *publication* is to be made of the banns of marriage three times before the ceremony can be ſolemnized; without eſpecial licence to the contrary. See **Marriage**.

Publication, is uſed of depoſitions of witneſſes in a cauſe in chancery, in order to the hearing; and rules may be given to paſs *publication*; which is a power to ſhew the depoſitions openly, and to give out copies of them, &c. There is alſo a *publication* of a will, which is a ſolemnity requiſite to the making thereof, by declaring it to be the laſt will of the teſtator, in the preſence of a number of witneſſes; and a will which hath been made many years, may be new publiſhed, with additions, and that makes it equivalent to a new will. 3 Nelſ. abr. 27.

Publication *of libels*. See **Libel**.

PUCCOON, *ſanguinaria*, in *Botany*, a genus of the *polyandria monogynia* claſs. Its characters are theſe: the empalement of the flower is compoſed of two oval, concave leaves, which fall away; it hath eight oblong, obtuſe, ſpreading petals, which are alternately narrow; it has many ſingle ſtamina, which are ſhorter than the petals, terminated by ſingle ſummits; and an oblong compreſſed germen, having no ſtyle, crowned by a permanent thick ſtigma, with two channels; the germen becomes an oblong bellied capſule with two valves, pointed at both ends, incloſing round acute-pointed ſeeds. We have but one ſpecies of this genus, which is a native of the northern parts of America.

The roots of this plant are tuberous, and the whole plant has a yellow juice, with which the Indians paint themſelves.

PUCELAGE, in *Natural Hiſtory*, a name by which ſome authors among the French have called the **porcelain-***ſhells*.

PUCELLAGE, *pucellagium*, in an ancient manuſcript written **puellagium**, denotes the ſtate of **virginity**, or maidenhead.

PUCERON, the name given by naturaliſts to a ſmall inſect of a peculiar nature, frequently found on the young branches of trees and plants, often in ſuch cluſters as wholly to cover them. See *Tab. of Inſects*.

The *puceron* is a ſmall animal, but very numerous in the ſeveral genera and ſpecies; inſomuch that Reaumur has obſerved that there is ſcarce a vegetable to be found, either in the fields or gardens, that has not its peculiar ſpecies of *puceron* to feed on its juices. Mr. de la Hire, of the Paris Academy, has left many curious particulars in regard to theſe animals in the Memoirs of the year 1703; and Mr. Leewenhoek, and others ſince, have given figures and deſcriptions of ſeveral of the ſpecies.

Pucerons are all vivaporous animals, and that after a very ſingular manner. It is to be obſerved, that the name is ſcarce more expreſſive of the creature, than ſome of the others given of late to inſects; that of the polype to a creature which has no legs or feet at all, is very improper; as that of the *puceron* hardly leſs ſo, as it would naturally lead us to imagine, that the creature thus called was able to hop like a flea, whereas, in reality, it is very ſlow in its motion, and ſeldom ſo much as walks.

Theſe creatures have ſix legs, which are extremely ſmall and ſlender; and which, when the animal is at its full growth, are loaded with a weight ſo large, that they ſeem ſcarce able to ſupport it. Some of the ſpecies arrive at a tolerable bigneſs from common obſervation; but the greater number are too ſmall to be accurately ſeen without the aſſiſtance of glaſſes. Among theſe inſects there are great numbers that in their full perfection have wings, and become a ſort of little flies: theſe are diſtinguiſhed from the others by the name of *alated pucerons*.

Thoſe ſpecies which never become winged, have nothing of the appearance of the caterpillar kind; having not long, but ſhort bodies, and much reſembling flies whoſe wings had been taken off. All the ſpecies have antennæ or horns; but theſe in the ſeveral kinds are very different from one another, ſome being very ſhort, and others as remarkably long; and of theſe laſt kinds, ſome carry them ſtraight before the head, as is the uſual cuſtom, and others carry them laid along over their backs; in ſome of theſe the horns are longer than the body. But beſide theſe antennæ, the greater number of theſe creatures have two other horns or ſpines placed in a very ſingular manner behind them, near the tail. They are placed at ſome diſtance at their origin, but they become more diſtant as they go out from the body. Theſe are much thicker and much ſhorter than the antennæ; and there are among the various kinds of them, ſome which actually want them, and others which appear to want them, though they have them in reality; and others have in the places of them certain round ſpots, which ſtand juſt where they ſhould, and ſeem deſtined to perform their functions.

The ſeveral kinds of *pucerons* differ greatly in colour. The greater number of them are green; but many are brown, ſome yellow, and ſome are black. In Auguſt the roſe-trees afford a vaſt number of them of a pale red, and ſome exactly of the colour of the damaſk roſe; in ſome other months of the year we find green ones on the roſe-trees. The ſycamore and ſeveral other plants afford green ones in the ſummer, and red ones in November; and there ſeems no doubt, but that theſe are the ſame individual animals which change colour, the leaves and juices of the plants being not capable of affording them the ſame ſort of nouriſhment at ſome times that they do at others. Some of them alſo are of a duſky colour, and others bright and ſhining, as if varniſhed over. Thoſe of the willow, of the poppy, and ſome other plants, are of a cloth-like appearance, and ſome reſemble velvet; others, as thoſe of the apricot, and of the catch-fly, are ſhining, as if covered with the fineſt lacquer. Some appear of the colour of bronze metal, when it has its higheſt poliſh; ſuch are thoſe of the tanſy, and ſome other plants. The largeſt kind are found on the oak and other trees. The gooſeberry buſh affords a ſpecies that are of the colour of mother of pearl; and, in general, the ſkin or covering of thoſe ſpecies which are thus bright and ſhining, is much harder and firmer than that of the others. The more uſual ſpecies are all over of one colour, but there are ſome others which are ſpotted; that of the common wormwood is prettily ſpeckled with black and brown; thoſe of the ſorrel are green in the middle, and black at each extremity; and there are ſeveral others, as of the willow, &c. that are variegated with theſe two colours.

It is not certain, however, that all the ſpecies are peculiar to the plants upon which they are found; for it has been obſerved, that when a plant of the common wormwood has been full of them, by ſome accident they all have left it to fix themſelves upon plants in the neighbourhood, which had juices of a leſs diſagreeable taſte. Theſe creatures always live in companies; we never find them ſingly on plants; and very ſeldom otherwiſe than in extremely great numbers. In plants they faſten themſelves on every part; but in trees they only ſeize upon the leaves and young ſhoots, and they uſually cover theſe entirely, leaving no part to be ſeen.

The elder is the tree on which they are of all others the moſt plentifully produced, and on which they are obſerved in their ſeveral ſtages with the greateſt accuracy and eaſe. They often cover the thick green roots of this tree for many inches together, and ſometimes for many feet; and they are always placed ſo cloſe together, that they touch in every part, and ſometimes they lie in two beds, one over another. Theſe are of a greeniſh black. If they are obſerved on the branches undiſturbed, they are always found to be perfectly quiet, and ſeem to paſs their whole lives in inaction; but they are all this time doing the moſt neceſſary buſineſs of life, that is, ſucking in their nouriſhment from the juices of the tree. They do this by means of a fine ſlender trunk, which eaſily eſcapes the naked eye; but is always found by the miſcroſcope, and it is by means of this that they pierce the bark of the tender parts of the vegetables, and get at their juices. The trunk is uſually of two thirds of the length of the body; but when they are moving on, it is always applied ſo cloſely under the belly, that it is not ſeen.

When there are two ſeries of theſe inſects placed one over another, they are always more looſely placed in the upper ſeries, and theſe are uſually the larger, and the nimbler in all their motions. In this caſe they have no power of ſucking the plant; for beſide that it is cloſe covered with the other ſeries, their trunks are not long enough to reach and penetrate it from the height at which they ſtand above it. Theſe, therefore, are ſuch as have no farther need of nouriſhment, but are employed in propagating their ſpecies.

Mr. Reaumur ſaw them brought forth; and indeed Mr. Leewenhoek long before ſaw, by the help of microſcopes, the young animals perfectly formed, though extremely minute, in the bodies of the full grown females.

They are a ſort of animal which propagates ſo quickly, that uſually there are many females on the ſame leaf or branch of a plant in labour at the ſame time; and their fecundity is ſo great, that when they have once begun to bring forth young ones, they ſeem to continue it inceſſantly for a long time together. They will often bring forth fifteen or twenty ſucceſſively, and if their bodies be a little ſqueezed afterwards, there are forced out of them a vaſt number of others leſs mature.

Theſe little inſects are extremely plentiful on many different trees, and are very eaſily obſerved in their ſeveral ſtages and progreſſions by a curious ſearcher after them; but if at any time they are not ſo eaſily found, the perſon who ſeeks after them may be conducted to them by the ants, which he will find moving in great numbers on the trees and plants where they are, and pointing out the way to them.

Mr. Leewenhoek, Hartſoeker, and others, have obſerved this, and have ſuppoſed that the ants fed on them, by their frequenting the places where they are found; but that is far from being the caſe, the ants, on the contrary, ſeem to love them as friends. We may eaſily find out the reaſon of the ants following the cluſters of *pucerons*, without doing them any injury, when we conſider that the ants love ſugar and all ſweet things, and the places about which the *pucerons* are, have uſually the cavities filled with a thick ſaccharine matter, and this the ants feed upon.

The moſt natural opinion would ſeem, that this was the juice of the tree ſimply extravaſated; but experience ſhews that it has another origin: it is really the excrement of theſe *pucerons*; they receive no ſolid food into their bodies, all that is conveyed into them coming through their trunk, which is an extremely fine pipe; and as none but a very thin and pure juice can be received through ſuch an organ, it is no wonder that the creature, which lives wholly upon it, ſhould void no ſolid excrements. The drops of this liquor are not ſo frequently found on the leaves of plants as might be expected, and that becauſe many of them are immediately devoured by the ants, and many others are dried up by the ſun; but they may always be found collected in ſome quantity in the bladders of the elm, and other trees inhabited by theſe creatures, as there the liquor is defended from the heat of the ſun, and is ſafe from being deavoured.

The *puceron*, like moſt other inſects, changes its ſkin three or four times before it arrives at its full growth. Theſe exuviæ perfectly reſemble the animal in its natural ſtate, the legs and other parts being all in their proper places; but whatever is the colour of the ſpecies of *puceron*, theſe ſkins which it caſts are whitiſh.

The male and female *pucerons*, as they are uſually ſuppoſed to be, differ greatly from one another in form, even in their time of growing, but much more eminently at the time of their maturity, the male having then wings, which the females never have. Leewenhoek and others, who have treated of theſe animals, have ſuppoſed that they all became at length little flies, that is, were winged; but this is a great error.

Notwithſtanding, however, the general opinion, that the winged *pucerons* are all males, and the unwinged ones females, it appears that their manner of generation is yet unknown to us. This opinion was formed too haſtily by ſome from a ſuppoſed analogy of theſe and other inſects; but later obſervations prove that this is not ſtrictly the caſe: for that the winged ones, as well as the others, bring forth young ones. Some have ſuppoſed, that theſe winged and naked *pucerons* were the offspring of different families of ſeveral ſpecies living together; but the contrary is proved by this, that the winged ones are found to produce ſome winged and ſome naked ones; and the naked to produce both kinds in the ſame manner. Some have imagined, that they found the male *pucerons* among the others, obſerving ſome of a flatter ſhape, in whoſe bodies there were never found any young ones, as there always were in the others, even when they were very young; but theſe have been ſince found to be only ſuch females as had already brought forth their offſpring.

The young *pucerons* being themſelves filled with embryos, and that in every individual, ſo that all that have been ever examined appear mothers, has given many ſtrange ideas of the manner of their generation: many have imagined them all to be hermaphrodites: and as no copulation has ever been obſerved among them, they are by ſome ſuppoſed to be able to impregnate each itſelf. The later opinion, however, is, that when a female is once impregnated by a male, ſhe will bring forth young ones already impregnated with others, and thus to the third or fourth ſucceſſion; ſo that copulation is only neceſſary to theſe animals once in three or four generations, and the children and children's children of an old *puceron* that has had congreſs with a male, will bring forth young ones without having ever had any ſuch congreſs. Reaumur's Hiſt. Inſ. vol. vi. p. 9, &c. See WOOD-*puceron*, OAK-*puceron*, &c.

PUCERON, *bladder*, a ſort of *puceron* that lives in bladders on the leaves of trees. See PUCERON, *ſupra*.

We often obſerve on the leaves of different trees, a ſort of roundiſh bladders, which only adhere to the leaf by a ſhort pedicle: theſe are a ſort of ſmall galls, and their figure varies much in the different kinds; ſome are leſs round than others, and many are very rough on the ſurface, and ſometimes they are long, terminating in a point, and being broader at the baſe than in any other part, and ſuſtained by no pedicle, but fixed immediately to the leaves.

The elm and aſh affords us more frequent inſtances of theſe than any other trees, and very often on the firſt of theſe they grow to the bigneſs of a nut, and ſometimes much larger; and when they are grown to their full ſize, they often take up the whole ſurface of the leaf. When theſe bladders are opened, they are found to contain a large number of *pucerons*.

If theſe bladders are examined at the time when they are but newly riſen, which uſually is the beginning of June, on opening them there is uſually found in them only one *puceron*, and that always a female big with young; and in others more advanced, the parent inſect is found ſurrounded with different numbers of her young ones. Theſe bladders have all of them at firſt only one female *puceron*; but afterwards they have more, as they become larger; and the largeſt of all are uſually found filled with a prodigious number of young ones. The newly riſen bladders are always found cloſe and firm in every part, the aperture, at which the female *puceron* had entered, being uſually neatly and cloſely ſtopped up. The queſtion is, how this bladder was formed?

The method of the formation of them ſeems to be this: as ſoon as the female *puceron* is produced, ſhe fixes her trunk into the leaf to ſuck its juices; the conſequence of this in all the *pucerons* is, that the ſurface of the leaf ſeparates a little from the nervous part: in the common caſes the creature takes no advantage of this, but only continues ſucking the juices; but in this kind the female, as ſoon as ſhe has made the ſeparation between the parts of the leaf, gets into the cavity that is formed there, by enlarging the orifice firſt made by the trunk, till it will admit her body. When once in, ſhe works forward in a ſtraight line, and the hole behind her ſoon cloſes up, as there was no rupture, but only a ſtretching open of the parts of the leaf. The female thus finds herſelf in a ſecure place, and the elevation ſhe makes in the leaf is ſcarce perceivable, only appearing as an oblong ſmall ſpecies of gall. The mark of the aperture at which ſhe made her way in is always to be ſeen at ſome diſtance behind her, though uſually very neatly cloſed up: thus the whole continues till the creature produces her young. But then the ſcene is quite altered; the young ones begin to ſuck as ſoon as produced, and as they uſually ſeize upon the ſides of the ſmall gall, already formed for that purpoſe, this derives more juices than otherwiſe would flow into it; and it begins to elevate itſelf much higher, and forms a tubercle of the ſhape of a nut or pear.

Its growth in this caſe is entirely analogous to that of the common galls on the branches of trees, &c. and all the difference in the ſhape of the ſeveral bladders, is owing to the manner of the young *puceron* ſucking; for if they ſuck much at its baſe, that enlarges and becomes the broadeſt part, as is the caſe in the conic and pointed ones; but if they let this alone, and ſuck only the ſides and upper part, they ſwell while this does not, and conſequently this forms a ſort of pedicle to the growing bladder.

PUCERON, *baſtard*. See FIG-*inſect*, and GRUB *of the box*.

PUCERON, *earth*. See EARTH.

PUCERON, *grub*. See GRUB.

PUCERON-*eater*, or *Lion*-PUCERON. See LION-*puceron*.

PUCERON, *oak*. See OAK.

PUCERON, *ver*. See VER *puceron*.

PUCERON, *wood*. See WOOD.

PUCKAUN *beady*, in *Natural Hiſtory*, a name given by the people of the Eaſt Indies to a peculiar ſpecies of orpiment, which they uſe in medicine.

They find it on the hills and on the banks of rivers. It is prepared by ſeveral tedious proceſſes, and then is given with ſucceſs in a diabetes.

PUDDENING, in a *Ship*, a thick wreath or circle of cordage, tapering from the middle towards the end, and faſtened about the main-maſt and fore-maſt of a ſhip, to prevent their yards from falling down, when the ropes by which they are uſually ſuſpended are ſhot away in battle.

The *puddening* is generally formed in the following manner: a ſmall piece of rope, whoſe length is twice the diameter of the maſt, is ſpliced together at the two ends; and being thus doubled and extended, a thimble is ſeized into each of the extremities. After this a large quantity of PARCELLING is firmly wound about its ſurface in ſuch a manner as to make it gradually larger from the two ends towards the middle. It is afterwards once or twice ſewed with ſpun-yarn throughout the whole length, to bind the parcelling more cloſely, and render it more compact; and the whole is completed by pointing it on the ſurface. Being then fitted with the laniard at one of the eyes, it is fixed about the maſt by paſſing the laniard alternately through both eyes or thimbels on the fore ſide of the maſt. Falconer. See Dolphin.

Puddennings are alſo ropes nailed to the arms of the main and fore-yards, near the ends, and then at three or four due diſtances inwards one from another, in order to keep the robbins from galling or wearing aſunder upon the yards, when the top-ſail ſheets are haled home.

They call alſo thoſe ropes which are wound about the rings of anchors, to ſave the clinch of the table from being galled with the iron, by this name; ſo that when the ring is ſo ſerved, it is called the *puddening of the anchor*.

PUDDING-*graſs*, a name by which the *pulegium*, or penny-royal, a ſpecies of MINT, is called.

Pudding-*pipe-tree*, the Engliſh name of a genus of plants, called by botanical writers CASSIA.

Pudding-*ſtone*. See Oculatus *lapis*.

PUDENDUM denotes a thing to be aſhamed of. Hence, *pudendum virile*, and *pudendum muliebre*. See Genital.

It is remarkable, that among the fiſh-tribe, all that are oviparous have no *pudenda*, properly ſpeaking; that is they have no penis or vulva, unleſs the ovaria of the females, and the veſiculæ ſeminales of the males, may be called by that name.

The viviparous fiſh, on the other hand, as the cetaceous fiſh in particular, and many kinds of the cartilaginous, have the penis and vulva, diſtinctly and properly ſo called. Artedi Ichthyolog.

Pudendum *regale*. See Aphrodita.

PUDIANO, called alſo *pediano* and by others *vermelho*, *apaimixira*, and *tetimixira*, a fiſh of the ſize of a middling pearch, but not ſo broad as that fiſh. Its whole body is of a gold yellow; but that the upper part of its head, and its back, to the end of the back-fin, are of a very beautiful purple; the rim or edge of the belly-fin is alſo purple, and the reſt of a gold yellow. It is a wholeſome and well-taſted fiſh.

Pudiano *verde*, in *Ichthyology*, the name of an American fiſh of a very remarkable colour, and very well-taſted and wholeſome. See *Tab.* IV. *of Fiſh*, N° 40.

It is of an oblong ſhape, and its uſual ſize is about ten fingers long, and three broad in the broadeſt part; for towards the tail it is but about half that breadth.

PUDICA *planta*. See Sensitive *plant*.

PUERI *alimentarii*. See Alimentarii.

PUERILE *ſtyle*. See Style.

PUERILITY, in *Diſcourſe*, is by Longinus defined to be a thought, which, by being too far fetched, becomes flat and inſipid. *Puerility*, he adds, is the common fault of thoſe who affect to ſay nothing but what is brilliant and extraordinary.

PUERITIA, or *childhood*, in the *Civil Law*, denotes the age of minors from ſeven to fourteen, which was divided into two equal parts; from ſeven to ten and a half, which was *ætas infantiæ proxima*; and from ten and a half to fourteen which was *ætas pubertati proxima*; during which ſtage they were puniſhable, if found to be *doli capaces*, or capable of miſchief; but with many mitigations, and not with the utmoſt rigour of the law.

PUERORUM *epiſcopus*. See Episcopus.

PUERPERAL (from *puer*, *child*, and *pario*, *I bear) fever*. See Fever.

PUFF-*ball*, the common Engliſh name for the *fungus pulveris lentus*, or lycoperdon; the characters of which are theſe: the whole plant, while young, is of the fleſhy ſubſtance of the muſhrooms, and of a roundiſh figure; but when ripe, it becomes hollow, and full of an extremely ſubtile powder.

The ſpecies of lycoperdon, enumerated by Mr. Tournefort, are twenty-ſeven, and by Linnæus eleven.

The duſt contained within this body (which when it is cruſhed, flies out in an inconceivably fine powder, in form of a cloud of ſmoak) when examined by the microſcope, appears to be a multitude of regularly figured, though extremely ſmall bodies. Theſe require the moſt powerful magnifiers to diſtinguiſh them, and are found to be little globules of an orange colour, and ſomewhat tranſparent; and ſo ſmall, that the cube of the diameter of a hair would be equal to a hundred and twenty-five thouſand of them. In other ſpecies of this muſhroom, the globules are evidently ſeen to be ſo many *puff-balls*, being of a darker colour, and having each a little ſtalk or tail; by means of theſe ſtalks they penetrate into the ground, when ſhed from their parent plant.

The duſt of theſe muſhrooms is very hurtful to the eyes, and we have had inſtances of perſons being blinded for a long time by it, with violent pain, ſwelling and inflammation; and this is probably owing to the ſharpneſs of theſe almoſt inconceivably minute ſtalks or tails. Baker's Microſcope, p. 255.

PUFFIN, in *Ornithology*, a name by which ſome call the anas arctica Cluſii, or the northern duck, or *alca* arctica of Linnæus.

This bird weighs about twelve ounces; its length is twelve inches, and the breadth from tip to tip of the wings extended, twenty-one inches; the bill is ſhort, broad at the baſe, compreſſed on the ſides, and running up to a ridge, triangular, and ending in a ſharp point; the baſe of the upper mandible is ſtrengthened with a white, narrow, prominent rim, full of ſmall holes; the bill near the head is of a bluiſh grey, and the lower part red; in the former is one tranſverſe furrow, in the latter three furrows; and the ſize of the bill varies in different birds; the noſtrils are long and narrow; the irides are grey, and the edges of the eye-lids of a fine crimſon; on the upper eye-lid is a ſingular callous ſubſtance, grey, and of a triangular form; on the lower is another of an oblong form; the crown of the head, whole upper part of the body, tail and covert feathers of the wing, are black; the quill-feathers are of a duſky hue; the cheeks are white, and full of feathers; the chin of the ſame colour, bounded on each ſide by a broad bed of grey; from the corner of each eye is a ſmall ſeparation of the feathers, terminating at the back of the head; the neck is encircled with a broad collar of black, but the whole lower part of the body is white; the tail is compoſed of ſixteen feathers, and black; the legs ſmall, of an orange colour, and placed ſo far behind as to render it incapable of ſtanding otherwiſe than in an erect poſition, reſting not only on the foot but the whole length of the leg, which circumſtance makes the riſe of the *puffin* from the ground very difficult; but when it gets on the wing, few birds fly longer or ſtronger.

Theſe birds frequent the coaſt of ſeveral parts of Great-Britain and Ireland, but are moſt numerous in Prieſtholm iſle, off the coaſt of Angleſea. They are birds of paſſage, reſorting there annually about the fifth or tenth of April; quit the place, and return twice or thrice before they ſettle to burrough, and prepare for ovation and incubation. They begin to borough the firſt week in May; but ſome diſlodge the rabbits, and make uſe of their holes. The taſk of boroughing falls chiefly to the males, which alſo aſſiſt in incubation. The firſt young are hatched in the beginning of July, to which the old ones diſcover a very ſtrong affection, which ceaſes at the ſtated time of migration, taking place punctually about the eleventh of Auguſt, when they leave ſuch young as cannot fly to the mercy of the peregrine falcon. They lay only one egg, and the eggs are of very different forms. The fleſh of theſe birds is exceeding rank, as they feed on weeds and fiſh, eſpecially ſprats; but when pickled and preſerved in ſpices, they are admired by thoſe who love high eating. Dr. Caius tells us, that in his time the church allowed them in Lent inſtead of fiſh. They are taken by digging them out, or drawing them from their burrows with a hooked ſtick. Their noiſe, when taken, is very diſagreeable, being like the effort of a dumb perſon to ſpeak. The winter reſidence of this genus is but imperfectly known; it is probable they live at ſea, in ſome more temperate climate, remote from land, forming thoſe multitudes of birds which navigators obſerve in many parts of the ocean; they are always found there at certain ſeaſons, retiring only at breeding time; repairing to the northern latitudes; and during that period are found as near the pole as navigators have penetrated. Pennant.

Puffin, *Manks*. See Shear-*water*.

PUFFINET, in *Ornithology*, the name of a bird known among authors by that of the *columba Groenlandica*, or the Greenland or ſea turtle-dove.

It is common on the northern coaſts, and is black all over, except two ſmall ſpots on its head; but it is pretended by ſome, that in winter it turns white.

PUGIL, from *pugillus*, *little hand*, among *Phyſicians*, &c. a meaſure of flowers, ſeeds, or the like matters, containing ſo much as may be taken up between the thumb and two fore-fingers.

The *pugil* is eſteemed the eighth part of the MANIPULE or handful; though ſome confound *pugil* with *manipulus*, and uſe it for a handful. The French frequently call it *pincée*, a *pinch*.

PUGNAX *avis*, in *Ornithology*, the name of the bird called in Engliſh the RUFF, and the female of which is the *reeve*. It has its Latin name from its quarrelſome diſpoſition, the males being always fighting.

PUGNITIUS, in *Ichthyology*. See Stickle-*back*.

Pugnitius *longus*, in *Ichthyology*, the name of a Weſt India ſea-fiſh caught about Chili and in ſome other places, and approaching in many particulars to the European *pugnitii*.

It is a ſmall animal; its body is ſquare, and of a tender conſtruction; of the thickneſs of a finger, and of five, ſix, or ſeven inches long, becoming gradually ſmaller towards the tail; its ſkin is ſmooth, and its back is black; its belly yellow; its head reſembles that of the pike, but that the noſe is ſomewhat longer; it has two fins at the gills, one of a triangular ſhape on the back; and from this to the neck there is placed a row of fifteen prickles, which bend a little backward, and are not connected by a membrane. On the middle of the belly it has alſo two ſpines at the two ſides, and one behind the anus; behind this there is a fin anſwering to that on the back, and the body is terminated by a fine ſmall tail.

PUIS *darrein continuance*, q. d. ſince the laſt adjournment, in *Law*, a plea which the defendant may plead even after iſſue or demurrer joined, when ſome new matter ariſes, at the day given for his next appearance. Pleas of this kind, when brought to a demurrer in law, or iſſue of fact, ſhall be determined in like manner as other pleas.

PUISNE, *puny*, in *Law*, a younger-born; or a child born after another.

The word is French, in which language it bears the ſame ſignification.

Puiſne is not only applied to the ſecond, third, fourth, &c. with regard to the firſt; but to the third with regard to the ſecond, &c. The laſt of all is called abſolutely *cadet*.

In the like ſenſe we ſay a *puiſne judge*, a *puiſne counſellor*. Three of the judges of the court of common pleas are called *puiſne* juſtices; and alſo three of the BARONS of the court of exchequer are diſtinguiſhed by the ſame appellation.

PUKING, a cant word for a NAUSEA, or diſpoſition to vomit. See VOMITING.

PUL, in *Commerce*, a general name which the Perſians give to all the copper monies current in that empire.

Olearius, who was at Iſpahan in 1637, in the retinue of the ambaſſador of Holſtein, aſſures us, that each city in Perſia has its ſeveral copper money, marked with its particular badge, which is only current in that diſtrict, and is changed every year. At the beginning of each year, which is at the vernal equinox, all the old money is cried down, and the new appears in its place.

Both the emperor and the ſtate find their intereſt in this frequent change: the firſt, in that he only gives at the rate of 17*d.* ſterling per pound for copper; yet delivers it out coined in *kabeſqui* and *demi-kabeſqui*, at about 2*s.* per pound: the ſecond, in that the copper money is by this means leſs abundant, being reduced each year to nearly the ſame quantity.

PULCHER *piſcis*, in *Ichthyology*, a name given by Gaza to the fiſh commonly known by the name of the *uranoſcope*, or ſtar-gazer. See URANOSCOPUS.

It is a ſpecies of the trachinus, and diſtinguiſhed by Artedi by the name of the *trachinus* with many beards on the lower jaw.

PULEGIUM, in *Botany*. See PENNY-*royal*.

PULEX. See FLEA.

PULEX *aquaticus*. See *Water* BEETLE, and MILLEPEDES.

PULEX-*eaters*, a name given by naturaliſts to a ſort of worms frequently found on the leaves of trees, where they devour the animals called *pulices arborei*.

Of theſe there are ſeveral ſpecies, which owe their origin to the eggs of different creatures; for they are none of them in their ultimate ſtate in this their time of feeding. According to the different animals whoſe eggs they are hatched from, theſe are of different form and ſtructure: ſome are hexapodes, or endued with ſix feet; theſe belong to the beetle tribe, and finally change into beetles like the parent animals from whoſe eggs they ſprung; others have no legs, and are produced from the eggs of flies of various kinds: and finally, others are genuine caterpillars, though ſmall; but theſe are the moſt rare of all. The two general kinds are the hexapodes or beetle-worms, and the apodes, or fly-worms. The fly which gives origin to the laſt of theſe is a four-winged one, and takes care always to depoſit her eggs in a place where there are plenty of the *pulices*, uſually on the ſtalk or young branches of a tree in the midſt of large families of them. The worm, as ſoon as hatched, finds itſelf in the midſt of abundance of food, preying at pleaſure on theſe animals, which are wholly defenceleſs. The ſtalk of the elder and woodbine are frequently found covered over with theſe *pulices*, and among them there may uſually be found one or more of theſe deſtroyers feeding at will, ſucking in the juices from their bodies, and then throwing away the dry ſkins. Beſides the worms of this four-winged fly, there is one of a two-winged waſp-fly, very diſtructive of theſe animals. Reaumur's Hiſt. Inſ. tom. i.

PULEX-*arboreus*, in *Natural Hiſtory*, the name given by Mr. Reaumur to a very large genus of ſmall animals. They are a kind of half-winged creatures; they have granulated antennæ, and ſome of them, in their moſt perfect ſtate, have complete wings. Theſe are diſtinguiſhed from the others by the name of *muſca pulex*, or the *winged pulex*.

The ſeveral ſpecies of theſe creatures are of different colours; ſome are brown, others yellow; but the moſt frequent are green. They all feed upon the leaves of trees, which become withered and curled up on their eroding them; and they are ſo common, that wherever a leaf of a tree is found curled up, or of a different form from the others, it is highly probable theſe animals are on it, or that it is their work. Among trees the willow and the roſe are moſt infected by them; and among plants, the bean and the poppy. They live a ſocial life, multitudes of males and females being found together. The females are eaſily diſtinguiſhed from the males, by their being thicker in the body, and having larger bellies.

It is very wonderful, that of all the known animals of the winged kind, theſe are the only ones which are viviparous. This is eaſily ſeen beyond a poſſibility of doubt; for, on examining a cluſter of them together, it is a common thing to ſee, by the help of a ſmall magnifier, a female in the act of parturition; and the author of this account frequently ſaw the young *pulex* protruded out, from a paſſage near the anus of the female, perfectly formed. He had ſuſpected this from the total want of eggs among ſo numerous a tribe of animals, and from their remarkably ſpeedy propagation, and was thus convinced of it by ocular demonſtration. Reaumur's Hiſt. Inſects, tom. i.

PULLEY, in *Mechanics*, one of the five MECHANICAL *powers*; conſiſting of a little wheel, or rundle, having a channel around it, and turning on an axis, ſerving, by means of a rope which ſlides in its channel, for the raiſing of weights.

The Latins call it *trochlea*; and the ſeamen, when fitted with a rope, a *tackle*. An aſſemblage of ſeveral *pulleys* is called a ſyſtem of *pulleys*, or POLYSPASTON: ſome of which are in a block or caſe, which is fixed; and others in a block which is moveable, and riſes with the weight. The moveable wheel or rundle, is called the *ſheave* or *ſhiver*; the axis on which it turns, the *gudgeon*; and the fixed piece of wood or iron, into which it is put, the *block*.

Doctrine of the PULLEY. 1. If the equal weights W and P (*Tab.* VI. *Mechanics*, *fig.* 100.) hang by the cord B B upon the *pulley* A, whoſe block *b* is fixed to the beam H I, they will counterpoiſe each other, juſt in the ſame manner as if the cord were cut in the middle, and its two ends hung upon the hooks fixed in the *pulley*, at A and A, equally diſtant from its centre. See MECHANICAL *powers*.

Hence a ſingle *pulley*, if the lines of direction of the power and the weight be tangents to the periphery, neither aſſiſts nor impedes the power, but only changes its direction.

The uſe of the *pulley*, therefore, is when the vertical direction of a power is to be changed into an horizontal one; or an aſcending direction into a deſcending one; and on the contrary.

This is found a good proviſion for the ſafety of the workmen employed in drawing with the *pulley*.

This change of direction by the means of a *pulley* has this farther advantage; that if any power can exert more force in one direction than another, we are here able to employ it in its greateſt force.

Thus, e. gr. a horſe cannot draw in a vertical direction, but draws with all its advantage in a horizontal one. By changing the vertical draught, therefore, into a horizontal one, a horſe becomes qualified to raiſe a weight.

But the grand uſe of the *pulley* is, where ſeveral of them are combined; thus forming what Vitruvius, and others after him, call *polyſpaſta*; the advantages whereof are, that the machine takes up but little room, is eaſily removed, and raiſes a very great weight with a moderate force.

2. If a weight W hangs at the lower end of the moveable block *p* of the *pulley* D (*fig.* 100), and the cord G F goes under the *pulley*, it is plain that the half G of the cord bears one half of the weight W, and the half F the other; for they bear the whole between them. Therefore, whatever holds the upper end of either rope, ſuſtains one half of the weight; and if the cord at F be drawn up ſo as to raiſe the *pulley* D to C, the cord will then be extended to its whole length, except that part which goes under the *pulley*; and conſequently, the power that draws the cord will have moved twice as far as the *pulley* D with its weight W riſes; on which account, a power whoſe intenſity is equal to one half of the weight, will be able to ſupport it, becauſe if the power moves (by means of a ſmall addition) its velocity will be double the velocity of the weight; as may be ſeen by putting the cord over the fixed *pulley* C (which only changes the direction of the power, without giving any advantage to it) and hanging

on the weight P, which is equal only to one half of the weight W; in which caſe there will be an equilibrium, and a little addition to P will cauſe it to deſcend, and raiſe W through a ſpace equal to one half of that through which P deſcends. Hence, the advantage gained will be always equal to twice the number of *pulleys* in the moveable or undermoſt block. So that, when the upper or fixed block *u* contains two *pulleys*, which only turn on their axes, and the lower or moveable block U contains two *pulleys*, which not only turn upon their axes, but alſo riſe with the block and weight, the advantage gained by this is as four to the working power. Thus, if one end of the rope K M O Q be fixed to a hook at I, and the rope paſſes over the *pulleys* N and R, and under the *pulleys* L and P, and has a weight T of one pound hung to its other end at T. this weight will balance and ſupport a weight W of four pounds, hanging by a hook at the moveable block U, allowing the ſaid block as a part of the weight. And if as much more powder be added, as is ſufficient to overcome the friction of the *pulleys*, the power will deſcend with four times as much velocity as the weight ariſes, and conſequently through four times as much ſpace. The two *pulleys* in the fixed block X, and the two in the moveable block Y, are in the ſame caſe with thoſe laſt mentioned; and thoſe in the lower block give the ſame advantage to the power. See Polyspaston.

It is neceſſary to obſerve, that if the lower *pulleys* do not riſe all together in one block with the weight, as in the caſes juſt recited. but act upon one another, and the weight is only faſtened to the loweſt of them, the force of the power is very much increaſed, each *pulley* doubling it. E. g. A power whoſe intenſity is equal to 8 lb. applied at *a (fig.* 101.) will, by means of the lower *pulley* A, ſuſtain 16 lb.; a power equal to 4 lb. at *b*, will, by means of a lower *pulley* B, ſuſtain the power of 8 lb. acting at *a*; a third power equal to 2 lb. at *c*, will, by means of the *pulley* C, ſuſtain the power of 4 lb. at *b*; a fourth power of 1 lb. at *d*, will, by means of the *pulley* D, ſuſtain the power of 2 lb. at *c*; and this is not altered by having its rope carried over the upper *pulley* or roller E In the former caſes, the force of the power is augmented in an arithmetical proportion of the number of ropes or *pulleys*; but in this, in a geometrical proportion.

3. If a power move a weight by means of ſeveral *pulleys*, the ſpace paſſed over by the power will be to the ſpace paſſed over by the weight, as the weight to the power. Hence, the ſmaller the force that ſuſtains a weight by means of *pulleys* is, the ſlower is the weight raiſed: ſo that what is ſaved in force, is ſpent in time.

The common methods of arranging *pulleys* in their blocks, may be reduced to two. The firſt conſiſts in placing them one by the ſide of another, upon the ſame pin; the other, in placing them directly under one another, upon ſeparate pins. Each of theſe methods is liable to inconvenience. Mr. Smeaton, in order to avoid the impediments to which theſe combinations are ſubject, propoſes to combine theſe two methods in one. Accordingly, the *pulleys* are placed in each block in two tiers; ſeveral being upon the ſame pin, as in the firſt method, and every one having another under it, as in the ſecond; and ſo that, when the tackle is in uſe, the two tiers that are the remoteſt from one another, are ſo much larger in diameter than thoſe that are neareſt, as to allow the lines of the former to go over the lines of the latter without rubbing. From this conſtruction ariſes a new method of reeving the line upon the ſhieves; for here, whatever be the number of ſhieves, the fall of the tackle will be always upon the middle ſhieve, or on that next to the middle, according as the number of *pulleys* in each pin is odd or even. To do this, the line is fixed to ſome convenient part of the upper block, and brought round the middle ſhieve of the larger tier of the under block, from thence round one of the ſame ſort next the centre one of the upper block, and ſo on, till the line comes to the outſide ſhieve, where the laſt line of the larger tier falls upon the firſt ſhieve of the ſmaller, and being reeved round thoſe, till it comes at the oppoſite ſide, the line from the laſt ſhieve of the ſmaller tier again riſes to the firſt of the larger, whence it is conducted round, till it ends on the middle ſhieve of the upper block on the larger tier. See *Tab*. VI. *Mechanics*, *fig*. 102. Phil. Tranſ. vol. xlvii. art. 82. p. 494, &c.

As a ſyſtem of *pulleys* has no great weight, and lies in a ſmall compaſs, it is eaſily carried about, and can be applied, in a great many caſes, for raiſing weights, where other engines cannot be uſed. But they have a great deal of friction on theſe accounts; 1. becauſe the diameters of their axes bear a very conſiderable proportion to their own diameters; 2. becauſe in working they are apt to rub againſt one another, or againſt the ſides of the block; 3. becauſe of the ſtiffneſs of the rope that goes over and under them. Ferguſon's Mechan. p. 37, 4to.

PULLING, in *Sea Language*, denotes the act of rowing with the oars.

PULMO, in *Anatomy*. See Lungs.

Pulmo *marinus*, *ſea-lungs*, among *Naturaliſts*, a light ſpongious body, of a ſhining colour, like cryſtal, intermixed with blue, and uſually of a figure reſembling the human lungs; whence its name. It is alſo called Urtica *marina*, or the ſea-nettle.

It ſwims on the ſurface of the water, and is popularly reputed to preſage a ſtorm. It is commonly ſuppoſed to be only a viſcous excrement of the ſea, hardened by the ſun; but ſir Robert Sibbald and Dr. Merret rank it among the zoophytes. It ſhines in the night time, and communicates its luminous property to a ſtick rubbed therewith. Being applied to the ſkin, it raiſes an itching, and takes off the hair.

PULMONARIA, in *Botany*. See Lung *wort*.

PULMONARY *veſſels*, in *Anatomy*, are thoſe which carry the blood from the heart to the lungs, and back again from the lungs to the heart.

Theſe are two in number; viz. the *pulmonary artery* and *vein*.

The Pulmonary *artery*, which the ancients called *vena arterioſa*, the *arterial vein*, is, in reality, an artery, and is compoſed, like the reſt, of ſeveral tunics. It riſes from the right ventricle of the heart, and divides into two large branches; which, ſubdividing into ſeveral ſmaller, diffuſe themſelves throughout the whole ſubſtance of the lungs. See *Tab. Anat. (Angeiol.) fig*. 8 *lit. dd*, &c. *bb. fig*. 12. *lit. I.*

Pulmonary *vein*, which the ancients called *arteria venoſa*, the *venous artery*, conſiſts of four membranes like the other veins. It ariſes in the lungs from an infinity of little branches; which, uniting in one trunk, open into the left ventricle of the heart. See *Tab. Anat. (Angeiol.) fig*. 9 *lit. a. b. c. d. d. d.* See alſo Heart.

For the office of theſe veſſels, ſee Circulation.

Mr. Cowper gives us an inſtance of polypus in the *pulmonary vein*.

Pulmonary *conſumption*, or conſumption of the lungs, is what we properly call a phthisis. See Conſumption.

PULMONES *marinæ*. See Urtica *marina*.

PULMONIC *machine*, is a machine contrived for drawing freſh air, or medicated ſteams, into the lungs or throat, &c. Some have recommended for this purpoſe an inverted funnel: others have contrived machines for infuſing herbs, &c. and annexed to them tubes for inſpiring the ſteam or volatile parts thus obtained for them. A machine of this kind was contrived ſome years ago by Mr. Arden of Derby, which is deſcribed in the Gentleman's Magazine for 1748, vol. xviii. p. 486. A machine of this kind was contrived by Dr. Hales, for meliorating the air paſſing through the lungs of miners, &c. and is deſcribed in his Vegetable Statics, vol. i p. 264, &c. An inſtrument deſigned for ſimilar purpoſes, and called an inhaler, was lately invented by Mr. Mudge.

PULMONUM *anima*. See Anima.

PULP, *pulpa*, in fruits, the *fleſh*; or that ſoft and ſucculent part between the rind and the nucleous or ſeed.

The *pulp* of a tree or plant, is the parenchyma, which grows and ſwells by means of a juice, at firſt very coarſe and diſagreeable; at length ſweeter, and more delicate.

Pulp, in *Pharmacy*, denotes the ſoft part of fruits, roots, or other bodies, extracted by infuſion or boiling, and paſſed through a ſieve.

Pulp, in *Medicine*, denotes the fatteſt, fulleſt, and moſt ſolid part of the fleſh.

Some people apply the word particularly to the upper part of the belly, becauſe fleſhy; and becauſe it is here that they feel animals, to examine whether they be fat.

This part the Latins call *pulpa*, from *pulpare*, *to feel*, *handle*.

PULPIT, *pulpitum*, a term now reſtrained to an elevation, or apartment in a church, whence ſermons are delivered.

Some authors derive the word from *publicum*, becauſe people are there expoſed to open view.

Pulpitum, among the *Romans*, was a part of the theatre, called alſo proscenium, or what we now call the *ſtage*, whereon the actors trod.

Though ſome ſay it was properly an eminence on the ſtage for the muſic, or a ſuggeſtum whence declamations, &c. were ſpoken.

The French uſe the word *pulpit*, *pupitre*, for a reading-deſk in a church, library, or the like: thoſe large ones in churches they properly call *lutrins*.

PULSATILLA, in *Botany*. See Campana Floræ.

PULSATION, *pulſatio*, in *Medicine*, the motion of the Pulſe, or the beating of an artery.

PULSATOR, a name given by ſome writers to that ſpecies of beetle commonly known among us by the name of the DEATH-*watch*, and about which ſo many ſuperſtitious fancies prevail.

PULSE, *pulſus*, in the *Animal Oeconomy*, denotes the beating or throbbing of the heart and arteries.

The *pulſe* is that reciprocal motion of the heart and arteries, whereby the warm blood, thrown out of the left ventricle of the heart, is ſo impelled into the arteries, to be by them diſtributed throughout the body, as to be perceivable by the finger.

The pulſation of the arteries ariſes from that of the heart; and has, like it, a ſyſtole and a diaſtole; the ſyſtole of the one correſponding to the diaſtole of the other.

Galen tells us, that Hippocrates was the firſt who obſerved the motion of the *pulſe*. M. Homberg mentions a caſe of a woman in Paris, who had a *pulſe* in the veins, perfectly like that we commonly obſerve in the arteries. He adds, that he is the firſt author that ever mentioned ſuch a thing.

The *pulſe* is thus accounted for. When the left ventricle of the heart contracts, and throws its blood into the great artery, the blood in that artery is not only thruſt forwards towards the extremities, but the channel of the artery is likewiſe dilated; becauſe fluids, when they are preſſed, preſs again towards all ſides, and their preſſure is always perpendicular to the ſides of the containing veſſels: but the coats of the artery, by any ſmall impetus, may be diſtended; therefore, upon the contraction of the heart, the blood from the left ventricle will not only preſs the blood in the artery forwards, but both together will diſtend the ſides of the artery: and thus is a motion of dilatation affected.

And when the impetus of the blood againſt the ſides of the artery ceaſes, that is, when the left ventricle ceaſes to contract, then the ſpiral fibres of the artery, by their natural elaſticity, return again to their former ſtate, and contract the channel of the artery, till it is again dilated by the ſyſtole of the heart: ſo that here is a motion of dilatation and contraction effected.

The diaſtole or dilatation of the artery is called its *pulſe*; and the time of the ſpiral fibres returning to their natural ſtate, is the diſtance between two *pulſes*.

This *pulſe* is in all the arteries of the body at the ſame time: for while the blood is thruſt out of the heart into the aorta, that artery being full, the blood muſt be propelled in all the arteries at the ſame time; and becauſe the arteries are conical, and the blood moves from the baſis of the cone to the apex, therefore the blood is continually preſſing againſt the ſides of the veſſels; and conſequently every point of the artery muſt be dilated, at the ſame time that the blood is thrown out of the left ventricle of the heart; and as ſoon as the elaſticity of the ſpiral fibres can overcome the impetus of the blood, the arteries are again contracted.

Thus, two cauſes operating alternately, the heart and fibres of the arteries, keep the blood in a continual motion.

The obſervation of the *pulſe* has been deemed of the utmoſt importance to a phyſician; both as it diſcovers the ſtate of the heart, the firſt mover in the animal frame; and as it ſhews the nature, quantity, and motion of the blood, that univerſal humour, whereon all the reſt depend; and as it indicates the condition of the artery, the primary veſſel of the whole body.

However Celſus calls the *pulſe*, *res fallaciſſima*: and as the variety of *pulſes* with regard to their being quick or ſlow, is owing to the different degrees of irritability in different conſtitutions, every accident that happens to the body, and every affection of the mind have an influence upon them, ſo that the concluſions deduced from the ſtate of the *pulſe*, ſeparately conſidered, are often very inſufficient and erroneous.

It is certain that the climate will alter the *pulſe* of perſons, and on this is founded the obſervation of *pulſes* being naturally various in people of different nations.

The *pulſes* of Frenchmen are ſaid to be more equal and quick, and thoſe of the Britiſh, Dutch, and Germans, more irregular and uncertain; and this is to be jointly attributed to the air of the country, and to the manner of living.

In general, the higher and nearer the ſun is, the quicker is the *pulſe*; and the lower and farther off, the ſlower. In rainy ſeaſons, the *pulſe* is more free and quick, becauſe of the ſmaller preſſure of the atmoſphere. It is more impetuous in the ſpring; more equal after a quiet ſleep; weak and uncertain in men very intent upon buſineſs. Melancholy renders the *pulſe* extremely inconſtant, probably through the great thoughtfulneſs of ſuch men: in bilious tempers it is high and ſtrong; in ſanguine, more equal and regular than in any: in the phlegmatic, equal enough, but more ſlow: in children, eſpecially infants, the *pulſe* is very ſmall; and in old men it is extremely uncertain: in gluttonous people it is dull and ſlow, unleſs by drinking it is made ſtumbling and vertiginous: this ſort of *pulſe* alſo frequently foretells ſudden death. By too ſparing a diet it becomes ſmall and ſlow, and always abates upon faſting. By the paſſions the *pulſe* may be alſo greatly altered; but moſt of all by fear, joy, and anger. In fevers the *pulſe* is varied according to the beginning, height, and declination. In ſcorbutic and hyſteric perſons, it is very uncertain: in hydropical perſons, it is much ſtopped and interrupted by ſtagnant humours: in the gout it is free and expedite: in the plague, as in the aſthma, it is mightily oppreſſed, unleſs freed by the hot fit. In general, any variation of the *pulſe* certainly denotes ſome alteration in the habit of the body.

The *pulſe* is unequal either in regard to time or ſtrength; that is, it either ſtrikes quicker or ſlower, or ſtronger and weaker.

The firſt is common in moſt acute diſtempers, and does not threaten any immediate danger; but the latter, both in acute and chronic caſes, is always a dangerous ſymptom; very often it is the forerunner of death, which happens two or three days after this is firſt obſerved. It is ſaid to be interrupted when the ſtrokes are much ſmaller and weaker than at other times, or their intervals much greater. This firſt ſhews a great decay of ſtrength; and the latter, which is, as it were, a ceſſation for a time, denotes approaching palſies, apoplexies, and the like terrible diſtempers, and ſometimes death itſelf.

The intenſe *pulſe* is when the ſtroke is very hard, the parts being, as it were, upon the bent; or elſe this ſtrength is made up by the multiplicity and frequency of leſs mications, as in the height of acute fevers.

The remiſs *pulſe* has ſtrokes leſs quick and ſtrong, and in ſickneſs ſhews more danger than the other. The ſuperficial *pulſe* ſhews an exact temperament of body, as alſo a free and eaſy temper of mind.

The deep *pulſe* ſhews a diſpoſition to melancholy, aſthmas, and lethargies, and is more frequent in aged than in young people.

The leaping *pulſe* often ſhews no great danger; but the trembling *pulſe* is uſually a fatal ſymptom, after which very few people recover.

But of all others the wandering *pulſe* is the moſt terrible and fatal; this is felt ſometimes in one part of the artery, and ſometimes in another, and ſometimes in no part at all. This is a certain forerunner of death, and that uſually very ſpeedily following; and if great power in nature gives a ſhort reprieve after this, it is only a very ſhort relief. Abercromb. de Variat. Pulſus.

The *pulſe* has been obſerved to beat faſter in perſons electrified. Phil. Tranſ. Nº 478. p. 59.

A ſtrong PULSE denotes, 1. A great muſcular force of the contracting heart; and, conſequently, the ſtrength of the contracting cauſe; i. e. 2. A briſk and copious influx of the nervous juice into the villi of the heart. 3. Plenty of blood. 4. A laudable ſecretion and circulation of humours.

A ſtrong *pulſe*, therefore, is a good preſage, if it be alike throughout the whole body. Indeed it is frequently fallacious in apoplectic, and ſome other diſeaſes, where the paſſage between the heart and brain is free; and when other parts, eſpecially the viſcera, are obſtructed.

A weak PULSE denotes the contrary of the former; though this ſometimes deceives, eſpecially in fat people.

A hard PULSE ſignifies, 1. That the membrane of the artery is drier than ordinary: and therefore, 2. Obſtructions in the minute veſicles, whereof the membranes of the artery are woven. 3. That the arteries are full: but, 4. That their capillary extremities are obſtructed with an inflammatory viſcidity. 5. That the blood is very denſe and compact: hence, 6. That the circulations, ſecretion, and excretions are depraved.

A ſoft PULSE denotes the contrary to all theſe; yet is very fallacious in an acute peripneumonia.

A ſlow PULSE denotes, 1. That the contractions of the heart are ſlow; and therefore, 2. A ſlowneſs of the influxes of the nervous juice from the brain into the villi of the heart. 3. That the blood has circulated a great number of times. 4. That all the humours circulate eaſily through their veſſels. Indeed, if the *pulſe* be thus from weakneſs, it is an ill ſign.

A quick PULSE denotes the contrary to all theſe; as acrimonies, ſpirits agitated, fevers, and phrenſy.

An equable PULSE denotes a conſtant tenor of the vital functions; an uneven one, the contrary.

An intermitting PULSE ſhews life in a ſlippery ſituation.

An intermitting *pulſe* is either owing to a fault in the nervous juice, which flows unequally into the heart; or in the veſſel which tranſmits the blood and humours; or to the humours themſelves.

The cauſe of this diſorder is various, as convulſions, polypuſes,

lypuſes, cacochymias, inflammations, want of blood, bony or cartilaginous arteries, &c. See **Intermittent.**

A ſtrong, equable, and, at the ſame time, ſlow *pulſe*, is of all others the beſt. A ſtrong and great, or ſtrong and ſlow *pulſe*, together, are good. A weak, ſmall, hard, unequal, intermitting, quick *pulſe*, is of all others the worſt.

Yet, in all theſe things, regard muſt be had to the nature of the particular artery, the age, ſex, temperament, affections of the mind, the ſix non-naturals, habit of body, ſeaſon, country, &c. all which have an influence on the *pulſe*.

Schwalbius of Prague contented himſelf with three *pulſes*, viz. the equal and unedual, the quick and ſlow, and the ſtrong and weak. Sylvius reduces *pulſes* to three kinds, viz. the ſtrong and weak, the large and ſmall, and the quick and ſlow. The full and ſmall *pulſes* are owing chiefly to the different diameters of the arteries; and, except the quick, the ſlow, and the irregular *pulſes*, there are none of the kinds ſo accurately diſtinguiſhed as not in many caſes to be found fallacious. It is obſerved, that there are adults in health, whoſe *pulſe* does not exceed 30 or 40 ſtrokes in a minute; and that others, while at reſt, have a *pulſe* ſo quick, that it may be counted to 120; and during the preſence of a fever, the *pulſe* hath been obſerved, in ſome inſtances, to beat 220 times in this ſhort period. Dr. Heberden (Lond. Med. Tranſ. vol. ii. p. 18, &c.) has given us ſome obſervations on the *pulſe*, which ſhew how little it is to be depended upon, without the concurrence of other ſymptoms; in how few caſes an attention to the *pulſe* is of real importance; and how groundleſs are the various diſtinctions of *pulſes*. Thoſe moſt to be regarded, are the quick and ſlow *pulſes*. To this writer we are indebted for the following obſervations on this ſubject. The *pulſe* of a child under two years old ſhould be felt while it is aſleep, becauſe it is ſo eaſily quickened by every new ſenſation. The *pulſe* of a healthy infant on the day of its birth, and when it is aſleep, is between 130 and 150 in a minute; the mean rate during the firſt month is 120, and rarely, if ever, below 108. During the firſt year, the limits may be from 108 to 120; the ſecond year, at 90 and 108; the third year at 80 and 108; the fourth, fifth, and ſixth, nearly the ſame as the third; the ſeventh year it is ſometimes at 72, but generally more; twelfth, about 70. In adults, it is uſually from a little below 60 to a little above 80.

A full meal quickens the *pulſe* to about 10 or 12 in a minute more than its number of pulſations was before the advantage of refreſhment.

If the *pulſe* is quickened, ſo as to exceed the healthy ſtandard by ten pulſations in a minute, there is ſome diſorder; but the irritability of a child is ſuch, that a very ſlight fever will make the artery beat 140, or even 160, when no danger attends: and as there is much difficulty in counting the *pulſe*, when it is at 180 and upwards, we are better enabled to judge of the danger of fevers in children by the thirſt, quickneſs of breathing, averſion to food, and want of ſleep, than by the *pulſe*.

A child of two years old will die of an inflammatory fever, though the artery beats only 144 in a minute; yet children of four years ſometimes recover from fevers when the pulſe is at 156.

If the *pulſe* of a child be 15 or 20 below the healthy ſtandard at its loweſt limits, and there be at the ſame time the ſigns of conſiderable illneſs, it is a certain indication that the brain is affected, conſequently ſuch a quiet *pulſe* ſhould alarm us with the probability of danger.

In adults labouring under an inflammatory fever, the danger is generally not very great, where the beats are fewer than one hundred. A hundred and twenty ſhew the beginning of danger; and they ſeldom exceed this number, unattended with deliriouſneſs, and where the caſe does not prove fatal. To this there are two exceptions; firſt, before ſome critical ſwelling begins to ſhew itſelf in fevers, then the *pulſe* hath riſen to 150; ſecondly, in acute rheumatiſms the *pulſe* riſes to 120, without danger: but in both theſe caſes the appetite, the ſenſes, ſleep, and ſtrength, deviate leſs from their natural ſtate than when the life of the patient is in danger.

When aſthmatic patients are ſeized with a ſudden fit, the *pulſe* ſometimes beat 120 times in a minute, in which caſe danger is great; but if this is exceeded, they rarely recover.

When the *pulſe*, from being very quick, ſuddenly becomes quiet, all other ill ſymptoms continuing, it ſhews that the patient is become irritable; that the diſeaſe is tranſlated to the brain; and that a palſy, an apoplexy, or death, will be the conſequence.

In an inflamed ſcirrhus ſeated in any of the viſcera, in a cancer, ulcers in the internal parts, a quick *pulſe* is a more certain ſign of danger than a quiet *pulſe* is of ſafety. In hectic and rheumatic patients the appetite continues, and an ability to take ſmall journies, when the *pulſe* is ſo quick, that in an acute fever, with ſuch a quickneſs in the *pulſe*, they would be forced to keep in bed.

A good *pulſe*, with a loſs of appetite, ſtrength, and ſleep, with thirſt and quickneſs of breathing, is a dangerous ſituation. On the contrary, a bad *pulſe*, the appetite, ſleep, and ſtrength not much affected, with moderate thirſt, and the breathing but little affected, is ſafe.

A diminution, or total ſuſpenſion, of the *pulſe*, is reducible either to a **lipothymia**, where it fails to ſuch degree as that there is ſcarce ſtrength left to ſuſtain the body.

Or to a **lipopsychia**, when it is attended with a ſenſible diminution of the natural heat.

Or to a **syncope**, when the heart fails, ſo as the heat, motions, ſenſes and all, are almoſt deſtroyed.

Or, laſtly, to an **asphyxia**, where thoſe are all abſolutely deſtroyed as to ſenſe, and death itſelf ſeems in poſſeſſion.

Pulse is alſo uſed for the ſtroke with which any medium is affected by the motion of light, ſound, &c. through it.

Sir Iſaac Newton demonſtrates, lib. ii. prop. 48. Princip. that the velocities of the *pulſes* in an elaſtic fluid medium (whoſe elaſticity is proportionable to its denſity) are in a ratio compounded of half the ratio of the elaſtic force directly, and half the ratio of the denſity inverſly: ſo that in a medium whoſe elaſticity is equal to its denſity, all *pulſes* will be equally ſwift.

Pulse, *legumen*, in *Botany*, is a term applied to thoſe grains or ſeeds which are gathered with the hand: in contradiſtinction to corns, &c. which are reaped or mowed.

Pulſe is the ſeed of the leguminous ſpecies of plants.

The word is primarily underſtood of grains that grow in pods: as beans, peas, vetches, &c. but it is by ſome alſo uſed by extenſion for artichokes, aſparagus, and other kitchen-herbs and roots.

PULSILOGIUM, a name given by authors to a pulſe-watch, or inſtrument to meaſure the celerity of the pulſe. Sanctorius was the firſt inventor of this machine; but ſeveral have ſince ſpoke very largely in praiſe of it, and ſir John Floyer wrote a treatiſe on this ſubject.

PULSION, formed from *pello*, *I drive*, the act of driving or impelling a thing forwards.

PULSUS *latus*. See **Latus** *pulſus*.

PULTURA, formed from *pulſare*, *to knock*, *to aſk*, in our *Old Law-Books*, denotes a previous demand or examination: on account of the monks, who, before they were admitted into the monaſteries, *pulſabant ad fores*, knocked at the doors for ſeveral days. *Et volo, ut ſint quieti de omnibus cauſis, & querelis, & placitis ballivorum & præpoſitorum hundredi, & a* pultura *ſerjanorum*, i. e. from the examination of ſerjeants; *& de rewardo foreſtarum*, i. e. the viſitation of the foreſts.

PULVERATICUM, in *Roman Antiquity*, the fee paid to ſurveyors for their trouble; alſo a ſum exacted from the provincial cities by their garriſon.

PULVERIZATION, *pulverizatio*, the art of *pulverizing*, or reducing a dry body into a fine powder.

This is performed, in friable bodies, by pounding or beating in a mortar: but to *pulverize* malleable ones, other methods muſt be taken.

To *pulverize* lead, or tin, the method is this: rub a round wooden box all over the inſide with chalk; pour a little of the melted metal nimbly into the box, when, ſhutting the lid, and ſhaking the box briſkly, the metal will be reduced into powder.

PULVILLUS, in *Surgery*, a term uſed to expreſs a little pledget-bolſter, or compreſs.

PULVINARIA, in *Roman Antiquity*, cuſhions upon which the ſtatues of the gods were laid in the temples, at the time that thanks were given for ſome ſignal victory.

PULVINATED, *pulvinatus*, in the *Ancient Architecture*, a term applied to a frieze, which ſwells, or bulges out, in manner of a pillow, *pulvinus*: whence the name.

PULVIS, in *Chemiſtry* and *Medicine*. See **Powder**.

Pulvis *antilyſſus*, was originally compoſed of equal parts of the *lichen cinereus terreſtris*, or *aſh-coloured ground* **liverwort**, and black pepper; but this quantity of pepper rendering the medicine too hot, only one part of the pepper is now uſed to two of the lichen. The efficacy of this powder, as a preſervative againſt the **madness** occaſioned by the bite of a mad dog, was firſt communicated to the Royal Society by Mr. Dampier, and an account of it publiſhed in the Phil. Tranſ. N° 237. It is highly extolled by Dr. Mead, who directs a dram and a half of the powder to be taken in the morning faſting, in half a pint of warm cow's milk, for four mornings ſucceſſively: but previouſly to theſe four doſes, the patient is to loſe nine or ten ounces of blood; and after them, to be dipped in cold water every morning, faſting, for a month, and then thrice a week for a fortnight longer. Mech. Account of Poiſons, Eſſ. iii. But Dr. Lewis obſerves, that the lichen does not promiſe to have any conſiderable medicinal power.

Pulvis *fæcundans*, in *Natural Hiſtory*, a name given by late writers to that fine powder, which is contained in capſules upon the ſtamina or threads in the flowers of plants, and is called by ſome Engliſh writers the *male-duſt*, and in general the FARINA of flowers.

Pulvis *fulminans*, or the thundering powder. See FULMINANS.

Pulvis *patrum*, the Jeſuit's powder, See CORTEX *Peruvianus*.

Pulvis *Puteolanus*, in *Natural Hiſtory*, the name of a foſſile ſubſtance, found in form of powder, and famous for its conſolidating under water. The accounts of it ſeem, however, to be a little erroneous. See POZZOLANA.

PUMICE *ſtone*, *pumex*, a kind of ſpongy ſtone, very porous and friable; reſembling the ſcoria of furnaces.

Naturaliſts are not agreed about the nature and origin of *pumice*. Some look on it as a fragment of rock half-burnt, and calcined, caſt up in eruptions of volcanoes, particularly Ætna and Veſuvius, into the ſea; and which, by being there waſhed in the ſalt-water, loſes the black colour which the impreſſion of the ſubterranean fires had given it, and becomes whitiſh, or ſometimes only greyiſh, according as it has floated more or leſs in the ſea.

Dr. Woodward conſiders *pumice* as only a ſort of ſlag or cinder; and affirms, it is only found either where forges of metals have anciently been, or near ſome volcano, or burning mountain.

Other authors will have the *pumice* to riſe from the bottom of the ſea; whence they ſuppoſe it detached by ſubterranean fires: and hence account both for its lightneſs and poroſity, and its ſaline taſte; alledging, in confirmation hereof, that *pumice* is frequently found in parts of the ſea, far remote from all volcanoes; and adding that ſeveral parts of the Archipelago are frequently found covered with it, all at once, after a few inward ſhakes and heavings of the bottom of the ſea.

Thus there have been many different conjectures about the nature and origin of this ſubſtance; but the very earlieſt writers of antiquity, and the moſt judicious of the later ages, agree, that it is no native foſſile, nor in its original condition, but a mere cinder, or remainder of ſome other foſſile body, calcined by a violent fire.

This may have been either ſubterranean and unſeen, or perhaps ſince extinguiſhed: or that of the well known burning mountains, on and about which *pumices* are conſtantly found, and that in vaſt abundance. The more violent exploſions of theſe may alſo, at one time or other, have toſſed vaſt quantities of *pumices* to places ſo diſtant, as to make people forget from whence they came; or into ſeas, whoſe tides and ſtorms may have carried them to other ſhores, near which no ſuch repoſitories of *pumices* are ſituated; and this might very much puzzle and miſlead people about its true nature and origin.

The great quantities of *pumices* found in this manner, far from fires by which they might have been formed, floating on the ſurface of the ſea, thus thrown on it, or perhaps raiſed by the burſting of volcanoes from its bottom, and ſomething altered from their original form and colour, by being waſhed and rounded by the motion of the waves, and by rolling againſt one another, gave riſe to an opinion in ſome, that theſe were of another kind, and were different from thoſe *pumices* found on the burning mountains, and that they were formed by the concretion of the froth of the ſea. Many have ſuppoſed, that the authors who have favoured this opinion, ranked the alcyonia among the bodies they call *pumices* ſo formed; and Theophraſtus has been very unjuſtly cenſured of the ſame fault, though not guilty of it. Hill's Theophraſtus, p. 48.

There are whole mountains in the principality of Heſſe, which conſiſt of rocks of the *pumice* ſtone, as it is there vulgarly called. This is a ſpongy and cavernous ſtone, of a grey colour, and very much reſembles the *pumices* in external appearance, but, on examination, proves to be a very different ſubſtance; and there is not the leaſt ground for ſuppoſing, that it owes its preſent appearance to the action of fire, as the common *pumices* thrown out of the burning mountains certainly do. It is very neceſſary, in order to treat accurately of the nature of the *pumice* ſtone, to diſtinguiſh rightly between theſe ſtones, and ſuch as have been burnt into their ſpongy ſtate. Yet this is generally neglected, and theſe are called *pumices* as well as the reſt, and are all ſuppoſed to be of the ſame origin.

Pumice makes a very conſiderable article in commerce: and is much uſed in the arts and manufactures, to poliſh and ſmooth ſeveral works.

Its pieces are of ſeveral ſizes: the parchment-makers and marblers uſe the largeſt and lighteſt; the curriers, the heavieſt and flatteſt; pewterers, the ſmalleſt.

Pliny obſerves, that the ancients made conſiderable uſe of *pumice* in medicine; but it is out of the preſent practice.

PUMMEL. See POMMEL.

PUMP, *antlia*, in *Hydraulics*, a machine formed on the model of a ſyringe, for raiſing of water.

Vitruvius aſcribes the firſt invention of *pumps* to Cteſebes the Athenian; whence the Latins call it *machina Cteſebiana*, or *organum Cteſebicum*.

Pumps are diſtinguiſhed into ſeveral kinds, with regard to the ſeveral manners of their acting. As the

Common ſucking PUMP, which conſiſts of a pipe open at both ends, in which is a moveable piſton, bucket, or ſucker, as big as the bore of the pipe in that part wherein it works, and leathered round ſo as to fit the bore exactly; and may be moved up and down, without admitting any air to come between it and the pipe or *pump* barrel. There are ſeveral kinds of buckets: the moſt ſimple of all, which is commonly uſed for ordinary *pumps*, conſiſt of a cylindric piece of wood, whoſe diameter is ſomewhat leſs than the bore of the barrel, that it may move in it freely, having a hole quite through the middle of it. Upon the top of this there is an iron piece faſtened to a rod of iron or wood, which goes quite to the top of the *pump*, and by means of which the motion is given to the bucket. Near the top of the cylindric wood, there is a leather ring faſtened round it, which goes a little higher than its top; the hole in the wood is ſtopped by a valve, made of a round piece of leather faſtened in one part to the wood with nails. Upon this there is an iron plate, a little larger than the bore of the hole, and another iron plate under it, a little leſs than the ſame bore; and the plates and leather are faſtened together by means of a rivet or ſcrew in the middle of them. When the bucket is put into the barrel, and the leather becomes wet, it will apply itſelf to the ſides of the barrel, and prevent the paſſage of the air. The uſe of the two iron plates is to ſuſtain the preſſure of the water which would otherwiſe bend the leathers. For larger *pumps*, the bucket is made in the following manner: there is a hollow piece of braſs, almoſt equal at top to the bore of the barrel, but ſmall at the bottom, having at its top a braſs bar, and at the bottom two notches to receive the ends of another braſs bar, of the ſame figure as that at the top. Round the braſs piece there goes a leathern ring, faſtened to it at its lower part by means of an iron ring, which being almoſt at the bottom of the braſs piece, is not ſo large as its top, and conſequently does not touch the ſides of the barrel; this leathern ring ſhould go a little higher than the croſs-piece at bottom. The valve conſiſts of a piece of leather almoſt equal to the top of the braſs piece, covered by two iron plates of the ſame ſize as the leather, and having under it two plates ſomewhat ſmaller than the bore of the braſs piece at its top; theſe iron plates and leathers are faſtened together with ſcrews. This valve muſt be applied to the top of the braſs piece or box, ſo that the braſs bar upon it may be between the two iron plates under the leather. The whole is faſtened together by means of an iron piece, whoſe lower part goes through the holes in the middle of the valve, and the two braſs rods, ſo that its upper part getting between the two upper iron plates of the valve, preſſes upon the leather, and makes it apply itſelf cloſe to the upper braſs bar. This iron piece or rod ought to have two holes, one at the bottom, juſt under the lower braſs rod, to hold it cloſe by means of a pin or key; and another at its top, to faſten it to another iron rod, which is continued quite to the top of the *pump*, in order to give motion to the bucket. The chief advantages of this kind of buckets are, that they give the freeſt paſſage to the water, having the leaſt friction poſſible, as they touch the barrel only at the upper end of the braſs box; and that the ſand or gravel, which is commonly mixed with the water, cannot get between the bucket and the barrel, becauſe the leathern ring is higher than the braſs tube; beſides, if by any accident the motion of one ſide of the valve were hindered, the other would ſerve till it were mended. See VALVE.

The conſtruction of *pumps* is uſually explained by glaſs models, in which the action both of the piſtons and valves may be ſeen. In order to underſtand the ſtructure and operation of the *common pump*, let the model D C B L (*Tab.* V. *Hydraulics, &c. fig.* 55.) be placed upright in the veſſel of water K, the water being deep enough to riſe at leaſt as high as from A to L. The VALVE *a* on the moveable bucket G, and the valve *b* on the fixed box H (which box quite fills the bore of the pipe or barrel at H) will each lie cloſe, by its own weight, upon the hole in the bucket and box, until the engine begins to work. The valves are made of braſs, and covered underneath with leather for cloſing the holes the more exactly: and the bucket G is raiſed and depreſſed alternately by the handle E and rod D *d*, the bucket being ſuppoſed at B before the working begins.

Take hold of the handle E, and thereby draw up the bucket from B to C, which will make room for the air in the pump all the way below the bucket to dilate itſelf, by which its ſpring is weakened, and then its force is not equivalent to the weight or preſſure of the outward air upon the water in the veſſel K: and therefore, at the firſt ſtroke, the outward air will preſs up the water through the notched foot A, into the lower pipe, about as far as *e*: this will condenſe the rarefied air in the pipe between *e* and C to the ſame ſtate it was in before; and then, as its ſpring within the pipe is equal to the force or preſſure of the outward air, the water will riſe no higher by the firſt ſtroke; and the valve *b*, which was raiſed a little by the dilatation of the air in the pipe, will fall, and ſtop the hole in the box H; and the ſurface of the water will ſtand at *e*. Then, depreſs the piſton or bucket from C to B, and as the air in the part B cannot get back again through the valve *b*, it will (as the bucket deſcends) raiſe the valve *a*, and ſo make its way through the upper part of the barrel *d* into the open air. But upon raiſing the bucket G a ſecond time, the air between it and the water in the lower pipe at *e* will be again left at liberty to fill a larger ſpace; and ſo its ſpring being again weakened, the preſſure of the outward air on the water in the veſſel K will force more water up into the lower pipe from *e* to *f*; and when the bucket is at its greateſt height C, the lower valve *b* will fall, and ſtop the hole in the box H as before. At the next ſtroke of the bucket or piſton, the water will riſe through the box H towards B, and then the valve *b*, which was raiſed by it, will fall when the bucket G is at its greateſt height. Upon depreſſing the bucket again, the water cannot be puſhed back through the valve *b*, which keeps cloſe upon the hole whilſt the piſton deſcends. And upon raiſing the piſton again, the outward preſſure of the air will force the water up through H, where it will raiſe the valve, and follow the bucket to C. Upon the next depreſſion of the bucket G, it will go down into the water in the barrel B; and as the water cannot be driven back through the now cloſe valve *b*, it will raiſe the valve *a* as the bucket deſcends, and will be lifted up by the bucket when it is next raiſed. And now, the whole ſpace below the bucket being full, the water above it cannot ſink when it is next depreſſed; but upon its depreſſion, the valve *a* will riſe to let the bucket go down; and when it is quite down, the valve *a* will fall by its weight, and ſtop the hole in the bucket. When the bucket is next raiſed, all the water above it will be lifted up, and begin to run off by the pipe F. And thus, by raiſing and depreſſing the bucket alternately, there is ſtill more water raiſed by it; which getting above the pipe F, into the wide top I, will ſupply the pipe, and make it run with a continued ſtream.

So, at every time the bucket is raiſed, the valve *b* riſes, and the valve *a* falls; and at every time the bucket is depreſſed, the valve *b* falls, and *a* riſes.

As it is the preſſure of the air or atmoſphere which cauſes the water to riſe, and follow the piſton or bucket G as it is drawn up: and ſince a column of water 32 feet high is of equal weight with as thick a column of the atmoſphere, from the earth to the very top of the air; therefore, the perpendicular height of the piſton or bucket from the ſurface of the water in the well muſt always be leſs than 32 feet; otherwiſe the water will never get above the bucket. But, when the height is leſs, the preſſure of the atmoſphere will be greater than the weight of the water in the *pump*, and will therefore raiſe it above the bucket: and when the water has once got above the bucket; it may be lifted thereby to any height, if the rod D be made long enough, and a ſufficient degree of ſtrength be employed, to raiſe it with the weight of the water above the bucket; without ever lengthening the ſtroke.

The force required to work a *pump*, will be as the height to which the water is raiſed, and as the ſquare of the diameter of the *pump*-bore, in that part where the piſton works. So that, if two *pumps* be of equal heights, and one of them be twice as wide in the bore as the other, the wideſt will raiſe four times as much water as the narroweſt; and will therefore require four times as much ſtrength to work it.

The wideneſs or narrowneſs of the *pump*, if any other part beſides that in which the piſton works, does not make the *pump* either more or leſs difficult to work; except what difference may ariſe from the friction of the water in the bore, which is always greater in a narrow bore than in a wide one, becauſe of the great velocity of the water.

The *pump*-rod is never raiſed directly by ſuch a handle as E at the top, but by means of a lever, whoſe longer arm (at the end of which the power is applied) generally exceeds the length of the ſhorter arm five or ſix times; and, by that means, gives five or ſix times as much advantage to the power. Upon theſe principles, it will be eaſy to find the dimenſions of a *pump* that ſhall work with a given force, and draw water from any given depth.

The quantity of water raiſed by each ſtroke of the *pump*-handle, is juſt as much as fills that part of the bore in which the piſton works, be the ſize of the reſt of the bore above and below the piſton what it will. The preſſure of the atmoſphere will raiſe the water 32 feet in a pipe exhauſted of air; but it is adviſable never to have the piſton more than 20 or 24 feet above the level of the ſurface of the water in which the lower end of the *pump* is placed: and the power required to work the *pump* will be the ſame, whether the piſton goes down to be on a level with the ſurface of the well, or whether it works 30 feet above that ſurface; becauſe the weight of the column of air that the piſton lifts, is equal to the weight or preſſure of the column of water raiſed by the preſſure of the air to the piſton. And although the preſſure of the air on the ſurface of the well will not raiſe or force up the water in the *pump*-bore more than 32 feet, yet, when the piſton goes down into the column ſo raiſed, the water gets above it; and may then be raiſed to any height whatever, above the piſton, according to the quantity of power applied to the handle of the *pump* for that purpoſe.

Pumps ought to be made ſo (ſays Mr. Ferguſon) as to work with equal eaſe in raiſing the water to any given height above the ſurface of the well. And this may be done by duly proportioning the diameter of the bore (in that part where the piſton works) to the height the water is to be raiſed, as that the column of water may be no heavier in a long *pump* than a ſhort one; or indeed equally heavy in all *pumps* from the ſhorteſt to the longeſt on ſuppoſition that the diameter of the bore is of the ſame ſize from top to bottom: and whatever the ſize of the bore be, above or below that part in which the piſton works, the power required to work the *pump* will be juſt the ſame as if the bore was of the ſame ſize throughout.

In order that a man of common ſtrength may raiſe water by *pumps*, with the ſame eaſe, to any height not leſs than 10 feet, or more than 100 feet, above the ſurface of the well, Mr. Ferguſon has calculated the annexed table, in which the diameter of the bore is duly proportioned to the height; and in theſe calculations he ſuppoſes the *pump*-handle to be a lever increaſing the power five times.

Height of the *pump*, in feet, above the ſurface of the well.	Diameter of the bore.		Water diſcharged in a minute, in wine mearſure.	
	Inches.	100 parts of an inch.	Gallons.	Pints.
10	6	.93	81	6
15	5	.66	54	4
20	4	.90	40	7
25	4	.38	32	6
30	4	.00	27	2
35	3	.70	23	3
40	3	.46	20	3
45	3	.27	18	1
50	3	.10	16	3
55	2	.95	14	7
60	2	.84	13	5
65	2	.72	12	4
70	2	.62	11	5
75	2	.53	10	7
80	2	.45	10	2
85	2	.38	9	5
90	2	.31	9	1
95	2	.25	8	5
100	2	.19	8	1

In the firſt column, look for the number of feet the water is to be raiſed; then, in the ſecond column you have the diameter of that part of the bore in which the piſton or bucket works; and in the third column, the quantity of the water which a man of ordinary ſtrength can raiſe in a minute by the *pump* to the given height.

The quantity of water contained in a pipe of either of thoſe heights in the table, ſuppoſing the diameter of the bore to be the ſame from top to bottom of the pipe, is 4523.2 cubic inches, or 19.58 gallons in wine meaſure, as near as the hundreth part of an inch in the diameter of the bore can make it.

Mr. Ferguſon has calculated the following table, by which the quantity and weight of water in a cylindrical bore of any given diameter and perpendicular height may be very readily found.

Diameter of the cylindrical bore one inch.			
Feet high.	Quantity of water in cubic inches.	Weight of water in Troy ounces.	In Avoirdupoiſe ounces.
1	9.4247781	4.9712340	5.4541539
2	18.8495562	9.9424680	10.9083078
3	28.2743343	14.9137020	16.3624617
4	37.6991124	19.8849360	21.8166156
5	47.1238905	24.8561700	27.2707695
6	56.5486686	29.8274040	32.7249234
7	65.9734467	34.7986380	38.1790773
8	75.3982248	39.7698720	43.6332312
9	84.8230029	44.7411060	49.087385

For tens of feet high, remove the decimal points one place towards the right hand; for hundreds of feet, two places; for thouſands, three places; and ſo on. Then, multiply each ſum by the ſquare of the diameter of the given bore, and the products will be the anſwer.

EXAMPLE.

Qu. *What is the quantity and weight of water in an upright pipe* 85 *feet high, and* 10 *inches in diameter of bore?* The ſquare of 10 is 100.

Feet high.	Cubic inches.	Troy ounces.	Avoirdupoiſe ounces.
80	753.982248	397.698720	436.332312
5	47.1238905	24.8561700	27.2707695
85	801.1061385	422.5548900	463.6030815
Multiply by	100	100	100
Anſ.	80110.6138500	42255.4890000	46360.3081500

Which number (80110.61) of cubic inches being divided by 231, the number of cubic inches in a wine gallon, gives 342.6 for the number of gallons in the pipe: and 42255.489 Troy ounces being divided by 12, gives 3521.29 for the weight of the water in Troy pounds: and laſtly, 46360.3 Avoirdupoiſe ounces being divided by 16, gives 2897.5 for the weight in Avoirdupoiſe pounds.

The power required to work a *pump*, or any other hydraulic engine, muſt not only be equal to the weight of the whole column of water in the *pump*-bore, but as much ſuperior to it as will overcome all the friction of the working parts of the engine.

The forcing PUMP, raiſes water through the box H (*fig.* 56.) in the ſame manner as the ſucking *pump* does, when the plunger or piſton *g* is lifted up by the rod D *d*. But this plunger or FORCER has no hole through it, to let the water in the barrel B C get above it, when it is depreſſed to B, and the valve *b* (which roſe by the aſcent of the water through the box H when the plunger *g* was drawn up) falls down and ſtops the hole in H, the moment that the plunger is raiſed to its greateſt height. Therefore, as the water between the plunger *g* and box H can neither get through the plunger upon its deſcent, nor back again into the lower part of the pump L *e*, but has a free paſſage by the cavity around H into the pipe MM, which opens into the air-veſſel KK at P; the water is forced through the pipe MM by the deſcent of the plunger, and driven into the air-veſſel; and in running up through the pipe at P, it opens the valve *a*; which ſhuts at the moment the plunger begins to be raiſed, becauſe the action of the water againſt the under ſide of the valve then ceaſes.

The water being thus forced into the air-veſſel KK by repeated ſtrokes of the plunger, gets above the lower end of the pipe GHI, and then begins to condenſe the air in the veſſel KK. For as the pipe GH is fixed air-tight into the veſſel below F, and the air has no way to get out of the veſſel but through the mouth of the pipe at I, and cannot get out when the mouth I is covered with water, and is more and more condenſed as the water riſes upon the pipe, the air then begins to act forcibly by its ſpring againſt the ſurface of the water at H: and this action drives the water up through the pipe IHGF, from whence it ſpouts in a jet S to a great height; and is ſupplied by alternately raiſing and depreſſing of the plunger *g*, which conſtantly forces the water that it raiſes through the valve H, along the pipe MM, into the air-veſſel KK.

The higher the ſurface of the water H is raiſed in the air-veſſel, the leſs ſpace will the air be condenſed into, which before filled that veſſel; and therefore the force of its ſpring will be ſo much the ſtronger upon the water, and will drive it with the greater force through the pipe at F: and as the ſpring of the air continues whilſt the plunger *g* is riſing, the ſtream or jet S will be uniform, as long as the action of the plunger continues: and when the valve *b* opens, to let the water follow the plunger upward, the valve *a* ſhuts, to hinder the water, which is forced into the air-veſſel, from running back by the pipe MM into the barrel of the *pump*.

If there was no air-veſſel to this engine, the pipe GHI would be joined to the pipe MMN at P; and then the jet S would ſtop every time the plunger is raiſed, and run only when the plunger is depreſſed.

Mr. Newſham's water engine, for extinguiſhing fire (ſee FIRE *engine*) conſiſts of two forcing *pumps*, which alternately drive water into a cloſe veſſel of air; and by forcing the water into that veſſel, the air in it is thereby condenſed, and compreſſes the water ſo ſtrongly, that it ruſhes out with great impetuoſity and force through a pipe that comes down into it; and makes a continued uniform ſtream by the condenſation of the air upon its ſurface in the veſſel.

By means of forcing *pumps*, water may be raiſed to any height above the level of a river or ſpring; and machines may be contrived to work theſe *pumps*, either by a running ſtream, a fall of water, or by horſes. See WATER *works*.

The rod of the plunger in a forcing *pump* is ſometimes made to work through a collar of oiled leathers and braſs plates connected with the barrel of the *pump* by ſcrews, and kept moiſt by water contained in a veſſel at the top. This apparatus is called by the workmen in the North, a *jack-head*. Deſaguliers's Exp. Phil. vol. ii. p. 152, &c. Ferguſon's Lectures, p. 73, &c. 4to.

The lifting PUMP differs from the *ſucking pump* only in the diſpoſition of its valves, and the form of its piſton frame. This kind of *pump* is repreſented in *fig.* 57. AB is a barrel fixed in a frame IKLM which is immoveable, with its lower part communicating with the water. GEQHO is a frame with two ſtrong iron rods, moveable through holes in the upper and lower parts of the *pump* IK and LM; in the bottom of this frame OQH is fixed an inverted piſton BD, with its bucket and valve upon the top at D. Upon the top of the barrel there goes off a part FR, either fixed to the barrel, or moveable by a ball and ſocket; but in either caſe water and air-tight. In this part, at C, is fixed a valve opening upwards. It is evident, that when the piſton frame is thruſt down into the water, the piſton D deſcends, and the water below will ruſh up through the valve D, and get above the piſton; and that, when the frame is lifted up, the piſton will force the water through the valve C up into the ciſtern P, there to run off by the ſpout. The piſton of this *pump* plays below the ſurface of the water. Mr. Martin has deſcribed a *mercurial pump*, which works by quickſilver, invented by Mr. Hoſkins, and perfected by Deſaguliers; and another *pump* of the lifting ſort, invented by Meſſ. Goſſet and De la Denille, and ſet up in the king of France's garden at Paris, the piſton of which works without friction. Phil. Brit. vol. ii. p. 57, &c. ed. 3.

PUMP, *Cteſebes's*, the firſt of all the kinds, acts both by ſuction and pulſion. Its ſtructure and action are as follow: — A braſs cylinder ABCD (*fig.* 58), furniſhed with a valve in L, is placed in the water. 2. In this is fitted the embolus MK, made of green wood, which will not ſwell in the water, and adjuſted to the aperture of the cylinder with a covering of leather, but without any valve. In H is fitted on another tube NH, with a valve that opens upwards in I.

Now, the embolus EK being raiſed, the water opens the valve in L, and riſes into the cavity of the cylinder:— and when the ſame embolus is again depreſſed, the valve I is opened, and the water driven up through the tube HN.

This is the *pump* uſed among the ancients, and that from which both the others are deduced. Sir S. Morland has endeavoured to increaſe its force by leſſening the friction; which he has done to good effect, inſomuch as to make it work without almoſt any friction at all.

PUMPS uſed in ſhips are of ſeveral kinds: the common *pump* is a long wooden tube, whoſe lower end reſts upon the ſhip's bottom, between the timbers, in an apartment called the well; incloſed for this purpoſe near the middle of the ſhip's length. This *pump* is managed by means of the brake, and the two boxes or piſtons. Near the middle of the tube, in the chamber of the *pump*, is fixed the lower box, which is furniſhed with a ſtaple, by which it may at any time be hooked and drawn up, in order to examine it. To the upper box is fixed a long bar of iron, called the ſpear, whoſe upper end is faſtened to the end of the brake, by means of an iron-bolt paſſing through both. At a ſmall diſtance from this bolt the brake is confined by another bolt between two cheeks, or ears, fixed perpendicularly on the top of the *pump*. Thus the brake acts upon the ſpear as a lever, whoſe fulcrum is the bolt between the two cheeks, and diſcharges the water by means of the valves, or clappers, fixed on the upper and lower boxes. Theſe *pumps*, however, are very rarely uſed in ſhips of war, unleſs of the ſmalleſt ſize. The moſt uſeful machine of this kind, in large ſhips, is the

Chain PUMP, which is univerſally uſed in the navy. This is no other than a long chain, furniſhed with a ſufficient number of valves, at proper diſtances, which paſſes downward through a wooden tube, and returns upward in the ſame manner on the other ſide. It is managed by a roller or winch, whereon ſeveral men may be employed at once; and thus it diſcharges, in a limited time, a much greater quantity of water than the common *pump*, and that with leſs fatigue and inconvenience to the labourers. This machine is, nevertheleſs, ſubject to ſeveral accidents by the nature of its conſtruction. The chain is of too complicated a fabric and the ſprocket-wheels, employed to wind it up from the ſhip's bottom, are deficient in a very material circumſtance, viz. ſome contrivance to prevent the chain from ſliding or jerking back upon the ſurface of the wheel, which frequently happens when the valves are charged with a conſiderable weight of water, or when the *pump* is violently worked. The links are evidently too ſhort, and the immechanical manner in which they are connected, expoſes them to a great friction in paſſing round the wheels. Hence they are ſometimes apt to break or burſt aſunder in very dangerous ſituations, when it is extremely difficult or impracticable to repair the chain. Of late ſome conſiderable improvements have been made in the naval *chain-pump* by Mr. Cole, under the direction of capt. Bentinck. The chain of this machine is more ſimple and mechanical, and much leſs expoſed to damage. It is exactly ſimilar to that of the fire-engine, and appears to have been firſt applied to the *pump* by Mr. Milne, to exhauſt the water from the caiſſons at Black-friars bridge. It has thence been transferred to the marine by capt. Bentinck, after having received ſome material additions to anſwer that ſervice. The principal ſuperiority of this *pump* to the former, conſiſts in the following particulars, viz. 1. That the chain is more ſimple, and more eaſily worked, and of courſe leſs expoſed to injuries by friction. 2. That the chain is ſecured upon the wheel, and thereby prevented from jerking back when charged with a column of water. 3. That it may be eaſily taken up and repaired when broken, or choaked with ballaſt, &c. 4. That it diſcharges a much greater quantity of water with a leſs number of men. A ſection of this machine, as fixed in a frigate of war, is exhibited in *Tab.* V. *Hydraulics*, *fig* 59; wherein A is the keel, V the floor-timber, X the kelſon, a, a, a, the ſeveral links of the chain, b b the valves, C the upper wheels, D the lower wheels, c c the cavities upon the ſurface of the wheels to receive the valves, as they paſs round thereon, d d the bolts fixed acroſs the ſurface of the wheels, to fall in the interval between every two links, to prevent the chain from ſliding back. The links of the chain, which are no other than two long plates of iron with a hole at each end, and fixed together by two bolts ſerving as axles, are repreſented in a larger ſcale as *a a*, the valves are two circular plates of iron, with a piece of leather between them, which are exhibited at large in *b b*. Upon a trial of this machine with the old *chain-pump* aboard the Seaford frigate, it appears, in a report ſigned by rear admiral ſir John Moor, twelve captains, and eleven lieutenants of his majeſty's navy, that its effects, when compared with the latter, were as follow.

New *Pump*.			Old *Pump*.		
Numb. of men	Tuns of water.	Seconds of time.	Numb. of men	Tuns of water.	Seconds of time.
4	1	43½	7	1	76
2	1	55	4	1	81

The ſubſcribers farther certify, that the chain of the new *pump* was dropped into the well, and afterwards taken up and repaired and ſet to work again in two minutes and a half; and that they have ſeen the lower wheel of the ſaid *pump* taken up to ſhew how readily it might be cleared and refitted for action, after being choaked with ſand or gravel, which, they are of opinion, may be performed in four or five minutes. Falconer's Mar. Dict. art. *Pump*.

PUMPS, *bare*, are ſmall ones made of cane, or a piece of wood bored through, uſed in lieu of cocks, &c. to *pump* beer or water out of the caſks.

PUMPS, *bur*, called alſo *bilge-pumps*, are chiefly uſed by the Dutch, who have them by their ſhips ſides. In theſe is a long ſtaff, with a bur at the end like a gunner's ſponge, to *pump* up the BILDGE-*water*.

PUMP, *air* in *Pneumatics*, is a machine, by means whereof the air is emptied out of veſſels, and a ſort of vacuum produced therein. For the invention, ſtructure, and uſe, of this *pump*, ſee AIR-*pump*; and for Smeaton's improved gage, ſee GAGE.

PUMP, *fetching the*, ſee FETCHING.

PUMP, *ſpiral*, ſee *Archimedes'* SCREW.

PUMPELMOES, a name uſed by ſome for a ſpecies of ORANGE.

PUMPING *at ſea*, is uſually done by ſpells, that is, by relieving the men with freſh ones, and counting how many ſtrokes they *pump* each watch. By this means they know if the ſhip be ſtanch, or how her leaks increaſe.

When all the water is drawn up, and there comes up nothing but wind and froth, they ſay the *pump ſucks*.

PUMPKIN, *cucurbita*, in *Botany*; for the characters, ſee GOURD. The *pumpkin* is frequently cultivated by the country people in England, who plant them upon their dunghills, where the plants run over them, and ſpread to a great diſtance; and when the ſeaſons are favourable, they will produce plenty of large fruit; theſe they uſually allow to grow to maturity, then they cut open a hole on one ſide, and take the ſeeds out of the pulp as clean as poſſible, after which they fill the ſhells with apples ſliced, which they mix with the pulp of the fruit, and ſome add a little ſugar and ſpice to it; then bake it in an oven, and eat it in the ſame manner as baked apples; but this is a ſtrong food, and only fit for thoſe who labour hard, and can eaſily digeſt it.

They may be propagated by ſowing their ſeeds in April on a hot-bed; and tranſplanting the plants on another moderate bed, where they ſhould be brought up hardily, and have a great deal of air to ſtrength them; and when they have got four or five leaves, they ſhould be tranſplanted into holes made upon an old dunghill, or ſome ſuch place, allowing them a great deal of room to run, for ſome of the ſorts will ſpread to a great diſtance.

PUN, or PUNN, a luſus verborum, the wit whereof depends on a reſemblance between the ſounds and ſyllables of two words, which have different, and, perhaps, contrary ſignifications. See PARONOMASIA.

Such are,—*Cane, de cane, cane.*—*Far mole mole molæ*—*Lex Dei, lux diei.*—All houſes are turned to ale-houſes.—Matrimony is become matter of money.—Some mens paradiſe is a pair of dice.—Was it ſo in the time of Noah? Ah no.—*L'ordre tiré du diſordre, ou diſordre ordonne*, is the title of a French book.

Puns, when they come eaſily, and are very ingenious, poignant, and appoſite, are allowed of in converſation, letters, epigrams, madrigals, and the like compoſitions; but they are abſolutely baniſhed out of the grave, ſerious, and ſublime, becauſe they weaken its force, and diminiſh its beauty, which conſiſts in ſomething great and elevated. The Greeks and Romans, it is true, ſometimes indulged themſelves in the practice, and uſed *puns* as ornaments in the moſt ſerious diſcourſes: but the moſt ſevere and philoſophical genius of our age, is by no means ſatisfied with ſuch an outſide of wit. Devices, ſymbols, rebuſes, mottoes, &c. are their proper ſphere, where they ſhine to moſt advantage.

PUNARU, in *Ichthyology*, the name of a ſmall fiſh of the alauda kind. It has an oblong body, and a thick head, obtuſe at the ſnout. The mouth is ſmall, and in the lower jaw there are only two oblong teeth, which are ſharp and pointed like needles. The eyes ſtand high in the head, the pupil is black, and the iris yellow; and over theſe there are two ſhort red filaments. The gills are large, and have two oblong fins placed behind them. The back-fin reaches from the head to the tail, and is prickly at the edge. The belly-fin reaches from the anus to the tail. The ſkin and fins are all brown.

Beſides this, there is another ſpecies, variegated on its ſides with lines of a duſky purple. Its jaws beſet with very ſmall teeth, and its fins not prickly. Both kinds are found among the rocks about Braſil, and ſometimes get into the ſhells of the larger ſhell-fiſh. Marggrave Hiſt. of Braſil.

PUNAY, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a very beautiful ſpecies of turtle, common in their woods.

It is of the ſize of a ſmall parrot, and is of a fine green colour but the extreme feathers of its wings are tipped with white, and the lower part of its belly is of a ſaffron colour Its beak is yellow.

PUNCH, an inſtrument of iron or ſteel, uſed in ſeveral arts, for the piercing and ſtamping holes in plates of metals, &c. being ſo contrived, as not only to perforate but to cut out and take away the piece: whence the French call it, *emporte-piece*, q. d. take-off piece.

The *punch* is a principal inſtrument of the metal-button-makers, wafer-makers, patch-makers, ſhoe-makers, &c. The *punch* of the makers of plate-buttons ſerves to cut and parcel out the plates of gold and ſilver wherewith they cover their moulds.—It is large, round, four or five inches high, the bottom hollow for about half an inch, well ſteeled, and the edge very ſharp.

To uſe it, they extend the plate of metal on a leaden table or block, and with a pretty heavy hammer ſtrike the head of the *punch*, &c. See Button-*making*.

Punch *horſe*, in the *Manege*, is a well-ſet, well-knit horſe, ſhort-backed and thick-ſhouldered, with a broad neck, and well lined with fleſh.

Punch is alſo a name of a ſort of compound drink, frequent in England, and particularly about the maritime parts thereof.

Its baſis is ſpring water, which being rendered cooler, briſker, and more acid, with lemon-juice, and ſweetened again to the palate with fine ſugar, makes what they call *ſherbet*; to which a proper quantity of a ſpirituous liquor, as brandy, rum, or arrack, being ſuperadded, the liquor commences *punch*.

Several authors condemn the uſe of *punch*, as prejudicial to the brain, and nervous ſyſtem.—Dr. Cheyne inſiſts, that there is but one wholeſome ingredient in it, viz. the mere water.

The proportions of the ingredients are various.—Some, inſtead of lemon-juice, uſe lime-juice, which makes what they call *punch-royal*: this is found leſs liable to affect the head, as well as more grateful to the ſtomach.

Some alſo make *milk-punch*, by adding near as much milk to the ſherbet as there is water, which tempers the acrimony of the lemon. Others prefer *tea-punch*, made of green tea inſtead of water, and drank hot.

Laſtly, What they call *punch for chamber-maids*, is made without any water, of lime-juice, ſharpened with a little orange and lemon-juice; twice as much white wine as lime-juice, and four times as much brandy, with ſugar.

PUNCHEON, ſee Punchion.

PUNCHIN, or Punchion, in *Building*, ſee Punchion.

PUNCHION, or Puncheon, a little block or piece of ſteel, on one end whereof is ſome figure, letter, or mark, engraven either in creux, or in relievo; impreſſions whereof are taken in metal, or ſome other matter, by ſtriking it with a hammer.

There are various kinds of theſe *punchions* uſed in the mechanical arts.—Such, for inſtance, are thoſe of the goldſmiths, cutlers, pewterers, &c.

Punchion, in *Coining*, is a piece of iron ſteeled, whereon the engraver has cut, in relievo, the ſeveral figures, arms, effigy, inſcription, &c. that are to be in the matrices wherewith the ſpecies are to be marked.

Minters diſtinguiſh three kinds of *punchions*, according to the three kinds of matrices to be made; that of the effigy, that of the croſs or arms, and that of the legend or inſcription.

The firſt includes the whole portrait in relievo. The ſecond are ſmall, each only containing a piece of the croſs or arms, v. gr. a fleur-de-lys, a harp, a coronet, &c. by the aſſemblage of all which the entire matrice is formed. The *punchions* of the legend only contain each one letter, and ſerve equally for the legend on the effigy-ſide, and the croſs ſide. See Coining.

For the manner of engraving, tempering, and ſtamping, theſe *punchions*, to form the matrices, ſee Engraving on ſteel, Matrice, &c.

Punchions, in *Printing*, are thoſe uſed in ſtamping the matrices, wherein the types of printing characters are caſt. See *Letter* Foundery.

Punchion is alſo uſed for ſeveral iron tools of various ſizes and figures, uſed by the engravers in creux on metals. Seal-gravers particularly uſe a great number, for the ſeveral pieces of arms &c. to be engraven; and many ſtamp the whole ſeal from a ſingle *punchion*.

Punchion is alſo a common name for all the iron inſtruments uſed by the ſtone cutters, ſculptors, lock-ſmiths, &c. for the cutting, inciding, or piercing their ſeveral matters. Thoſe of ſculptors and ſtatuaries ſerve for the repairing ſtatues, when they are taken out of the moulds.

The lock-ſmiths uſe the greateſt variety of *punchions*; ſome for piercing hot, others for piercing cold; ſome flat, ſome ſquare, ſome round, others oval; each to pierce holes of its reſpective figure in ſeveral parts of locks.

Punchion, or Punchin, in *Carpentry*, is a piece of timber placed upright between two poſts, whoſe bearing is too great, ſerving together with them to ſuſtain ſome large weight.

The *punchion* is uſually lower and ſlighter than either prick-poſts or principal poſts, and is joined by a brace, or the like, of iron. See Post. Thoſe on each ſide of a door, are called *door punchions*.

Punchion is alſo a piece of timber raiſed upright under the ridge of a building, wherein the little forces, &c. are jointed. Vitruvius calls the *punchion columen*.

Punchion is alſo uſed for the arbor or principal part of a machine, whereon it turns vertically; as that of a crane, &c.

Punchion is alſo a measure for liquids, containing a hogſhead and $\frac{1}{3}$, or 84 gallons or $\frac{1}{3}$ of a tun.

The Paris *punchion* is the ſame with their demiqueue: at Rouen it is three buſhels, &c.

PUNCTA *lachrymalia*, ſee Lachrymalia.

PUNCTATED *hyperbola*, in the *higher geometry*, an hyperbola whoſe oval conjugate is infinitely ſmall, i. e. a point.

PUNTICULARIS *febris*, a name given by ſome authors to a fever attended with ſmall eruptions.

PUNCTION, or Puncture, in *Surgery*, an aperture made in the lower belly, in dropſical perſons, to diſcharge the water, called alſo *paracenteſis*.

PUNCTUATION, in *Grammar*, the art of pointing; or dividing a diſcourſe into periods, and members of periods, by points expreſſing the pauses to be made in the reading thereof; and neceſſary both for underſtanding and pronouncing it.

The points uſed herein are four; viz. the *period*, *colon*, *ſemicolon*, and *comma*. See the particular uſe of each under its proper article.

Punctuation is a modern art; the ancients were entirely unacquainted with the uſe of our commas, colons, &c. and wrote not only without any diſtinction of members and periods, but alſo without diſtinction of words; which cuſtom, Lipſius obſerves, continued till the 104th Olympiad; during which time the ſenſe alone divided the diſcourſe.

The antiquity of *pointing*, however, has had its advocates: ſome have aſcribed the invention of it to Thraſymachus, who was cotemporary with Plato: others to Iſocrates, who flouriſhed about the ſame time; and others to Nicanor, in the time of Adrian. A late writer obſerves, that *pointing* was not unknown in the time of Alexander the Great. Aloyſii Antonii Verneii, &c. de Orthog. Lat. Rom. 1747.

Cicero's expreſſions, *verborum et ſententiarum interpunctas clauſulas in orationibus*, Lib. iii. de Orat. and *clauſulus atque interpuncta verborum*, &c. in his Orat. pro Muræna, have been alledged by ſome as evidences of the antiquity of this practice: but others have referred the former words to ſpeaking, and not to writing; the latter, to thoſe points which were formerly placed after each word, in order to diſtinguiſh word from word, when the whole was written in large capitals, at equal diſtances from one another; which is a very different thing from that ſort of *punctuation* which divides the ſenſe and ſubject matter into members and ſentences, and parts of ſentences, in ſuch proportions as either the ſenſe or the conſtruction may require. The words of Seneca in his 40th Ep. *Nos etiam cum ſcribimus interpungere ſolemus*, are more applicable to this latter ſort of *pointing* than thoſe of Cicero; and yet theſe have been underſtood to refer to the diſtinctions of words. See an Eſſay on the Uſe of *Pointing*, by ſir James Burrow, F. R. S. and F. A. S. 4to, p. 6.

There is much more difficulty in *pointing* than people are generally aware of. In effect, there is ſcarce any thing in the province of the grammarians ſo little fixed and aſcertained as this. The rules uſually laid down are impertinent, dark, and deficient; and the practice, at preſent, is perfectly capricious, authors varying not only from one another, but from themſelves too.

Dr. Lowth obſerves, that few preciſe rules can be given which will hold without exception, in all caſes: they muſt be laid down with as much exactneſs as the nature of the ſubject will admit; and they may ſerve for a general direction, to be accommodated to different occaſions, and to be ſupplied, when deficient, by the taſte and judgment of the writer. Introd. to Eng. Gram. Ed. 1772. p. 194.

Indeed, F. Buffier, and ſince him Dr. Ward, and biſhop Lowth, have done ſomething towards a fixed and preciſe ſyſtem of *pointing*, from the reaſon and analogy of things. Their doctrine the reader will find under the articles Comma, Colon, Sentence, &c.

In the general, we ſhall only here obſerve, that the comma is to diſtinguiſh nouns from nouns, verbs from verbs, and ſuch other parts of a period as are not neceſſarily joined together. The ſemicolon ſerves to ſuſpend and ſuſtain the period when too long; the colon, to add ſome new, ſupernumerary reaſon, or conſequence, to what is already ſaid: and the period, to cloſe the ſenſe and conſtruction, and to releaſe the voice. For the proportional quantity, or time of the points, with reſpect to one another, ſee Comma.

PUNCTUM, in *Geometry*, &c. ſee Point.

In the ſchools they have their

Punctum *terminans*, which is the indiviſible extreme of a line, beyond which no part of the line extends.

Punctum *continuans*, an indiviſible magnitude between contiguous points of a line, whereby they are connected, and from whence ariſes a continuity.

Punctum *initians*, an indiviſible point, from which the line begins.

Punctum *formatum*, or *generatum*, in *Conics*, is a point determined by the interſection of a right line drawn through the vertex of a cone to a point in the plane of the baſe that conſtitutes the conic ſection.

Punctum *ex comparatione* denotes either of the foci of an ellipſis and hyperbola; thus called by Apollonius, becauſe the rectangles under the ſegment of the tranſverſe diameter in the ellipſis, and under that and the diſtance between the vertex and the focus in the hyperbola, are equal to one fourth part of what he calls the *figure* thereof.

Punctum *lineans*, in *Geometry*, is a term uſed by ſome authors for that point of the generating circle of a cycloid, or epicycloid, which in the geneſis produces any part of the cycloidal line.

Punctum *ſaliens*, in *Anatomy*, the firſt rudiments of the heart, in the formation of the fœtus, where a throbbing motion is perceived.

This is eaſily obſerved with a microſcope in a brood-egg, wherein, after conception, we ſee a little ſpeck or cloud; the middle whereof is a ſpot that appears to beat, or leap, a conſiderable time before the fœtus be formed for hatching.

Punctum *lachrymale*, in *Anatomy*, a little hole in the edge of each eye-lid, opened into a bag called *glandula lachrymalis*. See Lachrymalia and Lachrymal *gland*.

PUNCTURE, Punctura, in *Surgery*, *&c.* any wound made by a pointed inſtrument.

Among the number of the moſt ſimple wounds are reckoned thoſe which are made by *puncture*, or ſtabbing on the external parts, and not penetrating to a very great depth. In theſe wounds, after the blood has been ſtopped at the firſt dreſſing, by the application of dry lint, the common digeſtive, or *linimentum Arcæi*, is to be ſpread upon a pledgit and applied once every day; or if the diſcharge is but ſmall, every other day, covering the dreſſings with a plaſter and compreſs, and ſecuring the whole with a proper bandage. At each dreſſing, care muſt be taken to remove every thing that will give way readily; the pus or ſanies is to be gently wiped off with fine rags; and unleſs a great diſcharge of matter makes it neceſſary, too frequent dreſſings do rather harm than good. The firſt dreſſings that have been applied, eſpecially when there has been a flux of blood, ſhould by no means be removed forcibly; but be left till they will fall off of themſelves, which they will do after a ſuppuration is formed: and by this caution, much pain, and, perhaps, a freſh hæmorrhage, are avoided.

When a *puncture*, however, penetrates very deep, the cure is attended with many difficulties; eſpecially if it is made perpendicularly down, and has no depending orifice; for in this caſe, the blood and matter are eaſily collected at the bottom, and protract the cure, and frequently form fiſtulæ. To prevent theſe conſequences, it will be proper to preſs the wound from the bottom upwards, to apply a compreſs toward the bottom of the wound externally, and to apply a bandage over all, which preſſes much tighter upon the lower than upon the upper parts. If all this precaution, however, prove of no effect, which, indeed, is too often the caſe, it is the moſt proper method to make a large opening at the bottom of the wound, before any fiſtulæ are formed there. In order to make this opening to the greater advantage, it will be proper to get a particular ſort of probe or needle, very blunt at top, and at the other end provided with a large eye, or hole, through which a linen rag may be paſſed. This probe is to be paſſed at the bottom of the wound, and the blunt end of it preſſed outwards toward the ſkin, till you can feel it with a finger: when you can feel it, cut down upon it if you can ſafely, and make a large opening; ſpread the rag that you have run through the eye of the probe with ſome vulnerary balſam, and draw it through the wound after the manner of a ſeton, and leave it there, dreſſing up both the orifices with the ſame balſam, and covering the whole with compreſſes and the proper bandages. In every ſucceeding dreſſing, that part of the rag that is left out of the wound is to be ſpread with freſh ointment, and the lower part drawn down till this takes place in the new wound. This method is to be continued till the wound is well cleanſed, the diſcharge greatly diminiſhed, and all in a readineſs to heal: the ſeton is then to be removed, and the wound healed as uſual. Heiſter's Surg. p. 35.

In phlebotomy, people are ſometimes brought in danger of the loſs of a limb, and even of life, by the *puncture of a tendon.*—The patient here does not immediately feel any pain; but about twelve hours after the operation, complains thereof; not in the puncture itſelf, but in the parts tending towards the arm-pit.—The wounded part then ſwells to the ſize of a filbert, and diſtils an aqueous humour, or ichor, which is the chief diagnoſtic of the *punctura tendinis*. See Tendon.

PUND-BRECH, or Pound-Breach, compounded of the Saxon, *pund*, *pound*, and *brech*, *fracture*, *breaking*, denotes the illegal taking of cattle out of the pound; either by breaking the pound, picking the lock, or otherwiſe. —*Si* pund-brech *fiat in curia regis*, *plena* wyta *ſit*: *alibi quinquin mancæ*. Leg. Hen. I. See Pound.

PUNDFULDA, a pound for cattle, or pinfold. *Placita inter abbat.* Glaſton. & Hen. de Hamel, anno 1236.

PUNICA, in *Botany*, ſee Pomegranate.

PUNICUS *lapis*, a name given by the writers of the middle ages to a ſtone of a ſpongy texture, the powder of which was good in diſeaſes of the eyes.

This ſeems to have been no other than the pumice, the writers of theſe times having been ſtrangely incorrect in their orthography; and all the virtues aſcribed to this ſtone, as alſo the places where it was found, which are the Æolian iſlands, &c. ſeeming to have been copied from Pliny's account of the pumice.

PUNISHMENT, a penalty impoſed upon the commiſſion of ſome crime or offence againſt the laws.

It is eſſential to the nature of a law, that it import or decree a *puniſhment* to the tranſgreſſors thereof.

The forms and manners of *puniſhment* are various in various countries and ages, and for various crimes; as treaſon, felony, adultery, parricide, &c.

Among the Romans, the *pecuniary puniſhments* were the *muleta* and *confiſcatio*. The *corporal puniſhments* were *capitis diminutio*, *aquæ & ignis interdictio*, *proſcriptio*, *deportatio*, *relegatio*, *furca*, *crux*, *carcer*, *culeus*, *equuleus*, *ſcalæ gemoniæ*, *damnatio ad gladium*, *ad metallum*, *flagellatio*, *talio*, &c. which ſee deſcribed under their reſpective articles.

Among us the principal *civil puniſhments* are *fines*, *impriſonments*, *the ſtocks*, *pillory*, *burning in the hand*, *whipping*, *ducking ſtool*, *hanging*, *beheading*, *quartering*, *burning*, *tranſportation*, &c.

The *eccleſiaſtical puniſhments* are *cenſures*, *ſuſpenſions*, *deprivations*, *degradations*, *excommunications*, *anathemas*, *penances*, &c. The *military puniſhments* are, *being ſhot*, *running the gantelope*, *riding the wooden horſe*, *the bilboes*, &c.

Among the Turks, &c. *impaling*, *baſtinadoes* on the ſoles of the feet, &c. obtain. See Empalement, &c.

PUNITORY *intereſt*, in the *Civil Law*, ſuch intereſt of money, as is due for the delay of payment, breach of promiſe, &c.

PUNK, in *Natural Hiſtory*, the inward part of the excreſcence or exuberance of an oak. It is uſed by the Indians in Virginia for medicinal burning, as the Eaſt Indians uſe moxa. Phil. Tranſ. Nº 454. ſect. 1.

PUNN. See Pun.

PUNT, in *Sea-Language*, a ſort of oblong flat-bottomed boat, whoſe floor reſembles the platform of a floating ſtage; and uſed by ſhip-wrights for breaming, caulking, or repairing a ſhip's bottom.

PUPA, in *Natural Hiſtory*, a name lately ſubſtituted in the room of *chryſalis* or aurelia, becauſe many inſects in this ſtate reſemble an infant in ſwaddling cloaths; and all, except thoſe of the *hemiptera* order, take no nouriſhment.

PUPIL, *pupillus*, in the *Civil Law*, a boy or girl not yet arrived at the age of puberty, i. e. under fourteen years of age for the boy, and under twelve for the girl.

While a minor remained under the direction of a tutor, he was called a *pupil*; after puberty, a curator being aſſigned him, he ceaſed to be called a *pupil*.

A tutor is obliged to pay intereſt for what monies of his *pupil* lie idle and unemployed. A tutor is allowed to do any thing for his *pupil*, but nothing againſt him.

Pupil is alſo uſed by way of extenſion, in *Univerſities*, &c. in the ſenſe of *alumnus*, for a youth under the education or diſcipline of any one.

Pupil, *pupilla*, in *Anatomy*, denotes a little aperture in the middle of the uvea and iris of the eye, through which the rays of light paſs to the cryſtalline, in order to be painted on the retina, and cauſe viſion.

It is obſerved, that as we are forced to uſe various apertures to our optic glaſſes, ſo nature has made a like proviſion in the eyes of animals, whereby to ſhut out too much, and admit ſufficient light, by the changes in the aperture of the *pupil*.

The ſtructure of the uvea and iris is ſuch, as that, by their aperture, the *pupil* is contractible and dilatable at pleaſure, ſo as to accommodate itſelf to objects, and to admit more or fewer rays, as the object, being either more vivid and near, or more obſcure and remote, requires more or leſs light: it being a conſtant law, that the more luminous the object, the ſmaller the *pupil*; and again, the nearer the object, the ſmaller the *pupil*; and *vice verſa*.

This fact has been long ago noticed by optical writers. B. Porta, about the middle of the ſixteenth century, in his treatiſe De Refractione, p. 74, obſerves, that the *pupil* is contracted involuntarily when it is expoſed to a ſtrong light, and opens of itſelf when the light is ſmall. A ſimilar obſervation was made by his countryman and cotemporary, Father Paul of Venice. Galen, indeed, firſt obſerved the dilatation of the *pupil* of one eye, when the other was ſhut or loſt, and the contraction of it, when the other was opened or recovered; and in this opinion he was followed by all naturaliſts and philoſophers, till Fabricius ab Aquapendente, profeſſor at Padua, by obſerving the eye of a cat, found that the *pupil* not only dilated and contracted itſelf, when one of the eyes was ſhut, but alſo when both were open. F. Paul found, from repeated experiments, that the *pupil* not only of cats, but alſo of men, and other animals, always contracted itſelf when the eye was expoſed to a bright light, and again dilated itſelf when the light was faint and languid. This he always obſerved, as well when both eyes were open, as when one of them was ſhut. The ſame remark had been made by Achillinus, in a treatiſe publiſhed in 1322; and the fact was known to the Arabians, Rhazes and Avicenna. That the *pupil* of the eye is enlarged, in order to view remote objects, and that it is contracted while we are viewing thoſe that are near, is a fact with which Scheiner, in the beginning of the ſeventeenth century, was well acquainted, and which he proved by experiments, and illuſtrated by figures. When a needle, or any ſmall object, is brought near to the eye of any perſon, who looks attentively at it, the *pupil*, he ſays, is plainly ſeen to contract; and it as conſtantly expands whenever it is withdrawn.

This alteration of the *pupil* is effected by certain muſcular fibres on the outſide of the uvea, which arrive from nerves detached hither from the ſclerotica. Theſe fibres proceeding ſtraight from their origin towards the centre, terminate in the orbicular limb or verge of the *pupil*, which conſiſts of orbicular fibres, whereby the figure and ſpace of the *pupil* are defined. The firſt, or longitudinal fibres, dilate the aperture of the *pupilla*; the latter, or orbicular ones, conſtringe it.

Some authors, however, attribute the motions of the *pupilla* to the ligamentum ciliare; and others think, that both this, and the fibres of the uvea, concur herein. Dr. Derham adds, that while the *pupil* opens and ſhuts, the ligamentum ciliare dilates or compreſſes the cryſtalline, and brings it nigher to, or farther from, the retina, as the object is more or leſs remote.

There is no doubt that the change to which the *pupil* is ſubject is the effect of light upon the eye. Dr. Hartley, Obſ. on Man, vol. i. p. 219, ſuppoſes, that the light which enters at the *pupil* has great efficacy in contracting both the greater and leſs rings of the iris, as may be concluded, he ſays, from the immobility of the *pupil* in a gutta ſerena; alſo becauſe, on this ſuppoſition, the light which paſſes in at the *pupil* muſt, by contracting the leſs ring, become a check and guard againſt its own too free admiſſion, which is agreeable to the tenor of nature in like inſtances. The retina, he obſerves, extends to the greater ring, and may ſend ſome nervous fibres to it, and even to the iris. Dr. Whytt alſo ſays, Eſſay on vital and involuntary Motion, p. 112. that the contraction of the *pupil* is not performed by the action of light upon the iris, but upon the retina; ſince whatever intercepts the rays of light, ſo as to prevent their reaching the retina, cauſes a preternatural dilatation of the pupil; becauſe in a cataract, where the cryſtalline humour, being conſiderably opaque, intercepts a great part of the rays, the *pupil* loſes a good deal of its contractile power. This author alſo obſerves, that the wideneſs of the *pupil* in a ſyncope, apoplexy, and confirmed gutta ſerena, ſhews that, in order to dilate the *pupil* to its largeſt ſize, no effort of the mind is neceſſary, but only the ſuperior contractile power of the longitudinal fibres of the uvea, when its circular muſcle is not excited into action by the ſtimulus of light on the retina. M. Mery informs us (Mem. Ac. Paris, for 1704.) that, having plunged a cat in water, and expoſing her eye to the ſtrong light of the ſun, the *pupil* was not at all contracted by it; whence he infers, that the contraction of the iris is not produced by the action of the light, but by ſome other circumſtance. For he contends that the eye in this ſituation receives more light than in the open air. M. de la Hire, in reply, endeavours to ſhew, (Mem. Ac. Par. for 1709) that fewer rays enter the eye under water, and that, in thoſe circumſtances, it is not ſo liable to be affected by them. Beſides, it is obvious to be remarked, that the cat muſt be in great terror in this ſituation; and being an animal that has a very great voluntary power over the muſcles of the iris, and being now extremely attentive to every thing about her, ſhe might have her eyes open, notwithſtanding the action of the light upon it, and though it might be very painful to her.

The figure of the pupil, in various animals, is wonderfully adapted to their various circumſtances and occaſions: in ſome, e. gr. in man, it is round, that form being fitteſt for the poſition of our eyes, and the various uſes we make of them in all directions.

In others, it is elliptical or oblong: in ſome of which, e. gr. the horſe, ſheep, ox, &c. the ellipſis is tranſverſe, and the fiſſure large, to enable them to ſee laterally, and even with a little light; and thereby both to gather their food the better in the night, and to avoid dangers on either ſide. In others, e. gr. the cat, the ellipſis is erect, and is alſo capable of opening very wide, and ſhutting very cloſe; by means of the latter of which ſtates, that animal can exclude all, but, as it were, a ſingle ray of light, and ſo avoid all the inconveniencies of the bright ſun; and by the former, it can take in all the fainteſt rays, and thus avoid the inconveniencies of the night. An incomparable proviſion for theſe animals, which are to watch and way-lay their prey both by day and night, to ſee upwards and downwards, to climb, &c. See Eye and Vision.

Pupil *contracted*. The diſtemper of the eye called by ſurgeons a *contraction of the pupil*, is ſo total or cloſe a contraction of that part as will not let it tranſmit light enough to the bottom of the eye, to enable the patient to ſee objects diſtinctly. Sometimes this diſorder is from infancy, and ſometimes it ariſes from an intenſe inflammation of the eye, or other cauſes.

The cure of this is extremely difficult; but Mr. Cheſelden has invented a method by which he has often proved very ſucceſsful in his attempts to relieve it. The method is this: the eye-lids being held open by a ſpeculum oculi, he takes a narrow ſingle-edged ſcalpel, or needle, almoſt like that uſed for couching in a cataract, and paſſing it through the ſclerotica, as in couching, he afterwards thruſts it forward through the uvea or iris, and in extracting it cuts through the iris.

If the diſorder is not accompanied with a cataract, it will be beſt to cut through the iris in the middle; otherwiſe, when there is a cataract, the inciſion ſhould be made a little higher in the uvea, that the cataract may not obſtruct the ingreſs of the rays or light. The cataracts that accompany this diſorder are uſually very ſmall, and ſometimes their adheſion to the iris is ſo firm, as to render it impracticable to couch or ſuppreſs them. Heiſter.

PUPILLARITY, or **Puppillage**, the ſtate of a pupil; in oppoſition to *puberty*.

PUPPET, in *Natural Hiſtory*. See Aurelia.

PUPPISOS, a name given by ſome authors to the os frontis. The ſuture in this bone is alſo called by many anatomiſts the *ſutura puppis*.

PUPULÆ, a name uſed by ſome to expreſs the extremities of the fingers.

PUR *autre vie*, in our *Law-Books*, is uſed where lands are held for the life of another.

PURA *eleemoſyna*, **Pure** *alms*, denotes a tenure, whereby the churchmen hold lands in Scotland, ſomewhat on the footing of the primitive clergy.

Pura *haſta*. See Hasta.

PURBECK *ſtone*, the *ſaxum arenarium cinereum Purbecenſe* of Da Coſta, and *pſadurium friabile albido fuſcum* of Hill, is an alkaline ſand ſtone, which is harſh and rough, of a diſagreeable aſhen colour, very heavy, and moderately hard, of a texture not very compact, but ſomewhat porous, and is compoſed of an angular grit, cemented together by an earthy ſpar: it cuts freely, and with a tolerable even or ſmooth ſurface, but will not take a poliſh. It will not ſtrike fire with a ſteel, and burns to a white colour. The quarries of this ſtone are in the iſland of *Purbeck* in Dorſetſhire, whence it is brought to London in great quantities, and uſed in building, and for pavements. Its ſpecific gravity is 2,68. There is alſo another kind of *Purbeck* ſtone, the *ſaxum fuſco-albidum* of Da Coſta, and the *ſympexium duriſſimum, ſplendidum albido-fuſcum* of Hill, which is alkaline, of a dull, diſagreeable, pale, browniſh, white colour, and is not capable of a poliſh, though it cuts to a very ſmooth ſurface: it is of a fine, cloſe, compact texture, not quite deſtitute of brightneſs, but full of ſparks of pure ſpar, and intimately mixed with vaſt quantities of ſmall pectunculi, which are often ſaturated and filled with the ſame ſubſtance; it is very heavy and hard, and water does not pervade its texture; it does not ſtrike fire with ſteel, and when burnt, acquires a clear aſhen colour. This ſtone is brought from *Purbeck*, and uſed in building, pavements, &c. Hill informs us, that it is likewiſe found in many other parts of the kingdom, and that there are large ſtrata of it in Yorkſhire. Da Coſta's Foſſils, p. 128—152.

PURCELAIN. See PORCELAIN.

PURCHASE, in *Law*, in its largeſt and moſt extenſive ſenſe, is defined by Littleton to be the poſſeſſion of lands and tenements, which a man hath by his own act or agreement, and not by deſcent from any of his anceſtors or kindred. In this ſenſe it is contradiſtinguiſhed from acquiſition by right of blood, and includes every other method of coming to an eſtate, but merely that by inheritance; wherein the title is veſted in a perſon, not by his own act or agreement, but by the ſingle operation of law. *Purchaſe*, in its vulgar and confined acceptation, is applied only to the acquiſition of goods, lands, tenements, or the like, by means of money, or ſome other valuable conſideration.

What we call *purchaſe*, *perquiſitio*, the feudiſts call CONQUEST, *conquæſtus*, or *conquiſitio*; both denoting any means of acquiring an eſtate out of the common courſe of inheritance; and this is ſtill the proper phraſe in the law of Scotland. The difference, in effect, between the acquiſition of an eſtate by deſcent and by *purchaſe*, conſiſts principally in theſe two points. 1. That by *purchaſe* the eſtate acquires a new inheritable quality, and is deſcendible to the owner's blood in general, and not the blood only of ſome particular anceſtor. 2. An eſtate taken by *purchaſe* will not make the heir anſwerable for the acts of the anceſtor, as an eſtate by deſcent will. According to this legal ſignification of the word *perquiſitio*, or *purchaſe*, it includes the five following methods of acquiring a title to eſtates, viz. ESCHEAT, OCCUPANCY, PRESCRIPTION, FORFEITURE, and ALIENATION, conveyance, or *purchaſe*, in its limited ſenſe: under which latter head may be compriſed any method wherein eſtates are voluntarily reſigned by one man, and accepted by another: whether that be effected by ſale, gift, marriage-ſettlement, deviſe, or other tranſmiſſion of property, by the mutual conſent of the parties.

Natural perſons, incorporate perſons, ſole or aggregate, deaf, dumb, and blind perſons, minors, and all reaſonable creatures, may *purchaſe*, except in ſome caſes; but ſome have capacity to *purchaſe*, and not to hold; as aliens, felons, &c. and others have ability to hold or not to hold upon a *purchaſe*, at the election of themſelves or others, as infants, and feme coverts. 1 Inſt. 2, 3. 11 Rep. 77. 7 Rep. 17.

PURCHASE *and value of land*. Lands are *purchaſed* at divers rates in this kingdom, according to their ſituation, &c. An eſtate of fee ſimple in lands, is uſually valued in the country at twenty years *purchaſe*. Lands near London yield about twenty-five years *purchaſe*; and in Wales not above eighteen or nineteen. The fee of tithes of perpetual advowſons is worth about twenty-two years *purchaſe*; and fee-farm rents iſſuing out of lands, and the fee of ground rents, are rated at twenty-four or twenty-five years *purchaſe*. The fee of houſes in London ſells for ſeventeen or eighteen years *purchaſe*, if in good repair, and the ground-rents are not high; otherwiſe, for leſs. Houſes not in London, but well ſituated, without any lands to them, are ſold for fifteen or ſixteen years *purchaſe*. For a leaſe of a houſe for thirty years, about eight years *purchaſe* is given in London; and for one-and-twenty years about ſix years value. A freehold leaſe for three lives abſolute, or a copyhold eſtate for the like term, where the quit-rents and heriots reſerved are not higher than uſual, is rated at fourteen year's *purchaſe*; for the firſt life eight, for the ſecond four, and two for the third life; or ſeven, five, and two. A chattel leaſe for three lives, thirteen years *purchaſe*. The exchanging one life for another is generally one year's *purchaſe*; but if a ſickly life be exchanged for a healthy one, two or three years *purchaſe*. A widowhood in a copyhold, after the death of the huſband a third life, is valued at one year's *purchaſe*. The fee in reverſion after lives, is worth nine, ſeven, and five year's *purchaſe*, after one, two, or three lives; and more where there is timber, or the eſtate is improvable.

PURCHASE *of writs*. See WRIT.

PURCHASE, in the *Sea Language*, has the ſame ſignification with *draw in*, at land. Thus, they ſay, *the capſtern purchaſes apace*, i. e. draws in the cable apace; and, when they cannot draw or hale any thing in with the tackle, they ſay, *the tackle will not* purchaſe.

PURCHASE is alſo a name given by ſailors to any mechanical power employed in raiſing or removing heavy bodies, or in fixing or extending the ſhip's rigging. Such are the tackles, windlaſſes, capſterns, ſcrews, and handſpikes.

PURCHASE-*hook*, among *Traders*, is the name given to a book which is a kind of journal, containing an account of all the purchaſes made, or things bought in the day.

PURE, ſomething free from any admixture of foreign or heterogeneous matters.

PURE *fire*. See FIRE.

PURE *hyperbola*, in *Conics*, is an hyperbola without any oval, node, ſpike, or conjugate point. See CURVE.

PURE *mathematics*. See MATHEMATICS.

PURE *propoſition*. See PROPOSITION.

PURE *quadratics*. See QUADRATIC.

PURE *reſignations*. See RESIGNATION.

PURE *villenage*. See VILLENAGE.

PURETTA, a name given by ſome writers to the common ſhining black ſand, uſed to ſtrew over writing, and erroneouſly called by ſome *ſteel-duſt*.

It is a natural mineral ſubſtance, found on the ſhores near Genoa, and in other places.

PURFLEW, a term in *Heraldry*, expreſſing ermines, peans, or any of the furs, when they compoſe a border round a coat of arms.

Thus they ſay, he beareth gules a border, *purflew*, vairy; meaning, that the border is vairy.

PURGATION, *purgatio*, the act of *purging*, ſcouring, or purifying any thing, by ſeparating and carrying off any impurities found therein.

PURGATION, in *Pharmacy*, is the cleanſing of a medicine by retrenching its ſuperfluities; as taking the wood and ſeeds out of caſſia, and the ſtones out of dates, tamarinds, and other fruits.

PURGATION is alſo uſed, in *Chemiſtry*, for ſeveral preparations of metals and minerals, intended to clear them of their impurities; more uſually called *purification* and *refining*.

The ordinary *purgation* of MERCURY is performed, by paſſing it through a chamois ſkin. Gold is *purged* by the coppel, cementation, &c. See GOLD, COPPEL, &c. *Purgation*, in other metals, is performed by repeated FUSION, &c.

PURGATION, *catharſis*, in *Medicine*, is an excretory motion, ariſing from a quick and orderly contraction of the fleſhy fibres of the ſtomach and inteſtines; whereby the chyle, corrupted humours, and excrements, lodged therein, are protruded farther and farther, and at length quite excluded the body by ſtool.

Purgation is one of the principal ſpecies of EVACUATION. For the means and manner whereby it is effected, ſee PURGATIVE.

PURGATION, in *Law*, is the clearing one's ſelf of a crime, whereof publicly ſuſpected or accuſed before a judge, called alſo *judicium Dei*.

Of theſe *purgatians* there was anciently much uſe in England, eſpecially touching matters of felony charged on clerks; and there is ſomething of them ſtill retained in the eccleſiaſtical court in ſuſpicion of incontinency, &c.

Purgation is either *canonical* or *vulgar*.

PURGATION, *canonical*, is that preſcribed in the canon-law, the form whereof, obtaining in the ſpiritual court, is, that the party ſhall take his oath he is clear of the fact objected; and bring ſo many of his honeſt neighbours, not above twelve, as the court ſhall aſſign him, to ſwear, on their conſciences, that they believe he ſwears truly.

The canonical doctrine of *purgation*, whereby the parties were obliged to anſwer upon oath to any matter, however criminal, that might be objected againſt them, continued till the middle of the laſt century to be upheld by the ſpiritual courts; when the legiſlature was obliged to interpoſe, to teach them a leſſon of ſimilar moderation. By the ſtatute of 13 Car. II. cap. 12. it is enacted, that it ſhall not be lawful for any biſhop, or eccleſiaſtical judge, to tender or adminiſter to any perſon whatſoever, the oath uſually called the oath *ex officio*, or any other oath whereby he may be compelled to confeſs, accuſe, or purge himſelf of any criminal matter or thing, whereby he may be liable to any cenſure or puniſhment. But this doth not extend to oaths in a civil ſuit; and, therefore, it is ſtill the practice both in the ſpiritual courts, and in equity, to demand the perſonal anſwer of the party himſelf upon oath. Yet if in the bill any queſtion be put, that tends to the diſcovery of any crime, the defendant may thereupon demur, and refuſe to anſwer. Anciently, upon the allowance of the *benefit* of CLERGY, the perſon accuſed was delivered to the ordinary, to make his *purgation*, which was to be before a jury of twelve clerks, by his own oath affirming his innocence, and the oaths of twelve compurgators as to their belief of it. But now, by the ſtat. 18 Eliz. cap. 7. this kind of *purgation* is alſo taken away; and the perſon admitted to his clergy ſhall not be delivered to the ordinary.

PURGATION, *vulgar*, being the moſt ancient manner, was by fire, or water, or combat; uſed by infidels, and by Chriſtians too, till aboliſhed by the canon-law. See ORDEAL and CORSNED.

Combat, though now diſuſed, may yet be ſtill practiſed by the laws of the realm, in caſes where evidence is wanting, and where the defendant rather chooſes combat than any other trial. See COMBAT.

Terris bonis, &c. *redhabendis poſt* PURGATIONEM. See TERRIS.

PURGATION, in *Rhetoric*, is uſed for that kind of defence which takes place when the accuſed perſon owns the fact, but denies that he did it with deſign, or with any bad intention.

PURGATION, in *Tragedy*, is a term which Ariſtotle uſes for the effect of tragedy on the mind.

That philoſopher obſerves, that tragedy, by means of the terror and compaſſion which it excites, *purges* paſſions out of the ſoul.

Indeed, Corneille adds, that TRAGEDY frequently creates paſſions, inſtead of *purging* them; ſo that he takes Ariſtotle's *purgation* to be no more than a chimera.

PURGATIONS, *menſtrual*, the catamenia or MENSES of women.

PURGATIVE, or PURGING *medicine*, a medicament which evacuates the impurities of the body by ſtool; called alſo CATHARTIC.

Purgatives are divided, with regard to their effect, into *gentle*, *moderate*, and *violent*.

Gentle purgatives are ſuch as operate very mildly, as tamarinds, caſſia, munna, rhubarb, ſena, and moſt of the mineral waters.

The *moderate* purge ſomewhat more briſkly; as jalap, ſcammony, &c.

The *violent* operate exceſſively; as coloquintida, hellebore, laureola, &c.

Purgatives are again divided, with regard to the humour they evacuate, into *phlegmagogues*, *cholagogues*, *melanagogues*, and *hydragogues*; each whereof ſee under its proper article.

The modern phyſicians reject this diviſion; and ſhew the operation of all *purgatives* to be alike.

Purgatives make one of the moſt important articles in medicine. Their effect is produced by vellicating and irritating the nervous fibres of the ſtomach and inteſtines, and thereby urging them to an expulſion.

An idea of the manner of their operation is thus given by Dr. Cheyne.

A *purgative* medicine being received into the ſtomach by the mouth, its particles do there vellicate or ſtimulate the fibres of the ſtomach, and thereby increaſe the digeſtive faculty; i. e. they bring the muſcular fibres of the ſtomach, and the muſcles of the abdomen and diaphragm, into more frequent contractions than ordinary, till the medicine is admitted into the inteſtines; the fibres and glands whereof being more ſenſible than thoſe of the ſtomach (whoſe parts, by the frequent rough contacts of one againſt another, and of the groſs bodies often thrown into it, are, as it were, deadened) it eaſily moves, and brings them into frequent forcible contractions, whereby theſe glands are ſqueezed, and ſo admit a fluid matter, which lubricates the paſſages, and which, mixing with the feculent matter of the inteſtines (which is rendered fluid by the ſame active and ſtimulating quality of the *purgative* medicine) renders it more fluid; by which, and by the uncommon contractions of the inteſtines, it paſſes more eaſily and plentifully into the inteſtinum rectum, and is thence ejected by ſtool.

Thus do gentle purges act, and only cleanſe the inteſtines, few of their particles entering in by the lacteal veins, ſo as to affect the blood. But in violent *purgatives*, the ſtimulating particles are mixed with the blood, and produce there, many times, very great effects, by occaſioning unnatural fermentations, by ſeparating the natural coheſions of the fluids of the body; and they do alſo, by vellicating the ſpiral fibres of the veins and arteries, bring thoſe into more forcible contractions, and thereby accelerate the motion of the blood; all which may have ſometimes a good, but ſometimes a bad, effect.

As to the effects of *purgatives* on animal bodies, Dr. Quincy adds, that every irritation of the inteſtines either quickens the periſtaltic motion in its natural direction, or occaſions ſome little inverſions of it. Now, in both caſes, any matters, that but ſlightly adhere to the coats, or inner membranes, will be looſened and ſhaken off, and carried forward with the other contents; and they will alſo be more agitated, and thus rendered more fluid.

Hence it is manifeſt, how a *purging* medicine haſtens and increaſes the diſcharges by ſtool; but the ſame manner of operation alſo carries its effects much farther, in proportion to the force of the ſtimulus: for, where it is great, all the appendices of the bowels, and even all the viſcera in the abdomen, will, by a conſent of parts, be pulled or twitched, ſo as to affect their reſpective juices, in the ſame manner as the inteſtines themſelves do their contents. The conſequence of which muſt be, that a great deal will be drained back into the inteſtines, and made a part of what they diſcharge. And, when we conſider the vaſt number of glands in the inteſtines, with the outlets of thoſe viſcera opening thereunto, and particularly of the liver and pancreas, it will be no wonder that vaſt quantities, eſpecially in full conſtitutions, may be carried off by one *purge*.

As to thoſe *purgatives*, diſtinguiſhed by the names of *cholagogues*, *hydragogues*, *phlegmagogues*, on a ſuppoſition of an ejective quality therein, they may be accounted for upon more intelligible principles: for, when the diſcharges by ſtool diſcover an over-proportion of any particular humours, it is always to be ſuppoſed there was a redundance of ſuch a humour, whoſe diſcharge any irritation would have occaſioned. Thus, in proportion to the proximity of ſome humours in the inteſtinal tube, and the diſpoſition of the paſſages to convey them that way, do they require greater or leſſer vibrations or ſhakes of the fibres to fetch them out.

For this reaſon, the briſker cathartics, which vellicate the membranes moſt of all, pump out, as it were, from all the meſenteric glands, and neighbouring parts, their contents, which, becauſe they abound ſo much with lymphatics, and viſcid watery humours, make the diſcharges thin and watery.

Thoſe which act in a ſomewhat lower degree, yet irritate enough to deterge and draw out a great deal of mucous and viſcid matter, which, ſometimes by lodgment, and want of due motion, changing into various colours, occaſions the different names of *phlegm* or *choler*: as the former, therefore, paſs for hydragogues, ſo do the latter for purges of phlegm and choler. But there is another principle, beſides that of a ſtimulus, whereby a purging medicine is enabled to anſwer its intention; viz. by fuſing the tumours, and rendering them more fluid than before, whereby they are better fitted to paſs off by their proper emunctories. Thoſe which conſiſt of very ſubtile and active parts are not ſo ſenſible in the larger paſſages, becauſe of the great quantities of matter, which lay too great a load upon them, and make them unheeded; but when they are got into the blood in any conſiderable number, they divide and fuſe thoſe coheſions, which obſtruct or move heavily along the capillaries, and ſcour the glands; inſomuch that every pulſation throws ſomething through the inteſtinal glands, which goes away by ſtool, that the refluent blood has waſhed away, and brought back from all parts of the body.

Of this kind are all thoſe cathartics, which are ſaid to purge the joints, and are preſcribed in rheumatiſms, and arthritic pains; as the radix turpethi, and all the aloetics. And this is the reaſon why purging medicines of this ſort are ſo eaſily changed into the moſt efficacious alteratives; for an alterative is a cathartic in a lower degree, or of a more remiſs operation. Whatſoever brings ſuch particles to a ſecretory orifice, which are fitted for its paſſage, oftener either by accelerating the blood's motion, or breaking it into more particles of that particular ſize and diſpoſition, will increaſe the ſecretion. According, therefore, to the difference of the parts where ſuch ſecretions are enlarged, as the glands of the inteſtines, kidneys, or ſkin, are the medicines, which are the inſtruments therein, called either *cathartics*, *diuretics*, or *diaphoretics*.

Quincy has made ſome improvements in the doctrine of *purging* medicines, their nature, manner of action, effects, and analogy with other medicines; with the circumſtances of their preparation, management, &c. in a diſcourſe inſerted in the Philoſophical Tranſactions; the ſubſtance of which we cannot do better than here ſubjoin.

In order hereto, it is to be premiſed, 1. That all thoſe parts of an animal body, which are vaſcular, or through which any fluid paſſes from the inteſtines to the minuteſt fibre, are the ſeat of the operation of medicines.

2. That this whole courſe of circulation, or animal motion, is naturally diſtinguiſhed into three different ſtages, by the different capacities of the veſſels, and motions of their contents, each having its proper outlet; and that theſe are the ſeat of the three concoctions ſo often mentioned by phyſical writers: the firſt being the ſtomach

and bowels, and having the anus for its emunctory: the ſecond, all that ſpace within the blood's motion, ſo far as it retains its red colour, having the kidneys; and the third, all beyond that circuit, having the ſkin for an excretory organ.

3. That every medicine which cauſes evacuation, is, in ſome ſenſe, a *purge*.

4. That every *purge* operates either as a diſſolvent, by fuſing the juices, and increaſing the quantity fit for expulſion; or, as a ſtimulus, by accelerating their motions, ſo as to bring the matter fit for expulſion oftener to the ſecretory outlet, or both.

Theſe poſtulata are only premiſed, in order to prove this grand propoſition, that a change in the bulks, figures, and motions, of the component particles of a purging medicine, will change the ſeat of its operation, and fit it for exertion in the larger or ſmaller veſſels, as thoſe mechanical affections are intended or remitted.

For illuſtration hereof, it may be convenient to attend to the common way of making a *purge* operate more or leſs than it otherwiſe would do.

Subſtances, then, which are groſs and heavy, as thoſe conſiſting chiefly of ſaline and earthy particles, ſuch as tartar, manna, and the like, when reduced ſmaller by triture, or by repeated ſolutions, operate more gently; but when actuated by acids, or any way made to expoſe their angles more plentifully to the membranes, they become rougher, and ſooner take effect.

Reſinous medicines, as ſcammony, gamboge, jalap, and moſt vegetable productions, are more violent, and operate ſooner, when they are more tenacious and adheſive, as in their extracts; but are gentler, when divided by hard brittle ſubſtances, ſuch as ſalt of tartar, ſugar, &c.

Medicines, which have in their compoſition ſulphur and ſalt, are more or leſs rough and ſpeedy in their operation, in proportion to their greater or leſs participation of the ſaline ingredient, and the aſperity of its angles. Of this kind are moſt minerals, and their preparations: it may be ſufficient to inſtance in the management of antimony and mercury; the firſt of theſe is, by chemical analyſis, known to be a compoſition of a ſubtile ſulphur and ſalt; and the more the ſaline part is ſet looſe by preparation, and *opening* the ſulphur, as it is commonly termed, the ſpeedier, and with the greater vehemence, will it operate; whereas, in its more imperfect preparations, when the ſalts are cloſely wrapped up in their native ſulphur, it will hardly work at all till it reaches the fartheſt ſtages of circulation.

Mercury *per ſe* is little uſed as a medicine; and its firſt preparation, which makes it into a ſublimate, ſo loads it with ſaline ſpiculæ, that it amounts even to a poiſon; but the more thoſe ſpiculæ are broken by triture, ſublimation, &c. the milder doth it operate; and, if to the comminution of its points be added a ſulphur ſubtile enough to join it, it may be reduced to ſo mild a medicine as not to be felt, but in the laſt ſtage of operation.

This ſhort view may be ſufficient to ſhew, 1. That it is the too great aſperity and motion in a medicine, that will not ſuffer it to paſs the ſtomach, without irritating it into ſuch convulſions as will throw it up again by vomit.

2. That a farther comminution, and ſmoothing its figure, will gain it admittance into the bowels, and cauſe it to operate, as a proper *purgative*, by ſtool.

4. That a yet farther remiſſion of theſe properties will convey it into the blood, and allow it there to promote evacuation by urine.

And, laſtly, that a ſtill farther comminution will paſs it into the minuteſt canals, where, by the ſame properties, only in a lower degree, it will cauſe ſweat, or increaſe perſpiration.

Hence it appears, that the more ſubtile medicines operate in the capillaries, and ſmalleſt fibres, by the ſame mechaniſm that the more groſs ones do in the common ſtream of the blood, when they go off by urine; or as the groſſeſt of all do in the greater paſſages, when they promote evacuation by ſtool.

Hence it is evident, that the ſkill of preparing and adminiſtering medicines conſiſts in proportioning their manifeſt and known properties to the capacity and circumſtances of the part they are to operate in; and to intend or remit their mechanical affections, as they are ſooner or later to take place in the greater or ſmaller veſſels.

Of the firſt claſs, or gentle purging medicines, there are few that can be reduced ſmall enough to go beyond the larger paſſages, and none of them are worth the pains they require to fit them farther than for diuretics; beſides, their natural diſpoſition to attract and join with the ſerous part of the blood, whenever they get into that ſtage of motion, runs them off by the kidneys, before they can undergo comminution enough to get farther; but if, by frequent repetitions of ſuch medicines, and an uncommon laxity of the paſſages, any parts are paſſed into the habit, their groſſneſs fouls the delicate ſtrainers, which are deſtined for their expulſion; and they lodge upon the glands and capillaries in ſuch a manner, as to induce intermittents: which are obſervable, in many perſons, after a long uſe of cream of tartar, the common cathartic ſalts, and the purging waters, eſpecially at the latter end of the ſummer, when the heat of the preceding ſeaſon has debilitated the ſolids, and left them under too great a relaxation.

Among the reſinous purges, there are many very powerful ones; but where there operation is deſired in the viſcera, blood, and remoter parts, they muſt be extremely divided; and this we find ſpirituous menſtruums will beſt do, by taking up the moſt ſubtile parts only, and carrying them into the very ſmall paſſages, where they operate chiefly by fuſion; becauſe the ſoftneſs of ſuch ſubſtances cannot enable them, hardly in any degree, to act as ſtimuli, farther, at leaſt, than ordinary detergents. And thus we find, that aloes, the chief of this tribe, goes fartheſt into the habit, and continues longeſt before it operates, when managed with a ſpirituous menſtruum, as in the tinctura ſacra. The rad. turpethi, and colocynth likewiſe, with all of the vegetable kind, that will yield to a ſpirituous liquor, may, by that means, be carried into the fartheſt ſcenes of animal action, where they will prove efficacious medicines in caſes which, with other management, they would never be able to reach, and, on this account, it muſt undoubtedly have been, that we frequently meet, in practical writers, with many materials of this ſort mentioned as alterants; the colocynth particularly by Helmont: for all medicines, which operate in the fartheſt paſſages, they commonly include under that general appellation.

But the moſt efficacious purges, and thoſe which require the moſt ſkill in the managing, are procured from the mineral kingdom: theſe abound in ſolidity beyond any other materials; and therefore, wherever they are brought into action, they neceſſarily excel in the quantity of impulſe; many of theſe, therefore, want not only the utmoſt comminution to carry them into the farther ſcenes of operation, but alſo ſome reſtraint of their aſperities and motions, to fit them for many intentions. Thus, ſublimate is not only to be much ſweetened, that is, ſmoothed in its points, to make it a ſafe purge in the larger veſſels; but if it be intended to go farther than the blood, and thoſe glands, which, in that circuit, it is moſt apt to be lodged upon when it ſalivates, it muſt not only be rendered very fine, but alſo covered with ſuch ſubſtances as weaken its points, and make it paſs into the laſt ſubdiviſions of the conſtitution. To this purpoſe, the common practice wiſely contrives in diſtempers, which, according to the courſe of circulation, lie moſt remote, to wrap up the baſis of this medicine in ſulphurs, and ſuch like ſubſtances, as follow it into its laſt diviſion, without giving it any aſperities to make it act as a ſtimulus. Thus, for all cutaneous foulneſſes, and habitual taints, the cinnabar, the æthiops, and all of that ſortment are in readineſs; and that ordinary ſulphurs will cover and deaden the efficacies of mercurial preparations, ſo that they ſhall not operate but in ſuch parts only, and in ſuch circumſtances, is demonſtrable in ordinary ſalivations, which are to be lowered by ſulphureous medicines.

Medicines from ſuch minerals, where a ſalt and ſulphur are united by nature, as they are in ſome mercurials by art, as antimony, the native cinnabar, ſteel, &c. are manageable only upon the ſame principles; and the more they are deſigned to be carried into the habit, the more are they to be reſtrained by their natural or adventitious ſulphurs. Steel, when opened by, and joined with, the points of acid liquors, operates the ſooner, and will ſometimes prove even emetic; but when it is covered with an additional ſulphur, it will go farther, and anſwer intentions much more remote; as is manifeſt in the common preparations of ſteel with tartar or vinegar, and with ſulphur.

This way of reaſoning, on theſe occaſions, ſeems the more juſt, from conſidering the texture of thoſe ſubſtances, which, by a natural preparation, are fitted for operation in the minuteſt part of an animal body; ſuch as thoſe of the aromatic kind, all which, more or leſs, according to their greater or leſs degree of ſubtilty and ſmoothneſs, promote a diaphoreſis; for theſe conſiſt of exquiſitely fine ſalts, covered with a moſt ſubtile ſulphur, as is demonſtrable by chemical analyſis; and the common ſal volatile oleoſum is an admirable contrivance upon the ſame foundation, where a very volatile animal ſalt is covered with a moſt exalted vegetable oil, whereby it is fitted to paſs into the minuteſt fibres, and make, as it were, a part of the animal ſpirits themſelves.

And here it may not be amiſs to obſerve, that all animal ſalts are very volatile, or eaſily rendered ſo; but when bare and naked, juſt as the fire draws them out, with a mixture alſo of its own particles in their compoſition, they are too pungent to be felt without painful ſenſations; and, when ſoftened with a fine portion of ſomewhat of an oppoſite texture, which is ſmooth and yielding, they become moſt efficacious and ſafe ſudorifics.

On theſe conſiderations, it likewiſe ceaſes to be a wonder, why the ſubtile ſalts of cantharides are more ſenſibly injurious to the bladder than to any other parts; and why camphor prevents thoſe injuries; for the exquiſite ſmallneſs of thoſe ſpiculæ makes them imperceptible, but in the moſt minute canals, into which the fibres, compoſing the membranes of the bladder are known to be divided; and camphor blunts their irritations, becauſe its extreme ſubtilty enables it to follow them into thoſe meanders, and there to ſheath their aſperities.

To this purpoſe is very remarkable what many now commonly practiſe in guarding even mercurials againſt their ſtimulating properties, and ſending them into the fineſt paſſages to operate by fuſion, and the bare force of impulſe: for not only calomel and the mercurius dulcis may be reſtrained from manifeſt operation in the wider paſſages, and the glands about the mouth, but even the mineral turbith, which of itſelf, in a ſmall doſe, will operate powerfully by vomit and ſtool, will not, when mixed with camphor, be ſo much felt in thoſe reſpects, but will go into the farther circuit of motion, and promote the cutaneous diſcharge in a more efficacious manner than any medicine of leſs ſpecific gravity. In this management, the camphor is to be mixed but a very little while before taking, otherwiſe it has not the effect; which appears to proceed from its great volatility, which makes it, in a great meaſure, exhale, while it ſtands mixed in the medicine.

As to the doſes of *purgatives*, Dr. Cockburn attempts to determine them on the following ſuppoſitions. 1. That no part of them operate, but in the blood. 2. That they operate there by changing the blood, and other circulating fluids derived from it.

From which poſtulata, he concludes, that, in the ſame conſtitution of blood, the doſe required to produce the like effects, muſt be proportionable to the blood's quantity; ſo that where a certain doſe is required to alter one pound of blood, for inſtance, to a certain degree, there will be required a double doſe to alter two pounds to the ſame degree, and a triple doſe to three pounds, &c. And univerſally if the quantity of blood b require the doſe d, the quantity $m b$ requires the doſe $m d$. For as $b : d :: m b : m d$.

We have had attempts of adjuſting the doſes of *purgative* medicines ſcientifically. Dr. Cockburn endeavoured at the ſolution of this problem; but, it is ſaid, on wrong principles. Dr. Balguy has alſo given us an eſſay on this ſubject in the Med. Eſſ. Edin. vol. iv. art. 5.

He aſſumes, that part of the medicine is ſpent on the firſt paſſages, where it acts as a ſtimulus; and that the other part is carried into the blood, and has its effect there by thinning and rarefying it. This being premiſed, 1ſt. If the medicine acts only in the firſt paſſages, the doſe will be as the ſize of the perſon into the conſtitution. 2d. If the whole medicine paſſes into the blood, the doſe will be as the ſize into the ſquare of the conſtitution; and therefore, 3d. You are to doſe ſo much of the medicine as is ſpent on the ſtomach and inteſtines directly, as the conſtitution; and ſo much as is carried into the blood, as the ſquare of the conſtitution, and the ſum into the perſon's ſize, is the quantity required.

The ſame rules hold in vomits. How far in either caſe the practice of phyſic may be thereby improved, we leave to the judgment of the learned. The ſolution of the problem ſuppoſes a great poſtulatum, no leſs than the art of meaſuring a perſon's conſtitution.

PURGATORY, *purgatorium*, in the Romiſh church, a place where the juſt are ſuppoſed to ſuffer the pains due to their ſins, for which they have not ſatisfied in this world.

It is by the mercy of God, the indulgences of the church, and the prayers of the faithful, that people are ſuppoſed to be delivered out of *purgatory*.

This doctrine of *purgatory*, which ſome derive from the Platonic fancies of Origen, the Montaniſm of Tertullian, pretended viſions, and pagan ſtories, rhetorical flouriſhes, and doubtful expreſſions of the later fathers, and in which we may diſcern an obvious reſemblance to the famous pagan doctrine, concerning the purification of departed ſouls by means of a certain kind of fire, was partly introduced, at leaſt in the ſpirit of it, towards the cloſe of the fifth century, and by Gregory the Great in the ſixth century; but it was not, however, poſitively affirmed till about the year 1140, nor made an article of faith till the council of Trent. Seſſ. 25. Decret. de Purgat. See POPERY.

In Ireland is a place called St. Patrick's *purgatory*, where, as the legend has it, at the prayers of St. Patrick, biſhop of the place, there was made a viſible repreſentation of the pains which the wicked undergo after death, in order to deter ſinners, &c.

PURGE, in *Medicine*, a term frequently uſed for a doſe of ſome purgative medicine.

PURGING *ale, Butler's*. See ALE.

PURGING *grain, oily*, in *Botany*. See SESAMUM.

PURGING *nut*, in *Botany*. See CASSADA, and CROTON.

PURGING *thorn*. See BUCKTHORN.

PURIFICATION, in *Chemiſtry*, &c. the act of *purifying* or refining natural bodies; or of ſeparating the fæces and impurities therefrom.

For the methods of *purifying* metals, gold, ſilver, iron, copper, tin, &c. ſee GOLD, SILVER, &c. and REFINING.

For the *purification* of ſemi-metals, minerals, and other matters, as antimony, ſulphur, camphor, ſalt-petre, &c. ſee ANTIMONY, SULPHUR, CAMPHOR, &c.

PURIFICATION, in *Pharmacy*. See TRYING.

PURIFICATION, in *Matters of Religion*, denotes an offering made the prieſt by women riſing out of child-bed, before they are re-admitted into the church.

By the law of Moſes, a woman, after bringing forth a male child, was unclean forty days; after a female, eighty days; during which time, ſhe was not to touch any thing holy, nor to go near the temple, but was to continue within doors, ſeparate from all company, and commerce of others.

This term expired, ſhe was to preſent herſelf at the temple, and at the door of the tabernacle, to offer a lamb, as an holocauſt, and a pigeon or turtle; which the prieſt taking, offered to God, and prayed for her, that ſhe might be *purified*.

This ceremony, which conſiſted of two things, an holocauſt, and a ſacrifice of expiation, was called טהרה טהר, *purificatio*, *purgatio*.

The holy Virgin, though, according to the fathers, exempt from the terms of the law, yet complied therewith, and, at the time preſcribed, went to the temple, and accompliſhed the law: in commemoration whereof, the church yearly ſolemnizes the feaſt of the Purification of the Virgin, on the ſecond of February; called alſo the *feaſt of* CANDLEMAS.

PURIFICATION, *the feaſt of the*, ſeems to be very ancient. It is ordinarily ſaid to have been inſtituted in the time of Juſtinian, in the year 542, and this on occaſion of a mortality, which that year diſpeopled almoſt the whole city of Conſtantinople. Yet there are ſome, who imagine it to have been obſerved before, though in another manner, and on a different day from that fixed by Juſtinian; viz. between the Circumciſion and Epiphany. See CANDLEMAS.

The ſame day is the preſentation of our Saviour in the temple.

PURIM, a ſolemn feaſt held among the Jews on the fourteenth and fifteenth of March, in memory of their deliverance from the conſpiracy of Haman by Eſther. See ESTHER.

This feaſt, which derives its name from the Perſian word *purim*, q. d. *lots*, becauſe it was by the caſting of lots that Haman determined this time for the deſtruction of the Jews, is the Bacchanals of theſe people, which they celebrate with all manner of rejoicing, mirth and jollity; indulging themſelves with every kind of luxury, eſpecially in drinking wine even to drunkenneſs, which they conſider as part of the duty of the ſolemnity; becauſe it was by means of the wine banquet (they ſay) that Eſther made the king's heart merry, and brought him into that good humour, which inclined him to grant the requeſt preſented by her for their deliverance; and, therefore, they think they ought alſo to make their hearts merry, when they celebrate the commemoration of it. During this feſtival the book of Eſther is ſolemnly read in all their ſynagogues from the beginning to the end, at which they are all to be preſent, men, women, children, and ſervants, becauſe all ſhared in the benefit of the deliverance which Eſther obtained for them. And as often as the name of Haman occurs in the reading of this book, the cuſtom is for all to clap with their hands, and ſtamp with their feet, and cry out, Let his memory periſh. Prideaux's Conn. vol. ii. p. 456.

PURITANS, in *Eccleſiaſtical Hiſtory*. See CATHARI and NOVATIANS.

PURITANS is alſo a term anciently uſed for the Calviniſts of Great Britain, from their profeſſing to follow the pure word of God, in oppoſition to all traditions, human conſtitutions, and other authorities.

The ſeparation, whence this diſtinguiſhing appellation took its riſe, commenced on the following occaſion. Upon the acceſſion of queen Mary, it is well known that popery revived in this kingdom; the ſtatutes of king Edward were repealed, and the penal laws againſt heretics were put in execution againſt the reformers. Many ſuffered at home; and others eſcaped the fury of perſecution by ſeeking refuge in foreign countries. Some went into France and Flanders; ſome to Geneva; and others into thoſe parts of Germany and Switzerland, where the reformation had taken place, and where the magiſtrates received them with great humanity, and allowed them places for public worſhip. The exiles were moſt numerous at Frankfort; and there that conteſt and diviſion began, which gave riſe to the *Puritans*, and to that ſeparation from the church of England, which continues to this day. In the year 1554, ſome of the Engliſh fugitives ſettled in this city; and agreed to conduct their worſhip, without anſwering aloud after the miniſter, and without uſing the liturgy and ſurplice; to begin the public ſervice with a general confeſſion of ſins, then to ſing a pſalm, after which the miniſter prayed for the divine aſſiſtance, and next proceeded to the ſermon; after ſermon, a general prayer for all eſtates, and particularly for England, at the end of which was ſubjoined the Lord's prayer, and a rehearſal of the articles of belief; then the people were to ſing another pſalm, and the miniſter to diſmiſs them with a bleſſing. Such was the order which they had unanimouſly adopted; and having choſen a miniſter and deacons, they invited their diſperſed brethren to join with them. In the year 1556, Dr. Cox, afterwards biſhop of Ely, came to ſettle at Frankfort with ſeveral of his friends; who, interrupting the public ſervice by anſwering aloud after the miniſter, and reading the whole litany, in violation of the agreement upon which the congregaton was formed, overpowered the firſt ſettlers; and obtaining leave of the magiſtrates for the free uſe of king Edward's ſervice book, performed divine worſhip according to the rites that had been authoriſed by that prince; while others, who preferred the Genevan method of worſhip, as more pure and ſimple, left the city of Frankfort, and removed to Baſil and Geneva. Thus commenced the diſtinction of *Puritans* and *Conformiſts*, by which the two parties were afterwards known. The former were called *Conformiſts*, on account of their compliance with the eccleſiaſtical laws enacted by Edward VI. and the denomination of *Nonconformiſts* and *Puritans* were given to the latter, from their inſiſting upon a form of worſhip, more exempt from ſuperſtition, and of a purer kind than the liturgy of Edward ſeemed to them to be. Upon the acceſſion of queen Elizabeth, the exiles returned to England, where each party ſtrove to advance the reformation according to their own ſtandard. The queen, with thoſe who had weathered the ſtorm at home, were only for reſtoring king Edward's liturgy; but the majority of the exiles were for the worſhip and diſcipline of the foreign churches, and refuſed to comply with the old eſtabliſhment, declaiming loudly againſt the popiſh habits and ceremonies. However, the queen's party prevailed; and in 1559 a committee of divines was appointed to review king Edward's liturgy, who were inſtructed to ſtrike out all offenſive paſſages againſt the pope, and to make people eaſy about the belief of the corporal preſence of Chriſt in the ſacrament. But no alterations were made in favour of thoſe who now began to be called *Puritans*, from their attempting a purer form of worſhip and diſcipline than had yet been eſtabliſhed; and whoſe ſentiments in many points were agreeable to thoſe maintained by John Wickliffe, the firſt reformer. For they agreed with him in opinion, that in the ſacrament of orders there ought to be but two degrees, preſbyters or biſhops, and deacons; that all human traditions are ſuperfluous and ſinful; that we muſt practiſe and teach only the laws of Chriſt; that myſtical and ſignificant ceremonies in religious worſhip are unlawful; and that to reſtrain men to a preſcribed form of prayer is contrary to the liberty granted them by God. The old feſtivals, with their eves and the popiſh habits, were continued as they were in the ſecond year of king Edward VI. In 1558 the act of ſupremacy was paſſed, in which there is a remarkable clauſe, that gave riſe to the court of *high commiſſion*, which proved afterwards ſo oppreſſive; and in 1559 was paſſed an act for the uniformity of common prayer, and ſervice in the church, and adminiſtration of the ſacraments. The *Puritans* remonſtrated againſt theſe proceedings, and complained, that the groſs ſuperſtitions of popery, which they had looked upon as abrogated and aboliſhed, were now revived, and even impoſed by authority. Some required nothing leſs than that the church of England ſhould be exactly modelled after that of Geneva; others only deſired liberty of conſcience, with the privilege of celebrating divine worſhip in their own way; but neither party obtained the object of their wiſhes. The queen, intent upon the ſuppreſſion of this troubleſome ſect (as ſhe was uſed to call it), permitted its enemies to employ for that purpoſe all the reſources of artifice, and all the ſeverity of the laws. The court reformers pleaded, that every prince had authority to correct all abuſes of doctrine and worſhip within his own territories; the *Puritans*, on the other hand, whilſt they diſowned all foreign authority and juriſdiction over the church, could not admit of that extenſive power which the crown claimed by the ſupremacy; apprehending it unreaſonable, that the religion of a whole nation ſhould be at the diſpoſal of a ſingle lay perſon. However they took the oath, with the queen's explication in her injunctions, as reſtoring her majeſty only to the ancient and natural rights of ſovereign princes over their ſubjects.

Farther, the court reformers allowed, that the church of Rome was a true church, though corrupt in ſome points of doctrine and government; that all her miniſtrations were valid, and that the pope was a true biſhop of Rome, though not of the univerſal church. But the *Puritans* affirmed the pope to be antichriſt, the church of Rome to be no true church, and all her miniſtrations to be ſuperſtitious and idolatrous; they renounced her communion, and durſt not ſuſpend the validity of their ordinations upon an uninterrupted line of ſucceſſion from the apoſtles through her hands. Moreover, it was agreed by all, that the holy ſcriptures were a perfect rule of faith; but the biſhops and court reformers did not allow them to be the ſtandard of diſcipline or church government; affirming that our Saviour and his apoſtles left it to the diſcretion of the civil magiſtrate, in thoſe places where Chriſtianity ſhould obtain, to accommodate the government of the church to the policy of the ſtate. But the *Puritans* apprehended the holy ſcriptures to be a ſtandard of church diſcipline as well as of doctrine; at leaſt that nothing ſhould be impoſed as neceſſary but what was expreſsly contained in, or derived from them by neceſſary conſequence, and, beſides, they maintained that the diſcretionary power was not lodged with the civil magiſtrate, but with the ſpiritual officers of the church. Farther, the court reformers maintained, that the practice of the primitive church for the firſt four or five centuries was a proper ſtandard of church government and diſcipline, and in ſome reſpects a better than that of the apoſtles, which (according to them) was only accommodated to the infant ſtate of the church while it was under perſecution, whereas theirs was ſuited to the grandeur of a national eſtabliſhment. Whereas the *Puritans* were for adhering to the Bible in the main principles of church government, and for admitting no church officers or ordinances, but ſuch as are herein mentioned: and they apprehended, that the apoſtles, in eſtabliſhing the firſt Chriſtian church on the ariſtocratical plan then obſerved in the Jewiſh ſanhedrim, deſigned it as an unchangeable model to be followed in all times and places. The court reformers alſo maintained, that things indifferent in their own nature, which are neither forbidden nor commanded in the holy ſcriptures, ſuch as rights, ceremonies, habits, &c. might be ſettled, determined, and made neceſſary by the command of the civil magiſtrate, and that in ſuch caſes it was the indiſpenſible duty of all ſubjects to obſerve them. But the *Puritans* inſiſted, that thoſe things which Chriſt had left indifferent, ought not to be made neceſſary by any human laws, and that ſuch rites and ceremonies as had been abuſed to idolatry, and had a manifeſt tendency to lead men back to popery and ſuperſtition, were no longer indifferent, but to be rejected as unlawful. Nevertheleſs, both parties agreed too well in aſſerting the neceſſity of an uniformity of public worſhip, and of calling in the ſword of the magiſtrate for the ſupport and defence of their ſeveral principles; which they made an ill uſe of in their turns, as they could graſp the power into their hands. The ſtandard of uniformity, according to the biſhops, was the queen's ſupremacy, and the law of the land; according to the *Puritans*, the decrees of provincial and national ſynods, allowed and enforced by the civil magiſtrate; but neither party was for admitting that liberty of conſcience, and freedom of profeſſion, which is every man's right, as far as is conſiſtent with the peace of the government under which he lives.

In the year 1564, upon a report that the habits, enjoined on the clergy, were generally neglected, and alſo of inattention to other impoſed forms, the queen directed the eccleſiaſtical commiſſioners to conſult ſome proper methods to reduce them to an exact uniformity; upon which they agreed on certain *advertiſements* (as they were called), partly for due order in preaching and adminiſtering the ſacraments, and partly for the apparel of eccleſiaſtical perſons. To theſe advertiſements certain proteſtations were annexed, to be made, promiſed, and ſubſcribed by ſuch as ſhould hereafter be admitted to any office or cure in the church. The queen, though ſhe would give no authority to the advertiſements, which had occaſioned much remonſtrance and complaint, iſſued out a proclamation in 1565, peremptorily requiring uniformity in the habits, upon pain of prohibition from preaching, and deprivation. Parker, the archbiſhop of Canterbury, was violent and unrelenting; and by various methods of ſeverity harraſſed, ſilenced, and deprived many of thoſe who ſcrupled the uſe of the habits. The ſuſpended miniſters, finding that renewed applications to the queen and her commiſſioners were ineffectual, publiſhed, in 1566, a ſmall treatiſe in vindication of their conduct; in which they alledge, that neither the prophets of the Old Teſtament, nor the apoſtles of the New, were diſtinguiſhed by their garments; that a diſtinction of garments in the Chriſtian church did not generally obtain till long after the riſing of antichriſt; that the garments againſt which they objected, had been abuſed to idolatary, ſorcery, and all kinds of conjurations; that they were an offence to weak Chriſtians, an encouragement to ignorant and obſtinate papiſts, and the uſe of them an affectation of returning to their communion; that at beſt they were only human appointments, ſubject to the apoſtle's reproof; Col. ii. 20—22. that allowing them to be indifferent (which they did not grant) yet they ought not to be impoſed, becauſe it was an infringement of the liberty with which Chriſt had made them free; and finally they urged the ſuffrage of foreign divines, who all condemned the habits, though they were not willing to hazard the reformation in its infancy, on account of them.

If, at this time, the habits and a few ceremonies had been left indifferent, both miniſters and people would have acquieſced; but it was the compelling of theſe things by law that made them ſeparate from the eſtabliſhed church. Accordingly, in 1566, they came to a reſolution, alledging it to be their duty, in their preſent circumſtances, to break off from the public churches, and to aſſemble, as they had opportunity, in private houſes, or elſewere, to worſhip God in a manner that might not offend againſt the light of their conſciences; and it was debated among them, whether they ſhould uſe as much of the common prayer and ſervice of the church as was not offenſive, or reſolve at once, ſince they were cut off from the church of England, to ſet up the pureſt and beſt form of woſhip, moſt conſonant to the holy ſcriptures, and to the practice of the foreign reformers. The latter of theſe meaſures was concluded upon; and accordingly they laid aſide the Engliſh liturgy, and made uſe of the Geneva ſervice-book. However, it is neceſſary to obſerve, that though all the *Puritans* of theſe times would have remained in the church, if they might have been indulged in the habits and a few ceremonies, yet they were far from being ſatiſfied with the hierarchy. They had other objections beſides thoſe for which they were deprived; of which we ſhall here ſubjoin a ſummary. They complained of the biſhops affecting to be thought a ſuperior order to preſbyters, and claiming the ſole right of ordination, and the uſe of the keys; and aſſuming, in connection with their office, temporal dignities, titles, and employments. As long, however, as the Engliſh biſhops pretended to derive their dignity and authority from no other ſource than the laws of their country, and pleaded a right, merely human, to the rank they held in the church and ſtate, the controverſy was carried on without exceſſive animoſity and zeal; but the flame broke out with redoubled fury in the year 1588, when Bancroft, afterwards archbiſhop of Canterbury, ventured to aſſert that the order of biſhops was ſuperior to the body of preſbyters, not in conſequence of any human inſtitution, but *jure divino*, or by the expreſs appointment of God himſelf. Farther, the *Puritans* excepted againſt the titles and offices of archdeacons, deans, chapters, and other officials, belonging to cathedrals, as having no foundation in Scripture, or primitive antiquity, and intrenching upon the privileges of the preſbyters in the ſeveral dioceſes. They complained of the exorbitant power and juriſdiction of the biſhops and their chancellors in their ſpiritual courts, as derived from the canon law of the pope, and not from the word of God, or the ſtatute law of the land. They lamented the want of a godly diſcipline, and were uneaſy at the promiſcuous and general acceſs of all perſons to the Lord's table. Though they did not diſpute the lawfulneſs of ſet forms of prayer, provided a due liberty was allowed for prayers of their own compoſure before and after ſermon, yet they diſliked the frequent repetition of the Lord's prayer in the liturgy, the interruption of the prayers by the frequent reſponſes of the people, ſome paſſages in the office of marriage, as *With my body I thee worſhip*, and in that of burial, as *In ſure and certain hope of the reſurrection to eternal life*, pronounced over the worſt of men, if not excommunicated, &c. They alſo objected againſt the reading of the apocryphal books in the church, while ſome parts of canonical Scripture were omitted; and though they did not diſlike the homilies, they thought that no man ſhould be ordained a miniſter in the church, who was not capable of preaching and expounding the holy ſcriptures. They diſapproved of ſeveral of the church feſtivals or holidays, as having no foundation in Scripture, or primitive antiquity; and they diſallowed of the cathedral mode of woſhip; nor did they approve of muſical inſtruments in the church ſervice. Finally, they ſcrupled conformity to certain rites and ceremonies, which were enjoined by the rubric, or the queen's injunctions; as the ſign of the croſs in baptiſm, baptiſm by midwives, or other women, in caſes of ſickneſs, and the mode of churching women; the uſe of god-fathers and god-mothers, to the excluſion of parents from being ſureties for the education of their own children; the cuſtom of confirming children, as ſoon as they could repeat the Lord's prayer and their catechiſm, by which they had a right to come to the ſacrament, without any other qualification, and the impoſition of hands, as a ſign of the divine ſavour, which ſeemed to them to imply a ſacramental efficacy in this ceremony; kneeling at the ſacrament of the Lord's ſupper, whilſt they conſidered that Chriſt gave it to his diſciples rather in a poſture of feaſting than of adoration; that it had no foundation in antiquity; that it had been groſly abuſed by the papiſts to idolatry in their adoration of the hoſt, and that, if the poſture were indifferent, it ought not to be impoſed as a neceſſary term of communion; nor did they approve of adminiſtering either of the ſacraments in private, even in caſes of danger; bowing at the name of Jeſus; giving the ring in marriage, which they conſidered as derived frim the papiſts, who made marriage a ſacrament, and the ring a ſort of ſacred ſign or ſymbol; the prohibition of marriage during certain times of the year, and the licenſing it for money; and, laſtly, the wearing of the ſurplice, and other veſtments to be uſed in divine ſervice.

In points of doctine there was, at this time, no difference between the *Puritans* and *Conformiſts*; and if we add one article more to the preceding, we ſhall have the principal heads of controverſy between the church of England and the proteſtant diſſenters at this day; viz. the natural right which every man has to judge for himſelf, and make profeſſion of that religion he apprehends moſt agreeable to truth, as far as it does not affect the peace and ſafety of the government under which he lives; without being determined by the prejudices of education, the laws of the civil magiſtrate, or the decrees of councils, churches, or ſynods.

Towards the latter end of queen Elizabeth's reign, there aroſe a party, which were firſt for ſoftening, and then for overthrowing, the received opinions concerning predeſtination, perſeverance, free-will, effectual grace, and the extent of Chriſt's redemption. The clergy of the epiſcopal church began to lean towards the notions concerning theſe intricate points, which Arminius propagated ſometime after this; while on the other hand. the *Puritans* adhered rigorouſly to the ſyſtem of Calvin. Several epiſcopal docters remained attached to the ſame ſyſtem in the reign of James I. &c. and all theſe abettors of Calviniſm, whether epiſcopal or preſbyterian, were called *doctrinal Puritans*. At length, according to Mr. Fuller (Church Hiſt. book ix. p. 97. book x. p. 100.) the name was extended to ſtigmatize all thoſe who endeavoured in their devotions to accompany the miniſter with a pure heart, and who were remarkably holy in their converſation; ſo that a *Puritan* was a man of ſevere morals, a Calviniſt in doctrine, and a non-conformiſt to the ceremonies and diſcipline of the church, though he did not totally ſeparate from it.

Queen Elizabeth was violent in her oppoſition to the *Puritans* through the whole courſe of her reign; and beſides the ordinary courts of the biſhops, ſhe erected, as we have already obſerved, a new tribunal, called the court of *high-commiſſion*, which ſuſpended and deprived men of their livings, not by the verdict of twelve men upon oath, but by the ſolemn determination of three commiſſioners of her own nomination, founded not upon the ſtatute law of the realm, but upon the canon law; and inſtead of producing witneſſes in open court to prove the charge, they aſſumed a power of adminiſtering an oath *ex officio*, whereby the priſoner was obliged to anſwer all queſtions the court ſhould put to him, though never ſo prejudicial to his own defence. If he refuſed to ſwear, he was impriſoned for contempt; and if he took the oath, he was convicted upon his own confeſſion.

During the reign of James I. from whom the *Puritans* expected more indulgent treatment, they were treated with great ſeverity, and many of them obliged to leave the kingdom, and retire to Holland; and from thence conſiderable numbers migrated to America, in the year 1620. All were *Puritans*, in the eſtimation of king James, who adhered to the laws of the land in oppoſition to his arbitrary government, though otherwiſe ever ſo good churchmen. Theſe were called *Puritans in the ſtate*; and thoſe who ſcrupled the ceremonies, and adhered to the doctrines of Calvin, were *Church Puritans*, who, though comparatively few, yet being joined by thoſe of the other claſs, became the majority of the nation. The ſucceſs that attended the firſt emigrators, who ſettled in that part of America afterwards called New Plymouth, engaged great numbers of *Puritans*, who groaned under the oppreſſion of the biſhops, and the ſeverity of a court, by which this oppreſſion was authoriſed, to follow the fortunes of theſe religious adventurers; and this produced a ſecond emigration in the year 1629, which gave birth to the ſecond grand colony, commonly known by the name of the Maſſachuſet's Bay. The colony of Connecticut was formed by emigrants of the ſame claſs in 1636, and that of New Haven in 1637, who fled from the perſecution of Laud, and the oppreſſions of the Star-chamber and High-commiſſion courts. Afterwards, when the *Puritans* were not allowed to tranſport themſelves to New England, many of them removed, with their families, into the Low Countries.

After the reſtoration of Charles II. in the year 1662, the name of *Puritans*, ſays biſhop Burnet, was changed into that of *Proteſtant* NON-CONFORMISTS, who were ſubdivided into PRESBYTERIANS, INDEPENDENTS, ANABAPTISTS, and QUAKERS. At this time a public law, called the *Act of Uniformity*, was enacted, by which all who refuſed to obſerve the rites, and ſubſcribe the doctrines of the church of England, were entirely excluded from its communion. From this period until the reign of king William III. the *Non-conformiſts* were in a precarious and changing ſituation, ſometimes involved in calamity and trouble, and at other times enjoying ſome intervals of tranquility and certain gleams of hope, according to the varying ſpirit of the court and miniſtry, but never entirely free from perplexities and fears. But in the year 1689, their affairs took a favourable turn, when a bill for the toleration of all Proteſtant DISSENTERS from the church of England, except the Socinians, paſſed in parliament, almoſt without oppoſition, and delivered them from the penal laws to which they had been ſubjected by the act of uniformity, and other acts paſſed under the houſe of Stuart. For the preſent ſtate of the toleration, ſee TOLERATION. See alſo CORPORATION *act* and TEST. Neal's Hiſt. of the Puritans, in 4 vols. 8vo. paſſim.

PURITY, in *Oratory*, is one of the conſtituent parts of ELEGANCE, and denotes the choice of ſuch words and phraſes as are ſuited and agreeable to the uſe of the language in which we ſpeak. Grammarians reduce the faults which they oppoſe to it to two ſorts, which they call BARBARISM and SOLECISM; the former of which reſpects ſingle words, and is an offence againſt etymology; and the latter, their conſtruction, or is an offence againſt ſyntax: to which Dr. Campbell adds a third claſs of faults, under the denomination of impropriety, which is an offence againſt lexicography, the buſineſs of which is to aſſign to every word of the language the preciſe meaning or meanings which uſe hath aſſigned to it. Dr. Ward recounts the principal things that vitiate the *purity* of language. It often happens, he ſays, that ſuch words and forms of ſpeaking, as were introduced by the learned, are afterwards dropped by them, as mean and ſordid, from a ſeeming baſeneſs contracted by vulgar uſe: and it is common to language, with all other human productions, that it is in its own nature liable to a conſtant change. Hor. Art. Poet. v. 68. We muſt, therefore, no leſs abſtain from antiquated, or obſolete words and phraſes, than from ſordid ones. On the other hand, we ſhould refrain from new ones, or ſuch, whoſe uſe has not been yet ſufficiently eſtabliſhed, at leaſt among thoſe of the beſt taſte. Beſides, any miſtake in the ſenſe of words or their conſtruction, is oppoſed to *purity*: for to ſpeak purely is to ſpeak correctly. And farther, a diſtinction ought to be made between a poetic diction, and that of proſe writers: for poets in all languages have a ſort of peculiar dialect, and take greater liberties, not only in their figures, but alſo in their choice and diſpoſition of words: ſo that what is a beauty in them, would often appear unnatural and affected in proſe. Ward's Or. vol. i. p. 308, &c. Campbell's Phil. of Rhet. vol. i. p. 409, &c.

PURLIEU. See PURLUE.

PURLINS, in *Building*, thoſe pieces of timber that lie acroſs the rafters on the inſide, to keep them from ſinking in the middle of their length.

PURLUE, PURLIEU, or POURALLEE, formed from the French *pur*, *pure*, and *lieu*, *place*, is all that ground near any foreſt, which, being added to the ancient foreſt by our kings, was, by perambulation, granted by ſome of their ſucceſſors, ſevered again from the ſame, and made *purlieu*, i. e. pure and free from the laws and obedience of the foreſt.

A *purlieu*, or *pourallee*, is defined a circuit of ground adjoining to the foreſt, and circumſcribed with immoveable boundaries, known only by matter of record; which compaſs of ground was once foreſt, and afterwards was diſafforeſted by the perambulations made for ſevering the new foreſt from the old.

Purlieus, or *pourallees*, commenced after the manner following. King Henry I. at his acceſſion to the crown in 1154, took ſo much delight in the foreſts of this kingdom, that, not being contented with thoſe he found here, though many and large, he began to enlarge divers of them, and to afforeſt the lands of his ſubjects near adjoining to the ſame.

His ſucceſſors, Henry II. and Richard I. far from retrenching or reſtoring any thing made ſtill farther encroachments: and thus did the lands continue till the 17th year of king John; at which time, the grievance being grown notorious, and generally felt by all degrees of people, divers noblemen and gentlemen beſought the king to grant, that they might have all thoſe new afforeſtations made by his predeceſſors aforeſaid, and by himſelf, diſafforeſted again; and the king, after much ſolicitation, was at length prevailed on to ſubſcribe and ſeal ſuch articles concerning the liberties of the foreſt, as they then demanded; being, for the moſt part, ſuch as are now contained in the charter of the foreſt.

Hereupon choice was made of divers noblemen, &c. to the number of twenty-five, who were ſworn with others their aſſiſtants, to ſee the ſaid liberties ſo granted and confirmed by the king, to be in every point obſerved.

But, before any thing was done to the purpoſe, king John died; and king Henry III. ſucceeding, freſh ſolicitations were made to him; who, for the better accompliſhing of the ſaid diſafforeſtation, ordered inquiſitions to be taken, by ſubſtantial juries, for ſevering all the new foreſts from the old: upon which, two commiſſioners were ſent to take thoſe inquiſitions; in virtue whereof, many great woods and lands were not only diſafforeſted, but were improved to arable lands by the owners thereof.

After this charter was made and confirmed, ſome of theſe new afforeſtations were perambulated, and proper inquiſitions taken, and the certainty was determined by matter of record, which were the old, and which the new: though it appears, that the greateſt part of the new afforeſtations were ſtill remaining during the life of king Henry III.

Under Edward I. freſh petitions and ſolicitations being ſet on foot, three biſhops, three earls, and three barons, were at length appointed to ſee thoſe perambulations performed and continued; who cauſed them to be made accordingly, and inquiſitions to be taken thereupon, and returned into the court of chancery; and all thoſe that were ancient foreſt to be meered, and bounded with irremoveable boundaries, to be known by matter of record for ever.

Thoſe woods and lands, that had been newly afforeſted, the king likewiſe cauſed to be ſeparated from the old, and to be returned into the chancery by marks, meres, and bounds, to be known in like manner by matter of record for ever.

Thus it appears how the *purlieus*, or *pourallees*, had their firſt beginning; for all ſuch woods and lands as were afforeſted by Henry II. Richard I. or king John, and, by perambulations, ſevered from the ancient foreſts, were, and yet are, called *pourallees*, q. d. woods and lands ſevered from the old foreſts, and diſafforeſted by perambulation; *pourallee* being the ſame as *perambulatio*, in Latin.

But, notwithſtanding ſuch new afforeſtations were diſafforeſted by perambulation, whereby the ſame became *pourallee*, or *purlieu*, yet they were not thereby ſo diſafforeſted as to every man, but that they do, in ſome ſenſe, continue foreſt ſtill as to others. For, by the words of *charta de foreſta*, if the king has afforeſted any woods or lands of his ſubjects, to the damage of the proprietors, they ſhould forthwith be diſafforeſted again; that is, only as to thoſe perſons, whoſe woods and lands they were: who, as the proper owners thereof, might fell and cut down their woods at their own pleaſure, without any licence from the king; as alſo convert their meadows and paſtures into tillage, or otherwiſe improve their ground to the beſt advantage. So alſo they might hunt, and chace the wild beaſts of the foreſt towards the ſame, &c. But no other perſon ſhould claim ſuch benefit of hunting in the *pourallee*, beſides the proper owner of the ſoil thereof, who is left at liberty to ſuffer the *pourallee* to remain foreſt ſtill, as ſome, in effect, have thought moſt expedient, becauſe hereby entitled to the benefit of the common within the foreſt, which otherwiſe they were excluded from. Hence, if the beaſts chance to wander out of the foreſt into the *pourallee*, the king hath a property in them ſtill, againſt every man, but the owner of the ground wherein they are, who hath a ſpecial property in them, *ratione ſoli*; yet ſo as he may only take them by hunting, or chaſing with his greyhounds or dogs, without any foreſtalling or foreſetting them in their courſe again towards the foreſt.

Beſide what hitherto has been ſaid of the difference between foreſt and *purlieu*, or *pourallee*, there is this farther diverſity, that all the woods and lands within the regard of the foreſt are abſolutely within the bondage or charge of the foreſt, as well in reſpect to the owners thereof, as of any other perſon; for no one may cut down his own woods, or improve his own lands, within the regard of the foreſt, without licence from the king or his chief juſtice in eyre of the foreſt. Neither ſhall any perſon hunt, chace, or moleſt the wild beaſts of the foreſt in his ground, within the regard of the foreſt, without licence or warrant from the king, or his chief juſtice of the foreſt ſo to do.

But thoſe, whoſe grounds are within the *pourallees*, are not ſubject to theſe reſtrictions. Yet are not the woods and lands in the *pourallees* abſolutely freed from the bondage of the foreſt, in reſpect of the wild beaſts having their haunts therein, when they happen to ſtray out of the foreſt; but as they were once abſolutely foreſt, ſo they are ſtill conditionally ſo.

Purlue-*man*, or Purlieu-*man*, or Pourallee-*man*, is one who has land within the *purlue*; and is allowed or qualified to hunt or courſe within the ſame, though under certain reſtrictions.

By ſtat. 13. Rich. II. he who may lawfully hunt in any *pourallee*, ought to have woods or lands of freehold within the *pourallee*, to the yearly value of 40*s*. By ſtat. Jac. 1. he ought to have lands of inheritance of the yearly value of 10*l*. or lands of freehold of the yearly value of 30*l*. or have goods worth 200*l*. or be the ſon of a knight or baron, or perſon of a higher degree, or ſon and heir apparent of an eſquire. But, by a later act, Car. II. no man may keep greyhounds within the *pourallee*, or elſewhere, within England or Wales, unleſs he have a free warrant, or be lord of a manor, or ſuch a freeholder as is ſeiſed, in his own right, or in right of his wife, of lands, tenements, or hereditaments of the clear yearly value of 40*l*. over and above all charges and repriſes of ſuch eſtate of inheritance; or of lands, tenements, or hereditaments, in his own right, or in right of his wife, for term of life or lives, of the yearly value of 80*l*. over and above all charges and repriſes, or that is worth in goods or chattels 400*l*.

The *pourallee*, or *purlieu*, then, is ſaid to be for him that is ſo qualified: others, not qualified, and therefore not *purlieu-men*, yet having land in the *pourallee*, may, if they find any wild beaſts of the foreſts in their own grounds within the *pourallee*, chaſe them thereout with little dogs; but not with grey-hounds, or other dogs.

Nor is the *purlieu-man* left at large to hunt at his own diſcretion: but he is tied down to ſeveral rules: as,

1. That he always begins his chaſe in his own ground; and that, though he finds ſuch wild beaſts in his own *pourallee*, and in reſpect thereof, hath a property in them, *ratione ſoli*, againſt all perſons, but the king; yet ſuch his property is only on this condition, that he can ſtay them with his dogs in chaſe, without foreſtalling them, before they can recover the foreſt. If they be within the liſt of the foreſt, before the dogs faſten on them, they are the king's, or other owner of the foreſt.

2. But if the *pourallee-man* firſt make his chaſe in his own freehold, he may purſue the ſame through every man's ground within the *pourallee*, and his dogs faſten on a wild beaſt, before he can get within the bounds of the foreſt, and the beaſt draw the dogs into the foreſt, and is there ſlain by them; here the *pourallee-man* ſhall not enter into the foreſt, nor take the beaſt ſo killed, becauſe his courſe was irregular from the beginning, as he could claim no property in the beaſt, *ratione ſoli*.

3. A *pourallee-man* may hunt in his own *pourallee* with no more company than his own ſervants; neither may he appoint, licence, or warrant any other perſon, except his ſervants, to hunt by his commandment in his *pourallee*.

4. Every *pourallee-man* is forbidden, by the laws of the foreſt, to hunt in his own grounds within the *pourallee* every day, or oftener than three days in any one week, Sunday excepted.

5. Nor is any man to diſturb, or make a courſe after any deer found in his *pourallee*, within forty days after the king hath made a general hunting in the foreſt adjoining thereunto; becauſe then the wild beaſts of the foreſt come not into the *pourallees* of their own accord, but as they are forced into the ſame by the hunters, with clamours, and blowing of horns, ſo that they fly thither for refuge.

6. No man ſhall hunt within ſeven miles of the borders of the foreſt, or in his own *pourallee*, within forty days next before the king hath iſſued out his proclamation, declaring his royal will and pleaſure to make a general hunting in that foreſt.

Inaſmuch as the *pourallees* were once, and in ſome ſenſe ſtill are foreſt, it was neceſſary to have officers to attend, and take on them the charge of the preſervation of the game that may happen to wander out of the foreſt into the *pourallees*; ſince otherwiſe the laws of the *pourallees* could not be executed, but the foreſt itſelf would ſoon be deſtroyed by the *pouralle-men*.

For this reaſon, rangers were firſt appointed, who, though not officers in the foreſt, yet appertain thereto; for all officers in the foreſt have charge of the vert and veniſon of the foreſt; but a ranger hath no charge of the vert, but only of veniſon coming out of the foreſt, into the *pourallees*, his place of charge; from whence his office is to conduct the ſame back again into the foreſt.

This officer is appointed by the king, or his chief juſtice in eyre, and is made by patent, with a fee commonly of twenty, thirty, or forty pounds, or more, by the year, payable out of the exchequer, as alſo certain fee-deer, both red and fallow, to be taken annually, at proper ſeaſons, out of the foreſt.

The ſubſtance of his oath is, to rechaſe, and with his hounds drive back, the wild beaſts of the foreſt, as often as they range out of the ſame into his *pourallee*; to prevent all unlawful hunting and hunters of wild beaſts of venery and chaſe, as well within the *pourallees*, as within the foreſt; and to preſent thoſe and other offences, at the next court of attachments or ſwainmote, which ſhall firſt happen.

Rangers, it is to be obſerved, belong only to ſuch *pourallees* as were once the woods and lands of the ſubject, and were afterwards diſafforeſted again, and ſo become *pourallees*. Hence, as there are ſome foreſts in England, which never had any enlargement by new afforeſtations, and therefore have no *pourallees* at this day, there can be no rangers belonging to them.

PURPARTY (Fr. *pour part*, i. e. *pro parte)* is that part or ſhare of an eſtate, firſt held in common by parceners, which is by partition allotted to any of them. To make *purparty* is to divide and ſever the lands that fall to parceners, which till partition they held jointly, and *pro indiviſo*. Old Nat. Br. 11.

PURPLE, *purpura*, *πoϱφυϱα*, a red colour, bordering on violet; now dyed chiefly with cochineal.

Purple was much eſteemed among the ancients; eſpecially the Tyrian *purple*, which underwent more dyes than the reſt, and which was almoſt peculiar to the emperors and kings. Yet this *purple* did not exceed that now in uſe: the chief reaſons why the ancient *purple* dye has been diſuſed, are, that the latter is both cheaper and finer.

The ancient *purple* was tinged or given with the blood or juice of a precious turbinated teſtaceous ſea-fiſh, called by the Greeks ϖοϱφυϱα, and by the Latins *purpura*; whereof we have deſcriptions in ſeveral authors, and ſhells in moſt of the cabinets of the curious. See Purple-*fiſh*.

The method of obtaining the colour, Mr. Cole (ſee Purple-*fiſh)* deſcribes thus:

The ſhell, which is very hard, being broken, (with the mouth of the fiſh downwards, ſo as not to cruſh the body) and the broken pieces being picked off, there appears a white vein lying tranſverſly in a little furrow or cleft next the head of the fiſh.

In this vein is the *purple* matter lodged; ſome of which being laid on linen, appears at firſt of a light green colour; and, if expoſed to the ſun, ſoon changes into a deep green, and in a few minutes, into a ſea-green, and, in a few more, into a blue; thence it ſoon becomes of a *purpliſh* red, and, in an hour more, of a deep *purple* red.

And here the ſun's action terminates; but by waſhing in ſcalding water and ſoap, and drying it, the colour ripens to a moſt bright and beautiful crimſon, which will bear waſhing admirably without the addition of any ſtyptic. While the cloth marked with this colour lies in the ſun, it will yield a very ſtrong and fœtid ſmell, as if garlic and aſſa fœtida were mixed together.

The juice which gives this beautiful *purple* colour is, ſays M. Du Hamel, while it remains in the body of the animal, and while that is in health, wholly white; but no ſooner is it expoſed to the ſun, than it begins to change colour, and in leſs than five minutes goes through the ſeveral changes of pale green, yellowiſh, and a beautiful emerald green; after this it becomes of a deeper and duſkier green, then bluiſh, reddiſh, and finally a deep and very beatiful *purple.* Sometimes the juice is found naturally green in the animal; this is probably from the creature's being in a diſeaſed ſtate; but when it is naturally thus, it immediately becomes red, and afterwards *purple*, on being expoſed to the ſun, its ſeveral preceding changes ſeeming to have been made already in the body of the animal.

If a piece of linen be rubbed over with this juice, and part of it expoſed to the ſun, part not, that only will turn red which is ſo expoſed, the other remaining green without any alteration; and it is obſerved, that the ſtronger the ſun ſhines, the quicker the change appears, and probably the colour is in proportion alſo the more beautiful and lively. And it is very remarkable, that if a needle, or any other opaque body, be laid upon the linen which is yet green, and is to become red on being expoſed to the ſun; after ſuch an expoſure the whole ſhall be changed red or *purple*, excepting only that ſmall ſpot which is covered by the needle, which will ſtill remain green.

A plate of glaſs, though it be three inches thick, will not prevent the colour from changing *purple* by being laid over it; but the thinneſt piece of metal will keep it wholly green. The one being opake, and the other pellucid, are evidently the only reaſons for this difference.

If the coloured linen be ſucceſſively covered by three pieces of paper, the one blacked with ink, the other in its natural ſtate, and the third rubbed over with oil, it will change colour on being expoſed to the ſun in different degrees; and that exactly in proportion to the degree of tranſparence in each of the papers: moſt of all in that which was covered with the oiled paper; ſomething leſs in that covered by the paper in its natural ſtate; and leaſt of all in that which was covered with the blacked paper, as that is leaſt tranſparent.

The common heat of a fire, or that of a red hot iron, produces no change at all in the colour when green. The vapour of burning ſulphur produces a little; but the green which had not changed to *purple* by theſe experiments, immediately changed to it on being expoſed to the rays of the ſun.

Theſe experiments were all made in the months of January and February, by M. du Hamel, in Provence; and the ſun having power to change the colour ſo ſpeedily there in theſe cold months, probably in a warmer climate or ſeaſon the air would have been ſufficient for the purpoſe, without the open ſun; ſince it ſeems, from experiment, that both the ſolar rays, and the light alone in a cloudy day, can act upon this colour. The light and heat of the ſun both act on this colour; light is always ſufficient to produce the effect: but the heat may eaſily be too great, or too little, and to do the whole in perfection it muſt be at a certain middle degree.

This beautiful *purple*, if it can ever be brought into uſe in dying, will have one very great advantage from its viſcoſity. The pieces of cloth that had been ſtained by it retained their colour, in ſpite of ſeveral boilings in different liquors, which M. Du Hamel made them paſs through; and the colour, on examination, was found not to be ſuperficial, but penetrated the whole body of the ſtuff, which was tinged by it. There are many inconveniencies which muſt naturally attend the uſe of this ſubſtance as a dye, but they may, perhaps, all be got over by care and application. It is very certain, that it is of too viſcid a nature eaſily to penetrate many ſubſtances; but it is alſo certain, that this might be obviated by diſſolving it in ſome proper liquor. It appears very plainly, that the ancients had a method of thus diſſolving their *purple*; but we neither know what was their *purple*, nor what was its diſſolvent; nor, which would be of much more conſequence to us at preſent, what is the proper diſſolvent for our own. Mem. Acad. Scien. Par. 1736.

Mr. Reaumur has alſo diſcovered another very different kind of *purple.* This is produced in oval grains about a quarter of an inch long, full of white liquor bordering on yellow which cover certain ſtones or ſands, about which the buccina of Poictou uſually aſſemble.

By the experiments M. Reaumur has made, it appears that theſe grains are neither the eggs of the buccinum, nor the ſeads of any ſea-plants, nor any riſing plants, but the eggs of ſome other unknown fiſh.

Theſe grains, being bruiſed on a white linen, at firſt only tinge it yellow, and that inſenſibly; but in three or four minutes they give it a very beautiful *purple* red, provided the linen be expoſed to the open air; for the air of a room, even though the windows be open, will not do. This colour fades, however, a little by repeated waſhings.

M. Reaumur concludes, from ſome experiments he made, that the effect of the air on the liquor does not conſiſt in its taking away any particles thereof, nor in giving it any new ones, but only in its agitating it, and changing the arrangement of the parts that compoſe it. He adds, that the liquor of the buccinum, and that of the grains, ſeem to be nearly of the ſame nature; except that the latter is more watery, and only ſaline; whereas the other is hot, and pungent.

P. Labat gives us the deſcription of another *purple* dye, produced by a tree growing in the Antilles. The juice of this tree, when cut ſtanding, is of a blood-red, and communicates the ſame colour to cloths; though, like the former, it loſes much in often waſhing.

PURPLE, *Dying*. See DYING.

PURPLE *Gold*. See GOLD *Precipitate*, &c.

PURPLE, in *Medicine*. The *purple fever*, *febris purpurea*, is a kind of plague, or a malignant fever diſcovering itſelf in eruptions on the ſkin like the bites of bugs or fleas, or like grains of millet, or the ſmall-pox; whence it is ſometimes alſo called the *ſpotted*, and *miliary* FEVER.

The eruptions are red, orange, violet, azure, livid, or black; and when they riſe in great quantity, it is eſteemed a good ſign. Sometimes they ſpread to a great extent, like eryſipelaſes, according to the quality of the poiſon.

PURPLE *apple*, in *Botany*. See *Cuſtard* APPLE.

PURPLE-*fiſh*, *purpura*, in *Natural Hiſtory*, the name of a genus of ſhell-fiſh, the characters of which are theſe: it is an univalve ſhell, jagged and beſet from head to tail with ſpines, tubercles, umbos, or ſtriæ. The mouth is ſmall and roundiſh; the tail is ſhort, and uſually the baſe runs out into a long beak.

It has been uſual with moſt authors to confound together the genera of the murex and *purpura*, and to uſe the words as ſynonymous: but though there is ſome external reſemblance between many of the ſhells of the two genera, yet they are eaſily diſtinguiſhed by this, that the mouth of the *purpura* is leſs long, and is leſs dentated and alated than that of the murex. The body and the head of the ſhells of this genus are not ſo elevated as thoſe of the murex kind, and are not covered with points or buttons at the mouth. If a ſhell is therefore found to have a ſmall, ſmooth, and round mouth, and a body covered with undulated leaves, as it were, like thoſe of ſavory or endive, and ſometimes with long points, and its tail, whether long or ſhort, be hollowed and ſomewhat bent, this may be called a *purpura*, and not a murex. Linnæus makes the *purpura* a ſpecies of the MUREX.

The ancients diſtinguiſhed three kinds of *purpura*; one which had a long and crooked tail, made hollow like a tube or pipe; a ſecond which had either no tail at all, or at the moſt a very ſhort one; and a third which had no ſpiral head, or, as we ſhould expreſs it, no clavicle.

On examining the whole family of the *purpuræ*, we may diſtinguiſh four remarkable ſpecific differences among them. The firſt of theſe comprehends thoſe *purpuræ* which have the body of the ſhell garniſhed with a ſort of undulated foliage in clouded ridges, and have a ſhort and crooked tail. The ſecond comprehends thoſe which have the body of the ſhell covered with acute points, and have a long tail. The third comprehends thoſe which have as long a tail as the former, but have a ſmooth body, or at the utmoſt have only a few ſlight protuberances and wrinkles on it. And the fourth takes in thoſe which are ſmall, and have an elevated clavicle, a ſhort crooked tail, and the body of which is covered either with ſlender ſpines or hairs. See *Tab. of Shells*, Nº 14.

This ſpecies of fiſh, as well as the murex, ſerved among the ancients to dye the fine *purple* colour they were ſo fond of, and ſome of the buccina (e. g. the *lapillus* of Linnæus) have been of late found to have the ſame juice.

The *purpura* and murex are both fiſhed up in great plenty in the gulph of Tarentum; but the ſmall quantity of the coloured juice which each fiſh contains, and the neceſſity of uſing it before the animal dies, makes it impoſſible to bring it to any regular article of traffick. The ancients uſed this colour only on cotton and woollen ſtuffs; whereas our cochineal, which was unknown to the ancients, ſtrikes equally well on ſilks and ſtuffs. Theſe ſhells are alſo found in various parts of the Mediterranean.

In the ſeas of the Spaniſh Weſt-Indies about Nicoya, is found a ſhell-fiſh, which perfectly reſembles the ancient *purpura*, and, in all probability, is the very ſame. This fiſh, Gage tells us, uſually lives ſeven years; it hides itſelf a little before the dog-days, and continues to diſappear for three hundred days running.

They are gathered plentifully in the ſpring, and, by rubbing one againſt another, they yield a kind of ſaliva or thick glair, reſembling ſoft wax: but the *purple* dye is in the throat of the fiſh, and the fineſt part is lodged in a little white vein; the reſt of the body is of no uſe.

He adds, that the chief riches of Nicoya conſiſt in this fiſh. Cloth of Segovia, dyed with it, is ſold for twenty crowns the ell; and none but the greateſt Spaniſh lords uſe it.

There are alſo found upon the coaſts of the South Sea near the equator, in the neighbourhood of point St. Helena, in the province of Guayaquil, certain ſea-ſnails, as Don Antonia de Ulloa calls them, ſticking to the ſtones, and covered by the ſea at high water, about the ſize of ſmall nuts, which contain a liquor or juice that has the true colour of *purple*. The colour is very bright, and ſo durable, that waſhing rather increaſes than diminiſhes its luſtre, nor does it fade or decay by uſe and wearing. Woven ſtuffs are not dyed with it, but only cotton threads. As ſoon as a ſufficient quantity of the liquor is ſqueezed from the fiſh, the cotton thread is drawn through it, and it takes and retains the tincture without any farther trouble; but the *purple* colour is not diſcovered till the thread is dry, the juice being of a milky colour at firſt, but it ſoon changes into green, and at laſt ſettles in a *purple*.

Beſides the Indian *purple* fiſhes, we have others much nearer home. In the Philoſoph. Tranſact. abr. vol. ii. p. 823, we have an account of *purple* fiſh diſcovered in 1684, by Mr. W. Cole, on the coaſts of Somerſetſhire, South Wales, &c. where it is found in great abundance.

The modern *purple* fiſh, M. Reaumur obſerves, is a kind of buccinum, a name given by the ancients to all fiſhes whoſe ſhell bears any reſemblance to a hunting-horn; and it appears from Pliny, that part of the ancient *purple* was taken from this kind of ſhell-fiſh: ſo that this may be eſteemed a recovery of what had been ſuppoſed entirely loſt.

The fiſh, he obſerves, is good; and adds, that there are ſeveral kinds of it differing in ſize and ſhell, and alſo in the colour of the tinging liquor. There are ſome found on the coaſts of Poictou.

The Caribbee iſlands have likewiſe their *purple* fiſh. This is called *burgan*, being of the ſize of the end of the finger, and reſembling our periwinkles; its ſhell is of a browniſh azure, its fleſh white, its inteſtines of a very bright red, the colour whereof appears through the body; and it is this that dies the froth, which it caſts forth when taken, and which is at firſt of a violet hue, bordering on blue.

To oblige them to yield the greater quantity of froth, they lay them on a plate, and ſhake and beat them againſt one another; upon which the plate is immediately covered with the froth, which is received on a linen cloth, and becomes *purple* in proportion as it dries.

P. Labat obſerves, that if this be the real Tyrian *purple*, the ſecret of preparing and fixing it is loſt; this colour being found to dwindle and diſſipate, in proportion as the linen dyed with it is waſhed.

The *purpura* lives on other fiſh. It uſually hides itſelf at a ſmall depth in the ſand, ſometimes even in freſh-water rivers, and as it lies hid, it thruſts up a pointed tongue, which wounds and kills any thing that comes over it. We frequently find ſea-ſhells with round holes bored through them, as regularly as if made with a boring inſtrument: theſe are generally allowed to be made by the tongue of the *purpura*, in order to its feeding on the fiſh within.

The *purpura* has two horns like that of a ſnail; and Fabius Columna ſays, that they have eyes in theſe, not placed at the ends, as in the ſnail, but in the middle of each horn.

The *purpura* is a ſhell-fiſh very well known, and has been known alſo in almoſt all times to afford a *purple* liquor; but as there has been no method diſcovered of bringing this liquor into uſe in dying, the fiſh has been neglected, and its juice never attempted to be brought into uſe.

PURPLE-*wort*, in *Botany*, a name given to ſeveral ſpecies of TREFOIL.

PURPRESTURE, in our *Ancient Law Books*. See POURPRESTURE.

PURPRISUM, of the French *pourpris*, denotes a cloſe, or incloſure: alſo the whole compaſs or extent of a manor or place.

Donavi eis meum purpriſum *de Kirkeham, & domos meas, & molendinum, & prata, &c.* Charta Walteri Eſpec. Priorat de Kirkeham.

PURPURA, *Perſian*, the ſame with the Perſian ſhell, a ſpecies of DOLIUM.

PURPURE, POURPRE, or PURPLE, in *Heraldry*, according to ſome, is one of the five colours of armories, mixed or compounded of gules and azure, bordering on violet; and, according to others, of a little black and much red colour. It is, by the heralds, ſuppoſed a ſymbol of temperance, liberality, dignity, authority, faith, and piety. Moſt authors in heraldry, as Favyn, Geliot, Monet, and Meneſtrier, do not allow *purple* for a colour, in regard it is not ſimple, but compoſed of a mixture of other colours. They rather eſteem it a kind of intermediate tincture, ſometimes metal, and ſometimes colour: hence the Spaniards call it *una miſtion*: ſo that one cannot lay it on metal and colour without falſifying the arms.

Add, that many take the *purple*, as it is accounted, on many ancient bearings, by which ſome of the moderns would evince the regularity and legitimacy of this colour in armory, to be no other than ſilver tarniſhed.

Spelman, however, in his Aſpilogia, allows *purple* the preference before all other colours, as having been an enſign of royalty for many ages; yet even he allows it to have been excluded, by the ancient heralds, as only an imperfect colour.

It is repreſented in engraving, by diagonal lines drawn from the ſiniſter chief to the dexter baſe point. Vide *Tab.* II. *Herald. fig.* 81. In the coats of noblemen it is called *amethyſt*; and in thoſe of princes, *Mercury*.

PURPURATI, in our *Ancient Hiſtorians*, denotes the ſons of emperors and kings.

PURPURINA, a name uſed by Caneparius, and ſome other authors, for the AURUM *moſaicum*, or *aurum muſivum* of the ſhops, the preſent preparation of which differs from that of that author only in the proportions of the ingredients.

PURPURISSUS, in the *Ancient Writers*, both Greek and Roman, the name of a compound colour or fucus of a fine purpliſh red, uſed to paint women's cheeks.

It ſeems by the compoſition to have been ſomewhat like our roſe pink, as it is called by the colourmen. It was made of the *creta argentaria*, or fine white kind of chalk, diſſolved in a ſtrong purple tincture of ſome of the roots of wood which dyed red; and when the coarſer part was ſubſided to the bottom of the veſſel, the liquor, while yet thick, was poured off into another veſſel; and what ſubſided from this, which was as fine as flour, was of a beautiful pale purple, and was the *purpuriſſus* ſaved for uſe.

PURREL, *anno* 35 Eliz. cap. 10. a liſt ordained to be made at the ends of kerſeys, to prevent deceit in diminiſhing their length.

PURSE, a manner of accounting; or, as ſome call it, a ſpecies of money of account, much uſed in the Levant, particularly at Conſtantinople.

The *purſe* conſiſts of about five hundred dollars, or one hundred and twenty pounds ſterling. It is ſo called, becauſe all the grand ſignor's treaſure in the ſeraglio is kept in leather bags of this value.

In this, however, there is ſome difference; for the *purſe* in Egypt is twenty-five thouſand medines, and in other parts of Turky it is only twenty thouſand.

This method of accounting the Turks derive from the Greeks, and they from the Romans; the emperors whereof brought it to Conſtantinople, as appears from a letter of Conſtantine to Cecilian, biſhop of Carthage, quoted by Euſebius and Nicephorus. See FOLLIS.

PURSER, an officer aboard a man of war, appointed by the lords of the admiralty, who receives her victuals from the victualler; and is to take care, that it be in good condition, and well laid up, and ſtowed. He is alſo to ſee that they are carefully diſtributed to the officers and crew, according to the inſtructions which he has received from the commiſſioners of the navy for that purpoſe. To him alſo belongs the diſtribution of the ſlops, &c.

He is alſo to keep a liſt of the men and boys belonging to the ſhip, and to ſet down, exactly, the day of each man's admittance into pay; that the paymaſter or treaſurer of the navy may iſſue out his diſburſements, and pay off the men according to the muſter-book.

PURSIVENESS, or PURSINESS, among *Farriers*, *thickneſs of wind*, a name common to all thoſe diſeaſes in horſes, which ariſe from obſtructions in the paſſages of the lungs.

Purſiveneſs, ſometimes alſo called *broken wind*, may proceed from an ulcer, or ſome inward waſting of the lungs, wherein the ſmall veſſels are worn or abraded by the ſharpneſs or acrimony of the common diſcharges.

The like diſorder may alſo ariſe from a ſtagnation, hindering the air from penetrating ſo as to lift up the lungs in the act of reſpiration; or from ſome tough and mucilaginous matter ſeparated in the branches of the wind-pipe.

The uſual occaſions are cold, ſurfeits, and other diſeaſes not thoroughly carried off. *Purſive* diſorders may alſo riſe from unwholeſome food, bad air, and hard riding when a horſe is full. The ſigns are commonly a heaving and beating of the flanks; a wheezing and rattling. Sometimes the kernels about the throat will ſwell, and there will be a glandulous running at the noſe, which is the utmoſt ſtage of the diſeaſe, and uſually reputed deſperate.

PURSLANE, *portulaca*, in *Botany*, a genus of the *dodecandria monogynia* claſs. Its characters are theſe: the empalement of the flower is ſmall, bifid, and permanent, ſitting upon the germen; the flower has five plain, erect, obtuſe petals, and many hair-like ſtamina, about half the length of the petals, terminated by ſingle ſummits; and a roundiſh germen, ſupporting a ſhort ſtyle, crowned by five oblong ſtigmas; the germen afterwards becomes an oval capſule with one cell, containing many ſmall ſeeds. Miller enumerates four, and Linnæus ſeven ſpecies.

Purſlane is propagated from ſeeds, which may be ſown upon beds of light rich earth, during any of the ſummer months. This ſeed is very ſmall, ſo that a little of it will be ſufficient to ſupply a family. There is no other culture which this plant requires, but to keep it clear from weeds, and in dry weather to water it two or three times a week. In warm weather, this plant will be fit for uſe in ſix weeks after ſowing; ſo that in order to continue a ſucceſſion of it, you ſhould ſow it at three or four different ſeaſons, allowing a fortnight or three weeks between each ſowing. This will be ſufficient to laſt the whole ſummer, while it is proper to be eaten, for being of a very cold nature, it is unſafe to be eaten, except in the heat of ſummer in England; for which reaſon it is not to any purpoſe to ſow it upon a hot bed, ſince it will come early enough for uſe in the open air. Miller.

The leaves are much uſed as a ſallad, being cooling, and good for the ſcurvy, attempering the heat of the bile, and relieving the ſtrangury, heat of urine, and gonorrhœa. The ſeed is cooling and reſtringent, and good to kill worms.

PURSLANE, *Horſe*. See TRIANTHEMA.

PURSLANE, *Sea*. See ORACH.

PURSLANE, *Water*, *peplis*, in *Botany*, a genus of the *hexandria monogynia* claſs. Its characters are, that it has a bell-ſhaped perianthium, divided into twelve ſegments, and ſix petals inſerted in the impalement; the fruit is a double-celled capſule. There are two ſpecies.

PURSUIVANT. See POURSUIVANT.

PURVEYANCE. See POURVEYANCE.

PURVEYOR. See POURVEYOR.

PURVIEW, from the French *pourveu*, *a gift*, *grant*, *proviſion*, &c. a term frequently uſed, by ſir Edward Coke, for the body of an act of parliament, or that part which begins with *Be it enacted*, &c. as contradiſtinguiſhed from the *preamble*.

The ſtatute of 3 Hen. VII. ſtands upon a *preamble* and a *purview*. 12. Rep.

PURULENT, *purulentus*, in *Medicine*, ſomething mixed with, or partaking of, pus or matter.

Phthiſical people frequently ſpit a *purulent* matter. In a dyſentery, the ſtools are *purulent*: when there is an ulcer in the reins or bladder, the urine is *purulent*.

The *purulent* eye is a diſorder to which new-born children are ſubject; for the cure of which Mr. Ware recommends the application of aſtringents, on a conviction that the diſcharge is not real pus, but merely mucus, increaſed in quantity, and altered in colour, by ſome irritating cauſe. The remedy which he has found to be highly uſeful in this diſorder, is the aqua camphorata of Bate's Diſpenſatory, much diluted with water, and injected with a ſyringe. Ware's Remarks on the Ophthalmy, &c. 8vo. 1780.

PUS, formed of the Greek ϖυος, in *Medicine*, a putrid matter, white and thick, formed of blood corrupted in a wound or ulcer, and iſſuing out of the lips thereof.

Wounds are always to be kept open while they ſuppurate, i. e. while they generate *pus*.

A very ſmall portion of *pus* abſorbed into the blood-veſſels, raiſes a putrid fever as certainly as yeaſt does a fermentation in wort. This fever is not owing to its ſtimulating the ſolids to quicker and greater vibrations, but to its increaſing the inteſtine motion, and accelerating the animal proceſs, haſtening the change of the juices to that ſubtil acrid ſtate which renders them unfit to be retained in the body, and diſpoſes them to run off in colliquative evacuations, ſuch as ſweating and purging, which conſtantly attend theſe putrid or hectic fevers, or riſing to internal ulcers. Med. Eſſ. Edinb. vol. v. art. 77. See PUTREFACTION.

When *pus* is *laudable* and mild, it is one of the moſt powerful digeſters, ſuppurants, and incarners; when it ſtagnates too long, or when the liquors or veſſels are faulty, it may become an acrid, ſtimulating, eroding ſanies; when abſorbed into the blood, it affects all the liquors, ſtimulates the veſſels, and is capable of producing violent diſorders.

PUSHERS, a name given to Canary birds when new flown. See BRANCHER, and CANARY *bird*.

PUSILLATUM, a word uſed by ſome medical writers to expreſs a coarſe powder, or any medicinal ſubſtance, beat into ſmall pieces for infuſion, or the like purpoſes.

PUSTULE, *puſtula*, a little pimple, or eruption, on the ſkin, full of pus; eſpecially ariſing in the ſmall and great pox. See EXANTHEMA.

PUSU, in *Botany*, the name of a famous plant growing in China, and greatly eſteemed there. This and the ginſeng theſe people a long time kept to themſelves; but at length it was diſcovered, that the one was eſteemed a certain prolonger of life, and the other a preſervative againſt all diſeaſes.

They, in their manner of ſpeaking, ſay, that the *puſu* gives immortality. We have not been ſo happy to obtain any of this famous plant for the trial, but the ginſeng having been brought over, and found not to poſſeſs thoſe great virtues they aſcribe to it, and the people in China, who are poſſeſſed of the *puſu*, dying, as well as thoſe who have it not, we find, that the virtues of both are ſo greatly exaggerated by the eaſtern dialect, that there is not much to be expected from them.

PUT, in the *Manege*, called in French *mettre*, is uſed for the breaking or managing of a horſe: thus,

To put a horſe to corvets, or caprioles, is to teach him thoſe parts of the manege.

To put a horſe upon his haunches, called in French *aſſeoir*, is to make him bend them handſomely in galloping in the manege, or upon a ſtop. See HAUNCHES.

To put a horſe to the walk, trot, or gallop, is to make him walk, trot, or gallop.

To put a horſe under the button. See BUTTON.

PUTAGE, *putagium*, in our *Old Law Books*, denotes whoredom or fornication on the part of a woman.

The word is formed from the French *putte*, *whore*; *putagium*, q. d. *putam agere*. *Quod autum generaliter ſolet dici*, putagium *hæreditatem non adimit*; *illud intelligendum eſt de* putagio *matris*; *quia filius hæres legitimus eſt*, *quem nuptiæ demonſtrant*. Glanv. lib. vii. cap. 12.

PUTANISM, *putaniſmo*, an Italian term, naturaliſed by ſome Engliſh writers, ſignifying *whoredom*, or the life or condition of a courteſan.

The word we borrow immediately from the French, *putaniſme*; and they from the Italian *puttana*, *whore*; of *putta*, *girl*.

PUTATIVE, *ſuppoſitive*, ſomething reputed to be what it really is not.

The word is ſeldom uſed but in the phraſe *putative father*. Thus we ſay, Joſeph was the *putative father* of Jeſus Chriſt.

PUTEAL, among the Romans, a ſmall kind of edifice raiſed in the place where a thunder-bolt had fallen. See BIDENTAL.

PUTEOLANUS *pulvis*. See POZZOLANA.

PUTICULI, among the Romans, ditches or holes in the earth, a little without the Eſquiline gate, in which the poorer ſort of people were buried.

PUTLOGS, or PUTLOCKS, in *Building*, ſhort pieces of timber, about ſeven feet long, uſed in building ſcaffolds. They lie at right angles to the wall, with one of their ends bearing upon it, and the other upon the ledges or poles which ſtand parallel to the ſide of the wall of the building.

PUTORIUS, in *Zoology*. See POLE *cat*.

PUTORIUS *ſerpens*, in *Zoology*, a name given by ſome to that ſpecies of ſerpent called by others DRYINUS.

PUTREFACTION, or PUTRIFACTION, in *Chemiſtry* and *Medicine*, is a ſpecies of FERMENTATION; being the laſt ſtage of the fermentatory proceſs, and conſiſting not merely in the decompoſition and tranſpoſition of the particles of putrefying ſubſtances, whether animal or vegetable, by which new combinations are produced, but alſo in the extrication and expulſion of ſome of the conſtituent parts of theſe ſubſtances.

In order to underſtand the modern theory of *putrefaction*, it will be neceſſary to recollect what has been already recited under the articles *fixed* AIR, DIGESTION, and FERMENTATION. It is ſufficient to repeat in this place, that Dr. Hales aſcribed the coheſion and ſolidity of bodies to the air, which exiſts in them in a fixed ſtate, and forms, as he expreſſes it, the cement or bond of union between their ſeveral conſtituent particles. To this purpoſe he obſerves, that air abounds much more in ſolid than in liquid bodies; and that ſolid bodies being generally denſer than water, the attraction of the air of theſe ſolid bodies in a fixed ſtate, and its repulſion when in an elaſtic ſtate, are greater than the attraction and repulſion of the lighter watery particles in a fixed and in an elaſtic ſtate; and hence the particles of air are fitter to be the principal bond of union in ſolid bodies, than the particles of water. This opinion was afterwards adopted by Baron de Haller, who maintains that air is the *vinculum elementorum primarium*, or the true cement which binds together the earthy particles of bodies. Dr. Macbride, as we have elſewhere ſhewn, has taken occaſion, by a variety of experiments, to illuſtrate and eſtabliſh this opinion: and in ſupport of it he alledges, that the preſervation of firmneſs and ſoundneſs in bodies depends on reſtraining the eſcape of that principle, now known by the name of *fixed* AIR, and which he ſuppoſes to be the immediate cauſe of coheſion: for the moment it flies off and reſumes its elaſticity, the other conſtituent particles, viz. the earthy, the ſaline, the oily or inflammable, and the aqueous, being thereby put in motion, immediately begin to exert their ſeveral peculiar attractive and repulſive powers, and run into new combinations, which firſt change, and at length altogether deſtroy the texture of the ſubſtance they formerly compoſed; provided that this ſubſtance contained in itſelf a ſufficient quantity of water to allow of the inteſtine motion, by giving the proper degree of fluidity; for without fluidity there can be no inteſtine motion; and without inteſtine motion there can be no change of combination: becauſe we ſee that ſuch animal and vegetable bodies as are ſuddenly deprived of their water, or naturally contain very little, are almoſt as durable and unchangeable in their texture as minerals. Hence Acoſta obſerves, that in Peru, and others have obſerved the ſame in Egypt, where it very rarely rains, every thing will continue a long time uncorrupted: unleſs we ſhould rather aſcribe this effect to the abundance of nitrous ſalt in the air of thoſe places, which is known to reſiſt *putrefaction*. Indeed all *putrefactions*, both of animal and vegetable bodies, are affirmed by the learned Boerhaave to be performed by means of water alone. Take, ſays he, a pound of freſh fleſh, and keep it in a heat like that of our body, and, in a few days the *putrefaction* will be completed: but if you firſt drain out, or exhale, all the watery part from the ſame in ſome chemical veſſel, though the ſalt and oil remain, the fleſh will harden like a ſtone, and may be kept for ages without *putrefaction*. Though when thus hardened, water poured on it, or even the common dew, will ſoon ſet it a putrefying.

By ſuch means, bread, fleſh, or the like foods, may be preſerved for many ages; provided regard be had to the place. Hence it is that in dry countries, as Egypt, dead carcaſes never putrefy, but dry and harden uncorrupted: as we ſee alſo in the mummies found buried under the ſand.

Even human blood, which, naturally, is ſo prone to *putrefaction*, if you deprive it of its watery part, may be kept for fifty years. Goat's blood, we actually find kept ſo long in the ſhops, without corrupting; though, if you diſſolve it in water, and expoſe it to a gentle warmth, it will putrefy immediately. See BLOOD.

In *putrefaction* there is a great inteſtine motion, which, when carried to an extreme, and when the putrefying ſubſtance is much compreſſed, is accompanied with heat and ſmoke, and ſometimes flame. However, M. Beaumé affirms, that *putrefaction* is not attended with any ſenſible heat: when, indeed, it proceeds ſlowly, and the quantity of putrefying matter is but ſmall, the heat, if any, is very little. That putreſcent ſubſtances emit light, is an unqueſtionable fact; and on this principle philoſophers account for the *luminouſneſs* of the SEA, the IGNIS *fatuus*, &c. To this purpoſe M. Ant. Martin (Swed. Abhad. vol. xxiii. p. 225, cited by Dr. Prieſtley, in his Hiſtory of Light, &c. p. 576.) obſerves, that human bodies have ſometimes emitted light about the time they begin to putrefy; and that the walls and roof of a place in which dead bodies had often been expoſed, had a kind of dew or clammineſs upon them, which was ſometimes luminous. And he imagines that the lights which are ſaid to be ſeen in burying grounds, may be owing to this cauſe. It has been obſerved, that heat extinguiſhes the light of putreſcent ſubſtances; Mr. Canton, attending to this circumſtance in ſome experiments for aſcertaining the cauſe of the luminouſneſs of the ſea, remarks, that though the greateſt ſummer-heat is well known to promote *putrefaction*, yet twenty degrees more than that of the human blood ſeems to hinder it; for, putting a ſmall piece of luminous fiſh into a thin glaſs ball, he found that water of the heat of one hundred and eighteen degrees would extinguiſh its light in leſs than half a minute; but that on taking it out of the water, it would begin to recover its light in about ten ſeconds: but it was never afterwards ſo bright as before. See LIGHT.

The moſt ſudden and remarkable changes produced upon a body by *putrefaction*, are upon its colour, ſmell, and taſte. Fleſh beginning to putrefy, is well known to exhale very ſoon after a penetrating fœtid ſmell, its colour becomes livid and black, and its taſte nauſeous. Tranſparent liquor, as urine and broth, during *putrefaction*, becomes alſo turbid: as the *putrefaction* advances, the ſmell becomes more and more fœtid, and it alſo acquires great pungency, which is cauſed by a large quantity of volatile alkali, diſengaged from thoſe ſubſtances that are completely putrefied. Solid bodies, whilſt they are putrefying, ſwell, become ſoft, loſe the coheſion of their parts, and are laſtly reduced to a very diſagreeable liquor. Sir John Pringle has obſerved, that, as all the humours of all animal bodies become thinner by *putrefaction*, ſo the ſolid or fibrous parts are thereby relaxed, and rendered more tender: and hence the extraordinary bulk of the heart, liver, and ſpleen, incident to perſons labouring under putrid diſeaſes, may be accounted for. It is remarkable, that in diſſections of perſons who die of the plague, the heart is almoſt always found of an uncommon magnitude; and as to the ſcurvy, the liver and ſpleen are ſometimes enlarged to ſuch a degree, that the tumor may be ſeen outwardly.

From matters completely putrefied may be obtained by diſtillation volatile alkali, ſome liquid and ſome ſolid; a pungent fœtid oil, which at firſt is thin, and afterwards becomes more thick; and a reſiduum of coal, not eaſily reducible to aſhes. Some writers on this ſubject have apprehended, that putrid ſubſtances are not to be regarded as alkaline. Sir John Pringle, finding from the experiments which he made in the year 1750, that ſyrup of violets was not changed into a green colour by the ſerum of putrid blood; that this ſerum did not make any effervescence, when ſpirit of vitriol was poured upon it; that water, in which corrupted fleſh had been for ſome time infuſed, neither effervesced nor changed the colour of the ſyrup; and that alkaline ſalts, both fixed and volatile, powerfully oppoſe *putrefaction*; was led to adopt this opinion. But when he became acquainted with the experiments made by M. J. Bapt. Gaber of Turin (Acta Taurinenſ. vol. i. p. 78, &c.) he embraced with the liberality of a true philoſopher, the firſt opportunity of acknowledging his miſtake. M. Gaber, having poured a drop or two of aqua fortis upon bile, taken out of the gall bladder of a perſon who had died of an inveterate jaundice without a fever, and whoſe body had laid about twenty-four hours in a cold place in winter, found, that the mixture immediately effervesced, became ſenſibly warm, and that ſeveral air-bubbles roſe to the ſurface. He alſo expoſed the remainder of this bile in three open glaſſes to the thirty-fifth, twenty-fifth, and tenth degrees of heat, indicated by Reaumur's thermometer, and at the end of twenty-four hours mixed them with acids; and he found, that the bile which had been placed in a degree of heat anſwering to thirty-five, was moſt dilated, and gave very ſlight indications of effervescence; that which had ſtood in twenty-five was alſo dilated, and the acid produced a more ſenſible effervescence, but ſtill very ſlight; and the bile which had been expoſed only to the temperament of the air, varying from ſeven to ten, preſerved its tenacity, and fermented as much as that in his firſt experiment. Having mixed ſome blood, taken out of a vein of the dead body at the ſame time, and which appeared to be of the yellowiſh red, with ſpirit of nitre, the mixture effervesced, but in a much leſs degree than the bile: this mixture, being left to digeſt for ſome hours, a yellow ſerum ſeparated from the blood, and covered its whole ſurface; and the blood, being ſubjected to the ſame heat as the bile, and for the ſame time, appeared more diſpoſed to effervesce than the bile, though this diſpoſition afterwards gradually diminiſhed. From theſe experiments the ingenious writer infers, that in diſeaſed bodies the humours may become ſo alkaleſcent as to effervesce with acids: that a very ſlight degree of *putrefaction* and fœtor, which is not ſufficient to produce alkaleſcence out of the body, will produce it in the body; that alkali formed in the body, and contained in the bile, is extremely volatile, ſince the heat of twenty-five degrees made a great part of it evaporate; and that the ſame alkali contained in the blood, being a little more entangled with other elements, is conſequently leſs volatile, ſince the ſame degree of heat continued for the ſame time, diſſipated but a very inconſiderable part of it: and, therefore, that the different phenomena taken notice of by thoſe who have proſecuted experiments of this kind, ſome of whom affirm that they have ſeen undoubted proofs of the preſence of an alkali, and others that they have ſcarce diſcovered any ſuch indications at all, are the effects of different degrees of heat, the ſtaleneſs of the ſubſtance expoſed to the heat, or the different volatility of the alkali ariſing from its coheſion with other principles. Having made ſimilar experiments upon healthy bile, blood, and ſerum, and ſubmitted them to the action of mineral acids, he found the bile moſt diſpoſed to effervesce; that human bile was more diſpoſed to effervesce than the bile of an ox; that corrupt blood ferments with acids ſtill ſlower; and that ſerum ferments ſlower than blood. He alſo obſerved, that putreſcent humours not only efferveſce with mineral acids, but with very weak diſtilled vinegar: and that thoſe humours that have been expoſed to artificial heat, become fœtid and efferveſce ſooneſt, and ſooneſt arrive at the laſt ſtage of fermentation; in which caſe the fermentation ceaſes, though the heat is continued; and the ſmell, which till then is intolerably fœtid, becomes herbaceous, and is not diſagreeable. The fœtor, he ſays, manifeſts itſelf ſooner and laſts longer than the alkaleſcence.

M. Gaber farther obſerves, in relation to the experiments of ſir John Pringle, that at the degree of heat to which he expoſed putreſcent ſubſtances, and which was equal to the hundredth degree of Fahrenheit, correſponding nearly to the thirtieth degree of Reaumur, animal humours very ſoon become putrid; but that they as ſoon loſe the alkaleſcence which they derive from *putrefaction*, if this degree of heat is continued: ſo that as the corrupting humours manifeſt their alkaleſcent quality only for a very ſhort time, it might eaſily happen that no ſign of alkaleſcence appeared in his experiment, if it was not made in the critical moment, i. e. if he examined the putreſcent humours a little before the alkali was formed, or a little after it had evaporated. And he, therefore, apprehends, that if ſir John Pringle's experiments were made with a degree of heat juſt equal to his own, the reſult, *cæteris paribus*, muſt have been the ſame.

From other experiments this writer infers, that blood received from the arm, agitated and left to putrefy, does not putrefy ſo ſoon, nor no ſoon manifeſt ſigns of alkaleſcence, as the red part ſeparated from the ſerum, becauſe the ſerum putrefies more ſlowly than any other animal humour; and that the alkali, which evaporates with a degree of heat from twenty-five to twenty-eight of Reaumer, being collected in a receiver, will efferveſce, and that the reſiduum is a maſs extremely fœtid, wholly deſtitute of alkali, and, conſequently, that no efferveſcence is to be expected by pouring acids upon it. Having kept ſome blood in a glaſs veſſel cloſe ſtopped, he found that it retained its alkaleſcence a long time, though expoſed to a degree of heat equal to twenty-five; but upon unſtopping the veſſel, it flew off with great violence, in an extremely fœtid vapour. Theſe exploſions he attributes to the expanſion of the air, in conſequence of the *putrefaction*; and hence he deduces the reaſon, why the humours that are contained in the veſſels of a human body become alkaleſcent while they are yet ſcarce fœtid, although when drawn from the body, and kept in open veſſels, they become fœtid before they gives ſigns of alkaleſcence. As ſoon as they begin to form alkali in the veſſels, the alkali is retained; but as it exhales from veſſels expoſed to the air, a greater quantity muſt be formed than exhales before it can become ſenſible. Having collected the diſtilled liquor of blood in ſuch a ſtate of putreſcence as to efferveſce with acids, and expoſed it to the action of various acids, a violent efferveſcence enſued; and when poured upon ſyrup of violets, it produced as fine a green as ſpirit of hartſhorn; and this tincture, having been changed into a red by the effuſion of a few drops of aqua fortis, became again blue, upon pouring into it ſome more of the diſtilled liquor; whence he concludes, that putreſcent humours form a true alkali, which exhales with a very ſlight heat. From other experiments he infers, that the alkali of putreſcent ſubſtances is not the productive cauſe of their fœtor, becauſe the latter remains when the former is departed. But as both appear in the ſame degree of heat, when long continued, it appears, he ſays, that this fœtor is produced by the effluvia of parts extremely volatile, but different from volatile alkali, which, though ſooner produced, are more ſlowly diſſipated. Alkaleſcence, however, may be ſometimes connected with a ſlight fœtor; and, on the contrary, extreme fœtor may ſubſiſt without alkaleſcence. And this fact confirms the obſervation of ſir John Pringle, who found a difference between the fœtid and alkaline particles; ſince the exhalations of freſh urine are not pernicious, though they contain more alkali than any ſuſtance in a ſtate of *putrefaction*, the odour of which is pernicious in the higheſt degree; and therefore, putrid effluvia are of a different nature from alkaline ſalts. M. Gaber farther adds, by way of inference from this fact, that a volatile alkali is not a neceſſary product of *putrefaction*, and that the degree of alkaleſcence is not equal to that of *putrefaction*. Dr. Crell, profeſſor of chemiſtry at Brunſwick, has objected to this doctrine, as not conformable to the phenomena (Phil. Tranſ. vol. lxi. part i. art 39.), for he ſuppoſes, that as all ſmell depends on a ſaline matter joined with phlogiſton, and the ſaline matter producing the putrid ſtench was very probably not an acid, it muſt be a volatile alkali, which, involved in phlogiſtic matter, might fly off before the alkali was developed. From ſome experiments made with a view of aſcertaining this fact, he infers that the volatile alkali is preſent as long, at leaſt, as the putrid ſmell continues, and that this volatile alkali is the baſis of it; becauſe, as this was diſtilled over, in his experiments, the reſidue, being ſtill in inteſtine motion, acquired only the herbaceous ſmell. The reaſon why the volatile alkali has been diſtinctly obſerved at a certain period of *putrefaction*, and not in the other, he apprehends to be this: the volatile alkali has, it ſeems, a tendency to diſentangle itſelf, by inteſtine motion, of all ſuch matter as it is involved with; but if it is not combined with ſuch fixed matter as retains it till it has gone through all its evolutions, it is, being itſelf volatile, carried off by the ſtill more volatile phlogiſtic matter with which it is commonly joined. For this reaſon, he ſuppoſes, the putrefying matter ſhews in its beginning no ſign of volatile alkali, becauſe its ſmell depends only on thoſe particles, which have been on the ſurface, without any ſtrong coheſion with the ſubſtance. In the farther progreſs of *putrefaction*, the matter involving the alkali, or forming it, is intermixed, and in coheſion with the ſolid particles of the ſubſtance, and is by theſe means retained till the alkali is come to its purer ſtate. Towards the end of *putrefaction*, the coheſion of the particles being almoſt entirely taken off, the volatile alkali is carried off before it can go through all its ſtates.

Dr. Macbride made ſeveral experiments with putrid blood and putrid bile, which aſcertain the fact, that as ſoon as an animal ſubſtance begins to putrefy, it begins to diſcover an alkaline quality; and this volatile matter, now produced in it, may be ſeparated by diſtillation in a very gentle warmth; but he obſerves, that the volatile alkali obtained from putrid ſubſtances is not exactly ſimilar to that obtained by violent heat from animal ſubſtances not putrid. It differs remarkably in the flavour, which is nauſeous and diſagreeable, is not ſo pungent, and is much weaker than the common volatile alkali; and this latter is capable of diſpoſſeſſing the putrid alkali, and of driving it off from any body to which it has been united. But to return from this digreſſion. As to the cauſe and proceſs of *putrefaction*, it has been generally believed, that the contact of atmoſpherical air is neceſſary for this purpoſe, and that bodies become putrid, becauſe air communicates ſomewhat to them: accordingly it has been alledged, that bodies buried deep under earth or in water, out of the reach of any air, have remained entire for ages; which, when expoſed to the open air, have ſoon rotted and mouldered away. It is alſo well known, that bodies are preſerved from *putrefaction* by covering them with wax, ſuet, &c. and Mr. Boyle relates, that he has preſerved lemons, oranges and other fruits, from *putrefaction*, during ſeveral years, by including them in an exhauſted receiver. Experiments of the ſame kind have been lately made by M. Eller of Berlin, which ſhew that ſubſtances, even of the moſt putreſcent nature (ſuch as blood) may be kept ſound *in vacuo* for many years. But Dr. Macbride has urged a variety of facts and conſiderations to prove, that *putrefaction* enſues in conſequence of the loſs of ſome principle, which cemented the conſtituent particles or bodies, and that, when this is diſengaged from them, they ſeparate, and are diſunited. This principle he diſcovered to be air, which, in *putrefaction* and fermentation, is extricated and thrown off, from a fixed and non-elaſtic ſtate, into one that is volatile and elaſtic; but which immediately, upon meeting with a proper recipient, returns again to its former nature. Thus he found, that cauſtic alkali and quicklime may be rendered mild by abſorbing this air, extricated from putrefying and fermenting ſubſtances; that without the extrication of this air no *putrefaction* can happen; and that even by abſorption of it, putrefied ſubſtances may be corrected and rendered ſweet. To the ſame purpoſe Dr. Alexander has endeavoured to prove, that putrid matter will preſerve other ſubſtances from *putrefaction*; which is not improbable, becauſe, being already ſaturated with the putrid effluvium, they cannot readily take any more. Dr. Macbride, having expoſed putrid matters to the vapours ariſing from fermenting mixtures, or from alkaline ſubſtances efferveſcing with acids, found that the putrid quality was deſtroyed; and hence he conſiders the fixed air as powerfully antiſeptic. And it appears alſo from the experiments of Dr. Prieſtley, that fixed air corrects and renders wholeſome air tainted with reſpiration or *putrefactian*. Hence he infers, that lime-kilns, which diſcharge great quantities of this air, may be wholeſome in the neighbourhood of populous towns, the atmoſphere of which muſt abound with putrid effluvia. Sir William Lee, in a hot ſeaſon, contrived, by impregnating water with fixed air, in the manner deſcribed under PYRMONT *water*, and waſhing meat with it two or three times a-day, not only to preſerve it as perfectly ſweet and good to the extent of ten days, as at the firſt killing, but alſo to recover ſome meat that had begun to change. And it is farther well known, that fixed air has been lately introduced into the materia medica, and adminiſtered with ſucceſs in a variety of putrid caſes. Dr. Macbride has alſo proved, that *putrefaction* is accelerated by taking off the preſſure of the atmoſphere; and from ſome experiments, he was led to conclude, that it will take place ſooner *in vacuo* than in the open air; but making a more complete vacuum by means of two braſs hemiſpheres joined together, he found that the obſervation of Mr. Boyle and others was agreeable to fact. It appeared alſo, by incloſing fleſh in condenſed air, that increaſing the preſſure of the ſurrounded air, retarded *putrefaction*; and hence he deduces, what he deems to be a demonſtrative proof, that bodies do not putrefy, becauſe the air adds ſomewhat to them; for if they did, then a piece of fleſh which lay in condenſed air ought to have putrefied the ſooneſt, becauſe it had the greateſt quantity of air applied to its ſurface. But the reaſon why, according to his ſyſtem, condenſed air prevents *putrefaction* is, that the preſſure of every ſide muſt force the conſtituent particles cloſer together, thus increaſe their coheſion, and prevent the inteſtine motion; and without inteſtine motion there can be no change of combination. However, it is obſerved by ſir John Pringle, that the *putrefaction* of meat and other ſubſtances, advances quicker in a confined than free air; for as the moſt putrid parts are alſo the moſt fugitive, they inceſſantly iſſue from a corruptible ſubſtance, and diſperſe with the wind; but in a ſtagnation of air they remain about the body, and, in the nature of a ferment, excite its corruption.

It has been long obſerved, that *putrefaction* generates air. Hence, though fleſh, as well as blood, be ſpecifically heavier than water, yet dead bodies are found to float, after lying ſome time at the bottom, from air generated in the bowels by *putrefaction*. And ſince it has been found by experiments, that the blood and other animal ſubſtances begin to emit air before they are ſo far corrupted, as they frequently are in putrid diſeaſes, it is probable that ſeveral of the ſymptoms in deep ſurfeits may be owing to the action of the confined air. As dead bodies become putrid from the loſs of their fixed air, according to Dr. Macbride's theory, he ſuggeſts, that the immediate cauſe of *putrefaction* in living bodies may be the detachment of too large a proportion of their fixed air. This fact he endeavours to evince by an enumeration of the ſymptoms that occur in the ſcurvy, and other highly putrid diſeaſes, which ſhew that the air is actually detached from the blood in ſuch caſes; as well as from an examination of the principal and prevailing cauſes of ſuch diſorders. And ſince the air tainted with animal or vegetable *putrefaction* is the ſame with air rendered noxious by animal reſpiration; ſince both equally extinguiſh flame, are equally noxious to animals, are equally and in the ſame way offenſive to the ſmell, equally precipitate lime in lime water, and are reſtored by the ſame means (ſee *Phlogiſticated* AIR), Dr. Prieſtley ſuggeſts, that one uſe of the lungs is to carry off the putrid effluvia, without which, perhaps, a living body might putrefy as ſoon as a dead one. See BLOOD and RESPIRATION.

We ſhall here obſerve, that putrefying and fermenting ſubſtances have been found, by the experiments of Mr. Cavendiſh, Dr. Prieſtley, &c. to yield not only *fixed* but *inflammable* AIR. From an experiment of Dr. Prieſtley, intended to determine the proportion of each of the kinds of air, in the different ſtages of the putrefactive proceſs, it appears that a piece of mutton weighing four pennyweights ſix grains, yielded in all $2\frac{11}{24}$ meaſures of air, of which $2\frac{15}{108}$ was fixed, and the reſt inflammable; and that all the inflammable part was exhauſted a conſiderable time before the fixed air. The ſame ingenious writer has obſerved, that the diminution of common air, by means of *putrefaction*, amounts to a complete fourth part of the whole, notwithſtanding the production of ſome permanent air from the putrefying ſubſtance, and has, in all reſpects, the appearance of being produced ſolely by the precipitation of fixed air. It muſt occur to every reader, in any way acquainted with this ſubject, that if inflammable air be the ſame with PHLOGISTON, as Dr. Prieſtley ſeems lately to have diſcovered, many of the phenomena of *putrefaction*, depending on this principle, ſuch as the ſmell, colour, light, &c. will probably from hence admit of an eaſy explication.

Putrefaction is one of the inſtruments in nature by which many great changes are brought about. In the proceſs of vegetable *putrefaction*, if we throw together any of the tender, green, and ſucculent parts of recent vegetables, whether acid or alkaline, in a large heap; in the warm open air, and preſs them down with an additional weight, if their own be inconſiderable; the middle part of the heap will, in a little time, ſpontaneouſly conceive a ſmall degree of heat, and paſs ſucceſſively through the other degrees, till it arrive at a ſtate of ebullition, and be perfectly putrefied.

In the ſpace of three days, from the firſt putting them together, they will yield a heat, perceivable by the hand, equal to that of a human body in a healthy ſtate; by the fifth, the heat will be too great for the hand to bear without pain; and, laſtly, by the ſixth, ſeventh, or eighth day, the juices will generally appear ready to boil; and ſometimes the matter will even flame, and burn away.

By this ſpontaneous operation, the vegetable acquires an abominably putrid, ſtercoraceous, or cadaverous, taſte and odour; and turns entirely into one ſoft, ſimilar, pulpy maſs, or craſſamentum, greatly reſembling fœtid human excrements in the ſcent, and putrefied fleſh in the taſte.

If now this fœtid matter, thus obtained, be directly, whilſt it remains in its fœtid ſtate, committed to a glaſs retort, and diſtilled with proper degrees of fire, there will come over, 1. A water impregnated with an urinous ſpirit, perfectly like that obtainable from animal ſubjects, and ſeparable by a freſh diſtillation ſlowly made in a tall glaſs, into elementary water, and a large quantity of pure, white, volatile, dry, alkaline ſalt, not to be diſtinguiſhed from animal ſalts. 2. A volatile, alkaline, oily ſalt, that ſhoots into globes. 3. An exceedingly volatile and thick fœtid oil, both which are entirely like thoſe of animals. And, laſtly, the remainder, being calcined in an open fire, affords not the leaſt particle of fixt ſalt; juſt as if the ſubject had really been of the animal, and not of the vegetable kingdom.

This proceſs is truly univerſal, and holds equally in all kinds of vegetables, though ever ſo different in their nature and virtue.

Experiments have been made in the coldeſt and moſt ſucculent, or watery, plants; ſuch as purſlane, ſorrel, &c. as well as with the hotteſt or moſt acrimonious, ſuch as the ſpurges, &c. and it was always found to ſucceed; but that the ſooner, as the vegetable employed contained the greater quantity of oil; though with the ſame phenomena.

It will likewiſe ſucceed with dry vegetables, provided they be moiſtened with water before they are thrown into heaps; and thus we ſometimes ſee, that ſtacks of hay will ſpontaneouſly take fire, and burn away; eſpecially if the hay was not well dried in the making.

It is ſurpriſing to conſider, that, by this means, the difference betwixt vegetables may be entirely taken away, and the whole kingdom thereof reduced to the ſame common nature; ſo that wormwood and tanſy, for inſtance, or ſorrel and ſcurvy-graſs, ſhall appear as one and the ſame thing; and this thing appear no otherwiſe than like putrefied fleſh.

Though ſorrel be famed for its power of preſerving the animal fluids uncorrupted whilſt they are circulating in the body, and ſcordium, for its embalming virtue, as continuing them in a ſtate of incorruption after death; yet even theſe plants are themſelves thus eaſily corrupted and changed into ſuch a kind of putrefied fleſh, as it is their virtue to prevent.

This Boerhaave conſiders as a general law of nature, wiſely eſtabliſhed to produce wonderful changes in the world, and to prevent the inaction and decreaſe of matter in our globe; this active principle, or medium, giving an eaſy and reciprocal tranſition of vegetable into animal ſubſtances, and of animal into vegetable.

This operation may let us a little into the nature of animal DIGESTION, or the change which the aliment ſuffers in the human body. For the change our vegetable foods undergo in the body, being ſuch as brings them to be of the ſame nature, and to afford the ſame principles, with the change induced by *putrefaction*, is a preſumption, that digeſtion is nothing elſe. Beſides, as we know that neither animal nor vegetable ſubſtances can become aliment, without undergoing ſome degree of *putrefaction*, many diſtempers muſt proceed from a deficiency of this action; the criſis of fevers ſeems to depend upon it; and even animal heat, according to Dr. Stevenſon, does the ſame.

Now, that the concoction of the humours is nothing elſe but *putrefaction*, ſeems probable from hence, that whenever they are in that ſtate, they are always more fluid, and fitter to paſs through the ſmaller veſſels, where they ſtagnated before. Again, the offenſiveneſs of the ſweats, or other excretions conſequent on a criſis, is likewiſe a ſure ſign of a high degree of corruption. The time of reſolution or *putrefaction* depends on the degree of heat, the habit of the patient, and on the part obſtucted. Reſolution is the *putrefaction* of the impacted humour only, but ſuppuration implies a corruption of the veſſels alſo. This manner of ſpeaking, indeed, has been diſuſed, from the prejudice that nothing was putrid but what was offenſively ſo; whereas, in fact, every fibre becoming more tender, and humour thinner, may be conſidered as putrid in ſome degree, whether the change tends to the better health, or to the deſtruction of the perſon, or weather it becomes grateful or offenſive to the ſenſes.

Mr. Boyle has uſed the words *fermentation* and *putrefaction* of the blood promiſcouſly, in his Treatiſe on the Human blood. Stahl and other celebrated chemiſts likewiſe uſe the term *putrid* FERMENT.

It is, therefore, juſtly obſerved by lord Bacon (Nat. Hiſt. Cent. iv.) that an enquiry into the means of preventing or ſtaying *putrefaction* is of excellent uſe in phyſic. Sir John Pringle has made many curious experiments with a view of determining the power of certain ſubſtances to promote or to prevent *putrefaction*, together with remarks on this ſubject, which are publiſhed in the Phil. Tranſ. vol. xlvi. p. 480, 525, 550, and by way of appendix to his Obſervations on the Diſeaſes of the Army. From the experiments of this learned and judicious phyſician, it appears, that ſalts of every kind, whether acid, alkaline, or neutral, fixed or volatile, as well as the aſtringent and gummy-reſinous part of vegetables, all of them reſiſt and moſt of them correct *putrefaction*; and he purſued this branch of enquiry ſo far as to enable him to form a table ſhewing the comparative antiſeptic power of the ſeveral ſubſtances, that of ſea-ſalt being the ſtandard. See this table under the article ANTISEPTIC.

Of all reſinous ſubſtances, he found that camphor reſiſted *putrefaction* moſt powerfully; its antiſeptic power being three hundred times greater than that of ſea-ſalt. Decoctions of wheat, barley, and other farinaceous grains, checked *putrefaction*, by becoming ſour. He alſo made experiments to diſcover the effects of mixing vegetable with animal matters.

Two drams of raw beef, as much bread, and an ounce of water, being beat to the conſiſtence of pap, and expoſed to 90° of heat, according to Fahrenheit's thermometer, began to ferment in a few hours, and continued in a fermentation two days. When it began to ferment and ſwell, the *putrefaction* had begun; and in a few hours afterwards the ſmell was offenſive. Next day the putrid ſmell ſeaſed, and an acid taſte and ſmell ſucceeded. Freſh alimentary vegetables, as ſpinach, aſparagus, ſcurvy-graſs, produced ſimilar effects as bread on fleſh, but in a weaker degree. From ſeveral other experiments he found that animal ſubſtances excite the fermentation of vegetable ſubſtances; and that the latter ſubſtances correct the putreſcency of the former.

By adding ſaliva to a ſimilar mixture of fleſh, bread, and water, the fermentation was retarded, moderated, but rendered of twice the uſual duration, and the acid produced at laſt was weaker than when no ſaliva was uſed.

By adding an oily ſubſtance to the common mixture of fleſh, bread, and water, a ſtronger fermentation was produced, which could not be moderated by the quantity of ſaliva uſed in the former experiment, till ſome fixed alkaline ſalt was added, which ſalt was found, without ſaliva, to ſtop ſuddenly very high fermentations.

He did not find that ſmall quantities of the following ſalts, ſal ammoniac, nitre, vitriolated tartar, ſal diureticus, ſalt of hartſhorn, ſalt of wormwood, were ſeptic, as ſmall quantities of ſea-ſalt were.

Sugar was found to reſiſt *putrefaction* at firſt, as other ſalts do, and alſo to check the *putrefaction* after it had begun by its own fermentative quality, like bread and other fermentative vegetables.

Lime-water made ſome ſmall reſiſtance to *putrefaction*.

Port-wine, ſmall beer, infuſions of bitter vegetables, of bark, and the juce of antiſcorbutic plants, retarded the fermentation of mixtures of fleſh and bread. But an unſtrained decoction of bark conſiderably increaſed that fermentation.

Lime-water neither retarded nor haſtened the fermentation of ſuch a mixture; but when the fermentation ceaſed, the liquor was neither putrid nor acid, but ſmelt agreeably.

Fleſh pounded in a mortar was found to ferment ſooner than that which had not been bruiſed.

The tough inflammatory cruſt of blood was found to be moſt putreſcent, next to which the craſſamentum, or red coagulated maſs, and laſtly the ſerum.

The experiments of the author of the Eſſai pour ſervir à l'Hiſtoire de la *Putrefaction*, ſhew that metallic ſalts, reſinous powders, extracts of bark, and opium, are very powerfully antiſeptic, and that ſalts with earthy baſes are leſs antiſeptic than any other ſalts.

The ſame ingenious phyſician made ſome attemps towards the ſweetening of corrupted fleſh by means of mild ſubſtances. For this purpoſe he put a piece of putrid fleſh into an infuſion of chamomile flowers, which was renewed twice or thrice in as many days, and its ſweetneſs and firm texture were recovered. Several pieces of putred fleſh were alſo ſweetened by repeated affuſions of a ſtrong decoction of the bark; and he conſtantly obſerved, that not only the corrupted ſmell was removed, but a firmneſs reſtored to the fibres. The corrupt yolk of an egg, diluted with water, was ſweetened by mixing it with a ſtrong infuſion of chamomile flowers. He found alſo that decoctions of wormwood, of the bark, and infuſions of chamomile flowers, and of ſnake root, preſerved yolks of eggs for a longer time than water, even with the addition of a conſiderable quantity of ſea-ſalt; and that they were preſerved better by ſalt of hartſhorn than by four times its weight of ſea-ſalt. Ox-gall was kept for ſome time from *putrefaction* by ſmall quantities of ley of tarter, ſpirit of hartſhorn, crude ſal ammoniac, and the ſaline mixture; and ſtill longer by a decoction of wormwood, infuſion of chamomile flowers and of ſnake-root, and by ſolutions of myrrh, camphor, and ſalt of amber. The ſerum of human blood was preſerved by a decoction of the bark, and an infuſion of ſnake-root, as effectually as fleſh. See ANTISEPTIC.

For an account of ſir John Pringle's experiments and obſervations with reſpect to thoſe ſubjects that haſten or promote *putrefaction*, See SEPTICS.

Dr. Macbride's experiments confirm many of thoſe above related, eſpecially thoſe which ſhew that the fermentation of vegetable ſubſtances is increaſed by a mixture of animal or putreſcent matter, that the putreſcency of the latter is corrected by the fermentative quality of the former; and that the *putrefaction* and fermentation of mixtures of animal and vegetable ſubſtances were accelerated by additions of abſorbent earths and of Peruvain bark. He alſo found, that although unburnt calcareous earths were ſeptic, quicklime and lime-water prevented *putrefaction*, but that they deſtroyed or diſſolved the texture of fleſh.

From his experiments we learn alſo, that acids, even when greatly lowered, have a ſtrong degree of power to reſiſt *putrefaction*, and alſo to correct it; but that they deſtroy the texture of the ſubſtance whoſe ſoundneſs they were ſuppoſed to reſtore; that ſalts in general, by a property which is common to them all as ſalts, have the ſame power, but that they exceed the acids in their efficacy for correcting *putrefaction*; that fermenting and efferveſcent mixtures are the moſt powerful of all known antiſeptics; and, in general, that whatſoever hath a power to reſtrain the eſcape of the fixed air, or hinder the inteſtine motion, muſt of courſe prevent *putrefaction*; and that fixed air, when transferred from a ſound body to one that is putrid, appears to reſtore to that body the principle which has been deſtroyed or loſt.

Dr. Macbridge objects againſt the adminiſtration of acids in putrid diſeaſes, for the following reaſons; becauſe, if they came unchanged to the abſorbent veſſels, they would not admit of them, and if they did, they would be dangerous, and they are quite changed before they leave the primæ viæ. Dr. Crell (Phil. Tranſ. vol. lxi. part i. p. 340.) has applied to this reaſoning, and propoſed experiments to prove, that acids, though changed in the alimentary canal ſo far as not to efferveſce with alkalis, may, notwithſtanding, check *putrefaction*, and, therefore, that their uſe is of great conſequence, and ought not to be omitted in putrid diſeaſes.

With regard to the exhibition of alkalis, Dr. Macbridge obſerves, that the point is not yet ſatisfactorily ſettled. There can be no doubt of their power to reſiſt and correct *putrefaction* in dead bodies; but whether, upon the preſumption of this virtue, they can be given with propriety as antiſeptics, he adds, is not ſo clear. Dr. Crell affirms, that they can never be uſed in living bodies as antiſeptics; for, laying aſide their ſtimulating quality, which muſt prevent their uſe in moſt of the putrid diſeaſes, they would, he apprehends, increaſe the morbific matter, by being intimately mixed by circulation with phlogiſtic matter, which they find abundantly in ſuch bodies.

Aſtringents, ſays Dr. Macbride, prevent *putrefaction* very powerfully, but they have not the leaſt degree of efficacy in correcting it; and as antiſeptics they can be of importance only in thoſe caſes where, from extreme relaxation and reſolution of the ſolids, the diſſolved fluids are ſuffered to tranſude, and either form ſpots of different hues, or run off by actual hæmorrhage; and he apprehends, that acids act in thoſe caſes where they have been adminiſtered with ſucceſs, merely as aſtringents. The antiſeptic virtue of the gummy-reſinous vegetables, judging of their effect by that of the bark, appears to depend on their fermenting in the body, and parting with fixed air in the courſe of their fermentation, and throwing a great quantity of it into the blood; and attending to the things that prevent *putrefaction* in living bodies, we ſhall find that the dependence is on the quantity of air. Thus, vegetable food prevents the putrefactive diatheſis; and to the frequent uſe of freſh vegetables and ſugar, in the diet of the European nations, it is owing that putrid diſeaſes, or plagues, are now ſo uncommon. See *Putrid* FEVER. And what proves almoſt to a demonſtration the antiſeptic power of the fermentable ſubſtances is the cure of the *ſea*-SCURVY.

Dr. Crell diſagrees with the opinion of Dr. Macbride, that putrid diſeaſes may be cured with fermentable ſubſtances only; nor is he convinced that *putrefaction* depends only on the loſs of fixed air. This, he apprehends, is an effect rather than the cauſe of *putrefaction*. We ſhall here only add, that Dr. Macbride recommends in the putrid *yellow* FEVER of the Weſt Indies, to give the patient repeated doſes of the alkaline ſalts, in freſh lime juice, or the like, and to let it be ſwallowed during the efferveſcence; and to order the patient's drink to be ſomewhat of the higly fermentable kind; ſuch as the juice of the green ſugar-cane, diluted and acidulated with ſome of the recent ſour juices. The natives on the coaſt of Africa give in fevers of this kind, with good ſucceſs, a drink prepared by macerating in water a fruit of the plum kind, that grows there in great plenty. He adds, that by throwing in ſuch a quantity of antiſeptic vapour as would be furniſhed from this kind of materials, the putrefactive acrimony, which at firſt ſeems chiefly to affect the biliary ſyſtem, might be corrected and ſaturated. See on the ſubject of this article Dr. Macbride's Eſſays, 1776, paſſim.

PUTREFACTION *of water.* It is ſaid to be the peculiar quality of the Thames water, that it will ſtink and yet be wholeſome; and after this will recover itſelf again. Many ſailors have been obliged to drink it ſtinking, ſo that they held their noſes while they poured it down their throats, yet no ſickneſs enſued from it. It generates a ſort of ſpirit alſo in this ſtinking ſtate, which will take fire at the approach of a lighted candle as if ſpirit of wine were touched by the ſame.

It appears from the preceding article, that, though a volatile alkali may be obtained from putrid ſubſtances by diſtillation, ſuch ſubſtances muſt not be ſuffered to remain too long before they are diſtelled, unleſs they are kept in cloſe veſſels; becauſe the volatile alkali, which is the offspring of *putrefaction*, is diſſipated as faſt as it is generated, inſomuch that, at length, nothing is left behind but an inſipid water, or a ſolid matter, being an earth ſimilar to common mould. It is in this way, ſays Dr. Macbride, that ſtinking water, after ſome time, becomes ſweet: the volatile alkali, generated by the *putrefaction* of the animal and vegetable ſubſtances at firſt contained in the water, being, after a while, entirely diſſipated, leaves the remainder without any diſagreeable ſmell.

A method of preſerving water free from *putrefaction* was ſome years ſince propoſed by Dr. Alſton. It conſiſted in adding a quantity of lime to every caſk of water; and as lime is known to have a ſtrong antiſeptic property, water, as long as it retains the impregnation of lime, never putrefies. In order to free the water at the time of uſing it from the lime, Dr. Alſton propoſes the precipitation of the latter by throwing a quantity of magneſia alba, on this principle, that as lime-ſtone is rendered ſoluble in water by the deprivation of its fixed air, and has a greater affinity with that air than magneſia has, the particles of quicklime diſſolved in the water would attract the air from the magneſia, and thereby becoming no longer ſoluble, would fall to the bottom, and leave the water taſteleſs and fit for œconomical uſes. See LIME-*water* and MAGNESIA.

The expence, however, attending this proceſs prevented the execution of the propoſal. Mr. Henry has lately ſuggeſted a cheap and eaſily practicable method of precipitating the lime, and thus of reſtoring the water to its original taſte. The following is a ſhort ſketch on the author's proceſs. To preſerve the water from *putrefaction*, two pounds of good quicklime are directed to be added to each caſk of water of a hundred and twenty gallons. To free the water afterwards from the lime with which it has been impregnated, it is to be drawn off into a ſtrong caſk, containing about ſixty gallons, with an aperture at one end large enough to admit a veſſel, which is to be let down into it by means of ſtrings, and which contains a proper quantity of efferveſcent materials, that is, of marble or chalk, and vitriolic acid. Eight ounces of mild calcareous earth, and ſix ounces of ſtrong vitriolic acid, will be ſufficient for ſixty gallons of lime-water. The mouth of this laſt veſſel is to be ſtopped with a tubulated ſtopper, through which the fixed air, let looſe from the marble, paſſes up through the body of the water. The lime is thus rendered inſoluble, and is ſoon precipitated in the form of an inpalpable powder of chalk; the water being thus reſtored to the ſame ſtate of purity as when it was firſt ſhipped on board; or, as Mr. Henry believes, to a ſtate of ſtill greater purity; ſeveral hard waters having, in conſequence of this proceſs, been rendered as ſoft as rain-water, and freed from different impregnations. For farther particulars and the deſcription and drawing of an apparatus for this operation, ſee Henry's Account of a Method of preſerving Water at Sea, &c. p. 10, &c. 1781.

PUTRID, *putridus*, ſomething rotten, or putrefied. See PUTREFACTION.

Thus we ſay, *putrid* fleſh; a *putrid* humour; *putrid* limbs, i. e. mortified ones. are to be cut off.

PUTRID *ferment*. See FERMENT.

PUTRID *fever*. See FEVER.

PUTRID *ulcer*. Tee ULCER.

PUTTOCKS, or PUTTOCK-*ſhrouds*. otherwiſe called *futtock* or *foot-hook ſhrouds*, in a *Ship*, are ſmall ſhrouds which go from the ſhrouds of the main-maſt, fore-maſt, and mizen-maſt, to the top-maſt ſhrouds; and if there be any top gallent-maſt, there are *puttocks* to go from the top maſt ſhrouds into theſe. Theſe *puttocks* are at the bottom ſeized to a ſtaff, or to ſome rope which is ſeized to a plate of iron, or to a dead-man's eye, to which the lanniards of the fore-maſt ſhrouds do come. See SHROUDS.

PUTTY ſometimes denotes a white powder of lead and tin calcined together, in the proportion of two parts of lead to one of tin; uſed in poliſhing, and giving the laſt gloſs to works of iron and ſteel. This is alſo the baſis of white ENAMELS, and GLAZINGS for earthen ware.

PUTTY is alſo uſed to denote SPODIUM.

PUTTY, in its popular ſenſe, denotes a kind of paſte, compounded of whiting, with or without a little white lead, and linſeed oil, beaten together to the conſiſtence of a tough dough; uſed by glaziers for faſtening the ſquares of glaſs in ſaſh-windows. &c. and by painters, to ſtop up the crevices and clefts in timber and wainſcot, to prevent the wet from getting in, and ruining the work.

PUTURA, a cuſtom claimed by the keepers of Foreſts, and ſometimes by bailiffs of hundreds, to take man's meat, horſe's meat, and dog's meat, of the tenants and inhabitants, gratis, within the perambulation of the foreſt, hundred, &c.

Johannes clamat unam puturam *in prioratu de Penevoſtham, qui eſt quædam cella abbatiæ de Eveſham. pro ſe & miniſtris equis & garcionibus ſuis, per unum diem & duas noctes, de tribus ſeptimanis, in tres ſeptimanas,* viz. *de victualibus. ut & eſculentis & potulentis, ad coſtas prioratus prædicti indebite.* Placit. apud Præſton. 17 Edw. III.

This cuſtom, within the liberty of Knareſburg, was long ſince turned into the payment of four pence, *pro putura*.

The land ſubject to this ſervice is called *terra puturata*.

The learned Somner has erred in his expoſition of this word.

PUWAKHAGA, in *Botany*, the name by which ſome authors call the faufel-tree, of whoſe fruit the expreſſed juice called *terra Japonica*, or Japan earth, is made.

PYANEPSIA, Πυανεψια, in *Antiquity*, a feaſt celebrated by the Athenians in the month *Pyanepſion*; which, according to the generality of the crities, correſponded to our September.

Plutarch refers the inſtitution of this feaſt to Theſeus; who, at his arrival from Crete, made a kind of ſacrafice to Apollo of all the proviſions remaining in his veſſel; putting them all into a kettle, boiling them together, and eating them with his ſix companions; which cuſtom was afterwards continued. The ſcholiaſt of Ariſtophanes ſays, this was done to acquit himſelf of a vow he made to Apollo in a tempeſt.

M. Baudelot writes the word *Puanepſia*, and takes it to be a feaſt inſtituted in memory of Theſeus's return after killing the Minotaur.

The Greeks vary as to the origin and ſignification of the word *Pyanepſion*, whence the feaſt is denominated. Harpocration calls it *Pæanoptia*; he adds, that others call it *Panopſia*, becauſe then the fruits all appear to the eye. Heſychius writes *Pyanepſia*; and derives it from πυανον, *bean*, and εψω, *coquo*; becauſe in this feaſt the Athenians gathered their beans, and made a kind of broth of them.

PYANEPSION, Πυανεψιων, in the Athenian *Chronology*, a month of thirty days, in which the feſtival PYANEPSIA was celebrated, and called by the Bæotians DAMATRIUS.

PYCIELT, in *Botany*, a name given by Hernandez, and ſome other authors, to peculiar ſpecies of tobacco, diſtinguiſhed by Mr. Tournefort by the name of *nicotiana major lato et rotundo folio*, the broad roundiſh leaved great TOBACCO.

PYCNI, πυκνοι, in the *Ancient Muſic*, was uſed for ſuch ſounds or chords of a tetrachord as might enter the ſpiſſum, or ϖυκνον.

Theſe were the hypatæ, the parypatæ, and the lichani, of the ſeveral tetrachords. The hypatæ were called *barypycni*, βαρυπυκνει; the parypatæ *meſopycni*, μεσοπυκνει; and the lichani *oxypycni*; οξυϖυκνοι; becauſe the firſt were the loweſt notes; the ſecond, the middle notes; and the third, the higheſt of the ſpiſſum. Such chords as could never enter the ſpiſſum were called *apycni*, αϖυκνοι, υπατοειδεις, παρυπατοειδεις, λιχανοειδεις.

Hence, in the Greek ſcale or diagram, containing eighteen chords, there were five *barypycni* as many *meſopycni*, and an equal number of *oxypycni*, together with three *apycni*. The *apycni* and *barypycni* were ſtabiles or fixed chords; but the *meſopycni* and *oxypycni* were moveable, or mobiles. See DIAGRAM.

PYCNON, πυκνον, in the *Ancient Muſic*. See SPISSUM.

PYCNOSTYLE, πυκνοϛυλος, formed from πυκνος, *cloſe*, and ϛυλος, *column*, in the *Ancient Architecture*, a building where the columns ſtand very cloſe to one another; one diameter and a half of the column being allowed for the intercolumnation. See *Tab. Architecture*, *fig.* 40. *lit.* A.

The *pycnoſtyle* is the ſmalleſt of all the intercolumnations mentioned by Vitruvius. Some make it the ſame with *ſyſtyle*; others diſtinguiſh the latter by its allowing half a module more in the Corinthian intercolumnation.

The *pycnoſtyle*, Mr. Evelyn obſerves, chiefly belonged to the Compoſite order, and was uſed before the moſt magnificent buildings; as, at preſent, in the peryſtyle of St. Peter's at Rome, conſiſting of near three hundred columns; and ſuch as yet remain of the ancients among the late diſcovered ruins of Palmyra.

PYCNOTICS, *incraſſants*, or medicines of an aqueous nature, which have the faculty of coolling and condenſing, or thickening, the humours.

The word, in its original Greek, ϖυκνωτικον, ſignifies ſomething that has the power of thickening.

Purſlain, the nenuphar or water-lily, ſolanum, &c. are ranked among *pycnotics*.

PYE, in Engliſh *Antiquity*. See PICA.

PYE, in *Mechanics*. See CRAB.

PYE, in *Ornithology*. See PICÆ.

PYE, *ſea*. See PICA *marina*.

PYGAIA, in the *Materia Medica*, a name by which ſome authors have called the IPECACUANHA, or vomiting Indian root.

PYGARGITES, in *Natural Hiſtory*, a name given by Pliny and ſome other of the old writers to the eagle-ſtone, when it was variegated with white, in the manner of the tail of the eagle called *pygargus*.

PYGARGUS, a ſpecies of eagle, called alſo by ſome authors *albiulla*, and *hinnularia*. Linnæus has claſſed this bird among the vultures, calling it the *vultur albiulla*, becauſe its bill is rather ſtraighter than is uſual in the eagle; but Mr. Pennant obſerves, that it can have no claim to be ranked with that genus, becauſe the *pygargus* is wholly feathered; whereas the characteriſtic mark of the vulture is, that the head and neck are either quite bare, or only covered with down.

It is a large and fierce bird, of the ſize of the common turkey; its beak is yellow, and covered with a yellow membrane at its baſe; it has large hazel-coloured eyes; its feet are yellow, and its claws extremely ſtrong and ſharp; the head is white, and there are no feathers, but ſome fine hairs between the eyes and noſtrils; the upper part of the neck is of a reddiſh brown, and the rump black; all the body beſides this is of an obſcure ruſt colour, and its wings are partly black, partly grey; its tail is long, and the upper half of it is white, and the reſt black. It is from this white part that it has its name *albiulla*. The male is of a darker colour than the female. This bird inhabits Scotland and the Orkneys, and feeds on fiſh as well as on land animals.

Authors who have written on this ſubject ſeem not at all agreed to call the ſame bird by this name. The *pygargus* of Aldrovand ſeems different from this, and the *pygargus prior* of Bellonius ſeems no other than the male of that kind of hawk, called in Engliſh the *hen-harrier*.

Mr. Willughby imagines his firſt *pygarus*, p. 61, to be only a variety of the *white-tailed* EAGLE, having the ſame characteriſtic mark, and differing only in the pale colour of the head.

PYGARGUS *accipiter*, in *Ornithology*, a name by which many authors have called the ſubbuteo, a bird of the hawk kind; the male of which is called in Engliſh the HEN-HARRIER, and the female ſuppoſed by ſome to be the RINGTAIL.

PYGME, ϖυγμη, the length, or extent, between the elbow, and extremity of the hand, the fiſt being ſhut; called alſo a CUBIT.

PYGMY, *pygmæus*, ϖυγμαιος, formed of ϖυγμη, *cubit*, a DWARF, or perſon of exceeding ſmall ſtature, not exceeding a cubit in height.

The appellation is given among the ancients to a fabulous nation, ſaid to have inhabited Thrace; who generated and brought forth young at five years of age, and were old at eight; famous for the bloody war they waged with the cranes.

PYKER, or PYCAR, in our *Writers*, a ſmall ſhip or herring boat.

PYLÆA, ϖυλαια, in *Antiquity*, a name given to the aſſembly of the Amphictyons, as well when they met at Delphi as at Thermopylæ. The concourſe of people at theſe aſſemblies was ſo great, that the term *pylæa* came to be uſed for any very numerous aſſembly, or croud of people. Mem. Acad. Inſcr. vol. iv. p. 287. 290.

PYLAGORÆ, Πυλαγορες, in *Antiquity*, a name given to the AMPHICTYONS, becauſe they aſſembled at Thermopylæ, or Pylæ.

PYLING *the ground for foundations*. See FOUNDATION, and PALLIFICATION.

PYLORIC *artery*, in *Anatomy*, is a branch of the hepatic artery, which is ramified on the PYLORUS, and having diſtributed branches to the neighbouring parts of the ſtomach, which communicate with thoſe of the right gaſtrica, it terminates in the pylorus, by an anaſtomoſis with the coronary artery of the ſtomach.

PYLORIC *vein*, in *Anatomy*, is a branch from the vena portæ inferior; ſometimes it is only a branch of the right gaſtrica. It paſſes over the PYLORUS to the ſhort arch of the ſtomach, where it is joined by anaſtomoſis with the coronaria ventriculi.

PYLORUS, ϖυλωρος, primarily ſignifying *janitor*, or *door-keeper*, in *Anatomy*, the right and lower orifice of the STOMACH, whereby it diſcharges itſelf into the INTESTINES. See *Tab. Anat.* (*Splanch.*) *fig.* 2. *litt. c*, *e*.

The *pylorus* is ſituate on the right-ſide of the ſtomach, and paſſes by an oblique aſcent, to the duodenum, to prevent the too precipitate paſſage of the aliment out of the ſtomach.

For this end it is likewiſe furniſhed with an extraordinary ſeries of fibres, to conſtringe it more than any other part: theſe, running around it, ſerve as a kind of ſphincter, which is opened by the contraction of the ſtomach, and the appulſe of the chyle.

At the bottom of the *pylorus* is a large cavity, which Willis calls ANTRUM *pylori*.

Kerkring gives us an account from his own knowledge of the entire ſtoppage of this part, by a Dutch ſtiver accidentally ſwallowed, the conſequences of which was the death of the patient in a few days. On the other hand, he mentions an inſtance of another perſon's ſwallowing a copper coin, which, without any other effect than violent nauſeas and ſickneſs, was, at the end of about a month, diſcharged by purges; but ſo corroded by the juices of the ſtomach, that it was ſcarce to be known, all the letters and marks being eaten down to the ſame common ſurface on both ſides.

PYNANG, in *Botany*, a name by which ſome authors call the fauſel, or ARECA-*tree*; a kind of palm, from the expreſſed juice of which the drug commonly, but improperly, called JAPAN-*earth* is made.

PYONY *water*. See WATER.

PYRACANTHA, in *Botany*, a name given by ſome authors to the lycium, or BOX *thorn*.

PYRÆIA, or PYRETHEA, among the *Eaſtern Nations of Antiquity*, were great incloſures uncovered, and dedicated to the ſun, in which a perpetual fire was kept up in honour of this luminary, which was worſhipped by moſt of them. See CHAMANIM.

PYRALIS, the *fire-fly*, a name given by authors to a ſuppoſed inſect, which they ſay is produced in the violent fires of the glaſs and metal furnaces. Plin. lib. ii. chap. xxxvi.

PYRAMID, ϖυραμις, in *Geometry*, a ſolid ſtanding on a ſquare, triangular, or polygonal baſis, and terminating at top in a point; or a body whoſe baſe is a regular rectilinear figure, and whoſe ſides are plain triangles; their ſeveral vertices meeting together in one point.

Euclid defines it a ſolid figure, conſiſting of ſeveral triangles whoſe baſes are all in the ſame plane, and have one common vertex.

Wolfius defines it a ſolid, bounded by as many triangles, A D C, D C B, and A D B, terminating in one point D, as the baſe A B C has ſides. *Tab.* III. *Geometry*, *fig.* 75.

The *pyramid* is ſaid to be *triangular*, *quadrangular*, *quinquangular*, &c. according as the baſe is triangular, quadrangular, &c. The *pyramid* may be called a ſquare, triangular, &c. cone; or the cone a round *pyramid*.

PYRAMID, *properties of the*. 1. All *pyramids* and cones ſtanding on the ſame baſe, and having the ſame altitude, are demonſtrated to be equal.

2. A triangular *pyramid* is the third part of a priſm, ſtanding on the ſame baſe, and of the ſame altitude.

3. Hence, ſince every multangular may be divided into triangulars, every *pyramid* is the third part of a priſm, ſtanding on the ſame baſis, and of the ſame altitude.

4. If a *pyramid* be cut by a plane *a b c*, parallel to its baſe ABC, the former plane, or baſe, will be ſimilar to the latter.

5. All *pyramids*, priſms, cylinders, &c. are in a ratio compounded of their baſes and altitudes: baſes, therefore, being equal, they are in proportion to their altitudes; and the altitudes being equal, they are in proportion to their baſes.

6. Similar *pyramids*, priſms, cylinders, cones, &c. are in a triplicate ratio of their homologous ſides.

7. Equal *pyramids*, &c. reciprocate their baſes and altitudes; i. e. the altitude of the one is to that of the other, as the baſe of this to the baſe of that.

8. A ſphere is equal to a *pyramid*, whoſe baſe is equal to the ſurface, and its height to the radius of the ſphere.

Pyramid, *to meaſure the ſurface and ſolidity of a.* Find the ſolidity of a priſm that has the ſame baſe and height with the given *pyramid.* And divide this by three; the quotient will be the ſolidity of the *pyramid.*

Suppoſe, v. gr. the ſolidity of the priſm be found 67010328, the ſolidity of the *pyramid* will be thus found 22336776.

The ſurface of a *pyramid* is had, by finding the areas, both of a baſe ABC, and of the lateral triangles ACD, CBD, DBA. See Triangles. The ſum of theſe is the area of the *pyramid.*

The external ſurface of a right *pyramid*, ſtanding on a regular polygonal baſe, is equal to the altitude of one of the triangles which compoſe it, multiplied by the whole circumference of the baſe of the *pyramid.*

Pyramid *on a plane, to deſcribe a.* 1. Draw the baſe, v. g. the triangle ABC (if the *pyramid* required be triangular); ſo as that the ſide AB, ſuppoſed to be turned behind, be not expreſſed. 2. On AC and CB, conſtruct the triangles ADC, and CDB, meeting in any aſſumed or determined point, v. gr. D; and draw AD, CD, BD; then will ADBC be a triangular *pyramid.*

Pyramid *of paſteboard,* &c. *to conſtruct a,* Suppoſe v. g. a triangular *pyramid* required. 1. With the radius AB deſcribe an arc BE (*fig.* 76.); and to this arc apply three equal chords, BC, CD, and DE. 2. On CD conſtruct an equilateral triangle DFC, and draw the right lines AD, and AC. This paſteboard, &c. being cut off by the contour of the figure, what remains within will turn up into a *pyramid.*

Pyramid, *truncated.* See Truncated.

Pyramid, *fruſtum of a.* See Frustum.

Pyramid, in *Architecture*, denotes a ſolid, maſſive edifice; which, from a ſquare, triangular, or other baſe, riſes diminiſhing to a point, or vertex.

Some derive the word from πυρος, *wheat*, and αμαω, *colligo*; pretending that the firſt *pyramids* were built by the patriarch Joſeph, for granaries. But Villalpandus, with much better reaſon, derives the word from πυρ, *fire*; becauſe of their ending in a point like flame.

When they are very narrow at bottom, i. e. their baſe very ſmall, they are called OBELISKS, and *needles.*

Pyramids are ſometimes erected to preſerve the memory of ſingular events, and, ſometimes, to tranſmit to poſterity the glory and magnificence of princes; but, as they are the ſymbol of immortality, they are more commonly uſed as funeral monuments.

Such is that of Ceſtius at Rome, the mauſoleum of this diſtinguiſhed Roman, who was one of the ſeven officers called EPULONES, and is ſaid to have lived under Auguſtus, repaired in 1673, by Alexander VII. and thoſe other celebrated ones of Egypt, as famous for their ſize as their antiquity.

Theſe laſt are all ſquare in their baſes; and it is a thing that has been frequently propoſed, to eſtabliſh a fixed meaſure from them, to be thereby tranſmitted to poſterity. See their deſcriptions, meaſures, &c. in Thevenot, Pietro della Valle, Greaves, Pococke, Shaw, Perry, &c.

The *pyramids* of Egypt, comprehending the great and ſmall, are very numerous; of theſe there are about twenty of the largeſt ſize. The moſt remarkable are the three *pyramids* of Memphis, or, as they are now called, of Gheiſa or Gize. The dimenſions of the greateſt of theſe have been differently ſtated both by ancient and modern writers. Herodotus (lib. ii.) makes the baſe of it to be 800 feet long; Diodorus (lib. i.) 700; Strabo (lib. xvii.) leſs than 600; and Pliny (lib. xxxvi. cap. 12.) 883 feet. Among the moderns, Sandys found it to be 300 paces; Bellonius 324; Greaves 693 Engliſh feet; and Le Brun 770 feet. In order to reconcile theſe differences, Dr. Shaw obſerves, that none of the ſides of this *pyramid* are exactly upon a level; ſo that it is difficult to find a true horizontal baſe; beſides it is impoſſible to ſay how much the drifts of ſand, to which it is expoſed, may have been accumulated above the foundation of it; and, therefore, all calculations, depending upon the time and circumſtances of the ſituation, when they were made, muſt be exceedingly precarious. The perpendicular altitude of it, according to Greaves, is 499 feet; but its oblique height is equal to the breadth of the baſe, or 693 feet. The whole area of the baſe contains 480,249 ſquare feet, or $11\frac{1039}{43500}$ Engliſh acres. The aſcent to the top of the *pyramid* is by ſteps, the lowermoſt being near four feet high and three broad; the ſecond of the ſame dimenſions, but retiring inward from the firſt near three feet; and in the ſame manner the third row is placed upon the ſecond, and the reſt in the ſame order to the top, which terminates in a ſmall flat or ſquare; and they are ſo diſpoſed, that a line ſtretched from the bottom to the top would touch the angle of every ſtep. Theſe ſteps are called by Herodotus little altars, on account of their form; and their number has been variouſly aſſigned; Greaves ſtates them at 207. For a deſcription of the inſide of this *pyramid*, as well as for an account of the others, we muſt refer to Greaves, &c. *ubi infra.*

Dr. Shaw apprehends that neither of theſe *pyramids* was ever finiſhed, ſuppoſing that the ſteps already mentioned ſhould have been filled up with priſmatical ſtones, ſo that each ſide of the *pyramid* might be ſmooth and level, like that of Ceſtius at Rome. The ancients inform us, that the ſtones of the *pyramids* were brought from the mountains of Arabia, and Herodotus (lib. ii. cap. 124) has deſcribed the manner in which they were conveyed; but Dr. Shaw imagines that they were taken from the ſpot where they were employed; and he obſerves, that the greateſt of them, eſpecially, is not an entire heap of hewn ſtones, becauſe that portion of it, which lies below the horizontal ſection of the entrance, may probably be no more than an incruſtation of the natural rock on which it is founded. Dr. Bryant conjectures, that, like the SPHYNX, which ſtands directly in the front of the ſecond *pyramid*, they were immenſe rocks which ſtood upon the brow of the mountain; that the Egyptians caſed them over with large ſtones, and brought them by theſe means to a degree of ſymmetry and proportion. At the ſame time they filled up the unneceſſary interſtices with rubbiſh and mortar, and made chambers and apartments, as the intervals in the rock allowed, being obliged to humour the indirect turns and openings in the original maſs to execute what they propoſed. This he infers from the narrowneſs and unneceſſary ſloping of the paſſages, which are often very cloſe and ſteep, and alſo from the fewneſs of the rooms in a work of ſo immenſe a ſtructure. That the *pyramids* were built upon a rock in the place where they now ſtand, was ſuggeſted by Mr. Hooke. See Birch's Hiſt. Royal Society, vol. iv. p. 245.

It is very ſurpriſing, that the *pyramids*, which have been reckoned among the wonders of the world, ſhould not have perſerved a more certain æra, and tradition of the names of their founders. Pliny reckons a number of authors who have wrote concerning them; and all, he informs us, diſagree in their accounts of thoſe who built them. Some modern writers maintain that they were erected by the Iſraelites, under the tyranny of the Pharoahs, and alledge to this purpoſe the teſtimony of Joſephus, Antiq. lib. i. cap. 5.

According to the relations of Herodotus (lib. ii.) and Diodorous (lib. i.), the firſt *pyramid* was erected by Cheops or Chemmis, a king of Egypt, who is ſaid to have employed three hundred and ſixty thouſand men for twenty years in the ſtructure. Cephren, brother to the former king, is ſaid to be the founder of the ſecond *pyramid*; and the third is ſaid to have been built by Mycerinus, the ſon of Chemmis, according to Diodorus, but according to Herodotus, of Cheops. However, Herodotus ſays, that ſome aſcribed the laſt to Rhodope, a courtezan, and the other two to the ſhepherd Philition. The learned Greaves places the three kings who erected theſe *pyramids*, in the twentieth dynaſty; Cheops having begun his reign in the year 3448 of the Julian period, 490 years before the firſt Olympiad, and 1266 years before the Chriſtian æra. He reigned fifty years. Cephren, the builder of the ſecond, reigned fifty-ſix years; and Mycerinus, the builder of the third, ſeven years.

Dr. Bryant gives a different account of the origin of theſe *pyramids*: he aſcribes the ſtructure of them to the Cuthites (ſee Dispersion *of mankind*) or Arabian ſhepherds who built Heliopolis, and who were the giants and Titans of the firſt ages. Theſe ſons of Chus, according to this writer, ſeem to have come into Egypt immediately after their diſperſion from Babel. Many have conſidered theſe ancient ſtructures with contempt, as being vaſt piles without any great ſymmetry, and have thought the labour idle, and the expence unneceſſary. Thus Pliny (lib. xxxvi. cap. 12.) calls them *regum pecuniæ otioſa ac ſtulta oſtentatio*, &c. built for oſtentation, to keep an idle people employed, and to prevent emotion and rebellion. Ariſtotle (Polit. lib. iii.) calls them the work of tyranny.

The general opinion with regard to their intention and uſe is, that they were ſepulchres and monuments of the dead, particularly of kings. This is expreſly affirmed by Diodorus (lib. i.), and Strabo (lib. xvii.) and the opinion is confirmed by the writings of the Arabians. And the reaſon, ſays Greaves, of their erecting theſe magnificent ſtructures is founded in the theology of the Egyptians, who, as Servius ſhews in his comment upon Virgil, (Æneid, lib. iii.) where he deſcribes the funeral of Polydorus—*Animamque ſepulchro condimus*—believed, that as long as the body endured, ſo long the ſoul continued with it; and this was alſo the opinion of the Stoics. Upon this principle, that the bodies might neither be reduced to duſt by putrefaction, nor converted into aſhes by fire, they embalmed them, and laid them up in theſe ſtately repoſitories, where they might continue from the injury of time and of men. The reaſon of their building their ſepulchres in the form of *pyramids* was either from a notion, that this was the moſt permanent form of ſtructure, or becauſe they hereby intended to repreſent ſome of their gods: particularly, as Greaves conjectures, Oſiris, or the ſun with many rays; for under this form the ſtatues of the gods were frequently exhibited, and the gods themſelves worſhipped.

Among the Egyptians, the *pyramid* is ſaid to have been a ſymbol of human life; the beginning whereof is repreſented by the baſe, and the end by the apex; on which account it was that they uſed to erect them on ſephulchres. Herodotus.

Some, however, have objected to this deſign of the Egyptian *pyramids*, and are of opinion that they were originally intended for ſome nobler purpoſe. If Cheops, or any other perſon, ſays Dr. Shaw, who was the founder of the great *pyramid*, intended it only for his ſepulchre, what occaſion was there for ſuch a narrow, crooked entrance into it; for the well, as it is called, at the end of the entrance; for the lower chamber, with a large nitch or hole in the eaſtern wall of it; for the long narrow cavities in the walls of the upper room; or, for the two antichambers and the lofty gallery, with benches on each ſide that introduce us into it.

As the whole of the Egyptian theology was clothed in myſterious emblems and figures, it ſeems reaſonable to ſuppoſe, ſays this writer, that all theſe turnings, apartments, and ſecrets in architecture, were deſigned for ſome purpoſe of religion, and that the deity, which was typified in the outward form of this pile, was to be worſhipped within. The ſquare cheſt of granate marble, which is placed in the upper chamber of the great *pyramid*, may be ſuppoſed to have been rather intended for ſome religious uſe than for the coffin of Cheops. It might have ſerved for one of their ſacred cheſts, in which either the images of their deities, or their ſacred veſtments or utenſils were kept, or it might have been a *faviſſa* or ciſtern, ſuch as contained the holy water uſed in their ceremonies. Its length favours the opinion of its having been deſigned for a coffin, but its height and breadth far exceed the dimenſions that were adhered to on ſuch occaſions; the Egyptian ſtone coffins were made of a different form, and inſcribed with hieroglyphics. Nor is this cheſt placed according to the manner in which the Egyptians depoſit their dead; for their mummies always ſtand upright, whereas this cheſt lieth flat upon the floor. If, therefore, this cheſt was not intended for a coffin, it is inferred that the *pyramid* itſelf could not have taken the name of a ſepulchre from it. Cheops, indeed, and others, might have been buried within the precinct of this or any other of the *pyramids*, and this was no more than was practiſed in other temples, and, therefore, could not deſtroy the principal uſe and deſign for which they were erected. Upon the whole, Dr. Shaw concludes, from the outward figure of theſe piles, the ſtructure and contrivance of the ſeveral apartments in the inſide of the greateſt, together with the ample proviſion that was made on each ſide of it for the reception, as may be ſuppoſed, of the prieſts, that the Egyptians intended the latter for one of the places, as all of them were to be the objects, at leaſt, of their worſhip and devotion.

Dr. Bryant has lately maintained, with conſiderable force of argument, this opinion, that the *pyramids* were deſigned for high altars and temples, and were conſtructed in honour of the Deity. If the chief *pyramid* were deſigned for a place of burial, what occaſion, ſays he, was there for a well, and for paſſages of communication, which led to other buildings? The apartments near the *pyramids* he ſuppoſes to be deſigned for the reception of prieſts, and to be appendages not to a tomb, but to a temple of the Deity. The ſtone coffin, he apprehends, was a trough or reſervoir for water, which by means of the well they drew from the Nile. The prieſts of Egypt delighted in obſcurity, and they probably came by the ſubterraneous paſſages of the building to the dark chambers within; where they performed their luſtrations, and other nocturnal rites. Many, he adds, of the ancient temples in this country were caverns in the rock, enlarged by art, and cut out into numberleſs dreary apartments; for no nation upon the earth was ſo addicted to gloom and melancholy as the Egyptians. From the top of the *pyramids* they obſerved the heavens, and marked the conſtellations; and upon the ſame eminence it is probable that they offered up vows and oblations. See on this article Greaves's Works, vol. i. p. 1, &c. Shaw's Travels, fol. p. 413, &c. Pococke's Deſcript. of the Eaſt, vol. i. p. 41, &c. Perry's View of the Levant, p. 413, &c. Bryant's Anal. of Ancient Myth. vol. iii. p. 523, &c. Farmer's Worſhip of Human Spirits, &c. p. 379, &c.

The tomb of Porſenna, king of Hetruria, at Cluſium in Italy, is an ancient monument of ſquare ſtone, each ſide of which is three hundred feet broad, and fifty feet high. Within the ſquare baſe there is an inextricable labyrinth; upon this ſquare there ſtand five *pyramids*, four in the angles, and one in the middle, ſeventy-five feet broad at the bottom, and a hundred and fifty feet high, and terminating in a point; at top they are covered with a braſs circle, from which are ſuſpended bells, which are put in motion by the wind, ſo as that their ſound may be heard at a great diſtance. Upon this circle there are four other *pyramids*, each a hundred feet high, above which upon one plane there are five other *pyramids*. Such is the account which Pliny gives from Varro, lib. xxxvi. cap. 13.

Pyramid, *ſcenography of a.* See Scenography.

Pyramid *optic.* See Optic *pyramid.*

PYRAMIDAL *fountain.* See Fountain.

Pyramidal *mirrors.* See Mirror.

Pyramidal *numbers* are the ſums of polygonal numbers, collected after the ſame manner as the polygonal *numbers* themſelves are extracted from arithmetical progreſſions. See *Figurate* Numbers.

Theſe are particularly called *firſt pyramidals.* The ſums of firſt *pyramidals* are called *ſecond pyramidals.* And the ſums of thoſe *third pyramidals*; and ſo on, *ad infinitum.* Particularly, thoſe ariſing from triangular numbers are called *prime triangular pyramidals*; thoſe ariſing from *pentagonal numbers* are called *prime pentagonal pyramidals*, &c. The numbers 1, 4, 10, 20, 35, &c. formed by the addition of the triangular numbers 1, 3, 6, 10, &c. are uſually called by the ſimple name of *pyramidals*; and the general formula for finding them is $n \times \frac{n-1}{2} \times \frac{n-2}{3}$; i. e. the fourth *pyramidal* may be found by ſubſtituting 4 for n; the fifth by ſubſtituting 5 for n, &c.

PYRAMIDALE *corpus*, in *Anatomy*, a plexus of blood-veſſels on the back of the teſticles, thus called from its form; and from its ſtructure, alſo called *corpus varicoſum*, and pampiniforme.

It conſiſts of innumerable little veins, communicating with each other, and forming a kind of net-work; which at length uniting, terminate in one vein, by which the blood is conveyed into them all.

The origin of this plexus is from the ſpermatic veins; which, a little above the teſticles, ſplit into ſeveral branches; which again uniting ſeveral times, form the *corpus pyramidale.*

PYRAMIDALES *papillæ.* See Papillæ *pyramidales.*

Pyramidales *abdominis*, in *Anatomy*, denote ſmall muſcles in the abdomen, lying in the lower part of the rectus. They have their name from their figure, and their origin from the margin of the oſſa pubis, with a pretty broad fleſhy head, whence they grow gradually narrower, till they end in a ſmall, round tendon, in the linea alba; ſometimes almoſt at the navel. See *Tab. Anat. (Myol.) fig.* 1. *n.* 46. *fig.* 2. *n.* 31.

When theſe muſcles are wanting, the lower extremities of the recti are always thicker than uſual; often there is only one found, and ſometimes, though rarely, three. Winſlow.

Pyramidalis *oculorum*, in *Anatomy*, a name given by Molinet and ſome others to one of the muſcles of the face, called by Douglas and Cowper aperiens *palpebram*, and by Albinus *levator palpebræ ſuperioris.*

Pyramidalis, is alſo a name given to the pyriformis.

PYRAMIDOID, called alſo *parabolic ſpindle*, a ſolid figure, formed by the revolution of a ſemiparabola round one of its ordinates.

According to the method of indiviſibles, this may be conceived to conſiſt of an infinite ſeries of circles, whoſe diameters are all parallel to the axis of the revolving parabola.

The *parabolic ſpindle* is equal to $\frac{8}{15}$ of its circumſcribing cylinder.

PYRAMIDOID, *parabolic*. See **PARABOLIC** *pyramidoid*.

PYRATE. See **PIRATE**.

PYRENE, in *Natural Hiſtory*, the name of a ſtone found always in the ſhape of the ſtone of an olive. It is of the lapis Judaicus kind, being no other than the petrified ſpine of ſome ſpecies of ECHINITES.

PYRENOIDES *proceſſus*, in *Anatomy*, a proceſs of the ſecond vertebra of the neck; called alſo *odontoides*, and *dentiformis*, or the tooth-like proceſs.

The word πυρηνοειδης, is formed of πυρην, *nucleus*, *kernel*, or *berry*, and ειδος, *figure*.

PYRETHRUM, in *Botany*. See **PELLITORY**.

PYRETICS, formed from πυρετος, *fever*, of πυρ, *fire*, medicines good againſt fevers.

PYRGUS, among the Romans, a dice-box of the ſhape of a modius, open above, and having a great many ſhelves or partitions within it; ſo that when the dice were thrown into it out of the fritillum, they were thereby overturned many times before they could reach the bottom, in which there was an opening for them to fall through upon the table.

PYRHOPOECILOS, in the *Natural Hiſtory of the Ancients*, a ſtone ſo called from its having a great many ſpots of the colour of fire.

PYRIATERION, a word uſed by the ancients to expreſs a ſweating room.

PYRIATOS, a word uſed by ſome authors to expreſs a brick when heated, in order to be applied to the body wrapped up in a cloth by way of a dry fomentation.

PYRICAUSTUM, a word uſed by medical writers to expreſs a burn or ſcald.

PYRICUBIUM, in *Natural Hiſtory*, the name of a genus of foſſile bodies, uſually comprehended, with many others of very different figure and ſtructure, under the general name *pyrites*. See *Tab. of Foſſils, Claſs* 5.

The diſtinguiſhing characters of the *pyricubia* are theſe: they are compound, inflammable metallic bodies, of a cubic figure, or reſembling a die, being compoſed of ſix ſides. Of this genus there are only two known ſpecies. Hill.

PYRIFORMIS, called alſo *pyramidalis*, in *Anatomy*, a ſmall oblong muſcle of the thigh, receiving its name from its figure, which reſembles that of a pear. It is alſo called *iliacus externus*, from its ſituation. See *Tab. Anat. (Myol.) fig.* 7. *n.* 21, 22.

It is ſituated almoſt tranſverſely between the os ſacrum and iſchium, being covered and hid by the firſt two glutæi. It is fixed to the interior lateral part of the os ſacrum by fleſhy fibres, and to the neighbouring part of the anterior or concave ſide of that bone, by three digitations lying between the anterior holes. It is alſo fixed by a ſmall inſertion to the ligamentum ſacro-ſciaticum, and the edge of the great ſinus of the os ilium. From thence it runs tranſverſely toward the joint of the hip, its fibres contracting in breadth; it terminates in a ſhort tendon, which is inſerted in the middle of the internal labium of the upper edge of the great trochanter, by two or three branches. The upper part of this tendon receives ſeveral fibres from the glutæus medius, and its lower part is united to the gemellus ſuperior, and tendon of the obturator internus. This muſcle moves the os femoris ſomewhat upwards, and turns it outwards. Sometimes there are two *pyriformes* ſeparated only by the nervus ſciaticus. Winſlow.

PYRIPHLEGES, a word uſed by the old writers in medicine to expreſs a perſon labouring under an extreme degree of a febrile heat.

PYRIPLACIS, in *Natural Hiſtory*, the name of a genus of pyritæ, the characters of which are theſe: they are compound, inflammable, metallic bodies, found in looſe detached maſſes of a ſimple and uniform, not ſtriated internal ſtructure, and are covered with an inveſtient coat or cruſt.

Of this genus of foſſils there are three known ſpecies. Hill. See *Tab. Foſſils, Claſs* 5.

PYRIPOLYGONIUM, in *Natural Hiſtory*, the name of a genus of foſſils, the characters of which are, that they are compound metallic bodies, of a regular figure, conſiſting of twelve planes. See *Tab. of Foſſils, Claſs* 5.

There is only one known ſpecies of this genus, though ſubject to great varieties in its appearance; and this has been by authors hitherto confounded with many other bodies of a very different nature and figure, under the general name *pyrites*.

It is not unfrequent in Cornwall and Devonſhire; but is much more common in Germany. Hill.

PYRITES, in *Phyſiology*, a mineral reſembling the true ores of metals, in its ſubſtance, colour, and weight, and in the parts of the earth where it is found; and compoſed, like them, of metallic ſubſtances, mineraliſed by ſulphur or arſenic, or by both, and of an unmetallic earth intimately united with its other principles. The Greek word πυριτης, formed of πυρ, *fire*, denotes *fire-ſtone*; a denomination given to this ſubſtance on account of its inflammability, which is ſuch, that, by colliſion with ſteel, it will yield ſparks of fire. The generality of writers diſtinguiſh between *pyrites* and ores, on account of a difference in the proportion and connection of the materials of which they are reſpectively compoſed. The *pyrites*, it is ſaid, generally contains leſs metal, and a greater quantity of ſulphur and arſenic and unmetallic earth: and theſe matters are more ſtrongly connected in *pyrites* than in ores, and they are accordingly much harder. *Pyrites* differs alſo from ores by its form and poſition in the earth; being found in diſtinct maſſes often unaccompanied with ores, and in all ſorts of earths and ſtones, and alſo in pit-coal and other bituminous matters. *Pyrites* is alſo diſtinguiſhable from ores by its luſtre and figure, which is almoſt always regular and uniform. However, other writers will not allow that there is any ſufficient reaſon for conſidering the *pyrites* as a diſtinct claſs of ſubſtances from ores; as they have no mark, by which they can certainly and conſtantly be diſtinguiſhed from theſe. The diſtinction has been chiefly introduced by miners, becauſe the *pyrite* in general contain ſo little metal, and ſo much of the mineraliſing ſubſtances, that they are ſeldom ſmelted. Nevertheleſs, there are ſome kinds of *pyrites* which yield a great quantity of copper, and are ſmelted with great advantage. Accordingly, ſome later mineralogiſts conſider the cupreous yellow *pyrites* as an ore of copper, the pale yellow martial *pyrites* as an ore of iron, and the white arſenical *pyrites* as an ore of arſenic.

The *pyrites* bears a near affinity to MARCASITE, with which ſome authors have confounded it. Dr. Woodward makes this diſtinction between the two, that *pyrites* is reſtrained to the nodules, or thoſe pieces that are found lodged in ſtrata of another kind, and marcaſite to thoſe compoſing whole ſtrata. Dr. Hill uſes the name *pyrites* as the claſſical term for the leſs regularly figured bodies of the number of thoſe uſually called too indeterminately by that name. See *Tab. of Foſſils, Claſs* 5.

According to this diſtinction, *pyritæ* are compound, inflammable, metallic bodies, found in detached maſſes, but of no determinately angular figure. The forms of theſe minerals are exceedingly various; they are ſpherical, oval, cylindrical, pyramidal, priſmatical, cubic; they are ſolids with five, ſix, ſeven, eight, nine, ten, &c. ſides. The ſurface of ſome is angular, and conſiſts of many baſes of ſmall pyramids, the points of which all unite in the centre of the maſs.

Of this claſs Hill diſtinguiſhes two general orders of bodies; the firſt, thoſe which are of a plain and ſimple internal ſtructure; and the ſecond, thoſe which are regularly ſtriated within: and of each of theſe there are two genera. Thoſe of the firſt are:

1. The *pyriplaces*. Theſe are *pyritæ* of a ſimple internal ſtructure, and covered with an inveſtient coat or cruſt.

2. The *gymnopyres*. Theſe are *pyritæ* of a ſimple internal ſtructure, and naked, or not covered by any inveſtient coat or cruſt.

The genera of the ſecond order, or the ſtriated *pyritæ*, are,

1. The *pyritricha*. Theſe are the *pyritæ* of a ſimply ſtriated ſtructure.

And, 2. The *pyritrichiphylla*. Theſe are the *pyritæ* whoſe ſurfaces are covered with foliaceous flakes, made by a continuation and expanſion of the ends of the ſtriæ. Hill's Hiſt. of Foſſ. p. 612.

The ſeveral ſpecies of each of theſe genera, ſee under the ſeveral generical heads, **PYRITRICHUM**, &c.

The *pyritæ* differ not only in their form, but in their component ſubſtances; accordingly they are called ſulphureous, martial, cupreous, arſenical, as one or other of theſe ſubſtances predominates.

Dioſcorides mentions only one kind of *pyrites*, which is the common yellow ſpecies. Avicenna and the other Arabians mention two yellow ſorts, a white one, and a ferruginous one. None of theſe authors made any diſtinction between the marcaſites and *pyritæ*, but this ſort of matter, whether formed into ſmall nodules, or continued ſtrata, was called indifferently by one or other of theſe names.

The four kinds of this ſtone mentioned by the Arabians are called from their colours, the golden, the ſilver, the braſſy, and the ferruginous *pyrites*. The oldeſt authors are of the opinion of Dioſcorides, and mention only one kind, deducing them all from the ſame principles, and ſuppoſing their variety of colours to be only owing to accidents. Ariſtotle and Theophraſtus thus mention the *pyrites* as one thing, under the name *mylia*, which having been tranſlated *molaris lapis*, has been underſtood by ſome to mean ſome ſort of mill ſtone, or other coarſe ſtone, fit for ſuch purpoſes; and by that means the whole ſenſe of the authors has been perverted and miſunderſtood.

Pliny mentions two kinds of the *pyrites*, the gold and the ſilver kind.

The principal contents of the *pyritæ* may be in general gueſſed at from their colour. Henckel diſtinguiſhes them in general into three colours, white, yellowiſh or a pale yellow, and yellow. The white *pyrites* contains moſt arſenic, the greateſt part of it being iron and arſenic; the yellowiſh is chiefly compoſed of ſulphur and iron; and the fully yellow, of ſulphur and copper. The colours, therefore, make a very eſſential mark for the diſtinction of the ſeveral kinds of this foſſil. The yellowiſh *pyrites*, that is, ſuch as contain iron and ſulphur, is found in the ſtrata of ſeveral kinds of ſtone, in clay, and in the earth lying over the mines of ſeveral metals. The white, or arſenical *pyrites*, and the fully yellow, are leſs common, but are uſually met with about mines.

The ancients in general ſuppoſed, that copper was contained in the *pyrites*; but they had no opinion that iron was a part of it, though it is certain that iron is the baſis of almoſt all of them, and copper has a part only in a very few; but this was the effect of judging from appearances, inſtead of having recourſe to experiments. Our own Liſter has the honour of being the firſt author who has treated properly of them, and found out their true and general baſis to be iron; accordingly he ſuppoſes them to be all properly iron ores. Liſter de Font. Medic. Angliæ.

Berger, who has written on the Caroline Baths, has taken up the ſubject, and though he allows that iron ſeems the baſis of great numbers of the *pyritæ*, as is evident from the obſervation. that the remaining matter of many of them, after burning away the ſulphur, is found to be attracted by the magnet; yet he obſerves alſo, that in many copper is mixed with the iron, and that though iron is in general found in even thoſe kinds which give the moſt obvious proofs of copper, yet there are ſome in which there can no iron be found.

This author obſerves alſo, that beſides the metalline particles, whether iron or copper, there is alſo contained in the *pyritæ* an unmetallic earth, which is in the compoſition of this ſtone moſt equally mixed and perfectly blended with the particles of theſe metals, and with thoſe of the ſalts and ſulphurs contained alſo in the maſs. Sulphur alſo he acknowledges to make a great part of many of the *pyritæ*, particularly of all the yellowiſh and full yellow kinds. The white or ſilvery *pyrites* contains leſs ſulphur than any of the others; and the yellow or venereal *pyrites*, though it contain much arſenic, yet does not fail to contain ſulphur alſo in conſiderable quantity. Berger de Font. Carolin.

Henckel, in his Pyritologia, obſerves, that in general all the *pyritæ* are martial, as ferruginous earth is the eſſential and fundamental part of every *pyrites*. This earth, he ſays, is united with an unmetallic earth, with ſulphur or arſenic, or with both theſe matters, in which caſe the ſulphur always predominates over the arſenic Theſe he conſiders as the only eſſential principles of *pyrites*, believing that all the other matters, metallic and unmetallic, which are found in it, are only accidental; amongſt which he includes even copper, although ſo much of it exiſts in ſome kinds of *pyrites*, that they are heated as ores of copper, and ſometimes contain even fifty pounds of copper each quintal. The exiſtence of an unmetallic earth in *pyrites* has been demonſtrated by Henckel, Cramer, and others; and this earth is intimately united with the other conſtituent parts of this ſubſtance, eſſential to its exiſtence, and inſeparable from it, otherwiſe than by its total decompoſition. According to Henckel, this unmetallic earth abounds much in the white *pyrites*, ſince he found from the analyſis which he made, that the iron, which is the only metal exiſting in theſe *pyritæ*, is only about one twentieth part of the fixed ſubſtance that remains after the arſenic has been expelled by torrefaction or ſublimation. In the pale yellow *pyrites*, the proportion of iron is generally about twelve pounds to a quintal of *pyrites*, and ſometimes fifty or ſixty pounds; and this is, therefore, called martial *pyrites*. It contains about one fourth its weight of ſulphur, and the reſt is unmetallic earth. The quantity of this earth contained in the yellow or cupreous *pyrites*, which is alſo martial, becauſe iron is an eſſential part of every *pyrites*, has not yet been determined. Theſe kinds probably contain ſome of that earth, though perhaps leſs of it than the others. As to the nature of this earth, Henckel thinks, that it is an earth diſpoſed already by nature to metalliſation, but not ſufficiently elaborated to be conſidered as a metallic earth: and perhaps it is different in the different kinds of *pyrites*.

The mention of gold and ſilver in the *pyrites* is very common among authors, but the colour of theſe ſtones ſeems principally to have given ground for that opinion. In reality, theſe metals are very ſeldom found naturally making parts of the *pyrites*; and when they are, it is only in a very inconſiderable quantity. But in thoſe ſpecimens found about the mines of gold and ſilver, the particles of thoſe metals aſſembled into viſible maſſes are ſometimes found unbedded in lumps of the *pyrites*; and ſuch pieces of this ſtone may then well be ſaid to contain thoſe precious metals. The occaſion of this accident, however, is no more than this, that the *pyrites* is formed in mines and other places at this day; and thus it might adhere to particles of gold and ſilver; and thereby give ground to the ſuppoſition of their being parts of it. Theſe precious metals Henckel alſo conſiders as accidental to *pyrites*. In ſome ſpecimens the gold has been found in its metallic form, and viſible to the naked eye; ſometimes otherwiſe: and in theſe caſes, the ore has been thought to contain the gold united firſt with iron, and that compound united with ſulphur. But Dr. Fordyce obſerves, that it has not yet been proved, that a compound metal can be combined with ſulphur: and, from ſome experiments made by this ingenious chemiſt and Mr. Alchorne, in order to determine, whether this ore contains gold in its metallic form, only mechanically mixed with the *pyrites*, or combined with the ſulphur by means of the iron, they were led to conclude, that the gold was in its native form, and not mineraliſed. Phil. Tranſ. vol. lxix. part ii. p. 527, &c.

The common *pyritæ* of our clay-pits and ſea-coaſts are uſed in the making of copperas or vitriol; but among theſe there is found a very great difference, ſome of them turning themſelves very eaſily to vitriol, when only expoſed to moiſt air; others doing it with more difficulty; and ſome not at all, though expoſed many years. Some alſo yield all their vitriol at once, on pouring warm water on them; while others muſt lie expoſed to the air at ſeveral different times, and roaſted in the mean while in order to obtain it. The ſettled obſervations on this ſubject, as collected from experiments, are theſe:

No *pyrites* which contains any copper, or any arſenic, will of itſelf turn into vitriol, but requires a previous roaſting.

The ſulphureous iron *pyrites*, void of copper or arſenic, all turn to vitriol on being only expoſed to the air; and that. the ſooner or later, as they are of a more or leſs compact ſubſtance. The fibrous or radiated *pyritæ* are uſually of this kind; but this is no general rule, for there are ſome radiated ones which remain whole years unaltered in the air.

Copper and arſenic always reſiſt the ſhooting of the ſalts of the *pyrites*, or its turning to vitriol; but theſe are not the only agents that reſiſt this change, for in ſome merely ferreous and ſulphureous *pyritæ* the change is not made but with much time and difficulty.

It is remarkable alſo, that vitriol found in ſome *pyritæ*, if water be poured upon them immediately after the roaſting; while others will not yield any till they have been afterwards expoſed to the air. It even ſeems, that we are to look into the air for the cauſe of the appearance of vitriol in the copperas ſtones. This it may greatly aſſiſt in effecting, as it carries a quantity of moiſt vapours in it: for it is well known, that the acid of ſulphur has not the power to reſolve iron into the form of a ſalt without the addition of water; nay, oil of vitriol, or of ſulphur, being moderately concentrated, though it be then diluted with much more water than it is united with while yet in ſulphur, does not even diſſolve filings of iron unleſs there be four times or ſix times as much water poured to it. Water alone, however, though a great and neceſſary agent, cannot be ſuppoſed to effect the whole change; for though there are ſome of the *pyritæ* that yield their vitriol by means of it, yet there are others that do not; and ſome *pyritæ* are preſently turned into vitriol, when expoſed to the air, which had before remained for many years under water unaltered. Of this kind there are many on the ſhores of the ſea in moſt parts of Europe. In England particularly we have them in great plenty in Sheppy Iſland in Kent. Theſe *pyritæ* will long reſiſt the change into vitriol, when in the air, and yet they evidently contain no copper nor arſenic.

There is alſo a kind very common on the ſhores, which reſembles wood in texture and appearance; and has probably once been wood, but has now its pores filled with the *pyrites*: of theſe many lie buried a foot or more deep in the ſand under the ſea water; and in that ſtate they never ſhoot into vitriol, but are of a firm texture and conſiderable hardneſs, and when broken look very bright within, and have no taſte of vitriol, nor give any mark that they contain any: yet theſe, if they are taken up and expoſed to the air for a fortnight, loſe all their brightneſs and their hardneſs, and mouldering to pieces, become ſo rich in vitriol, that it forms itſelf into regular cryſtals on their ſurfaces. Now, if moiſture alone was ſufficient to produce this effect, there is no reaſon why they ſhould not have been reſolved into vitriol under a very moiſt ſand. The great cauſe we are able to aſſign, appears to be the vague acid, ſo common in the foſſile world, and filling alſo the region of the air; but an ingenious reaſoner will own, that though this may do much, yet there muſt be ſome other cauſe, yet undiſcovered, for the production of vitriol in theſe foſſils; ſince this, as well as the moiſture of the air, ought to act more equally than we find by experience it does on theſe ſtones, if all were owing to it.

In the expoſing theſe copperas ſtones to the air, if it be a moiſt ſeaſon, no farther care need be taken of them than the piling them up in a heap; but moiſtening them now and then is a neceſſary circumſtance in dry ſeaſons, and in this caſe the water ſhould be ſprinkled on them in ſmall quantities at a time, and the heaps now and then turned and new made. Much depends on this management, the ſame quantity of ſtones yielding twice as much copperas, with proper care, as they would without it.

It is well known, that iron and ſulphur have a ſingular action on each other, when they are well mixed together and moiſtened. Hence it happens, that many kinds of *pyrites*, particularly thoſe which contain only the principles now mentioned, ſuſtain a ſingular alteration, and even a total decompoſition, when expoſed during a certain time to the combined action of air and water. The moiſture gradually penetrating them, divides and attenuates their parts; the acid of the ſulphur particularly attacks the martial and alſo the unmetallic earth, its inflammable principle is ſeparated from it, and diſſipated. In theſe circumſtances, the *pyrites* changes its nature. The acid of the ſulphur which is decompoſed forms with the fixed principles of the *pyrites*, vitriolic, aluminous, and ſelenitic ſalts; ſo that a *pyrites*, which was once a ſhining, compact, very hard mineral, becomes in a certain time a greyiſh, ſaline, powdery maſs, the taſte of which is ſaline, auſtere, and ſtyptic. And if this maſs be lixiviated with water, cryſtals of vitriol, and ſometimes of alum, according to the nature of the *pyrites* employed, may be obtained by evaporation and cryſtalliſation. This decompoſition of *pyrites* is called efflореſcence and vitrioliſation, becauſe it becomes covered with a ſaline powder, and becauſe vitriol is always formed. In the pale yellow, *pyrites*, containing chiefly ſulphur and iron, the fermentation excited by moiſture in its conſtituent parts is ſo violent, that when the quantity is conſiderable, not only a ſulphureous vapour and heat may be perceived, but the whole maſs kindles and burns intenſely. Thus in an experiment of Dr. Slare (Phil. Tranſ. N° 213.) a heap of *pyrites*, conſiſting of two or three hundred tons, which was covered from the air five or ſix months, took fire and burnt for a week. Some of it looked like melted metal; and other parts like red-hot ſtones. It alſo emitted a very noiſome ſmoke. To this decompoſition of *pyrites* in the bowels of the earth ſome philoſophers have aſcribed ſubterranean fires and volcanos: and Liſter miſtakenly attributes thunder and earthquakes to the ſulphureous and inflammable breath of the *pyrites*. No other *pyrites* is ſubject to this ſpontaneous decompoſition, when expoſed to humid air, beſides the pale yellow *pyrites*, which is both martial and ſulphureous. The arſenical *pyrites* is not changed by expoſure to air.. This kind is harder, heavier, and more compact than the former; and Wallerius propoſes to diſtinguiſh it by the name of MARCASITE. When cut, it may be poliſhed ſo as to give a luſtre almoſt equal to that of diamonds, but without refracting the light, as it is perfectly opake. It has been employed ſome years paſt in the manufacture of toys, as of buckles, necklaces, &c. Dict. Chem. Eng. ed. art. *Pyrites*.

The *pyritæ*, in ſubſtance, are never uſed medicinally; nevertheleſs, in their products they are very important. From theſe common ſulphur is extracted, in Sweden and Saxony; the native vitriols are produced in caverns of the earth, or on its ſurface; the greateſt quantities of artficial vitriol are prepared; and the mineral waters, vitriolic, aluminous, ſulphureous, hot or cold, are ſuppoſed to receive their impregnation.

When the matter of the *pyrites* is mixed with the lead ores, the method of ſeparating the metal by aſſaying is this: roaſt two centners of the ore, as in the uſual method, and keep a ſtronger fire than when the ore is pure. The *pyrites*, eſpecially when it is merely iron, hinders an ore from eaſily growing clammy or turning into large lumps, or entirely melting. When the ore is ſufficiently waſhed, let it cool, beat it to powder, and repeat the roaſting to a third fire, till when it is red-hot in the fire, there is no ſmell of ſulphur; then mix the ore with ſix centners of the black flux, and two of ſandiver, and finiſh the work in the common way, only making the fire greater, and continuing it longer, toward the end of the operation. Cramer's Art of Aſſaying, p. 292. See LEAD-*ore*.

PYRITES is applied by ſome authors to the marcaſite ores of all metals; the names whereof are varied according to the metals they partake of.

Thus *chryſitis* is that of gold; *argyritis* that of ſilver; *ſideritis* that of iron; *chalcitis* that of copper; and *molybditis* that of lead, &c.

PYRITICUM *liquamen*. See LIQUAMEN *pyriticum*.

PYRITRICHIPHYLLUM, in *Natural Hiſtory*, the name of a genus of foſſils of the claſs of the PYRITES, the characters of which are theſe: they are compound, inflammable, metallic bodies, found in looſe maſſes not of any regularly angular figure, and of a ſtriated texture, with foliaceous ends to the ſtriæ, appearing on the ſurface or within the maſs. See *Tab. of Foſſils, Claſs* 5.

Of this genus there are only two known ſpecies; one having the foliaceous ends of the ſtriæ on the outer ſurface of the maſs; and the other having a ſmooth external ſurface, and the foliaceous ends of the ſtriæ covering the ſides of internal hollows.

The firſt of theſe is found in many of the Engliſh and German mines; the other has been yet only found in the mines on Mendip hills in Somerſetſhire, but there in conſiderable plenty. Hill's Hiſt. of Foſſ. p. 618.

PYRITRICHUM, in *Natural Hiſtory*, the name of a genus of PYRITES, the characters of which are theſe: they are compound, inflammable, metallic foſſils, always found in detached maſſes of no regularly angular figure, and of a ſimply ſtriated internal ſtructure. See *Tab. of Foſſils, Claſs* 5.

Of this genus of *pyritæ* there are three known ſpecies. All the three ſpecies are found plentifully in different parts of the kingdom: the firſt in all ſorts of ſtrata, and often looſe on the ground; the ſecond principally in the chalk-pits of Kent and Suſſex; and the laſt in Eſſex and Hampſhire, and very frequently in the German mines. Hill's Hiſt. of Foſſ. p. 617.

PYRMONT *water*, in *Phyſiology* and *Medicine*, a very briſk, ſpirituous chalybeate, abounding in fixed air, and which, when taken up from the fountain at *Pyrmont* in Weſtphalia, in Germany, whence its name, ſparkles like the briſkeſt Champaign wine. It has a pleaſant, vinous taſte, and ſomewhat ſulphureous ſmell. It is perfectly clear, and bears carriage better than the SPA *water*.

The hiſtory of theſe waters is accurately given by Hoffman in his obſervations on them, both in their natural ſtate and in mixture with other bodies.

He firſt obſerves, that they contain a volatile and ſubtle principle, much more penetrating and ſtrong, as well as in larger quantity, than any other mineral water; but that this is not to be expected in them any where but upon the ſpot, for thoſe who tranſport them to other places are conſtrained to let a part of this fly off, to preſerve the reſt. If either glaſs or earthen veſſels be filled at the ſpring, and immediately corked and faſtened down, the conſequence is, that they will burſt on the firſt motion or heat of the weather. They are, therefore, forced to fill them only in part at firſt, and let them ſtand awhile for this ſubtle ſpirit to exhale, and then awhile after the filling them up to cork and fit them for carriage.

2. If they are drank upon the ſpot in a morning on an empty ſtomach, they affect the noſe with a pungent tingling, and diſturb the head for many hours afterwards.

3. If they are taken at the ſpring, they purge but very little; but if taken in another place, after tranſportation, they purge conſiderably more, and render the ſtools black. It is obſervable alſo, that if they are left in an open veſſel a few days, their virtue wholly exhales, and they no longer purge nor render the ſtools black.

4. If tea-leaves, bauluſtine-flowers, or galls, are put into this water, they firſt change it to a blue, from that to a purple, and finally to a black. This is a ready proof that black is only a deep purple, and purple only a deep blue: a little ſpirit of vitriol added to this liquor deſtroys all the colour, and renders it limpid as before.]

5. If any acid be mixed with *Pyrmont water*, there is raiſed an effervеſcence, and bubbles of air are carried up in great quantity; and this whether the ſtronger acids, ſuch as ſpirit of vitriol, or aqua fortis, be uſed; or the weaker, as vinegar, lemon juice, or Rheniſh wine.

6. If an alkaline liquor be added, whether it be volatile, as the ſpirit of ſal ammoniac, or fixed, as the oil of tartar, there is no ebullition raiſed, but the liquor becomes turbid and milky. If ſpirit of vitriol be afterwards added to this, to ſaturate the additional alkali, the liquor becomes limped again.

7. Cow's milk mixed in equal quantity with *Pyrmont water* does not coagulate, but, on the contrary, becomes thinner than before, and is preſerved from turning four ſo ſoon as it otherwiſe would in hot weather. This is a proof that there is no predominating acid in theſe waters.

8. If ſyrup of violets be added to *Pyrmont water*, it turns it to a beautiful green. This is a proof of the alkaline nature of theſe waters; and it is farther proved by adding ſpirit of vitriol, or any other acid, to this green liquor, which on that becomes limped again.

9. Four pints of this water evaporated over a gentle fire, yield no more than two ſcruples of a dry reſiduum. Oil of vitriol being poured on this, an acid efferveſcence ariſes, and with it an acrid and pungent vapour, like that producid by mixing oil of vitriol and common ſalt. If ſpirit of vitriol be uſed inſtead of the oil, the efferveſcence is in a leſs degree, and the ſalt is in part changed to a bitter ſaline maſs, the remainder ſeparated from which proves to be a calcareous earth, no longer fermenting with the ſpirit of vitriol.

10. If a quantity of *Pyrmont water* be expoſed twenty-four hours to the open air in a baſon, it will at the end be found to have loſt all its virtues, taſting wholly inſipid, and being turbid, inſtead of the fine clearneſs it had before, and a yellow ochreous earth is precipitated to the bottom; after this the liquor will no longer ſhew any of thoſe qualities which were before its diſtinguiſhing characters, it will no longer ferment with acids, nor turn black with galls, nor green with ſyrup of violets.

It appears from the whole, that the *Pyrmont waters* poſſeſs a pure, extremely penetrating, and elaſtic mineral ſpirit, and that in a very large proportion; and to this their virtues are principally to be attributed. This mineral ſpirit, while it remains engaged in a calcareous earth, imitates the properties of an alkaline ſubſtance; and when joined with a ſubtile martial earth, it emulates the properties of vitriol, giving the ſtools a black colour, and turning a tincture of galls into ink: and while this remains in the water in theſe forms of an alkaline or vitriolic principle of ſo great ſubtilty, it cannot but give them very great virtues in ſtrengthening the tone of the viſcera, opening obſtructions, and ſtimulating in a proper manner the excretory ducts, ſo as to make them duly perform their office; but as ſoon as by the ſtanding of the water open, or by any other accident, this ſubtile element is evaporated, all the virtues of the water muſt be gone with it.

The great quantity of this powerful ſpirit contained in the waters, makes them more fit for the robuſt and ſtrong conſtitutions, when depraved by illneſs, than for the weak and tender ones; but even the tendereſt people may take them, only obſerving to take but a ſmall doſe, or to dilute them with an equal quantity of common water immediately before the taking them.

Hoffman alſo recommends the *Pyrmont water* mixed with equal quantities of milk, on his own experience, in ſcorbutic and gouty caſes. Hoffm. Opera. tom. v. p. 143, ſeq.

We have already obſerved, under the articles ACIDULÆ and *fixed* AIR, that *Pyrmont water*, and other mineral waters of a ſimilar nature, owe their acidulous taſte and peculiar virtues to the fixed air which they contain; and to thoſe articles the reader is referred for a brief hiſtory of this important diſcovery. We ſhall here add ſome farther remarks on the effects and medical uſes of this water. Perſons who drink it at the well are affected with a kind of giddineſs or intoxication, which is probably owing to the great quantity of fixed air with which the water abounds. The common operation of this water is by urine; but it is alſo a gentle ſudorific; and if taken in large quantity proves laxative. However, in order to this effect, it is uſual to mix ſome ſalts with the firſt glaſſes. It is drank by glaſsfuls in the morning to the quantity of from one to five or ſix pints, according to circumſtances; thoſe who drink it walking about between each glaſs. This water is recommended in caſes where the conſtitution is relaxed: in want of appetite and digeſtion; weakneſs of the ſtomach, and heart-burn; the green ſickneſs; female obſtructions and barrenneſs; the ſcurvy and cutaneous diſeaſes; and in the gout, eſpecially, as Hoffman obſerves, when mixed with milk: in colics; bloody fluxes; diſorders of the breaſt and lungs; in which caſe it is beſt taken lukewarm: in nervous, hyſteric and hypochondriacal diſorders; in apoplexies and palſies; in the gravel and unitary obſtructions; in foulneſs of the blood; and in obſtructions of the finer veſſels. It amends the lax texture of the blood; exhilarates the ſpirits without inflaming, as vinous liquors are apt to do; and is reckoned among the beſt reſtoratives in decayed and broken conſtitutions. It is ſaid to poſſeſs the general virtues of the SPA *water*, and at the fountain it is more ſpirituous, as well as a ſtronger chalybeate. Elliot's Medicinal Virtues, &c. of Mineral Waters, 1781. p. 181.

Near the famous well at *Pyrmont*, is a ſtone quarry under ground, from ſome parts in which a ſulphureous ſteam comes out, which commonly riſes to a ſmall height. Animals held in this ſteam are ſoon ſuffocated, but recover if quickly taken out. When a man ſtands in this ſteam, but with his head over it, it proves an excellent ſudorific. Dr. Seip propoſes to perform cures in ſeveral diſeaſes with it. See Phil. Tranſ. Nº 448. ſect. 4. and Miſc. Berolin. tom. v. part 2. ſect. 4. See GROTTA *del Serpi*.

PYRMONT *water*, *Imitation of*. This medicinal water may be imitated very nicely by art in the following manner; take a quart of the pureſt and lighteſt water, add to it thirty drops of a ſtrong ſolution of iron made in ſpirit of ſalt, a drachm of oil of tartar per deliquium, and thirty drops of ſpirit of vitriol, or a little more or leſs, as is found neceſſary, not to let the alkali of the oil of tartar prevail too ſtrongly, though it muſt prevail a little. Shake all briſkly together, and on taſting it will be found extremely to reſemble the true *Pyrmont water*.

The baſis on which this is founded is the analyſis and trial of the true *Pyrmont water*, by which it is found to contain a ſubtile aqueous fluid, a volatile iron, and a predominant alkali, all joined together into one briſk pungent ſpirituous water. The artificial *Pyrmont* thus made, if the proportions are carefully minded, will extremely reſemble the natural, and will have the ſame effect as a medicine. Shaw's Lectures, p. 90.

But the beſt method of forming artificial *Pyrmont water* is by impregnating it with fixed air, for which we are indebted to Dr. Prieſtley. The firſt perſon, we believe, who actually compounded an artificial acidulous or ſpirituous water, like that of Seltzer or *Pyrmont*, was M. Venel; though he was ignorant of the real nature of the ingredient to which it owed theſe qualities, and which he erroneouſly ſuppoſed to be common air. For this purpoſe he diſſolved in a pint of water two drachms of foſſile alkali, to which he added an equal quantity of marine acid; in the proceſs he made uſe of a veſſel with a narrow neck, and to prevent the eſcape of the air, he diſpoſed the ingredients in ſuch a manner, that they could not communicate with each other till after the bottle was corked. In this caſe the fixed air diſlodged from the alkaline ſalt, in a phial nearly full and cloſely corked, being confined, ſuffers a degree of compreſſion that greatly promotes its combination with the water. See Memoires preſentes par les Sçavans Etrangers, tom. ii. containing two Memoirs of M. Venel, read before the Royal Academy of Sciences in 1750; and Lavioſier's Eſſays, &c. by Henry, p. 34, &c. However, Dr. Prieſtley was undoubtedly the firſt who ſo far improved upon the diſcoveries made by himſelf and others, in relation to the principle denominated fixed air, as to contrive an eaſy method of impregnating water with it. The firſt idea of this kind occurred to him in 1767, when, having placed ſhallow veſſels of water within the region of fixed air on the ſurface of the fermenting veſſels of a brewery, and left them all night in that ſituation, he found that the water had acquired a very ſenſible and pleaſant impregnation. He proceeded to accelerate the impregnation by pouring the water from one veſſel into another, while they were both held within the ſphere of the fixed air. The method of effecting this by air diſlodged from chalk and other calcareous ſubſtances, did not occur to him till the year 1772, when he publiſhed his Directions for this purpoſe, together with a drawing of the neceſſary apparatus, which he had before communicated to the board of admiralty. This apparatus, repreſented in *Tab.* III. *Pneumatics*, *fig.* 50. conſiſts of a glaſs veſſel *a* with a narrow neck, and ſo formed that is will ſtand upright with its mouth downwards: this veſſel, when filled with water, and covered with a ſlip of paper or thin paſteboard, preſſed cloſe to it, to prevent the admiſſion of common air, is inverted in another veſſel *b* with a little water in it, ſo that the ſlip of paper or paſteboard may be withdrawn, and the end of the pipe *c* introduced into it. This pipe is flexible and air-tight, and beſt made of leather, ſewed with a ſhoemaker's waxed thread. It is kept open at both ends by a piece of a quill, while one of them is introduced into the veſſel of water, and the other into the bladder *d*; the oppoſite end of which is tied round a perforated cork, kept open by a quill, and the cork is made to fit a phial *e*, two thirds of which ſhould be filled with chalk juſt covered with water. Dr. Prieſtley has ſince found it moſt convenient to uſe a glaſs tube, and to preſerve the advantage which he had of agitating the veſſel *e*, he makes uſe of two bladders, communicating by a perforated cork, to which they are both tied. He alſo obſerves, that the flexible pipe is not neceſſary; but inſtead of this a bent tube of glaſs muſt be ready to be inſerted into the hole made in the cork, when the bladder containing the fixed air is ſeparated from the phial in which it was generated. The extremity of this tube being put under the veſſel of water, and the bladder being compreſſed, the air will be conveyed into it, as in the other caſe. Inſtead of the bladder, a ſmall phial may be interpoſed between the phial containing the chalk, &c. and the veſſel of water: for thus the chalk and water that may be thrown up the tube communicating with this phial will lodge at the bottom of the other, while nothing but the air will get into the pipe communicating with the water. The apparatus being thus prepared, let the phial containing the chalk and water be detached from the bladder, and the pipe alſo from the veſſel of water; pour a little oil of vitriol upon the chalk and water; and having carefully preſſed all the common air out of the bladder, put the cork into the bottle preſently after the efferveſcence has begun. Alſo preſs the bladder once more after a little of the newly-generated air has got into it, in order the more effectually to clear it of all the remains of the common air; and then introduce the end of the pipe into the mouth of the veſſel of water as in the drawing, and begin to agitate the chalk and water briſkly. This will preſently produce a conſiderable quantity of fixed air, which will diſtend the bladder; and this being preſſed, the air will force its way through the pipe, and aſcend into the veſſel of water, the water at the ſame time deſcending, and coming into the baſon.

When about one half of the water is forced out, let the operator lay his hand upon the uppermoſt part of the veſſel, and ſhake it as briſkly as he can, not to throw the water out of the baſon; and in a few minutes the water will abſorb the air, and taking its place, will nearly fill the veſſel as at the firſt. Then ſhake the phial containing the chalk and water again, and force more air into the veſſel, till, upon the whole, about an equal bulk of air has been thrown into it. Alſo ſhake the water as before, till no more of the air can be imbibed. As ſoon as this is perceived to be the caſe, the water is ready for uſe; and if it be not uſed immediately, ſhould be put into a bottle as ſoon as poſſible, well corked, and cemented. It will keep, however, very well, if the bottle be only well corked, and kept with the mouth downwards.

It may be proper to obſerve on this proceſs, that the phial *e* ſhould always be placed conſiderably lower than the veſſel *a*; that the water to which the chalk is put ſhould be changed after every operation; that with a veſſel of water holding three pints, and a phial containing the chalk and water of ten ounces, a little more than a tea-ſpoonful of oil of vitriol will produce air enough to impregnate ſuch a quantity of water; that the whole proceſs does not take up more than a quarter of an hour, and the agitation not five minutes; and that in this method the water is eaſily made to imbibe an equal bulk of air; whereas Dr. Brownrigg found that *Pyrmont water* at the ſpring-head did not contain ſo much as one half. This apparatus has received conſiderable improvements, which we ſhall briefly recite; but in juſtice to the merit of the original inventor, his method deſerves to be recorded; and beſides, it requires leſs time, and is much leſs expenſive than thoſe that are now generally uſed.

The apparatus contrived by Dr. Nooth, and improved by Mr. Parker, is repreſented in *Tab.* III. *Pneumatics, fig.* 51. It is made of glaſs, and ſtands on a wooden veſſel *d d* reſembling a tea-board: the middle veſſel B has a neck, which is inſerted into the mouth of the veſſel A, to which it is ground air-tight. This lower neck of the veſſel B has a glaſs ſtopple S, compoſed of two parts, both having holes ſufficient to let a good quantity of air paſs through them. Between theſe two parts is left a ſmall ſpace, containing a plano-convex lens, which acts like a valve, in letting the air paſs from below upwards, and hindering its return into the veſſel A. The upper veſſel C terminates below in a tube *r t*, which, being crooked, hinders the immediate aſcent to the bubbles of fixed air into that veſſel, before they reach the ſurface of the water in the veſſel B. The veſſel C is alſo ground air-tight to the upper neck of the middle veſſel B, and has a ſtopple *p* fitted to its upper mouth, which has a hole through its middle. The upper veſſel B holds juſt half as much as the middle one B; and the end *t* of the crooked tube goes no lower then the middle of the veſſel B.

For the uſe of this apparatus: fill the middle veſſel B, with ſpring or any other wholeſome water, and join to it the veſſel C. Pour water into the veſſel A (by the opening *m*, or otherwiſe) ſo as to cover the riſing part of its bottom: about three fourths of a pint will be ſufficient. Fill an ounce phial with oil of vitriol, and add it to the water, ſhaking the veſſel ſo as to mix them well together. As heat is generated, it will be beſt to add the oil by a little at a time, otherwiſe the veſſel may be broke. Put to this, through a wide glaſs or paper funnel, about an ounce of powdered raw chalk, or marble. White marble being firſt granulated, or pounded like coarſe ſand, is better for the purpoſe than pounded chalk, becauſe it is harder; and, therefore, the action of the diluted acid upon it is ſlower, and laſts a conſiderable time. On this account the ſupply of fixed air from it is more regular than with the chalk: and beſides, when no more air is produced, the water may be decanted from the veſſel A, and the white ſediment waſhed off, and the remaining granulated marble may be employed again, by adding to it freſh water and a new quantity of oil of vitriol. The funnel in this proceſs is made uſe of, in order to prevent the powder from touching the inſide of the veſſel's mouth: for if that happens, it will ſtick ſo ſtrongly to the neck of the veſſel B, as not to admit of their being ſeparated without breaking. Place immediately the two veſſels B and C (faſtened to each other) into the mouth of the veſſel A, as in the figure, and all the fixed air which is diſengaged from the chalk or marble by the oil of vitriol, will paſs up through the valve in S into this veſſel B. When this fixed air comes to the top of the veſſel B, it will diſlodge from thence as much water as is equal to its bulk; which water will be forced up through the crooked tube into the upper veſſel C.

Care muſt be taken not to ſhake the veſſel A when the powdered chalk is put in; otherwiſe a great and ſudden efferveſcence will enſue, which will perhaps expel part of the contents. In ſuch caſe it may be neceſſary to open a little the ſtopple *p*, in order to give vent, otherwiſe the veſſel A may burſt. It will be proper alſo to throw away the contents, and waſh the veſſel; for the matter will ſtick between the necks of the veſſels, and cement them together. The operation muſt then be begun afreſh. But if the chalk be thrown in without ſhaking the machine, or if marble be uſed, the efferveſcence will not be violent. If the chalk be put into the veſſel looſely wrapt up in paper, this accident will be ſtill better guarded againſt. When the efferveſcence goes on well, the veſſel C will ſoon be filled with water, and the veſſel B half filled with air; which will eaſily be known to be the caſe by the air going up in large bubbles through the crooked tube *r t*.

When this is obſerved, take off the two veſſels B and C together as they are, and ſhake them ſo that the water and air within them may be much agitated. A great part of the fixed air will be abſorbed into the water; as will appear by the end of the crooked tube being conſiderably under the ſurface of the water in the veſſel. The ſhaking them for two or three minutes will be ſufficient for this purpoſe. Theſe veſſels muſt not be ſhook while joined to the under one A, otherwiſe too great an efferveſcence will be occaſioned in the latter; together with the ill conſequences above mentioned. After the water and air have been ſufficiently agitated, looſen the upper veſſel C, ſo that the remaining water may fall down into B, and the unabſorbed air paſs out. Put theſe veſſels together, and replace them into the mouth of A, in order that B may be again half filled with fixed air. Shake the veſſels B and C, and let out the unabſorbed air, as before. By repeating the operation three or four times, the water will be ſufficiently impregnated.

Whenever the efferveſcence nearly ceaſes in the veſſel A, it may be renewed by giving it a gentle ſhake, ſo that the powdered chalk or marble at the bottom may be mixed with the oil of vitriol and water above it; for then a greater quantity of fixed air will be diſengaged.

When the efferveſcence can be no longer renewed by ſhaking the veſſel A, either more chalk muſt be put in, or more oil of vitriol; or more water, if neither of theſe produce the deſired effects.

The ingenious Mr. Magellan has ſtill farther improved the contrivance of Dr. Nooth and Mr. Parker. He has two ſets of the veſſels B and C. While he is ſhaking the air and water contained in one of theſe ſets, the other may be receiving fixed air from the veſſel A. By this means twice the quantity of water may be impregnated in the ſame time. He has a wooden ſtand K (*fig.* 52.) to fix the veſſels B, C on, when taken off from A, which is very convenient. He has a ſmall tin trough for meaſuring the quantity of chalk or marble requiſite for one operation, and a wide glaſs funnel for putting it through into the veſſel A, to prevent its ſticking to the ſides, as mentioned before.

He has alſo contrived a ſtopple without a hole, to be uſed occaſionally, inſtead of the perforated one *p*. It has a kind of baſon at the top to hold an additional weight when neceſſary, (ſee *fig*. 53.) The ſtopple muſt be of a conical figure, and very looſe; but ſo exactly and ſmoothly ground as to be air-tight merely by its preſſure, which may be increaſed by additional weights put into its baſon. Its uſe is to compreſs the fixed air on the water, and thereby increaſe the impregnation. For by keeping the air on the water in this compreſſed ſtate, the latter may be made to ſparkle like Champaign. And if the veſſels are ſtrong, there will be no danger of their burſting in the operation.

If the veſſels be ſuffered to ſtand ſix or eight hours, the water will be ſufficiently impregnated even without agitation. But by employing the means above deſcribed, it may be done in as many minutes.

The water thus impregnated may be drawn out at the opening *k*. But if it is not wanted immediately, it will be better to let it remain in the machine, where it has no communication with the external air. Otherwiſe the fixed air flies off by degrees, and the water becomes vapid and flat; as alſo happens to other acidulous waters. But it may be kept a long time in bottles well ſtopped, eſpecially if they are placed with their mouths downwards.

Mr. Blades of Ludgate-hill has ſtill farther improved this apparatus, by changing the ſtopple at *k* for a glaſs cock, which is more convenient. He has likewiſe altered the middle veſſel B into a form more advantageous for the impregnation. See *Tab*. III. *Pneumaties*, *fig*. 54.

For Dr. Hulme's method of impregnating water with fixed air, ſee *Putrid* FEVER.

Dr. Withering of Birmingham has lately contrived a new apparatus for impregnating water with fixed air, which, he ſays, is preferable to that in common uſe, becauſe it can be made at leſs expence, and is more eaſily prepared; becauſe the whole quantity of fixable air produced is converted to uſe, without any waſte of the vitriolic acid; becauſe it impregnates three times the quantity of water at one time, more completely and with leſs trouble; and the impregnated water will always retain its virtue, if the joints and cocks of the machine are made perfectly air tight; for which purpoſe they ſhould once a year be ſupplied with a ſmall quantity of unſalted lard. This apparatus is exhibited in *Tab*. III. *Pneumatics*, *fig*. 55. and conſiſts of a glaſs veſſel A, about ten inches high in the cylindrical part, and ſix inches and a half in diameter; another glaſs veſſel B, about twelve inches high in the conical part, one inch and a half in the neck, and five inches in diameter at the bottom; a copper pipe C paſſing through the ſtopper of the veſſel B, and tied faſt in the flexible tube D, made of ſtrong leather, air-tight, and kept hollow by means of a ſpiral wire paſſing through its whole length; a conical braſs pipe E, with a ſtop-cock faſtened to the tube D; another conical pipe F, with a ſtop-cock G, into which the end of the tube E is accurately ground ſo as to be air-tight, and cutting off all communication with the atmoſphere when the pipe E is removed; two large hog's bladders H, H, each of which ought to hold two quarts; a ſtop-cock I to prevent the water riſing into the bladders, when the veſſel A is agitated; a bladder K, tied to the crooked tube with the ſtop-cock L, which occaſionally opens or ſhuts the communication with the veſſel B; a glaſs funnel M, accurately fitted with the glaſs ſtopper N; an aperture O, fitted with a glaſs ſtopper or a ſilver cock, from which the impregnated water is to be drawn for uſe; and, laſtly, the tube P opening into the veſſel A. When this apparatus is uſed, let the veſſel A be filled with pure water, and any other ingredients that are required, in a proper proportion; into the veſſel B put as much marble or whiting, in ſmall lumps, as will cover its bottom to the height of about two inches, and pour in water to the height repreſented by the dotted line; let the mouth of the veſſel A be well fitted with a cork, and through a hole in the cork paſs the tube P, putting upon the cork melted ſealing-wax of the ſofteſt kind, or modelling-wax, ſo as to make the whole air-tight. The modelling-wax may be procured at the engravers, or it may be prepared by adding to half a pound of melted bees-wax two ounces of tallow, and one ounce of Venice turpentine: to this maſs add a ſufficient quantity of red lead or Spaniſh brown to give it a colour, and let the mixture be ſtirred till it is cold: let the mouth of the veſſel B be ſtopped with a piece of mahogany, turned into a conical figure in a lathe, and of a ſize ſomewhat larger than the mouth of the glaſs will admit; put this piece of wood into melted bees-wax, and heat the wax till the wood begins to grow black: when cool, turn it again till it fits the mouth of the veſſel: the tubes C, L and M are fitted into holes bored through the wooden ſtopper, previous to its being immerſed in the wax: puſh theſe tubes through the holes, and preſs the ſtopper into the orifice of the veſſel B, and cement the whole with ſealing or modelling wax: ſhut the ſtop-cocks I and L, having previouſly preſſed the air out of the bladder K; open the ſtop-cocks G and E; then ſqueeze the air out of the bladders H, H, and afterwards preſs the conical pipe E into the pipe F: pour about a large ſpoonful of oil of vitriol through the funnel M, and ſtop it with its ſtopper N. The fixable air let looſe by the efferveſcence in the veſſel B, riſing through the tube C, paſſes into the bladders H, H, and diſtends them. In this caſe open the ſtop-cock I, and from the aperture O draw out about a quart of water; and the ſpace before occupied by the water will be filled with fixable air, which ſoon begins to be abſorbed by the remaining water, and is ſtill ſupplied from the bladders H, H, and from the efferveſcing mixture in the veſſel B. When the bladders are conſiderably collapſed, more vitriolic acid muſt be added through the funnel M, ſo that they may be always kept pretty fully diſtended. When an impregnation is ſpeedily required, turn the ſtop-cocks at G and E, and open that a L; then ſeparate the pipe E from the tube F, and agitate the veſſel A; the fixable air will paſs into the bladder K, and may be preſſed into the two other bladders, when the parts of the apparatus are united. During the agitation, the ſtop-cock at I ſhould be cloſed, and opened only occaſionally to ſupply out of the bladders H, H the fixable air abſorbed by the water. If a ſtrong impregnation be required, this proceſs ſhould be carried on in a room, the heat of which does not exceed forty-eight degrees of Fahrenheit's thermometer. Dr. Withering obſerves, that the impregnated water receives no taſte from the bladders: and that if the veſſel A with its impregnated water be ſeparated from the veſſel B, at the conical parting E, F, it may be incloſed in a pyramidal mahogany caſe, out of the lower part of which the ſilver cock at O projects; and thus ſerve for an ornamental as well as a luxurious and ſalubrious addition to the ſide-board, particularly in the ſummer and autumnal ſeaſons.

Mr. Henry has deſcribed a method of impregnating water in large quantities with fixed air, ſo as to give it the properties of mineral water, for the uſe of the ſick on board of ſhips, and in hoſpitals. He has given the following account of his apparatus and proceſs for this purpoſe. Cut off the two extremities of a calf's or pig's bladder *f*, *Tab*. III. *Pneumatics*, *fig*. 56. and having previouſly moiſtened them, into one end inſert the top of the tubular ſtopper *e*, round the neck of which it is to be cloſely faſtened with ſtrong thread. Into the upper end introduce the part *g* of the long bent tube *h*, and tie them round in the ſame manner. The pipe *h* muſt be paſſed through a hole formed by a hot iron borer, in a large cork adapted to the orifice *i* in the caſk B B, holding about ten or twelve gallons, to which it muſt be cemented: and the length of the pipe from this point muſt be ſuch as to reach within a few inches of the bottom of the caſk B B, which is to be completely ſilled with freſh water, or ſuch as has been recovered from lime. See PUTREFACTION *of water*.

To a quantity of mild calcareous earth and water, placed in the air veſſel C, add a ſmall portion of ſtrong vitriolic acid, and by the time moſt of the common air may be ſuppoſed to be expelled by the fixed air, ariſing from the mild calcareous earth, add a larger quantity of acid, and putting the tubulated ſtopper *e* in its place, the bladder *f* will become inflated. Preſs it gently till its ſides collapſe; and then introducing the pipe *h h* with its cork, into the orifice *i* of the caſk B B, again preſs the air forward, as it diſtends the bladder into the water caſk, where bubbling up through the water, it will riſe to the ſurface, and, by its preſſure, force the water to aſcend into the funnel *k*, which is to be cemented into the head of the caſk at *l*. In proportion as the water in the caſk becomes impregnated with fixed air, that in the funnel will return into its place; but if, at any time, the latter ſhould riſe ſo high as to be in danger of overflowing, a quantity of air may be let out of the water caſk, by means of the ſmall plug at *m*. And this is neceſſary to be done, occaſionally, to diſcharge the reſiduum of the fixed air, which is not ſoluble in water.

If the operation be required to be performed more expeditiouſly, it may be quickened by agitating the water caſk. To do this, the tubular ſtopper *e* muſt be withdrawn from the air veſſel, and ſupported, together with the bladder, by an aſſiſtant, while the caſk B B is ſhaken. During this time another tubular ſtopper muſt be put into the air veſſel, and it may be immerſed into a quantity of lime-water to prevent waſte. When the agitation has been continued for ſome minutes, in proportion to the falling of the water in the funnel, replace the ſtopper attached to the bladder *f* in the air veſſel when taken out of the lime-water, and proceed as before, repeating the agitation occaſionally.

During the proceſs, additional quantities of vitriolic acid may be introduced into the air veſſel through the opening at *d*, which is to be, at all other times, carefully ſecured with its ſtopper.

By this proceſs, fixed air may be imparted to wine, beer, and almoſt any liquor whatever. And when beer is become flat or dead, it will be revived by this means; but the delicate agreeable flavour, or acidulous taſte communicated by the fixed air, and which is manifeſt in water, will hardly be perceived in wine, or other liquors, which have much taſte of their own.

The artificial mineral waters thus made, are more pleaſant to the taſte than the natural *Pyrmont* or Seltzer waters; which, beſides their fixed air, contain ſaline particles of a diſagreeable taſte, which are known to contribute little or nothing to their medicinal virtues, and may, in ſome caſes, be hurtful. They are likewiſe conſiderably ſtronger. According to Sir John Pringle, theſe waters may be made more nearly to reſemble genuine *Pyrmont* water, by adding to each pint of them from eight to ten drops of *tinctura martis cum ſpiritu ſalis*. Or this may be done, by adding to the water in the middle veſſel B (*fig*. 51.) in the proportion of about thirty grains of Epſom ſalt, ten grains of common ſalt, a ſcruple of magneſia alba, and a dram of iron filings, or iron wire, clean and free from ruſt, to one gallon of ſpring water, and impregnating the whole with fixed air in the manner already deſcribed. Let them remain till the other ingredients, and as much of the iron as is neceſſary, are diſſolved, which will be in two or three days; or the magneſia may be omitted, and then the operation will be finiſhed in leſs than half that time. Theſe waters may be rendered ferruginous or chalybeate very eaſily, by putting in the middle veſſel two or more ſlender phials, filled with cuttings of fine iron-binding wire, or with ſmall iron nails; becauſe the impregnated water will diſſolve the iron ſo faſt, as to become well ſaturated with it in a few hours, according to the experiments of Mr. Lane. But the method of rendering theſe artificial waters chalybeate, uſed by Dr. Hulme, is to add one grain of ſalt of ſteel to each pint (ſixteen ounces) of water already impregnated with fixed air.

The diſcovery of an eaſy method of impregnating water with fixed air is of great importance; as it is now well known that ſuch water is a very powerful antiſeptic, or that it both reſiſts and corrects PUTREFACTION. It is, therefore, given with great ſucceſs in putrid fevers, in the ſea-ſcurvy, in dyſenteries, in mortifications, and in other diſorders ariſing from a putrid cauſe, or attended with putrefaction, a draught of it being taken now and then, or even by way of common drink. But the ingenious Mr. Bewly has invented a ſtill better method of exhibiting fixed air as a medicine. He directs a ſcruple of alkaline ſalt to be diſſolved in a ſufficient quantity (a quarter of a pint, or leſs) of water, which is to be impregnated with as much fixed air as it can imbibe; this is to be drank for one doſe. Mr. Bewly directs it to be prepared in larger quantities at a time, and calls it his mephitic julep. If immediately after it a ſpoonful of lemon juice, mixed with two or three ſpoonfuls of water, and ſweetened with ſugar, be drank, the fixed air will be extricated in the ſtomach; and thus a much greater quantity of it may be given than the ſame quantity of water alone can be made to imbibe. Fixed air acts as a corroborant; and, therefore, may be given with ſucceſs in weakneſs of the ſtomach, and in vomitings ariſing from that cauſe. It has alſo been given with ſucceſs in the STONE, and in nephritic complaints. When the lungs are purulent, fixed air, mixed with the air drawn into the lungs, has repeatedly been found to perform a cure. The bark alſo may be given with advantage in water impregnated with fixed air, as they both coincide in the ſame intention. Fixed air may be applied by means of a ſyringe, funnel, or otherwiſe, to inflamed breaſts, putrid ulcers, mortified parts, ulcerated ſore throats, and has been found in ſuch and ſimilar caſes to have very remarkable efficacy. It may alſo be given internally at the ſame time. In putrid dyſenteries, and in putrid ſtools, fixed air may be given by way of clyſter. Fermenting cataplaſms are of ſervice chiefly as they ſupply fixed air to the part. In caſes of putridity, fixed air has been ſucceſsfully applied to the ſurface of the body, expoſed to ſtreams of it. It is alſo found an excellent cooling as well as ſtrengthening beverage in hot relaxing weather, and has the advantage of being pleaſant to the taſte. See on the ſubject of this article Prieſtley's Exp. and Obſ. on Air, vol. ii. p. 263, &c. 298, &c. Phil. Tranſ. vol. lxv. part i. p. 59, &c. Magellan's Deſcription of a Glaſs Apparatus for making Mineral Waters, &c. p. 1, &c. Prieſtley's Exp. and Obſ. vol. 5. Appendix, p. 389, &c. Elliot's Account of the Nature and medicinal Virtues of the principal Mineral Waters, &c. 1781. Henry's Account of a Method of preſerving Water at Sea, &c. 1781. p. 19. &c.

PYROBOLOGY. See PYROTECHNY.

PYROBOLUS, in *Natural Hiſtory*, a name given by many authors to the ſtone more generally called PYRITES; others have called it *ſiderites*, *pyrobalanus*, *pyropus*, and *othonna*, and the Greeks *mylias*.

PYROCTOGONIUM, in *Natural Hiſtory*, the name given by Dr. Hill to a genus of foſſils uſually comprehended by authors, with many other bodies of a different figure and ſtructure, under the general name PYRITES.

The characters of the *pyroctogonium* are theſe: it is a compound, inflammable, metallic body, of a regular octohedral figure, or compoſed of eight planes.

There is only one known ſpecies of this genus, which is a very ſingular and elegant foſſil, being compoſed of eight triangular planes; theſe being the ſides of two quadrilateral pyramids, with broad baſes, which being joined baſe to baſe, conſtitute the *pyroctogonium*. See *Tab. of Foſſils, Claſs* 5.

It is found very frequently in Cornwall, Devonſhire, and moſt other of our counties where there are mines. It is ſometimes met with looſe in the earth, ſometimes lodged in the bodies of marcaſites, or in the ſolid foſſils, and varies ſometimes from its iron colour to a duſky yellow. It is ſometimes alſo found with many ſpecimens connected into a maſs; theſe are ſeldom uniform in ſize, and cohere in various directions, often greatly injuring one another's figure. Sometimes alſo, as in the caſe of the cryſtals, they form a large maſs, of which the outer ſurface only is concreted into or covered with regular figures, the whole inner part being a confuſed ſubſtance.

Maſſes of this kind are not unfrequently found of a regular orbicular figure, and beſet all over with regularly figured *pyroctogonia* of various ſizes. Hill's Hiſt. of Foſſ. p. 620.

PYROENUS, formed of πυϱ, *fire*, and οινος, *wine*, is a term ſometimes uſed for rectified ſpirit of wine; thus called becauſe made by fire, or rather becauſe rendered of a fiery nature.

PYROET, PYROUET, or rather PIROUETTE, in the *Manege*. See PIROUETTE.

PYROLA, in *Botany*. See WINTER *green*.

PYROLAMPIS, in *Zoology*. See GLOW *worm*.

PYROMACHUS, a name given by ſome to antimony, when reduced to a ſtony hardneſs; and by others to copper, when fuſed with ſulphur, and thus rendered leſs ductile.

PYROMANCY, πϱομαντεια, a kind of DIVINATION, performed by means of fire.

The ancients imagined they could foretel futurity by inſpecting fire and flame: to this end they conſidered its direction, or which way it turned. Sometimes they added other matter to the fire, e. gr. a veſſel full of urine, with its neck bound about with wool, watching narrowly on which ſide it would burſt, and thence taking their augury.

Sometimes they threw pitch on it, and if it took fire immediately, they eſteemed it a good augury.

PYROMETER, formed of πυϱ, *fire*, and μετϱω, *I meaſure*, in *Phyſics*, the name of a machine contrived to meaſure the alteration of the dimenſions of metals, and other ſolid bodies, ariſing from heat.

Muſchenbroek, who was the original inventor of this machine, has given a table of the expanſion of the different metals, in the ſame degree of heat. Having prepared cylindric rods of iron, ſteel, copper, braſs, tin, and lead, he expoſed them firſt to a *pyrometer* with one flame in the middle; then with two flames; and ſucceſſively to one with three, four, and five flames. But previous to this trial, he took care to cool them equally, by expoſing them ſome time upon the ſame ſtone, when it began to freeze, and Fahrenheit's thermometer was at thirty-two degrees. The effects of which experiment are digeſted in the following table, where the degrees of expanſion are marked in parts equal to the $\frac{1}{12500}$ part of an inch.

Expanſion of	Iron	Steel	Copper	Braſs	Tin	Lead
By one flame	80	85	89	110	153	155
By two flames placed cloſe together	117	123	115	220		274
By two flames 2½ inches diſtant	109	94	92	141	219	263
By three flames placed cloſe together	142	168	193	275		
By four flames placed cloſe together	211	270	270	361		
By five flames	230	310	310	377		

It is to be obſerved of tin, that it will eaſily melt, when heated by two flames placed together. Lead commonly melts with three flames, placed together, eſpecially if they burn long.

From theſe experiments it appears, at firſt view, that iron is the leaſt rarified of any of theſe metals, whether it be heated by one or more flames; and therefore is moſt proper for making machines, or inſtruments, which we would have free from any alterations by heat or cold, as the rods of pendulums for clocks, &c. So likewiſe the meaſures of yards or feet ſhould be made of iron, that their length may be as nearly as poſſible the ſame, ſummer and winter.

The expanſion of lead and tin, by only one flame, is nearly the ſame; that is, almoſt double of the expanſion of iron. It is likewiſe obſervable, that the flames, placed together, cauſe a greater rarefaction than when they have a ſenſible interval between them; iron, in the former caſe, being expanded 117 degrees, and only 109 in the latter; the reaſon of which difference is obvious.

By comparing the expanſion of the ſame metal, produced by one, two, three, or more flames, it appears, that two flames do not cauſe double the expanſion of one; nor three flames three times that expanſion, but always leſs; and theſe expanſions differ ſo much the more from the ratio of the number of flames, as there are more flames acting at the ſame time.

It is alſo obſervable, that metals are not expanded equally, at the time of their melting, but ſome more, ſome leſs. Thus tin began to run, when rarefied 219 degrees; whereas braſs was expanded 377 degrees, and yet was far for melting.

As to the conſtruction of M. Muſchenbroeck's *pyrometer*, together with Deſaguliers's alterations and improvements, the curious may conſult Deſagul. Experim. Philoſoph. vol. i. p. 421, &c. See alſo Muſchenbroeck's tranſlation of the experiments of the Academy del Cimento, printed at Leyden in 1731. And for a *pyrometer* of a new conſtruction, by which the dilatations of metals in boiling fluids may be examined and compared with Fahrenheit's thermometer, ſee Muſchenb. Introd. ad Philoſophiam Nat. 4to. 1762. vol. ii. p. 610.

But it has been obſerved, that M. Muſchenbroeck's *pyrometer* was liable to ſome objections; and theſe have been removed in a good meaſure by Mr. Ellicott, who has given a deſcription of his improved *pyrometer* in the Philoſophical Tranſactions, Nº 443. This may alſo be ſeen in Dr. Martyn's Abridgment, vol. viii. p. 464.

This inſtrument is formed with a flat plate of braſs AA (*Tab*. III. *Miſcellany*, *fig*. 33.) which is ſcrewed down to a thick piece of mahogany. Upon this plate are ſcrewed three pieces of braſs, two of which B, B, ſerve to ſupport the flat iron bar C, called the ſtandard bar. The upper part of the third piece of braſs is a circle D about three inches in diameter divided into three hundred and ſixty equal parts, or degrees: within this circle is a moveable *plate d* divided likewiſe into three hundred and ſixty parts, and a ſmall ſteel index. The bar of metal E upon which the experiment is to be made, is laid on the ſtandard bar. F is a lever two inches and a half long, faſtened to an axis, which turns in two pieces of braſs ſcrewed to one of the ſupports B. To the end of this lever is faſtened a chain, or ſilk line, which, after being wound round a ſmall cylinder, to which the index in the braſs circle D is faſtened, paſſes over a pulley, with a weight hung to the end of it. Upon the axis to which the lever is fixed, is a pulley, a quarter of an inch in diameter, to which a piece of watch-chain is faſtened, the other end of which is hooked to a ſtrong ſpring G, which bears againſt one end of the metal E. H is a lever exactly of the ſame form and dimenſions with the other: but the chain faſtened to the pulley on its axis is hooked to the ſtandard bar. The line faſtened to the end of this lever, after being wound round a cylinder, to which the moveable plate is fixed, paſſes over a ſmall pulley, and has a weight hung to the end of it; or rather the ſame line paſſing under a pulley to which the weight is hung, has its other end faſtened to the lever F; ſo that one weight ſerves for both levers. From this deſcription it is plain, that whenever the bar E is lengthened, it gives liberty to the weight to draw the lever F upwards by its action to the ſpring G; and the index will, at the ſame time, by means of the ſilk line, he carried forward in the circle, and as the bar ſhortens it will return back again: the ſame motion will be communicated to the ſtandard bar. When the bar is lengthened $\frac{1}{20}$th of an inch, the index will be carried once round the braſs circle, which is divided into three hundred and ſixty degrees; and therefore, if the metal lengthens the 7200th part of an inch, the index will move one degree.

In order to make an experiment with this inſtrument, lay a bar of any kind of metal, as E, on the ſtandard bar, then heat this bar to any degree of heat with a lamp, and mark the degree of its expanſion as indicated by the moveable plate; obſerve alſo the degree of expanſion of the metal E, by the heat communicated to it from the ſtandard bar, as marked on the braſs circle by the index: let the inſtrument ſtand, till the whole is thoroughly cold: then removing the bar E, lay any others ſucceſſively in its place, and proceed exactly as before; and thus the degrees of expanſion of different metals by the ſame degree of heat may be eſtimated.

By the help of this inſtrument Mr. Ellicot found, upon a medium, that the expanſion of bars of different betals, as nearly of the ſame dimenſions as poſſible, by the ſame degree of heat, were as follow:

Gold,	Silver,	Braſs,	Copper,	Iron,	Steel,	Lead,
73	103	95	89	60	56	149

The great difference between the expanſions of iron and braſs, has been applied with good ſucceſs to remedy the irregularities in pendulums ariſing from heat. Phil. Tranſ. vol. xlvii. p. 485. See PENDULUM.

Mr. Graham uſed to meaſure the minute alterations, in length, of metal bars, by advancing the point of a micrometer-ſcrew, till it ſenſibly ſtopped againſt the end of the bar to be meaſured. This ſcrew, being ſmall and very lightly hung, was capable of agreement within the three or four thouſandth part of an inch. On this general principle Mr. Smeaton contrived his *pyrometer*, in which the meaſures are determined by the contact of a piece of metal with the point of a micrometer-ſcrew. ABCD (*Tab*. III. *Miſcellany*, *fig*. 34.) repreſents the main bar or baſis of this inſtrument: EF is the bar to be meaſured, lying in two notches, one fixed to the upright ſtandard AB, the other to the principal lever HI: the end E of the bar EF bears againſt the point of G, a ſcrew which is of uſe in examining the micrometer-ſcrew: the other end of the bar F bears againſt a ſmall ſpherically protuberant bit of hard metal fixed at the ſame height as G, in the principal lever HI: K is an arbor fixed in the baſis, which receives at each end the points of the ſcrews H, L, upon which the lever HI turns and ſerves as a fulcrum to it; O is a ſlender ſpring, to keep the lever in a bearing ſtate againſt the bar; and P is a check, to prevent the lever from falling forward when the bar is taken out: N is the feeler, ſomewhat in the ſhape of a T, ſuſpended, and moveable up and down upon the points of the ſcrews I, M, which, as well as L, H, are ſo adjuſted as to leave the motion free, but without ſhake: QR is the handle of the feeler, moveable upon a looſe joint at R; ſo that laying hold of it at Q, the feeler is moved up and down without being affected by the irregular preſſure of the hand: the extremity S of the feeler is alſo furniſhed with a bit of protuberant hard metal, to render its contact with the point of the micrometer-ſcrew more perfect: T is the micrometer-ſcrew; V the divided index-plate; and W a knob for the handle: the micrometer-ſcrew paſſes through two ſolid ſcrewed holes at D and Y: the piece YZ is made a little ſpringy, and endeavours to pull the ſcrew backwards from the hole at D; and, conſequently, keeps the micrometer-ſcrew conſtantly bearing againſt its threads the ſame way: and thereby renders the motion thereof perfectly ſteady and gentle: X is the index, having diviſions upon it, anſwering to the turns of the ſcrew: this piece points out the diviſions of the plate, as the face of the plate points out the diviſors upon the index. When the inſtrument is uſed, lay hold of the knob at Q with one hand, and, moving the feeler up and down, with the other move forward the ſcrew T till its point comes in contact with the feeler, then will the plate and index V and X ſhew the turns and parts. The baſis of this inſtrument (as well as the other parts of it) is braſs: one end of which is continued of the ſame piece at right angles, to the height of three inches and a half; and the other end acts upon the middle of a lever of the ſecond kind, whoſe fulcrum is in the baſis: and, therefore, the motion of the extremity of the lever is double the difference between the expanſion of the bar and the baſis. Hence, having the length of the lever from its fulcrum to the point of ſuſpenſion of the feeler, the diſtance between the fulcrum and the point of contact with the bar, the inches and parts that correſpond to a certain number of threads of the micrometer, and the number of diviſions in the circumference of the index-plate; the fraction of an inch expreſſed by one diviſion of the plate may be deduced: thoſe meaſures are as follow: from the fulcrum of the lever to the feeler, 5.875 inches; from the fulcrum to the point of contact, 2.895 inches; length of ſeventy threads of the ſcrew, 2.455 inches; and the diviſions in the circumference of the index-plate, 100. Hence the value of one diviſion will be the $\frac{10}{57863}$d part of an inch: but if the ſcrew be altered one fourth of one of theſe diviſions, when the contact between the ſcrew and feeler is well adjuſted, the difference of contact will be very perceivable to the ſlighteſt obſerver; and conſequently, $\frac{1}{2345}$th part of an inch is perceivable in this inſtrument. When the inſtrument is made uſe of, it is immerged, together with the bar to be meaſured, in a ciſtern of water, which water, by means of lamps underneath, is made to receive any intended degree of heat not greater than that of boiling, and thereby communicates the ſame degree of heat to the inſtrument, the bar, and to a mercurial thermometer immerged therein, for the purpoſe of aſcertaining that degree. See *fig*. 35. in which A B is the ciſtern, C the cover, which, when the inſtrument (*fig*. 34.) is raiſed upon blocks, goes on between the bar EF and the baſis BC; D a handle to take off the cover, when hot; E the mercurial thermometer; F the cock to let out the water; and GH a hollow piece of tin, which ſupports ſeven ſpirit lamps, which are raiſed higher or lower by the ſcrews I and K, in order to give the water in the ciſtern a proper degree of heat. With this *pyrometer* Mr. Smeaton performed ſeveral experiments, which are arranged in a table; and their reſult agrees very well, he obſerves, with the proportions of expanſions of ſeveral metals given by Mr. Ellicott. The following table ſhews how much a foot in length of each metal grows longer by an increaſe of heat correſponding to 180° of Fahrenheit's thermometer, or to the difference between freezing and boiling water, expreſſed in ſuch parts of which the unit is equal to the 10000th part of an inch.

1.	White-glaſs barometer-tube,	100.
2.	Martial regulus of antimony,	130.
3.	Bliſtered ſteel,	138.
4.	Hard ſteel,	147.
5.	Iron,	151.
6.	Biſmuth,	167.
7.	Copper hammered,	204.
8.	Copper eight parts, mixed with tin one,	218.
9.	Caſt braſs,	225.
10.	Braſs ſixteen parts, with tin one,	229.
11.	Braſs wire,	232.
12.	Speculum metal,	232.
13.	Spelter ſolder, viz. braſs two parts, zinc one,	247.
14.	Fine pewter,	274.
15.	Grain tin,	298.
16.	Soft ſolder, viz. lead two, tin one,	301.
17.	Zinc eight parts, with tin one, a little hammered,	323.
18.	Lead,	344.
19.	Zinc or ſpelter,	353.
20.	Zinc hammered half an inch per foot,	373.

For a farther account of this inſtrument, with its uſe, ſee Phil. Tranſ. vol. xlviii. art. 79. p. 598, &c.

Mr. Ferguſon has conſtructed and deſcribed a *pyrometer*, which makes the expanſion of metals by heat viſible to the 45000th part of an inch. The upper ſurface of this machine is repreſented by *fig*. 36. *Tab*. III. *Miſcellany*. Its frame A B C D is made of mahogany, on which is a circle divided into three hundred and ſixty equal parts; and within that circle is another, divided into eight equal parts. If the ſhort bar E be puſhed one inch forward (or toward the centre of the circle) the index *e* will be turned 125 times round the circle of 360 parts or degrees. As 125 times 360 is 45000, it is evident, that if the bar E be moved only the 45000th part of an inch the index will move one degree of the circle. But, as in this *pyrometer*, the circle is nine inches in diameter, the motion of the index is viſible to half a degree, which anſwers to the 90000dth part of an inch in the motion or puſhing of the ſhort bar E.

One end of a long bar of metal F is laid into a hollow place in a piece of iron G, which is fixed to the frame of the machine; and the other end of this bar is laid againſt the end of the ſhort bar E, over the ſupporting croſs bar HI: and, as the end *f* of the long bar is placed cloſe againſt the end of the ſhort bar, it is plain that if F expands, it will puſh E forward, and turn the index *e*.

The machine ſtands upon four ſhort pillars, high enough from a table, to let a ſpirit lamp be put on the table under the bar F; and, when that is done, the heat of the flame of the lamp expands the bar, and turns the index.

There are bars of different metals, as ſilver, braſs, and iron; all of the ſame length as the bar F, for trying experiments on the different expanſion of different metals, by equal degrees of heat applied to them for equal lengths of time; which may be meaſured by a pendulum, that ſwings ſeconds. Thus,

Put on the braſs bar F, and ſet the index to the 360th degree: then put the lighted lamp under the bar, and count the number of ſeconds in which the index goes round the plate, from 360 to 360 again; and then blow out the lamp, and take away the bar.

This done, put on an iron bar F where the braſs one was before, and then ſet the index to the 360th degree again. Light the lamp, and put it under the iron bar, and let it remain juſt as many ſeconds as it did under the braſs one; and then blow it out, and you will ſee how many degrees the index has moved in the circle: and by that means you will know in what proportion the expanſion of iron is to the expanſion of braſs; which will be found to be as 210 is to 360, or as 7 is to 12. By this method, the relative expanſion of different metals may be found.

The bars ought to be exactly of equal ſize; and to have them ſo, they ſhould be drawn, like wire, through a hole.

When the lamp is blown out, you will ſee the index turn backward; which ſhews that the metal contracts as it cools.

The inſide of this *pyrometer* is conſtructed as follows.

In *fig*. 37. A *a* is the ſhort bar, which moves between rollers; and, on the ſide *a* it has fifteen teeth in an inch, which take into the leaves of a pinion B (twelve in number) on whoſe axis is the wheel C of one hundred teeth, which take into the ten leaves of the pinion D, on whoſe axis is the wheel E of one hundred teeth, which take into the ten leaves of the pinion F, on the top of whoſe axis is the index above mentioned.

Now, as the wheels C and E have one hundred teeth each, and the pinions D and F have ten leaves each, it is plain, that if the wheel C turns once round, the pinion F and the index on its axis will turn one hundred times round. But, as the firſt pinion B has only twelve leaves, and the bar A *a* that turns it has fifteen teeth in an inch, which is twelve and a fourth part more; one inch motion of the bar will cauſe the laſt pinion F to turn one hundred times round, and a fourth part of one hundred over and above, which is twenty-five. So that, if A *a* be puſhed one inch, F will be turned one hundred and twenty-five times round.

A ſilk thread *b* is tied to the axis of the pinion D, and wound ſeveral times round it; and the other end of the thread is tied to a piece of ſlender watch-ſpring G which is fixed in the ſtud H. So that, as the bar *f* expands, and puſhes the bar A *a* forward, the thread, winds round the axle, and draws out the ſpring; and as the bar contracts, the ſpring pulls back the thread, and turns the work the contrary way, which puſhes back the ſhort bar A *a* againſt the long bar *f*. This ſpring always keeps the teeth of the wheels in contact with the leaves of the pinions, and ſo prevents any ſhake in the teeth.

In *fig*. 36. the eight diviſions of the inner circle are ſo many thouſandth parts of an inch in the expanſion or contraction of the bars; which is juſt one thouſandth part of an inch for each diviſion moved over by the index. Ferguſon's Lectures on Mechanics, Supplem. p. 7, &c. 4to.

We ſhall cloſe this article with a brief deſcription of a *pyrometer* lately invented by M. De Luc, in conſequence of a hint ſuggeſted to him by Mr. Ramſden. The baſis of this inſtrument is a rectangular piece of deal board two feet and a half long, fifteen inches broad, and one inch and a half thick, and to this all the other parts are fixed. This is mounted in the manner of a table, with four deal legs, each a foot long, and an inch and a half ſquare, well fitted near its four angles, and kept together at the other ends by four firm croſs-pieces. This ſmall table is ſuſpended by a hook to a ſtand: the board being in a vertical ſituation in the direction of its grain, and bearing its legs forward in ſuch a manner as that the croſs-pieces which join them may form a frame, placed vertically facing the obſerver. This frame ſuſtains a microſcope, which is firmly fixed in another frame that moves in the former by means of grooves, but with a very conſiderable degree of tightneſs; the friction of which may be increaſed by the preſſure of four ſcrews. The inner ſliding frame, which is likewiſe of deal, keeps the tube of the microſcope in a horizontal poſition, and in great part without the frame, inſomuch that the end which carries the lens is but little within the ſpace between the frame and the board. This microſcope is conſtructed in ſuch a manner as that the object obſerved may be an inch diſtant from the lens; and it has a wire which is ſituated in the focus of the glaſſes, in which the objects appear reverſed. At the top of the apparatus there is a piece of deal, an inch and a half thick, and two inches broad, laid in a horizontal direction from the board to the top of the frame. To this piece the rods of different ſubſtances, whoſe expanſion by heat is to be meaſured, are ſuſpended: one end of it ſlides into a ſocket, which is cut in the thickneſs of the board, and the other end, which reſts upon the frame, meets there with a ſcrew, which makes the piece move backwards and forwards, to bring the objects to the focus of the microſcope. There is a cork very ſtrongly driven through a hole bored vertically through this piece; and in another vertical hole, made through the cork, the rods are fixed at the top; ſo that they hang only, and their dilatation is not counteracted by any preſſure. In order to heat the rods, a cylindrical bottle of thin glaſs, about twenty-one inches high, and four inches in diameter, is placed in the inſide of the machine, upon a ſtand independent of the reſt of the apparatus. In this bottle the rods are ſuſpended at a little leſs than an inch diſtance from one of the ſides, in order to have them near the microſcope. Into this bottle is poured water of different degrees of heat, which muſt be ſtirred about by moving upwards and downwards, at one of the ſides of the bottle, a little-piece of wood faſtened horizontally at the end of a ſtick: in this water is hung a thermometer, the ball of which reaches to the middle of the height of the rods. During theſe operations the water riſes to the cork, which thus determines the length of the heated part; the bottle is covered to prevent the water from cooling too rapidly at the ſurface; and a thin caſe of braſs prevents the vapour from fixing upon the piece of deal to which the rods are fixed. This *pyrometer* is repreſented in *fig.* 38. in which *a a* is the ſtand to which it is ſuſpended; *b* the hook from which it hangs; *c c c* the deal-board, which is the baſis of the whole apparatus; *d d d d* four arms to which is fixed the frame *e e e c*: the other frame which carries the microſcope is *s s s s*: *g g* are two croſs-pieces, through which paſſes the tube of the microſcope, and which ſupport it near both ends; *h h* is the microſcope: *i* its micrometer; *k* the cork through which paſſes the glaſs rod *l l*, and by which it is kept ſuſpended; *m* a rod of metal, or any other ſubſtance leſs dilatable than glaſs; *n* the point of union, obtained by means of two connected rings, in which both rods are faſtened by ſcrews: above theſe is another pair of rings, in one of which the metal rod is free, and which rod it ſupports; *o p* the piece to which the glaſs rod is ſuſpended; *q*, a ſquare piece fixed to the frame by four ſcrews, behind which is a box, in which as well as in a groove cut in the baſis in *p*, the piece *o p* ſlides; *r* a ſcrew, which paſſes through the ſquare piece *q*, whoſe uſe is to move backwards or forwards the piece *q* in order to bring the ſurface of the metal rod to the focus of the microſcope: *s s s s* four ſcrews, with round metal plates behind their heads, which ſerve to preſs the frame of the microſcope againſt the frame *e e e e*; the longitudinal openings, through which the ſcrews paſs, permit the free motion of the firſt frame, when one ſtrikes gently with a hammer to the bottom or the top of one of the ſides. If the microſcope is wanted higher or lower than the grooves permit, the ſcrews may be removed to other holes made on purpoſe in the ſide-pieces of the frame *e e e e*: *t t t t* is the cylindrical bottle, in which hang the rods in order to be heated at different degrees by water of various temperatures; *u u* are the ſupporters of the bottle; *x* the thermometer ſuſpended in the water; *y y* a rod, to the lower end of which is fixed a ſmall plate, to ſtir the water by moving it up and down; *z z* a ſyphon, one branch of which is within, and the other without, the bottle, the latter being furniſhed with a cock, which ſerves to draw off the quantity of water that is neceſſary for changing the temperature in the bottle. For a farther account of this inſtrument, together with the principle of its conſtruction and uſe, both in the comparative meaſure of the expanſions of bodies by heat, and the meaſure of their abſolute expanſion, and the experiments made with it, we muſt refer to an elaborate eſſay of M. De Luc on *Pyrometry*, &c. in the Phil. Tranſ. vol. lxviii. part i. art. 20. p 419.—546.

PYRONOMIA, a term uſed by the chemical writers to expreſs the art of regulating fire, ſo as to make it ſubſervient to all their proceſſes in a determinate degree.

PYROPHAGI. See Fire-*eaters*.

PYROPHORUS, formed of πυρ, *fire*, and φερω, *I bear*, in *Chemiſtry*, the name uſually given to that ſubſtance called by ſome *black phoſphorus*; a chemical preparation poſſeſſing the ſingular property of kindling ſpontaneouſly when expoſed to the air.

This ſubſtance was accidently diſcovered by M. Homberg, who prepared it of alum and human fæces. See Phosphorus *fæcalis*. See alſo M. Le Fevre's preparation, deſcribed under Phosphorus *of ſulphur*.

It was apprehended for a conſiderable time after the diſcovery, that human fæces were eſſential to the operation, till the youngeſt ſon of the great Lemeri found, that honey, ſugar, flour, and, indeed, any animal or vegetable matter, might be ſubſtituted inſtead of the human fæces; and ſince that time, M. De Suvigny has ſhewn that moſt vitriolic ſalts may be ſubſtituted for the alum; having added to the aluminous *pyrophorus* of Homberg two other claſſes of ſubſtances of this kind, viz. the metallic, or thoſe made with the three vitriols of iron, copper, and zinc; and the neutral, or thoſe compoſed of vitriolated tartar and Glauber's ſalt.

The aluminous *pyrophorus* may be made in the following manner. Take four or five parts of alum, and one part of wheat flour, or any animal or vegetable ſubſtance; calcine theſe together to a brown or blackiſh maſs: powder the maſs, and put it into a phial; ſtop it looſely with paper, and ſet it in a ſand heat, ſo as to make it continue glowing-hot for ſome time; after this remove the whole from the fire, ſet it to cool gradually, and finally ſtop the bottle very cloſe down.

The following proceſs is recommended by Macquer for this preparation. Let three parts of alum and one part of ſugar be mixed together. This mixture muſt be dried in an iron ſhovel over a moderate fire, till it be almoſt reduced to a blackiſh powder of coal; during which operation it muſt be ſtirred with an iron ſpatula. Any large maſſes muſt be bruiſed into powder, and then it muſt be put into a glaſs matraſs, the mouth of which is rather ſtrait than wide, and its length ſeven or eight inches. This matraſs is to be placed in a crucible, or rather earthen veſſel, large enough to contain the belly of the matraſs, with about a ſpace equal to the thickneſs of a finger all round it. The ſpace is to be filled with ſand, ſo that the matraſs ſhall not touch the earthen veſſel: the apparatus is then to be put in a furnace, and the whole to be made red-hot: the fire muſt be gradually applied, that any oily or fuliginous matter may be expelled. After which, when the matraſs is made red-hot, ſulphureous vapours exhale: this degree of heat is to be continued till a truly ſulphureous flame, which appears at the end of the operation, has continued nearly a quarter of an hour: the fire is then to be extinguiſhed, and the matraſs to cool without taking it out of the crucible; and when it ceaſes to be red-hot, it muſt be ſtopped with a cork. Before the matraſs is perfectly cold, it muſt be taken out of the crucible; and the powder it contains muſt be poured into a very dry glaſs phial, which muſt be well cloſed with a glaſs ſtopper. If we would preſerve this *pyrophorus* a long time, the bottle containing it muſt be opened as ſeldom as poſſible. Sometimes it kindles while it is poured into the glaſs phial, but it may be then extinguiſhed by cloſing the phial expeditiouſly.

When half a dram of this *pyrophorus* is put on a piece of paper and expoſed to air, it quickly kindles, becomes red like burning coals, emits a ſtrongly ſulphureous vapour, and burns the paper or other combuſtible body which ſupports it.

The ſpontaneous accenſion of the aluminous *pyrophorus*, on its being expoſed to the air, has been a ſubject of conſiderable diſcuſſion among chemiſts and philoſophers; the lateſt and ableſt of whom have adopted the hypotheſis propoſed by M. De Suvigny, in the Memoires de Mathematique et de Phyſique, tom. iii. To explain this curious appearance, M. De Suvigny juſtly obſerves, that the vitriolic acid in the alum, during the calcination in the phial, leaves its earthy baſis, and unites with the phlogiſton in the coal. By its union with this inflammable matter, a part of it is undoubtedly rendered volatile, and exhales partly under the form of volatile vitriolic acid, and partly in that of a blue ſulphureous flame; while another part of it combines likewiſe with the phlogiſton forming a real ſulphur, or an earthy hepar ſulphuris; in which the ſulphur is protected from the fire by the earth with which it is combined, and the particles of which remain every where intermixed with thoſe of the powder. Thus far (ſays Mr. Bewly, an excellent chemiſt and philoſopher) M. De Suvigny is ſupported by the appearances, and by a juſt chemical analyſis of the powder: but he proceeds farther, and ſuppoſes that, at the end of the proceſs, a part of the vitriolic acid is left in a diſengaged, or uncombined ſtate, and highly concentrated. In this ſtate it is well known that this acid attracts moiſture, and at the ſame time generates a conſiderable degree of heat. When the *pyrophorus*, therefore, is expoſed to the air, he again ſuppoſes that this diſengaged and concentrated acid ſuddenly attracts the watery particles floating in the atmoſphere, and, by the heat thus generated, ſets fire to the ſulphur and other inflammable matter contained in the powder. This hypotheſis he has endeavoured to eſtabliſh by the following obſervations; that the *pyrophorus*, as he apprehends, can be made only with ſubſtances fit for producing ſulphur, or with ſulphur itſelf:—that no *pyrophorus* will be produced, if the mixture be calcined by two long or too violent a fire; becauſe then the whole vitriolic acid can be combined into perfect ſulphur, and conſequently is engaged, and not in a proper ſtate to attract the moiſture of the air; or elſe if it does not combine into ſulphur, being half diſengaged from its baſis, it is driven off by the violence or long continuance of the fire; and, conſequently, after this complete calcination, no acid remains partly diſengaged, as it ought to be, that it might unite with the water with ſufficient activity:—that when the *pyrophorus* is very ſlowly moiſtened, as when it is kept in a bottle not well cloſed, it does not kindle, becauſe ſufficient heat is not produced by this ſlow and gradual attraction of water; it is alſo ſpoiled and rendered incapable of kindling, when expoſed to the open air; becauſe its acid becomes then ſaturated, or nearly ſaturated with moiſture, and cannot, therefore, unite with that of the air with ſufficient activity:—that a *pyrophorus*, thus ſpoiled by expoſure to moiſture, may be reſtored to its peculiar properties by making it again red-hot in a matraſs; ſince by this calcination its partly-diſengaged acid is again concentrated, and reſumes all its force of combining with water;—and, laſtly, that the inflammation of the *pyrophorus* is accelerated by placing it upon a paper a little wetted, or by breathing upon it; becauſe the acid then attracts the moiſture more haſtily, and conſequently with more heat.

M. De Suvigny extends the ſame reaſoning to the ſeveral other *pyrophori* which he diſcovered, ſimilar to that of alum; particularly to thoſe which are made by ſubſtituting vitriolated tartar, Glauber's ſalt, and other vitriolic ſalts with metallic, earthy, or alkaline baſes, in the room of alum. Mr. Bewly, has lately examined this hypotheſis with his uſual acuteneſs and accuracy; and from numerous well-conducted experiments he is led to conclude, that *pyrophori* of all the above mentioned claſſes may be prepared, differing from them in no other particular, except that they contain no vitriolic acid, and which nevertheleſs kindle as readily, on being expoſed to the air, as thoſe which have been impregnated with that principle. In order to ſhew that the preſence of vitriolic acid is not neceſſary to conſtitute the *pyrphorus* made with vitirolated tartar, he added to a quantity of this tartar more than an equal weight of powdered charcoal, and calcined the mixture a long time, in a red heat, in an open crucible; frequently ſtirring the powder, in order to expel from it as much of the vitriolic acid as poſſible; the calcination was alſo ſometimes repeated with freſh charcoal: and yet on heating the ſalt, thus deprived of a conſiderable part of its acid, with charcoal, in a crucible or tobacco-pipe, in the manner which we ſhall here ſubjoin, he obſerved no diminution in its quality of producing a *pyrophorus*.

Mr. Bewly, in ſeveral of his experiments, made uſe of the bowl of a tobacco-pipe, in which he combined the materials, which he wiſhed to examine in ſmall quantities, and in an expeditious manner; preſſing them down ſlightly, ſo as to fill half or three-fourths of the bowl, and filling the remainder of it with fine ſand. This is kept in a red heat twenty minutes or half an hour; or it may continue there two hours longer, if the operator pleaſes, without any injury to the *pyrophorus*. The pipe being taken out of the fire, the matter is knocked out of it as ſoon as it becomes cool, and generally, pretty ſoon afterwards, takes fire ſpontaneouſly. Thus he formed his *pyrophorus* with a mixture conſiſting of two parts of alum, previouſly calcined in a red heat; and of powdered charcoal and ſalt of tartar each one part.

In another experiment, having added ſucceſſively various and increaſing quantities of fixed alkali to the ſalt heated as above, till the vitriolic acid contained in the mixture might be conſidered nearly as an evaneſcent quantity, a *pyrophorus* was ſtill produced on calcining it with charcoal as before. He alſo mixed equal parts of ſalt of tartar, and vegetable or animal coal, or ſometimes three parts of the former with two of the latter, and calcined them in the uſual manner; and this compoſition, on being expoſed to the air, generally kindled in half a minute or a minute; though, as it contained no ſulphur, it did not burn with ſo much vivacity as the vitriolic *pyrophori*. This, which Mr. Bewly calls the alkaline *pyrophorus*, differs in no circumſtance from M. De Suvigny's neutral *pyrophori*, except in its not containing that principle to which he aſcribes their accenſion. However, leſt it might be ſuſpected that the ſalt of tartar which he employed might accidentally contain vitriolated tartar, or vitriolic acid, he repeated the experiment with tartar calcined by himſelf, as well as with nitre fixed or alkaliſed by deflagration with charcoal, and with iron filings; and in all theſe caſes with the ſame reſult. By diverſifying in a like manner M. De Suvigny's experiments on the metallic *pyrophori*, Mr. Bewly found that none of the three vitriols, heated with charcoal alone, in his uſual method, could produce a *pyrophorus*. And thus he found that the addition of an alkaline ſalt to the compoſition, which was a part of M. De Suvigny's proceſs, was eſſential to its ſucceſs.

Treating in the uſual manner equal parts of calcined green vitriol and charcoal, the powder which contained no ſulphur nor hepar ſulphuris, did not acquire any of the properties of a *phyrophorus*. The vitriolic acid ſeemed to have been entirely diſſipated; having no baſe to detain it, when diſlodged from the metallic earth. The charcoal and calx of iron, left in this proceſs, were calcined again, together with ſome ſalt of tartar; and a *pyrophorus* was produced, which exhibited indications of its containing a ſcarce perceptible portion of hepar ſulphuris. Thirty grains of crocus martis aſtringens were calcined with fifteen grains of charcoal, and the ſame quantity of ſalt of tartar; and the mixture burnt ſpontaneouſly, though it contained no hepar ſulphuris, or vitriolic acid. Having by theſe experiments evinced that metallic *pyrophori* may be prepared without vitriolic acid, Mr. Bewly proceeded to form an aluminous *pyrophorus* of the ſame kind. For this purpoſe, he procured the earth of alum by a long and violent calcination; and examining a part of it, he found, by the uſual teſts; that it neither contained any ſulphur, hepar ſulphuris, nor alum undecompounded. This he conſidered as perfectly pure, though he afterwards found that it contained a ſmall quantity of vitriolated tartar: and yet it repeatedly furniſhed a *pyrophorus* as active as when alum itſelf is employed. From theſe and ſimilar experiments he infers, that the ſeveral kinds of *pyrophori* are not kindled by moiſture, attracted by the vitriolic acid, as M. De Suvigny has maintained: and his concluſion is farther confined by ſome experiments of Dr. Prieſtley, from which it appears, that they are kindled in dry, nitrous, and dephlogiſticated air.

M. Prouſt, cited by Mr. Bewly, deſcribes a variety of new *pyrophori*, which neither contain vitriolic acid, nor ſeem likely to owe their accenſion to the attraction of humidity from the air. Theſe principally conſiſt of a coaly matter ſimply divided by metallic or other earths; ſuch are the ſediment left on the filter in preparing Goulard's extract, various combinations of tartar, or its acid, or the acetous acid, with metals, calcareous earth, &c.

Mr. Bewly, having evinced the inſufficiency of M. De Suvigny's theory, and diſcovered that the *pyrophori* are not kindled by moiſture, attracted (merely) by the vitriolic acid, directed his attention to the nitrous acid, which Dr. Prieſtley has ſhewn to be a conſtituent part of atmoſpherical air, as the probable agent in the production of this phenomenon. The ſtrong affinity which this acid has with phlogiſton, and the heat, and even flame, which it is known to produce with certain inflammable matters, manifeſted that it was equal to the effect; and having excluded the vitriolic acid from having any eſſential concern in this operation, he ſuggeſts, either that the *pyrophorus* is kindled by moiſture attracted by ſome of the other ingredients which compoſe it; or that it has the power of decompounding atmoſpherical air, by ſuddenly attracting its nitrous acid, and thereby generating a heat ſufficient to kindle the phlogiſtic matter contained in it. This idea appeared plauſible, when he farther conſidered that Dr. Prieſtley produced the pureſt reſpirable air with this ſame acid combined with other principles; and that this as well as common air is diminiſhed, and probably in part decompounded, in a variety of phlogiſtic proceſſes. This ingenious writer concludes, upon the whole, from the experiments he hath made, that the *pyrophorus* ſeems to owe its ſingular property to its being a combination of earth or alkali with phlogiſton; the vitriolic acid, when preſent, only occaſionally increaſing or diminiſhing the effect, according to circumſtances. In the proceſs of calcination, the earth or alkaline principle is not merely mixed, but actually, though looſely, combined with the phlogiſtic principle of the coal; ſo that the *pyrophorus*, conſidering it in its moſt ſimple ſtate, is only a perfectly dry phlogiſticated alkali or earth. On theſe data, the phenomena may be explained in the two following methods; with reſpect particularly to the influence of moiſture and heat upon the *pyrophorus*. Suppoſing either the alkaline or earthy principles to have a greater affinity to water than to the phlogiſton with which either of them is united, they may, on being expoſed to a moiſt atmoſphere, attract the humidity, and therefore ſet the phlogiſtic principle at liberty; which may, in its turn, attract and be ignited by, the ſuppoſed aerial acid, its ſtrong affinity to which is well known:—or, if this hypotheſis be rejected, the inflammable matter may be kindled, merely in conſequence of the heat produced by the combination of the alkali, &c. with moiſture. See on the ſubject of this article, Chemical Dict. article *Pyrophorus*; and Prieſtley's Obſ. on Air, vol. iii. Appendix, p. 386, &c. vol. iv. Appendix, p. 479, &c.

PYROPHYLACIA, a term uſed by Kircher and ſome others to expreſs thoſe magazines of fire which are placed in the cavities of mountains and other hollows of the earth, and ſerve to ſupply the ſeveral volcanoes in the different parts of the world. See VOLCANO.

PYROSCOPIA, formed of ϖυρ, *fire*, and σκοπεω, *I conſider*, among the Greeks, a kind of divination, being the ſame with PYROMANCY and igniſpicium.

PYROSIS, a word uſed to expreſs an intenſe heat and redneſs in the face, ſuch as that of perſons who travel in extremely hot weather, and the like.

PYROTECHNY, Πυροτεχνια, formed from ϖυρ, *fire*, and τεχνη, *art*, the art of fire, or a ſcience which teaches the management and application of fire in ſeveral operations.

Pyrotechny is of two kinds, military and chemical.

PYROTECHNY, *military*, is the doctrine of artificial fireworks, and fire-arms, teaching the ſtructure and uſe both of thoſe uſed in war for the attacking of fortifications, &c. as gunpowder, cannons, bombs, granadoes, carcaſſes, mines, fuſees, &c. and of thoſe made for amuſement-ſake, as rockets, ſtars, ſerpents, &c.

Some call *pyrotechny*, by the name *artillery*; though that word is uſually confined to the inſtruments uſed in war. Others chooſe to call it *pyrobology*, or rather *pyroballogy*, q. d. the art of miſſile fires, from the Greek ϖυρ, *fire*, and βαλλειν, *to caſt*, or *throw*.

Wolfius has reduced *pyrotechnia* into a kind of mixt mathematical art: indeed it will not allow of geometrical demonſtrations; but he brings it to tolerable rules and reaſons; whereas before it had uſed to be treated by authors at random, and without regard to any reaſons at all.

See the elements of *military pyrotechny*, under the ſeveral inſtruments and operations, CANNON, BOMB, ROCKET, GUNPOWDER, &c.

PYROTECHNY, *chemical*, is the art of managing and applying fire in diſtillations, calcinations, and other operations of chemiſtry.

Some reckon a third kind of *pyrotechnia*, viz. the art of fuſing, refining, and preparing metals.

PYROTECHNICAL *ſpunge*. See SPUNGE.

PYROTICS, Πυρωτικα, formed from ϖυρ, *fire*, in *Medicine*, cauſtics, or remedies, either actually or potentially hot; and which, accordingly, will burn the fleſh, and raiſe an eſchar.

PYROUET. See PIROUETTE.

PYRRHALA, in *Ornithology*, the name of a bird well known in England by the name of the BULLFINCH, and called by ſome authors *rubicilla*.

PYRRHICHA, Πυῤῥιχη, in *Antiquity*, a kind of exerciſe on horſeback; or a feigned combat, for the exerciſe of the cavalry.

It was thus called from its inventor Pyrrhicus, or Pyrrhus, in Cydonia, who firſt taught the Cretans to march in meaſure and cadence to battle, and to obſerve the pace of the Pyrrhic foot. Others derive the name from Pyrrhus, ſon of Achilles, who inſtituted this exerciſe at the obſequies of his father. Ariſtotle ſays, that it was Achilles himſelf who invented it.

The Romans alſo called it *ludus Trojanus*, the Trojan game; and Aulus Gellius, *decurſus*. It is doubtleſs this exerciſe that we ſee repreſented on medals, by two cavaliers in front, running with lances, and the word *decurſio* in the exergum.

PYRRHICHIUS, Πυῤῥιχιος, in the Greek and Latin *Poetry*, a foot conſiſting of two ſyllables, both ſhort; as *deus*.

Among the ancients this foot is alſo called *periambus*; by others *hegemona*.

PYRRHOCORNIX, in *Ornithology*, a name given by authors to a bird of the crow-kind, deſcribed by ſome authors as a diſtinct ſpecies; but Mr. Ray, and other very judicious naturaliſts, eſteem it the ſame with the CORACIAS, or Corniſh chough, or only differing in age by other accidents.

PYRRHONIANS, PYRRHONEANS, or PYRRHONISTS, a ſect of ancient philoſophers, ſo called from their founder Pyrrho, a Greek philoſopher, born at Elis, in Peloponneſus, who was a diſciple of Anaxarchus, and accompanied him as far as India. In this journey he followed Alexander the Great; and hence we may know in what time he flouriſhed.

The diſtinguiſhing character of this philoſopher was, that he profeſſed to doubt of every thing, maintaining that men only judge of truth and falſhood from appearances, which deceive. On this principle he kept himſelf in continual ſuſpenſion of mind, never determining on any thing; to avoid the inconveniences of error and falſe judgments.

He found in all things (ſays Bayle) reaſons to affirm and to deny; and therefore he ſuſpended his aſſent after he had well examined the arguments *pro* and *con*, and reduced all his concluſions to a *non liquet*, let the matter be farther enquired into. Hence it is (ſays he) that he ſought truth as long as he lived, but he ſo contrived the matter, as never to grant that he had found it. Though he is not the inventor of that method of philoſophizing, yet it goes by his name. The art of diſputing about every thing, without doing any thing elſe but ſuſpending one's judgment, is called *Pyrrhoniſm*, or SCEPTICISM.

Thoſe now diſtinguiſhed by the name of *Pyrrhonians*, or SCEPTICS, are perſons who, from the great number of things that are dark and obſcure, and from the averſion they bear to popular credulity, maintain, that there is nothing certain in the world.

The truth is, *Pyrrhoniſm* has ſome foundation in nature: we do not judge of things from their real eſſences, but from their relations to ourſelves. Moſt of our ideas we receive by means of our ſenſes; but our ſenſes are not given us to judge of the eſſences, but of the relations of things to themſelves; i. e. how they may affect us ſo as to do us good or harm.

Thus, e. gr. our eyes do not give us the real magnitudes of objects, but their relative ones only.

The ACADEMICS differed from the *Pyrrhonians*, in that they owned there were ſome things more like or more near akin to truth than others, which the *Pyrrhonians* peremptorily denied.

Le Clerc obſerves, that the *Pyrrhonians*, in affirming that there is nothing certain, were the moſt aſſuming and deciſive of all philoſophers; ſince they muſt firſt have examined all things, to be able to determine preciſely that all things are uncertain.

It may be added, that the very principle of the *Pyrrhonians* deſtroys itſelf; for if there be nothing certain, then muſt that dogma itſelf be precarious; and if no one thing be more probable, or liker to truth than another, why ſhall the principle of the *Pyrrhonians* be believed preferably to the oppoſite one? ſince itſelf is come at in the ſame way as our other knowledge.

PYROPŒCILOS, in the *Natnral Hiſtory of the Ancients*, the name by which they call the granite of Arabia, commonly known to this day under the name of the *Oriental granite*.

The name is derived from the Greek ϖυρ, *fire*, or *fire-coloured*, and ϖοικιλος, *ſpotted*; and the ancients having uſed the epithet fiery to yellow, as well as red, ſome have imagined the granite muſt be a yellow ſtone; but it is evident that red is the colour meant by it here.

PYRSEPHORUS, Πυρσηφορος, in the Athenian feſtival, Hephæſtia, the ſame with LAMPADEPHORUS.

PYRUS, *pear-tree*, in *Botany*, a genus of the *icoſandria pentagynia* claſs. Its characters are, that the flower hath a permanent impalement of one leaf, which is concave, and divided into five parts at the top; it hath five roundiſh concave petals, which are inſerted in the empalement, and about twenty awl-ſhaped ſtamina, ſhorter than the petals, inſerted in the empalement, and terminated by ſingle ſummits; the germen is ſituated under the flower, ſupporting three or four ſtyles, crowned by ſingle ſtigmas, and afterwards becomes a pyramidal fleſhy fruit, indented at the top, but produced at the baſe, having five membranaceous cells, each containing one ſmooth oblong ſeed, pointed at the baſe. Miller.

Linnæus has joined to this genus the *malus* and cydonia of Tournefort. See APPLE, PEAR, and QUINCE.

PYTHAGORAS's *table*. See TABLE.

PYTHAGOREAN, or PYTHAGORIC *ſyſtem*, among the *Ancients*, was the ſame with the Copernican ſyſtem among the moderns. See SYSTEM.

It was thus called, as having been maintained and cultivated by Pythagoras, and his followers; not that it was invented by him, for it was much older.

PYTHAGOREANS, a ſect of ancient philoſophers, who adhered to the doctrine of Pythagoras.

Pythagoras, the founder of this ſect, was of Samos, the ſon of a lapidary, and a pupil of Pherecydes, and flouriſhed (ſays Bayle) about five hundred years before Chriſt, in the time of Tarquin, the laſt king of Rome, and not in Numa's time, as many authors have ſuppoſed. See Cicero Tuſcul. Queſt. lib. iv. cap. 1.

This ſect was alſo called the *Italic ſect*, or *Italic ſchool*, becauſe Pythagoras, after travelling into Egypt, Chaldea, and even into the Indies, to inform his underſtanding, returning home to his own country, and there unable to bear the tyranny of Polycrates, or Syloſon, retired into the eaſtern part of Itally, then called the Greater Greece, and there taught and informed his ſect.

He is held to have excelled in every part of ſcience: Laertius ſays, among the Chaldees and Hebrews he learnt divination, and the interpreting of dreams; and that in Egypt he learnt all the myſteries of the prieſts, and the whole ſyſtem of ſymbolical knowledge, with all their theology. Porphyry adds, that he learned the mathematical ſciences in his travels; geometry from the Egyptians, the doctrine of numbers and proportions from the Phœnicians, and aſtronomy from the Chaldeans; morality and theology he chiefly learnt from the magi.

He was the firſt who aſſumed the modeſt title *philoſopher*, or *lover of wiſdom*; thoſe who excelled in the knowledge of nature, and made themſelves conſpicuous by an exemplary life, till his time having borne the arrogant appellation σοφοι, *ſages*.

Iamblichus obſerves, that in Phœnicia he converſed with the prophets and philoſophers, the ſucceſſors of Mochus the Phyſiologiſt; which Mochus, Selden, and ſome others, will have to be Moſes.

His ſchool in Italy was at Crotona, where he is ſaid to have been attended by no leſs than ſix hundred ſcholars. His houſe was called the temple of Ceres, and the ſtreet where it ſtood, the Muſeum.

Out of this ſchool proceeded the greateſt philoſophers and legiſlators, Zaleucus, Charondas, Archytas. Porphry ſays, as ſoon as he arrived in Italy, he had an auditory of two thouſand people, to whom he explained the laws of nature, reaſon, and juſtice.

He endeavoured to aſſuage the paſſions of the mind with verſes and numbers; and made a practice of compoſing his mind every morning by his harp, frequently ſinging the pæans of Thales. Exerciſes of the body alſo made a conſiderable part of his diſcipline.

His ſchool became ſo popular, that whole cities and people committed their republics to the government of his ſcholars. At length, Porphyry adds, envy ſtirring up ſedition againſt them, they were oppreſſed; and, in time, their learning, which they ever kept ſecret, was loſt; except ſome difficult things learnt by rote by the croud of hearers; for Pythagoras never committed any thing to writing.

Beſide his public ſchool, Pythagoras had a college in his own houſe, which he called κονιοϐιον, *cænobium*: in this were two orders or claſſes of ſcholars, εξωτερικοι, *exoterici*, called alſo *auſcultantes*; and εσωτερικοι, *intrinſeci*. The former were novices and probationers, who were kept under a long examen, and had even a quinquennial ſilence impoſed, to teach them modeſty and attention, according to Apuleius; or, according to Clemens Alexandrinus, to teach them to abſtract their minds from ſenſible objects, and inure them to the pure contemplation of the Deity.

The latter were called *genuini*, *perfecti*, *mathematici*, and *Pythagoreans*, by way of eminence. Theſe alone were let into the arcana and depths of the real Pythagoric diſcipline.

Clemens obſerves, that theſe orders correſponded very exactly to thoſe among the Hebrews; for in the ſchools of the prophets there were two claſſes, viz. the ſons of the prophets, who were the ſcholars; and the doctors or maſters, who were alſo called *perfecti*: and among the Levites, the novices or tyros, who had their quiquennial exerciſes, by way of preparation. Laſtly, even among the proſelytes there were two orders; *exoterici*, or proſelytes of the gate; and *intrinſeci* or *perfecti*, proſelytes of the covenant. He adds, it is highly probable, that Pythagoras himſelf had been a proſelyte of the gate, if not of the covenant.

Gale endeavours to prove, that Pythagoras borrowed his philoſophy from that of the Jews; to this end producing the authorities of many of the fathers, and ancient authors; and even pointing out the tracks and footſteps of Moſes in ſeveral parts of Pythagoras's doctrine.

Pythagoras taught, that God is one; that he is a moſt ſimple, incorruptible, and inviſible being; and therefore only to be worſhipped with a pure mind, with the ſimpleſt rites, and thoſe preſcribed by himſelf. Laertius obſerves, that he made unity the principle of all things; hence aroſe duality, &c.

In his converſation with the Egyptians, he learnt abundance of ſecrets about numbers; to which he attributed ſo much, that he even attempted to explain all things in nature by numbers. In effect, it was a common opinion of the ancient philoſophers, that the ſpecies of things have to each other the nature and relation of numbers; and that the univerſe, and all things therein, were produced according to certain numbers, inherent in the Creator's mind.

Hence Porphyry obſerves, the *Pythagoreans* ſtudied the doctrine of numbers with great attention; ſince the incorporeal forms, and firſt principles of things, i. e. the divine ideas, could not be delivered in words, they had recourſe to demonſtration by numbers; and thus called the common reaſon and cauſe of unity, identity, and equality, by the name *one*.

Pythagoras farther taught, that there is a relation or kinſhip between the gods and man; and therefore that the gods take care of man. Which, Clemens Alexandrinus ſays, is apparently borrowed from the doctrine of Providence.

It is ſaid, that Pythagoras conſidering God as the mover of the univerſe, and the ſoul of the world, affirmed, that our ſouls are portions of God. Cicero De Nat. Deorum, lib. i. cap. 11.

Pythagoras alſo aſſerted a METEMPSYCHOSIS, or tranſmigration of ſouls; and therefore the immortality of the ſoul. He alſo taught, that virtue is harmony, health, and every good thing; and that God, and therefore all things, conſiſt of harmony.

With reſpect to the end of our actions and ſtudies, he taught, that the ſtudy of philoſophy ſhould tend to make men like God; and that the acquiſition of truth was the only way to attain to the likeneſs of God; but that truth cannot be known, unleſs it be enquired after with a purified ſoul, and ſuch as has overcome the paſſions of the body. And his followers are ſaid to have taught, that men become perfect three ways. 1. By converſing with the gods; for, during that commerce, they abſtain from every evil action, and become, as far as poſſible, like the gods. 2. By doing good to others; for it is God's property; it is an imitation of God. 3. By going out of this life. The beſt preſents which heaven gave to men, according to Pythagoras, are to ſpeak truth, and to do good offices: thoſe two things, ſaid he, reſemble the works of God. See Bayle, art. *Pythagoras*.

PYTHAGORIC *theorem*, or *propoſition*, is the 47th of the firſt book of Euclid. See TRIANGLE and HYPOTHENUSE.

PYTHAGORIC *tetractys*. See TETRACTYS.

PYTHAGORIC *abacus*. See ABACUS and TABLE.

PYTHIA, or PYTHIAN, in *Antiquity*, the prieſteſs of Apollo, by whom he delivered oracles. See DELPHOS.

She was thus called from the god himſelf, who was entitled *Apollo Pythius*, from his ſlaying the ſerpent Python; or, as others will have it, απο τȣ ϖυθεσθαι, becauſe Apollo, the ſun, is the cauſe of rottenneſs; or becauſe the carcaſe of Python was left there to putrefy; or, according to others, from ϖυνθανομαι, *I enquire*, becauſe people went to hear and conſult his oracles.

This prieſtleſs was to be a pure virgin. She ſat on the covercle, or lid, of a brazen veſſel, mounted on a tripod; before ſhe aſcended which, ſhe uſed to waſh her whole body, and eſpecially her hair, in Caſtalio, a fountain at the foot of Parnaſſus, where the poets, men inſpired by the ſame deity, uſed to waſh, and drink; and thence, after ſhaking the laurel-tree that grew by it, and ſometimes eating the leaves, which were ſuppoſed to conduce to inſpiration, and were ſucceeded by a violent enthuſiaſm, ſhe delivered her oracles, or rather explained thoſe of the god; i. e. ſhe rehearſed a few ambiguous and obſcure verſes, which were taken for oracles.

Diodorus Siculus (lib. xvi.) informs us, that theſe prieſteſſes were at firſt virgins, but that after one of them was deflowered by Echecrates, a Theſſalian, choice was made of women above fifty years of age; that ſo they might either be ſecured from the attempts of luſt, or if they ſhould at any time be forced to the violation of their chaſtity, having paſſed the time of child-bearing, they might remain undiſcovered, and not bring the oracles or religion into contempt: nevertheleſs they wore the habit of virgins, thereby to ſignify their purity and virginal modeſty.

All the *Pythiæ* did not ſeem to have had the ſame talent at poetry, or to have memory enough to retain their leſſon. Plutarch and Strabo make mention of poets, who were kept in pay, as interpreters of Jupiter, &c.

PYTHIA, or PYTHIAN *games*, were ſolemn games inſtituted in honour of Apollo, and in memory of his killing the ſerpent Python with his arrows.

The *Pythia* were celebrated in Macedonia, in a place called *Pythium*. They were next in fame after the Olympic games, but were more ancient than they; for it is pretended they were inſtituted immediately after the de-ſeat of the ſerpent. The *Pythia* were alſo celebrated at Delphi; and they were theſe that were the moſt renowned.

The *Pythian* games, according to Pauſanias, were firſt inſtituted by Jaſon or Diomedes, king of Etolia, and reſtored by Eurylochus of Theſſaly, in the third year of the 48th Olympiad, or the year of the world 3364, and 584 years before the birth of Chriſt; from which time the Greeks reckoned ſometimes by *Pythiades*, as they had been accuſtomed to do by Olympiads. They were at firſt celebrated every eight years, but afterwards every four years, in the third year of each Olympiad; ſo that the *Pythiade*, which was a term of four years, ſerved as an epocha for the inhabitants of Delphi. At firſt they conſiſted of poetical and muſical conteſts, but in proceſs of time they conſiſted of the other exerciſes of the PANCRATIUM, which were performed in the Olympic games. The victors were crowned with branches of laurel; though, at the firſt inſtitution, the crown was of beech-leaves. The Romans are ſaid to have adopted theſe games in the year U. C. 642, and to have given them the name of APOLLINARES *ludi*.

A part of Pindar's poems was compoſed in praiſe of the victors in [illegible] *Pythian* games.

The critics are divided on the ſubject of the ſerpent Python. The poets ſay, that Juno made uſe of it to perſecute Latona, and prevent her bringing into the world Apollo and Diana, whom ſhe had conceived of Jupiter; and that it was for this reaſon that Apollo afterwards killed it.

Strabo ſays, it was no other than a famous villain, one Draco, that Apollo freed the world from. Dickinſon, in his Delphi Phœnicizantes, maintains the Python of the Greeks to be the Typhon of the Phœnicians; and the Typhon of the Phœnicians to be the Og of Scripture; and Apollo, who ſlew it, he will have to be Joſhua.

PYULCUM, a word uſed by the ancients to expreſs an inſtrument uſed in their times to draw out the pus from the bottom of deep ſinuſes, probably a ſort of canula.

PYXIS *nautica*, in *Navigation*, the ſeaman's COMPASS.

The word ϖυξις literally ſignifies a *box*.

PYXIS, among *Anatomiſts*, is alſo uſed for the cavity of the hip-bone. See ACETABULUM.

END OF THE THIRD VOLUME.

MVSEVM
BRITAN
NICVM